EXHIBIT M

FINANCIAL ANALYSIS
OAR 345-021-0010(1)(m)

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ATTACHMENTS

M.1 INTRODUCTION

OAR 345-021-0010(1)(m) *Information about the applicant's financial capability, providing evidence to support a finding by the Council as required by OAR 345-022-0050(2). Nothing in this subsection shall require the disclosure of information or records protected from public disclosure by any provision of state or federal law. The applicant shall include:*

Response: See sections M.2 through M.4.

M.2 OPINION OF LEGAL COUNSEL

OAR 345-021-0010(1)(m)(A) *An opinion or opinions from legal counsel stating that, to counsel's best knowledge, the applicant has the legal authority to construct and operate the facility without violating its bond indenture provisions, articles of incorporation, common stock covenants, or similar agreements;*

Response: Attachment M-1 is an opinion from Toan Nguyen, in-house legal counsel for Leaning Juniper Wind Power II, LLC (the Applicant), conforming to the requirements of the rule.

M.3 BOND, SECURITY, OR OTHER FINANCIAL INSTRUMENT

OAR 345-021-0010(1)(m)(B) *The type and amount of the applicant's proposed bond or letter of credit to meet the requirements of OAR 345-022-0050; and*

Response:

The Applicant will submit, to the state of Oregon through the Council, before Leaning Juniper II Wind Power Facility (Facility) construction begins, a bond or bonds or letter(s) of credit in a form satisfactory to the Council, in the amount of $697,126 for Leaning Juniper II North and $1,161,576 for Leaning Juniper II South. The Applicant may present two bonds or letters of credit, one for each of the two Facility components, in order to provide separate decommissioning security. This security will assure that adequate funds will be available to retire the Facility and restore the site to a useful, nonhazardous condition (please see Exhibit W for a calculation of the site restoration costs). The bond(s) or letter(s) of credit will remain in effect until the Facility is retired, and will be inflation-adjusted on an annual basis according to the Gross Domestic Product Implicit Price Deflator Index.

M.4 EVIDENCE OF REASONABLE LIKELIHOOD OF OBTAINING SECURITY

OAR 345-021-0010(1)(m)(C) *Evidence that the applicant has a reasonable likelihood of obtaining the proposed bond or letter of credit in the amount proposed in paragraph (B), before beginning construction of the facility.*

Response: The Applicant is in the process of obtaining a letter from Safeco, or another similar institution, demonstrating the reasonable likelihood it will be able to provide one or more bonds in an amount equal to or greater than that proposed in section M.3. The

Applicant understands that the Council will require this evidence before issuing the Site Certificate, and plans to provide this letter in the near future.

ATTACHMENT M-1

Legal Opinion on Authority to Construct

PPM Energy
A ScottishPower Company

Please Reply To:

Toan-Hao B. Nguyen, Legal Counsel
Direct Dial (503) 241-3204
Fax (503) 796-6904

January 11, 2006

Oregon Department of Energy
625 Marion Street, N.E.
Salem, Oregon 97310

Re: Application of Leaning Juniper Wind Power II, LLC for Site Certificate

Dear Ladies and Gentleman

I am an in house attorney for Leaning Juniper Wind Power II, LLC, an Oregon limited liability company (the "Applicant"), and have also acted as counsel to the Applicant.

In that connection, I have examined originals or copiers certified or otherwise identified to my satisfaction of the books and records of Applicant and such other documents, limited liability company records, certificates of public officials and other instruments regarding the Applicant as I have deemed necessary and appropriate for the purposes of this opinion.

In rendering this opinion expressed below, I have assumed (i) the authenticity of all documents submitted to me as originals and (ii) the conformity to original documents of all documents submitted to me as copies. As to factual matters, I have relied to the extent deemed proper, upon statements and certifications of officers and manager of the Applicant.

Based upon the foregoing, to the best of my knowledge, I am of the opinion that, subject to the Applicant's meeting all applicable federal, state and local laws (including all rules and regulations promulgated thereunder) the Applicant has the legal authority to construct and operate the up to 99.5 MW name-plate capacity wind generation facility and associated facilities located in the Gilliam County, Oregon (the "Project") that the Applicant proposes in its Applicant for Site Certificate to be filed with the Oregon Energy Facility Siting Council and in connection with which this opinion is rendered, without violating articles of organization covenants or similar agreements.

I am a member of the bar of the states of California, Oregon, and Washington and do not hold myself out as an expert in, and do not express any opinion with respect to, the law of any jurisdiction other than the law of the states of California, Oregon, and Washington.

PPM Energy
A ScottishPower Company

The foregoing opinion is limited solely to whether the Applicant has the authority under its operating agreements to construct, own and operate the Project. I express no opinion as to the applicability of any federal, state or local laws (including all rules and regulations promulgated thereunder) to such construction and operation or as to the effects of the foregoing laws on such construction and operation.

Please contact me if you have any additional questions regarding this matter.

Very truly yours,

PPM ENERGY, INC.

Toan Nguyen

Toan-Hao B. Nguyen
Legal Counsel

EXHIBIT N

NONGENERATING FACILITY INFORMATION
OAR 345-021-0010(1)(n)

Exhibit N requires information about a nongenerating facility. Exhibit N is not required for this application because Leaning Juniper Wind Power II, LLC (the Applicant) is not proposing to construct a nongenerating energy facility.

EXHIBIT O

WATER RESOURCES
OAR 345-021-0010(1)(o)

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O.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

OAR 345-021-0010(1)(o) *Information about the water requirements the applicant anticipates for construction and operation of the proposed facility. If the applicant has submitted any permit applications to the Office, as described in OAR 345-021-0000(4), that contain this information, the applicant may copy relevant sections of those documents into this exhibit or include in this exhibit cross-references to the relevant sections of those documents. The applicant shall include:*

Response: The following description identifies the sources of water to be used, the nature of the water use by the Facility, and steps taken to minimize consumptive use.

O.2 SOURCES OF WATER

OAR 345-021-0010(1)(o)(A) *A description of each source of water and the applicant's estimate of the amount of water the facility will need from each source under annual average and worst-case conditions;*

Response: During Facility construction, water will be trucked in from offsite for dust control, concrete generation, and other construction uses. During Facility operation, a well to be located near the proposed Facility Operations and Maintenance (O&M) building(s) will provide water and produce less than 5,000 gallons per day.

O.2.1 Leaning Juniper II North

Total water use is expected to be approximately 11 million gallons during the construction period for concrete mixing and road dust control, as shown in Table O-1.

The majority of the water required for Leaning Juniper II North will be used to control dust and maintain compaction on roads. An estimated 10 million gallons of water will be used during the construction period for road watering, for an average of approximately 86,500 gallons of water applied daily to roads and construction areas. However, the amount of water applied daily is highly dependent on weather and varies between construction periods. The estimate included in Table O-1 is based on construction of the Klondike II Wind Project in Sherman County, Oregon. On Klondike II, the construction contractor used 120,000 gallons of water per day during road construction, 80,000 gallons per day during foundation construction, and 50,000 gallons per day during erection of turbines.

An additional 330,000 to 657,510 gallons of water will be combined with 11,000 to 21,917 cubic yards of concrete to construct the 31 to 40 concrete foundations. If the 3.0-MW turbine is used, approximately 657,510 gallons of water will be combined with approximately 21,917 cubic yards of concrete based on construction of 31 of the larger turbines and the 80-foot-wide foundation. For each 3.0-MW turbine, approximately 21,210 gallons of water will be mixed with approximately 707 cubic yards of concrete to form the turbine foundation.

If the 1.5-MW turbine is used, approximately 330,000 gallons of water will be mixed with approximately 11,000 cubic yards of concrete based on construction of 40 of the smaller foundations. For each 1.5-MW turbine, approximately 8,250 gallons of water will be mixed with approximately 275 cubic yards of concrete to form the turbine foundation.

Table O-1. Water Use During Construction of Leaning Juniper II North Based on 40 GE 1.5-MW Turbines and 31 Vestas 3.0-MW Turbines

Material	Foundations	Material Per Foundation	Total	Ultimate Disposition
Water Use for Concrete Mixing				
Concrete for foundations	31 to 40	275 to 707 cubic yards of concrete per foundation	11,000 to 21,917 cubic yards of concrete	Incorporated into turbine foundation
Water for concrete mixing (30 gallons water per cubic yard of concrete)	31 to 40	8,250 to 21,210 gallons of water per foundation	330,000 to 657,510 gallons of water	Incorporated into concrete
Ranges are provided based on construction of 40 GE 1.5-MW turbines or 31 Vestas 3.0-MW turbines.				
Water Use for Dust Control and Road Compaction				
Material	**Days**	**Water Use Gallons/ Day**	**Total Water Use**	**Ultimate Disposition**
Road watering during road construction	45	120,000 gallons/day	5,400,000 gallons	Absorbed or evaporated
Road watering during foundation construction	35	80,000 gallons/day	2,800,000	
Road watering during erection	35	50,000 gallons/day	1,750,000	
Total Gallons	**Approximately 115 days**		**10,607,510**	
The above estimates assume very dry, dusty conditions requiring large quantities of water.				

For Leaning Juniper II North, water most likely will be obtained from the city of Arlington. The City has sufficient capacity to serve the Facility and has expressed its willingness to do so (see Attachment O-1). The City's water right is provided as Attachment O-2.

O.2.2 Leaning Juniper II South

Total water use for Leaning Juniper II South will be approximately 24 million gallons during the construction period for concrete and road dust control, as shown in Table O-2.

The majority of the water required for Leaning Juniper II will be used to control dust and maintain compaction on roads. An estimated 23 million gallons of water will be used during the construction period for road watering, for an average of approximately 85,400 gallons of water applied daily to roads and construction areas. However, as noted in Section O.2.1, the amount of water applied daily is highly dependent on weather.

An additional 767,250 to 1,315,020 gallons of water will be used in the concrete mixing for the turbine foundations. The amount of water required depends on the size of the turbine selected and its supporting foundation. If the 3.0-MW turbine is used, approximately 1,315,020 gallons of water will be combined with approximately 43,834 cubic yards of concrete based on construction of 62 of the larger turbines and the 80-foot-wide foundation. For each 3.0-MW turbine, approximately 21,210 gallons of water will be mixed with approximately 707 cubic yards of concrete to form the turbine foundation.

If the 1.5-MW turbine is used, approximately 767,250 gallons of water will be mixed with approximately 25,575 cubic yards of concrete based on construction of 93 of the smaller foundations. For each 1.5-MW turbine, approximately 8,250 gallons of water would be mixed with approximately 275 cubic yards of concrete to form the turbine foundation.

Table O-2. Water Use During Construction of Leaning Juniper II South Based on 93 GE 1.5-MW Turbines or 62 Vestas 3.0-MW Turbines

Material	Foundations	Material Per Foundation	Total	Ultimate Disposition
Water Use for Concrete Mixing				
Concrete for foundations; foundation size depends on turbine selected	62 to 93	275 to 707 cubic yards of concrete per foundation	25,575 to 43,834 cubic yards of concrete	Incorporated into turbine foundation
Water for concrete mixing (30 gallons water per cubic yard of concrete)	62 to 93	8,250 to 21,210 gallons of water per foundation	767,250 to 1,315,020 gallons of water	Incorporated into concrete
Ranges are provided based on construction of 93 GE 1.5-MW turbines or 62 Vestas 3.0-MW turbines.				
Water Use for Dust Control and Road Compaction				
Material	**Days**	**Gallons/ Day**	**Total Water Use**	**Ultimate Disposition**
Road watering during road construction	100	120,000 gallons/day	12,000,000 gallons	Absorbed or evaporated

Table O-2. Water Use During Construction of Leaning Juniper II South Based on 93 GE 1.5-MW Turbines or 62 Vestas 3.0-MW Turbines

Material	Foundations	Material Per Foundation	Total	Ultimate Disposition
Road watering during foundation construction	85	80,000 gallons/day	6,800,000	
Road watering during erection	85	50,000 gallons/day	4,250,000	
Total Gallons	**Approximately 270 days**		**24,365,020**	

The above estimates assume very dry, dusty conditions requiring large quantities of water.

For Leaning Juniper II South, water most likely will be obtained from the city of Arlington. The City has sufficient capacity to serve the Facility and has expressed its willingness to do so (see Attachment O-1). The City's water right is provided as Attachment O-2.

O.3 WATER RIGHTS

OAR 345-021-0010(1)(o)(B) *If a new water right is required, the approximate location of the points of diversion with the estimated quantity of water to be taken at each point;*

Response: No new water rights will be required for this Facility. Oregon law allows exempt industrial and commercial uses up to 5,000 gallons per day from groundwater wells without a permit (ORS 537.545(1)(f)). Exempt industrial uses include water for drinking, flushing toilets, and using sinks, as well as other industrial uses during construction and operation of the Energy Facility. No new water rights will be required for the water trucked to the site during construction because it will be provided by a contractor. It is anticipated that this water will originate from the city of Arlington.

O.4 WATER USE

OAR 345-021-0010(1)(o)(C) *A description of how the water is to be used*;

Response: See section O.2. During construction, water will be pumped into tanker trucks, driven to active construction areas, and used for concrete mixing, road compaction, and dust suppression. During operations, water will be used at the O&M building(s) for industrial applications such as drinking, flushing toilets, and using sinks. Blade washing is not anticipated, as blade washing is not recommended by the manufacturer. However, if the manufacturer were to recommend blade washing in the future, water would be obtained from the approved on-site well. If implemented at the Facility, blade washing would involve a small amount of water per turbine (estimated to be approximately 50 gallons per blade) and would require washing of less than 8 turbines per week.

O.5 WATER LOSSES

OAR 345-021-0010(1)(o)(D) *A description of each avenue of water loss or output from the facility site, the applicant's estimate of the amount of water in each avenue under annual average and worst-case conditions, and the final disposition of all wastewater, including stormwate*r.

Response: During construction, water loss will occur primarily through evaporation from wetted road surfaces and from drying concrete. Because of the dry conditions at the site and the relatively low rates of water use and application, it is expected that all water used during construction will be lost on or very near the site. No water used on the site will be discharged into wetlands, lakes, rivers, or streams. For the purposes of road compaction, dust suppression, and concrete mixing, water would be used at the rate needed to perform these functions, as described in Section O-2. During operations, water used for sanitary purposes will enter into the proposed septic system. Stormwater will infiltrate into the ground. If blade wash water were to be produced, this water would evaporate or infiltrate into the ground and would be discharged into wetlands, streams or other waterways.

As stated in Section O.2, based on recent construction of the Klondike II Wind Project in Sherman County, Oregon, the amount of water applied daily to roads and construction areas during Facility construction is highly dependent on weather and varies between construction phases. On Klondike II, the construction contractor used 120,000 gallons of water per day during road construction, 80,000 gallons per day during foundation construction, and 50,000 gallons per day during erection of turbines. During operations, water use would not exceed 5,000 gallons per day.

O.6 WATER BALANCE DIAGRAM

OAR 345-021-0010(1)(o)(E) *For operation, a water balance diagram, including the source of cooling water and the estimated consumptive use of cooling water, based on annual average conditions;*

Response: Water will not be used for cooling of any industrial processes. During the operations phase, the only water used will be for sanitary purposes at the O&M building(s). In this building, water used for drinking, flushing toilets, and handwashing will flow into the proposed septic system. No water balance diagram is provided in this Exhibit because of the simplicity of the proposed water use.

O.7 PERMITS OR TRANSFERS REQUIRED

OAR 345-021-0010(1)(o)(F) *If the facility does not require a groundwater permit, a surface water permit, or a water rights transfer, an explanation why no such permit or transfer is required for the construction and operation of the proposed facility;*

Response: No permit or transfer is required because the Applicant proposes to purchase water from the city of Arlington for construction, and will use an exempt well during Facility operation. No permit or transfer is required for the water to be trucked onto the site.

O.8 EVIDENCE IN SUPPORT OF PERMITS OR TRANSFERS

OAR 345-021-0010(1)(o)(G) *Evidence to support Council findings that the Water Resources Department should issue a groundwater or a surface water permit under ORS Chapter 537 or should approve a transfer of a water use under ORS Chapter 540, including a discussion and evaluation of all relevant factors, including those listed in ORS 537.153(2) and (3), 537.170(8) and OAR Chapter 690, divisions 15 and 310*;

Response: As noted in Section O.7, no permit or transfer from the Oregon Water Resources Department will be required for constructing or operating this Facility.

O.9 MEASURES TO REDUCE CONSUMPTIVE USE OF WATER

OAR 345-021-0010(1)(o)(H) *A discussion of any steps proposed by the applicant to reduce consumptive water use; and*

Response: Consumptive water use will be very low for this Facility compared to fossil-fuel fired electric plants. During construction, only enough water to suppress dust and cure concrete will be used. During operations, water use at the O&M building(s) will be minimal and building code requirements for water conservation, such as low-flow toilets, will be met.

O.10 OTHER MITIGATION MEASURES

OAR 345-021-0010(1)(o)(I) *A discussion of any mitigation steps proposed by the applicant to address the impact of the applicant's water use on affected resources*.

Response: One of the environmental benefits of wind generation is that the wind farms require very little water, particularly during their operations phase. Because construction and operation of the Facility will not create any significant impact on water resources, no mitigation is proposed.

ATTACHMENT O-1

City of Arlington Confirmation Letter

ATTACHMENT O-2

City of Arlington Water Right

September 21, 2006

Andrew O'Connell
PPM Energy, Inc.
1125 NW Couch, Suite 700
Portland, OR 97209

Dear Andrew,

This letter is to confirm our discussions that the City of Arlington can supply PPM Energy with approximately 35 million gallons for both Leaning Juniper II North and South (11 million for Leaning Juniper II North and 24 million for Leaning Juniper LJ II South for a total of 35 million). We look forward to working with PPM to complete the construction of the Leaning Juniper II project. Should you have any questions please call me at (541) 454-2740. Thanks very much.

Sincerely,

Tim Wetherell

Tim Wetherell
Public Works Director
City of Arlington

STATE OF OREGON

COUNTY OF GILLIAM

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

EMPRISE INC.
C/O NANCY PROCTOR
P.O. BOX 158
ARLINGTON, OREGON 97812

PHONE: (541) 545-2833

The specific limits and conditions of the use are listed below.

APPLICATION FILE NUMBER: G-14507

SOURCE OF WATER: A WELL, IN THE JOHN DAY RIVER BASIN

PURPOSE OR USE: QUASI-MUNICIPAL USE

MAXIMUM RATE: 0.668 CUBIC FOOT PER SECOND

PERIOD OF USE: YEAR ROUND

DATE OF PRIORITY: APRIL 17, 1997

POINT OF DIVERSION LOCATION: SE 1/4 SE 1/4, SECTION 28, T3N, R21E, W.M.; NORTH 25 DEGREES 11 MINUTES 22 SECONDS WEST 1140.2 FEET

THE PLACE OF USE IS LOCATED AS FOLLOWS:

SW 1/4 SW 1/4
SE 1/4 SW 1/4
NE 1/4 SE 1/4
SW 1/4 SE 1/4
SE 1/4 SE 1/4
SECTION 28
TOWNSHIP 3 NORTH, RANGE 21 EAST, W.M.

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

C. The Director may require the permittee to keep and maintain a record of the amount (volume) of water used and may require the permittee to report water use on a periodic schedule as established by the Director. In addition, the Director may require the permittee to report general water use information, the periods of water use and the place and nature of use of water under the permit. The Director may provide an opportunity for the permittee to submit alternative reporting procedures for review and approval.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The water user shall develop a plan to monitor and report the impact of water use under this permit on water levels within the aquifer that provides water to the permitted well(s). The plan shall be submitted to the Department within one year of the date the permit is issued and shall be subject to the approval of the Department. At a minimum, the plan shall include a program to periodically measure static water levels within the permitted well(s) or an adequate substitute such as water levels in nearby wells. The plan shall also stipulate a reference water level against which any water-level declines will be compared. If a well listed on this permit (or replacement well) displays a total static water-level decline of 25 or more feet over any period of years, as compared to the reference level, then the water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s). Such action shall be taken until the water level recovers to above the 25-foot decline level or until the Department determines, based on the water user's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or senior water rights. The water user shall in no instance allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit.

STANDARD CONDITIONS

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The Director finds that the proposed use(s) of water described by this permit, as conditioned, will not impair or be detrimental to the public interest.

Actual construction of the well shall begin within one year from permit issuance. Complete application of water to the use shall be made on or before October 1, 2002.

Issued January 28, 1998

Martha O. Pagel, Director
Water Resources Department

EXHIBIT P

FISH AND WILDLIFE HABITATS AND SPECIES

OAR 345-021-0010(1)(p)

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FIGURES

ATTACHMENTS

P.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The Leaning Juniper II Wind Power Facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW) and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

OAR 345-022-0060 *To issue a site certificate, the Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are consistent with the fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025 in effect as of September 1, 2000.*

Response:

Exhibit P provides evidence to support a finding by the Council, as required by OAR 345-022-0060. The evidence provided below demonstrates that this standard has been met.

The Oregon Department of Fish and Wildlife (ODFW) goals and standards to mitigate impacts to fish and wildlife habitat caused by land and water development actions are set forth in OAR 635-415-0000 through -0025, and summarized in Section P.2 of this Exhibit. The Council has also adopted these habitat mitigation rules, and this Exhibit addresses these rules.

The construction and operation of the Facility will have no significant impacts on any Category 1 habitat. The construction and operation of the Facility will avoid, minimize, and/or mitigate for impacts to habitat in Categories 2 through 6, consistent with the applicable provisions of OAR 635-415-0025 and implementing documents. Predicted avian and bat mortality from Facility operations is expected to be within the range documented at other wind generation facilities in the region and is not expected to cause significant impacts to sensitive or other wildlife species using the project site.

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

Response:

Sections P.3 through P.9 provide information about the fish and wildlife habitats and nonlisted species that may be affected by the Facility, in accordance with OAR 345-021-0010(1)(p). Studies discussed in Exhibit P were designed to assess use by all wildlife (for example, the avian use study), whether the species has special federal or state status. The avian use study is primarily discussed in Exhibit P. Exhibit Q addresses state and federal listed and candidate species.

P.2 FISH AND WILDLIFE HABITAT MITIGATION GOALS AND STANDARDS

The Energy Facility Siting Council (EFSC) uses the fish and wildlife habitat mitigation goals and standards described in OAR 635-415-0025 to prioritize fish and wildlife habitats. OAR 635-415-0025 defines six habitat categories and establishes mitigation goals and implementation standards for each category. The six habitat categories and corresponding mitigation goals and implementation standards are described below:

(1) ***"Habitat Category 1"*** *is irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population, or unique assemblage.*

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

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

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

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

Note: Clarification on Habitat Category 1 versus Category 2 for the Washington ground squirrel (WGS) was provided in a letter to FPL Energy (Stateline Wind Project) from ODFW. ODFW stated that potential WGS (State Endangered status) is Category 2, not Category 1, if the habitat is replaceable when considering the consequences of a proposed development action (FPLE, 2002a, Tab 14). A copy of this letter is provided as Attachment P-1.

(2) ***"Habitat Category 2"*** *is essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population, or unique assemblage.*

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

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

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

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

The fish and wildlife mitigation measures shall be implemented and completed either prior to or concurrent with the development action.

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

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

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

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

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

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

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

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

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

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

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

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

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

(5) ***"Habitat Category 5"*** *is habitat for fish and wildlife having high potential to become either essential or important habitat.*

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

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

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

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

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

(6) ***"Habitat Category 6"*** *is habitat that has low potential to become essential or important habitat for fish and wildlife.*

(a) The mitigation goal is to minimize impacts.

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

P.3 IDENTIFICATION AND DESCRIPTION OF FISH AND WILDLIFE HABITATS IN THE ANALYSIS AREA

OAR 345-021-0010(1)(p)(A) *Identification and description of all habitat within the analysis area, classified by the habitat categories as set forth in OAR 635-415-0025;*

Response:

All habitat types within a 1-mile buffer of the Leaning Juniper II South Facility lease boundary were delineated into broad habitat types in the fall of 2004, as shown in Figure P-1 and described in the Wildlife Baseline Study included as Attachment P-2. These broad habitats were further defined into subtypes based on additional field surveys as shown in Figure P-2, and finally rated according to the ODFW habitat categories defined in Section P.2, as shown in Figures P-3 and P-4. The analysis area used for mapping and rating habitat was the entire lease boundary for both Leaning Juniper II North and Leaning Juniper II South.

Sections P.3.1 and P.3.2 describe the habitats for Leaning Juniper II North and Leaning Juniper II South, respectively.

P.3.1 Habitat Descriptions for Leaning Juniper II North

The following fish and wildlife habitats were identified within the analysis area for Leaning Juniper II North during the environmental review and field surveys. Table P-1 summarizes the habitat types with their corresponding ODFW habitat categories (1-6) and GIS mapping code.

TABLE P-1

Habitat Types and Categories Within the Leaning Juniper II North Analysis Area

Primary Habitat Type (Mapping Code) General Description	Subtype	Habitat Category	Subhabitat Type Description	Acres within Analysis Area
Grassland (G) Native bunchgrass or non-native grasslands with weeds.	G-A	4	**Annual grass and weeds with residual native bunchgrass.** Primarily non-native grassland with weeds resulting from past wildfires or land use practices. Patches of native perennial bunchgrass and forbs. Soil depth variable. Category 4—important habitat, but not limited. Areas show signs of recovery to a level that would provide more value for a variety of common or special status wildlife. With sufficient time and appropriate livestock grazing practices, may become essential habitat.	Total GA: 16
	G-B	2	**Perennial bunchgrass.** Native bunchgrass. Primarily bluebunch wheatgrass and Sandberg's bluegrass. Shrubs, if present, are an inconspicuous component. Soils generally medium to deep. Native bunchgrass sites in good condition that are in deep soils are limited in the general area. Category 2—essential habitat to sensitive species. Areas show less grazing pressure and more native plant diversity than Category 3 or 4. May also support white-tailed jackrabbit, grasshopper sparrows, or other ground nesting grassland bird species such as savannah sparrow and vesper sparrow. Nesting habitat for Western meadowlark	Total GB: 3
				Total Grassland: 19 acres
Shrub-Steppe (SS) Open low shrub, with native and non-native bunchgrass. Some unburned sites have dense sagebrush cover. Some shrub-steppe lost shrub cover in recent fires but show signs of recovery (trending toward pre-burn shrub conditions).	SS-A	3	**Shrub-grass.** Sagebrush-rabbitbrush-snakeweed/bunchgrass-annual grasses. Soils medium to deep. Some sites have been intensively impacted by cattle grazing. The Shrub-grass type appears to have potential value for shrub obligate species such as loggerhead shrike. This subtype is limited in size; larger areas are more functional and typically are rated Category 2. Category 3—essential or important habitat that is limited. Nesting habitat for Western meadow lark. Categories 1 through 3 may also support white-tailed jackrabbit and loggerhead shrike.	Total SSA: 14
	SS-B	2,3 or 6	**Open low shrub.** Rabbitbrush-snakeweed-buckwheat (*Eriogonum sp*.)/perennial bunchgrass, usually Sandberg's bluegrass *(Poa sandbergii*), and annual grasses. Most of these areas are formerly SS-A attempting to recover from frequent burning. Little current potential for nesting by shrub obligate species.	Total SSB: 2348
		2	Category 2—essential habitat to sensitive species. Show less grazing pressure and more native plant diversity than Category 3 or 4.	27
		3	Category 3—essential or important habitat that is limited. May support long-billed curlew and white-tailed jackrabbit.	2321

TABLE P-1

Habitat Types and Categories Within the Leaning Juniper II North Analysis Area

Primary Habitat Type (Mapping Code) General Description	Subtype	Habitat Category	Subhabitat Type Description	Acres within Analysis Area
	SS-E	2	**Bitterbrush/Buckwheat, Bunchgrass-Annual grass.** Bitterbrush/Eriogonum, native bunchgrass, non-native annual grass. Category 2—essential habitat to sensitive species. Show less grazing pressure and more native plant diversity than Category 3 or 4.	Total SSE: 244
				Total Shrub-Steppe: 2606 acres
Exposed Basalt Rock (E)	EB	4	**Exposed Basalt.** Vegetative cover is very open, contains Sandberg's bluegrass with annual grasses and forbs Category 4—important habitat, but not limited. Areas show signs of recovery to a level that would provide more value for a variety of common or special status wildlife. With sufficient time may become essential habitat.	44
	ESC	2	**Escarpment**. Basalt rim-rock, cliffs Category 2—essential habitat to sensitive-status animals (some raptors and bats). Important for deer resting and provides home sites for wood-rats and marmots	78
				Total Exposed Rock: 122 acres
Raptor Nest Structures Raptor, corvid (common raven) nesting habitat.	W-J ESC	1	**Cliffs and Isolated juniper trees** Category 1— Cliff supports active raptor nests and isolated juniper tree supports active raptor nests and a large, inactive stick nest that could be used by sensitive raptors in the future.	<1
				Total Raptor Nest Habitat: <1 acres
Developed (D)	D-B	3 or 5	**Old field.** Previously cultivated, currently occupied by non-native perennial grass, rabbitbrush/annual grasses and weeds.	Total DB: 89
		3	Category 3—important and limited habitat for wildlife. Fields are in relative good condition and contain more patches of native perennial bunchgrass.	4
		5	Category 5—Not important habitat or limited, but not as degraded as Category 6. Native habitat that was tilled at some point and farming and or grass seeding attempted periodically through the years. Good deer cover.	85
	D-W	5	**Dryland wheat.** May be seeded or fallow. Horned lark in winter when bare dirt or fallow. Better habitat than Category 6.	111
	D-F	6	**Farmyard,** residence, outbuildings including surroundings, or other farming related disturbed area	25

TABLE P-1

Habitat Types and Categories Within the Leaning Juniper II North Analysis Area

Primary Habitat Type (Mapping Code) General Description	Subtype	Habitat Category	Subhabitat Type Description	Acres within Analysis Area
	D-Q	6	**Quarry**.	26
	D-X	6	**Other disturbed ground. A**n intensively used pasture with poor vegetative cover and lots of weeds.	6
				Total Developed: 317

Overall, the habitat has been impacted by recent patchy hot fires coupled with periods of lower than normal precipitation. Detailed descriptions of these habitat categories are provided in sections P.3.1.1 through P.3.1.6.

P.3.1.1 Category 1 Habitat within Leaning Juniper II North Analysis Area

Habitat Category 1 is irreplaceable, essential habitat for wildlife that is limited and includes documented habitat occupied by target species such as WGS or active raptors nests. No occupied WGS colonies were observed within the Leaning Juniper II North lease boundary. However, several active raptor nests were observed. The habitat supporting these nests was identified as Category 1 habitat, as described below.

Raptor Nest Structures

Active raptor nests were found in isolated juniper trees (*Juniperus occidentalis*) or habitat subtype W-J, on the escarpment or cliff face on the east side of the leased land, and within the existing BPA transmission lines (Figure P-5a). Native or non-native trees, cliff faces or other natural structures that support active or inactive raptor nests were classified as Category 1 habitat.

According to the ODFW standards, trees or cliffs (mapped as “escarpment”) with raptor nests are considered irreplaceable habitat for a special status/sensitive, or nonlisted target species, such as Swainson’s hawk. Numerous upland trees (primarily junipers) were identified within the vicinity of Leaning Juniper II North, and one tree was identified as supporting a large, inactive stick nest that could be used by sensitive raptors in the future. The cliff supports American kestrel and red-tailed hawk nests. No upland tree habitat will be permanently or temporarily affected by the Facility construction or footprint. Impacts to the cliff face will also be avoided.

P.3.1.2 Category 2 Habitat within Leaning Juniper II North Analysis Area

Habitat Category 2 is essential, but not irreplaceable, habitat for target species and is limited within the region. Three habitat types were identified as Category 2 within the analysis area: escarpment, grassland, and shrub-steppe.

Escarpment

Category 2 escarpment provides essential, but not replaceable, foraging habitat to target species. Escarpment habitats also show less signs of grazing pressure and have more native plant diversity than Category 3 or 4 habitats. Small areas that provide good cover and shade or protection from extreme weather conditions are present in these primarily east and north-facing areas.

The vegetative cover on escarpments is composed primarily of Sandberg’s bluegrass and various forbs. Soils are absent or very shallow due to the rock outcroppings or steep slopes. Pockets of deeper soils are present in swales located in areas with less exposed basalt and fewer cliffs.

Approximately 78 acres of Category 2 escarpment exist within the Leaning Juniper II North analysis area.

Grassland

Category 2 grasslands provide essential, but not replaceable, foraging habitat to target species. These grasslands also show fewer signs of impacts resulting from wildfires and domestic livestock grazing pressure, and have more native plant diversity than Category 3 or 4 habitat.

The vegetative cover in these grasslands is composed primarily of native perennial bunchgrass (habitat subtype G-B), such as Sandberg's bluegrass (*Poa secunda*). Bluebunch wheatgrass (*Pseudoroegneria spicata*) is also present. Soils appear to be generally medium to deep. Other native species, such as Idaho fescue (*Festuca idahoensis*) and western needle-and-thread grass (*Hesperostipa comata*), are occasionally present in the appropriate soil types for the species. Various native forbs and low shrubs such as gray rabbitbrush and to a lesser extent, green rabbitbrush are present but are an inconspicuous component. Non-native grasses are present throughout and consist of cheatgrass, bulbous bluegrass, and annual cereal rye. These non-native grasses are typical throughout the Columbia Basin, but non-native plants are generally less extensive in Category 2 grasslands than in lower Category grasslands. Native bunchgrass sites, as a whole, are in good condition that are in deep soils are limited in the general area.

The Category 2 grassland within the analysis area is a narrow strip located to the east of the G turbine string on the northern side of an existing rock quarry. The grassland provides essential foraging habitat to a variety of common resident and migratory birds and common mammals. Signs of grasshopper sparrows were detected in the grassland, as well as in the adjacent Category 3 shrub-steppe habitat (described below). Native grasslands may also support white-tailed jackrabbit and burrowing owl, though no signs of these species were found in this habitat during the 2006 field surveys. Other nesting grassland bird species that may use this habitat include savannah and vesper sparrows. Native grasses and forbs provide forage for mule deer.

Only approximately 3 acres of Category 2 grassland exists within the Leaning Juniper II North analysis area.

Shrub-Steppe

Shrub-steppe is classified as Category 2 where it provides essential habitat to target species such as grasshopper sparrows. There are two subtypes of Category 2 shrub-steppe: bitterbrush shrub (subtype SS-E) and open low shrub (subtype SS-B).

Bitterbrush shrub or SS-E habitat is characterized by medium to dense bitterbrush and buckwheat and annual bunchgrass cover and is present in one area where recent fires have not eliminated shrub cover from the landscape. The open low shrub habitat, SS-B, is characterized by the lack of sagebrush cover presence. The SS-B habitat likely supported sagebrush and is attempting to recover from frequent burning.

The bitterbrush shrub or SS-E habitat has an overstory consisting of bitterbrush (*Purshia tridentata*) and intermittent big sagebrush (*Artemesia tridentata*). The shrub coverage is moderate to dense. The understory consists mainly of native perennial grasses, buckwheat (*Eriogonum sp)* and non-native annual grasses and weedy forbs. Although the habitat is often quite weedy in a few places (dense weed patches, resulting from past land use or fires), it is the best remaining shrub-steppe bitterbrush habitat to be found within the vicinity, and as such provides important habitat for wildlife, especially for wintering mule deer.

The SS-B open low shrub habitat has an overstory dominated by low-growing gray rabbitbrush (*Ericameria nauseosa)* or, to a lesser extent, green rabbitbrush (*Chrysothamnus viscidiflorus*). Snakeweed (*Gutierrezia sarothrae*) is fairly extensive throughout and is the dominant mid height structure. Small patches of big sagebrush are intermittent. Understory plants are primarily native and non-native bunchgrass, including Sandberg's bluegrass, buckwheat, and annual, non-native grasses such as cheatgrass (*Bromus tectorum*), and bulbous bluegrass (*Poa bulbosa*). Annual cereal rye (*Secale cereale*) is present in swales and deeper soils where past disturbance has removed most of the native vegetation. Weeds are more common in parts of SS-B habitat than SS-E as a result of recent fires or land use practices. These include Russian thistle (*Salsola kali*) and tumblemustard (*Sisymbrium altissimum*).

These shrub-steppe habitats provide important foraging and/or nesting habitat to grasshopper sparrows, and white-tailed jackrabbit, as well as common horned lark and western meadowlark. During the 2006 field surveys, grasshopper sparrows and white-tailed jackrabbits (or jackrabbit sign of use) were found within the SS-B Category 2 habitat along the dry drainage between turbines H-10 and H-11. The location of these sensitive species is shown in Figure P-6.

There are approximately 244 acres of SS-E and 27 of SS-B Category 2 habitat within the Leaning Juniper II North analysis area.

P.3.1.3 Category 3 Habitat within Leaning Juniper II North Analysis Area

Category 3 habitat provides essential or important wildlife habitat that is limited. This category includes relatively undisturbed habitat with moderate cover by native grasses or moderate shrub structure and forage for wildlife. Two types of habitats were identified as Category 3 within the analysis area: shrub-steppe and old fields. The primary difference in the Category 2 and Category 3 SS habitats is the overall functionality of the habitat and the breeding season value for special status vertebrate wildlife species. In general, Category 3 tends to be more weedy, less biologically diverse, and is a habitat type relatively common in the general area.

Shrub-Steppe

Category 3 shrub-steppe habitat is the most abundant habitat type and was found throughout the analysis area. These open low shrub habitats are similar to Category 2 SS-B shrub-steppe, but have been affected more by wildfires, domestic livestock grazing or other land use practices resulting in less vascular and nonvascular vegetative diversity. The protective soil surface biotic crust of mosses, lichens, algae and bacteria (cryptogamic layer) has been impacted from land use, resulting in opportunities for non-native weedy plants to become established. The SS habitat is important to wildlife species but is not as limited in the region; many steppe habitats in the local region have experienced wildfires and resulting vegetation is similar in plant species overall vegetative structure. Two habitat subtypes are present in this category: shrub-grass SS-A and open low shrub SS-B.

The SS-A consists of big sagebrush at a mature stage (large structure) Patches of Category 3 SS-A along Rattlesnake Road are high quality habitat but are limited in size and disturbed by vehicle traffic along the road. However, the mature shrub cover provides escape and resting cover for common wildlife and is limited in the immediate area and the region..

The Category 3 SS-B is the dominant habitat type within the analysis area. SS-B areas have been more affected by recent fires and are in an early seral stage. Native rabbitbrush and other low-stature plants such as snakeweed and buckwheat are common. The understory is native Sandberg's bluegrass and non-native cheatgrass, bulbous bluegrass, and tumblemustard. Patches of native perennial grasses such as bluebunch wheatgrass and western needle-and-thread grass are present but to a lesser extent than found in Category 2. In many areas, the grass layer consists entirely of cheatgrass, but these areas were designated as Category 3 rather than Category 4 because there are some signs of recovery and the habitat still provides important wildlife value for the sensitive status species long-billed curlew (which uses it for staging, courtship and foraging) and common birds and mammals. Small seasonally wet areas (vernal pools) are found in SS-B but were not mapped as a separate habitat type (see Exhibit J for descriptions of the hydrology and vegetation associated with these vernal pools). Category 3 SS-B habitat is extensive throughout the analysis area.

Wildlife expected to use Category 3 shrub-steppe may use it primarily for foraging and for relying on residual native bunchgrasses and shrubs for escape cover and for nesting. Approximately 2321 acres of Category 3 SS-B and 14 acres of SS-A shrub-steppe exist within the Leaning Juniper II North analysis area.

<u>Developed</u>

Previously cultivated agricultural fields that are in relatively good condition and provide important habitat to wildlife are classified as Category 3 habitat. There is one Category 3 old field within the Leaning Juniper II North analysis area, located at the collector substation. The area was previously cultivated but is now occupied by non-native perennial crested wheatgrass (*Agropyron cristatum*) or non-native annual grasses and contains young sagebrush and rabbitbrush. Common species include horned larks and western meadowlarks. Savannah sparrows may also be present. Approximately 4 acres of Category 3 agricultural fields exist within the analysis area.

P.3.1.4 Category 4 Habitat within Leaning Juniper II North Analysis Area

Habitat Category 4 is important wildlife habitat that is not limited and could include areas that have been moderately to highly grazed or show signs of other disturbance. Where past disturbance is not the influencing factor, soil types and shallow, exposed basalt rocky areas with sparse vegetation are present and these areas were rated Category 4, primarily because this type is not limited in the region. The Category 4 areas are usually weedy and contain a high percentage of non-native grasses. There are two types of Category 4 habitat within the Leaning Juniper II North analysis area: annual grassland and exposed basalt.

Grassland

Category 4 grasslands found within the analysis area are non-native (subtype G-A) grasslands with a very high weed component and disturbed or less nutrient-rich soils. The forb component is composed primarily of non-native weeds, such as cheatgrass, tumblemustard, bulbous bluegrass, mustard, and cereal rye with occasional patches of native bunchgrass, primarily Sandberg's bluegrass. The high weed content is primarily due to the recent hot fires, which burned native shrubs and bunchgrasses, and were followed by heavy grazing and/or wind erosion. Category 4 G-A habitat is found at the southern end of the Leaning Juniper II North lease boundary.

The habitat provides important habitat to common species, but the lack of native grasses and the dense weed cover limit the ability of most wildlife species to use these areas for forage or cover. This habitat is commonly found throughout the Columbia Basin. In addition, the weed cover, often dominated by annuals such as cheatgrass, makes the slopes in this area more susceptible to erosion and soil damage from grazing, because of a lack of the robust root structure found in perennial species, such as the native bunchgrasses. With sufficient time and appropriate livestock grazing practices, however, these areas could become essential habitat to both common and special status species. Approximately 16 acres of Category 4 grassland exist within the Leaning Juniper II North analysis area.

Exposed Basalt

Category 4 exposed basalt is composed of shallow soils, exposed rock and variable surface relief (uplifted large boulders and small to medium-sized rocks) resulting in numerous small areas containing wind-deposited soil with sparse grass and forb cover. Grasses are Sandberg's bluegrass and bluebunch wheatgrass. Forbs are early-season plants due to the typical warmer temperature soils. Weeds are present but not dominant for the most part due to the lack of suitable deep soil to support them. This area burned in the past 6 to 10 years; shrub cover is limited but where present, consists of big sagebrush and to a lesser extent, bitterbrush. Approximately 44 acres of Category 4 exposed rock exist within the Leaning Juniper II North analysis area.

P.3.1.5 Category 5 Habitat within Leaning Juniper II North Analysis Area

Habitat Category 5 is wildlife habitat that is not limited in the region or important to wildlife at its current stage. There are two Category 5 habitat areas identified within the Leaning Juniper II North analysis area: an old field and an area mapped as subtype DW (dryland wheat). The actual land use of this DW habitat is in fluctuation, and it is not clear what the farmer is intending to do with the land. These areas have been highly impacted by plowing or other disturbance and have low structure and forage for wildlife. These areas are weedy and contain a high percentage of non-native grasses. Mule deer forage and bed in this habitat due to the lush broad-leaved weeds and tall weed/grass structure Approximately 196 acres of Category 5 habitat exist within the Leaning Juniper II North analysis area.

P.3.1.6 Category 6 Habitat within Leaning Juniper II North Analysis Area

There are several patches of Category 6 habitat within the Leaning Juniper II North analysis area. This is nonessential wildlife habitat with limited potential to become important or essential in the foreseeable future. Category 6 habitats within the analysis area include quarries, nonirrigated agricultural croplands and other developments. The agricultural areas are a monoculture of dryland wheat and include those areas currently in production as well as alternating year fallow fields. Other types of developments include farm yards and residential areas and other human activity related disturbed grounds. All areas mapped as developed are highly disturbed on a regular basis and have been mostly or entirely cleared of native vegetation. Approximately 196 acres of Category 6 habitat exist within the Leaning Juniper II North analysis area.

As a result of the high level of disturbance, no special status/sensitive species are known or expected to occur with regularity in the Category 6 habitats and these areas are unlikely to become important or essential wildlife habitat in the foreseeable future.

P.3.2 Habitat Descriptions for Leaning Juniper II South

The analysis area used for mapping and rating habitat for Leaning Juniper II South includes a 1-mile buffer around the entire lease boundary. Table P-2 provides the habitat types and categories identified within the analysis area for Leaning Juniper II South.

TABLE P-2

Habitat Types and Categories Within the Leaning Juniper II South Analysis Area

Primary Habitat Type (Mapping Code) General Description	Subtype	Habitat Category	Subhabitat Type Description	Acres within Analysis Area
Grassland (G) Native bunchgrass or non-native grasslands with weeds.	G-A	1, 3, or 4	**Annual grass and weeds with residual native bunchgrass.** Primarily non-native grassland with weeds resulting from past wildfires or land use practices. Patches of native perennial bunchgrass and forbs. Soil depth variable.	Total GA: 468
		1	Category 1—irreplaceable habitat for Washington ground squirrel colony documented in 2005, may support long-billed curlews.	4
		3	Category 3—essential or important habitat that is limited. Shows less grazing pressure and more native plant diversity than Category 4. may support long-billed curlews.	221
		4	Category 4—important habitat, but not limited. Areas show signs of recovery to a level that would provide more value for a variety of common or special status wildlife. With sufficient time and appropriate livestock grazing practices, may become essential habitat. Categories 1 through 4 provide nesting habitat to common horned lark.	243
	G-B	2	**Perennial bunchgrass.** Native bunchgrass. Primarily bluebunch wheatgrass and Sandberg's bluegrass. Shrubs, if present, are an inconspicuous component. Soils generally medium to deep. Native bunchgrass sites in good condition that are in deep soils are limited in the general area.	Total GB: 29
			Category 2—essential habitat to raptors and other sensitive species. Areas show less grazing pressure and more native plant diversity than Category 3.	
				Total Grassland: 497
Shrub-Steppe (SS) Open low shrub, with native and non-native bunchgrass. Some unburned sites have dense sagebrush cover. Some shrub-steppe lost shrub cover in recent fires but shows signs of recovery (trending toward pre-burn shrub conditions).	SS-A	1, 2 or 3	**Shrub-grass.** Sagebrush-rabbitbrush-snakeweed/bunchgrass-annual grasses. Soils medium to deep. Some sites have been intensively impacted by cattle grazing. This type appears to have potential value for shrub obligate species such as loggerhead shrike.	Total SS-A: 305
		1	Category 1—supports WGS colony documented in 2005, irreplaceable habitat.	21
		2	Category 2—adjacent to WGS colony and essential habitat to that and other sensitive species. Show less grazing pressure and more native plant diversity than Category 3.	266
		3	Category 3—essential or important habitat that is limited. Nesting habitat for western meadowlark. Categories 1 through 3 may also support white-tailed jackrabbit and loggerhead shrike.	18
	SS-B	1, 2 or 3	**Open low shrub.** Rabbitbrush-snakeweed-buckwheat (*Eriogonum sp.*)/perennial bunchgrass, usually Sandberg's bluegrass (*Poa sandbergii*), and annual grasses. Most of these areas are formerly SSA attempting to recover from frequent burning. Little current potential for nesting by shrub obligate species (loggerhead shrike).	Total SS-B: 1505

TABLE P-2

Habitat Types and Categories Within the Leaning Juniper II South Analysis Area

Primary Habitat Type (Mapping Code) General Description	Subtype	Habitat Category	Subhabitat Type Description	Acres within Analysis Area
		1	Category 1—supports Washington ground squirrel colony with natal sites or small area of individuals (patches) documented in 2005, irreplaceable habitat.	87
		2	Category 2—adjacent to Washington ground squirrel colony or small areas of individuals (patches) and essential habitat to that and other sensitive species. Show less grazing pressure and more native plant diversity than Category 3 or 4.	1054
		3	Category 3—essential or important habitat that is limited.	364
			Categories 1 through 3 are nesting habitat for horned lark and Western meadowlark. May support long-billed curlew and white-tailed jackrabbit.	
	SS-C	3	**Open low shrub (buckwheat)/Sandberg's bluegrass with non-native annual grasses.**	Total SS-C: 5
			Category 3—Significant bare ground could be used by reptiles such as the short-horned lizard as well as foraging birds like long-billed curlew, loggerhead shrike, raptors. Essential or important and limited habitat for these species.	
	SS-D	2 or 3	**Purple sage/Sandberg's bluegrass with non-native annual grasses.**	Total SS-D: 32
		2	Category 2—Significant bare ground used by the short-horned lizard and sagebrush lizard as well as foraging birds like long-billed curlew, loggerhead shrike, raptors. Essential and limited habitat for these species.	28
		3	Category 3—Important and limited habitat for above species. Areas show signs of recovery to a level that would provide more value for a variety of common or special status wildlife. With sufficient time, may become essential habitat.	4
				Total Shrub-Steppe: 1846
Woodland (W)	W-J	1 or 2	**Woodland consisting of junipers.** Open canopy. Usually in areas with significant sagebrush (big sage) and bare ground with conspicuous stands of trees.	Total W-J: 96
Raptor, corvid and shrub obligate nesting habitat.		1	Category 1—supports great-horned owl and other raptor nests documented in 2005. Nesting potential for other raptors in future years	<1
		2	Category 2—essential and limited woodland habitat without raptor nests. Categories 1 and 2 support loggerhead shrike foraging and nesting potential. Bare ground of value to short-horned lizard, sagebrush lizard. Wintering habitat for American robins, Townsend's solitaire, waxwings (two species), and mountain bluebirds.	95

TABLE P-2

Habitat Types and Categories Within the Leaning Juniper II South Analysis Area

Primary Habitat Type (Mapping Code) General Description	Subtype	Habitat Category	Subhabitat Type Description	Acres within Analysis Area
	W-L	2	**Woodlot consisting of non-native deciduous trees.** Tree species typically are black locust. Open canopy (trees not dense). Several to many trees in relatively small well defined areas. Category 2—essential and limited woodland habitat for birds and mammals but trees are without raptor nests.	3
				Total Woodland: 100
Developed (D)	D-B	3, 4 or 6	**Old field.** Previously cultivated, currently occupied by non-native perennial grass, rabbitbrush/annual grasses and weeds.	Total D-B: 111
		3	Category 3—important and limited habitat for wildlife. Fields are in relative good condition and contain more patches of native perennial bunchgrass.	4
		4	Category 4—important but not limited habitat for wildlife. Areas show signs of recovery to a level that would provide more value for common or special status wildlife. With sufficient time and appropriate livestock grazing practices, may become essential habitat. Categories 3 and 4: Common species—horned lark, Western meadowlark, may include savannah sparrow.	100
		6	Category 6 D-B is highly degraded with very low to no potential to become essential or important wildlife habitat.	6
	D-W	6	**Dryland wheat.** May be seeded or fallow. Horned lark in winter when bare dirt or fallow.	2871
	D-F	6	**Farmyard,** residence, or outbuildings including surrounds.	22
	D-L	6	**Landfill**	15
	D-Q	6	**Quarry.**	19
	D-X	4 or 6	**Other disturbed ground.**	Total D-X: 51
		4	Category 4 appears to be a recent grassland seeding and could become important wildlife habitat.	34
		6	Category 6 is an intensively used pasture with poor vegetative cover.	17
				Total Developed: 3089

P.3.2.1 Category 1 Habitat within Leaning Juniper II South Analysis Area

Habitat Category 1 is irreplaceable, essential habitat for wildlife that is limited, and includes documented WGS habitat or target species nest locations or food, cover, nest, and roost habitat. Three types of habitats were identified as Category 1 within the Leaning Juniper II South analysis area: grassland, shrub-steppe, and woodland.

<u>Grassland</u>

In accordance with ODFW habitat goals and standards, habitats that support target species such as WGS and raptor nests are considered irreplaceable Category 1 habitat. During the spring/summer 2005 field surveys, one active WGS site was documented in grassland habitat near big sagebrush cover within the Leaning Juniper II South analysis area. Patch #6, which consisted of just a few individuals in 2005 and 2006, is located in annual grassland (subtype G-A) south of J turbine string near Highway 19 and the adjacent railroad tracks. The G-A grassland is characterized by non-native annual grasses, weeds and some residual native bunchgrass, and lacks native bunchgrasses due to past wildfires, heavy grazing or other land use practices. Big sagebrush is present along the railroad tracks and a two-track road trail and may provide habitat for WGS. In the G-A, non-native invasive species such as cheatgrass, tumblemustard, and Russian thistle generally out-compete native species. Native bunchgrasses (primarily Sandberg's bluegrass) have been grazed intensively in the past and due to generally south/southeast-facing slope (warm exposure) generally do not have the ability to thoroughly recover from past land use or wildfires. There are also some patches of native perennial bunchgrass such as Sandberg's bluegrass Soils in the GA site are Krebs silt loam. See Exhibit Q for a more detailed description and a map (Figure Q-2) of this and other WGS colonies in the analysis area. Approximately 4 acres of Category 1 grassland exist within the Leaning Juniper II South analysis area.

<u>Shrub-Steppe</u>

Category 1 shrub-steppe habitat is also present within the Leaning Juniper II South analysis area. Three WGS colonies were discovered in shrub-steppe habitat during the spring/summer 2005 field surveys and with the exception of 4d, activity was checked in 2006 and noted as being similar to 2005 use and colony extent. Colony numbers 1, 4, and 5 were found near turbine strings E, F and J respectively. Colonies 1 and 4 were large colonies, with an estimated size of 40 to more than 100 individuals, as further described in Exhibit Q. These colonies were found in both shrub-grass (subtype SS-A, sagebrush) and open low shrub (subtype SS-B), while the small colony 5 was located in SS-B.

The shrub-grass SS-A habitat is present in the few areas where fire has not eliminated it from the landscape. The overstory consists of sagebrush and occasional gray and green rabbitbrush, resulting in a generally moderate to dense shrub cover. The understory consists mainly of native bunchgrasses such as bluebunch wheatgrass, Sandberg bluegrass, and annual grasses and snakeweed. Although the habitat is often quite weedy in a few places, it is the best remaining shrub-steppe sagebrush habitat to be found within the vicinity, and as such provides important habitat for common wildlife and some target species.

The SS-B open low shrub habitat is currently characterized by dense or intermittent sagebrush "skeletons" resulting from recent hot wildfires, suggesting that the areas are formerly SS-A habitat attempting to recover from frequent burning. The overstory is dominated by low-growing gray and green rabbitbrush, snakeweed and low-growing buckwheat species. Co-dominant or undercover plants are perennial bunchgrasses such as Sandberg's bluegrass, annual grasses and various forbs. Weeds are more common in SS-B habitat as a result of recent wildfires followed by domestic livestock grazing and/or wind erosion.

There are approximately 21 acres of Category 1 SS-A and 87 acres of SS-B, for a total of approximately 107 acres of Category 1 shrub-steppe habitat within the Leaning Juniper II South analysis area.

Woodland

There are two types of woodland habitat within the Leaning Juniper II South analysis area: subtype W-J or juniper tree woodland and subtype W-L or wooded lots consisting of non-native deciduous trees such as black locust. Native or non-native trees that support active or inactive raptor nests were classified as Category 1 habitat.

According to the ODFW standards, trees with raptor nests are considered irreplaceable habitat for a special status/sensitive, or nonlisted target, species, such as Swainson's hawk. Numerous upland trees were identified within the vicinity of Leaning Juniper II South, many of which were identified as supporting raptor nests during 2005 and/or 2006 surveys, as shown in Figure P-5a.

While the majority of the woodland habitat in the analysis area is located in Juniper Woodland Canyon north of Leaning Juniper II South, all of the sensitive raptor nests were found in isolated trees scattered across the Facility lease boundary. As a result, there are only 2 acres of Category 1 woodland habitat within the Leaning Juniper II South analysis area.

The raptor nest trees are surrounded by developed areas, low-growing shrub-steppe habitat or grasslands, and provide the only perching habitat or protective cover available in an otherwise open setting. The woodland patches currently provide forage, cover, and nesting habitat for sensitive species such as Swainson's hawks, red-tailed hawks, great-horned owls (*Bubo virginianus*), and common ravens, as well as forage and cover for wintering or migratory passerines (songbirds). The proximity of the Leaning Juniper II Facility components to active raptor nests identified within the Facility lease boundary is described in Section P.5.2.2. No upland tree habitat will be permanently or temporarily affected by the Facility footprint.

P.3.2.2 Category 2 Habitat within Leaning Juniper II South Analysis Area

Habitat Category 2 is essential, but not irreplaceable, habitat for target species and is limited within the region. Four habitat types were identified as Category 2 within the Leaning Juniper II analysis area: grassland, shrub-steppe and woodland habitats.

Grassland

Category 2 grasslands provide essential, but not replaceable, habitat to raptors and/or other target species. The grassland habitat consists mainly of perennial native bunchgrass (subtype G-B), and shows less signs of grazing pressure and have more native plant diversity than Category 3 or 4 habitat.

The vegetative cover in these grasslands is composed primarily of native perennial bunchgrass (habitat subtype G-B), such as Sandberg's bluegrass (*Poa secunda*). Bluebunch wheatgrass (*Pseudoroegneria spicata*) is also present. Soils appear to be generally medium to deep. Other native species, such as Idaho fescue (*Festuca idahoensis*) and western needle and thread grass (*Hesperostipa comata*), are occasionally present. Various native forbs and low shrubs such as gray rabbitbrush and, to a lesser extent, green rabbitbrush are present but are an inconspicuous component. non-native grasses are found throughout, and consist of cheatgrass, bulbous bluegrass, and annual cereal rye but are less extensive in this Category than other grassland Categories. Native bunchgrass sites in good condition that are in deep soils are limited in the general area.

Category 2 grassland is located to north of the C turbine string in relative steep ground along an intermittent drainage, as well as north of the collector line home runs to the Facility substation. This habitat provides essential cover and foraging habitat to raptors and other wildlife species. Native grasslands may also support white-tailed jackrabbit and burrowing owl, though no signs of these species were found in this habitat during the 2005 field surveys. Other nesting grassland bird species that may occupy this habitat include savannah and vesper sparrows. Approximately 29 acres of Category 2 grassland exist within the Leaning Juniper II South analysis area.

Shrub-Steppe

Category 2 shrub-steppe habitat is similar to the habitat characterized as Category 1 habitat described above, but lacks WGS active sites (defined as colonies with natal areas or patches of a few individuals). Shrub-steppe is classified as Category 2 where it provides essential habitat to WGS in the adjacent Category 1 colonies or to other target species such as loggerhead shrikes or sagebrush lizards.

Four WGS patches (colonies that include natal sites, or small patches consisting of a few individuals where no natal sites was located) were discovered in shrub-steppe habitat within the analysis area for Leaning Juniper II South in spring/summer 2005 (colonies 1, 2, 4, 5 and 6). The WGS, which is a state-listed endangered species and a candidate for listing under the federal Endangered Species Act, requires a limited range of habitat conditions for survival. The #4a-d colonies were found near turbine strings E and F. Exhibit Q describes the colonies in further detail; the locations of these colonies within the analysis area are shown in Figures Q-2 through Q-5.

Depending on the site-specific vegetative condition and extent of cover, adjacent habitat (up to 785 feet from the delineated active cluster of concentrated squirrel activity, a known travel distance) can potentially be used by squirrels for cover and possibly forage during daily or periodic movements. This is generally referred to as a potential squirrel use area. The species is also known to travel longer distances. Habitat in areas of unconfirmed use is considered replaceable because grassland and shrub cover could be restored if disturbed, is rated Category 2, regardless of its current vegetative state (inclusions of annual non-native grass within native grass, open low shrub sites previously burned) (see Section P.3.1.2).

Based on guidance from ODFW, WGS habitat that is essential and limited is considered Category 1 if the habitat is irreplaceable when considering the consequences of a proposed development action (ODFW, 2002). Essential and limited habitat for WGS is Category 2 if the habitat is replaceable when considering the consequences of a proposed development action. Given the amount of potentially suitable shrub-steppe and grassland habitat (1,808 acres of shrub-steppe and 497 acres of grassland) and extensive soil types used by the species within the Leaning Juniper II South lease boundary, the proposed development will not affect connectivity between the active colonies. The squirrel use area adjacent to the colonies is not considered irreplaceable. The species is known to occupy crop fields that were previously farmed and were restored to grassland (Kronner, 2006; PPM Energy, 2006). Not much is known about long-term persistence at these sites and occupancy likely can be attributed to adjacent suitable WGS habitat (FPLE, 2002; Klein, 2005; Marr, 2005; Kronner 2006). It is not known what role the habitat surrounding the five patches plays for supporting use and persistence of WGS for those sites. The Facility components planned for development in Category 2 habitat are minimal and do not interrupt connectivity between known WGS patches and potentially suitable habitat for the species. In addition, a large WGS colony (#1), a potential source population for the general area, was completely avoided during Facility layout design.

Three shrub-steppe habitat subtypes are classified as Category 2 habitat within the analysis area: shrub-grass (SS-A), open low shrub (SS-B), and purple sage areas (SS-D). While the SS-A and SS-B habitat types are similar in vegetative composition to Category 1 shrub-steppe, the SS-D habitat is characterized by purple sage and native Sandberg's bluegrass, with some annual grasses. There is also significant bare ground in the SS-D areas, primarily due to soil type.

All three Category 2 shrub-steppe habitats provide important foraging habitat to loggerhead shrikes, long-billed curlews, and white-tailed jackrabbits, as well as common horned larks and western meadowlarks. Nesting/denning likely occurs, as documented by behavior of these species while surveyors were in the habitats. Long-billed curlews and white-tailed jackrabbits were also detected near turbine string F. The protective soil surface biotic crust layer in Category 2 is generally still functional and less disturbed than in Categories 3 and 4. Bare ground in the SS-D habitat is used by lizards as well as foraging birds like the long-billed curlew and raptors. The location of these sensitive species is shown in Figure P-6. Small seasonally wet areas (vernal pools) are found in SS-B but were not mapped as a separate habitat type (see Exhibit J for descriptions of hydrology and vegetation). Depending on the precipitation levels, the vernal pools likely provide temporary resting areas for a small number of water birds during late winter and early spring.

Category 2 SS-B shrub-steppe habitat is dispersed throughout the lease area, with approximately 1,054 acres within the analysis area. SS-A habitat is less prevalent, composing approximately 266 acres within the analysis area. These sagebrush shrubby areas are located east of the main access road to the J turbine string, in Jones Canyon and along a western access road to the A turbine string. The SS-D subtype is limited to approximately 28 acres and is located on ridgetops between the turbine J-17 and Cedar Springs Road. In total, there are approximately 1,477 acres of Category 2 shrub-steppe habitat within the Leaning Juniper II South analysis area.

Woodland

Woodland or tree groves and the grassland or shrub-steppe understory that do not support nests for raptors but do provide essential and limited habitat for food, water, cover, and nesting are considered Category 2 habitat. As a result of recent fires, the presence of mature woodland is sparse in the vicinity of the Facility and provides essential habitat to both special status and common wildlife species. Juniper woodlands support nesting loggerhead shrikes and provide cover for thrushes and other birds during the winter and migration periods. Woodlands also provide resting places for mammals such as porcupines.

Within the Leaning Juniper II South analysis area Category 2 woodland areas have a lower potential for future raptor nesting, primarily due to the current size of the trees, difficult growing conditions for the trees to reach a suitable size in the near future, or because of proximity to active ranch residences or related activities. Raptor nests typically persist over time, and are used traditionally over time (intermittently or yearly), added to, or rebuilt. Upland tree habitat patches without raptor nests probably lack large-scale environmental, topographic, or exposure attributes necessary for successful rearing and fledging of young but may provide the cover for their prey species. The habitat quality can still be important for raptor perching and foraging during the day, as well as during the night for owls.

There are approximately 95 acres of Category 2 Juniper woodland and about 3 acres of deciduous woodlot habitat within the Leaning Juniper II South analysis area. No upland tree habitat will be permanently or temporarily affected by the Facility footprint.

P.3.2.3 Category 3 Habitat within Leaning Juniper II South Analysis Area

Category 3 habitat provides essential or important wildlife habitat that is limited. This could include relatively undisturbed habitat with moderate cover by native grasses or moderate structure and forage for wildlife. Three types of habitats were identified as Category 3 within the Leaning Juniper II South analysis area: grassland, shrub-steppe, and developed areas.

Grassland

Category 3 grassland is similar to the Category 2 grassland, but has been affected more by grazing or other land use practices. As a result, the Category 3 grassland has less plant diversity, but still provides important habitat to target species.

There is a relatively large area of annual G-A grassland between the J turbine string and Highway 19. There are also patches of both G-A and G-B grasses south of the Facility substation.

The area between the J turbine string and Highway 19 is annual grassland adjacent to WGS colony 6. Though this area is adjacent to the Category 1 grassland habitat supporting the WGS colony, it was classified as Category 3 habitat on the basis that it does not provide essential and limited habitat to WGS. Colony 6 is a small colony without any natal sites, and is likely to have only a few individuals, as further described in Exhibit Q. In addition, the overall quality of the grassland is moderate when compared to Category 2 habitats.

Small patches of G-A and G-B grassland located southwest of the Facility substation are characterized by sparse, annual grass or native bunchgrasses mixed with a robust layer of non-native species such as cheatgrass and bulbous bluegrass. Bare soil and rocks were common. Some grazing by cattle and deer was noted, and the soil surface in many places was disturbed and slightly more prone to erosion than Category 2 grassland.

These areas were identified as Category 3 because they may provide important habitat for more common, less-sensitive wildlife species such as the western meadowlark and, because of the high invasive species content, they are not limited within the region. While long-billed curlews are less likely to utilize these grasslands, primarily due to slope and extensive observations of the species onsite, white-tailed jackrabbits and burrowing owls may use this habitat. There are approximately 221 acres of G-A Category 3 grassland within the Leaning Juniper II South analysis area.

<u>Shrub-Steppe</u>

Category 3 shrub-steppe habitat was found throughout the Leaning Juniper II South analysis area. Four shrub-steppe subtypes are represented. SS-A shrub grass is located in Jones Canyon and along Juniper Woodland Canyon near the main access. The SS-A consists of native sagebrush and rabbitbrush, with a weedy understory (often extensive). non-native grasses and forbs include cheatgrass, bulbous bluegrass, and tumblemustard. Category 3 SS-B is widespread throughout the eastern Facility area. Having been more affected by recent fires, the SS-B has a grass layer that consists almost entirely of cheatgrass. An area of purple sage shrub-steppe, SS-D, located near the access road to the J turbine string also provides important habitat to species. Finally, there is some buckwheat dominated open low shrub (subtype SS-C) within the analysis area. Of the approximately 390 acres of Category 3 shrub-steppe that exist within the Leaning Juniper II South analysis area, most of it is SS-B (364 acres).

As with the Category 3 grassland, these shrub-grass or open low shrub habitats have been affected more by grazing or other land use practices resulting in less plant diversity than Category 2 habitats. These habitats were designated as Category 3 rather than Category 4 habitat, however, because of the wildlife value provided by the sagebrush, rabbitbrush, or purple sage cover in an area otherwise dominated by grasslands. Wildlife expected to use Category 3 shrub-steppe may use it primarily for cover, and secondarily for foraging, since prey species may be less common due to the prevalence of less valuable forage such as cheatgrass.

Developed

Developed areas classified as Category 3 habitat within the Leaning Juniper II South analysis area are non-native grassland that may be enrolled in the Conservation Reserve Program (CRP) and previously cultivated fields. There is one Category 3 old field within the Leaning Juniper II South analysis area, located at the collector substation. The non-native perennial grassland fields are in relatively good condition and are currently occupied by patches of young sagebrush and rabbitbrush or annual grasses and weeds. Common species include horned larks and western meadowlarks. Savannah sparrows may also be present. Approximately four acres of Category 3 agricultural fields exist within the analysis area.

P.3.2.4 Category 4 Habitat within Leaning Juniper II South Analysis Area

Habitat Category 4 is important wildlife habitat that is not limited and could include areas that have been moderately to highly grazed or show signs of other disturbance and have moderate structure and forage for wildlife. These areas are usually weedy and contain a high percentage of non-native grasses. There are two types of Category 4 habitat within the Leaning Juniper II South analysis area: grassland and developed (previously cultivated) fields.

Grassland

Category 4 grasslands found within the analysis area are non-native G-A grasslands with a very high weed component and variable soil depth. These areas are dominated by non-native weeds, such as cheatgrass, tumble mustard, bulbous bluegrass, tumblemustard, and cereal rye with occasional patches of native bunchgrass, primarily Sandberg's bluegrass. The high weed content is primarily due to the recent hot fires, which burned native shrubs and bunchgrasses, followed by heavy grazing. Category 4 G-A habitat is found primarily within Jones Canyon near the E turbine string, but is also found along a drainage north of the C string, east of the D string, and in a drainage near the main access road. There are approximately 243 acres of Category 4 G-A habitat within the Leaning Juniper II South analysis area.

The habitat provides important habitat to common species, but the lack of native grasses and the dense weed cover limit the ability of most wildlife species to use these areas for forage or cover. In addition, the weed cover, often dominated by annuals such as cheatgrass, makes the slopes along Jones Canyon more susceptible to erosion and soil damage from grazing, because of a lack of the robust root structure found in perennial species, such as the native bunchgrasses. With sufficient time and appropriate livestock grazing practices, however, these areas could become essential habitat to both common and special status species.

Developed

Category 4 developed areas provide some important habitat to wildlife, but are not limited in the region. Previously cultivated fields (subtype D-B) of moderate condition are located throughout the lease boundary. There are approximately 100 acres of Category 4 D-B habitat within the Leaning Juniper II South analysis area. Vegetation is dominated by non-native annual grasses, primarily cheatgrass, Bulbous bluegrass, mouse barley (*Hordeum murinum*), and medusahead rye (*Taeniatherium caput-medusae*). Crested wheatgrass was seeded but is not dominant. Weedy forbs are present, but vertical structure (cover for wildlife) is limited, primarily due to grazing and several years of low precipitation. There is also an old field south of the Facility substation, which will be crossed by several Leaning Juniper II South collector lines. This field is currently occupied by non-native perennial crested wheatgrass, young sagebrush and rabbitbrush and annual grasses. During the 2005 field surveys, grasshopper sparrows were identified in this area. Other Category 4 D-B habitat within the analysis area is located north of Jones Canyon.

There is also a 44-acre disturbed area (subtype D-X) between the J turbine string and Highway 19 that appears to have been reseeded with grassland species in recent years. This area is classified as Category 4 habitat because it could provide important wildlife habitat, though it is not essential or limited.

The Category 4 fields have less plant diversity and higher concentrations of weeds than higher rated developed areas. However, with sufficient time and appropriate livestock grazing practices, however, the fields could become essential habitat.

P.3.2.5 Category 5 Habitat within Leaning Juniper II South Analysis Area

There was no Category 5 habitat identified within the analysis area.

P.3.2.6 Category 6 Habitat within Leaning Juniper II South Analysis Area

The majority of the habitat within the Leaning Juniper II South analysis area is Category 6 developed land (approximately 2,951 acres). This land is nonessential wildlife habitat with limited potential to become important or essential in the foreseeable future. Category 6 habitats within the analysis area include nonirrigated agricultural croplands and developments. The agricultural areas are a monoculture of dryland wheat and include those areas currently in production as well as cut, fallow fields. Developments include farm yards and residential areas, old fields adjacent to Highway 19, the Waste Management landfill and leachate pond, an existing rock quarry, and other disturbed grounds. All areas mapped as developed are highly disturbed on a regular basis and have been mostly or entirely cleared of native vegetation.

Due to the high level of disturbance, no special status/sensitive species are known or expected to occur in the Category 6 habitats and these areas are unlikely to become important or essential wildlife habitat in the foreseeable future.

P.4 DESCRIPTION OF BIOLOGICAL AND BOTANICAL SURVEYS PERFORMED

OAR 345-021-0010(1)(p)(B) *A description of biological and botanical surveys performed that support the information in this exhibit, including a discussion of the timing and scope of each survey;*

Response:

Sections P.4.1 through P.4.4 summarize the information review and the biological and botanical (habitat, rare plants) investigations completed specifically for the Facility and references studies conducted in the nearby area. The information review and field surveys conducted for both Leaning Juniper II North and Leaning Juniper II South were conducted using the same protocols, so these are discussed concurrently in this section.

P.4.1 Information Review

The pre-field review for special status/sensitive species of plants and wildlife within the analysis area included a query of the ORNHIC and USFWS databases for documented and projected occurrences of candidate, proposed, and listed species in the analysis area, as shown in Attachment Q-1 to Exhibit Q. Existing literature and scientific data were reviewed and ODFW biologists contacted for additional records in the general area and to discuss species distribution and habitat requirements. To supplement the information provided by ORNHIC and USFWS, a number of other sources were consulted for information on special status/sensitive plants. These sources provided additional information such as habitat preferences, morphological characteristics, phenologic development timelines, and species ranges. Sources included taxonomic keys and species guides, online databases of common and special status/sensitive plant species, and Natural Resources Conservation Service (NRCS) soils data; sources are listed at the end of the Rare Plant Habitat Assessment included as Attachment Q-1 to Exhibit Q, and at the end of the Wildlife Baseline Study included in Attachment P-2.

Based on the USFWS and ONHIC database searches, nine state-sensitive animal species are known to occur within 5 miles of the Facility lease boundary; no state-sensitive plants are known to occur. Table P-3 summarizes special status/sensitive animal species that may occur within the analysis areas according to the results of the pre-field review. No plant state species of concern were identified during the database searches. The table also indicates whether there is potential suitable habitat within the analysis area, and shows whether the species was documented during the field surveys. If there is no suitable habitat for the species within the analysis area, the species was not addressed further. State and federal listed and candidate plant and animal species are addressed in Exhibit Q, so are not included in this table.

TABLE P-3

Special Status/Sensitive Animal and Plant Species of Known or Potential Occurrence Within the Facility Analysis Areas

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near the Facility Site Boundaries D = Documented N = Not Documented
Mammals			
White-tailed jackrabbit *Lepus townsendii*	–	SU	**D**—Recorded in the Facility area, infrequently observed. Historic records in the general area: observed 1-2 miles south of Facility area in 2001 (Kronner, personal field notes).
Pallid bat *Antrozous pallidis*	–	SV	**N**—The general habitat is correct; large crickets available as food; presence will depend on availability of deep rock crevices as other roost types are mostly lacking.
Townsend's big-eared bat *Corynorhinus townsendii*	SoC	SC	**N**—Appropriate roost sites are mostly lacking; has not been recorded in Gilliam County (although not an easily detected species); questionable moth population on ridges and sites where wind turbines will be placed. Closest known population in Klickitat County, WA.
Silver-haired bat *Lasionycteris noctivagans*	SoC	SU	**N**—Area lacks tree roost sites. Likely to occur during fall migration (based on fatality records at four regional wind projects and preconstruction sampling conducted in July and September 2000 for the Condon Wind Project, Gilliam County, OR).
Western small-footed myotis *Myotis ciliolabrum*	SoC	SU	**N**—Habitat is correct for both foraging and roosting, although use of ridges and sites where wind turbines will be placed is questionable.
Long-eared myotis Myotis evotis	SoC	SU	**N**—More common in forests than arid grassland and shrub-steppe.
Fringed myotis *Myotis thysanodes*	SoC	SV	**N**—Most common roosts are in caves, mines, and snags; there are no records of this species for the Columbia Basin.
Long-legged myotis *Myotis volans*	SoC	SU	**N**—More common in forests than arid grassland and shrub-steppe.
Yuma myotis *Myotis yumanensis*	SoC	–	**N**—Might roost in rock crevices or old abandoned buildings, but would most likely forage near or over the Columbia River. Documented August 25, 2005, through acoustical monitoring at the town of Arlington approximately 4.5 miles from Leaning Juniper Facility site.
Birds			
Greater sandhill crane *Grus canadensis tabida*	–	SV	**N**—Not observed. May occur as migrant during migration seasons.

TABLE P-3

Special Status/Sensitive Animal and Plant Species of Known or Potential Occurrence Within the Facility Analysis Areas

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near the Facility Site Boundaries D = Documented N = Not Documented
Long-billed curlew *Numenius americanus*	–	SV	**D**—Recorded in the analysis area and known to occur in the general area. Nests in grassland flats and plateaus. Considered “Highly Imperiled” (U.S. and Canadian shorebird conservation plans) due to declines throughout its geographic range.
Golden eagle *Aquila chrysaetos*	EPA BoCC	–	**D**—Observed infrequently during avian use study of Leaning Juniper II South; none recorded during spring 2006 point count surveys of Leaning Juniper II North. A few nests are present within the general landscape: one long-term historic nest is located within 5 miles east of the Facility and was active in 2005 and 2006 (Kronner, personal field notes, 2005 and Pebble CUP 2006). Another historic nest is located approximately 5 miles northwest of Facility and a third is approximately 10 miles northeast of Facility.
American peregrine falcon *Falco peregrinus anatum*	NW BoCC	E	**N**—Has been seen in Arlington area (Morgan, pers. comm., 2004). Basalt cliffs along Columbia River within 5 to 7 miles are potentially suitable for nesting. Historic nest sites are present within 7 to 30 miles of the Facility. The nearest known active next in 2005 was located within 11 miles.
Ferruginous hawk *Buteo regalis*	SoC BoCC	SC FS	**D**—Nest structures on site are juniper trees. In 2005 and 2006, one active nest within the Facility boundary and one active nest southeast of Facility.
Swainson’s hawk *Buteo swainsoni*	BoCC	SV	**D**—Nests onsite in junipers or isolated deciduous trees.
Western burrowing owl *Athene cunicularia*	SoC BoCC	SC	**D**—One confirmed nest observed nearby in 2005 – was not active in 2006. No nests observed within the analysis area..
Loggerhead shrike *Lanius ludovicianus*	BoCC	SV	**D**—Suitable nesting habitat present—sagebrush and junipers. Observed during in-transit travel in sagebrush and junipers. Not typically found in the Columbia Basin in winter. Observed along Hwy 19 approximately 8.5 miles south of Arlington in December 1999 (Kronner, personal field notes).
Sage sparrow *Amphispiza belli*	BoCC	SC FS	**N**—May occur during migration. Sagebrush shrub habitat onsite very limited and likely not extensive to support breeding populations. Breeds at Boardman Conservation Area several miles east.

TABLE P-3

Special Status/Sensitive Animal and Plant Species of Known or Potential Occurrence Within the Facility Analysis Areas

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near the Facility Site Boundaries D = Documented N = Not Documented
Grasshopper sparrow *Ammodramus savannarum*	–	SV FS	**D**—Observed within the analysis area for Leaning Juniper II North during 2006 surveys. Some grasslands with good vertical structure for cover and perching.
Reptiles and Amphibians			
Northern sagebrush lizard *Sceloparus graciosus graciosus*	SoC	SV	**D**—Suitable habitat exists on the site in native habitat where there is less dense grass cover; also found in sandy soils with sagebrush and juniper or sagebrush and sand dunes. Observed within the analysis area for Leaning Juniper II south during 2005 surveys.
Western toad *Bufo boreus*	–	SV	**N**—No aquatic habitat, very limited potential for upland movements during wet periods. May be found around homes or Landfill Office where woody cover or ponds and domestic livestock watering sites may be present.
Plants			
None			

* Obtained from Oregon Natural Heritage Information Center Web Site on January 2005.

– = No listing.

Federal:

T	Threatened	SoC	Species of Concern
E	Endangered	NW	Not Warranted; delisted
C	Candidate	EPA	Eagle Protection Act

BoCC USFWS Birds of Conservation Concern (BCR 9, Great Basin).

Note: All migratory birds are protected by the Migratory Bird Treat Act (MBTA).
Sources for status = USFWS 2005, USFWS 2002

Oregon:

T	Threatened
E	Endangered
C	Candidate
SV	Sensitive Vulnerable; listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring.
SC	Critical; listing as threatened or endangered is pending or may be appropriate if immediate conservation actions are not taken.
SU	Undetermined; status is unclear, may be susceptible to population decline of sufficient magnitude that the species could qualify for endangered, threatened, critical, or vulnerable status. Additional information is required before a determination can be made.
SP	Peripheral or naturally rare; low population due to naturally limiting factors; maintaining status quo for habitats and populations is minimum requirement.
FS	Focal Species highlighted in the Draft John Day Subbasin Plan (CBMRCD/NWPPC, 2004)

TABLE P-3

Special Status/Sensitive Animal and Plant Species of Known or Potential Occurrence Within the Facility Analysis Areas

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near the Facility Site Boundaries D = Documented N = Not Documented

State and Federal Status Definitions

EA—Bald and Golden Eagle Protection Act.

SoC—Species of Concern. Former Category 2 candidates for which additional information is needed in order to propose as threatened or endangered under the ESA; these species are under review for consideration as Candidates for listing under the ESA.

SC—State Sensitive-Critical. Species for which listing is pending; or those for which listing may be appropriate if immediate conservation activities are not taken. Also considered critical are some peripheral species which are at risk throughout their range, and some disjunct populations.

SV—State Sensitive-Vulnerable. Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases the population is sustainable, and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.

SU—State Sensitive-Undetermined Status. Animals in this category are species whose status is unclear. They may be susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical or vulnerable status, but scientific study would be required before a judgment can be made.

ONHP Definitions

List 1—taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

List 2—taxa threatened with extirpation or presumed extirpated from Oregon; often peripheral or disjunct species which are of concern considering species diversity within Oregon; can be very significant in protecting the genetic diversity of the taxon; ONHP regards extreme rarity as a significant threat and has included species which are very rare in Oregon on this list.

List 3—taxa for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

List 4—taxa which are of conservation concern but not currently threatened or endangered; including taxa that are very rare but considered secure as well as those declining in numbers or habitat but still too common to be proposed as threatened or endangered; these taxa require continued monitoring.

Ex—Presumed extirpated or extinct.

P.4.2 Field Survey Methodology

P.4.2.1 Plants

Field surveys were conducted for state and federal listed and candidate plant species, as described in Exhibit Q. Sessile mousetail, a state candidate species, was identified onsite, and is discussed in Exhibit Q. However, no State Sensitive species were identified within known occurrences within 5 miles of the Facility lease boundary (USFWS, 2006; USFWS, 2005; ORNHIC, 2005). Based on the results of the database searches and known suitable habitat, there are no special status/sensitive plants anticipated within the analysis area. No additional rare plant surveys are proposed at this time.

P.4.2.2 Animals

The Applicant contracted Northwest Wildlife Consultants (NWC) to conduct wildlife surveys for the entire Facility. Based on the information review, NWC drafted a biological resources study protocol in the early winter of 2004/2005. The protocol was reviewed and approved by Gilliam County and the ODFW, and discussed with USFWS. Methods proposed were implemented in 2004 and 2005 for Leaning Juniper II South using the preliminary layout. Site-specific surveys included:

- Site reconnaissance in 2003 for suitable WGS habitat
- Wildlife habitat mapping within 1 mile of leased land in 2004; updated in 2006
- Avian use study conducted fall 2004 through summer 2005
- Raptor nest survey in 2005 and monitoring of special status raptor nests on Leaning Juniper I during the 2006 project construction (some nest sites in Leaning Juniper I and "South" areas overlap project boundaries).
- WGS surveys in 2005, spot-checks of some colonies in 2006
- Special status species surveys in 2005 (surveys for State Sensitive status wildlife utilizing the site's habitats during the spring-early summer breeding season) within 1,000 feet of the Facility components based on the 2005 layout, for a total width of 2,000 feet
- Bat species review (habitat suitability and potential for occurrence) and
- Wildlife habitat rating within the analysis area of the leased land in summer and fall 2005 and updated, where necessary, in 2006

NWC prepared a final Wildlife Baseline Study documenting the information review and 2005 field surveys. The study is included as Attachment P-2. A copy of the field survey protocol is included as Appendix A to the Wildlife Baseline Study. Information on the timing, scope, and results of the surveys is provided in the report as well. The report also included several components for addressing potential impacts to vertebrate wildlife from the construction and operation of the Facility.

Subsequent to these surveys, the Applicant revised the Facility to include Leaning Juniper II North. In 2005 and 2006, NWC conducted habitat mapping and multi-species wildlife surveys for the entire Leaning Juniper II North lease boundary. Site-specific surveys included:

- Site reconnaissance in 2005 for suitable WGS habitat
- Wildlife habitat mapping in 2005 and 2006
- Avian use study conducted in spring of 2006
- Raptor nest survey in 2006
- WGS surveys in 2006

- Special status species surveys in 2006 (surveys for State Sensitive status wildlife utilizing the site's habitats during the spring-early summer breeding season)
- Bat species review (habitat suitability and potential for occurrence) and
- Wildlife habitat rating in spring and summer 2006

Surveys were not conducted in disturbed areas lacking suitable habitat, such as plowed wheat fields or residential areas. Wildlife surveys also were not conducted below the bluff where no facilities are proposed.

No surveys were conducted for fish species of concern, since the nature of the Facility developments, on ridgelines or plateaus lacking perennial stream channels, precludes the presence of any fish species of concern (listed or nonlisted) or their habitats within or immediately adjacent to the proposed developments.

P.4.3 Habitat Typing and Categorization

Habitat types within a 1-mile buffer of the Leaning Juniper II South and within the Leaning Juniper II North lease boundary were delineated into broad habitats by a qualified biologist from NWC in the fall of 2004 and 2005, respectively. To initially map the habitats, NWC used aerial photography and County soils maps, at an acquisition scale of 1:24,000, to create a preliminary map of the boundaries of the fish and wildlife habitat types within the Facility area. Project-specific (custom flown) aerial photos were used later to validate initial mapping and for determining land use details not available otherwise.

These broad habitats were further defined into subtypes based on additional field surveys conducted in the spring and summer of 2005 and 2006. For each broad habitat type, field notes included dominant and co-dominant vegetation and overall habitat quality (vegetation structure, age, size of trees, presence or absence of invasive vegetation, history of disturbance). Experienced wildlife biologists sampled each of the broad habitat types during various field studies and draft habitat maps prepared from aerial photos were adjusted as necessary to reflect actual conditions in the field.

Habitats within the analysis area for both Leaning Juniper II North and Leaning Juniper II South were then rated according to the ODFW habitat categories defined in Section P.2. A habitat classification system (vegetation/land cover types) was developed for the Facility analysis areas based on the following: (1) the unique vegetation composition of each habitat type or category; (2) the habitat types considered important for supporting threatened, endangered, or special status/sensitive species, especially for nesting and denning; and (3) consistency, where applicable, with classification systems used by resource agencies. Habitat types were categorized (1 through 6) by means of the ODFW habitat mitigation goals and standards defined in OAR 635-415-0025 (as described in Section P.2) and through use of the wildlife location data from the 2005 and 2006 spring season and other field surveys (i.e., presence of sensitive species nesting or denning in the various habitats).

Where on-the-ground field surveys were not conducted, such as below the bluff on Leaning Juniper II North, habitat was mapped and rated from a distance and by referring to low-level aerial photos. These habitats were rated based on vegetation, potential for use by sensitive species and best professional judgment. The sub-types were assigned based on professional experience of the biologist conducting the mapping. The approach used to rate habitats is consistent with methods used at other wind and natural gas energy facilities approved under the EFSC process and these methods, such as the Stateline Wind Project area (FPLE, 2001, 2002a, 2002b), and have received approval by the local ODFW biologists.

Figures P-1 through P-4 illustrate the habitat types and categories found within the analysis area.

P.5 RESULTS OF FIELD SURVEYS

The results of the field surveys are discussed for Leaning Juniper II North and II South together in this section. However, Section P.7 differentiates between potential impacts to sensitive species identified in the surveys that may result from one or both of the two phases. Mitigation measures in Section P.8 are also discussed separately.

P.5.1 Plants

No federally listed, proposed, or candidate plant species were found during field investigations at the Facility. One state candidate plant species, Sessile mousetail, was found onsite, as described in Attachment Q-1 to Exhibit Q.

P.5.2 Animals

P.5.2.1 Avian Use Study

As part of the wildlife baseline studies, a four-season avian use study was conducted for Leaning Juniper II South in 2004 and 2005. A spring-season avian use study was also conducted for Leaning Juniper II North in 2006. The primary objectives of the fixed-point surveys were to (1) quantify and compare the general level of bird use and species composition within the Facility leased boundary with similar information collected at other regional facilities for the purpose of predicting impacts and (2) provide spatial and temporal information on avian use of the site. Point counts (variable circular plots) were conducted on the Facility and reference areas by means of methods described by Reynolds et al. (1980). The points were selected to survey representative habitats and topography of the study sites while also providing relatively even coverage with minimal overlap of surveyed areas, taking into consideration the location of access roads and landowner concerns about impacts to wheat crops. All birds seen during the point counts were recorded. Raptors and other large birds, species of concern, and species not previously seen onsite that were observed between point counts also were recorded; coordinates derived from a global positioning satellite (GPS) were also noted for species of concern.

Six circular plots with 0.5-mile radii were established in and around Leaning Juniper II South and surveyed on a weekly basis in 2004 and 2005, as shown in Figure 2 of the Wildlife Baseline Study included as Attachment P-2. In 2006, a seventh circular plot was established within the Leaning Juniper II North lease boundary and surveyed using the same protocol (Figure P-5b). Each plot consisted of a circle with an 800-meter (2,625-foot) radius centered on an observation point location. Landmarks were located to aid in identifying the 800-meter (2,625-foot) boundary of each observation point. Observations of birds beyond the 800-meter (2,625-foot) radius were recorded, but these observations were not included in standardized use estimates. The plots were located to provide good coverage of the habitat types and variation in topography of the Facility site and the proposed turbine strings. All wildlife seen or heard during 20-minute point counts was recorded. Species, number, flight height, weather, etc., were collected.

Survey periods at each point were 20 minutes long. All raptors and other large birds observed during the survey were assigned unique observation numbers and plotted on a topographic map of the survey plot. Date, time, and weather information, such as temperature, wind speed, wind direction, and cloud cover, were recorded for each survey. Species, number of individuals, sex and age classes (if possible), distance from plot center when first observed, closest distance, height above ground, activity (behavior), flight direction, and habitat were recorded for each bird observed. Flight or movement paths were mapped for all raptors and large birds and given corresponding unique observation numbers. This mapped information, such as point of first observation and flight path, was used when reviewing spatial use of the site.

Three instantaneous counts were made during each 20-minute observation period. An instantaneous count consists of a summary of all birds present in and near the plot at a particular time. The first instantaneous count was made at the beginning of the observation period and the remaining counts occurred at 10-minute intervals. During the instantaneous count, the observer scanned the full survey plot recording all birds seen at that moment. For each raptor or large bird seen during an instantaneous count, the approximate height above ground and distance to the observer were recorded. The behavior of each raptor or large bird observed and the habitat in or over which the bird occurred were recorded. Behavior categories included perching, soaring, flapping, flushed, circle soaring, flapping and hovering, gliding, and other (noted in comments). Habitats were recorded as winter wheat, stubble, plowed, riparian, deciduous tree or shrub, coniferous tree, sagebrush, grassland shrub-steppe, grassland, rock or rock outcrop, and other (noted in comments). Approximate flight height at first observation was recorded to the nearest meter or 5-meter increment and the approximate lowest and highest flight heights observed were also recorded. Any comments or unusual observations were noted in the comments section.

Sampling intensity was designed to document avian use and behavior by habitat and season in and around the Facility. Perched locations and flight paths of special status species or raptors were hand-plotted on topographic maps in the field. All detected wildlife were recorded, whether inside or outside the fixed point plot. Special status species or species of interest (such as raptors) were also recorded while in-transit near the proposed turbines during the avian surveys. Surveys were conducted during daylight hours and survey periods were varied to cover approximately all daylight hours during a season. To the extent practical, each station was surveyed about the same number of times each season.

Researchers documented 40 species of birds during the avian use surveys at the Facility. Seven special status bird species were observed during the avian point count surveys, listed in Table P-4. Sensitive bird species documented during the 2004 and 2005 baseline monitoring included Swainson's hawks (68 detections during point counts), ferruginous hawk (24 detections), golden eagle (8 detections), burrowing owl (5 detections), long-billed curlew (71 detections), and grasshopper sparrow (1 detection). In the course of the four-season study, 1,520 groups (flocks) comprising a total of 10,303 individual birds were recorded at the six survey points. During the spring 2006 surveys at Leaning Juniper II North, the only sensitive species documented during point counts was the long-billed curlew (5 detections).

Mean use and frequency observed in 2004 and 2005 is described in Table P-4. Mean use is the average number of birds of a given species observed during each 20-minute avian point count survey. Frequency of occurrence is the percent of surveys in which a species/group is observed; if a species is seen several times during the same survey it is only counted once for the calculation.

TABLE P-4

Avian Species Observed Within 800 m of Observer and Estimated Mean Use and Percent Frequency (Percent of Surveys in Which Species was Observed) Based on Plots Surveyed in 2004 and 2005 in and around the Facility Leased Boundary

Species	Use	% Freq.	Species	Use	% Freq.
	Fall			Winter	
Horned lark	9.464	92.05	Horned lark	21.844	84.44
Common raven	3.926	54.10	Unidentified passerine	11.022	18.89
Unidentified passerine	3.441	23.33	Common raven	7.433	72.22
European starling	0.962	2.56	Canada goose	4.167	6.67
Western meadowlark	0.410	19.23	European starling	1.667	1.11
White-crowned sparrow	0.410	2.56	Western meadowlark	0.344	20.00
American kestrel	0.221	14.36	American goldfinch	0.289	4.44
American pipit	0.154	5.13	Red-tailed hawk	0.122	11.11
American goldfinch	0.077	2.56	American pipit	0.089	2.22
Barn swallow	0.064	1.28	Mountain bluebird	0.067	3.33
Black-billed magpie	0.051	2.56	Black-billed magpie	0.033	3.33
Unidentified sparrow	0.051	2.56	American kestrel	0.022	2.22
Ferruginous hawk	0.046	1.54	Golden eagle	0.022	1.11
Rough-legged hawk	0.038	2.56	Northern harrier	0.022	2.22
Short-eared owl	0.038	2.56	Northern shrike	0.022	2.22
Swainson's hawk	0.028	2.82	Rough-legged hawk	0.022	2.22
Turkey vulture	0.028	2.82	American robin	0.011	1.11

TABLE P-4

Avian Species Observed Within 800 m of Observer and Estimated Mean Use and Percent Frequency (Percent of Surveys in Which Species was Observed) Based on Plots Surveyed in 2004 and 2005 in and around the Facility Leased Boundary

Species	Use	% Freq.	Species	Use	% Freq.
Golden eagle	0.026	2.56	Ferruginous hawk	0.011	1.11
Northern harrier	0.026	2.56	Lark sparrow	0.011	1.11
Sharp-shinned hawk	0.026	2.56	Prairie falcon	0.011	1.11
Unidentified buteo	0.026	2.56	Sharp-shinned hawk	0.011	1.11
Yellow-rumped warbler	0.026	1.28			
American crow	0.013	1.28			
Dark-eyed junco	0.013	1.28			
Northern flicker	0.013	1.28			
Prairie falcon	0.013	1.28			
Red-tailed hawk	0.013	1.28			
Unidentified woodpecker	0.013	1.28			
	Spring			**Summer**	
Horned lark	3.833	95.45	Horned lark	4.267	68.33
Common raven	2.076	60.61	Common raven	0.733	21.67
Unidentified gull	1.606	6.06	Swainson's hawk	0.517	33.33
Western meadowlark	1.530	78.79	Western meadowlark	0.367	23.33
European starling	0.939	4.55	American kestrel	0.133	10.00
Long-billed curlew	0.864	36.36	Long-billed curlew	0.133	6.67
Ring-billed gull	0.182	3.03	Ferruginous hawk	0.117	8.33
American pipit	0.136	3.03	Red-tailed hawk	0.117	8.33
Swainson's hawk	0.106	7.58	Burrowing owl	0.083	5.00
Red-tailed hawk	0.091	9.09	Unidentified passerine	0.067	3.33
Ferruginous hawk	0.061	6.06	Northern harrier	0.050	5.00
Barn swallow	0.045	3.03	Black-billed magpie	0.033	3.33
Golden eagle	0.045	4.55	Osprey	0.033	1.67
Western kingbird	0.045	4.55	Cliff swallow	0.017	1.67
Northern harrier	0.030	3.03	Mourning dove	0.017	1.67
Ring-necked pheasant	0.030	3.03	Unidentified falcon	0.017	1.67
Savannah sparrow	0.030	3.03	Unidentified gull	0.017	1.67
American crow	0.015	1.52	Unidentified hummingbird	0.017	1.67
American kestrel	0.015	1.52	Western kingbird	0.017	1.67
Grasshopper sparrow	0.015	1.52			
Merlin	0.015	1.52			
Rough-legged hawk	0.015	1.52			
Unidentified raptor	0.015	1.52			

TABLE P-4

Avian Species Observed Within 800 m of Observer and Estimated Mean Use and Percent Frequency (Percent of Surveys in Which Species was Observed) Based on Plots Surveyed in 2004 and 2005 in and around the Facility Leased Boundary

Species	Use	% Freq.	Species	Use	% Freq.

Mean use and frequency was also recorded for Leaning Juniper II North in the spring of 2006. As shown in Table P-5, the total mean use or number of birds seen per survey at Leaning Juniper II North was similar to that observed during spring 2005 in and around Leaning Juniper II South. In addition, the number and type of avian groups and species observed at Leaning Juniper II North during the 2006 spring surveys is similar. The most common species observed at both areas was the horned lark, and three of the four most abundant species were horned larks, common ravens and western meadowlarks. Mean use by raptors was higher at Leaning Juniper II North due to higher numbers of red-tailed hawks observed at the single point count, but sensitive raptors were less common in this area than near Leaning Juniper II South. The frequency of occurrence by species/group of birds was also similar; passerines were detected during nearly all of the surveys, followed by shorebirds, raptors and waterbirds.

TABLE P-5

Comparison of Avian Mean Use and Mean Percent Frequency (Percent of Surveys in Which Species was Observed) of Occurrence Recorded During Spring in 2005 and in 2006 at Leaning Juniper II North

Species	Use	% Freq.	Species	Use	% Freq.
	2005 Spring in/around Leaning Juniper II South			2006 Spring at Leaning Juniper II North	
Horned lark	3.833	95.45	Horned lark	5.333	75.00
Common raven	2.076	60.61	Common raven	0.917	41.67
Unidentified gull	1.606	6.06	Unidentified gull	0.500	16.67
Western meadowlark	1.530	78.79	Western meadowlark	1.833	83.33
European starling	0.939	4.55	European starling	0.417	8.33
Long-billed curlew	0.864	36.36	Long-billed curlew	0.417	16.67
Ring-billed gull	0.182	3.03	Ring-billed gull	0	0
American pipit	0.136	3.03	American pipit	0	0
Swainson's hawk	0.106	7.58	Swainson's hawk	0	0
Red-tailed hawk	0.091	9.09	Red-tailed hawk	0.667	25.00
Ferruginous hawk	0.061	6.06	Ferruginous hawk	0	0
Barn swallow	0.045	3.03	Barn swallow	0.250	8.33
Golden eagle	0.045	4.55	Golden eagle	0	0
Western kingbird	0.045	4.55	Western kingbird	0	0
Northern harrier	0.030	3.03	Northern harrier	0	0
Ring-necked pheasant	0.030	3.03	Ring-necked pheasant	0	0

TABLE P-5

Comparison of Avian Mean Use and Mean Percent Frequency (Percent of Surveys in Which Species was Observed) of Occurrence Recorded During Spring in 2005 and in 2006 at Leaning Juniper II North

Species	Use	% Freq.	Species	Use	% Freq.
Savannah sparrow	0.030	3.03	Savannah sparrow	0.250	16.67
American crow	0.015	1.52	American crow	0	0
American kestrel	0.015	1.52	American kestrel	0.167	8.33
Grasshopper sparrow	0.015	1.52	Grasshopper sparrow	0	0
Merlin	0.015	1.52	Merlin	0	0
Rough-legged hawk	0.015	1.52	Rough-legged hawk	0	0
Unidentified raptor	0.015	1.52	Unidentified raptor	0	0
Sharp-shinned Hawk	0	0	Sharp-shinned Hawk	0.083	8.33
Cliff Swallow	0	0	Cliff Swallow	0.083	8.33
Total Mean Use	11.76		Total Mean Use	11.08	

During the 2004-2005 surveys, mean use by all species of birds combined was 23.7 per survey across all seasons, as shown in Table P-6. Avian use of the area within the Facility leased boundary was highest in winter (47.2 per survey) and lowest in the summer (6.8 per survey). The mean number of species observed per survey (avian richness) was highest in the spring (3.4 species per 20 minute interval) and lowest in the summer (2.0 per survey).

TABLE P-6

Mean Use, Mean Number of Species/Survey, Total Number of Species, and Total Number of Fixed-Point Surveys Conducted by Season and Overall Based on Plots Surveyed in 2004 and 2005 in and around Facility

Season	No. Visits	Mean Use	No. Species/Survey	No. Species	No. Surveys
Fall	13	19.615	2.538	25	77
Winter	15	47.244	2.433	20	90
Spring	11	11.758	3.424	23	66
Summer	10	6.750	2.083	17	60
Overall	49	23.684	2.612	42	293

Fall Season Data:	August 27, 2004, through November 30, 2004.
Winter Season Data:	December 1, 2004, through March 15, 2005.
Spring Season Data:	March 16, 2005, through May 31, 2005.
Summer Season Data:	June 1, 2005, through August 15, 2005.

Passerines (songbirds) were the most abundant group across all seasons, comprising from 97.2 percent of all birds observed in the fall season to a low of 73.8 percent of all birds in the spring (Table P-7). Waterbirds were the next most abundant group in the spring and winter, comprising 15.2 percent of the birds in the spring and 8.8 percent in the winter. However, waterbirds were barely present in the summer, with only 0.3 percent of the bird detections and no detections in the fall. Shorebirds comprised up to 7.4 per cent of all birds observed in the spring and 2.0 percent in the summer, but were not observed at all in the fall and winter surveys. Raptors were the second most abundant birds in the summer and fall with 15.8 and 2.7 percent of the bird counts respectively.

The most abundant species across all seasons were horned larks and common ravens. In the spring, avian use was as follows: horned lark (3.83 per survey), common raven (2.08), unidentified gull (1.61), western meadowlark (1.53), and European starling (0.94). In the summer, species with the highest use were horned lark (4.27 per survey), common raven (0.73), Swainson's hawk (0.52), western meadowlark (0.37), and American kestrel (0.13). In the fall, species with the highest use were horned lark (9.46 per survey), common raven (3.93), European starling (0.96), western meadowlark (0.41), and white-crowned sparrow (0.41). Finally, species with the highest use in winter were horned lark (21.84/survey), common raven (7.43), Canada goose (4.17), European starling (1.67), and western meadowlark (0.34).

Fourteen species of raptors were documented during the four-season study (all distances from observer, inside the plot and outside the plot). Swainson's hawk was the most abundant raptor species in the spring (0.11 per survey), followed by red-tailed hawk (0.09), ferruginous hawk (0.06), and golden eagle (0.05). Swainson's hawk was also the most abundant raptor species in the summer (0.52 per survey), followed by American kestrel (0.13), ferruginous hawk (0.12), and red-tailed hawk (0.12). However, in the fall, American kestrel was the most abundant raptor species (0.22 per survey), followed by ferruginous hawk (0.05), rough-legged hawk (0.04), and short-eared owl (0.04). Red-tailed hawk was the most abundant winter raptor (0.12 per survey), followed by American kestrel, golden eagle, northern harrier, and rough-legged hawk (all 0.02 per survey). Use of the area by all raptors combined was highest in the summer (1.07 per survey) and lowest in the winter (0.24 per survey); raptor use of the area was 0.39 in the spring and 0.53 in the fall.

The full results for the avian use study are provided in the Wildlife Baseline Study (Attachment P-2).

TABLE P-7

Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups by Season Based on Plots Surveyed in 2004 and 2005 in and around Facility

Group	Fall	Winter	Spring	Summer
	Mean Use number/20-minutes)			
Waterbirds/waterfowl	0.000	4.167	1.788	0.017
Shorebirds	0.000	0.000	0.864	0.133
Raptors/vultures	0.528	0.244	0.394	1.067
Accipiters	0.026	0.011	0.000	0.000
Buteos	0.151	0.156	0.273	0.750
Northern harrier	0.026	0.022	0.030	0.050

TABLE P-7

Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups by Season Based on Plots Surveyed in 2004 and 2005 in and around Facility

Group	Fall	Winter	Spring	Summer
Eagles	0.026	0.022	0.045	0.000
Falcon	0.233	0.033	0.030	0.150
Owls	0.038	0.000	0.000	0.083
Other raptors	0.000	0.000	0.015	0.033
Vultures	0.028	0.000	0.000	0.000
Passerines	19.062	42.833	8.682	5.517
Upland gamebirds	0.000	0.000	0.030	0.000
Other birds	0.026	0.000	0.000	0.017
Overall	19.615	47.244	11.758	6.750
		% Group Composition (number/20-minutes)		
Waterbirds/waterfowl	0.00	8.82	15.21	0.25
Shorebirds	0.00	0.00	7.35	1.98
Raptors/vultures	2.69	0.52	3.35	15.80
Accipiters	0.13	0.02	0.00	0.00
Buteos	0.77	0.33	2.32	11.11
Northern harrier	0.13	0.05	0.26	0.74
Eagles	0.13	0.05	0.39	0.00
Falcon	1.19	0.07	0.26	2.22
Owls	0.20	0.00	0.00	1.23
Other raptors	0.00	0.00	0.13	0.49
Vultures	0.14	0.00	0.00	0.00
Passerines	97.18	90.66	73.84	81.73
Upland gamebirds	0.00	0.00	0.26	0.00
Other birds	0.13	0.00	0.00	0.25
Overall	100.00	100.00	100.00	100.00
		% Freq. of Occurrence		
Waterbirds/waterfowl	0.00	6.67	7.58	1.67
Shorebirds	0.00	0.00	36.36	6.67
Raptors/vultures	34.10	18.89	33.33	58.33
Accipiters	2.56	1.11	0.00	0.00
Buteos	10.77	13.33	21.21	46.67
Northern harrier	2.56	2.22	3.03	5.00
Eagles	2.56	1.11	4.55	0.00
Falcon	15.64	3.33	3.03	11.67

TABLE P-7

Mean Use, Percent Composition, and Percent Frequency of Occurrence for Avian Groups by Season Based on Plots Surveyed in 2004 and 2005 in and around Facility

Group	Fall	Winter	Spring	Summer
Owls	2.56	0.00	0.00	5.00
Other raptors	0.00	0.00	1.52	1.67
Vultures	2.82	0.00	0.00	0.00
Passerines	94.62	98.89	100.00	75.00
Upland gamebirds	0.00	0.00	3.03	0.00
Other birds	2.56	0.00	0.00	1.67

P.5.2.2 Raptor Nest Surveys

Aerial raptor nest surveys were conducted for the Leaning Juniper II South lease boundary and a 2-mile buffer area in 2005, covering approximately 61 square miles. Residential areas were not surveyed. In 2006, another aerial survey of raptor nests was conducted to include the unsurveyed area within 2 miles of the Leaning Juniper II North lease boundary.

During the 2005 raptor nest surveys for Leaning Juniper II South, 27 active nests were identified during these surveys, including:

- 11 Swainson’s hawk nests
- 10 red-tailed hawk nests
- 2 ferruginous hawk nests
- 1 prairie falcon nest
- 1 great-horned owl nest
- 2 common raven nests

In addition, three inactive stick nests that could provide habitat to sensitive raptors were identified within the lease boundary. These nests were relatively large and may have been used by ferruginous hawks in the past or will be used in the future. They may also be serving as courtship nests. One of these was occupied by a Swainson’s hawk in 2005.

Twenty-two inactive nests were also identified during the surveys. Some of these were very old and may not have been used for several years but were recorded into the database because these sites may still be attractive for future raptor nesting (not all would be occupied in any given year), depending on competition with other raptors or with ravens, the ability of the tree to still support a nest, and the level of prey availability in the general area. Some of the inactive nests may have been originally built and/or used by common ravens.

During the 2006 raptor nest surveys at Leaning Juniper II North, 18 active nests were identified during these surveys, including:

- 5 red-tailed hawk nests
- 4 Swainson's hawk nests
- 4 common raven nests
- 2 prairie falcon nest
- 2 American kestrels
- 1 barn owl nest

In addition, two inactive stick nests that could provide habitat to sensitive raptors were identified within the lease boundary. These nests were relatively large and may have been used by ferruginous hawks, a special status species of interest, in the past or will be used in the future. They may also be serving as courtship nests. Twelve inactive nests were also identified during the surveys.

The proximity of these active nests and two inactive large stick nests in relation to the Leaning Juniper II North and South Facility components is shown in Tables P-8 and P-9. The large stick nests were included in the tables on the basis that they could be used by a ferruginous hawk in the future. Figure P-5a shows the mapped locations of these raptor nests. Potential impacts to these raptor nests are discussed in sections 7.1.5 and 7.2.5.

There are six active raptor nests within a half mile of Leaning Juniper II North, including one red-tailed hawk, one American kestrel, one common raven nest, and two active raptor nests of unknown species (potentially owl), all of which are nesting along the escarpment except the raven, which is nesting in a transmission line structure. There is also one active Swainson's hawk nest within a half mile of Leaning Juniper II North, although this nest is located on the other side of the railroad and Highway 19 away from construction and operation. There were also two inactive large stick nests just over a half mile away, one located in a juniper tree and the other in the power line pole, which could be used by ferruginous or Swainson's hawks in the future. Proximity of nests to turbines is shown in Table P-8. Given that the Applicant seeks micrositing flexibility for Leaning Juniper II, the proximity of turbines to raptor nests was also analyzed based on moving the turbines within the micrositing corridor to the "worst case" location or the location closest to the nest. In some instances, the nest is within the micrositing corridor. However, the facilities would not be moved onto the escarpment, and in no instance would the Facility result in clearing of nests.

TABLE P-8

Raptor Nests Within 0.5 Mile and 2 Miles of Leaning Juniper II North Current Layout and Worst Case Scenario

Raptor Species	Total Number of Nests	GIS Nest ID	Closest Turbine ID (Others within 0.5 mi)	Distance to Nest with Current Layout (feet/miles)		Distance to Nest with Worst Case Scenario (feet/miles)
Raptor Nests Within 0.5 Mile of Leaning Juniper II North Turbines (NWC 2006)						
Red-tailed hawk	1	159	I-5 (I-1 thru I-8, I-15)	147.52	0.09	0.0—Nest is within corridor
Common Raven	1	340	H-4 (H-2 thru H-7)	353.80	0.22	0.0—Nest is within corridor

TABLE P-8

Raptor Nests Within 0.5 Mile and 2 Miles of Leaning Juniper II North Current Layout and Worst Case Scenario

Raptor Species	Total Number of Nests	GIS Nest ID	Closest Turbine ID (Others within 0.5 mi)	Distance to Nest with Current Layout (feet/miles)		Distance to Nest with Worst Case Scenario (feet/miles)	
Active Raptor Nest - Unknown Species	2	378	H-1 (H-1, H-2)	559.64	0.35	336.25	0.21
		379	I-1 (H-1 thru H-3)	652.15	0.41	0.0—Nest is within corridor	
American kestrel	1	377	G-3 (G-1 thru G-5)	720.54	0.45	0.0—Nest is within corridor	
Swainson's hawk	1	380	I-8 none	755.79	0.47	627.69	0.39
Active Raptor Nests Within 2 Miles of Leaning Juniper II North Lease Boundary (NWC 2006)							
Inactive Large Stick Nest	2	337	G-4	813.33	0.51	635.47	0.39
Inactive Large Stick Nest		335	G-8	823.13	0.51	596.98	0.37
Swainson's Hawk	1	336	G-7	1067.37	0.66	851.99	0.53
American kestrel	1	87	I-1	1745.29	1.08	1518.06	0.94
Common Raven	1	154	I-1	1957.56	1.22	1496.19	0.93
Barn Owl	1	386	G-1	2181.21	1.36	1501.85	0.93
Prairie Falcon	1	342	I-1	2249.47	1.40	2130.63	1.32

There are nine active raptor nests within a half mile of Leaning Juniper II South, including four Swainson's hawk nests within a half mile of several turbines, as shown in Table P-9. There is also one large stick nest within a half mile of several turbines, which could be used by a ferruginous hawk in the future. Proximity of nests to turbines is shown in Table P-9. Given that the Applicant seeks micrositing flexibility for Leaning Juniper II, the proximity of turbines to raptor nests was also analyzed based on moving the turbines within the micrositing corridor to the "worst case" location or the location closest to the nest. In some instances, the nest is within the micrositing corridor. However, in no instance would the facilities be moved into woodland or result in the clearing of nest trees or other mature trees.

TABLE P-9

Raptor Nests Within 0.5 Mile and 2 Miles of Leaning Juniper II South Current Layout and Worst Case Scenario

Raptor Species	Total Number of Nests	GIS Nest ID	Closest Turbine ID (Others within 0.5 mi)	Distance to Nest with Current Layout (feet/miles)		Distance to Nest with Worst Case Scenario (feet/miles)	
Raptor Nests Within 0.5 Mile of Leaning Juniper II South Turbines (NWC 2005)							
Great horned owl	1	40	J-3 (J-1 thru J-6)	136.46	0.08	0.0 - Nest is within corridor	
Swainson's Hawk	4	30	J-7 (J-4 thru J-11)	302.61	0.19	0.0 - Nest is within corridor	
		9	D-12 (D-9 thru D-16)	311.52	0.19	95.37	0.06
		41	J-1 (J-2, J-3)	350.59	0.22	0.0 - Nest is within corridor	
		24	E-4 (E-1 thru E-7)	381.65	0.24	160.73	0.10
Common Raven	1	16	D-16 (D-13 thru D-15)	338.80	0.21	185.33	0.12
Inactive Large Stick Nest	1	10	E-4 (E-1 thru E-6)	590.95	0.37	211.87	0.13
Red-tailed hawk	1	29	D-16 (D-15)	605.34	0.38	179.40	0.11
	1	6	F-1 none	756.76	0.47	381.71	0.24
Active Raptor Nests Within 2 Miles of Leaning Juniper II South Lease Boundary (NWC 2005)							
Common Raven	1	17	B-15	2625.51	1.63	2304.15	1.43
Ferruginous Hawk	2	42	F-5	1105.23	0.69	542.53	0.34
		35	J-17	1455.77	0.90	926.12	0.58
Inactive Large Stick Nest	1	49	J-14	861.89	0.54	348.65	0.22
Prairie falcon	1	7	F-1	1345.10	0.84	1053.55	0.65
Red-tailed Hawk	6	54	F-1	1756.11	1.09	819.36	0.51
		39	J-17	1178.65	0.73	926.28	0.58
		37	F-13	1696.89	1.05	1585.57	0.99
		28	J-6	1722.45	1.07	298.07	0.19
		33	J-17	3169.66	1.97	2832.82	1.76
		19	A-6	3335.17	2.07	2068.44	1.29

TABLE P-9

Raptor Nests Within 0.5 Mile and 2 Miles of Leaning Juniper II South Current Layout and Worst Case Scenario

Raptor Species	Total Number of Nests	GIS Nest ID	Closest Turbine ID (Others within 0.5 mi)	Distance to Nest with Current Layout (feet/miles)		Distance to Nest with Worst Case Scenario (feet/miles)	
Swainson's Hawk	6	32	J-16	1194.67	0.74	972.25	0.60
		34	J-16	1529.33	0.95	1181.79	0.73
		38	F-13	1641.71	1.02	1331.92	0.83
		15	F-1	2013.13	1.25	1858.59	1.15
		27	F-6	2118.95	1.32	359.01	0.22
		20	A-1	2367.18	1.47	1497.77	0.93

The closest Swainson's hawk nest (nest 30) is located in a juniper tree adjacent to Highway 19, approximately 300 feet from turbine J-7 and within a half mile of other turbines in that string. This nest is located immediately adjacent to both the railroad and highway. A second nest (nest 41) is located along Stone Lane approximately 350 feet west of the J turbine string. The nest is located in an isolated juniper tree south of the main access road, Stone Lane. Two other Swainson's hawk nests are located within a half mile of Leaning Juniper II South, but outside the micrositing corridor. The first (nest 9) is located in a dry wash to the east of the D turbine string on the edge of the wheat fields. Both nests are located outside the site boundary, and would not be affected by the Facility footprint. located The second (nest 24) is also located in a drainage; this nest is located approximately 380 feet from the E turbine string in an isolated juniper tree on the eastern side of Jones Canyon.

