EXHIBIT M

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

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ATTACHMENT

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:*

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: The legal opinion is attached as M-1.

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: A bond, parent guarantee, or letter of credit in the amount of approximately $4,500,000, will be obtained to meet the requirements.

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: A "comfort" letter from a financial institution is attached as M-2.

ATTACHMENT M-1

Legal Counsel Opinion

bp

Yevgeniy V. Nikulin
Attorney
BP Legal

BP America Inc.
501 WestLake Park Blvd.
WL1-16.136
Houston, Texas 77079

P.O. Box 3092
Houston, Texas 77253-3092

July 19, 2007

Oregon Department of Energy
625 Marion Street, NE
Salem, OR 97310

Direct 281-366-0996
Fax 281-366-7583
Eugene.Nikulin@bp.com

Re: Application of Golden Hills Wind Farm LLC

Ladies and Gentlemen:

BP America Inc.'s legal staff has ultimate responsibility for legal matters of its indirect subsidiary Golden Hills Wind Farm LLC (the "Company" or the "Applicant"). As an attorney of BP America Inc., I have acted as in-house counsel for the Company in connection with the application (the "Application") to the Oregon Energy Facility Siting Council to which this opinion is appended. In the Application, the Applicant proposes to construct and operate a nominal 400 megawatt (MW) (net) capacity wind electric generating plant and associated facilities (collectively, the "Project").

In that connection, I have examined or caused to be examined under my supervision original or copies, certified or otherwise identified to my satisfaction, of the Applicant's organizational documents and such other documents, company records, certificates of officials and other instruments, and have conducted such other investigations of fact and law, as I have deemed necessary or advisable for purposes of this opinion.

In rendering this opinion, I have assumed the genuineness of all signatures, the authenticity of all documents provided to me as originals and the conformity to authentic original documents of all documents provided to me as certified, conformed, or photostatic copies. As to factual matters, I have relied upon representations, certifications, and statements of directors, officers, and employees of the Applicant and certificates of public officials.

Based upon the foregoing, and subject to the qualifications below, to the best of my knowledge, the Applicant has the legal authority to construct and operate the Project (as described in the Application) without violating its bond indenture provisions, articles of organization or operating agreement, or any membership interest covenants, or similar agreements.

The foregoing opinion is limited solely to the Applicant's authority under its organization documents and binding agreements and instruments to construct and operate the Project known to me. I express no opinion as to the applicability or effect of any federal, state or local laws (including rules and regulations promulgated thereunder) that may be applicable to such construction and operation or as to the effect of the foregoing laws on such construction and operation. I am a member of the Bar of the State of California, and I do not purport to express an opinion on any laws other than those of the State of California and the general corporation and limited liability company laws of the State of Delaware.

This opinion is rendered solely to the Oregon Department of Energy and the Oregon Energy Facility Siting Council in connection with the Application. This opinion may not be relied upon or referred to for any other purpose or relied upon by or furnished to any other person without my prior written consent. The opinions expressed herein are given as of the date hereof, and no opinion is expressed with respect to any facts or events that might arise after such date, the effect of the passage of time or any facts or actions taken or any laws hereafter arising or in effect, and I assume no obligation by the issuance of this opinion to update or modify this opinion based on matters arising after the date hereof.

Very truly yours,

Yevgeniy V. Nikulin

ATTACHMENT M-2

Comfort Letter

bp

BP Corporation North America Inc.
4101 Winfield Road
Warrenville, IL 60555

Date: July 31, 2007

Oregon Energy Facility Siting Council
Oregon Department of Energy
Salem, OR

Golden Hills Wind Farm LLC is an indirect wholly-owned subsidiary of BP Corporation North America, Inc. ("BPCNAI"). BPCNAI is a wholly owned subsidiary of BP plc. and has a Standard and Poors (S&P) credit rating of AA+. It is our understanding that Golden Hills Wind Farm LLC may be asked by the State of Oregon Department of Energy to provide a bond or other security (including, but not limited to, a letter of credit or parent company guarantee) as security for certain removal and restoration obligations in connection with the project known as "Golden Hills" ("Project Security"). It is our further understanding that the estimated amount of the Project Security could be Four and One Half Million Dollars ($ 4,500,000.00), inflation adjusted on an annual basis according to the Gross Domestic Product Implicit Price Deflator Index (the "Bond").

We are confident Golden Hills Wind Farm LLC has the financial ability to provide the Project Security.

However, notwithstanding the ability of Golden Hills Wind Farm LLC to provide the Project Security, it is in the best interest and present intention of BPCNAI to ensure that Golden Hills Wind Farm LLC diligently performs its obligations to provide the Project Security. This undertaking is subject to review and acceptance of the terms and conditions of the final contract between the parties and the required bond form.

BP Corporation North America Inc.

By: Suzanne R. Sawada

Title: Corporate Secretary

EXHIBIT N

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

Not Applicable

EXHIBIT O

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

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O.1 INTRODUCTION

OAR 345-021-0010(1)(o) *Information about water use during construction and operation of the proposed facility. The Applicant shall include:*

O.2 USE OF WATER

OAR 345-021-0010(1)(o)(A) *A description of the use of water during construction and operation of the proposed facility.*

Response: During construction of this Project, water will primarily be used for dust control, and making concrete. During operations, water will be provided in the O&M facilities for normal domestic use, such as drinking, showering, etc.

O.3 SOURCES OF WATER

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

Response: During construction, water that has been obtained from a permitted source will be trucked to the site. Approximately 25 million gallons will be needed during the approximately 10 month construction period.

During operations, water for the O&M facilities will be supplied from an exempt well (i.e., one that produces less than 5000 gallons per day) located near the O&M building.

O.4 WATER LOSSES

OAR 345-021-0010(1)(o)(C) *A description of each avenue of water loss or output from the facility site for the uses described in (A), 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.*

Response: Water used for dust control (22.5 million gallons) will evaporate into the atmosphere. Water used for foundations (2.6 million gallons) will remain in the concrete mix. Water used at the O&M facilities (less than 5000 gallons per day) will be discharged to an on site septic system, and ultimately discharged to the soil in a drain field.

O.5 WATER BALANCE DIAGRAM

OAR 345-021-0010(1)(o)(D) *For thermal power plants, a water balance diagram, including the source of cooling water and the estimated consumptive use of cooling water during operation, based on annual average conditions.*

Response: Not applicable.

O.6 PERMITS OR TRANSFERS REQUIRED

OAR 345-021-0010(1)(o)(E) *If the proposed facility would need a groundwater permit, a surface water permit or a water right transfer, an explanation of why no such permit or transfer is required for the construction and operation of the proposed facility.*

Response: Not applicable.

O.7 EVIDENCE IN SUPPORT OF PERMITS OR TRANSFERS

OAR 345-021-0010(1)(o)(F) *If the proposed facility would need a groundwater permit, a surface water permit or a water right transfer, information to support a determination by the Council that the Water Resources Department should issue the permit or transfer of a water use, including information in the form required by the Water Resources Department under OAR Chapter 690, divisions 310 and 380.*

Response: Not applicable.

O.8 OTHER MITIGATION MEASURES

OAR 345-021-0010(1)(o)(G) *A description of proposed actions to mitigate the adverse impacts of water use on affected resources*.

Response: No adverse impacts are expected to result from water use at the Project during construction and operation; therefore, no mitigation measures are proposed.

EXHIBIT P

Fish and Wildlife Habitats and Species
OAR 345-021-0010(1)(p)

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TABLES

FIGURES

ATTACHMENTS

P.1 INTRODUCTION

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

Response: As required by OAR 345-022-0060, the Council issues certificates only when the facility is deemed to be consistent with the Oregon Department of Fish and Wildlife Habitat Mitigation offset forth in Oregon Administrative Rules (OAR) chapter 635, division 415. The information in Exhibit P about fish and wildlife habitat that might be affected by the Project is organized consistently with the Council's application rule, OAR 345-021-0010(1)(p).

P.2 DESCRIPTION OF BIOLOGICAL AND BOTANICAL SURVEYS

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

Response: The following discussion summarizes the biological and botanical surveys performed that support the information in this exhibit, including a discussion of the timing of each survey.

P.2.1.1 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 (ORNHIC, 2007; USFWS, 2007). Existing literature and scientific data were reviewed to determine species distribution and habitat requirements. A biological protocol was prepared to define the Project analysis and survey areas and the species that would be included within Exhibits P and Q of this Application for Site Certification (SCA). The wildlife baseline study protocols are included as Attachment P-1.

Supplementing the information provided by ORNHIC and USFWS, a number of other sources were consulted for information on special status/sensitive species. Frank Isaacs of the Oregon Cooperative Fish and Wildlife Research Unit (Isaacs, F., pers. comm., 2007) was contacted for data on the mid-winter bald eagle surveys conducted along the Columbia River and documentation of any bald eagle nests within 5 miles of the Project area (see Exhibit Q). Keith Kohl was contacted in spring 2004 regarding information on sensitive species surveys and issues and concerns relative to the Biglow Canyon Project and Reference areas, the latter of which the Golden Hills Wind Farm is a part. Existing biological data collected for the permitting of the Klondike I, Klondike II and Klondike

III facilities and the Biglow Canyon project in Sherman County, and the Leaning Juniper I and II projects in Gilliam County were also reviewed (e.g., NWC 2006, Johnson, 2004; Johnson et al., 2003b, 2002a, WEST 2005). This information, along with results from the 2004-2007 studies at the Golden Hills Project, other baseline and monitoring data of other regional and non-regional wind facilities, and site characteristics such as habitat and topography was used to develop an overall risk of impacts assessment (described in the following section).

P.2.1.2 Survey Methods and Relevant Studies

Wildlife surveys were conducted within and near the analysis area from 2001 through 2007. Table P-1 summarizes the Project and reference area field surveys and other studies that are relevant to the descriptions of wildlife occurrence and impacts from the Project.

Table P-1. Summary of Field Surveys

Date	Analysis Area	Description
4/01 – 4/02	Klondike I and II Facility Area	Four-season wildlife and habitat baseline study of the proposed Klondike I and II facility areas, including avian point count surveys
5/01, 6/01	Klondike I and II Facility Area	Raptor nest surveys of Klondike I and II facility and within a 5-mile buffer of Biglow Canyon Facility
2/02 – 2/03	Klondike I Facility	One-year avian and bat fatality monitoring study – Klondike I
3/4 – 3/05	Biglow Canyon Facility and Reference Area (includes Golden Hills Project Area)	Four-season wildlife baseline study of the Biglow Canyon Facility and reference area
4/04	Biglow Canyon Facility and Reference Area (includes Golden Hills Project Area) and approximate 3-mile buffer	Aerial nest survey for raptor nests with 3-mile buffer of Biglow Canyon Facility and reference area, with opportunistic follow up ground surveys
9/05 – 10/05	Biglow Canyon Facility	Nocturnal anabat surveys
??	Klondike III Facility	Four-season wildlife baseline study of the Klondike III Facility
4/06 - 6/06, 4/07 – 6/07	Golden Hills Facility	Vegetation mapping within general Facility area, habitat characterization within habitat analysis area
5/06 – 6/06	Golden Hills Facility	Sensitive species surveys within habitat analysis area
5/07 – 6/07		
6/07	Golden Hills Facility	Rare plant surveys in suitable habitat along project facilities
4/04, 4/07, 6/07	Golden Hills Facility	Aerial nest surveys for raptor nests within 2-mile buffer of Golden Hills Facility
4/06, 6/06		
7/06 – 6/07	Golden Hills Facility	Four-season wildlife baseline study of the Golden Hills Facility and surrounding area

P.2.1.3 Wildlife and Habitat Baseline Study—Klondike I and II

Prior to construction of the Klondike I and II wind facilities, a baseline study was conducted from April 2001 to April 2002. The goal of the avian use surveys was to estimate temporal and spatial use of Klondike I and II project area by birds. Seven circular plots with 0.5-mile radii were established in the project area and surveyed on a weekly basis (Figure P-1). Four of the observation stations are less than 2 miles from turbines in the Project area. All sightings of native birds, upland gamebirds, and mammal, reptile, and amphibian species of concern in and near plots during a 30-minute interval were recorded.

Researchers documented 41 species of birds, 7 species of mammal, and 1 reptile (western rattlesnake) during the study. Sensitive species documented during baseline monitoring included Swainson's hawk (11 nests within 5 miles, 12 birds observed during point counts), ferruginous hawk (2 observed during point count surveys), long-billed curlew (1 observation), golden eagle (1 nest within 5 miles, 3 observed during point count surveys), loggerhead shrike (1 individual), and white-tailed jackrabbit (5 individuals). In total, 1,184 flocks of birds comprising 8,675 individuals were recorded at the 7 survey points. Mean use by all species of birds combined was 17.46 per survey. Avian use of the Klondike areas was highest in winter (34.46 per survey) and lowest in the summer (3.70 per survey), due mainly to Canada goose observations in the winter. The mean number of species observed per survey (avian richness) was highest in the summer (3.14 species per survey) and lowest in the spring (2.10 per survey).

Use of the Klondike area by waterbirds and shorebirds was extremely low. The only species of waterfowl observed was Canada goose; 43 flocks totaling 4,845 individuals were observed flying over the project area over the yearlong survey period. The only gallinaceous game bird observed was ring-necked pheasant, with 31 observations. The only other upland gamebird recorded was mourning dove, with 23 observations totaling 33 individuals. Eight species of raptors were documented during the study.

The raptor species with the greatest number of individuals recorded was rough-legged hawk (83), followed by northern harrier (74), red-tailed hawk (65), American kestrel (32), Swainson's hawk (12), golden eagle (3), prairie falcon (3), and ferruginous hawk (2). Use of the area by all raptors combined was highest in the winter (0.73 per survey) and lowest in the fall (0.49 per survey); raptor use of the area in the spring (0.59 per survey) and summer (0.60 per survey) was similar. Twenty-three species of passerines were observed during surveys. The most abundant passerines were horned lark (2.25 per survey), American goldfinch (0.89 per survey), western meadowlark (0.75 per survey), violet-green swallow (0.33 per survey), common raven (0.21 per survey), cliff swallow (0.16 per survey), and American robin (0.14 per survey).

P.2.1.4 Avian and Bat Fatality Monitoring Study – Klondike I, February 2002 – February 2003

A 1-year mortality monitoring study was conducted at the Klondike I facility between February 2002 and February 2003. Components of the Phase I monitoring study included (1) fatality monitoring of all 16 turbines by means of standardized carcass searches, (2) scavenging and searcher efficiency trials, and (3) a ground survey of existing raptor nests identified during 2001 helicopter surveys within 3 miles of project features. The primary objective of the fatality studies was to estimate the number of avian and bat fatalities attributable to wind turbine collisions for the Klondike I facility. The study was conducted for one full year. The study also included searches of the permanent meteorological (met) tower and reporting of other fatalities that were discovered incidental to conducting other tasks. In total, 13 searches were conducted at each turbine and at the one permanent met tower during the monitoring year.

Boundaries of square plots 140 meters (approximately 459 feet) on a side and centered on the turbine were delineated. It took approximately 45 to 90 minutes to search each turbine, depending on the habitat type.

Out of approximately 221 total searches over the course of the year, 8 fatalities composed of 7 species of birds were found associated with operational wind turbines during the study. No fatalities were found at the guyed met tower during the study. Of the eight turbine fatalities, six were passerines and two were Canada geese. The passerines included European starling, brown-headed cowbird, house wren, golden-crowned kinglet, ruby-crowned kinglet, and dark-eyed junco. No raptor mortalities were found during the study.

Six dead bats were found during the study, including three hoary bats, one silver-haired bat, and two unidentified *Myotis* species that were too decomposed to allow for positive identification. All three hoary bat fatalities were found in September, the silver-haired bat was found in May, and the two unidentified *Myotis* bats were found in June.

P.2.1.5 Wildlife and Habitat Baseline Study – Golden Hills, March 2004 – March 2005, July 2006 – June 2007

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 Project and adjacent areas with similar information collected at nearby and other regional facilities for the purpose of predicting impacts and (2) provide spatial and temporal information on avian use of the site to use with existing information on bird use to aid in siting facilities within the Project.

In 2004, 13 point count stations were established within the Project area and areas to the east of the Project area (Figure P-1). This area served as a reference area to the Biglow Canyon Wind Farm, and these results were reported in 2005 (WEST 2005). In summer 2006, a total of 29 stations were established in the Project area and adjacent area to the east. Several plots for the baseline study for the Klondike I facility also were located within and near the Project (Figure P-1). 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.

Point counts (variable circular plots) were conducted 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 GPS were also noted for species of concern.

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 later flight path, was digitized for describing 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/large bird seen during an instantaneous count, the approximate height above ground and distance to the observer were recorded.

The behavior of each raptor/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/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/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 within the Project area. In 2004 and 2005, a full year of weekly surveys occurred approximately twice a month at each of 13 stations. In 2006 and 2007, a full year of approximately weekly surveys occurred, with a survey conducted a each station twice a month. 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; however, some stations were missed on occasion because of adverse weather conditions (e.g., fog or rain) or active farming practices involving blocked roads or hazardous conditions during cultivation or harvest of crop fields.

In total, 82 avian species were identified during the avian point count surveys in the Golden Hills Project area. (Table P-2). Sixty species were recorded during the 04/05 surveys, and 69 during the 06/07 surveys. More species per survey were documented during the 06/07 surveys (2.9) compared to the 04/05 surveys (2.2), likely due in part to a greater diversity of habitats sampled in 06/07. Overall mean bird use was similar between the 04/05 and 06/07 surveys, and for both surveys, winter showed the highest utilization. In both years, a large proportion of winter use was horned larks. In 04/05, 770 groups comprising 3,938 individuals were observed during the study (Table P-3). In 06/07, 2,440 groups comprising 7,161 individuals were observed (Table P-3). In 04/05, relatively similar numbers of species were observed among seasons (Table P-4). In 06/07, the number of species was lowest in the winter (26), following by fall (40), summer (42) and spring (52, Table P-4).

Horned larks (36% of detections), European starlings (12%), Canada goose (9%), western meadowlarks (8%), and red-winged blackbirds (6%) comprised over 71 percent of the 11,099 individuals detected over the two study periods (2004/05 and 2006/07, Table P-3). The mostly commonly observed raptors included red-tailed hawk (239 individuals) rough-legged hawks (195), northern harrier (104) and American kestrel (103). The order of the five most abundant species was the same for both study periods.

Table P-2. List of avian species observed during fixed-point surveys in the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site[a].

Species/Group	Scientific Name	Area[b]	Species/Group	Scientific Name	Area[b]
American wigeon	*Anas americana*	04-05	American goldfinch	*Carduelis tristis*	B
Canada goose	*Branta canadensis*	B	American pipit	*Anthus rubescens*	B
great blue heron	*Ardea herodias*	04-05	American robin	*Turdus migratorius*	B
greater scaup	*Aythya marila*	06-07	barn swallow	*Hirundo rustica*	B
green-winged teal	*Anas crecca*	04-05	black-billed magpie	*Pica pica*	B
hooded merganser	*Lophodytes cucullatus*	04-05	Brewer's blackbird	*Euphagus cyanocephalus*	B
Mallard	*Anas platyrhynchos*	B	brown-headed cowbird	*Molothrus ater*	04-05
parasitic jaeger	*Stercorarius parasiticus*	06-07	cliff swallow	*Petrochelidon pyrrhonota*	B
sandhill crane	*Grus canadensis*	B	common raven	*Corvus corax*	B
Killdeer	*Charadrius vociferus*	B	dark-eyed junco	*Junco hyemalis*	B
long-billed curlew	*Numenius americanus*	06-07	European starling	*Sturnus vulgaris*	B
Wilson's snipe	*Gallinago Gallinago*	06-07	golden-crowned kinglet	*Regulus satrapa*	B
American coot	*Fulica americana*	06-07	golden-crowned sparrow	*Zonotrichia atricapilla*	04-05
American kestrel	*Falco sparverius*	B	grasshopper sparrow	*Ammodramus savannarum*	B
bald eagle	*Haliaeetus leucocephalus*	06-07	horned lark	*Eremophila alpestris*	B
Cooper's hawk	*Accipiter cooperii*	06-07	house finch	*Carpodacus mexicanus*	B
ferruginous hawk	*Buteo regalis*	06-07	house sparrow	*Passer domesticus*	06-07
golden eagle	*Aquila chrysaetos*	06-07	lapland longspur	*Calcarius lapponicus*	04-05
Merlin	*Falco columbarius*	B	lark sparrow	*Chondestes grammacus*	06-07
northern harrier	*Circus cyaneus*	06-07	Lincoln's sparrow	*Melospiza lincolnii*	04-05
Osprey	*Pandion haliaetus*	B	loggerhead shrike	*Lanius ludovicianus*	B
prairie falcon	*Falco mexicanus*	B	mountain bluebird	*Sialia currucoides*	06-07
red-tailed hawk	*Buteo jamaicensis*	B	N. rough-winged swallow	*Stelgidopteryx serripennis*	B
rough-legged hawk	*Buteo lagopus*	B	northern shrike	*Lanius excubitor*	B
sharp-shinned hawk	*Accipter striatus*	06-07	orange-crowned warbler	*Vermivora celata*	04-05
short-eared owl	*Asio flammeus*	B	red-breasted nuthatch	*Sitta canadensis*	04-05
Swainson's hawk	*Buteo swainsoni*	B	red-winged blackbird	*Agelaius phoeniceus*	B
turkey vulture	*Cathartes aura*	06-07	rock wren	*Salpinctes obsoletus*	B
American crow	*Corvus brachyrhynchos*	B	ruby-crowned kinglet	*Regulus calendula*	06-07

Table P-2. List of avian species observed during fixed-point surveys in the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site.

Species/Group	Scientific Name	Area[b]	Species/Group	Scientific Name	Area[b]
savannah sparrow	*Passerculus sandwichensis*	B	rusty blackbird	*Euphagus carolinus*	04-05
Say's phoebe	*Sayornis saya*	B	ring-necked pheasant	*Phasianus colchicus*	B
song sparrow	*Melospiza melodia*	B	mourning dove	*Zenaida macroura*	B
spotted towhee	*Pipilo maculatus*	04-05	rock pigeon	*Columba livia*	B
Townsend's solitaire	*Myadestes townsendi*	06-07	common nighthawk	*Chordeiles minor*	06-07
tree swallow	*Tachycineta bicolor*	06-07	downy woodpecker	*Picoides pubescens*	06-07
varied thrush	*Ixoreus naevius*	04-05	northern flicker	*Colaptes auratus*	B
vesper sparrow	*Pooecetes gramineus*	B	Vaux's swift	*Chaetura vauxi*	B
violet-green swallow	*Tachycineta thalassina*	06-07	unidentified gull		06-07
western kingbird	*Tyrannus verticalis*	B	unidentified swan		06-07
western meadowlark	*Sturnella neglecta*	B	unidentified buteo		B
white-crowned sparrow	*Zonotrichia leucophrys*	B	unidentified falcon		06-07
yellow-rumped warbler	*Dendroica coronata*	B	unidentified raptor		06-07
California quail	*Callipepla californica*	B	unidentified passerine		B
chukar	*Alectoris chukar*	B	unidentified sparrow		B
gray partridge	*Perdix perdix*	06-07	unidentified swallow		06-07

[a] All species observed, even those seen in the last ten minutes of the survey.

[b] The year that the species was observed: B = Both (A04-05, A06-07

Table P-3. Avian Species Observed during Fixed-Point Surveys (March 2004, to March 2005, July 2006 to June 2007) in the Golden Hills Project Area and surrounding areas

	04/05		06/07		Grand Total	
Species/Group	# obs.	# groups	# obs.	# groups	# obs.	# groups
Waterbirds/Waterfowl	**445**	**13**	**660**	**25**	**1105**	**38**
American coot	0	0	1	1	1	1
American wigeon	1	1	0	0	1	1
Canada goose	343	5	642	14	985	19
great blue heron	1	1	0	0	1	1
greater scaup	0	0	1	1	1	1
green-winged teal	1	1	0	0	1	1
hooded merganser	2	2	0	0	2	2
Mallard	24	2	11	4	35	6
parasitic jaeger	0	0	1	1	1	1
sandhill crane	73	1	1	1	74	2
unidentified gull	0	0	2	2	2	2
unidentified swan	0	0	1	1	1	1
Shorebirds	**3**	**2**	**5**	**5**	**8**	**7**
killdeer	3	2	1	1	4	3
long-billed curlew	0	0	3	3	3	3
Wilson's snipe	0	0	1	1	1	1
Raptors	**103**	**95**	**696**	**637**	**799**	**732**
Accipiters	*1*	*1*	*15*	*15*	*16*	*16*
Cooper's hawk	0	0	5	5	5	5
sharp-shinned hawk	1	1	10	10	11	11
Buteos	*71*	*68*	*452*	*412*	*523*	*480*
ferruginous hawk	0	0	4	4	4	4
red-tailed hawk	34	34	205	184	239	218
rough-legged hawk	25	24	170	162	195	186
Swainson's hawk	9	7	29	22	38	29
unidentified buteo	3	3	44	40	47	43
Northern Harrier						
northern harrier	9	9	95	94	104	103
Eagles	*0*	*0*	*10*	*10*	*10*	*10*
bald eagle	0	0	1	1	1	1
golden eagle	0	0	9	9	9	9
Falcons	*18*	*15*	*101*	*89*	*119*	*104*
American kestrel	15	12	88	76	103	88
merlin	0	0	4	4	4	4
prairie falcon	3	3	8	8	11	11
unidentified falcon	0	0	1	1	1	1
Owls						
short-eared owl	0	0	2	1	2	1

Table P-3. Avian species observed while conducting fixed-point surveys in the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site. [a]

	04/05		06/07		Grand Total	
Species/Group	# obs.	# groups	# obs.	# groups	# obs.	# groups
Other Raptors	*0*	*0*	*6*	*5*	*6*	*5*
osprey	0	0	1	1	1	1
unidentified raptor	0	0	5	4	5	4
Vultures						
turkey vulture	4	2	15	11	19	13
Passerines	**3183**	**601**	**5439**	**1595**	**8622**	**2196**
American crow	0	0	8	5	8	5
American goldfinch	7	4	73	15	80	19
American pipit	166	11	1	1	167	12
American robin	10	5	37	16	47	21
barn swallow	38	11	39	15	77	26
black-billed magpie	1	1	11	7	12	8
Brewer's blackbird	74	11	203	14	277	25
brown-headed cowbird	8	2	0	0	8	2
cliff swallow	16	3	8	4	24	7
common raven	72	50	252	170	324	220
dark-eyed junco	20	3	3	3	23	6
European starling	672	24	634	74	1306	98
golden-crowned kinglet	1	1	1	1	2	2
golden-crowned sparrow	1	1	0	0	1	1
grasshopper sparrow	7	6	3	3	10	9
horned lark	1236	241	2786	663	4022	904
house finch	22	5	97	20	119	25
house sparrow	0	0	4	1	4	1
lapland longspur	34	5	0	0	34	5
Lark sparrow	0	0	1	1	1	1
Lincoln's sparrow	1	1	0	0	1	1
loggerhead shrike	8	7	11	11	19	18
mountain bluebird	0	0	3	2	3	2
northern rough-winged swallow	13	2	1	1	14	3
northern shrike	2	2	2	2	4	4
orange-crowned warbler	1	1	0	0	1	1
red-breasted nuthatch	1	1	0	0	1	1
red-winged blackbird	312	21	330	45	642	66
Rock wren	2	1	1	1	3	2
ruby-crowned kinglet	0	0	1	1	1	1
rusty blackbird	11	2	0	0	11	2
savannah sparrow	11	6	12	7	23	13
Say's phoebe	29	24	6	5	35	29
song sparrow	36	16	7	6	43	22

Table P-3. Avian species observed while conducting fixed-point surveys in the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site. [a]

	04/05		06/07		Grand Total	
Species/Group	# obs.	# groups	# obs.	# groups	# obs.	# groups
spotted towhee	4	4	0	0	4	4
Townsend's solitaire	0	0	1	1	1	1
Tree swallow	0	0	8	5	8	5
unidentified passerine	38	13	39	19	77	32
unidentified sparrow	4	2	1	1	5	3
unidentified swallow	0	0	35	17	35	17
varied thrush	1	1	0	0	1	1
vesper sparrow	2	2	11	11	13	13
violet-green swallow	0	0	97	7	97	7
western kingbird	4	3	7	5	11	8
western meadowlark	269	100	665	431	934	531
white-crowned sparrow	41	7	33	3	74	10
yellow-rumped warbler	8	1	7	1	15	2
Upland Gamebirds	**108**	**31**	**212**	**128**	**320**	**159**
California quail	34	5	27	18	61	23
chukar	37	10	54	13	91	23
gray partridge	0	0	7	1	7	1
Ring-necked pheasant	37	16	124	96	161	112
Doves/Pigeons	**91**	**25**	**140**	**44**	**231**	**69**
mourning dove	65	20	50	28	115	48
Rock pigeon	26	5	90	16	116	21
Other Birds	**5**	**3**	**9**	**6**	**14**	**9**
common nighthawk	0	0	3	3	3	3
downy woodpecker	0	0	1	1	1	1
northern flicker	2	2	1	1	3	3
Vaux's swift	3	1	4	1	7	2
Overall Total	**3938**	**770**	**7161**	**2440**	**11099**	**3210**

Table P-4. Mean use, mean # species/survey, total number of species, and total number of fixed-point surveys conducted by season and overall for the Golden Hills Project site and the Reference area on the Biglow Canyon Project site.

Season	Number of Visits	Mean Use[a]	# Species/ Survey	# Species	# Surveys Conducted
A06/07					
Spring	6	11.322	4.086	52	174
Summer	5	7.614	3.137	42	135
Fall	6	9.664	2.116	40	172
Winter	4	23.775	2.141	26	90
Overall	21	12.337	2.927	71	571
A04/05					
Season	Number of Visits	Mean Use[a]	# Species/ Survey	# Species	# Surveys Conducted
Spring	6	7.538	2.515	25	69
Summer	3	6.297	1.900	23	37
Fall	4	9.327	1.962	27	52
Winter	7	21.726	2.102	30	83
Overall	20	12.676	2.167	47	241
Combined					
Season	Number of Visits	Mean Use[a]	# Species/ Survey		# Surveys Conducted
Spring	12	9.430	3.301		243
Summer	8	6.955	2.518		172
Fall	10	9.496	2.039		224
Winter	11	22.751	2.121		173
Overall	41	12.507	2.547		812

For this section, we discuss the combined data from the 04/05 and 06/07 surveys, since the average of the two years of data provide a better representation of the expected survey results on a longer term basis.

In spring, at the Project area and adjacent areas, passerines were the most abundant group (7.989 per survey), followed by raptors (0.903), doves (0.249), and upland gamebirds (0.247, Table P-5). Similarly, passerines composed 84.7 percent of all birds observed, raptors (9.6), doves (2.6 percent), and upland gamebirds (2.6, Table P-5). Avian groups most frequently occurring were passerines (94.6 percent of surveys), raptors (48 percent), and upland gamebirds (18.84 percent). Species with the highest use in spring were horned lark (2.78 per survey), western meadowlark (1.94), European starling (0.94), red-winged blackbird (0.75) and violet-green swallow (0.52, Table P-6). Rough-legged hawk was the most abundant raptor species in the spring (0.31 per survey), followed by red-tailed hawk (0.24) northern harrier (0.15), American kestrel (0.07) and Swainson's hawk (0.05, Table P-6). Individual species most frequently observed during spring surveys were horned lark (79.0 percent of surveys), western meadowlark (70.1 percent), common raven (22.6), rough-legged hawk (20.5), red-tailed hawk (16.9), ring-necked pheasant (15.6), northern harrier (13.8), European staring (11.4), Say's phoebe (8.2 percent), American kestrel (7.4), and red-winged blackbird (6.5, Table P-7).