P.5.2.3 Special Status Species Surveys

Five special status species were identified during surveys conducted in the survey corridors areas during the spring season nesting and denning season (for State Sensitive status species and Federal Species of Concern). Data from the avian use survey were also reviewed for detections of these species. These species are discussed below. Figure P-6 shows the location of these special status species.

Loggerhead shrike (State Sensitive-Critical)

Loggerhead shrikes were found in areas with mature sagebrush cover or in juniper woodlands and occasionally at isolated juniper trees. Several nests were found in sagebrush and juniper trees in Juniper Woodland Canyon between Leaning Juniper II North and South. Others were found in Jones Canyon. Nest success seemed to be moderate to high as many young birds were observed at various times. The species was also detected during in-transit travel onsite for other studies conducted in 2005.

Burrowing Owl (State Sensitive-Critical, Federal Species of Concern)

One bird was observed during early fall 2004 outside of the leased land. The bird could have nested outside of the surveyed corridors or could have been a transient or migrant from outside of the Facility leased boundary. An active burrowing owl nest was documented during the 2005 surveys. However, the nest is not located within the Facility lease boundary and was not active in 2006. None were observed during winter season.

Long-billed curlew (State Sensitive-Vulnerable)

Long-billed curlews were frequently seen or heard along Rattlesnake Road, portions of Leaning Juniper II North and near the E and F turbine strings at Leaning Juniper II South in open low shrub and grassland terrain. Curlew locations were mapped based on behavior observed and recorded during multiple surveys conducted within the survey corridors/areas between the spring arrival period (mid-March) and the summer departure period (June). Each location in Figure P-6 indicates a breeding pair or a territory that was defended by individuals or small groups, or a nest. Several nests were also found.

Grasshopper sparrow (State Sensitive-Vulnerable)

Grasshopper sparrows, a ground-nesting grassland bird species, were found primarily near the Facility substation and within the Leaning Juniper II North lease boundary in open low shrub and grassland areas. Density within the Leaning Juniper II North leased land is considered high but typical for the grassland and shrub-steppe habitat structure in that area. No grasshopper sparrows were found within the Leaning Juniper II South lease boundary.

White-tailed jackrabbit (State Sensitive-Undetermined)

Two white-tailed jackrabbits were observed in the southern part of the Leaning Juniper II North lease boundary and two others were observed in the central part of Leaning Juniper II South. Jackrabbit droppings were found in few other areas within the Facility lease boundary. However, the scat may also have been from another species, black-tailed jackrabbit (not sensitive-status), and survey results indicate relatively low use within the Facility leased boundary.

P.5.2.4 Bat Review

Because preconstruction bat use studies are generally inconclusive for predicting bat mortality rates at wind farms, the Applicant contracted NWC to review the bat habitat suitability and potential for occurrence and collision risk. Sources included bat species data from Morrow County and Klickitat County, Washington (north of the Facility site across the Columbia River), agency personnel and databases, and bat fatality monitoring study results from regional wind projects.

Most bat species roost in structures such as buildings, caves, mines, trees, and bridges, which are rare to absent within the Facility leased boundary. There are some rock crevices in the escarpments and scattered juniper trees in the general area that could provide summer roost sites to the pallid bat, big brown bat, California myotis, western small-footed myotis and western pipstrelle. However, the Facility area lacks water for drinking and a stable food source. The dry grassland, wheat crop, and other habitats in the area are not likely to support a substantial night-flying insect population. If bats were to roost in the area, they would likely fly to canyons and ponds outside the Facility leased boundary or the Columbia River for water and food. Because foraging habitat and water sources are limited within the Facility leased boundary, the construction and decommissioning of the Facility is not anticipated to result in the loss or degradation of bat roosting and foraging habitat within the Facility leased boundary. The potential impact to bats could be from collision mortality during operation.

P.6 MAP OF HABITAT LOCATION

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

Response:

The habitat types and categories described in Section P.3 are illustrated in Figures P-1 through P-4.

P.7 DESCRIPTION OF SIGNIFICANT POTENTIAL IMPACTS ON IDENTIFIED HABITATS

OAR 345-021-0010(1)(p)(D) *A description of the nature, extent and duration of significant potential impacts on the habitat identified in (A) that may result from construction, operation, and retirement of the proposed facility*;

Response:

This section describes potential significant impacts of the Facility to identified wildlife habitats during construction, operation, and retirement. Impacts resulting from Leaning Juniper II North and South are discussed separately.

The nature, extent, and duration of significant potential impacts that could result from construction, operation, and retirement of the Facility were identified based on the existing values of each site that would be directly or indirectly impacted by the proposed Facility.

P.7.1 Potential Impacts Resulting from Leaning Juniper II North

This section identifies potential direct and indirect impacts to habitats and wildlife identified within the Leaning Juniper II North analysis area, based on construction, operation, and retirement of the proposed Facility layout.

P.7.1.1 Potential Impacts to Wildlife Habitat from Leaning Juniper II North

Potential impacts to wildlife habitat from construction of Leaning Juniper II North include temporary and permanent habitat loss, and alteration and disturbance during construction and operation. After Facility retirement, a site restoration plan will ensure conversion of the operations corridors back to a site condition similar to preconstruction conditions. Table P-10A summarizes the temporary and permanent impacts to wildlife habitat based on an "expected" layout shown in Exhibit C. Table P-10B summarizes the same types of impacts based on a "worst case" layout within the proposed micrositing corridors shown in Figure P-7.

When calculating impacts from the "expected" layout, the 133 GE 1.5-MW turbines were used. As described in Exhibit B, each tower will be supported by a reinforced concrete foundation ranging from 15 to 24 m (48 to 80 feet) in width, for a total area of up to 6,400 square feet. The majority of the foundation will be installed 3 feet below grade, and only a small portion will be located aboveground and covered with gravel for fire protection. At each tower, a circular area will be permanently impacted by the tower itself (ranging in diameter at the base from 14 to 16 feet) and the surrounding graveled area (ranging in radius from 10 to 15 feet). The largest permanent footprint for each tower would be a circular area of approximately 1,660 square feet. The temporary footprint for the area of disturbance around each tower for staging turbine blades is based on the 1.5-MW turbine. The circular impact area consists of a 130-foot radius for 253-foot-diameter (77-meter-diameter) rotors, for a total area of approximately 51,437 square feet.

Areas of impact based on the expected layout described above are summarized in Table P-10A.

TABLE P-10A

Habitat Types and Categories in the Leaning Juniper II North Analysis Area with Area of Impact

		Impacts		
Category and Habitat Description	**Habitat Subtype**	**Total Acres Within Lease Boundary**	**Temporary [1] Facilities (Acres Disturbed)**	**Permanent [2] Facilities (Acres Disturbed)**
Category 1				
Raptor nests (Juniper woodland, escarpment)	WJ, ESC	<1	0.00	0.00
Category 2				
Escarpment	ESC	78	0.00	0.00
Open low shrub	SSB	27	0.52	0.37
Bitterbrush/Buckwheat, Bunchgrass-Annual grass	SSE	244	13.44	1.98
Perennial bunchgrass	GB	3	0.00	0.00
Category 3				
Old field	DB	4	0.00	0.00
Shrub-grass	SSA	14	0.30	0.23
Open low shrub	SSB	2321	68.08	14.82

TABLE P-10A

Habitat Types and Categories in the Leaning Juniper II North Analysis Area with Area of Impact

Category and Habitat Description	Habitat Subtype	Impacts		
		Total Acres Within Lease Boundary	Temporary [1] Facilities (Acres Disturbed)	Permanent [2] Facilities (Acres Disturbed)
Category 4				
Exposed basalt	EB	44	4.19	0.77
Annual grass and weeds with residual native bunchgrass	GA	16	1.86	0.63
Category 5				
Old field	DB	85	7.19	1.20
Dryland wheat	DW	111	0.00	0.00
Category 6				
Farmyard	DF	25	0.29	0.23
Quarry	DQ	26	0.12	0.06
Other disturbed ground	DX	6	0.00	0.00

[1] Temporary facilities include access roads, construction areas, access for overhead line construction, installation sites for underground collector cables, and equipment laydown areas for individual turbines, entire strings of turbines, and laydown areas for in-transit towers, cranes, and miscellaneous construction equipment.

[2] Permanent facilities include turbine pads and towers, substation, meteorological towers, O&M facility or facilities, and permanent access roads.

[3] Because some Facility impact areas overlap, the total Facility disturbance to habitat is less than the sum of all Facility impact areas, as shown in Tables C-4 and C-5. The total areas presented in Tables C-4 and C-5 do not provide a precise estimate of the Facility's total impact to land and habitat. Because Tables C-4 and C-5 do not account for overlapping impact areas, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables (Tables P-10 and P-15) using GIS, overlapping impact areas were not double-counted. As a result, the tables in Exhibit P provide a more accurate total calculation of impact to habitat.

Temporary impacts are the construction-related impacts associated with the laydown areas and the underground collector systems. These areas will be temporarily disturbed during construction and will be restored to preconstruction condition after the construction-related activities are complete.

Because the Applicant seeks micrositing flexibility for Leaning Juniper II North, habitat impacts were analyzed based on the "worst case" situation (Table P-10B). When calculating the "worst case" impacts, as shown in Table P-10B, 133 3.0-MW turbines were used. While the permanent footprint would be the same for both turbine types because of the grounded area, the temporary footprint would be larger for the 3.0-MW turbines. The temporary footprint for the larger turbine would have a radius of 164 feet for 328-foot-diameter (100-meter-diameter) rotors, for a total of approximately 84,545 square feet. (A greater number of smaller turbines might have a larger impact in total ground area than a smaller number of larger turbines. Therefore, in order to provide a single "worst case" analysis, the Applicant calculated the area of permanent impact using the maximum number of turbines *and* the largest of the permanent footprints. This method provides a worst case analysis consistent with other sections of the ASC. Expected impacts are not overstated in this analysis.)

The "worst case" impact analysis is based also on moving the turbines and permanent facilities to locations within the micrositing corridor into a higher rated habitat than where the turbine is currently shown to be located. The micrositing corridor is defined in Exhibit C. In some places the micrositing corridor overlaps with Category 1 habitat (i.e., active raptor nests located within the corridor). However, in no instance would the facilities be moved into woodland or other Category 1 habitat. Figure P-7 illustrates these "worst case" situations.

Areas of impact based on the worst case layout described above are summarized in Table P-10B.

TABLE P-10B

Habitat Types and Categories in the Leaning Juniper II North Analysis Area with Maximum Possible Area of Impact

		Impacts (Worst Case)		
Category and Habitat Description	**Habitat Subtype**	**Total acres Within Lease Boundary**	**Temporary [1] Facilities (Acres Disturbed)**	**Permanent [2] Facilities (Acres Disturbed)**
Category 1				
Raptor nests (Juniper woodland, escarpment)	WJ, ESC	<1	0.00	0.00
Category 2				
Escarpment	ESC	78	0.00	0.00
Open low shrub	SSB	27	0.73	0.37
Bitterbrush/Buckwheat, Bunchgrass-Annual grass	SSE	244	20.73	2.29
Perennial bunchgrass	GB	3	0.00	0.00
Category 3				
Old field	DB	4	0.00	0.00
Shrub-grass	SSA	14	0.30	0.23
Open low shrub	SSB	2321	92.40	15.57
Category 4				
Exposed basalt	EB	44	0.12	0.00
Annual grass and weeds with residual native bunchgrass.	GA	16	2.47	0.63

TABLE P-10B

Habitat Types and Categories in the Leaning Juniper II North Analysis Area with Maximum Possible Area of Impact

Category and Habitat Description	Habitat Subtype	Impacts (Worst Case) Total acres Within Lease Boundary	Temporary [1] Facilities (Acres Disturbed)	Permanent [2] Facilities (Acres Disturbed)
Category 5				
Old field	DB	85	6.72	1.20
Dryland wheat	DW	111	0.00	0.00
Category 6				
Farmyard	DF	25	0.29	0.23
Quarry	DQ	26	0.12	0.06
Other disturbed ground.	DX	6	0.13	0.00

1 Temporary facilities include access roads, construction areas, access for overhead line construction, installation sites for underground collector cables, and equipment laydown areas for individual turbines, entire strings of turbines, and laydown areas for in-transit towers, cranes, and miscellaneous construction equipment.

2 Permanent facilities include turbine pads and towers, substation, meteorological towers, Operations and Maintenance facility or facilities, and permanent access roads.

3 Because some Facility impact areas overlap, the total Facility disturbance to habitat is less than the sum of all Facility impact areas, as shown in Tables C-4 and C-5. The total areas presented in Tables C-4 and C-5 do not provide a precise estimate of the Facility's total impact to land and habitat. Because Tables C-4 and C-5 do not account for overlapping impact areas, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables (Tables P-10 and P-15) using GIS, overlapping impact areas were not double-counted. As a result, the tables in Exhibit P provide a more accurate total calculation of impact to habitat.

To summarize:

- No Category 1 habitat will be permanently or temporarily impacted.
- 14 acres of Category 2 habitat, 68 acres of Category 3 habitat, 6 acres of Category 4 habitat, and 7 acres of Category 5 habitat will be temporarily impacted based on the current layout. Under the worst case scenario, 22 acres of Category 2 habitat, 92 acres of Category 3 habitat, 2 acres of Category 4, and 7 acres of Category 5 habitat would be temporarily impacted.
- 2 acres of Category 2 habitat, 15 acres of Category 3 habitat, and 2 acres of Category 4 habitat, and 1 acre of Category 5 habitat will be permanently impacted. Under the worst case scenario, 3 acres of Category 2 habitat, 16 acres of Category 3 habitat, 1 acre of Category 4 habitat and 1 acre of Category 5 habitat and would be permanently impacted.

P.7.1.2 Summary of Potential Impacts to Wildlife from Leaning Juniper II North

Potential impacts are discussed for birds, bats, big game, other mammals, amphibians, and reptiles. Potential impacts to special status/sensitive species are addressed, as well. The detailed discussions that follow this section can be summarized as follows:

- Average fatality estimates for all birds from regional wind facilities have ranged from 0.9 to 2.9 birds per MW per year. Overall bird use and species richness estimated for the Facility was not high relative to other wind facility sites in the United States, including other open habitat sites. This suggests the range of regional averages could serve as a basis for estimating fatalities at Leaning Juniper II North. However, based on differences in turbine configuration (tower height, blade length) compared to the turbines where fatality monitoring was conducted and the fact that the landscape level habitat types contain more native habitat, all-bird fatality estimates for Leaning Juniper II North would conservatively be 1 to 4 birds per MW per year.
- Raptor fatality rates for Leaning Juniper II North are anticipated to be relatively low, ranging from 0.01 to 0.09 per MW per year.
- Passerine (songbird) species will comprise most of the avian fatalities so the fatality range is anticipated to range from 1 to 4 fatalities per MW per year, with the most common fatality probably being horned larks. No other species is expected to make up a large proportion of fatalities.
- Waterfowl and waterbird mortality is expected to be low, based upon monitoring results of existing facilities in the region, relatively infrequent use of the Facility year-round by Canada geese, and the low level of Canada goose collision fatalities at existing wind facilities.
- Results of fatality monitoring for existing Columbia Basin wind facilities indicate a mortality range from 1.0 to 2.5 bats per MW per year. Based on this range and on similar characteristics of the Facility area to these other facilities, it is anticipated that bat mortality will also be similar and primarily involve migratory silver-haired and hoary bats.
- Little risk is expected to nonmigratory bat populations in the Facility area, given the lack of habitat and the fatality results of other facilities in similar habitats. No impacts to threatened or endangered bat species are anticipated.
- Loss of native habitat may result in displacement or indirect impacts to long-billed curlews, grasshopper sparrows and other grassland or shrub-steppe, open low shrub nesting birds. Although the majority of the area within the Leaning Juniper II North analysis area is either native grassland or shrub-steppe habitats, habitat loss will be mitigated by the Facility conservation easement, protecting otherwise unsecure habitat (vulnerable to alterations) for the life of the wind project. Displacement impacts to birds in grassland and shrub-steppe habitats are anticipated to be minimal with predicted reduced densities, depending on the affected species, occurring within less than 100 meters (328 feet) of facilities located in these habitats. The Applicant is developing a Grassland Bird Displacement study with a goal of

measuring any obvious changes in presence of these species during the spring breeding season in a portion of the leased land (see Attachment P-3).

- No impacts to amphibians are anticipated during operations. Seasonally wet pools (see Exhibit J) may support common amphibians such as Pacific tree frog (*Pseudacris regilla*). Impacts to reptiles during operation are likely to be limited to direct mortality as a result of vehicle collisions and are expected to be low and will likely consist mostly of two to three snake species such as bull snake, racer and western rattlesnake.
- Road and Facility construction may result in loss of foraging and breeding habitat for small mammals such as common deer mouse, Ord's kangaroo rat, and pocket gopher and some small mammal fatalities may occur from vehicle activity during operations, but impacts are expected to be very low.

P.7.1.3 Potential Impacts to Birds from Leaning Juniper II North

This section describes the potential impacts to birds from the construction, operation, and retirement of the proposed Leaning Juniper II North.

Construction and Retirement

Facility construction could affect birds through loss of habitat (described in Section P.7.1, above), potential fatalities from construction equipment, and disturbance or displacement effects from construction activities. Impacts from the retirement of the Facility are anticipated to be similar to construction in terms of noise, disturbance and equipment. Potential mortality from construction equipment is expected to be very low. Equipment used in wind facility construction (for example, cranes) generally moves at slow rates or is stationary for long periods. The risk of direct mortality from construction to avian species is most likely limited to potential destruction of a nest for ground- and shrub-nesting species.

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

Construction may also disturb nesting raptors. There are six active raptor nests within a half mile of Leaning Juniper II North, including one red-tailed hawk, one American kestrel, one common raven nest, and two active raptor nests of unknown species (potentially owl), all of which are nesting along the escarpment except the raven, which is nesting in a transmission line structure. However, none of these raptors are protected species.

There are no active ferruginous hawk nests or other sensitive raptor nests within the lease boundary or within 1300 feet of the turbine micrositing corridors. There is one active Swainson's hawk nest within a half mile of Leaning Juniper II North, but this nest is located on the other side of the railroad and Highway 19 from construction and operation. There were also two inactive large stick nests located just over a half mile from the turbines, which could be used by ferruginous or Swainson's hawks in the future. However, these were not active in 2006.

The Applicant will conduct a preconstruction survey of raptor nests near construction areas to serve as a baseline for the Wildlife Monitoring and Mitigation Plan (WMMP) that will be developed for the Facility, and to identify and characterize any nests that could be affected by construction activities. The Applicant plans to complete as much of the road and foundation construction as possible before the raptor nesting season, with a concerted effort to complete high-impact construction within the ODFW restricted conservation zones for active raptor nests before the ODFW sensitive nesting periods for these species. Under the current construction schedule, the majority of the road and turbine foundation construction activities are expected to be complete by the spring 2007 with tower assembly and erection to follow. This latter phase of construction does not involve blasting, ground disturbance, or large levels of construction traffic. Because tower assembly and erection involves slow-moving cranes and pickup trucks, it is expected that this phase of construction would have less of an impact than louder phases of construction on sensitive raptor species that may nest in the area.

Based on the 2005 and 2006 raptor nest survey reports, no sensitive raptors are nesting near construction zones. If sensitive raptors move into the area before construction begins, the Applicant will contract a qualified independent professional biologist to monitor the sensitive raptor nests near construction, as further described in Section P.7.1.5.

Operation

The most probable impact to birds resulting from the operation of Leaning Juniper II North is direct mortality or injury caused by collisions with the turbines. Collisions could occur with resident birds foraging and flying within the Facility leased boundary, or with birds migrating through the area. Other impacts could include abandonment of the area because of disturbance caused by Facility activities, and mortality or injury caused by collisions with vehicles or other equipment.

The estimates of operational impacts to birds from wind facilities is based on the site-specific measures of bird use, bird behavior, nesting, habitat, and topography, in combination with existing information on these same metrics in other locations, in addition to direct measures of impact (for example, mortality and displacement). Leaning Juniper II North is located in a landscape with relatively flat topography and in a setting composed of native grassland or shrub-steppe with scattered upland trees (junipers). It is located in the same physiographic province in which several wind facilities have been developed and studied. Baseline and/or monitoring studies have been conducted at most of these wind facility locations, providing an existing comprehensive data source for predicting impacts to wildlife species.

Measured bird use of Leaning Juniper II North by avian species, habitat, and topography, in addition to measured use and mortality estimates (where available) from other existing wind facilities in the region, were used to predict mortality of birds for

Leaning Juniper II North. Primary regional data utilized from other projects include the following:

- Prefacility avian use, habitat, and raptor nest information and operational phase fatality monitoring at the Klondike I, and prefacility avian use and raptor nest information at the Klondike II and III wind facilities
- Pre-Facility avian use, habitat, and raptor nest information and operational phase avian use, raptor nesting, and fatality monitoring from the Stateline Wind Project in Walla Walla County, Washington, and Umatilla County, Oregon
- Pre-Facility avian use, habitat, and raptor nest information and operational phase avian use, raptor nesting, and fatality monitoring from the Combine Hills Wind Project in Umatilla County, Oregon
- Pre-Facility avian use, habitat, and raptor nest information and operational phase avian fatality monitoring from the Nine Canyon Wind Project, Phase I and II in Benton County, Washington
- Pre-Facility avian use, habitat, and raptor nest information from the Mar-Lu Wind Project in Gilliam County, Oregon (located just west of Leaning Juniper II North site)

Substantial data on avian mortality at operational wind facilities are currently available (Erickson et al., 2001; Erickson et al., 2004, NWCC 2004). Outside of existing California facilities, diurnal raptor fatalities comprised only 2 percent of wind facility-related fatalities (Erickson et al., 2001). Passerines (excluding house sparrows and European starlings) were the most common collision victims, comprising 82 percent of the 225 fatalities documented. No other group (for example, raptors, waterfowl) comprised more than 5 percent of fatalities. Of 841 avian fatalities reported from California studies in Erickson et al. (2001), over 70 percent of which were from the facility at Altamont Pass, California, 39 percent were diurnal raptors, 19 percent were passerines (excluding house sparrows and European starlings), and 12 percent were owls. Nonprotected birds, including house sparrows, European starlings, and rock doves, comprised 15 percent of the fatalities. Other avian groups generally made up less than 10 percent of the fatalities.

Because of the differences in rotor swept area, and similarly nameplate MW output among turbines included in mortality studies, fatality rates are presented both in terms of estimated number of fatalities per MW per year and fatalities per turbine per year. The estimated number of fatalities per MW per year is used as the basis for predicting impacts of the Facility. This MW approach assumes that the fatality rates are approximately proportional to the MW nameplate of the turbine, which yields results similar to those from assuming fatality rates are proportional to the turbine’s rotor swept area. Although some research has suggested, for example, that larger turbines, with slower revolutions per minute (rpm) and larger ground clearance, might be safer for some bird groups, such as raptors (Smallwood and Thelander, 2004), this relationship has not been clearly defined, at least for different sizes of newer generation turbines. Therefore, the impacts assessment uses the conservative approach that impacts are proportional to the MW nameplate of turbines.

For all avian species combined, estimates of the number of bird fatalities per MW per year from individual studies have ranged from 0 at the sites at Searsburg, Vermont (Kerlinger, 1997), and Algona, Iowa (Demastes and Trainer, 2000), to approximately 10 (7.7 per turbine per year) at the site at Buffalo Mountain, Tennessee (Nicholson, 2003). Throughout the entire United States, the average number of avian collision fatalities per turbine is 2.19 per year (NWCC 2004), or approximately 3 fatalities per MW per year.

Facility and turbine characteristics of five Pacific Northwest regional wind facilities where standardized fatality monitoring has been conducted are described in Table P-11. Average fatality estimates from these facilities for all birds these have ranged from 0.6 to 3.6 fatalities per turbine per year or 0.9 to 2.9 fatalities per MW per year (Table P-12). The only species representing more than 10 percent of the documented fatalities has been horned lark, the most commonly observed species at all of these facilities during daytime use surveys (Table P-13).

TABLE P-11

Facility and Turbine Characteristics of Six Regional Wind Energy Projects

Pacific Northwest Wind Project (approximate air-miles distance from Leaning Juniper II Facility)	Project Size		Turbine Characteristics			
	Number of Turbines	**MW**	**RD (m)**	**Tip Height (m)**	**RSA m^2**	**MW**
Stateline, OR/WA (84 miles)	454	300	47	74	1735	0.66
Vansycle, OR (86 miles)	38	25	47	74	1735	0.66
Klondike I, OR (12 miles)	16	24	65	100	3318	1.50
Nine Canyon I, WA (66 miles)	37	48	62	91	3019	1.30
Nine Canyon II, WA (65 miles)	12	20	62	91	3019	1.30
Combine Hills I, OR (90 miles)	41	41	61	84	2961	1.0
Total	**598**					

Note: Results are from fatality monitoring studies with similar study methods. The Condon Wind Project Study was omitted because of differences in study methods.

RD = rotor diameter.

RSA = rotor-swept area.

TABLE P-12

Pacific Northwest Regional Annual Fatality Estimates on Per Turbine, Per 5,000 m^2 RSA, and Per MW Nameplate Basis for All Birds and for All Raptors

	All Bird Fatality Rates			Raptors		
Pacific Northwest	**No./ Turbine**	**No./5,000 m^2 RSA**	**No./ MW**	**No./ Turbine**	**No./5,000 m^2 RSA**	**No./ MW**
Stateline I and II, OR/WA	1.9	5.6	2.9	0.06	0.17	0.09
Vansycle, OR	0.6	1.8	1.0	0.00	0.00	0.00
Klondike I, OR	1.4	2.1	0.9	0.00	0.00	0.00
Nine Canyon I*, WA	3.6	5.9	2.8	0.07	0.11	0.05
Combine Hills (under review)						
Average	**1.9**	**3.9**	**1.9**	**0.03**	**0.06**	**0.04**

*Nine Canyon II monitored part-year.

RSA = rotor-swept area.

TABLE P-13

Number and Species Composition of Bird Fatalities Found at the Pacific Northwest Regional Wind Facilities

Species	% Composition	Number of Fatalities
Horned lark	37.5	107
Ring-necked pheasant (N)	9.1	26
Golden-crowned kinglet	7.7	22
Western meadowlark	4.9	14
Gray partridge (N)	4.2	12
White-crowned sparrow	3.9	11
Chukar (N)	3.5	10
Red-tailed hawk	3.2	9
European starling (N)	2.5	7
American kestrel	2.1	6
Unidentified passerine	2.1	6
Yellow-rumped warbler	1.8	5
Winter wren	1.8	5
Canada goose	1.1	3
Dark-eyed junco	1.1	3
Unidentified bird	1.1	3

TABLE P-13

Number and Species Composition of Bird Fatalities Found at the Pacific Northwest Regional Wind Facilities

Species	% Composition	Number of Fatalities
House wren	1.1	3
Unidentified sparrow	0.7	2
Short-eared owl	0.7	2
Savannah sparrow	0.7	2
Ruby-crowned kinglet	0.7	2
Rock dove (N)	0.7	2
Vesper sparrow	0.7	2
White-throated swift	0.7	2
Golden-crowned sparrow	0.7	2
Red-breasted nuthatch	0.7	2
Great blue heron	0.7	2
Red-winged blackbird	0.4	1
Black-billed magpie	0.4	1
Ferruginous hawk	0.4	1
Grasshopper sparrow	0.4	1
American pipit	0.4	1
Mallard	0.4	1
Swainson's thrush	0.4	1
Swainson's hawk	0.4	1
Spotted towhee	0.4	1
Northern flicker	0.4	1
Lewis's woodpecker	0.4	1
MacGillivray's warbler	0.4	1
House finch	0.4	1
Rough-legged hawk	0.4	1
Virginia rail	0.4	1
Total (39 species identified) (34 native identified, 5 non-native)	**100.0**	**287**

Johnson et al., 2003; Young et al., 2002; Erickson et al., 2000; Erickson et al., 2001; Erickson et al., 2003; Erickson et al., 2004.

N = non-native species.

Overall bird use estimated for the Facility was not high, relative to other open-habitat facility sites in the United States. This suggests the range of averages could serve as a basis for estimating fatalities at Leaning Juniper II. However, based on differences in turbine configuration (tower height, blade length) compared to the turbines where fatality monitoring was conducted and the fact that the landscape level habitat types contain more native habitat, all bird fatality estimates for Leaning Juniper II North would conservatively be 1 to 4 birds per MW per year.

Detailed descriptions of impacts to bird groups including raptors, passerines, and waterbirds (waterfowl, shorebirds, and other waterbirds) are included in the following discussion.

Raptor Use

The Altamont Pass Wind Resource Area (APWRA) has had a history of high raptor mortality (Orloff and Flannery, 1992, 1996; Smallwood and Thelander, 2004). The APWRA consists of approximately 5,000 mostly small (< 200 kW) old wind turbines located in an area of 60 square miles. It is estimated that approximately 500 to 1,300 raptors are killed annually at this site (Orloff and Flannery, 1992; Smallwood and Thelander, 2004), based on estimates of approximately 1 to 2.2 raptor fatalities per MW per year. The most common raptors killed include red-tailed hawks, American kestrels, burrowing owls, golden eagles, and barn owls. Until just recently, the largest operating turbines were 330-kW turbines, with rotor diameters of 33 meters (108 feet).

Wind turbine design has changed significantly since the first large wind facilities, such as those in the APWRA in California, were developed. Turbines are now typically installed on tubular steel towers instead of lattice towers, without open platforms at the top of the tower, eliminating perching and nesting opportunities for raptors and other birds. Raptors and ravens commonly nest on turbines within the APWRA. No observations have been made of raptors perched on the new turbine types during studies at Foote Creek Rim, Wyoming (Johnson et al., 2000a), Buffalo Ridge, Minnesota (Johnson et al., 2000b), Vansycle, Oregon (Erickson et al., 2000), and Stateline, Oregon-Washington (Jeffrey and Kronner, pers. comm.), suggesting that new turbines are not a perch attractant for birds.

Collisions with wires and electrocutions have been a common source of mortality at Altamont Pass, California (Orloff and Flannery, 1992), and other older wind facilities, whereas electrical collection lines between turbines in new generation wind facilities are typically buried underground to eliminate perching opportunities, collisions with wires, and electrocutions. Overhead lines within new wind facilities are typically designed to be raptor safe from electrocution, and anti-perching devices are often installed (for example, Stateline wind facility, Oregon-Washington, and Nine Canyon wind facility, Washington).

Turbines are now much larger, with blades moving at lower rpm, and are therefore presumably more visible to raptors than blades on the older, smaller turbines. For example, the blades of the 1.5-MW turbines installed at the Klondike, Oregon, wind facility turn at approximately 20 rpm, compared to greater than 60 rpm for the Kenetech

56-100 downwind turbine, the most common turbine at the Altamont Pass, California, wind facility. Blade tip speeds are similar for both new generation and old generation wind turbines. Although the relationship between blade tip speed and mortality is unknown, it is presumed that rpm is a factor in avian mortality, because avian ability to distinguish blade speed and blade position decreases as rpm increases.

Raptor mortality has been much lower at all new generation wind facilities in the United States, compared with mortality in the APWRA. The highest reported raptor fatality rate at new generation wind facilities occurred at a facility in Solano County, California. The High Winds facility is a 162-MW facility, consisting of 91 1.8-MW turbines, located in an area with very high raptor use estimates, compared with those of the APWRA, especially for American kestrels. Overall raptor use at High Winds is estimated to be higher than that estimated at APWRA overall (1.5 to approximately 2 times), and 7 times higher for American kestrels. Despite the very high level of raptor use of the High Winds area, relatively low raptor mortality estimates of approximately 0.3 per MW per year have been reported based on preliminary data, with most mortality consisting of American kestrels. This low mortality raptor mortality rate (compared with the high raptor use of the area) may indicate that the newer turbine technology used at High Winds and proposed at Leaning Juniper II substantially reduces raptor mortality risk compared with the technology in use in the APWRA.

Mean raptor use at Leaning Juniper II North suggests that the project area is not within a major raptor migration corridor or breeding area. The mean raptor use is also much lower than mean raptor use at both the High Winds Facility and the APWRA. Facilities in the region consistently observe red-tailed hawks, American kestrels, northern harriers, and rough-legged hawks (in winter) as the most abundant raptor species. The closest turbine at Leaning Juniper II North to the Columbia River is approximately 1.25 miles. Although some cliffs are present along the river north of the site, a visual assessment conducted by boat and helicopter in 2004 determined that the basalt structure is not conducive to supporting cliff nesting raptors needing a shelf-like platform for the nest (eyrie). In addition, much of the cliff face is immediately adjacent to a railroad track that has considerable train traffic on a daily basis. While the open water does attract raptors that hunt fish, waterfowl or shorebirds, these raptors (osprey, bald eagle) would likely roost closer to their prey instead of in the wind turbine area. One bald eagle was observed during the Mar-Lu study chasing another bird up from the river but flew back before reaching the Mar-Lu project study point west of Leaning Juniper II North (Kronner 2004b). Prairie falcons, and potentially peregrine falcons if present, could hunt rock doves (non-native pigeons) and gulls along and over the river (G. Clowers, pers. comm.). Rock doves are commonly found along the river nesting and roosting in crevices of the basalt cliff face.

<u>Raptor Nests</u>

Raptor nest density is shown for proposed and existing wind facilities located in agricultural landscapes (Table P-14). At Klondike I, Oregon, raptor nest density was 0.15 per square mile within 5 miles of the Klondike facility area, but no raptor mortality was documented during a 1-year fatality monitoring study (Johnson et al., 2003b). At Buffalo Ridge, Minnesota, raptor nest density was also 0.15 per square mile, and the only documented raptor mortality over a 6-year period was a single red-tailed hawk (Osborn et al., 2000; Johnson et al., 2002b). Raptor nest density at the large Stateline wind facility on the Oregon-Washington border was 0.21 per square mile and raptor mortality was estimated to be 0.09 raptor fatalities per MW per year, consisting primarily of red-tailed hawks and American kestrels. Raptor nest density for the 41-MW Combine Hills wind facility, adjacent to Stateline, was estimated to be 0.24 per square mile, and no raptor fatalities were documented the first year of operation (D. Young pers. comm., 2005; Young et al., 2005). Raptor nest density for the recently permitted Hopkins Ridge wind facility in Columbia County, Washington, was 0.43 per square mile. Raptor nest densities are also available for other wind facilities in the region, including Condon, Oregon (0.06 per square mile), Nine Canyon, Washington (0.03 per square mile), and Zintel Canyon, Washington (0.08 per square mile). Very few raptor fatalities have been documented at those smaller facilities (one rough-legged hawk at Condon; an American kestrel and a short-eared owl at Nine Canyon).

Development of wind turbines near raptor nests may result in indirect impacts, such as displacement, to the nesting birds. There has been one report of avoidance of wind turbines by raptors at the Buffalo Ridge Wind Project in Minnesota (Usgaard et al., 1997). However, raptors have successfully nested near wind projects in other areas. A pair of golden eagles successfully nested 0.8 km from the Foote Creek Rim, Wyoming wind plant for three different years after it became operational (Johnson et al., 2000a), and a Swainson's hawk nested within 0.8 km of Klondike Wind Project (Johnson et al., 2003b). Studies at the Stateline Wind Project in Oregon and Washington have not shown any measurable short-term effects on nesting raptors (Erickson et al., 2004). No long-term displacement studies have been conducted. However, long-term studies are being conducted at Stateline so more information will be available in several years.

Based on results of other regional projects, estimates of raptor mortality at 0.01 to 0.09 per MW per year, and knowledge of nesting and raptor use at Leaning Juniper II, the estimate for Leaning Juniper II North is also estimated to be 0.01 to 0.09 per MW per year. The majority of the fatalities of diurnal raptors will likely consist of buteos and American kestrels. The two buteos with highest use of the Leaning Juniper II North area are red-tailed and Swainson's hawks. Small numbers of other raptors (American kestrel) and owls may also occur as fatalities. Actual fatality numbers may be higher or lower for each year during the life of the project.

TABLE P-14

Estimated Raptor Nest Densities from Other Regional Proposed and Existing Wind Projects that are Located Primarily in Arid Environments*

	Raptor Nest Density (number/mile^2), Rounded							
		Buteos						
Project Site	**All Raptors Combined**	**SWHA**	**RTHA**	**FEHA**	**GOEA**	**PRFA**	**GHOW**	**SSHA**
Leaning Juniper II North and II South, OR	0.41	0.18	0.16	0.03	0.00	0.02	0.02	0.00
Klondike I and II, OR	0.16 (5 mile radius survey area)	0.04	0.08	0.00	0.00	0.00	0.04	0.00

TABLE P-14

Estimated Raptor Nest Densities from Other Regional Proposed and Existing Wind Projects that are Located Primarily in Arid Environments*

	Raptor Nest Density (number/mile^2), Rounded							
		Buteos						
Project Site	**All Raptors Combined**	**SWHA**	**RTHA**	**FEHA**	**GOEA**	**PRFA**	**GHOW**	**SSHA**
Klondike III, OR	0.27	0.04	0.20	0.00	0.00	0.00	0.03	0.00
Stateline OR/WA	0.21	0.03	0.08	0.03	0.00	0.00	0.07	0.00
Condon, OR	0.06 (10 mile radius survey area)		0.40					
Nine Canyon, WA	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zintel Canyon, WA	0.08	0.04	0.02	0.02	0.00	0.00	0.00	0.00
Buffalo Ridge, MN	0.15	0.07	0.06	0.01	0.00	0.00	0.02	0.00
Klickitat County, WA	0.12	0.00	0.09	0.00	0.00	0.01	0.03	0.00
Combine Hills, OR	0.24	0.06	0.11	0.01	0.00	0.00	0.00	0.00
Columbia Hills, WA	0.30	0.04	0.18	0.00	0.02	0.02	0.02	0.02
Ponnequin, CO	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Hopkins Ridge, WA	0.43	0.01	0.27	0.01	0.00	0.00	0.08	0.00
Maiden, WA	0.18	0.05	0.04	0.03	0.00	0.03	0.02	0.00
Wild Horse, WA	0.16	0.00	0.12	0.00	0.00	0.02	0.02	0.00
Kittitas Valley, WA	0.09		0.09					
AVERAGE of Other Projects (excluding Leaning Juniper I and II)	**0.16**							

* Arid environments with extensive dryland wheat, non-native grassland (CRP), and native grassland. Narrow riparian corridors in some drainages.

SWHA = Swainson's hawk.
RTHA = red-tailed hawk.
FEHA = ferruginous hawk.
GOEA = golden eagle.
PRFA = prairie falcon.
GHOW = great-horned owl.
SSHA = sharp-shinned hawk.

Passerines/Songbirds

Passerines, often referred to as songbirds, have suffered the most abundant avian fatality at wind facilities outside California, often comprising more than 80 percent of the total avian fatalities (Erickson et al., 2001; Erickson et al., 2002). Passerines are also the birds most commonly observed during point count surveys at all of these sites. Both migrant and resident passerine fatalities have been observed.

Songbird mortality at operating wind facilities in eastern Oregon and Washington has been reasonably consistent. Horned larks have been the most commonly observed resident songbird fatality at agriculture and grassland facilities in the Pacific Northwest, and have been the most abundant songbird observed during point count surveys at these sites. Based on the U.S. Geological Survey's (USGS) Breeding Bird Survey (BBS) data, horned larks are probably one of the most common birds in the Columbia Plateau. Otherwise, no other resident songbird species has comprised a large proportion of the fatalities observed at the facilities in the Pacific Northwest.

Studies of nocturnal migration at several wind plants suggest that the mortality compared to the number of birds passing through the area is low (Johnson et al., 2002b; Mabee and Cooper, 2002; McCrary et al., 1984). In much of the West, songbirds appear to migrate across a broad front, except in unique topographic situations, such as coastlines, and large river valleys or riparian corridors. In the Pacific Northwest, nocturnal migration has been studied at the Stateline wind facility on the Oregon-Washington border (Mabee and Cooper, 2002), there has been some small sampling effort at the Nine Canyon wind facility in Washington. The Stateline study was designed to monitor waterfowl, shorebird, and passerine movements during two fall migration seasons (2000 and 2001) and one spring migration season (2001). Marine radar was used to study nocturnal bird migration at two stations: one near the existing Vansycle wind facility near the southeastern end of the Stateline facility area, and one to the north of the facility area in Washington. The northern and southern stations had very similar passage rates, suggesting broad front movements throughout the facility site.

Numerous events have been recorded at communication structures that document up to several hundred avian fatalities in one night, while there have been only two events reported, both reasonably small, at wind generation facilities in the United States. Fourteen fresh nocturnal migrating passerine fatalities were observed at two adjacent turbines during a single search at the Buffalo Ridge wind facility in Minnesota during spring migration (Johnson et al., 2002b). Approximately 25 to 30 nocturnal migrating passerine fatalities were observed at three turbines and a well-lit substation at the Backbone Mountain, West Virginia, facility during one or two nights of foggy weather (Kerns and Kerlinger, 2004). The data suggest that sodium vapor lamps at the substation were the primary attractant, since fatality locations were correlated with the location of the substation, and few fatalities were documented the morning after the event at the other turbines away from the substation. After the lights were turned off at the substation, no events occurred.

Tall, lighted structures are suspected of attracting nocturnal migrating birds, especially during inclement weather (Kerlinger, 2000). Lighting at communication towers, where large mortality events have been documented, is typically different from lighting at wind turbines. Communication towers commonly have more than one light location on a tower, whereas wind turbines have only one location for the light (on top of the nacelle, per Federal Aviation Administration [FAA] requirements). Communication towers often have one red pulsating or flashing light on the top of the tower, and several solid red lights at various heights.[1] Communication tower lighting might be more of an attractant than wind turbine lighting (Kerlinger, 2004), but research and data are limited. No large measured differences in nocturnal migrant fatality rates have been documented between wind turbines that are lit with aircraft obstruction lighting and unlit turbines. At the Stateline (Oregon-Washington) wind facility, observed fatality rates at lit turbines were not statistically different than at unlit turbines ($p > 0.10$) (Erickson et al., 2004). Similar results were found at the Nine Canyon wind facility, which has the same lighting characteristics (red-flashing at night), but on turbines that are larger and taller than those at Stateline (Erickson et al., 2003). The Buffalo Ridge wind facility showed a similar result for turbines similar in size to those at Stateline, although lighting types differ (that is, steady-burning red incandescent; Johnson et al., 2002b). Phase I turbines at the Buffalo Ridge wind facility were not lit, whereas approximately every other turbine in Phase II was lit with solid red lights (approximately 70 of 143 turbines). Six of the 138 Phase III turbines along the outer boundary of the site were lit with solid red lights. No statistical differences were found between lit and unlit turbines.

Based on mortality observed at other operating wind facilities (Erickson et al., 2004; Erickson et al., 2003; Johnson et al., 2003b) located in generally similar landscapes, an approximate range of 1.0 to 4.0 songbird fatalities per MW per year is predicted for Leaning Juniper II North. Based on this number, the largest number of fatalities will probably be horned larks, a common grassland songbird. No impacts to threatened or endangered songbird species are anticipated. Actual fatality numbers may be higher or lower for each year during the life of the project.

<u>Waterfowl and Other Waterbirds</u>

Wind facilities with year-round waterfowl use have shown the highest waterfowl mortality, although levels of waterfowl and waterbird mortality appear insignificant compared to use of the sites by these groups. Two Canada goose fatalities were documented at the Klondike I, Oregon, wind facility, although several Canada goose flocks were observed during preconstruction surveys (Johnson et al., 2003b). Few Canada goose fatalities have been observed at wind facilities in the United States (Erickson et al., 2004).

The recently constructed Top of Iowa Wind Farm, comprising 89 turbines with tip heights of 97.5 meters (320 feet), is located in cropland among three wildlife management areas (WMAs) with historically high bird use, including migrant and resident waterfowl, shorebirds, raptors, and songbirds. During a recent study approximately 1 million total goose-use days and 120,000 total duck-use days were recorded in the WMAs during the fall and early winter, yet no waterfowl fatalities were documented during concurrent and standardized wind facility fatality studies.

[1] Recent FAA lighting regulations released in 2006 for wind turbines favor synchronized, red flashing lights during the night, and no white strobe during the day. All turbines must be white in color using the standard turbine finish, to provide sufficient daylight marking. Wind facilities are to be “outlined” with lighting, rather than lighting every turbine.

Similar findings were observed at the Buffalo Ridge wind facility in southwestern Minnesota, which is located in an area with relatively high waterfowl and waterbird use and some shorebird use. Some large flocks of snow geese, and Canada geese and mallards were the most common waterfowl observations. Five of the 55 fatalities observed during the fatality studies were waterfowl, including 2 mallards, 2 American coots, and 1 blue-winged teal. One herring gull, one pied-billed grebe, and one killdeer were the only other waterbird fatalities found.

Leaning Juniper II North may have some waterfowl use by Canada geese, especially during the winter period. The use estimates for the site were lower than estimates observed during the Klondike I wind project preconstruction studies (Johnson et al., 2002a). Some waterfowl mortality may occur from the Facility, but based on available data from other projects, the numbers are expected to be low relative to the waterfowl use of the general area.

The only shorebird observed at the Leaning Juniper II North Facility was the long-billed curlew, a State Sensitive species. Shorebirds as a group are rarely killed at wind projects; of 1036 avian fatalities collected at U.S. wind projects, only one was a shorebird (a killdeer found at Buffalo Ridge, Minnesota) (Erickson et al., 2001), even though shorebirds have been recorded at virtually every wind project evaluated. No long-billed curlew collision fatalities have been found at any existing wind projects even though some wind projects have been constructed at sites where long-billed curlews were recorded during baseline avian-use studies (URS, 2001; FPLE, 2000, 2002a; NWC, 2000). However, none of these studied sites had high long-billed curlew use. Some long-billed curlew fatalities could occur, as further discussed in Section P.7.1.5.

Displacement Effects

The presence of wind turbines can alter the landscape so as to change wildlife habitat use patterns, thereby displacing wildlife from areas near turbines. Several studies have been conducted in the United States examining the potential displacement effects on birds. Most of the studies focused on grassland bird and raptor species (Leddy et al., 1999; Erickson et al., 2004; Osborn et al., 1998). "Displacement" means that birds tend to avoid an area. However, avoidance of an area does not necessarily imply impacts on population parameters such as population size, and such impacts have not been documented. Although displacement effects have been documented for some species or groups in the United States and Europe, there is little information on whether displacement effects have any real impacts on population parameters such as population size, population trends, and reproduction.

Avian baseline studies of the Foote Creek Rim, Wyoming, wind facility conducted in 1994 and 1995 documented mountain plovers (*Charadrius montanus*)[2] in the proposed development area. Construction of the Foote Creek Rim wind facility began in fall 1997. Phase I of the wind facility, as identified in the Bureau of Land Management (BLM)

[2] The U.S. Fish and Wildlife Service proposed listing mountain plover as a threatened species under the Endangered Species Act in February 1999. Prior to this time, mountain plover had been included on the USFWS list of *candidate* species. In 2003, the USFWS found that listing mountain plover as threatened was not warranted and withdrew the proposed rule, stating that the threats to the species as identified are not as significant as earlier believed, and the plover is now not listed.

Environmental Impact Statement, involved construction of turbines in several units on the southern end of Foote Creek Rim. Development of Phase I of the wind facility occurred between 1997 and 2000, during which time four construction units were completed, totaling 133 turbines. This wind facility is located in shortgrass prairie habitat on a mesa topographic feature with a relatively flat top and steep sloping sides. Habitat on top of Foote Creek Rim is suitable for mountain plovers, which prefer flat areas with a prevalence of bare ground and short vegetation. Transect surveys to census mountain plovers were conducted on an annual basis through 2004.

In 1995, the estimated size of the mountain plover population for the Foote Creek Rim wind facility was approximately 60 individuals. The estimated population size declined through 1999 to 18 individuals, when only 39 total observations of mountain plovers were made during the surveys. After 1999, the estimated population size in the wind facility rose slowly to 36 during the 2003 and 2004 field seasons when 89 and 66 total plovers, respectively, were observed. The period of plover population decline on Foote Creek Rim (1995-1999) also corresponds with the wind facility construction period (1998-2000). It is not known if plovers were simply displaced from the rim because of the construction activity or if the population in the area was experiencing a decline in numbers. The initial impression is that the low population on Foote Creek Rim from 1998-2000, followed by a steady recovery, was related to displacement during construction of the wind plant and subsequent habituation to the facility by plovers. However, it is hard to separate possible displacement type effects from a broader decline in the mountain plover population. The Foote Creek Rim population appeared to be declining before construction started. Also, declines in other regional populations (southeast Wyoming–northeast Colorado) suggest a larger species-wide or regional decline during the decline observed at Foote Creek Rim.

Based upon European research summaries, displacement impacts on breeding waterbirds, shorebirds, and waterfowl have been less than impacts on nonbreeding birds. European studies suggest variable levels of disturbance for feeding and roosting birds (Spaans et al., 1998). Based on this European summary, the authors concluded that with the exception of lapwings, black-tailed godwits, and redshanks, species used areas for breeding that were close to the wind farms. In general, the displacement effects (areas with reduced densities) rarely exceeded 100 meters (328 feet) for breeding birds. During the nonbreeding season, many bird species inhabiting open landscapes avoided approaching wind parks closer than a few hundred meters, and this avoidance behavior as especially noted for waterfowl and shorebirds. Displacement effects of up to 600 meters (1,969 feet) from wind turbines (reduced densities) have been reported for some waterfowl species (for example, pink-footed goose [*Anser brachyrhunchus*], and European white-fronted goose). However, a study in the United States did not document such a large-scale displacement impact. Based on preliminary analysis at the large Top of Iowa wind facility, no large-scale displacement of Canada geese was apparent, based on counts and behavior observations of geese in areas with and without turbines (Koford and Jain, 2004).

At a large wind plant on Buffalo Ridge in Minnesota, the abundance of shorebirds, waterfowl, upland gamebirds, woodpeckers, and several groups of passerines was found to be statistically significantly lower at survey plots with turbines than at plots without turbines. There were fewer differences in avian use as a function of distance from turbines, however, suggesting that the area of reduced use was limited primarily to those areas within 100 meters (328 feet) of the turbines (Johnson et al., 2000a). Some proportion of these displacement effects is likely to be the result of direct loss of habitat near the turbine for the turbine pad and associated roads. These results are similar to those of Osborn et al. (1998), who reported that birds at Buffalo Ridge avoided flying in areas with turbines. Also at Buffalo Ridge, Leddy et al. (1999) found that densities of male songbirds were significantly lower in CRP grasslands containing turbines than in CRP grasslands without turbines. Grasslands without turbines and grasslands located at least 180 meters (591 feet) from turbines had bird densities four times greater than grasslands located near turbines. Reduced avian use near turbines was attributed to avoidance of turbine noise and maintenance activities and reduced habitat effectiveness because of the presence of access roads and large gravel pads surrounding turbines (Leddy, 1996; Johnson et al., 2000a).

Preliminary results from the Stateline (Oregon-Washington) wind facility suggest a fairly small-scale impact of the wind facility on grassland nesting passerines, with a large part of the impact related to direct loss of habitat from turbine pads and roads, and temporary disturbance of habitat between turbines and road shoulders (Erickson et al., 2004). Horned larks appeared least affected, with some suggestion of displacement to grasshopper sparrows, although sample sizes were limited.

Leaning Juniper II North is utilized by one species not previously studied at regional wind facilities like Stateline and Combine Hills: the long-billed curlew. No displacement data are available from other wind projects. The State Sensitive-status long-billed curlew was found nesting in the lease boundary. It is likely that some birds will avoid areas of human activity and the perimeter around new roads and turbines. Response to vehicular traffic will likely depend on the level of use and size of equipment (for example, noise and width). However, intermittent travel through the nesting habitat during Facility operations is not likely to alter their ability to nest and protect fledged young.

The Applicant is developing a Grassland Bird Displacement study with a goal of measuring any obvious changes in presence of these species during the spring breeding season in a portion of the leased land (see Attachment P-3). In addition to this study effort, the habitat mitigation area(s) may be successful in conserving suitable nesting habitat and removing and potential habitat reducing influencing factors such as domestic livestock for the life of the wind project, depending on the site selected. Areas with similar habitat and function for nesting and denning wildlife as found at the Facility are available for conservation and are being considered.

P.7.1.4 Potential Impacts to Bats from Leaning Juniper II North

This section describes the potential impacts to bats from the construction, operation and retirement of the proposed wind power facility.

Construction and Retirement

Construction could affect bats through loss of habitat (described in Section P.7.1, above), potential fatalities from construction equipment, and disturbance or displacement effects from construction activities. Impacts from the retirement of the facility are anticipated to be similar to construction in terms of noise, disturbance and equipment. Potential mortality from construction equipment is expected to be very low. Equipment used in wind facility construction (for example, cranes) generally moves at slow rates or is stationary for long periods.

Most bat species roost in structures such as buildings, caves, mines, trees, and bridges, which are rare to absent within the Facility area. As discussed earlier, foraging habitat is also limited in the Facility area because of a lack of surface water; therefore, the construction and decommissioning of the facility is not anticipated to result in the loss or degradation of bat roosting and foraging habitat in the Facility area.

Operation

The potential impact to bats could be from collision mortality during operation. Preconstruction surveys conducted to predict impacts to migratory bats appear to be relatively ineffective, because current technology for studying bats does not appear to be highly effective for documenting migrant bat use of a site (Johnson et al., 2003b). The primary method of predicting impacts is the use of mortality studies at existing wind facilities.

Very few bats have been reported as fatalities at older wind facilities in California, including those at Altamont Pass, San Gorgonio Pass, and Tehachapi Pass, although most studies have focused on documenting raptor fatalities and have been conducted at very small, short turbines. However, some bat fatalities have been found at all new wind facilities that have been monitored (fewer than 15; Johnson, 2005). Available evidence indicates that impacts to bats during Facility operations are confined primarily to migratory species, especially for open agriculture and grassland facilities in the West.

Although 46 species of bats occur in the United States, only 11 species comprise all known bat fatalities at United States wind facilities (Johnson, 2005). The three most common species of migratory bats in the United States (hoary, eastern red, and silver-haired bats) comprised 93 percent of the 774 bat fatalities identified to species at wind facilities in the United States (Johnson, 2005). The hoary bat is a nonhibernating migratory species with the widest distribution of any bat in North America, ranging from just below the Canadian tree line to South America (Shump and Shump, 1982). It is a solitary bat that roosts primarily in deciduous trees (Barbour and Davis, 1969; Nordquist, 1997) and occasionally in coniferous trees (Gruver, 2002). Silver-haired bats are also migratory (Izor, 1979; Kunz, 1982; Barclay et al., 1988). Silver-haired bats historically were also believed to be strictly solitary tree bats, but recent studies have documented maternal colonies of silver-haired bats (Barclay et al., 1998). Hoary bats occur throughout Oregon. The silver-haired bat also occurs throughout most of Oregon (Hayes and Waldien, 2000).

Bat foraging areas such as riparian zones, shrublands, and streams and other water sources are extremely limited in the Facility area. At several wind facilities evaluated in the United States, bat collision mortality during the breeding season was virtually nonexistent, despite the fact that relatively large populations of resident bats of several species were documented breeding in proximity to the wind plant (Gruver, 2002; Johnson et al., 2003b, 2004; Johnson, 2003, 2004, 2005). Based on these studies, it appears that wind facilities, especially those in open habitats, pose little risk to nonmigratory bat populations.

Bat mortality patterns at wind facilities in Washington and Oregon have followed patterns similar to those at other facilities in open habitats of the West and Midwest. At the 25-MW Vansycle Ridge wind facility in Oregon, bat mortality was estimated at 1.1 bats per MW per year (0.7 bats per turbine per year) based on 1 year of monitoring (Erickson et al., 2000). At the 25-MW Klondike I wind facility, bat mortality was estimated at less than 1 bat fatality per MW per year (1.2 bat fatalities per turbine per year; Johnson et al., 2003b). At the 300-MW Stateline wind facility in Oregon-Washington, bat mortality was estimated at approximately 1 to 2.3 bat fatality per MW per year (0.7 to 1.5 per turbine per year; Erickson et al., 2004) from July 2001 through December 31, 2003. At the 25-MW Nine Canyon wind facility in Washington, bat mortality was estimated at approximately 2.5 bats per MW per year (3.2 bat fatalities per turbine per year; Erickson et al., 2003). Of 193 bat fatalities collected at existing wind projects in eastern Oregon and Washington during the past several years, 183 (95%) were represented by the two migratory species, including 91 hoary bats and 92 silver-haired bats (Erickson et al., 2005; Erickson et al., 2004; Erickson, et al., 2000; Johnson et al., 2003c). Over 90 percent of the mortality documented at wind facilities in these open habitats has comprised hoary and silver-haired bats. The other mortalities have consisted of occasional big brown bats, little brown bats, and some unidentified bats. Virtually all of the mortality has occurred from July through early fall, during the fall migration period for hoary and silver-haired bats. A few fatalities were found during May and June and based on age estimate of carcass, were determined to have died during that time period. Much higher bat fatality rates have been observed in the upper Midwest at a site between large wetland complexes in Iowa (Koford and Jain, 2004), and at forested ridgetop facilities in the eastern United States (Nicholson, 2003; Arnett, 2005).

Bat mortality at Leaning Juniper II North is expected to be similar to what has been documented at wind projects located in other arid landscapes of eastern Washington and Oregon containing similar habitat types, topography and proximity to the Columbia River. The basalt cliffs and escarpments along both sides of Highway 19 could provide summer roost sites to the pallid bat, big brown bat, California myotis, western small-footed myotis and western pipstrelle. Escarpments along portions of the eastern boundary of Leaning Juniper II North could provide roosting habitat for some species; no large concentrations are expected to occur since the escarpments are relatively small in overall height in comparison to similar geologic structure along the Columbia River. There is limited aquatic habitat present onsite for bats to drink or forage for insects over open water. While some bats may roost in juniper trees, deciduous trees (live or dead snags), old buildings and basalt rimrock escarpment cavities at the Facility, these bats would likely fly to canyons and ponds outside the Facility area or to the Columbia River for water and (assumed) more dense sources of food. Of all the bat species that might be a resident at the Leaning Juniper II Facility, only the pallid bat gleans insects from the ground; thus, even if pallid bats are present and feeding on the large crickets in the area, the risk of collision is low because the bats would spend most of the time near the ground below the rotor-swept area.

The results of fatality monitoring for the regional Columbia Basin wind facilities indicate mortality ranges from 1.0 to 2.5 bats per MW per year (0.7 to 3.2 bats per turbine per year). On a per megawatt basis, the regional average is 1.7 per MW per year. Although future mortality of migratory bats is difficult to predict, an estimate can be calculated based on levels of mortality documented at these other wind facilities in similar habitats. Based on these fairly consistent bat fatality rates, and considering the similarities in the characteristics of the Leaning Juniper II Facility site to these other regional facilities, it is anticipated that bat mortality will range from 0.80 to 2.5 bats per MW per year. Species composition will likely be similar to that at other wind projects, with silver-haired and hoary bats comprising most of the fatalities. Other Myotis (genus name for a group of bats) species may be a smaller composition of the total fatalities as was also documented at Vansycle, Stateline, and Nine Canyon wind projects. Actual fatality numbers may be higher or lower for each year for the life of the project.

Although the upper range of this bat mortality might be conservative when taken in comparison with other facilities in the Pacific Northwest, actual levels of mortality are unknown and could be lower or higher, depending on regional migratory patterns of bats, patterns of local movements through the area, and the response of bats to turbines, individually and collectively. Mortality would probably involve silver-haired and hoary bats, two widely distributed forest-dwelling migratory species. No impacts to threatened or endangered bat species are anticipated.

The significance of this impact is hard to predict, as there is very little information available regarding bat populations, but studies in open habitats do suggest resident bats do not appear to be significantly affected by wind turbines (Johnson et al., 2003b; Johnson, 2003; Gruver, 2002), as almost all mortality is observed during the fall migration period. Furthermore, the hoary bat, which is expected to be the most common fatality, is one of the most widely distributed bats in North America.

P.7.1.5 Potential Impacts to Special Status/Sensitive Species from Leaning Juniper II North

Impacts to special status/sensitive species are addressed below.

<u>Golden Eagle</u>

Golden eagles are known to nest within 5 to 6 miles of the Facility and were occasionally observed during fall through early spring 2004-2005 field surveys. Golden eagles are one of the most common fatalities at Altamont Pass, California. It is thought that the small size and high revolutions per minute of most of the turbines at Altamont combined with presence of a large prey base contributes to the high eagle mortality observed at Altamont. In contrast, no eagle fatalities have been documented at any of the completed modern wind farms in the Pacific Northwest (recent interviews were conducted with wind project managers in spring-summer 2006). Based on relatively low use of the site by golden eagles and lack of eagle mortality at existing Pacific Northwest wind farms, it is unlikely Leaning Juniper II North would have any significant impact on golden eagle populations in the area. In addition, no nesting habitat will be impacted because nesting habitat is not present on the Facility site.

Ferruginous Hawk and Swainson's Hawk

Both the ferruginous hawk and Swainson's hawk are known to nest near the Facility lease boundary, and could be disturbed by construction. There is one active Swainson's hawk nest within a half mile of turbines, as discussed in Section 7.1.3. There are no ferruginous hawk or other sensitive raptor nests within the Leaning Juniper II North lease boundary or within 1300 feet of the turbine micrositing corridors. The Applicant will conduct a preconstruction survey of raptor nests near construction areas to serve as a baseline for the WMMP that will be developed for the Facility, and to identify and characterize any nests that could be affected by construction activities.

As discussed earlier, the Applicant plans to complete as much of the road and foundation construction as possible before the raptor nesting season to minimize impacts to nesting raptors, with a concerted effort to complete construction of the road and turbine foundations that are located within the ODFW restricted conservation zones before the ODFW sensitive nesting periods for these species. Based on the 2005 and 2006 raptor nest survey reports, no sensitive raptors are nesting near construction zones, so no significant impacts to this species are expected. However, if sensitive raptors move into the area before construction begins, the Applicant will contract a qualified independent professional biologist to monitor the sensitive raptor nests near construction to quantify any nest site abandonment and record number of young fledged where possible without disturbing the birds. If monitoring indicates that construction has resulted in nest site abandonment or a reduction in productivity, the Applicant will work with ODOE and ODFW to develop appropriate minimization and mitigation measures to avoid impacting these species. For example, the Applicant could incorporate mitigation measures into the process of selecting and preserving a habitat Conservation Easement, which could be enhanced with raptor nest platforms or other habitat quality improvement projects to mitigate any loss in reproduction.

Loggerhead Shrike

No loggerhead shrikes were recorded within the Leaning Juniper II North lease boundary. Loggerhead shrikes were found in shrub-steppe sagebrush in Juniper Woodland Canyon between Leaning Juniper II North and South and in Jones Canyon. However, these areas and habitat types were intentionally avoided during layout of the Facility components.

Burrowing Owl

One active burrowing owl nest was documented during the 2005 wildlife surveys. However, no nests were observed within the Leaning Juniper II North lease boundary.

In addition, no burrowing owls were observed during the 2006 spring avian point counts in this area.

Long-Billed Curlew

Long-billed curlews were frequently seen or heard along Rattlesnake Road in open low shrub and grassland terrain during the pedestrian wildlife surveys and avian point counts. Long-billed curlews appear to be fairly common in the general area, as 5 were observed during the 2006 spring point county surveys. Most of the long-billed curlews observed during point count surveys were seen flying below the rotor-swept height, which reduces their risk of collision. No long-billed curlew wind turbine collision fatalities have been found at any existing wind projects, even though some wind projects have been constructed at sites where curlews were recorded during baseline avian-use studies (URS, 2001; FPLE, 2000, 2002a; NWC, 2000). Shorebirds as a group are rarely killed at wind facilities. Of 1,036 avian fatalities collected at U.S. wind facilities, only one was a shorebird (a killdeer found at Buffalo Ridge, Minnesota) (Erickson et al., 2001), even though shorebirds have been recorded at virtually every wind project evaluated. However, none of these studied sites had high Long-billed curlew use. Some long-billed curlew fatalities could occur.

Long-billed curlews nest within Leaning Juniper II North leased boundary, and construction of the wind project will result in some minor temporary and permanent habitat loss. Presence of turbines and human activity during and after construction may also displace curlews from some areas. However, other portions of the Facility leased boundary are suitable for curlew nesting and staging and curlew use is expected to occur there. These areas will not be disturbed with the development and operation of the Facility. Localized impacts to nesting and staging curlews would not likely impact breeding populations in the general area.

A preliminary Habitat Mitigation Plan (HMP) has been proposed to mitigate habitat loss associated with the permanent footprint and changes to habitat from temporary construction activities (see Attachment P-4). Depending on the final site(s) selected, this plan would likely result in conservation of suitable long-billed curlew habitat for the life of the wind project, ensuring availability of undisturbed habitat for the species.

Grasshopper Sparrow

Grasshopper sparrows were found throughout the Leaning Juniper II North lease boundary within open low shrub (rabbitbrush) and grassland areas. Grasshopper sparrows spend most of their time on the ground or in low stature vegetation. They may occasionally fly through the area at heights of the turbines to access other habitat areas or during seasonal movements, but they generally fly below the rotor swept area. None were observed during the 2006 spring season point counts at Leaning Juniper II North; all detections were occurred during the walking transects. Very few were observed during the four-season 2004-2005 avian point counts in and near Leaning Juniper II South (only two groups). However, none were documented at rotor-swept height during the point counts.

Construction of the Facility will result in some temporary and permanent habitat loss. Temporary impacts will be restricted to underground collection cable trenches which will be restored to preconstruction conditions. Disturbance to nesting birds could occur if construction occurs during the sensitive period (May 1 through June 30). However, grasshopper sparrows could be expected to temporarily relocate to other suitable grassland portions of the lease area, in areas void of occupied territories. Localized impacts to nesting grasshopper sparrows are not expected to impact breeding populations in the general area because the area impacted is small in comparison to areas within the leased land with breeding birds and areas in the immediate area with suitable habitat and/or documented breeding birds; no habitat alterations are imminent in the near future for these sites. Overall impacts to this species are expected to be less than significant.

A preliminary HMP has been proposed to mitigate habitat loss associated with the permanent footprint and changes to habitat from construction activities (see Attachment P-4). Depending on the final site(s) selected, this plan would likely result in conservation of suitable grasshopper sparrow habitat for the life of the project, ensuring availability of undisturbed habitat for the species.

<u>White-tailed Jackrabbit</u>

Two white-tailed jackrabbits were observed in the southern part of the Leaning Juniper II North lease boundary. However, survey results indicate relatively low use of this area. A temporary and permanent loss of open shrub cover and grassland will not adversely impact this species because this habitat type is extensive on sites where additional jackrabbits may be present.

<u>Plants</u>

No federally listed, proposed, or candidate plant species were found during field investigations at the Facility. One state candidate plant species, Sessile mousetail, was found onsite. Impacts to this species are described in Attachment Q-1 to Exhibit Q.

P.7.1.6 Impacts to other Wildlife from Leaning Juniper II North

Potential impacts to other wildlife, including nonlisted mammals, amphibians, and reptiles are expected to be less than significant. No measurable impacts are anticipated to big game from Facility operations. Road and Facility construction may result in loss of foraging and breeding habitat for nonlisted small mammals, such as northern pocket gopher (*Thomomys talpoides*), Ord's kangaroo rat (*Dipodymys ordi)*, and badger (*Taxidea taxus*). Ground-dwelling mammals will lose the use of the permanently affected areas; however, they are expected to repopulate the temporarily affected areas. Some small mammal fatalities can be expected from vehicle activity during operations, but impacts are expected to be very low. No impacts to amphibians are anticipated during operations. Impacts to reptiles during operation are likely to be limited to direct mortality as a result of vehicle collisions and are expected to be low. Potential impacts to federal and state listed species are discussed in Exhibit Q.

P.7.2 Potential Impacts Resulting from Leaning Juniper II South

This section identifies potential direct and indirect impacts to habitats and wildlife identified within the Leaning Juniper II South analysis area, based on construction, operation, and retirement of the proposed Facility layout. The discussion focuses on potential impacts specific to Leaning Juniper II South and simply refers back to, rather than repeating, the detailed literature review and conceptual analysis in sections P.4.1 and P.7.1.

P.7.2.1 Potential Impacts to Wildlife Habitat from Leaning Juniper II South

Potential impacts to wildlife habitat from construction of Leaning Juniper II South include temporary and permanent habitat loss, and alteration and disturbance during construction and operation. After Facility retirement, a site restoration plan will ensure conversion of the operations corridors back to a site condition similar to preconstruction conditions. Table P-15A summarizes the temporary and permanent impacts to wildlife habitat based on an "expected" layout shown in Exhibit C. Table P-15B summarizes the same types of impacts based on a "worst case" layout within the proposed micrositing corridors shown in Figure P-8.

When calculating impacts from the "expected" layout, the 133 GE 1.5-MW turbines were used. As described in Exhibit B, each tower will be supported by a reinforced concrete foundation ranging from 15 to 24 m (48 to 80 feet) in width, for a total area of up to 6,400 square feet. The majority of the foundation will be installed 3 feet below grade, and only a small portion will be located aboveground and covered with gravel for fire protection. At each tower, a circular area will be permanently impacted by the tower itself (ranging in diameter at the base from 14 to 16 feet) and the surrounding graveled area (ranging in radius from 10 to 15 feet). The largest permanent footprint for each tower would be a circular area of approximately 1,660 square feet. The temporary footprint for the area of disturbance around each tower for staging turbine blades is based on the 1.5-MW turbine. The circular impact area consists of a 130-foot radius for 253-foot-diameter (77-meter-diameter) rotors, for a total area of approximately 51,437 square feet.

Areas of impact based on the expected layout described above are summarized in Table P-15A.

TABLE P-15A

Habitat Types and Categories in the Leaning Juniper II South Analysis Area with Area of Impact

Category and Habitat Description	Habitat Subtype	Impacts: Total Acres Within Lease Boundary	Impacts: Temporary [1] Facilities (Acres Disturbed)	Impacts: Permanent [2] Facilities (Acres Disturbed)
Category 1				
Raptor nests (Juniper woodland and escarpment)	WJ, ESC	<1	0.00	0.00
Annual grass and weeds with residual native bunchgrass	GA	4	0.00	0.00
Shrub-grass	SSA	21	0.00	0.00
Open low shrub	SSB	87	0.00	0.00
Category 2				
Perennial bunchgrass	GB	29	1.80	0.29
Shrub-grass	SSA	266	29.72	4.02
Open low shrub	SSB	1054	46.81	8.57
Purple sage/Sandberg's bluegrass with non-native annual grasses.	SSD	28	0.33	0.00
Juniper woodland	WJ	95	0.00	0.00
Deciduous woodland	WL	3	0.00	0.00
Category 3				
Old field	DB	4	4.44	3.69
Annual grass and weeds with residual native bunchgrass	GA	221	0.00	0.00
Shrub-grass	SSA	18	4.15	0.00
Open low shrub	SSB	364	25.53	3.46
Open low shrub (buckwheat)/Sandberg's bluegrass with non-native annual grasses.	SSC	5	0.47	0.00
Purple sage/Sandberg's bluegrass with non-native annual grasses.	SSD	4	0.00	0.00
Category 4				
Old field	DB	100	13.51	1.04
Other disturbed ground.	DX	34	2.11	0.24

TABLE P-15A

Habitat Types and Categories in the Leaning Juniper II South Analysis Area with Area of Impact

Category and Habitat Description	Habitat Subtype	Impacts: Total Acres Within Lease Boundary	Impacts: Temporary [1] Facilities (Acres Disturbed)	Impacts: Permanent [2] Facilities (Acres Disturbed)
Annual grass and weeds with residual native bunchgrass.	GA	243	3.98	0.40
Category 6				
Old field	DB	6	0.73	0.06
Farmyard	DF	22	1.75	0.17
Landfill	DL	15	0.00	0.00
Quarry	DQ	19	0.00	0.00
Dryland wheat	DW	2871	126.57	21.30
Other disturbed ground.	DX	17	1.04	0.11
			130.08	21.64
			262.94	43.37
			0.49	0.50

[1] Temporary facilities include access roads, construction areas, access for overhead line construction, installation sites for underground collector cables, and equipment laydown areas for individual turbines, entire strings of turbines, and laydown areas for in-transit towers, cranes, and miscellaneous construction equipment.

[2] Permanent facilities include turbine pads and towers, substation, meteorological towers, Operations and Maintenance facility or facilities, and permanent access roads.

[3] Because some Facility impact areas overlap, the total Facility disturbance to habitat is less than the sum of all Facility impact areas, as shown in Tables C-4 and C-5. The total areas presented in Tables C-4 and C-5 do not provide a precise estimate of the Facility's total impact to land and habitat. Because Tables C-4 and C-5 do not account for overlapping impact areas, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables (Tables P-10 and P-15) using GIS, overlapping impact areas were not double-counted. As a result, the tables in Exhibit P provide a more accurate total calculation of impact to habitat.

Temporary impacts are the construction-related impacts associated with the laydown areas and the underground collector systems. These areas will be temporarily disturbed during construction and will be restored to preconstruction condition after the construction-related activities are complete.

Because the Applicant seeks micrositing flexibility for Leaning Juniper II South, habitat impacts were analyzed based on the "worst case" situation (Table P-15B). When calculating the "worst case" impacts, as shown in Table P-15B, 133 3.0-MW turbines were used. While the permanent footprint would be the same for both turbine types because of the grounded area, the temporary footprint would be larger for the 3.0-MW turbines. The temporary footprint for the larger turbine would have a radius of 164 feet for 328-foot-diameter (100-meter-diameter) rotors, for a total of approximately 84,545 square feet. (A greater number of smaller turbines might have a larger impact in total ground area than a smaller number of larger turbines. Therefore, in order to provide a single "worst case" analysis, the Applicant calculated the area of permanent impact using the maximum number of turbines *and* the largest of the permanent footprints. This method provides a worst case analysis consistent with other sections of the ASC. Expected impacts are not overstated in this analysis.)

The "worst case" impact analysis is based also on moving the turbines and permanent facilities to locations within the micrositing corridor into a higher rated habitat than where the turbine is currently shown to be located. The micrositing corridor is defined in Exhibit C. In some places the micrositing corridor overlaps with Category 1 habitat (i.e., active raptor nests located within the corridor). However, in no instance would the facilities be moved into woodland or other Category 1 habitat. Figure P-8 illustrates these "worst case" situations.

Areas of impact based on the worst case layout described above are summarized in Table P-15B.

TABLE P-15B

Habitat Types and Categories in the Leaning Juniper II South Analysis Area with Maximum Possible Area of Impact

		Impacts		
Category and Habitat Description	**Habitat Subtype**	**Total acres Within Lease Boundary**	**Temporary [1] Facilities (Acres Disturbed)**	**Permanent [2] Facilities (Acres Disturbed)**
Category 1				
Raptor nests (Juniper woodland and escarpment)	WJ, ESC	<1	0.00	0.00
Annual grass and weeds with residual native bunchgrass	GA	4	0.00	0.00
Shrub-grass	SSA	21	0.00	0.00
Open low shrub	SSB	87	0.00	0.00
Category 2				
Perennial bunchgrass	GB	29	7.90	0.74
Shrub-grass	SSA	266	41.15	6.69
Open low shrub	SSB	1054	65.03	8.54
Purple sage/Sandberg's bluegrass with non-native annual grasses.	SSD	28	0.62	0.00
Juniper woodland	WJ	95	1.02	0.40
Deciduous woodland	WL	3	0.10	0.07
			115.82	16.44
Category 3				

TABLE P-15B

Habitat Types and Categories in the Leaning Juniper II South Analysis Area with Maximum Possible Area of Impact

Category and Habitat Description	Habitat Subtype	Impacts: Total acres Within Lease Boundary	Temporary [1] Facilities (Acres Disturbed)	Permanent [2] Facilities (Acres Disturbed)
Old field	DB	4	4.47	3.69
Annual grass and weeds with residual native bunchgrass	GA	221	0.00	0.00
Shrub-grass	SSA	18	4.33	0.00
Open low shrub	SSB	364	24.66	2.64
Open low shrub (buckwheat)/Sandberg's bluegrass with non-native annual grasses.	SSC	5	0.58	0.32
Purple sage/Sandberg's bluegrass with non-native annual grasses.	SSD	4	0.00	0.00
			34.04	6.65
Category 4				
Old field	DB	100	14.44	1.04
Other disturbed ground.	DX	34	0.04	0.03
Annual grass and weeds with residual native bunchgrass.	GA	243	3.72	0.40
			18.20	1.48
Category 6				
Old field	DB	6	0.77	0.06
Farmyard	DF	22	0.30	
Landfill	DL	15	0.00	0.00
Quarry	DQ	19	0.00	0.00
Dryland wheat	DW	2871	157.34	18.87
Other disturbed ground.	DX	17	1.04	0.11
			159.45	19.04
			327.51	43.61
			0.49	0.44

[1] Temporary facilities include access roads, construction areas, access for overhead line construction, installation sites for underground collector cables, and equipment laydown areas for individual turbines, entire strings of turbines, and laydown areas for in-transit towers, cranes, and miscellaneous construction equipment.

[2] Permanent facilities include turbine pads and towers, substation, meteorological towers, Operations and Maintenance facility or facilities, and permanent access roads.

[3] Because some Facility impact areas overlap, the total Facility disturbance to habitat is less than the sum of

TABLE P-15B

Habitat Types and Categories in the Leaning Juniper II South Analysis Area with Maximum Possible Area of Impact

Category and Habitat Description	Habitat Subtype	Impacts: Total acres Within Lease Boundary	Impacts: Temporary [1] Facilities (Acres Disturbed)	Impacts: Permanent [2] Facilities (Acres Disturbed)

all Facility impact areas, as shown in Tables C-4 and C-5. The total areas presented in Tables C-4 and C-5 do not provide a precise estimate of the Facility's total impact to land and habitat. Because Tables C-4 and C-5 do not account for overlapping impact areas, they show a larger overall impact than will occur. When calculating the impacts in the Exhibit P tables (Tables P-10 and P-15) using GIS, overlapping impact areas were not double-counted. As a result, the tables in Exhibit P provide a more accurate total calculation of impact to habitat.

The following provides a summary of habitat impacts:

- No Category 1 habitat will be permanently or temporarily impacted.
- 79 acres of Category 2 habitat, 35 acres of Category 3 habitat, and 20 acres of Category 4 habitat will be temporarily impacted based on the current layout. Under the worst case scenario, 116 acres of Category 2 habitat, 33 acres of Category 3 habitat, and 18 acres of Category 4 habitat would be temporarily impacted.
- 13 acres of Category 2 habitat, 7 acres of Category 3 habitat, and 2 acres of Category 4 habitat will be permanently impacted. Under the worst case scenario, 16 acres of Category 2 habitat, 7 acres of Category 3 habitat, and 1 acre of Category 4 habitat would be permanently impacted.
- 49 percent of temporary impacts and 50 percent of permanent impacts will occur on Category 6 agricultural or otherwise developed habitat. Under the worst case scenario, 49 percent of the temporary and 44 percent of the permanent impacts would occur within Category 6 habitat.

P.7.2.2 Summary of Potential Impacts to Wildlife from Leaning Juniper II South

Potential impacts to birds, bats, special status/sensitive species and general wildlife were also evaluated for Leaning Juniper II South. To summarize the detailed discussions that follow this section:

- Average fatality estimates for all birds from regional wind facilities have ranged from 0.9 to 2.9 birds per MW per year. Overall bird use and species richness estimated for the Facility was not high relative to other wind facility sites in the United States, including other open habitat sites. This suggests the range of regional averages could serve as a basis for estimating fatalities at Leaning Juniper II South. However, based on differences in turbine configuration (tower height, blade length) compared to the turbines where fatality monitoring was conducted and the fact that the landscape level habitat types contain more native habitat, all bird fatality estimates for Leaning Juniper II South would conservatively be 1 to 4 birds per MW per year.

- Raptor fatality rates for the Facility are anticipated to be relatively low, ranging from 0.01 to 0.09 per MW per year.
- Passerine (songbird) species will comprise most of the avian fatalities so the fatality range is anticipated to range from 1 to 4 fatalities per MW per year, with the most common fatality probably being horned larks. No other species is expected to make up a large proportion of fatalities.
- Waterfowl and waterbird mortality is expected to be low, based upon monitoring results of existing facilities in the region, relatively infrequent use of the Facility year-round by Canada geese, and the low level of Canada goose collision fatalities at existing wind facilities.
- Results of fatality monitoring for existing Columbia Basin wind facilities indicate a mortality range from 1.0 to 2.5 bats per MW per year. Based on this range and on similar characteristics of the Facility area to these other facilities, it is anticipated that bat mortality will also be similar and primarily involve migratory silver-haired and hoary bats.
- Little risk is expected to nonmigratory bat populations in the Facility area, given the lack of habitat and the fatality results of other facilities in similar habitats, and no impacts to threatened or endangered bat species are anticipated.
- Loss of native habitat may result in displacement or indirect impacts to long-billed curlews, grasshopper sparrows and other grassland nesting birds. Although approximately 44 percent of the area within the Leaning Juniper II South analysis area is either native grassland or shrub-steppe habitats, habitat loss will be mitigated by the Facility conservation easement, protecting otherwise unsecure habitat (vulnerable to alterations) for the life of the wind project. Displacement impacts to birds in grassland and shrub-steppe habitats are anticipated to be minimal with predicted reduced densities, depending on the affected species, occurring within less than 100 meters (328 feet) of facilities located in these habitats. The Applicant is developing a Grassland Bird Displacement study to investigate whether the Facility has a significant impact on grassland bird use in the area (see Attachment P-4).
- No impacts to amphibians are anticipated during operations. Impacts to reptiles during operation are likely to be limited to direct mortality as a result of vehicle collisions, are expected to be low, and will likely consist mostly of 2 to 3 snake species.
- Road and Facility construction may result in loss of foraging and breeding habitat for small mammals such as common deer mouse and pocket gopher; some small mammal fatalities may occur from vehicle activity during operations, but impacts are expected to be very low. Impacts to the WGS and other listed species are discussed in Exhibit Q.

P.7.2.3 Potential Impacts to Birds from Leaning Juniper II South

This section describes the potential impacts to birds from the construction, operation and retirement of Leaning Juniper II South. A more complete background discussion of the potential types of bird impacts at regional wind power facilities is found in Section P.7.1.3.

Construction and Retirement

Facility construction could affect birds through loss of habitat, potential fatalities from construction equipment, and disturbance or displacement effects from construction activities. Impacts from the retirement of the Facility are anticipated to be similar to construction in terms of noise, disturbance and equipment. Potential mortality from construction equipment is expected to be very low. Equipment used in wind facility construction (for example, cranes) generally moves at slow rates or is stationary for long periods. The risk of direct mortality from construction to avian species is most likely limited to potential destruction of a nest for ground- and shrub-nesting species.

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

Construction of Leaning Juniper II South may also disturb nesting raptors. There are nine active raptor nests within a half mile of Leaning Juniper II South, including one Great horned owl, four Swainson's hawk, one common raven, and two red-tailed hawk nests within a half mile of turbines. There is also one large stick nest within a half mile of several turbines, which could be used by a ferruginous hawk in the future.

The closest Swainson's hawk nest (nest 30) is located in a juniper tree adjacent to Highway 19, approximately 300 feet from turbine J-7 and within a half mile of other turbines in that string. This nest is located immediately adjacent to both the railroad and highway. A second nest (nest 41) is located along Stone Lane approximately 350 feet west of the J turbine string. The nest is located in an isolated juniper tree south of the main access road, Stone Lane. Two other Swainson's hawk nests are located within a half mile of Leaning Juniper II South, but outside the micrositing corridor. The first (nest 9) is located in a dry wash to the east of the D turbine string on the edge of the wheat fields. Both nests are located outside the site boundary, and would not be affected by the Facility footprint. located The second (nest 24) is also located in a drainage; this nest is located approximately 380 feet from the E turbine string in an isolated juniper tree on the eastern side of Jones Canyon. There are seven Swainson's hawk nests and two Ferruginous hawk nests within 1300 feet of the turbine micrositing corridors.

The Applicant will conduct a preconstruction survey of raptor nests near construction areas to serve as a baseline for the WMMP that will be developed for the Facility, and to identify and characterize any nests that could be affected by construction activities. The Applicant plans to complete as much of the road and foundation construction as possible before the raptor nesting season, with a concerted effort to complete high-impact construction within the ODFW restricted conservation zones for active raptor nests before the ODFW sensitive nesting periods for these species. Under the current construction schedule, the majority of the road and turbine foundation construction activities are expected to be complete by the spring 2007 with tower assembly and erection to follow. This latter phase of construction does not involve blasting, ground disturbance, or large levels of construction traffic. Because tower assembly and erection involves slow-moving cranes and pickup trucks, it is expected that this phase of construction would have less of an impact than louder phases of construction on sensitive raptor species that may nest in the area.

If sensitive raptors move into the area before construction begins, the Applicant will contract a qualified independent professional biologist to monitor the sensitive raptor nests near construction, as further described in Section P.7.2.5.

Operation

The most probable impact to birds resulting from the operation of the Facility is direct mortality or injury caused by collisions with the turbines. Bird mortality from Leaning Juniper II South was estimated using the same sources and methods discussed for Leaning Juniper II North.

Average fatality estimates from five Pacific Northwest regional wind facilities for all birds have ranged from 0.6 to 3.6 fatalities per turbine per year or 0.9 to 2.9 fatalities per MW per year. The only species representing more than 10 percent of the documented fatalities has been horned lark, the most commonly observed species at all of these facilities during daytime use surveys.

Overall bird use estimated for the Facility was not high, relative to other open-habitat facility sites in the United States. This suggests the range of averages could serve as a basis for estimating fatalities at Leaning Juniper II South. However, based on differences in turbine configuration (tower height, blade length) compared to the turbines where fatality monitoring was conducted and the fact that the landscape level habitat types contain more native habitat, all bird fatality estimates for Leaning Juniper II South would conservatively be 1 to 4 birds per MW per year. Detailed descriptions of impacts to bird groups including raptors, passerines, and waterbirds (waterfowl, shorebirds, and other waterbirds) are included in the following discussion.

Raptors

Mean raptor use at Leaning Juniper II South (0.52/survey) suggests that the project area is not within a major raptor migration corridor or breeding area. The mean raptor use is also much lower than mean raptor use at both the High Winds Facility and the APWRA. Facilities in the region consistently observe red-tailed hawks, American kestrels, northern harriers, and rough-legged hawks (in winter) as the most abundant raptor species.

Based on results of other regional projects, estimates of raptor mortality at 0.01 to 0.09 per MW per year, and knowledge of nesting and raptor use in the area, the estimate for Leaning Juniper II South is also 0.01 to 0.09 raptor fatalities per MW per year. The majority of the fatalities of diurnal raptors will likely consist of buteos and American kestrels. The two buteos with highest use at Leaning Juniper II South are red-tailed and Swainson’s hawks. Small numbers of other raptors (American kestrel) and owls may also occur as fatalities. Actual fatality numbers may be higher or lower for each year during the life of the project.

Passerines

Passerine mortalities are also expected to be low. Based on mortality observed at other operating wind facilities (Erickson et al., 2004; Erickson et al., 2003; Johnson et al., 2003b) located in similar landscapes, an approximate range of 1.0 to 4.0 songbird fatalities per MW per year are predicted for Leaning Juniper II South. The largest number of fatalities will probably be horned larks, a common grassland songbird. No other species (migrant or resident) is anticipated to make up a large proportion of the fatalities, based on the patterns of results of other regional studies. No impacts to threatened or endangered songbird species are anticipated. Actual fatality numbers may be higher or lower for each year during the life of the project.

Waterfowl

Leaning Juniper II South gets some waterfowl use by Canada geese, especially during the winter period. The use estimates for Leaning Juniper II South were lower than estimates observed during the Klondike I wind project preconstruction studies (Johnson et al., 2002a). Some waterfowl mortality may occur from the Facility, but based on available data from other projects, the numbers are expected to be low relative to the waterfowl use of the general area.

The only shorebird observed at Leaning Juniper II South was long-billed curlew, a State Sensitive species. Shorebirds as a group are rarely killed at wind projects; of 1,036 avian fatalities collected at U.S. wind projects, only one was a shorebird (a killdeer found at Buffalo Ridge, Minnesota) (Erickson et al., 2001), even though shorebirds have been recorded at virtually every wind project evaluated. No long-billed curlew collision fatalities have been found at any existing wind projects even though some wind projects have been constructed at sites where long-billed curlews were recorded during baseline avian-use studies (URS, 2001; FPLE, 2000, 2002a; NWC, 2000). However, none of these studied sites had high Long-billed curlew use.

Displacement

Leaning Juniper II South could result in some displacement to long-billed curlews and loggerhead shrikes. It is likely that some birds will avoid areas of human activity and the perimeter around new roads and turbines. However, the Applicant is developing a Grassland Bird Displacement study to investigate whether the Facility has a significant impact on grassland bird use in the area (see Attachment P-4). In addition, the habitat mitigation area(s) may be successful in conserving suitable nesting habitat for these species for the life of the wind project, depending on the site selected. Areas with similar habitat and function for nesting and denning wildlife as found at the Facility are available for conservation and are being considered.

P.7.2.4 Potential Impacts to Bats from Leaning Juniper II South

Impacts to bats from Leaning Juniper II South were estimated using the same sources and methods discussed for Leaning Juniper II North. The Facility area lacks bat roost sites, foraging habitat and drinking water sources as well. Based on the regional bat fatality monitoring results, it is anticipated that bat mortality will range from 0.80 to 2.5 bats per MW per year. Species composition will likely be similar to that at other wind projects, with silver-haired and hoary bats comprising most of the fatalities. Other Myotis (genus name for a group of bats) species may be a smaller composition of the total fatalities as was also documented at Vansycle, Stateline, and Nine Canyon wind projects. Actual fatality numbers may be higher or lower for each year for the life of the project.

P.7.2.5 Potential Impacts to Special Status/Sensitive Species from Leaning Juniper II South

Impacts to special status/sensitive species are addressed below.

<u>Golden Eagle</u>

Golden eagles are known to nest within 5 to 6 miles of the Facility and were occasionally observed during fall through early spring 2004-2005 field surveys. Relatively low use of the site by golden eagles and lack of eagle mortality at existing Pacific Northwest wind farms indicate that the Leaning Juniper South Facility is unlikely to have any significant impact on golden eagle populations in the area. In addition, no nesting habitat will be impacted because nesting habitat is not present on the Facility site.

<u>Ferruginous Hawk and Swainson's Hawk</u>

Both the ferruginous hawk and Swainson's hawk are known to nest within the Facility lease boundary. There are nine active raptor nests within a half mile of Leaning Juniper II South, including four Swainson's Hawk nests. There is also a large stick nest next to one of the Swainson's hawk nests that is also within a half mile of turbines, and could be used by ferruginous hawk in the past or possibly in the future.

Based on the location of Leaning Juniper II South micrositing corridors and 2005 raptor nest data, supplemented with 2006 nest data, there are 3 Swainson's hawk nests and two Ferruginous hawk nests whose restricted conservation zones overlap with the micrositing corridor. The Applicant will conduct a preconstruction survey of raptor nests near construction areas to identify and characterize any nests that could be affected by construction activities. The preconstruction survey will also serve as a baseline for the WMMP.

The Applicant plans to complete as much of the road and foundation construction as possible before the raptor nesting season to minimize impacts to nesting raptors, with a concerted effort to complete construction of the road and turbine foundations that are located within the ODFW restricted conservation zones before the ODFW sensitive nesting periods for these species. However, if sensitive raptors move into the area prior to construction, the Applicant would contract a qualified independent professional biologist to monitor the sensitive raptor nests near construction to quantify any nest site abandonment and record number of young fledged where possible without disturbing the birds. If monitoring indicates that construction has resulted in nest site abandonment or a reduction in productivity, the Applicant will work with ODOE and ODFW to develop appropriate minimization and mitigation measures to avoid impacting these species. For example, the Applicant could incorporate mitigation measures into the process of selecting and preserving a habitat conservation easement, which could be enhanced with raptor nest platforms or other habitat quality improvement projects to mitigate any loss in reproduction. Significant impacts to these species are not anticipated.

Loggerhead Shrike

Loggerhead shrikes were found in shrub-steppe sagebrush in Juniper Woodland Canyon outside of the Leaning Juniper II South lease boundary. These areas and habitat types were intentionally avoided during layout of the Facility access roads and other components. Loggerhead shrikes may temporarily be affected by construction. However, none were observed during the avian point counts and thus are not exhibiting an exposure to operating turbines. Individual birds may occasionally fly through the area at heights of the turbines, although they usually fly well below the rotorswept area. Loggerhead shrikes do not appear highly susceptible to turbine collision. They nest in low shrubs and juniper trees and typically fly low to the ground while foraging. This species occurs throughout the U.S. where wind projects have been built, yet only two loggerhead shrikes (both in California) have been reported as fatalities at wind power facilities (Erickson et al., 2001). Significant impacts to this species are not anticipated.

Burrowing Owl

One active burrowing owl nest was documented during the 2004-2005 surveys. However, no active burrowing owl nests were documented near Leaning Juniper II South Facility components and none were observed flying within the rotor-swept area during avian point count surveys. Burrowing owls are not considered at risk of collision with turbines.

Long-Billed Curlew

Long-billed curlews were frequently seen or heard near the E and F turbine strings at Leaning Juniper II South in open low shrub and grassland terrain. Like burrowing owls, though, they are not considered at risk for collision. Long-billed curlews appear to be fairly common in the general area, as 71 were observed during the 2005 point count surveys, all in the spring and summer seasons. Most of the long-billed curlews observed during point count surveys were seen flying below the rotor-swept height, which reduces their risk of collision. No long-billed curlew wind turbine collision fatalities have been found at any existing wind projects (URS, 2001; FPLE, 2000, 2002a; NWC, 2000). Shorebirds as a group are rarely killed at wind facilities. However, none of these studied sites had high Long-billed curlew use.

Long-billed curlews nesting near turbines could be affected by some minor temporary and permanent habitat loss. Presence of turbines and human activity during and after construction may also displace curlews from some areas, though it is expected that curlews would displace to nearby portions of the lease boundary that are suitable for curlew nesting and staging. Localized impacts to nesting and staging curlews would not likely impact breeding populations in the general area.

A preliminary HMP has been proposed to mitigate habitat loss associated with the permanent footprint and changes to habitat from temporary construction activities (see Attachment P-4). Depending on the final site(s) selected, this plan would likely result in conservation of suitable long-billed curlew habitat for the life of the wind project, ensuring availability of undisturbed habitat for the species.

Grasshopper Sparrow

Grasshopper sparrows were found primarily near the collector substation and near Leaning Juniper II North within open low shrub (rabbitbrush) and grassland areas. However, no grasshopper sparrows were observed during point counts at Leaning Juniper II North and very few were observed during the point counts conducted for Leaning Juniper II South. They may occasionally fly through the area at heights of the turbines, although none were documented at this height during the point counts.

Construction of the Facility will result in some minor temporary habitat loss. However, this will be restricted to underground collection cable trenches which will be restored to preconstruction conditions. Construction could also result in temporary displacement during the sensitive nesting period. However, grasshopper sparrows are expected to move to nearby areas within the lease boundary like the long-billed curlews. Localized impacts to nesting grasshopper sparrows would not impact breeding populations in the general area. Overall impacts to this species are expected to be less than significant.

A preliminary HMP has been proposed to mitigate habitat loss associated with the permanent footprint and changes to habitat from temporary construction activities (see Attachment P-4). Depending on the final site(s) selected, this plan would likely result in conservation of suitable grasshopper sparrow habitat for the life of the project, ensuring availability of undisturbed habitat for the species.

White-Tailed Jackrabbit

Two white-tailed jackrabbits were observed in the central part of Leaning Juniper II South. However, survey results indicate relatively low use of the Facility area. A temporary and permanent loss of open shrub cover and grassland will not adversely impact this species because this habitat type is extensive on sites where additional jackrabbits may be present.

Sagebrush Lizard

This species was found onsite but not within survey corridors or planned construction zones. No impacts are expected to this location or individuals using this site. Other individuals may be present onsite and may intermittently be found along dirt roads within the juniper woodland where more sandy soils and an open soil surface is present in the understory of sagebrush and junipers.

Plants

No federally listed, proposed, or candidate plant species were found during field investigations at the Facility. One state candidate plant species, Sessile mousetail, was found onsite. Impacts to this species are described in Attachment Q-1 to Exhibit Q.

P.7.2.6 Impacts to Other Wildlife from Leaning Juniper II South

Potential impacts to other wildlife, including nonlisted mammals, amphibians, and reptiles are expected to be less than significant. No measurable impacts are anticipated to big game from Facility operations. Road and Facility construction may result in loss of foraging and breeding habitat for nonlisted small mammals. Ground-dwelling mammals will lose the use of the permanently affected areas; however, they are expected to repopulate the temporarily affected areas. Some small mammal fatalities can be expected from vehicle activity during operations, but impacts are expected to be very low. No impacts to amphibians are anticipated during operations. Impacts to reptiles during operation are likely to be limited to direct mortality as a result of vehicle collisions and are expected to be low. Potential impacts to the WGS and other protected species are discussed in Exhibit Q.

P.8 MEASURES TO AVOID, REDUCE, OR MITIGATE IMPACTS

OAR 345-021-0010(1)(p)(E) *A description of any measures the applicant proposes to avoid, reduce, or mitigate potential adverse impacts;*

Response: This section describes the measures that will be implemented to avoid, reduce, or mitigate potential adverse impacts to special status/sensitive species and wildlife habitat. Measures employed for Leaning Juniper II North and South are discussed separately.

P.8.1 Avoidance, Minimization, and Mitigation Measures for Leaning Juniper II North

The Applicant will implement the following avoidance and minimization measures. For the impacts that cannot be avoided or minimized, mitigation will be developed by means of reliable methods and in compliance with ODFW habitat mitigation rules (OAR 635-415-0025). These measures are discussed in sections 8.1.3 through 8.1.4.

P.8.1.1 Avoidance in Leaning Juniper II North Facility Design

Leaning Juniper II North will be microsited during the final design to avoid impacts on sensitive species, riparian areas, and shrub-steppe habitat.

General Measures

- Existing roads are being used to the maximum extent possible, except where use of the roads would affect sensitive species.
- All turbine towers and permanent meteorological (met) towers are un-guyed.

- Collector lines are being buried in the temporarily disturbed road shoulder where feasible, or placed overhead to avoid impacts to wetlands, canyons, or rugged terrain that would prevent the safe use of underground trenching technology.
- Overhead collector lines are being constructed in accordance with the recommendations of the Avian Power Line Interaction Committee (APLIC) for raptor protection on power lines (including minimum conductor spacing and the use of anti-perch guards.

No Leaning Juniper II North Facility component footprint is located within known Category 1 Habitat.

P.8.1.2 Minimization during Construction of Leaning Juniper II North

The following protective measures will be implemented during construction of Leaning Juniper II North to minimize impacts:

Construction Monitoring

- Qualified biologist(s) will provide environmental training and environmental monitoring during construction. The qualified biologist will visit the site before site development to sign sensitive resource areas, including sensitive raptor nests and the ford crossings. The qualified biologist will periodically visit the site during construction to maintain flagging, monitor nesting birds, and oversee construction and permit compliance.
- If sensitive raptor nests are located in proximity to construction areas, the qualified biologist will monitor specific raptor nests during construction. The environmental monitor will monitor raptor nesting behaviors during construction site visits to quantify any nest site abandonment and will record number of young fledged where possible without disturbing the birds.
- The Applicant will use an onsite manager and will require the construction contractors to designate a Field Contact Representative (FCR) to oversee their compliance during construction. The FCR is responsible for overseeing compliance with protective measures and coordination in accordance with the county and other regulatory agencies.

Environmental Training

- The Applicant will provide an environmental training course for the construction contractors. The course provides information on the sensitive species present onsite, exclusion flagging, permit requirements, and other environmental issues. All construction site personnel will be required to attend the environmental training in conjunction with hazard and safety training prior to working onsite.
- The training also covers proper protocol for responding to dead or injured wildlife. Construction and operations personnel will be required to report any injured or dead wildlife detected while on the site to the biological monitor during construction or appropriate onsite manager during operations.

Exclusion Flagging

Wetlands, sensitive raptor nests and other sensitive resources will be identified near planned construction, as described below:

- As of 2006, no WGS colonies were identified within the Leaning Juniper II North lease boundary. If the Facility is not built within 3 years of the 2006WGS surveys, a refresh survey will be conducted within the anticipated construction zones during the spring season before initiation of construction. If WGS colonies are identified, these would be marked with orange exclusion fencing or other marking. The contractor would also be instructed to work outside these boundaries at all times.
- Wetlands and streams near the site boundary that should not be impacted during construction will be marked with brightly colored pin flags or wooden lathes. The biological monitor will work with the onsite manager and FCR to ensure that exclusion flagging is in place prior to construction in that area.
- For raptor nests, the biological monitor will flag raptor nests within approximately one-quarter mile or in proximity to construction zones (depending on best judgment of topography and level of anticipated disturbance) with an appropriate sign. The biological monitor will also work with the Applicant and the construction contractor to minimize construction work in these areas to the extent feasible.

Speed Limits

- All construction personnel will be instructed to observe caution when driving through the Facility area and to maintain reasonable driving speeds (particularly during the period from 1 hour before sunset to 1 hour after sunrise) so as not to harass or accidentally strike wildlife. Speed limits will be posted throughout the Facility construction area.

Fire Control

- The Applicant will be prepared for a quick response to wildfires that could impact the natural (wildlife habitat) environment.

Erosion Control

- An Erosion and Sediment Control Plan will be developed in accordance with the project National Pollutant Discharge Elimination System (NPDES) permit for the Leaning Juniper II North site. The plan requires the contractor to install erosion and siltation controls near riparian areas and other appropriate locations as designated in the plan.
- The FCR or a designated person under the FCR is periodically monitoring the erosion and siltation controls onsite to ensure that they are in working condition.

P.8.1.3 Mitigation for Wildlife Habitat Impacts from Leaning Juniper II North

Mitigation for Temporary Impacts

To mitigate temporary disturbance to wildlife habitats such as shrub-steppe and grassland from construction of Leaning Juniper II North, areas disturbed during construction will be reseeded with the appropriate mixture of grasses and forbs, depending on the habitat. The composition and application rate of the seed mixes will be determined in consultation with ODFW and the landowners and will be subject to the approval of the ODOE. Under the maximum possible area impact, approximately 22 acres of Category 2 habitat, 92 acres of Category 3 habitat, 2 acres of Category 4 habitat and 7 acres of Category 5 will be temporarily affected. The Applicant is in the process of developing a Revegetation Plan for the Facility in consultation with the ODFW and ODOE, using the Klondike III Revegetation Plan as a model. The Applicant understands that the Council will require this plan to be included as an attachment to the Final Order, and plans to submit a draft Plan to ODOE in the fall of 2006. Measures to restore the original habitat will include:

- Disturbed sites will be revegetated primarily with native seed mixes to preconstruction or better condition.
- Disturbed agricultural areas will be replanted with dryland wheat.
- Monitoring will be conducted to ensure successful establishment of vegetation.

Because noxious weeds can have detrimental effects on native plant populations, additional measures will be implemented to control the introduction and spread of undesirable plants during and after construction:

- Areas disturbed during construction will be revegetated expeditiously.
- The Applicant will consult with the Gilliam County Weed Control Board regarding appropriate weed control measures.

Indirect Facility-related impacts to plant species of concern might also occur as a result of changes in fire frequency patterns in the area. Facility operation and maintenance activities could ignite wildfires if precautions are not taken. Because it is not clear if wildfires would have a positive or negative effect on native plants in the Facility area, the most prudent course of action is to implement measures to maintain existing fire frequency patterns. Fire control measures include:

- A comprehensive fire control plan will be developed before construction and implemented Facility-wide over the life of the project.
- The fire control plan will take into account the dry nature of the region, and address risks on a seasonal basis.

Mitigation for Permanent Impacts

Permanent direct habitat impacts (that is, from the Facility footprint) that cannot be avoided or minimized will be mitigated by the use of standards and methods that are in compliance with ODFW's habitat mitigation goals and standards. The Applicant will preserve a parcel of native habitat to mitigate for permanent loss of habitat from the permanent footprint of Leaning Juniper II North, as well as potential loss of raptor production during the construction phase.

The Applicant plans to preserve a parcel that is currently unprotected but functional for grassland and shrub-steppe wildlife species of interest. Targeted wildlife species include species status species recorded within Leaning Juniper II North leased land, including long-billed curlews, grasshopper sparrows and raptors. The primary goal will be to achieve a net benefit to species by securing suitable habitat and protecting, for the life of the project, essential or important habitat from land use activities that could negatively affect these species.

The property will be protected under a Conservation Easement or other type of formal designation for the life of the project, which would specify allowed uses by the landowner. The land selected would be preserved under such an easement, and potentially restored or enhanced with modifications to grazing or other methods, depending on the nature of the parcel. In addition, the conservation easement would be made available to ODFW for monitoring and research, subject to landowner's approval. Wildlife enhancement opportunities could include raptor nest platforms to mitigate potential loss in productivity for certain sensitive-status raptor species. The Applicant is in the process of developing a formal HMP in consultation with ODFW and ODOE, using the Klondike III HMP as a model (see Attachment P-4). The Applicant understands that the Council will require this plan to be included as an attachment to the Final Order, and plans to submit a draft Plan to ODOE in the fall of 2006.

The Applicant has reviewed several parcels to assess the potential to support sensitive species, including WGS, long-billed curlews, grasshopper sparrows, and raptors. In order to preserve habitat for other sensitive species, such as long-billed curlews and raptors, several different habitat types may be protected. Parcels being considered are currently in private ownership and as such, are subject to the landowner's primary objectives for the land—either as grazing or some type of future development.

After talking to several landowners, the Applicant proposed to conserve a habitat mitigation site to the southwest of Leaning Juniper II North and to the west of Leaning Juniper II South turbine string E, on land immediately adjacent to a parcel of land managed by the Bureau of Land Management, as described in Attachment P-4. During a site visit on July 6, 2006, the Applicant conducted a tour of the proposed Facility and habitat mitigation site for members of ODOE and ODFW, and received informal comments from the ODFW on habitat enhancement methods. ODFW expressed interest in using the habitat mitigation site for research opportunities, such as a study on WGS translocation, subject to landowner approval (McMahon, pers. comm.).

Subsequent to the site visit, the landowner reconsidered the proposed habitat mitigation site, suggesting that he may no longer be interested in preserving his land under a conservation easement. The Applicant has since identified a replacement site located on shrub-steppe habitat approximately 16 to 18 miles southeast of the Facility. The newly proposed site is described in more detail in Attachment P-4.

Leaning Juniper II North would permanently impact approximately 21 acres of land, including 1 acre of developed Category 6 habitat. Anticipated habitat impacts and the proposed mitigation for relevant impacts are summarized in the subsection below. The word "protect" is defined as follows: conserve, for the life of the project, native habitat of similar vegetative composition that is in like or better ecological condition, ensuring that no loss of such habitat will occur from various land use practices typically occurring in the Columbia Basin. The proposed 26-acre mitigation total protects a greater quantity of native habitat of equal or better quality than the 20 acres of permanent impact, resulting in a net benefit to wildlife habitats, as further described in Attachment P-4.

Mitigation Intent by Category

The intent of the mitigation effort is as follows:

Category 1

The mitigation goal requires avoidance of this habitat category. No Category 1 habitat will be impacted by Leaning Juniper II North; therefore, no mitigation is required.

Category 2

The mitigation goal, if impacts are unavoidable, is no net loss of either habitat quantity or quality and the provision of a net habitat benefit. Potentially adverse impacts to Category 2 habitats have been avoided, minimized, and mitigated to the greatest extent practicable. Under the worst case scenario, 2.67 acres of Category 2 habitat will be permanently impacted by Leaning Juniper II North.

To mitigate for this unavoidable impact, the Applicant will enhance or protect approximately 8 acres of grassland or shrub-steppe of the same or better quality as the Category 2 habitat impacted.

Category 3

The mitigation goal for Category 3 habitat, if impacts are unavoidable, is no net loss in either existing habitat quantity or quality. Potentially adverse impacts to Category 3 habitats have been avoided, minimized, and mitigated to the greatest extent practicable. Under the worst case scenario, 15.80 acres of Category 3 habitat will be permanently impacted by Leaning Juniper II North.

To mitigate for this unavoidable impact, the Applicant will enhance or protect an equal amount of acres of grassland or shrub-steppe habitat in as good as or better condition as the Category 3 habitat impacted.

Category 4

The mitigation goal for Category 4 habitat, if impacts are unavoidable, is no net loss in either existing habitat quantity or quality. Potentially adverse impacts to Category 4 habitats have been avoided, minimized, and mitigated to the greatest extent practicable. Under the worst case scenario, 0.63 acre of Category 4 habitat will be permanently impacted.

To mitigate for this unavoidable impact, the Applicant will enhance or protect approximately an equal amount of acres of grassland or shrub-steppe habitat in as good as or better condition as the Category 4 habitat impacted.

Category 5

The mitigation goal for Category 5 habitat, if impacts are unavoidable, is to provide a net benefit of quantity or quality. Under the worst case scenario, 1.20 acres of Category 5 habitat will be permanently impacted. To mitigate for this unavoidable impact, the Applicant will enhance or protect approximately an equal amount of acres of grassland habitat in as good as or better condition as the Category 5 habitat impacted.

Category 6

The mitigation goal for Category 6 habitat, if impacts are unavoidable, is to minimize the impacts. Impacts to this habitat have been avoided, minimized, and mitigated to the greatest extent practicable. Under the worst case scenario, less than 1 acre of Category 6 will be permanently impacted.

The size of the habitat mitigation site would be approximately 26 acres for Leaning Juniper II North. Potential enhancement measures could include:

- Establishing an agreement with a landowner to enhance existing native habitat for the life of the project. An example is the use of livestock exclosures or fencing to exclude livestock from riparian, shrub-steppe and native grassland habitat, which creates Category 2 habitat from Category 3 habitat.
- Establishing an agreement with a landowner that initiates and maintains the conversion of agricultural land to grassland and shrub-steppe habitat, creating Category 2 or 3 habitat from Category 6 habitat. The conservation approach is similar to that deployed under the CRP, and the term would be for the life of the project.

Proposed enhancement measures for the Leaning Juniper II North habitat mitigation site are described in Attachment P-4, and will be developed in consultation with the ODOE and ODFW.

P.8.1.4 Mitigation for Impacts to Special Status/Sensitive Species at Leaning Juniper II North

Plants

There are no anticipated impacts to special status/sensitive plants; therefore, no mitigation is required.

Wildlife

Construction and operation of Leaning Juniper II North is not expected to cause significant impacts to special status/sensitive wildlife species. However, it is possible that construction could temporarily displace some raptors or reduce raptor productivity. If this is observed during construction monitoring, the Applicant will mitigate these impacts with raptor nest platforms or other wildlife enhancement measures at the conservation easement in consultation with the ODOE and ODFW.

P.8.2 Avoidance, Minimization, and Mitigation Measures for Leaning Juniper II South

The Applicant will implement the following avoidance and minimization measures. For the impacts that cannot be avoided or minimized, mitigation will be developed by means of reliable methods and in compliance with ODFW habitat mitigation rules (OAR 635-415-0025). These measures are discussed in sections 8.2.3 through 8.2.4.

P.8.2.1 Avoidance and Minimization in Leaning Juniper II South Facility Design

Leaning Juniper II South will be microsited during the final design to avoid impacts on sensitive species, riparian areas, and shrub-steppe habitat.

General Measures

- Existing roads will be used to the maximum extent possible, except where use of the roads would affect sensitive species.
- All turbine towers and permanent meteorological (met) towers will be un-guyed.
- Collector lines will be buried in the temporarily disturbed road shoulder where feasible, or placed overhead to avoid impacts to wetlands, canyons, or rugged terrain that would prevent the safe use of underground trenching technology.
- Overhead collector lines and transmission lines will be constructed in accordance with the recommendations of the APLIC for raptor protection on power lines (including minimum conductor spacing and the use of anti-perch guards.

The Applicant has also agreed not to use or improve several existing roads to avoid impacts to intact wildlife habitat.

Elimination of Major Through-Roads

Major roads that could have provided main access to Leaning Juniper II South but were eliminated from the construction plan for environmental reasons included:

- Jones Canyon Road through and parallel to Jones Canyon.
- Juniper Woodland Canyon road, which runs east-west to the south of Stone Lane.
- Road from the Waste Management Disposal Services of Oregon, Inc., office area north to Facility. This road could provide direct access to turbine J-17.

Elimination and Relocation of Facilities

Following the 2004-2005 habitat and wildlife surveys, the Applicant worked with ODFW to identify turbine locations, laydown areas, and roads located near known WGS colonies, raptor nests, and other sensitive species so that these facilities could be relocated during micrositing to avoid impacting these resources.. These changes include:

- Roads through WGS colonies were eliminated from the Leaning Juniper II construction plan.
- Turbines in the E and F turbine strings were relocated from within occupied WGS habitat to outside the occupied habitat.
- The road between E and F turbine strings and construction staging area will be constructed to avoid WGS occupied habitat.
- The road from turbine J-16 to Cedar Springs Road was designed to be located farther from WGS colony #6.
- In addition, the Applicant will maximize use of existing gravel roads rather than existing two-track, farm roads to avoid impacts to WGS. For example, the Applicant will utilize the graveled road off Highway 19, Stone Lane, as primary project access rather than improving the farm road through Juniper Canyon woodland, which traverses historic WGS colony #1.

As a result of these changes, no Leaning Juniper II South Facility component is located within known WGS active colonies or Category 1 Habitat. In addition, potential Facility-related disturbance in habitat adjacent to all known WGS patches was kept to a minimum.

P.8.2.2 Minimization during Construction of Leaning Juniper II South

The following protective measures will be implemented during construction of Leaning Juniper II South to minimize impacts:

Construction Monitoring

- Qualified biologist(s) will provide environmental training and monitoring during construction. The qualified biologist will visit the site before site development to sign sensitive resource areas, including WGS sites. The qualified biologist will visit the site periodically before site development and during construction in order to flag sensitive resource areas and oversee construction and permit compliance.
- If sensitive raptor nests are located in proximity to construction areas, the qualified biologist will monitor specific raptor nests during construction. The environmental monitor will monitor raptor nesting behaviors during construction site visits to quantify any nest site abandonment and will record number of young fledged where possible without disturbing the birds.
- The Applicant will use an onsite manager and will require the construction contractors to designate an FCR to oversee their compliance during construction. The FCR is responsible for overseeing compliance with protective measures and coordination in accordance with the county and other regulatory agencies.

Environmental Training

- The Applicant will develop an environmental training course for the construction contractors. The course will provide information on the sensitive species present onsite, exclusion flagging, permit requirements, and other environmental issues. All construction site personnel will be required to attend the environmental training in conjunction with hazard and safety training prior to working onsite.
- The training will also cover proper protocol for responding to dead or injured wildlife. Construction and operations personnel will be required to report any injured or dead wildlife detected while on the site to the biological monitor during construction or appropriate onsite manager during operations.

Exclusion Flagging

WGS-occupied colonies, wetlands, and sensitive raptor nests will be identified near planned construction, as described below:

- All WGS-occupied colonies will be marked with orange exclusion fencing or other marking. The contractor will be instructed to work outside these boundaries at all times.
- If the Facility is not built within 3 years of the WGS surveys, a refresh of the original 2005 surveys will be conducted within the anticipated construction zones during the spring season before initiation of construction.
- Wetlands and streams near the site boundary that should not be impacted during construction will be marked with brightly colored pin flags or wooden lathes. The biological monitor will work with the onsite manager and FCR to ensure that exclusion flagging is in place prior to construction in that area.
- Sensitive raptor nest trees will also be flagged, and the biological monitor(s) will work with the construction contractor to minimize construction work in these areas to the extent feasible.