In summer, passerines were the most abundant group (5.61 per survey), followed by raptors (0.56), doves (0.40) and upland gamebirds (0.35, Table P-5). Similarly, passerines composed 80.6 percent of all birds observed, raptors composed 8.0 percent, doves 5.7 percent, and upland gamebirds composed 5.0 percent. Avian groups most frequently occurring were passerines (85.7 percent of surveys), raptors (30.1 percent), and upland gamebirds (18.1 percent, Table P-5). Species with the highest use in summer were horned lark (2.2 per survey), western meadowlark (0.91), red-winged blackbird (0.67), barn swallow (0.40), and European starling (0.37, Table P-6). American kestrel was the most abundant raptor species in the summer (0.23 per survey), followed by northern harrier (0.16), red-tailed hawk (0.14), and Swainson's hawk (0.05, Table P-6). Individual species most frequently observed during summer surveys were horned lark (58.6 percent of surveys), western meadowlark (41.2), American kestrel (13.9 percent), ring-necked pheasant (13.4), northern harrier (12.2), barn swallow (10.1) and red-tailed hawk (9.6 percent, Table P-7).

In fall, passerines were the most abundant group (8.17 per survey), followed by upland gamebirds (0.51), raptors (0.38), and doves (0.24, Table P-5). Similarly, passerines composed 86.1 percent of all birds observed, upland gamebirds composed 5.4 percent, raptors composed 4.0 percent, and doves composed 2.6 percent (Table P-5). Avian groups most frequently occurring were passerines (86.3 percent of surveys), raptors (22.1 percent), and upland gamebirds (8.7 percent, Table P-5). Species with the highest use in fall were horned lark (4.60/survey), European starling (0.78), western meadowlark (0.61), Brewer's blackbird (0.53), and red-winged blackbird (0.42, Table P-6). Red-tailed hawk was the most abundant raptor species in the fall (0.18 per survey), followed by American kestrel (0.12), northern harrier (0.08), and rough-legged hawk (0.05, Table P-6). Individual species most frequently observed during fall surveys were horned lark (66.8

percent of surveys), western meadowlark (24.1 percent), common raven (18.1 percent), red-tailed hawk (12.4 percent), and American kestrel (9.3 percent, Table P-7).

In winter, passerines were the most abundant group (17.70 per survey), followed by waterbirds/waterfowl (3.95), raptors (0.44), and upland gamebirds (0.33, Table P-5). Similarly, passerines composed 77.8 percent of all birds observed, followed by waterbirds/waterfowl (17.3 percent), raptors (2.0 percent), and upland gamebirds (1.5 percent, Table P-5). Avian groups most frequently occurring were passerines (89.0 percent of surveys), raptors (34.2 percent), waterbirds/waterfowl (7.9 percent), and upland gamebirds (7.5 percent; Table P-5). Species with the highest use in winter were horned lark (9.46 per survey), European starling (3.99), Canada goose (3.78), red-winged blackbird (2.14), and American pipit (1.82, Table P-6). Rough-legged hawk was the most abundant raptor species in the winter (0.19 per survey), followed by red-tailed hawk (0.10), northern harrier (0.07), and American kestrel (0.04, Table P-6). Individual species most frequently observed during winter surveys were horned lark (68.6 percent of surveys), common raven (21.4 percent), western meadowlark (20.9 percent), rough-legged hawk (16.6), European starling (11.1 percent), and red-tailed hawk (8.5 percent, Table P-7).

Raptor use by station from the 06/07 study ranged from 0.4 to 1.7 per survey (Figure P-2a). The highest use occurred at stations SP and V which are both outside the project area and near the John Day River (Figure P-1, P-2). In general, the results of the 2004-2005 surveys were similar to the results of the 2006/07 surveys with the exception of raptors. Raptor use was higher in the 06/07 surveys (Table P-3). The primary species influencing these differences was rough-legged hawks. Rough-legged hawks were much more abundant in the winter and early spring 2006/07 than on 04/05, and other species such as red-tailed hawk and American kestrel showed higher use than the previous year.

Table P-5. Mean use, percent composition and percent frequency of occurrence for avian groups by season for the Golden Hills Project Site and the Reference area.

Combined												
Species/Group	Mean Use (#/20 min. survey)				Group Composition (%)				% Frequency			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
Waterbirds/Waterfowl	0.020	0.024	0.132	3.946	0.21	0.35	1.39	17.34	1.44	0.69	0.57	7.89
Shorebirds	0.020	0.003	0.003	0.000	0.21	0.05	0.03	0.00	1.27	0.34	0.29	0.00
Raptors	0.903	0.556	0.379	0.443	9.57	7.99	3.99	1.95	48.00	30.13	22.11	34.20
Accipiters	0.023	0.000	0.052	0.009	0.24	0.00	0.55	0.04	2.30	0.00	4.62	0.86
Buteos	0.629	0.168	0.225	0.296	6.67	2.41	2.37	1.30	36.42	12.02	16.29	24.62
Northern Harriers	0.153	0.078	0.040	0.068	1.62	1.12	0.43	0.30	13.81	6.08	3.18	6.12
Eagles	0.011	0.007	0.017	0.026	0.12	0.10	0.18	0.11	1.15	0.69	1.15	1.72
Falcons	0.077	0.234	0.076	0.062	0.81	3.36	0.80	0.27	7.66	14.58	6.13	5.57
Owls	0.000	0.021	0.000	0.000	0.00	0.30	0.00	0.00	0.00	1.05	0.00	0.00
Other Raptors	0.017	0.000	0.000	0.000	0.18	0.00	0.00	0.00	1.72	0.00	0.00	0.00
Vultures	0.018	0.063	0.003	0.000	0.20	0.90	0.03	0.00	1.56	2.66	0.30	0.00
Passerines	7.989	5.605	8.178	17.697	84.71	80.59	86.12	77.79	94.57	85.69	86.31	88.99
Upland Gamebirds	0.247	0.350	0.510	0.333	2.62	5.03	5.38	1.46	18.84	18.09	8.75	7.50
Doves	0.249	0.399	0.243	0.326	2.64	5.74	2.55	1.43	6.25	11.66	8.10	4.81
Other Birds	0.003	0.017	0.050	0.006	0.03	0.25	0.53	0.03	0.29	1.74	2.22	0.60
Overall	9.430	6.955	9.496	22.751	100.00	100.00	100.00	100.00				

Table P-6. Avian species observed within 800m of the observer and estimated mean use (#/20-minute survey) for large and small birds on the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site.

Large Birds							
Spring		Summer		Fall		Winter	
Species/Group	Use	Species/Group	Use	Species/Group	Use	Species/Group	Use
common raven	0.362	chukar	0.234	common raven	0.339	Canada goose	3.783
rough-legged hawk	0.310	American kestrel	0.227	ring-necked pheasant	0.306	common raven	0.334
red-tailed hawk	0.239	northern harrier	0.156	Canada goose	0.264	mallard	0.290
ring-necked pheasant	0.173	ring-necked pheasant	0.152	red-tailed hawk	0.177	chukar	0.219
northern harrier	0.153	red-tailed hawk	0.140	chukar	0.155	rough-legged hawk	0.193
American kestrel	0.074	common raven	0.123	American kestrel	0.117	California quail	0.160
California quail	0.057	turkey vulture	0.063	northern harrier	0.081	red-tailed hawk	0.103
Swainson's hawk	0.052	California quail	0.057	California quail	0.050	northern harrier	0.068
Chukar	0.045	gray partridge	0.048	rough-legged hawk	0.048	ring-necked pheasant	0.063
Killdeer	0.028	Swainson's hawk	0.048	American crow	0.047	black-billed magpie	0.043
ferruginous hawk	0.023	mallard	0.034	sharp-shinned hawk	0.040	American kestrel	0.043
Mallard	0.023	short-eared owl	0.021	prairie falcon	0.024	golden eagle	0.026
turkey vulture	0.018	golden eagle	0.007	black-billed magpie	0.023	prairie falcon	0.015
sharp-shinned hawk	0.017	killdeer	0.007	golden eagle	0.017	American wigeon	0.012
unidentified buteo	0.016	merlin	0.007	Cooper's hawk	0.012	great blue heron	0.012
black-billed magpie	0.011	parasitic jaeger	0.007	merlin	0.012	green-winged teal	0.012
golden eagle	0.011	prairie falcon	0.007	turkey vulture	0.006	Cooper's hawk	0.009
long-billed curlew	0.011	unidentified buteo	0.007	Wilson's snipe	0.006	merlin	0.009
unidentified raptor	0.011	unidentified gull	0.007				
American coot	0.006						
Cooper's hawk	0.006						
greater scaup	0.006						
Osprey	0.006						
prairie falcon	0.006						

Table P-6 (Continued). Avian species observed within 800m of the observer and estimated mean use (#/20-minute survey) for large and small birds on the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site.

Spring Species/Group	Use	Summer Species/Group	Use	Fall Species/Group	Use	Winter Species/Group	Use
Small Birds							
horned lark	2.779	horned lark	2.190	horned lark	4.604	horned lark	9.461
western meadowlark	1.942	western meadowlark	0.911	European starling	0.780	European starling	3.992
European starling	0.936	red-winged blackbird	0.674	western meadowlark	0.613	red-winged blackbird	2.137
red-winged blackbird	0.751	barn swallow	0.400	Brewer's blackbird	0.530	American pipit	1.821
violet-green swallow	0.523	European starling	0.369	red-winged blackbird	0.422	western meadowlark	0.574
rock pigeon	0.207	northern rough-winged swallow	0.346	unidentified passerine	0.365	American goldfinch	0.465
American goldfinch	0.201	mourning dove	0.334	house finch	0.225	lapland longspur	0.345
rusty blackbird	0.146	unidentified passerine	0.166	American pipit	0.173	Brewer's blackbird	0.345
mourning dove	0.146	rock pigeon	0.131	mourning dove	0.129	white-crowned sparrow	0.243
white-crowned sparrow	0.125	Brewer's blackbird	0.120	rock pigeon	0.113	rock pigeon	0.192
unidentified swallow	0.109	unidentified swallow	0.118	white-crowned sparrow	0.105	house finch	0.166
American robin	0.101	song sparrow	0.088	unidentified sparrow	0.077	unidentified passerine	0.161
Say's phoebe	0.100	western kingbird	0.072	savannah sparrow	0.064	mourning dove	0.134
unidentified passerine	0.092	loggerhead shrike	0.062	barn swallow	0.042	song sparrow	0.107
song sparrow	0.079	cliff swallow	0.059	Vaux's swift	0.041	Say's phoebe	0.055
barn swallow	0.069	savannah sparrow	0.056	violet-green swallow	0.030	American robin	0.045
Brewer's blackbird	0.056	grasshopper sparrow	0.052	golden-crowned sparrow	0.019	spotted towhee	0.026
savannah sparrow	0.042	house finch	0.048	Lincoln's sparrow	0.019	dark-eyed junco	0.020
grasshopper sparrow	0.041	vesper sparrow	0.038	northern flicker	0.019	loggerhead shrike	0.020
tree swallow	0.040	American goldfinch	0.035	orange-crowned warbler	0.019	northern flicker	0.012
yellow-rumped warbler	0.040	Say's phoebe	0.034	red-breasted nuthatch	0.019	northern shrike	0.011
vesper sparrow	0.023	common nighthawk	0.028	spotted towhee	0.019		
loggerhead shrike	0.013	house sparrow	0.028	song sparrow	0.018		
American pipit	0.006	American robin	0.017	American goldfinch	0.017		
cliff swallow	0.006	downy woodpecker	0.007	mountain bluebird	0.017		
lark sparrow	0.006	golden-crowned kinglet	0.007	dark-eyed junco	0.013		

Table P-6 (Continued). Avian species observed within 800m of the observer and estimated mean use (#/20-minute survey) for large and small birds on the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site.

Small Birds							
Spring		Summer		Fall		Winter	
Species/Group	Use	Species/Group	Use	Species/Group	Use	Species/Group	Use
northern flicker	0.006	tree swallow	0.007	vesper sparrow	0.012		
northern rough-winged swallow	0.006	unidentified sparrow	0.007	western kingbird	0.012		
rock wren	0.006	violet-green swallow	0.007	American robin	0.006		
ruby-crowned kinglet	0.006			loggerhead shrike	0.006		
Townsend's solitaire	0.006			northern shrike	0.006		

Table P-7. Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds on the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site.

Large Birds							
Spring		Summer		Fall		Winter	
Species/Group	% freq	Species/Group	% freq	Species/Group	% freq	Species/Group	% freq
common raven	22.56	American kestrel	13.89	common raven	18.18	common raven	21.36
rough-legged hawk	20.54	ring-necked pheasant	13.42	red-tailed hawk	12.36	rough-legged hawk	16.61
red-tailed hawk	16.90	northern harrier	12.16	American kestrel	9.32	red-tailed hawk	8.45
ring-necked pheasant	15.56	red-tailed hawk	9.60	northern harrier	6.36	northern harrier	6.12
northern harrier	13.81	common raven	8.95	ring-necked pheasant	6.34	Canada goose	5.99
American kestrel	7.37	Swainson's hawk	4.14	rough-legged hawk	4.51	chukar	5.00
California quail	4.02	California quail	3.64	sharp-shinned hawk	3.45	American kestrel	4.27
Swainson's hawk	3.81	chukar	3.12	American crow	2.34	ring-necked pheasant	3.31
chukar	2.99	turkey vulture	2.66	California quail	2.12	mallard	2.62
ferruginous hawk	2.30	short-eared owl	1.05	prairie falcon	1.77	black-billed magpie	1.72
sharp-shinned hawk	1.72	golden eagle	0.69	black-billed magpie	1.72	golden eagle	1.72
unidentified buteo	1.62	gray partridge	0.69	chukar	1.25	California quail	1.69
turkey vulture	1.56	killdeer	0.69	Cooper's hawk	1.17	prairie falcon	1.46
killdeer	1.39	mallard	0.69	merlin	1.17	American wigeon	1.19
black-billed magpie	1.15	merlin	0.69	Canada goose	1.15	great blue heron	1.19
Golden eagle	1.15	parasitic jaeger	0.69	golden eagle	1.15	green-winged teal	1.19
long-billed curlew	1.15	prairie falcon	0.69	turkey vulture	0.60	Cooper's hawk	0.86
mallard	1.15	unidentified buteo	0.69	Wilson's snipe	0.57	merlin	0.86
unidentified raptor	1.15	unidentified gull	0.69				
American coot	0.57						
Cooper's hawk	0.57						
greater scaup	0.57						
osprey	0.57						
prairie falcon	0.57						
unidentified swan	0.57						

Table P-7 (Continued). Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds on the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site.