Speed Limits

- All construction personnel will be instructed to observe caution when driving through the project area and to maintain reasonable driving speeds (particularly during the period from 1 hour before sunset to 1 hour after sunrise) so as not to harass or accidentally strike wildlife. Speed limits will be posted throughout the Facility construction area.

Fire Control

- The Applicant will be prepared for a quick response to wildfires that could impact the natural (wildlife habitat) environment.

Erosion Control

- An Erosion and Sediment Control Plan will be developed in accordance with the NPDES permit for the Leaning Juniper II South site and will also be implemented during construction. The plan requires the contractor to install erosion and siltation controls near riparian areas and other appropriate locations as designated in the plan.

- The FCR or a designated person under the FCR will monitor the erosion and siltation controls onsite to ensure that they are in working condition.

P.8.2.3 Mitigation for Wildlife Habitat Impacts from Leaning Juniper II South

Mitigation for Temporary Impacts

To mitigate temporary disturbance to wildlife habitats such as shrub-steppe and grassland from construction of Leaning Juniper II South, areas disturbed during construction will be reseeded with the appropriate mixture of grasses and forbs, depending on the habitat. The composition and application rate of the seed mixes will be determined in consultation with ODFW and the landowners and will be subject to the approval of the ODOE. Under the maximum possible area impact, approximately 116 acres of Category 2 habitat, 33 acres of Category 3 habitat, and 18 acres of Category 4 habitat will be temporarily affected. The Applicant is in the process of developing a Revegetation Plan for the Facility in consultation with the ODFW and ODOE, using the Klondike III Revegetation Plan as a model. The Applicant understands that the Council will require this plan to be included as an attachment to the Final Order, and plans to submit a draft Plan to ODOE in the fall of 2006. Measures to restore the original habitat will include:

- Disturbed sites will be revegetated primarily with native seed mixes to preconstruction or better condition.
- Disturbed agricultural areas will be replanted with dryland wheat.
- Monitoring will be conducted to ensure successful establishment of vegetation.

Because noxious weeds can have detrimental effects on native plant populations, additional measures will be implemented to control the introduction and spread of undesirable plants during and after construction:

- Areas disturbed during construction will be revegetated expeditiously.
- The Applicant will consult with the Gilliam County Weed Control Board regarding appropriate weed control measures.

Indirect project-related impacts to plant species of concern might also occur as a result of changes in fire frequency patterns in the area. Facility O&M activities could ignite wildfires if precautions are not taken. Because it is not clear if wildfires would have a positive or negative effect on native plants in the Facility area, the most prudent course of action is to implement measures to maintain existing fire frequency patterns. Fire control measures include:

- A comprehensive fire control plan will be developed before construction and implemented project-wide over the life of the project.

- The fire control plan will take into account the dry nature of the region, and address risks on a seasonal basis.

Mitigation for Permanent Impacts

Permanent direct habitat impacts from the Leaning Juniper II South footprint that cannot be avoided or minimized will be mitigated by the use of standards and methods that are in compliance with ODFW's habitat mitigation goals and standards. The Applicant will preserve a parcel of native habitat to mitigate for permanent loss of habitat as well as any potential loss of wildlife production during the construction phase, using the same methods described above for Leaning Juniper II North. The selection and management of the Conservation Easement parcel is discussed further, above, for Leaning Juniper II North; that discussion is not repeated here. The Applicant proposes to establish the habitat mitigation sites for both Leaning Juniper II North and South in the same general area, as described in Attachment P-4.

Under the worst case scenario, Leaning Juniper II South will permanently affect 16.44 acres of Category 2 habitat, 6.65 acres of Category 3 habitat, and 1.48 acre of Category 4 habitat. The intent of the mitigation effort is as follows:

- Mitigate for 16.44 Category 2 permanently impacted habitat: enhance or protect approximately 49 acres of grassland or shrub-steppe of the same or better quality as the Category 2 habitat impacted.
- Mitigate for 6.65 Category 3 permanently impacted habitat: enhance or protect an equal area of grassland or shrub-steppe habitat in as good as or better condition as the Category 3 habitat impacted.
- Mitigate for 1.48 acre of Category 4 permanently impacted habitat: enhance or protect an equal area of grassland of the same or better condition as the Category 4 habitat impacted.
- Mitigate impacts to Category 6 habitat through noxious weed control and habitat restoration as described earlier.

The size of the habitat mitigation site would be approximately 57 acres for Leaning Juniper II South. Potential enhancement measures could include:

- Establishing an agreement with a landowner to enhance existing native habitat for the life of the project. An example is the use of livestock exclosures or fencing to exclude livestock from riparian or intermittent drainages, grassland, and shrub-steppe habitats which, in time, could result in development of Category 2 habitat from Category 3 habitat.
- Establishing an agreement with a landowner that initiates and maintains the conversion of agricultural land to grassland and shrub-steppe habitat, creating Category 2 or 3 habitat from Category 6 habitat. The conservation approach is similar to that deployed under the CRP, and the term would be for the life of the project.

- Grazing Management Plan. The Applicant has initiated discussions with the current landowner (Waste Management) and the new grazing lessee to develop a grazing management plan for the lease area as a secondary component to the habitat mitigation package. Both parties are supportive of improvements in the previous' grazing lessee's land use practices. The Applicant has offered technical support directly to the grazing lessee. The wildlife biologist will provide assistance.

  The objective of the grazing management plan would be to aid in assisting the lessee with an understanding the wildlife and wildlife habitat values of the Facility site and how the important native vegetation can be used (grazed) while retaining the desired structural stage and seed production appropriate to the site and to the wildlife needs. Initial discussions have included duration of grazing season(s), pasture rotation, and avoidance of human disturbance at raptor nests during certain seasons. Because the lessee has not grazed the Facility lease area in the past and is willing to learn about retaining wildlife values, this is an ideal time to develop a technical assistance partnership. The plan will be an internal plan managed and implemented by the lessee. The technical assistance of the Applicant will be available on an on-going basis.

Proposed enhancement measures for the Leaning Juniper II South habitat mitigation site are described in Attachment P-4, and will be developed in consultation with the ODOE and ODFW.

P.8.2.4 Mitigation for Impacts to Sensitive Species

Plants

There are no anticipated impacts to special status/sensitive plants; therefore, no mitigation is required.

Wildlife

Construction and operation of Leaning Juniper II South is not expected to cause significant impacts to special status/sensitive wildlife species. However, it is possible that construction could temporarily displace some raptors or reduce raptor productivity. If this is observed during construction monitoring, the Applicant will mitigate these impacts with raptor nest platforms or other wildlife enhancement measures at the conservation easement in consultation with the ODOE and ODFW.

P.9 EVIDENCE THAT THE PROPOSED FACILITY COMPLIES WITH ODFW FISH AND WILDLIFE HABITAT MITIGATION GOALS

OAR 345-021-0010(1)(p)(F) *Evidence that the proposed facility, including any proposed mitigation, complies with the fish and wildlife habitat mitigation goals and standards in OAR 345-415-0030;*

Response:

With the habitat mitigation described in (E), the proposed Facility complies with the fish and wildlife habitat mitigation goals and standards in OAR 635-415-0030.

P.10 MONITORING PROGRAM

OAR 345-021-0010(1)(p)(G) *The applicant's proposed monitoring program, if any, for impacts to such fish and wildlife species and their habitats.*

Response:

The wildlife monitoring programs for the operational phase of Leaning Juniper II North and South are described in sections 10.1 and 10.2. No fish or fish habitat is impacted; no monitoring plans are needed. The programs will be developed in consultation with ODFW and ODOE. Construction monitoring is discussed in Section P.9.

P.10.1 Wildlife and Habitat Monitoring Program for Operation of Leaning Juniper II North

The Applicant will implement a WMMP for the operational phase of Leaning Juniper II North to evaluate both direct and indirect impacts of the Facility on wildlife and habitat. Aspects and objectives of the monitoring proposal will include avian and bat standardized casualty searches, training of Facility personnel on emergency response for discovered injured animals, tracking and reporting of incidental finds (whether reported by Facility employees or the monitoring contractor), searcher efficiency trials, and carcass removal trials. The Applicant is in the process of developing a WMMP in consultation with ODFW and ODOE, using the Klondike III WMMP as a model. The Applicant understands that the Council will require this plan to be included as an attachment to the Final Order, and plans to submit a draft plan to ODOE in the fall of 2006. The monitoring plan will be based in part on the results from the previously conducted monitoring. Study components will be similar to the Stateline and Klondike III Wildlife Monitoring and Mitigation plan and will incorporate recently obtained fatality results from regional projects monitored in 2005 and 2006.

Raptor nests will also be monitored for use and productivity to determine potential indirect impacts to raptors. The objectives behind raptor nest surveys are to estimate the size of the local breeding populations of tree-nesting raptor species in the vicinity of the facility and to determine whether operation of the facility results in a reduction of nesting activity or nesting success in the local populations of target raptor species: Swainson's hawk, ferruginous hawk, and golden eagle. Four Swainson's hawk nests were discovered during the 2006 baseline surveys, though all were located off of the Leaning Juniper II North leased land. Raptor nests will be monitored during the first and fourth years after construction.

In addition to fatality and raptor nest monitoring, the program will also include a Wildlife Incidental Response and Handling (WIRH) System similar to that used at Klondike I. The WIRH system will train operations and maintenance personnel in responding to injured or killed birds.

Reclamation success will also be monitored to determine if habitats temporarily affected during construction have been restored. Revegetation monitoring will be described in the Revegetation Plan to be submitted to ODOE in the fall of 2006. Restoration monitoring and weed control needs will be conducted by the restoration contractor and incidentally during fatality and raptor nest monitoring.

P.10.2 Wildlife and Habitat Monitoring Program for Operation of Leaning Juniper II South

The Applicant will implement a WMMP for the operational phase of Leaning Juniper II South as well. The program will be similar to that developed for Leaning Juniper II North, and will include avian and bat standardized casualty searches, training of Facility personnel on emergency response for discovered injured animals, tracking and reporting of incidental finds (whether reported by Facility employees or NWC), searcher efficiency trials, carcass removal trials, a WIRH system for operations and maintenance personnel, and reclamation procedures for habitats temporarily affected during construction. The Applicant is in the process of developing the WMMP, and plans to submit a draft Plan to ODOE in the fall of 2006. Study components will be similar to the Klondike III Wildlife Monitoring and Mitigation plan and will incorporate recently obtained fatality results from regional projects monitored in 2005 and 2006.

Raptor nests will also be monitored for use and productivity to determine potential indirect impacts to raptors. Target raptor species are: Swainson’s hawk, ferruginous hawk and golden eagle. Eleven Swainson’s hawk and two ferruginous hawk nests were discovered during the 2005 baseline surveys. Some of these nests are located off of the leased land site. Raptor nests will be monitored during the first and fourth years after construction. Where possible, raptor nest surveys for Leaning Juniper II North and South would be combined.

Post-construction monitoring of WGS sites will be conducted for Leaning Juniper II South, as described in the Incidental Take Permit Application included as Attachment Q-3 to Exhibit Q. WGS activity observed incidentally during the avian and bat mortality monitoring for Leaning Juniper II South will be used to evaluate effects to this species occurring in close proximity to the Facility. If WGS are present at the habitat mitigation site, this population could also be monitored to help evaluate the health and trends of local populations and identify fluctuations in the population or overall density of the site. This information will be contributed to various agencies in the immediate area who are involved in formal short or long-term monitoring of the species. Temporarily disturbed habitats will be restored according to the Facility Revegetation Plan. Reclamation success and weed control needs will be monitored by the restoration contractor and incidentally during fatality and raptor nest monitoring.

P.11 CONCLUSION

The Facility siting process complies with the ODFW Fish and Wildlife Habitat Mitigation Policy as set forth in OAR 635-415-0000 through –0025. As part of the siting process, all of the fish and wildlife habitats within the fish and wildlife habitat analysis area were identified and categorized according to the ODFW Policy. In summary, no Category 1 habitats will be permanently impacted by the Facility. The majority of the

Leaning Juniper II North and South analysis areas is classified as Category 1, 2, 3, or 4 habitat but only approximately 19 and 23 acres of Category 2 and 3 habitat are expected to be permanently impacted by the construction and operation of Leaning Juniper II North and South, respectively. Temporary and permanent impacts to grasslands and shrub-steppe habitat will be mitigated consistent with ODFW standards through restoration and a conservation easement.

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Figures

ATTACHMENT P-1

Letter from Oregon Department of Fish and Wildlife Regarding Washington Ground Squirrel Habitat Categories

ATTACHMENT P-2

Wildlife Baseline Study for the Leaning Juniper Wind Power Project

ATTACHMENT P-3

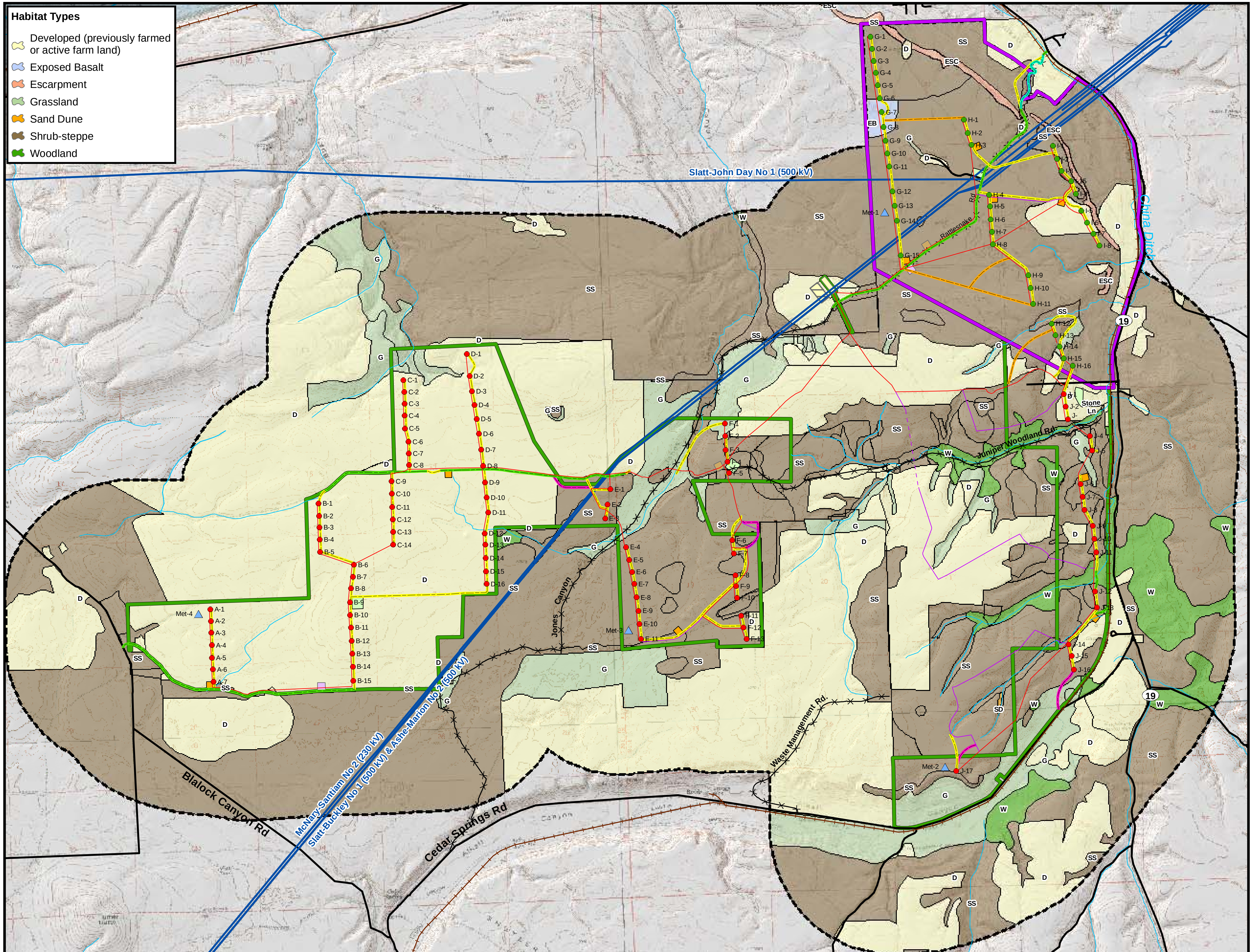
Leaning Juniper II North Grassland Bird Displacement Study

ATTACHMENT P-4

Proposed Habitat Mitigation Plan for Leaning Juniper II Wind Power Facility

Figure P-1
Habitat Types

Leaning Juniper II
Wind Power Facility



PPM Energy
A ScottishPower Company

Legend

Proposed Permanent Facilities
- Proposed Turbine - Leaning Juniper II North
- Proposed Turbine - Leaning Juniper II South
- Proposed Permanent Met Tower

Proposed Roads - Leaning Juniper II
- New Road
- Existing Road - Improvements Needed

Alternate Routes - Leaning Juniper II
- Existing Road - Improvements Needed
- New Road

Preferred Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line

Alternate Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Proposed Temporary Facilities
- Proposed Crane Path
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area

Existing Facilities
- Major Roads
- Minor Roads
- Existing Road - Not Used for Construction
- Railroads
- Existing Transmission Line
- Intermittent Streams
- Habitat Study Area
- Leaning Juniper II - North
- Leaning Juniper II - South

N W E S

Note:
-Habitat boundaries digitized using field maps.

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Field Data Collected by:
Northwest Wildlife Consultants, Inc.

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure P-1 Habitat Types.mxd, Date: September 15, 2006 1:03:28 PM

Figure P-2
Habitat Subtypes

Leaning Juniper II
Wind Power Facility

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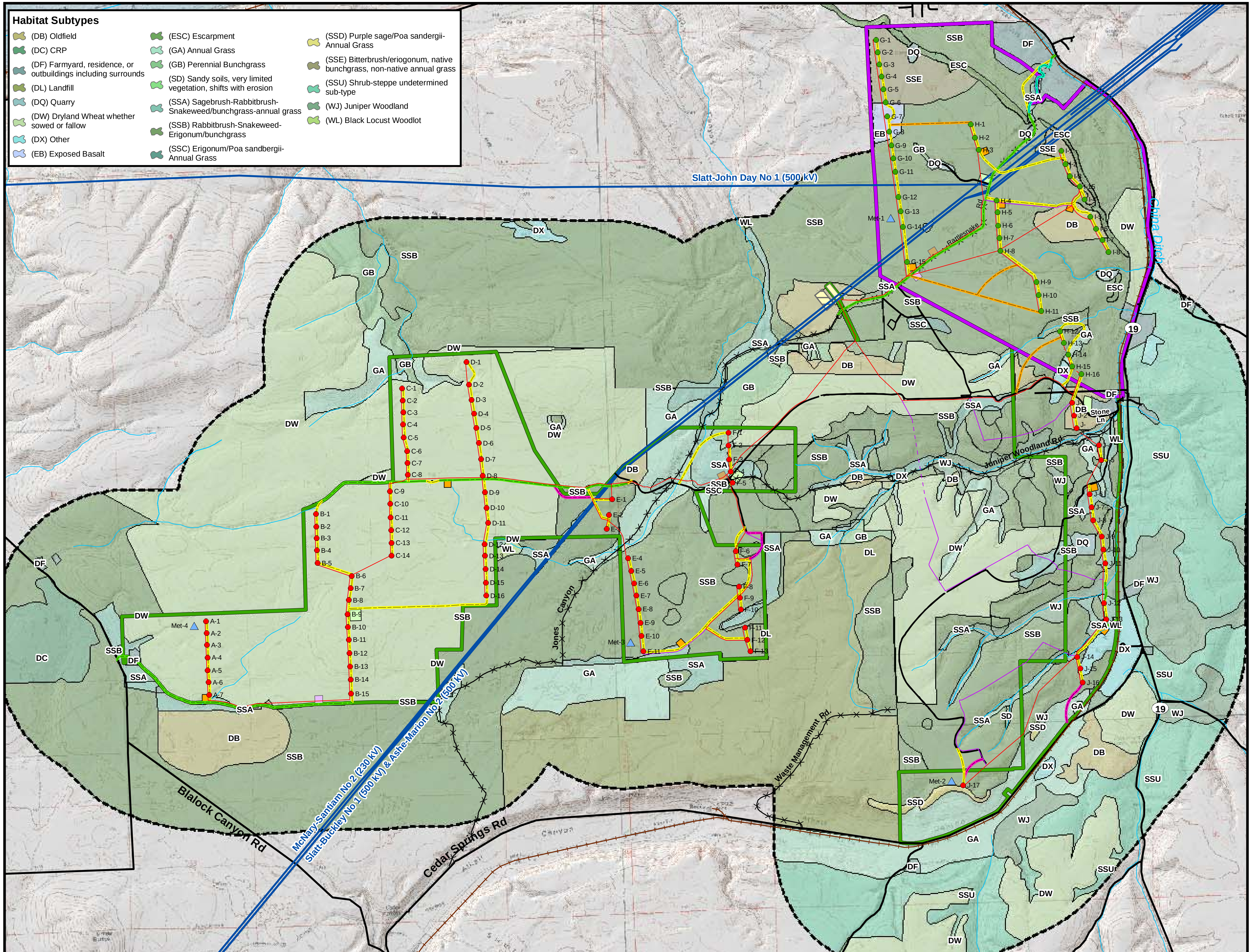

Legend

Proposed Permanent Facilities

- Proposed Turbines - Leaning Juniper II North
- Proposed Turbines - Leaning Juniper II South
- Proposed Permanent Met Tower

Proposed Roads - Leaning Juniper II

- New Road
- Existing Road - Improvements Needed

Alternate Routes - Leaning Juniper II

- Existing Road - Improvements Needed
- New Road

Preferred Collector Routes

- Underground 34.5-kV Line
- Overhead 34.5-kV Line

Alternate Collector Routes

- Underground 34.5-kV Line
- Overhead 34.5-kV Line
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Proposed Temporary Facilities

- Proposed Crane Path
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area

Existing Facilities

- Major Roads
- Existing LJ I Roads
- Existing Road - Not Used for Construction
- Railroads
- Existing Transmission Line
- Intermittent Streams
- Habitat Study Area
- Leaning Juniper II - North
- Leaning Juniper II - South

N W E S

Note:
-Habitat boundaries digitized using field maps.

0 2,000 4,000 6,000 Feet

Field Data Collected by:
Northwest Wildlife Consultants, Inc.

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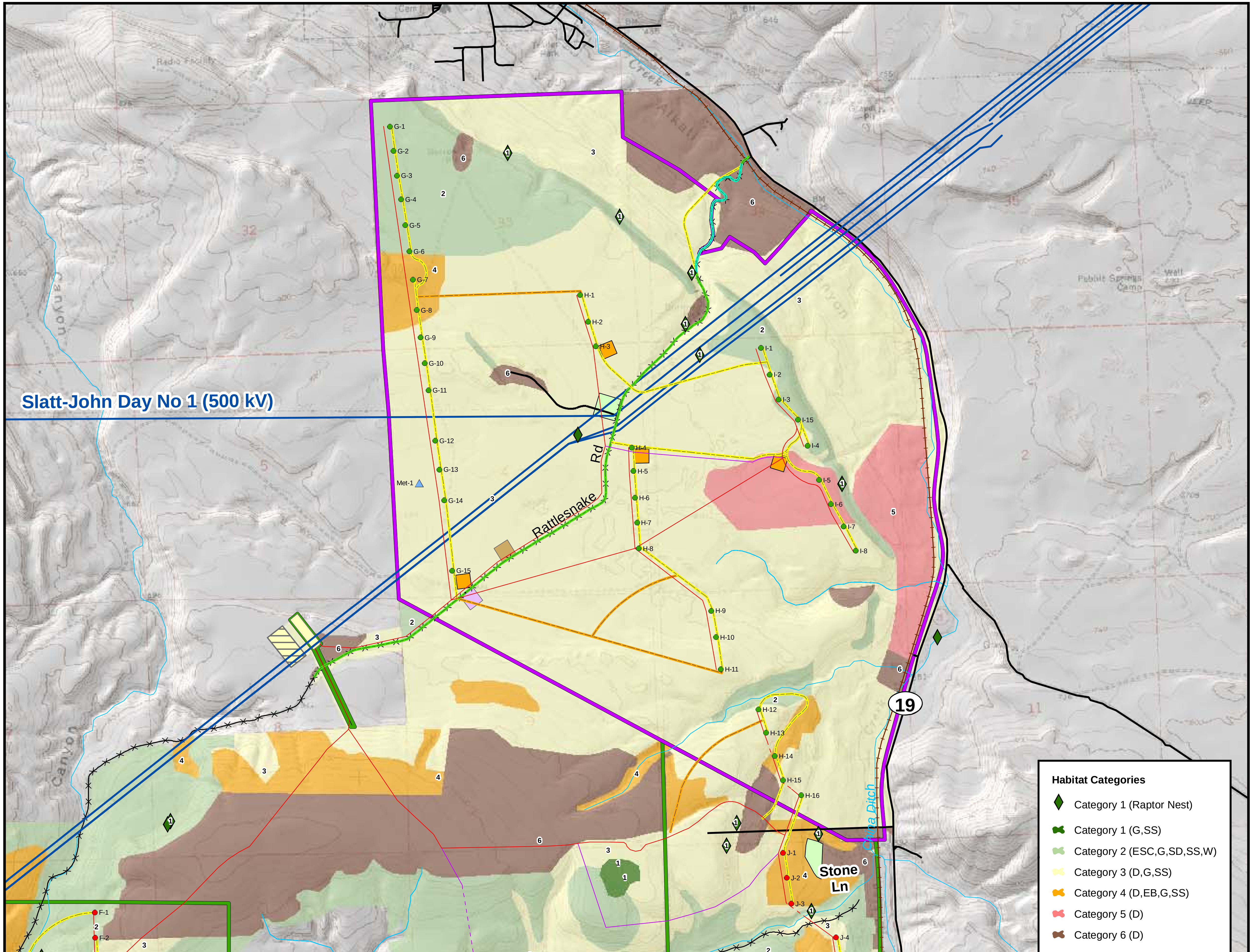

Figure P-3
Habitat Categories within Leaning Juniper II North Analysis Area

Leaning Juniper II Wind Power Facility

Legend

Proposed Permanent Facilities
- Proposed Turbines - Leaning Juniper II North
- Proposed Turbines - Leaning Juniper II South
- Proposed Permanent Met Towers

Proposed Roads - Leaning Juniper II
- New Road
- Existing Road - Improvements Needed

Alternate Routes - Leaning Juniper II
- Existing Road - Improvements Needed
- New Road

Preferred Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line

Alternate Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Proposed Temporary Facilities
- Proposed Crane Path
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area

Existing Facilities
- Major Roads
- Existing LJ I Roads
- Existing Road - Not Used for Construction
- Railroads
- Existing Transmission Line
- Intermittent Streams

Lease Boundary
- Leaning Juniper II - North
- Leaning Juniper II - South
- Category 1 Habitat

N
W E
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Feet

Note:
-Habitat boundaries digitized using field maps.

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Field Data Collected by: Northwest Wildlife Consultants, Inc.

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure P-3 - Habitat Categories - LJ II North.mxd, Date: September 20, 2006 9:47:12 AM

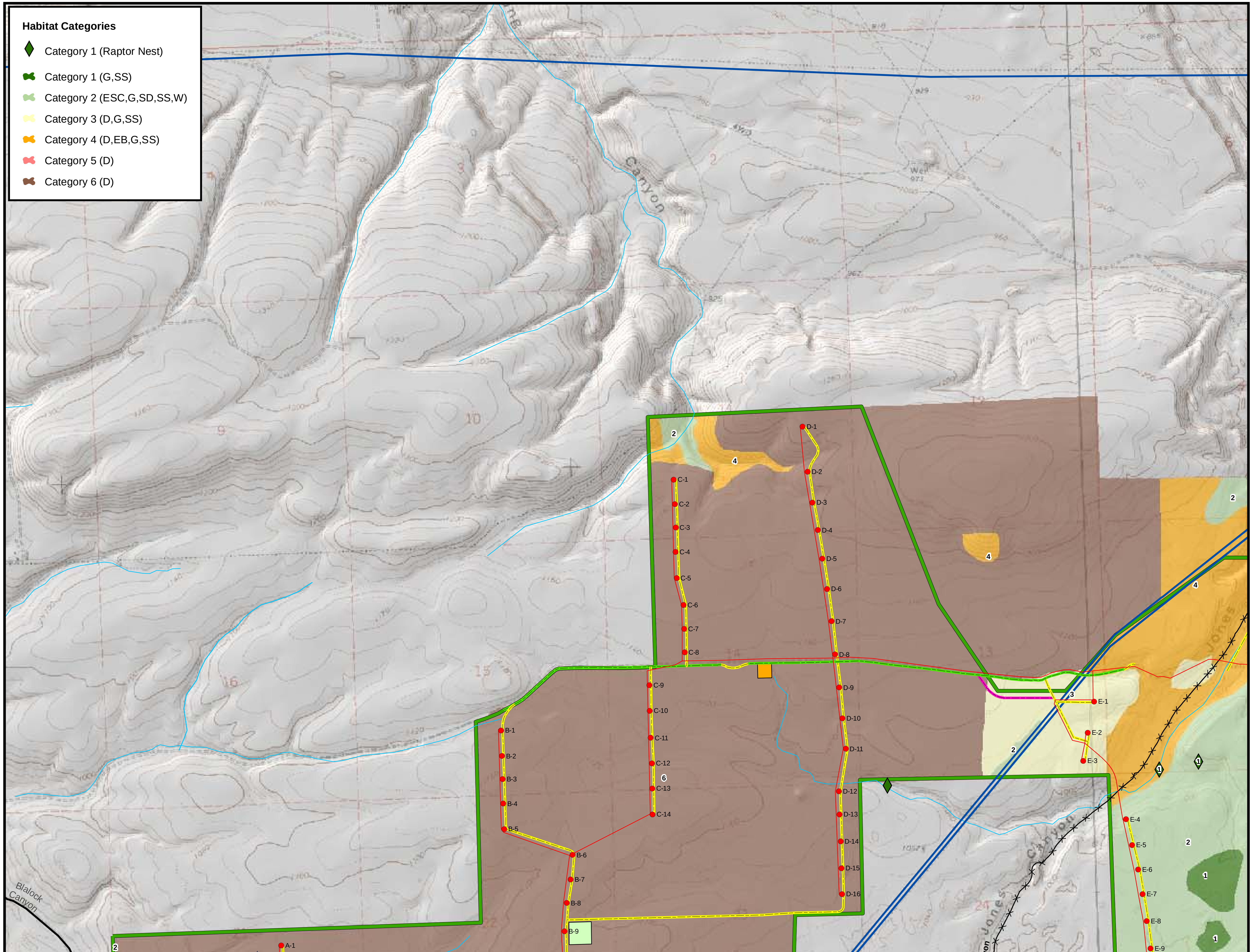

Figure P-4a
Habitat Categories within Leaning Juniper II South Analysis Area
Leaning Juniper II Wind Power Facility

Legend

Proposed Permanent Facilities
- Proposed Turbines - Leaning Juniper II North
- Proposed Turbines - Leaning Juniper II South
- Proposed Permanent Met Tower

Proposed Roads - Leaning Juniper II
- New Road
- Existing Road - Improvements Needed

Alternate Routes - Leaning Juniper II
- Existing Road - Improvements Needed
- New Road

Preferred Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line

Alternate Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Proposed Temporary Facilities
- Proposed Crane Path
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area

Existing Facilities
- Major Roads
- Existing LJ I Roads
- Existing Road - Not Used for Construction
- Railroads
- Existing Transmission Line
- Intermittent Streams

Lease Boundary
- Leaning Juniper II - North
- Leaning Juniper II - South
- Category 1 Habitat

Note:
-Habitat boundaries digitized using field maps.

N W E S

0 1,000 2,000
Feet

PPM Energy
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Field Data Collected by: Northwest Wildlife Consultants, Inc.

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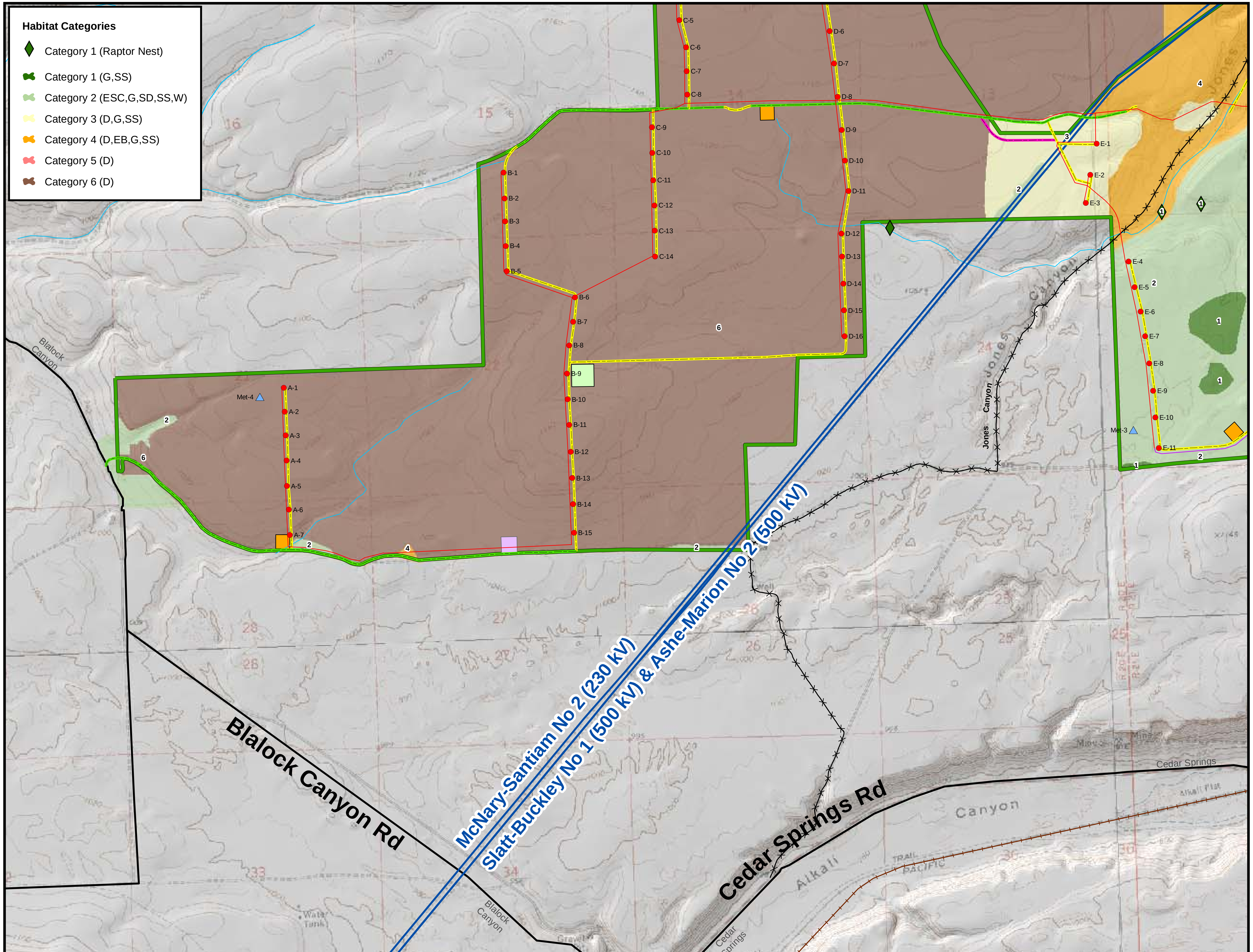

Figure P-4b
Habitat Categories within Leaning Juniper II South Analysis Area
Leaning Juniper II Wind Power Facility

Legend

Proposed Permanent Facilities
- Proposed Turbines - Leaning Juniper II North
- Proposed Turbines - Leaning Juniper II South
- Proposed Permanent Met Tower

Proposed Roads - Leaning Juniper II
- New Road
- Existing Road - Improvements Needed

Alternate Routes - Leaning Juniper II
- Existing Road - Improvements Needed
- New Road

Preferred Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line

Alternate Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Proposed Temporary Facilities
- Proposed Crane Path
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area

Existing Facilities
- Major Roads
- Existing LJ I Roads
- Existing Road - Not Used for Construction
- Railroads
- Existing Transmission Line
- Intermittent Streams

Lease Boundary
- Leaning Juniper II - North
- Leaning Juniper II - South
- Category 1 Habitat

N W E S

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Feet

Note:
-Habitat boundaries digitized using field maps.

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Field Data Collected by: Northwest Wildlife Consultants, Inc.

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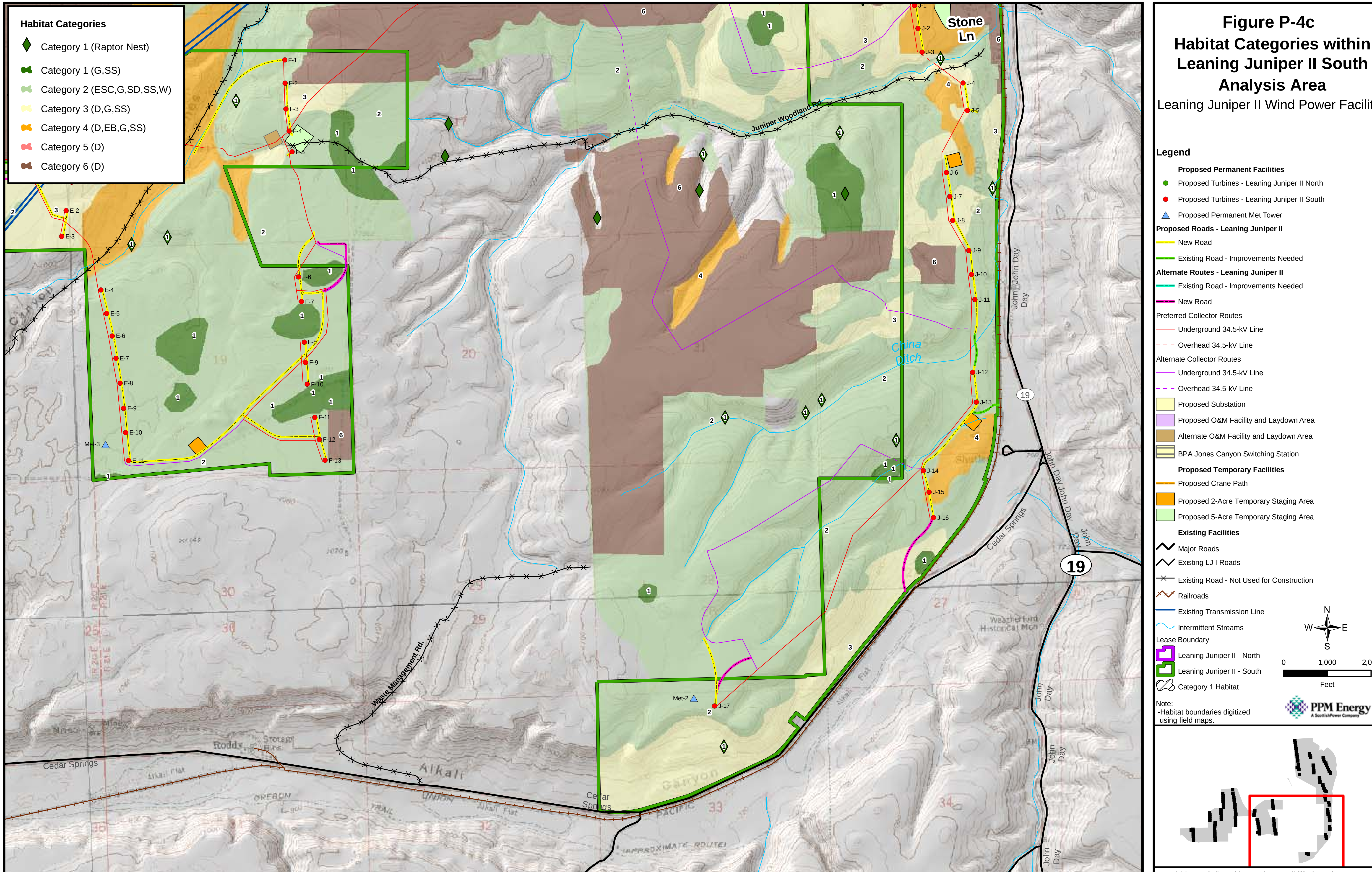

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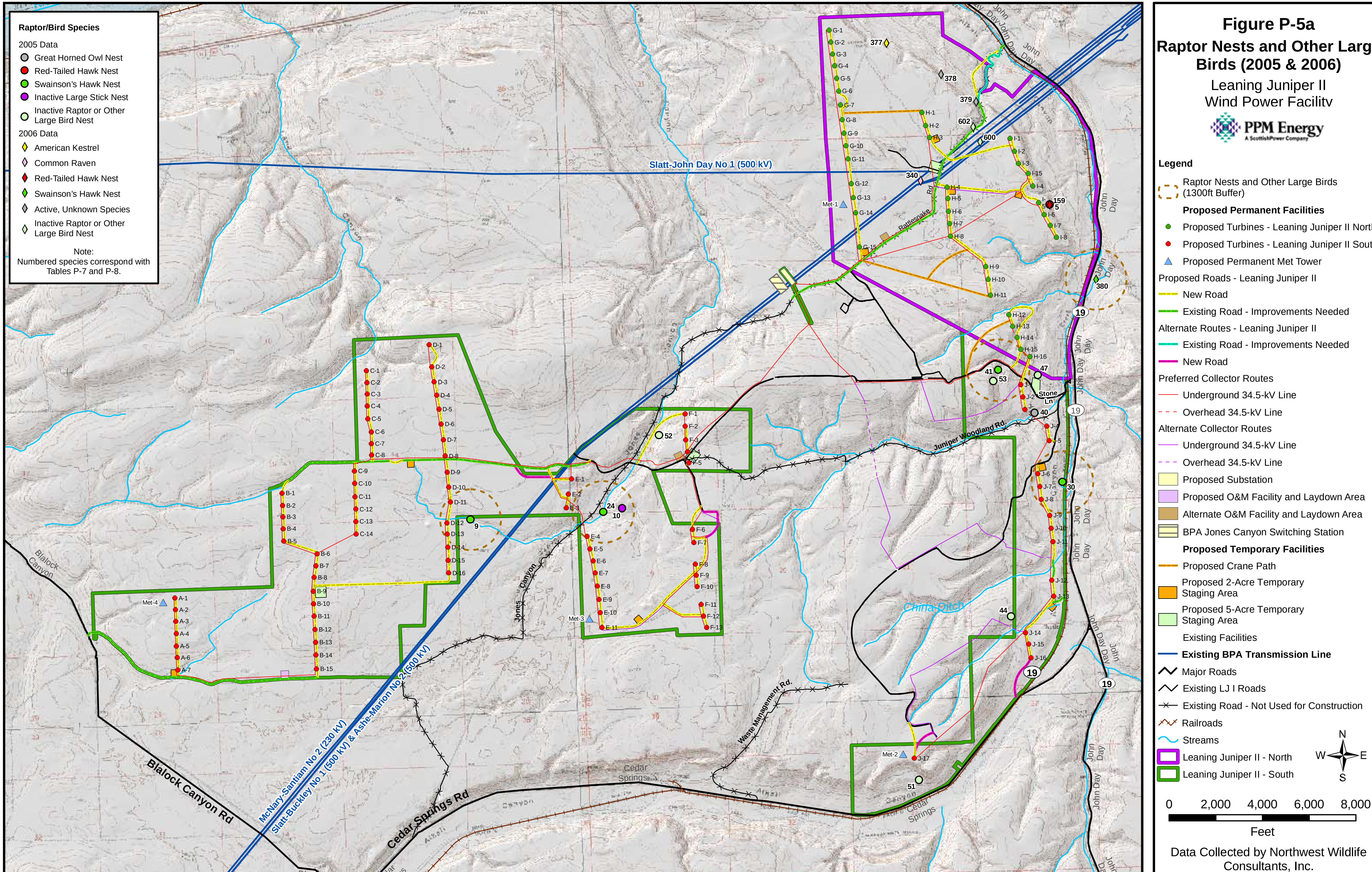

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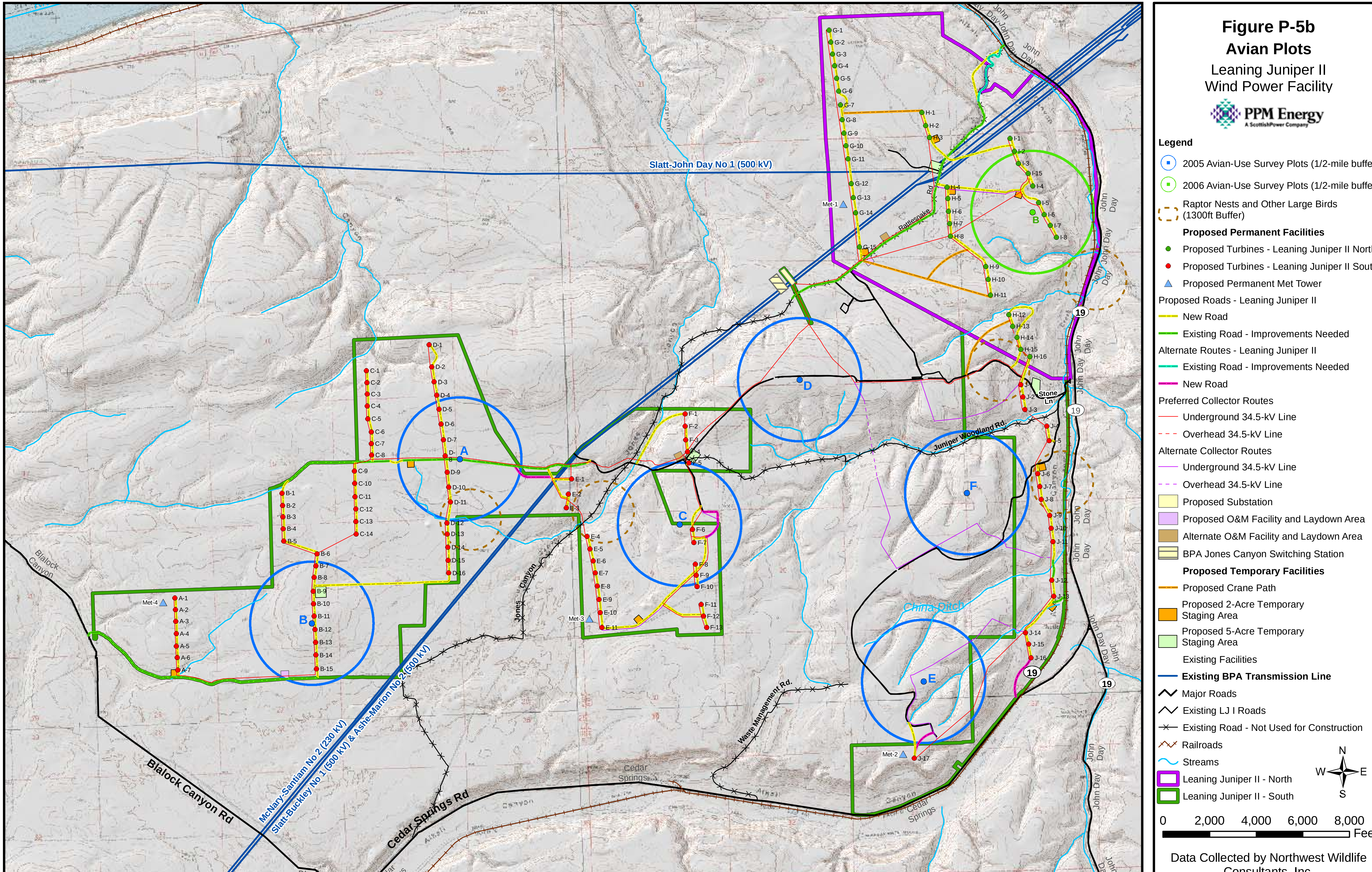

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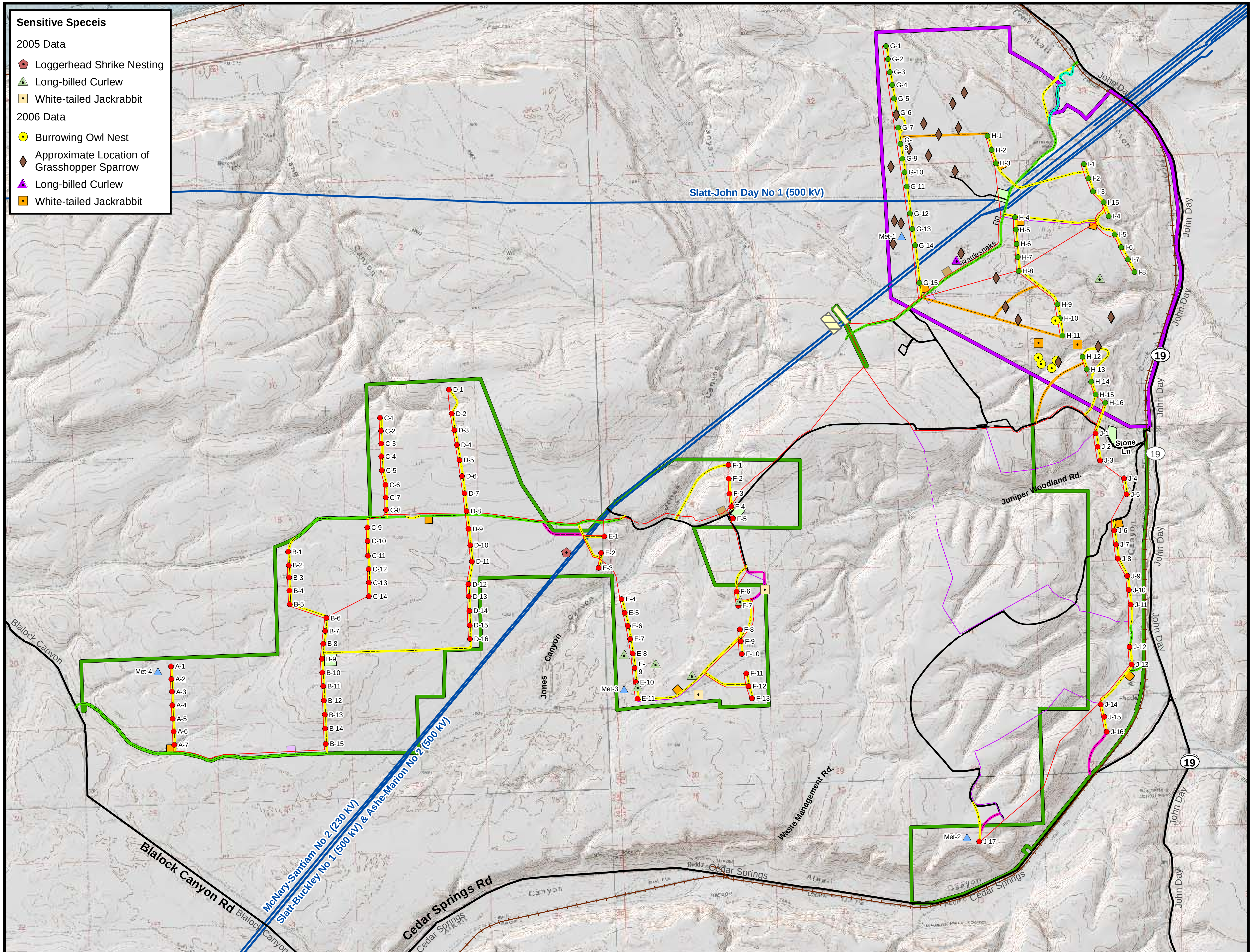

Figure P-6

Sensitive Wildlife Species Locations (2005 & 2006))

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

Proposed Permanent Facilities

- Proposed Turbines - Leaning Juniper II North
- Proposed Turbines - Leaning Juniper II South
- Proposed Permanent Met Tower

Proposed Roads - Leaning Juniper II

- New Road
- Existing Road - Improvements Needed

Alternate Routes - Leaning Juniper II

- Existing Road - Improvements Needed
- New Road

Preferred Collector Routes

- Underground 34.5-kV Line
- Overhead 34.5-kV Line

Alternate Collector Routes

- Underground 34.5-kV Line
- Overhead 34.5-kV Line
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Proposed Temporary Facilities

- Proposed Crane Path
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area

Existing Facilities

- Existing BPA Transmission Line
- Major Roads
- Existing LJ I Roads
- Existing Road - Not Used for Construction
- Railroads
- Streams
- Leaning Juniper II - North
- Leaning Juniper II - South

N W E S

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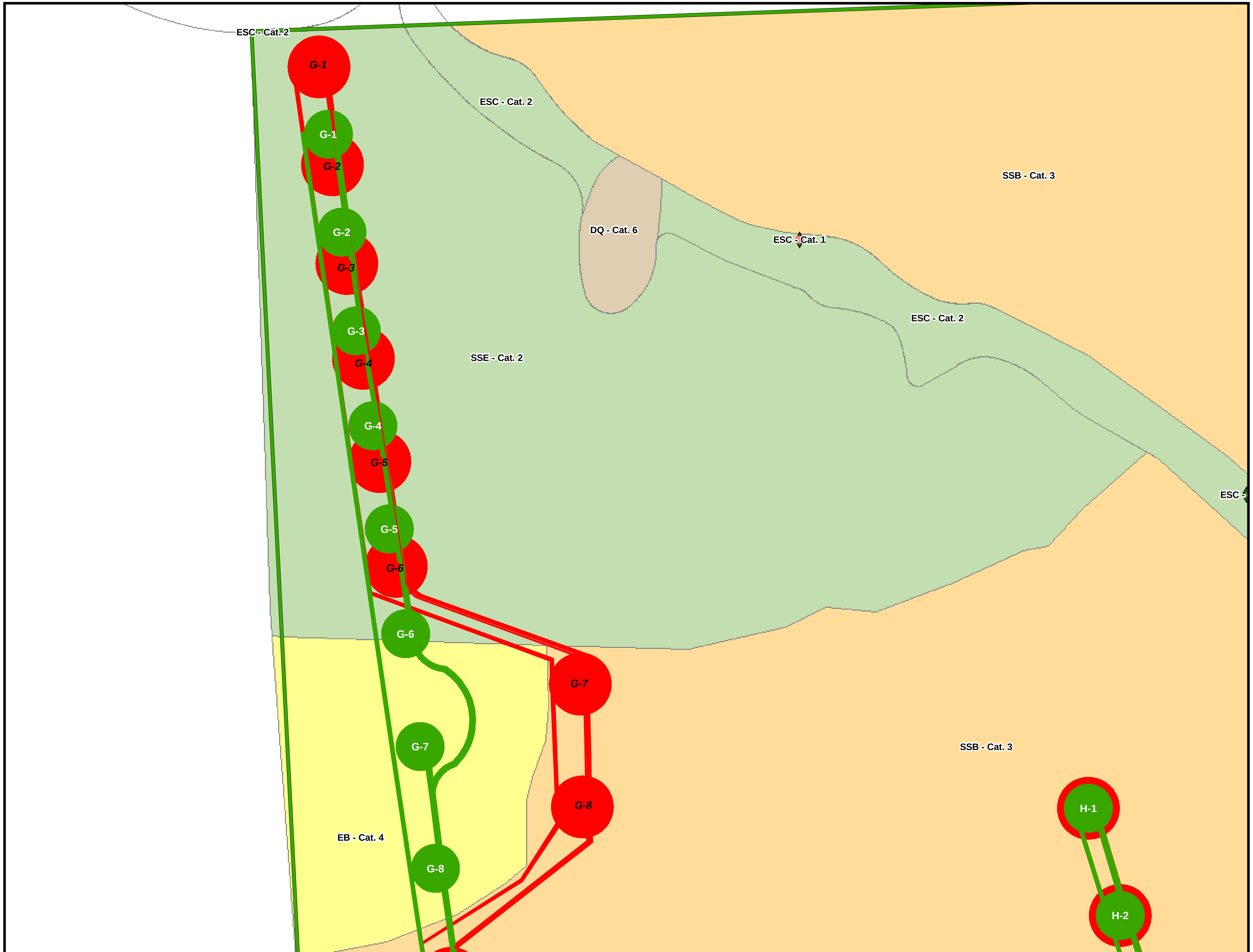
Data Collected by Northwest Wildlife Consultants, Inc.

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure P-6 Sensitive Wildlife Species Locations.mxd, Date: September 15, 2006 1:09:51 PM

Figure P-7a
Habitat Impacts: Maximum Possible Impact (Leaning Juniper II North)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company



Legend

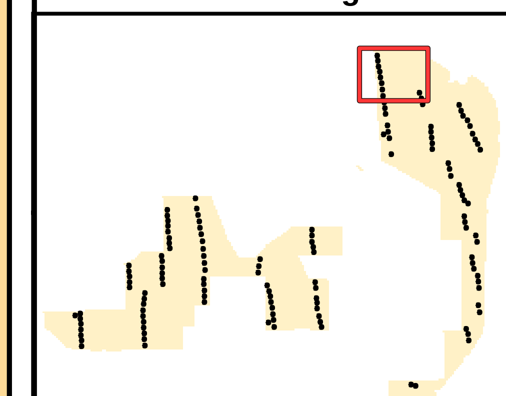
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged



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Field Data Collected by:
Northwest Wildlife Consultants, Inc.

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure P-7a-b - Habitat Impacts-Maximum Possible Impact - LJ II North.mxd, Date: September 20, 2006 10:45:54 AM

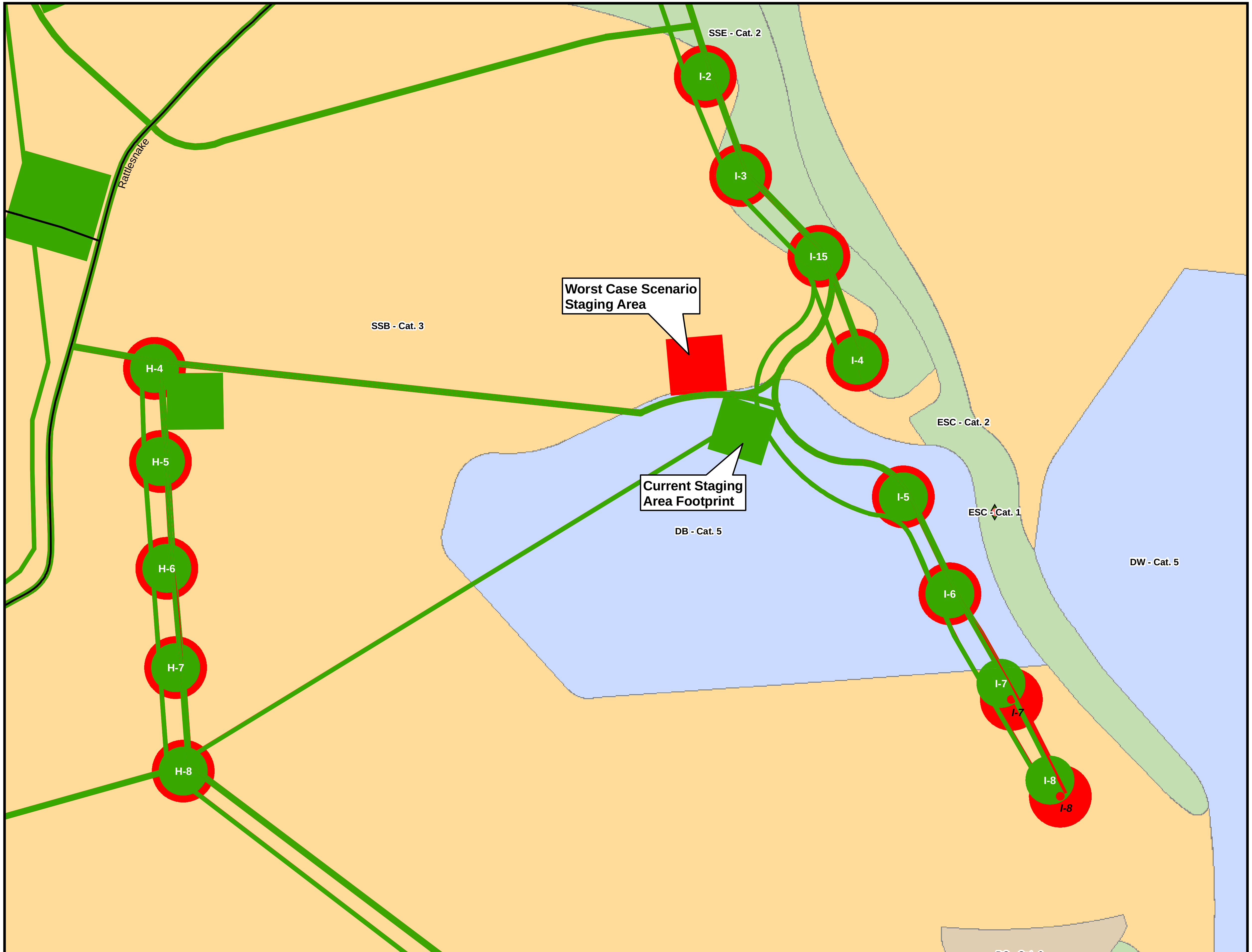


Figure P-7b

Habitat Impacts: Maximum Possible Impact (Leaning Juniper II North)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

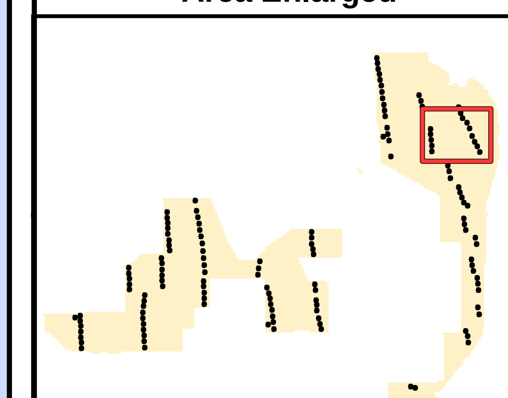
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged



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Field Data Collected by:
Northwest Wildlife Consultants, Inc.

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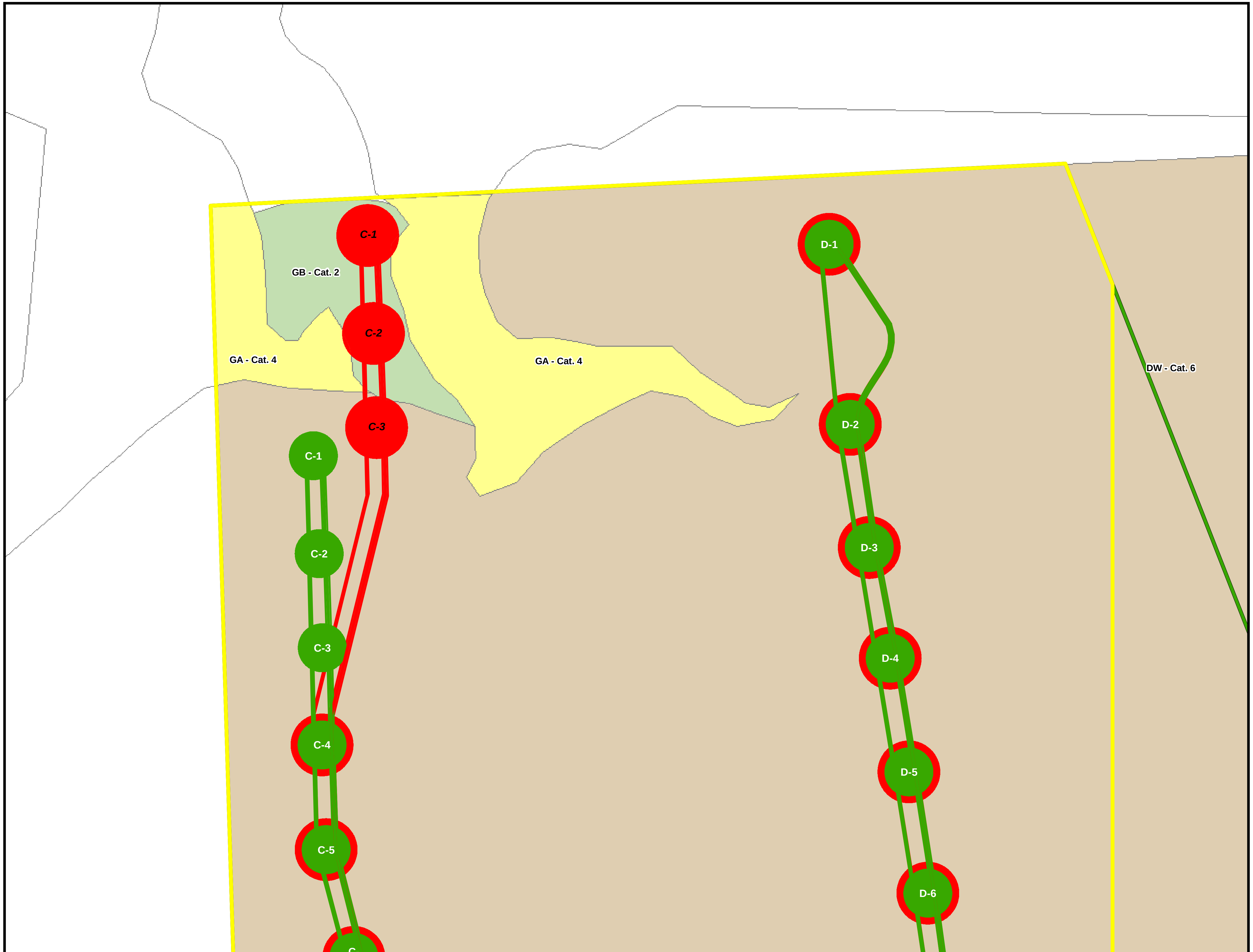


Figure P-8a

Habitat Impacts: Maximum Possible Impact (Leaning Juniper II South)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

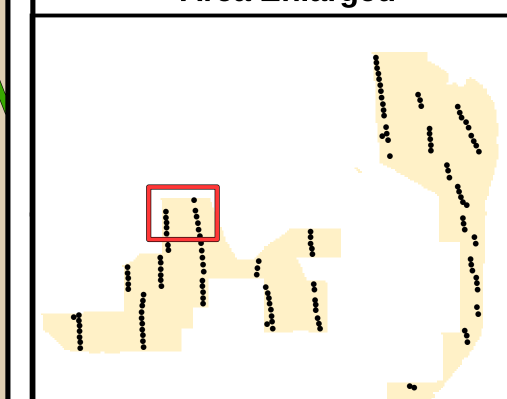
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

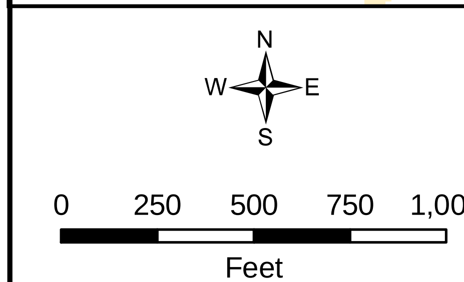
Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged





Field Data Collected by:
Northwest Wildlife Consultants, Inc.

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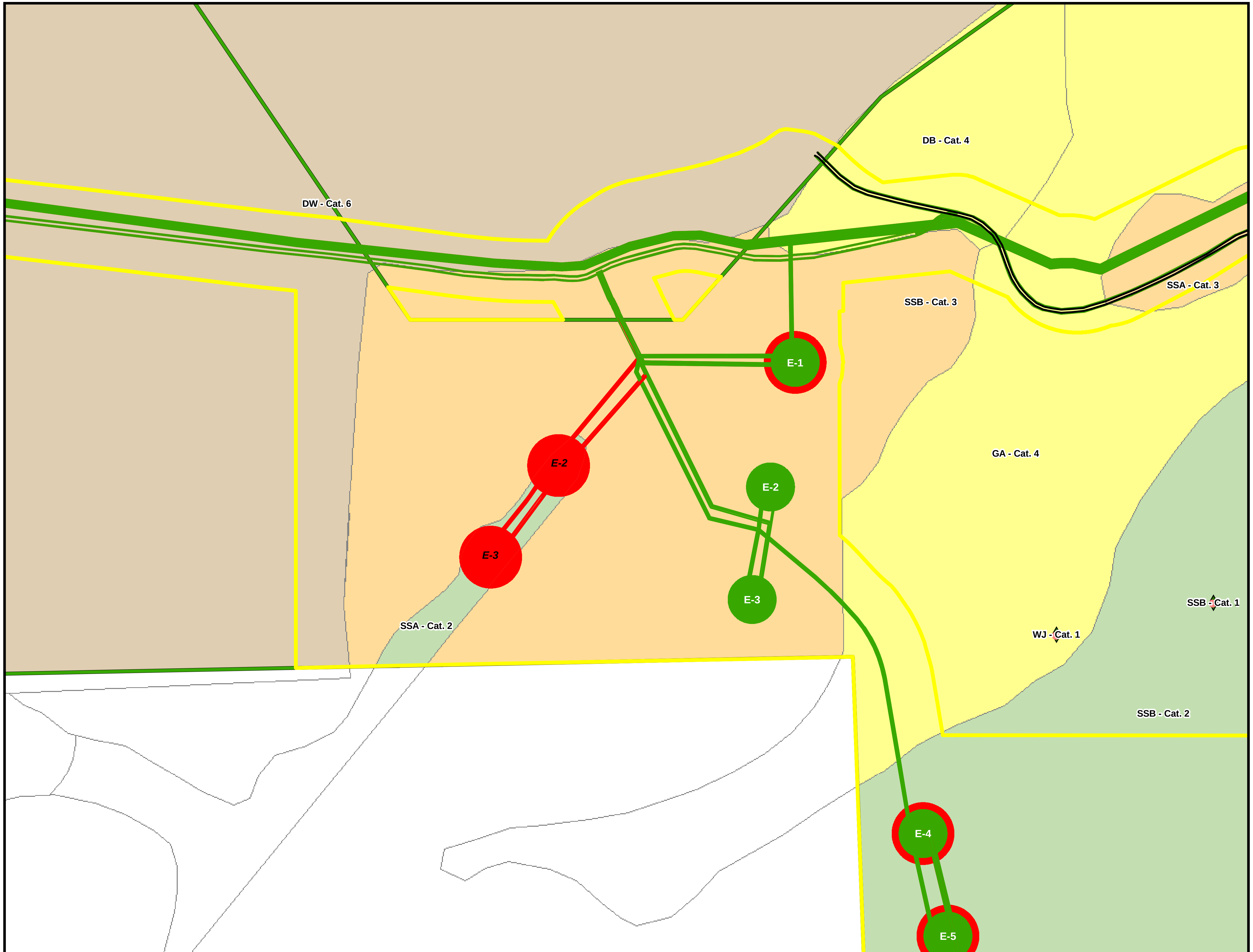


Figure P-8b
Habitat Impacts: Maximum Possible Impact (Leaning Juniper II South)

Leaning Juniper II
Wind Power Facility

PPM Energy

Legend

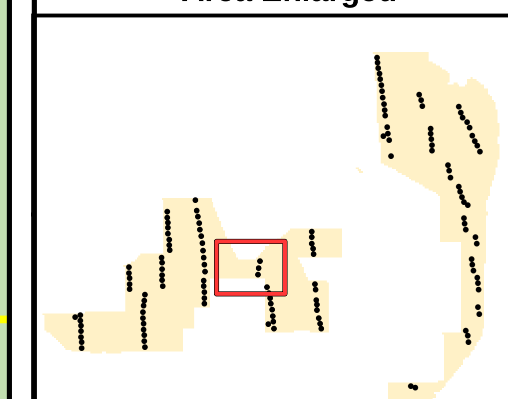
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged



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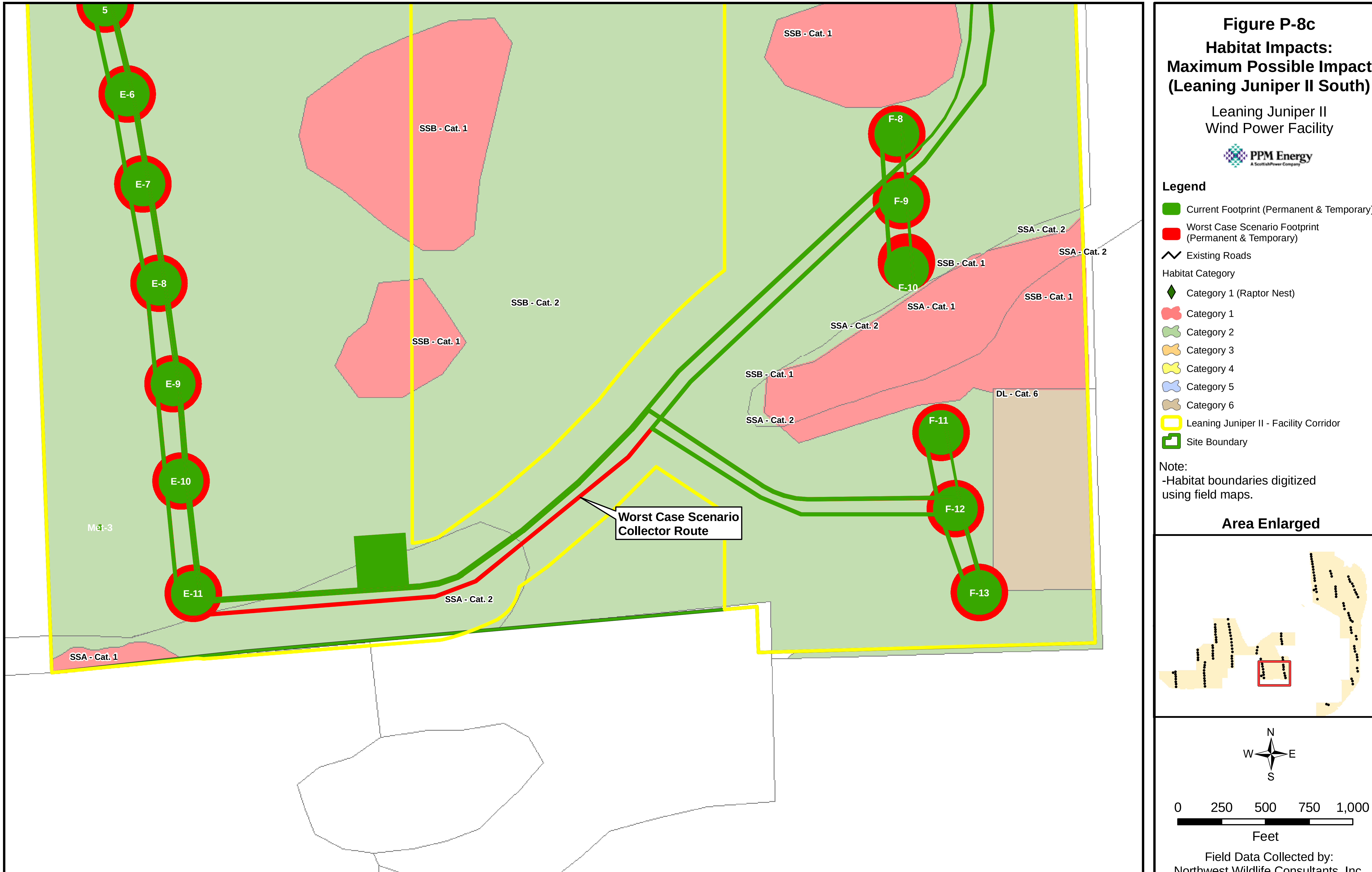

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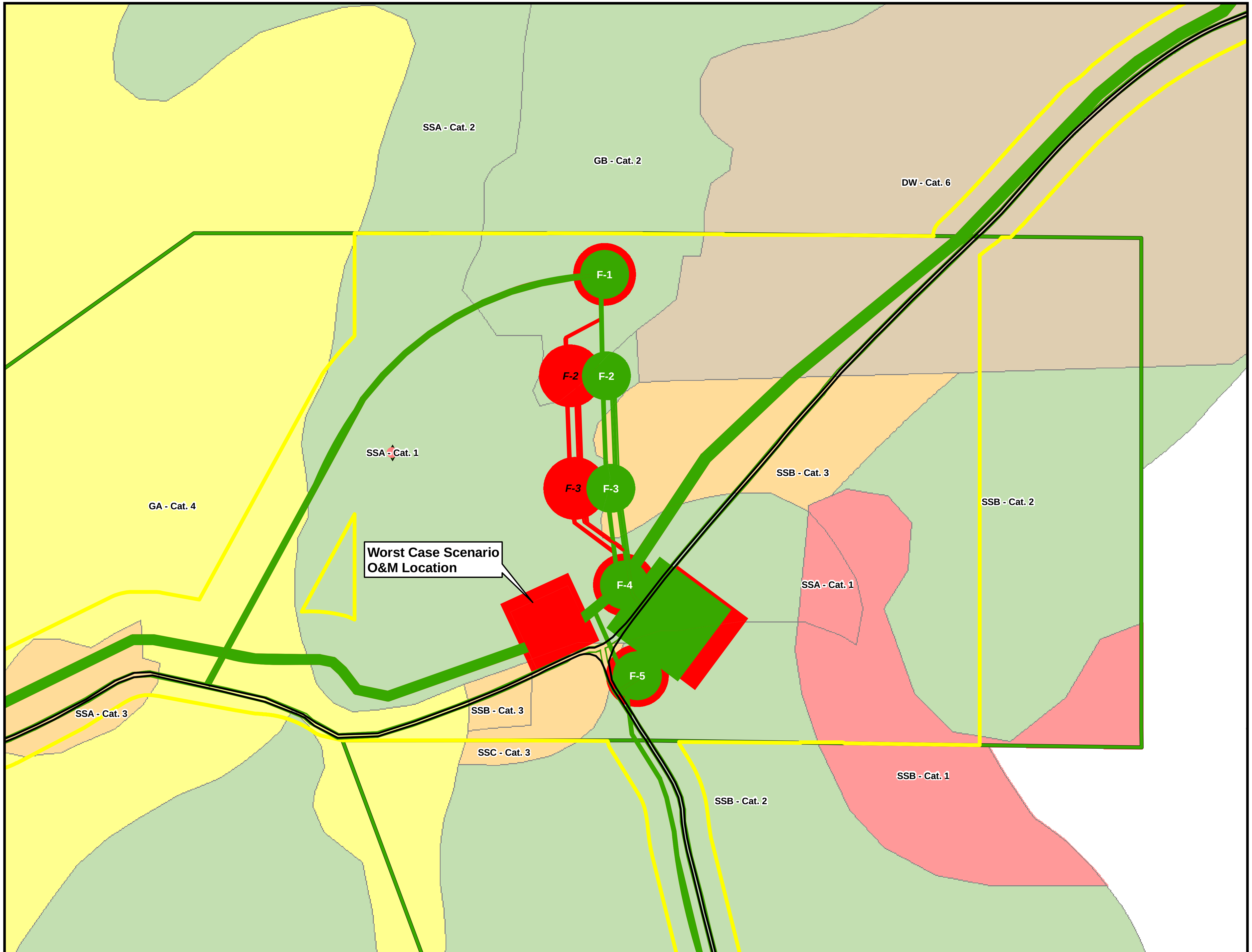


Figure P-8d

Habitat Impacts: Maximum Possible Impact (Leaning Juniper II South)

Leaning Juniper II
Wind Power Facility

PPM Energy

Legend

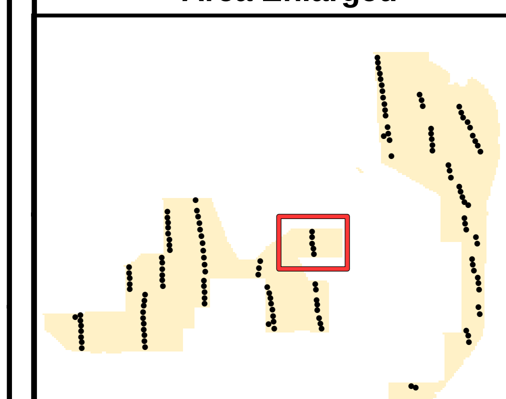
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged



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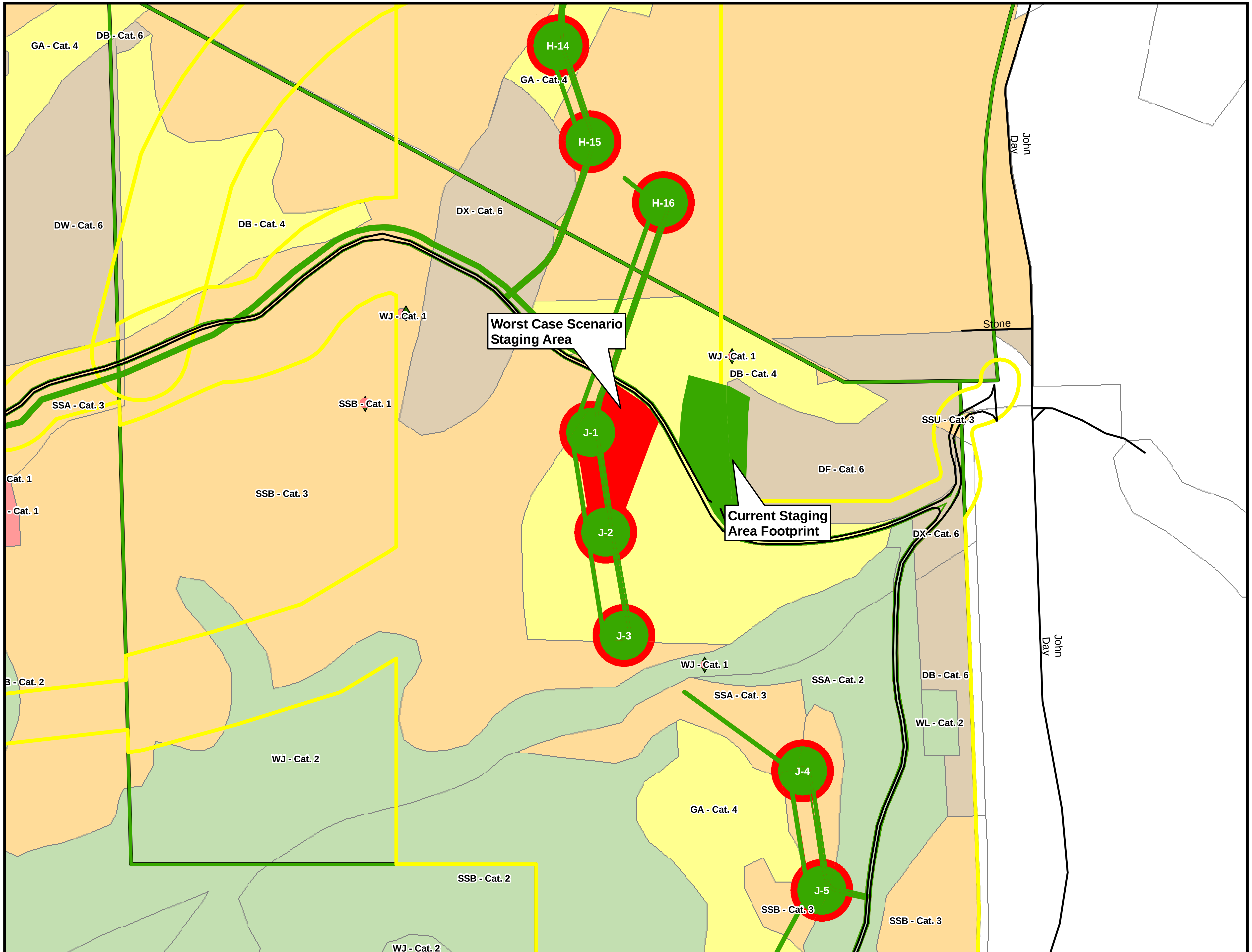

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Figure P-8e
Habitat Impacts: Maximum Possible Impact (Leaning Juniper II South)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

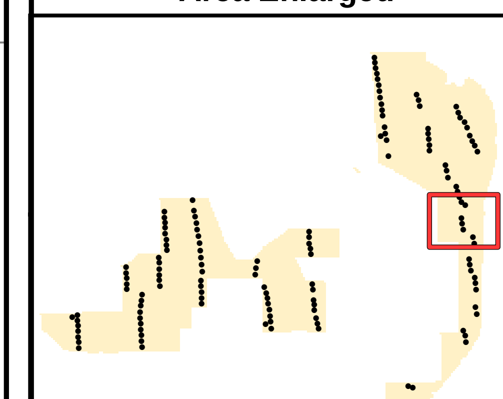
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged



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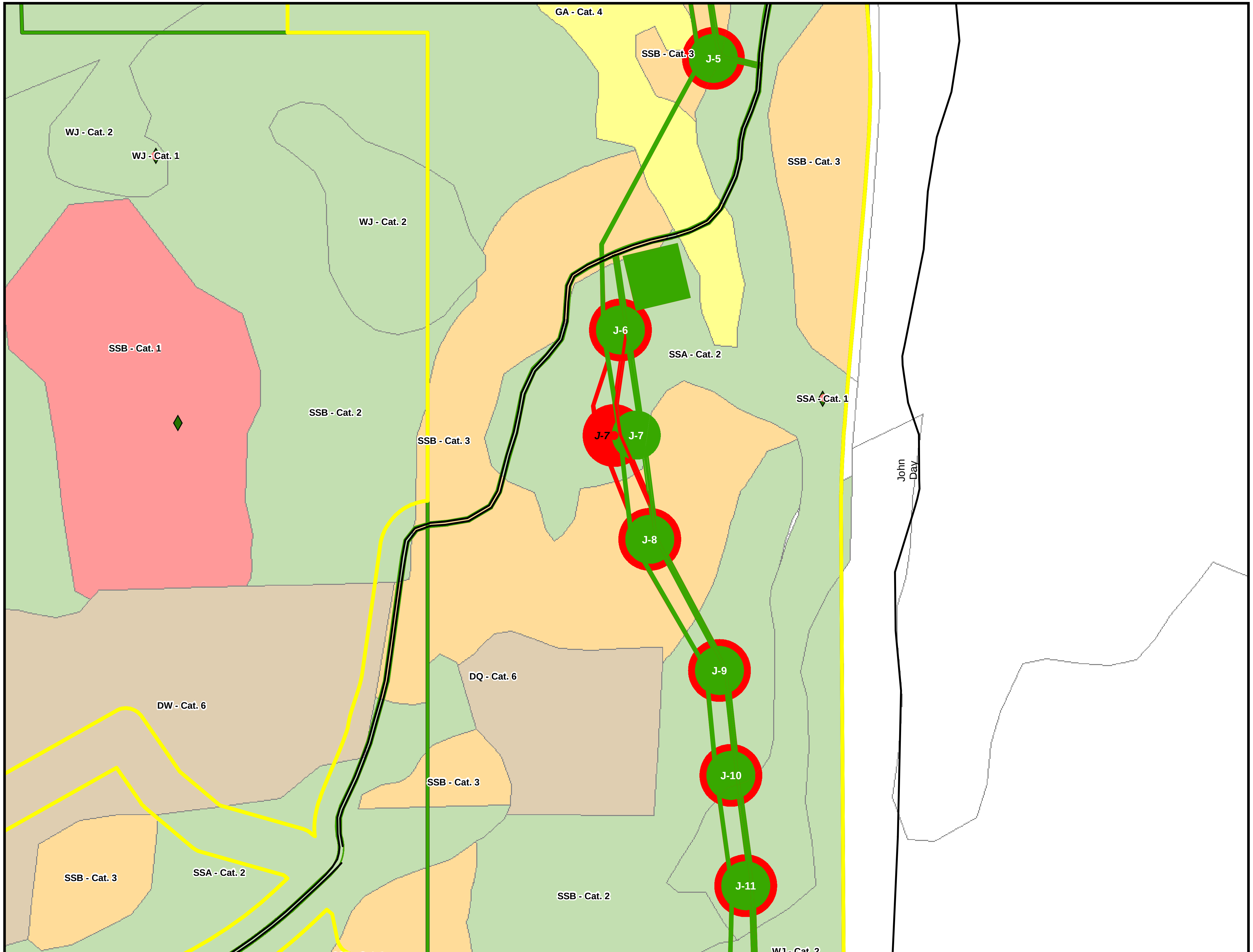

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Figure P-8f

Habitat Impacts: Maximum Possible Impact (Leaning Juniper II South)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

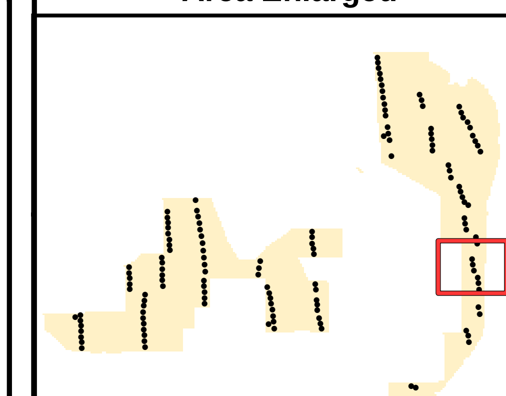
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged



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Field Data Collected by:
Northwest Wildlife Consultants, Inc.

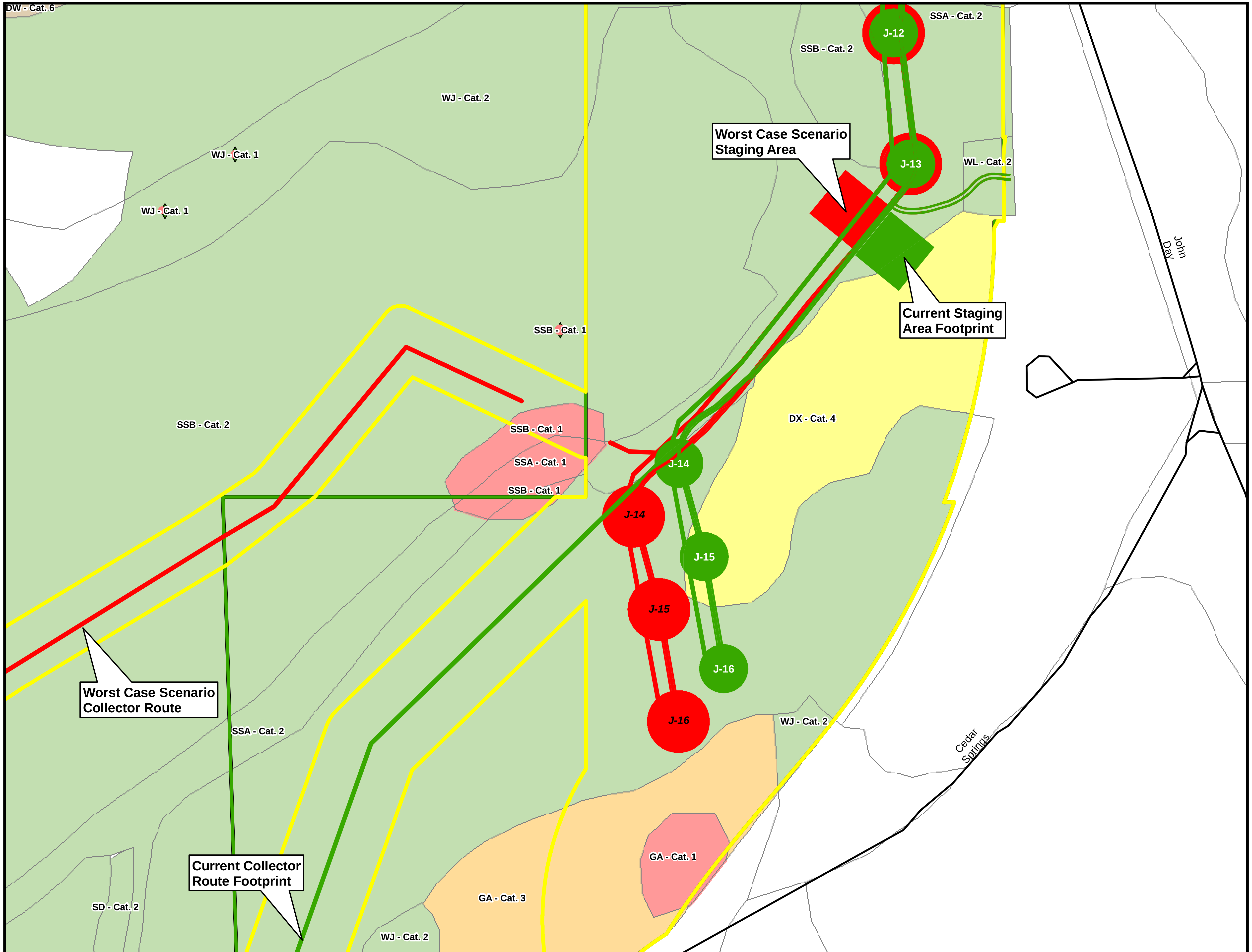


Figure P-8g
Habitat Impacts: Maximum Possible Impact (Leaning Juniper II South)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

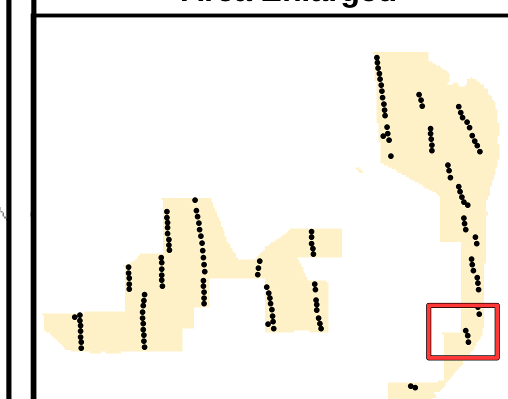
- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
- Category 3
- Category 4
- Category 5
- Category 6
- Leaning Juniper II - Facility Corridor
- Site Boundary

Note:
-Habitat boundaries digitized using field maps.

Area Enlarged



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Field Data Collected by:
Northwest Wildlife Consultants, Inc.

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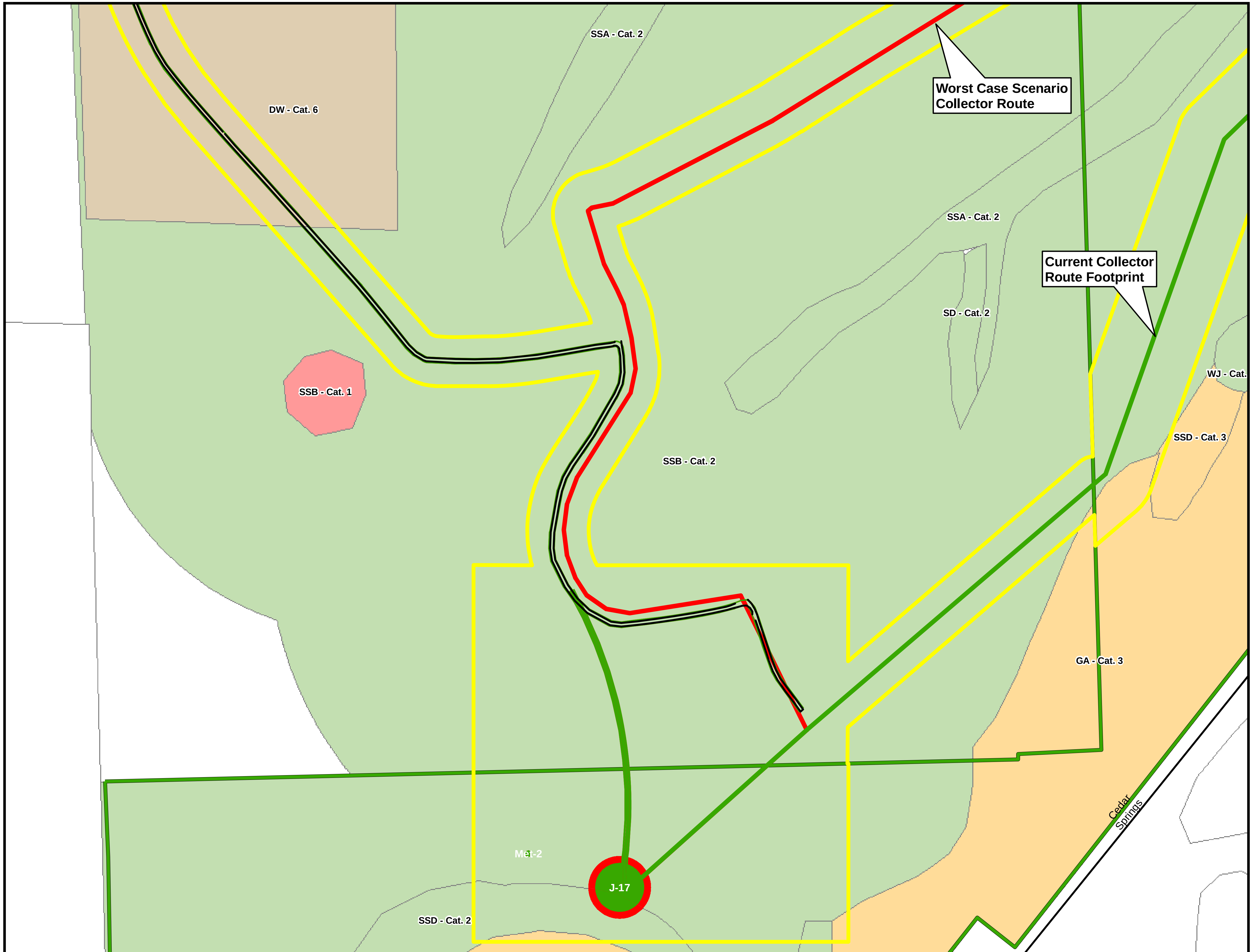
Figure P-8h
Habitat Impacts: Maximum Possible Impact (Leaning Juniper II South)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company



Legend

- Current Footprint (Permanent & Temporary)
- Worst Case Scenario Footprint (Permanent & Temporary)
- Existing Roads

Habitat Category

- Category 1 (Raptor Nest)
- Category 1
- Category 2
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- Site Boundary

Note:
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Area Enlarged

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Field Data Collected by:
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File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure P-8a-h - Habitat Impacts-Maximum Possible Impact - LJ II South.mxd, Date: September 20, 2006 10:48:03 AM

Oregon
John A. Kitzhaber, M.D., Governor

Department of Fish and Wildlife
Pendleton District Office
73471 Mytinger Lane
Pendleton, OR 97801
(541) 276-2344
FAX (541) 276-4414

March 15, 2002

Peter D. Mostow, attorney
Stoel Rives, LLP
900 SW Fifth Avenue, Suite 2600
Portland, Oregon 97204-1268

Subject: Washington Ground Squirrel Habitat Categories

Dear Mr. Mostow:

As part of the discussion with wind energy developers the Oregon Office of Energy (OOE) and Oregon Department of Fish and Wildlife (ODFW) were asked to clarify habitat categories for the Washington ground squirrel (WGS) in relation to the ODFW Habitat Mitigation Policy. The following description of habitat categories is entirely in reference to WGS and should be considered as guidelines to respond to site-specific circumstances in application of the Habitat Mitigation Policy.

Essential and limited habitat for WGS is any habitat that is necessary for WGS colonies including the associated WGS use area for those colonies or habitat that provides necessary movement (connectivity) between existing colonies, previously documented colonies and suitable habitat for future colonies. This would include:

1. Habitat that contains a currently occupied WGS colony and the colony's associated WGS use area; or

2. Habitat that historically contained a documented WGS colony site (not currently occupied) and the associated WGS use area unless the area is no longer suitable for a WGS colony because the habitat has been altered; or

3. Habitat that is within the historic geographic range of the WGS and has the potential to support a WGS colony and its associated WGS use area. This determination will be made on a site-specific basis using best professional judgment based on the best available scientific information and considering the following habitat attributes:

   a) The proximity of the potential habitat to currently or previously documented WGS colonies and their associated WGS use areas;

   b) The likelihood for connectivity between the potential habitat and currently or previously documented WGS colonies and their associated WGS use areas considering factors including, but not limited to, distance, topography and land use;

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c) The presence of habitat characteristics (e.g. vegetation, topography, aspect, soils, and degree of habitat alteration) that are similar to the characteristics of currently or previously documented WGS colonies;

or

4. Habitat that provides for dispersal and movement of WGS (connectivity) between currently occupied WGS colonies, previously documented WGS colonies and potential habitat for WGS colonies. This determination will be made on a site-specific basis using best professional judgment based on the best available scientific information and considering the following habitat attributes:

a) The proximity of the habitat to currently occupied, previously documented or potential habitat for WGS colonies and their associated WGS use areas;

b) The likelihood for connectivity between the potential habitat and currently or previously documented WGS colonies and their associated WGS use areas considering factors including, but not limited to, distance, topography and land use;

c) The amount and availability of alternative habitats that provides equivalent potential for dispersal and movement of WGS between currently occupied previously documented or potential habitat for WGS colonies.

"Essential and limited habitat" for WGS is Category One if the habitat is irreplaceable when considering the consequences of a proposed development action. "Essential and limited habitat" for WGS is Category Two if the habitat is replaceable when considering the consequences of a proposed development action.

Sincerely,

Kevin L. Blakely
John Day Watershed District Manager

C: Tom Meehan, OOE
Gail McEwen, ODFW
Russ Morgan, ODFW
Andy Linehan, Ch2M Hill
Karen Kronner, NW Wildlife Consultants

Wildlife Baseline Study
for the
Leaning Juniper Wind Power Project

Gilliam County, Oregon

Prepared for:

PPM Energy
Portland, Oregon

And

CH2M HILL
Portland, Oregon

Prepared by:

Karen Kronner
Bob Gritski
Jerry Baker
Verne Marr

Northwest Wildlife Consultants, Inc.
815 NW 4th Street
Pendleton, OR 97801

And

Greg Johnson
Kimberly Bay

WEST Inc.
2003 Central Avenue
Cheyenne WY 82001

November 3, 2005

Northwest Wildlife Consultants, Inc.

WEST, Inc.

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1.0 Introduction

PPM Energy, Inc. (PPM) has proposed to build and operate a wind power facility at a site approximately 3 miles southwest of Arlington, Oregon. The project would be located on private land in Gilliam County owned by Waste Management Services of Oregon and surrounding on three sides the Arlington landfill. The 196.5-megawatt (MW) project is planned in two phases. Phase I consists of 103.5 MW. A County-level Conditional Use Permit (CUP) was issued to PPM in January 2005 for Phase I and the project will be in the initial stage of construction by late 2005 or early 2006. Construction is expected to be complete by late summer or early fall 2006. Both phases of the project will be constructed on privately-owned land and will be connected to the regional transmission grid at the existing Jones Canyon Substation located along the existing Bonneville Power Administration (BPA) 230-kilovolt (kV) McNary-Santiam transmission line.

Phase I will have 69 1.5-MW turbines (103.5 MW). Phase II will have between 61 and 70 turbines depending on the generating capacity of the turbines selected. The current layout as shown in Figure 1 has 69 turbines for Phase 1 and 61 for Phase 2. Because the manufacturer, model, and size of the wind turbine generators have not yet been selected for both phases, two turbine sizes were used to define a range of alternative turbine technologies encompassing the potential scale and impacts of turbines potentially used at the project. The range is bracketed by the General Electric (GE) 1.5-MW turbine (at the small end) and a 3.0-MW VESTAS turbine (at the large end). The resulting rotor-swept area (area occupied by turbine and blade, excluding tower) would be 41.5 meters (m) to 121 m for the 1.5-MW turbine and 30 m to 130 m for the 3-MW turbine. The turbines would operate at wind speeds ranging from 8 to 56 miles per hour (mph). Wildlife impact assessments discussed in this report analyze the maximum rotor-swept area potentially occupied by either the 1.5-MW or 3-MW turbine.

The turbines would be grouped in linear strings of approximately 1 to 12 and connected by an underground collector cable system. An overhead transmission line would collect the output and route it to the new Leaning Juniper substation scheduled to be constructed outside the project boundaries near and existing BPA substation. For Phase I there would be 11 miles of underground electrical lines and 2 miles of overhead transmission lines. For Phase II there would be approximately 12 miles of underground electrical lines and approximately 2 miles of overhead transmission lines. Further Phase I project details are provided in the Leaning Juniper Conditional Use Application submitted to the Gilliam County, Oregon Planning Department in January 2005. Phase I and II project facilities known as of November 2005 are displayed in Figure 1.

Northwest Wildlife Consultants, Inc. (NWC), located in Pendleton, Oregon, was contracted by CH2M HILL to manage all the field investigations and to assist with avian impact assessments for Leaning Juniper Phases I and II. Western EcoSystems Technology, Inc. (WEST) located in Cheyenne, Wyoming, was contracted by CH2M HILL to assist NWC with technical review of avian use study plot layout and avian use study protocols, and to conduct avian use data analysis, prepare avian risk assessments, and assist with the bat impact assessment.

This report summarizes the pre-field reviews, field study methods and results, and bat species review. Potential impacts are discussed. Wildlife monitoring and mitigation plans will be developed with the Gilliam County Planning Department and will include consultation with the Oregon Department of Fish and Wildlife (ODFW). This comprehensive report is inclusive of data provided in January 2005 to the Gilliam County Planning Department during the CUP application process. The January 19, 2005, NWC report, *Interim Report for the Wildlife Baseline Studies Leaning Juniper Wind Power Project, Gilliam County, Oregon*, included study results through early winter 2004-2005. As required in the CUP Conditions, PPM has completed the project pre-construction biological studies.

2.0 Methods

A draft biological resources study protocol outline was prepared in early winter of 2004/2005 (Appendix A). The study protocol includes several components for addressing potential impacts to vertebrate wildlife from the construction and operations of the 196.5-MW wind project. In addition to a review of existing information such as existing reports and public databases, the site-specific studies included the following:

- Site reconnaissance in 2003 for suitable Washington ground squirrel habitat
- Wildlife habitat mapping in 2004
- Avian use study conducted fall 2004 through summer 2005
- Raptor nest survey in 2005
- Washington ground squirrel surveys in 2005
- Special status species surveys in 2005 (surveys for State Sensitive status wildlife utilizing the site's habitats during the spring-early summer breeding season)
- Bat species review (habitat suitability and potential for occurrence)

2.1. Information Review

2.1.1. Review of Previous Studies and Other Reviews

A pre-field review of relevant environmental documents and data sources was conducted in 2003 and 2004. NWC staff interviewed Russ Morgan, ODFW District Biologist, for his knowledge of Washington ground squirrel (WGS) studies or observation records within the general project area. He was not aware of any other WGS reports or observations other than earlier environmental permitting documents (Morgan, pers. com. 2003) but he provided copies of the relevant sections from the 1990 report, *Biological Enhancement Study for the Columbia Ridge Landfill and Recycling Center* (Waste Management, 1990) prepared for an area south of the Leaning Juniper site.

Waste Management, Inc., Environmental Engineer Phil Kovacs was interviewed for his knowledge of WGS on its property, including the site of the proposed wind project. Phil Kovacs and Waste Management Administrative Assistant, Marilee Stewart, were asked if they were aware of any other environmental documents that could be reviewed for wildlife data. Phil was not aware of any documents and Marilee could not locate any after inquiring internally at other departments. Gilliam County soil survey maps (USDA, 1977) were reviewed for soil types appropriate for supporting WGS colonies.

2.1.2. Database Searches

The Oregon Natural Heritage Information Center (ORNHIC) was contacted in April 2003 for wildlife data within the project area and a buffer and for all records of WGS within the database. Also in April 2003, the United States Fish and Wildlife Service (USFWS) was contacted for a comprehensive list of threatened, endangered, candidate, and state sensitive status species of the general wind project area. Information derived from these sources and from the project biologists' experiences while working in the general area for the past 20 years was used to generate a list of vertebrate wildlife species with potential for occurrence within the general project area. The list includes special status species (state or federal level listed or other status).

2.1.3. Site Reconnaissance

The initial Leaning Juniper Wind Power Project site reconnaissance was conducted within the wind-leased lands on April 18, 2003. NWC was requested to review the site's potential to support a State endangered wildlife species, the Washington ground squirrel. Approximately 37 miles of farm roads and trails were slowly driven by vehicle to locate high vantage points from which to scan for suitable WGS habitat sites in potential development areas. Blocks of grassland areas were sampled periodically throughout the day by conducting meandering walking transects through portions of the habitat block, focusing on areas most likely to support WGS. No WGS were found and no sign of their use was noted.

2.1.4. Regional Information

Other regional wind power project wildlife investigation reports were reviewed for information that may be helpful in understanding special status wildlife species in the general project area. NWC reviewed environmental studies conducted for the proposed 4.5-MW *Mar-Lu Wind Power Project* located on private land approximately 1.5 miles north of the Leaning Juniper site. Specifically, NWC reviewed the *Ecological Baseline Study for Mar-Lu Wind Power Project Arlington, Oregon* (NWC, 2004), which describes the habitat and wildlife study results for surveys conducted from fall season 2002 through summer season 2004. This report was submitted to the U.S. Department of Agriculture for a wind power development grant and the project was permitted under the Gilliam County CUP process during the winter of 2004. With the exception of its closer proximity to the Columbia River and slightly different soils and vegetation, the information provided in the report was generally applicable to the Leaning Juniper site and was used to aid in understanding wildlife use of the general landscape near Leaning Juniper.

A second wind power project permitted by Morrow County is planned for an area near Cecil, Oregon, approximately 14 miles southeast of Leaning Juniper in habitat similar to parts of Leaning Juniper (dryland wheat fields). The 100-MW project, Shepherd's Ridge, was studied for avian use from fall season 2002 through summer season 2003. The December 2003 report titled *Wildlife Assessment for the Shepherd's Ridge Wind Farm* (ENW, 2003) provides the results of an avian use study and other studies and addresses potential adverse impacts on birds as required in the Morrow County CUP application. A third wind power project in the general landscape (10 miles northwest in Washington), the White Creek wind project, was studied from 2002-2004 (Kronner *et al*., 2004). The project-specific study data are used as general information on special status species occurrence in the general landscape that includes Leaning Juniper. Other avian studies used in conducting the impact assessment are listed in Section 4.2 of this report.

2.2. Agency Correspondence and Site Tours

PPM, CH2M HILL, and NWC met onsite with Russ Morgan and Steve Cherry, Oregon Department of Fish and Wildlife on October 21, 2004 to discuss biological surveys to be conducted for the project. The local U.S. Fish and Wildlife Service (USFWS) wildlife biologist, Jerry Cordova of Prineville, Oregon, was notified about the project in early 2004. During March 2005 a second site tour was provided to Russ Morgan and Jerry Cordova also attended the tour. Project construction schedules and wildlife issues were discussed. In addition, there were several subsequent follow-up discussions with Russ Morgan after the field studies were completed and a briefing with Jerry Cordova during early fall 2005.

2.3. Field and Other Investigations

2.3.1. Wildlife Habitat Mapping and Other Reviews

During the fall of 2004, NWC biologists reviewed the various habitat types for sign of wildlife use, primarily nesting raptors. Notes were recorded on habitat types and structure with potential to support nesting raptors. Habitat types were assessed for their potential to support special status species during the spring and summer nesting/denning season. NWC biologists worked with PPM engineers during the winter of 2004-2005 to design a layout to avoid and minimize potential impacts to sensitive habitats.

Habitat of the leased land and a one-mile buffer was delineated into broad habitat types. Mapping was conducted in the fall of 2004 by an experienced wildlife biologist. Methods were consistent with other habitat and plant association mapping conducted elsewhere in the Columbia Basin (Marr, 2001; Morgan, 2003; NWC, 2004). The biologist walked most representative types and scanned from vantage points for areas inaccessible or outside of the leased land. The soil maps were used as a reference during the mapping (USDA, 1977). A map was prepared in November and updated in August 2005 reflecting locations of the final Phase I and Phase II turbines and supporting facilities. The figure displays broad habitat categories found within the leased land and a one-mile buffer. An expanded legend was prepared describing the habitat types and sub-types and a brief list of wildlife species that may occur within each sub-type during the nesting/denning period or year-round. The species use determination was based on suitable habitat types and structure, habitat quality, and the biologist's extensive experience with the habitat types in the Columbia Basin.

2.3.2. Avian Use Study

A four-season avian study was conducted for the Phase I and Phase II projects. This method uses the fixed-point plot method to obtain information on bird species-composition and relative abundance. Six, 800-meter radius study plots were located to provide good coverage of the habitat types and variation in topography of the project site and the proposed turbine strings (Figure 2). All wildlife seen or heard during 20-minute point counts were recorded. Species, number, flight height, weather, etc, were collected. Individual birds were tracked to determine if they had already been recorded during the survey but this was not always possible to determine; it is highly likely that some birds may have been recorded more than once.

There were 293 point count surveys conducted within the project site; each of the six plots was surveyed approximately 49 times (one was surveyed 48 times). Surveys were conducted at weekly intervals from August 27, 2004 through August 15, 2005, except in June when only two surveys were conducted. Flight paths of special status species or raptors were hand-plotted on topographic maps in the field. All detected wildlife were recorded, whether inside or outside the fixed point plot. Special status species or species of interest (such as raptors) were also recorded while in-transit near the proposed turbines during the avian surveys

Data were entered into a MS Access database. The following tables or figures were generated:

- Mean use, mean # species/survey, total number of species, and total number of fixed-point surveys conducted by season and overall
- Mean use, percent composition and percent frequency of occurrence for avian groups by season that were within 800 m of observer.
- Avian species observed within 800 m of observer and estimated mean use and percent frequency.
- Flight height characteristics by avian group.
- Flight height characteristics by avian species.
- Mean exposure indices calculated by species observed.
- Avian species observed within 800 m of observer and estimated mean use for the six plots surveyed.
- Species observed at each plot for the full four-season study
- Species observed by season during in-transit travel

A basic set of analyses was conducted to determine the species and groups using the area most frequently, to describe raptor and other special status species use, and to determine which species or groups could be at most risk of collision with the turbines. Risk was based on an exposure index. The exposure index is a relative measure of the risk that each species will come into contact with a turbine blade (assuming no avoidance). The exposure index is the product of a species' mean use, the percentage of time spent flying, and the percentage of time flying within the turbine rotor-swept area. Mean use for a species equals the mean number of individuals/20-min point count/800 meters. The relative index to collision risk (*R*) was calculated for bird species observed in the project area using the following formula: $R = A*P_f*P_t$. Where A = mean use for species *i* averaged across all surveys, P_f = proportion of all observations of species *i* where activity was recorded as flying (an index to the approximate percentage of time species *i* spends flying during the daylight period), and P_t = proportion of all flight height observations of species *i* within the RSA. The RSA used for the Leaning Juniper avian use data analysis was 30 meters above ground to 130 meters at the highest point (blade tip) above ground. This encompasses the largest RSA for both the 1.5-MW and the 3.0-MW turbines being reviewed for use at the Leaning Juniper site.

2.3.3. Raptor Nest Surveys

The objective of raptor nest surveys was to provide information that can be used to predict potential impacts to nesting raptors and to identify options for avoiding or mitigating impacts. Impacts to nesting raptors can potentially occur during the construction or operations phase of the wind project and may include disturbance during nesting, direct loss of the nest structure, or individual nesting birds colliding with turbines.

One aerial survey was conducted via helicopter in 2005. In addition, several juniper trees and basalt cliffs were checked from the ground during the ground-based walking transects conducted for other species. The 39,519–acre area was surveyed once from May 1 through June 8, a time when most species would be detected at or near their nests. The nest search area included the project site and a buffer of approximately 2 miles from the proposed turbine strings (based on the May 2005 turbine layout). The active landfill property was not surveyed but there are no nesting structures in that area. It is well-documented that some raptor species forage farther than two miles from their nest. To assess use of the project area by foraging raptors nesting outside of the 2-mile buffer area, point counts were conducted onsite within proximity of the proposed turbine strings (see Avian Use Study).

All potential and confirmed raptor nests were recorded, regardless of activity status. Determination of nest status (active, inactive, unknown) was made using a combination of visual clues such as adult behavior, presence of eggs or young, presence or absence of whitewash (excrement), or observational data from the ground-based surveys. Inactive nests (without sign of use) were assessed for the type of bird that may have used the nest in the previous year or earlier in the season but was abandoned. Stick nests in trees that appeared to have been constructed and used by common ravens were included in "Inactive" status because the structure could be attractive to raptors in future years. All nest locations were recorded using a hand-held Global Positioning System (GPS) unit. All data were entered into a project database.

2.3.4. Washington Ground Squirrel Surveys

Survey methods were reviewed with ODFW and approved before being conducted (Appendix A). Using the March 2005 proposed layout, each project facility was buffered 1,000 feet in all directions. Parallel transects spaced at 164 to 220 feet apart were walked twice within these corridors, excluding cropland and unsuitable habitat (Figure 2). Some of the corridors extended beyond the project-leased land boundary. Surveys were conducted within those areas where permission from the landowner was granted.

The first survey was conducted between March 1 and March 23 and the second survey was conducted between March 29 and April 11. Before the initial survey, known occupied WGS sites in the nearby area were checked for level of activity and, based on the level of recent sign of use or presence of active squirrels, it was determined that surveys could be started at Leaning Juniper. A few areas devoid of suitable WGS habitat (obviously shallow rocky soils, rimrock) were either avoided or quickly passed through to access more suitable sites for the species (deeper soils). Experienced surveyors meandered along the transect routes looking for sign of use (burrow entrance holes and droppings) while looking ahead for squirrels and listening for their diagnostic calls. They typically surveyed in pairs, noting unusual sign or a wildlife detection to each other through hand signals or two-way radios for a more thorough investigation.

Suspected (droppings located) and confirmed-use (animal detected) locations were recorded in hand-held GPS units; accuracy of location was typically 20-60 feet. Other information recorded included weather, time of survey, surveyors' names, and other wildlife species of interest. Approximately 3,037 acres of grassland and shrub-steppe habitats within the leased land were surveyed and approximately 705 acres adjacent to the leased land were surveyed. Approximately 340 to 360 miles of survey transects were walked.

During the second survey when WGS were at their peak seasonal activity, confirmed WGS locations were mapped by walking through the site in tighter meandering transects until lack of any sign was noted or until the surveyor reached the outside of the 1,000-foot survey corridor. Later season observations (detections noted during other types of field surveys) were also plotted. GPS coordinates were taken for the furthest outside WGS hole, or where the animal was seen or heard calling and entered in the wildlife Geographic Information System (GIS) files. The confirmed areas were enclosed in polygons and each site was further described (soil and habitat type, overall density of WGS, and colony size).

2.3.5. Other Special Status Wildlife Species Surveys

Other *special status* wildlife species that may occur in the project area include State Sensitive status species and/or federal "Species of Concern." Six species were expected to occur during the spring/early summer breeding season in the habitats at Leaning Juniper—long-billed curlew, grasshopper sparrow, burrowing owl, loggerhead shrike, sagebrush lizard and white-tailed jackrabbit (Appendix B). Other species (primarily raptors) were surveyed from the air or noted incidentally while conducting other ground-based surveys (see Raptor Nest Surveys).

Methods to confirm presence of these six species were developed by NWC using the extensive experience backgrounds of the staff and suggested methods in the Oregon Methodology Manual (ODFW, 1994). Protocols were prepared (Appendix A) and approved by ODFW. It was determined that night-spotlighting would not be necessary for jackrabbits because past experience has indicated that diurnal surveys typically result in flushing jackrabbits from resting spots in shrubs and also are a good method to search for sign of jackrabbit use (droppings).

As discussed above, the WGS surveys were conducted at a time when some, but not all, sensitive-status wildlife species had returned for nesting. Long-billed curlews had arrived by mid-March and were detected during the WGS surveys but grasshopper sparrows and other species did not arrive until late April. Therefore, a third survey was conducted through the same survey corridors as the first two surveys but only within 400 feet of the project facility (Figure 2). The March-April project facility layout was used during this spring survey period. As a result of slight shifts in the final facility layout (as of August 2005), some survey corridors were not centered on the final layout. However, much of the area was covered during the earlier WGS surveys and the survey effort likely detected most species utilizing the habitat near facilities. Locations of territorial male grasshopper sparrows, which are sometimes difficult to hear at greater distances, may have been missed whereas long-billed curlews are quite vocal and detectable from greater distances and thus could have been detected outside of the area actually walked.

The special status wildlife species surveys were conducted April 25 through May 4 and a later survey was conducted in June at a few small areas for lizards. Surveys were conducted with the same basic methods used for WGS surveys. Surveys typically were conducted during the morning hours and when conditions were optimal (no or low wind, mild temperatures). When planning the survey schedules, surveyors determined which sites had moderate or high potential for supporting sagebrush lizards and those sites were surveyed mid to late morning or early afternoon when lizard species would be more active. These areas are very limited within the proposed project footprint – most of the suitable lizard habitat is within the sagebrush juniper woodland (Figure 1) where no development will occur. Throughout the survey period, areas suspected of supporting burrowing owls were more closely examined. Surveyors recorded all wildlife seen or heard during each survey.

2.3.6. Bat Review

Pre-construction studies to assess presence and level of use by resident and migratory bats are challenging and inconclusive when their goal is to evaluate potential wind turbine interactions and assess collision risk. The bats species review focused on gathering existing information from areas closest to the project site, including Morrow County and Klickitat County, Washington (north of the project site across the Columbia River). As previously stated, databases were searched and agency personnel were interviewed for information on wildlife species, including bat species. Copies of applicable reports of bat studies were obtained and reviewed and a table of species with potential or documented occurrence in the general Leaning Juniper project area was prepared. In addition, bat fatality monitoring study results from regional wind projects were reviewed to determine levels of bat mortalities anticipated for the Leaning Juniper project. Personal field notes from staff at NWC for bat species records near Arlington, Oregon, were also reviewed.

3.0 Results

3.1. Information Review

The general soil map indicates two major types are present: (1) Olex-Krebs – deep, well-drained silt loams and gravelly silt loams, and (2) Ritzville-Makkalo – moderately deep and very deep, well drained silt loams. Because the Olex-Krebs has a gravelly component, some of these sites reviewed in the field appeared to not be as cohesive as the Ritzville-Makkalo and thus have a lower potential for supporting WGS colonies. Typically, deposits of less gravelly soils can be found within areas of this soil type so it is not possible to completely rule out this soil type for its ability to support WGS. Generally, most non-cropland on the project area has suitable WGS soils but grazing and wildfires have altered some of the native vegetation on these sites, reducing the overall habitat quality.

The Oregon Natural Heritage Information Center (ORNHIC) was contacted for all records of WGS. Results were received by NWC on April 21. There were 59 records provided, several within Gilliam County (information withheld from this report owing to sensitivity of data). Only three were in proximity to the project-leased lands; none were actually on the wind project site. The ORNHIC and the USFWS were contacted on April 18, 2003, for a comprehensive list of threatened, endangered, candidate and state sensitive status species list in the general wind project area (project site plus a 1.5 to 2-mile buffer). The ORNHIC response included three duplicate WGS records and two plant records (Appendix B-1). Instead of a project-specific response, the USFWS sent a Gilliam County Species List (Appendix B-2). Federal Listed or Candidate wildlife that may occur in Gilliam County were bald eagle, Washington ground squirrel and yellow-billed cuckoo. The Species of Concern list included 9 mammals (8 bats and California bighorn sheep), 6 birds and one reptile. Several of the species were not likely to occur in the wind project area due to lack of habitat at the site or adjacent to the site so were omitted from the project's potential or documented species list (Appendix C). The wildlife species omitted from review in this wildlife investigation are yellow-billed cuckoo, willow flycatcher, yellow breasted chat, Lewis' woodpecker, mountain quail and bighorn sheep.

The 1990 Biological Enhancement Study for the Columbia Ridge Landfill and Recycling Center described presence of WGS during their field study, noting "Several [WGS] were observed during limited sunny periods on May 21 and May 25. Observations of ground squirrels were likely reduced due to inactivity resulting from the cool weather." One area of concentrated activity was noted near the entrances to the Waste Management facilities off of Cedar Springs Rd. This area is located near "Roddy" (a geographic reference location plotted on U.S. Geologic Survey topographic maps), approximately 1.2 miles south of the Leaning Juniper site. No other WGS sites were provided in figures or tables of the report. This area was visually scanned from the landfill access road during the 2003 site reconnaissance. It appears the habitat had been altered somewhat since the 1990 study and suitability for WGS is now questionable. There are several buildings and large gravel roads with moderate levels of large vehicle traffic associated with landfill operations. Because the historic site is near the main offices where there is considerable human activity and also because Waste Management staff have never seen any WGS, it is unlikely the WGS are still present at that site. This historic site is located outside of the potential wind power development boundary.

3.2. Field and Other Investigations

3.2.1. Wildlife Habitat Mapping

The general landscape of the project area was formed by the Missoula floods and is primarily composed of flood deposited and subsequent wind re-deposited silts and loams. Soil types include three general types: Olex-Krebs, Warden-Sagehill, and Ritzville-Mikkalo. Vegetation in this Columbia Basin Eco-region is characterized by steppe and shrub-steppe vegetation types that typically have often been modified heavily by human activities (Kagan *et al.,* 1999) associated with agricultural development and human settlement. In general, shrub-steppe vegetation (where shrubs and bunchgrasses co-dominate) occurs in the middle of the Eco-region, while steppe vegetation (where native bunchgrasses dominate) occurs around the eastern rim of the Eco-region (Franklin and Dyrness, 1988; Daubenmire, 1970) and is generally at higher elevations towards the Blue Mountains.

Historical land cover maps from the Oregon Gap Analysis Program (OGAP) place the project areas within the ‘Perennial Bunchgrass’ type (Kagan *et al.,* 1999). However, OGAP’s Current Land Cover maps show the project area to be primarily modified grassland, with inclusions of sagebrush-steppe cover type around the edges. In addition, there is some non-native grassland (mostly annual species), scattered juniper or other trees, a juniper/sagebrush woodland in a dry drainage, small patches of deciduous trees in portions of the project, and a very large active landfill operation. There are a few basalt rim edges with sparse vegetation on the canyon edges.

Franklin and Dyrness (1988) also describe a number of plant associations that occur on lithosols (shallow soils) within the Columbia Basin and shrub-steppe areas. Daubenmire (1970) recognizes a variety of lithosolic plant associations. All are typically composed of a uniform layer of Sandberg’s bluegrass (*Poa secunda*) over a crust of mosses and lichens, with a low shrub layer above. The primary difference in these communities is in the composition of the shrub layer.

The above descriptions of generalized vegetation zones and associations are based on climax communities, which typically develop over time in the absence of anthropogenic disturbance. Within the project area (as in most of the steppe and shrub-steppe regions) numerous disturbance factors have modified many of the plant communities. Cattle grazing, changes in wildfire frequency and intensity, introduction of exotic plant species, ground disturbance from development activities, and a host of other factors have resulted in plant communities that are kept at an early- to mid-seral stage of development. In particular, recent fires have removed shrub cover in many areas and subsequent livestock grazing or re-burns have hindered normal recovery of native vegetation.

The project site where development will occur is a mosaic of native and non-native vegetation on shallow to deep soils. On the large landscape scale, these areas are typically referred to as "agricultural farm land" and "shrub-steppe." During the fall of 2004, the project site and a one-mile buffer (8,563 acres) were further separated into plant associations based on the current dominant and co-dominant plant species (Figure 1). It includes broad habitat types and sub-types. An expanded legend was prepared describing each and a brief list of wildlife species that may occur within each sub-type during the nesting/denning period or for some mammals, year-round was included. Table 1 describes the general habitat types within the 3,636-acre project boundary and includes vertebrate wildlife species typically associated with the sub-type.

During the fall of 2004, areas that appeared to be potential nesting habitat for species of concern were mapped on field maps. The habitat features included juniper or black locust trees for nesting raptors; junipers with sagebrush and a shallow basalt cliff for raptors, loggerhead shrikes and passerines; grasslands for long-billed curlew nesting; and black locust trees for raptor nesting/perching. Shallow rocky soils in grassland were noted because these sites do not provide habitat for Washington ground squirrel and burrowing owls. These areas typically have sparse vegetation and cover is very limited for ground-nesting birds. The field map highlighting deeper soil sites with native vegetation cover was used to conduct an initial turbine and road micro-siting process with PPM Energy engineers and meteorologists. Experienced NWC wildlife biologists reviewed tentative turbine locations in the field. Based on these presurvey site-specific reviews, the engineers were able to design a preliminary turbine string layout during the winter of 2004-2005 which took into consideration raptor nesting and habitat quality. This served as the basis for wildlife impact discussions and study protocol development with ODFW and USFWS during the winter of 2004-2005. As a result of these discussions, maximum temporary and permanent disturbance impacts anticipated for construction and operations activities were calculated by habitat type (Table 2).

3.2.2. Avian Use Study

<u>Species Abundance and Composition</u>

Forty species of birds were identified during point count surveys (Appendix D-1) conducted at the 6 plots. Other unidentifiable birds were recorded into taxonomic groups such as waterbirds (gull), raptors (e.g., falcon, Buteo) passerines (e.g., sparrow). Over the course of the four-season study, 1,520 groups (flocks) comprising a total of 10,303 individual birds were recorded. The number of birds observed by species that were used to obtain use and composition estimates are presented in Appendix D-2. The number of species observed ranged from 17 in the summer to 25 in the fall (Table 3). Avian richness (defined as number of species per 20-minute survey per plot) ranged from 2.0 in the summer to 3.4 in the spring (Table 3). The mean number of birds observed per survey plot was highest in the winter (47.2), followed by fall (19.6), spring (11.8), and summer (6.8), and averaged 23.7/survey across all seasons (Table 3) (Appendix D-2).

Passerines (song birds) were the most abundant group in the *spring* (8.68/survey), followed by waterbirds (1.79), shorebirds (0.86), and raptors (0.39) (Table 4). Passerines comprised 73.8% of all birds observed, waterbirds comprised 15.2%, shorebirds comprised 7.4%, and raptors comprised 3.4%. The most frequently occurring groups were passerines (100% of surveys), shorebirds (36.4%), and raptors (33.3%). Species with the highest use in spring were horned lark (3.83/survey), common raven (2.08), unidentified gull (1.61), western meadowlark (1.53), and European starling (0.94) (Table 5). Swainson's hawk was the most abundant raptor species in the spring (0.11/survey), followed by red-tailed hawk (0.09), ferruginous hawk (0.06), and golden eagle (0.05). The species of birds most frequently observed during spring surveys, regardless of the number observed, were horned lark (95.5% of surveys), western meadowlark (78.8%), common raven (60.6%), and long-billed curlew (36.4%) (Table 5).

In the *summer,* passerines remained the most abundant group (5.52/survey), followed by raptors (1.07), shorebirds (0.13), and waterbirds (0.02) (Table 4). Passerines comprised 81.7% of all birds observed, raptors comprised 15.8%, shorebirds comprised 2.0%, and waterbirds comprised 0.3%. The most frequently occurring groups were passerines (75.0% of surveys), raptors (58.3%), shorebirds (6.7%), and waterbirds (1.7%). Species with the highest use in summer were horned lark (4.27/survey), common raven (0.73), Swainson's hawk (0.52), western meadowlark (0.37), and American kestrel (0.13) (Table 5). Swainson's hawk was the most abundant raptor species in the summer (0.52/survey), followed by American kestrel (0.13), ferruginous hawk (0.12), and red-tailed hawk (0.12). The species of birds most frequently observed during summer surveys were horned lark (68.3% of surveys), Swainson's hawk (33.3%), western meadowlark (23.3%), common raven (21.7%), and American kestrel (10.0%).

In the *fall*, the most abundant group was passerines (19.06/survey), followed by raptors (0.53) and vultures (0.03) (Table 4). Passerines comprised 97.2% of all birds observed, raptors comprised 2.7%, and vultures comprised 0.1%. The most frequently occurring groups were passerines (94.6% of surveys), raptors (34.1%), and vultures (2.8%). Species with the highest use in fall were horned lark (9.46/survey), common raven (3.93), European starling (0.96), western meadowlark (0.41), and white-crowned sparrow (0.41) (Table 5). American kestrel was the most abundant raptor species in the fall (0.22/survey), followed by ferruginous hawk (0.05), rough-legged hawk (0.04), and short-eared owl (0.04). The species of birds most frequently observed during fall surveys were horned lark (92.1% of surveys), common raven (54.1%), western meadowlark (19.2%), and American kestrel (14.4%) (Table 5).

Passerines were again the most abundant group in *winter* (42.83/survey), followed by waterbirds (4.17), and raptors (0.24); these groups comprised 90.7%, 8.8%, and 0.5% of all birds observed, respectively. The groups of birds most frequently observed during winter surveys were passerines (98.9% of surveys), raptors (18.9%), and waterbirds (6.7%) (Table 4). Species with the highest use in winter were horned lark (21.84/survey), common raven (7.43), Canada goose (4.17), European starling (1.67), and western meadowlark (0.34). Red-tailed hawk was the most abundant winter raptor (0.12/survey), followed by American kestrel, golden eagle, northern harrier, and rough-legged hawk (all 0.02/survey) (Table 5). The species of birds most frequently observed during winter surveys were horned lark (84.44% of surveys), common raven (72.22%), western meadowlark (20.0%), and red-tailed hawk (11.1%) (Table 5).

Flight Behavior

During the study, 1,089 flocks comprising 8,303 birds (out of 10,303 total birds recorded) were observed flying during point count surveys (Table 6). Mean flight height for all species combined was 24.04 m. For avian groups with at least 10 observations of flying flocks, mean flight height was lowest for passerines (15.9 m). Highest mean flight heights were recorded for buteos (59.8 m), followed by waterbirds (57.6 m) and northern harriers (20.9 m).

For all species combined, 73.6% of all flying birds observed were below the rotor-swept height (<25 m), 25.4% were within the rotor-swept height (25 – 125 m), and 1.0% were above the rotor-swept height (>125 m) (Table 6). For groups with at least 10 observations of flying flocks, those most often observed flying within the turbine rotor-swept height were buteos (76.0%), waterbirds (29.8%), falcons (25.8%), and northern harriers (25.0%). For all flying raptors combined, 64.5% were observed flying within the rotor-swept height. For species with at least 10 observations of flying flocks, those most often observed at rotor-swept heights were rough-legged hawk (100%), Canada goose (90.2%), red-tailed hawk (85.5%), Swainson's hawk (69.6%), and ferruginous hawk (52.2%).

Turbine Exposure Index

Based on the exposure index, species with the highest probability of turbine exposure were common raven (1.29), Canada goose (0.80), horned lark (0.62), European starling (0.10), and Swainson's hawk (0.08) (Table 7). This analysis may provide insight into what species might be the most likely turbine casualties. However, this index only considers relative probability of exposure based on abundance, proportion of daily activity budget spent flying, and how often each species flies within the turbine rotor-swept heights. This analysis is based on observations of birds during the daylight period and does not take into consideration flight behavior or abundance of nocturnal migrants. It also does not take into consideration the turbine rotor-swept area, varying ability among species to detect and avoid turbines, habitat selection and other factors that may influence exposure to turbine collision; therefore, the actual risk may be lower or higher than indicated by these data. For example, in the Altamont Pass Wind Resource Area (WRA) in California, mortality among the five most common species was not related to their abundance. American kestrels, red-tailed hawks, and golden eagles were killed more often, and turkey vultures and common ravens were killed less often than predicted based on abundance (Orloff and Flannery, 1992). Similarly, at the Tehachapi Pass WRA in California, common ravens were found to be the most common large bird in the WRA, yet no fatalities for this species were documented during intensive studies (Anderson *et al.,* 1996).

Spatial Use

Raptor use among the six survey plots was fairly similar, ranging from 0.39 to 0.71 per survey. Use of the project area by shorebirds (all long-billed curlews) was much higher at Plot C (0.59/survey) and Plot E (0.53/survey) than at the other 4 points, where it ranged from 0 to 0.10/survey. Waterfowl/waterbird use was much higher at Plot B (7.18/survey) than the other plots, where use ranged from 0 to 1.43/survey. Passerine use was highest at Plots B (34.73/survey) and D (36.12/survey). Use of the other 4 plots was much lower, ranging from 7.90 to 19.51/survey.

Special Status Species

Six special status bird species were observed during the avian point count surveys (Appendix D-1). These were *raptors* (ferruginous hawk, golden eagle, burrowing owl), one *shorebird* (long-billed curlew) and a *passerine* (grasshopper sparrow). No species listed as endangered or threatened by either the federal government or state of Oregon were observed during the study.

Raptors

There were 24 ferruginous hawk (State Sensitive-Critical) and 68 Swainson’s hawk (State Sensitive-Vulnerable) detections recorded during the point count surveys. There were 8-11 golden eagles detections were recorded during the study. The numbers observed/recorded do not indicate a population size as the same bird could have been counted more than once during the survey and during the season. Golden eagle is not listed as sensitive by the state of Oregon but is protected by the federal Bald and Golden Eagle Protection Act and is considered a federal bird of conservation concern in the Great Basin (USFWS, 2002). They were seen during October, January, February and March. Adults and sub-adults were seen. A total of 69% of the Swainson’s hawks observed were flying at the turbine rotor-swept height, 52% of the ferruginous hawks observed were flying at turbine rotor-swept height, and 77.8% of the golden eagles were flying at turbine rotor-swept height. The sample size for golden eagle is too small to make any definitive statements about the risk of turbine exposure based on flight behavior. Observations of 68 Swainson's and 24 ferruginous hawks indicate moderate use of the project area; most observations were recorded during the nesting season. Infrequent observations of golden eagles indicated low use of the project area. Observations occurred from fall through early spring.

Other Special Status Species Detected During Point Counts

There were 71 long-billed curlew (state sensitive-vulnerable) and one grasshopper sparrow (state sensitive-vulnerable) and 5 detections of burrowing owl (state sensitive-critical) recorded. 18.6% of the long-billed curlews were observed flying at turbine rotor-swept height, and no grasshopper sparrows or burrowing owls were observed flying at rotor-swept heights.

In-Transit Observations

During the course of the four-season avian study, there were 17 bird species and 1 mammal observed while in-transit during point count surveys. The number of bird species recorded during in-transit was fairly constant season to season (Table 8). Five bird and one mammal species were not detected during the avian use surveys. In order of most frequently detected these were: loggerhead shrike (25), great-horned owl (3), Clark's nutcracker (1), sage thrasher (1), Wilson's snipe (1), and pronghorn antelope. The additional bird observations are not included in the species abundance, flight behavior and turbine exposure index tables because they were not seen at the plots located within and adjacent to turbine strings (the area analyzed for use and risk). It should be noted that for loggerhead shrike and great-horned owl, individuals may have been counted more than once because surveyors traveled the same routes while in-transit between avian survey plots and likely recorded birds on established territories during the nesting season. In addition, these birds use shrub and tree structure not present within the direct viewshed at some of the avian plots conducted at higher elevations.

3.2.3. Raptor Nest Surveys

In the 61 square miles surveyed within two miles of the Phase I and Phase II turbines (June 2005 layout) there were 25 active nests consisting of five raptor species; two common raven nests were also noted, resulting in a total of 27 active nests (Figure 3). There were 22 inactive nests within two miles of Phase I and Phase II turbines. Some of these were very old and may not have been used for several years but were recorded into the database because these sites may still be attractive for future raptor nesting (not all would be occupied in any given year). Some of the inactive nests may have been used by common ravens. Three were relatively large and may have been used by ferruginous hawks in the past or will be used in the future. They may also be serving as courtship nests. One of these was occupied by a Swainson's hawk in 2005. The following lists the species and the number of nests recorded within two miles of the turbines: Swainson's hawk (11), red-tailed hawk (10, but one may have been abandoned), ferruginous hawk (2), common raven (2), great-horned owl (1), and prairie falcon (1). There was 1 active Swainson's hawk nest within 0.25 mile of Phase I turbines (~1,269 feet) and 3 Swainson's hawk nests within 0.25 mile of Phase II turbines (~1,119 to 1,257 feet). No other special status species were documented within 0.25 mile. Active ferruginous hawk nests were > 0.50 mile from the nearest proposed turbine. One ferruginous hawk nest was within 2,775 feet of Phase I turbine #116, and the other was within 3,881 feet of Phase I turbine #78.

3.2.4. Washington Ground Squirrel

Active Washington ground squirrel colonies were discovered in several locations within the surveyed corridors (Figure 4). Table 9 displays the site's characteristics and other pertinent information. There were 7 primary patches and one of these consisted of five smaller areas. Four of the 7 primary patches were closest to Phase I facilities and the others were nearer to Phase II facilities. The 7 sites ranged in size from 3 to 74 acres and ranged from very low density to dense. Some active sites extended onto unsurveyed areas since squirrels were heard calling from those areas during the surveys. Most sites were in habitat broadly defined during the fall 2004 habitat mapping as shrub-steppe and further typed as having a vegetative cover of rabbitbrush-snakeweed-buckwheat/bunchgrass (SSB, Figure 1). In addition to low, open shrub cover, these sites contain a few species of buckwheat (*Eriogonum spp*.), Sandberg's bluegrass and non-native cheatgrass. Most of these areas are sagebrush-steppe attempting to recover from frequent burning. Residual, unburned sagebrush patches are present in a few colonies. Based on the 2005 surveys, there were approximately 245 acres of occupied WGS areas documented within SSB and 4 acres of occupied WGS areas within the GA habitat type of the survey corridors (Figure 2). Based on soils and habitat, more WGS colonies are probably present within the project boundary in some uncultivated areas that have not been surveyed. There are approximately 3,300 acres of the SSB habitat type and 472 acres of annual grassland (GA, Figure 1) within the project boundary.

3.2.5. Other Special Status Species Surveys

The following describes species that were documented during other surveys conducted during the spring season nesting/denning season for State Sensitive species and/or Federal Species of Concern.

<u>Special Status Species </u>(4 birds, 1 mammal, Figure 3)

Loggerhead shrike (State Sensitive-Critical,) Loggerhead shrikes were found in areas with mature sagebrush cover or in juniper woodlands and occasionally at isolated juniper trees. Several nests were found in sagebrush and juniper trees. Nest success seemed to be moderate to high as many young birds were observed at various times. The species was also detected during in-transit travel onsite for other studies conducted in 2005.

Burrowing Owl (State Sensitive-Critical, Federal Species of Concern)

One active nest and one other detection were documented during the nesting season. One bird was observed during early fall 2004 not near where nesting occurred the following spring. The bird could have nested outside of the surveyed corridors or could have been a transient/migrant from outside of the project boundary. None were observed during winter season.

Long-billed curlew (State Sensitive-Vulnerable)

This species was frequently seen and/or heard in a few specific areas. Most of the observations were on the open low shrub/grassland gentle terrain of the southeast and central portions of the project site. Curlew locations were mapped based on behavior recorded during multiple surveys conducted within the survey corridors between the spring arrival period (mid-March) and the summer departure period (June). Each mapped location (Figure 3) indicates a breeding pair or a territory that was defended by individuals or small groups, or a nest. Three nests were located and plotted. The prenesting staging areas (upon arrival in March) were approximately the same areas as the suspected or documented nesting sites that were mapped. A few more curlews were observed during the early arrival period than what was documented during the walking transect surveys and they were also detected during point counts (Appendix D-1).

Grasshopper sparrow (State Sensitive-Vulnerable)

This ground-nesting grassland bird was located primarily at the far north central end of the project within open low shrub (rabbitbrush)/grassland areas. The territorial males and a few females were typically more frequently heard than seen. Surveyors mapped 2 general locations of where the bird was either seen or most likely located. Density within the project survey corridors is considered low, likely due to lack of sufficient grassland structure for nesting cover.

White-tailed jackrabbit (State Sensitive-Undetermined)

Jackrabbit scat (droppings) was found in few areas of the project site and results indicate relatively low use of the project area. The scat may also have been from another species, black-tailed jackrabbit (not sensitive-status) however, none were ever observed. Two or three white-tailed jackrabbits were observed, primarily in the central part of the project site.

3.2.6. Bat Review

Habitat

Areas used by bats for roosting and foraging are typically not the same areas conducive to development of wind energy generation facilities, which are usually constructed in open areas to take advantage of the wind. Open surface water ponds and pools (bat foraging and drinking sites) will not be impacted during the construction or operation of the project and no trees or snags (bat roosting habitat) will be impacted. Therefore, construction of the project would not result in the loss or degradation of bat habitat in the project area.

Very limited roosting structure and watering sites are present within the general Leaning Juniper project area and none of these habitats which attract bats are present in the turbine area. No aquatic habitat is present onsite for bats to drink or forage for insects over open water. There is an old house with an adjacent small pond located offsite about 1.5 miles north, a large pond (also offsite), about 1.5-2 miles west, and a small pond near the Waste Management (landfill) office located about one mile from the closest proposed Phase I turbine location and 1.25 miles from the closest Phase II turbine. An old well pump-house and an old wooden water reservoir are located within Jones Canyon west of Phase I turbines 60 and 61. One or two cattle watering troughs are present and contain water year-round or intermittently throughout the year, depending on the grazing plan. It is not known if bats use these as drinking sites. One water trough and an open barn are located about ¼ mile northwest of Phase I turbine #98. The onsite buildings were checked once during summer 2005 for use by roosting bats and none were found; no sign was present. The structures are too open (too much daylight) for day-time roosting but may occasionally be used for intermittent roosting during evening foraging activities. The Columbia River is about 3 miles north of the closest planned turbine location. The shoreline facing the Columbia River is steep and contains areas of open, fissured rock; similar rocky areas are located in other parts of the general project area especially along the rims of the canyons.

Outside of the project boundary, the active landfill may have higher or lower insect activity (bat attractant) due to the type of operations, but no information on relative insect abundance is available for the landfill and it is not possible to study.

One of the three requirements of bats is an appropriate roost site. Building, tree, and cave roost sites are lacking in the general project area; thus, it is likely that only five species (pallid bat, big brown bat, California myotis, western small-footed myotis, and western pipistrelle) would be summer residents in the area. These would most likely roost in crevices in the rock faces (Appendix D-3). Juniper trees and basalt rimrock cavities onsite may provide bat roost structure. Rock faces were not checked for presence of bats and the crevice depth was not measured. The summer/fall 2004 general habitat assessment indicates moderate to high likelihood of occurrence, assuming that appropriate crevices or locations are present. Small, shallow crevices would be sufficient for males and non-reproductive females, which are often solitary, but larger, deeper crevices would be needed for maternity groups and for the larger species. The old house offsite was not checked for bats or suitability for bat use but bat species that roost in buildings generally need access to dark attics or small spaces between roofing materials.

A second requirement is access to water for drinking. Although there are a few ponds in the general vicinity, they are outside the project area and are unlikely to draw bats toward the turbine locations. It is more likely that any bats roosting in rock crevices or juniper trees in the project area would fly out of the project area to one of the ponds or the Columbia River for water.

A third requirement is food. All bats in Oregon are insectivorous and all but one of the 14 species "hawk" insects from the air. The pallid bat often feeds on large insects on the ground, and large crickets typically abundant in the general area from May through August would provide excellent food. Other than the possible presence of these crickets, the dry grassland, wheat crop or stubble and juniper are not likely to support much of a night-flying insect population. Insects are likely to be more abundant in canyons, near ponds and along the Columbia River, or at the landfill located outside of the wind project area.

Bat Species

Fourteen species of bats have geographic ranges that cover the project area (Verts and Carraway, 1998). Nine of the 14 species have been documented in Gilliam County and all but one species has been documented from at least one adjacent Oregon County; the lack of documentation for some species is likely a result of minimal investigation. Additionally, the ranges of 13 of the 14 species (exclusive of the spotted bat) include Klickitat County, Washington, across the Columbia River north of the project area. However, only one formal bat survey has been done in the general area and that was in Klickitat County, Washington (Fleckenstein, 2001) approximately 18 to 20 miles northwest of the Leaning Juniper project area; results are included in Appendix D-3. During the summer and early fall of 2005 there was some informal bat echolocation recording (acoustical monitoring) and surveys of old buildings in the same general area (Kronner, pers. field notes). In addition, one site supporting Townsend's big-eared bats in 2001 (Fleckenstein, 2001) was confirmed to be supporting them again in 2005 (Kronner, personal field notes).

Two of the species (hoary bat and silver-haired bat) are considered migratory. In Gilliam County the hoary bat was documented within 5 miles of the project and the silver-haired bat was documented at the Condon wind project ~ 34 miles from the Leaning Juniper site. Both have also been found in Wheeler County, which is directly south of both Gilliam County and the project area. The hoary bat has been found in Klickitat County, Washington, northwest of the project area and the ranges of both hoary and silver-haired bats extend into Canada in areas north of the project area. Thus, even though we know almost nothing about the migration paths taken by bats, there is a potential for both species to move through the project area during migration. Although the other bats species are not considered long-distance migrants, they do move unknown distances between summer active sites and winter hibernation sites and, thus, have the potential to move through the project area.

There are no bat species in Oregon or adjacent counties in Washington that are classified as federally or state threatened or endangered. There are 9 bat species that are federally listed as "Species of Concern" and/or state listed as "Sensitive" whose ranges include the project area, but only two of these (pallid bat and western small-footed myotis) are likely to be residents in the general project area because of the combination of foraging and roosting habitats that are present (Appendix D-3). As noted below, it is unlikely that either of these species would be significantly affected by the presence of turbines. A third species, Townsend's big-eared bat (Oregon State Sensitive-Critical), has been found recently in a barn along Rock Creek in Washington (Fleckenstein, 2001; K. Kronner, Northwest Wildlife Consultants, Inc., Pendleton, Oregon, 2005, pers. comm.), but this species has not been documented from Gilliam County and there does not seem to be appropriate roost sites present in or near the project area. The Rock Creek site is ~18 miles from the Leaning Juniper project site. Two additional species (hoary bat and silver-haired bat) probably migrate through the general area of the project (URS *et al*., 2001; Kronner and Gritski personal field notes, 2005); one of these (silver-haired bat) has state sensitive-undetermined status.

4.0 Discussion

4.1. Habitat

The wind project development is expected to occur within a variety of habitats, primarily agricultural fields (dryland wheat) and native habitat: shrub-steppe and grassland. The native habitat currently is quite variable in quality, mostly as a result of wildfires and grazing practices.

Phase I

A total of 122 acres are expected to be temporarily impacted and a total of 54 acres are expected to be permanently impacted during construction.

Approximately 45 acres (36% of total disturbance) of the temporarily impacted land is currently cropland or disturbed land of low value to wildlife. Approximately 77 acres (63% of total disturbance) of the temporarily disturbed land is currently other habitat consisting of annual grassland, open low shrub weedy disturbed shrub-steppe and other shrub-steppe, and native grassland – each with various levels of value for special status and other wildlife species. A total of 25 acres (40% of total project footprint) of cropland or other disturbed land will be permanently impacted. Approximately 39 acres (60% of total footprint) of other habitat will be permanently impacted. A total of 116 (77+39) acres of wildlife habitat will be either temporarily or permanently impacted for the Phase I project. The rabbitbrush-snakeweed type will be the most impacted (66 acres). A habitat mitigation plan is currently being developed to offset losses of habitat that are valuable to wildlife.

Phase II

A total of 131 acres are expected to be temporarily impacted and a total of 25 acres are expected to be permanently impacted during construction. Approximately 78 acres (60% of total disturbance) of the temporarily impacted land is currently cropland or disturbed land of low value to wildlife. Approximately 52 acres (39% of total disturbance) of the temporarily impacted land is currently in other habitat consisting of annual grassland, open low shrub weedy disturbed shrub-steppe and other shrub-steppe, and native grassland—each with various levels of value for special status and other wildlife species. A total of 15 acres (64% of total project footprint) of cropland or other disturbed land will be permanently impacted. Approximately 9 acres (36% of total footprint) of other habitat will be permanently impacted. A total of 61 (52+9) acres of wildlife habitat will be either temporarily or permanently impacted for the Phase II project. The rabbitbrush-snakeweed type will be the most non-cropland type impacted (8 acres).

Excluding cropland or other disturbed ground, for Phase I and Phase II combined there will be approximately 129 (77+52) acres of wildlife habitat *temporarily impacted* and 48 (39+9) acres of wildlife habitat *permanently impacted* for the Leaning Juniper Phase wind project.

4.2. Avian Impact Assessment

In general, potential impacts to wildlife from wind power development include injury or mortality, loss or destruction of habitat, or avoidance of an area. Impacts may occur during project construction and/or operation. This section describes background information and potential impacts from the wind development project to wildlife including mammals, reptiles and amphibians, birds in general, raptors, waterfowl, and passerines. This section includes impact assessment results for federal and state listed endangered, threatened and special status wildlife species that are known to be present in the project area. Details on documented use at the project site are also provided in Appendix C.

The most probable impact to birds resulting from the project is direct mortality or injury due to collisions with the turbines. Collisions may occur with resident birds foraging and flying within the project area, or with birds migrating through the project area. Other impacts could include abandonment of the area due to disturbance caused by project construction or operation, and mortality or injury due to collisions with construction vehicles or other equipment.

Project construction could affect birds through loss of habitat, potential fatalities from construction equipment, and disturbance/displacement effects from construction activities. Impacts from the retirement of the facility are anticipated to be similar to construction in terms of noise, disturbance and equipment. Potential mortality from construction equipment is expected to be very low. Equipment used in wind facility construction generally moves at slow rates (e.g., cranes) or is stationary for long periods. The risk of direct mortality from construction to avian species is most likely limited to potential destruction of a nest for ground- and shrub-nesting species. Disturbance-type impacts can be expected if construction activity occurs near an active nest or a primary foraging area. Birds displaced from these areas might move to areas with less disturbance, depending on the stage of nesting; however, breeding effort and fledging success could be affected, and foraging opportunities might be altered during the construction period. .

The assessment of operational impacts to birds from wind projects is based on the site-specific measures of bird utilization, bird behavior, nesting, habitat, and topography in combination with existing information on these same metrics in addition to direct measures of impact (e.g., mortality and displacement). Fortunately, this particular site is located in a particular landscape with relatively flat topography composed primarily of dryland wheat within a particular region where several wind projects have been developed and studied. Baseline and/or monitoring studies have been conducted at most of these locations providing an existing comprehensive data source for predicting impacts to wildlife species.

Measured bird use of the Leaning Juniper site by avian species, habitat, and topography in addition to measured use and mortality estimates from other existing wind plants is used to predict mortality of birds for the project. Primary regional data utilized from other projects include:

1. Pre-project avian use, habitat, and raptor nest information and operational phase fatality monitoring at the Klondike I, and pre-project avian use an raptor nest information at the Klondike II and III wind projects
2. Pre-project avian use, habitat and raptor nest information and operational phase carcass search results for the Condon Wind Project (was not a formal monitoring study with similar methods as other projects)

3. Pre-project avian use, habitat and raptor nest information and operational phase avian use, raptor nesting and fatality monitoring from the Stateline Wind Project in Walla Walla County, Washington and Umatilla County, Oregon

4. Pre-project avian use, habitat and raptor nest information and operational phase avian use, raptor nesting and fatality monitoring from the Combine Hills Wind Project in Umatilla County, Oregon

5. Pre-project avian use, habitat and raptor nest information and operational phase avian fatality monitoring from the Nine Canyon Wind Project in Benton County, Washington

6. Pre-project avian use, habitat and raptor nest information from the Mar-Lu Wind Project in Gilliam County, Oregon (located just north of Leaning Juniper project site)

Substantial data on avian mortality at wind facilities are currently available. Of 841 avian fatalities reported from California studies (>70% from Altamont Pass, CA), 39% were diurnal raptors, 19% were passerines (excluding house sparrows and European starlings), and 12% were owls. Non-protected birds including house sparrows, European starlings, and rock doves comprised 15% of the fatalities. Other avian groups generally made up <10% of the fatalities. During 12 fatality monitoring studies conducted outside of California, diurnal raptor fatalities comprised only 2% of the wind project-related fatalities and raptor mortality averaged 0.03/turbine/year. Passerines (excluding house sparrows and European starlings) were the most common collision victims, comprising 82% of the 225 fatalities documented. No other group (e.g., raptors, waterfowl) comprised more than 5% of the fatalities. Many of these projects that were studied are small in scale and have more modern turbines than the California projects.

For all avian species combined, estimates of the number of bird fatalities per turbine per year from individual studies have ranged from 0 at the Searsburg, Vermont (Kerlinger, 1997) and Algona, Iowa sites (Demastes and Trainer, 2000) to 7.7 at the Buffalo Mountain (TN) site (Nicholson, 2003). Using updated mortality data from wind projects throughout the entire U.S., the average number of avian collision fatalities is 3.1 per megawatt per year or 2.3 per turbine per year (NWCC, 2004).

Project and turbine characteristics of five regional wind facilities where standardized fatality monitoring has been conducted are described in Table 10. All bird average fatality estimates from these have ranged from 0.6 to 3.6 fatalities/turbine/year or 0.9 to 2.9 fatalities/MW/year (Table 11). The only species represented by more than 10% of the documented fatalities has been horned lark, the most commonly observed species observed at all of these facilities during daytime use surveys (Table 12). Overall bird use estimated for the Leaning Juniper Project was not high relative to other open habitat project sites in the U.S., suggesting that mortality estimates observed at these projects provide a strong basis for predicting mortality impacts at Leaning Juniper. An initial estimate of the estimated average avian fatality rate is 1 to 4 bird fatalities/MW/year. Further discussions of impacts to bird groups including raptors, passerines, and waterbirds (waterfowl, shorebirds, others) are described in detail below.

4.2.1. Raptors

Raptor Use

The Altamont Pass Wind Resource Area (APWRA) in California is the only wind project area in the U.S. with a relatively high mortality level of raptors. This project consists of approximately 5,000 mostly small (<200 kW) older wind turbines located in a 60 square mile area. Approximately 500 – 1300 raptors are estimated to be killed annually at this site (Orloff and Flannery, 1992; Smallwood and Thelander, 2004). The most common raptors killed include red-tailed hawks, American kestrels, burrowing owls, golden eagles, and barn owls. Until just recently, the largest operating turbines were 330 kW turbines, with rotor diameters of 33 m.

Wind project design has changed significantly since the first large wind plants were developed in California. Turbines are now typically installed on tubular steel towers instead of lattice towers and without open platforms at the top of the tower, eliminating perching and nesting opportunities for raptors and other birds. Raptors and ravens commonly nest in turbines within the Altamont Pass Wind Resource Area. There have been few reported observations of raptors perched on wind turbines. No observations have been made of raptors perched on the new turbine types during studies at Foote Creek Rim (WY) (Johnson *et al.*, 2000a), Buffalo Ridge (MN) (Johnson *et al.*, 2000b), Vansycle (OR) (Erickson *et al.*, 2000a), and Stateline (OR/WA) (Jeffrey and Kronner 2005, pers. comm.).

Electrical lines between turbines in new-generation wind projects are buried underground to eliminate perching opportunities, collisions with wires, and electrocutions. Collisions with wires and electrocutions have been a common source of mortality at Altamont Pass (CA) (Orloff and Flannery, 1992) and other older wind projects. Overhead lines within new wind projects are typically designed to be raptor safe from electrocution and anti-perching devices are often installed (e.g., Stateline Wind Project, OR/WA, Nine Canyon Wind Project, WA). Turbines are much larger, with blades moving at slower revolutions per minute (rpm) and are therefore presumably more visible than blades on the smaller older turbines. For example, the blades of the 1.5-MW turbines installed at the Klondike (OR) wind project turn at approximately 20 rpm's, contrasted to greater than 60 rpm's for the Kenetech 56-100 downwind turbine, the most common turbine at the Altamont Pass (CA) wind plant. However, blade tip speeds are similar for both new generation and old generation wind turbines.

Mean raptor use at the Leaning Juniper project was 0.52/survey. The data suggest that the Leaning Juniper project area is not within a major raptor migration corridor or breeding area. Low raptor migration rates are likely due to the lack of topographical features that might be used as migration corridors. Based on studies of several WRAs using similar protocols, mean raptor use (defined as number of raptors observed per 20 minute period at a station with an 800-m radius) typically ranges from 0.10/survey to 0.71/survey (Figure 5). The only areas studied with higher than typical raptor use are Altamont Pass and Montezuma Hills, California, where use is 2–3/survey. An analysis of avian use and mortality estimates for several WRA throughout the U.S. indicates that mortality of raptors is positively and significantly correlated with the number of birds observed during point count surveys (Smallwood and Thelander, 2004). This analysis is based on all species observed, rather than on a species by species basis. Therefore, certain species that are the most abundant on a particular site may not be the most common turbine fatalities if their behavior, habitat use, or other factors make them less susceptible to turbine collision.

Raptor mortality at new-generation wind projects outside California has been low. Pre-construction raptor use and post-construction raptor fatality estimates adjusted for searcher efficiency and scavenger removal biases are available for several wind farms recently constructed in the western U.S., including the Klondike and Vansycle Projects in Oregon, the Stateline Project on the Oregon/Washington border, the Nine Canyon Project in Washington, and the Foote Creek Rim Project in Wyoming. Raw mortality data are also available for the Condon Project in Oregon and the Ponnequin Project in northern Colorado. All of these wind farms are sited in open habitats similar to those at Leaning Juniper. Pre–construction raptor use estimates at these projects were similar to the Leaning Juniper Project and ranged from 0.3 at Nine Canyon to 0.5 at Klondike (Figure 5). Raptor mortality was not documented at two of these wind farms (Klondike and Vansycle) and was very low at the other two (i.e., 0.07/turbine/year at Nine Canyon, 0.09/turbine/year at Stateline, 0.04/turbine/year at Foote Creek Rim). One raptor carcass was found at the Condon Project, and one American kestrel fatality has been observed at the Ponnequin Wind Project in Weld County, Colorado over the last 7 years. Raptor mortality at the Leaning Juniper Wind Energy Project is also expected to be low given the relatively few turbines, low raptor use of the site, and the low raptor mortality observed at other new wind farms in the U.S. outside California.

<u>Raptor Nests</u>

Raptor nest density within 2 miles of the Leaning Juniper project was 0.41/mi^2, which is above the average raptor nest density for proposed and existing wind projects studies in low precipitation agricultural landscapes in Eastern Oregon and Washington (Table 13). At Klondike, Oregon, pre-construction raptor nest density was 0.15/mi^2 within 5 miles of the project area. No raptor mortality was documented during a one-year fatality monitoring study (Johnson *et al*., 2003b). At Buffalo Ridge, Minnesota, raptor nest density was 0.15/mi^2, and the only documented raptor mortality over a 6-year period was a single red-tailed hawk (Osborn *et al.*, 2000; Johnson *et al.*, 2002b). Raptor nest density at the large Stateline Wind Project on the Oregon/Washington border was 0.21/ mi^2. Raptor mortality was estimated to be 0.09 raptor fatalities/MW/year, and consisted primarily of red-tailed hawks and American kestrels. Incidental reporting in ongoing; one red-tailed hawk was found away from the turbines (may have been unrelated to the project operations) and one American kestrel and one unidentified raptor were found onsite (WWRPD, 2005). Raptor nest density for the 41-MW Combine Hills Wind Project, adjacent to Stateline, was estimated to be 0.24/mi^2, and no raptor fatalities were documented the first year of operation (Young, pers comm. 2003). Since the end of monitoring in spring 2005 no raptor casualties have been reported incidentally at the turbines but two owls and one kestrel fatality were found near an overhead transmission line that is away from the turbines (Ledwidge, D., pers. com. 2005). Raptor nest density for the recently permitted Hopkins Ridge Wind Project in Columbia County, Washington was 0.43/mi^2 (project not constructed yet). Raptor nest densities are also available for other regional wind plants, including Condon, Oregon (0.06/mi^2), Nine Canyon, Washington (0.03/mi^2), and Zintel Canyon, Washington (0.08/mi^2). Very few raptor fatalities have been documented at those smaller facilities (1 rough-legged hawk at Condon during the formal monitoring study, 1 American kestrel and 1 short-eared owl fatality at Nine Canyon during the study, and one red-tailed hawk after the study; Meade, T., pers com. 2004). No raptor fatalities were found at Condon Wind project since formal carcass searches (Fishman, 2003) were completed in 2003 (Azeka, 2005).

Development of wind turbines near raptor nests may result in indirect impacts to the nesting birds; however, the only report of avoidance of wind turbines by raptors occurred at Buffalo Ridge (MN), where raptor nest density on 101 mi^2 (261 km^2) of land surrounding a wind project was 5.94/39 mi^2 (5.94/100 km^2), yet no nests were present in the 12 mi^2 (32 km^2) wind project facility itself, even though habitat was similar (Usgaard *et al.*, 1997). A pair of golden eagles successfully nested 0.8 km from the Foote Creek Rim, Wyoming wind plant for three different years after it became operational (Johnson *et al.*, 2000a), and a Swainson's hawk nested within 0.8 km of Klondike Wind Project (Johnson *et al.*, 2003b). Studies at the Stateline Wind Project in Oregon and Washington have not shown any measurable short-term effects on nesting raptors (Erickson *et al.*, 2004). No long-term displacement studies have been conducted. However, long-term studies are being conducted at Stateline so more information will be available in several years.

Based on results of other regional projects, estimates of raptor mortality at 0.01 to 0.09 per MW/year, and knowledge of nesting and raptor use at Leaning Juniper, the estimate for Leaning Juniper Phase I is 1 to 9 raptor fatalities per year and for Phase II the estimate is 0.90 to 8 raptor fatalities per year. The majority of the fatalities of diurnal raptors will likely consist of buteos and American kestrels. The two buteos with highest use of the project area are red-tailed and Swainson's hawks. Small numbers of other raptors (American kestrel) and owls may also occur as fatalities. Actual fatality numbers may be higher or lower for each year during the life of the project.

4.2.2. Passerines / Songbirds

Passerines, often referred to as songbirds, have been the most abundant avian fatality at wind plants outside California, often comprising more than 80% of total avian fatalities (Erickson *et al*., 2001). Passerines are also the most commonly observed birds during pre-construction avian use point count surveys at all of these sites. Both migrant and resident passerine fatalities have been observed.

Songbird mortality at wind projects in eastern Oregon and Washington has been reasonably consistent. Horned larks have been the most commonly observed resident songbird fatality at agriculture and grassland projects in the Pacific Northwest (Table 12), and have been the most abundant songbird observed during pre-construction point count surveys at these sites. Based on long term Breeding Bird Survey data, horned larks are likely one of the most common in the Columbia Plateau. Otherwise, no other resident songbird species has comprised a large proportion of the fatalities observed at the sites in the Pacific Northwest (Table 12).

Studies of nocturnal migration at several wind projects suggest that the mortality compared to the number of birds passing through the area appears low (Johnson *et al*., 2002b; Mabee and Cooper, 2002; McCrary *et al*., 1984). In much of the West, songbirds appear to migrate across a broad front, except in unique topographic situations such as coastlines, and large river valleys or riparian corridors. In the Pacific Northwest, nocturnal migration has been studied at the Stateline Wind Project on the Oregon/Washington border (Mabee and Cooper, 2002), as well as some small sampling effort at the Nine Canyon Wind Project in Washington. The Stateline study was designed to monitor waterfowl, shorebird, and passerine movements during 2001 spring and fall migrations. Marine radar was used to study nocturnal bird migration at two stations: one near the existing Vansycle Wind Project near the southeastern end of the Stateline project area, and one to the north of the project area in Washington. The northern and southern monitoring stations had very similar passage rates, suggesting broad front movements throughout the project site.

Turbines on taller towers may kill more nocturnal migrating birds that typically fly at altitudes much higher than the heights of small older-generation turbines. While there have been numerous fatality events recorded at communication structures that involved up to several hundred avian fatalities in one night, there have been only two events reported, both reasonably small, at U.S. wind generation facilities (includes sites with modern generation turbines). Fourteen nocturnal migrating passerine fatalities were observed at two turbines during a single night at the Buffalo Ridge wind project in Minnesota, during spring migration (Johnson *et al*., 2002b). Approximately 25-30 nocturnal migrating passerine fatalities were observed at three turbines and a well lit substation at the Backbone Mountain, WV facility during one or two nights of foggy weather (Kerns and Kerlinger, 2004). The data suggest that sodium vapor lamps at the substation were the primary attractant, since fatality locations were correlated with the location of the substation, and the other turbines away from the substation had few fatalities documented the morning after the event. After the lights were turned off at the substation, no events occurred. Tall-lighted structures are suspected of attracting nocturnal migrating birds, especially during inclement weather (Kerlinger, 2003). Lighting at communication towers, where larger mortality events have been documented, is typically different than lighting at wind turbines. Communication towers commonly have more than one light location on a tower, while wind turbines have only one location for the light (on top of the nacelle, see FAA circular on lighting). Communication towers often have one red pulsating or flashing light on the top of the tower, and several solid red lights at various heights. Communication tower lighting may be more of an attractant than wind turbine lighting (Kerlinger, 2003), but research and data are limited.

No large measured differences in nocturnal migrant fatality rates have been documented between wind turbines that are lit with aircraft obstruction lighting and unlit turbines. At the Stateline Wind Project, observed fatality rates at lit turbines were slightly higher than at unlit turbines, although none of the differences were statistically significant ($p>0.10$) (Erickson *et al*., 2004). Similar results were found at the Nine Canyon wind project, which has the same lighting characteristics (red-flashing at night) but on larger and taller turbines than Stateline turbines (Erickson *et al*., 2003). The Buffalo Ridge wind project showed a similar result for turbines similar in size to Stateline, although lighting types differ (i.e., steady-burning red incandescent; Johnson *et al*., 2002b). Buffalo Ridge wind project Phase I turbines were not lit, whereas Phase II turbines had approximately every other turbine lit with solid red lights (approximately 70 of 143 turbines). Six of the 138 Phase III turbines along the outer boundary of the site were lit with solid red lights. No statistical differences were found between lit and unlit turbines. This can sometimes be challenging to discern because the fatality is assigned the nearest turbine to where it was found (assuming it was the turbine that caused the mortality). It is likely that birds or bats killed may have landed closer to an adjacent turbine that may or may not be lit. Also, birds attracted to lit turbines may be attempting to fly through an unlit turbine RSA when the fatal interaction occurred.

Based on results of other regional projects (Erickson *et al.,* 2004, Erickson *et al.,* 2003, Johnson *et al.,* 2003b), an approximate range of 200 to 800 songbird fatalities per year (1 to 4 MW/year) are predicted for the Leaning Juniper Project. The largest number of fatalities will likely be horned larks, a common grassland songbird detected during the surveys. No other species (migrant or resident) is anticipated to make up a large proportion of the fatalities, based on the patterns of results of other regional studies for projects that are operating in native habitat (grassland). Actual fatality numbers may be higher or lower for each year during the life of the project.

4.2.3. Waterfowl and Other Waterbirds

Wind projects with year-round waterfowl use have shown the highest waterfowl mortality, although levels of waterfowl/waterbird mortality appear insignificant compared to use of the sites by these groups. Two Canada goose fatalities were documented at the Klondike (OR) wind project, although several Canada goose flocks were observed during pre-construction surveys (Johnson *et al.*, 2003b). Few Canada goose fatalities have been observed as fatalities at Stateline wind project (Erickson *et al.,* 2004) or at other U.S. wind projects.

The recently constructed Top of Iowa Wind Project is located in cropland between three Wildlife Management Areas (WMAs) with historically high bird use, including migrant and resident waterfowl, shorebirds, raptors, and songbirds. During a recent study, approximately 1 million total goose-use days and 120,000 total duck-use days were recorded in the WMAs during the fall and early winter, and no waterfowl fatalities were documented during concurrent and standardized wind project fatality studies (Koford *et al.,* 2004).

Similar findings were observed at the Buffalo Ridge Wind Project in southwestern Minnesota, which is located in an area with relatively high waterfowl/waterbird use and some shorebird use. Snow geese, Canada geese and mallards were the most common waterfowl observed. Three of the 55 fatalities observed during the fatality monitoring studies were waterfowl, including 2 mallards, 2 American coots and 1 blue-winged teal. Two American coots, one grebe, and one shorebird fatality were found.

The Leaning Juniper project gets some waterfowl use by Canada geese, especially during the winter period. The use estimates for this project were lower than estimates observed during the Klondike I wind project pre-construction studies (Johnson *et al.,* 2002). Some waterfowl mortality may occur from the project, but based on all available data from other projects, the numbers are expected to be low relative to the waterfowl use of the general area.

The only shorebird observed at the Leaning Juniper Project was long-billed curlew, a State Sensitive species. Shorebirds as a group are rarely killed at wind projects; of 1036 avian fatalities collected at U.S. wind projects, only one was a shorebird (a killdeer found at Buffalo Ridge, Minnesota) (Erickson *et al.,* 2001), even though shorebirds have been recorded at virtually every wind project evaluated. No long-billed curlew collision fatalities have been found at any existing wind projects even though some wind projects have been constructed at sites where long-billed curlews were recorded during baseline avian-use studies (URS, 2001; FPLE, 2000, 2002a; NWC, 2000). Actual fatality numbers of long-billed curlews may be higher or lower for each year during the life of the project.

4.2.4. Upland Game Birds

Some upland game bird mortality has been documented at wind projects (Erickson *et al.,* 2001, Erickson *et al.,* 2004). It is not clear if these mortalities were caused by striking turbine towers or blades but there is likely some strikes with project vehicles traveling through the project. Based on habitat present, results from other regional wind projects, and the presence of a few gamebirds (primarily pheasants) during baseline surveys, there is potential for mortality of some upland gamebirds to occur; however, it is expected to be infrequent.

4.2.5. Other Avian Groups and/or Displacement Effects

The presence of wind turbines may alter the landscape so that wildlife habitat use patterns are altered, thereby displacing wildlife away from the project facilities. In Europe, displacement effects related to wind projects are considered to have a greater impact on birds than collision mortality, and several European studies have addressed this issue. Avian displacement associated with wind power development has not received as much research attention in the U.S. At a large wind project on Buffalo Ridge in Minnesota, the abundance of shorebirds, waterfowl, upland gamebirds, woodpeckers, and several groups of passerines was found to be statistically significantly lower at survey plots with turbines than at plots without turbines. There were fewer differences in avian use as a function of distance from turbines, however, suggesting that the area of reduced use was limited primarily to those areas within 100 meters of the turbines (Johnson *et al*., 2000a). Some portion of these displacement effects is likely to be the result of direct loss of habitat near the turbine for the turbine pad and associated roads and a temporary effect of habitat change within the construction zones (depending on intensity of activity). These results are similar to those of Osborn *et al.,* (1998), who reported that birds at Buffalo Ridge avoided flying in areas with turbines. Also at Buffalo Ridge, Leddy *et al*. (1999) found that densities of male songbirds were significantly lower in Conservation Reserve Program (CRP) grasslands containing turbines than in CRP grasslands without turbines. Grasslands without turbines and portions of grasslands located at least 180 meters from turbines had bird densities four times greater than grasslands located near turbines. Reduced avian use near turbines was attributed to avoidance of turbine noise and maintenance activities and reduced habitat effectiveness because of the presence of access roads and large gravel pads surrounding turbines (Leddy, 1996; Johnson *et al*., 2000a).

Preliminary results from the Stateline Wind Project (Erickson *et al.,* 2004) suggest a relatively small-scale impact of the wind facility on grassland nesting passerines. A large portion of the impact is due to direct loss of habitat from turbine pads and roads and temporary disturbance of habitat between turbines and road shoulders. Horned larks appeared least impacted. The study is ongoing and should be finished in a few years.

The Leaning Juniper project site is utilized by one additional grassland bird species not documented as a nesting species within the areas studied for grassland bird displacement at the Stateline and Combine Hills wind projects. The State Sensitive-status long-billed curlew was found nesting within portions of the 1,000-foot survey corridors of Leaning Juniper facilities (previously discussed on page 18 and 20) and was documented most frequently at avian study plot D (Table 14). No displacement data are available from other wind projects. It is likely some birds will avoid areas of human activity and avoid a perimeter around new roads and turbines. It is not clear what the area of avoidance will be. Operational monitoring studies may aid in understanding the response. The habitat mitigation area(s) (sites not selected yet) will conserve suitable nesting habitat for the life of the wind project.

The Leaning Juniper project site is utilized by one shrub-steppe bird species not documented as a nesting species within the areas studied for grassland bird displacement at the Stateline and Combine Hills wind projects. The loggerhead shrike was documented nesting within juniper woodland habitats at the Leaning Juniper sites. These areas are farther away from turbines but near access roads (Figure 3), primarily the road through juniper woodland. Response to vehicular traffic will likely depend on the level of use and size of equipment (for example, noise and width). If construction occurs during the sensitive nesting season (April 15 through August 31), it is not known how the construction activity will affect nesting loggerhead shrikes. Intermittent travel through the nesting habitat during project operations is not likely to alter their ability to nest and protect fledged young.

4.3. Bat/Wind Turbine Interaction Assessment

The primary impact to bats will be collision mortality. Available evidence indicates that this will be confined primarily to the migratory species. Although only 1-2 bat fatalities per turbine per year are typical for most projects in the Northwest, Rocky Mountains, and upper Midwest where the habitat is open prairie and farmland (NWCC, 2004; Arnett *et al.,* 2005, Johnson, 2005), the number of bat kills becomes more significant as the number of operating turbines increases nationwide into the thousands (Arnett, 2005). Additionally, many more bats have been killed in eastern states where wind turbines are located on forested ridges that bats might be using as migration corridors (Arnett, 2005). For instance, 28 bats per turbine were reported for a wind project at Buffalo Mountain, Tennessee, in 2001 (Nicholson *et al.,* 2003), and an estimated 2100 bats were killed at just

44 turbines at the Mountaineer Project in West Virginia in 2003 (Kerns and Kerlinger, 2004).

Although 46 species of bats occur in the U.S., 11 species comprise all known bat fatalities at U.S. wind plants (Johnson, 2005), despite the fact that wind projects occur in several regions of the country in a variety of habitats. The three most common species of migratory bats in the U.S. (hoary, eastern red, and silver-haired bats) comprised 93% of the 774 bat fatalities identified to species at U.S. wind projects (Johnson, 2004).

At several wind projects evaluated in the U.S., bat collision mortality during the breeding season was virtually non-existent, despite the fact that relatively large populations of resident bats of several species were documented breeding in proximity to the wind project (Johnson *et al.,* 2003a; Johnson, 2005). Because the Townsend's big-eared bat is a special status species, other literature was reviewed to more thoroughly understand the biology of this bat species and potential use near wind turbines. A Biological Assessment recently was prepared to address the potential for a wind project in West Virginia to impact the federally endangered Virginia big-eared bat, a subspecies of Townsend's big-eared bat (Oregon State Sensitive-Critical status). The Biological Assessment concluded that the collision risk to the Virginia big-eared bat is very low because the species is non-migratory and forages well below the space occupied by turbine blades (Johnson and Strickland, 2003b). Not much is known about the species daily and seasonal activity patterns in eastern Klickitat County north of Leaning Juniper where they are known to occur or in Gilliam County of Oregon (no records), but they are not expected to use the open, arid, windy environment of the wind turbine locations.

Bat mortality estimates have been made for four existing wind projects in the Pacific Northwest, where they have ranged from 0.74 to 3.21 per turbine per year, resulting in a weighted average of 1.2 per turbine per year (Table 15). On a per megawatt basis, the regional average is 1.7/MW/year. Bat mortality patterns at wind projects in Washington and Oregon have followed patterns similar to the rest of the country but the average is slightly lower (NWCC, 2004). Of 193 bat fatalities collected at existing wind projects in eastern Oregon and Washington during the past several years, 183 (95%) were represented by the two migratory species, including 91 hoary bats and 92 silver-haired bats (Erickson *et al.,* 2005; Erickson *et al.,* 2004; Erickson, *et al.,* 2000; Johnson *et al.,* 2003c). The other mortalities have consisted of small numbers of big brown bats, little brown bats, and unidentified *Myotis* bats. Virtually all of the mortality has occurred from July through early fall, during the fall migration period for hoary and silver-haired bats. A few fatalities were found during May and June and based on age estimate of carcass, were determined to have died during that time period.

With the exception of monitoring data from wind projects located in arid environments in eastern Oregon or Washington, little is known about hoary bat and silver-haired bat migration. Nothing is known specifically for the Leaning Juniper project site, but the hoary bat was detected in Gilliam County approximately 5 miles from the project site in early September 2005 (Appendix B-3) when this species would most likely be expected to be “migrating” or moving through the area. The predicted fatality rates for Leaning Juniper wind project are much lower than estimates from two of the most recently studied wind projects in the East (Kerns and Kerlinger, 2004; Nicholson, 2003), where bat mortality has ranged from 28 to over 40 per turbine per year. It is possible that the predicted collision mortality at the Leaning Juniper project would not result in a significant impact to hoary or silver-haired bat populations. Athough not much is known about the regional populations or seasonal movements of this species, populations are thought to be extensive and are not expected to be in downward declines. Bat Conservation International (BCI), the American Wind Energy Association (AWEA), the U.S. Fish and Wildlife Service, and the U.S. Department of Energy’s National Renewable Energy Laboratory (NREL) have initiated a research effort (the Bat Wind Energy Cooperative) to understand bats and wind turbine interactions and how bat fatalities can be prevented or minimized.

Bat mortality at the Leaning Juniper Project is expected to be similar to what has been documented at wind projects located in other arid landscapes of eastern Washington and Oregon containing similar habitat types, topography and proximity to the Columbia River. No aquatic habitat is present onsite for bats to drink or forage for insects over open water. Juniper trees and basalt rimrock cavities may provide bat roost structure. Old dark buildings located away from the wind turbines may attract bats to the general area but they would likely be more active near the buildings than in the open wind turbine ridges. Although it would require insect sampling to be sure, the extensive dryland habitat within the actual Leaning Juniper wind project site does not appear likely to produce large concentrations of insects during either the summer breeding season or the late summer-early fall dispersal period that would jeopardize any resident populations that might exist. However, the landfill south of the project area may produce abundant insect populations that would attract bats that might fly through the project area from roost sites to the landfill. Of all the bat species that might be resident at the Leaning Juniper Wind project area, only the pallid bat gleans insects from the ground; thus, even if pallid bats are present and feeding on the large crickets in the area, it is unlikely they would be killed by the turbines because the bats would spend most of the time near the ground below the rotor-swept area.

Using the regional per MW per year range, bat mortality during operations of Phase I and Phase II Leaning Juniper is expected to range from 0.80 to 2.5 MW per year. This may result in an estimated 83 to 259 bat fatalities for the 103.5-MW Phase I and 74 to 232 bat fatalities for the 93-MW Phase II project. Species composition will likely be similar to that at other wind projects, with silver-haired and hoary bats comprising most of the fatalities.

Other Myotis (genus name for a group of bats) species may be a smaller composition of the total fatalities as was also documented at Vansycle, Stateline and Nine Canyon wind projects. Actual fatality numbers may be higher or lower for each year for the life of the project.

In summary, there is little potential foraging habitat and limited roosting habitat for bats in the vicinity of the Leaning Juniper Wind Project. Only five species of bats are likely to be resident in the area and they are unlikely to be affected by construction of the turbines. Insect populations are likely to be small within the project area itself, but insect activity and populations in the nearby landfill might attract bats through the general wind project area and some fatalities might be expected as a result. It is not known if insects are at a different level at the landfill; the site offers almost no bat roosting habitat except one small pond and a few deciduous trees around office buildings. The turbine locations are open, arid environments that are often windy. Two additional species have the potential to migrate through the area. Although bat inventories and studies are almost non-existent in the general area, based on all available information, no threatened or endangered are likely to occur. No State Sensitive status bat species have been documented within and near the Leaning Juniper project area; only the silver-haired (sensitive-undetermined status) is likely to occur due to its potential migratory movements through the general area.

4.4. Special Status Species *(excluding bats)*

4.4.1. Threatened and Endangered Species

No birds classified as threatened or endangered by the USFWS or ODFW were observed during the one-year baseline study. Bald eagles winter along the Columbia River near the project area, but the nearest known nest (2004 data) is over 47 miles away from the Leaning Juniper project. Bald eagles may pass through the site very infrequently during spring and fall migration or during the winter. This low level of use is consistent with bald eagle use at the nearby proposed Mar-Lu Wind Project (one during winter) and other existing wind projects including the other regional projects (e.g., Stateline OR/WA, Nine Canyon WA, Combine Hills OR, Klondike I, II, and III OR). It is likely lower than other existing wind projects such as Foote Creek Rim, Wyoming. Unlike golden eagles, bald eagles do not appear susceptible to colliding with wind turbines, likely because of their differences in foraging habits (golden eagles are predators and move through the landscape in search of upland prey whereas bald eagles tend to feed on fish or scavenge). There have been no reported instances of a bald eagle fatality at any U.S. wind farm (Erickson *et al.,* 2001). It is unlikely the Leaning Juniper Project would have any negative effect on bald eagles.

There is suitable nesting habitat for peregrine falcons (state endangered) on basalt cliffs along the Columbia River within 7 miles of the project, although no active nests have been recently confirmed. The nearest known active nest in 2005 (location withheld) was approximately 11 miles from Leaning Juniper (Isaacs, pers. comm. 2005). A few historical nests are located from 7 to 30 miles away from the project area. Although occasional prairie falcon fatalities have been observed at some wind projects (Erickson *et al.,* 2001, 2002), extremely low risk is anticipated for peregrine falcons because none were observed during the Leaning Juniper or Mar-Lu baseline surveys and no active nests or are known to be present near the project site. Historic nests are located between 7 to 30 miles of the project site. Nests closes to the site may be within foraging range of nesting peregrines. However, none were observed during the extensive field studies conducted onsite. Peregrine falcon researchers suspect the nesting birds forage extensively on rock doves (pigeons) along the Columbia River basalt cliffs (Clowers, pers. comm.). One pair of peregrine falcons nested at approximately 5 miles from the closest Stateline wind turbine but none were found as casualties during 2.5 years of intensive monitoring or were found incidentally after the end of the studies.

Washington Ground Squirrel

All Phase I and Phase II project facility layouts avoid known WGS colonies, though an access road and two Phase I turbines (120 and 122) abut a colony. Figure 4 depicts delineated areas within which Washington ground squirrels spend most of the breeding cycle (based on 2005 survey data), but not all squirrels remain within the colony for all their activities throughout the season. For example, adult males may travel more than 150 meters (m) (492 feet) in less than an hour, and adult females about 100 m (328 feet). One adult male was documented to have moved more than 600 m (1,968 feet), returned after a few days, then traversed the distance again to immerge for estivation/hibernation (Delevan, 2005). Juvenile males are known to have dispersed up to 2.25 miles, though the average is about 0.6 mile (0.9 km) (Klein, 2005). Ground squirrels, therefore, may use any parcel within these movement parameters while traveling, conducting daily activities, settling after dispersal, or estivating/hibernating.

The project facilities have been designed to avoid all known, occupied WGS areas, thus keeping direct loss of individual squirrels to a minimum based on current knowledge. Two project-related activities could influence WGS persistence of the currently occupied areas and future use of suitable, unoccupied habitat. Disturbance during construction/operations and permanent or temporary loss or degradation of suitable habitat could temporarily or permanently influence the species' persistence near turbines and new roads. Project construction activities could disturb estivating squirrels or interrupt the WGS daily habits during their above-ground activity period (late January through early June) resulting in increased energy consumption and underweight immergence, respectively, followed by greater over winter mortality. Loss and degradation of occupied habitat would likely result in loss of animals, whereas loss or degradation of suitable, unoccupied areas may reduce the ability of subpopulations to communicate and for the population as a whole to expand as conditions allow.

Little is known about how WGS respond to human activity and no long-term monitoring data are available to aid in understanding how WGS might respond to new gravel roads and presence of wind turbines. Short-term monitoring data recorded for the Stateline Wind Project in Washington indicate persistence of the species in the presence of these types of facilities and human activities related to the operations. One 1.5-mile-long turbine string and associated road were constructed during the spring of 2001 when WGS were first detected on the site and next to the construction zone. Construction continued through spring and early summer and WGS persisted adjacent to the turbine construction zone. They emerged the following late winter (2002) and their distribution was found to be quite extensive throughout the suitable habitat immediately adjacent to the turbine string road during that year as well as subsequent years (NWC field notes, 2002, 2003, 2004; Erickson *et al.,* 2004).

During fall season 2004, 15 turbines were removed from the site, which necessitated large cranes and heavy equipment at the base of the turbines. In May of 2005, WGS were again found to be occupying the same sites along the turbine string road as had been noted in the previous years and they were at about the same densities (Kronner, 2005). Along nearby turbine strings, WGS were found in smaller patches during construction and those areas were actually larger the year following construction. The increase in the level of active sites followed similar offsite monitoring where WGS appeared to be in an increasing trend over a 2- to 3-year period of formal surveys. This increasing trend has been ongoing for decades in the Columbia Basin (Rohweder *et al*., 1979; Carlson *et al*., 1980; Quade, C., 1994; Green, E., 1999; Marr, V., 2001, 2004.). This may have been a response to favorable precipitation and the resulting vegetation growth. No formal monitoring measurements (e.g., population numbers, distance from project facilities) were recorded along these turbine strings. All the observational data were recorded incidental to conducting other activities throughout the spring and early summer seasons. Though anecdotal, these observations suggest some level of tolerance by Washington ground squirrels to construction and operation activities as conducted at the Stateline Wind Project. Similar construction and operations activities are expected at Leaning Juniper and both sites have other suitable habitat onsite that may be occupied. It is not known how the WGS near Leaning Juniper turbines and roads will respond to the new facilities and human activities. Based on a visual assessment of vegetation and a review of soil types, suitable habitat is quite extensive near the facilities as well as outside the studied survey corridors (Figure 2). Use of suitable habitat may be temporary travel to and from one “more-suitable” or it can be fully functional by having the right soil types and characteristics as well as a tolerable predator activity level.

Approximately 66 acres of rabbitbrush-snakeweed habitat type (the type most WGS colonies were found within) will be impacted temporarily during construction or permanently for the project facility footprint for Phase I and approximately 38 acres for Phase II. Most non-cropland habitat within the project site has been very degraded by a history of frequent fire, heavy livestock use, and alien weed invasion. Proper grazing practices designed for the site's existing conditions could enhance the recovery of native bunchgrass, shrubs and forbs. This may result more suitable habitat being available for WGS long-term persistence onsite. Rehabilitation with native vegetation species in temporary construction zones along with weed and fire management and appropriate grazing practices all have the potential to improve the habitat to some degree. Monitoring of WGS use near the turbines supplemented with additional inventory for WGS onsite in areas not yet inventoried is recommended. These supplemental studies could aid in understanding WGS persistence onsite in the presence of wind project facilities over a longer period than what has been documented at Stateline Wind Project. A habitat mitigation plan is currently being developed, which could offset WGS habitat impacts by conserving suitable habitat within the project boundary.

4.4.2. Special Status or Other Species

Golden Eagle

This raptor species is known to nest within 5 to 6 miles of the project and was occasionally observed during fall through early spring. Golden eagles are one of the most common fatalities at Altamont Pass, California. It is thought that the small size and high revolutions per minute of most of the turbines at Altamont combined with presence of a large prey base contributes to the high eagle mortality observed at Altamont. In contrast, no eagle fatalities have been documented at any of the completed modern wind farms in the Pacific Northwest. Based on relatively low use of the site by golden eagles and lack of eagle mortality at existing Pacific Northwest wind farms, it is unlikely the Leaning Juniper project would have any significant impact on golden eagle populations in the area.

Ferruginous Hawk and Swainson's Hawk

Potential impacts to raptors are discussed in sections 3.2.2 and 4.2.1. Known nest sites were buffered during project facility layout (turbines were planned to be placed away from the nest sites). Construction schedule plans for areas near known nests or suspected nests will be reviewed to accommodate the standard sensitive nesting period – March 1 through August 15 for ferruginous hawk, May 15 through August 31 for Swainson's hawk (ODFW, 1994). In addition, PPM has proposed to monitor raptor nest sites within the project boundary to gain insight into raptor nesting in proximity to an operating wind power facility.

Loggerhead Shrike

This species was more frequently detected in sagebrush along Jones Canyon and within juniper woodland, two habitat types intentionally avoided during planning of project facilities. None were observed during point counts and thus, are not exhibiting an exposure risk to operating turbines. Most were recorded within sagebrush and juniper woodland, areas intentionally avoided during layout of the wind project facilities. Individual birds may occasionally fly through the area at heights of the turbines, although they usually fly much lower than rotor-swept height. Loggerhead shrikes do not appear highly susceptible to turbine collision. This species occurs throughout the U.S. where wind projects have been built, yet only two loggerhead shrikes (both in California) have been reported as fatalities at wind power facilities (Erickson *et al.,* 2001).

<u>Burrowing Owl</u>

Although not at risk of collision with turbines because none were observed flying within the rotor-swept area (page 18), during the nesting season one detection along an access road and a confirmed nest site 540 feet from proposed turbine 121 location indicates some burrowing owls may be within construction activity zones and could be displaced. Nesting burrowing owls were monitored during construction at Stateline (FPLE, 2002b) and although most active nests were farther from turbine construction zones, one nest site located 367 feet from a turbine was active through the construction period and successfully produced young. The nest site was not at a direct line of sight to the construction zone as the site at Leaning Juniper is expected to be. In addition to persistence during construction, burrowing owl nest site monitoring conducted post-construction for 2 to 3 years indicated persistence in the presence of an operating wind turbine facility (Erickson *et al.*, 2004; Kronner, 2004, 2005). Standard Breeding Bird Survey (BBS) analyses suggest that populations of this species have increased and spatial analyses conducted by Dobkin *et al*. (2004) suggest populations are stable. However, in portions of the Oregon Columbia Basin, habitat conversion to agriculture has significantly reduced suitable habitat available for this species.

Monitoring of two known burrowing owl sites (one was a nest site) and any new active nest sites discovered during or after construction will aid in understanding project-related impacts to this species at Leaning Juniper and persistence of the species during the nesting period onsite.

<u>Long-Billed Curlew</u>

Long-billed curlews appear to be fairly common in the project area, as 71 were observed during point count surveys, all in the spring and summer seasons. Long-billed curlews were also observed while in-transit onsite and in a few locations during the spring 2005 bird nesting surveys. Most (i.e., 81.4%) of the long-billed curlews observed flying were flying below the rotor-swept height, which reduces their risk of collision. No long-billed curlew wind turbine collision fatalities have been found at any existing wind projects, even though some wind projects have been constructed at sites where curlews were recorded during baseline avian-use studies (URS, 2001; FPLE, 2000, 2002a; NWC, 2000). Shorebirds as a group are rarely killed at wind projects; of 1,036 avian fatalities collected at U.S. wind projects, only one was a shorebird (a killdeer found at Buffalo Ridge, Minnesota) (Erickson *et al*., 2001), even though shorebirds have been recorded at virtually every wind project evaluated. Therefore, it is unlikely that long-billed curlew collision fatalities would occur.

Long-billed curlews nest in the project area, and construction of the wind project will result in some minor temporary and permanent habitat loss (Table 2). Presence of turbines and human activity during and after construction may also displace curlews from some areas. However, other portions of the wind-leased area are suitable for curlew nesting and staging and curlew use is expected to occur there. These areas will not be disturbed with the development and operations of the wind project. Localized impacts to nesting and staging curlews would not likely impact breeding populations in the general area. The current distribution of this species in North America has changed dramatically from the historical distribution. Long-billed curlews are designated an imperiled species by the U.S. and Canadian Shorebird Conservation plans and are considered sensitive vulnerable by the state of Oregon (Appendix C). Within the Columbia Plateau, this species showed a positive population trend, based on analysis of BBS data collected from 1968 through 2001 (Dobkin *et al*., 2004). However, suitable resting, staging and nesting habitats are becoming less abundant in the Columbia Basin. Population trend data are mixed or unclear, and not necessarily promising for the species (Dobkin *et al.*, 2004).

A habitat mitigation plan is currently being developed to offset habitat loss associated with the wind project footprint and changes to habitat from temporary construction activities. Depending on the final site(s) selected, this plan would likely result in conservation of suitable long-billed curlew habitat for the life of the wind project, ensuring availability of undisturbed habitat for the species.

<u>Grasshopper Sparrow</u>

Very few grasshopper sparrows were observed during point counts and thus, are not exhibiting an exposure risk to operating turbines (Table 7). They may occasionally fly through the area at heights of the turbines although none were documented at this height during the point counts. They were documented during the nesting season in the northern portion of project area (Figure 3, Appendix D-3) where fires have not removed suitable grassland and open low shrub structure for nesting cover. Construction of the wind project will result in some minor temporary habitat loss and will be restricted to an underground electrical line which will be restored. Disturbance to nesting birds could occur if construction occurs during the sensitive period (May 1 through June 30). Although turbine strings are not planned in areas where the species was documented during the 2005 nesting season, construction activities related to underground electrical lines in the known sites could result in temporary displacement, depending on the activity level.

Other grassland portions of the wind-leased area that were not surveyed appear to be suitable for nesting and grasshopper sparrows are expected to occur there. These areas will not be disturbed with the development and operations of the wind project. Localized impacts to nesting grasshopper sparrows would not impact breeding populations in the general area. Overall impacts to this species are expected to be insignificant. Standard BBS analyses suggest that populations of this species have declined catastrophically. Spatial analyses conducted by Dobkin *et al*. (2004) suggest populations are relatively stable but very sparse. The species was found to be relatively common in Conservation Reserve Program (CRP) fields in Umatilla County that were informally monitored from 1990-2005 (Kronner, 2004, 2005) and were found in several native and grassland habitats on private land during many baseline studies conducted over a 10-year period in Umatilla and Morrow Counties (URS *et al*. 2001; FPLE, 2001; NWS, 1994; Woodward-Clyde, 1992)

A habitat mitigation plan is currently being developed to offset habitat loss associated with the wind project footprint and changes to habitat from temporary construction activities. Depending on the final site(s) selected, this plan would likely result in conservation of suitable grasshopper sparrow habitat for the life of the wind project, ensuring availability of undisturbed habitat for the species.

<u>White-Tailed Jackrabbit</u>

This species was occasionally observed or sign of use was noted. A temporary and permanent loss of 66 to 116 acres of open shrub cover and grassland (page 23 and 24) will not adversely impact this species because this habitat type is extensive on sites where additional jackrabbits may be present.

<u>Sagebrush Lizard</u>

This species was found onsite but not within survey corridors or planned construction zones. No impacts are expected to this location or individuals using this site. Other individuals may be present onsite and may intermittently be found along dirt roads within the juniper woodland where more sandy soils and an open soil surface is present in the understory of sagebrush and junipers.

4.4.3 Mitigation and Monitoring Implemented and Proposed

Avoidance and Minimization of Habitat Impacts

Several measures were implemented during planning of the project facilities. These measures resulted in either avoidance or minimization of impacts to habitat or special status and common wildlife species. The following measures were implemented:

- Habitat Surveys: Northwest Wildlife Consultants characterized habitats and current vegetative cover in the project area and CH2M HILL delineated wetlands near proposed construction.
- Pre-Construction Wildlife Surveys: Northwest Wildlife Consultants conducted surveys during all seasons of the year to understand how both sensitive and common wildlife species use the project site.
- Project Design: PPM designed the project to avoid impacting sensitive species, riparian areas, and shrub-steppe habitat by utilizing existing roads to the maximum extent possible, burying collector cables underground in the temporarily disturbed road shoulder where feasible, and stringing overhead cables only where necessary to avoid impacts to wetlands or steep slopes. In addition, PPM agreed not to use or improve the existing Jones Canyon Road or the existing Juniper Woodland Canyon road that runs east-west north of turbines 98 and 119 during project construction. Juniper Woodland Road was originally proposed as one of the main access roads to the west side of the project. However, both roads were eliminated from the construction plan in response to concerns from ODFW about raptor nests and intact sagebrush-dominated shrub-steppe habitat in this canyon.
- PPM also eliminated use of and improvements to an existing road from the Waste Management Disposal Services of Oregon, Inc., office area that would provide access to the project from the south. Although this road was evaluated as a major access route, it has been eliminated from consideration because of its proximity to a Swainson's hawk nest. Furthermore, PPM worked with ODFW to shift project roads outside of known Washington ground squirrel colonies, as further discussed in the next bullet.
- Project Rerouting: In light of the wildlife surveys, PPM eliminated several roads from the project entirely and revised project facilities to avoid direct impacts to known WGS colonies, raptor nests, and other sensitive species. These changes to what had been the optimal layout in terms of cost, wind energy capture, and constructability included:
    - Relocated 12 turbines from within occupied WGS habitat to outside the habitat.
    - Eliminated use of two existing farm roads through occupied WGS habitat east of turbines 61 through 66. Rerouted roads between

turbines 62 and 77 and between turbines 66 and 98 to avoid impacts to occupied WGS habitat and locate roads through wheat fields to the maximum extent possible.
  - Relocated road between turbines 59 and 70 to avoid WGS occupied habitat. Also relocated construction staging area near turbine 70 farther north along the turbine string to avoid placing it near the WGS colony.
  - Eliminated two roads to turbine 112 because of proximity to WGS colonies, and rerouted road to turbine 133 to site the road farther from WGS colonies.
  - Rerouted the proposed road between turbines 121 and 122 to avoid occupied WGS habitat.

As a result of these changes, no Leaning Juniper project facility footprint is located within known WGS active colonies or Category 1 Habitat.

During Construction

PPM is also committed to implementing protective measures during construction, as summarized below.

- Erosion Control: In an effort to minimize impacts to the project habitat, an Erosion and Sediment Control Plan was developed in accordance with the project National Pollutant Discharge Elimination System (NPDES) permit. The plan requires the contractor to install erosion and siltation controls near riparian areas and other appropriate locations as designated in the plan.

- Flagging: Wetlands, WGS-occupied colonies, and sensitive raptor nests will be identified near planned construction. The biological monitor will mark areas that should not be impacted during construction with brightly colored pin flags or wooden lathes, and instruct the contractor to work outside these boundaries. For raptor nests, the monitor will flag the nest trees and work with PPM and the construction contractor to minimize construction work in these areas to the extent feasible.

- Environmental Training: PPM will develop an environmental training course for the construction contractors that provides information on the sensitive species present onsite, the exclusion flagging, permit requirements, and other environmental issues. All construction site personnel will be required to attend the environmental training in conjunction with hazard and safety training prior to working onsite.

- Limited Work Areas: Construction work will be limited to the approved and surveyed areas shown on project constraints maps. No working or driving cross country within the project boundaries as shortcuts will be permitted without prior approval from the County and appropriate authorities.

- Construction Monitoring:

    - o PPM uses an onsite manager and requires the construction contractors to designate a Field Contact Representative (FCR) to oversee their compliance during construction. The FCR is responsible for overseeing compliance with protective measures and coordination in accordance with the county and other regulatory agencies.
    - o A qualified biologist will visit the site periodically before site development and during construction in order to flag sensitive resource areas, monitor nesting birds, and oversee construction and permit compliance.

Post-Construction

After construction is complete, PPM will work to restore the habitat to pre-construction standards and monitor avian impacts from operation. These mitigation measures are summarized as follows:

- Habitat Restoration: PPM prepared a Revegetation and Weed Control Plan in consultation with the Natural Resources Conservation Service in Condon, Oregon, and the Gilliam County Weed Control Board. Disturbed agricultural areas will be replanted with dryland wheat. In order to reestablish plant communities of most value to wildlife, the appropriate native grass and forb species will be used in non-agricultural areas to the maximum extent possible.

- Avian-Impact Monitoring Plan: PPM will develop a Wildlife Monitoring Plan for the operational phase of the project. This will include fatality monitoring and raptor nest monitoring to determine direct and potential indirect impacts. PPM will form a Technical Advisory Committee consisting of interested stakeholders and agency staff to review the plan before initiation of the monitoring following construction. Avian and bat mortality monitoring will be conducted for 1 year. Nests of special status raptors within the project boundary will be monitored for use and productivity during the first and second years after construction and subsequent years on a schedule to be determined in consultation with the landowner, ODFW, and USFWS.

- Conservation Easement: A parcel of native habitat will be selected for conservation and potentially restoration or enhancement, depending on the nature of the parcel. The property will be protected under a Conservation Easement or other type of designation for the life of the project. Several sites will be explored during fall 2005 and the final site(s) will be selected in consultation with a Gilliam County department representative and ODFW. The protection of this land would be used to offset permanent loss of habitat as well as any potential loss of production during the construction phase.

The conservation easement would be made available to ODFW for monitoring, subject to landowner's approval.

PPM has spoken to a number of different landowners and identified three parcels that could potentially serve as a multi-species conservation easement. Total permanent impacts to all habitat types, including wheat, have been calculated to be approximately 64 acres. Although not required by the County, PPM is committed to acquiring an area of land equal to the total permanent footprint. The final selection of the conservation parcel and its management details has not yet been solidified; PPM expects to work with ODFW to finalize an acceptable conservation easement for this project.

Current Construction Plan

PPM's goal is to complete as much of the road and foundation construction as possible before the spring of 2006. The current construction plan for the Phase I Leaning Juniper project is provided below.

Civil/Found/Erection – January 1, 2006 to May 31, 2006

- Turbine Roads
  - Grading of roads is scheduled to begin February 6.
  - Equipment includes belly dumps, gravel, graders and dozers.
- Foundations
  - The construction of turbine foundations is scheduled to start within 6 weeks of the start of roads.
  - Equipment includes backhoes, blasting machines, drillers, dump trucks, and compacters.
- Towers
  - Turbines are expected to be delivered by the end of April or beginning of May.
  - Turbine erection would involve crawler cranes, rubber tired cranes, delivery trucks, all terrain forklifts, and pickup trucks.

Electrical Collection System—February 20, 2006 to July 30, 2006
Substation—February 20, 2006 to May 31, 2006
Miscellaneous Construction—February to July 2006
Energization—June 2006
Commissioning—June-August 2006
Substantial Completion—August 30, 2006
Final Completion—September 30, 2006

The majority of the road and turbine foundation construction activities are expected to be complete by May 2006, with a concerted effort in construction scheduling to advance turbines 98 through 103. Tower assembly and erection is scheduled for the end of April or early May. This phase of construction does not involve blasting, ground disturbance, or large levels of construction traffic. Because tower assembly and erection involves slow-moving cranes and pickup trucks, it is expected that this phase of construction would have less of an impact than louder phases of construction on sensitive raptor species that may nest in the area.

Based on this construction plan, it is expected that the level of construction in the spring and early summer of 2006 would not have a significant impact on nesting raptors. To support this determination, the biological monitor will monitor raptor nesting behaviors during site visits to quantify any nest site abandonment and will record number of young fledged where possible without disturbing the birds. In addition to monitoring, PPM is in the process of selecting and preserving a habitat Conservation Easement on privately-owned land that is currently unprotected but functional for grassland/shrub-steppe wildlife species of interest. Other wildlife enhancement opportunities could include raptor nest platforms to offset potential loss in productivity for certain sensitive-status raptor species.

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Tables

Table 1. Habitat types within the Leaning Juniper Project boundary.

Primary Habitat Type (Mapping Code) General description	**Sub-Type**	**Sub-habitat Type Description**	**# Acres in Project Boundary** (rounded)
Grassland (G) Native or non-native grasslands	**G-A**	Annual grass and/or weeds. Soil depth variable. May support Long-billed curlews (LBCU), Washington ground squirrel (WGS). Common species horned lark (HOLA) nesting habitat.	223
	G-B	Perennial bunchgrass. Shrubs if present, are an inconspicuous component. Soils generally medium to deep. WGS, white-tailed jackrabbit (WTJ), burrowing owl (BUOW). May also support other ground nesting grassland bird species such as savannah sparrow (SASP) and vesper sparrow (VESP). Common species - Western meadowlark (WEME) nesting habitat.	67
Shrub-Steppe (SS) "Semi-arid grassland characterized by grasses occurring in scattered bunches with other herbaceous vegetation and occasional woody species." Bedell, T. E. (Chairman), 1998. Glossary of terms used in Range Management-A definition of terms commonly used in Range Management. Glossary Update Task Group, Society for Range Management.	**SS-A**	Sagebrush-rabbitbrush-snakeweed/bunchgrass-annual grass. Soils medium to deep. This category appears to have potential value for shrub obligate species; Loggerhead shrike (LOSH). Also WGS and WTJ. Common species WEME.	180
	SS-B	Rabbitbrush-snakeweed-Eriogonum/bunchgrass, usually *Poa sandbergii*-annual grass. Most of these areas are formerly SS1 attempting to recover from frequent burning. Little current potential for nesting by shrub obligate species. LBCU, WTJ, WGS. Common species HOLA, WEME.	1,057
	SS-C	Eriogonum/*Poa sandbergii*-annual grass. Significant bare ground used by short-horned lizard (SHL) as well as foraging birds like LBCU, LOSH, raptors.	7
	SS-D	Purple sage/*Poa sandbergii*-annual grass. Significant bare ground used by SHL, sagebrush lizard (SBL) as well as foraging birds like LBCU, LOSH, raptors.	13
Woodland (W) Raptor, corvid and shrub obligate nesting habitat.	**W-J**	Woodland consisting of junipers. Open canopy. Usually in areas with significant sagebrush (big sage) and bare ground with conspicuous stands of trees. Nesting potential for ferruginous hawk (FEHA), Swainson's hawk (SWHA); LOSH foraging and nesting potential. Bare ground of value to SHL, SBL. Wintering habitat for American robins (AMRO), Townsend's solitaire (TOSA), waxwings (two species), and mountain bluebirds (MOBL).	79
	W-L	Woodlot consisting on non-native deciduous trees. Open canopy (trees not dense). Several to many trees in relatively small well defined areas. Depending on tree health and branch size, is nest site potential for SWHA, FEHA.	1
Developed (D)	**D-C**	Non-native grassland that may be enrolled in the CRP program. WTJ. Common species - WEME.	6

	D-B	Old-field. Previously cultivated, currently occupied by rabbitbrush/annual grasses and weeds. Common species - HOLA, WEME, may include savannah sparrow (SVSP).	68
	D-W	Dryland wheat. May be seeded or fallow. HOLA in winter when bare dirt or fallow.	1,447
	D-F	Farmyard, residence, or outbuildings including surrounds.	6
		Landfill, includes leachate pond at north end	463
		Quarry.	6
	D-L	Other disturbed ground.	18
			D-Q
Sand Dune (SD) Sandy soils, very limited vegetation, shifts with erosion. SBL.			<1
Total (rounded)			3,641

(Scientific names of plants and animals available upon request)

Table 2. Maximum Temporary and Permanent Disturbance Impacts for Construction and Operations Activities by Habitat Type.

Habitat/Vegetation Type	Approximate Acres of **Temporary** Disturbance		Percent (%) of **Temporary** Habitat Impacts (rounded)		Approximate Acres of **Permanent*** Disturbance		Percent (%) of **Permanent** Habitat Impacts (rounded)	
	Phase I	Phase II*	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II
DB—Old Field	7.2	2.1	6	2	10.3	0.8	16	3
DW—Dryland Wheat	39.4	75.8	32	58	25.4	15.8	40	63
GA—Annual Grassland	9.8	3.4	8	3	1.2	0.4	2	2
GB—Perennial Grassland	0.0	0	0	0	0	0	0	0
SSA—Sagebrush-Rabbitbrush	13.8	12.4	11	9	3.3	0.1	5	0
SSB—Rabbitbrush-Snakeweed	43.5	30.2	36	23	22.4	7.9	35	31
SSC—Eriogonum-Sandberg's bluegrass	1.2	3.3	1	2	1.3	0	2	0
DF-Farmyard, etc.	3.6	1.8	3	1	0	0	0	0
DX-Other disturbed ground	1.0	0.9	1	1	0	0.3	0	1
WJ-Woodland consisting of juniper trees and sagebrush	1.2	0.3	1	0	0.1	0	0	0
Other (SSU and SSQ)	1.3	0.3	1	0	0	0	0	0
Total	**122.1**	**130.5**	**100**	**100**	**64.0**	**25.3**	**100**	**100**

* Phase II layout was in draft form at the time of these calculations

Table 3. Mean use, mean # species/survey, total number of species, and total number of fixed-point surveys conducted by season and overall based on plots surveyed for the Leaning Juniper Project site.

Season	# Visits	Mean Use	#Species/Survey	# Species	# Surveys
Fall	13	19.615	2.538	25	77
Winter	15	47.244	2.433	20	90
Spring	11	11.758	3.424	23	66
Summer	10	6.750	2.083	17	60
Overall	49	23.684	2.612	42	293

Fall Season Data:	August 27, 2004 through November 30, 2004
Winter Season Data:	December 1-31, 2004 through March 15, 2005
Spring Season Data:	March 16, 2005 through May 31, 2005
Summer Season Data:	June 1, 2005 through August 15, 2005

Table 4. Mean use, percent composition and percent frequency of occurrence for avian groups by season based on plots surveyed for the Leaning Juniper Project site.

	Mean Use #/20-minutes)			
Group	**Fall**	**Winter**	**Spring**	**Summer**
Waterbirds/Waterfowl	0.000	4.167	1.788	0.017
Shorebirds	0.000	0.000	0.864	0.133
Raptors/Vultures	0.528	0.244	0.394	1.067
Accipiters	0.026	0.011	0.000	0.000
Buteos	0.151	0.156	0.273	0.750
Northern Harrier	0.026	0.022	0.030	0.050
Eagles	0.026	0.022	0.045	0.000
Falcon	0.233	0.033	0.030	0.150
Owls	0.038	0.000	0.000	0.083
Other Raptors	0.000	0.000	0.015	0.033
Vultures	0.028	0.000	0.000	0.000
Passerines	19.062	42.833	8.682	5.517
Upland Gamebirds	0.000	0.000	0.030	0.000
Other birds	0.026	0.000	0.000	0.017
Overall	19.615	47.244	11.758	6.750
	% Group Composition (#/20-minutes)			
Group	**Fall**	**Winter**	**Spring**	**Summer**
Waterbirds/Waterfowl	0.00	8.82	15.21	0.25
Shorebirds	0.00	0.00	7.35	1.98
Raptors/Vultures	2.69	0.52	3.35	15.80
Accipiters	0.13	0.02	0.00	0.00
Buteos	0.77	0.33	2.32	11.11
Northern Harrier	0.13	0.05	0.26	0.74
Eagles	0.13	0.05	0.39	0.00
Falcon	1.19	0.07	0.26	2.22
Owls	0.20	0.00	0.00	1.23
Other Raptors	0.00	0.00	0.13	0.49
Vultures	0.14	0.00	0.00	0.00
Passerines	97.18	90.66	73.84	81.73
Upland Gamebirds	0.00	0.00	0.26	0.00
Other birds	0.13	0.00	0.00	0.25
Overall	100.00	100.00	100.00	100.00
	% Freq. of Occurrence			
Group	**Fall**	**Winter**	**Spring**	**Summer**
Waterbirds/Waterfowl	0.00	6.67	7.58	1.67
Shorebirds	0.00	0.00	36.36	6.67
Raptors/Vultures	34.10	18.89	33.33	58.33
Accipiters	2.56	1.11	0.00	0.00
Buteos	10.77	13.33	21.21	46.67
Northern Harrier	2.56	2.22	3.03	5.00
Eagles	2.56	1.11	4.55	0.00
Falcon	15.64	3.33	3.03	11.67
Owls	2.56	0.00	0.00	5.00
Other Raptors	0.00	0.00	1.52	1.67
Vultures	2.82	0.00	0.00	0.00
Passerines	94.62	98.89	100.00	75.00
Upland Gamebirds	0.00	0.00	3.03	0.00
Other birds	2.56	0.00	0.00	1.67

Table 5. Avian species observed within 800 m of observer and estimated mean use and percent frequency based on plots surveyed for the Leaning Juniper Project site.

	Fall			Winter	
Species	**Use**	**% Freq.**	**Species**	**Use**	**% Freq.**
horned lark	9.464	92.05	horned lark	21.844	84.44
common raven	3.926	54.10	unidentified passerine	11.022	18.89
unidentified passerine	3.441	23.33	common raven	7.433	72.22
European starling	0.962	2.56	Canada goose	4.167	6.67
western meadowlark	0.410	19.23	European starling	1.667	1.11
white-crowned sparrow	0.410	2.56	western meadowlark	0.344	20.00
American kestrel	0.221	14.36	American goldfinch	0.289	4.44
American pipit	0.154	5.13	red-tailed hawk	0.122	11.11
American goldfinch	0.077	2.56	American pipit	0.089	2.22
barn swallow	0.064	1.28	mountain bluebird	0.067	3.33
black-billed magpie	0.051	2.56	black-billed magpie	0.033	3.33
unidentified sparrow	0.051	2.56	American kestrel	0.022	2.22
ferruginous hawk	0.046	1.54	golden eagle	0.022	1.11
rough-legged hawk	0.038	2.56	northern harrier	0.022	2.22
short-eared owl	0.038	2.56	northern shrike	0.022	2.22
Swainson's hawk	0.028	2.82	rough-legged hawk	0.022	2.22
turkey vulture	0.028	2.82	American robin	0.011	1.11
golden eagle	0.026	2.56	ferruginous hawk	0.011	1.11
northern harrier	0.026	2.56	lark sparrow	0.011	1.11
sharp-shinned hawk	0.026	2.56	prairie falcon	0.011	1.11
unidentified buteo	0.026	2.56	sharp-shinned hawk	0.011	1.11
yellow-rumped warbler	0.026	1.28			
American crow	0.013	1.28			
dark-eyed junco	0.013	1.28			
northern flicker	0.013	1.28			
prairie falcon	0.013	1.28			
red-tailed hawk	0.013	1.28			
unidentified woodpecker	0.013	1.28			
	Spring			**Summer**	
horned lark	3.833	95.45	horned lark	4.267	68.33
common raven	2.076	60.61	common raven	0.733	21.67
unidentified gull	1.606	6.06	Swainson's hawk	0.517	33.33
western meadowlark	1.530	78.79	western meadowlark	0.367	23.33
European starling	0.939	4.55	American kestrel	0.133	10.00
long-billed curlew	0.864	36.36	long-billed curlew	0.133	6.67
ring-billed gull	0.182	3.03	ferruginous hawk	0.117	8.33
American pipit	0.136	3.03	red-tailed hawk	0.117	8.33
Swainson's hawk	0.106	7.58	burrowing owl	0.083	5.00
red-tailed hawk	0.091	9.09	unidentified passerine	0.067	3.33
ferruginous hawk	0.061	6.06	northern harrier	0.050	5.00
barn swallow	0.045	3.03	black-billed magpie	0.033	3.33
golden eagle	0.045	4.55	osprey	0.033	1.67
western kingbird	0.045	4.55	cliff swallow	0.017	1.67
northern harrier	0.030	3.03	mourning dove	0.017	1.67
ring-necked pheasant	0.030	3.03	unidentified falcon	0.017	1.67
savannah sparrow	0.030	3.03	unidentified gull	0.017	1.67
American crow	0.015	1.52	unidentified hummingbird	0.017	1.67
American kestrel	0.015	1.52	western kingbird	0.017	1.67
grasshopper sparrow	0.015	1.52			
merlin	0.015	1.52			
rough-legged hawk	0.015	1.52			
unidentified raptor	0.015	1.52			

Table 6. Flight height characteristics by avian group during fixed-point surveys for the Leaning Juniper Project site.

Group	# Flocks flying	# Birds flying	Mean Flight height (m)	% Birds flying	Relation to rotor-swept height		
					Below	Within	Above
Waterbirds/Waterfowl	31	2327	57.58	91.01	69.06	29.82	1.12
Shorebirds	33	43	16.51	60.56	81.40	18.60	0.00
Raptors/Vultures	220	251	50.51	71.71	28.69	64.54	6.77
Accipiters	4	4	52.75	100.00	25.00	75.00	0.00
Buteos	158	183	59.75	67.28	15.85	75.96	8.20
Northern Harrier	12	12	20.92	100.00	75.00	25.00	0.00
Eagles	9	9	52.00	81.82	22.22	77.78	0.00
Falcon	28	31	19.80	88.57	74.19	25.81	0.00
Owls	3	4	0.60	50.00	100.00	0.00	0.00
Other Raptors	4	6	50.50	100.00	50.00	16.67	33.33
Vultures	2	2	17.50	100.00	50.00	50.00	0.00
Passerines	802	5679	15.86	77.58	77.43	21.82	0.76
Upland Gamebirds	0	0	N/A	0.00	N/A	N/A	N/A
Other birds	3	3	31.00	100.00	33.33	66.67	0.00
Overall	1089	8303	24.04	80.59	73.61	25.35	1.04

Table 7. Mean exposure indices calculated by species observed during fixed-point surveys at the Leaning Juniper Project site.

Species	# flocks flying	Overall mean use	% flying	% Flying Within RSA	Exposure Index
common raven	281	3.933	69.02	47.33	1.285
unidentified passerine	42	4.301	100.00	27.28	1.173
Canada goose	10	1.276	69.60	90.23	0.801
horned lark	428	10.929	80.01	7.12	0.623
European starling	9	0.976	63.10	16.08	0.099
Swainson's hawk	46	0.137	82.35	69.64	0.078
red-tailed hawk	49	0.085	80.88	85.45	0.059
unidentified gull	19	0.364	99.89	11.77	0.043
ring-billed gull	2	0.041	100.00	100.00	0.04
ferruginous hawk	21	0.053	95.83	52.17	0.027
long-billed curlew	33	0.221	60.56	18.60	0.025
American kestrel	25	0.096	93.33	25.00	0.022
rough-legged hawk	10	0.020	100.00	100.00	0.020
golden eagle	9	0.024	81.82	77.78	0.015
American goldfinch	5	0.109	96.88	9.68	0.010
mountain bluebird	2	0.020	83.33	60.00	0.010
northern harrier	12	0.031	100.00	25.00	0.008
sharp-shinned hawk	3	0.010	100.00	66.67	0.007
yellow-rumped warbler	1	0.007	100.00	100.00	0.007
turkey vulture	2	0.007	100.00	50.00	0.004
western meadowlark	11	0.633	9.14	5.88	0.003
barn swallow	3	0.027	100.00	12.50	0.003
western kingbird	3	0.014	75.00	33.33	0.003
unidentified falcon	1	0.003	100.00	100.00	0.003
unidentified hummingbird	1	0.003	100.00	100.00	0.003
unidentified woodpecker	1	0.003	100.00	100.00	0.003
black-billed magpie	4	0.031	50.00	16.67	0.003
unidentified buteo	32	0.007	38.24	79.49	0.002
unidentified raptor	3	0.003	100.00	25.00	0.001
white-crowned sparrow	1	0.112	87.88	0.00	0.000
American pipit	7	0.099	93.10	0.00	0.000
burrowing owl	1	0.017	20.00	0.00	0.000
unidentified sparrow	1	0.014	75.00	0.00	0.000
short-eared owl	2	0.010	100.00	0.00	0.000

American crow	1	0.007	50.00	0.00	0.000
osprey	1	0.007	100.00	0.00	0.000
prairie falcon	1	0.007	33.33	0.00	0.000
cliff swallow	1	0.003	100.00	0.00	0.000
dark-eyed junco	1	0.003	100.00	0.00	0.000
merlin	1	0.003	100.00	0.00	0.000
mourning dove	1	0.003	100.00	0.00	0.000
northern flicker	1	0.003	100.00	0.00	0.000
unidentified accipiter	1	N/A	100.00	100.00	N/A
northern shrike	0	0.007	0.00	N/A	N/A
ring-necked pheasant	0	0.007	0.00	N/A	N/A
savannah sparrow	0	0.007	0.00	N/A	N/A
American robin	0	0.003	0.00	N/A	N/A
grasshopper sparrow	0	0.003	0.00	N/A	N/A
lark sparrow	0	0.003	0.00	N/A	N/A

Table 8. Abundance of Avian and Mammal Species Incidentally Observed While In-transit* in Leaning Juniper Wind Project, from August 27, 2004, through August 15, 2005.

Common Name	Fall	Winter	Spring	Summer
Mountain bluebird		X		
Loggerhead shrike	X	X	X	X
Long-billed curlew		X	X	
Red-tailed hawk	X	X	X	X
Swainson's hawk			X	X
Ferruginous hawk	X		X	X
Northern shrike	X	X		
Great-horned owl				X
American kestrel	X	X	X	X
Prairie falcon	X	X		X
Sharp-shinned hawk		X	X	
White-tailed jackrabbit			X	X
Merlin			X	
Burrowing owl				X
Northern harrier	X		X	
Common snipe or Wilson's snipe	X			
Sage thrasher				X
Clark's nutcracker				X
Totals 13 Species	**8 birds, 1 mammal**	**8 birds, 1 mammal**	**10 birds, 1 mammal**	**10 birds, 1 mammal**

NOTES

*table includes raptors and other species of potential interest (excluding Washington ground squirrels) that were observed incidentally while traveling in-transit near avian-use survey plots. Individuals may have been counted more than once while in-transit or counted again during survey plot surveys.

Seasons

Fall Season – 8/27/04 through 11/30/04
Winter Season - 12/1/05 through 3/15/05
Spring Season – 3/16/05 through 5/30/05
Summer Season – 6/1/05 through 8/15/05

Table 9. Leaning Juniper Wind Project 2005 Washington Ground Squirrel Colonies.

WGS Colony #	Soils	Mapped Habitat (late 2004)	Overall Density	Colony Size and Acres (rounded)	General Notes	Near Turbines
1	23B, 56B	SSB	Dense	Large, 74 ac		No, east of Phase I 61-66
2	23B	SSB	Dense	Small to Medium, 11 ac		Phase I 91-92
3	32B, 40B	SSB	Dense	Large, 48 ac		Phase I 119-122
4		SSB	Dense	Large, a-e combined=~101 ac	Extensive – probably is larger than surveyed data shows. Probably connects to Colony 1	
a	23B	SSB	Low Density	Small, 9 ac		Phase II 67
b	23B	SSB	Medium Density	Medium, 15 ac		Phase II 67-69
c	14B, 23B	SSB	Dense	Large, 44 ac	Was probably more extensive to the south in prior years. Probably is more extensive in the area not leased (not surveyed) than shown	Phase II 70
d	23B	SSB	Dense	Large, 25 ac		No, east of Phase II 54-56
e	23 B, 23C	SSB	Dense	Small, 8 ac	Connected to **d** but a noticeable gap in-between	Phase II 57-58
5	23C, 23D, 33E	SSB	Dense	Small, 8 ac		Phase I 118 and 131
6	14D	GA	Very Low	Very Small, 4 ac (May have been just a few individuals)		No, south of Phase I 133
7	56B	SSB	Very Low (1 individual)	Very Small, 3 ac		No, west of Phase II 112 and 113

Estimated size based on general observations
Small = 10 to 30 individuals
Medium = 30 to 40 individuals

Large = 40 to 100+ individuals

Soils

14B – Krebs silt loam, 2-5% slopes
14D – Krebs silt loam, 5-20% slopes
23B – Olex silt loam, 0-5% slopes
23C – Olex silt loam, 5-12% slopes
23D – Olex silt loam, 12-20% slopes
32B – Ritzville silt loam, 2-7% slopes
33E – Ritzville silt loam, 20-40% north slopes
40B – Sagehill fine sandy loam, 2-5% slopes
56B – Willis silt loam, 2-5% slopes

(23B has the most WGS use)

Mapped Habitat

Specific colony site vegetation descriptions are not yet prepared however, many of the sites burned moderately hot in 1999 or 2000 and are now grassland (native or annual) with open low shrub (rabbitbrush and Eriogonum).

4c and part of 1 and 4d are unburned sagebrush.

The following text is from the NWC November 2004 Habitat Mapping.

"GA - Annual grass and/or weeds. Soil depth variable. Long-billed curlews (LBCU), Washington ground squirrel (WGS). Common species such as horned lark (HOLA).

SSB- Rabbitbrush-snakeweed-Eriogonum/bunchgrass, usually *Poa sandbergii*-annual grass. Most of these areas are formerly SS (more sagebrush) attempting to recover from frequent burning. Little current potential for nesting by shrub obligate species. LBCU, white-tailed jackrabbit (WTJ), WGS. Common species HOLA, Western meadowlark (WEME)."

Table 10. Project and turbine characteristics of four regional wind energy facilities where fatality monitoring studies* have been conducted.

Pacific Northwest Wind Project (approximate air-miles distance from Leaning Juniper Project)	**Project Size**		**Turbine Characteristics**			
	# Turbines	**MW**	**RD (m)**	**Tip Height (m)**	**RSA m^2**	**MW**
Stateline, OR/WA (84 miles)	454	300	47	74	1735	0.66
Vansycle, OR (86 miles)	38	25	47	74	1735	0.66
Klondike I, OR (12 miles)	16	24	65	100	3318	1.50
Nine Canyon I, WA (66 miles)	37	48	62	91	3019	1.30
Nine Canyon II, WA (65 miles)	12	20	62	91	3019	1.30
Combine Hills I, OR (90 miles)	41	41	61	84	2961	1.0
Total	**598**					

* similar study methods. Condon Wind Project Study omitted due to differences in study methods

Table 11. Pacific Northwest regional annual fatality estimates on a per turbine, per 5,000 m2 RSA, and per MW nameplate basis for all birds and for all raptors.

Pacific Northwest	**All Bird Fatality Rates**			**Raptors**		
	# / Turbine	**# / 5,000 m^2 RSA**	**# / MW**	**# / Turbine**	**# / 5,000 m^2 RSA**	**# / MW**
Stateline I and II, OR/WA	1.9	5.6	2.9	0.06	0.17	0.09
Vansycle, OR	0.6	1.8	1.0	0.00	0.00	0.00
Klondike I, OR	1.4	2.1	0.9	0.00	0.00	0.00
Nine Canyon I*, WA	3.6	5.9	2.8	0.07	0.11	0.05
Combine Hills (under review)						
Average	**1.9**	**3.9**	**1.9**	**0.03**	**0.06**	**0.04**

* Nine Canyon II monitored part-year.

Table 12. Number and species composition of bird fatalities found at the four Pacific Northwest regional wind projects.

Species	% Composition	Number of Fatalities
Horned lark	37.5	107
Ring-necked pheasant (N)	9.1	26
Golden-crowned kinglet	7.7	22
Western meadowlark	4.9	14
Gray partridge (N)	4.2	12
White-crowned sparrow	3.9	11
Chukar (N)	3.5	10
Red-tailed hawk	3.2	9
European starling (N)	2.5	7
American kestrel	2.1	6
Unidentified passerine	2.1	6
Yellow-rumped warbler	1.8	5
Winter wren	1.8	5
Canada goose	1.1	3
Dark-eyed junco	1.1	3
Unidentified bird	1.1	3
House wren	1.1	3
Unidentified sparrow	0.7	2
Short-eared owl	0.7	2
Savannah sparrow	0.7	2
Ruby-crowned kinglet	0.7	2
Rock dove (N)	0.7	2
Vesper sparrow	0.7	2
White-throated swift	0.7	2
Golden-crowned sparrow	0.7	2
Red-breasted nuthatch	0.7	2
Great blue heron	0.7	2
Red-winged blackbird	0.4	1
Black-billed magpie	0.4	1
Ferruginous hawk	0.4	1
Grasshopper sparrow	0.4	1
American pipit	0.4	1
Mallard	0.4	1
Swainson's thrush	0.4	1
Swainson's hawk	0.4	1
Spotted towhee	0.4	1
Northern flicker	0.4	1
Lewis's woodpecker	0.4	1
Macgillivray's warbler	0.4	1
House finch	0.4	1
Rough-legged hawk	0.4	1
Virginia rail	0.4	1
Total (39 species identified) (34 native identified, 5 non-native)	**100.0**	**287**

Johnson *et al*., 2003; Young *et al*., 2002; Erickson *et al*., 2000; Erickson *et al*., 2001; Erickson *et al*., 2003; Erickson *et al*., 2004.

N = Non-native species

Table 13. Estimated raptor nest densities from other regional proposed and existing wind projects that are located primarily in arid environments*.