Small Birds							
Spring		Summer		Fall		Winter	
Species/Group	% freq	Species/Group	% freq	Species/Group	% freq	Species/Group	% freq
horned lark	79.00	horned lark	58.59	horned lark	66.80	horned lark	68.62
western meadowlark	70.06	western meadowlark	41.19	western meadowlark	24.14	western meadowlark	20.98
European starling	11.41	barn swallow	10.12	American pipit	7.69	European starling	11.05
Say's phoebe	8.24	mourning dove	9.94	unidentified passerine	5.77	red-winged blackbird	7.29
red-winged blackbird	6.52	unidentified passerine	9.36	red-winged blackbird	5.68	unidentified passerine	4.91
American goldfinch	5.75	unidentified swallow	7.62	European starling	4.82	lapland longspur	4.76
mourning dove	5.39	red-winged blackbird	7.18	mourning dove	4.73	American goldfinch	4.22
song sparrow	3.83	European starling	7.12	house finch	4.71	Say's phoebe	4.05
unidentified swallow	3.45	Brewer's blackbird	6.94	unidentified sparrow	3.85	song sparrow	3.78
American robin	3.34	western kingbird	5.62	rock pigeon	3.37	American pipit	3.72
barn swallow	3.30	northern rough-winged swallow	5.34	savannah sparrow	3.07	mourning dove	3.07
unidentified passerine	2.87	loggerhead shrike	4.92	Brewer's blackbird	2.51	spotted towhee	2.62
violet-green swallow	2.87	vesper sparrow	3.81	white-crowned sparrow	2.21	white-crowned sparrow	2.62
grasshopper sparrow	2.80	rock pigeon	3.45	golden-crowned sparrow	1.92	Brewer's blackbird	2.14
rusty blackbird	2.67	Say's phoebe	3.36	Lincoln's sparrow	1.92	dark-eyed junco	2.00
rock pigeon	2.30	song sparrow	3.36	northern flicker	1.92	loggerhead shrike	2.00
tree swallow	2.30	common nighthawk	2.79	orange-crowned warbler	1.92	rock pigeon	1.74
vesper sparrow	2.30	savannah sparrow	2.78	red-breasted nuthatch	1.92	American robin	1.59
savannah sparrow	2.26	cliff swallow	2.43	spotted towhee	1.92	house finch	1.46
white-crowned sparrow	1.86	grasshopper sparrow	2.42	song sparrow	1.54	northern flicker	1.19
Brewer's blackbird	1.33	house finch	2.08	dark-eyed junco	1.26	northern shrike	1.14
loggerhead shrike	1.27	American robin	1.74	Vaux's swift	1.26		
American pipit	0.57	American goldfinch	1.73	vesper sparrow	1.19		
cliff swallow	0.57	downy woodpecker	0.69	mountain bluebird	1.15		
lark sparrow	0.57	golden-crowned kinglet	0.69	barn swallow	0.60		

Table P-7 (Continued). Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds on the Golden Hills Project site and in the Reference area on the Biglow Canyon Project site.

Small Birds							
Spring		Summer		Fall		Winter	
Species/Group	% freq	Species/Group	% freq	Species/Group	% freq	Species/Group	% freq
northern flicker	0.57	house sparrow	0.69	violet-green swallow	0.60		
northern rough-winged swallow	0.57	tree swallow	0.69	western kingbird	0.60		
rock wren	0.57	unidentified sparrow	0.69	American goldfinch	0.57		
ruby-crowned kinglet	0.57	violet-green swallow	0.69	American robin	0.57		
Townsend's solitaire	0.57			loggerhead shrike	0.57		
yellow-rumped warbler	0.57			northern shrike	0.57		

P.2.1.6 Raptor Nest Surveys – Biglow Canyon Wind Farm, April 2004

Searches were conducted for raptor, corvid, and large bird nests within 3 miles of the Biglow Canyon Wind Farm and reference area; this area was extended along the Columbia and John Day Rivers to cover suitable habitat for peregrine falcons. The survey area for the reference area includes the Golden Hills project area. Surveys were conducted from a helicopter with one observer on April 20 and 21, 2004. Search paths were recorded with a real-time differentially corrected Trimble Trimflight III Global Positioning System (GPS) at 5-second intervals, with coordinates as Universal Transverse Mercator (UTM) NAD27.

Raptor nest surveys were scheduled after most species of raptor had finished courtship and were incubating eggs or brooding young. Surveys were also scheduled just prior to the onset of leaf-out to increase the visibility of raptor nests within deciduous tree habitats. Nest searches were conducted by searching habitat suitable for most above-ground nesting species, such as cottonwood, ponderosa pine, tall shrubs, and cliffs or rocky outcrops. During surveys, the helicopter was flown at an altitude of tree-top level to approximately 76 meters (250 feet) above ground. If a nest was observed, the helicopter was moved to a position where nest status and species present could be determined. Efforts were made to minimize disturbance to breeding raptors, including keeping the helicopter a maximum distance from the nest at which the species could be identified. Those distances varied, depending upon nest location and wind conditions. Data recorded for each nest location included species occupying the nest, nest status (inactive, bird incubating, young present, eggs present, adult present, unknown, or other), nest substrate (pine, oak, cottonwood, juniper, shrub, rocky outcrop, cliff, or power line), number of young present, time and date of observation, and the nest location (recorded with both a handheld GPS and the differentially corrected unit).

Twenty-seven active nests were located within 2 miles of the Project area, including 16 red-tailed hawk, 5 Swainson's hawk, 5 great-horned owl, 1 common raven (Table P-8, Figure P-3). The nests were more concentrated along some of the draws and canyons in the southern portion of the Project, including Grass Valley Canyon, Bull Canyon, Barnum Canyon and Demoss Canyon. Nest density in this 100-square mile area is 0.27 nests per square mile.

P.2.1.7 Raptor Nest Surveys – Golden Hills Project Area, April and May 2007

Searches were conducted for raptor, corvid, and large bird nests within 2 miles of the Project area and Biglow reference area to the east (Golden Hills "Phase II"; Figure P-4). The survey area for the reference area includes the Golden Hills Project. Surveys were conducted from a helicopter with one observer on April 20 and 21, 2004. Search paths were recorded with a real-time differentially corrected Trimble Trimflight III Global Positioning System (GPS) at 5-second intervals, with coordinates as Universal Transverse Mercator (UTM) NAD27.

Raptor nest surveys were scheduled after most species of raptor had finished courtship and were incubating eggs or brooding young. Surveys were also scheduled just prior to the onset of leaf-out to increase the visibility of raptor nests within deciduous tree habitats. Nest searches were conducted by searching habitat suitable for most above-ground nesting species, such as cottonwood, ponderosa pine, tall shrubs, and cliffs or rocky outcrops. During surveys, the helicopter was flown at an altitude of tree-top level to approximately 76 meters (250 feet) above ground. If a nest was observed, the helicopter was moved to a position where nest status and species present could be determined. Efforts were made to minimize disturbance to breeding raptors, including keeping the helicopter a maximum distance from the nest at which the species could be identified. Those distances varied, depending upon nest location and wind conditions. Data recorded for each nest location included species occupying the nest, nest status (inactive, bird incubating, young present, eggs present, adult present, unknown, or other), nest substrate (pine, oak, cottonwood, juniper, shrub, rocky outcrop, cliff, or power line), number of young present, time and date of observation, and the nest location (recorded with both a handheld GPS and the differentially corrected unit).

Thirty-one active nests were located within 2-miles of the Project area, including 16 red-tailed hawk, 5 Swainson hawk, 5 great-horned owl, 1 common raven Table P-8, Figure P-4). Nest density in this 138 square mile area is 0.25 nests per square mile.

Table P-8. Results of Raptor Nest Surveys

	2004		2007	
	No. of Nests	**Density (no./mi.^{2})**	**No. of Nests**	**Density (no./mi.^{2})**
American Kestrel	0	0	0	0
Red-Tailed Hawk	16	0.14	19	0.16
Swainson’s Hawk	5	0.04	5	0.04
Great Horned Owl	5	0.04	6	0.05
Golden Eagle	0	0.000	0	0.00
Prairie Falcon	0	0.000	0	0.00
Common Raven	1	0.01	1	0.01
Total Number of Active Nests	27	0.22	31	0.26
Total Number of Raptor Nests	26	0.21	30	0.25

P.2.1.8 General Vegetation Mapping and Habitat Categorization Surveys, May – June 2006, April – June 2007

A general habitat map was developed by delineating habitats (cultivated and noncultivated areas) using digital orthoquads (DOQs). This map was then ground-truthed to separate native habitats from CRP grasslands, and to map other features such as trees and water bodies. This general habitat map was used to delineate areas that needed to be sampled for sensitive wildlife, and to aid in characterizing habitat types, mapping codes, and categorization according to the habitat definitions of the Oregon Department of Fish and Wildlife (ODFW), which are used as a foundation for their mitigation standards. The mapped boundaries of each habitat type were then digitized using ArcView™.

All fish and wildlife habitat types within 750 feet of the proposed development corridors and within 1000 feet of other facilities were analyzed and mapped according to the ODFW Fish and Wildlife Habitat Mitigation Policy. Ground visits during initial habitat mapping in spring 2006 and during the sensitive species surveys in May and June 2006 and 2007 allowed for accurate classification of each polygon within this analysis area. Field notes included dominant vegetation and habitat quality (structure, age, presence/absence of invasive vegetation, evidence for historical disturbance). Habitat categorization (Categories 1 – 6) followed the ODFW habitat mitigation goals and standards defined in OAR 635-415-0025. The habitat types and categories were generally consistent with those identified for the Klondike III and Biglow Canyon sites Figures P-5 through P-10 illustrate the habitat types and categories found within the analysis area.

Land coverages in the habitat analysis area consist of approximately 83.4% cultivated agriculture (dryland wheat), 10.5% shrub-steppe/grassland, 3.4% Conservation Reserve Program (CRP) grassland, 1.5% developed, and 1.1% riparian tree, riparian- intermittent stream (IS), upland tree, and Conservation Reserve Enhancement Program (CREP). The composition of the lease area is similar to Biglow Canyon and similarly has more cultivated agriculture than other regional projects (Table P-10).

Table P-10. Comparison of approximate percent composition of general habitats associated with several Pacific Northwest windpower projects. AG=cultivated agriculture; UT/RT/RI/IS/CREP=upland and riparian trees, riparian and intermittent stream, Conservation Reserve Enhancement Program; SS/GR=shrub-steppe and native grasslands; CRP=Conservation Reserve Program grassland; DEV=developed; and WA=water.

Project Area	AG	UT/RT/RI/IS/CREP	SS/GR	CRP	DEV	WA
Golden Hills, OR	83.4	1.1	10.5	3.4	1.5	0.0
Biglow Canyon, OR	85.2	0.3	8.5	5.4	0.5	0.1
Stateline, OR&WA	41.5	0.8	43.7	14.1	0.1	0.1
Stateline REF, OR	79.0	0.7	11.4	8.8	0.2	0.1
Nine Canyon, WA	71.1	0.1	5.8	32.1	0.4	0.0
Condon, OR	61.0	0.1	14.2	22.3	2.5	0.0
Hopkins Ridge, WA	52.0	4.0	39.0	5.0	0.5	0.0

P.3 IDENTIFICATION AND DESCRIPTION OF ALL HABITAT WITHIN THE ANALYSIS AREA

OAR 345-021-0010(1)(p)(B) *Identification of all fish and wildlife habitat in the analysis area, classified by the habitat categories as set forth in OAR 635-415-0025 and a description of the characteristics and condition of that habitat in the analysis area.*

Response:

P.3.1.1 Oregon Department of Fish and Wildlife (ODFW) Habitat Categories and Mitigation Standards

Six habitat categories are defined by ODFW and recommendations for mitigation goals and actions are provided for each (OAR 635-415-0025).

P.3.1.2 Habitat Category 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." OAR 635-415-0025(1).

The mitigation goal for Category 1 habitat is no loss of habitat quantity or quality. ODFW recommends or requires (1) avoidance of impacts through alternatives to the proposed development action or (2) no authorization of the proposed development action if impacts cannot be avoided.

P.3.1.3 Habitat Category 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." OAR 635-415-0025(2).

The mitigation goal if impacts are unavoidable, is no net loss of habitat quantity or quality and provision of a net benefit of habitat quantity or quality. ODFW recommends or requires (1) avoidance of impacts through alternatives to the proposed development action or (2) 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 toward achieving the mitigation goals and standards is to be reported on a schedule agreed upon in the mitigation plan performance measures. The fish and wildlife mitigation measures are to be implemented and completed either prior to or concurrent with the development action. If neither (1) or (2) can be achieved, ODFW will recommend against or will not authorize the proposed development action.

P.3.1.4 Habitat Category 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 a site-specific basis, depending on the individual species or population." OAR 635-415-0025(3).

The mitigation goal is no net loss of habitat quantity or quality. ODFW recommends or requires (1) avoidance of impacts through alternatives to the proposed development action, or (2) 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 toward achieving the mitigation goals and standards is to be reported on a schedule agreed upon in the mitigation plan performance measures. The fish and wildlife mitigation measures are to be implemented and completed either prior to or concurrent with the development action. If neither (1) or (2) can be achieved, ODFW will recommend against or will not authorize the proposed development action.

P.3.1.5 Habitat Category 4

Habitat Category 4 is "important habitat for fish and wildlife species." OAR 635-415-0025(4).

The mitigation goal is no net loss of existing habitat quantity or quality. ODFW recommends or requires (1) avoidance of impacts through alternatives to the proposed development action or (2) 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 pre-development habitat quantity or quality. Progress toward achieving the mitigation goals and standards will be reported on a schedule agreed upon in the mitigation plan performance measures. The fish and wildlife mitigation measures are to be implemented and completed either prior to or concurrent with the development action. If neither (1) or (2) can be achieved, ODFW will recommend against or will not authorize the proposed development action.

P.3.1.6 Habitat Category 5

Habitat Category 5 is "habitat for fish and wildlife having high potential to become either essential or important habitat." OAR 635-415-0025(5).

The mitigation goal, if impacts are unavoidable, is to provide a net benefit in habitat quantity or quality. ODFW recommends or requires (1) avoidance of impacts through alternatives to the proposed development action or (2) mitigation of impacts, if unavoidable, through actions that contribute to essential or important habitat. If neither (1) or (2) can be achieved, ODFW will recommend against or will not authorize the proposed development action.

P.3.1.7 Habitat Category 6

Habitat Category 6 is "habitat that has low potential to become essential or important habitat for fish and wildlife." OAR 635-415-0025(6).

The mitigation goal is to minimize impacts. ODFW recommends or requires actions that minimize direct habitat loss and impacts to off-site habitat.

P.3.2 Identification and Description of Fish and Wildlife Habitats in the Analysis Area

The habitat analysis area includes the turbine development corridor, a 750-foot buffer from the edge of development corridors, and a 1000-foot buffer from all other project linear components (e.g., underground and overhead transmission lines, and road corridors) and edges of Project polygons (e.g., substation and laydown areas). Habitats found within the analysis area are described in Table P-9 and potential impacts are quantified in Table P-10. Typology and map codes correspond with the locations of each habitat within the analysis area identified in Figures P-5 through P-10.

Table P-9. Habitat Types and Categorical Rating (based upon ODFW criteria) within the Golden Hills Wind Farm Project Area.

Habitat Type	Habitat Subtype	Map Code	Habitat Categories
Agricultural	Non-irrigated cropland	AG	6 – Cultivated croplands with low potential for becoming essential or important habitat.
	Conservation Reserve Program (CRP)	CRP	3 – Croplands planted to dominant grassland with few forbs in the CRP program that provide important wildlife habitat.
Riparian	Conservation Reserve Enhancement Program	CREP	1 – Irreplaceable, essential habitat for a wildlife species (i.e., loggerhead shrike) and limited within a physiogeographic province (documented food/cover/nest habitat, and active nest).
			2 - Essential and limited habitat for wildlife (e.g., documented nest/roost habitat for loggerhead shrikes, and/or western toad habitat).
Riparian	Intermittent Streams	IS	2 – Essential and limited habitat for wildlife and fishes (e.g., suitable breeding/nesting/foraging/migratory stopover habitat for blackbirds, waterfowl, misc passerines; likely spring-fed in areas and perennial is some if not most years; suitable for centrarchids, stocked gamefishes, possible juvenile salmonid nursery habitat; suitable for western toads). Potential for mixed wetland vegetative obligates and native shrub species.
			3 -- Essential and limited habitat for wildlife. Seasonal water resource, potential for wetland facultative and obligate species, and native shrub species.
Riparian	Riparian trees	RT	2 – Essential and limited habitat for wildlife (documented raptor nest/roost habitat, e.g., red-tailed hawk)
			3 – Essential and limited habitat for wildlife but without documented nest.
Grassland/Cliffs	Cliffs/Crevices	GR/CL	3 – Important habitat for wildlife, especially nesting raptors. Basaltic rock outcrops and/or cliffs, intermixed with grasses and forbs
Upland	Upland trees	UT	1 – Irreplaceable, essential habitat for a wildlife species (e.g., Swainson's hawk) and limited within a physiogeographic province (documented food/cover/nest

Table P-9. Habitat Types and Categorical Rating (based upon ODFW criteria) within the Golden Hills Wind Farm Project Area.

Habitat Type	Habitat Subtype	Map Code	Habitat Categories
			habitat, and active nest) 2—The same as UT-1, but with an inactive nest. 3 – Essential and limited habitat for wildlife but without documented nest.
Shrub-steppe	Sagebrush/Shrub-steppe	SS	1 - – Irreplaceable, essential habitat for a wildlife species (e.g., loggerhead shrike) and limited within a physiogeographic province (documented food/cover/nest habitat, and active nest). Old-growth big sagebrush present. 2 - Essential and limited habitat for wildlife (e.g., documented breeding/nesting/foraging habitat for loggerhead shrikes). Old-growth big sagebrush present. 3 – Essential or important wildlife habitat which is limited (e.g., fairly undisturbed habitat; moderate grazing).
Grassland-steppe	Grassland	GR	3 – Essential or important wildlife habitat which is limited (e.g., fairly undisturbed habitat; moderate grazing). Non-native grasses interspersed with native grasses; rabbitbrush and sagebrush species spotty in location and non-dominant. 4 – Important wildlife habitat (e.g., moderate-heavy grazing and/or weedy habitat). Potential for higher rating under different land management.
Surface Water	Pond	WP	2 -- Essential and limited habitat for wildlife and fishes (e.g., documented breeding/nesting/foraging/migratory stopover habitat for blackbirds, waterfowl, misc passerines; spring-fed and stocked with trout species; suitable for western toads). Mixed wetland vegetative obligates.
Developed	Developed	DE	6 – Low potential for becoming essential or important habitat (e.g., residences, storage bins, farm equipment storage, grain elevators, industrial/commercial facilities, gravel quarries, cultivated agricultural fields).
Road	Roads	Road	6 – Includes asphalt, gravel, and farm roads. Low potential for becoming essential or important habitat at the landscape-level.

P.3.2.1 Category 1 Habitat

Three habitat types were identified as Category 1 within the analysis area: upland trees (UT), CREP land, and shrub-steppe (SS).

Upland Trees

Upland tree habitats scattered across the Project site are composed primarily of black locust trees (*Robinia pseudoacacia*), with varying degrees of understory deciduous shrubs, smaller locust trees, and native and invasive grasses and forb species. This habitat is designated as Category 1 because it provides irreplaceable, essential habitat for wildlife that is limited in availability. Many of these small habitats have linear edges and are square or rectangular in shape. Others are irregularly shaped, especially those found within lower-elevation drainages. The square or rectangular habitats were planted either for early twentieth century homesteads or cemeteries, or as wildlife habitat plots (WHP) in the mid-twentieth century. These habitat patches currently provide forage, cover, and nesting habitat for migratory songbirds, raptors, and other sensitive species such as loggerhead shrikes, Swainson's hawks (*Buteo swainsoni*), and potentially ferruginous hawks (*Buteo regalis*). No permanent facilities will be located in areas identified as Category 1 upland tree habitat.

Two loggerhead shrike nests were documented in understory shrubs of upland tree habitat, one in a historic homestead and the other in a WHP (Figure P-11). They will not be permanently or temporarily impacted by construction of the Project. Four active raptor nests were identified in upland tree habitat within 750 feet of the Project footprint:

(1) One active Swainson's hawk nest is located within a shelter belt near the north end of String J (Figures P-4 and P-7). While the turbine corridor includes the shelter belt, the Applicant will not disturb or physically remove these trees during construction. The nearest turbine will be at least 200 meters away from the nest site. Construction buffers will be used during the nesting period if the nest site is active (see Mitigation section).

(2) One active red-tailed hawk nest is adjacent to a proposed underground collector line between turbine string A and B (Figures P-4 and P-8). The Applicant modified the layout to avoid having to remove any of these Category 1 trees. Construction buffers will be used during the nesting period if the nest site is active (see Mitigation section).

(3) Another active red-tailed hawk nest is located immediately north of Turbine String C adjacent to a proposed underground collector line (Figures P-4 and P-10). The Applicant will not disturb or physically remove these trees during construction. Construction buffers will be used during the nesting period if the nest site is active (see Mitigation section).

(4) An active great horned owl nest exists along a facility connector between Turbine Strings E and D (Figures P-4 and P-8). This Category 1 habitat will be avoided by boring underneath the road, avoiding impacts to both trees and a small wetland in the area. This particular site is adjacent to Highway 97 and is already subject to disturbance from road traffic.

Conservation Reserve Enhancement Program

The CREP was created to address the environmental issues of soil erosion, water quality, and wildlife habitat. Oregon has partnered with the federal government to preserve vulnerable land areas as part of a comprehensive effort to protect Oregon's land, water and wildlife. This program is directed at riparian areas, typically perennial but also larger intermittent streams and spring-fed smaller systems. Terrestrial areas adjacent to the water course are planted with grasses and/or shrubs and small trees in order to provide a buffer to the stream system and overall watershed. CREP Category 1 is ranked as such because of an active western loggerhead shrike nest. No permanent facilities will be located in areas identified as Category 1 CREP, and no permanent or temporary impacts will occur to this habitat.

Shrub-steppe

Category 1 shrub-steppe is characterized by being dominated by native big sagebrush (*Artemisia tridentata*), and also having an active western loggerhead shrike nest. Only 0.45 acres occur within the analysis area, and the potential area of impact is being avoided by the Applicant (see section P.8). Other characteristics of this habitat type are the same as those described in the Category 3 Shrub Steppe section below. No permanent or temporary impacts will occur to this Category 1 habitat.

P.3.2.2 Category 2 Habitat

Six habitat types were identified as Category 2 within the analysis area: upland trees (UT), riparian-intermittent stream (IS), Conservation Reserve Enhancement Program land (CREP), shrub-steppe (SS), riparian trees (RT), and surface water-pond (WP).

Upland Trees

Category 2 upland trees within the analysis area are limited and important, especially for nesting raptors. These areas currently do not contain an active raptor nest. However, these areas are also important for other species of birds such as loggerhead shrikes. Along with nesting, these areas are also used for perching and foraging by raptors, shrikes, and other birds.

The initial proposed Project layout sited a laydown area in Category 2 upland tree habitat (Figure P-10). This area was also utilized by foraging shrikes from a nearby shrub-steppe nest site. For this reason, the Applicant has decided not to site a laydown area at this location.

Intermittent Stream

Category 2 intermittent streams within the habitat analysis area are restricted to lower elevation drainages and provide a seasonal water resource with riparian vegetation being potentially composed of mixed wetland vegetative obligates and native shrub species, particularly big sagebrush. This categorical ranking is based upon documented observations of this habitat providing suitable breeding, nesting, and foraging sites for both resident and migratory stopover species, e.g., waterfowl, blackbirds, and other passerines such as song and white-crowned sparrows. Much of this aquatic system is likely spring-fed in areas and perennial is some if not most years; suitable for centrarchids, stocked gamefishes, and possibly juvenile salmonids (i.e., nursery habitat). This habitat likely ranks high in suitability for western toads.

2.17 acres of this habitat occurs within the analysis area, and only 0.09 acre will be temporarily impacted by Project construction. No permanent impacts will occur to this habitat (see section P.8 for impact mitigation measures).

Conservation Reserve Enhancement Program

Category 2 CREP habitat is generally along riparian intermittent stream habitats with old-growth sagebrush/shrub-steppe and shrub plantings, and has the potential to support shrub-steppe obligate species, including loggerhead shrikes, as well as riparian species such as the western toad. 8.64 acres of Category 2 CREP habitat will be temporarily impacted by Project construction (Table P-10). No permanent impacts will occur to this habitat type. Most of the temporary impacts occur along connector corridors (underground collector lines and roads).

Shrub-Steppe

Category 2 shrub-steppe was identified primarily along Grass Valley Canyon and its associated side canyons. These areas consist of native sagebrush (e.g., *Artemisia tridentata*, *Artemisia arbuscula*), rabbitbrush (*Chrysothamnus viscidiflorus*), and mixed forb species (e.g., *Balsamorhiza* spp., *Lupinus* spp). Several of these areas also have inclusions of other native species such as Sandberg's bluegrass (*Poa secunda*), buckwheat (*Eriogonum* spp.), and other forb species. This categorical ranking is supported by presence of abundant old-growth big sagebrush. Livestock grazing pressure is typically moderate. These areas lack documented nesting of sensitive species, yet have the potential to be utilized for breeding, nesting, and foraging by shrub-steppe obligates and other game and non-game wildlife. Examples of sensitive species documented in this habitat type include Swainson's hawks, loggerhead shrikes, and grasshopper sparrows. 15.53 acres of Category 2 shrub-steppe will be temporarily impacted, and 0.89 acres will be permanently impacted from Project construction and ultimate footprint (Table P-10).

Riparian Trees

5.08 acres of Category 2 riparian tree habitat were identified in the entire analysis area. These areas consist of riparian trees and harbor raptor nests that have been documented as inactive. The potential exists for these habitats/nests to be available for use for nesting raptors in the future. This habitat is represented by tree species often consisting of white poplar (*Populus alba*), willow (*Salix* sp.), Lombardy poplars (*Populus nigra*), and black cottonwood (*Populus trichocarpa*). These tree species are often associated with understory or adjacent deciduous shrub including sagebrush and rabbitbrush species. No temporary or permanent impacts will occur to these habitats from Project construction.

Surface Water – Pond

One Category 2 pond that is spring-fed was identified within the habitat analysis area (3.3 acres) along Nish road southwest of highway 206, and south of Grass Valley Canyon. Vegetation associated with this wetland feature includes dense patches of cattail (*Typha latifolia*) bulrush (*Scirpus* sp.), curly dock (*Rumex* sp.), rushes (*Juncus* spp.), and sedges (*Carex* spp.). The area surrounding this feature transitions into Category 2 shrub-steppe and is also bordered by a developed road on one side. No temporary or permanent impacts will occur to this habitat from Project construction.

P.3.2.3 Category 3 Habitat

Seven types of habitats were identified as Category 3 within the analysis area: upland trees (UT), shrub-steppe (SS), Conservation Reserve Program grasslands (CRP), riparian-intermittent stream (IS), riparian trees (RT), grassland (GR), grassland/Cliff (GR/CL).

Upland Trees

Category 3 upland tree habitats are described as in the Category 1 habitat, but lack active or inactive raptor nests. Raptor nests typically persist over time, and are used repeatedly, added to, or rebuilt. Upland tree habitat patches without raptor nests may lack large-scale environmental, topographic, and/or exposure attributes necessary for successful rearing and fledging of young. However, the potential still exists for this category to be suitable for nesting, and the habitat quality can still be important for raptor perching and foraging, and for use by resident and migrating songbirds. Approximately 69.7 acres of Category 3 upland tree habitat (no nests) exists within the habitat analysis area. Approximately 11.8 acres of this habitat are identified as temporarily impacted by construction of the Project. No Category 3 upland tree habitat will be permanently affected from the Project footprint.

Shrub-Steppe

53 acres of Category 3 shrub-steppe habitat were identified in the entire analysis area. These areas consist of native sagebrush (e.g., *Artemisia tridentata*, *Artemisia arbuscula*), rabbitbrush (*Chrysothamnus viscidiflorus*), and mixed forb species (e.g., *Balsamorhiza* spp., *Lupinus* spp). Several of these areas also have inclusions of other native species such as Sandberg's bluegrass (*Poa secunda*), buckwheat (*Eriogonum* spp.), and other forb species. In other areas, invasive species such as cheatgrass (*Bromus tectorum*), yellow star thistle (*Centaurea solstitialis*), tumble mustard (*Sisymbrium altissimum*), and fiddleneck tarweed (*Amsinckia lycopsoides*) can be present in varying quantities, depending upon the cattle grazing pressure, which varies from moderate to moderate/heavy. These areas are important wildlife habitat and have the potential to be of higher quality if managed differently. Examples of sensitive species documented in this habitat type include Swainson's hawks, loggerhead shrikes, and grasshopper sparrows. 2.1 acres of Category 3 shrub-steppe will be temporarily impacted, and no permanent impacts will occur from the Project footprint. (Table P-10).

Conservation Reserve Program

Tracts of Category 3 CRP habitats are found in several areas within the habitat analysis area, comprising approximately 764.71 acres. CRP areas formerly were used for crop production, but have since been reseeded with grasses, typically in areas considered to be vulnerable to erosion. The grasses provide vegetative cover for soil and wildlife conservation. Some areas have spotty sagebrush and rabbitbrush shrub cover, in addition to non-native grasses such as intermediate wheatgrass *(Agropyron intermedium*) and crested wheatgrass (*Agropyron cristatum*); these CRP tracts are dominated by such grass species. Weeds and grazing are largely lacking in these habitats. Most, if not all, CRP lands were documented as having grasshopper sparrows, a sensitive species. White-tailed jack rabbits can also occur in this habitat. These areas are important because they provide cover and food for wildlife, and suitable habitat for grassland/ground nesting birds. Approximately 55.35 acres will be temporarily impacted by construction of the Project, and 3.43 acres will be permanently impacted (Table P-10).

Riparian Trees

Catagory 3 riparian trees are the same as Category 2 but without an inactive or active raptor nest. Less than 1 acre will be temporarily impacted by construction of the Project.

Grassland

Category 3 grassland within the habitat analysis is typically associated with the slopes and steeper areas of the drainages, especially along Grass Valley Canyon and Hay Canyon. They are dominated by non-native grasses and forbs, but still maintain scattered populations of native grasses and forbs. 134.49 acres will be temporarily impacted by the Project, but only 1.95 acres will be permanently impacted.

Grassland/Cliffs

Catagory 3 grassland/cliffs within the analysis area is restricted to Grass Valley Canyon. These areas are steep escarpments of Columbia River basalt, and are important for raptors and other birds for both nesting and perching. 6.64 acres will be temporarily impacted by the Project.

Intermittent Streams

Category 3 intermittent streams within the habitat analysis area are restricted to lower elevation drainages and provide a seasonal water resource with riparian vegetation being potentially comprised of mixed wetland vegetative obligates and native shrub species, particularly big sagebrush. 9.10 acres of this habitat occurs within the analysis area, and only 0.51 acres will be temporarily impacted by the construction of the Project. No permanent impacts will occur to this habitat (see section P.8 for impact mitigation measures).

P.3.2.4 Category 4 Habitat

Grasslands were the only habitat identified as Category 4 within the analysis area.

Grassland

Category 4 grasslands are areas that are completely dominated by non-native grasses and shrubs. Weeds either are rooted or are blown into these areas. Common weed species can include cheatgrass, tumble mustard, Russian thistle (*Salsola kali*), and in some places, complete dominance by cereal rye (*Secale cereale*). These habitats are often deep-soiled areas too steep to cultivate, and therefore are commonly narrow, small, and isolated among the larger cultivated landscape. Thick horizontal and vertical weed density precludes many wildlife species, especially sensitive species, from using these areas for forage or cover, with the exception being some game species, coyotes, and badgers. Other areas are shallow drainage areas within cultivated fields, again interspersed with invasive species, including fiddleneck tarweed. These areas are small in spatial extent and are bordered by cultivated farm ground where invasive species and disturbance will persist. Therefore, this habitat is important to wildlife, but not essential or unique, and limited within this landscape. Temporary impacts will affect 37.28 acres of Category 4 grassland habitat, but only 0.77 acres will be permanently impacted by the Project.