	Raptor Nest Density (#/mi^2), rounded							
		Buteos						
Project Site	All Raptors Combined	SWHA	RTHA	FEHA	GOEA	PRFA	GHOW	SSHA
Leaning Juniper I and II, OR	0.41	0.18	0.16	0.03	0.00	0.02	0.02	0.00
Klondike I and II, OR	0.16 (5 mile radius survey area)	0.04	0.08	0.00	0.00	0.00	0.04	0.00
Klondike III, OR	0.27	0.04	0.20	0.00	0.00	0.00	0.03	0.00
Stateline OR/WA	0.21	0.03	0.08	0.03	0.00	0.00	0.07	0.00
Condon, OR	0.06 (10 mile radius survey area		0.40					
Nine Canyon, WA	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zintel Canyon, WA	0.08	0.04	0.02	0.02	0.00	0.00	0.00	0.00
Buffalo Ridge, MN	0.15	0.07	0.06	0.01	0.00	0.00	0.02	0.00
Klickitat County, WA	0.12	0.00	0.09	0.00	0.00	0.01	0.03	0.00
Combine Hills, OR	0.24	0.06	0.11	0.01	0.00	0.00	0.00	0.00
Columbia Hills, WA	0.30	0.04	0.18	0.00	0.02	0.02	0.02	0.02
Ponnequin, CO	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Hopkins Ridge, WA	0.43	0.01	0.27	0.01	0.00	0.00	0.08	0.00
Maiden, WA	0.18	0.05	0.04	0.03	0.00	0.03	0.02	0.00
Wild Horse, WA	0.16	0.00	0.12	0.00	0.00	0.02	0.02	0.00
Kittitas Valley, WA	0.09		0.09					
AVERAGE of Other Projects (excluding Leaning Juniper)	0.16							

*Arid environments with extensive dryland wheat, non-native grassland (CRP), and native grassland. Narrow riparian corridors in some drainages.

SWHA = Swainson's hawk
RTHA = Red-tailed Hawk
FEHA = Ferruginous hawk
GOEA = Golden Eagle
PRFA = Prairie Falcon
GHOW = Great-horned Owl
SSHA = Sharp-shinned Hawk

Table 14. Avian species observed within 800 m of observer and estimated mean use for the plots surveyed for the Leaning Juniper Project site.

Species	Plots					
	A	B	C	D	E	F
ring-billed gull	0.000	0.000	0.102	0.143	0.000	0.000
unidentified gull	0.000	0.000	1.327	0.020	0.000	0.854
Canada goose	0.469	7.184	0.000	0.000	0.000	0.000
long-billed curlew	0.000	0.102	0.592	0.082	0.531	0.021
sharp-shinned hawk	0.000	0.000	0.020	0.000	0.000	0.042
unidentified accipiter	N/A	N/A	N/A	N/A	N/A	N/A
Swainson's hawk	0.184	0.061	0.327	0.082	0.122	0.042
ferruginous hawk	0.041	0.041	0.082	0.143	0.000	0.000
red-tailed hawk	0.020	0.061	0.000	0.061	0.102	0.271
rough-legged hawk	0.000	0.082	0.020	0.000	0.000	0.021
unidentified buteo	0.000	0.000	0.000	0.020	0.020	0.000
northern harrier	0.082	0.000	0.020	0.000	0.041	0.042
golden eagle	0.000	0.000	0.041	0.061	0.020	0.021
American kestrel	0.122	0.020	0.061	0.184	0.041	0.146
merlin	0.020	0.000	0.000	0.000	0.000	0.000
prairie falcon	0.000	0.000	0.020	0.000	0.000	0.021
unidentified falcon	0.000	0.020	0.000	0.000	0.000	0.000
burrowing owl	0.000	0.000	0.000	0.000	0.000	0.104
short-eared owl	0.000	0.061	0.000	0.000	0.000	0.000
osprey	0.000	0.041	0.000	0.000	0.000	0.000
unidentified raptor	0.000	0.000	0.000	0.000	0.020	0.000
turkey vulture	0.041	0.000	0.000	0.000	0.000	0.000
American crow	0.000	0.000	0.000	0.000	0.041	0.000
American goldfinch	0.347	0.000	0.122	0.000	0.000	0.188
American pipit	0.204	0.327	0.000	0.061	0.000	0.000
American robin	0.000	0.000	0.000	0.000	0.000	0.021
barn swallow	0.041	0.000	0.000	0.122	0.000	0.000
black-billed magpie	0.000	0.000	0.000	0.000	0.041	0.146
cliff swallow	0.000	0.000	0.000	0.000	0.020	0.000
common raven	2.408	1.102	5.224	6.837	6.367	1.688
dark-eyed junco	0.000	0.000	0.000	0.020	0.000	0.000
European starling	0.000	3.061	1.469	0.000	1.327	0.000
grasshopper sparrow	0.000	0.000	0.020	0.000	0.000	0.000
horned lark	14.347	13.673	4.041	24.714	4.286	4.563
lark sparrow	0.000	0.020	0.000	0.000	0.000	0.000
mountain bluebird	0.000	0.000	0.000	0.041	0.000	0.083
mourning dove	0.000	0.000	0.000	0.000	0.000	0.021
northern shrike	0.000	0.000	0.000	0.000	0.000	0.042
savannah sparrow	0.000	0.000	0.020	0.000	0.020	0.000
unidentified passerine	1.735	16.265	1.082	3.939	2.612	0.167
unidentified sparrow	0.020	0.000	0.061	0.000	0.000	0.000
western kingbird	0.020	0.000	0.020	0.000	0.000	0.042
western meadowlark	0.347	0.286	0.796	0.388	1.122	0.875
white-crowned sparrow	0.000	0.000	0.020	0.000	0.592	0.063
yellow-rumped warbler	0.041	0.000	0.000	0.000	0.000	0.000
ring-necked pheasant	0.000	0.020	0.000	0.000	0.000	0.021
northern flicker	0.000	0.000	0.000	0.000	0.000	0.021
unidentified hummingbird	0.000	0.000	0.000	0.000	0.020	0.000
unidentified woodpecker	0.000	0.000	0.000	0.020	0.000	0.000

Table 15. Bat mortality estimates at existing wind projects in the Pacific Northwest.

Wind Project	# bat fatalities found*	Mortality estimate	Upper and lower range of estimated fatalities	Mean # bats per turbine per year	Number of bat fatalities per MW per year	Upper and lower range of bats per turbine per year
Stateline I and II	150	447	335-539	1.12	1.7	0.84 – 1.35
Nine Canyon I	27	119	63-199	3.21	2.5	1.71-5.37
Vansycle	10	28	10-59	0.74	1.1	0.26-1.56
Klondike I	6	19	7-40	1.16	0.8	0.41-2.12
Mean				**1.2** (weighted average)**	**1.7 per MW per yr.**	**0.81-2.60**

* = found during formal fatality monitoring study conducted for one year or for 2.5 years (Stateline)

** = weighted for the number of turbines studied (NWCC, 2004)

Appendices

APPENDIX A

Biological Resources Study Protocol—Outline
Leaning Juniper Wind Power Project
Arlington, Oregon
January 5, 2005

This outline summarizes the biological resources study components for PPM Energy's proposed Leaning Juniper Wind Power Project located in Gilliam and Morrow Counties, Oregon. This draft was prepared for review by CH2M HILL and PPM Energy. The project site description and facility layout are described in previous documents. This outline lists the primary study components to address potential impacts to special status wildlife species and habitat types of concern. Also Included below are the time periods in which the task was completed.

1. **Information Review -** 2003 and fall and winter seasons 2004-2005
   Identify sources of information for pre-field review. Review agency databases for records of special status species. Request species list from U.S. Fish and Wildlife Service and Oregon Natural Heritage Information Center. Consult with avian and mammal specialists.

2. **Site Reconnaissance** – 2003 and fall season 2004
   Review proposed project area for site-specific study needs, habitat types and potential areas of concern. Establish six avian study plot locations. Provide site tour to ODFW and USFWS wildlife biologists.

3. **Prepare Base Map and Classify Vegetation** – Fall 2004 and update, if needed, in spring of 2004.
   Habitat mapping will be conducted by a wildlife biologist with extensive experience in conducting wildlife studies in Morrow and Gilliam Counties. Cover type descriptions will include dominant and co-dominant plant species as determined by ocular assessment. Basalt outcroppings and cliffs will be mapped. Individual juniper trees with high potential for raptor nesting will be mapped.

4. **Threatened, Endangered, and Sensitive Wildlife Species** (TES) (includes all bird species) – Fall 2004 through Spring 2005

   - No studies needed for fish due to lack of habitat within construction zones.

   - *Ground Based Spring Season Surveys:*

     The walking transect survey method will be used during the month of March to locate Washington ground squirrels. Two surveys will be conducted in suitable habitat within project construction zones and a buffer. The first survey is conducted within 1,000 feet (30Leaning Juniper meters) of all sides of the centerline of turbine strings, new or improved roads and other ground disturbing activities. The second survey will be conducted in the same buffer but if there are areas determined to be unsuitable for the species, these areas will be noted and not surveyed.

     Beginning in mid-April and ending in mid- May, additional sensitive species surveys may be conducted as determined in consultation with Oregon

Department of Wildlife. Target species during this time period are anticipated to be: grasshopper sparrow, long-billed curlew, burrowing owl, loggerhead shrike, and sagebrush lizard. Two surveys will be conducted in suitable habitat within 400 feet of the project facility centerline. Transects during both March and April to mid-May surveys will be walked by experienced biologists and technicians during sunrise and 1:00 pm, approximately 50 to 60 meters (164 to 213 feet) apart. When suitable habitat for reptiles is found, surveyors will walk tighter transects and meander for a longer duration at the suitable location. All wildlife observed will be recorded. All special status species locations will be plotted and notes recorded on nesting / denning, if determined.

No surveys for bats or night spot-lighting for white-tailed jackrabbits are proposed at this time (jackrabbits are surveyed for during the diurnal spring season multi-species walking transects).

- *Avian Use* – Study plots located during #2 above. Conducted weekly for three seasons, 20 minutes each survey. Fall season surveys are August 27, 2004 through November 30, 2004. Winter season is December 1, 2004 through March 1, 2005. Spring season is March 16, 2005 through May 31, 2005. Surveys will be conducted weekly. In-transit (between plots) observations of special status species will be recorded

- *Raptor Nests* – One aerial survey will be conducted during spring 2005 in mid- to late May). Area covered is a two-mile buffer of the turbine strings. Areas excluded are residential and business areas and the active landfill. A pilot experienced in piloting a helicopter for raptor nest surveys and an experienced wildlife biologist will be involved in this task.

- *Bat Species* – Potential bat species occurring within the project area will be determined by conducting an extensive review of the literature and local study results (if any) and by conducting interviews with regional bat specialists. A table will be prepared and will include all species with potential for occurrence, their suitable habitat types and any survey data for the species which would be relative to the project site.

Data Analysis

Data Compilation and Storage

A database will be established to store, retrieve, and organize field observations. Data from field forms will be keyed into electronic data files using a pre-defined format that should make subsequent data analysis straightforward. All field data forms, field notebooks, and electronic data files will be retained for ready reference.

Quality Assurance/Quality Control (QA/QC)

QA/QC measures will be implemented at all stages of the field studies, including field data collection, data entry, data analysis, and report preparation. At the end of each survey day, each observer will be responsible for inspecting his or her data forms for completeness, accuracy, and legibility. Periodically, the study team leader will review data forms to ensure completeness and legibility; any problems detected will be corrected. Any changes made to the data forms will be initialed and dated by the person making the change.

For the avian use surveys data will be entered into a relational database (e.g., ACCESS) and checked thoroughly for data entry errors. Any errors will be corrected by referencing the raw data forms and/or consulting with the observer(s) who collected the data. Any irregular codes detected, or any data suspected as questionable, will be discussed with the observer and study team leader. Any changes made to the raw data will be documented for future reference.

Statistical Analysis and Products

Statistics and data to be generated for the project areas may include the following:

- Vegetation/habitat mapping and expanded legend of broad plant community types.
- Raptor nests by species, inactive nest sites and locations (map).
- Species lists by study period, season, and study unit (if applicable)
- Tabulation of nest timing, occupation, and success by raptors (table).
- Summaries of flight paths and heights, by species and season (maps and/or tables).
- Species and proportion of flights passing within the zone (including the rotor-swept area) potentially occupied by wind turbines (table).
- Behavior patterns by species, group, vegetation type, and/or land form (tables).
- Relative use by species, season, and observation point (tables and maps).
- Locations of threatened, endangered, and sensitive avian and mammal species and other species of concern (map).
- Detailed comparisons of avian use, raptor nest densities, and habitat composition between the project and other new or proposed wind projects in the nearby region, if available.

The number of raptors and other species seen during each point count survey will be standardized to a unit area and unit time searched. For example, if 4 raptors are seen during the 20 minutes at a point with a viewing area of 2.01 km^2, these data may be standardized to 4/2.01 = 1.99 raptors/km^2 in a 20-minute survey. For instantaneous counts, the number of birds seen will be standardized by area searched and to the number of instantaneous counts taken during the point count. For example, if at the same station, five instantaneous counts are taken during a 20-minute observation period, and two raptors were present during the second instantaneous count, and one was present during the third instantaneous count, data may be standardized to ((2+1)/Leaning Juniper)/2.01 km^2= 0.30 raptors/km^2 per instantaneous count.

Instantaneous and continuous point count data will be plotted to illustrate differences in raptor and other bird use between: (1) seasons, (2) times of day, and (3) plots. Mean values and 90% confidence intervals will be reported.

A relative index to collision risk (R) will be calculated for bird species observed in the project area during the point counts using the following formula: $R = A*P_f*P_t$

Where A = mean use for species *i* averaged across all surveys, P_f = proportion of all observations of species *i* where activity was recorded as flying (an index to the approximate percentage of time species *i* spends flying during the daylight period), and P_t = proportion of all flight height observations of species *i* within the rotor-swept height (RSH). This index does not account for differences in behavior other than flight characteristics (i.e., flight heights and proportion of time spent flying).

6. Draft and Final Report

A draft and final report will be prepared. The report may also include a proposed mitigation and monitoring plan, revegetation plan, a wildlife protection plan (reporting of incidentally discovered bird and bat fatalities and a response plan for potential injured animals).

Appendix B-1
ORNHIC Response

April 30, 2003

Karen Kronner
Northwest Wildlife Consultants
815 NW 4th Street
Pendleton, OR 97801

Dear Ms. Kronner:

Thank you for requesting information from the Oregon Natural Heritage Information Center (ORNHIC). We have conducted a data system search for rare, threatened and endangered plant and animal records for your project area in Townships 1 and 2 North, Ranges 20 and 21 East, W.M.

Five (5) records were noted within your project area, and are included on the enclosed computer printout. A key to the fields is also included.

Please remember that the lack of rare element information from a given area does not mean that there are no significant elements there, only that there is no information known to us from the site. To assure that there are no important elements present, you should inventory the site, at the appropriate season.

Please note that at this time ORNHIC does not have comprehensive computerized records available for all anadromous fish in Oregon. For more information on anadromous fish you may wish to contact NMFS at: 525 NE Oregon Street; Portland, Oregon 97232-2737. Please also note that the U.S. Fish and Wildlife Service now has jurisdiction over coastal cutthroat trout.

This data is confidential and for the specific purposes of your project and is not to be distributed.

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

Sincerely,

Cliff Alton
Conservation Information Assistant

encl.: invoice (H-043003-CWA1)
        computer printout and data key

Appendix B-2

USFWS Gilliam County List

Enclosure A

FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, CANDIDATE SPECIES AND SPECIES OF CONCERN THAT MAY OCCUR IN GILLIAM COUNTY

LISTED SPECIES[1/]

Birds		
Bald eagle[2/]	*Haliaeetus leucocephalus*	T
Fish		
Steelhead (Middle Columbia River)[3/]	*Oncorhynchus mykiss*	**T
Steelhead (Upper Columbia River)[4/]	*Oncorhynchus mykiss*	** E
Steelhead (Snake River Basin)[4/]	*Oncorhynchus mykiss*	** T
Sockeye salmon	*Oncorhynchus nerka*	CH **E
Salmon River tributary to the Snake River, Idaho.		
Chinook salmon (Upper Columbia River)[5/]	*Oncorhynchus tshawytscha*	** E
Chinook salmon	*Oncorhynchus tshawytscha*	CH **T
Snake River spring/summer runs		
Chinook salmon	*Oncorhynchus tshawytscha*	CH **T
Snake River fall runs		

PROPOSED SPECIES

None

CANDIDATE SPECIES

Mammals	
Washington ground squirrel[6/]	*Spermophilus washingtoni*
Birds	
Yellow-billed cuckoo[7/]	*Coccyzus americanus*
Plants	
Northern wormwood	*Artemisia campestris* ssp. *wormskioldii*

SPECIES OF CONCERN

Mammals	
Pale western big-eared bat	*Corynorhinus townsendii pallescens*
Spotted bat	*Euderma maculatum*
Silver-haired bat	*Lasionycteris noctivagans*
Small-footed myotis (bat)	*Myotis ciliolabrum*
Long-eared myotis (bat)	*Myotis evotis*
Fringed myotis	*Myotis thysanodes*
Long-legged myotis (bat)	*Myotis volans*
Yuma myotis (bat)	*Myotis yumanensis*
California bighorn sheep	*Ovis canadensis californiana*
Birds	
Western burrowing owl	*Athene cunicularia hypugea*
Ferruginous hawk	*Buteo regalis*
Willow flycatcher	*Empidonax traillii adastus*

Yellow-breasted chat	*Icteria virens*
Lewis' woodpecker	*Melanerpes lewis*
Mountain quail	*Oreortyx pictus*
<u>Amphibians and Reptiles</u>	
Northern sagebrush lizard	*Sceloporus graciosus graciosus*
<u>Fish</u>	
Pacific lamprey	*Lampetra tridentata*
Interior redband trout	*Oncorhynchus mykiss gibbsi*
<u>Plants</u>	
Robinson's onion	*Allium robinsonii*
Laurence's milk-vetch	*Astragalus collinus* var. *laurentii*
Disappearing monkey flower	*Mimulus evanescens*
Little mousetail	*Myosurus minimus* ssp. *apus* var. *sessiliflorus*

(E) - Listed Endangered — *(T) - Listed Threatened* — *(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered — *(PT) - Proposed Threatened* — *(PCH) - Critical Habitat has been proposed for this species*
(S) - Suspected — *(D) - Documented*

Species of Concern - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

** *Consultation with National Marine Fisheries Service may be required.*

1/ *U. S. Department of Interior, Fish and Wildlife Service, October 31, 2000, <u>Endangered and Threatened Wildlife and Plants</u>, 50 CFR 17.11 and 17.12*
2/ *Federal Register Vol. 60, No. 133, July 12, 1995 - Final Rule - Bald Eagle*
3/ *Federal Register Vol. 64, No. 57, March 25, 1999, Final Rule - Middle Columbia and Upper Willamette River Steelhead*
4/ *Federal Register Vol. 62, No. 159, August 18, 1997, Final Rule-Upper Columbia and Snake River Steelhead*
5/ *Federal Register Vol. 64, No. 56, March 24, 1999, Final Rule - West Coast Chinook Salmon*
6/ *Federal Register Vol. 69, No. 86, May 4, 2004, Notice of Review - Candidate or Proposed Animals and Plants*
7/ *Federal Register Vol. 66, No. 143, July 25, 2001, 12-Month Finding for a Petition To List the Yellow-billed Cuckoo*

Appendix B-3
ODFW CUP Process
Recommendations

January 19, 2005

Gilliam County Planning Department
Brent Lake, Acting Planning Director
PO Box 427
Condon, OR 97823

RE: CUP 2004-05

Dear Brent:

This letter is in reference to the Application for Conditional Use Permit for the 103.5 MW wind energy project (CUP 2004-05) to be considered on January 20, 2005. I have reviewed the application materials for the CUP prepared by PPM Energy. In addition the Oregon Department of Fish and Wildlife has conducted one field visit to the proposed site with the applicant and we have had one follow up phone conversation with the applicant regarding the proposed wind farm and protection of wildlife resources.

It is the policy of the Oregon Department of Fish and Wildlife that wildlife are managed to prevent serious depletion of indigenous species and to provide optimum recreational and aesthetic benefits for present and future generations of the citizens of this state. To that end, I would like to offer the following comments and recommendations regarding wildlife and the proposed wind farm.

Comment 1: Environmental reviews (particularly wildlife surveys) are not completed at the time of this consideration. Pre-construction wildlife surveys provide the Department the ability to assess a project's biological impacts. While it is always preferable to have completed wildlife surveys before a project is approved, the Department understands that this is not always possible. In the application materials supplied by PPM it states that the surveys will be conducted this spring and summer before construction will begin.

Recommendation: The Department would recommend that as a condition of approval that pre-construction surveys will be completed as referenced and discussed and that construction in potential sensitive areas is not started without consultation with ODFW until all appropriate wildlife surveys are completed.

Comment 2: The application does not address many proposed protection measures if threatened, endangered, or other species of concern are found during the pre-construction surveys. In Section K of the permit it requests "Information pertaining to the impacts of the Wind Power Generating Facility on… (2) Wildlife (all potential species of reasonable concern)… and proposed actions, if any, to avoid, minimize or mitigate negative impacts."

However, I am not aware of what all of the proposed actions or mitigation efforts might be, and if they are adequate to protect native wildlife. In the event that these species are present, there are a number of options the Applicant can utilize. For the majority of the previously permitted wind power projects in the Columbia Basin, the Department has utilized the ODF&W Habitat Mitigation Policy as a basis for making recommendations to the developers in order to protect wildlife habitat and species.

Recommendation: In order to protect threatened, endangered, and sensitive wildlife species should they be found to occur within the project area, the Department recommends that the applicant, as a condition of approval, should comply with requirements of appropriate agencies with jurisdiction relative to these species and any mitigation efforts deemed necessary and reasonable.

Comment 3: The CUP requires that PPM provides an avian impact monitoring plan as part of the proposal. In their application PPM states that they intend to plan for and complete a 1-year post-construction avian and bat mortality study of the project.

Recommendation: In order to better understand the long-term effects of the wind farm development the Department would also like to have PPM as a condition of approval conduct some additional post-construction monitoring. The Department would recommend monitoring of all known raptor nest sites in the project area for the life of the project. The Department would also request permission to conduct wildlife surveys on the project area that might help the Department better understand the long-term effects of the wind farm on the native wildlife. The Department understands that the landowner of the project area must agree to these conditions before they could be implemented as part of the Conditional Use Permit.

In summary I would like to make it clear that I am not expressing either opposition or support for this project. I am simply trying to convey that I have some concerns that I would like to see addressed as part of the CUP requirements.

Thank you for the opportunity to provide comments on this proposal. Please feel free to call me if you have any questions on my recommendations. I will also make every attempt to be present at your hearing on January 20 so I can answer any questions or provide further information.

Respectfully,

Steve Cherry
Assistant District Wildlife Biologist

Appendix C

Special Status Wildlife Species of Known or Potential Occurrence in the Leaning Juniper Wind Project Area

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near the Leaning Juniper Project D = Documented N = Not Documented
Mammals (see Appendix D-3 for bats)			
Washington ground squirrel *Spermophilus washingtoni*	C Priority List 2	E	**D** – Historic records nearby. Suitable habitat found intermittently onsite in some areas of deep soil bunchgrass and sagebrush.
White-tailed jackrabbit *Lepus townsendii*	–	SU	**D** Recorded in the area, infrequently observed. Observed 1-2 miles south of project area in 2001 (Kronner, personal field notes).
Birds			
Greater sandhill crane *Grus canadensis tabida*	-	SV	**N** – not observed. May occur as migrant during migration seasons.
Long-billed curlew *Numenius americanus*	-	SV	**D** – Known to occur in the general area. Nests in grassland flats and plateaus. Considered “Highly Imperiled” (U.S. and Canadian shorebird conservation plans) due to declines throughout its geographic range.
Bald eagle *Haliaeetus leucocephalus*	T EPA	T	**N** - May occasionally occur during winter months. Wintering population in the Columbia Basin, primarily along watercourses. Known to hunt uplands for carrion and small mammals. Nearest known nest is ~47 miles from the project. No suitable nest structure near project area. None observed during onsite point counts. One observed during winter at the proposed 4.5 MW Mar-Lu Wind Project (NWC 2004). None recorded during a one-year avian study at Shepherd’s Ridge (ENW 2003).
Golden eagle *Aquila chrysaetos*	EPA BoCC	-	**D** – Observed infrequently during avian use study. A few nests are present within the general area. One long-term historic nest is located within 5.5 miles east of the project and was active in 2005 (Kronner, personal field notes 2005). Another historic nest is located ~5 miles NW of project site.
American peregrine falcon *Falco peregrinus anatum*	NW BoCC	E	**N** - Has been seen in Arlington area (Morgan pers. com 2004). Basalt cliffs along Columbia River within 7 miles are potentially suitable for nesting. Historic nest sites are present within 7 to 30 miles of the project. The nearest known active next in 2005 was located within 11 miles .
Ferruginous hawk *Buteo regalis*	SoC BoCC	SC FS	**D** – Nest structures on site. In 2005 one active nest within the project boundary and one active nest southeast of project. Nests are 2,775 feet and 3,881 feet from the nearest Phase I turbines 78 and 116.
Swainson’s hawk *Buteo swainsoni*	BoCC	SV	**D** – Nests onsite in junipers or isolated deciduous trees.
Western burrowing owl *Athene cunicularia*	SoC BoCC	SC	**D** - One observed onsite on October 21, 2004. In spring 2005 one potential nest site was confirmed abandoned and one nest site was confirmed active near Phase I turbine #120.

Common Name and Scientific Name	Federal Status	ODFW Status*	Occurrence Within or Near the Leaning Juniper Project D = Documented N = Not Documented
Loggerhead shrike *Lanius ludovicianus*	BoCC	SV	**D** -Suitable nesting habitat present – sagebrush and junipers. Observed during in-transit travel in sagebrush and junipers. Not typically found in the Columbia Basin in winter. Observed along Hwy. 19 ~8.5 miles south of Arlington in December 1999 (Kronner, personal field notes)
Sage sparrow *Amphispiza belli*	BoCC	SC FS	**N -** May occur during migration. Shrub habitat onsite very limited and likely not extensive to support breeding populations. Likely breeds at Boardman Conservation Area several miles east
Grasshopper sparrow *Ammodramus savannarum*	–	SV FS	**D** – Some grasslands with good vertical structure for cover and perching.
Reptiles and Amphibians			
Northern sagebrush lizard *Sceloparus graciosus graciosus*	SoC	SV	**N** - Suitable habitat exists on the site in native habitat where there is less dense grass cover; also found in sandy soils with sagebrush and juniper/sagebrush and sand dunes.
Western toad *Bufo boreus*	-	SV	**N** – No aquatic habitat, very limited potential for upland movements during wet periods. May be found around homes or Landfill Office where woody cover and/or ponds and domestic livestock watering sites may be present.

* Obtained from Oregon Natural Heritage Information Center Web Site on January 2005

Federal:

T	Threatened	SoC	Species of Concern
E	Endangered	NW	Not Warranted**;** delisted
C	Candidate	EPA	Eagle Protection Act

BoCC USFWS Birds of Conservation Concern (BCR 9, Great Basin)

Priority List 2 – Priorities for listing review are assigned to Candidate Species (USFWS 2004)

Note: All migratory birds are protected by the Migratory Bird Treat Act (MBTA).

Oregon:

T	Threatened
E	Endangered
C	Candidate
SV	Sensitive Vulnerable; listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring.
SC	Critical; listing as threatened or endangered is pending or may be appropriate if immediate conservation actions are not taken.
SU	Undetermined; status is unclear, may be susceptible to population decline of sufficient magnitude that the species could qualify for endangered, threatened, critical or vulnerable status. Additional information is required before a determination can be made.
SP	Peripheral or naturally rare; low population due to naturally limiting factors; maintaining status quo for habitats and populations is minimum requirement.
FS	Focal Species highlighted in the Draft John Day Subbasin Plan (CBMRCD/NWPPC 2004)

Appendix D-1. Comprehensive species list from avian use surveys conducted August 27, 2004 through August 15, 2005 for the Leaning Juniper Wind Project.

COMMON NAME (listed alphabetically)	SCIENTIFIC NAME	GROUP
American crow	*Corvus brachyrhynchos*	Passerines
American goldfinch	*Carduelis tristis*	Passerines
American kestrel	*Falco sparverius*	Raptors/Vultures
American pipit	*Anthus spinoletta*	Passerines
American robin	*Turdus migratorius*	Passerine
Barn swallow	*Hirundo rustica*	Passerines
Black-billed magpie	*Pica pica*	Passerines
Burrowing owl	*Athene cunicularia*	Raptors/Vultures
Canada goose	*Branta Canadensis*	Waterfowl
Cliff swallow	*Petrochelidon pyrrhonota*	Passerines
Common raven	*Corvus corax*	Passerines
Dark-eyed junco	*Junco hyemalis*	Passerines
European starling	*Sturnus vulgaris*	Passerines
Ferruginous Hawk	*Buteo regalis*	Raptors/Vultures
Golden eagle	*Aquila chrysaetos*	Raptors/Vultures
Grasshopper sparrow	*Ammodramus savannarum*	Passerines
Horned lark	*Eremophila alpestris*	Passerines
Lark sparrow	*Chondestes grammacus*	Passerines
Long-billed curlew	*Numenius americanus*	Shorebirds
Merlin	*Falco columbarius*	Raptors/Vultures
Mountain bluebird	*Sialia currucoides*	Passerines
Mourning dove	*Zenaida macroura*	Doves/Pigeons
Northern flicker	*Colaptes auratus*	Passerines
Northern harrier	*Circus cyaneus*	Raptors/Vultures
Osprey	*Pandion haliaetus*	Raptors/ Vultures
Prairie falcon	*Falco mexicanus*	Raptors/Vultures
Red-tailed hawk	*Buteo jamaicensis*	Raptors/Vultures
Ring-billed gull	*Larus delewarensis*	Waterbirds
Ring-necked pheasant	*Phasianus colchicus*	Gamebirds
Rough-legged hawk	*Buteo lagopus*	Raptors/Vultures
Savannah sparrow	*Passerculus sandwichensis*	Passerines
Sharp-shinned hawk	*Accipter striatus*	Raptors/Vultures
Short-eared owl	*Asio flammeus*	Raptors/Vultures
Swainson's hawk	*Buteo swainsoni*	Raptors/Vultures
Turkey vulture	*Cathartes aura*	Raptors/Vultures
Unidentified accipiter		Raptors/Vultures
Unidentified buteo		Raptors/Vultures
Unidentified falcon		Raptors/Vultures
Unidentified gull		Waterbirds
Unidentified passerine		Passerines
Unidentified raptor		Raptors/Vultures
Unidentified sparrow		Passerines
Unidentified woodpecker		Passerines
Western kingbird	*Tyrannus verticalis*	Passerines
Western meadowlark	*Sturnella neglecta*	Passerines
White-crowned sparrow	*Zonotrichia leucophrys*	Passerines
Yellow-rumped warbler	*Dendroica coronata*	Passerines

Note: includes all species at all distances

Appendix D-2. Number of avian groups and individuals by species observed during the avian studies associated with the Leaning Juniper Project site.

Species	Fall		Winter		Spring		Summer		Overall	
	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.
Waterbirds/Waterfowl	**3**	**330**	**10**	**420**	**19**	**1750**	**3**	**57**	**35**	**2557**
ring-billed gull	0	0	0	0	2	12	0	0	2	12
unidentified gull	0	0	0	0	17	1738	3	57	20	1795
Canada goose	3	330	10	420	0	0	0	0	13	750
Shorebirds										
long-billed curlew	0	0	0	0	52	63	6	8	58	71
Raptors/Vultures	**45**	**50**	**41**	**44**	**70**	**126**	**105**	**130**	**261**	**350**
Accipiters	*2*	*2*	*1*	*1*	*1*	*1*	*0*	*0*	*4*	*4*
sharp-shinned hawk	2	2	1	1	0	0	0	0	3	3
unidentified accipiter	0	0	0	0	1	1	0	0	1	1
Buteos	*16*	*18*	*30*	*33*	*58*	*114*	*87*	*107*	*191*	*272*
Swainson's hawk	2	2	0	0	11	13	42	53	55	68
ferruginous hawk	1	3	1	1	12	12	8	8	22	24
red-tailed hawk	4	4	17	20	22	23	19	21	62	68
rough-legged hawk	4	4	4	4	2	2	0	0	10	10
unidentified buteo	5	5	8	8	11	64	18	25	42	102
Northern Harriers										
northern harrier	3	3	2	2	3	3	4	4	12	12
Eagles										
golden eagle	4	4	4	4	3	3	0	0	11	11
Falcons	*16*	*18*	*4*	*4*	*3*	*3*	*9*	*10*	*32*	*35*
American kestrel	15	17	2	2	2	2	8	9	27	30
merlin	0	0	0	0	1	1	0	0	1	1
prairie falcon	1	1	2	2	0	0	0	0	3	3
unidentified falcon	0	0	0	0	0	0	1	1	1	1

Appendix D-2. ***Continued*** Number of avian groups and individuals by species observed during the avian studies associated with the Leaning Juniper Project site.

Species	Fall		Winter		Spring		Summer		Overall	
	# groups	**# obs.**	**# groups**	**# obs.**	**# groups**	**# obs.**	**# groups**	**# obs.**	**# groups**	**# obs.**
Owls	*2*	*3*	*0*	*0*	*0*	*0*	*3*	*5*	*5*	*8*
burrowing owl	0	0	0	0	0	0	3	5	3	5
Short-eared owl	2	3	0	0	0	0	0	0	2	3
Other Raptors	*0*	*0*	*0*	*0*	*2*	*2*	*2*	*4*	*4*	*6*
osprey	0	0	0	0	0	0	1	2	1	2
unidentified raptor	0	0	0	0	2	2	1	2	3	4
Vultures										
turkey vulture	2	2	0	0	0	0	0	0	2	2
Passerines	**267**	**1543**	**390**	**4503**	**339**	**740**	**165**	**534**	**1161**	**7320**
American crow	1	1	0	0	1	1	0	0	2	2
American goldfinch	2	6	4	26	0	0	0	0	6	32
American pipit	4	12	2	8	2	9	0	0	8	29
American robin	0	0	1	1	0	0	0	0	1	1
barn swallow	1	5	0	0	2	3	0	0	3	8
black-billed magpie	2	4	3	3	0	0	4	5	9	12
cliff swallow	0	0	0	0	0	0	1	1	1	1
common raven	54	350	149	1082	84	284	45	240	332	1956
dark-eyed junco	1	1	0	0	0	0	0	0	1	1
European starling	2	75	4	385	4	82	0	0	10	542
grasshopper sparrow	0	0	0	0	1	1	0	0	1	1
horned lark	158	736	176	1966	162	253	91	256	587	3211
lark sparrow	0	0	1	1	0	0	0	0	1	1
mountain bluebird	0	0	3	6	0	0	0	0	3	6
mourning dove	0	0	0	0	0	0	1	1	1	1
northern shrike	0	0	2	2	0	0	0	0	2	2
savannah sparrow	0	0	0	0	2	2	0	0	2	2
unidentified passerine	21	283	17	992	0	0	4	8	42	1283
unidentified sparrow	2	4	0	0	0	0	0	0	2	4
western kingbird	0	0	0	0	3	3	1	1	4	4
western meadowlark	16	32	28	31	77	101	18	22	139	186

Appendix D-2. ***Continued*** Number of avian groups and individuals by species observed during the avian studies associated with the Leaning Juniper Project site.

Species	Fall		Winter		Spring		Summer		Overall	
	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.
white-crowned sparrow	2	32	0	0	1	1	0	0	3	33
yellow-rumped warbler	1	2	0	0	0	0	0	0	1	2
Upland Gamebirds										
ring-necked pheasant	0	0	0	0	2	2	0	0	2	2
Other Birds	**2**	**2**	**0**	**0**	**0**	**0**	**1**	**1**	**3**	**3**
northern flicker	1	1	0	0	0	0	0	0	1	1
unidentified hummingbird	0	0	0	0	0	0	1	1	1	1
unidentified woodpecker	1	1	0	0	0	0	0	0	1	1
Total	**317**	**1925**	**441**	**4967**	**482**	**2681**	**280**	**730**	**1520**	**10303**

Appendix D-3. Comprehensive vertebrate wildlife species list of species observed during the spring season during ground-based wildlife surveys and other field investigations (March 3, 2005 through July 10, 2005)

Common Name (listed in alphabetic order)	
Birds	
American kestrel	Prairie falcon
American pipet	Red-tailed hawk
American robin	Red-winged blackbird
Black-billed magpie	Ring-necked pheasant
Burrowing owl*	Rock wren
California quail	Ring-billed gull
Canada goose (flyover)	Ruby-crowned kinglet
Cedar waxwing	Sage thrasher**
Chukar (N)	Savannah sparrow
Common raven	Sharp-shinned hawk
Dark-eyed junco	Short-eared owl
European starling (N)	Spotted towhee
Ferruginous hawk*	Swainson's hawk*
Golden-crowned kinglet	Townsend's solitaire
Golden-crowned sparrow	Varied thrush
Golden eagle	White-crowned sparrow
Grasshopper sparrow	Western kingbird
House finch	Western meadowlark
Horned lark	
Killdeer	**Mammals**
Lark sparrow	Badger
Lapland longspur	Cottontail rabbit (? Sp., likely Mountain)
Loggerhead shrike*	Coyote
Long-billed curlew*	Mule deer
Long-eared owl	Northern pocket gopher
Merlin	Ord's Kangaroo Rat
Mountain bluebird	Porcupine
Mourning dove	Washington ground squirrels
Northern flicker	Bushy-tailed Woodrat
Northern shrike	Yellow-bellied marmot
Northern harrier	Pronghorn antelope
Northern rough-winged swallow	
	Reptiles
	Bull snake
Total:	
50 Avian Species, 11 Mammals (or sign), 1 Reptile	

* = State Sensitive Status
** = one detection only
N = Non-native
Scientific names available upon request

Appendix D-4 Species of bats that occur in eastern Oregon and their likelihood of occurring in the proposed Leaning Juniper Wind Project area.

Scientific and Common Name	Current Federal Status[1]	Current Oregon Status[2]	Oregon Natural Heritage Rank[3]	Docu-mented in Gilliam County?[4]	Documented in Adjacent Oregon[4] and Washington[5] Counties?	Primary Roost Sites[5]	Foraging Habitat[5]	Likelihood of Occurrence in Project Area[5]	Comments
Pallid bat *Antrozous pallidis*		SV	S2	Yes	Wheeler (OR), Klickitat (WA)	Rock crevices, tree hollows, mines, caves, buildings	Rocky deserts, grasslands; takes large insects, often from the ground	Moderate to high	The general habitat is correct; large crickets available as food; presence will depend on availability of deep rock crevices as other roost types are mostly lacking.
Townsend's big-eared bat *Corynorhinus townsendii* [sometimes the subspecies in this area is called pale western big-eared bat]	SoC	SC	S2	No	Wheeler (OR), Klickitat (WA)	Mines, caves, buildings	Edges along streams, areas adjacent to and within pinyon-juniper and pine forests, desert scrub, agricultural areas; probably a moth specialist	Low	Appropriate roost sites are mostly lacking; has not been recorded in Gilliam Co. (although not an easily detected species); questionable moth population on ridges. Closest known population in Klickitat County, WA,
Big brown bat *Eptesicus fuscus*	None	None	None	Yes	Morrow (OR), Wheeler (OR), Klickitat (WA)	Rock crevices, tree hollows, mines, caves, buildings	Wide variety including desert scrub, grasslands, forests, urban areas; perhaps a beetle specialist	Moderate to high	The general habitat is correct; presence will depend on availability of deep rock crevices as other roost types are mostly lacking.

Appendix D-4 ***Continued*** Species of bats that occur in eastern Oregon and their likelihood of occurring in the proposed Leaning Juniper Wind Project area.

Scientific and Common Name	Current Federal Status[1]	Current Oregon Status[2]	Oregon Natural Heritage Rank[3]	Docu-mented in Gilliam County?[4]	Documented in Adjacent Oregon[4] and Washington[5] Counties?	Primary Roost Sites[5]	Foraging Habitat[5]	Likelihood of Occurrence in Project Area[5]	Comments
Spotted bat *Euderma maculatum*	SoC		S2	Yes	Wheeler (OR)	Rock crevices in cliff faces	Riparian areas, meadows, old agricultural fields, forest openings	Low	This species has a very patchy distribution; it is hard to capture and many "sightings" are based on its audible echolocation signal. Although the area is close to Columbia River riparian areas, the cliff faces don't appear as massive as in areas where this species has been documented.
Hoary bat *Lasiurus cinereus*	None	None	S3	Yes	Wheeler (OR), Klickitat (WA)	Foliage of coniferous and deciduous trees	Riparian areas, grasslands, shrub-steppe, forest edges and openings, urban areas	Low in summer; high to moderate in fall during migration	Area lacks roost sites and species is much more common in forest habitats; no specimens have been collected from the Columbia Basin in summer. Likely to occur during fall migration (based on fatality records at four regional wind projects). Species was recorded during acoustical monitoring conducted at Blalock Canyon in early September 2005 (Kronner and Gritski, personal field notes)
Silver-haired bat *Lasionycteris noctivagans*	SoC	SU	S3S4	Yes	Morrow (OR), Wheeler (OR)	Tree cavities, under loose bark	Forested areas, riparian areas near forest	Low in summer; high to moderate in fall during migration	Area lacks tree roost sites. Likely to occur during fall migration (based on fatality records at four regional wind projects and pre-construction sampling conducted in July and September 2000 for the Condon Wind Project, Gilliam County, OR).

Appendix D-4 ***Continued*** Species of bats that occur in eastern Oregon and their likelihood of occurring in the proposed Leaning Juniper Wind Project area.

Scientific and Common Name	Current Federal Status[1]	Current Oregon Status[2]	Oregon Natural Heritage Rank[3]	Docu-mented in Gilliam County?[4]	Documented in Adjacent Oregon[4] and Washington[5] Counties?	Primary Roost Sites[5]	Foraging Habitat[5]	Likelihood of Occurrence in Project Area[5]	Comments
California myotis *Myotis californicus*	None	None	S3	Yes	Wheeler (OR), Klickitat (WA)	Rock crevices, under loose bark, tree cavities, buildings	Shrub-steppe, desert, arid grasslands, coniferous forest edges	Moderate to high	Habitat is correct for both foraging and roosting, although use of ridges is questionable. Species was recorded during acoustical monitoring conducted at Blalock Canyon in early September 2005 (Kronner and Gritski, personal field notes)
Western small-footed myotis *Myotis ciliolabrum*	SoC	SU	S3S4	No	Morrow (OR), Sherman (OR), Wheeler (OR), Klickitat (WA)	Rock crevices, caves, mines, talus slopes, buildings	Desert, semiarid shrubland, riparian areas, coniferous forest	Moderate to high	Habitat is correct for both foraging and roosting, although use of ridges is questionable.
Long-eared myotis *Myotis evotis*	SoC	SU	S4	No	Morrow (OR), Wheeler (OR), Klickitat (WA)	Rock crevices, tree cavities, under loose bark, tree stumps, caves, mines, buildings	Coniferous forest, semiarid shrubland, sage; often gleans insects from plant and rock surfaces	Low	More common in forests than arid scrubland.
Little brown bat *Myotis lucifugus*	None	None	None	Yes	Morrow (OR), Wheeler (OR)	Tree cavities, under loose bark, buildings, rock crevices, caves	Open forest, forest edges, over water in arid habitats	Low	More common in forests than arid scrubland. Might roost in rock crevices and be found using buildings at ranches where deciduous trees are plentiful. Would most likely forage near the Columbia River. Documented 08/25/05 through acoustical monitoring at the China Creek Golf Course ~ 3.5 miles from Leaning Juniper project site, (Kronner and Gritski, pers. field notes)

Appendix D-4 ***Continued*** Species of bats that occur in eastern Oregon and their likelihood of occurring in the proposed Leaning Juniper Wind Project area.

Scientific and Common Name	Current Federal Status[1]	Current Oregon Status[2]	Oregon Natural Heritage Rank[3]	Docu-mented in Gilliam County?[4]	Documented in Adjacent Oregon[4] and Washington[5] Counties?	Primary Roost Sites[5]	Foraging Habitat[5]	Likelihood of Occurrence in Project Area[5]	Comments
Fringed myotis *Myotis thysanodes*	SoC	SV	S2	No	No	Caves, mines, buildings, rock crevices, tree cavities	Dry woodlands, desert scrubland, grasslands, coniferous forest	Low	Most common roosts are in caves, mines, and snags; there are no records of this species for the Columbia Basin.
Long-legged myotis *Myotis volans*	SoC	SU	S3	No	Morrow OR), Wheeler (OR), Klickitat (WA)	Tree cavities, under loose bark, rock crevices, buildings	Montane coniferous forest, desert, riparian areas	Low	More common in forests than arid scrubland.
Yuma myotis *Myotis yumanensis*	SoC	None	S3	Yes	Morrow (OR), Sherman (OR), Wheeler (OR), Klickitat (WA)	Caves, mines, rock crevices, buildings	Near or over water in desert, scrubland, and forest	Low	Might roost in rock crevices or old abandoned buildings, but would most likely forage near or over the Columbia River. Documented 08/25/05 through acoustical monitoring at the town of Arlington ~ 4.5 miles from Leaning Juniper project site (Kronner and Gritski, pers. field notes)
Western pipistrelle *Pipistrellus hesperus*	None	None	None	Yes	Sherman (OR), Wheeler (OR)	Rock crevices, caves, mines	Desert, rocky canyons, shrub-steppe	Moderate to high	The general habitat is correct; presence will depend on availability of appropriate rock crevices (not reviewed in detail). Species was recorded during acoustical monitoring conducted at Blalock Canyon and Rock Creek (5-10 miles from Leaning Juniper) in early September 2005 (Kronner and Gritski, personal field notes)

Appendix D-4 ***Continued*** Species of bats that occur in eastern Oregon and their likelihood of occurring in the proposed Leaning Juniper Wind Project area.

Footnotes

[1]SoC = Species of Concern.

[2]Current status according to Oregon Department of Fish and Wildlife; SC = Sensitive Critical, SV = Sensitive Vulnerable, SU = Sensitive Unknown.

[3]S2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences; S3 = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-80 occurrences; S4 = Not rare and apparently secure, but with cause for long-term concern, usually with 81-300 occurrences.

[4]Sources of information: Oregon Natural Heritage Database, Verts and Carraway (1998); personal communication from Mark Perkins, Bats-R-Us Northwest, Portland, OR; personal knowledge and inventories conducted by Karen Kronner and Bob Gritski, Northwest Wildlife Consultants, Inc.; Condon, Oregon Wind Project BPA EIS and personal knowledge of Dr. Burr Betts, LaGrande, OR (under contract to Northwest Wildlife Consultants, Inc.).

[5]Based on Fleckenstein (2001).

[6]Based on: Nagorsen and Brigham (1993), Verts and Carraway (1998), Western States Bat Working Group (1998), various Mammalian Species accounts see references, and personal knowledge.

Figures

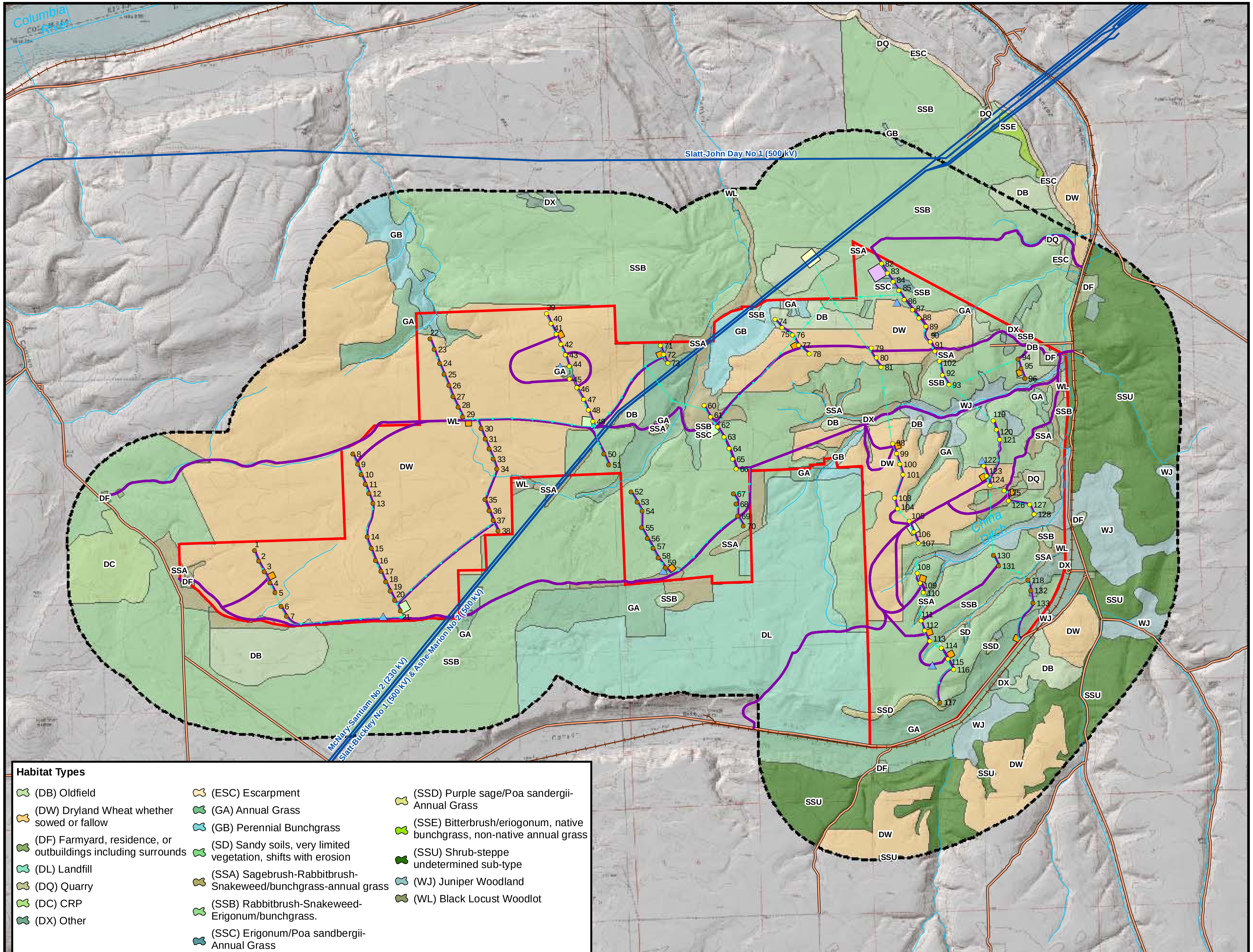

Figure 1
Habitat Types

Leaning Juniper Wind Project

PPM Energy
A ScottishPower Company

Legend

- Proposed Turbine - Phase I
- Proposed Turbine - Phase II
- Railroads
- Intermittent Streams
- Existing Roads
- Access Roads
- Proposed 31-kV Transmission Lines
- Existing Transmission Line
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Project Boundary
- 1-mile Habitat Review Area

* Note:
-Habitat boundaries not surveyed.

N W E S

0 2,250 4,500 6,750 9,000
Feet

CH2MHILL

Field Data Collected by Northwest Wildlife Consultants, Inc.

File Path: \\Rosa\Proj\PPMEnergy\180506Arlington\GIS\MapDocuments\CUP_Application\NWC_WEST_Report\Figure 1 - Habitat Types.mxd, Date: September 13, 2005 10:24:41 AM

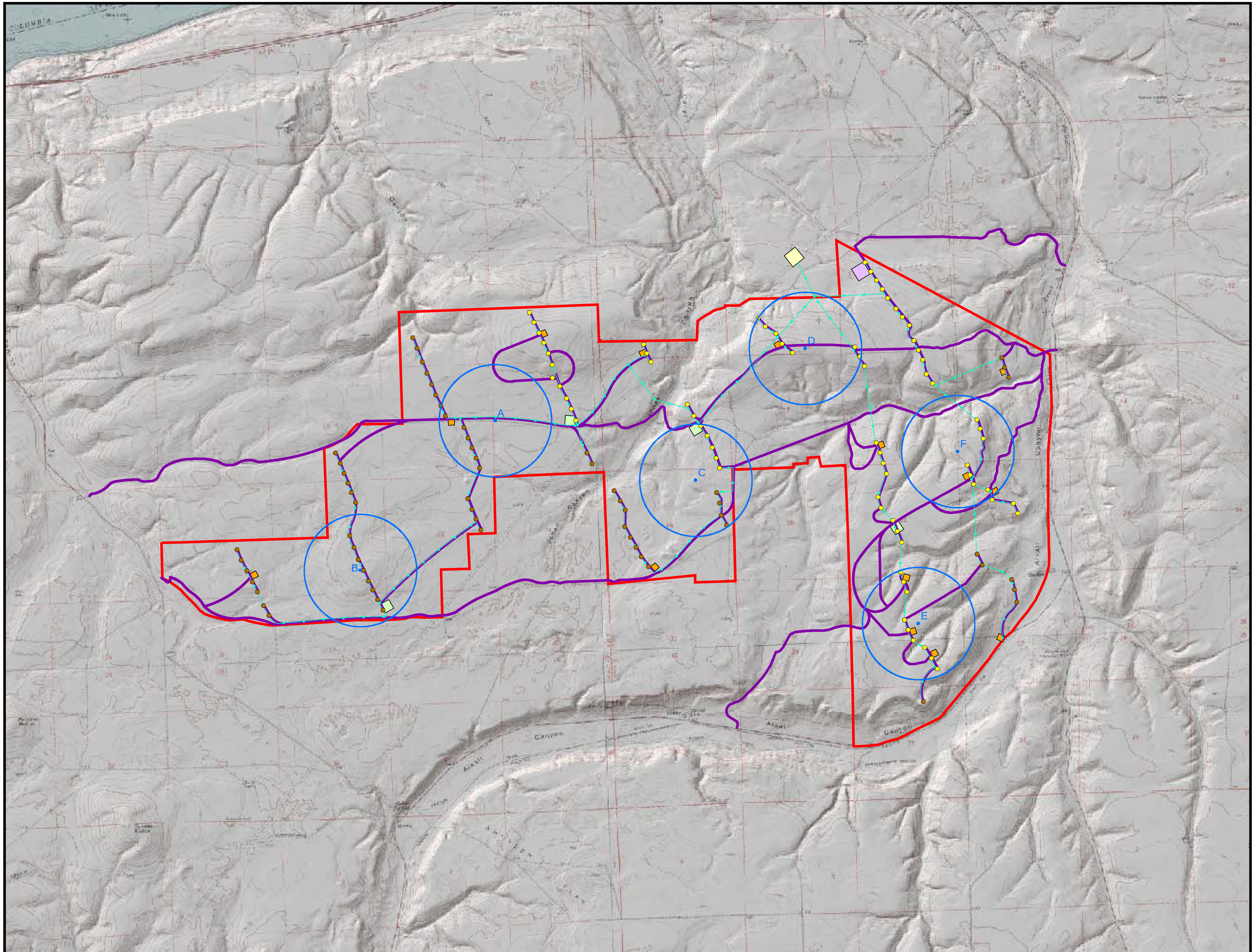

Figure 2
Plot Locations and Spring Season 2005 Ground-Based Wildlife Survey Corridors

Leaning Juniper Wind Project

PPM Energy
A ScottishPower Company

Legend

- Avian-Use Survey Plots (1/2-mile Buffer)
- Project Boundary
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Access Roads
- Proposed 31-kV Transmission Lines
- Turbine Layout Phase I
- Turbine Layout Phase II

N W E S

0 2,250 4,500 6,750 9,000
Feet

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Field Data Collected by Northwest Wildlife Consultants, Inc.

File Path: \\130.77.30.13\proj\PPMEnergy\180506Arlington\GIS\MapDocuments\CUP_Application\NWC_WEST_Report\Figure 2 - Plot Locations and Spring 05 Wildlife Survey Corridors.mxd, Date: September 16, 2005 10:33:04 AM

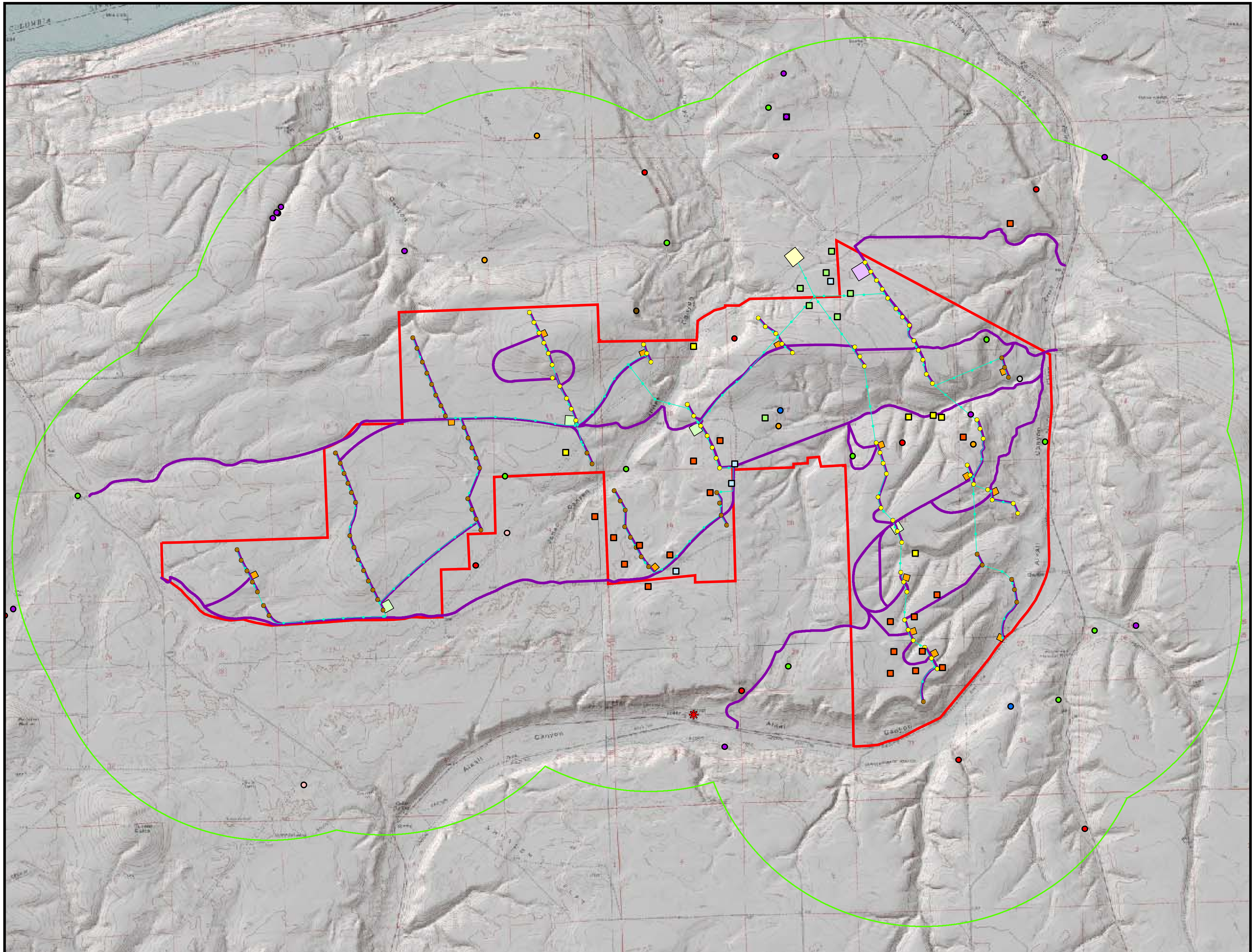

Figure 3
Raptor Nests and Sensitive Species

Leaning Juniper Wind Project

PPM Energy
A ScottishPower Company

Legend

- Project Boundary
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Two-Mile Buffer Around Turbines
- Access Roads
- Proposed 31-kV Transmission Lines
- Proposed Turbine Layout (Phase I)
- Proposed Turbine Layout (Phase II)
- May 1990 WGS Site

Raptor Nests

- Burrowing Owl Nest
- Common Raven Nest
- Ferruginous Hawk Nest
- Great Horned Owl Nest
- Prairie Falcon Nest
- Red-tailed Hawk Nest
- Swainson's Hawk Nest
- Inactive Nest

Sensitive Species

- Long-billed Curlew
- Grasshopper Sparrow
- Loggerhead Shrike Nesting
- White-tailed Jackrabbit

N W E S

0 2,250 4,500 6,750 9,000
Feet

CH2MHILL

Field Data Collected by Northwest Wildlife Consultants, Inc.

File Path: \\rosa\proj\PPMEnergy\180506Arlington\GIS\MapDocuments\CUP_Application\NWC_WEST_Report\Figure 3 - Raptor Nests and Sensitive Species.mxd, Date: October 5, 2005 2:22:13 PM

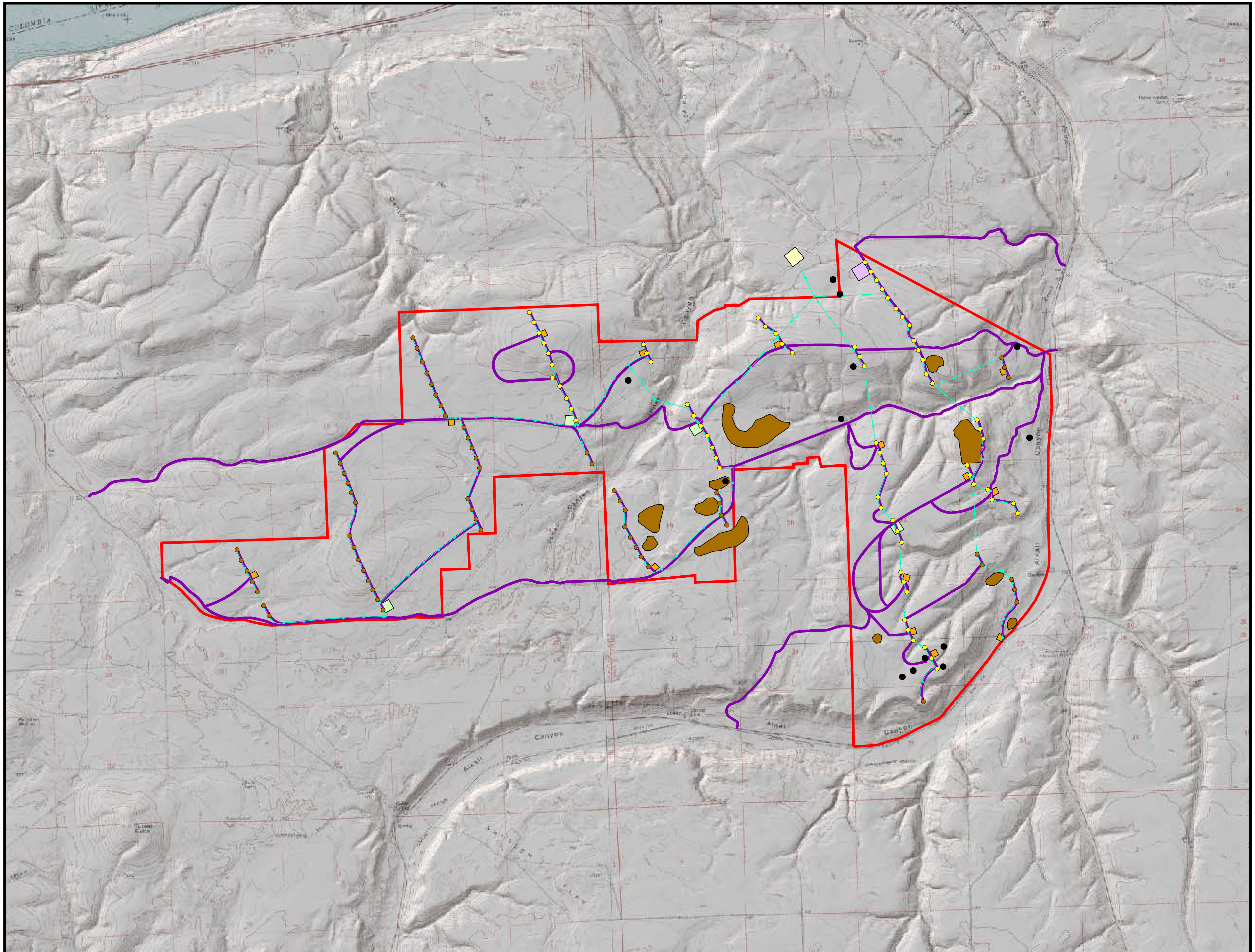

Figure 4
Washington Ground Squirrel Colonies

Leaning Juniper Wind Project

PPM Energy
A ScottishPower Company

Legend

- Project Boundary
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Access Roads
- Proposed 31-kV Transmission Lines
- Turbine Layout Phase I (August 2005)
- Turbine Layout Phase II (August 2005)
- Single Hole with Washington Ground Squirrel Characteristics (no sign of use)
- Active Washington Ground Squirrel Patches

N
W E
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0 2,250 4,500 6,750 9,000
Feet

CH2MHILL

Field Data Collected by Northwest Wildlife Consultants, Inc.

File Path: \\rosa\proj\PPMEnergy\180506Arlington\GIS\MapDocuments\CUP_Application\NWC_WEST_Report\Figure 4 - Washington Ground Squirrel Colonies.mxd, Date: October 4, 2005 10:53:46 AM

Figure 5. Raptor Use Estimates from Wind Resource Areas Located in Open Habitats in the West and Midwest Where Data Were Collected Using Similar Methods.

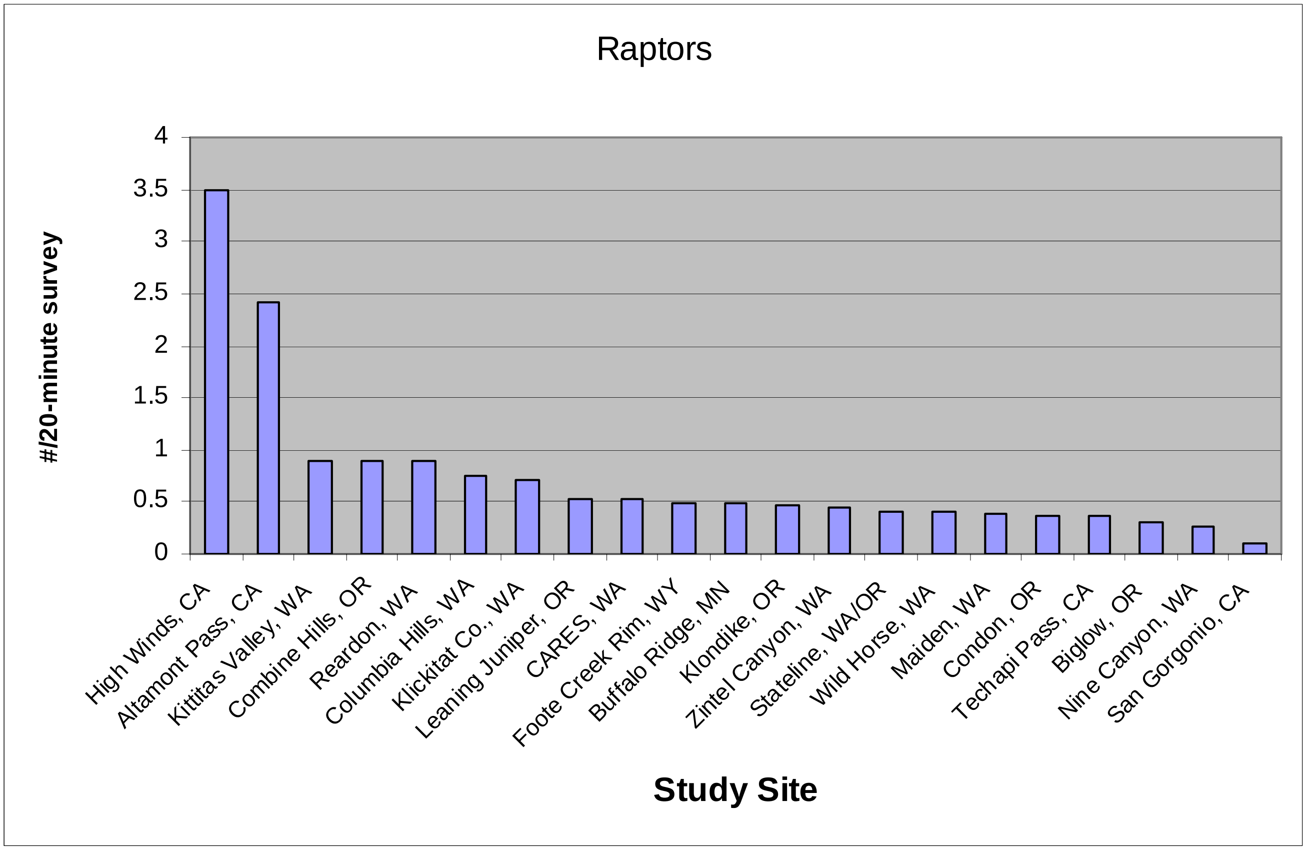
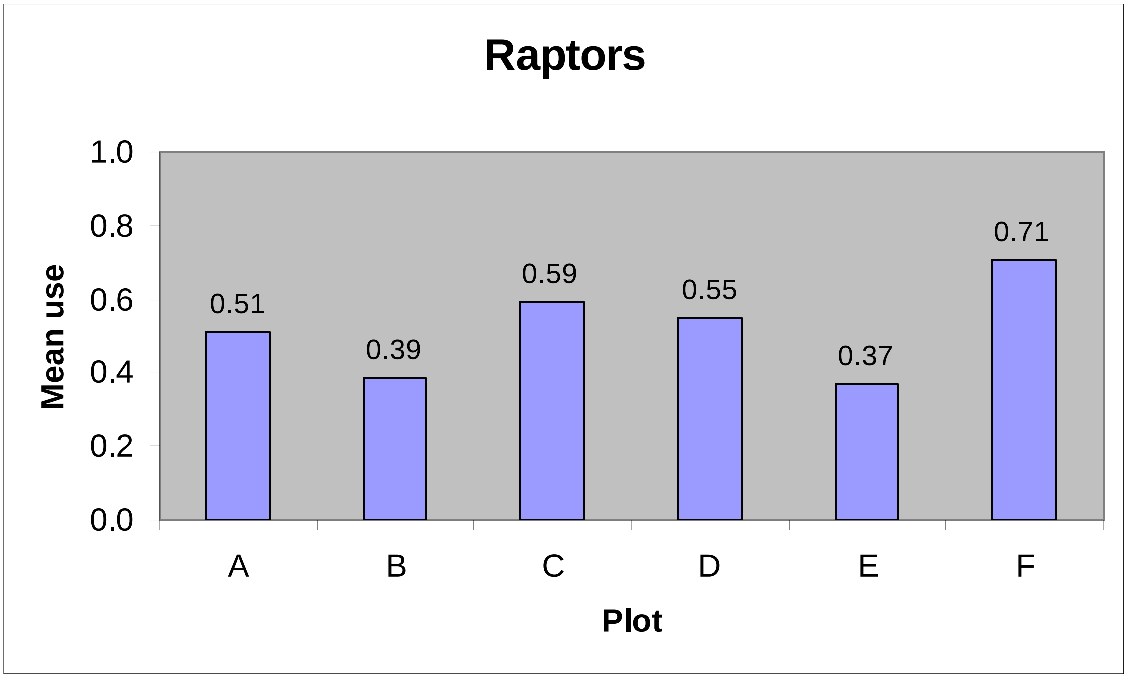


Figure 6. Avian use by survey plot*



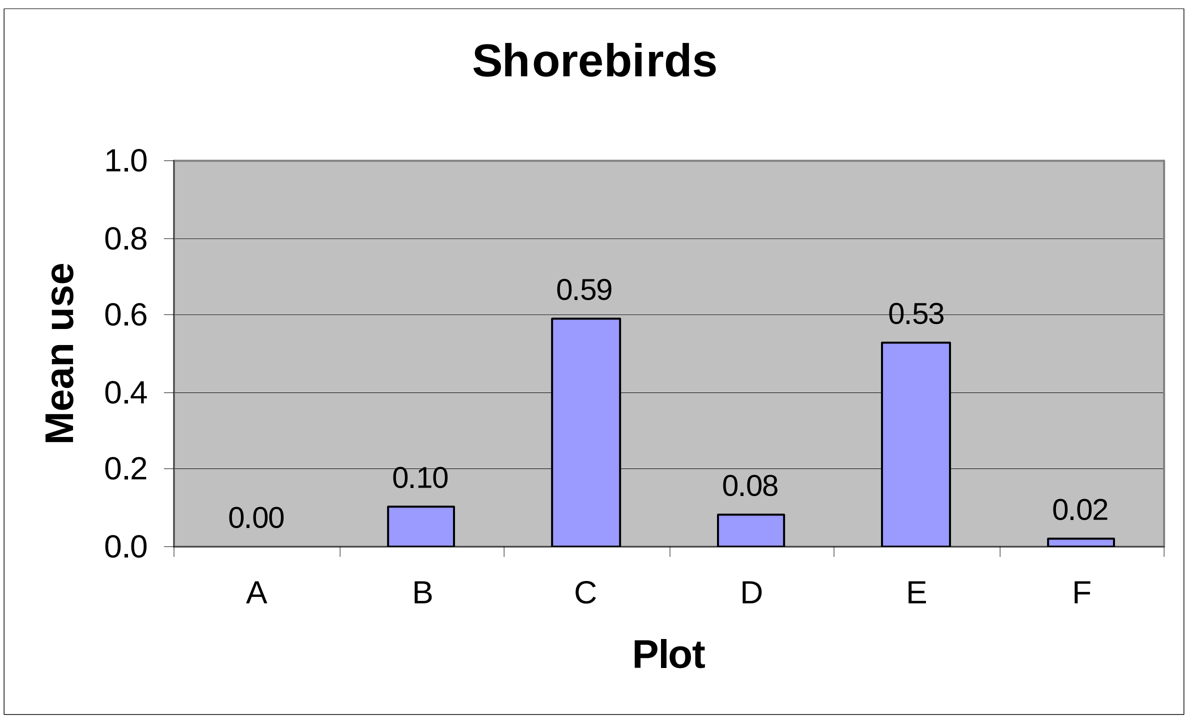
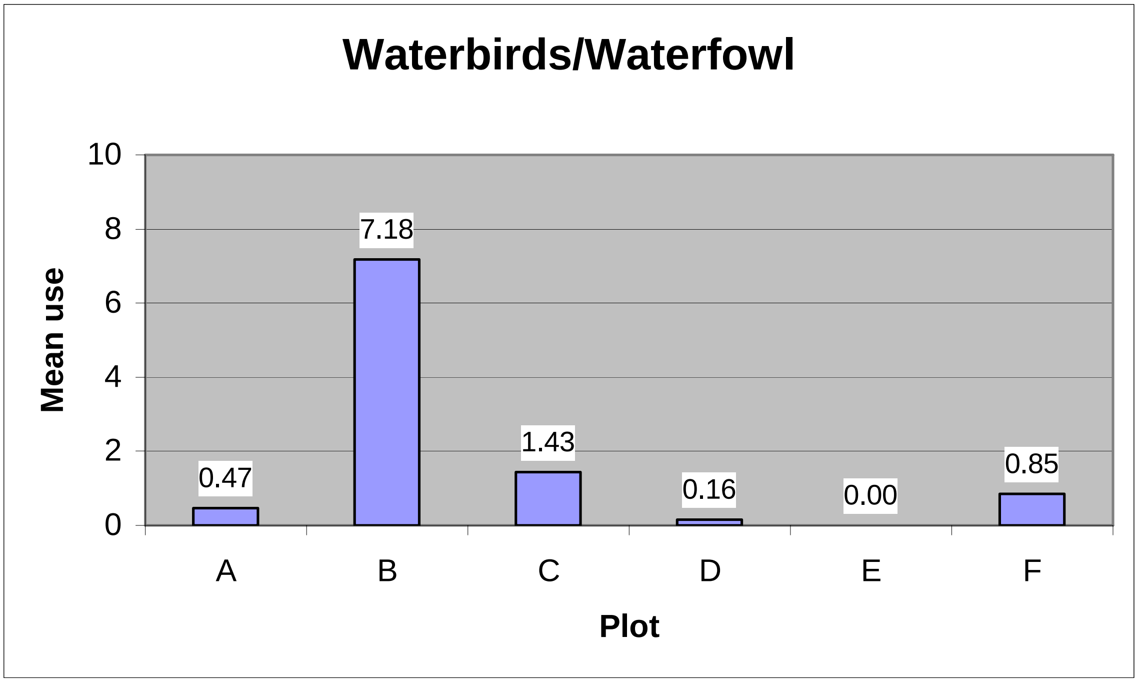
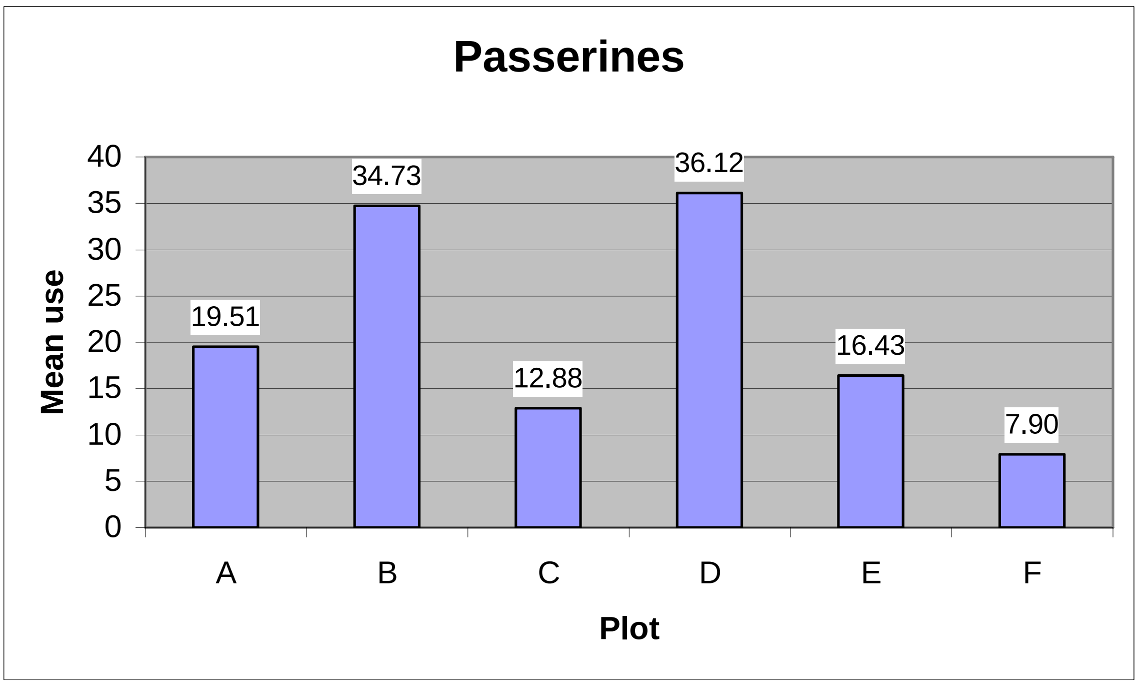


Figure 6 (*Continued)*. Avian use by survey plot*





* Figure 2 displays the plot location.

ATTACHMENT P-3

Leaning Juniper II North Grassland Bird Displacement Study

Introduction

This document describes the proposed approach to a 2-year, post-construction evaluation of grassland bird use and potential displacement in the Leaning Juniper II Wind Power Facility (the Facility) area.

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct the Facility in Gilliam County, Oregon. The proposed Facility will have a generating capacity of up to approximately 279 megawatts (MW), and will consist of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

Background

The Applicant is proposing placement of wind turbines and supporting facilities in native habitat suitable for various ground-nesting grassland, open low shrub habitat birds. This group includes long-billed curlew (a shorebird) and several others, generally referred to as passerines or songbirds. Grassland birds that were documented onsite (and likely nesting onsite) during protocol-level surveys conducted in 2006 were long-billed curlew, grasshopper sparrow, savannah sparrow, Western meadowlark, and horned lark. The loggerhead shrike was not recorded although it was suspected to occur. While the diversity of species found on the site is not high, this avian species assemblage is typical for the general Facility area in similar habitats located in low-elevation, low-precipitation zones of northeastern and north-central Oregon.

The long-billed curlew, grasshopper sparrow, and loggerhead shrike were the target species for preconstruction breeding season surveys. The data resulting from the year 2006 surveys were used for determining potential Facility-related impacts to these special-status species. As described in Exhibit P of the Application for Site Certificate, 50- to 60-meter-wide (approximately 165- to 200-foot-wide) transects were walked twice during the peak period of activity for the target species. Specifically, at Leaning Juniper II North, all leased lands were surveyed with this method, whereas other portions of the Facility site were surveyed out a perpendicular distance of 300 meters (approximately 1,000 feet) from proposed facilities known at the time of surveys. These are generally referred to as survey corridors.

At Leaning Juniper II North, all wildlife along transect lines walked throughout the entire leased area were recorded. All detections, whether visual, auditory, or sign of use, were noted. For target species only (listed above), locations were mapped on field data forms or coordinates were taken of their perch site or flight area; some nests were found. Abundant species that fly readily in the surveyor's presence were tracked visually. Areas of their use were generally mapped and some indication of behavior noted (for example, nesting, staging, courtship, nonbreeders foraging in loose groups). The presence of other species was noted on field data forms but the species were not counted. Experienced surveyors with Northwest Wildlife Consultants, Inc. conducted the surveys and will likely be the same surveyors to conduct any post-construction avian surveys for LJ II North. Because there is just one landowner of the property, planning multiple-year field studies will be simplified.

Objective

The objective of this qualitative study is as follows: On a 1,000-acre, representative habitat parcel containing wind turbines, determine if there are noticeable changes in the presence and overall use by the assemblage of native grassland bird species recorded in 2006 (before construction) compared with the post-construction period (2007 or later). This study will observe and record changes in use and presence of avian species along north-south, east-west-oriented, established transect lines, focusing on long-billed curlew and grasshopper sparrow.

Method

The Applicant proposes to replicate the 2006 survey method used for censusing birds. The area selected is large and will likely contain two turbine strings of potentially 12 to 17 turbines (Figure 1). This habitat is not highly variable and is representative of a large portion of the remainder of LJ II North where up to 22 additional turbines may be installed. The habitat is primarily shrub-steppe and large wildfires have removed mature shrubs in places, resulting in an open low shrub, mostly grassland-like vegetative recovery stage.

The study area is triangular and bound by the leased land boundary on the northeast and west sides and Rattlesnake Road on the southeast side, encompassing 1,000 acres. Habitat types are presented in Exhibit P, Figures P-1 and P-2. Most of the habitat is shrub-steppe, but as a result of wildfires and land use, it is structurally an open low shrub, grassland-like, early recovery stage area. Some shrubs remain but the habitat is relatively open. The area also contains bitterbrush habitats, which grassland-type birds (western meadowlark) use and the more shrub-dependant loggerhead shrike may also use for nesting.

This area was selected because of the representative habitat types and corresponding avifauna, some of which are classified by the Oregon Department of Fish and Wildlife as Sensitive. The area is somewhat removed from human activity (except Facility roads and one main Gilliam County road with low traffic use), and it also includes a large area of grassland/shrub-steppe (mapped as SSB) that is not proposed to be altered.

Two complete transect surveys of this area would be walked, in both April and May of two separate years. The April and May time periods are necessary to span the periods of activity for a variety of species. These activities include staging (prenesting) of long-billed curlews in April, and the major period of territorial calling of grasshopper sparrows, which also coincides with the nesting period for long-billed curlews and other species in May. All sensitive species will be recorded and mapped. The first year's survey will be conducted in the first spring following the initial operation of the Facility. The second survey will take place 2 to 5 years after the first survey, once it has been ascertained that the seeded, temporarily disturbed construction zones have reestablished grassland cover.

Products and Other Data Collected

Maps will be prepared showing transects walked, and areas of use by grasshopper sparrows, long-billed curlews, and loggerhead shrikes for each study year. Notes will be recorded for all other species in terms of relative abundance (for example, infrequently detected, common, very abundant) observed along transects. After the Facility is built and a final Facility map prepared, a grid system will be overlaid on the study area for describing results by area. Vegetation will be described relative to preconstruction conditions. This description is likely to include notes on changes in land use by landowner, wildfire influences, and cattle aggregations, among other groups, causing areas of intense vegetation impact. Vegetation communities will be sampled by the transect method and a description of plant communities will be provided for each survey year. Notes on obvious changes in use by grassland birds will be provided by species. These qualitative-level descriptions will then be reviewed to identify noticeable changes on a landscape (study area) scale. Locations of long-billed curlew, grasshopper sparrow, and loggerhead shrike and their primary areas of use (occupied territories) and proximity to the Facility will be reviewed.

Figure 1
Area to be studied for Grasslands Birds during Operations Phase

11x17

color

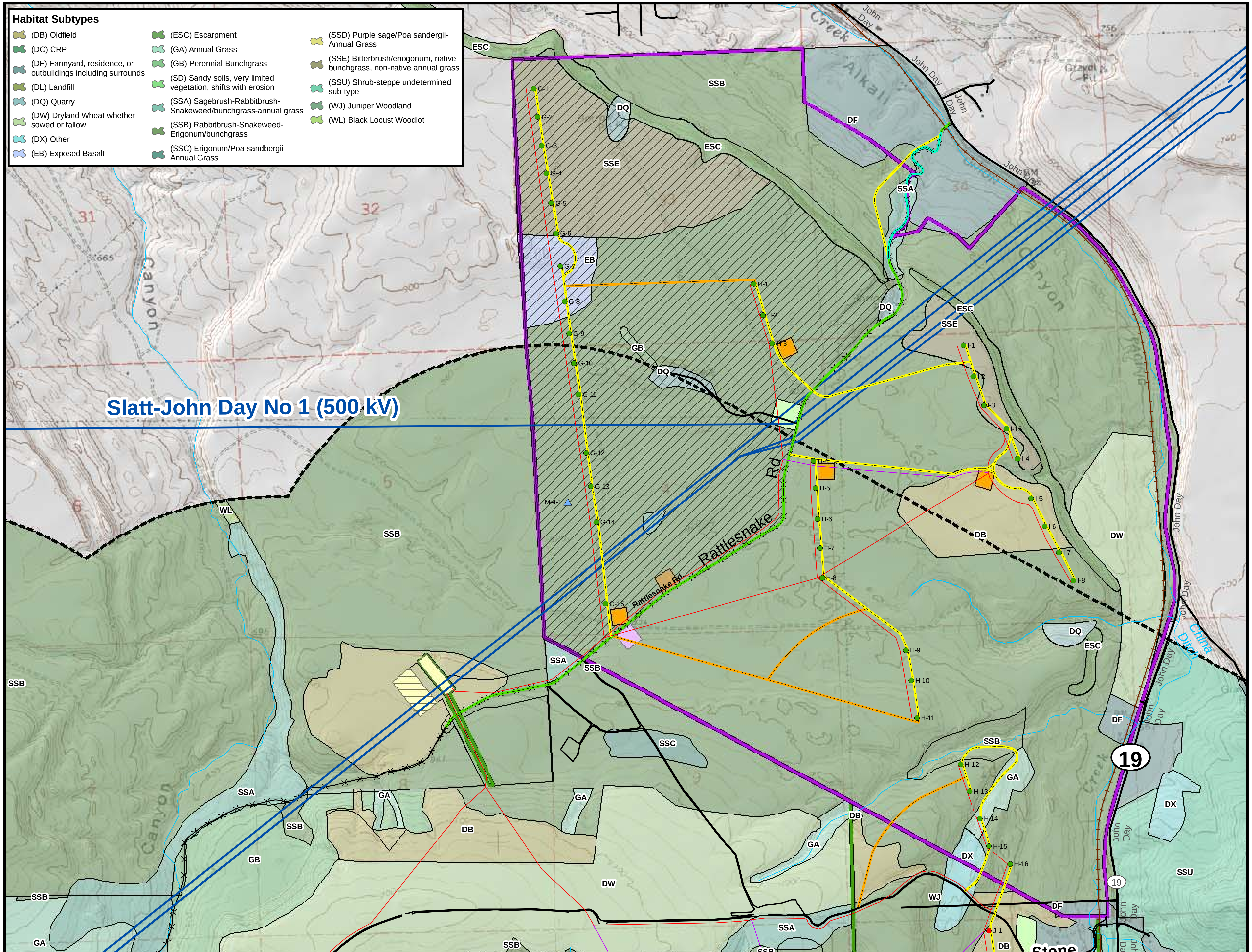


Figure 1

Area to be studied for Grasslands Birds during Operations Phase

Leaning Juniper II
Wind Power Facility

Legend

- Grassland Bird Study Area
- **Proposed Permanent Facilities**
- Proposed Turbines - Leaning Juniper II North
- Proposed Turbines - Leaning Juniper II South
- Proposed Permanent Met Tower

Proposed Roads - Leaning Juniper II
- New Road
- Existing Road - Improvements Needed

Alternate Routes - Leaning Juniper II
- Existing Road - Improvements Needed
- New Road

Preferred Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line

Alternate Collector Routes
- Underground 34.5-kV Line
- Overhead 34.5-kV Line
- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Substation
- **Proposed Temporary Facilities**
- Proposed Crane Path
- Proposed 2-Acre Temporary Staging Area
- Proposed 5-Acre Temporary Staging Area
- **Existing Facilities**
- Major Roads
- Existing LJ I Roads
- Existing Road - Not Used for Construction
- Railroads
- Existing Transmission Line
- Intermittent Streams
- 1-mile Habitat Study Area
- Leaning Juniper II - North
- Leaning Juniper II - South

N W E S

PPM Energy
A ScottishPower Company

0 1,000 2,000
Feet

* Note:
-Habitat boundaries not surveyed.

Field Data Collected by:
Northwest Wildlife Consultants, Inc.

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Misc\Figure 1 - Area to be studied for Grasslands Birds during Operations Phase.mxd, Date: September 6, 2006 1:58:49 PM

ATTACHMENT P-4

Proposed Habitat Mitigation Plan for Leaning Juniper II Wind Power Facility

Introduction

This document describes the proposed mitigation plan for the permanent loss of habitat at the Leaning Juniper II Wind Power Facility (the Facility). Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct the Facility in Gilliam County, Oregon. The proposed Facility will have a generating capacity of up to approximately 279 megawatts (MW), and will consist of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

This mitigation plan is written in accordance with Oregon Administrative Rule (OAR) 635-415-0000. Under OAR 635-415-0005 (16d), mitigation for unavoidable permanent impacts is defined as "Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the development action and by monitoring and taking appropriate corrective measures." Mitigation for permanent impacts to Category 2 habitat requires a net benefit, and mitigation for Category 3 and 4 habitats requires no net loss, as described in OAR 635-415-0025. Under OAR 635-415-0005 (21), "Net Benefit" is defined as "an increase in overall in-proximity habitat quality or quantity after a development action and any subsequent mitigation measures have been completed and monitored."

Background

The Applicant is developing a formal Habitat Mitigation Plan (HMP) for the Facility in consultation with the Oregon Department of Fish and Wildlife (ODFW) and the Oregon Department of Energy (ODOE), using the Klondike III HMP as a model. The Applicant understands that the Energy Facility Siting Council will require inclusion of the HMP as an attachment to the Final Order. This proposed mitigation plan provides background information on the earlier site reviews, the proposed site, selection criteria, and habitat improvement methods, all of which will be used in creating the draft HMP for ODOE review. The Applicant plans to submit the draft HMP to ODOE in the fall of 2006.

The Applicant is proposing two mitigation sites for the Facility, including one site for each of the two main Facility components: Leaning Juniper II North and South. The proposed mitigation area is located on native land approximately 16 to 18 miles southeast of Leaning Juniper II. The area would be enhanced by proper management of current land use practices and would be placed into a conservation easement. The two Facility components may or may not be sited immediately adjacent to each other.

This mitigation plan is based on anticipated Facility impacts, knowledge of the proposed sites, conversations with regional restoration experts, and comments from ODFW and ODOE.

Leaning Juniper II Facility Impacts

The permanent footprint for the Facility equals approximately 64 acres under the worst case scenario, as described in Exhibit P. Total permanent impacts in undeveloped habitats equal approximately 44.87 acres. Anticipated habitat impacts and the proposed mitigation for relevant impacts are summarized below. Note that the word "protect" is defined as follows: conserve, for the life of the Facility, native habitat of similar vegetative composition that is in like or better ecological condition, ensuring that no loss of such habitat will occur from various land use practices typically occurring in the Columbia Basin.

Leaning Juniper II North

- Category 2:
  - Maximum Permanent Impacts: 2.67 acres shrub-steppe.
  - Proposed mitigation: Protect or enhance an area of 8.00 acres of Category 2 shrub-steppe No upland trees would be cleared.
- Category 3:
  - Maximum Permanent Impacts: 15.80 acres shrub-steppe.
  - Proposed mitigation: Protect an equal area (15.80 acres) of Category 3 or better quality native habitat.
- Category 4:
  - Maximum Permanent Impacts: 0.63 acres grassland.
  - Proposed Mitigation: Protect an equal area (0.63 acres) of Category 4 or better quality native habitat.
- Category 5:
  - Maximum Permanent Impacts: 1.20 acres old field.
  - Proposed Mitigation: Protect an equal area (1.20 acres) of Category 5 or better quality native habitat.
- Maximum Permanent Impacts
  - Total: 20.31 acres
  - Leaning Juniper II North Mitigation Total: 25.65 acres

Leaning Juniper II South

- Category 2:

  - Maximum Permanent Impacts: 16.44 acres (15.23 shrub-steppe +0.74 grassland + 0.47 Juniper and deciduous trees).
  - Proposed mitigation: Protect or enhance an area of 49.32 acres of Category 2 shrub-steppe or grassland. No upland trees would be cleared.
- Category 3:
  - Maximum Permanent Impacts: 6.65 acres (2.96 shrub-steppe + 3.69 old field).
  - Proposed mitigation: Protect an equal area (6.65 acres) of Category 3 or better quality native habitat.
- Category 4:
  - Maximum Permanent Impacts: 1.48 acres (1.07 old field + 0.4 grassland).
  - Proposed Mitigation: Protect an equal area (1.48 acres) of Category 4 or better quality native habitat.
- Maximum Permanent Impacts
  - Total: 24.56 acres
  - Leaning Juniper II South Mitigation Total: 57.44 acres
- Leaning Juniper II North and South combined totals:
  - Maximum Permanent Impacts—20.31 + 24.56 = 44.87 acres
  - Mitigation Total: 83.09

The proposed 83-acre mitigation total protects a greater quantity of native habitat of equal or better quality than the 44.87 acres of permanent impact, resulting in a net benefit to wildlife habitats, as further described later in this plan.

Because the landowner has requested that the number of acres for the conservation easement be established in 10-acre increments, the Applicant plans to protect an additional 7 acres for future mitigation, resulting in a formal conservation easement for a 90-acre area.

Mitigation Site Description

In March and late July 2006, Karen Kronner reviewed a 440-acre parcel of land for suitability to meet habitat mitigation/conservation easement needs for Leaning Juniper II. The 440-acre parcel is under one ownership, and is located 16 to 18 miles southeast of the Facility, as shown in Figure 1. The mitigation sites would be placed into conservation easements to guarantee preservation of the native shrub-steppe and grassland for the life of the Facility.

Location

The 440-acre mitigation area is located approximately 16 to 18 miles southeast of the Facility in the Columbia Basin. The area is southeast of Olex, Oregon, in the "East half of Southeast Quarter Section 9, Township 2 North, Range 23 East," in Morrow County. According to the landowner, there has been one other landowner during the previous 27 years. Before that, the land was owned by the federal Bureau of Land Management (BLM). Grazing has been the primary use in the past. Eighty (80) acres of the 440-acre area are already being protected from development or other land use activities as part of an existing conservation easement, as shown in Figure 2.

Habitat and Wildlife

The mitigation area consists of native grassland and shrub-steppe habitat. Vegetation is variable and many Columbia Basin native plant communities are present onsite. Native plant communities include (dominant plant species listed): bluebunch wheatgrass, western needle-and-thread grass, Sandberg's bluegrass, sagebrush, with snakeweed and buckwheat species scattered intermittently throughout. Lithosol with forbs and sparse grass is found on steeper slopes and rim edges. There are several dry drainages with small seeps onsite, and one drainage had small pools of water at the end of July.

Weeds are limited in the area. Although non-native cheatgrass is found onsite like most areas in the Columbia Basin, native vegetation persists and out-competes undesirable plants and grasses, setting the area apart from most rangeland sites visited in the region. The protective soil surface biotic crust (cryptogam) is in excellent condition and offers opportunities for ecology studies to further the knowledge of this under-studied, but important, unique biotic feature.

Wildlife use was assessed at the proposed mitigation area during two site visits in March and July 2006. In March 2006, sage sparrows were seen onsite, although no visits occurred during the typical wildlife breeding season to confirm nesting. In late July, the following species were observed: Western meadowlarks, horned lark, vesper sparrow, savannah sparrow, two species of swallows, loggerhead shrike, rock wren, American kestrel, side-blotched lizard, fence lizard, (3) mule deer and (2) elk. Swallow nesting occurs just off the property and swallows were foraging throughout the 440-acre parcel. There are historical (1990) Washington ground squirrel (WGS) records within 2 miles of the parcel, and the soils and vegetation onsite are suitable for WGS. While no colonies have been confirmed, there could be a colony onsite.

While the overall ecological condition is very good in the area, there are some areas of lower quality habitat that could benefit from supplemental planting. A hard freeze appears to have occurred in limited portions of the mitigation area, affecting some of the sagebrush cover in certain areas. Sage plantings could speed the recovery of sagebrush. Grazing by domestic livestock has been light in recent years. Eliminating all current and potential domestic livestock (cattle, horses, sheep, llamas) grazing would be appropriate to alleviate the site of any unnecessary trampling and disturbance of soil surface and vegetation.

Topography and Soils

Topography in the area is variable. Deep soils are present on upper slopes and plateaus and consist of Ritzville silt-loam, Mikkalo silt loam. Soils on steeper slopes are Lickskillet stony loam (lithosol) and Lickskillet rock outcrop complex. The shallower soil sites (Lickskillet) have pockets of deeper soil in swales and drainages.

Site Selection and Alternatives

The proposed habitat mitigation site was chosen based on site availability and comments received from the ODOE and ODFW. Numerous parcels were considered during the past 2 years, but landowners chose not to be involved. Parcels were reviewed for the potential to support sensitive species, including WGS, long-billed curlews, grasshopper sparrows, and raptors. Other site characteristics were reviewed, such as indications of past land uses and their influence on the various ecological components, and the current stage of the site's functionality (fully functional for native flora and fauna or recovering from past perturbations, such as fire or grazing). To preserve habitat for other sensitive species, such as long-billed curlews and raptors, several different habitat types may be protected. Parcels being considered are currently in private ownership and as such, are subject to the landowner's primary objectives for the land—either as grazing and other agricultural activities or some type of future development.

After talking to several landowners, the Applicant originally proposed to ODOE to conserve a habitat mitigation site on land to the southwest of Leaning Juniper II North and to the west of Leaning Juniper II South, immediately adjacent to a parcel of land owned by the BLM, as described in the memorandum included as Attachment 1 to this plan. During a site visit to Leaning Juniper II on July 6, 2006, the Applicant provided members of the ODOE and ODFW with a tour of the proposed Facility and habitat mitigation site, and received informal comments from the ODFW on habitat enhancement methods (no written comments have been received as of the date of this document). The ODFW mentioned that it would be interested in having the option, at any point in the future, to study various wildlife and habitat relationships, and expressed interest in using the habitat mitigation site for these informal or formal research opportunities, subject to landowner approval. ODFW suggested that studies could include WGS translocation, supplemental studies to complement existing avian and habitat research conducted elsewhere in the Columbia Basin, and other yet-to-be-determined studies focusing on future wildlife and habitat concerns (McMahon, pers. comm. 2006; Kronner, pers. comm. 2006).

Subsequent to the July site visit, the landowner reconsidered the proposed habitat mitigation site and commented that he may no longer be interested in preserving his land under a conservation easement. The Applicant has since identified the current proposed mitigation area as a replacement site. The current proposed area is located on shrub-steppe habitat approximately 16 to 18 miles southeast of the Facility, as described earlier.

The objective of the HMP is to facilitate selection of mitigation sites that are functional for wildlife and have not been significantly degraded by human-caused or other (e.g., hot wildfires) impacts, yet still offer portions ideal for enhancement. Given that the mitigation area is a relatively intact high quality parcel that is currently functional for some special status species identified within the Facility lease boundary, the goal of establishing the habitat mitigation sites would be to ensure the protection of the parcel(s) from loss of quality or functionality by protecting the site from grazing pressure, plowing or other disturbance and developments. For portions of the area that have lesser quality site and provide opportunities for enhancement, the goal would be protection and enhancement. This combined approach provides a net-benefit for species.

Selection Criteria

The primary selection criterion was the current site condition and the immediate need for protection of the habitat within an area where no native habitat is currently protected from future loss or land use alterations. Previous mitigation projects for EFSC-level wind energy projects in Oregon have improved existing, weedy grassland and shrub-steppe for wildlife habitat. However, this approach may not be the best approach to offset impacts resulting from permanent impacts to wildlife habitat. Monitoring the vegetation recovery of these sites (ECC 2006) indicates the initial weed spraying and subsequent grass seeding efforts were successful. While this restoration effort may vegetatively "enhance" the vertical structure of the habitat, which was previously poor quality for wildlife, long-term conservation of intact habitat may be a more successful approach to offsetting impacts of the Leaning Juniper II Facility. Since the original Stateline project mitigation planning in 2001, extensive additional funding through the federal Farm Service Agency for the Conservation Reserve Program (CRP) has converted thousands of acres of farmland into restored grassland habitats in the Columbia Basin. Methods used to restore grassland as part of the CRP typically consist of seeding with grass seed mixtures and weed control. In contrast, measurable funding for conserving intact native grassland and shrub-steppe has not been available for decades. Therefore, the need for conserving relatively intact shrub-steppe and other habitat is a high priority identified by agencies, academic institutions and the public.

The following ecological components found on native undisturbed sites are found naturally on intact sites and provide a specific value for the long-term health and persistence of native flora and fauna. Most of these components are easily impacted or lost completely during farming and grazing activities. Important ecological components include, but are not limited to, the following:

- **Microbiotic soil surface crust**—Microbiotic soil crust (cryptogam) is formed by living organisms and their by-products, creating a surface crust of soil particles bound together by organic materials. Cryptogam could be studied to understand the importance of this crust to habitat and wildlife. Aboveground crust thickness can reach up to 10 cm.
- **Diversity of invertebrates**—Some invertebrates are pollinators of vertebrate animal food plants.
- **Native shrubs and bunchgrass**—Native habitat with a sufficient amount of bare ground and microbiotic crust is used for foraging by birds and reptiles (in contrast to a dense cover of non-native annual grasses).
- **Lithosols (rock-soil)**—Native plants grow in lithosols early in the late winter, providing important habitat and food sources to wildlife early in the season. Lithosols also have a unique diversity of low-growing native wildflowers. In contrast, previously tilled lands that are seeded with grasses, like CRP lands, are simplified systems that typically are missing other desirable biotic features such as biotic crust and a high diversity of native forbs.

In addition to the above-mentioned values, intact native and healthy vegetative covers help retard the spread of invasive weeds (both grasses and forbs), an ever-increasing problem in native rangelands of the Columbia Basin. In native shrub-steppe vegetation in south-central Idaho, breeding bird densities range from 3.7 to 8.1 birds/hectare (ha) and may include up to 12 species. As this habitat is degraded by cheatgrass, bird densities decline to 1 bird/ha and species richness (the number of different species) drops to as low as one (Rich, 1996).

Besides being an intact and functional wildlife habitat parcel, other selection criteria for the mitigation sites included the following:

- **Overall Potential for Improvement**. Land that provides functional wildlife habitat, but has some past perturbation (grazing pressure) or natural influences (wildfire, insect damage) that reduce habitat values can be successfully enhanced with chemical and mechanical habitat improvement measures. Other factors such as soil depth and accessibility affect a site’s overall potential for enhancement.

- **Size and Continuity**. Large blocks, or a single block of land, are easier to lease from landowners and easier to access for habitat improvement purposes. Sites with a significant number of acres of strategically-located suitable land can also contribute to providing contiguous wildlife habitat in a specific landscape setting.

- **Privacy for Wildlife**. Parcels farther from human or domestic animal disturbance, such houses and livestock grazing areas, have a higher potential for restoration success. In addition, depending on the frequency of disturbance, some sensitive status species populations are healthier in the absence of human disturbance.

- **Distance to Turbine Strings**. According to ODFW, grassland should not be enhanced at the base of turbine strings to avoid providing habitat for small mammals that are prey for raptors (Chris Carey, ODFW, pers. comm. 2004).

- **Location**. A site within the existing wind-lease boundary is desirable because it eliminates the need for further surveys or leases. However, a site outside the wind-lease boundary is desirable because it is further away from turbines and other potential disturbance. The Applicant searched for an area that has very low potential for wind energy development in the near future, is in an environmental setting that has very low road density and has complementary grasslands that will likely persist through time.

- **Landowner Interest**. The Applicant looked for sites owned by landowners interested in a conservation easement.

- **Conservation Recommendations**. The Applicant looked for parcels that contain habitat targeted for conservation, as identified by the academic institutions, conservation groups and governments actively involved in conserving native wildlife of the Columbia Basin. In particular, the ODFW has identified “strategy habitats” and approaches for “conservation actions” within the Columbia Plateau Ecoregion (ODFW, 2006). The Oregon Conservation Strategy is “intended to provide a long-term, big-picture “blue print” for conserving Oregon’s natural resources to maintain or improve environmental health…” (ODFW, 2006). In several public documents reviewed, a recurring theme was the need to work with landowners for conservation easements that would protect remaining native habitats. Shrub-steppe was identified as the highest priority for conservation based on trends in bird populations and habitat availability in the Interior Columbia Basin (Saab and Rich, 1997; Paige and Ritter, 1999). Historically, steppe vegetation accounted for about 90 percent of the Columbia Basin ecoregion (O’Connor and Wieda, 2000). However, as of 1996, steppe now occupies only about

30 percent of habitat in the Columbia Basin. In its place, human-altered areas occupy 60 percent of the ecoregion. Almost all of the land in the ecoregion is designated for agricultural based activities, including active farming and grazing. Closer to the general north-central Oregon area, other land uses in addition to farming are altering native plant communities and the wildlife that depend on them. Grazing, landfills, dairy operations, orchards, vineyards, biosolid waste disposal, liquid dairy land-application, and natural gas exploration are occurring in north-central Oregon, and more is being planned. Remote native habitat lands that were relatively secure from human activity are also desired for those seeking alternative residential settings.

Based on these criteria, there were very few sites in the project vicinity, primarily due to lack of landowner interest. The proposed mitigation site was selected based on the above selection criteria and comments from ODOE and ODFW, as described below:

- **Overall Potential for Improvement**. The area is not just a standalone island of valuable habitat but instead, in a general area of where non-native grasslands (CRP) are in effect, creating a larger wildlife habitat parcel for some species. However within the easement, some areas of sagebrush shrubs have experienced intensive grazing, a hard freeze or other factors. The Applicant plans to supplement these areas with sagebrush plantings (number of shrub-planting acres to be determined, estimated to be 5 to 8). In addition, the entire easement parcel along with an adjacent conservation easement parcel will not be grazed in future years. Removal of cattle will protect delicate soil surface biotic crust and allow bunchgrasses to produce seed, a food source for wildlife. Shrubs, large or small, will not be trampled and sensitive features such as small seasonal springs and seeps in drainages will not be impacted by cattle. Domestic livestock grazing will only be used as a vegetative management tool, on approval from the designated reviewers.
- **Native, Undisturbed Soils**. Soil types are deep Ritzville and Mikkalo silt-loam and lithosol soils Lickskillet-rock outcrop complex and stony loam. The deeper soils are suitable for taller-stature native bunchgrasses and shrubs but are the desirable soils for farming in the Columbia Basin. The Facility mitigation sites (83 acres) have portions of deep soil.
- **Size and Continuity**. The Facility mitigation sites are within a larger block of partially protected native habitat. The entire parcel consists of 440 acres of contiguous land owned by one cooperative landowner, 80 acres of which is already in another 30-year conservation easement.
- **Privacy for Wildlife**. The area selected has almost no human activities in the immediate landscape, except for farming and fall season hunting. The site is surrounded primarily by CRP grasslands, native habitat, and dryland wheat. There are no human activities on the parcel, there are no residences on or adjacent to the 440-acre tract, and there are no roads or two-track trails onsite. The entire property is fenced on the boundary. In addition, if cattle are excluded from grazing, there will be no disturbance to ground-nesting birds from domestic animals typically on rangeland during the critical spring nesting season.
- **Distance to Turbine Strings.** Currently, there are no known wind energy developments planned on the 440 acres or in the nearby area.

- **Location**. The site is within an area where no habitat conservation has been designated. The nearest protected land is 16 miles north, Horn Butte, owned by BLM. Farther northeast from the site is the Boardman Conservation Area. There are no other long-term protected lands of the same habitat types for greater than 20 miles west and 30 miles east.
- **Landowner Interest**. The landowner has expressed interest in a conservation easement and currently has accepted another 80-acre conservation easement as shown in Figure 2, demonstrating the willingness to support our needs and goals.

Habitat Improvement

The following describes improvement projects that are feasible, given the mitigation area's characteristics and the overall goal of wildlife habitat improvement for replacement of lost habitat from the Leaning Juniper II permanent facilities.

Based on the site visits and field surveys, the proposed area of interest would serve as a suitable conservation easement to mitigate impacts from the permanent footprint of the Leaning Juniper II wind project. The habitat within the area of interest is very similar to much of the Leaning Juniper II Facility footprint—open low shrub, grassland, and shrub-steppe. However, unlike habitats impacted by the footprint, this offsite mitigation area has not been impacted by hot wildfires or human disturbance. The area does not show signs of grazing pressure, and has very limited weed issues. In addition, there are no roads that cross the 440-acre area. The habitat is shrub-steppe and bunchgrass, as shown in the photos in Attachment 2 to this plan. There are areas of deeper soils that support patches of sagebrush, and native bunchgrasses such as blue-bunch wheatgrass (*Pseudoroegneria spicata*), needle-and-thread grass (*Hesperostipa comata*), and Idaho fescue (*Festuca idahoensis.*).

Wildlife use was assessed at the proposed mitigation area during two site visits in March and July 2006. Because discussions with the landowner for the original mitigation site were progressing, no site visits occurred at the 440-acre mitigation area during the peak nesting period April-June. One aerial survey was conducted in May 2006 and habitats were assessed from the air by a biologist experienced in assessing Columbia Basin habitats for the past 20+ years. In addition to the species listed during ground visits, the experienced biologist expects the following native birds to nest on-site: Western meadowlark, horned lark, savannah sparrow, grasshopper sparrow, vesper sparrow, lark sparrow, rock wren, loggerhead shrike, sage sparrow (potential not fully determined). Long-billed curlews may also use the site. Numerous others avian species may migrate through the area, resting in shrub cover and foraging. Sign of burrowing mammals (badger, coyote) indicate suitable soils for nesting/denning burrowing owls. Two reptiles have been confirmed onsite, side-blotched lizard and fence lizard, and the following reptiles are expected to occur onsite: sagebrush lizard (State-sensitive status), bull snake, and racer. Spadefoot toad, chorous frog, and western toad (a State-sensitive status amphibian) could also occur seasonally onsite at seeps, springs and shallow pools in drainages.

Modifications to the grazing practices could improve the overall habitat and wildlife use. Although grazing by domestic livestock has been light in recent years, further reducing all current and potential domestic livestock (cattle, horses, sheep, llamas) grazing would reduce unnecessary trampling and disturbance of soil surface and vegetation. Continued cattle grazing could break up soil surface crust. If disturbance is in a small area, some of the crust species (mosses, lichens, algae, fungi) could return in 5 to 7 years. If larger disturbance occurs, and the original crust was composed of a complex association of species and was several centimeters deep, it could take more than 100 years for the crust to fully recover (O'Connor and Weida, 2000). Cattle grazing could be suppressing native shrub and bluebunch wheatgrass annual growth and seed production.

The proposed conservation easement agreement will describe approved grazing practices for the site, and will limit grazing within the conservation easement to the period between February 1 and April 15. However, the landowner has voluntarily committed to not graze the parcel unless it becomes necessary and approved as a wildlife habitat enhancement tool, and in that case, only during the period between February 1 and April 15.

Improvement Methods

The proposed mitigation approach is to proceed in phases. The first step in the process would be to determine enhancement needs in the spring of 2007 or later. The following steps summarize the anticipated process:

- **Shrub Planting**. At this time, it appears that supplementing the disturbed sagebrush portions with sagebrush seedlings would assist the recovery of this valuable shrub-steppe component that appears to have been grazed hard or impacted by a hard freeze. Approximately 5 to 6 acres would be planted.
- **Inspect for Weed Control Needs**. While onsite planting shrubs, experienced restoration specialists will inspect the parcel for sign of noxious weeds and will spot-spray as needed during that year (one to two applications).

Monitoring

As mentioned earlier, the Applicant is in the process of developing a formal HMP for the Facility in consultation with ODFW and ODOE. The plan will include appropriate monitoring measures for the mitigation sites. At this time, the Applicant proposes to conduct the following monitoring measures:

- **Shrub Planting**. Depending on the number and age of the sagebrush plantings, the Applicant would likely monitor planting success during the first year of planting, and every other year for the first 4 years.
- **Weed Control**. Inspect the conservation easement for noxious weeds during the first year and every other year for 4 years. Weed control monitoring could be conducted during the same years and seasons as the monitoring of shrub plantings.

Conclusions—Net Benefit

In accordance with the definition of mitigation under OAR 635-415-0005 (16d) and OAR 635-415-0025, the Applicant is reducing and eliminating the impact of the Facility over time by preserving and maintaining in-kind habitat in the Columbia Basin ecoregion to achieve a net benefit to Category 2 habitat and no net loss of Category 3, 4, and 5 habitats. Under OAR

635-415-0005 (21), "Net Benefit" is defined as "an increase in overall in-proximity habitat quality or quantity after a development action and any subsequent mitigation measures have been completed and monitored." For Category 2 habitat requiring a net benefit, the Applicant proposes to protect approximately 57 acres of intact sagebrush shrub-steppe habitat of equal or better quality for approximately 19 acres of permanent impacts, using a ratio of 3:1. To mitigate for a total of approximately 45 acres, the Applicant proposes to protect 83 acres of shrub-steppe habitat. By protecting a greater number of acres of native shrub-steppe habitat of equal or better quality within the Columbia Basin ecoregion than the number of acres permanent impacted by the Facility, the proposed habitat mitigation plan results in a net benefit.

Protection of remaining native habitat parcels in the Columbia Basin will benefit native flora and fauna of the region by ensuring dependable habitat availability in the area for the next 30 years, resulting in habitat security that is unprecedented except by federal, state, or other agency ownership. Loss of habitat is often cited as a primary reason for putting fish and wildlife species on the Threatened and Endangered Species List (NHI, 2006). Under the proposed HMP, various subtle ecosystem components that play a role in the overall health of the habitat will be protected from alterations. Proposed enhancement activities will accentuate habitat components needed by many Columbia Basin wildlife species, especially those that are dependant on big sagebrush for nesting, escape, or thermal cover. In addition, opportunities may occur to conduct research on the conservation easement, subject to landowner approval.

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Figures

P-4 ATTACHMENT 1

Memorandum on Habitat Mitigation Parcel

MEMORANDUM

Northwest
Wildlife
Consultants, Inc.

Date: June 9, 2006

To: Sara McMahon

PPM Energy

From: Karen Kronner

Senior Wildlife Biologist

Subject: Draft: Potential Leaning Juniper II Habitat Mitigation Parcel at Holzaphel Section 24

Background Information

A 120-acre portion of privately-owned land adjacent to land owned by Waste Management (Figure 1) is being considered for a habitat mitigation option for habitat impacts resulting from construction of Leaning Juniper. The permanent footprint for Leaning Juniper II equals approximately 64 acres, of which 44.87 acres is within shrub-steppe or annual grassland habitat dominated by rabbitbrush, snakeweed, erigonum and bunchgrass. The remaining permanent footprint is located within non-native developed areas, such as areas associated with the landfill or disturbed areas around residences, old fields and agricultural lands.

Of the 120-acre conservation easement, a portion would be set aside for the purposes of mitigating the permanent footprint of Leaning Juniper II. The conservation easement would preserve habitat similar to the 45 acres of shrub-steppe affected by the project. The remaining acres within the 120-acre conservation easement could be used to mitigate for future wind energy projects.

The property of interest is located south of the Leaning Juniper II lease boundary and west of Arlington landfill and the Leaning Juniper II E turbine string. The 120-acre area is found in the southeast quarter of Township 2 North, Range 20 East and Section 24 (Tax Lot 2318), south of a 120-acre parcel owned by Bureau of Land Management (BLM).

The site of interest was reviewed by two of our staff members; a small portion was walked by Wildlife and Botanical Technician Jerry Baker in December 2005, one brief review was conducted by Karen Kronner on February 16, 2006 and a thorough walk-through was conducted by Karen Kronner on May 10, 2006 during the peak wildlife breeding season and vegetation growing season. In addition, photos were taken of representative portions of the site of interest.

December 2005 Review

On December 8 2005, Wildlife and Botanical Technician Jerry Baker conducted a ground-based survey of the southern approximately 10 acres of the area of interest. The purpose of this initial review was to identify any potentially used Washington ground squirrel (WGS) burrows or colonies that may have been for the 2005 February-May 2005 period. In December 2005, Jerry found sign of WGS use as indicated by burrow holes with confirmed WGS droppings. This sign could have been a result of WGS activity and use in the spring and early summer of 2005. Although by December most of the sign of WGS use could have been obscured by summer or fall season cattle trampling, hard rains, or other above ground activities, diagnostic WGS droppings were readily found in a strip of sagebrush along the southern boundary of the southeast quarter of Section 24 (Figure 2). These findings suggested potential connectivity between WGS colony #4, a 2005 documented use area within the Leaning Juniper II lease boundary in Section 19 to the east, and the WGS burrows in Section 24. Sign of use by burrowing owl was also found and indicated a potential nest site.

February 2006 Review

On February 16, 2006, Karen Kronner reviewed most of the southeast quarter of T2N, R 20E, Section 24 of the Holzaphel property (Tax Lot 2318) located west of Leaning Juniper II turbine string E. The area covered was approximately 160 acres. Meandering transects were walked while looking at the habitat condition and looking for sign of use (old or fresh) by WGS. Other wildlife observations were also noted.

During the February 16 visit, no fresh sign of WGS use was noted. A few WGS were seen and heard in Section 19 to the east (near the 2005 documented use areas); one freshly dug out burrow was noted along a fence line, which appears to correspond with the Section line between Sections 19 and 24.

May 2006 Review

Meandering transects were walked by Karen Kronner again on May 10 2006, throughout the 120-acre of interest. In addition, habitat along the BPA Power line was reviewed for presence of State Sensitive-status species because of the vegetative type: sagebrush and native bunchgrass. The primary goal of this spring season visit was to look for presence of special status wildlife species and to review habitat quality of the 120-acre parcel and 40 additional acres nearby that contained unburned sagebrush.

No fresh sign of use by WGS was found. However, some of the habitat observed in the area could support WGS. For comparison, Ms. Kronner also walked WGS colony #4 located approximately a half-mile east on May 10. Although the colony was still active, it appeared to have less use than in 2005, possibly due to soil moisture conditions that were unusual in early 2006. It is likely that in a more typical precipitation year, the WGS would utilize portions of the 120-acre site in Section 24 in conjunction with the colony in Section 19.

Other wildlife signs were also observed. One long-billed curlew flew over Section 24 and its defensive behavior indicated nesting or chicks nearby. The burrowing owl den discovered in December 2005 was not active. Dense weed growth from the super-saturated soils the past winter may have influenced the species interest in returning to the site. A few savannah sparrows were noted as defending breeding territories and jackrabbit droppings were found at a few locations. No grasshopper sparrows, another State sensitive species found on Leaning Juniper II (low density), were observed. This species is not likely to occur in the 120-acre site until bunchgrass recovers and more nest cover is present.

Seasonal pools with a variety of low-growing forbs were located along the western boundary, as shown in Figure 2. Dense populations of a sensitive plant, Sessile Mousetail (*Myosurus sessilis*), were found in a few of the small temporary pools in the area. It is listed as Candidate by the Oregon Dept. of Agriculture. It has no federal status. According to the Oregon Natural Heritage database, the last previous records of this species in the area are from 1979, along Alkali Canyon Rd. to the south.

Habitat Description

Habitat in the southeast quarter of Section 24 is very similar in vegetation cover and soils as Section 19, where several WGS colonies were found and mapped in 2005. As shown in Photo 1 and 2, the grassland, open low shrub habitat in Sec 24 and adjacent land in this general area is extensive and not too variable, primarily due to past wildfires.

The southeast quarter of Section 24 is approximately 20 to 40 feet lower in elevation than the eastern portion of Section 19. As shown in the aerial photograph, this minor elevation change creates a "basin-like" condition in some areas with pooling of snowmelt and/or rain water. The higher soil moisture in these areas could have influenced the activity of WGS and reduced their use of the area in February and May of this year. The southeast quarter of Section 24 could have more use later in 2006, when the soils become less saturated, or in other dryer years, as indicated by the December 2005 sign of use.

The area was broadly mapped by experienced wildlife biologists as Rabbitbrush-Snakeweed/bunchgrass-annual grass (code SSB) in 2005 to support permit applications for Leaning Juniper. No access was granted at the time of mapping, so no wildlife surveys were conducted on this property during the peak of the growing season and peak of wildlife nesting/denning season until May 2006.

The vegetation cover is mostly open grassland with small patches of residual big sagebrush. The grassland consists of native perennial Sandberg's bluegrass (*Poa secunda*) and non-native bulbous bluegrass (*Poa bulbosa*). Varying densities of snakeweed (*Gutierrezia sarothrae*), rabbitbrush (*Chrysothamus vicidiflorus*) and buckwheat (*Eriogonum* spp.) are found throughout the area (Photo 3). Similar to the whole immediate landscape, a hot fire several years ago resulted in removal of shrub cover such as big sagebrush (*Artemisa tridentata*), and skeleton-like sticks resembling burned sagebrush can be found in many portions of the reviewed area.

Soils types within Section 24 are similar to Section 19, which has been studied for wildlife. The soil type within the area reviewed is Olex Silt Loam on 0 to 5%

slopes and a smaller amount of Krebs Silt Loam on 2 to 5% slopes (USDA Gilliam County Soils Map). Both types are capable of supporting the burrowing mammal, WGS. While the majority of the area provides deep loamy soil conducive to supporting burrowing animals, there are some basalt outcroppings present within the southeast quarter. However, these are very low in profile.

Conclusions

Based on the site visits and field surveys, the proposed area of interest would serve as a suitable conservation easement to mitigate impacts from the permanent footprint of the Leaning Juniper II wind project. The habitat within the area of interest is very similar to much of the Leaning Juniper II project facility footprint. The habitat was broadly mapped as SSB, or Rabbitbrush-Snakeweed/bunchgrass-annual grass. Vegetation cover is mostly open grassland with small patches of residual big sagebrush. Like the wind-leased land, much of the property burned in recent years (1990 or 1991). While the site may not have the potential to support tall, dense bunchgrass over the entire site because of the intermittent shallow soils, there are areas of deeper soils that could support patches of sagebrush, and native bunchgrasses such as blue-bunch wheatgrass (*Pseudoroegneria spicata*) and needle-and-thread grass (*Hesperostipa comata*).

The site also provides habitat for a variety of species affected by the Leaning Juniper II project. Active WGS burrows found in December 2005 indicate that the area could provide additional habitat to WGS using colony #4 near Leaning Juniper II turbine string E in Section 19 to the east. Field surveys also suggest that long-billed curlews and burrowing owls have nested in the area in the past, and could continue to nest here in the coming years. Grasshopper sparrows could also potentially use the area in the long-term, if the bunchgrass were to recover and provide sufficient nest cover.

Modifications to the grazing practices could improve the overall habitat and wildlife use. Continued cattle grazing may be suppressing native shrub and bluebunch wheatgrass recovery. The proposed Conservation Easement will describe approved grazing practices for the site; grazing will be allowed within the conservation easement only between February 1 and March 31. By grazing the annual grasses and recovering native perennial grasses lightly and briefly (February 1 through March 31), vegetative structure can provide nesting cover and other values for wildlife, common and State Sensitive status. It is anticipated that limited grazing practices will allow further recovery of sagebrush and native perennial bunchgrass and enhance the habitat quality. In addition, by insuring proper land use that is compatible with native wildlife of the area and by expanding protection (BLM plus Conservation Easement = 240 acres), wildlife will have secure habitat for at least the life of the Leaning Juniper II Wind Project.

PHOTO LOG

Photo 1. Looking E/NE at Southeast Section 24 and the West/Southwest of Section 19, February 2006 (seasonal pools are outside of Conservation Easement property)

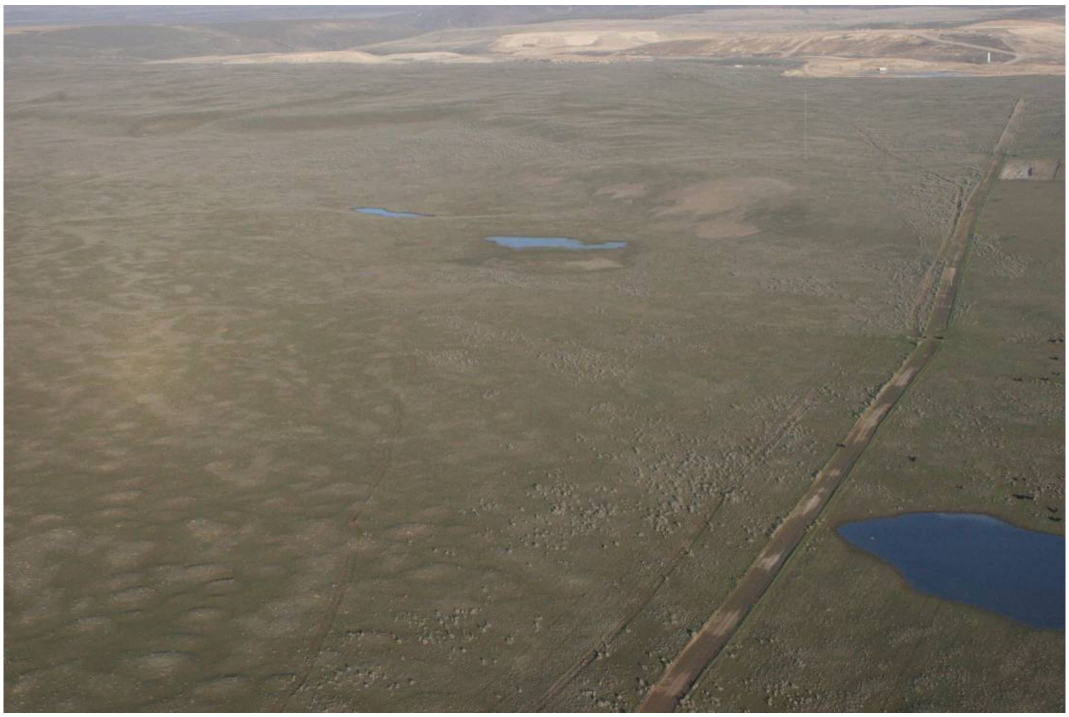


Photo 2. Aerial photo of the south end of Sections 19 and 24, May 2005. (Dirt road is the east-west boundary of the southern portions of Sec. 19 and 24)

Photo 3. Typical vegetative cover of the 120-acre site: Sandberg's bluegrass, cheatgrass, forbs, snakeweed and buckwheat species (May 10, 2006)

Photo 4. Habitat on right is Waste Management property (Leaning Juniper II leased land). Habitat on left of fence is Conservation Easement site.

Northwest Wildlife Consultants, Inc. in an Oregon Registered Woman Business Enterprise Specializing in Eastern Oregon and Washington Wildlife Surveys, Environmental Monitoring and Permitting

P-4 ATTACHMENT 2

Proposed Conservation Easements
Photo Log

Photos of Portions of the 440-acre Native Habitat Parcel and the Leaning Juniper II North and South Conservation Easements

Photo 1. Aerial photo of 440 acres (approximate boundary) of native grassland, shrub-steppe habitat. This is the largest tract of unprotected native habitat in the general area. Most of surrounding land is Conservation Reserve Program (CRP) with smaller tracks of native habitat. A wheat field is located to the north of the western third. The eastern boundary of the property adjoins CRP and native habitat grazed by livestock, primarily horses.

Photo 2. Sagebrush on Facility site frames Leaning Juniper I Wind Project located on the far horizon.

Photo 3. Native bunchgrass habitats are bluebunch wheatgrass, needle and thread, and Sandberg's bluegrass. The cryptogamic crust is in excellent condition because of limited grazing in the past.

Photo 4. Native bunchgrass and sagebrush on plateaus and slopes. Lithosol on steep side slopes. No human activities in the general area except farming.

Photos 5a and 5b. Sagebrush in drainages and on plateaus for loggerhead shrikes and other shrub-dependant Columbia Basin wildlife. This habitat provides nesting, migration, and wintering cover.

Photo 6. Deep soil Ritzville silt-loam on upper slopes and plateaus with signs of use by various burrowing mammals that need deep soil. Ritzville silt loam is the typical soil type that supports Washington ground squirrels throughout the Columbia Basin.

Photos 7a and 7b. Diversity of native forbs and other vegetation supports invertebrates and vertebrates.

Photo 8. A Penstemon species unique to the area is found at moist seeps (July 2006).

Photo 9. Springs where livestock watering has occurred could be converted to wildlife guzzlers.

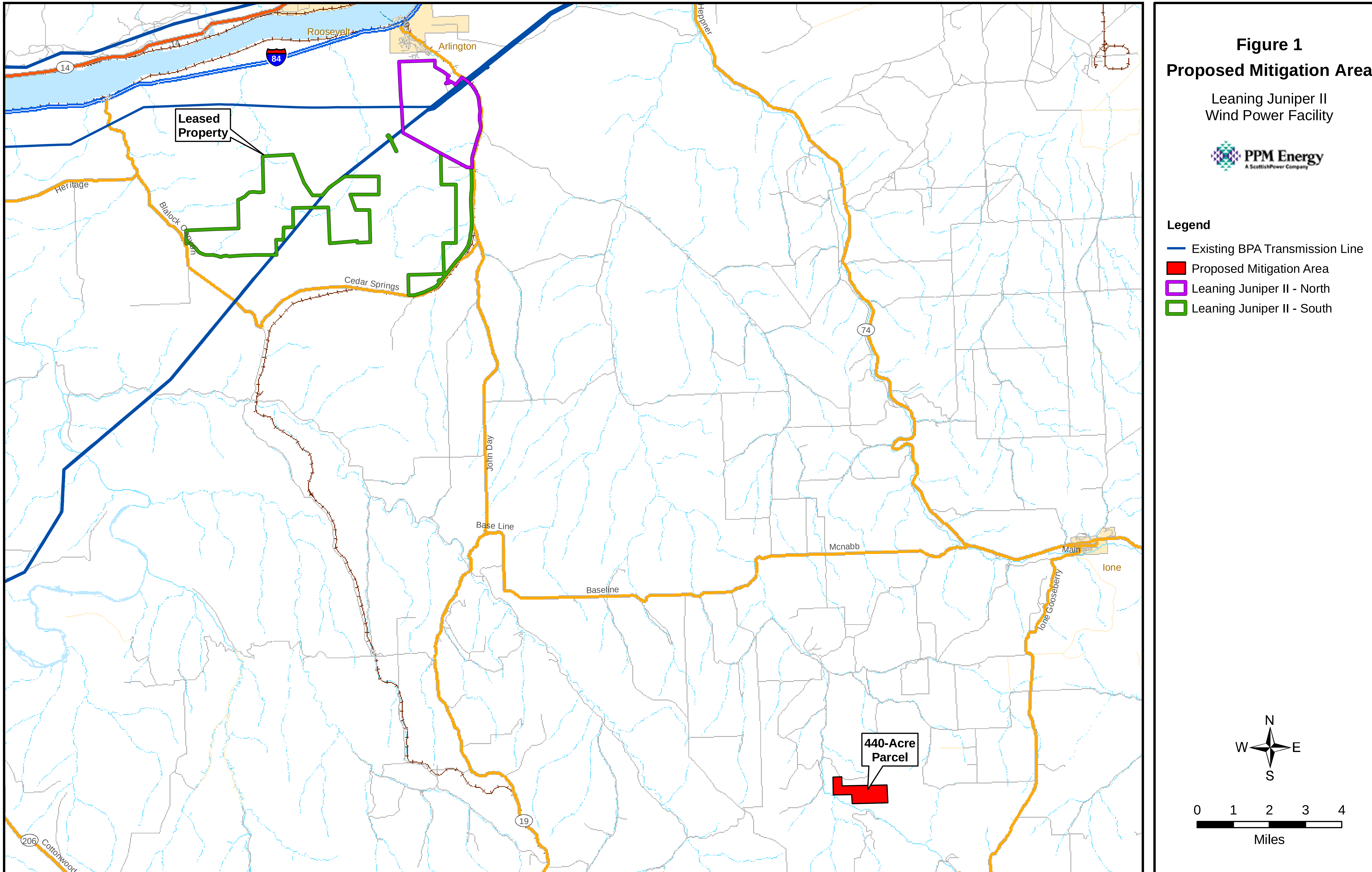
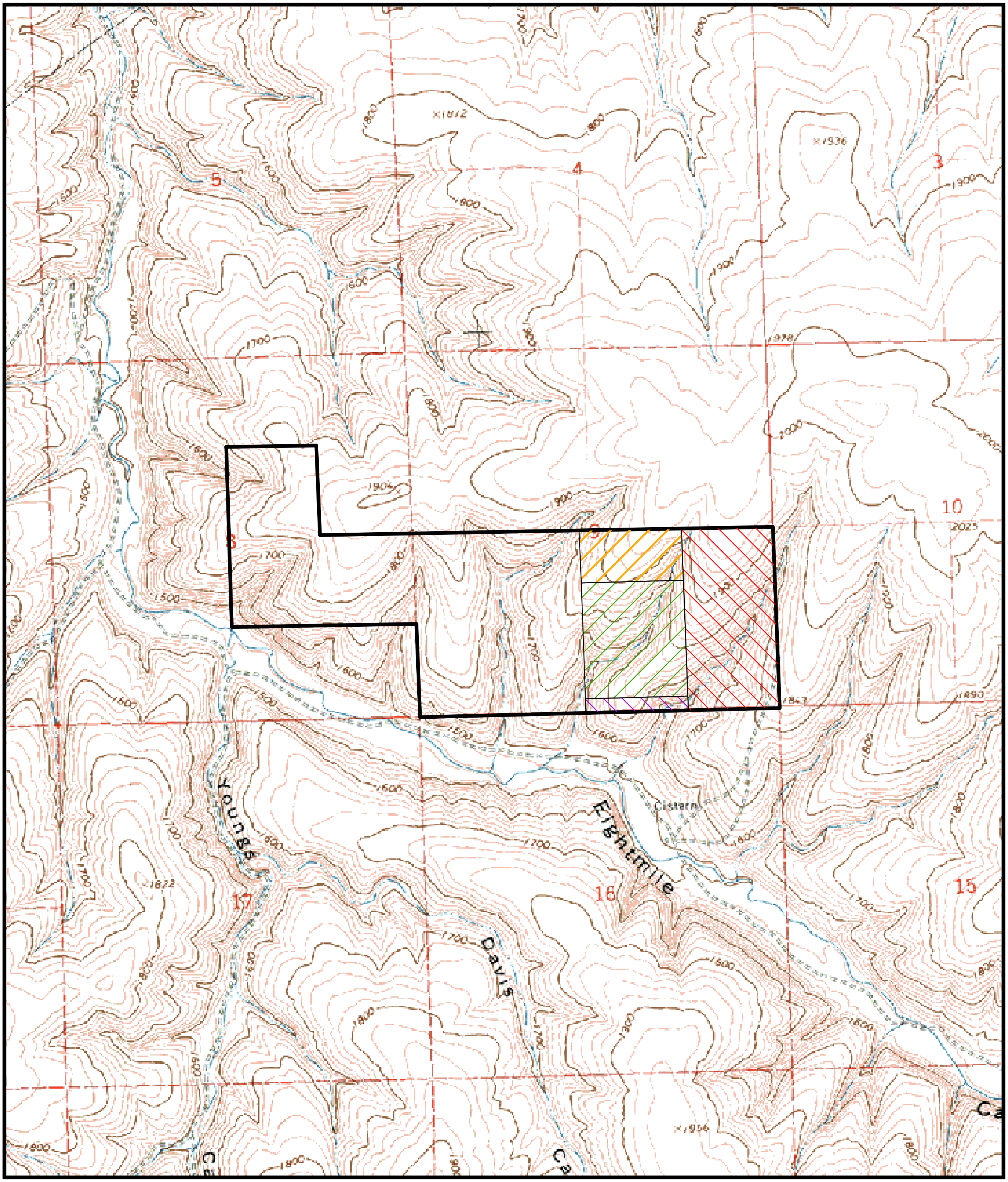


Figure 1
Proposed Mitigation Area
Leaning Juniper II
Wind Power Facility

File Path: \\Porgis01\GIS Data\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Misc\Conservation Easement\Figure 1 -LJ II Proposed Mitigation Area.mxd, Date: September 21, 2006 1:32:09 PM



Legend

- Existing 80-acre Mitigation Site
- LJ II North 26-acre Mitigation Site
- LJ II South 57-acre Mitigation Site
- 7-acre Mitigation Bank
- Proposed Mitigation Area

N

0 1,000 2,000 3,000

Feet

Figure 2

Proposed Mitigation Sites

Leaning Juniper II Wind Project

PPM Energy
A ScottishPower Company

EXHIBIT Q

THREATENED AND ENDANGERED SPECIES

OAR 345-021-0010(q) and OAR 345-022-0070

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TABLES

FIGURES

ATTACHMENTS

Q.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

Q.2 REQUIREMENTS FOR ISSUING A SITE CERTIFICATION

OAR 345-022-0070 *To issue a site certificate, the Council, after consultation with appropriate state agencies, must find that:*

(1) For plant species that the Oregon Department of Agriculture has listed as threatened or endangered under ORS 564.105(2), the design, construction, operation and retirement of the proposed facility, taking into account mitigation:

(a) Are consistent with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3); or

(b) If the Oregon Department of Agriculture has not adopted a protection and conservation program, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species; and

Response:

The evidence provided in this Exhibit demonstrates that this standard has been met for plants, because no populations of plant species listed as threatened or endangered under ORS 564.105(2) were found in the study area, and, based on habitats present, no listed species have the potential for occurrence. There is no plant protection and conservation program for the site, thus 1(a) does not apply.

(2) For wildlife species that the Oregon Fish and Wildlife Commission has listed as threatened or endangered under ORS 496.172(2), the design, construction, operation and retirement of the proposed facility, taking into account mitigation, are not likely to cause a significant reduction in the likelihood of survival or recovery of the species.

Response:

The standard has been met for wildlife. Based on extensive onsite studies and information reviews, listed wildlife species are not likely to occur at, or be affected by, the Facility, except for the state endangered Washington ground squirrel (WGS), which was found in a few scattered colonies near the proposed Facility. No permanent facilities will be placed within documented, active WGS colonies. The Facility has been designed to avoid these areas.

Some impacts might occur to the WGS as a result of temporary habitat impacts and/or incidental injuries or kills caused by construction and operation traffic. However, no significant impacts will occur that would jeopardize the survival or recovery of the species. Furthermore, the Applicant applied for an Incidental Take Permit (ITP) from the Oregon Department of Fish and Wildlife (ODFW) for Leaning Juniper II South, the portion of the Facility near WGS colonies, to address the potential for incidental takes of this species, as further described in Section Q.6. Following a brief discussion of the analysis area, this Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(q).

Exhibit Q addresses state and federally listed and candidate species. Exhibit P contains a discussion of Oregon sensitive status as well as nonlisted species.

Q.3 ANALYSIS AREA

OAR 345-001-0010(53)(b) *"Study area" means an area defined in this rule. For a notice of intent, the study areas are the minimum areas for which an applicant shall assess environmental impacts. For an application for a site certificate in an expedited review granted under OAR 345-015-0300 or 345-015-0310, the applicant shall use these study areas as analysis areas, subject to modification in the project order. For the purposes of this definition, "site boundary" means the perimeter of the site of the proposed energy facility, its related or supporting facilities, all temporary laydown and staging areas and, for a facility that is a pipeline or a transmission line, all corridors proposed by the applicant. Except as specified in subsections (g) through (j), the study area is an area that includes all the area within the site boundary and the area within the following distances from the site boundary:*

OAR 345-001-0010(53)(b) *For impacts to threatened and endangered plant and animal species, 5 miles.*

Response:

This section describes the analysis area with regard to threatened and endangered (T&E) species. Figure Q-1 depicts the 5-mile analysis area for T&E species.

Q.3.1 Description of Lease Boundary

It is requested that the Site Certificate authorize a lease boundary "corridor" as described in Exhibit C. Turbines will be placed within a defined corridor rather than at specific points, in order to retain flexibility to microsite turbines at the optimal locations for wind capture, impact avoidance, and geotechnical conditions at the Facility site.

Because micrositing corridors, for ease of description and depiction, are generally regularly shaped polygons, certain micrositing corridors overlap with patches of Category 1 habitat and occupied WGS colonies. However, the Applicant will site all permanent facilities outside Category 1 habitat when finalizing the layout. No permanent facilities will be located within WGS colonies or other Category 1 habitat such as historical raptor nest sites.

Q.3.2 Description of Threatened and Endangered Species Analysis Area

Q.3.2.1 Threatened and Endangered Plants

The area within 5 miles of the Facility lease boundaries was analyzed for T&E plant species in accordance with OAR 345-001-0010(53)(b). A database search was requested for federally listed plants within 5 miles of the lease boundaries from the USFWS. The Applicant also researched recorded occurrences of both state and federally listed species within 5 miles of the lease boundaries. A habitat level survey was then conducted based on species identified as possibly occurring within the Facility site boundaries. The habitat level survey is summarized in Attachment Q-1. No suitable habitat for state or federally listed species was found to exist within the Facility boundaries.

Q.3.2.2 Threatened and Endangered Wildlife

The area within 5 miles of the Facility lease boundaries was also analyzed for T&E animal species (OAR 345-001-0010(53)(b). A database search was requested for federally listed species within 5 miles of the lease boundaries. In addition, recorded occurrences of both state and federally listed species within 5 miles of the lease boundaries were identified. Raptor nests were identified through aerial field surveys within 2 miles of the proposed Facility lease boundaries in 2005 and/or 2006, as described in Exhibit P. None of the expected nesting species are threatened or endangered status. Habitat areas suitable for T&E wildlife were surveyed by means of spring season walking transects within 1,000 feet of the Leaning Juniper II South components based on the 2005 layout. All habitat suitable for T&E wildlife within the entire Leaning Juniper II North leased area was surveyed by spring season walking transects in 2006.

The multi-species survey corridor is shown on Figure Q-2. Surveys were not conducted in disturbed areas lacking suitable habitat, such as plowed wheat fields or residential/ farmyard areas. For Leaning Juniper II North, all suitable habitat within the micrositing corridor and lease boundary are within the study area that was surveyed for wildlife species. For Leaning Juniper II South, most suitable habitat within the micrositing corridor and lease boundary is within the study area that was surveyed for wildlife species. For any facilities proposed outside the wildlife survey corridor, the Applicant commits to pre-construction surveys and avoidance of T&E species.

Q.4 THREATENED AND ENDANGERED SPECIES THAT MIGHT BE AFFECTED

OAR 345-021-0010(1)(q) *Information about threatened and endangered plant and animal species that may be affected by the proposed facility, providing evidence to support a finding by the Council as required by OAR 345-022-0070. The applicant shall include:*

> *(a) Based on appropriate literature and field study, identification of all threatened or endangered species listed under ORS 496.172(2), ORS 564.105(2) or 16 USC § 1533 that may be affected by the proposed facility[.]"*

Response:

See sections Q.4.1 through Q.4.2.

Q.4.1 Scope of Literature Review and Field Studies

Q.4.1.1 General

To identify state and federally listed species possibly occurring within 5 miles of the Facility, the U.S. Fish and Wildlife Service (USFWS) and the Oregon Natural Heritage Information Center (ORNHIC) databases were queried for information on listed and sensitive plant and wildlife species. As of February 2006, the USFWS no longer provides project-specific species lists, so the USFWS provided a list of federally listed plants with the potential to occur in Gilliam County, OR, which includes the area within 5 miles of the lease boundaries.

The 5-mile analysis area also includes a portion of Klickitat County. In the interest of completeness, the Applicant also obtained a USFWS species list for Klickitat County, Washington. Species list that were not also included in the Gilliam County list, such as the Gray wolf and Canada lynx, were eliminated from further review based on a lack of suitable habitat and because the USFWS does not include these species in their list of species with potential to occur in Gilliam County. These species have the potential to occur in Klickitat County on the north side of the Columbia River, but were not identified by the USFWS as having the potential to occur on the south side of the River within Gilliam County. No portion of the analysis area is located within Morrow County or other Counties in Oregon or Washington.

The ORNHIC provided records of species within 5 miles of the lease boundaries. Copies of the correspondence and responses are provided in Attachment Q-2. The ORNHIC noted that the data is confidential and requested that the data not be distributed. The data can be provided to the ODFW and Oregon Department of Energy (ODOE) upon request, with the permission of the ORNHIC.

The Applicant reviewed the list of species obtained from the USFWS and ORNHIC and assessed the potential for these species to occur based on suitable habitat, professional experience and consultation with ODFW.

Given that no populations of T&E plant species listed were found in the study area, no Oregon Department of Agriculture (ODA) plant protection and conservation programs apply to the Facility. No wildlife conservation programs are in place either.

The ODFW was contacted for information on wildlife habitat requirements and distribution. Additional sources were also reviewed for relevant biological resource information, as further described in the Wildlife Baseline Study included as Attachment P-2 to Exhibit P. Some of the technical reports reviewed as part of the baseline study or that were available after completion of the baseline study were:

- Current Status of Washington Ground Squirrels in Oregon and Washington (Betts, 1999)
- Status and Habitat Use of the Washington Ground Squirrel (*Spermophilus washingtoni*) on State of Oregon Lands, South Boeing, Oregon, in 1999 (Morgan and Nugent, 1999)
- Dispersal Patterns of Washington Ground Squirrels in Oregon (Klein, 2005)
- Home Range, Movement, and Foraging Behavior of Adult Washington Ground Squirrels (Delevan, 2005)
- Biological Enhancement Study for the Columbia Ridge Landfill and Recycling Center (Waste Management, 1990)
- Results of Peregrine Falcon Breeding Area Monitoring in Oregon during 2005: Final Report (Isaacs, 2005)
- Ecological Baseline Study for Mar-Lu Wind Power Project—Arlington, Oregon (Kronner 2004)
- Results of 2005 Bald Eagle Nest Monitoring (Isaacs, 2006)

Q.4.1.2 Plants

The USFWS and the ORNHIC were queried for information on listed and sensitive plant species in Gilliam County, recorded within 5 miles of the Facility lease boundaries.

The Applicant contracted with CH2M HILL to prepare a preliminary rare plant habitat assessment for the Facility, based on literature review and field surveys (CH2M HILL, 2005, 2006). This report is included as Attachment Q-1. As part of the investigation, a review of available literature and other sources was conducted to identify rare plant species that might be found within the analysis area. The ORNHIC was contacted to obtain element occurrence records for any known rare plant populations within 5 miles of the lease boundaries (ORNHIC, 2003). In addition, a list of federally threatened, endangered, or candidate taxa that could occur within the analysis area was requested from the USFWS (CH2M HILL and NWC, 2005 and 2006). The USFWS responded with electronic communication that provided a list of federally listed species within Gilliam County.

To supplement the information provided by the above agencies, a number of other sources were consulted, including the following:

- Eastman, Donald C. *Rare and Endangered Plants of Oregon.* Beautiful America Publishing. Wilsonville, Oregon. 1990.
- Hitchcock, C. L. and A. Cronquist. *Flora of the Pacific Northwest.* University of Washington Press. Seattle & New York. 1973.

- Meinke, Robert J. (1982). Threatened and Endangered Vascular Plants of Oregon: an Illustrated Guide. Oregon State University Press. Corvallis, Oregon.
- Niehaus, T. F. and C. L. Ripper (1976). A Field Guide to Pacific States Wildflowers: Washington, Oregon, California, and Adjacent Areas. The Peterson Field Guide Series. Houghton Mifflin Company. Boston and New York.
- Oregon Natural Heritage Program. 2001. *Rare, Threatened and Endangered Plants and Animals of Oregon.* Oregon Natural Heritage Program, Portland, Oregon.
- Washington Natural Heritage Information System (2005). *Endangered, Threatened, and Sensitive Vascular Plants of Washington.*
- *Interactive Plant Keys and Color Photos for Oregon,* version 4.1. Oregon Plant Atlas., Flora ID Project

These sources provided additional information on possible rare plant species in the Facility area and included critical information such as habitat preferences, morphological characteristics, phenologic development timelines, and species ranges.

Rare plant species potentially occurring near the Facility site boundaries were identified based on the results of the ORNHIC and USFWS responses, and are listed in Table Q-1 along with the survey results. Habitat preferences were derived from the literature for each potential species. With this information, a field investigation was conducted to evaluate soils, hydrology, and vegetation in order to determine if appropriate habitat existed onsite for these species.

Q.4.1.3 Wildlife

The USFWS, ORNHIC, and ODFW were queried for information on listed and sensitive wildlife species in Gilliam County recorded within 5 miles of the Facility lease boundaries. In addition, existing literature and scientific data were reviewed and ODFW biologists were contacted to determine species distribution and habitat requirements.

The Applicant enlisted the expertise of Northwest Wildlife Consultants, Inc. (NWC), located in Pendleton, Oregon, and Western EcoSystems Technology, Inc. (WEST), located in Cheyenne, Wyoming, to conduct literature reviews and wildlife impact analyses for Leaning Juniper II South and North. NWC designed and conducted wildlife and habitat field investigations, established avian use study plot locations, and conducted and managed the study and conducted literature reviews. WEST analyzed the avian use study data. NWC and WEST prepared the Wildlife Baseline Study, which summarizes the literature review and field investigations and includes a discussion of potential impacts on wildlife (see Attachment P-2). Following is a more detailed description of the study protocols executed for each of Leaning Juniper II South and North.

Leaning Juniper II South

In early winter 2004-2005, NWC began the Wildlife Baseline Study by drafting a biological resources study protocol, which was reviewed and approved by Gilliam County Planning Department and the ODFW. A copy of the protocol is included as Appendix A to the Wildlife Baseline Study. The study protocol included several components for addressing potential impacts on vertebrate wildlife from the construction and operations of the Facility. In addition to a review of existing information such as existing reports and public databases, the site-specific studies included the following:

- Site reconnaissance in 2003 for suitable WGS habitat
- Wildlife habitat mapping in 2004
- Avian use study conducted fall 2004 through summer 2005
- Raptor nest survey in 2005 and raptor nest monitoring in 2006
- WGS surveys in 2005 and spot-checking or monitoring of 2005 sites from March-June 2006
- Special status species surveys in 2005 (surveys for state sensitive status wildlife using the site's habitats during the spring-early summer breeding season)
- Bat species review (habitat suitability and potential for occurrence)
- Wildlife habitat rating in 2005 and 2006

Leaning Juniper II North

In the spring of 2006, NWC conducted multi-species surveys throughout suitable habitat within all the leased land for Leaning Juniper II North, following the same survey protocol used for Leaning Juniper II South. In addition to a review of existing information such as existing reports and public databases, the site-specific studies included the following (all during spring, 2006):

- Spring Avian use study
- Raptor nest survey
- WGS and special status species surveys in 2006 (surveys for state sensitive status wildlife using the site's habitats during the spring-early summer breeding season)
- Wildlife habitat rating in 2006

All suitable habitats within the micrositing corridor and lease boundary are within the study area that was surveyed for wildlife species.

Q.4.1.4 Fish

The nature of the Facility developments, on gentle ridgelines or plateaus lacking perennial stream channels, precludes the presence of any fish species of concern (listed or nonlisted) or their habitats within or adjacent to the proposed developments.

Q.4.2 Identification of Species that Might be Affected

Based on literature review, technical report review, the experience of the field surveyors, and preliminary agency contacts, a list was generated of all listed plant and animal species either known to occur or having the potential to occur within the analysis area. Table Q-1 lists those species included in the USFWS Gilliam County list and ORNHIC database search for the 5-mile analysis area, along with a description of potential occurrence based on the literature review and field surveys.

Federal species of concern, state sensitive species, and other nonlisted, rare species are addressed in Exhibit P; this Exhibit addresses all state and federally listed candidate and proposed species. Candidate and proposed species are included in Exhibit Q because of their potential for listing during the Facility application process. A narrative discussion of all species on the broader list follows, along with a more in-depth review for the WGS and a plant, Sessile mouse-tail, the species with documented habitat and occurrence in the general area.

The presence of T&E plant and wildlife species for both Leaning Juniper II North and South is presented in Table Q-1.

Table Q-1. State and Federal Listed, Candidate, and Proposed Species with the Potential to Occur within 5 Miles of the Facility Lease boundaries

Species	Federal Status[1]	State Status[1]	ORNHIC List[2]	Occurrence at LJ II		Impact Potential at LJ II	
				North	South	North	South
Plants							
Northern wormwood (*Artemisia campestris ssp. wormskioldi*)	C	LE	1-ex	No	No	No	No
Sessile mouse-tail (*Myosurus sessilis*)	SC	C	1	Yes	Yes	No	No
Mammals							
Washington ground squirrel (*Spermophilus washingtoni*)	C	LE	1	No	Yes	No	Yes
Gray wolf (*Canis lupus*)	LE		—	No	No	No	No
Canada lynx (*Lynx canadensis*)	LT		—	No	No	No	No
Fish							
Steelhead – Mid-Columbia River ESU, summer run (*Oncorhynchus mykiss*)	LT	SV	2,3	No	No	No	No
Steelhead – Upper Columbia River ESU	LE	--	--	No	No	No	No
Steelhead – Snake River Basin ESU	LT	--	2,3	No	No	No	No

Table Q-1. State and Federal Listed, Candidate, and Proposed Species with the Potential to Occur within 5 Miles of the Facility Lease boundaries

Species	Federal Status[1]	State Status[1]	ORNHIC List[2]	Occurrence at LJ II		Impact Potential at LJ II	
				North	South	North	South
Sockeye Salmon – Salmon River Tributary to the Snake River (*Oncorhynchus nerka*)	LE	–	–	No	No	No	No
Chinook Salmon – Snake River ESU, spring/summer and fall runs (*Oncorhynchus tshawytscha*)	LT	LT	1	No	No	No	No
Chinook Salmon – Upper Columbia River ESU (*Oncorhynchus tshawytscha*)	LE	–	–	No	No	No	No
Bull trout (*Salvelinus confluentus)*	LT		__	No	No	No	No
Birds							
Bald Eagle (*Haliaeetus leucocephalus*)	LT	LT	4	Low Potential	Low Potential	Low Potential	Low Potential
American Peregrine Falcon (*Falco peregrinus anatum*)	-	LE	2	Very Infrequent	Very Infrequent	Low Potential	Low Potential
Yellow-billed Cuckoo (*Coccyzus americanus*)	C	–	–	No	No	No	No

[1] **State and Federal Status Definitions**

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

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

PE – Proposed Endangered. Taxa proposed by the above agencies to be listed as endangered.

PT – Proposed Threatened. Taxa proposed by the above agencies to be listed as threatened.

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

SC – State Sensitive-Critical. Species for which listing is pending, or those for which listing may be appropriate if immediate conservation activities are not taken. Also considered critical are some peripheral species which are at risk throughout their range, and some disjunct populations.

[2] **ORNHIC Definitions**

List 1 – Taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

List 2 – Taxa threatened with extirpation or presumed extirpated from Oregon; often peripheral or disjunct species which are of concern considering species diversity within Oregon; can be very significant in protecting the genetic diversity of the taxon; ONHP regards extreme rarity as a significant threat and has included species which are very rare in Oregon on this list.

List 3 – Taxa for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

List 4 – Taxa which are of conservation concern but not currently threatened or endangered; including taxa that are very rare but considered secure as well as those declining in numbers or habitat but still too common to be proposed as threatened or endangered; these taxa require continued monitoring.

Ex – Presumed extirpated or extinct

[3] A "yes" in this column denotes the potential for impacts, whether significant or not, and means that the species will be considered in more detail in the subsequent sections of this Exhibit.

Q.4.2.1 Plants

Two state or federally listed or candidate species were identified as potentially occurring within 5 miles of the Facility lease boundaries.

The list of federally threatened, endangered, or candidate taxa provided by the USFWS did not indicate any federally endangered or threatened species within Gilliam County (CH2M HILL and NWC, 2005 and 2006). Only one federal candidate species was identified as possibly occurring in Gilliam County, the northern wormwood (*Artemesia campestris ssp. wormskioldii*). However, according to correspondence with the ORNHIC, no occurrences for this species have been recorded within 5 miles of the Facility lease boundaries.

The ORNHIC database search identified only one plant species, Sessile mouse-tail (*Myosurus sessilis*), as having been observed within 5 miles of the lease boundaries. It is listed as a candidate species by the ODA. It has no federal status. This species occurs in vernal pools and alkali flats.

<u>Leaning Juniper II North</u>

A reconnaissance-level survey was conducted in the spring of 2006 with the purpose of determining if potential habitat existed to support rare plants, as described in Attachment Q-1. CH2M HILL evaluated the site for potential habitat conditions that will support this species. In addition, NWC looked for the Sessile mouse-tail in suitable habitats encountered during the 2006 wildlife surveys. Habitats observed in the course of the field investigation included shrub-steppe and upland riparian shrub-steppe. Streams within the Facility lease boundaries are intermittent or ephemeral. The surveys were conducted during the blooming season to observe the species listed in Table Q-1, including Sessile mouse-tail (*Myosurus sessilis)*. Sessile mouse-tail occurs only in a very specific habitat type: alkali flats and vernal pools. Alkali flat habitat was identified in a number of locations near Leaning Juniper II North, though no surface water was present at vernal pools within this area at the time of the field investigation. Populations of Sessile mouse-tail plants were identified in three different vernal pools in the central part of the leased area, as shown on Figure Q-3.

Myosurus sessilis has no federal ESA status and is identified as a candidate for listing by the state of Oregon. It is therefore not subject to federal or state ESA regulations.

<u>Leaning Juniper II South</u>

For Leaning Juniper II South, a reconnaissance-level survey was conducted in 2004 with the purpose of determining if potential habitat existed to support rare plants, as described in Attachment Q-1.

CH2M HILL evaluated the site for potential habitat conditions that will support this species. Habitats observed in the course of the field investigation included cultivated wheat fields, shrub-steppe, and upland riparian shrub-steppe. Streams within the Facility lease boundaries are intermittent or ephemeral. While the survey was not conducted during the proper season to observe the species listed in Table Q-1, Sessile mouse-tail (*Myosurus sessilis)* occurs only in two very specific habitat types: alkali flats and vernal pools. The alkali flat habitat identified in the vicinity of Leaning Juniper II South was determined to be in Alkali Canyon, outside of the leased land boundary, east and south of the site. No surface water was present within the site at the time of the field investigation. No alkali flat or vernal pool habitats were observed during this field investigation.

In 2006, the site experienced wetter conditions than in the two previous years, and some wet vernal pools were identified during other spring-season field surveys in the area. Follow-up surveys were conducted at vernal pools within Leaning Juniper II South in the spring of 2006, and one population of Sessile mouse-tail plant was identified in a vernal pool near WGS colony # 4, as shown on Figure Q-4.

Myosurus sessiis has no federal ESA status and is identified as a candidate for listing by the state of Oregon. It is therefore not subject to federal or state ESA regulations.

Q.4.2.2 Animals

According to the database results received from USFWS and ORNHIC, as well as additional contacts and references consulted during as part of the wildlife baseline study, federally listed or candidate wildlife that could occur in Gilliam County are the bald eagle, the Washington ground squirrel, and the yellow-billed cuckoo, as well as six federally listed fish species. The yellow-billed cuckoo is not likely to occur in or near the Facility lease boundaries because of the lack of habitat at the site or adjacent to the site. In addition, the yellow-billed cuckoo is considered a "rare and irregular visitor east of the Cascades" (Marshall, et al. 2003), utilizes more mesic habitats such as riparian deciduous trees, and is not expected to occur within the Facility vicinity. Because there are no anticipated impacts on the yellow-billed cuckoo, this species will not be addressed further within this Exhibit.

American Peregrine Falcon (*Falco peregrinus anatum*)

The peregrine falcon, a state-listed (no federal listing status) species, is not known to nest within 5 miles of the Facility, but one peregrine has been seen at the town of Arlington, approximately 1 mile from the lease boundaries. There is suitable nesting habitat for peregrine falcons on basalt cliffs along the Columbia River within 5 to 7 miles of the Facility, although no active nests have been recently confirmed. The nearest known active nest in 2005 (location withheld) was approximately 11 miles from the Facility (Isaacs, pers. comm. 2005). A few historical nests are located from 7 to 30 miles away from the Facility area. One closer site not used but with adults showing interest in nesting is approximately 5 miles from the nearest turbine. Although occasional prairie falcon (a related species) fatalities have been observed at some wind projects (Erickson et al., 2001, 2002), extremely low risk is anticipated for peregrine falcons because none were observed during the Facility or nearby Mar-Lu wind project baseline surveys (NWC and WEST, 2005; Kronner, 2004) and no active nests or are known to be present near the Facility site. Nests closes to the site may be within foraging range of nesting peregrines. However, none were observed during the extensive field studies conducted onsite. Peregrine falcon researchers suspect the nesting birds forage extensively on rock doves (pigeons) along the Columbia River basalt cliffs (Clowers, pers. comm.). One pair of peregrine falcons nested at approximately 5 miles from the closest Stateline wind turbine but none were found as casualties during 2.5 years of intensive monitoring or were found incidentally after the end of the studies (Kelley, D., pers. comm.). None have been found as fatalities at the Nine Canyon Wind Project in southeast Washington or Combine Hills Wind Project near Stateline Wind Project.

No peregrine falcons were observed during the multiple-year avian field work in the Facility areas. In addition, NWC contacted ODFW and others who are monitoring the historical sites closest to the Facility in 2006 and no new nest sites have been confirmed as of May 9, 2006 (NWC personal communications with Steve Cherry, ODFW Heppner District, on May 9, 2006). Based on relatively low use of the site and lack of peregrine falcon mortality at existing Pacific Northwest wind farms, it is unlikely that the Facility would have any significant impact on peregrine falcon populations in the area. Further information is provided in the Wildlife Baseline Study included as ASC Attachment P-2.

Bald eagle (*Haliaeetus leucocephalus*)

The bald eagle was listed as endangered in the conterminous United States under the ESA on March 6, 1967. The Bald Eagle is presently protected by the Endangered Species Act (ESA) of 1973, Bald Eagle Protection Act of 1940, Migratory Bird Treaty Act of 1918 and the Lacey Act. It is presently listed as a "threatened" species in the lower 48 states under the ESA.

The population in the Pacific Northwest was downlisted on February 14, 1978, to threatened. Eagles in the remaining states were subsequently downlisted to threatened on July 12, 1995. Bald eagle populations have rebounded considerably within the last few years, with nearly all recovery goals met for Oregon, Washington, and other regions of the country. Bald eagle nest surveys have been conducted in Oregon for 28 years (as of 2005) and the history of use has been documented for 1,303 nest trees at 502 nest sites in Oregon and Washington (as of 2003). As of 2004, the nesting population had increased from 56 to 416 pairs, nearly doubling each decade (Isaacs and Anthony, 2001; Isaacs, 2004). Net increase in the Oregon population was 3.2 percent for 2005 (Isaacs and Anthony 2005).

On July 6, 1999, the USFWS proposed delisting bald eagles. In February 2006 the USFWS re-opened the 90-day comment period on three proposals related to removing the bald eagle from the threatened list. It closed June 19, 2006 and a court has ordered that USFWS make a determination on delisting by 16 February 2007 (Isaacs, pers. comm. 2006). If delisted, bald eagles and golden eagles will continue to be protected under the Bald and Golden Eagle Protection Act of 1940 (as amended) and the Migratory Bird Treaty Act.

The northern bald eagle is closely associated with freshwater, estuarine, and marine ecosystems that provide abundant prey and suitable habitat for nesting and communal roosting. Breeding territories are typically located within 1 mile of permanent water in predominantly coniferous, uneven-aged stands with old-growth structural components. Bald eagles winter along ice-free lakes, streams, and rivers where food and perch sites are abundant and the level of human disturbance is low. Communal night roosts are used by bald eagles primarily during the winter months. In the Pacific Northwest, communal roosts generally occur in multi-layered mature or old-growth conifer stands that provide protection from weather and human disturbance.

Home-range size varies greatly, according to food abundance and the availability of suitable nest and perch trees. Favored nest trees are usually the largest trees or snags in a stand that provides an unobstructed view of the surrounding area and a clear flight to and from the nest (Isaacs and Anthony, 2001; Isaacs, 2004). Nests are usually built on limbs just below the crown, with the canopy above providing cover. Nesting behaviors typically begin in January, followed by egg laying and incubation in February and March. Young are reared throughout April, May, and June. Fledging occurs in July and August. Bald eagles are primarily predators, but they are also opportunistic scavengers that feed on a variety of prey, including salmon, other fish, small mammals, waterfowl, seabirds, and carrion (Snow, 1981). Bald eagles usually forage in large open areas with a wide visual field and suitable perch trees near the food source.

No bald eagles were observed in the vicinity of the Facility during the avian baseline study conducted as part of the wildlife baseline study. Bald eagles winter along the Columbia River several miles north of the Facility lease boundaries, concentrating their foraging and roosting in areas along or close to the Columbia River. They are known to scavenge on animal carcass carrion and small mammals in the uplands during winter, although this was not recorded at Leaning Juniper during the avian baseline studies. The nearest known nest is more than 47 miles from the Facility. Bald eagles might pass through the site infrequently during spring and fall migration or during the winter. This low level of use is consistent with bald eagle use at the nearby proposed Mar-Lu Wind Facility (one observed during winter) and other existing wind facilities, including the other regional wind facilities, as further described in the baseline study. However, unlike golden eagles, bald eagles do not appear susceptible to colliding with wind turbines, probably because of their differences in foraging habits (golden eagles are predators and move through the landscape in search of upland prey, whereas bald eagles tend to feed on fish or scavenge). In addition, there have been no reported instances of bald eagle fatalities at any U.S. wind facility (Erickson et al., 2001; interviews with regional wind facility managers, 2005 and 2006). Therefore, it is unlikely the Facility will have negative effects on bald eagles.

Washington Ground Squirrel (*Spermophilus washingtoni*)

The WGS is a state-endangered species and a federal candidate species. This species historically was abundant in the sagebrush (*Artemesia tridentata*) and/or bluebunch wheatgrass (*Pseudoroegneria spicatum*) and other native bunchgrass habitats throughout the Columbia plateau east and south of the Columbia River in Washington and Oregon (Bailey, 1936; Howell, 1938). Its current range is not exactly known, but it is greatly reduced from the historical range (Betts, 1990). Overall, 69 percent of historical habitat for WGS is no longer inhabited (Wisdom et al., 2000). Agricultural and grazing activities have fragmented and disturbed the native vegetation. Today, much of the remaining native habitat in the Columbia Basin is dominated by rabbitbrush (*Chyrysothamnus visciduiflorus* and *C. tectorum*) and cheatgrass (*Bromus tectorum*) or is grazed intensively; grazing has reduced forage and cover for the ground squirrels and burrows have been trampled. In this degraded habitat, the WGS is found most often in areas that have good cover (annual grasses and forbs, some shrubs) and deep, loose soils with low clay content, enabling burrow excavation.

The WGS is the only listed terrestrial species with documented habitat and occurrence within 5 miles of the Facility. Both the ORNHIC and a biological enhancement study completed for the Columbia Ridge Landfill and Recycling Center described the presence of WGS near the Facility. Because of the historical and recently active WGS colonies documented in the vicinity of the Facility and suitable soils, NWC conducted site reconnaissance in 2003 for suitable WGS habitat and extensive protocol-level surveys in 2005.

No WGS colonies were discovered during surveys of Leaning Juniper II North.

Active WGS colonies were discovered in several locations within the surveyed corridors near Leaning Juniper II South, as shown in Figures Q-4 through Q-7 and described in Table Q-2. There were five primary patches or occupied colonies and one of these consisted of five smaller areas. The sites ranged from 3 to 74 acres in size and from very low density to dense. There was also a small patch of WGS use west of the E string without natal sites. Some active sites extended onto unsurveyed areas (outside of the established survey corridor), as squirrels were heard calling from those areas during the surveys.

Most WGS colonies were located in habitat broadly defined during the fall 2004 habitat mapping as shrub-steppe and further typed as having a vegetative cover of rabbitbrush-snakeweed-buckwheat/bunchgrass (SSB). In addition to low, open shrub cover, these sites contain a few species of buckwheat (*Eriogonum spp*.), Sandberg's bluegrass and non-native cheatgrass. Most of these areas are sagebrush-steppe attempting to recover from frequent burning. Sagebrush is very limited and residual, and unburned sagebrush patches mapped as SSA are present in a few colonies. During the original surveys in 2005, approximately 87 acres of occupied WGS areas were documented within SSB, 20 acres in SSA and 4 acres of occupied WGS areas within the annual grassland (GA) habitat type within the Facility lease boundaries. Based on soils and habitat, more WGS colonies are likely to be present in the vicinity of the Facility, in uncultivated areas that have not been surveyed. There are approximately 3,650 acres of the SSB habitat type and 485 acres of GA within the Facility lease boundaries. The complete 2005 WGS survey methods and results are provided in the Wildlife Baseline Study (Attachment P-2). The 2006 WGS colony monitoring results are included in Attachment P-2. The 2006 survey methods and results are included in this Exhibit text (Section Q.4.1.3 and Table Q-2).

<u>*Sensitive Fish Species*</u>

The database results identified six evolutionarily significant units (ESUs) of federal listed anadromous fish that occur within Gilliam County, including steelhead (three ESUs), sockeye salmon (one ESU), and chinook salmon (two ESUs).

Table Q-2. 2005 Washington Ground Squirrel Colonies Identified Near Leaning Juniper II South

WGS Colony#*	Soils	Mapped Habitat (late 2004)	Overall Density	Colony Size and Acres (rounded)	General Notes	Proximity to Facilities
1	23B, 56B	SSB, SSA	Dense	Large, 74 ac	Active in 2006	East of existing access roads and the F turbine string.
2	23B	SSB	Dense	Small to Medium, 11 ac	Active in 2006; extended slightly further north.	South of Stone Lane, an existing primary access road off Highway 19
4		SSB	Dense	Large, a-e combined=~101 ac	Extensive – probably is larger than surveyed data shows. Probably connects to Colony 1. Active in 2006 however less use was noted at 4d.	
A	23B	SSB	Low Density	Small, 9 ac		Leaning Juniper II F turbine string
B	23B	SSB	Medium Density	Medium, 15 ac		Leaning Juniper II F turbine string
C	14B, 23B	SSA	Dense	Large, 44 ac	Was probably more extensive to the south in prior years. Probably is more extensive in the area not leased (not surveyed) than shown	Leaning Juniper II F turbine string
D	23B	SSB	Dense	Large, 25 ac		Leaning Juniper II E turbine string
E	23 B, 23C	SSB	Dense	Small, 8 ac	Connected to D but a noticeable gap in-between	Leaning Juniper II E turbine string
5	23C, 23D, 33E	SSB	Dense	Small, 8 ac	Active in 2006	Leaning Juniper II J turbine string and alternate overhead collector line route
6	14D	GA	Very Low	Very Small, 4 ac (May have been just a few individuals)	Sign of activity found at this site, incidental to conducting other 2006 field investigations.	South of J turbine string
8	14B, 23B, 32B	SSA	Very Low	Very small, 2 ac	Was likely active in 2005, judging by sign of use noted in December 2005. Heard and saw two or three Washington ground squirrel on February 16, 2006. No indication of natal activity (female with young).	West of E turbine string

* Table includes only those colonies located near Leaning Juniper II Facility components.

Estimated size based on general observations.
Small = 10 to 30 individuals.
Medium = 30 to 40 individuals.
Large = 40 to 100+ individuals.

Soils

14B – Krebs silt loam, 2-5% slopes
14D – Krebs silt loam, 5-20% slopes
23B – Olex silt loam, 0-5% slopes

Table Q-2. 2005 Washington Ground Squirrel Colonies Identified Near Leaning Juniper II South

WGS Colony#*	Soils	Mapped Habitat (late 2004)	Overall Density	Colony Size and Acres (rounded)	General Notes	Proximity to Facilities

23C – Olex silt loam, 5-12% slopes
23D – Olex silt loam, 12-20% slopes
32B – Ritzville silt loam, 2-7% slopes
33E – Ritzville silt loam, 20-40% north slopes
40B – Sagehill fine sandy loam, 2-5% slopes
56B – Willis silt loam, 2-5% slopes
(23B has the most WGS use)

Mapped Habitat

Specific colony site vegetation descriptions are not yet prepared however, many of the sites burned moderately hot in 1999 or 2000 and are now grassland (native or annual) with open low shrub (rabbitbrush and buckwheat species {Eriogonum}).

4c and part of 1 and 4d are unburned sagebrush.

The following text is from the NWC November 2004 Habitat Mapping.

GA (1 site) - Annual grass and/or weeds. Soil depth variable. Long-billed curlews (LBCU), Washington ground squirrel (WGS). Common species such as horned lark (HOLA).

SSA (1 site, part of second site)—Shrub-grass. Sagebrush-rabbitbrush-snakeweed/bunchgrass-annual grasses. Soils medium to deep. Some sites have been intensively impacted by cattle grazing. This type appears to have potential value for shrub obligate species; Loggerhead shrike (LOSH). Also WGS and WTJ. Common species WEME.

SSB (many sites)—Open, low shrub and grass. Rabbitbrush-snakeweed-Eriogonum/bunchgrass-annual grass. Native bunchgrass is usually perennial Sandberg's bluegrass (*Poa sandbergii*). Most of these areas are formerly SS (more sagebrush) attempting to recover from frequent burning. Little current potential for nesting by shrub obligate species. LBCU, white-tailed jackrabbit (WTJ), WGS. Common species HOLA, Western meadowlark (WEME)."

However, no occurrences of state-listed fish species have been recorded within the Facility lease boundaries. The Facility is within the Middle Columbia Steelhead ESU, which was listed as threatened on May 24, 1999. All steelhead (*O. mykiss*) in the Columbia River Basin upstream from The Dalles Dam are summer-run, inland steelhead. The nature of the Facility developments, on ridgelines or plateaus lacking perennial stream channels, precludes the presence of fish species of concern (listed or nonlisted) or their habitats within or adjacent to the proposed developments. In addition, this species does not occur in Jones Canyon, the only intermittent drainage where activities are proposed, and the Facility does not involve work in, or use of water from, streams that function as habitat for the species (Exhibit P, Exhibit J). No impacts will occur to fish species or their required habitats.

Q.5 POTENTIAL IMPACTS

OAR 345-021-0010(1)(q)(B) *For each species identified under (A), a description of the nature, extent, locations and timing of its occurrence in the analysis area and how the facility might adversely affect it;*

Response: The following sections discuss potential impacts on species identified in Section Q.4. Impacts resulting from Leaning Juniper II North and Leaning Juniper II South are discussed separately.

Q.5.1 Impacts Resulting from Leaning Juniper II North

Q.5.1.1 Plants

No state or federally listed or candidate plant species were identified as possibly occurring in or near the Leaning Juniper II North facilities. Only one federal candidate species was identified as possibly occurring in Gilliam County—northern wormwood (*Artemesia campestris ssp. wormskioldii*). However, based on correspondence with the ORNHIC, no occurrences of this species have been recorded within 5 miles of the Leaning Juniper II North lease boundary.

The ORNHIC database search identified only one plant species, Sessile mouse-tail (*Myosurus sessilis*), as having been observed within 5 miles of the lease boundaries. During field surveys, three populations of Sessile mouse-tail were identified within three different vernal pools between the H and I turbine strings within the Leaning Juniper II North lease boundary. No temporary or permanent facilities would be located within these areas.

No direct Facility-related impacts on federally endangered, threatened, or candidate plant species are anticipated. Likewise, no direct Facility-related impacts are predicted for ODA endangered, threatened or candidate plant species.

Q.5.1.2 Fish

No occurrences of listed fish species have been recorded within the Facility lease boundaries. The nature of Facility developments, on ridgelines or plateaus lacking perennial stream channels, precludes the presence of fish species of concern (listed or nonlisted) or their habitats within or adjacent to the proposed developments. No impacts on fish species or their required habitats will occur.

Q.5.1.3 Wildlife

As noted in the response to Q.4, one listed species, WGS, was documented as occurring within 5 miles of the Facility. Bald eagles and peregrine falcons might pass through the site infrequently, during spring and fall migration or during the winter. However, neither species was observed in the vicinity of the Facility. The nearest known bald eagle nest and peregrine falcon nest are more than 47 miles and 11 miles away from the Facility lease boundaries, respectively. Details on species occurrence and potential impacts on these two species are provided in the following discussion. No other listed species were documented as occurring within 5 miles of the Facility or were discovered during field surveys.

General Discussion of Potential Impacts

In general, direct impacts on threatened, endangered, and candidate wildlife from construction activities include habitat alteration and mortality or injury from being struck by vehicles. Direct operations impacts include mortality or injury to birds and bats from being struck by turbine blades. Indirect impacts include disturbance to terrestrial or tree-nesting birds from increased traffic and noise.

The degree of wildlife disturbance depends on the construction seasons, methods, and duration. Temporary impacts are expected to be short term and will affect only those areas disturbed during construction, until the vegetation has recovered to a pre-construction stage. Temporarily disturbed sites in nonagricultural areas will be revegetated with predominantly native seed mixtures, which eventually will provide cover for wildlife. The Applicant is in the process of developing a Revegetation Plan for the Facility in consultation with the ODFW and ODOE, as further described in Exhibit P. The plan will include seed mixtures, weed control measures, and a follow-up monitoring schedule to ensure habitat restoration success. Long-term vegetation changes, including introduction of weedy species, if allowed to occur, could reduce the value of some wildlife habitats. The Applicant will control erosion and restore the area disturbed during construction according to the revegetation plan. Therefore, impacts on habitat are expected to be limited.

Washington Ground Squirrel

During field surveys, no WGS were documented as occurring adjacent to or near the Leaning Juniper II North facilities (Figure Q-4). The five primary patches or occupied colonies identified during the field surveys were located within proximity to Leaning Juniper II South. After the surveys, turbines, roads, and collector lines were eliminated or relocated outside the occupied WGS areas to prevent placement of permanent facilities within these areas.

Peregrine Falcon

One peregrine was seen several years ago in the town of Arlington, approximately 1 mile from the lease boundaries, and might pass through the Leaning Juniper II North lease boundary infrequently during spring and fall migration. However, no peregrine falcons were observed in the vicinity of the Facility during the spring avian baseline study conducted in 2006, and the nearest known nest is more than 11 miles away from Leaning Juniper II North. A few historical nests are located from 7 to 30 miles away from the Facility area. One closer site not used but with adults showing interest in nesting is approximately 5 miles from the nearest turbine.

At their general nest sites, the species is known to hunt non-native rock doves (pigeons) that nest in basalt cliff cavities along the Columbia River. Peregrine falcons might occasionally forage in the Facility area, possibly seeking migrating waterfowl or rock doves near the basalt cliffs. However, there are no abandoned homesteads or grain storage bins in the Facility area and forage is probably more common along the Columbia River, especially during the nesting and brood-rearing season.

The closest turbine at Leaning Juniper II North to the Columbia River is approximately 1.25 miles. Although some cliffs are present along the river north of the site, a visual assessment conducted by boat and helicopter in 2004 determined that the basalt structure is not conducive to supporting cliff nesting raptors needing a shelf-like platform for the nest (eyrie). In addition, much of the cliff face is immediately adjacent to a railroad track that has considerable train traffic on a daily basis. While the open water does attract raptors that hunt fish, waterfowl or shorebirds, these raptors (osprey, bald eagle) would likely roost closer to their prey instead of in the wind turbine area. One bald eagle was observed during the Mar-Lu study chasing another bird up from the river but flew back before reaching the Mar-Lu project study point west of Leaning Juniper II North (Kronner, 2004b). Prairie falcons, and potentially peregrine falcons if present, could hunt rock doves (non-native pigeons) and gulls along and over the river (G. Clowers, pers. comm.). Rock doves are commonly found along the river nesting and roosting in crevices of the basalt cliff face.

Although occasional prairie falcon [a related species] fatalities have been observed at some wind projects (Erickson et al., 2001, 2002), extremely low risk is anticipated for peregrine falcons because none were observed during the Facility or Mar-Lu baseline surveys (NWC, 2005; Kronner, 2004) and no active nests or are known to be present near the Facility site. One pair of peregrine falcons nested at approximately 5 miles from the closest Stateline wind turbine but none were found as casualties during 2.5 years of intensive monitoring or were found incidentally after the end of the studies (Kelley, pers. com. 2006). Construction will not have impacts on this species, since this species does not nest near the site. None have been found as fatalities at the Nine Canyon Wind Project in southeast Washington or Combine Hills Wind Project near Stateline Wind Project.

No peregrine falcons were observed during the multiple-year avian field work at the Leaning Juniper I and II Facility. In addition, NWC contacted ODFW and others who are monitoring the historical sites closest to Leaning Juniper in 2006 and no new nest sites have been confirmed as of May 9, 2006 (NWC, pers. comm.). Based on relatively low use of the site and lack of peregrine falcon mortality at existing Pacific Northwest wind farms, it is unlikely that the Facility would have any significant impact on peregrine falcon populations in the area. Further information is provided in the Wildlife Survey Report included as ASC Attachment P-2.

Bald Eagle

Bald eagles winter along the Columbia River several miles north of the Facility lease boundaries and might pass through the Leaning Juniper II North lease boundary infrequently during spring and fall migration or during the winter. However, no bald eagles were observed in the vicinity of the Facility during the avian baseline study conducted as part of the wildlife baseline study, and the nearest known nest is more than 47 miles away from the Facility lease boundaries. In addition, the annual Midwinter Bald Eagle Survey conducted along the Columbia River by volunteers and agency staff has conducted surveys in a route referred to as "John Day (River mouth) to Arlington" This route typically has no bald eagle observations, with a high count of two noted since 1988. Direct impacts on bald eagles could occur from strikes by operating turbines, resulting in injuries or fatalities. However, the likelihood of these impacts is extremely small as a result of this species' very limited use of the Facility lease boundaries. Construction will not have impacts on this species, because its only use of the Facility lease boundaries is flying through infrequently.

Q.5.2 Impacts Resulting from Leaning Juniper II South

Q.5.2.1 Plants

Two state or federally listed or candidate plant species were identified as possibly occurring within 5 miles of the Facility lease boundaries, but none were found in or near the Leaning Juniper II South micrositing corridor. Northern wormwood (*Artemesia campestris ssp. wormskioldii*) could occur in Gilliam County, but no occurrences for this species have been recorded within 5 miles of Leaning Juniper II South.

The ORNHIC database search identified only one plant species, Sessile mouse-tail (*Myosurus sessilis*), as having been observed within 5 miles of the Leaning Juniper II South lease boundary. During field surveys, one population of Sessile mouse-tail was identified within one vernal pool in the micrositing corridor for the E turbine string within the Leaning Juniper II South lease boundary. No temporary or permanent facilities would be located within these areas.

No direct Facility-related impacts on federally endangered, threatened, or candidate plant species are anticipated. Likewise, no direct Facility-related impacts are predicted for ODA endangered, threatened, or candidate plant species.

Q.5.2.2 Fish

No occurrences of listed fish species have been recorded within 5 miles of the Facility lease boundaries. In addition, Leaning Juniper II South does not involve construction within intermittent or perennial drainages likely to support sensitive fish species. The nature of the developments, on ridgelines or plateaus lacking perennial stream channels, precludes the presence of fish species of concern (listed or nonlisted) or their habitats within or adjacent to the proposed developments. No impacts on fish species or their required habitats will occur.

Q.5.2.3 Wildlife

The WGS was documented as occurring within 5 miles of the Leaning Juniper II South lease boundary. The bald eagle and peregrine falcon might also pass through the site infrequently during spring and fall migration or during the winter. Details on species occurrence and potential impacts for these species are provided in the following discussion. No other listed wildlife species were documented as occurring within 5 miles of Leaning Juniper II South or were discovered during field surveys.

General Discussion of Potential Impacts

In general, direct impacts on threatened, endangered, and candidate wildlife from construction activities include habitat alteration and mortality or injury from being struck by vehicles. Direct operations impacts include mortality or injury to birds and bats from being struck by turbine blades. Indirect impacts include disturbance to terrestrial or tree-nesting birds from increased traffic and noise in the Facility area.

The amount of wildlife disturbance depends on the construction seasons, methods, and duration. Temporary impacts are expected to be short term and will affect only those areas disturbed during construction, until the vegetation has recovered to a pre-construction stage. Temporarily disturbed sites in non-agricultural areas will be revegetated with predominantly native seed mixtures, which eventually will provide cover for wildlife.

The Applicant is in the process of developing a Revegetation Plan for the Facility in consultation with the ODFW and ODOE, as further described in Exhibit P. The plan will include seed mixtures, weed control measures, and a follow-up monitoring schedule to ensure habitat restoration success. Long-term vegetation changes, including introduction of weedy species, if allowed to occur, could reduce the value of some wildlife habitats. The Applicant will consult with the Gilliam County Weed Control Board regarding appropriate weed control measures. Therefore, impacts on habitat are expected to be limited.

Washington Ground Squirrel

During field surveys, WGS were documented as occurring adjacent to or near the Leaning Juniper II South facilities (Figure Q-4). During micrositing all turbines, roads, and collector lines will be eliminated or relocated outside the occupied ground squirrel areas to prevent placement of permanent facilities within these areas. There is the potential for animals to be struck by vehicles if they should travel outside of identified colonies and into the Facility construction zones during the activities. To account for these incidental impacts, the Applicant has applied for an ITP from the ODFW for Leaning Juniper II South. A copy of the ITP application is included as Attachment Q-3. While some incidental injuries or kills might occur as a result of construction and operation traffic, no impacts will occur that would reduce the likelihood of the survival or recovery of the species.

Project engineers and biologists will review all facilities in relation to the landscape-level distribution of WGS colony patches. No displacement or abandonment of the colony site is likely to occur, as demonstrated by extensive informal monitoring of nearby WGS colonies during and after construction of Stateline turbine strings WS-A and B (FPLE 2002a, 2002b, 2002c; Erickson et al., 2004; Kronner, personal field notes, 2005 and 2006).

Peregrine Falcon

One peregrine has been seen several years ago at the town of Arlington, approximately 5 miles from Leaning Juniper II South, and might pass through the lease boundary infrequently during spring and fall migration. However, no peregrine falcons were observed in the vicinity of the Facility during the spring avian baseline study, and the nearest known nest is more than 11 miles away from Leaning Juniper II South. Although occasional prairie falcon (a related species) fatalities have been observed at some wind projects (Erickson et al., 2001, 2002), extremely low risk is anticipated for peregrine falcons because none were observed during the Facility or Mar-Lu baseline surveys and no active nests or are known to be present near the Facility site. One pair of peregrine falcons nested at approximately 5 miles from the closest Stateline wind turbine but none were found as casualties during 2.5 years of intensive monitoring or were found incidentally after the end of the studies (Kelley, D. pers. com. 2006). Construction will not have impacts on this species, since this species does not nest near the site.

Bald Eagle

Bald eagles winter along the Columbia River several miles north of the Facility lease boundaries and might pass through the Leaning Juniper II South lease boundary infrequently during spring and fall migration or during the winter. However, as mentioned earlier, no bald eagles were observed in the vicinity of the Facility during the avian baseline study conducted as part of the wildlife baseline study, and the nearest known nest is more than 47 miles away from the Facility lease boundaries. In addition the annual Midwinter Bald Eagle Survey conducted along the Columbia River by volunteers and agency staff has conducted surveys in a route referred to as "John Day (River mouth) to Arlington" This route typically has no bald eagle observations, with a high count of two noted since 1988. Direct impacts on bald eagles could occur from strikes by operating turbines, resulting in injuries or fatalities. However, the likelihood of these impacts is extremely small as a result of this species' limited use of the Facility lease boundaries and the fact that none have been found as fatalities at regional wind power facilities constructed in similar environments. Construction will not have impacts on this species, because its only use of the Facility lease boundaries is flying through infrequently.

Q.6 MEASURES TO AVOID OR REDUCE ADVERSE IMPACTS ON SPECIES

OAR 345-021-0010(1)(q)(C) *For each species identified under (A), a description of measures proposed by the applicant, if any, to avoid or reduce adverse impact;*

Response:

The Applicant has implemented several measures to avoid or reduce adverse impacts on threatened and endangered species. These measures are discussed separately for the two phases.

Q.6.1 Avoidance and Minimization Measures for Leaning Juniper II North

Leaning Juniper II North turbines and related and supporting facilities will be micro-sited within approved corridors during the final design to avoid impacts on sensitive species, riparian areas, and shrub-steppe habitat identified by NWC and CH2M HILL, as described in Exhibit P, Section P.8.1.1. Turbine locations, laydown areas, and roads located near known populations will be relocated during micrositing to avoid impacts on Sessile mouse-tail.

As a result of these changes, no Leaning Juniper II North Facility component footprint is located within known Category 1 habitat.

Protective measures to be implemented during construction of Leaning Juniper II North for the Sessile mouse-tail include exclusion fencing around confirmed populations. Because impacts on WGS and Sessile mouse-tail have been avoided or minimized, no mitigation measures are required.

Based on the impacts analysis discussed in Section Q.5, impacts to the bald eagle or peregrine falcon are unlikely to occur. However, in the unlikely even that a fatality were to occur, the proper agencies will be notified and will review the significance, and possibly propose mitigating recommendations. Mitigation measures would be discussed with USFWS, given that USFWS regulates any takes of federal T&E species. Even if this species is delisted in the future, the Applicant will continue to work with USFWS to address any incident. If peregrine falcon fatalities were to occur, mitigation measures would be discussed with the ODFW and ODOE.

Mitigation would be designed to benefit the affected species. Agency biologists would provide the Applicants with the factors that are known to influence habitat quality for the species. For example, habitat for wintering bald eagles and nesting habitat along the Columbia River are likely to be the two primary categories to investigate for mitigation opportunities. Protection of nest and roost sites and enforcement of closed access to nesting sites on islands could be potentially appropriate projects. If winter survey data or supplemental nest data are needed to understand more about the biology of the species in order to conserve important habitat, mitigation could also include additional surveys to assist the agencies with data gathering and to aid in protecting the species' persistence in the general area (mid-Columbia River).

Q.6.2 Avoidance and Minimization Measures for Leaning Juniper II South

Leaning Juniper II South will be designed to avoid impacts on sensitive species, riparian areas, and shrub-steppe habitat identified by NWC and CH2M HILL, as described in

Exhibit P, Section P.8.3.1. Facility design measures to avoid impacts on WGS and Sessile mouse-tail, in particular, are repeated here.

Elimination and Relocation of Facilities

Following the 2004-2005 habitat and wildlife surveys, the Applicant worked with ODFW to identify turbine locations, laydown areas, and roads located near known WGS colonies, raptor nests, and other sensitive species, so that these facilities could be relocated during micrositing to avoid impacting these resources. These changes include:

- Roads such as Juniper Canyon Woodland and two-track farm roads, which cross through WGS colonies, were eliminated from the Facility construction plan.
- Turbines in the E and F turbine strings were relocated from within occupied WGS habitat to outside the occupied habitat.
- The road between E and F turbine strings and construction staging area will be constructed to avoid WGS occupied habitat.
- The road from turbine J-16 to Cedar Springs Road was designed to be located farther from WGS colony #6. During final design, an existing road from ORE 19 to an existing quarry may be used to access J-16 rather than construct a new road.
- Turbines and roads in the E turbine string will be constructed so as to avoid impacts to Sessile mouse-tail populations.
- In addition, the Applicant will maximize use of existing gravel roads rather than existing two-track, farm roads to avoid impacts to WGS. For example, the Applicant will utilize the graveled road off Highway 19, Stone Lane, as primary Facility access rather than improving the farm road through Juniper Canyon woodland, which traverses historical WGS colony #1.

As a result of these changes, no Leaning Juniper II South component footprint is located within known WGS active colonies or Category 1 habitat. In addition, potential Facility-related disturbance in habitat adjacent to all known WGS patches was kept to a minimum.

Protective measures to be implemented during construction of Leaning Juniper II South for the WGS and Sessile mouse-tail include exclusion fencing around confirmed populations. Because impacts on WGS and Sessile mouse-tail have been avoided or minimized, no mitigation measures are required.

Based on the impacts analysis discussed in Section Q.5, impacts to the bald eagle or peregrine falcon are unlikely to occur. However, in the unlikely event that a fatality was to occur, the proper agencies will be notified and will review the significance, and possibly propose mitigating recommendations. Mitigation measures would be discussed with USFWS, given that USFWS regulates any takes of federal T&E species. If peregrine falcon fatalities were to occur, mitigation measures would be discussed with the ODFW and ODOE. As discussed above for Leaning Juniper II North, mitigation would be designed to benefit the affected species.

Q.7 NO SIGNIFICANT REDUCTION IN LIKELIHOOD OF SURVIVAL OR RECOVERY OF PLANT SPECIES

OAR 345-021-0010(1)(q)(D) *For each plant species identified under (A), a description of how the proposed facility, including any mitigation measures, complies with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3);*

Q.7.1 Identified Plant Species with an ODA Protection and Conservation Program

Response: Protection and Conservation Programs are prepared by ODA for plant species listed as threatened or endangered under the Oregon ESA. As described in response Q.5, no state or federally listed threatened or endangered plant species were identified as potentially occurring within the Facility analysis area.

Q.7.2 Identified Plant Species without an ODA Protection and Conservation Program

OAR 345-021-0010(1)(q)(E) *For each plant species identified under (A), if the Oregon Department of Agriculture has not adopted a protection and conservation program under ORS 564.105(3), a description of significant potential impacts of the proposed facility on the continued existence of the species and on the critical habitat of such species and evidence that the proposed facility, including any mitigation measures, is not likely to cause a significant reduction in the likelihood of survival or recovery of the species;*

Response: As there were no anticipated occurrences of state or federally listed plant species in or near the Facility site boundaries, the construction and operation of the proposed Facility are not likely to cause a significant reduction in the likelihood of survival or recovery of threatened or endangered plant species.

Q.8 NO SIGNIFICANT REDUCTION IN LIKELIHOOD OF SURVIVAL OR RECOVERY OF ANIMAL SPECIES

OAR 345-021-0010(1)(q)(F) *For each animal species identified under (A), a description of significant potential impacts of the proposed facility on the continued existence of such species and on the critical habitat of such species and evidence that the proposed facility, including any mitigation measures, is not likely to cause a significant reduction in the likelihood of survival or recovery of the species;*

Response:

In compliance with these requirements, Section Q.5 of this Exhibit described the potential impacts of the proposed Facility on the continued existence of state and federally listed animal species and on the suitable habitat for these species. The mitigation measures described in Section Q.6 were designed to avoid and/or minimize adverse impacts on the listed wildlife species. The construction, operation, and maintenance of the Facility, as described and including the proposed mitigation measures, is not likely to cause a significant reduction in the likelihood of survival or recovery of the federally threatened bald eagle or the state endangered WGS.

Q.8.1 Leaning Juniper II North

Peregrine Falcons and Bald Eagle

Leaning Juniper II North will have no significant impact on the existence, survival, or recovery of these species. These species were not discovered during surveys. Their only use of the area around the Facility lease boundary might be flying through, which is expected to be infrequent. Finally, the bald eagle appears likely to be delisted.

Washington Ground Squirrel

Leaning Juniper II North will have no significant impact on the survival or recovery of this species, given that none were identified within the leased land for this portion of the Facility.

Q.8.2 Leaning Juniper II South

Peregrine Falcons and Bald eagle

Leaning Juniper II South will have no significant impact on the existence, survival, or recovery of these species. These species were not discovered during surveys. Their only use of the area in the Facility lease boundary might be flying through, which is expected to be infrequent.

Washington Ground Squirrel

Leaning Juniper II South will have no significant impact on the survival or recovery of this species. No permanent components will be placed within the occupied ground squirrel colonies. WGS were discovered primarily within the shrub-steppe within the open, low shrub and grass habitat (SSB), and to a lesser extent, within shrub-grass (SSA) and annual grassland (GA). Leaning Juniper II South could permanently affect up to 12.03 acres of SSB, 7 acres of SSA, less than 1 acre of GB and less than 1 acre of GA, as shown in Exhibit P (Tables P-15a and b).

Given the amount of potentially suitable shrub-steppe and grassland habitat (1,808 acres of shrub-steppe and 497 acres of grassland) within the Leaning Juniper II South lease boundary, the proposed development will not affect connectivity between the active WGS colonies or the survival or recovery of the species. The squirrel use area adjacent to the colonies is not considered irreplaceable habitat, and the species is known to occupy crop fields that were previously farmed and were restored to grassland (Kronner 2006, PPM Energy 2006). Not much is known about long-term persistence at these sites and occupancy likely can be attributed to adjacent suitable WGS habitat (FPLE, 2002; Klein, 2005; Marr, 2005; Kronner 2006). It is not known what role the habitat surrounding the five patches plays for supporting use and persistence of WGS for those sites. The facility components planned for development in Category 2 habitat are minimal and do not interrupt connectivity between known WGS patches and potentially suitable habitat for the species. In addition, a large WGS colony (#1), a potential source population for the general area, was completely avoided during facility layout design.

Q.9 MONITORING PROGRAM

OAR 345-021-0010(1)(q)(G) *The applicant's proposed monitoring program, if any, for impacts to threatened and endangered species;*

Response:

Q.9.1 Monitoring Program for Leaning Juniper II North

The Applicant will develop and implement a Wildlife Monitoring and Mitigation Plan (WMMP) for Leaning Juniper II North, as described in Exhibit P. The WMMP will include avian and bat mortality monitoring, as well as monitoring of special status raptor nests within the Facility lease boundary.

Q.9.2 Monitoring Program for Leaning Juniper II South

The Applicant will develop and implement a WMMP for Leaning Juniper II South, as described in Exhibit P.

Post-construction monitoring of WGS sites will also be conducted in compliance with the ITP Application. If WGS are present at the conservation easement, that WGS colony may also be monitored to help evaluate the health and trends of local populations and identify fluctuations in the population. This information will be contributed to agencies in the immediate area who are involved in formal short- or long-term monitoring of the species.

Q.10 CONCLUSION

No significant impacts are expected to occur to listed or candidate species as a result of the proposed Facility. No populations of plant species that are listed as threatened or endangered under ORS 564.105(2) were found in or near the Facility lease boundary. The Sessile mouse-tail, a candidate plant for state listing, and one state-listed endangered species, the WGS, are located within the Facility lease boundaries. One federally listed threatened species, the bald eagle, might travel through the area, but neither they nor their habitat will be significantly affected by the Facility. Avoidance and mitigation measures built into the Facility location and design will reduce the potential for impacts to insignificant levels.

Q.11 REFERENCES

Q.11.1 Documents and Web Sites

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Figures

EXHIBIT R

SCENIC AND AESTHETIC VALUES
OAR 345-021-0010(1)(r)

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FIGURES

ATTACHMENT

R.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

Exhibit R addresses the potential impacts of the proposed Facility on scenic and aesthetic values in the analysis area, in compliance with OAR 345-021-0010(1)(r), which requires the submission of:

OAR 345-021-0010(1)(r) *An analysis of significant potential impacts of the proposed facility, if any, on scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans for the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0080[.]*

R.1.1 Overview

A systematic analysis was undertaken in response to OAR requirements. The first step was to create a map displaying the location of the Facility site and the surrounding areas within 30 miles of the site. Within this 30-mile zone, scenic and aesthetic areas were identified based on provisions of applicable federal land management plans and local land use plans. To narrow the area requiring more detailed analysis, a Zones of Visual Influence (ZVI) analysis was conducted (using Environmental Systems Research Institute [ESRI] ArcGIS software). The ZVI analysis identified the areas from which the proposed Facility's wind turbines might be visible. The ZVI data were overlaid on the map of areas for which federal land management and local land use plans have been prepared. Review of these maps made it possible to identify those scenic areas identified in federal and local management or land use plans from which the Facility might be visible, and for which further analysis was required. At the same time, areas from which the Facility will not be visible were identified and dropped from further evaluation.

R.1.2 Analysis Summary and Results

Because the total number of turbines, vendor, size, and layout has not yet been determined, this ASC addresses two scenarios that represent a range of turbine sizes and associated potential impacts. That range is bracketed by installation of up to 133 GE 1.5-MW turbines and up to 93 Vestas 3.0-MW turbines. In accordance with this range, the ZVI analysis consisted of two potential turbine layout scenarios. To determine which analysis represents the "worst-case" scenario, ZVI analyses were conducted for both the maximum turbine layout (composed of 133 1.5-MW turbines) and the minimum turbine layout (composed of 93 3.0-MW turbines). The two layout scenarios were then compared.

In the first scenario, represented in Figures R-1 and R-2 (close-up view), the potential visibility of the maximum turbine layout (133 turbines) consisting of Leaning Juniper II

North (40 1.5-MW GE turbines) and Leaning Juniper II South (93 1.5-MW GE turbines) is shown. For the maximum turbine analysis, towers for both Leaning Juniper II North and Leaning Juniper II South were assumed to be 80 meters (262 feet) tall and rotors were assumed to be 77 meters (253 feet) in diameter.

In the second scenario, represented in Figures R-3 and R-4 (close-up view), the potential visibility of a minimum turbine layout (93 turbines) consisting of Leaning Juniper II North (31 1.5-MW GE turbines) and Leaning Juniper II South (62 3.0-MW Vestas turbines) is shown. For the minimum turbine analysis, towers for both Leaning Juniper II North and Leaning Juniper II South were assumed to be 100 meters (328 feet) tall and rotors were assumed to be 100 meters (328 feet) in diameter. The 1.5- and 3.0-MW turbines were modeled in the same way, within the micrositing corridors described in Exhibit C of the ASC.

Comparison of the two analyses shows that the maximum turbine layout is more visible from within the 30-mile analysis, primarily because turbines occur in greater numbers than in the minimum turbine layout, which consists of taller turbines. However, the ZVI analysis shown in Figures R-1, R-2, and R-4 reveals that from designated scenic areas within the 30-mile analysis, the maximum and minimum turbine layouts do not create a materially different visual impression.

It is important to note that the visibility pattern the ZVI analysis presents is highly conservative. First, in some areas where the model indicates Facility visibility, the only visible parts of the Facility might be the tips of the turbine blades, which will be hardly noticeable at some locations. In addition, the analysis does not take into account the screening role of vegetation, trees, and other structures, so in some areas where Facility visibility is indicated, views of the turbines will be screened by trees, vegetation, or other structures in the foreground. Finally, the ZVI model is a line-of-sight model that does not account for attenuating factors such as distance, haze, humidity, background landscape, or weather, which will make the Facility invisible or barely visible from certain locations under many atmospheric or weather conditions.[1]

In evaluating the extent to which the presence of the Facility might adversely affect the scenic and aesthetic values identified in the federal land management plans and in local land use plans, the analysis that was conducted followed standard professional methods based on the procedures for evaluation of aesthetic impacts developed by federal agencies such as the U.S. Bureau of Land Management (BLM), the U.S. Forest Service (USFS), and the Federal Highway Agency (FHA).[2]

OAR 345-022-0080(1) requires that “the Council must find the design, construction, operation, and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area described in the project order.” OAR 345-022-0080(1) is not

[1] The ZVI analysis is based on visibility that would occur at 2 meters (6.6 feet) above ground level, which is somewhat higher than the average eye level for an upright adult.

[2] These methods are documented in Smardon et al., 1986.

an applicable approval criterion for wind energy facilities. However, because it may be a source of site certificate conditions, this Exhibit provides the information listed in the relevant Council application rule.

This Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(r) and provides evidence to support a finding by the Council as required by OAR 345-022-0080.

R.2 APPLICABLE FEDERAL LAND MANAGEMENT PLANS AND LOCAL LAND USE PLANS

OAR 345-021-0010(1)(r)(A) *Identification of the applicable federal land management plans and local land use plans:*

Response: Table R-1 lists applicable federal land management plans and local land use plans that pertain to areas within 30 miles of the Facility site. Those areas from which the Facility will be potentially visible are identified.[3] Figures R-1 through R-4 show these areas.

Table R-1. Identification of Applicable Federal Land Management Plans and Local Land Use Plans that Pertain to Areas Within 30 Miles of the Facility Site

Plan Category/Area/Applicable Plans	Facility Not Visible in the Plan Area	Facility Potentially Visible in the Plan Area and Further Analysis Required
Applicable Federal Land Management Plans		
Columbia River Gorge National Scenic Area		
Management Plan for the Columbia River Gorge National Scenic Area, September 1992, revised May 10, 2004		**X**
Deschutes River		
Two Rivers Resource Management Plan Record of Decision, June 1986	**X**	
Lower Deschutes River Management Plan Record of Decision, February 1993	**X**	
John Day River		
Two Rivers Resource Management Plan Record of Decision, 1986		**X**
Final John Day River Plan Record of Decision, February 2001		**X**
Umatilla National Wildlife Refuge[1]		**X**
Oregon Trail		**X**
Local Land Use Plans		
Sherman County		
Sherman County Comprehensive Land Use Plan, October 25, 2000 (revised June 2003)		**X**
Gilliam County		
Gilliam County Comprehensive Land Use Plan, October 25, 2000		**X**

[3] Note that scenic or aesthetic areas or values in the State of Washington fall outside of the jurisdiction of the EFSC process, unless they are part of a federal land management plan.

Table R-1. Identification of Applicable Federal Land Management Plans and Local Land Use Plans that Pertain to Areas Within 30 Miles of the Facility Site

Plan Category/Area/Applicable Plans	Facility Not Visible in the Plan Area	Facility Potentially Visible in the Plan Area and Further Analysis Required
Wasco County		
Wasco County Comprehensive Plan for Wasco County, August 25, 1983		X
Morrow County		X
Morrow County Comprehensive Land Use Plan, January 1986		
Klickitat County, Washington		
Klickitat County Comprehensive Plan, August 1977		X
Klickitat County Energy Overlay Zone, March 15, 2005		X
Yakima County, Washington		X
Benton County, Washington		
Benton County Comprehensive Land Use Plan, January 2005		X
Goldendale, Washington	X	
Boardman, Oregon		
City of Boardman Comprehensive Plan, April 2003		X

[1] A Comprehensive Conservation Plan for the Umatilla National Wildlife Refuge is underway by the U.S. Fish and Wildlife Service (http://www.fws.gov/pacific/planning/).

R.3 IDENTIFICATION AND DESCRIPTION OF SCENIC AND AESTHETIC VALUES IDENTIFIED AS SIGNIFICANT OR IMPORTANT

OAR 345-021-0010(1)(r)(B) *Identification and description of the scenic and aesthetic values identified as significant or important in the applicable plans;*

Response: Significant or important scenic and aesthetic values for each applicable plan are as follows:

Federal Land Management Plans

Columbia River Gorge National Scenic Area

Management Plan for the Columbia River Gorge National Scenic Area, September 1992, revised May 2004. The Columbia River Gorge National Scenic Area (CRGNSA) consists of the 80-mile corridor extending along the Columbia River from Troutdale to the Deschutes River. The Facility site lies approximately 27 miles to the east of the CRGNSA eastern boundary.

The CRGNSA was the first and is still the only National Scenic Area (NSA) in the United States. The federal legislation that established the NSA in 1986 specified that its purposes are to:

- Protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge

- Protect and support the economy of the Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development in a manner that is consistent with protection of resources

The Scenic Area Management Plan, adopted by the Columbia River Gorge Commission in 1991, and concurred with by the U.S. Secretary of Agriculture (the cabinet secretary responsible for the USFS) in 1992, establishes policies and guidelines for resource protection that are implemented by the National Scenic Area Ordinance adopted by the local jurisdictions within the NSA boundaries. The ordinance and management plans designate Urban Areas, General Management Areas, and Special Management Areas. The Urban Areas are exempt from NSA regulations, allowing continuation and expansion of urban uses. The most environmentally and visually sensitive lands in the NSA are designated as Special Management Areas, where development is strictly regulated and limited to agriculture, compatible forestry activities, recreation, and residential development on parcels of 40 acres and larger. The rest of the lands in the Scenic Area are designated as General Management Areas, where a range of compatible land uses and activities is allowed.

The NSA Management Plan and Ordinances also designate key viewing areas within the NSA. The key viewing areas are considered to be the most important vantage points within the Scenic Area from which the public views Scenic Area landscapes. Three of these key viewing areas are located in the Facility's 30-mile-radius analysis area. The locations of these three areas—the Columbia River, Highway I-84, and Washington State Route 14—are indicated in Figures R-1 through R-4.

Management plans for the NSA do not apply directly to development, such as the Facility, located outside of the NSA. Chapter 7 of the NSA Management Plan specifies in its savings provisions that "neither the Forest Service nor the Gorge Commission may establish any buffer zones or protective perimeters outside the boundaries of the Scenic Area." Revision of the exterior NSA boundaries can be accomplished only by Congressional action. As a consequence, no direct federal NSA review of activities at the Facility site is required. Nonetheless, in applying the Council's scenic areas standard, the Applicant relies on the identification and assessment of scenic resources within the NSA, and consider the potential impact of the Facility on these resources.

<u>John Day River</u>

<u>*Two Rivers Resource Management Plan and Record of Decision*, June 1986</u>. As indicated in Figures R-1 through R-4, the Facility will be visible to some degree in scattered locations along the northern reach of the John Day River, specifically within ¼ mile of the river banks (which is within the Wild and Scenic River [WSR] designation). The basic policy direction for management of public lands along the lower John Day River was set by the BLM's 1986 management plan for the BLM Two Rivers management district that encompasses Gilliam, Hood River, Sherman, and Wasco counties as well as parts of Crook and Jefferson counties. This plan identified the areas in the canyons occupied by the Deschutes and John Day rivers that are areas of high visual quality, and it designated these areas as Special Management Areas.

The BLM has placed the lands along this segment of the river in Visual Resources Management (VRM) Class II, a management classification that permits management activities resulting in changes to the existing character of the landscape, provided that they do not attract the attention of the casual observer.

It is important to note that BLM's management plans and policies do not apply directly to lands, such as the Facility site, located outside the jurisdictional boundaries of BLM's plans. BLM's plans are helpful, however, in identifying and assessing scenic resources.

Record of Decision for John Day Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments, February 2001. Beginning at Tumwater Falls, near river mile 10, and upstream through the analysis area, the John Day River is designated as a National WSR. The WSR designation and the WSR plan apply to the river itself and to the lands that lie within ¼ mile of each bank. Outstanding remarkable values that the plan identifies along this segment of the river include "scenic, recreation, fish, wildlife, geological, paleontological, and archaeological." Botanical and ecological values are identified as being significant. The plan classifies the WSR segment in this area as Recreational, meaning that at the time of designation, the segment was readily accessible by road or railroad, might have some shoreline development, and might have undergone some impoundment or diversion in the past. The ROD indicates that along the part of the river in the analysis area, there would be no change in the VRM class, which would mean that BLM lands in the WSR along this segment of the river would be managed in accordance with VRM Class II standards, permitting changes to the existing character of the landscape that do not attract the attention of the casual observer. Because the area of jurisdiction of this plan is the National Wild and Scenic River, which has a variable boundary that extends only ¼ mile to 1 mile in the reach between river mile 10 and river mile 21, developments outside of this buffer, regardless of their scenic impacts, are not regulated by this plan.

This same segment of the John Day River, located upstream and south of Tumwater Falls, is also designated as a State Scenic Waterway pursuant to the Oregon State Scenic Waterways Act, ORS 390.805-390.020. The Scenic Waterway designation encompasses the river itself and the lands that lie within ¼ mile of its high water line. Under the State Scenic Waterways Act, the river segments in the Facility analysis area have been classified as a Scenic River Area, i.e., river segments that are "…accessible by roads in places but contain related adjacent lands and shorelines still largely primitive and undeveloped except for agriculture and grazing. Scenic River Areas are administered to preserve their undeveloped character, maintain or enhance their high scenic quality, recreation, fish, and wildlife values while allowing continued agricultural use." The State's rules for the management of lands in Scenic River Areas (ORS 736-040-0065) include provisions that all new development (e.g., farm-related dwellings) must conform to County land use regulations and that all new development must be screened to the extent feasible. The guideline for new utility facilities in Scenic River Areas (OAR 736-040-0065) is that they share existing utility corridors, minimize ground and vegetation disturbance, and make use of nonvisible alternatives when reasonably possible.

While the federal land management plans are helpful in identifying and characterizing scenic resources along the John Day River, the plans are not directly applicable to the proposed Facility because it lies outside of the areas regulated by these plans.

Oregon Trail

Management Land Use Plan Update: Final Environmental Impact Statement, Oregon National Historic Trail and Mormon Pioneer National Historic Trail, August 1999. In the Management and Use Plan Update: Final Environmental Impact Statement, Oregon National Historic Trail and Mormon Pioneer National Historic Trail (U.S. National Park Service, August 1999), identification of scenic and aesthetic values is restricted to a selected number of "high-potential sites." The locations of the high-potential sites in the analysis area are indicated in Figures R-1 through R-4. All but one of these sites (Four Mile Canyon) lie outside the areas from which the Facility's turbines might be visible.

Record of Decision John Day Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments, February 2001. The Two Rivers Resource Management Plan Record of Decision identifies the Oregon Trail Historic Sites at Four Mile Canyon and McDonald Crossing as Special Management Areas. For the trail sites, "the unusual qualities of these sites will be maintained and protected" (BLM, 1996).

Local Land Use Plans

Sherman County

Sherman County Comprehensive Land Use Plan, 2000, revised June 2003. Physical Characteristics—Section XI of the *Sherman County Comprehensive Plan* identifies important landscape features within the County. These include rock outcroppings, trees, and the John Day and Deschutes River canyons (Sherman County, Oregon, 2003).

The County's Goal X is to "preserve the integrity of the Sherman County Landscape." Policy I of Goal X states "trees should be considered an important feature of the landscape and therefore the County Court shall encourage the retention of this resource when practical" (Sherman County, Oregon, 2003).

Goal XII is to "provide for the rational use of all resources within the designated Deschutes and John Day Oregon State Scenic Waterways." Policy I of Goal XII states "designation of the John Day and Deschutes rivers to the National Wild and Scenic River System shall be opposed" (Sherman County, Oregon, 2003).

Section XV states the County finds it has wind resources that have not been utilized since widespread use of electricity was introduced. Under Goal XVIII to conserve energy resources, the County defines a policy to "cooperate with public agencies and private individuals in the use and development of renewable resources" (Sherman County, Oregon, 2003).

The segment of U.S. 97 extending from Biggs in Sherman County to Baker City in Baker County has been designated by the Oregon Department of Transportation (ODOT) as the Journey Through Time Scenic Byway. A guide to Oregon's Scenic Byways published by ODOT and the Oregon Tourism Commission (1999) characterizes this byway as celebrating 50 million years of Oregon history by providing a route through an area with abundant fossils, pioneer trails, ghost towns, and other remnants of the old west. Features mentioned by the guide along the segment of the scenic byway in the Facility analysis area are Biggs, which is characterized as a traditional Native American salmon-harvesting site; Wasco, with its original Columbia Southern Railroad depot; and Moro, home of the Sherman County Historical Museum and Columbia Basin Agricultural Resource Center. Although the Facility will be visible from locations along U.S. 97, there are no scenic overlooks or vista points along the segment of highway in the vicinity of the Facility site. ODOT, which administers U.S. 97, has not identified any specific views in this segment of the route as scenic. The *Sherman County Comprehensive Plan* acknowledges the state Scenic Byway designation for U.S. 97, but provides no specific policies related to its scenic or aesthetic values.

Gilliam County

Gilliam County Comprehensive Land Use Plan, October 25, 2000. Part Five of the County's Comprehensive Plan focuses on conservation of open space and natural and scenic resources, intending to comply with statewide planning Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources) and Goal 8 (Recreation Needs) (Gilliam County, Oregon, 2000).

In Finding 2 of Part 5, the County identifies "rock outcroppings marking the rim and walls of steep canyon slopes as an important characteristic of the County's landscape" (Gilliam County, Oregon, 2000). In Finding 7 of Part 5, the County identifies the John Day River corridor as an important scenic resource. The County defers to the Oregon State Scenic Waterways Act (ORS 390.805-390.925) to govern this resource and deems additional regulation unnecessary.

Policy 2 of Part 5 states that "it is the policy of Gilliam County to publicize provisions of state law relative to Scenic Waterways, to render all possible assistance in enforcement of the laws, rules, and regulations pertaining to State designated Scenic Waterways and to otherwise aid in the implementation of the declared policy of the State of Oregon with respect to such waterways. Conflicts between agricultural and recreational uses in this area should be resolved in favor of agriculture" (Gilliam County, Oregon, 2000).

Wasco County

Comprehensive Plan for Wasco County, August 25, 1983. The *Comprehensive Plan for Wasco County* identifies the Deschutes and John Day Scenic waterways, the White River Canyon, and the Columbia River Gorge as important scenic resources. Two of these areas, the Columbia River Gorge and the Deschutes River scenic waterway, lie within the Facility's 30-mile-radius scenic and aesthetic analysis area. These areas are identified in Figures R-1 and R-3, and the figures indicate that the Facility's proposed turbines will not be visible in distant views from the parts of these areas that lie within Wasco County.

Morrow County, Oregon

Morrow County Comprehensive Land Use Plan, January 1986. The Scenic Views and Sites subsection of the Goal 5 Analysis Section of the *Morrow County Comprehensive Land Use Plan* states: "Morrow County contains a variety of landscapes, many of which may be considered to be scenic. The County has not, however, designated any sites or areas as being particularly high in scenic-resource value."

Klickitat County, Washington

Klickitat County Comprehensive Plan, August 1977. References to aesthetic values in the *Klickitat County Comprehensive Plan* are limited to those that exist in an urban exempt area outside of White Salmon, which is outside the 30-mile analysis zone, and those related to the Columbia River Gorge National Scenic Area (Herrington, pers. comm.).

Yakima County, Washington/Yakama Indian Reservation

The ZVI analysis presented in Figures R-1 through R-4 indicates that turbines in the Facility might be visible in small segmented areas at the southern edge of Yakima County. One of these areas also falls within the boundaries of the Yakama Indian Reservation. Because this small area is approximately 30 miles from the closest turbine, at the outer edge of the Scenic and Aesthetic analysis area, the turbines have a low probability of being detectable under most atmospheric and lighting conditions. As a consequence, they are unlikely to have an impact of any kind on views from this area, much less a significant impact. For this reason, no further analysis was done of aesthetic values that might be reflected in plans for Yakima County and the Yakama Indian Reservation.

Benton County, Washington

Benton County Comprehensive Land Use Plan. January 2005. References to aesthetic values in the *Benton County Comprehensive Land Use Plan* are limited to Badger Mountain Preserve and the water resources within the County, specifically, the Snake, Yakima, and Columbia rivers. All of these areas, with the exception of the Columbia River, are located outside of the 30-mile analysis zone.

Boardman, Oregon

City of Boardman Comprehensive Plan. April 2003. Scenic views and sites are addressed in Chapter 5: Natural Resources, of the City of Boardman Comprehensive Plan. Chapter text reads: "Due to the City's topography, vegetation, and existing infrastructure development, the City believes there are limited scenic views, none of which could be considered outstanding."

R.4 SIGNIFICANT POTENTIAL ADVERSE IMPACTS TO SCENIC AND AESTHETIC VALUES

OAR 345-021-0010(1)(r)(C) *A description of significant potential adverse impacts to the scenic and aesthetic values identified in (B), including, but not limited to, potential impacts such as*:

(i) *Loss of vegetation or alteration of the landscape as a result of construction or operation;*

Response: The Facility is proposed for an area adjacent to the active Arlington Landfill. Approximately 40 percent of the Facility lease boundary is agricultural, devoted primarily to dry land winter wheat production where little natural vegetation and few significant rock outcrops occur. The remainder of the land within the lease boundary is shrub-steppe and grassland (approximately 52 and 6 percent, respectively), and is used for cattle grazing. Although the Facility will result in the conversion of relatively small areas of agricultural lands and native grassland or shrub-steppe to access roads and turbine pads, the Applicant has minimized impacts to native habitat to the extent practicable, and will not disturb mature trees. In addition, potentially significant impacts to native vegetation will be mitigated through a conservation easement, as further discussed in Exhibit P. The construction, operation, and retirement of these facilities is not anticipated to result in removal of aesthetically important natural vegetation, to require substantial grading, to alter important rock outcroppings, or to require removal of mature trees. Thus, the Facility will have no adverse effect on vegetation or rock outcrops identified as important landscape features in Finding 2 of Part 5 of the *Gilliam County Comprehensive Land Use Plan*.

(ii) *Visual impacts of facility structures, including cooling tower or other plumes, if any;*

Response:

R.4.1 Overview

Leaning Juniper II will consist of 133 GE 1.5-MW turbines or 93 Vestas 3.0-MW turbines, depending on final turbine selection. The turbines will be mounted on a concrete pad and spaced approximately 350 to 850 feet apart, depending on the turbine size.

Under the maximum turbine layout (133 turbines) being considered, smaller turbines will be used in greater quantity. Turbines will be mounted on towers up to 80 meters (262 feet) in height, and will have rotors with a diameter of up to 77 meters (253 feet). Under the minimum turbine layout (93 turbines) being considered, towers will be up to 100 meters (328 feet) in height, and the rotors will be up to 100 meters (328 feet) in diameter.

The Facility will require the creation of cleared pads at the base of each turbine, and a system of new and improved roads to provide access to each of the turbine locations. Energy from the proposed Facility will be collected by the underground cable system and connected to the Leaning Juniper II Collector Substation, located immediately adjacent to the existing Bonneville Power Administration (BPA) Jones Canyon Switching Station. The Jones Canyon Substation will deliver 230 kilovolts (kV) of power into BPA's existing McNary-Santiam 230-kV transmission line. The 230-kV line and the Jones Canyon Substation are located less than a mile from the existing Facility substation (note that because of its short length, the Facility transmission line is therefore not by itself a related or supporting facility, as defined in ORS 469.300(9)). The Facility also will include a substation, Operations and Maintenance (O&M) building(s), meteorological towers, and related facilities.

Photographs providing views of the Facility site from the perimeter roads are provided in Attachment R-1.

R.4.2 Visual Impact Analysis

The Applicant's visual impact analysis considered all Facility components. However, because of the large distances from most of the designated scenic resources, the limited lines of sight from the closest designated scenic resources, and the dominance of wind turbines compared to other components of the Facility in terms of visual impact, the visual appearance of the Facility from all scenic areas consists almost entirely of the wind turbines. For this reason, the following discussion focuses on the turbines.

In addition, because the maximum and minimum turbine layout scenarios do not create a materially different visual impression from any of the designated scenic areas within the 30-mile analysis zone, both ZVI scenarios were used for the visual impact analysis.

<u>Columbia River Gorge National Scenic Area</u>

Because the Facility lies over 25 miles outside of the closest boundaries of the CRGNSA, it is not directly regulated by the Columbia Gorge Commission's plan policies and regulations. Nonetheless, an analysis is provided here of the Facility's effects on views from the key areas that the NSA has designated as being the most important vantage points within the Scenic Area from which the public views the Scenic Area's landscapes. The analysis concludes that the Facility will not be visible from any of the 26 key viewing areas that the NSA Management Plan designates.

<u>John Day River</u>

The ZVI analysis depicted in Figures R-1 through R-4 indicates that the Facility may be visible to a very limited degree from small areas of BLM lands in the canyon but would generally not be visible from the Wild and Scenic River/Oregon Scenic Waterway segment of the river and the lands extending ¼ mile on either side of the river.

BLM's management plans and policies do not apply directly to privately owned lands, such as the Facility site, located outside the jurisdictional boundaries of BLM's plans. However, because BLM's plans are helpful in identifying and assessing scenic resources, an assessment of the Facility's potential effects on views from BLM lands in the John Day River canyon and the corridor along the John Day River Federal Wild and Scenic River and State Scenic Waterway was undertaken to evaluate the impacts on the aesthetic qualities of this area. This analysis focuses on the impacts of the Facility on views from the river and from the lands along it in the canyon bottom. This approach was taken because it is reasonable to assume that the BLM lands on the sides of the John Day River canyon were given a VRM Class II designation to protect the existing character and quality of views within the canyon, which has some visual interest and some level of recreational use, as opposed to protecting the views from these river viewshed lands on the canyon's slopes toward areas that lie outside of the canyon. This approach is consistent with the scoping opinion related to the proposed Klondike III wind project by a member of the BLM Prineville District planning staff, who indicated that because access to the rim and canyon walls is very limited, potential impacts to these areas would not be significant and are not the primary concern of BLM (PPM Energy, 2005).

The primary access to these lands is by primitive jeep trails. Because these trails are located primarily on privately-owned lands, and because access is regulated by a series of locked gates, the general public has no overland access to this area. The only public right-of-way through this area is the river channel itself. During high flow periods in the spring, there is some very limited use of this reach of the river by canoeists and kayakers. Although the John Day River has a reputation as a good river for boating and other recreational activities, these activities occur primarily in the reaches of the river that lie to the south of Cottonwood (next to J.S. Burres State Park) in an area where the Facility will not be visible. Because of limited accessibility, the numbers of recreational users, and thus potential viewers, is extremely low in this reach of the river where there is limited potential for Facility visibility.

In the few limited areas along the river corridor from which Facility's turbines might be visible, few turbines will be visible from any one point, and only the blades are likely to be visible from many locations, rather than the turbines themselves or the support towers. In the places where they may be visible, the turbines will appear as elements on the ridgelines in the landscape's background, and will have no direct effect on the appearance of the walls of the canyon or the canyon floor. Although the turbines might be noticeable in some of the views, because of their small numbers, their location in the background, and the viewing distance (which will range from a minimum of 6 miles from nearest turbine to nearest point on the John Day Wild and Scenic River/John Day State Scenic Waterway), they will not be dominant elements in the scene. To the extent to which they will be visible, the turbines will be subordinate elements of the view, and because views from the canyon already include views of transmission lines of various voltages and are thus not entirely pristine, the presence of the turbines will not substantially alter the existing character and quality of views from the river corridor.

There are very few locations in the canyon where the Facility's turbines will be visible at all, and to the limited extent to which they will be seen, they will appear as small objects in the background of the view. Consequently, the Facility's impacts on this reach of the river will not be significant. The Facility will thus be consistent with the BLM Two Rivers and John Day management plans, which set limits on the degree of visual modification of BLM lands in the canyon, and with the Sherman and Gilliam County comprehensive plans, which identify the John Day River canyon as an important visual resource.

Oregon Trail

The ZVI analysis shown in Figures R-1 through R-4 indicates that the Facility may be visible to a very limited degree from Four Mile Canyon, one of the four "high-potential sites." The Four Mile Canyon site is located east of the Facility and 7 miles from the closest turbine. From I-84, the site is reached by traveling 4 miles south on Oregon Highway 18, east on Eight Mile Road, and east again on Four Mile Canyon Road. The site consists of an interpretive wayside with BLM pedestal signs. Deep ruts are the feature located at this Oregon Trail site. To the limited extent to which Facility turbines may be seen, they will appear as small objects in the background of the view. The Facility's impact on this interpretive wayside will not be significant. The Facility will thus be consistent with the *Management Land Use Plan Update: Final Environmental Impact Statement, Oregon National Historic Trail and Mormon Pioneer National Historic Trail*, which identifies Four Mile Canyon as a "high-potential" scenic and aesthetic value site.

Umatilla National Wildlife Refuge

The ZVI analysis shown in Figures R-1 through R-4 indicates that turbines in the Facility will be visible from the Umatilla National Wildlife Refuge. Because this small area is greater than 25 miles from the closest turbine, at the outer edge of the Scenic and Aesthetic analysis area, the turbines have a low probability of being detectable under most atmospheric and lighting conditions. As a consequence, they are unlikely to have an impact of any kind on views from this area, much less a significant impact.

Currently, there is no management plan for the Umatilla National Wildlife Refuge. However, a Comprehensive Conservation Plan for the Umatilla National Wildlife Refuge is underway by the U.S. Fish and Wildlife Service. For this reason, no further analysis was done of aesthetic values that might be reflected in plans for the Umatilla National Wildlife Refuge.

(iii) *Visual impacts from air emissions resulting from facility construction or operation, including, but not limited to, impacts on Class 1 visual resources as described in OAR 340-031-0120 [renumbered to 340-204-0050].*

Response: During construction, dust might be generated during road construction and during clearing activities for the turbine pads. Dust will be controlled during the construction period by watering. Any potential impacts are anticipated to be temporary and negligible. Because Facility operation will create no air emissions, the Facility will have no impacts on air quality during the operational period.

The minor dust-related issues that could occur during the construction period have no potential for adverse impacts on Class I Prevention of Significant Deterioration Areas. The Facility does not lie within a Class I area, and the closest Class I area, the Mount Hood Wilderness, lies over 60 miles to the west of the Facility site.

R.5 OPPORTUNITY FOR MITIGATION

OAR 345-021-0010(1)(r)(D) *The measures the applicant proposes to avoid, reduce, or otherwise mitigate any significant adverse impacts;*

Response: Although no significant adverse impacts to scenic and aesthetic resources have been identified, the Applicant will incorporate best management practices to minimize the proposed wind farm's visual effects. Measures that will be incorporated into the design of the Facility to assure an attractive appearance and good integration into its landscape setting include the following:

- Implementation of active dust suppression measures during the construction period to minimize the creation of dust clouds
- Use of wind turbine towers, nacelles, and rotors that are locally uniform and that conform to high standards of industrial design to present a trim, uncluttered, aesthetic appearance
- Use of low-reflectivity, neutral gray, white, off-white, or earth tone finishes for the towers, nacelles, and rotors to minimize contrast with the sky backdrop and to minimize the reflections that can call attention to structures in the landscape
- Use of neutral gray, white, off-white, or earth tone finishes for the small cabinets containing pad-mounted equipment that might be located at the base of each turbine, to help the cabinets blend into the surrounding ground plane
- Restriction of exterior lighting on the turbines to the aviation warning lights required by the FAA, which will be kept to the minimum required number and intensity to meet FAA standards
- Placement of much of the Facility's electrical collection system underground, minimizing the system's visual impacts
- Use of a low-reflectivity finish for the exterior of the O&M facility building to maximize its visual integration into the surrounding landscape
- Restriction of outdoor night lighting at the O&M facility and the substation to the minimum required for safety and security; sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and offsite light trespass
- Use of a low-reflectivity finish for substation equipment to minimize its visual salience
- Use of dull gray porcelain insulators to reduce insulator visibility
- Use of fencing with a dull finish around the substation to reduce the fence's contrast with the surroundings

R.6 MAP

OAR 345-021-0010(1)(r)(E) *A map or maps showing the location of the visible scenic and aesthetic values analyzed under (B)*; and

Response: The analysis area for impacts on scenic and aesthetic values includes the area within the Facility site boundary and extends 30 miles beyond the Facility boundary, encompassing lands in Oregon and, for completeness, in Washington, as shown in Figures R-1 through R-4. These figures indicate the areas where scenic and aesthetic values have been identified in federal land management plans and local land use plans and show the areas from which the Facility might be visible.