P.3.2.5 Category 5 Habitat

No Category 5 habitat was identified within the analysis area.

P.3.2.6 Category 6 Habitat

Two habitat types were identified as Category 6 within the analysis area: agricultural and developed. Category 6 habitats are unlikely to become important or essential wildlife habitat.

Agricultural

Agricultural cropland occurs throughout the analysis area and is the predominant land coverage, comprising 18,678.68 acres. This cultivated area is planted primarily with winter wheat (*Triticum aestivum*), with areas either in production or temporarily fallow. Because of intensive land use managed for optimal grain production, this habitat undergoes high levels of disturbance and has only limited value to wildlife. 96.23 acres of this type will be permanently affected by the project footprint.

Developed

Developed areas within the analysis area consist primarily of residential habitations, roads and road margins, utility structures for farming, grain storage facilities, feed lots, and corrals and comprise 338.82 acres within the habitat analysis area. These areas lack native vegetation, but might have some trees associated with them. Although raptors such as red-tailed hawks and great horned owls might use trees on the fringes of developments, these habitats receive frequent disturbance and are not suited for sensitive species. Less than one acre of this type might be permanently affected by the Project footprint.

Table P-10. Total habitat acreage within potential impact zone (analysis area, see section P.3) and estimated quantity of disturbance or loss of categorical habitats and associated habitat types, within the Golden Hills Wind Farm Facility Area.

		Impacts	
	Total Acres (within analysis zone)	**Temporary Facilities[1] (acres disturbed)**	**Permanent Facilities[2] (acres lost)**
Category 1			
Upland Trees (UT)[3,4]	2.32		
Conservation Reserve Enhancement Program (CREP)[4]	0.10		
Shrub-steppe (SS)[4]	0.45		
Category 2			
Upland Trees (UT)	15.78	**2.17**	**0.02**
Intermittent Stream (IS)	2.17	**0.09**	
CREP	147.35	**8.64**	
Shrub-steppe (SS)	299.93	**15.53**	**0.89**
Riparian Trees (RT)	5.08		
Pond (WP)	3.33		
Category 3			
Conservation Reserve Program (CRP)	764.71	**55.35**	**3.43**
Shrub-steppe (SS)	53.03	**2.10**	
Grassland (GR)	1531.27	**134.49**	**1.95**
Grassland/Cliff (GR/CL)	78.15	**6.64**	
Upland Trees (UT)	69.69	**11.83**	
Riparian Trees (RT)	7.71	**0.91**	
Intermittent Stream (IS)	9.10	**0.51**	
Category 4			
Grassland	387.00	**37.28**	**0.77**
Category 5 [N.A.]			
Category 6			
Developed (DE)	172.24	**20.22**	**0.36**
Agricultural (AG)	18678.68	**709.31**	**96.23**
Road	166.58	**36.41**	**0.34**
TOTAL	**22394.68**	**1043.01**	**103.99**

1 ***Temporary facilities include***: transmission lines, poles on transmission lines (during construction), underground collectors, connector corridors, crane paths, new roads, access roads for turbine construction, laydown areas.

2 ***Permanent facilities include***: poles on transmission lines (post construction), new roads (post construction), turbine pads, turbine access roads (post construction), substations, O & M buildings.

3 ***Habitat*** with active Swainson's hawk nest (2007).

4 ***Habitat*** with active western loggerhead shrike nest (2007).

P.4 MAP OF HABITAT LOCATIONS

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

Response: See Figures P-5 through P-10.

P.5 IDENTIFICATION OF STATE SENSITIVE SPECIES

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

Response: All federal and state listed species, or candidate species, are addressed in Exhibit Q. No federally listed species were observed during wildlife, habitat, or plant surveys.

Table P-11 summarizes special status/sensitive fish, wildlife, and invertebrate species that occur in Sherman County based upon Oregon Natural Heritage Information Center and U.S. Fish and Wildlife Service queries (ORNHIC, 2007; USFWS, 2007; results in Attachments P-2 and P-3, respectively). Notes regarding the potential presence of these species in the analysis area are included in P-11. All plant species are addressed in Exhibit Q. Diurnal springtime walking surveys during 2006 and 2007 of the Project for threatened, endangered, and special status/sensitive species (TES) documented 82 grasshopper sparrows, 11 Swainson's hawks, 14 loggerhead shrikes, 1 short-eared owl[1], 1 ferruginous hawk, and 5 white-tailed jackrabbits. The ferruginous hawk was an observation of an adult hunting. Western loggerhead shrikes are addressed in section P.5.1 below.

All biological surveys[2] and in-transit travel of the Project during 2006 and 2007 documented the following state- or federal-status species of concern: 83 grasshopper sparrows, 28 Swainson's hawks, 7 golden eagles, , 4 short-eared owls, 3 ferruginous hawks, 29 loggerhead shrikes, and 5 white-tailed jackrabbits.. This is a total tally that represents repeat observations of the same individual in some cases.

[1] short-eared owls are not currently listed as special status species, however agencies typically request information on them because of their grassland/shrub-steppe affinity

[2] biological surveys: avian use, habitat mapping, aerial raptor nest, TES, rare plants, in-transit travel

Table P-12. List of State and Federal Special Status/Sensitive Species Occurring in Sherman County, Oregon, with notes on use or potential use of the proposed Golden Hills Wind Facility.

Common Name	Scientific Name	Federal Status	State Status	Notes on Occurrence Within Facility area
Fish				
Inland/Interior Redband Trout	*Oncorhynchus mykiss*	SoC	SV	Habitat lacking
Pacific Lamprey	*Lampetra tridentate*	SoC	SV	Habitat lacking
Amphibians				
Northern Leopard Frog	*Rana pretiosa*	--	SC	None observed
Western Toad	*Bufo boreas*	--	SV	No observations; suitable habitat present; likely occurs within sandy or aquatic habitats within drainages of Facility area
Reptiles				
Northern Sagebrush Lizard	*Sceloporus graciosus graciosus*	SoC	SV	Sagebrush shrub and xeric habitats present, occurrence possible
Painted Turtle	*Chrysemys picta*	--	SC	No observations
Sharptail Snake	*Contia tenuis*	--	SV	Suitable habitat lacking
Western Rattlesnake	*Crotalus viridis*	--	SV	No observations; likely in shrub-steppe, drainages, old homesteads/barns (*C.v. oregonus*); common east of Facility
Birds				
Bank Swallow	*Riparia riparia*	--	SU	No observations, probable migrant through Facility area
Burrowing Owl	*Athene cunicularia hypugaea*	SoC	SC	2 observations in 2006 east of Facility; historical county records, no observations in ORNHIC query
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	SoC	--	Historical county record, no observations in ORNHIC query
Common Nighthawk	*Chordeiles minor*	--	SC	Observed in 2007 east of Facility; county records; potential for summer use
Eastern Oregon Willow Flycatcher	*Empidonax traillii adastus*	SoC	SU	No observations, probably migrant through Facility area
Ferruginous Hawk	*Buteo regalis*	SoC	SC	3 observations within Facility; infrequent observations east of Facility
Grasshopper Sparrow	*Ammodramus savannarum*	--	SV/SP	Common in non-AG habitat
Lewis's Woodpecker	*Melanerpes lewis*	SoC	SC	No observations, probable migrant through Facility area
Loggerhead Shrike	*Lanius ludovicianus*	--	SV	Three known nesting sites documented, numerous other observations made during avian use and TES surveys, and during in-transit travel among surveys.
Long-billed Curlew	*Numenius americanus*	--	SV	A few individuals observed east of Facility; ORNHIC lists use along John Day River up to Drapper Canyon mouth
Mountain Quail	*Oreortyx pictus*	SoC	SU	Habitat lacking in Facility uplands

Table P-12 (Continued). List of State and Federal Special Status/Sensitive Species Occurring in Sherman County, Oregon, with notes on use or potential use of the proposed Golden Hills Wind Facility.

Common Name	Scientific Name	Federal Status	State Status	Notes on Occurrence Within Facility area
Swainson's Hawk	*Buteo swainsoni*	--	SV	Five active nests within two miles of the Facility; infrequent use of Facility area
Golden Eagle	*Aquila chrysaetos*	EA	--	Several observations during 2006/2007 avian use surveys; two active nests east of Facility in 2007.
Western Bluebird	*Sialia mexicana*	--	SV	None observed, possible use of Facility tree lots and/or barns
Western Greater Sage Grouse	*Centrocercus urophasianus*	SoC	SV	Regionally extirpated
Western Meadowlark	*Sturnella neglecta*	--	SC	Abundant
Yellow-breasted Chat	*Icteria virens*	SoC	Soc	Habitat lacking; potential irregular migrant through Facility
Bats				
Hoary Bat	*Lasiurus cinereus*			Probable migrant through Facility area
Long-eared Myotis	*Myotis evotis*	SoC	SU	Unknown
Long-legged Myotis	*Myotis volans*	SoC	SU	Unknown
Pale Western Big-eared Bat	*Corynorhinus townsendii pallescens*	SoC	SC	Unknown
Pallid Bat	*Antrozous pallidus pallidus*	--	SV	Unknown
Silver-haired Bat	*Lasionycteris noctivagans*	SoC	SU	Probable migrant through Facility area
Western Small-footed Myotis	*Myotis ciliolabrum*	SoC	SU	Unknown
Yuma Myotis	*Myotis yumanensis*	Soc	--	Unknown
Other Mammals				
California Bighorn Sheep	*Ovis canadensis californiana*	SoC	--	Observed south of Facility on John Day breaks on steep slopes during 2004 and 2007 raptor nest surveys; out of Facility viewshed
White-tailed Jackrabbit	*Lepus townsendii*	**--**	SU	Observed within Facility during 2006 nocturnal surveys; uncommon due to limited habitat, more common east of Facility
Invertebrate				
California Floater	*Anodonta californiensis*	SoC		Habitat lacking
Oregon Snail	*Monadenia fidelis minor*	SoC		Habitat lacking

Key

Federal Status

SoC	Species of Concern	Former C2 candidates which need additional information in order to propose as Threatened or Endangered under the ESA. These are species which the USFWS is reviewing for consideration as Candidates for listing under the ESA.
EA	Bald and Golden Eagle Protection Act	Federal Act providing protection.

Table P-12 con't. List of State and Federal Special Status/Sensitive Species Occurring in Sherman County, Oregon, with notes on use or potential use of the proposed Golden Hills Wind Facility.

Key (Continued).

ODFW Status

SC	Critical	Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species which are at risk throughout their range, and some disjunct populations.
SV	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.
SP	Peripheral or naturally rare	Species whose Oregon populations are on the edge of their range.
SU	Undetermined Status	Scientific study required before a judgment can be made.

P.5.1 Western Loggerhead Shrikes

The following review of western loggerhead shrikes (*Lanius ludovicianus gambeli*) and factors affecting their life history and population status are based upon the work of Jewett et al. (1953), Ehrlich et al. (1988), Littlefield (1990), Knopf and Smith (1992), Hall and Snow (1994), Pruitt (2000), Lindenmayer and Fischer (2006), Marshall et al. (2006), and LOSH (2007). Additionally, based upon a 2001 Shrub-steppe workshop in Boise, Idaho, personal communications with shrubland ecosystem bird experts is relied upon for pertinent sections below. The western loggerhead shrike is not currently federally listed as threatened, endangered, or as a candidate species. In Oregon, the western loggerhead shrike is listed as "state vulnerable". This status is for 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.

Eleven subspecies of loggerhead shrikes represent a large geographic distribution ranging east-west from coast to coast, and north-south from southern Canada through southern Mexico. Pruitt (2000) notes that regardless of geographic location, each occupied breeding territory includes some common habitat features: 1) nesting substrate (a tree or shrub); 2) elevated perches for hunting, pair maintenance, and territory advertisement (natural and artificial perches, such as powerlines or fenceposts, are used); 3) foraging areas (generally, open short grass areas with scattered shrubs or perches and some bare ground); 4) impaling sites (dense multi-stemmed and/or thorny shrubs, or barbed wire fences). These habitat requirements may be met in a wide variety of habitats, including pasture, old field, prairie, savanna, pinyon-juniper woodland, and shrub-steppe.

In the western U.S., loggerhead shrike breeding habitat is associated with shrub-steppe, desert scrub, and pinyon-juniper woodlands (Lefranc 1997 *in* Pruitt 2000). Western loggerhead shrikes in the Pacific Northwest are more of a shrub-steppe obligate species, dependent upon large shrubs or small trees for breeding and nesting. Loggerhead shrikes in the eastern U.S. exhibit adaptation to nesting in urban/suburban habitats (e.g., residential yards, parks university campuses, cemeteries, housing developments, golf courses; Pruitt 2000). In contrast, western shrikes appear less likely to nest in suburban settings. Sagebrush nesting shrikes tend to be shy and somewhat inconspicuous, and do not readily nest near human habitations (Woods 1995 *in* Pruitt 2000). Habitats used by breeding loggerhead shrikes in agricultural landscapes (e.g., pastures, hayfields, CRP) are created by human-induced changes in native vegetative communities; these habitats must be "maintained" to remain suitable for shrikes. In contrast, shrub-steppe habitats are more permanent communities and likely represent one of the historic core areas of the species, prior to European settlement (Fraser and Luukkonen 1986, Cade and Woods 1997 *in* Pruitt 2000). High densities observed by Poole (1992) and Woods (1995) in relatively undisturbed shrub-steppe habitats suggest that these are high quality breeding habitats for loggerhead shrikes.

P.5.1.1 Golden Hills Project Area – Use by Loggerhead Shrikes

Use of the proposed Project by loggerhead shrikes is likely more than other regional projects. All biological surveys documented 29 shrike observations, some likely repeat observations of the same individuals. Four individuals were documented during avian use surveys. Eleven shrike observations were observed while traveling to different areas around the proposed Project during the different biological surveys.

This higher use may be due to a slightly more diverse and enhanced (e.g., CREP, CRP, WHP) sagebrush-dominant shrub-steppe ecosystem (Table P-12). Although the proposed Project is predominantly dryland agriculture, these other patch habitats apparently provide suitable sized systems for what appears to be a slightly larger population of shrikes at the regional level. Three loggerhead shrike nests were documented during TES surveys (Figure P-11).

Table P-12. Comparison of approximate percent composition of general habitats associated with several Pacific Northwest windpower projects. AG=cultivated agriculture; UT/RT/RI/IS/CREP=upland and riparian trees, riparian and intermittent stream, Conservation Reserve Enhancement Program; SS/GR=shrub-steppe and native grasslands; CRP=Conservation Reserve Program grassland; DEV=developed; and WA=water.

Project Area	AG	UT/RT/RI/IS/CREP	SS/GR	CRP	DEV	WA
Golden Hills, OR	83.4	1.1	10.5	3.4	1.5	0.0
Biglow Canyon, OR	85.2	0.3	8.5	5.4	0.5	0.1
Stateline, OR&WA	41.5	0.8	43.7	14.1	0.1	0.1
Stateline REF, OR	79.0	0.7	11.4	8.8	0.2	0.1
Nine Canyon, WA	71.1	0.1	5.8	32.1	0.4	0.0
Condon, OR	61.0	0.1	14.2	22.3	2.5	0.0
Hopkins Ridge, WA	52.0	4.0	39.0	5.0	0.5	0.0

P.5.1.2 General and Regional Life History

The western loggerhead shrike occurs in the Columbia Basin during spring through summer, and regularly in winter but with rare observations. In general, mid-March through mid-September is the time period for migration, breeding, and brood-rearing. Early migrants appear in February. However, more and more observations are being made of this species through winter, implying an increasing population of wintering loggerhead shrikes; possibly related to climate change (Mike Denny, Blue Mountain Audubon, pers.comm). Male shrikes select breeding territories in late winter through early spring, and they may be selecting breeding territories earlier in winter than historically documented. Mid-April through August is considered the seasonality and sensitive period. Nest initiation peaks in mid-April. Clutch size ranges from 5-8 eggs. Few successful breeding pairs attempt a second brood in the Columbia Basin (Marshall et al. 2006).