R.7 MONITORING

OAR 345-021-0010(1)(r)(F) *The applicant's proposed monitoring program, if any, for impacts to scenic and aesthetic values.*

Response: Because the proposed Facility will not result in significant adverse impacts to scenic and aesthetic values, the Applicant does not propose an active monitoring program specific to impacts on scenic and aesthetic values. With respect to the Applicant's efforts to incorporate design measures intended to better integrate the facilities into their landscape setting, no ongoing monitoring is proposed.

R.8 CONCLUSION

The Facility will comply with all applicable regulatory guidelines concerning scenic and aesthetic resources as discussed in the foregoing responses to the criteria contained in OAR 345-021-0010(l)(r)(A), (B), (C), (D), (E), and (F). Based on the foregoing information, the Applicant has satisfied the requirements in OAR 345-021-0010(1)(r), and the Council may find that the standards contained in OAR 345-022-0080 have been satisfied.

R.9 REFERENCES

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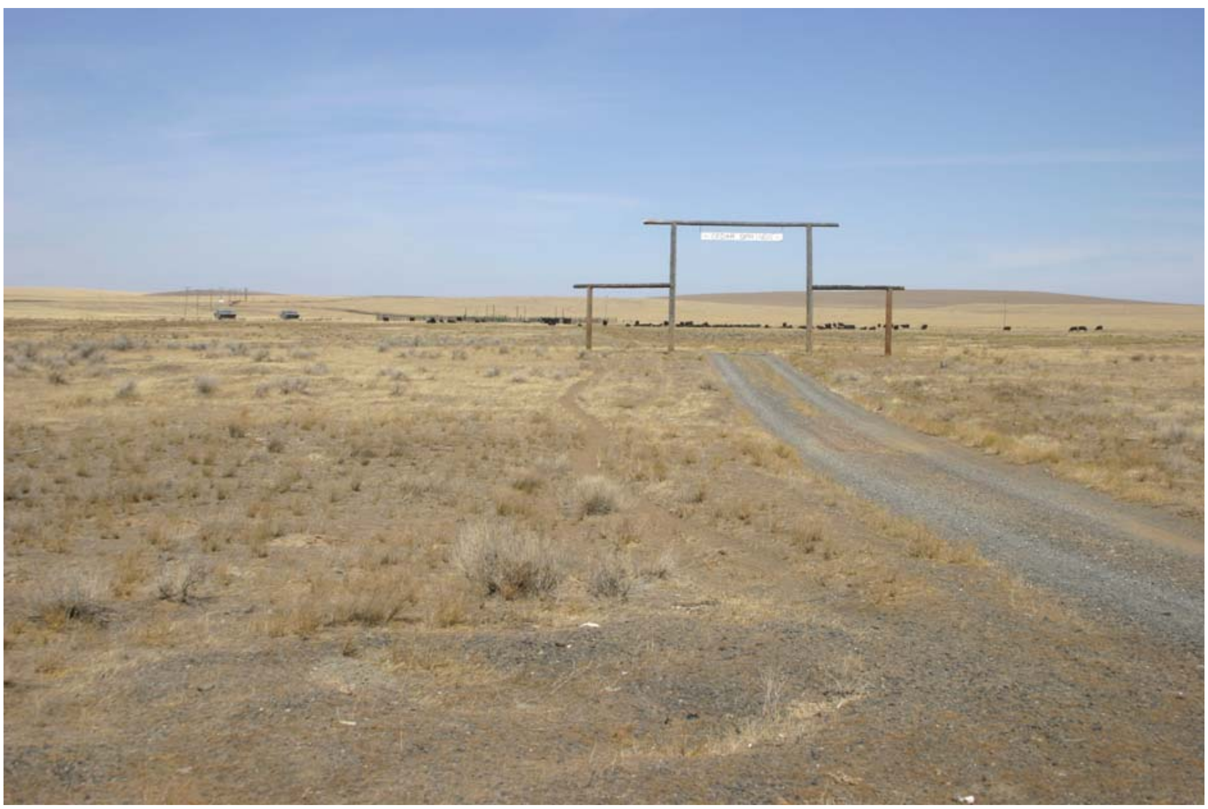
Figures

ATTACHMENT R-1

Site Photographs

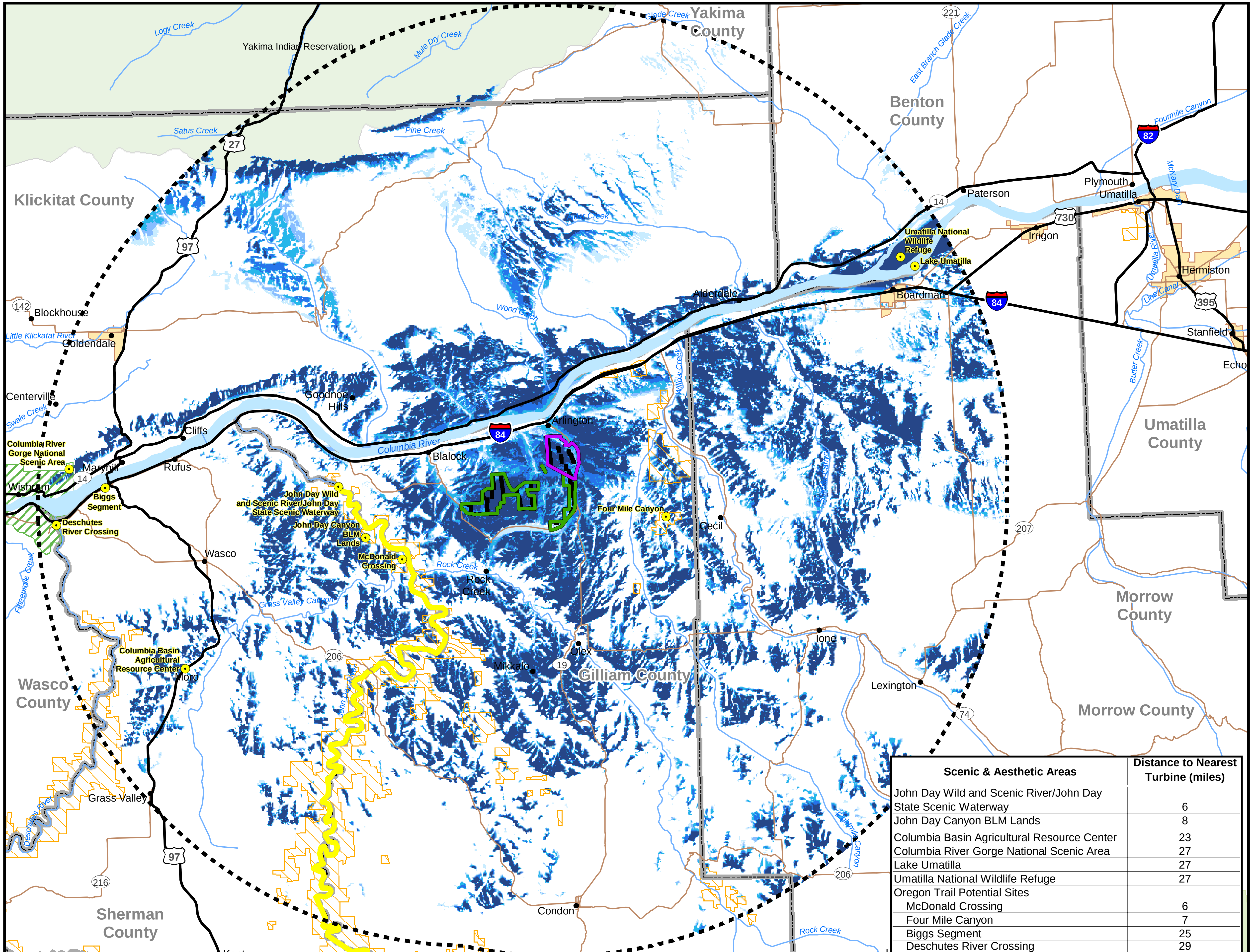
Blalock Canyon Road and West Road



Blalock Canyon Road

Columbia Ridge Landfill

Highway 19 and Eight Mile Road



Scenic & Aesthetic Areas	Distance to Nearest Turbine (miles)
John Day Wild and Scenic River/John Day State Scenic Waterway	6
John Day Canyon BLM Lands	8
Columbia Basin Agricultural Resource Center	23
Columbia River Gorge National Scenic Area	27
Lake Umatilla	27
Umatilla National Wildlife Refuge	27
Oregon Trail Potential Sites	
McDonald Crossing	6
Four Mile Canyon	7
Biggs Segment	25
Deschutes River Crossing	29

Figure R-1

Scenic and Aesthetic Areas Maximum Turbine Layout (1.5-MW Layout)

Leaning Juniper II Wind Power Facility

PPM Energy

Legend

- Scenic and Aesthetic Areas
- Proposed Turbine
- Highway
- Major Road
- Local Road
- Wild and Scenic Rivers
- Lakes & Rivers
- Park or Forest
- Columbia Gorge National Scenic Area Boundary
- 30-mile Analysis Area
- Leaning Juniper II - North
- Leaning Juniper II - South
- City Limits
- County Line
- BLM Land

ZVI Analysis

# of Visible Turbines

- 1 - 5
- 6 - 10
- 11 - 30
- 31 - 50
- > 50

Note:
ZVI analysis assumes 133 1.5-MW turbines for Leaning Juniper II.

N W E S

0 5 10 15

Miles

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure R-1 - Scenic & Aesthetic Areas (15MW).mxd, Date: September 20, 2006 1:57:54 PM

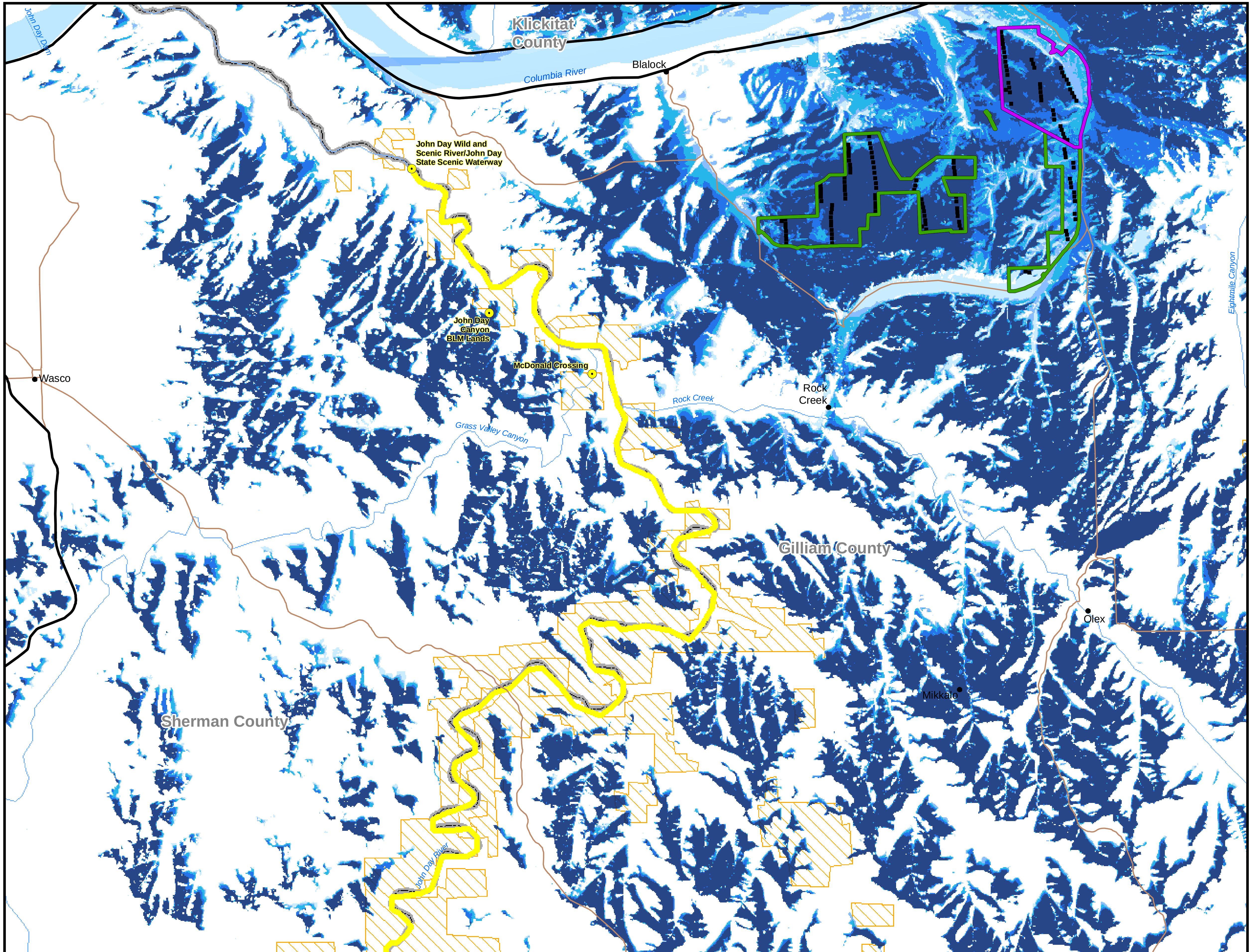


Figure R-2

John Day River ZVI Maximum Turbine Layout (1.5-MW Layout)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

- Scenic and Aesthetic Areas
- Proposed Turbine
- Highway
- Major Road
- Local Road
- Wild and Scenic Rivers
- Lakes & Rivers
- Park or Forest
- Columbia Gorge National Scenic Area Boundary
- 30-mile Analysis Area
- Leaning Juniper II - North
- Leaning Juniper II - South
- County Line
- BLM Land

ZVI Analysis

# of Visible Turbines

- 1 - 5
- 6 - 10
- 11 - 30
- 31 - 50
- > 50

Note:
ZVI analysis assumes 133 1.5-MW turbines for Leaning Juniper II.

N
W E
S

0 1 2 3 4
Miles

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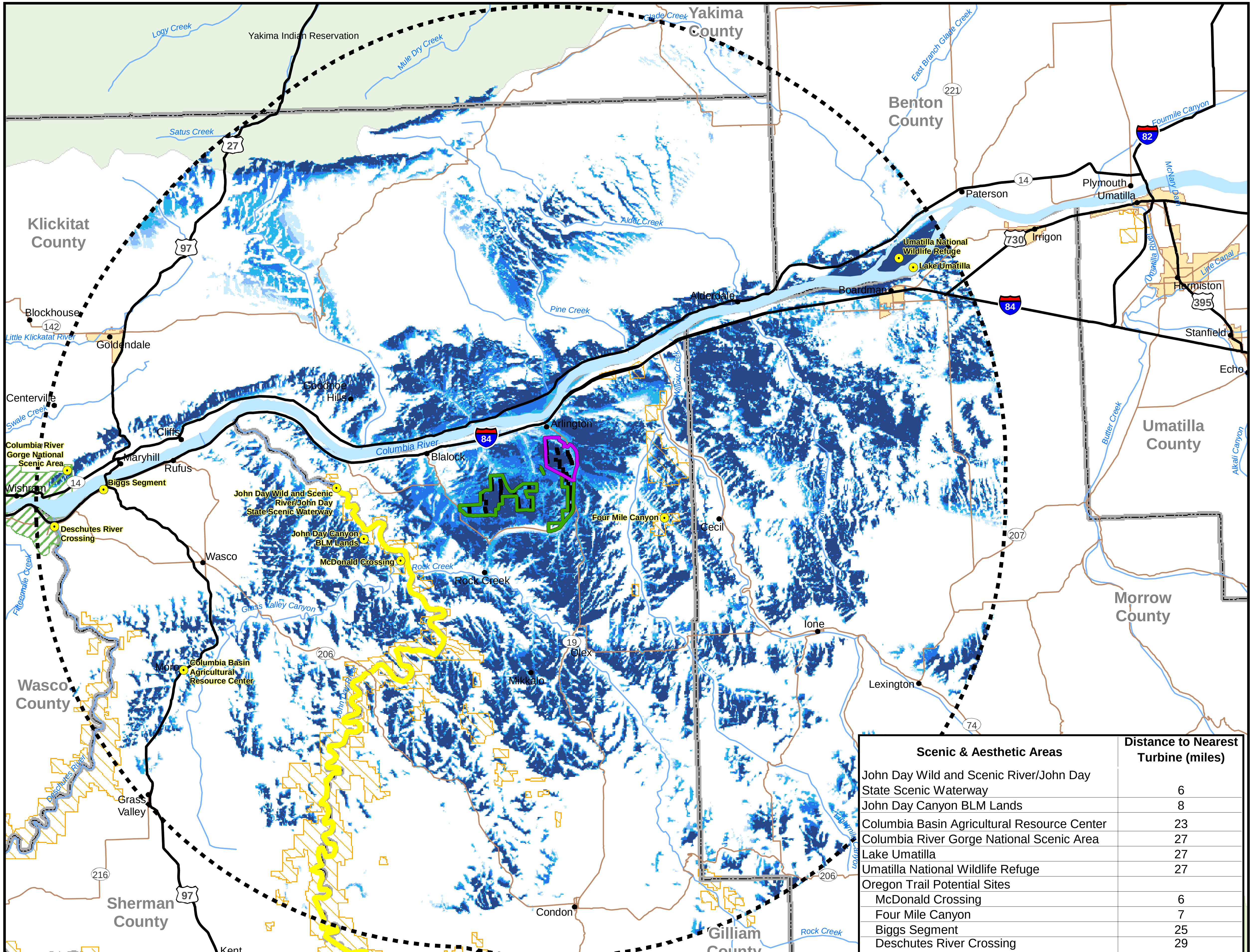

Figure R-3
Scenic and Aesthetic Areas Minimum Turbine Layout (3.0-MW Layout)
Leaning Juniper II Wind Power Facility

PPM Energy

Legend
- Scenic and Aesthetic Areas
- Proposed Turbine
- Highway
- Major Road
- Local Road
- Wild and Scenic Rivers
- Lakes & Rivers
- Park or Forest
- Columbia Gorge National Scenic Area Boundary
- 30-mile Analysis Area
- Leaning Juniper II - North
- Leaning Juniper II - South
- City Limits
- County Line
- BLM Land

ZVI Analysis

\# of Visible Turbines
- 1 - 5
- 6 - 10
- 11 - 30
- 31 - 50
- > 50

Note:
ZVI analysis assumes 93 3.0-MW turbines for Leaning Juniper II.

N, S, E, W

0 5 10 15 Miles

Scenic & Aesthetic Areas	Distance to Nearest Turbine (miles)
John Day Wild and Scenic River/John Day State Scenic Waterway	6
John Day Canyon BLM Lands	8
Columbia Basin Agricultural Resource Center	23
Columbia River Gorge National Scenic Area	27
Lake Umatilla	27
Umatilla National Wildlife Refuge	27
Oregon Trail Potential Sites	
McDonald Crossing	6
Four Mile Canyon	7
Biggs Segment	25
Deschutes River Crossing	29

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure R-3 - Scenic & Aesthetic Areas (3MW).mxd, Date: August 31, 2006 2:23:10 PM

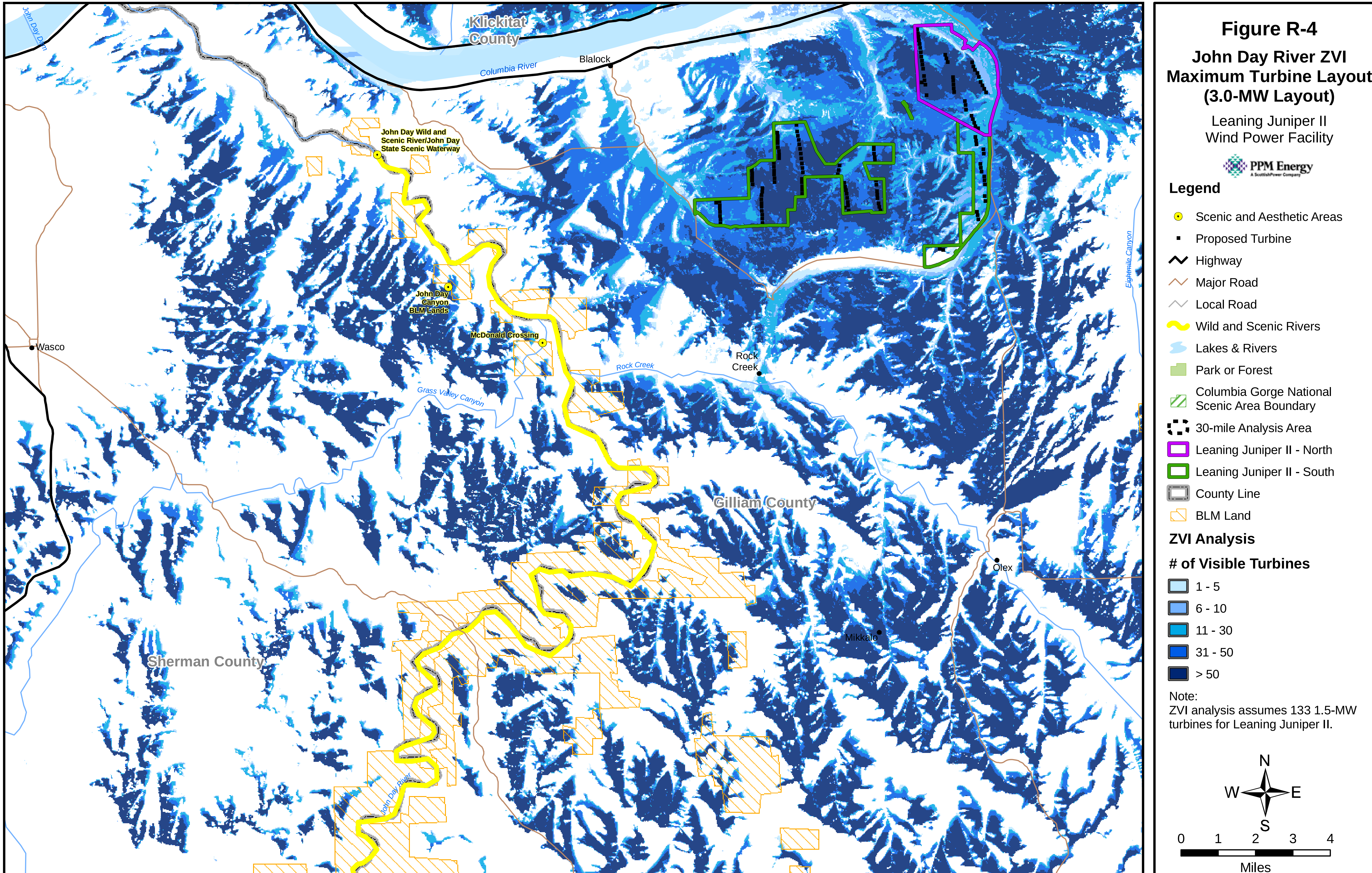

Figure R-4
John Day River ZVI Maximum Turbine Layout (3.0-MW Layout)
Leaning Juniper II Wind Power Facility

File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure R-4 - John Day River ZVI (3MW).mxd, Date: September 20, 2006 12:10:28 PM

EXHIBIT S

HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

OAR 345-021-0010(1)(s)

TABLE OF CONTENTS

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Figure

Attachments

S.1 INTRODUCTION

OAR 345-021-0010(1)(s) *Information about historic, cultural, and archaeological resources providing evidence to support a finding by the Council as required by OAR 345-022-0090*[.]

Response: Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The Leaning Juniper II Wind Power Facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

This Exhibit describes Facility impacts on historic, cultural, and archaeological resources in the vicinity.

OAR 345-022-0090 requires that the site certificate application for the proposed energy facility address historic, cultural, or archaeological resources, and that "the construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impacts to:

(a) Historic, cultural or archaeological resources that have been listed on, or would likely be listed on the National Register of Historic Places;

(b) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and

(c) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c)."

OAR 345-022-0090 is not an applicable approval criterion for wind energy facilities. However, because it may be a source of site certificate conditions, this Exhibit provides the information listed in the relevant Council application rule.

S.2 RESOURCES LISTED, OR ELIGIBLE FOR LISTING, ON THE NATIONAL REGISTRY OF HISTORIC PLACES

(A) Historic and cultural resources within the analysis area that have been listed, or would likely be eligible for listing, on the National Register of Historic Places;

Response: "Historic properties" are cultural resources that have been listed on, or are likely to be listed on, the National Register of Historic Places (NRHP). No historic properties in the area of the Facility currently are listed on the NRHP.

The Council's Historic, Cultural, and Archaeological Resources Standard, OAR 345-022-0090, states:

To issue a site certificate, the Council must find that the construction, operation, and retirement of the facility, taking into account mitigation, is not likely to result in significant adverse impacts to:

(1) Historic, cultural, or archaeological resources that have been listed on, or would likely be listed on, the National Register of Historic Places;

(2) For a facility on private land, archaeological objects, as defined in ORS 358.905(1)(a), or archaeological sites, as defined in ORS 358.905(1)(c); and

(3) For a facility on public land, archaeological sites, as defined in ORS 358.905(1)(c).

Three historic or prehistoric archaeological sites (LJ-S-1, LJ-S-2, and LJ-S-3) were discovered and recorded with the Oregon State Historic Preservation Office (SHPO) (Figure S-1).

LJ-S-1 is a sparse and diffuse scatter of historic debris in an agricultural field. No remains of structures are present; therefore, the site is entirely archaeological in nature. Broken ceramics, cast iron stove metal fragments, and glass shards were observed on the surface. Most artifacts are fragments less than 2 inches in diameter. An unimproved roadway bisects the site. To the north of and parallel to the road is a 4-foot-tall berm. A few small locust trees grow out of the berm. The majority of the site is located in the agricultural field to the north of the berm, although a few artifacts were found to the south of the roadway. No evidence of former standing structures is present. The berm does contain a pile of three or four railroad ties that appear to have been more recently deposited in this location. No evidence of a railroad line (for example, railroad spikes, other ties, ballast) is present on or near the site. The site is not known to be associated with events that have made a significant contribution to the broad patterns of history (criterion "a"), nor is it associated with the lives of persons significant in the past (criterion "b"). It clearly lacks integrity and is not eligible under criterion "c."

LJ-S-2 is an historic, archaeological site consisting of seven, bowl-shaped excavations from 10 to 30 feet in diameter. Associated with the depressions is a sparse scattering of historic debris and a rectangular-shaped stone foundation feature. The site is located adjacent to agricultural fields and probably is associated with agricultural activities.

LJ-S-3 is a site consisting of four stacked rock features overlooking a narrow ravine. The features include a small fallen cairn, a linear stacked rock wall, a semicircular stacked rock feature, and a low, one-course rock wall. The provenience of the features overlooking the ravine suggests they were used as hunting blinds. The antiquity of the site is unknown and no associated cultural materials were observed in or around the rock features.

Attachment S-1, the Cultural Resources Survey Report, shows the mapped locations of the recorded sites, and provides details of the investigation methodology and findings from the November/December 2004 survey. The Cultural Resources Survey Report contains two addendums documenting additional surveys completed in September 2005 and April 2006, respectively, in response to changes in the Facility layout.

S.3 ARCHAEOLOGICAL OBJECTS ON PRIVATE LANDS WITHIN THE ANALYSIS AREA

(B) For private lands, archaeological objects, as defined in ORS 358.905(1)(a), and archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area;

Response: Archaeological sites LJ-S-1 and LJ-S-2 and site LJ-S-3 have not been evaluated for eligibility for listing on the NRHP.

S.4 ARCHAEOLOGICAL SITES ON PUBLIC LANDS WITHIN THE ANALYSIS AREA

(C) For public lands, archaeological sites, as defined in ORS 358.905(1)(c), within the analysis area;

Response: The Facility is located entirely on private lands.

S.5 SIGNIFICANT POTENTIAL IMPACTS OF CONSTRUCTION, OPERATION, AND RETIREMENT OF THE FACILITY ON HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

(D) The significant potential impacts, if any, of the construction, operation, and retirement of the proposed facility on the resources described in paragraphs (A), (B), and (C) and a plan for protection of those resources that includes at least the following:

S.5.1 Methodology

(i) A description of any discovery measures, such as surveys, inventories, and limited subsurface testing work, recommended by the State Historic Preservation Officer and the National Park Service of the U.S. Department of Interior for the purpose of locating, identifying, and assessing the significance of resources listed in paragraphs (A), (B), and (C);

Response: An intensive cultural resources field inventory was conducted to check for the presence or absence of historic properties and for cultural resources that otherwise might not meet the threshold of significance necessary to qualify them as historic properties.

The study methods employed here followed applicable National Environmental Policy Act (NEPA) regulations and were consistent with U.S. Secretary of Interior standards for cultural resource survey and documentation under Section 106 of the National Historic Preservation Act. For the 2004 investigations, turbine strings and adjacent access roads were surveyed as 200-foot (60-meter) study corridors, with 66- to 100-foot (20- to 30-meter) transect intervals. Collector cable study corridors were approximately 100 feet (30 meters) wide and were surveyed with meandering 66- to 100-foot (20- to 30-meter) transect intervals. Transportation study corridors for access roads other than those directly adjacent to turbine strings were also 100 feet wide (30 meters) and were surveyed with 66- to 100-foot (20- to 30-meter) transect intervals. Operations and maintenance (O&M) facilities were investigated with buffers of approximately 25 percent to provide for altered placement. The 2006 field surveys examined study corridors of 1,000 feet for turbine strings. Surveys were conducted and sites were recorded using hand-held Trimble global positioning system (GPS) devices.

Human occupation of the Columbia Plateau is generally thought to have occurred for at least the last 11,000 years. Most evidence for prehistoric cultures is derived from lowland sites located near streams. Archaeological evidence in upland areas, such as the Facility vicinity, has not been extensively documented or explored. Upland areas are considered to be of lower archaeological sensitivity because they are often removed from permanent, resource-bearing water sources, and are generally thought to lack the wider array of natural resources normally found in lowland or riverine settings. Upland areas have not yet yielded evidence of prehistoric seasonal, semipermanent, or permanent settlements.

The Columbia River Gorge traditionally was used by several cultural groups: the Wishram, White Salmon, and Cascades groups (Eastern Chinookan linguistic group) and the Yakama and Klickitat groups (Echeesh-Keen linguistic group) (Griffin and Churchill, 2001). These groups used the Columbia River and its tributaries. Loose territorial boundaries, usually based on geography, were established. Subsistence centered on a seasonal round of resource availability (Griffin and Churchill, 2001). Upland and inland resources were used seasonally, and permanent or semi-permanent villages were located along streams and other permanent water sources. The specific Facility area was used by the Tenino, and perhaps the Umatilla (Ray et al., 1938). Berreman (1937) placed the boundary between the Umatilla and the Tenino at Arlington.

The proto-historic period represents the introduction of non-aboriginal cultures into the area. It is believed that this initial contact began between 1600 and 1750. It was during this period that epidemics were introduced resulting in heavy mortality among native populations.

Accounts of Euro-American exploration by Lewis and Clark, the Northwest Fur Company, and the Hudson's Bay Company described the indigenous cultural groups that settled along the Columbia River. Accounts of the settlements of the Wishram, White Salmon, Cascades, Yakama, and Klickitat by these early explorers confirm the land use pattern described by ethnographic informants. The implication of this use pattern for archaeological identification of cultural resources is that physical evidence of cultural activity in upland and inland areas is scant, if it exists at all. Instead, most archaeological evidence for ethnographic and ethno-historic activity is expected to be found in lowland areas along major rivers and streams.

Gilliam County was created in 1885 and was named for Colonel Cornelius Gilliam, who was accidentally killed while commanding the Oregon volunteers during the Cayuse War of 1847 (McArthur, 1982). The town of Arlington, 3 miles northeast of the Facility area, is located at the mouth of Alkali Creek on the Columbia River. The town was originally known as Alkali but the name was changed in 1885 to Arlington as a name more befitting of a growing community. The approximate path of the Oregon Trail runs just south of the Facility area along Alkali Canyon.

The Donation Land Act of 1850 enabled settlers to stake claims along the Columbia and its tributaries. The settlers pursued agriculture, established orchards, vineyards, and other crop fields groups (Griffin and Churchill, 2001).

In 1862, Congress passed the Homestead Act. The Act allowed qualified individuals the opportunity to homestead 160 acres of public domain. For a $10 fee, the head of the family, who was at least 21 years old, was eligible for unappropriated land. In order to receive full ownership, prospective landowners were required to live on the land for 5 years and make improvements to the property (Rasmussen, 1960; Johansen, 1967). The Homestead Act provided the opportunity for agricultural expansion wherever free land was available and led to further expansion of agriculture in Gilliam County.

S.5.2 Survey and Inventory Results

(ii) The results of surveys, inventories, and subsurface testing work recommended by the state and federal agencies listed in subparagraph (i), together with an explanation by the applicant of any variations from the survey, inventory, or testing recommended;

Response: The results of the November 29 to December 3, 2004, cultural resources survey are documented in the Cultural Resources Survey Report (Attachment S-1). Two additional cultural surveys were conducted in response to revisions in the Facility layout. The results of these additional surveys are documented in addendums I and II, attached to the Cultural Resources Survey Report. Sites LJ-S-1, LJ-S-2, and LJ-S-3 will be avoided during construction, operation, and retirement of the proposed Facility.

In the event that the Facility is changed or expanded beyond the areas recently surveyed for cultural resources, or if micrositing indicates that certain turbines would optimally be located outside of the surveyed areas, the Applicant proposes to conduct cultural resource surveys and submit that information to the Oregon Department of Energy (ODOE) before construction begins. All new or additional components will be designed to avoid impacts on cultural resources.

S.5.3 Measures Designed to Prevent Destruction of Historic, Cultural, and Archaeological Resources

(iii) A list of measures to prevent destruction of the resources identified during surveys, inventories, and subsurface testing referred to in subparagraph (i) or discovered during construction; and

Although sites LJ-S-1, LJ-S-2, and LJ-S-3 have not been formally evaluated for eligibility for listing on the NRHP, impacts to the sites will be avoided. LJ-S-1 is within a few hundred feet of a planned staging area and is in the existing dirt road. To avoid any impacts to the site, planned roads and collector cables will be routed around the site with an added 50-foot buffer. This archaeological site and 50-foot buffer zone will be temporarily flagged in the field. To avoid unplanned or accidental impacts to the site, it will be shown on construction maps and drawings as a “no entry” area. Construction crews will participate in environmental compliance training, including the necessity of avoiding sites LJ-S-1, LJ-S-2, and LJ-S-3, to further increase awareness of the site and to prevent accidental damage to this cultural resource. In February 2006, SHPO concurred on methods for avoiding site LJ-S-1 (Attachment S-2).

LJ-S-2 is not believed to be an historic property eligible for listing on the NRHP. However, the site is located on the far margins of the study corridor. The site will be labeled on Facility construction drawings before and during construction as a "no entry" area. If the final turbine layout is within 200 feet of the site, t he site and a 50-foot buffer will be flagged in the field during construction. As described for LJ-S-1, construction crews will participate in environmental compliance training to increase awareness of the site and avoid accidental damage to it.

LJ-S-3 is a collection of four rock features of uncertain antiquity. The site is located on the top of a steep hill overlooking a narrow ravine and is more than 400 feet out of the footprint of any construction or operations activities. The site will be marked on all Facility construction drawings before and during construction as a "no entry" area. As described for LJ-S-1 and LJ-S-2, construction crews will participate in environmental compliance training to increase awareness of the site and avoid accidental damage to it. An active rock quarry is located to the southeast of the quarry. Should future quarry activities encroach within 200 feet of the site, a formal Determination of Eligibility (DOE) will be required to determine whether mitigation is required.

Before beginning construction, the Applicant will provide the ODOE with a map showing the final design locations of all components of the Facility and areas that will be temporarily disturbed during construction, in relation to the areas surveyed for cultural resources. For areas that fall outside the survey corridors, the Applicant will hire qualified personnel to conduct cultural resource surveys and provide a written report of the field investigation to the ODOE. If any significant historic, cultural, or archaeological resources are found during the field investigation, the Applicant will ensure that construction and operation of the Facility will have no impact on the resources. The Applicant will instruct all construction personnel to avoid the areas where the resources were found and will implement other appropriate measures to protect the resources.

S.5.4 Permit Application

(iv) A completed copy of any permit applications submitted pursuant to ORS 358.920. Notwithstanding OAR 345-021-0000(4), the applicant shall include copies of the permit applications as part of the site certificate application. If the same information required by subparagraphs (i) through (iii) above is contained in the permit applications, then the applicant may provide cross-references to the relevant sections of the permit applications in substitution.

No permit applications have been submitted to SHPO pursuant to ORS 358.920 because no subsurface testing on public or private land was conducted (recorded sites and general site location and history do not warrant subsurface testing). In the event that heretofore undiscovered archaeological sites are inadvertently disturbed during construction, construction work will cease and the Applicant will direct the site archaeologist to apply for necessary archaeological excavation permits from SHPO.

(E) The applicant's proposed monitoring program, if any, for impacts to historic, cultural, and archaeological resources during construction, operation and retirement of the proposed facility;

The three sites identified near the Facility (LJ-S-1, LJ-S-2, and LJ-S-3) will be flagged in the field and shown on construction maps as "no entry" areas. Construction crews, as part of the environmental compliance training for all construction workers, will be instructed not to enter or disturb the sites. No further monitoring is proposed.

S.6 CONCLUSION

The foregoing evidence demonstrates that no historic properties in the proposed Facility area have been listed on the NRHP. Sites LJ-S-1, LJ-S-2, and LJ-S-3 will be avoided by marking them on construction drawings as "no entry" areas, by flagging them, and by requiring construction worker training. No other site-specific conditions are necessary with respect to the Council's historic, cultural, and archaeological resources standard.

S.7 REFERENCES

Berreman, Joel V. 1937. Tribal Distribution in Oregon. American Anthropological Association, Memoir No. 47.

Griffin, Dennis, and Thomas Churchill. 2001. *Traditional Cultural Properties for the Lake Chelan and Rocky Reach Projects*. Report prepared for Chelan County Public Utility District No. 1, Wenatchee, Washington.

Johansen, D.O. 1967. *Empire of the Columbia*. Harper and Row Publishers, New York, and London.

McArthur, Lewis A. 1982. *Oregon Geographic Names*. Fifth Ed. Oregon Historical Society. Portland, Oregon.

Rasmussen, W.D. 1960. *The History of American Agriculture*. University of Illinois Press, Urbana.

Ray, Verne F., et al. 1938. Tribal Distribution in Eastern Oregon and Adjacent Areas. American Anthropologist 40:384-415.

Figure

ATTACHMENT S-1

Cultural Resources Survey Report with Addendums

ATTACHMENT S-2

State Historic Preservation Office LJ-S-1 Concurrence Letter

CONFIDENTIAL
LJWAPPDoc47
w/ Addendum 2006-01-12
Addendum II 2006-09-25

U.S.G.S Quad Sundale, Oreg. 7.5', 1971
U.S.G.S Quad Arlington, Oreg. 7.5', 1971
T. 2N, R20E, Sec. 11-15, 21-23, 26-28
T. 2N, R21E, Sec. 7-10, 15-19, 21, 22, 27,28, 33
Historic Site (+)
Surveyed Acres: 533

CULTURAL RESOURCES SURVEY REPORT

LEANING JUNIPER WIND ENERGY PROJECT GILLIAM COUNTY, OREGON

Prepared For

PPM Energy
1125 NE Couch
Portland, Oregon 97209

By

Raena Ballantyne and Robin D. McClintock

CH2MHILL
825 NE Multnomah, Suite 1300
Portland, Oregon 97232-2146

January 2005

Oregon
Theodore R. Kulongoski, Governor

Parks and Recreation Department
Heritage Conservation Division
725 Summer St. NE, Suite C
Salem, OR 97301-1271
(503) 986-0707
FAX (503) 986-0793
www.hcd.state.or.us

February 07, 2006

Mr. John White
Oregon Department of Energy
625 Marion NE
Salem, OR 97301-3742

RE: SHPO Case No. 06-0268
Leaning Juniper Wind Power Facility Project
Various legals, Arlington vicinity Gilliam County

Dear John:

Our office recently received your report about the project referenced above. I have reviewed the Cultural Resources Survey Report with Addendum (Exhibit S) included in the Historic, Cultural and Archaeological Resources section of the report and agree with CH2MHill that the project will have no affect on any known cultural resources as long as the documented single cultural resource LJ-S-1 (site 35GM137) is avoided. Recommendations include site LJ-S-1 (35GM137) to be marked in the field and on construction drawings to ensure that no disturbance from construction activities occur within site boundaries. If areas of potential effect should change or areas that had previously been excluded from the original survey be included in the project then further archaeological investigations will need to take place.

Please be aware, however, that if during development activities you or your staff encounters any cultural material (i.e., historic or prehistoric), all activities should cease immediately and an archaeologist should be contacted to evaluate the discovery. Under state law (ORS 358.905-955) it is a Class B misdemeanor to impact an archaeological site on public or private land in Oregon. Impacts to Native American graves and cultural items are considered a Class C felony (ORS 97.740-760). If you have any questions regarding any future discovery or my letter, feel free to contact our office at your convenience.

Lucie Tisdale

Lucie Tisdale, M.A., R.P.A.
SHPO OTIA Archaeologist
(503) 986-0683
Lucie.Tisdale@state.or.us

Cc: Robin McClintock, CH2M Hill

EXHIBIT T

RECREATIONAL FACILITIES AND OPPORTUNITIES
OAR 345-021-0010(1)(t)

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Page

T.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

Exhibit T addresses impacts the proposed Facility will have on important recreational opportunities in the analysis area. This Exhibit responds to the requirements of OAR 345-021-0010(1)(t), as follows:

OAR 345-021-0010(1)(t) *Information about the impacts the proposed facility would have on important recreational opportunities in the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0100, including:*

Response: OAR 345-022-0100(1) requires that the site certificate application for the proposed energy facility address important recreational opportunities, and that "the Council must find that the design, construction, and operation of a facility, taking into account mitigation, are not likely to result in significant adverse impact to important recreational opportunities in the analysis area as described in the project order." OAR 345-022-0100(1) is not an applicable approval criterion for wind energy facilities. However, because it may be a source of site certificate conditions, this Exhibit provides the information listed in the relevant Council application rule.

This Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(t) and provides evidence to support a finding by the Council as required by OAR 345-022-0100.

T.2 IMPORTANT RECREATIONAL OPPORTUNITIES AND FACILITIES IN THE ANALYSIS AREA

OAR-345-021-0010(1)(t)(A) *A description of any important recreational opportunities in the analysis area considering the criteria in OAR 345-022-0100;*

Response: The analysis area for potential impacts on recreational opportunities includes the Facility site and the area within 5 miles of the lease boundaries, as shown in Figure T-1. Accordingly, the following discussion considers potential recreational opportunities on the Facility site itself and also within the broader analysis area.

There are no city, county, state, or federally designated recreation lands or any designated recreational facilities within the Facility lease boundaries. In general, recreational activities in the vicinity include camping, hiking, upland bird and big game hunting, boating, fishing, sightseeing, nature and wildlife photography, wind surfing, and bicycling.

The limited recreation areas within the 5-mile analysis area surrounding the lease boundaries include three city of Arlington parks, one Port of Arlington recreation site, and the Oregon National Historic Trail.

The three city of Arlington parks are Earl Snell City Park, Alkali Park, and City Park. Earl Snell City Park along the Columbia River is a day use park with a playground and access to the beach along the Columbia River. Alkali Park is an open grassy area in town. City Park is a small grassy area with limited playground equipment on Shane Drive (Rosenbaum, pers. comm.).

The Port of Arlington has one recreation site on the Columbia River. It includes a public marina and boat launch, a day use area, and a recreational vehicle (RV) park. The beach access is used for boating, swimming, and wind surfing. The area is open to the public year round, with primary use in the summer (Grady, pers. comm.).

The Oregon National Historic Trail is not within the Facility lease boundary and no Facility features intersect with the trail. In addition, no high-potential sites or segments of the Oregon National Historic Trail are within the analysis area as identified by the *Management and Use Plan Update: Final Environmental Impact Statement, Oregon National Historic Trail and Mormon Pioneer National Historic Trail* (U.S. National Park Service, 1999). The surrounding landscape is used primarily for private landfill operation and cultivation of wheat, so recreational opportunities are limited to visiting and viewing the approximate historic alignments from county roads.

OAR 345-022-0100 prescribes criteria for evaluating a recreation facility's relative importance: any special designation or management, degree of demand, outstanding or unusual qualities, availability or rareness, and irreplaceability or irretrievability of the opportunity. Table T-1 summarizes the degree of demand, any outstanding or unusual qualities, and any facts that would make the identified recreational opportunities rare or irreplaceable Based on these criteria, no important recreational facilities or opportunities exist within the Facility lease boundary or within the analysis area.

T.3 SIGNIFICANT POTENTIAL ADVERSE IMPACTS TO THE OPPORTUNITIES IDENTIFIED

OAR 345-021-0010(1)(t)(B) *An assessment of significant potential adverse impacts to the opportunities identified in (A) including, but not limited to, potential impacts such as*:

(i) *Direct or indirect loss of an opportunity as a result of construction or operation;*

Response: There will be no direct or indirect loss of an opportunity as a result of Facility design, construction, or operation.

(ii) *Noise resulting from facility construction or operation;*

Response: See Exhibit X.

Given projected noise levels, the distance between turbine locations and recreational opportunities, and the role of topography in attenuating noise effects, the noise resulting from Facility construction and operation will not affect recreational opportunities in the 5-mile analysis zone.

(iii) Increased traffic resulting from facility construction or operation;

Response: A detailed traffic analysis is presented in Exhibit U.

It is assumed that the primary transporter route will carry the majority of construction-related heavy-duty and light-duty delivery vehicles, as well as some workforce traffic. This route will probably begin from eastbound or westbound I-84 and continue south on Oregon Highway 19 (ORE 19) from Arlington, Oregon. The primary access route from the east will be along Stone Lane and Rattlesnake Road from ORE 19. The primary access route from the west will then continue west on Cedar Springs Lane and possibly north on Blalock Canyon Road. The primary route will not include Blalock Canyon Road north of Heritage Lane. These roadways follow the general perimeter of the analysis area and intersect with local unnamed gravel roadways that will provide access to the individual turbine string roads.

State, county, or local roadways could be temporarily affected by traffic increases resulting from construction vehicles accessing the site. Potential construction and operational impacts to traffic safety or maintenance on state highways from this Facility are anticipated to be inconsequential, as the state highway system (I-84 and ORE 19) is constructed to design, safety, and load-bearing standards. These roadways are able to accommodate vehicles at the legal load limit, thereby reducing the potential for significant traffic safety and maintenance impacts.

It is anticipated that county and local roadways will safely accommodate Facility construction traffic. In some cases, however, county and local roadways might require improvement before construction can begin.

Increased traffic resulting from Facility construction or operation will not detrimentally impact important recreational opportunities.

(iv) Water use during facility construction or operation;

Response: There will be no impacts on water use. As discussed in Exhibit O, any impacts will be temporary and limited to the construction period. Water will be used during construction for concrete mixing, road compaction, and dust suppression. The construction contractor will be responsible for arranging for delivery of water to the site via water trucks from a source with an existing water right. The city of Arlington has agreed to provide the Applicant's contractors with water for construction activities.

Water for dust suppression will have a positive effect on recreational opportunities by improving air quality and reducing haze. Other water uses during Facility construction or operation will not affect recreational opportunities.

(v) *Wastewater resulting from facility construction or operation;*

Response: There will be no wastewater impacts. As discussed in Exhibit V, the use of water for construction practices is not anticipated to generate runoff. Wastewater will not be discharged into wetlands or other adjacent resources. Sanitary effluent will be treated via the proposed septic tank and stormwater will infiltrate on site.

Wastewater resulting from Facility construction or operation will not affect recreational opportunities.

(vi) *Visual impacts of facility structures, including cooling tower or other plumes, if any; and*

Response: Exhibit R includes a discussion of potential impacts to visual resources as a result of the proposed Facility, and concludes that the Facility will have no significant visual impacts on scenic or aesthetic areas.

(vii) *Visual impacts from air emissions resulting from facility construction or operation, including, but not limited to, impacts on Class 1 visual resources as described in OAR 340-204-0050;*

Response: The proposed Facility will not create air emissions. Therefore, no impacts will occur.

T.4 MITIGATION MEASURES

OAR 345-021-0010(1)(t)(C) *A description of any measures the applicant proposes to avoid, reduce or otherwise mitigate the significant adverse impacts identified in (B);*

Response: Because there will be no significant impacts on important recreational opportunities, no further measures are proposed to avoid, reduce, or otherwise mitigate Facility impacts. Potential impacts on other (unimportant) recreational opportunities will be reduced through measures being taken for other purposes, including the use of existing roads where possible and the visual design of the turbine towers.

T.5 MAP OF ANALYSIS AREA

OAR 345-021-0010(1)(t)(D) *A map of the analysis area showing the locations of important recreational opportunities identified in (A)*; and

Response: Figure T-1 shows the analysis area for recreational opportunities and facilities and the potentially important recreational facility identified pursuant to OAR 345-021-0010(t)(A).

T.6 MONITORING PROGRAM

OAR 345-021-0010(1)(t)(E) *The applicant's proposed monitoring program, if any, for impacts to important recreational opportunities.*

Response: Because there will be no significant impacts on important recreational resources, no monitoring program is proposed.

T.7 CONCLUSION

There are no important recreational opportunities within the analysis area. There will be no significant adverse impacts on any unimportant recreational opportunity within the analysis area. Accordingly, no site certificate conditions are required to protect recreational resources.

T.8 REFERENCES

DeLorme Co. 2001. Oregon Atlas and Gazetteer. www.delorme.com.

DeLorme Co. 2001. Washington Atlas and Gazetteer. www.delorme.com.

Grady, Jody. Port of Arlington. Personal communication with Erin Toelke, CH2M HILL. December 22, 2005.

Mottl, Heidi. Recreational Planner, Prineville District BLM. Personal communication with Erin Toelke, CH2M HILL. December 30, 2005.

Rosenbaum, Pam. City of Arlington. Personal communication with Erin Toelke, CH2M HILL. December 21, 2005.

U.S. National Park Service. 1999. *Management and Use Plan Update: Final Environmental Impact Statement, Oregon National Historic Trail and Mormon Pioneer National Historic Trail*. August 1999.

Table T-1. Summary of Recreational Importance Evaluation for Leaning Juniper II Wind Power Facility					
	Criteria				
Facility	**Special Designation/Mgmt**	**Degree of Demand**	**Outstanding/Unusual Quality**	**Availability/ Rareness**	**Irreplaceability/ Irretrievability**
Arlington Parks (Earl Snell Park, Alkali Park, and City Park)	None known[1]	Low	Not outstanding; limited facilities	Common	Replaceable
Port of Arlington Park	None known[1]	Moderate	Not outstanding	Common	Replaceable
Historic Oregon Trail	National Historic Trail Management and Use Plan Update Final Environmental Impact Statement, Oregon National Historic Trail	Moderate	Most trail remnants destroyed as a result of agricultural practices; no access to intact segments on public land; trail is unusual	Alignment is common in region; intact segment is rare	Most trail already irretrievably altered; intact segments are irreplaceable
Hunting (upland bird and deer)	Oregon Department of Fish and Wildlife hunting regulations	Low to Moderate	Not outstanding	Common	Replaceable/ retrievable

[1] Gilliam County Comprehensive Land Use Plan applies, but provides no special designation or management objectives.

Figure

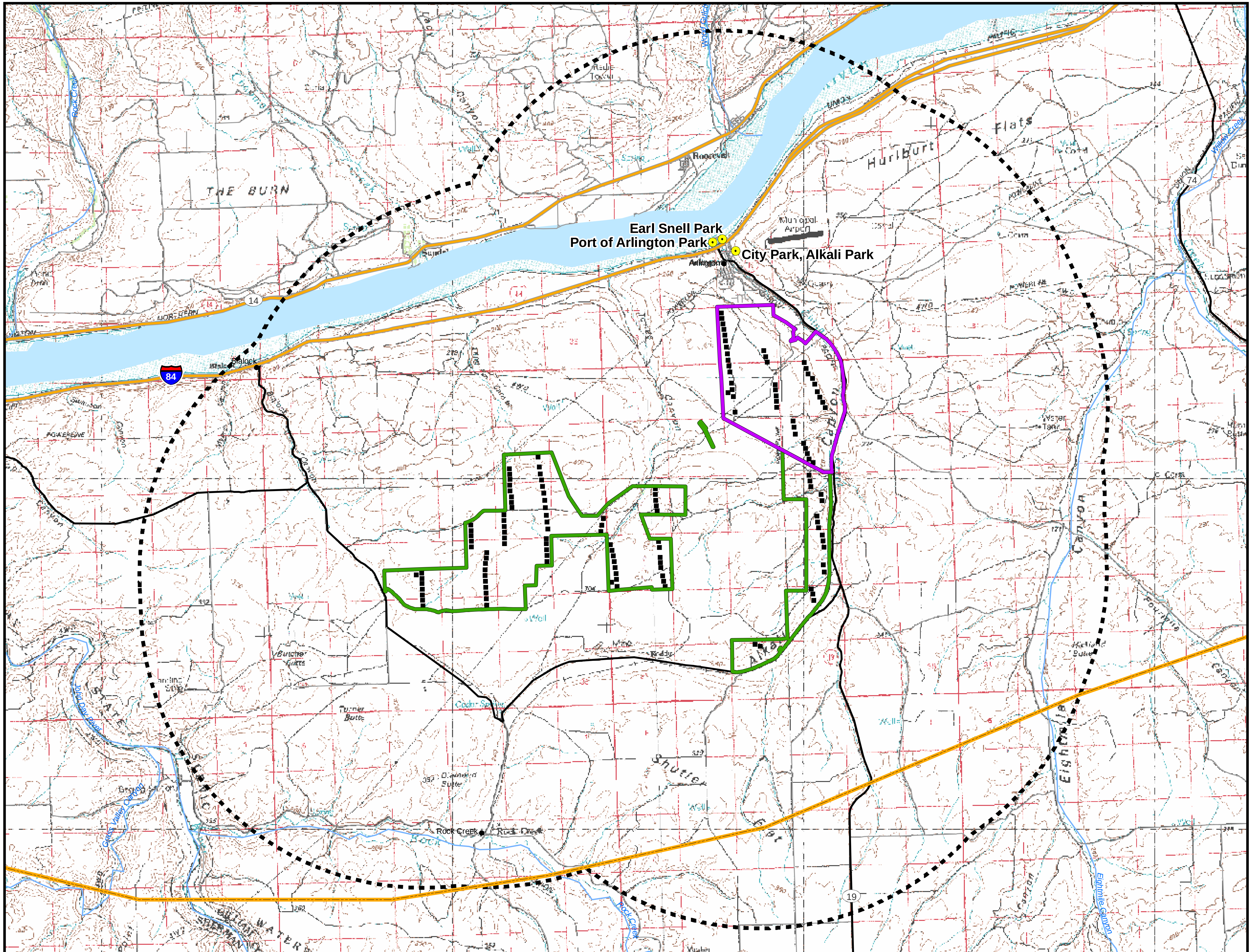

Figure T-1

Recreational Facilities and Opportunities

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

- Recreational Facilities and Opportunities
- Proposed Turbines
- Highways
- Major Roads
- Local Roads
- Lakes & Rivers
- Oregon National Historic Trail (Approximate Location)
- 5-mile Recreational Opportunity Buffer
- Leaning Juniper II - North
- Leaning Juniper II - South

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File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure T-1 - Recreational Facilities and Opportunities.mxd, Date: August 31, 2006 2:25:57 PM

EXHIBIT U

PUBLIC SERVICES/SOCIOECONOMIC IMPACTS
OAR 345-021-0010(1)(u)

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U.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

OAR 345-021-0010(1)(u) *Information about significant potential adverse impacts of construction and operation of the proposed facility on the ability of public and private providers in the analysis area to provide the services listed in OAR 345-022-0110, providing evidence to support a finding by the Council as required by OAR 345-022-0110. The applicant shall include:*

Response: This Exhibit describes potential adverse impacts of Facility construction and operation on employment, population, housing, and transportation, and on the ability of affected communities in the analysis area to provide public services. The analysis area extends 30 miles from the Facility site in Oregon and Washington (see OAR 345-001-0010 (53)(d)). Figure U-1 shows the analysis area.

OAR 345-022-0110 requires that the site certificate application for the proposed energy facility address important public services, and that “the Council must find that the construction and operation of the facility, taking into account mitigation, are not likely to result in significant adverse impact to the ability of public and private providers within the analysis area described in the project order to provide: sewers and sewage treatment, water, storm water drainage, solid waste management, housing, traffic safety, police and fire protection, health care and schools.” OAR 345-022-0110 is not an applicable approval criterion for wind energy facilities. However, because it may be a source of site certificate conditions, this Exhibit provides the information listed in the relevant Council application rule.

U.2 IMPORTANT ASSUMPTIONS USED TO EVALUATE POTENTIAL IMPACTS

OAR 345-021-0010(1)(u)(A) *The important assumptions the applicant used to evaluate potential impacts;*

Response: Potential impacts were evaluated on the basis of the assumptions described in the following subsections.

U.2.1 Employment

Construction

The Applicant proposes an earliest construction beginning date for the Facility of early 2007 and completion of construction by the end of 2007. Construction is expected to begin no later than 3 years from the issuance of the site certificate. The Applicant requests this “window” for beginning construction to allow some flexibility in response to industry constraints such as turbine availability. The schedule currently planned is used here as the most conservative assumption. During construction, an estimated average of 167 people will be employed at the Facility (an average of 55 people for Leaning Juniper II North and 112 people for Leaning Juniper II South), with a maximum of 335 employees during the entire construction period (a maximum of 112 people for Leaning Juniper II North and 223 people for Leaning Juniper II South). Most construction workers will be employees of construction and equipment manufacturing companies under contract to the Applicant.

Construction workers will include a mix of locally hired workers within 30 miles of the Facility site (in Gilliam, Morrow, Sherman, Wasco, Klickitat, Benton, and Yakima counties) for road and turbine pad construction, and specialized workers for specialized construction (for example, substation and electrical transmission construction, turbine erection, turbine testing). For purposes of this analysis, the conservative assumption was made that 30 percent of construction workers will be hired locally and the remainder from outside the analysis area. Local hiring may be greater and will depend on the availability of workers with appropriate skills**.** Additional workers may commute daily from communities outside the Facility analysis area (e.g., The Dalles, Hood River, Hermiston, and Umatilla, Oregon, and Klickitat County, Washington), which would lessen the impacts associated with the in-migration of outside workers. The Applicant intends to hire locally to the extent possible.

Operations

An estimated 10 to 30 operational personnel will be employed at the Facility (6 to 10 operations personnel and 3 administrative personnel for Leaning Juniper II North and 10 to 15 operations personnel and 3 administrative personnel for Leaning Juniper II South). Most of the operations and maintenance staff will be hired locally, with the exception of those positions (for example, supervisor) that require previous experience at other wind generation facilities. Some specialized outside contractors may also be required on occasion (for example, for repair of nacelles or meteorological services). The assumption is that operations will begin in late 2007 and continue for at least 30 years and probably much longer. (See Exhibit B for a discussion of Facility life.)

Retirement

If the Facility is retired, operational jobs will be eliminated. Retirement of the Facility will require removal of most Facility components and restoration of disturbed areas. These activities will result in temporary construction employment similar to Facility construction employment.

U.2.2 Population

Construction

Population in the analysis area will change very little as a result of Facility construction. Assuming conservatively that only 30 percent of the construction workers will be local residents (from Gilliam, Morrow, Sherman, Wasco, Klickitat, Benton, and Yakima counties), an average of about 50 and a maximum of about 100 new workers will be temporary residents (in-migrants) at the Facility. If an average household size is 2.0

persons (assuming many workers will not be accompanied by families or others), an estimated maximum of 200 temporary new residents might be associated with Facility construction during the peak construction period in summer. The actual number of temporary residents likely will be less owing to a combination of more local hiring and fewer workers bringing families or others with them. These in-migrants will likely settle in vacant hotels, campgrounds, RV parks, houses, and temporary housing located within a commutable distance to the Facility site.

Operations

The number of new permanent residents resulting from Facility operations will be small. An estimated maximum of 30 employees will be hired for Facility work but most will already be local residents. Assuming conservatively that 20 percent of these employees are in-migrants with an average household size of 3.0 (higher than for temporary employees), as many as 18 new permanent residents could be added to the local population. This number is insignificant relative to the populations of the seven-county area.

U.2.3 Transportation

Access to the Facility area will be provided by a primary transporter/haul route and secondary transporter routes. These routes will be used to bring in equipment, materials, and manpower from outside of the analysis area to the Facility site and will include state, county, and private roadways.

The primary transporter route is assumed to carry the majority of construction-related heavy-duty and light-duty delivery vehicles, as well as some workforce traffic. This route will likely begin from either eastbound or westbound I-84, and continue south on Oregon Highway 19 (ORE 19) from Arlington, Oregon. Primary access to the site from the east will be along Stone Lane and Rattlesnake Road from ORE 19. To access the site from the west, the primary route will travel south on ORE 19 and then continue west on Cedar Springs Road and north on Blalock Canyon Road. The primary route will not include Blalock Canyon Road to the north of Heritage Lane. These roadways follow the general perimeter of the analysis area and intersect with local unnamed gravel roadways that will provide access to the individual turbine string roads.

A secondary transporter route is assumed to begin from either eastbound or westbound I-84, but it will continue south on Blalock Canyon Road (from Blalock, Oregon). Blalock Canyon Road is fairly narrow with a winding path. In discussions with the Gilliam County Roads Department (Carnine, pers. comm.), it was determined that Blalock Canyon Road is not suitable for oversize or overweight trucks because of limitations caused by the physical terrain. Although it is unsuitable for large vehicles, this route will provide more efficient access for smaller delivery vehicles destined for the turbines in the west portion of the analysis area.

During construction, a large number of trucks may be accessing the site on these transporter routes. Heavy-duty trucks will be carrying gravel and other materials required to improve or construct new turbine access roads from existing roadways.

These heavy-duty trucks will also provide concrete for the turbine pads and footings. In addition to concrete and gravel, lighter-duty trucks delivering water to the site will be required. Water will be needed for dust control during road construction and for concrete batch plants. Light-duty trucks carrying electrical equipment and materials required for connection to existing power lines also will be necessary.

Facility construction is anticipated to take 10 to 12 months beginning in early 2007. During construction, an estimated average workforce of 167 people will be employed (an average of 55 people for Leaning Juniper II North and 112 people for Leaning Juniper II South), with a maximum of 335 employees during the peak months of construction (a maximum of 112 people for Leaning Juniper II North and 223 people for Leaning Juniper II South). Construction workers will be hired locally for road and turbine pad construction as local expertise and availability permits. Local workers will most likely originate from communities within the 30-mile analysis area or in the nearby city of The Dalles (to the west), or the city of Hermiston (to the east), both of which are approximately 50 miles from the Facility site. The workforce is anticipated to take I-84 to ORE 19 southbound to the Facility site. Some workers from outside the local area may temporarily relocate to communities closer to the Facility site. Workers needed for specialized construction (e.g., substation and electrical transmission construction, turbine erection, turbine testing) may originate from areas outside the County, but when feasible, preference will be given to local workers.

An estimated 10 to 30 full-time personnel will be required for operation and maintenance of the Facility. It is assumed that these workers will be hired locally, with the exception of specialized personnel who may be from outside the area. It is assumed that Facility operations will begin in late 2007 and continue for at least 30 years.

U.3 PUBLIC AND PRIVATE PROVIDERS IN THE ANALYSIS AREA

OAR 345-021-0010(1)(u)(B) *Identification of the public and private providers in the analysis area that would likely be affected*;

Response:

U.3.1 Population Within Analysis Area

While the Facility itself is entirely within Gilliam County, the analysis area includes portions of the other six counties and incorporated communities within a 30-mile radius of the Facility site (Figure U-1). (Note that no incorporated communities are located in the portions of Wasco, Yakima, and Benton counties that are in the analysis area.) Table U-1 presents historical population estimates for each of the counties and communities within the Facility analysis area. In 2004, 17 percent of the entire population resided in the communities located in Gilliam, Morrow, Sherman, and Klickitat counties.

The Dalles, located to the west of the Facility analysis area in Wasco County, is the largest community within commutable distance to the Facility site. The Dalles had a 2004 population of approximately 12,400 people, 21 percent of the five-county area's population total (not including Yakima and Benton counties).

Between 1990 and 2004, communities in the analysis area added population at varying rates. With the exception of Rufus in Sherman County and Lexington in Morrow County, all of the communities experienced a more rapid average annual growth rate from 1990 to 2000 than from 2000 to 2004.

Table U-1. Historical Population of Counties and Communities within the Facility Analysis Area

	Population			Average Annual Growth Rate	
	1990	**2000**	**2004**	**1990-00**	**2000-04**
Gilliam	**1,717**	**1,915**	**1,900**	**1.1%**	**-0.2%**
Arlington	425	524	570	2.1%	2.1%
Condon	635	750	770	1.7%	0.7%
Morrow	**7,625**	**10,995**	**11,750**	**3.7%**	**1.7%**
Boardman	1,387	2,855	3,120	7.5%	2.2%
Ione	255	321	350	2.3%	2.2%
Lexington	286	263	260	-0.8%	-0.3%
Sherman	**1,918**	**1,934**	**1,900**	**0.1%**	**-0.4%**
Rufus	295	268	270	-1.0%	0.2%
Wasco	374	381	380	0.2%	-0.1%
Moro	292	337	320	1.4%	-1.3%
Grass Valley	160	171	170	0.7%	-0.1%
Wasco	**21,683**	**23,791**	**23,900**	**0.9%**	**0.1%**
Klickitat	**16,616**	**19,161**	**19,300**	**1.4%**	**0.2%**
Goldendale	3,324	3,760	3,690	1.2%	-0.5%
Yakima	**188,823**	**222,581**	**231,586**	**1.7%**	**1.0%**
Benton	**112,560**	**142,475**	**157,950**	**2.4%**	**2.6%**

Source: U.S. Census Bureau, 2005 Population Estimates, Census 2000, 1990 Census.

Growth has occurred throughout the analysis area, but appears to have occurred most rapidly in Benton County, which added more than 40,000 people since 1990. Other communities have also added residents, as described above, but not to the degree experienced in Benton County. Sherman County was the only county in the analysis area to lose population between 1990 and 2004.

U.3.2 Public and Private Providers

Transportation

The providers of transportation services in Gilliam County include the Gilliam County Roads Department and the Oregon Department of Transportation (ODOT).

State, county, or local roadways may be temporarily affected by traffic increases resulting from construction vehicles accessing the site. Potential construction and operational impacts to traffic safety or maintenance on state highways from this Facility are anticipated to be inconsequential as the state highway system (I-84 and ORE 19) is constructed to design, safety, and load-bearing standards. These roadways are able to accommodate vehicles at the legal load limit, thereby reducing the potential for significant traffic safety and maintenance impacts.

It is anticipated that county and local roadways will safely accommodate Facility construction traffic. In some cases, however, county and local roadways could require improvement before construction can begin. To ensure the integrity of local roads, the Applicant conducted an inspection of local roadways. The Applicant will apply for a permit to construct a state highway approach from ODOT for the construction of the access approach from ORE 19 (at mile point 5.15) to the Facility area. The Applicant has also discussed with the Gilliam County Road Department the possibility of needing to straighten or make other improvements to Rattlesnake Road, depending on final construction plans. The Applicant will continue to work with local transportation officials to make improvements where necessary to accommodate Facility construction traffic. Inspections will include monitoring of roadway conditions after the completion of construction activities. Monitoring could include use of photographs, videotape, and engineer field notes to document road conditions.

Sewers and Sewage Treatment

Most of the cities in the analysis area have sewer systems and treatment facilities. Rural residences in the area generally use onsite private septic systems for sewage disposal. No community in the analysis area currently provides sewers or sewage treatment to the Facility.

Water

Most of the cities in the analysis area have public water systems that serve their respective incorporated areas, but those systems will not be used or affected by the Facility. During construction, water will be obtained from the city of Arlington. The city will serve as a sufficient water source to meet the Facility requirements (as discussed further in Exhibit O). An onsite well will be drilled to provide water during operations.

Stormwater Drainage

The larger communities in the analysis area provide stormwater drainage facilities in urban areas. Other stormwater drainage facilities, such as ditches, grading, and detention ponds, are provided in rural areas (e.g., for roads). Currently, no community in the analysis area provides stormwater drainage service to the Facility site, with the exception of minimal stormwater drainage facilities associated with public roads maintained by Gilliam County.

Solid Waste Management

The incorporated communities in the analysis area provide solid waste management services to their respective incorporated areas. Currently, no community in the analysis area provides solid waste management services to the Facility site. Solid waste disposal for the Facility during construction and operations will be provided by private contract with a local commercial hauler or haulers. The public landfill nearest to the Facility site is the Arlington Landfill owned by Waste Management Services of Oregon, Inc.

Housing

Housing is provided to varying degrees in all of the incorporated and unincorporated communities in the analysis area. In general, housing is not provided as a government service per se except in the case of subsidized housing for low-income persons and through a variety of government loans and other incentives. Provision of housing in a given area depends on a number of factors, including the supply of appropriately zoned land, builders and developers, and the demand for housing by potential residents. There is no government housing on the Facility site.

Table U-2 presents housing supply and availability data for counties and communities within the analysis area. Housing vacancy rates for 2000 ranged from 5.3 percent in Lexington to 21.3 percent in Grass Valley. The seven-county average vacancy rate of approximately 12.9 percent is higher than the state of Oregon's average of 8.2 percent.

Table U-2. Housing Data for Counties and Communities within the Analysis Area

	Housing Units		**Average Annual Growth Rate**	**Vacancy Rate**
	1990	**2000**	**1990-00**	**2000**
Gilliam	**932**	**1,043**	**1.1%**	**21.5%**
Arlington	192	278	3.8%	18.0%
Condon	356	422	1.7%	15.4%
Morrow	**3,412**	**4,276**	**2.3%**	**11.7%**
Boardman	562	948	5.4%	9.2%
Ione	142	139	-0.2%	10.1%
Lexington	114	114	0.0%	5.3%
Sherman	**900**	**935**	**0.4%**	**14.8%**
Rufus	144	162	1.2%	21.0%
Wasco	182	199	0.9%	14.1%
Moro	136	144	0.6%	8.3%
Grass Valley	81	94	1.5%	21.3%
Wasco	**10,476**	**10,651**	**0.2%**	**11.7%**
Klickitat	**7,215**	**8,633**	1.8%	**13.4%**
Goldendale	1,418	1,690	1.8%	**NA**
Yakima	**70,852**	**79,174**	**1.1**	**8.2**
Benton	**44,877**	**55,963**	**2.2**	**9.3**

NA = Not Available.
Source: U.S. Census Bureau, 2000.

Police Protection

Local police service is provided by most of the incorporated cities in the Facility area. The Applicant will seek assistance from the Gilliam County Sheriff's Office in Condon, Oregon, for police service. Backup law enforcement service is available from the Oregon State Police Eastern Region, with offices in Arlington, Condon, Pendleton, and Milton-Freewater.

Fire Protection

North Gilliam County Rural Fire Protection District provides fire protection to the Facility area. The Applicant will notify the Fire Protection District of construction plans and phasing, identify the location of and access to Facility structures, and provide mutual assistance in the case of fire in or around the Facility area.

The site will be equipped with fire protection equipment in accordance with the Oregon Fire Code.

Health Care

Because population density in the analysis area is relatively low, hospitals and health care services tend to be regional. The hospitals nearest to the Facility site are the Mid-Columbia Medical Center, located in The Dalles, and the Good Shepard Hospital located in Hermiston (they are about the same distance from the Facility). Ambulance service in the area is provided by private service groups that contract with Gilliam County. Providers will offer basic, intermediate, and advanced life support emergency medical care and transportation.

Schools

In Oregon, five school districts and 11 individual schools are located in the analysis area. The schools closest to the Facility are operated by the Arlington and Condon school districts. Arlington and Condon both have an elementary school and high school.

In Washington, two school districts and four individual schools are located in the analysis area.

U.4 SERVICE PROVIDERS IN COMMUNITIES

OAR 345-021-0010(1)(u)(C) *A description of any likely adverse impact to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0110;*

Response:

U.4.1 Economic and Demographic Impacts

U.4.1.1 Population

Limited in-migration for construction-related employment and permanent operations and maintenance employment are expected to occur as a result of the proposed Facility. Temporary construction-related jobs filled from outside of the analysis area are anticipated to last no more than 12 months, but during that time workers likely will stay at area motels, eat at local restaurants, and purchase other amenities such as gas and groceries, all having a beneficial impact on the local economy. To the extent practicable, residents from the local communities will fill the 10 to 30 operations and maintenance jobs. In-migrant operational staff and their families will not have a significant impact on local population. Assuming 20 percent of the operations and maintenance positions are filled from outside the analysis area, approximately 18 new residents will be added to the Facility area's population, if all relocate within the seven-county area and not in another county.

U.4.1.2 Economic Activity

Revenue generated for the local economy will benefit public services, including schools and others services Gilliam County provides for its citizens. While Morrow, Sherman, Wasco, Klickitat, Benson, and Yakima counties will not gain revenue from the site operation through tax payments, residents from communities within those counties may be employed during construction and operation of the Facility. Income earned by those individuals as a result of the proposed Facility will contribute to the local economy indirectly through local purchases. In addition, the proposed Facility itself will purchase goods and services from local and regional businesses, from Facility maintenance services to office equipment to business services. Lease payments to local landowners will also benefit the local economy because it is likely that a portion of the lease payments will be spent in nearby communities. All of this activity will result in a net inflow of dollars into the local economy that will have a beneficial effect beyond that of the new employment.

U.4.1.3 Tax Revenues

Development of the Facility will result in an increase in annual property tax revenue to Gilliam County. In addition, Facility development will raise the value of other properties because of the increase in wages and overall economic activity in the analysis area. The additional tax revenue generated by the existence of the Facility will increase the county's ability to provide roadways, police and fire protection, and other services to its citizens.

U.4.2 Sewers and Sewage Treatment

<u>Construction</u>

The only sewage services required by the Facility during construction will be related to the handling of sewage from contract portable toilets. Because the sewage demands of the Facility will be minimal and temporary, no adverse impacts are anticipated.

<u>Operations</u>

The Applicant will install kitchen and bathroom facilities in the Operations and Maintenance building(s). The domestic-strength waste will be treated by the building's onsite septic system. No other sewage treatment will be needed for Facility operations. As described in Section U.5, no adverse impacts are anticipated.

U.4.3 Water

See Exhibit O for a description of water use for the Facility.

Construction

Total water use is expected to be approximately 11 million gallons for Leaning Juniper II North, and 24 million gallons for Leaning Juniper II South, during the construction period for concrete mixing and road dust control (see Exhibit O). The actual amount of water applied daily for road watering is highly dependent on weather and varies between construction phases. Water needed for construction activities at the Facility will most likely be obtained from the city of Arlington. The City has sufficient available capacity to meet the Facility requirements (see Exhibit O).

Operations

For domestic purposes, the Facility will obtain water from an onsite well. Water use is expected to be less than 5,000 gallons per day and therefore require no water right permit. Because water use for Facility operations will constitute only a small portion of total agricultural water use in the Facility area, there will be no adverse impacts on existing water rights or water use, and adequate water will be available for intended uses.

U.4.4 Stormwater Drainage

No municipal or quasi-municipal stormwater drainage is provided in the Facility area. The Facility will be constructed and operated with its own stormwater management systems, consistent during construction with a National Pollution Discharge Elimination System (NPDES) 1200-C permit issued by the Oregon Department of Environmental Quality. The Applicant is in the process of preparing a 1200-C permit application for Leaning Juniper II and plans to submit this application to the Oregon Department of Environmental Quality (DEQ) in the fall of 2006.

U.4.5 Solid Waste Management

Construction and Operations

Potential impacts from the Facility on the ability of communities to provide solid waste management services could result if the solid waste management needs from the Facility (during either construction or operations) could not be met through existing facilities or if meeting those needs interfered with the ability of service providers to meet other community waste management needs (for example, if local landfill capacity were inadequate to handle the needs of the Facility). As described in Section U.5, no such impacts from construction or operations are anticipated.

U.4.6 Housing

Potential impacts on housing could result if there were an inadequate supply of housing in relation to the demand from the new temporary and permanent residents associated with the Facility. At the time of application, it is not known where the new temporary and permanent residents associated with the Facility will settle and what type of housing they will select.

Construction

Typical housing options for temporary workers include campgrounds and other areas where workers can park trailers or other mobile housing, motels and hotels, and apartments or other short-term rental homes. These types of temporary housing will be most available in larger communities within a commutable distance where hotels, motels, and trailer parking are available, such as The Dalles, Hermiston, and Umatilla, Oregon.

Operations

Permanent housing for about four new households will be required starting in the last quarter of 2007. As described in Section U.5, no significant adverse impacts are anticipated.

U.4.7 Transportation

Traffic Volumes and Roadways

To evaluate the possible impacts resulting from construction traffic associated with the Facility, traffic volumes for state highways that are part of the expected transporter routes were obtained. ODOT was consulted for traffic volumes. These volumes are presented in the Traffic Volume Tables for 2000 through 2004 for portions of the routes on the state system in Oregon. Volumes were available from ODOT for all state routes on the system, including segments of I-84 and ORE 19.

Gilliam County also was consulted for traffic volumes on major county roads that may be used. Because of the rural nature of the area, the county does not monitor traffic volumes on a yearly basis. In discussions with the Gilliam County Roads Department (Carnine, pers. comm.), a qualitative description of traffic volumes on the roadways indicates that volumes are minimal, and only during harvest times for various crops in the area do the roadways carry more than residential trips. Harvest season is typically between July and mid-September.

Table U-3 shows the average daily traffic (ADT) volumes for the past 5 years on I-84 at various milepost locations along the primary transporter route, as well as locations along ORE 19 between I-84 and Cedar Springs Road. I-84 is known as the Columbia River Highway Number 2 in the Facility area. This segment of I-84 is classified as an Interstate on the National Highway System and is designated a freight route by the Oregon Highway Plan. I-84 includes two paved lanes in each direction and is barrier separated between the eastbound and westbound directions. Portions of this roadway east of the Facility site are grade-separated between directions. Paved shoulders vary from 4 to 10 feet, and the posted speed is 65 miles per hour (mph) for general traffic and 55 mph for trucks. ORE 19, also known as John Day Highway Number 5, consists of one paved lane in each direction. These lanes are bordered by open vegetation in most areas and are not barrier separated. The terrain is fairly level between I-84 and the intersection with Cedar Springs Road, and does include paved shoulder widths. This roadway is well traveled with trucks; it is classified as a regional highway by the Oregon Highway Plan, making it a suitable transporter route.

Table U-3. Oregon State Highway Traffic Volumes and Lane Numbers (2005)

Highway	Location	Milepost	Number of Lanes	2000 ADT	2001 ADT	2002 ADT	2003 ADT	2004 ADT	2005 [1] ADT
I-84	West of Blalock	123.61	Four with barrier	10,600	10,700	10,800	10,900	10,800	11,300
I-84	East of Blalock	129.73	Four with barrier	10,600	10,700	10,900	11,000	10,900	11,300
I-84	West of Arlington	137.02	Four with barrier	10,600	10,700	10,900	10,900	10,900	N/A
I-84	East of Arlington	146.16	Four with barrier	10,100	10,200	10,600	10,700	10,600	N/A
ORE 19	North of Shutler	3.89	Two undivided	1,100	1,100	1,100	1,300	1,300	N/A
ORE 19	South of Shutler	6.30	Two undivided	790	750	750	790	790	N/A

[1] Volumes are reported from the Oregon Department of Transportation (ODOT) State Highway Inventory Report (Traffic Volumes), accessed on August 4, 2006.

N/A = Not yet available from ODOT State Highway Inventory Report Traffic Volumes tables.

Source: Oregon Department of Transportation, 2006.

Table U-3 shows that traffic on most of the roadway segments within the Facility area has remained fairly constant during the past 6 years. The reported ADT volumes on I-84 east and west of Blalock have increased by 6 percent overall since 2000, with the highest growth occurring within the last year of measured data (2005). Between 2004 and 2005, the traffic volumes at these locations have increased by approximately 4 percent. The other locations have increased by less than 5 percent overall since 2000, except on ORE 19 north of Shutler. The volumes here have increased by almost 20 percent from 2000 to 2004. This increase is reasonable considering the extremely low volumes that use this roadway.

Pavement Conditions

Pavement conditions may relate to traffic safety issues. Poor pavement with potholes could cause vehicles to swerve, resulting in unsafe vehicle operation.

ODOT's Pavement Condition Map was consulted for District 9 (ODOT, 2003). Table U-4 shows the pavement condition for state highways expected to be used as transporter routes.

Table U-4. Pavement Condition for State Highway Routes

Highway	Pavement Condition
I-84	Good
ORE 19	Good

Source: Oregon Department of Transportation, District 9 Pavement Condition Map, 2003.

A review of roadway conditions indicates that both I-84 and ORE 19 are currently in good condition. Regardless of existing pavement conditions, roadway segments will be reviewed before any construction traffic is added, and a system for monitoring safety or degradation to pavement will be developed prior to construction.

Pavement conditions on local county roadways vary from paved to unimproved gravel. Cedar Springs Road is a primary transporter route that is paved. The only county road that connects the primary transporter route with the turbine string roads is Rattlesnake Road, which is currently surfaced with gravel. This road will be evaluated before and after construction of the Facility to determine what, if any, degradation has occurred. The roadway will be repaired to existing conditions or better.

Construction Traffic Volumes

Potential traffic safety impacts are not anticipated as a result of construction of this Facility. Although high volumes of vehicle and truck traffic may be added to the roadways in Gilliam County, safety and traffic flow will be monitored to avoid adverse effects.

The size and weight of the vehicles are of concern largely in areas where roadways are designed for less than the legal load limit of 80,000 pounds or where pavement conditions are poor. Oversize transporter trucks will be required to bring in the parts of each turbine. Five oversize trucks are estimated per turbine; one overweight truck for the nacelle, one over-length truck for the blades, and three over-length trucks for the tower segments. Additional oversize vehicles will be required for transport of large construction operating equipment (for example, cranes and bulldozers).

To estimate the number of construction trips this Facility will potentially produce, the Applicant requested the number of truck trips used to construct similar wind projects in the region from a contractor experienced in wind farm construction. Based on experience with similar projects, it is estimated that approximately 120 truck trips would be needed for each 1.5-MW turbine and approximately 140 trips for each 3.0-MW turbine. Truck deliveries include large turbine components, construction machinery, concrete mixing materials, electrical equipment, and water. Based on this estimate, the anticipated 93 to 133 turbines for the Facility (potentially 40 GE turbines or 31 Vestas turbines for Leaning Juniper II North, and potentially 93 GE turbines or 62 Vestas turbines for Leaning Juniper II South) will require approximately 13,020 to 15,960 trucks for construction. Assuming 12 months of construction at 20 work days per month (possibly more work days during the peak period of construction), approximately 108 to 133 truck trips (54 to 66 trucks with one inbound trip and one outbound trip) per day will be added to background traffic patterns.

As previously established, I-84 currently carries an ADT volume ranging from 10,600 to 10,900 vehicles within the Facility area. The Facility will cause an increase in traffic of less than 2 percent through all segments of I-84, and effects will be inconsequential.

An increase of up to 133 trips per day will raise the daily traffic volumes on ORE 19 by approximately 16 percent south of Shutler. Although this is a larger increase (percentage-wise) in traffic than I-84 experiences, volumes on ORE 19 are low to begin with, and an increase of 133 trips per day will result in total ADT volume of less than 1,000 vehicles per day. This low volume can be accommodated by ORE 19. In addition, delivery vehicles will be advised to avoid peak traffic hours (a.m. and p.m. commuting periods) of the surrounding communities to minimize effects of construction.

In summary, the volume of traffic generated by the Facility will be minimal with respect to the state highway system ADT volumes. On the basis of traffic trips on transporter routes, construction of the Facility is not expected to have any traffic safety impacts on the state highway system.

Existing county roadway facilities included as part of the Facility transporter routes will experience an increase in traffic volumes during construction, but operations are anticipated to remain acceptable. Because of the rural nature of the area, the roadway currently supports very few trips while still having ample capacity. Additional construction traffic will increase the volume of vehicles on the roadway, but not to the point where capacity is reached. Therefore, even with traffic increases, construction is not anticipated to cause adverse effects on operations.

Construction Traffic and Design Standards

State highways are designed and constructed to accommodate legal loads of 80,000 pounds without a permit. During construction, it will be necessary for trucks exceeding the legal load limit to access the site via state highways. These trucks will be delivering turbines and other heavy construction equipment. Before construction, the transportation contractor will consult with ODOT to determine if any segments of roadway or bridges are restricted for travel, as well as obtain any heavy haul permits required to allow transport of these loads. Because the state highways are built to accommodate overweight vehicles with permits, impacts on safety or roadway pavement conditions are not anticipated.

The contractor must also obtain authorization from Gilliam County before proceeding with overweight loads on county-maintained roadways. There are no restricted bridges on Cedar Springs Road or Blalock Canyon Road. However, Gilliam County roadways may be constructed to lower standards than the state highway system, and will be rated before construction to determine any special requirements or conditions for transport of overweight or oversize vehicles. These requirements or conditions will be imposed to maintain traffic safety and roadway integrity.

The Applicant will strictly adhere to all travel conditions and transportation equipment requirements set forth by either ODOT or Gilliam County.

Operational Impacts

Operational traffic impacts associated with the Facility are not anticipated. While construction will introduce approximately 133 trips per day to the transporter routes, operation of the Facility will require far less traffic trips. Operational trips include employees traveling to work in their personal vehicles, as well as specialized personnel required for inspections of the turbine strings who may travel in light-duty trucks. The occasional delivery truck may also access the site during operations. As noted above, construction of the Facility is not anticipated to cause adverse impacts on transportation. Once completed, the Facility will require far less trips and personnel. Therefore, adverse impacts on the transportation network are not anticipated during operation of the Facility.

U.4.8 Police

Construction and Operations

Communities could experience adverse impacts on their ability to provide police protection if the Facility itself were to result in an increased need for police services (e.g., protection from vandalism or other crime during construction or operations), or if the additional temporary or permanent population from the Facility were to result in increased need. As described in Section U.5, the Facility will not have an adverse impact on the ability of communities in the Facility area to provide police protection or law enforcement services.

U.4.9 Fire Protection and Emergency Response

Construction and Operations

Adverse impacts on fire protection services could occur if Facility construction or operations, or the increased population associated with either, were to result in an increase in fires or in other needs for fire protection services beyond the ability of local fire departments to provide those services. During Facility construction, there could be some risk of accidental grass fires on the site. However, as described in Section U.5, Facility fire protection measures will minimize the risk of such fires and the Facility will not have an adverse impact on the ability of communities in the Facility area to provide fire protection services.

U.4.10 Health Care

Construction and Operations

Impacts on health care could occur if Facility construction activities or increases in temporary residents (during construction) and permanent residents (during operations) were to result in an increase in the use of routine and emergency health care services exceeding the capacity of local providers. As described in Section U.5, impacts on health care services are anticipated to be minor.

U.4.11 Schools

Construction

Because construction work for the Facility will be short-term and temporary, and because peak construction will occur during the summer months, no new students are anticipated in association with Facility construction. Therefore, no impacts on schools will result.

Operations

Assuming that about four new permanent households result from the Facility, approximately eight new school children (assuming two children per household) could move to the analysis area. As described in Section U.5, no significant adverse impacts on schools are anticipated.

U.5 ADVERSE IMPACT ON THE ABILITY OF PROVIDERS TO PROVIDE SERVICES

OAR 345-021-0010(1)(u)(D) *Evidence that adverse impacts described in (C) are not likely to be significant, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts; and*

Response:

U.5.1 Economic and Demographic Impacts

The number of new temporary construction jobs and new permanent full-time and part-time jobs created from Facility construction and operation will represent less than 1.0 percent of total employment in the seven-county area (greater than 160,000 jobs in the seven-county region [Bureau of Labor Statistics, 2006]). Because the Facility and the jobs will be located in an unincorporated part of Gilliam County, they will not directly affect the employment base of a specific city or town. The jobs created by the Facility will result in short- and long-term benefits to overall county employment.

U.5.2 Sewers and Sewage Treatment

Construction

The Facility is not located within any wastewater facility treatment area. Therefore, the Facility will have no impact on existing wastewater treatment facilities or collection systems.

During construction, contract portable toilets will be used. Sewage from portable toilets will be pumped regularly and disposed of at a local treatment facility.

Operations

The Applicant will install kitchen and bathroom facilities in the Operations and Maintenance building(s). The Facility will be served by an existing onsite sewage disposal (septic) system.

Because the Facility's sewage needs will be minimal during both construction and operations, the Facility will not have a significant adverse impact on the ability of any community in the area to provide sewers or sewage treatment.

U.5.3 Water

Construction

Total water use is expected to be approximately 11 million gallons for Leaning Juniper II North, and 24 million gallons for Leaning Juniper II South, during the construction period for concrete mixing and road dust control

As indicated in Section U.4.3, during the construction period for the Facility, an estimated 11 million gallons of water will be used at Leaning Juniper II North and 24 million gallons at Leaning Juniper II South for road watering (an average of approximately 85,950 gallons of water per day at each site.)

The city of Arlington will provide the Facility's water during construction and the expected demand will not injure an existing water right or exceed the amount of water available to the city of Arlington or its ability to deliver water to other customers.

Operations

The Applicant will install kitchen and bathroom facilities in the Operations and Maintenance building. A nominal amount of water will be used for domestic purposes—no more than 5,000 gallons per day, which will come from an onsite well and will not affect municipal water sources within the analysis area.

U.5.4 Stormwater

The Facility is not located within any jurisdiction's stormwater system and will not impact existing stormwater systems or providers.

U.5.5 Solid Waste Management

Solid waste generated in the construction and operation of the Facility is described further in Exhibit V. Because of the minimal quantity and inert nature of most of the potential waste, there is no anticipated adverse impact on surrounding or adjacent areas from wastes generated at the Facility during construction, operation, or retirement. The Facility is not expected to have a significant adverse impact on the ability of any community in the area to provide solid waste management services.

Construction

Most waste will be removed from the site and either reused, recycled, or disposed of at the adjacent Arlington Landfill if necessary. The Arlington Landfill has adequate capacity to accommodate construction-related debris and is not expected to reach its full capacity for an additional 50 years. As described in Exhibit G, little construction waste will require offsite disposal and only minimal amounts of solid waste will be generated during Facility operations.

Operations

As described in Exhibit G, only minimal amounts of solid waste will be generated by the Facility during operations.

U.5.6 Housing

Construction

Based on employment and population projections for the Facility, additional temporary housing could be required for up to 100 new households during the peak construction period and about 50 new households on average during the 12-month construction period. As described in Section U.5, no significant adverse impacts on the ability of communities to provide housing are anticipated.

Motels, hotels, and trailer or recreational vehicle (RV) parking will be the most available housing option for temporary residents. An Internet search identified more than 1,000 hotel and motel rooms in communities within a commutable distance to the Facility site (The Dalles Area Chamber of Commerce, 2005; Travel Oregon, 2005; Tripadvisor.com, 2005). Most rooms were found in The Dalles and Hermiston, Oregon, which are both located outside the Facility analysis area. Additional rooms may be available in establishments that do not have information on the Internet. Furthermore, additional rooms may be available in communities located in the state of Washington (e.g., Goldendale), within 30 miles of the Facility. Additional temporary housing will be available in overnight facilities located at Oregon state parks and private RV campgrounds. Memaloose and Deschutes state parks, for example, have nearly 100 sites combined that can accommodate RVs as well as 67 tent sites (Oregon State Parks, 2005). Although not all of these housing facilities will be available at any given time, adequate supplies are available in relation to the number of temporary workers.

Operations

For the four new permanent households anticipated as a result of Facility operations, it is assumed that adequate opportunities will be available to purchase housing or to construct new housing within the analysis area. As discussed in Section U.3, a supply of vacant housing exists in the analysis area.

Given the factors described in this section and the general availability of housing opportunities, no significant adverse impacts on the ability of communities to provide housing are anticipated from Facility construction or operations.

U.5.7 Transportation

Adverse construction and operational impacts on traffic safety or travel times from the Facility are not anticipated.

While construction-related traffic may cause short-term traffic delays (because of large delivery trucks), this scenario is temporary and will be mitigated with measures that further minimize impacts. These measures may include:

- Providing notices to adjacent landowners when construction takes place to help minimize access disruptions
- Providing proper road signage and warnings of "Equipment on Road," "Truck Access," or "Road Crossings"
- Implementing traffic diversion equipment (such as advance signage and pilot cars) whenever possible when slow or oversize loads are being hauled
- Encouraging carpooling for the construction workforce to reduce traffic volume
- Employing flagpersons as necessary to direct traffic when large equipment is exiting or entering public roads to minimize risk of accidents
- Maintaining at least one travel lane at all times so that roadways will not be closed to traffic because of construction vehicles entering or exiting public roads

Advance warning in the form of signage and notices to landowners may reduce the effect construction vehicles have on ORE 19 and county roadways. By providing notices to landowners ahead of time, citizens will be aware of temporary access disruptions as well as potential delays and may be able to adjust their travel accordingly. To further reduce the effect of construction vehicles, flagpersons will efficiently guide large or oversize vehicles as they enter or exit any public roadway.

Although short-term delays may occur, traffic operations will be maintained by keeping at least one travel lane of the transporter route open at all times. This will be important on ORE 19, Rattlesnake Road and Cedar Springs Road as transport vehicles will access turbine string roads via these county roads. Flagpersons may facilitate two-way traffic on one lane by alternately restricting travel directions. This method will not require lane closures, detours, or reroutes. Flagpersons will also monitor through traffic on public roadways as necessary so that they are not in conflict with construction vehicles.

Unlike large construction vehicles, the construction workforce will most likely travel during the morning and afternoon peaks of a typical work day. Although local Gilliam County traffic volumes are low, by encouraging carpooling among workers, fewer vehicles can be anticipated on the roadway during this time, therefore reducing the effect of construction on typical commuters.

U.5.8 Police

Construction and Operations

The additional temporary and permanent work force is not anticipated to create any significant concerns. A letter from the Gilliam County Sheriff's Office confirms that they provide services in the area of the Facility (see Attachment U-1). If needed, backup law enforcement will be available from the Oregon State Police Eastern Region and from local police in the surrounding jurisdictions (Arlington, Condon, Milton-Freewater, and Pendleton). The relatively small number of new temporary and permanent residents is not anticipated to place significant new demands on the providers of police protection in the area. Therefore, the Facility will not have a significant adverse impact on the ability of communities in the Facility area to provide police protection or law enforcement services.

U.5.9 Fire Protection and Emergency Response

Construction

A conversation with the North Gilliam County Rural Fire Protection District indicated that they had no concerns about Facility construction or operations with respect to providing fire protection services (Davison, pers. comm.). This statement is confirmed by a letter from the Fire Protection District to that effect (see Attachment U-2). Steps that will be taken for preventing fires during construction include establishing roads before accessing the site (to allow vehicles to stay away from grass), using diesel vehicles whenever possible (to prevent potential ignition by catalytic converters), avoiding idling vehicles in grassy areas, and keeping cutting torches and similar equipment away from grass.

Operations

The relatively small number of new temporary and permanent residents is not anticipated to place significant new demands on the fire protection forces that serve the area.

For the preceding reasons, the Facility will have no impacts on the ability of surrounding communities to provide fire protection during construction or operations.

U.5.10 Health Care

Construction and Operations

To reduce the potential for health and safety risks, the Applicant will require all onsite construction contractors to prepare site health and safety plans before they begin construction activities. Each plan will provide instruction to employees and others on what to do in case of emergencies. Plans will include locations of fire extinguishers, important telephone numbers, and first aid techniques. Nearby hospitals, their addresses, and their contact information will be listed. The plans will be maintained during construction and operations. Additional preventive measures could be included, such as briefings with local hospitals and emergency service providers, identification of an emergency helicopter or aircraft landing area, and coordination with local fire officials.

Impacts on local health care services will be minimized by careful management of site health and safety risks. The small number of new temporary and permanent residents is not expected to place significant new demands on the health care facilities that serve the area.

U.5.11 Schools

Construction and Operations

As described in Section U.4, no demand for school facilities is anticipated during Facility construction. Only minimal demand is expected from the small increase in local population resulting from new permanent employees during Facility operations.

Actual impacts on schools will depend on the housing choices of new residents with children, which is unknown. Given the dispersed area in which new residents are likely to settle, the small number of new school children expected, and the number of schools available, it is unlikely that any one school will receive more new students than it can accommodate. As a result, no significant adverse impacts on the ability of communities to provide school services are anticipated as a result of Facility construction or operation.

U.5.12 Mitigation Measures

The proposed Facility will not result in any significant adverse impacts on the public service and utility providers within the analysis area. Therefore, no mitigation is required.

U.6 MONITORING PROGRAMS

OAR 345-021-0010(1)(u)(E) *The applicant's proposed monitoring program, if any, for impacts to the ability of the providers identified in (B) to provide the services listed in OAR 345-022-0010;*

Response: Because the Facility will have no significant impacts on the ability of public and private providers to provide the listed services, no monitoring program is proposed.

The Facility contractor and the construction manager will be in ongoing contact with Gilliam County Public Works Department during Facility construction. The Applicant's construction manager will monitor the implementation of the traffic control procedures written into the contract specifications.

County roadways that are part of transporter routes may need to be improved in order to accommodate construction-related traffic. Gravel roads will need upgrades, as well as paved county roads (Cedar Springs Road) that may be in poor condition. All county roads used for transport also will be evaluated before construction so that conditions may be documented. If any degradation has occurred, the roadway will be repaired to existing conditions or better.

Once construction is complete, these improved county roads will remain in place, providing increased quality of travel for the public.

U.7 CONCLUSION

The evidence provided in this Exhibit demonstrates that the Council's community services standard has been met, because the Facility will not result in a significant adverse impact on the ability of any of the communities in the analysis area to provide the listed government services.

U.8 REFERENCES

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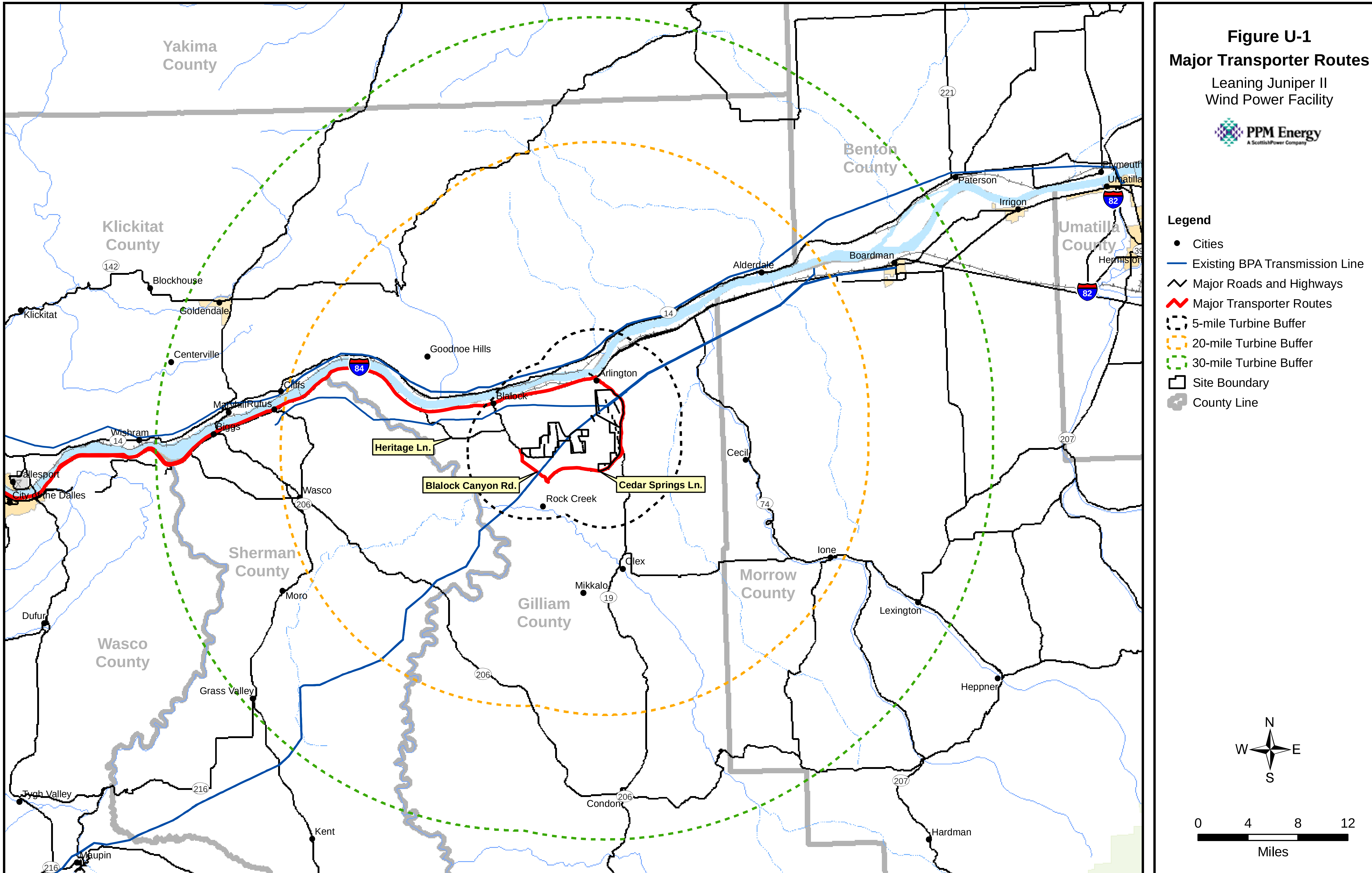
Figure

ATTACHMENT U-1

Letter from Sheriff

ATTACHMENT U-2

Letter from Fire Protection District



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GILLIAM COUNTY
SHERIFF'S OFFICE

221 S. OREGON STREET
P.O. BOX 685
CONDON, OREGON 97823
TEL: 541-384-2851 - EXT. 146
FAX: 541-384-2878

November 22, 2005

Mrs. Carrie Konkol
CH2M HILL
2020 SW Fourth Avenue, 3rd Floor
Portland, OR 97201

Dear Mrs. Konkol:

The Gilliam County Sheriff's Office is the primary response police agency for the area in which the Leaning Juniper Wind Power Facility is located. This project is in a relatively low crime area of our County.

The Sheriff's Office will respond appropriately and as necessary to all complaints that come from the Leaning Juniper Wind Power Facility Project.

Sincerely,

Gary Bettencourt, Sheriff
Gilliam County Sheriff's Office

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North Gilliam County Rural Fire
Protection District
PO Box 476
1500 Railroad Avenue
Arlington, Oregon 97812
541-454-2900

January 3, 2006

Mrs. Carrie Konkol
CH2M HILL
2020 SW Fourth Avenue, 3rd Floor
Portland, OR 97201

Dear Mrs. Konkol

The North Gilliam County Rural Fire Protection District is the primary fire response for the area in which the Leaning Juniper Wind Power Facility is located. The Fire Chief has determined that the Leaning Juniper Wind Power Facility will not have a significant impact on fire emergency services

Sincerely,

~~XXXXX~~, Fire Chief
North Gilliam County Rural Fire Protection District
Board Chairman
Larry W Eubanks

EXHIBIT V

WASTE MINIMIZATION

OAR 345-021-0010(1)(v)

TABLE OF CONTENTS

V.1 INTRODUCTION

OAR 345-021-0010(1)(v) *Information about the applicant's plans to minimize the generation of solid waste and wastewater and to recycle or reuse solid waste and wastewater, providing evidence to support a finding by the Council as required by OAR 345-022-0120. The applicant shall include:*

Response: The evidence provided in this Exhibit demonstrates that the standard established in OAR 345-021-0010(1)(v) is met because solid waste and wastewater plans developed by Leaning Juniper Wind Power II, LLC (the Applicant) will minimize the generation of solid waste and wastewater by the proposed Facility (the Facility) and lead to recycling and reuse of such wastes. Additionally, the Applicant's plans to manage generated wastes will result in minimal impact on surrounding and adjacent areas.

OAR 345-022-0120 requires that the site certificate application for the proposed energy facility address waste minimization, and that "to the extent reasonably practicable: (a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction, operation, and retirement of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes; [and] (b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas."

V.2 TYPES OF WASTE

OAR 345-021-0010(1)(v)(A) *A description of the major types of solid waste and wastewater that construction, operation and retirement of the facility are likely to generate*;

Response: See sections V.2.1 through V.2.3.

V.2.1 Wastes Produced During Construction

Response: A variety of nonhazardous, inert construction wastes will be generated during Facility construction. Construction wastes primarily will consist of concrete waste from turbine pad construction, wood waste from wood forms used for concrete pad construction, and scrap metal steel from turbine tower construction. Some additional wastes could include erosion control materials, such as straw bales and silt fencing, and packaging materials for associated turbine parts and other electrical equipment. Wastewater will be generated during construction from washdown of concrete trucks after concrete loads have been emptied. Washdown will be up to the contractor. Washdown may occur at the contractor-owned batch plant. Concrete trucks may also be washed down at each foundation site to prevent the concrete from hardening in the trucks. In these cases, the concrete wastewater will be disposed of on backfill piles and buried underground with the backfill over the tower foundation. Portable toilets will be provided for onsite sewage handling during construction and will be pumped and cleaned regularly by the construction contractor. No other wastewater will be generated during construction.

V.2.2 Wastes Produced During Operation

Response: Little solid waste will be generated from Facility operations. Office waste, such as paper and food packaging/scraps, will be generated at the Operations and Maintenance (O&M) building(s). Some minor and potentially hazardous wastes include oily rags or similar wastes related to turbine lubrication and other maintenance, as described in Exhibit G. The only other source of waste will be incidental waste from repair or replacement of electrical or turbine equipment. No industrial wastewater will be generated during operations.

The Applicant proposes to construct a septic system to serve the sanitary uses at the proposed O&M building(s). The estimated number of permanent employees is 10 to 30. The design capacity of the proposed new septic system(s) is less than 2,500 gallons per day. A local septic system permit will be obtained from the County prior to construction of the septic system.

The operations personnel will be responsible for the waste management program, ensuring that solid waste is disposed of in dumpsters, and any hazardous wastes are properly disposed of in accordance with applicable rules.

V.2.3 Wastes Produced By Retirement

Response: When the Facility is retired or decommissioned, the turbine towers will be removed from the site and the materials reused or sold for scrap. Inert underground electrical cables and underground concrete turbine pads will be left in place, provided landowner permission is obtained, but no such equipment will be left within 3 feet of the ground surface, so that agricultural activities may continue. It is anticipated that at least some of the improved roads will be left in place by Waste Management Disposal Services of Oregon, Inc., or the adjacent landowner.

Leaving concrete pads and other equipment 3 feet below the surface upon retirement of the Facility will allow agricultural activities to continue with no adverse effect. Please refer to the letters from Sandy Macnab of Sherman County and Jordan Maley of Gilliam County, provided as Attachments V-1 and V-2, respectively, for support of this industry standard. Ms. Macnab is a Sherman County Crops Agent at the OSU Extension Service and Mr. Maley is a Gilliam County Dryland Cropping Systems Extension Agent at the OSU Extension Service. Because plowing depths are no more than 12 inches, leaving concrete pads and other equipment 3 feet below the surface will allow normal farming operations to resume. Mr. Maley states that the restoration process will likely include movement of top soil to fill any void left by tower removal, a type of shallow cut and fill that is widely practiced in the construction of erosion control structures in Gilliam County.

V.3 PLANS FOR RECYCLING AND REUSE

OAR 345-021-0010(1)(v)(B) *The applicant's plans to minimize, recycle or reuse the solid waste and wastewater described in (A);*

Response: Waste minimization and recycling will be implemented during project construction and operations. See sections V.3.1 through V.3.3.

V.3.1 Recycling During Construction

Response: Generation of wastes from construction will be minimized through detailed estimating of materials needs and through efficient construction practices. Any wastes generated during construction will be recycled when feasible. Steel scrap will be collected and transported to a recycling facility. Wood waste will also be recycled where feasible, depending on size and quantity of scrap and leftover materials. Concrete waste will be used as fill onsite or at another site or, if no reuse option is available, removed to the adjacent Arlington Landfill. Packaging waste (such as paper and cardboard) will be separated and recycled. Any nonrecyclable wastes will be collected and transported to a local landfill.

V.3.2 Recycling During Operations

Response: Minimal waste will be generated during operations. Waste from the O&M building(s) (for example, paper, cans, and bottles) will be collected and recycled as feasible. Nonrecyclable wastes will be collected and transported to the adjacent Arlington Landfill.

V.3.3 Recycling During Retirement

Response: In the event of Facility retirement, most of the aboveground waste will be removed and reused as described in Section V.3.1. Underground waste limited to concrete pads and underground cables more than 3 feet below ground surface is likely to be left in place, as is standard practice for retirement of wind energy facilities throughout the United States. The practice of leaving concrete pads and other equipment in place at depths greater than 3 feet below ground surface is commonly accepted as having no adverse effect on agricultural activities.

V.4 ADVERSE IMPACTS OF WASTE DISPOSAL

OAR 345-021-0010(1)(v)(C) *A description of any adverse impact on surrounding and adjacent areas from the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility;*

Response: As a result of the minimal quantity and inert nature of most of the potential waste, there is no anticipated adverse impact on surrounding or adjacent areas from wastes generated at the Facility during construction, operation, or retirement. Most waste will be removed from the site and either reused, recycled, or disposed of at the adjacent Arlington Landfill if necessary. Any waste disposed of onsite (for example, concrete waste and wastewater) will be inert. This waste will be disposed of in a manner consistent with applicable regulations and protective of human health and the environment.

V.5 EVIDENCE THAT ADVERSE IMPACTS WOULD BE MINIMAL

OAR 345-021-0010(1)(v)(D) *Evidence that adverse impacts described in (C) are likely to be minimal, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts; and*

Response: As discussed in Section V.4, taking into account waste minimization and recycling, adverse impacts caused by Facility waste will be minimal.

The Applicant's proposed measures to avoid, reduce, and mitigate any possible impacts on the site or to adjacent land are discussed above and in Exhibit G. They include storing oily waste, such as rags or dirt, in sealable drums and removing it for recycling or disposal by a licensed contractor. In addition, spill kits containing items such as absorbent pads will be located on equipment and in the onsite temporary storage facilities to respond to accidental spills that may occur. Further, during construction, equipment (for example, graders and dozers) will be available to respond to spills and to quickly construct berms or ditches, if necessary.

Disposal of materials as fill onsite will be conducted in accordance with OAR 340-093-0080 and other applicable regulations. OAR 340-093-0080 provides a permit exemption to the disposal permit requirement for disposal of inert wastes such as soil, rock, concrete, and tile that does not contain contaminants that could adversely impact waters of the state or the United States. To meet the clean fill definition, any inert construction debris to be disposed of onsite will be separated from other debris that is not inert.

The only clean fill that has the potential to be disposed of onsite is waste concrete generated during construction. The construction contractor may, with agreement of the landowner, bury waste concrete (excess cement mix from a construction site; batches of concrete that do not meet specifications) onsite. In such cases, the material will be placed in an excavated hole, covered with at least 3 feet of topsoil, and regraded to match existing contours.

Any packing materials, paper, and refuse will be separated, accumulated in dumpsters, and periodically removed for recycling or disposal by a licensed waste hauler. Portable toilets will be provided for onsite sewage handling during construction and will be pumped and cleaned regularly by the construction contractor.

Transportation of wastes to landfills or recycling facilities will involve periodic truck trips over public and private roads between the project and the nearest landfill or recycling facilities. Given the number and frequency of these trips and the anticipated volume of waste materials, these trips are not anticipated to have adverse impacts on the adjacent or surrounding area.

V.6 PROPOSED MONITORING PROGRAM

OAR 345-021-0010(1)(v)(E) *The applicant's proposed monitoring program, if any, for minimization of solid waste and wastewater impacts;*

Response: During construction, it will be the responsibility of the contractor to monitor waste generation and management activities, and ensure that wastes are recycled or disposed of in an appropriate manner. Because no significant adverse impacts from waste or wastewater will occur on the adjacent or surrounding areas during operation, no monitoring program is proposed.

V.7 CONCLUSION

The evidence provided above demonstrates that the Council's waste minimization standard is met because wastes will be minimized, reused, or recycled where feasible and because no significant adverse impacts on the surrounding or adjacent areas will result from the management of wastes related to the Facility.

ATTACHMENT V-1

Letter from Sherman County Oregon State University Extension Service

ATTACHMENT V-2

Letter from Gilliam County Oregon State University Extension Service

OSU
Oregon State
UNIVERSITY

Extension Service Sherman County
Oregon State University, 409 Hood Street, PO Box 385, Moro, OR 97039
T 541-565-3230 | F 541-565-3330 | http://extension.oregonstate.edu/sherman/

September 29, 2005

PPM Energy
Jesse Gronner
1125 NW Couch
Suite 700
Portland, Ore. 97209

Mr. Gronner,

Regarding the FSEC questions pertaining to the Phase III energy development plan for Sherman County, I would like to provide some answers to some of the questions posed.

Although the contracts call for the sites to be restored upon possible decommissioning of the towers, the questions regarding farming over those sites should not be a problem. Typical tillage in this area is primarily in the 6 to 8 inch zone, occasionally as deep as 10 inches and rarely if ever, over 12.

When the original soil was removed, most of the topsoil was spread around the farm ground in the area of the tower site and it could be pushed back in to the holes upon decommissioning. Farmers in this area frequently scrape the topsoil to build sediment dams and terrace as conservation practices to control erosion and there are skilled contractors in the area very capable of pushing enough nearby topsoil into position without going so deep they expose non-producing bedrock or hard pans. If extra fill dirt is needed, there are a number of sites behind old sediment dams or fill that has been stored after removal for a sewage filtration pond that could be available for that purpose.

If you have any other questions, please do not hesitate to contact me.

Sincerely,

Sandy Macnab

Sandy Macnab
Oregon State University Extension Service
Sherman County Crops Agent

Extension Service
Gilliam County

OSU

OREGON STATE UNIVERSITY

333 South Main Street
PO Box 707
Condon, Oregon 97823

Telephone
541-384-2271
Fax
541-384-2571

May 8, 2006

PPM Energy
Sara McMahon
Project Manager
Suite 700
1125 NW Couch
Portland, OR 97209

Dear Ms. McMahon,
Regarding the Energy Facility Siting Council questions pertaining to the Leaning Juniper II energy development plan, I would like to provide the following input on the proposal.

It is my understanding the wind tower siting contracts include a provision for restoration of the land following decommissioning. Returning that land to crop production once the towers are removed and foundations buried three feet below the land surface should not pose a problem for future agricultural management. The restoration process will likely include movement of top soil to fill any void left by tower removal. This type of shallow cut and fill is already widely practiced in the construction of erosion control structures in our county. Land productivity is not significantly impacted by this type of activity. Once the land is returned to farming, typical tillage depth in this region is approximately 8 inches, and rarely over one foot in depth. For that reason, the buried foundation mass would lie well below the level of any tillage activity.

Feel free to contact me if you have questions concerning this input to the EFSC process.

Sincerely yours,

Jordan B. Maley

Jordan B. Maley
Dryland Cropping Systems Extension Agent
Oregon State University Extension Service – Gilliam County

EXHIBIT W

FACILITY RETIREMENT AND SITE RESTORATION

OAR 345-021-0010(1)(w)

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W.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

OAR 345-021-0010(1)(w) *Information about facility retirement and site restoration, providing evidence to support a finding by the Council as required by OAR 345-022-0050(1). The applicant shall include:*

Response: The evidence provided in this Exhibit demonstrates that the standard contained in OAR 345-022-0050(1) can be met because the proposed Facility can be retired (decommissioned) and the Facility site restored to a useful, nonhazardous condition that allows continued use for agriculture. Further, the Applicant will put in place adequate security to ensure that decommissioning will be funded to necessary levels.