Male shrikes show high nesting territory fidelity, being even more pronounced than many other passerine bird species. However, this may be biased toward smaller fragmented habitats, i.e., in larger contiguous tracts of suitable habitat site fidelity may be much less as nesting habitat is less limited. Regardless, fragmented smaller habitat patches are more common as compared to the Hanford or Yakima military training center sites; likely two of the most notable large remaining contiguous tracts of shrub-steppe ecosystems in the Pacific Northwest.

In addition to its unique physical looks, the loggerhead shrike is possibly best known for its unique and complex impaling behavior. Impaling is one of the adaptations in shrikes associated with their raptorial mode of feeding, unique among passerines. Shrikes cannot hold large prey in their feet as raptors do. Instead, they employ impaling and wedging to anchor prey that is too large to swallow whole (Cade 1995 *in* Pruitt 2000). After impaled prey are securely anchored, shrikes are able to tear off bite-sized pieces. A wide variety of substrates are used as impaling stations by shrikes: thorny plants (e.g., osage orange, hawthorn, cacti), barbed wire, and sharp ends of broken branches are frequently used (Miller 1931 *in* Pruitt 2000). Loggerhead shrikes are opportunistic, primarily insectivorous, yet are able to exploit a variety of vertebrate species as food. Dominant prey items year-round are insects, primarily belonging to the orders of Coleoptera (beetles), Orthoptera (grasshoppers), and Lepidoptera (caterpillars only). Grasshoppers often make up close to 90% of the diet during summer and fall seasons. Similar prey items are utilized heavily by sage grouse, particularly young-of-the-year sage grouse. Small mammals, reptiles, and other juvenile birds makeup a minor component of the shrike diet; allowing a smaller territory size required (more widely dispersed larger prey items would require a larger territory if fed upon exclusively).

Predation is considered the leading cause of shrike nest failure. Predators include domestic and feral cats, coyotes, badgers, least chipmunks, Townsend’s ground squirrel, long-tailed weasels, sharp-shinned hawks, common raven, black-billed magpies, gopher snakes, and Pacific Northwest rattlesnakes. Reproductive success for some species of shrub-steppe obligate birds is highest in large contiguous habitats versus fragmented habitats. Shrikes may experience higher than normal predation rates in non-native linear habitats, because predators have been observed to use linear features as travel corridors more often than non-linear polygon features. Two of the Golden Hills shrike nests were in linear non-native shrub habitats. Permanent native habitat, i.e., sagebrush shrub-steppe, appears to be a limiting habitat for nesting loggerhead shrikes in the Columbia River Basin (which includes Washington, Oregon, Idaho, and Montana).

P.5.1.3 Habitat Impacts Affecting Shrike Populations

Habitat loss is the primary reason for the decline or regional extirpations of all loggerhead shrike species. West of the Rocky Mountains and throughout the arid Pacific Northwest, there has been loss and degradation of shrub-steppe habitats. In 2001, it was estimated that over 60% of shrub-steppe habitats were lost in eastern Washington within the Columbia Basin, with loss due to wildfires continuing (Wisdom, USDA, pers. comm.). Over the past century, more sagebrush and riparian habitat is burned with each passing decade (Campbell, BLM, pers. comm.). Much of the permanent loss of shub-steppe habitat is attributed to the tilling practices involved with cultivated agriculture, where loamy and sandy deep soils are available to maximum crop production. Most of the shrub-steppe obligate bird species - sage sparrow, Brewer’s sparrow, sage thrasher, loggerhead shrike – are associated with deep soil shrub-steppe habitats in lieu of shallow soil shrub-steppe habitats. Therefore, deep soil shrub-steppe areas are considered critical habitat for shrub-steppe obligate bird species. In much of the Columbia Basin, the best condition shrub-steppe are small fragments. However, large areas of less quality shrub-steppe can still have high value. For instance, large patch areas are highly correlated with sage sparrows (Vander Haegen, WDFW, pers. comm.). Poole (1992) documented that the density of nesting shrikes was highly variable, which was attributed to differences in habitat quality. The nesting density at the Hanford site (U.S. Department of Energy) was 12-19 times greater than in other shrub-steppe habitats in eastern Washington, and that nesting habitat there appeared to be saturated. The quality of the relatively undisturbed shrub-steppe habitat at this site was high compared to other sites. Most remaining shrub-steppe in Washington has been converted to agriculture, and what hasn’t been converted is dominated by steep slopes, poor soils, and has been modified by fires or fire suppression, livestock grazing, introduction of exotic species, and habitat fragmentation.

Overgrazing of rangeland can have a negative impact on nesting grassland birds by reducing nesting habitat, brood-rearing habitat, and foraging habitat. However, several individuals in Pruitt (2000) mention that properly regulated grazing can be potentially beneficial to shrikes. Long-term research on the impacts of livestock grazing was recommended.

P.5.1.4 Keystone Species and Landscape Linkages

Considering the landscape of the Golden Hills Project area, western loggerhead shrikes may be considered an important keystone species, especially of old-growth shrub-steppe habitats with large and tall vertical vegetative structure (e.g., big sagebrush, *Artemisia tridentata*, and antelope bitterbrush, *Pershia tridentata*). Keystone species are those that if managed for, have the potential to benefit many other species as well. Therefore, it is not single-species management, but the use of one species as an umbrella for managing biological diversity - or more specifically in this case - diversity of a shrub-steppe species assemblage, a unique community within the arid Pacific Northwest ecosystem. The primary management tool involves making land management decisions that link the landscape with a keystone species, thereby linking land management and biodiversity. This particular management strategy may have extra merit when considering mitigation measures for multiple issues involving multi-habitats and multi-species.

P.6 BASELINE SURVEY OF THE USE OF HABITAT

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

Response: An interim report for the Golden Hills baseline wildlife and habitat study was provided to the Applicant on 22 March, 2007. Avian use surveys were completed 19 June, 2007. A complete baseline report will be available to the Applicant by 1 October, 2007, and provided as an amendment to this EFSC ASC. Habitats in the Project are defined in section P.3 and detailed maps are referenced in P.4. Geospatial use of these habitats by target avian groups are denoted by avian use stations and individual bird flight paths (Figures P-12a-o and P-13a-d). Affinity toward topographic features and possibly habitat, if any, appears to be more of a phenomenon farther to the east of the Project, closer to deep canyons and drainages of the John Day River. Figures P-14a-d illustrate raptor flight paths for the Project only. Development corridors and avian point count stations are mapped with flight paths, only buteos show some affinity toward north and westerly side slopes exposed to prevailing wind; largely out of development corridors. Update results with spring 2007 data will be presented in the baseline report SCA amendment. Raptor nests are mapped in Figures P-3 (2004 survey) and P-4 (2007 survey). A finalized TES map showing mapped locations of species reported in P.5 will be included in the final baseline report. Numbers of TES species observed during TES surveys of wildlife habitat and for all surveys combined are reported in P.5. Avoidance and mitigation measures are presented in P.5 and P.8.

P.7 DESCRIPTION OF POTENTIAL ADVERSE IMPACTS

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

Response: This section identifies potential direct and indirect impacts to habitats and wildlife identified within the Project area, based on construction, operation, and retirement of the proposed Project layout. To summarize:

- Turbine corridor J overlaps upland trees that currently contain a Swainson's hawk nest. The nest tree is Considered Category 1 habitat. This shelterbelt will be avoided and not impacted.
- Underground collector lines between turbine corridor A and B cut through upland tree habitat that, in 2007, contained a red-tailed hawk nest. The nest tree will not be impacted by construction of the underground lines.

- There was a great horned owl nest along a connection between turbine strings E and D. While some trees will need to be removed, the nest tree will not be impacted by construction. This particular site is adjacent to Highway 97 and is subject to disturbance from road traffic.
- One loggerhead shrike nest would have been directly impacted near Turbine string B, where a laydown area was proposed (Figure P-6 through P-10, P-11 nest sites). However, the Applicant has agreed to omit that laydown area and direct impacts will be avoided, including avoiding indirect impacts by not using roads adjacent to the nesting area for access during construction. Locations of other shrike observations where no nests were documented will be revisited in spring 2008 to verify no active nesting is occurring in these areas as well.
- No other Category 1 or 2 habitat will be permanently or temporarily affected.
- 212 acres of Category 3 habitat and 37 acres of Category 4 habitat will be temporarily affected.
- 5 acres of Category 3 habitat and less than 1 acre of Category 4 habitat will be permanently affected.
- 73 percent of temporary impacts and 93 percent of permanent impacts will occur on Category 6 agricultural habitat.

P.7.1 Potential Impacts to Habitats

Direct permanent habitat loss will require mitigative compensation. Habitat loss can increase habitat fragmentation which can, in turn, increase predation on some bird species (see western loggerhead shrike review above). Mitigation proposals related to habitat are presented in section P.8.

Temporary impacts to habitat from Project construction will be mitigated for on a habitat case-by-case basis. These mitigation measures, due to direct or indirect impacts, are presented in section P.8.

Temporary loss of habitat and disturbance to an area can occur from construction activities. Permanent loss of habitat occurs in those areas that are occupied by Project features. Table P-10 summarizes acreage of affected habitat by type and category, fully defined for (1) the habitat analysis area, (2) temporary facilities, and (3) permanent facilities.

P.7.2 Potential Impacts to Wildlife

Potential impacts are discussed for birds, bats, big game, other mammals, amphibians, and reptiles. Discussion of potential impacts to special status/sensitive species is also included. To summarize:

- 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 Project was not high relative to other wind project sites in the United States, including other open habitat sites. The results observed at this site were relatively consistent with the other Sherman County wind facilities. However, the 2006/07 surveys did show higher raptor use that the other Sherman County wind facilities.

- Raptor fatality rates for the Project are anticipated to be less than 0.14 per MW per year).
- Passerine (songbird) fatality range is anticipated to be from 1 to 2.75 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 mortality is expected to be low, based upon monitoring results of existing facilities in the region and relatively infrequent use of the Project year-round by Canada geese.
- Displacement impacts to birds in grassland and shrub-steppe habitats are anticipated to be minimal with reduced densities occurring within less than 100 meters (328 feet) of facilities located in these habitats. A very small percentage of the area within 150 meters (492 feet) of the Project is either native grassland or shrub-steppe habitats. Special consideration should be given to western loggerhead shikes, especially where O&M personnel or structures may be near existing or new nest sites. The large shrub-steppe ecosystem of the Yakima Training Center, Washington, documented disturbance impacts to nesting loggerhead shrikes from roads out to 150 m by monitoring nest failure (*in* Pruitt 2000).
- 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 Project 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 Project area, given the lack of habitat and fatality results of other facilities in similar habitats, and no impacts to threatened or endangered bat species are anticipated.
- No measurable impacts are anticipated to big game from Project operations.
- Project construction will result in loss of foraging and breeding habitat for 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 evidence exists that supports the presence of Washington ground squirrels in Sherman County. Special consideration should be given to loggerhead shrikes with regard to construction and O&M vehicular traffic speed. Loggerhead shrikes are apparently more vulnerable than other bird species to vehicle collision. This is likely due to several factors: affinity to roadside habitats, roadside perches, having a low inter-perch flight height, using roads as feeding grounds and/or scavenging grounds for roadkill insects, and fledglings with

poorly developed flying skills being apparently particularly susceptible to collisions (Novak 1989, Andrle and Carroll 1988; *in* Pruitt 2000). The Applicant will limit traffic speed accordingly throughout the Project.

- 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. Because the Project is sited in a non-aquatic or riparian area, western toads are not expected to be impacted unless of a rare event involving heavy rainfall/flooding where toads may disperse uncharacteristically. Impacts to intermittent streams/wetlands during construction will be temporary and during the dry season.

P.7.2.1 Birds

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 Project are anticipated to be similar to those from construction in terms of noise, disturbance, and equipment. Potential mortality from construction equipment is expected to be very low. Equipment used in wind Project 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. See western loggerhead shrike review above as an example.

The most probable impact to birds resulting from the operation of the Project is direct mortality or injury caused by collisions with the turbines. Collisions could 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 because of disturbance caused by Project 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 (e.g., mortality and displacement). The Project site is located in a landscape with relatively flat topography composed primarily of dryland wheat within a region in which several wind facilities have been developed and studied. Baseline and/or monitoring studies have been conducted at most of these wind project locations, providing an existing comprehensive data source for predicting impacts to wildlife species.

Measured bird use of the Project area by avian species, habitat, and topography, in addition to measured use and mortality estimates from other existing wind facilities in the region, was used to predict mortality of birds for the Project. Primary information from other facilities in the region include:

- Pre-construction avian use, habitat, and raptor nest information and post-construction fatality monitoring at the nearby Klondike I wind project
- Pre-construction avian use, habitat, and raptor nest information at the nearby Klondike II wind project
- Pre-construction avian use, habitat, and raptor nesting collected for the nearby Klondike III wind project
- Pre-construction avian use, habitat, and raptor nest information and post-construction fatality monitoring for the Condon wind facility, Gilliam County, Oregon
- Pre-construction avian use, habitat, and raptor nest information and post-construction avian use, raptor nesting, and fatality monitoring from the Stateline wind facility in Walla Walla County, Washington, and Umatilla County, Oregon
- Pre-construction avian use, habitat, and raptor nest information, and post-construction avian use, raptor nesting and fatality monitoring from the Combine Hills wind facility in Umatilla County, Oregon
- Pre-construction avian use, habitat, and raptor nest information, and post-construction avian use, raptor nesting and fatality monitoring from the Nine Canyon wind facility in Benton County, Washington

Collision

Substantial data on avian mortality at operational wind facilities are currently available (Erickson et al., 2001; Erickson et al., 2004), especially for those projects in the Pacific Northwest. Outside of existing California facilities, diurnal raptor fatalities comprised only 2 percent of wind project-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 (e.g., raptors, waterfowl) composed 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. Non-protected birds, including house sparrows, European starlings, and rock doves, composed 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 similar 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 Project. 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 (e.g., raptors; Smallwood and Thelander, 2004, WEST 2006), 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 (Erickson et. al., 2001) or approximately 3 fatalities per MW per year.

Project and turbine characteristics of seven Pacific Northwest regional wind facilities where standardized fatality monitoring has been conducted are described in Table P-13. 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-14). 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-15). Overall bird use estimated for the Project was not high, relative to other open-habitat wind project sites in the United States, suggesting that mortality estimates observed at these facilities provide a strong basis for predicting mortality impacts for the Project. Detailed descriptions of impacts to bird groups including raptors, passerines, and waterbirds (waterfowl, shorebirds, and other waterbirds) are included in the following discussion.

Table P-13. Facility and Turbine Characteristics of Six Regional Wind Energy Facilities Where Fatality Monitoring Studies are Underway or Have Been Conducted

	Facility Size		Turbine Characteristics			
Pacific Northwest Wind Facility	**No. of Turbines**	**No. of MW**	**RD (m)**	**Tip Height (m)**	**RSA m^2**	**MW per Turbine**
Stateline, Oregon-Washington	454	300	47	74	1735	0.66
Vansycle, Oregon	38	25	47	74	1735	0.66
Klondike, Oregon, Phase I	16	24	65	100	3318	1.50
Hopkins Ridge, Washington	83	150	70	107	5027	1.8
Nine Canyon, Washington, Phase I	37	48	62	91	3019	1.30
Nine Canyon, Washington, Phase II	12	20	62	91	3019	1.30
Combine Hills, Oregon	41	41	61	84	2961	1.00

Table P-14 Pacific Northwest Regional Annual Fatality Estimates on Per Turbine and Per MW Nameplate Bases for All Birds and for All Raptors[1]

Pacific Northwest Wind Facility	Bird Fatality Rates		Raptor Fatality Rates	
	No. per Turbine	No. per MW	No. per Turbine	No. per MW
Stateline, Oregon-Washington	1.9	2.9	0.06	0.09
Vansycle, Oregon	0.6	1.0	0.00	0.00
Klondike, Oregon, Phase I	1.4	0.9	0.00	0.00
Nine Canyon, Washington, Phase I	3.6	2.8	0.07	0.05
Combine Hills, Washington	2.6	2.6	0	0
Hopkins Ridge, Washington	2.2	1.2	0.22	0.14
Average	2.1	1.9	0.06	0.05

Raptors

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).