The construction and operation of the Facility will involve minimal amounts of hazardous material and solid waste (as described in Exhibits B, G, and V). Therefore, restoring the site to a useful, nonhazardous condition will require simple removal of all Facility features to below grade and subsequent soil restoration and revegetation. This Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(w).

W.2 USEFUL LIFE

OAR 345-021-0010(1)(w)(A*)* *The estimated useful life of the proposed facility;*

Response: For financial evaluation and contractual purposes, the Facility is assumed to have a useful life of 25 to 30 years. The trend in the wind energy industry, however, has been to "repower" older wind energy projects by upgrading existing towers and other infrastructure with more efficient turbines and related equipment. Based on today's market for renewable power, it is likely that the Facility will be upgraded with more efficient equipment and, therefore, could have a useful life longer than 30 years.

W.3 RETIREMENT AND SITE RESTORATION

OAR 345-021-0010(1)(w)(B) *The actions that the applicant proposes for retirement of the facility and restoration of the site to a useful, non-hazardous condition*;

Response: If the Facility is terminated, the Applicant will obtain the necessary authorization from the appropriate regulatory agencies and landowners to proceed with decommissioning of Facility components. The first step in decommissioning will be dismantling all turbines, towers, pad-mounted transformers and related aboveground equipment. Turbine towers, nacelles, and pad-mounted transformers will have considerable value and will thus be removed and sold for use or scrap. Unsalvageable material will be disposed of at authorized sites (as described in Exhibit V).

Subsequent steps in decommissioning will be removal of concrete turbine pads to an appropriate depth below the soil surface. The Applicant's lease agreements with the landowners specify that in the event of Facility termination, all turbine foundations will be removed to a minimum depth of 3 feet below grade and soils will be restored, as is the standard industry practice. Portions of underground electrical and communication cable buried below 3 feet also will be left in place. This will allow agricultural use of the Facility site after decommissioning. The soil surface will be restored as close as reasonably possible to its original condition.

Reclamation procedures will be based on site-specific requirements and techniques commonly employed at the time the area is to be reclaimed, and will likely include regrading to restore soil and original contours and revegetating disturbed area with native plant seed mixes or agricultural crops, as appropriate, based on the use of surrounding lands.

One of the final steps in decommissioning will be removal of Facility roads. Decommissioned roads will be reclaimed to restore the surface grade and soil to a condition useful for either agriculture or wildlife habitat, depending on the use of surrounding lands. Roads also may be left in place based on landowner preference. It is expected that landowners generally will not want the Applicant to decommission the widened portions of farm roads that pre-existed the Facility, but will want the Applicant to decommission the new access roads built for the Facility.

All decommissioning will be done consistent with an approved weed control plan.

W.4 ESTIMATED COST OF RETIREMENT

OAR 345-021-0010(1)(w)(C) *The estimated costs to retire the facility and restore the site to a useful, non-hazardous condition and a discussion of the methods and assumptions used to estimate retirement and restoration costs*; *and*

Response:

W.4.1 Leaning Juniper II North

The Applicant estimates the net cost of retiring Leaning Juniper II North and restoring the site based on the cost of removal, minus the scrap value of the components in the turbines, to be $633,751 in November/December 2005 dollars. The Applicant understands that ODOE has generated its own estimates of the cost of removal and of the scrap value of Facility components. The Applicant's dollar estimate was based on comparing the net cost of retiring a Facility ranging in size from 31 Vestas 3.0-MW turbines to 40 GE 1.5-MW turbines.

The Applicant's cost estimate is based on a worst case scenario of decommissioning 31 Vestas 3.0-MW turbines. Decommissioning the larger 31 Vestas 3.0-MW turbines would cost more than decommissioning 40 GE 1.5-MW turbines, as shown in Tables W-1 and W-2 in Attachment W-1. The price quote was provided by a contractor experienced in wind farm demolition. The quote was prepared for this specific Facility location and the specific model of turbine, tower, and foundation design to be employed. The quote includes removal of all turbines, transformers, aboveground collector lines, and met towers; excavation of foundations and underground collector lines down to a depth of 3 to 4 feet; and return of all soils to preconstruction grade, including the removal or restoration of roadways for Leaning Juniper II North.

The revenue from the scrap value of steel was calculated based on an independent analysis from a metals expert, using the current scrap value escalated at Gross Domestic Product Implicit Price Deflator. Each GE 1.5-MW turbine contains approximately 220 metric tons of steel. Each Vestas 3.0-MW turbine contains approximately 348 metric tons of steel, including both the tower and nacelle. Each Vestas 3.0-MW turbine weighs approximately 364 metric tons, including the nonmetallic blades. The scrap value was calculated based on the following:

- 220 net tons per unit for the 40 GE 1.5-MW turbines for a total of 8,816 total net tons
- 348 net tons per unit for the 30 Vestas 3.0-MW turbines for a total of 10,780 total net tons

Based on the independent analysis, salvage value for Leaning Juniper II North was calculated to be $1,411,606 for the 40 GE 1.5-MW turbines and $1,557,209 for the 31 Vestas 3.0-MW turbines, as shown in Tables W-1 and W-2. While the salvage value of the 31 larger turbines would be greater than that of the 40 smaller turbines, decommissioning the larger turbines would also cost more, resulting in a larger net cost of retiring a Facility with 31 Vestas 3.0-MW turbines. The larger net cost was used as the worst-case scenario.

The net cost of retiring Leaning Juniper II North under the worst-case scenario (3.0-MW turbines) will be $2,190,960 less the salvage value of $1,557,209, or $633,751 (Table W-2). The Applicant proposes to assume an additional 10 percent contingency, bringing the net retirement cost in November/December 2005 dollars to $697,126. This amount will be sufficient to fund the restoration of Leaning Juniper II North to a useful, nonhazardous condition. Please see Exhibit M for a discussion of the security the Applicant proposes to cover this amount.

W.4.2 Leaning Juniper II South

The Applicant estimates the net cost of retiring Leaning Juniper II South and restoring the site based on the cost of removal, minus the scrap value of the components in the turbines, to be $1,055,978 in November/December 2005 dollars (see Tables W-3 and W-4 in Attachment W-1). The Applicant understands that ODOE has generated its own estimate of the cost of removal and of the scrap value of Facility components. The Applicant's dollar estimate was based on comparing the net cost of retiring a Facility ranging in size from 62 Vestas 3.0-MW turbines to 93 GE 1.5-MW turbines.

The Applicant's cost estimate is based on a worst case scenario of decommissioning 62 of the Vestas 3.0-MW turbines. Decommissioning 62 of the larger turbines would cost more than decommissioning 93 GE 1.5-MW turbines, as shown in Tables W-1 and W-2 in Attachment W-1. The price quote was provided by a contractor experienced in wind farm demolition. The quote was prepared for this specific Facility location and the specific model of turbine, tower, and foundation design to be employed. The quote includes removal of all turbines, transformers, aboveground collector lines, and met towers; excavation of foundations and underground collector lines down to a depth of 3 to 4 feet; and return of all soils to preconstruction grade, including the removal or restoration of roadways for Leaning Juniper II South.

The revenue from the scrap value of steel was calculated based on an independent analysis from a metals expert, using the current scrap value escalated at Gross Domestic Product Implicit Price Deflator. The scrap value was calculated based on the following:

- 220 net ton per unit for the 93 GE 1.5-MW turbines for a total of 20,460 total net tons
- 348 net ton per unit for the 62 Vestas 3.0-MW turbines for a total of 21,576 total net tons

Based on the independent analysis, salvage value for Leaning Juniper II South was calculated to be $3,281,241 for the 93 GE 1.5-MW turbines and $3,113,857 for the 62 Vestas 3.0-MW turbines, as shown in Tables W-1 and W-2. Although the salvage value is similar under each scenario, decommissioning the larger turbines would cost more, resulting in a larger net cost of retiring a Facility with 62 Vestas 3.0-MW turbines. The larger net cost was used as the worst-case scenario.

The net cost of retiring Leaning Juniper II South under the worst-case scenario (3.0-MW turbines) will be $4,169,835 less the salvage value of $3,113,857, or $1,055,978 (Table W-4). The Applicant proposes to assume an additional 10 percent contingency, bringing the net retirement cost in November/December 2005 dollars to $1,161,576. This amount will be sufficient to fund the restoration of Leaning Juniper II South to a useful, nonhazardous condition. Please see Exhibit M for a discussion of the security the Applicant proposes to cover this amount.

W.5 PROPOSED MONITORING PLAN FOR HAZARDOUS MATERIALS

OAR 345-021-0010(1)(w)(D) *For facilities that might produce site contamination by hazardous materials, any proposed monitoring plan, such as periodic environmental site assessment and reporting, or an explanation why a monitoring plan is unnecessary.*

Response: A monitoring plan, such as periodic environmental site assessment and reporting, will be unnecessary at this site because the Facility will not produce any site contamination by hazardous materials.

ATTACHMENT W-1

Contractor Bid for Decommissioning

Table W-1. Decommission and Site Restoration Estimate for Leaning Juniper II North —GE Turbines

All of the pricing is estimated based on 2005 pricing and does not include any time value of money.
The information below is for informational purposes only and does not represent a quotation to accomplish the work.
THE COSTS ARE BASED ON DISMANTLEMENT, DEMOLITION, AND LOADING ON TRUCKS

		Quantity		Unit Price	Extension
1a	**Remove turbines and towers, assume 40 ea GE 1.5-MW SLEs on 80-meter towers**	40	EA	22,500	900,000
	Towers and turbines will be removed in such a manner as to allow for re-use & max. salvage				
	Load on trucks				
1b	**Disconnect electrical within turbine and ready for disassembly**	40	EA	3,500	140,000
2a	**Excavate and demolish turbine foundations to 4' below grade, incl. transformer pads**	40	EA	7,850	314,000
	Sites will be graded to match existing contours and restored to a condition that will support surrounding vegetation.				
2b	**Remove, load on trucks 1750 kVA transformers**	40	EA	1,000	40,000
	Remove 600 volt cabling from transformer secondary to turbine controller				
	Remove 35kV treminations from transformer primary and abandon 4' below grade				
3a	**Roadway obliteration, gravel removal and return roads to tillable conditions.**	10	MI	17,085	170,850
3b	**Revegetation**	26	ac	1,500	39,000
3c	**Remove 35kV junction boxes, 35 kV cabling, remove and abandon 4' below sub-grade**	4	ea	1,000	4,000
4a	**Remove one(1) 80 m met towers**	1	ea	5,000	5,000
4b	**Remove electrical and abandon at 4' below subgrade**	1	ea	500	500
6a	**Remove substation, load equipment, and restore land**	1	ea	200,000	200,000
	Remove all fencing, foundations, equipment, load, and restore land				
				Total Decommissioning Cost	**1,813,350**
7a	**Salvage Value of tower and turbine steel (220 tons per turbine)**	8,800	Ton		-1,411,606
	Source: Independent metals analyst estimate, 11/12/05				
				Project Cost	**401,744**

Table W-2. Decommission and Site Restoration Estimate for Leaning Juniper II North—Vestas Turbines

All of the pricing is estimated based on 2005 pricing and does not include any time value of money.
The information below is for informational purposes only and does not represent a quotation to accomplish the work.

THE COSTS ARE BASED ON DISMANTLEMENT, DEMOLITION, AND LOADING ON TRUCKS

		Quantity		Unit Price	Extension
1a	**Remove turbines and towers** **Assume 31 Vesta V100 3 MW turbines on 100m towers.** Towers and turbines will be removed in such a manner as to allow for re-use & max. salvage Load on trucks	**31**	**EA**	**42,000**	**1,302,000**
1b	**Disconnect electrical within turbine and ready for disassembly**	**31**	**EA**	**4,100**	**127,100**
2a	**Excavate and demolish turbine foundations to 4' below grade, incl. transformer pads** Sites will be graded to match existing contours and restored to a condition that will support surrounding vegetation.	**31**	**EA**	**9,810**	**304,110**
2b	**Remove, load on trucks 1750 kVA transformers** Remove 600 volt cabling from transformer secondary to turbine controller Remove 35kV treminations from transformer primary and abandon 4' below grade	**31**	**EA**	**1,400**	**43,400**
3a	**Roadway obliteration, gravel removal and return roads to tillable conditions.**	**10**	**MI**	**17,085**	**170,850**
3b	**Revegetation**	**26**	**ac**	**1,500**	**39,000**
3c	**Remove 35kV junction boxes, 35 kV cabling, remove and abandon 4' below sub-grade**	**4**	**ea**	**1,000**	**4,000**
4a	**Remove Met Towers**	**1**	**ea**	5,000	0
4b	**Remove electrical and abandon at 4' below subgrade**	**1**	**ea**	**500**	**500**
6a	**Remove substation, load equipment, and restore land** Remove all fencing, foundations, equipment, load, and restore land	**1**	**ea**	**200,000**	**200,000**
				Total Decommissioning Cost	**2,190,960**
7a	**Salvage Value of tower and turbine steel (364 tons per turbine)** Source: Independent metals analyst estimate, 11/12/05	**11,284**	**Ton**		**-1,557,209**
	Project Cost			**Project Cost**	**$ 633,751**
				Plus 10 %	697,126

Table W-3. Decommission and Site Restoration Estimate for Leaning Juniper II South—GE Turbines

All of the pricing is estimated based on 2005 pricing and does not include any time value of money.
The information below is for informational purposes only and does not represent a quotation to accomplish the work.

THE COSTS ARE BASED ON DISMANTLEMENT, DEMOLITION, AND LOADING ON TRUCKS

		Quantity		Unit Price	Extension
1a	**Remove turbines and towers, assume 93ea GE 1.5 MW SLE's on 80 meter towers** Towers and turbines will be removed in such a manner as to allow for re-use & max. salvage Load on trucks	93	EA	22,500	2,092,500
1b	**Disconnect electrical within turbine and ready for disassembly**	93	EA	3,500	325,500
2a	**Excavate and demolish turbine foundations to 4' below grade, incl. transformer pads** Sites will be graded to match existing contours and restored to a condition that will support surrounding vegetation.	93	EA	7,850	730,050
2b	**Remove, load on trucks 1750 kVA transformers** Remove 600 volt cabling from transformer secondary to turbine controller Remove 35kV treminations from transformer primary and abandon 4' below grade	93	EA	1,000	93,000
3a	**Roadway obliteration, gravel removal and return roads to tillable conditions.**	19	MI	17,085	324,615
3b	**Revegetation**	45	ac	1,500	67,500
3c	**Remove 35kV junction boxes, 35 kV cabling, remove and abandon 4' below sub-grade**	8	ea	1,000	8,000
4a	**Remove three (3) 80 m met towers**	3	ea	5,000	15,000
4b	**Remove electrical and abandon at 4' below subgrade**	3	ea	500	1,500
6a	**Remove substation, load equipment, and restore land** Remove all fencing, foundations, equipment, load, and restore land	1	ea	200,000	200,000
				Total Decommissioning Cost	**3,857,665**
7a	**Salvage Value of tower and turbine steel (220 tons per turbine)** Source: Independent metals analyst estimate, 11/12/05	20,460	Ton		-3,281,241
	Project Cost			**Project Cost**	**576,424**

Table W-4. Decommission and Site Restoration Estimate for Leaning Juniper II South—Vestas Turbines

All of the pricing is estimated based on 2005 pricing and does not include any time value of money.
The information below is for informational purposes only and does not represent a quotation to accomplish the work.

THE COSTS ARE BASED ON DISMANTLEMENT, DEMOLITION, AND LOADING ON TRUCKS

		Quantity		Unit Price	Extension
1a	**Remove turbines and towers** **Assume 62 Vesta V100 3 MW turbines on 100m towers.** Towers and turbines will be removed in such a manner as to allow for re-use & max. salvage Load on trucks	**62**	**EA**	**42,000**	**2,604,000**
1b	**Disconnect electrical within turbine and ready for disassembly**	**62**	**EA**	**4,100**	**254,200**
2a	**Excavate and demolish turbine foundations to 4' below grade, incl. transformer pads** Sites will be graded to match existing contours and restored to a condition that will support surrounding vegetation.	**62**	**EA**	**9,810**	**608,220**
2b	**Remove, load on trucks 1750 kVA transformers** Remove 600 volt cabling from transformer secondary to turbine controller Remove 35kV treminations from transformer primary and abandon 4' below grade	**62**	**EA**	**1,400**	**86,800**
3a	**Roadway obliteration, gravel removal and return roads to tillable conditions.**	**19**	**MI**	**17,085**	**324,615**
3b	**Revegetation**	**45**	**ac**	**1,500**	**67,500**
3c	**Remove 35kV junction boxes, 35 kV cabling, remove and abandon 4' below sub-grade**	**8**	**ea**	**1,000**	**8,000**
4a	**Remove Met Towers**	**3**	**ea**	5,000	**15,000**
4b	**Remove electrical and abandon at 4' below subgrade**	**3**	**ea**	**500**	**1,500**
6a	**Remove substation, load equipment, and restore land** Remove all fencing, foundations, equipment, load, and restore land	**1**	**ea**	**200,000**	**200,000**
				Total Decommissioning Cost	**4,169,835**
7a	**Salvage Value of tower and turbine steel (364 tons per turbine)** Source: Independent metals analyst estimate, 11/12/05	**22,568**	**Ton**		**-3,113,857**
	Project Cost			**Project Cost**	**$ 1,055,978**
				Plus 10 %	1,161,576

EXHIBIT X

NOISE

OAR 345-021-0010(1)(x)

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TABLES

FIGURES

X.1 INTRODUCTION

OAR 345-021-0010(1)(x) *Information about noise generated by construction and operation of the proposed facility, providing evidence to support a finding by the Council that the proposed facility complies with the Oregon Department of Environmental Quality's noise control standards in OAR 340-035-0035. The applicant shall include:*

OAR-345-021-0010(1)(x)(A) *A baseline noise assessment for the proposed site and vicinity;*

Response:

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

Because the total number of turbines, vendor, size, and layout has not yet been determined, this ASC addresses two scenarios that represent a range of turbine sizes and associated potential impacts. That range is bracketed by installation of up to 133 GE 1.5-MW turbines and up to 93 Vestas 3.0-MW turbines. In accordance with this range, the noise analysis consisted of two potential turbine layout scenarios. To determine which analysis represents the "worst-case" scenario, noise analyses were conducted for both the maximum turbine layout (composed of 133 1.5-MW turbines) and the minimum turbine layout (composed of 93 3.0-MW turbines). The noise results from these two scenarios are presented.

It is useful to understand how noise is defined and measured. Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. There are several ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Table X-1 summarizes the technical noise terms used in this Exhibit.

Table X-1. Definitions of Acoustical Terms

Term	Definitions
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals.
A-weighted sound pressure level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Statistical noise level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L_{50} is the level exceeded 50 percent of the time)

Table X-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

Table X-2. Typical Sound Levels Measured in the Environment and Industry

Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
Civil defense siren (100 feet)	130		
Jet takeoff (200 feet)	120		Pain threshold
	110	Rock music concert	
Pile driver (50 feet)	100		Very loud
Ambulance siren (100 feet)			
	90	Boiler room	
Freight cars (50 feet)		Printing press plant	
Pneumatic drill (50 feet)	80	In kitchen with garbage disposal running	
Freeway (100 feet)			
	70		Moderately loud
Vacuum cleaner (10 feet)	60	Data processing center	
Department Store; Light traffic (100 feet)	50	Private business office	
Large transformer (200 feet)	40		Quiet
Soft whisper (5 feet)	30	Quiet bedroom	
	20	Recording studio	
	10		Hearing threshold

Source: Beranek, L.L., 1988.

X.1.1 Study Area and Facility Site

The analysis area for noise impacts includes all areas in Oregon that could be affected by construction or operational noise related to the Facility.

All Facility components will be located on private land on which the Applicant has negotiated long-term wind energy leases with the landowners. The turbines for Leaning Juniper II South will be located on land owned by Waste Management Disposal Services of Oregon, Inc., which surrounds the existing Arlington Landfill on three sides. This land functions as a buffer around the landfill and as a source of soils and rock for covering landfill cells as they are filled and closed. Portions of the land are used for cultivation of winter wheat. Other portions are used for cattle grazing. The turbines for Leaning Juniper II North will be located on land owned by a private landowner, J.R. Krebs. This land currently is used for farming and cattle grazing. Easements have also been negotiated with adjacent landowners for road and collector cable access.

X.1.2 Existing Noise Conditions

For this Exhibit, the Facility is presumed to be located on "previously unused" land, as defined in Oregon Administrative Rules (OAR) Chapter 340, Division 35.[1] In accordance with these recently revised rules, this Exhibit assumes an L_{50} ambient noise level of 26 dBA[2].

X.2 PREDICTED NOISE LEVELS

OAR-345-021-0010(1)(x)(B) *Predicted noise levels resulting from construction and operation of the proposed facility;*

Response:

X.2.1 Construction Noise

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control studied noise from individual pieces of construction equipment, as well as from construction sites for power plants and other types of facilities (see Table X-3). Because specific information about types, quantities, and operating schedules of construction equipment is not known at this stage, data from the EPA document for industrial projects of similar size have been used. These data are conservative, because the evolution of construction equipment has generally been toward quieter design. Use of these data is reasonable for estimating noise levels, given that they are still widely used by acoustical professionals.

Table X-3. Average Noise Levels from Common Construction at a Reference Distance of 50 feet (dBA)

Construction Equipment	Typical Average Noise Level at 50 ft, dBA
Air compressor	81
Backhoe	85
Concrete mixer	85
Concrete pump	82
Crane, mobile	83
Dozer	80
Generator	78
Grader	85
Loader	79
Paver	89
Pile driver	101
Pneumatic tool	85
Pump	76
Rock drill	98

[1] For purposes of this Exhibit it has been assumed, without intending a waiver of any contrary position, that the site is previously unused property.

[2] The Applicant may elect to conduct additional studies to demonstrate that the L50 noise level is greater than 26 dBA.

Table X-3. Average Noise Levels from Common Construction at a Reference Distance of 50 feet (dBA)

Construction Equipment	Typical Average Noise Level at 50 ft, dBA
Saw	78
Scraper	88
Shovel	82
Truck	91

Source: U.S. EPA, 1971.

Table X-4 shows the total composite noise level at a reference distance of 50 feet, based on the pieces of equipment operating for each construction phase and the typical usage factor for each piece. The noise level at 1,500 feet is also shown. The calculated level at 1,500 feet is probably conservative, because the only attenuating mechanism considered was geometric spreading, which results in an attenuation rate of 6 dBA per doubling of distance; attenuation related to the presence of structures, trees or vegetation, ground effects, and terrain was not considered.

Table X-4. Composite Construction Site Noise Levels

Construction Phase	Composite Equipment Noise Level at 50 feet, dBA	Composite Equipment Noise Level at 1,500 feet, dBA
Clearing	88	58
Excavation	90	60
Foundation	89	59
Erection	84	54
Finishing	89	59

X.2.2 Operational Noise

The Facility will consist of up to 133 GE 1.5-MW turbines or up to 93 Vestas 3.0-MW turbines. Table X-5 presents the potential turbine dimensions for the GE 1.5-MW and Vestas 3.0-MW turbines.

Table X-5. Potential Turbine Dimensions

Turbines	1.5-MW GE Turbine (meters/feet)	3.0-MW Vestas Turbine (meters/feet)
Tower Type	Tubular	Tubular
Hub Height	80 m/262 ft	100 m/328 ft
Rotor Diameter	77 m/253 ft	100 m/328 ft
Total Height	119 m/389 ft	150 m/492 ft

Source: Exhibit B, Table B-1.
m = meter.
ft = ft.

As described in Exhibit B, the Applicant seeks micrositing flexibility for the Facility. Exhibit C provides a definition and maps of the micrositing corridors. The number of turbines in each corridor, the spacing between turbines, and their precise locations within the corridor will be determined by the Applicant and presented to the Oregon Department of Energy (ODOE) before construction. The potential layouts presented in Exhibit C were used to develop the noise model.

Table X-6 presents the maximum overall and octave band sound power levels determined in accordance with IEC 61400-11 (2002) for the 1.5-MW GE turbine and the 3.0-MW Vestas turbine.

Table X-6. Maximum Sound Power Levels

		Octave Band Center Frequency, Hz (A-weighted)							
	Overall	**63**	**125**	**250**	**500**	**1,000**	**2,000**	**4,000**	**8,000**
GE 1.5-MW	104	85	94	97	99	98	95	87	78
Vestas 3.0-MW	110	94	98	103	105	104	101	95	85

Each wind turbine was considered to be a point source of noise at the hub height depicted in Table X-5. Although not required by the rule, the octave band levels shown in Table X-6 were conservatively adjusted upwards by 2 dB in the model. This adjustment reflects the typical sound power levels warranted by the turbine manufacturer. Figures X-1 and X-2 present the noise contours for the 1.5-MW and 3.0-MW turbine layouts, respectively, including the Facility substation. In the 1.5-MW turbine layout, the Facility turbines are modeled with GE 1.5-MW data. In the 3.0-MW layout, the Facility turbines are modeled with Vestas 3.0-MW data. Transformers are expected to have a National Electrical Manufacturers Association (NEMA) sound rating of 87 dBA. The Facility also involves construction of a new, high-voltage (230-kilovolt [kV]) overhead transmission line connection between the two substations, estimated to be less than 400 feet in length. The transmission lines will be designed to ensure that audible noise from foul-weather corona will not exceed 50 dBA at the edge of the right-of-way. There will be no audible noise from this 400-foot section of transmission line at any receptor.

Predicted noise levels are presented in Table X-7. After the precise turbine types and turbine layouts have been selected, and before construction of the Facility, the Applicant will submit for ODOE administrative review, pursuant to a Council-approved methodology, the IEC 61400-11 or other appropriate acoustical test reports for the selected turbines, along with an acoustical analysis of the Facility performed with the same methodology as this analysis. At that time, the Applicant will also submit to ODOE evidence substantiating Facility compliance with OAR Chapter 340, Division 35. The evidence may include noise easements for sensitive receptors at which the standard would otherwise be exceeded, and/or monitoring results that establish ambient L_{50} sound levels greater than 26 dBA. The Applicant will demonstrate that Facility noise levels will not exceed allowed levels under the applicable OAR standards. In the event that some or all of the noise easements for sensitive receptors are not obtained and noise monitoring is not conducted to establish ambient L_{50} sound levels greater than 26 dBA, the appropriate turbines from the potential layouts listed in Table X-8 will not be built.

Table X-7. Summary of Predicted Noise Levels for Leaning Juniper II (dBA)

	GE 1.5-MW Turbine Layout			Vestas 3.0-MW Turbine Layout		
Receptor ID	**Predicted Level (dBA)**	**Closest Turbine**	**Distance to Closest Turbine (m)**	**Predicted Level (dBA)**	**Closest Turbine**	**Distance to Closest Turbine (m)**
R1	39	I-8	1030	44	H-10	1060
R2	39	H-15	890	44	I-10	900
R3	46	J-1	380	49	J-2	480
R4	47	J-2	360	49	J-2	440
R5	46	J-11	350	49	J-8	460
R6	39	J-13	670	47	K-4	630
R7	37	A-5	1010	42	A-3	1020
R8	37	I-1	1000	43	H-4	1030
R9	36	I-1	1070	42	H-4	1090

Table X-8. Summary of Turbines to be Removed if Noise Waivers are Not Obtained

	1.5-MW Leaning Juniper II Turbines		3.0-MW Leaning Juniper II Turbines	
Receptor ID	**Turbine ID**	**Turbine Sound Level (dBA)**	**Turbine ID**	**Turbine Sound Level (dBA)**
R1	I-8	29	H-10	35
	H-15	27	I-10	34
	H-13	27	H-9	33
	H-12	27	I-8	33
	H-14	27	I-9	33
	H-11	27	H-8	31
	I-7	27	J-1	31
			I-7	30
			I-6	30
			J-2	29
			H-7	29
			J-3	28
			H-6	28
			I-5	27
			J-4	27
			I-4	27
			H-5	27
R2	H-15	30	I-10	37
	H-14	29	I-9	34
	H-13	29	I-8	33
	H-12	28	J-1	33
	H-11	27	H-10	31
	J-1	26	J-2	30
	J-2	25	I-7	30
			H-9	30
			J-4	30
			I-6	30
			J-3	29
			H-8	28
			I-5	27
			H-7	27
			I-4	26
			H-6	26
			I-3	26
			J-5	25

Table X-8. Summary of Turbines to be Removed if Noise Waivers are Not Obtained

Receptor ID	1.5-MW Leaning Juniper II Turbines		3.0-MW Leaning Juniper II Turbines	
	Turbine ID	Turbine Sound Level (dBA)	Turbine ID	Turbine Sound Level (dBA)
R3	Not Applicable—Waiver Obtained			
R4	Not Applicable—Waiver Obtained			
R5	Not Applicable—Waiver Obtained			
R6	Not Applicable—Waiver Obtained			
R7	A-4 A-5 A-3	29 29 29	A-3 A-4 A-2 A-5 A-1	35 35 35 35 34
R8	I-1 H-1 H-2	29 28 27	H-4 H-1 H-2 H-5 H-6 H-3 H-7 H-8 G-3 G-2 G-1 G-4 I-1 G-5	35 34 33 33 31 30 30 28 27 27 27 25 25 25
R9	I-9	28	H-4 H-1 H-5 H-2 H-3 H-6 H-7 G-3 G-2 G-1 H-8 H-9	34 33 32 32 31 31 27 26 26 26 25 24

X.3 COMPLIANCE WITH OAR 340-035-0035

OAR 345-021-0010(1)(x)(C) *An assessment of the proposed facility's compliance with the applicable noise regulations in OAR 340-035-0035;*

Response:

X.3.1 Summary of Regulations

OAR Chapter 340, Division 35, was revised to specifically address wind energy facilities:

- OAR 340-035-0035(1)(b)(B)(iii)(I) establishes the option for a proposed wind energy facility to assume a background L_{50} ambient noise level of 26 dBA.

- OAR 340-035-0035(1)(b)(B)(iii)(IV) requires a proposed wind energy facility to satisfy the ambient noise standard, where a landowner has not waived the standard, by predicting facility noise levels at the appropriate measurement point, assuming that all of the proposed wind facility's turbines are operating between cut-in speed and the wind speed corresponding to the maximum sound power level established by IEC 61400-11. These predictions are to be compared to the assumed ambient noise level of 26 dBA, or to the actual ambient background L_{10} and L_{50} noise levels, if measured. The facility complies with the ambient background standard, if this comparison shows that the increase in noise is not more than 10 dBA over this entire range of wind speeds.

- OAR 340-035-0035(1)(b)(B)(iii)(VI) requires that the Facility predict compliance with the "Table 8" limits set forth in the regulations, which are summarized in Table X-9. Compliance must occur at the appropriate measurement point, with reference to the turbine's maximum sound power level, following procedures established by IEC 61400-11, and assuming that all of the Facility's turbines are operating at the maximum sound power level.

Table X-9. State of Oregon Statistical Noise Limits for Industrial and Commercial Sources (OAR-340-35-0035)

Statistical Descriptor	Maximum Permissible Statistical Noise Levels (dBA) Daytime (7:00 a.m. – 10:00 p.m.)	 Nighttime (10:00 p.m. – 7:00 a.m.)
L_{50}	55	50
L_{10}	60	55
L_{1}	75	60

Note:

Based on "Table 8" of OAR-340-0035: New Industrial and Commercial Noise Source. Standards and OAR-340-0035(1)(b)(B(i).

dBA = decibel (A-weighted scale).

Assuming an ambient level of 26 dBA, the maximum allowable noise level produced by the Facility, as measured at a sensitive receptor such as a home, is an increase of 10 dBA over the ambient level across the entire range of wind speeds between the cut-in wind speed and the wind speed corresponding to the maximum sound power level, or 36 dBA (26 dBA +10 dBA). In accordance with OAR 340-035-0035(1)(b)(B)(iii)(IV), the 36-dBA level must be complied with when all turbines operate at the maximum sound power level established by IEC 61400-11. At wind speeds corresponding to sound power levels less than maximum (for example, during cut-in wind speeds), the resulting noise level also will be less. Therefore, it is not necessary to predict noise levels for each wind speed between cut-in and the maximum sound power level when assuming an ambient level of 26 dBA.[3]

[3] At receptors that have not waived the 10-dBA increment, the 26-dBA "assumed ambient" results in a regulatory limit of 36 dBA under all wind speeds. Therefore, it is necessary to model only the loudest scenario that occurs at the wind speed corresponding to the maximum sound power level.

If the Facility complies with the OAR 340-035-0035(1)(b)(B)(iii)(IV) limit of 36 dBA at a receptor, it necessarily also complies with OAR 340-035-0035(1)(b)(B)(iii)(VI), namely, the OAR Table 8 limit of 50 dBA, at that same receptor.

In addition to the foregoing limits, OAR 340-35-035(1)(f) establishes standards that regulate octave band sound pressure levels and audible discrete tones. Such standards can be applied by the Oregon Department of Environmental Quality (DEQ) when it believes subsections (1)(a), (b), or (c) (summarized in Table X-9) do not adequately protect the health, safety, or welfare of the public.

Impulse noise is also regulated in OAR 340-35-035(1)(d), but wind turbines do not generate impulse noise.

The noise limits apply at "appropriate measurement points" on "noise sensitive property." The "appropriate measurement point" is defined as whichever of the following is farther from the noise source:

- 25 feet (7.6 meters) toward the noise source from that point on the noise sensitive building nearest the noise source
- That point on the noise-sensitive property line nearest the noise source

"Noise-sensitive property" is defined as "real property normally used for sleeping, or normally used as schools, churches, hospitals, or public libraries. Property used in industrial or agricultural activities is not noise-sensitive property unless it meets the foregoing criteria in more than an incidental manner." Residences are the only noise-sensitive property identified within the Facility lease boundary.

X.3.2 Construction

OAR-340-35-035(5)(g) specifically exempts construction activity. Therefore, by regulatory definition, there will be no construction noise impacts. Section X.2.1 and Table X-4 present the expected construction noise levels.

Decommissioning activities will be similar to the activities anticipated during the construction phase, but shorter in duration. Therefore, decommissioning will not cause a significant noise impact.

X.3.3 Operations

The maximum operational noise levels for the 1.5-MW and 3.0-MW turbine layouts based on the turbine characteristics identified in Table X-5 are presented in Table X-7 and Figures X-1 and X-2. As shown in Table X-7, the "Table 8 limit" of 50 dBA is complied with at all receptors under both the 1.5-MW and 3.0-MW turbine layouts.

After the precise turbine types and turbine layouts have been selected, and before construction of the Facility, the Applicant will submit for ODOE administrative review, pursuant to Council-approved methodology, the IEC 61400-11 or other appropriate acoustical test reports for the selected turbines, along with an acoustical analysis of the

Facility performed with the same methodology as this analysis. At that time, the Applicant will also submit to ODOE evidence substantiating Facility compliance with OAR Chapter 340, Division 35. The evidence may include noise easements for sensitive receptors at which the standard would otherwise be exceeded, and/or monitoring results that establish ambient L_{50} sound levels greater than 26 dBA. The Applicant will demonstrate that Facility noise levels will not exceed allowed levels under the applicable OAR standards. In the event that some or all of the noise easements for sensitive receptors are not obtained and noise monitoring is not conducted to establish ambient L_{50} sound levels greater than 26 dBA, the appropriate turbines from the potential layouts listed in Table X-8 will not be built.

X.4 DESCRIPTION OF PROPOSED MITIGATION MEASURES

OAR 345-021-0010(1)(x)(D) *Any measures the applicant proposes to reduce noise levels or noise impacts;*

Response:

The Applicant proposes to secure the waivers/noise easements necessary to ensure that Oregon noise standards are met at all noise sensitive receptors. In the event that noise easements for sensitive receptors are not obtained, Table X-8 summarizes the turbines that will not be built assuming an ambient L_{50} level of 26 dBA.

X.5 ASSUMPTIONS AND METHODS

OAR 345-021-0010(1)(x)(E) *The assumptions and methods used in the noise analysis;*

Response:

Standard acoustical engineering methods were used in the noise analysis. The noise model, CADNA/A by Datakustik GmbH of Munich, Germany, is a sophisticated software program that enables complete noise modeling of complex industrial plants. The sound propagation factors used in the model have been adopted from ISO 9613 (ISO, 1993) and VDI 2714 (VDI, 1988). Atmospheric absorption for conditions of 10°C and 70 percent relative humidity (conditions that favor propagation) was computed in accordance with ISO 9613-1, *Calculation of the Absorption of Sound by the Atmosphere*, as typically requested by ODOE. Topography was included in the model.

All turbines and substations were assumed to be operating at the sound power levels shown in Table X-10. The modeled turbine levels were increased 2 dBA above the estimated maximum sound power level shown in Table X-6 consistent with typical warranted sound power levels.

Table X-10. Modeled Octave Band Sound Power Levels[1]

	Overall (dBA)	Octave Band Center Frequency, Hz (A-weighted)							
		63	125	250	500	1,000	2,000	4,000	8,000
GE 1.5-MW Turbine	106	87	96	99	101	100	97	89	80
Vestas 3.0-MW Turbine	112	96	100	105	107	106	103	97	87
Substation Transformers (87-dBA NEMA)[1]	107	84	96	98	104	101	97	92	83

[1] Transformers that are expected to have a National Electrical Manufacturers Association (NEMA) sound rating of 87 dBA or less. A total of six transformers were modeled, and each contributed less than 10 dBA to the nearest receptor.

OAR 340-035-0035(1)(b)(B)(iii)(I) establishes the option for a wind energy facility to assume a background L_{50} ambient noise level of 26 dBA. If the Applicant elects not to make this assumption when presenting its acoustical analysis of the final turbine layout before construction, it will provide supporting data for the background L_{50} ambient noise level used.

X.6 MONITORING PROGRAM

OAR 345-021-0010(1)(x)(F) *The applicant's proposed monitoring program, if any, for noise generated by construction and operation of the facility.*

Response:

A construction and operational noise monitoring program is not proposed because of the absence of predicted impacts. However, the Applicant proposes a site certificate condition for noise as described in the following paragraph.

After the precise turbine types and turbine layouts have been selected, and before construction of Facility turbine foundations, the Applicant will submit for ODOE administrative review, pursuant to Council-approved methodology, the IEC 61400-11 or other appropriate acoustical test reports for the selected turbines, along with an acoustical analysis of the Facility performed with the same methodology as this analysis. At that time, the Applicant will also submit to ODOE evidence substantiating Facility compliance with OAR Chapter 340, Division 35. The evidence may include noise easements for sensitive receptors at which the standard would otherwise be exceeded, and/or monitoring results that establish ambient L_{50} sound levels greater than 26 dBA. The Applicant will demonstrate that Facility noise levels will not exceed allowed levels under the applicable OAR standards. In the event that some or all of the noise easements for sensitive receptors are not obtained and noise monitoring is not conducted to establish ambient L_{50} sound levels greater than 26 dBA, the appropriate turbines from the potential layouts listed in Table X-8 will not be built.

X.7 CONCLUSION

This noise analysis concludes that applicable DEQ noise regulations will be met for the construction and operation of the Facility.

X.8 REFERENCES

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VDI. 1988. *Outdoor Sound Propagation*. VDI (Verein Deutscher Ingenieure) 2714, Verlag GmbH, Dussledorf, Beuth Verlag, Berlin, Koln, Germany.

Figures

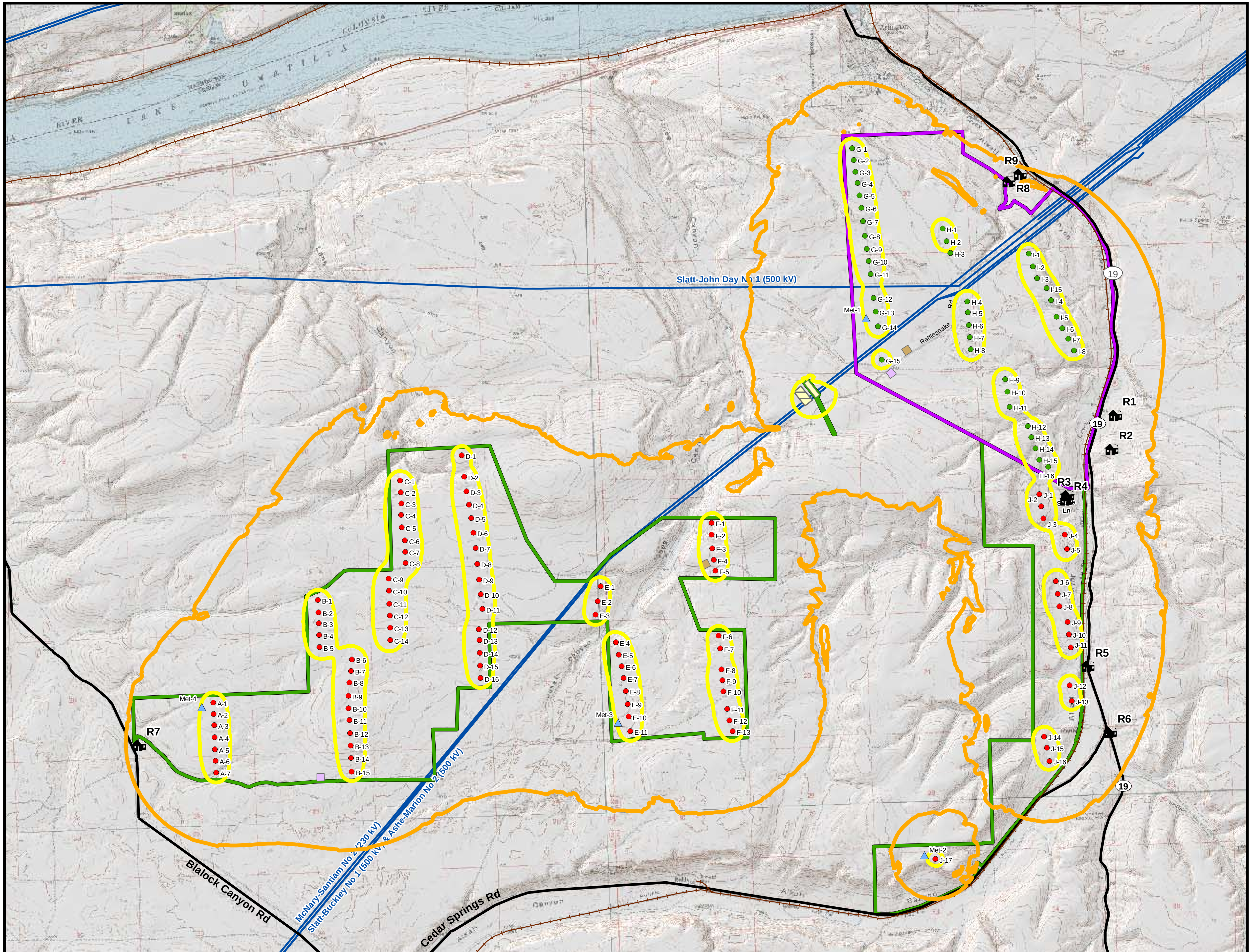

Figure X-1

Predicted 1.5-MW Turbine Layout Noise Contours (dBA)

Leaning Juniper II
Wind Power Facility

PPM Energy

Legend

- Proposed Turbines - Leaning Juniper II North
- Proposed Turbines - Leaning Juniper II South
- Proposed Permanent Met Tower
- House
- 36-dBA Noise Contour
- 50-dBA Noise Contour

Proposed Permanent Facilities

- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Existing Facilities

- Existing BPA Transmission Line
- Major Roads
- Railroads
- Streams
- Leaning Juniper II - North
- Leaning Juniper II - South

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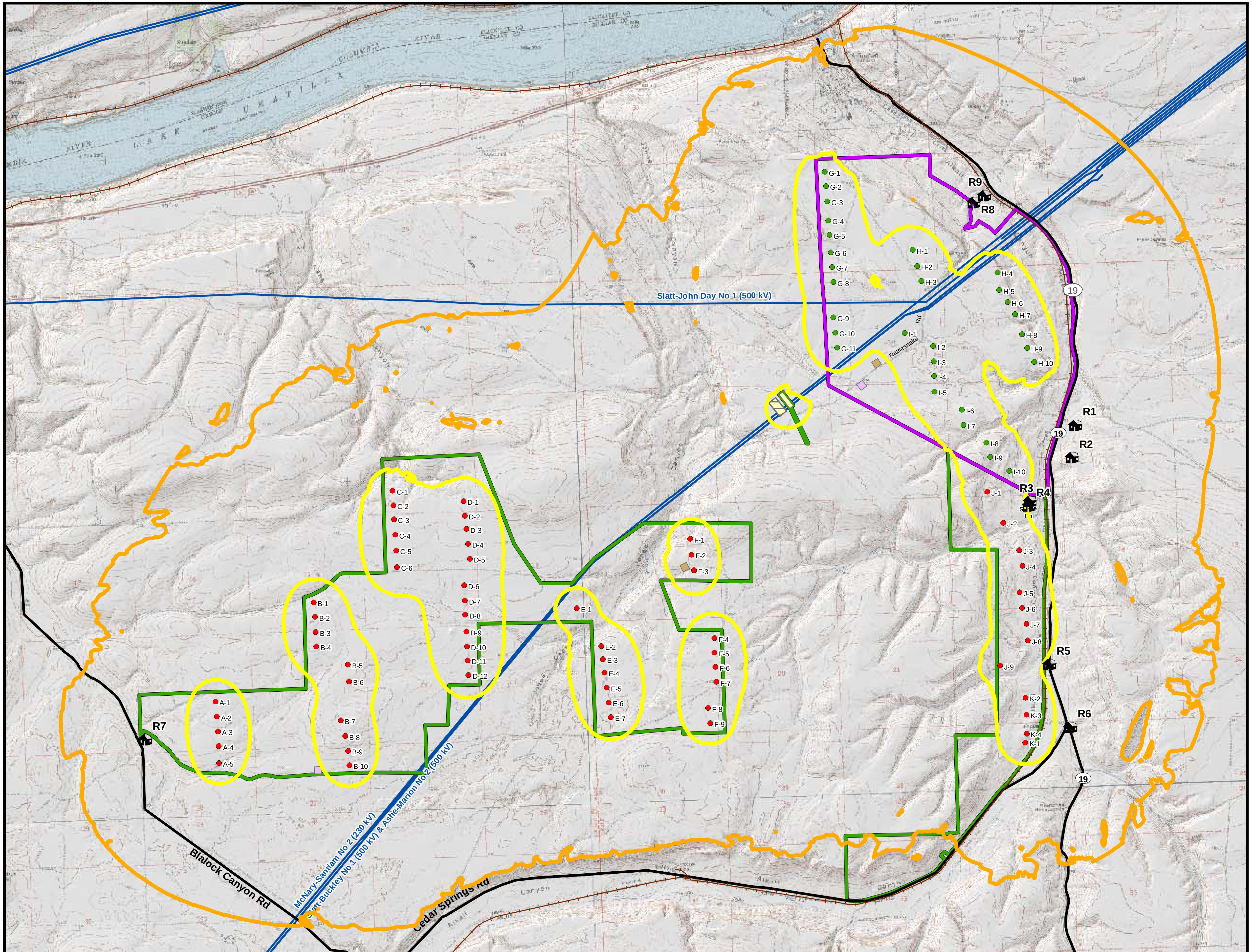

Figure X-2

Predicted 3.0-MW Turbine Layout Noise Contours (dBA)

Leaning Juniper II
Wind Power Facility

PPM Energy
A ScottishPower Company

Legend

- House
- 36-dBA Noise Contour
- 50-dBA Noise Contour

Proposed Permanent Facilities

- Proposed Substation
- Proposed O&M Facility and Laydown Area
- Alternate O&M Facility and Laydown Area
- BPA Jones Canyon Switching Station

Existing Facilities

- Existing BPA Transmission Line
- Major Roads
- Railroads
- Streams
- Leaning Juniper II - North
- Leaning Juniper II - South

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File Path: Z:\Projects\OR-WA\Leaning Juniper\MapDocuments\Report Figures\EFSC (LJII)\Figure X-2 - Predicted 3MW Turbine Layout Noise Contours.mxd, Date: September 15, 2006 2:20:59 PM

EXHIBIT Y

CARBON DIOXIDE EMISSIONS
OAR 345-021-0010(1)(y)

Exhibit Y requires information about a base load gas plant, a non-base load power plant, or a nongenerating energy facility that emits carbon dioxide. Exhibit Y is not required for this application because Leaning Juniper Wind Power II, LLC (the Applicant) is not proposing to construct any facilities that emit carbon dioxide.

EXHIBIT Z

COOLING TOWERS
OAR 345-021-0010(1)(z)

Exhibit Z requires information about evaporative cooling towers and cooling tower plumes. Exhibit Z is not required for this application because Leaning Juniper Wind Power II, LLC (the Applicant) is not proposing to construct an evaporative cooling tower.

EXHIBIT AA

ELECTRIC TRANSMISSION LINE

OAR 345-021-0010(1)(aa)
OAR 345-024-0090(2)

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FIGURES

ATTACHMENT

AA.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

OAR 345-021-0010(1)(aa) *If the proposed facility includes an electric transmission line:*

Response: See responses in Section AA.2.

AA.2 ELECTRIC AND MAGNETIC FIELDS

OAR 345-021-0010(1)(aa)(A) *Information about the expected electric and magnetic fields, including:*

AA.2.1 Distance from Transmission Line Center Line to Edge of Right-of-Way

(i) The distance in feet from the proposed center line of each proposed transmission line to the edge of the right-of-way;

Response: The only overhead 230-kilovolt (kV) collector line for the Facility is estimated to be the less than 400-foot connection between the Leaning Juniper II Facility Collector Substation, the PacifiCorp Leaning Juniper I Facility Collector Substation, and the Bonneville Power Administration (BPA) Jones Canyon Switching Station. Because the 400-foot connection is considered a shared facility between the Facility and the PacifiCorp Leaning Juniper I substation and the BPA Jones Canyon Switching Station, the right-of-way does not apply.

The Facility will include approximately 8 miles of underground 34.5-kV collector lines on Leaning Juniper II North and 22 miles on Leaning Juniper II South.

For the underground 34.5-kV collector lines, the distance between the centerline of the 34.5-kV lines and the edge of the right-of-way is undefined, because the entire wind farm is right-of-way for the collection circuits.

The majority of the collector system will be buried directly in the soil approximately 3 to 4 feet below the ground surface. However, where site-specific considerations require, the collector system may be aboveground. Using aboveground structures allows the collector lines to “span” canyons and intermittent streams and thus to reduce environmental impacts. The overhead pole structures will generally be about 35 to 80 feet tall, depending on terrain. Based on the preliminary collector cable layout shown in Figure C-3a, it is anticipated that approximately 0.2 mile of 34.5-kV collector lines will be installed on overhead structures on Leaning Juniper II North and approximately 0.1 mile of collector lines will be placed on overhead structures on Leaning Juniper II South.

Examples of specific conditions that would make it environmentally or economically advantageous to run portions of the collection system aboveground are as follows:

- Steep terrain making the use of backhoes and trenching machines infeasible or unsafe
- Stream and wetland crossings where an aboveground line avoids or minimizes environmental impacts
- Soil with low thermal conductivity preventing adequate heat dissipation from the conductor, and very rocky conditions that significantly increase trenching costs

Because detailed geotechnical studies have not yet been completed for the Facility, it is not possible to determine the precise locations where aboveground collector cables may be necessary. Geotechnical studies may show that more cables are needed aboveground than the 0.22 mile outlined in the preliminary layout. Therefore, to evaluate the potential impact for aboveground collector cables, the Applicant proposes that no more than 30 percent of the collector system be aboveground.

AA.2.2 Types of Occupied Structures within 200 Feet of Center Line of Proposed Transmission Lines

(ii) *The type of each occupied structure, including but not limited to residences, commercial establishments, industrial facilities, schools, daycare centers and hospitals, within 200 feet on each side of the proposed center line of each proposed transmission line;*

(iii) *The approximate distance in feet from the proposed center line to each structure identified in (A);*

Response: There are no occupied buildings, residences, or other sensitive receptors within 200 feet on either side of the proposed centerline of proposed overhead collector line. Therefore, the potential for human exposure to electric and magnetic fields (EMF) from these overhead 34.5-kV collector lines is negligible.

AA.2.3 Graphs of Electric and Magnetic Field Levels

(iv) *At representative locations along each proposed transmission line, a graph of the predicted electric and magnetic fields levels from the proposed center line to 200 feet on each side of the proposed center line;*

Response:

AA.2.3.1 Overview of Electric and Magnetic Fields Generation

All electric utility wires and devices generate alternating EMF. The earth itself generates steady-state magnetic and electric fields. The EMF produced by the alternating current (AC) electrical power system in the United States has a frequency of 60 hertz (Hz), meaning that the fields change from positive to negative and back to positive, 60 times per second.

In AC power systems, voltage swings positive to negative and back to positive, a 360-degree cycle, 60 times every second. Current follows the voltage, flowing forward, reversing direction, and returning to the forward direction, again a 360-degree cycle, 60 times every second. Each AC three-phase circuit carries power over three conductors. One phase of the circuit is carried by each of the three conductors. The AC voltage and current in each phase conductor is out of sync with the other two phases by 120 degrees, or one-third of the 360-degree cycle. The fields from these conductors tend to cancel out because of the phase difference. However, when a person stands under a transmission line or over a buried circuit of underground lines, one conductor is always significantly closer and will contribute a net uncanceled field at the person's location.

Electric Fields

Electric fields around transmission lines are produced by electrical charges, measured as voltage, on the energized conductor. Electric field strength is directly proportional to the line’s voltage; that is, increased voltage produces a stronger electric field. The electric field is inversely proportional to the distance a sensor is from the conductors, so that the electric field strength declines as the distance from the conductor increases. For this transmission line, the voltage and electric field alternate at a frequency of 60 Hz. The strength of the electric field is measured in units of kilovolts per meter (kV/m). The voltage, and therefore the electric field, around a transmission line remains practically steady and is not affected by the common daily and seasonal fluctuations in usage of electricity by customers.

Magnetic Fields

Magnetic fields around transmission lines are produced by the electrical load or the amount of current flow, measured in terms of amperage, through the conductors. Like the electric field, the magnetic field alternates at a frequency of 60 Hz. The magnetic field strength is directly proportional to the amperage; that is, increased amperage produces a stronger magnetic field. The magnetic field is inversely proportional to the sensor’s distance from the conductors. Also, like the electric field, the magnetic field strength declines as the distance from the conductor increases. Magnetic fields are expressed in units of milligauss (mG). However, unlike voltage, the amperage and therefore the magnetic field around a transmission line, fluctuate hourly and daily as the amount of current flow varies. The strength of the magnetic field depends on the current in the conductor, the geometry of the construction, the degree of cancellation from other conductors, and the distance from the conductors or cables.

AA.2.3.2 EMF Calculations for 34.5-KV Underground Collection System

For an underground 34.5-kV circuit, the electric field is totally contained within the insulation of the cable. Each cable has a semiconducting insulation shield and a grounded concentric neutral, made up of multiple strands of copper wire that encircle the cable just under the outer jacket. This means that the cable jacket has no measurable voltage to ground, or between other cable jackets, and that the cables can be safely touched, although it is not recommended. Because the electric field is contained within the buried cables, no electric field is measurable at the surface of the ground.

Underground cables do not contain the magnetic field. Therefore, the net magnetic field of buried cables is measurable on the surface of the ground above the cables.

AA.2.3.3 Calculations for the 35-KV Overhead Transmission Line

Figure AA-1 illustrates the typical proposed structural configuration of the 34.5-kV distribution collection line with a shield wire. The ground-level magnetic field intensity across the corridor is determined by the currents and geometry of these typical facilities.

Figure AA-2 illustrates the typical proposed structural configuration of the 34.5-kV Double-Circuit distribution line with a shield wire. For this construction, the phase positions on one side of the structure are transposed to achieve better electric and magnetic field cancellation.

Line Loads for EMF Calculation

It is important that any discussion of EMF include the assumptions used to calculate these fields. It is also important to remember that EMF in the vicinity of the power lines varies with regard to line design, line loading, distance from the line, and other factors. The electric field depends upon line voltage, which remains nearly constant for a transmission line in normal operation. The magnetic field is proportional to line loading (amperage), which varies as power plant generation is changed by the wind. Maximum magnetic fields are produced at the maximum (peak) conductor currents.

The entire overhead line in this study is rated for a nominal voltage of 34.5-kV. The peak line loading value assumed for each overhead circuit is 60 MVA, or approximately 1000 amperes per phase conductor. This value is used in the EMF study. The conductor is assumed to be a single conductor per phase of 1,590 kcmil ACSR “Falcon”; Diameter: 1.545 inches.

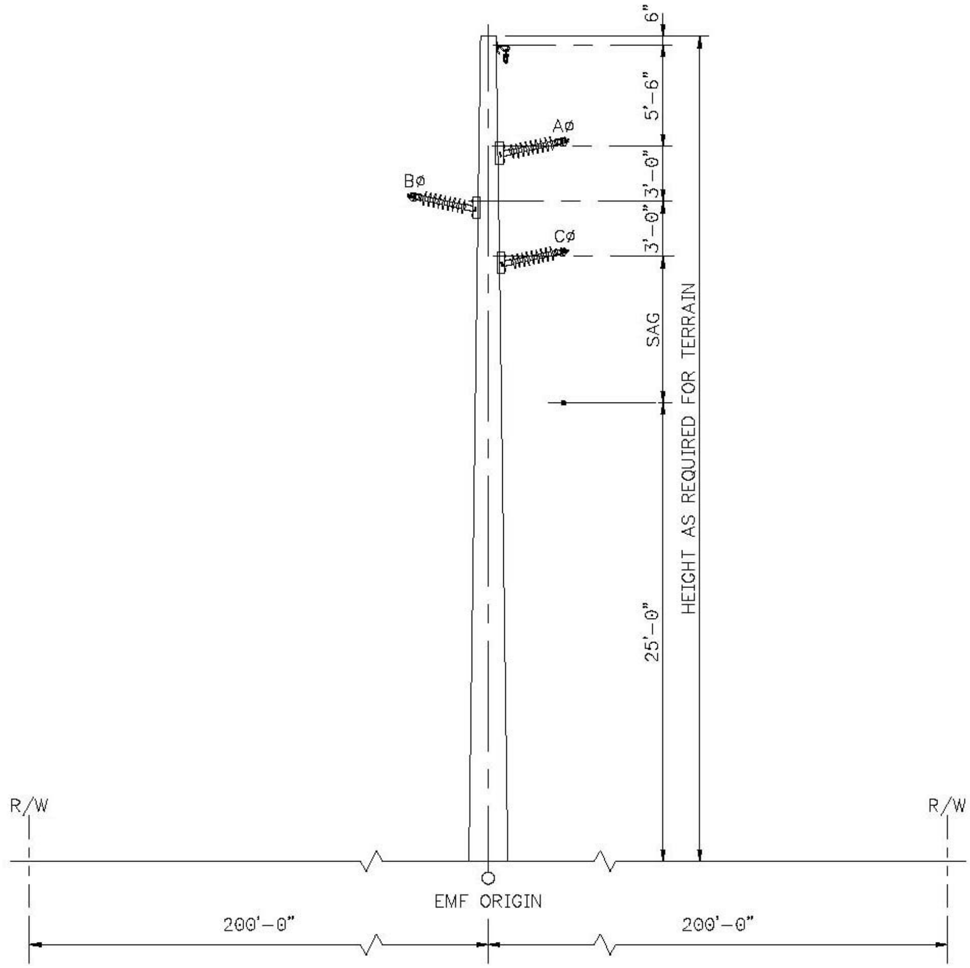

Figure AA-1. Typical 34.5-kV Single-Circuit Configuration

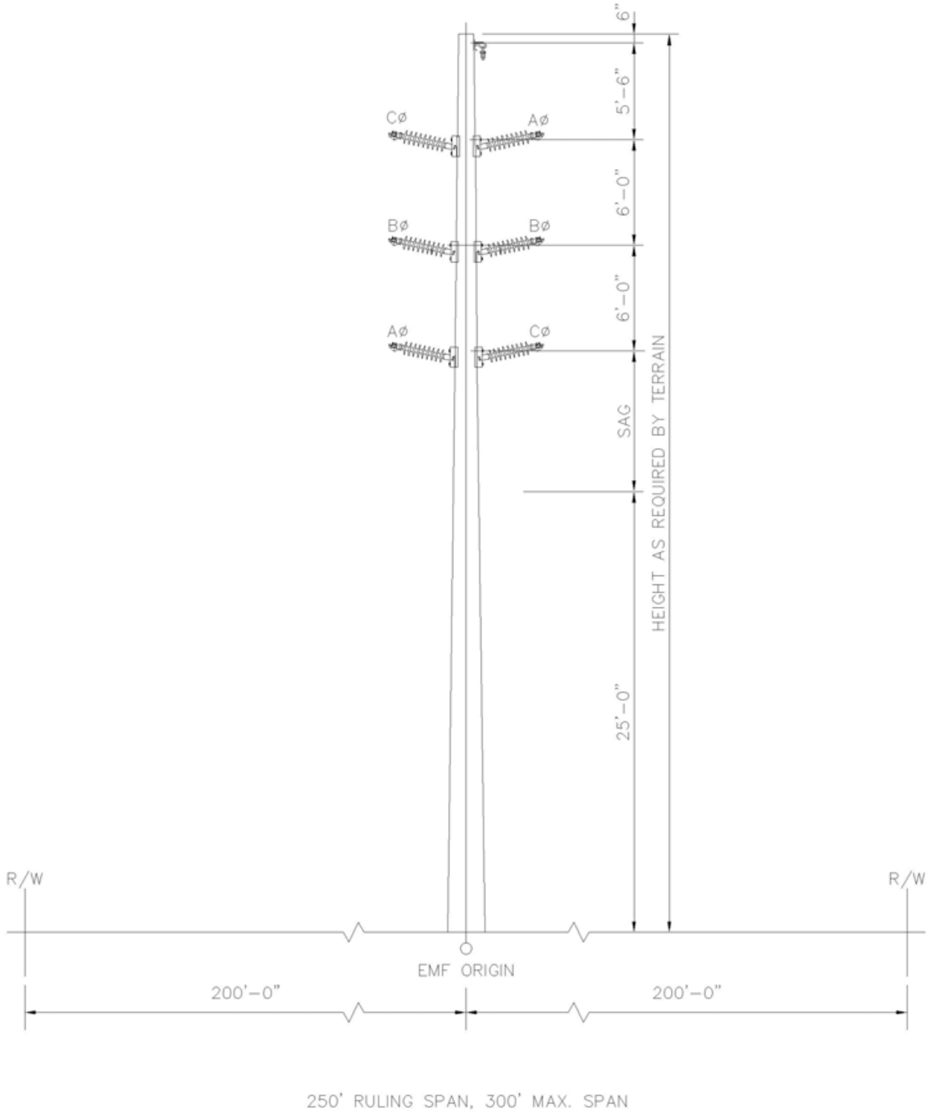

Figure AA-2. Typical 34.5-kV Double-Circuit Configuration

Calculation Methods

The calculation methods used for the analysis are provided in Chapter 8 of the *Transmission Line Reference Book, 345-kV and Above* (Electric Power Research Institute, 1982, Second Edition). The software tool program used for these analyses, called "Corona and Field Effect Program (Version 3)," was developed by the Bonneville Power Administration and is based on the methods and equations of the *Transmission Line Reference Book*. This program and others like it have been used to predict electric and magnetic field levels for many years. The predicted values of field strength from these programs have been consistently confirmed by field measurements. The results of the Bonneville Power Administration Corona and Field Effect Program are provided in Attachment AA-1.

To estimate the maximum fields, calculations are performed at mid-span where the conductor is positioned at its lowest point between structures (the estimated maximum sag point). This section addresses the estimates of the maximum possible 60-Hz AC electric and magnetic field strengths that will be produced by the proposed 34.5-kV facilities. These estimates are computed for a height of 1 meter (3.3 feet) above the ground on the proposed line routes.

The presumed distance between the centerline of 34.5-kV circuit and the edge of the right-of-way for this study is assumed to be 200 feet. However, at this Facility, there is no right-of-way limit because the entire wind farm constitutes the 34.5-kV right-of-way.

Results of EMF Calculations

Table AA-1 gives the calculated values of the magnetic and the electric field values at left and right edges of the right-of-way, and at the centerline, for the projected maximum currents during peak load. The values are computed with conductors at maximum sag (minimum conductor ground clearance). The actual magnetic field values vary, as load varies daily, seasonally, and as conductor sag changes with ambient temperature. The levels shown represent the highest magnetic fields expected for the proposed project. Average fields along the ground between poles, and over a year's time would be considerably less than the peak values shown.

Table AA-1. Calculated Maximum Magnetic and Electric Field Values

Case	Figure	Voltage	Magnetic Field (mGauss)			Electric Field (KV/M)		
			Left R/W (200')	Max. on R/W	Right R/W (200')	Left R/W (200')	Max. on R/W	Right R/W (200')
1	AA-3 AA-4	34.5-kV Single Circuit	1.45	98.7	1.46	0.003	0.302	0.003
2	AA-5 AA-6	34.5-kV Double-Circuit	0.15	59.8	0.15	0.002	0.221	0.002

As shown in Table AA-1, magnetic field and electric field values are higher on the right-of-way than at the edges of the right-of-way.

These results are plotted on graphs and included here.

For Case Figure 1, see Figure AA-3 for the magnetic field profile, and Figure AA-4 for the electric field graph.

For Case 2, see Figure AA-5 for the magnetic field profile, and Figure AA-6 for the electric field graph.

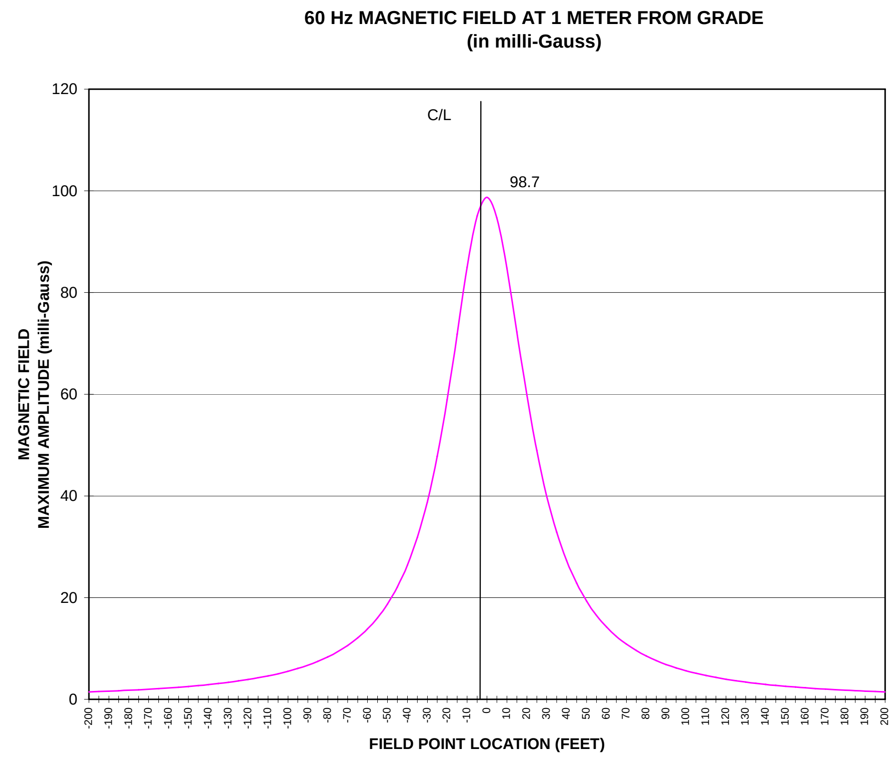

Figure AA-3. Magnetic Field Profile for One Circuit

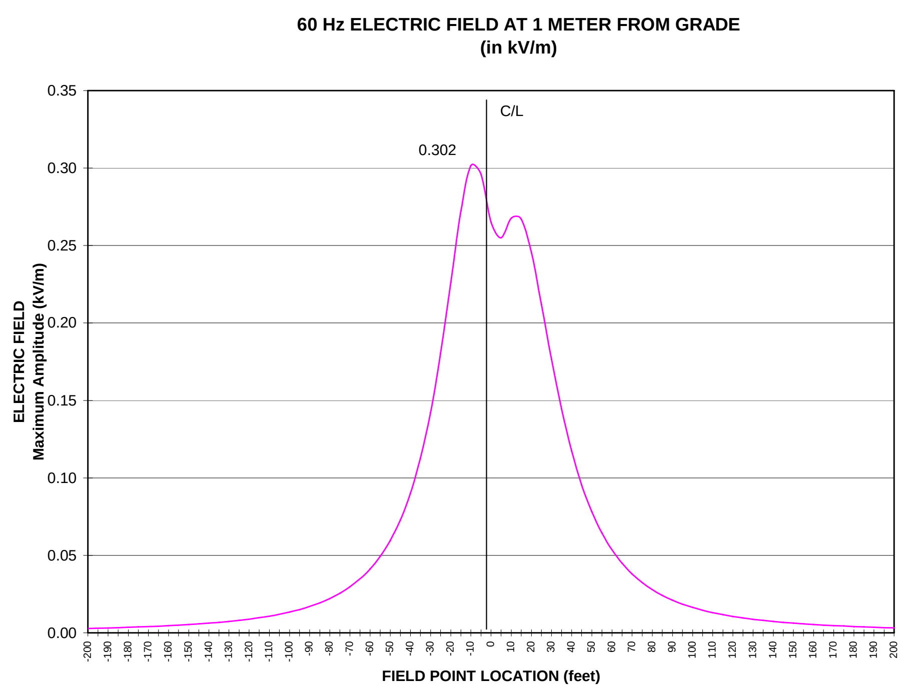

Figure AA-4. Electric Field Profile for One Circuit

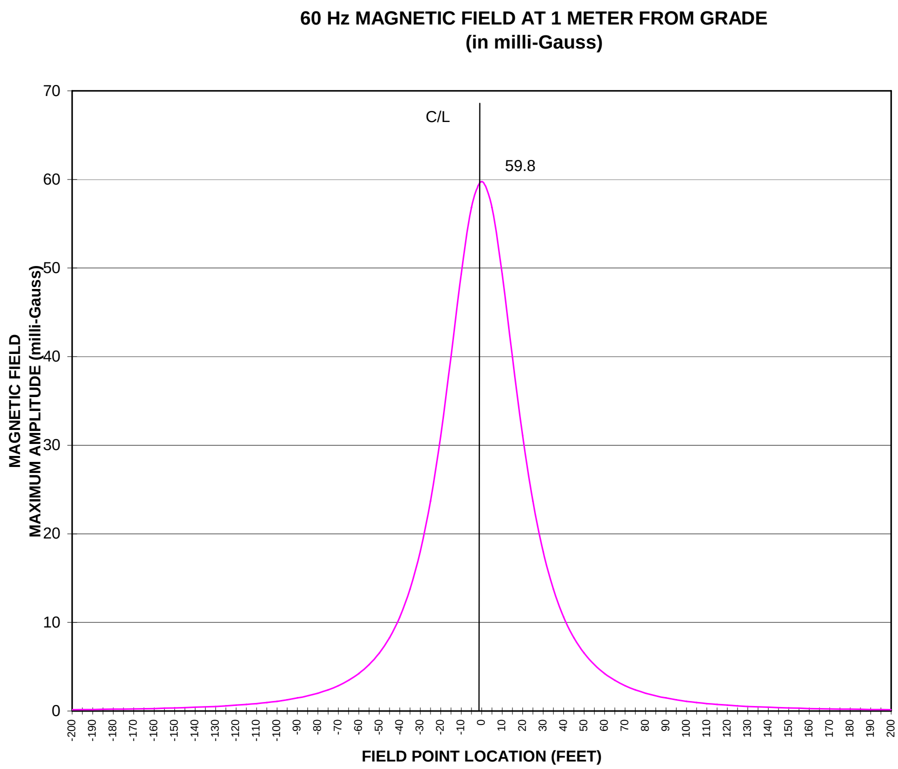

Figure AA-5. Magnetic Field Profile for Two Circuits

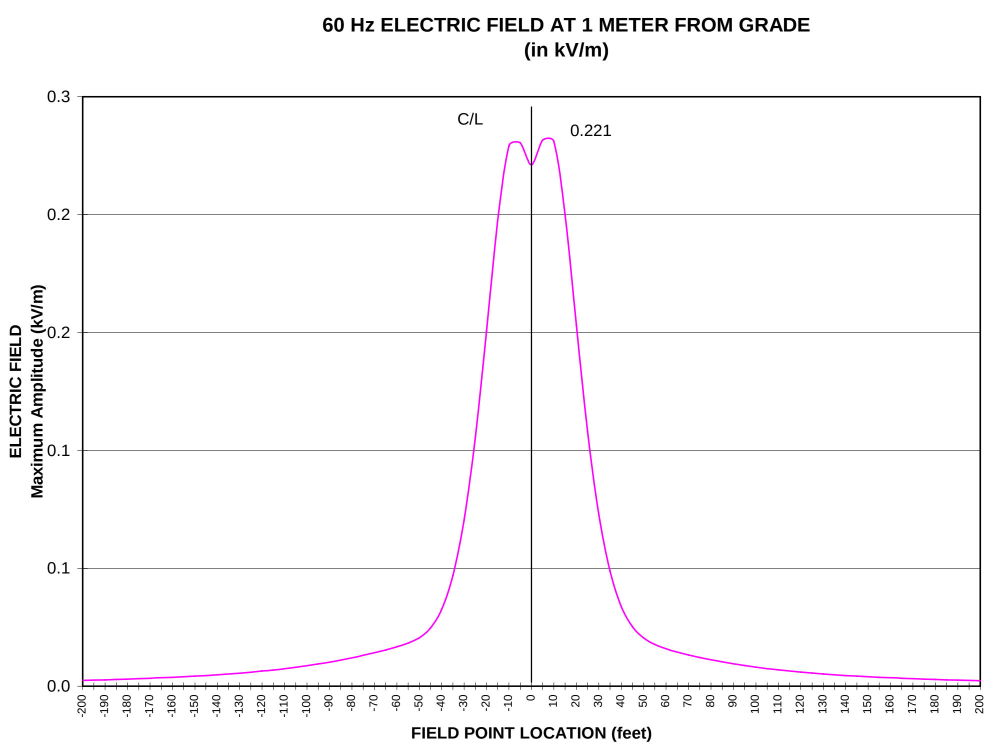

Figure AA-6. Electric Field Profile for Two Circuits

AA.2.3.4 Measures Proposed to Reduce Electric or Magnetic Field Levels

(v) Any measures the applicant proposes to reduce electric or magnetic field levels;

Response: For the 34.5-kV overhead single-circuit lines, no measures are proposed to reduce electric or magnetic fields because the conductor configuration is already optimized to mitigate the electric and magnetic fields.

For the 34.5-kV overhead double-circuit lines, measures will be taken to reduce electric and magnetic fields (EMF).

Mitigation of EMF will involve the transposing of conductors to improve the cancellation of fields. For the double-circuit 34.5-kV overhead lines, conductors will be arranged, with A, B, and C phases, from top to bottom, on one side of the pole, and with C, B, and A phases, from top to bottom, on the other side of the pole. Construction drawings will clearly designate the intended phase positions and connections.

•

AA.2.3.5 Assumptions and Methods Used in Electric and Magnetic Field Analyses

(vi) The assumptions and methods used in the electric and magnetic field analysis, including the current in amperes on each proposed transmission line; and

Response: See response *(iv)*. Attachment AA-1 shows data inputs and assumptions used in the electric and magnetic field analysis conducted using the BPA Corona and Field Effects (Version 3) program.

AA.2.3.6 Monitoring Program

(vii) The applicant's proposed monitoring program, if any, for actual electric and magnetic field levels; and

Response: The Applicant contracted Triaxis Engineering to analyze EMF for the 34.5-kV underground collector lines.

AA.3 ALTERNATING CURRENT FIELDS

OAR 345-024-0090(1) *Can (the applicant) design, construct, and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;*

Response: The electric field on the corridor of the proposed 34.5-kV single-circuit and double-circuit lines do not exceed 9 kV per meter (see Figures AA-4 and AA-6).

AA.4 INDUCED VOLTAGE AND CURRENT

OAR 345-024-0090(2) *To issue a site certificate for a facility that includes any high voltage transmission line under Council jurisdiction, the Council must find that the applicant can design, construct and operate the proposed transmission line so that induced currents resulting* *from the transmission line and related or supporting facilities will be as low as reasonably achievable.*

Response: The Applicant has designed the proposed collector line so that induced currents resulting from the collector line and related or supporting facilities will be as low as reasonably achievable. Below is an analysis prepared by Triaxis Engineering of the risk of induced currents from the proposed underground collector lines.

AA.4.1 Overview of Induced Voltage and Current

AA.4.1.1 Induced Voltage

Voltage is the electrical pressure that pushes current through a conducting wire or object. An object, such as a bird, person, vehicle, or barbed-wire fence that is insulated from ground and in an electric field will possess an induced voltage. A bird flying through the field is safe because the induced voltage cannot make current flow through the bird, unless there is a conducting path for the current. Induced voltages can only be a hazard when the object is shorted to ground, allowing a path for current to flow. The conductivity of the air around the overhead conductor will determine the upper limit of the current that can flow when the object is shorted to ground.

A common induced voltage hazard occurs on fences that parallel overhead transmission lines. If the fence is ungrounded, it possesses the voltage of the net electric field of the overhead conductors. A person touching such a fence becomes a conducting path for the current and will feel a momentary shock. The AC static voltage on the fence bleeds off quickly but can be annoying or hazardous. This hazard is easily removed by periodically bonding the fence wires to grounding rods that are driven into the soil.

AA.4.1.2 Induced Current

A current carrying conductor will induce a current to flow in another conductor that is parallel to it. Induced currents are due to the net AC magnetic field. In the common case cited above, grounded fences create electrical loops in which induced currents can flow. The value of the induced current will depend on the magnetic field strength, the size, and shape of the conducting object, and the object-to-ground resistance.

Induced currents are not a hazard to people because almost no voltage is involved. However, induced currents are a concern for railroad communications, and pipeline cathodic protection systems that parallel transmission lines.

AA.4.2 Analysis of Induced Voltages

As stated in Section AA.2, the underground 34.5-kV lines do not generate electric fields and will not cause a voltage to appear on fences that parallel the underground circuits. Therefore, the grounding of fences in proximity to the underground lines is unnecessary. Underground circuits generate only magnetic fields, and these fields pose no shock hazard to people. As noted above, induced currents from magnetic fields are a concern only for parallel pipelines or railroad communications that parallel the collector line. There are no such facilities within a mile of any of the underground collector lines.

As described in Section AA.2, the approximately 0.22 mile of overhead 34.5-kV collector lines will not generate electric or magnetic fields that are measurable at distances beyond 200 feet from the centerline. There are no occupied buildings, residences, or other sensitive receptors within 200 feet of either side of the proposed centerline of the overhead collector line.

AA.5 RADIO AND TV INTERFERENCE

OAR 345-021-0010(1)(aa)(B) *An evaluation of alternate methods and costs of reducing radio interference likely to be caused by the transmission line in the primary reception area near interstate, U.S. and state highways;*

Response: Not applicable. The 34.5-kV underground collector lines will not cause radio or television interference. Overhead 230-kV collector lines can generate random corona radiation during wet weather as a result of raindrops on the wire. However, 34.5-kV collector lines do not generate the same level of corona radiation. In addition, there are no occupied buildings or residences within 200 feet on either side of the proposed centerline of the overhead collector line. The approximately 0.22 mile of overhead collector lines are not expected to generate any radio or TV interference.

AA.6 CONCLUSION

Based on the above information, the Applicant has satisfied the requirement of OAR 345-021-0010(1)(aa), and the Council may find that the standard contained in OAR 345-024-0090(2) has been satisfied.

ATTACHMENT AA-1

Results of the Bonneville Power Administration Corona and Field Effect Program for 34.5-kV Collector Lines

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Û      C O R O N A   A N D   F I E L D      Û
Û E F F E C T S   P R O G R A M   V E R.  3  Û
Û   Source: Bonneville Power Administration   Û
ÛÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÜÛ
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INPUT DATA LIST

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****************** LEANING JUNIPER*************
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FIGURE 1 35-KV SINGLE CIRCUIT SHIELDED 1590 ACSR 60MW-1000A PER CKT

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1,0, 3, 4,0.0,   2.00,   1.00,    .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  4 CONDUCTORS, OF WHICH  3 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
'CIR1-A  ','A',   -4.50,   31.00, 1,   1.545,    .000,  23.000,    .000,   1.000,    .000
'CIR1-B  ','A',    4.50,   28.00, 1,   1.545,    .000,  23.000,-120.000,   1.000,    .000
'CIR1-C  ','A',   -4.50,   25.00, 1,   1.545,    .000,  23.000, 120.000,   1.000,    .000
'SH-1    ','A',     .75,   37.00, 1,    .385,    .000,    .000,    .000,    .000,    .000
 41 -200.0    5.0
 40    5.0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
****************** LEANING JUNIPER*************
FIGURE 1 35-KV SINGLE CIRCUIT SHIELDED 1590 ACSR 60MW-1000A PER CKT
```

	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
CIR1-A	-4.50	31.00	2.51	1.55	1	.00	23.00	.00	1.00	.000
CIR1-B	4.50	28.00	2.33	1.55	1	.00	23.00	-120.00	1.00	.000
CIR1-C	-4.50	25.00	2.51	1.55	1	.00	23.00	120.00	1.00	.000
SH-1	.75	37.00	.66	.38	1	.00	.00	.00	.00	.000

```
AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=      .0 FT
RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT
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LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	(FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	(FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	-51.3	-76.3	-53.2	-70.2	-82.9	.000000	.003	.00145
-195.0	-51.2	-76.2	-52.9	-69.9	-82.7	.000000	.003	.00152
-190.0	-51.1	-76.1	-52.6	-69.6	-82.4	.000000	.003	.00160
-185.0	-50.9	-75.9	-52.2	-69.2	-82.2	.000000	.003	.00169
-180.0	-50.8	-75.8	-51.9	-68.9	-81.9	.000000	.004	.00178
-175.0	-50.6	-75.6	-51.5	-68.5	-81.7	.000000	.004	.00188
-170.0	-50.5	-75.5	-51.2	-68.2	-81.4	.000000	.004	.00199
-165.0	-50.4	-75.4	-50.8	-67.8	-81.2	.000000	.004	.00211
-160.0	-50.2	-75.2	-50.4	-67.4	-80.9	.000000	.005	.00224
-155.0	-50.0	-75.0	-50.0	-67.0	-80.6	.000000	.005	.00238
-150.0	-49.9	-74.9	-49.5	-66.5	-80.3	.000000	.005	.00254
-145.0	-49.7	-74.7	-49.1	-66.1	-80.1	.000000	.006	.00271
-140.0	-49.5	-74.5	-48.6	-65.6	-79.7	.000000	.006	.00290
-135.0	-49.4	-74.4	-48.1	-65.1	-79.4	.000000	.007	.00311
-130.0	-49.2	-74.2	-47.6	-64.6	-79.1	.000000	.007	.00335
-125.0	-49.0	-74.0	-47.0	-64.0	-78.8	.000000	.008	.00361
-120.0	-48.8	-73.8	-46.5	-63.5	-78.4	.000000	.009	.00390
-115.0	-48.6	-73.6	-45.9	-62.9	-78.0	.000000	.010	.00423
-110.0	-48.4	-73.4	-45.2	-62.2	-77.6	.000000	.011	.00461
-105.0	-48.1	-73.1	-44.6	-61.6	-77.2	.000000	.012	.00503
-100.0	-47.9	-72.9	-43.9	-60.9	-76.8	.000000	.013	.00552
-95.0	-47.7	-72.7	-43.1	-60.1	-76.4	.000000	.015	.00607
-90.0	-47.4	-72.4	-42.3	-59.3	-75.9	.000000	.017	.00672
-85.0	-47.1	-72.1	-41.5	-58.5	-75.4	.000000	.019	.00746
-80.0	-46.8	-71.8	-40.6	-57.6	-74.9	.000000	.022	.00834
-75.0	-46.5	-71.5	-39.6	-56.6	-74.3	.000000	.026	.00937
-70.0	-46.2	-71.2	-38.6	-55.6	-73.7	.000000	.030	.01060
-65.0	-45.9	-70.9	-37.5	-54.5	-73.0	.000000	.035	.01207
-60.0	-45.5	-70.5	-36.4	-53.4	-72.3	.000000	.041	.01386
-55.0	-45.1	-70.1	-35.1	-52.1	-71.6	.000000	.049	.01605
-50.0	-44.7	-69.7	-33.8	-50.8	-70.7	.000000	.060	.01875
-45.0	-44.3	-69.3	-32.4	-49.4	-69.8	.000000	.073	.02214
-40.0	-43.8	-68.8	-30.9	-47.9	-68.9	.000000	.090	.02642
-35.0	-43.3	-68.3	-29.3	-46.3	-67.8	.000000	.113	.03188
-30.0	-42.8	-67.8	-27.7	-44.7	-66.6	.000000	.142	.03888
-25.0	-42.2	-67.2	-25.6	-42.6	-65.2	.000000	.180	.04781
-20.0	-41.7	-66.7	-23.5	-40.5	-63.8	.000000	.226	.05890
-15.0	-41.2	-66.2	-21.6	-38.6	-62.4	.000000	.272	.07182
-10.0	-40.8	-65.8	-20.1	-37.1	-61.2	.000000	.302	.08495
-5.0	-40.6	-65.6	-19.5	-36.5	-60.7	.000000	.296	.09505

.0	-40.7	-65.7	-19.9	-36.9	-61.0	.000000	.265	.09870
5.0	-40.9	-65.9	-21.2	-38.2	-62.1	.000000	.255	.09467
10.0	-41.3	-66.3	-23.1	-40.1	-63.5	.000002	.268	.08476
15.0	-41.8	-66.8	-25.2	-42.2	-65.0	.000004	.267	.07224
20.0	-42.3	-67.3	-27.3	-44.3	-66.3	.000005	.245	.05982
25.0	-42.9	-67.9	-29.0	-46.0	-67.5	.000006	.212	.04895
30.0	-43.4	-68.4	-30.6	-47.6	-68.6	.000006	.177	.04002
35.0	-43.9	-68.9	-32.1	-49.1	-69.7	.000007	.144	.03290
40.0	-44.3	-69.3	-33.5	-50.5	-70.6	.000006	.117	.02728
45.0	-44.8	-69.8	-34.9	-51.9	-71.4	.000006	.096	.02285
50.0	-45.2	-70.2	-36.1	-53.1	-72.2	.000006	.078	.01933
55.0	-45.6	-70.6	-37.3	-54.3	-72.9	.000006	.064	.01652
60.0	-45.9	-70.9	-38.4	-55.4	-73.6	.000006	.054	.01425
65.0	-46.3	-71.3	-39.4	-56.4	-74.2	.000005	.045	.01240
70.0	-46.6	-71.6	-40.4	-57.4	-74.8	.000005	.038	.01087
75.0	-46.9	-71.9	-41.3	-58.3	-75.3	.000005	.032	.00960
80.0	-47.2	-72.2	-42.2	-59.2	-75.8	.000005	.028	.00853
85.0	-47.4	-72.4	-43.0	-60.0	-76.3	.000005	.024	.00763
90.0	-47.7	-72.7	-43.7	-60.7	-76.7	.000004	.021	.00686
95.0	-47.9	-72.9	-44.4	-61.4	-77.1	.000004	.019	.00619
100.0	-48.2	-73.2	-45.1	-62.1	-77.6	.000004	.016	.00562
105.0	-48.4	-73.4	-45.8	-62.8	-77.9	.000004	.015	.00512
110.0	-48.6	-73.6	-46.4	-63.4	-78.3	.000004	.013	.00469
115.0	-48.8	-73.8	-46.9	-63.9	-78.7	.000004	.012	.00431
120.0	-49.0	-74.0	-47.5	-64.5	-79.0	.000004	.011	.00397
125.0	-49.2	-74.2	-48.0	-65.0	-79.4	.000003	.010	.00367
130.0	-49.4	-74.4	-48.5	-65.5	-79.7	.000003	.009	.00340
135.0	-49.6	-74.6	-49.0	-66.0	-80.0	.000003	.008	.00316
140.0	-49.8	-74.8	-49.4	-66.4	-80.3	.000003	.007	.00294
145.0	-49.9	-74.9	-49.9	-66.9	-80.6	.000003	.007	.00275
150.0	-50.1	-75.1	-50.3	-67.3	-80.9	.000003	.006	.00257
155.0	-50.2	-75.2	-50.7	-67.7	-81.1	.000003	.006	.00241
160.0	-50.4	-75.4	-51.1	-68.1	-81.4	.000003	.005	.00227
165.0	-50.5	-75.5	-51.5	-68.5	-81.7	.000003	.005	.00213
170.0	-50.7	-75.7	-51.8	-68.8	-81.9	.000003	.005	.00201
175.0	-50.8	-75.8	-52.2	-69.2	-82.1	.000003	.004	.00190
180.0	-50.9	-75.9	-52.5	-69.5	-82.4	.000003	.004	.00180
185.0	-51.1	-76.1	-52.8	-69.8	-82.6	.000003	.004	.00170
190.0	-51.2	-76.2	-53.1	-70.1	-82.8	.000003	.004	.00162
195.0	-51.3	-76.3	-53.4	-70.4	-83.0	.000002	.003	.00154
200.0	-51.5	-76.5	-53.7	-70.7	-83.3	.000002	.003	.00146

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 Û      C O R O N A   A N D   F I E L D      Û
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 Û   Source: Bonneville Power Administration  Û
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INPUT DATA LIST

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****************** LEANING JUNIPER *************
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FIGURE 2 35-KV DOUBLE-CIRCUIT SHIELDED 1590 ACSR 60MW-1000A PER CKT

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1,0, 6, 7,0.0,   2.00,   1.00,    .00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF  7 CONDUCTORS, OF WHICH  6 ARE ENERGIZED PHASES

OPTIONS: 'COMB'
  5.000,  5.000, 10.000,   .000,  1.000, 75.000,  3.280,  2.000,  3.280
'CIR1-A  ','A',   -4.50,   37.00, 1,   1.545,    .000,  23.000,    .000,   1.000,    .000
'CIR1-B  ','A',   -4.50,   31.00, 1,   1.545,    .000,  23.000,-120.000,   1.000,    .000
'CIR1-C  ','A',   -4.50,   25.00, 1,   1.545,    .000,  23.000, 120.000,   1.000,    .000
'CIR2-A  ','A',    4.50,   25.00, 1,   1.545,    .000,  23.000,    .000,   1.000,    .000
'CIR2-B  ','A',    4.50,   31.00, 1,   1.545,    .000,  23.000,-120.000,   1.000,    .000
'CIR2-C  ','A',    4.50,   37.00, 1,   1.545,    .000,  23.000, 120.000,   1.000,    .000
'SH-1    ','A',     .75,   43.00, 1,    .385,    .000,    .000,    .000,    .000,    .000
 41 -200.0    5.0
 40    5.0    5.0
  0     .0     .0
1COMBINED OUTPUT OF AUDIBLE NOISE, RADIO NOISE, TVI, OZONE CONCENTRATION, GROUND GRADIENT AND MAGNETIC FIELD
 ****************** LEANING JUNIPER *************
 FIGURE 2 35-KV DOUBLE-CIRCUIT SHIELDED 1590 ACSR 60MW-1000A PER CKT
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	DIST. FROM CENTER OF TOWER (FEET)	HEIGHT (FEET)	MAXIMUM GRADIENT (KV/CM)	SUBCON DIAM. (IN)	NO. OF SUBCON	SUBCON SPACING (IN)	VOLTAGE L-N (KV)	PHASE ANGLE (DEGREES)	CURRENT (kAmps)	CORONA LOSSES (KW/MI)
CIR1-A	-4.50	37.00	2.57	1.55	1	.00	23.00	.00	1.00	.000
CIR1-B	-4.50	31.00	2.62	1.55	1	.00	23.00	-120.00	1.00	.000
CIR1-C	-4.50	25.00	2.58	1.55	1	.00	23.00	120.00	1.00	.000
CIR2-A	4.50	25.00	2.58	1.55	1	.00	23.00	.00	1.00	.000
CIR2-B	4.50	31.00	2.62	1.55	1	.00	23.00	-120.00	1.00	.000
CIR2-C	4.50	37.00	2.59	1.55	1	.00	23.00	120.00	1.00	.000
SH-1	.75	43.00	.59	.38	1	.00	.00	.00	.00	.000

```
AN MICROPHONE HT.=  5.0 FT, RI ANT. HT.=  5.0 FT, TV ANT. HT.= 10.0 FT, ALTITUDE=      .0 FT
RI FREQ=  1.000 MHZ, TV FREQ=  75.000 MHZ, WIND VEL.(OZ)= 2.000 MPH, GROUND CONDUCTIVITY =   2.0 MMHOS/M
E-FIELD TRANSDUCER HT.=  3.3FT, B-FIELD TRANSDUCER HT.=  3.3FT
```

LATERAL DIST FROM REFERENCE (FEET)	AUDIBLE NOISE (RAIN) L50 DBA	AUDIBLE NOISE (FAIR) L50 DBA	RADIO INTERFERENCE (RAIN) L50 DBUV/M	RADIO INTERFERENCE (FAIR) L50 DBUV/M	TVI TOTAL RAIN DBUV/M	OZONE FOR RAIN RATE OF 1.00 IN/HR AT 0. FT LEVEL PPB	ELECTRIC FIELD KV/M	MAGNETIC FIELD GAUSS
-200.0	-45.7	-70.7	-50.4	-67.4	-80.7	.000000	.002	.00015
-195.0	-45.6	-70.6	-50.1	-67.1	-80.5	.000000	.003	.00016
-190.0	-45.5	-70.5	-49.8	-66.8	-80.3	.000000	.003	.00017
-185.0	-45.3	-70.3	-49.5	-66.5	-80.0	.000000	.003	.00019
-180.0	-45.2	-70.2	-49.2	-66.2	-79.8	.000000	.003	.00020
-175.0	-45.1	-70.1	-48.8	-65.8	-79.6	.000000	.003	.00022
-170.0	-44.9	-69.9	-48.4	-65.4	-79.3	.000000	.003	.00024
-165.0	-44.8	-69.8	-48.1	-65.1	-79.0	.000000	.004	.00026
-160.0	-44.6	-69.6	-47.7	-64.7	-78.8	.000000	.004	.00029
-155.0	-44.5	-69.5	-47.3	-64.3	-78.5	.000000	.004	.00031
-150.0	-44.3	-69.3	-46.8	-63.8	-78.2	.000000	.004	.00035
-145.0	-44.2	-69.2	-46.4	-63.4	-77.9	.000000	.005	.00038
-140.0	-44.0	-69.0	-45.9	-62.9	-77.6	.000000	.005	.00042
-135.0	-43.8	-68.8	-45.4	-62.4	-77.3	.000000	.005	.00047
-130.0	-43.6	-68.6	-44.9	-61.9	-76.9	.000000	.006	.00052
-125.0	-43.5	-68.5	-44.4	-61.4	-76.6	.000000	.006	.00058
-120.0	-43.3	-68.3	-43.8	-60.8	-76.2	.000000	.006	.00066
-115.0	-43.1	-68.1	-43.3	-60.3	-75.9	.000000	.007	.00074
-110.0	-42.8	-67.8	-42.6	-59.6	-75.5	.000000	.007	.00084
-105.0	-42.6	-67.6	-42.0	-59.0	-75.1	.000000	.008	.00096
-100.0	-42.4	-67.4	-41.3	-58.3	-74.7	.000000	.009	.00110
-95.0	-42.2	-67.2	-40.6	-57.6	-74.2	.000000	.009	.00126
-90.0	-41.9	-66.9	-39.8	-56.8	-73.8	.000000	.010	.00147
-85.0	-41.7	-66.7	-39.0	-56.0	-73.3	.000000	.011	.00171
-80.0	-41.4	-66.4	-38.2	-55.2	-72.7	.000000	.012	.00202
-75.0	-41.1	-66.1	-37.3	-54.3	-72.2	.000000	.013	.00239
-70.0	-40.8	-65.8	-36.3	-53.3	-71.6	.000000	.014	.00286
-65.0	-40.5	-65.5	-35.3	-52.3	-71.0	.000000	.015	.00346
-60.0	-40.1	-65.1	-34.2	-51.2	-70.3	.000000	.017	.00423
-55.0	-39.8	-64.8	-33.0	-50.0	-69.6	.000000	.018	.00523
-50.0	-39.4	-64.4	-31.7	-48.7	-68.9	.000000	.021	.00654
-45.0	-39.0	-64.0	-30.3	-47.3	-68.0	.000000	.025	.00827
-40.0	-38.6	-63.6	-28.8	-45.8	-67.2	.000000	.033	.01061
-35.0	-38.1	-63.1	-27.2	-44.2	-66.2	.000000	.047	.01375
-30.0	-37.6	-62.6	-25.6	-42.6	-65.1	.000000	.070	.01801
-25.0	-37.1	-62.1	-24.0	-41.0	-63.8	.000000	.105	.02370
-20.0	-36.7	-61.7	-22.0	-39.0	-62.3	.000000	.151	.03107

-15.0	-36.2	-61.2	-20.1	-37.1	-60.9	.000000	.198	.03997
-10.0	-35.8	-60.8	-18.6	-35.6	-59.7	.000000	.229	.04932
-5.0	-35.6	-60.6	-18.0	-35.0	-59.2	.000000	.230	.05683
.0	-35.5	-60.5	-18.4	-35.4	-59.5	.000000	.221	.05976
5.0	-35.6	-60.6	-18.0	-35.0	-59.2	.000000	.232	.05683
10.0	-35.8	-60.8	-18.7	-35.7	-59.8	.000003	.231	.04932
15.0	-36.2	-61.2	-20.1	-37.1	-60.9	.000006	.200	.03997
20.0	-36.7	-61.7	-22.1	-39.1	-62.4	.000011	.153	.03107
25.0	-37.1	-62.1	-24.0	-41.0	-63.8	.000015	.108	.02370
30.0	-37.6	-62.6	-25.6	-42.6	-65.1	.000017	.073	.01801
35.0	-38.1	-63.1	-27.2	-44.2	-66.2	.000018	.049	.01375
40.0	-38.6	-63.6	-28.8	-45.8	-67.2	.000019	.034	.01061
45.0	-39.0	-64.0	-30.3	-47.3	-68.1	.000018	.025	.00827
50.0	-39.4	-64.4	-31.7	-48.7	-68.9	.000018	.020	.00654
55.0	-39.8	-64.8	-32.9	-49.9	-69.6	.000018	.018	.00523
60.0	-40.1	-65.1	-34.0	-51.0	-70.3	.000017	.016	.00423
65.0	-40.5	-65.5	-35.1	-52.1	-71.0	.000017	.014	.00346
70.0	-40.8	-65.8	-36.1	-53.1	-71.6	.000016	.013	.00286
75.0	-41.1	-66.1	-37.0	-54.0	-72.2	.000015	.012	.00239
80.0	-41.4	-66.4	-37.9	-54.9	-72.8	.000015	.011	.00202
85.0	-41.7	-66.7	-38.8	-55.8	-73.3	.000014	.010	.00171
90.0	-41.9	-66.9	-39.6	-56.6	-73.8	.000014	.009	.00147
95.0	-42.2	-67.2	-40.4	-57.4	-74.2	.000013	.009	.00126
100.0	-42.4	-67.4	-41.1	-58.1	-74.7	.000013	.008	.00110
105.0	-42.6	-67.6	-41.7	-58.7	-75.1	.000012	.007	.00096
110.0	-42.8	-67.8	-42.4	-59.4	-75.5	.000012	.007	.00084
115.0	-43.1	-68.1	-43.0	-60.0	-75.9	.000012	.006	.00074
120.0	-43.3	-68.3	-43.6	-60.6	-76.3	.000011	.006	.00066
125.0	-43.4	-68.4	-44.2	-61.2	-76.6	.000011	.006	.00058
130.0	-43.6	-68.6	-44.7	-61.7	-77.0	.000011	.005	.00052
135.0	-43.8	-68.8	-45.2	-62.2	-77.3	.000010	.005	.00047
140.0	-44.0	-69.0	-45.7	-62.7	-77.6	.000010	.005	.00042
145.0	-44.2	-69.2	-46.1	-63.1	-77.9	.000010	.004	.00038
150.0	-44.3	-69.3	-46.6	-63.6	-78.2	.000010	.004	.00035
155.0	-44.5	-69.5	-47.0	-64.0	-78.5	.000009	.004	.00031
160.0	-44.6	-69.6	-47.4	-64.4	-78.8	.000009	.004	.00029
165.0	-44.8	-69.8	-47.8	-64.8	-79.1	.000009	.003	.00026
170.0	-44.9	-69.9	-48.2	-65.2	-79.3	.000009	.003	.00024
175.0	-45.1	-70.1	-48.6	-65.6	-79.6	.000008	.003	.00022
180.0	-45.2	-70.2	-48.9	-65.9	-79.8	.000008	.003	.00020
185.0	-45.3	-70.3	-49.2	-66.2	-80.1	.000008	.003	.00019
190.0	-45.5	-70.5	-49.6	-66.6	-80.3	.000008	.003	.00017
195.0	-45.6	-70.6	-49.9	-66.9	-80.5	.000008	.002	.00016
200.0	-45.7	-70.7	-50.2	-67.2	-80.7	.000008	.002	.00015

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EXHIBIT BB

OTHER INFORMATION
OAR 345-021-0010(1)(bb)

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BB.1 INTRODUCTION

Leaning Juniper Wind Power II, LLC (the Applicant) proposes to construct a wind generation facility in Gilliam County, Oregon, with generating capacity of up to approximately 279 megawatts (MW). The proposed facility (the Facility) consists of two main components: (1) Leaning Juniper II North (the north portion of the Facility with up to 93 MW), and (2) Leaning Juniper II South (the south portion of the Facility with up to 186 MW).

OAR 345-021-0010(1)(bb) *Any other information that the Office requests in the project order;*

Response: The Oregon Department of Energy (ODOE) has confirmed in writing that the Applicant has satisfied the requirements of OAR 345-015-0300(2), and has thus granted expedited review under this standard and issued a project order.

BB.2 SITING STANDARDS FOR WIND ENERGY FACILITIES

OAR 345-024-0015 *To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:*

Response: See sections BB.2.1 through BB.2.3, below.

BB.2.1 Reduce Visual Impacts

OAR 345-024-0015(1) *Can design and construct the facility to reduce visual impact by methods including, but not limited to*:

(a) Not using the facility for placement of advertising, except that advertising does not include the manufacturer's label or signs required by law;

Response: The Applicant will not allow any advertising to be used on any part of the Facility. Turbine components may be printed with the manufacturer's logo. No advertising sign will be posted at the Facility. There are likely to be nonadvertising signs for traffic instructions and warning signs posted on or near any necessary equipment. These postings will be limited to those required by law and/or for health and safety purposes.

(b) Using the minimum lighting necessary for safety and security purposes and using techniques to prevent casting glare from the site, except as otherwise required by the Federal Aviation Administration or the Oregon Department of Transportation, Transportation Development Branch, Aeronautics Section; and

Response: The Applicant will use only the minimum lighting on the turbine strings as required by the Federal Aviation Administration (FAA), including any revised guidelines. The Operations and Maintenance (O&M) building(s) will have a small amount of low-impact (focused downward) exterior lighting for safety and security purposes.

(c) Using only those signs necessary for facility operation and safety and signs required by law.

Response: As discussed above in (a), signs will not be posted at the Facility except for those required for traffic movement and Facility operation identification, and safety.

BB.2.2 Restrict Public Access

OAR 345-024-0015(2) *Can design and construct the facility to restrict public access by the following methods:*

(a) For a horizontal-axis wind energy facility with tubular towers, using locked access sufficient to prevent unauthorized entry to the interior of the tower;

Response: The turbines will be located on private lands and therefore public access will be restricted. The towers feature a locked entry door at ground level and an internal access ladder with safety platforms for access to the nacelle.

(b) For a horizontal-axis wind energy facility with lattice-type towers:

Response: The Facility will not use lattice-type towers.

(A) Removal of wind facility tower climbing fixtures to 12 feet from the ground;

Response: Not applicable.

(B) Installation of a locking, anti-climb device on the wind facility tower; or

Response: Not applicable.

(C) Installation of a protective fence at least 6 feet high with a locking gate; or

Response: Not applicable.

(c) For a vertical-axis wind energy facility, installation of a protective fence at least 6 feet high with a locking gate.

Response: The Facility will not be a vertical-axis wind energy facility.

BB.2.3 Reduce Cumulative Adverse Environmental Impacts

OAR 345-024-0015(3) *Can design and construct facility to reduce cumulative adverse environmental impacts in the vicinity to the extent practicable by measures including, but not limited to, the following, where applicable:*

(a) Using existing roads to provide access to the facility site, or if new roads are needed, minimizing the amount of land used for new roads and locating them to reduce adverse environmental impacts;

Response: Transportation to and from the site will follow a route that includes access via interstate, state, and county roads. A final transportation plan will be approved as required prior to the commencement of construction. Improvements will be made to some access roads to include grading and regraveling. The construction of new roads will be limited to within the lease boundary. Potential adverse environmental impacts were considered and analyzed in locating the proposed new roads. Road construction will not significantly impact any wetlands, other waters of the state, or fish and/or wildlife habitat. Further discussions of the impacts of roadways can be found in Exhibits C, P, and U.

(b) Combining transmission lines and points of connection to local distribution lines;

Response: A network of underground collector cables will be installed alongside new and existing roads at the Facility to collect power generated by the individual wind turbines and route the power to a substation for delivery to the Federal Columbia River Transmission System (the regional transmission grid) at Bonneville Power Administration's (BPA) Jones Canyon Switching Station. The connection into BPA's 230-kilovolt (kV) McNary-Santiam transmission line is currently under construction and is designed to serve several wind projects, including the adjacent Leaning Juniper I project. The Leaning Juniper II Collector Substation (LJ II Substation) will be located immediately adjacent to the Jones Canyon Switching Station; the 230-kV overhead connection between the two substations is estimated to be less than 400 feet in length.

(c) Connecting the facility to existing substations, or if new substations are needed, minimizing the number of new substations; and

Response: See response to (b), above.

(d) Avoiding, to the extent practicable, the creation of artificial habitat for raptors or raptor prey. Artificial habitat may include, but is not limited to:

(A) Above-ground portions of foundations surrounded by soil where weeds can accumulate;

Response: All aboveground portions of the foundation will be graveled to reduce the potential for weed infestation and raptor use. The Applicant will implement an ongoing weed control plan at the Facility in consultation with the appropriate agencies and with minimal adverse environmental impacts.

(B) Electrical equipment boxes on or near the ground that can provide shelter and warmth; and

Response: A GSU transformer will be installed at the base of each wind turbine to increase the output voltage of the wind turbine to the voltage of the power collection system (typically 34.5 kilovolts [kV]). There is no evidence at this time to suggest these transformers will be used by raptors as perches. If required as a result of mortality monitoring, antiperching devices will be installed to limit perching opportunities.

(C) Horizontal perching opportunities on the towers or related structures.

Response: The turbines will use tubular towers (rather than lattice towers), which provide no horizontal perching opportunities. Meteorological towers will be free-standing lattice-type with no guy wires.

The majority of the collector system will be buried directly in the soil approximately 3 to 4 feet below the ground surface. However, where site-specific considerations require, the collector system may be aboveground. Using aboveground structures allows the collector cables to "span" canyons and intermittent streams and thus to reduce environmental impacts. The overhead pole structures will generally be about 35 to 80 feet tall, depending on terrain. Based on the preliminary collector cable layout shown in figures C-3a and C-3b, 30 miles of collector cables will be placed underground, and less than 1 mile will be run on overhead structures. Antiperching devices will be installed on overhead pole structures. Electrocution from transmission lines is rare because the distances between conductors, and between conductors and grounded hardware, are greater than the wingspan of any raptor (APLIC, 1996).

BB.3 REFERENCES

APLIC (Avian Powerline Interaction Committee). 1996. Suggested practices for raptor protection on powerline: the state of the art in 1996. Edison Electric Institute/Raptor Research Fund. Washington D.C.

EXHIBIT CC

ADDITIONAL STATUTES, RULES, AND ORDINANCES

OAR 345-021-0010(1)(cc)

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CC.1 INTRODUCTION

Exhibit CC must identify all state statutes, administrative rules, and local ordinances containing standards or criteria that the proposed Leaning Juniper II Wind Power Facility (the Facility) must meet for the Council to issue a site certificate, other than statutes, rules, and ordinances identified in Exhibit E.

This Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(cc).

CC.2 ADDITIONAL STATUTES, RULES AND ORDINANCES

OAR 345-021-0010(1)(cc) *Identification, by legal citation, of all state statutes and administrative rules and local government ordinances containing standards or criteria that the proposed facility must meet for the Council to issue a site certificate, other than statutes, rules and ordinances identified in Exhibit E, and identification of the agencies administering those statutes, administrative rules and ordinances. The applicant shall identify all statutes, administrative rules and ordinances that the applicant knows to be applicable to the proposed facility, whether or not identified in the project order. To the extent not addressed by other materials in the application, the applicant shall include a discussion of how the proposed facility meets the requirements of the applicable statutes, administrative rules and ordinances.*

CC.2.1 Statutes, Rules, and Local Ordinances Referenced in Other Exhibits

Response: The following statutes, rules, and local ordinances are referenced in various Exhibits but are not addressed in Exhibit E. Discussion of compliance with these laws is found in each applicable Exhibit of this site certificate application and is not repeated here.

1. **Oregon Department of Agriculture**—Plant Conservation Biology Program—ORS 564; OAR Chapter 603, Division 73.

   Agency: Oregon Department of Agriculture
   635 Capitol Street, N.E.
   Salem, OR 97301-2532
   (503) 986-4550

2a. **Oregon Department of Environmental Quality**—Water Quality—ORS Chapter 468 and 468B; OAR Chapter 340, Divisions 14, 41, 45, 52, and 55.

   Agency: Oregon Department of Environmental Quality
   2146 NE 4th Street, Suite 104
   Bend, OR 97701
   (541) 388-6146

2b. **Oregon Department of Environmental Quality**—Noise—ORS 467; OAR Chapter 340, Division 35.

Agency: Oregon Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696

3. **Oregon Department of Fish and Wildlife**—Habitat Conservation Division—ORS 496 and ORS 506; OAR Chapter 635, Divisions 100 and 415.

Agency: Oregon Department of Fish and Wildlife
2501 S.W. First Avenue
P.O. Box 59
Portland, OR 97207
(503) 872-5268

4. **Oregon Department of Geology and Mineral Industries**—OAR Chapter 632.

Agency: Oregon Department of Geology
800 N.E. Oregon Street, Suite 965
Portland, OR 97232
(503) 731-4100

Exhibit K identifies the numerous state statutes, administrative rules, and local government ordinances that contain land use standards or criteria the Facility must meet for issuance of a site certificate. Exhibit K also includes a discussion of how the Facility meets the requirements of the applicable statutes, rules, and ordinances identified therein. Rather than repeat those statutes, rules, and local ordinances here, the Applicant requests that the Council refer to Exhibit K.

CC.2.2 Spill Response Statutes

Response: The state and federal release reporting requirements are contained in the following statutes and rules: ORS 466.635, OAR Chapter 340, Divisions 45, 47, 108, 122, 150, 160; 33 CFR part 153; and 40 CFR parts 110, 122, 262, 265, 280, 302, 355, 761. These provisions include requirements for responding to, or reporting, spills or release of various hazardous materials under a variety of circumstances or conditions. Depending on the nature of the particular spill or release, Oregon agencies that may be notified of a spill or release include the Oregon Emergency Management Division, the Oregon Department of Environmental Quality, and the Oregon Department of State Police.

CC.3 AFFIDAVIT

OAR 345-021-0010(1)(cc)(2) *The applicant shall submit an affidavit with the original application that, to the applicant's best knowledge and belief, the information in the application is true and accurate. If the applicant is not an individual, the affidavit must be signed by an individual authorized to act on behalf of the applicant. The applicant shall include a copy of the affidavit in each copy of the application.*

Response: The required affidavit is provided as Attachment CC-1. The affidavit is signed by Donald Furman, Vice President at PPM Energy, Inc., parent company to Leaning Juniper Wind Power II, LLC (Applicant).

CC.4 DOCUMENTS PREPARED IN CONNECTION WITH ENVIRONMENTAL ASSESSMENT OR ENVIRONMENTAL IMPACT STATEMENT

OAR 345-021-0010(1)(cc)(3) *Documents prepared in connection with an environmental assessment or environmental impact statement for the proposed facility under the National Environmental Policy Act of 1970, if any, may contain some of the information required under section (1) of this rule. The applicant may copy relevant sections of such documents into the appropriate exhibits of the site certificate application. The applicant may otherwise submit full copies of those documents and include, in the appropriate exhibits of the site certificate application, cross-references to the relevant sections of those documents. The applicant may use such documents only to avoid duplication. The applicant shall include additional information in the site certificate application as needed to meet the requirements of section (1) of this rule.*

Response: There are no documents being prepared in connection with an environmental assessment or environmental impact statement for the proposed Facility under the National Environmental Policy Act of 1970 (NEPA). NEPA documentation for the proposed Facility is not required because there are no federal approvals or authorizations that are required to construct and operate the Facility.

CC.5 INDEX OR TABLE OF CONTENTS FOR ALL EXHIBITS REQUIRED BY THIS RULE

OAR 345-021-0010(1)(cc)(4) *In each application for a site certificate submitted to the Office of Energy, the applicant shall include an index or table of contents clearly identifying by page number the location of each exhibit required by this rule. The applicant shall submit the original application for a site certificate and ten copies to the Office and shall prepare and distribute additional copies of the application as required by OAR 345-021-0050. In addition to the printed copies, the applicant shall submit the text (including appendices and graphical information to the extent practical) of the application in electronic format suitable to the Office.*

Response: A table of contents clearly identifying by tab letter the location of each Exhibit required by OAR 345-021-0010 is included at the beginning of the application for a site certificate (ASC). The original ASC and 10 printed copies are being submitted to the Oregon Department of Energy (ODOE). Additional copies are being distributed as required by OAR 345-021-0050. The text of the ASC (including attachments and graphical information to the extent practical) is also being submitted in electronic format suitable to the ODOE.

ATTACHMENT CC-1

Affidavit of Authenticity

AFFIDAVIT OF AUTHENTICITY

STATE OF OREGON)
) ss.
County of Multnomah)

I, Donald Furman, being first duly sworn, depose and say as follows:

1. I am a Vice President of Leaning Juniper Wind Power II, LLC an Oregon limited liability company and am authorized to act on behalf of Leaning Juniper Wind Power II, LLC.

2. Leaning Juniper Wind Power II, LLC is submitting this Application for Site Certificate for the Leaning Juniper II Wind Facility. To my best knowledge and belief, the information in this Application is true and accurate.

3. Leaning Juniper Wind Power II, LLC is submitting this Application for Site Certificate for the Leaning Juniper II Wind Facility. To my best knowledge and belief, the information in this application is true and accurate.

LEANING JUNIPER WIND POWER II, LLC

uBL

By ______________________________
~~Donald~~ Furman, Vice President

OFFICIAL SEAL
JULIE L HENSEL
NOTARY PUBLIC-OREGON
COMMISSION NO. 376087
MY COMMISSION EXPIRES JAN. 8, 2008

SUBSCRIBED AND SWORN TO me this 16 day of August 2006.

OFFICIAL SEAL
JULIE L HENSEL
NOTARY PUBLIC-OREGON
COMMISSION NO. 376087
MY COMMISSION EXPIRES JAN. 8, 2008

____
Notary Public for Oregon
My Commission Expires Jan 8 2008