A recent study within the APWRA suggested lower overall raptor mortality at newer wind turbines (WEST 2006). A repowering project which included the replacement of old turbines with newer Vestes 660 kw turbines was completed in 2005. Fatality studies conducted at these new turbines suggested approximately 30-50% lower raptor mortality at the new turbines compared to the estimates from the remaining older turbines in the APWRA (WEST 2006).

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 per. 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 (e.g., Stateline wind facility, Oregon-Washington, 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 project 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 project. 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 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. 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. 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.

Mean raptor use of the Project site is moderate compared to that at several other wind plants in the United States that have been surveyed by means of similar methods (Figure P-14) and much lower than mean raptor use at both the High Winds Facility and the APWRA. Based on the numerous studies in the region, species consistently observed as most abundant are red-tailed hawks, American kestrels, northern harriers, and rough-legged hawks (in early spring and winter).

Raptor nest density within the Project site and within a 2-mile buffer was 0.25 per square mile, which is in the range of the average raptor nest density for proposed and existing wind facilities located in agricultural landscapes (Table P-15). At Klondike I, Oregon, raptor nest density was also 0.15 per square mile within 5 miles of the Klondike project area (which overlaps with much of the Golden Hills Project 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 (Young et al., 2005, Young et al., 2006). Raptor nest density for the recently permitted Hopkins Ridge wind facility in Columbia County, Washington, was 0.43 per square mile, and that site has seen the highest raptor mortality in the region (0.14 per MW per year). 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).

Given the information on raptor use and nesting density at this and nearby facilities, the habitat and topographic characteristics of the site, and relevant mortality data from nearby facilities, raptor fatality rates are anticipated to be relatively low (≤ 0.14 per MW per year). We expect most of the fatalities of diurnal raptors to consist of red-tailed hawks and American kestrels, with occasional fatalities of Swainson's hawk, rough-legged hawk, Northern harrier, and some owl species.

Table P-15 Estimated Raptor Nest Densities from Other Proposed and Existing Wind Facilities Located Primarily in Agricultural Landscapes

Facility Site	Raptor Nest Density (#/mi^2)							
	All Raptors	**SWHA**	**RTHA**	**FEHA**	**GOEA**	**PRFA**	**GHOW**	**SSHA**
Golden Hills, Oregon	0.25	0.04	0.16	0.00	0.00	0.00	0.05	0.00
Biglow Oregon	0.15	0.04	0.08	0.00	0.00	0.00	0.02	0.00
Klondike III Oregon	0.16	0.04	0.08	0.00	0.00	0.00	0.04	0.00
Leaning Juniper, Oregon	0.41	0.18	0.16	0.03	0.00	0.02	0.02	0.00
Stateline Oregon-Washington	0.21	0.03	0.08	0.03	0.00	0.00	0.07	0.00
Nine Canyon, Washington	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zintel Canyon, Washington	0.08	0.04	0.02	0.02	0.00	0.00	0.00	0.00
Buffalo Ridge, Minnesota	0.15	0.07	0.06	0.01	0.00	0.00	0.02	0.00
Klickitat County, Washington	0.12	0.00	0.09	0.00	0.00	0.01	0.03	0.00
Combine Hills, Oregon	0.24	0.06	0.11	0.01	0.00	0.00	0.00	0.00
Columbia Hills, Washington	0.30	0.04	0.18	0.00	0.02	0.02	0.02	0.02
Ponnequin, Colorado	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Hopkins Ridge, Washington	0.43	0.01	0.27	0.01	0.00	0.00	0.08	0.00
Maiden, Washington	0.18	0.05	0.04	0.03	0.00	0.03	0.02	0.00
Wild Horse, Washington	0.16	0.12	0.00	0.00	0.00	0.02	0.02	0.00
Kittitas Valley, Washington	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Desert Claim, Washington	0.34	0.23	0.00	0.00	0.00	0.00	0.04	0.00
Average	**0.19**	**0.07**	**0.07**	**0.01**	**0.00**	**0.01**	**0.02**	**0.00**

Passerines/Songbirds

Passerines, often referred to as songbirds, have had the highest avian fatality rates at wind facilities outside California, often comprising more than 80 percent of the total avian fatalities (Erickson et al., 2001; Erickson et al., 2002), largely because they 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 (Table P-16), 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.

Table P-16 Number and Species Composition of Bird Fatalities Found at the Pacific Northwest Regional Wind Facilities

Species	Percent Composition	Number of Fatalities
Horned lark	35.2	128
Ring-necked pheasant	9.6	35
Golden-crowned kinglet	6.3	23
Chukar	4.7	17
Western meadowlark	4.1	15
European starling	4.1	15
Gray partridge	3.8	14
White-crowned sparrow	3.3	12
Red-tailed hawk	2.5	9
American kestrel	2.5	9
Unidentified passerine	2.2	8
Yellow-rumped warbler	1.6	6
Winter wren	1.4	5
Rock pigeon	1.4	5
Canada goose	1.1	4
Dark-eyed junco	1.1	4
Unidentified bird	1.1	4
House wren	0.8	3
Red-breasted nuthatch	0.8	3
Black-billed magpie	0.8	3
Northern flicker	0.8	3

Table P-16 Number and Species Composition of Bird Fatalities Found at the Pacific Northwest Regional Wind Facilities

Species	Percent Composition	Number of Fatalities
Golden-crowned sparrow	0.8	3
Unidentified sparrow	0.5	2
Short-eared owl	0.5	2
Savannah sparrow	0.5	2
Ruby-crowned kinglet	0.5	2
Vesper sparrow	0.5	2
White-throated swift	0.5	2
Rough-legged hawk	0.5	2
Great blue heron	0.5	2
Red-winged blackbird	0.3	1
Ferruginous hawk	0.3	1
Grasshopper sparrow	0.3	1
American pipit	0.3	1
Mallard	0.3	1
Swainson's thrush	0.3	1
Swainson's hawk	0.3	1
Spotted towhee	0.3	1
Lewis's woodpecker	0.3	1
American robin	0.3	1
Macgillivray's warbler	0.3	1
House finch	0.3	1
Virginia rail	0.3	1
American coot	0.3	1
Cooper’s hawk	0.3	1
Gray catbird	0.3	1
Northern harrier	0.3	1
Townsend’s warbler	0.3	1
Unidentified flycatcher	0.3	1
Total (47 species identified)	**100.0**	**364**
Total	**100.0**	**287**

Johnson et al., 2002b; Erickson et al., 2000, 2001, 2003, 2004, Young et al. 2006, Young et al. 2005

N = Non-native species.

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 project area, and one to the north of the project area in Washington. The northern and southern stations had very similar passage rates, suggesting broad front movements throughout the project areas.

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 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.[3] 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 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 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 (i.e., steady-burning red incandescent; Johnson et al., 2002b). Phase I turbines at the Buffalo Ridge wind facility were not lit,

[3] Recent FAA lighting regulations released in 2005 for wind turbines favor solid red lighting during the night, and white lights with some strobe during the day. Wind facilities are to be “outlined” with lighting, rather than lighting every turbine.

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 similar landscapes, an approximate range of 1.0 to 2.75 songbird fatalities per MW per year are predicted for the Project. 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.

Waterfowl and Other Waterbirds

Wind facilities 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 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 project fatality studies.

Similar findings were observed at the Buffalo Ridge wind facility in southwestern Minnesota, which is located in an area with relatively high waterfowl/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.

The Golden Hills Project area gets some waterfowl use, primarily Canada goose, especially during the winter period. The amount of use likely varies annually and seasonally, depending on weather patterns, food availability, and other factors. However, few observations were made of Canada geese during the two years of avian use surveys in the area. Canada goose use estimates from the 2001 studies at the Klondike I and II facilities (Johnson et al., 2002a) estimated much higher goose use in the winter (17 individual goose observations per 30-minute survey). This variability is not surprising, given the nature of the observations during all the studies (a small number of flocks of highly variable size were recorded). High spatial variability in avian use is apparent from results of this study and from studies of nearby facilities, and is not surprising given regional landscape characteristics, i.e., relatively flat monoculture of dryland agriculture.

Although this high variability indicates high uncertainty in an annual goose use estimate for this area, the impact predictions are much less variable, because of the low mortality factors involved. Some waterfowl mortality could occur from the Project. However, even if estimates of goose use are near the high end of the range reported near this Project, waterfowl mortality on average is expected to be low, both absolutely and relative to the waterfowl use of the area. The possibility exists for a rare event involving several individuals of a flock colliding with wind turbines, given unusual weather circumstances. However, this would have negligible effects, if any, on the Pacific population of Canada geese (exhibiting an increasing trend over the last decade; Garrettson et al., 2003).

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 (e.g., 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/ 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 and reproduction.

Avian baseline studies of the Foote Creek Rim (FCR), Wyoming, wind facility conducted in 1994 and 1995 documented mountain plovers (*Charadrius montanus*)[4] 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) 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 4 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

[4] The U.S. Fish and Wildlife Service proposed listing mountain plover as a threatened species under the Endangered Species Act in February 1999 (USFWS, 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.

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 was 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 (e.g., 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.

Some indirect impacts to birds in grassland and shrub-steppe habitats are anticipated. Given that only 15.5 percent of the Project footprint is located in noncultivated or undeveloped habitats, and displacement effects have been relatively low [reduced densities less than 100 meters (328 feet) from turbines and roads] at other facilities, indirect impacts are anticipated to be minimal.

P.7.2.2 Bats

Most bat species roost in structures such as buildings, caves, mines, trees, and bridges, which are rare to absent within the Project area. Foraging habitat is also extremely limited in the Project area because of a lack of surface water; therefore, the construction and decommissioning of the Project is not anticipated to result in the loss or degradation of bat roosting and foraging habitat in the Project area. The potential impact to bats could be from collision mortality during operation. Pre-construction 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). Pre-construction surveys for bats have not been demonstrated to be strongly correlated with post-construction bat fatality rates t this time and research is on-going to determine the usefulness of pre-construction studies for bats. For now, the typical methods used to assess potential bat impacts include using risk assessment methods, use of mortality information from adjacent sites and acoustic surveys to assess species composition and relative use.

Twelve species of bats are known to reside in or migrate through Sherman County (Csuti et al. 2006; USFWS 2007; Table P-17). Of these species, six are listed as federal species of special concern. These species include western small-footed myotis, long-legged myotis, spotted bat, Yuma myotis, silver-haired bat, and Townsend's big eared bat. Of these 12 species, there is a high/moderate likelihood to occur within the Project area and surrounding lands based on the presence of suitable roost habitat such as rocky canyons, trees, and buildings and foraging habitat such as water and open grasslands.

Table P-17. Life history characteristics for bat species known to occur in Sherman County

western small-footed myotis (*Myotis ciliolabrum)*	Federal Species of Concern	High	NA	Associated with cliffs and rock canyons. Also found in ponderosa pine and mixed conifer forests. Forages over rocks. Feeds on small insects taken in flight.	Solitary or 2–6 individuals	Roosts in rock crevices, under boulders, sometimes under bark.	NA	Winters in caves and mines.
spotted bat (*Euderma maculatum)*	Federal Species of Concern	High	6-38.5 km (3.7-24 mi)	Most often found in juniper and sagebrush habitats. Usually a solitary forager and from 2-10 m above ground.	Relatively solitary but may for small clusters	Roosts in caves, cracks and crevices in cliffs and canyons.	Believed solitary	Unknown
Townsend's big-eared bat *(Corynorhinus townsendii pallescens)*	Federal Species of Concern	Moderate	1– 4 km (0.6-2.5 mi)	Found in arid western scrub and pine forests. Primarily feeds on moths. Forages on wing, but will glean insects from foliage.	Seldom exceeds 100 individuals	Roosts in buildings, caves, mines and under bridges (intolerant of human disturbance).	Solitary or in clusters.	Winters in cold areas of caves and mines (intolerant of human disturbance)
Yuma myotis (*Myotis yumanensis)*	Federal Species of Concern	Moderate	NA	Closely associated with water. Found in a wide variety of upland and lowland habitats. Requires open water for drinking and foraging. Most important food items are small moths, midges, flies and termites.	Up to 5000 individuals	Roosts in buildings, caves, mines and under bridges.	NA	Unknown
long-legged myotis (*Myotis volans)*	Federal Species of Concern	Low	NA	Associated with coniferous forests, but may also be found in oak	Several hundred individuals	Roosts in tree cavities, under loose bark,	NA	Winters in caves and mines.

Table P-17. Life history characteristics for bat species known to occur in Sherman County

				and mixed evergreen woodlands. In arid parts of range found near riparian forests. Feeds in insects, primary moths.		crevices in cliff faces, abandoned buildings.		
silver-haired bat (*Lasionycteris noctivagans)*	Federal Species of Concern	Low	0.05–0.09 km (0.03–0.06 mi.)	Found in forested areas, most abundant in Oregon in older Douglas-fir/western hemlock forests. Forages over ponds and streams in woods. Prefers soft-bodied insects like moths, termites and flies.	Small	Roosts in tree foliage, tree cavities and under loose bark.	Usually solitary but can have 3–6 individuals.	Winters in small tree hollows, underneath bark, in woodpiles and cliff faces.
pallid bat (*Antrozous pallidus)*	State Sensitive	Moderate	NA	Occurs in arid regions. Feeds on flightless arthropods (crickets, beetles, grasshoppers and scorpions). Also known to eat small vertebrates. Forages on ground.	Usually small; may include up to 200 adults	Roosts in cliff faces, caves, mines and buildings (intolerant of disturbance; readily abandons roosts).	NA	Winters in narrow crevices in caves.
long-eared myotis (*Myotis evotis)*	State Sensitive	Low	NA	Found in forested areas and forest edges. Can also be found in scrubland, if roosting sites are available. Prey items primarily moths.	Small colonies; 12–30 individuals have been found in BC	Roosts in buildings, hollow trees, caves mines and rock fissures. Pregnant females often roost at ground level in rock crevices or fallen logs.	NA	Winters in caves. Most migrate out of Oregon.

Table P-17. Life history characteristics for bat species known to occur in Sherman County

California myotis (*Myotis californicus)*	None	High	NA	Forages around clumps of trees, over or near open water. In Oregon feeds on butterflies and small flies.	Solitary but up to 25 individuals	Roosts in cliff faces, crevices in trees or buildings (between shingles).	NA	Winters in caves and mines.
big brown bat (*Eptesicus fuscus)*	None	High	1–2 km (0.62–1.24 mi.)	A generalist, more common in deciduous forests. Adapted to human development. Forages over land and water, open areas and forests. Primarily takes beetles including many crop pests. Also named "house bat."	25–75 individuals	Roosts in hollow trees, crevices in cliffs, buildings, bridges and bat houses.	Rarely more than a few hundred individuals.	Winters in caves, mines, and man-made structures.
western pipistrelle (*Pipistrellus hesperus)*	None	High	NA	Found in greasewood and sagebrush communities, as well as, juniper woodland and sedge. Feeds on swarms of small flying insects (e.g., mosquitoes, flies.). Emerges before dark and active after dawn.	Up to a dozen, but solitary females have been found	Roosts among boulders or in cracks and crevices of rock faces. May find shelter in rodent burrows.	NA	Winter in caves and mines.
little brown bat (*Myotis lucifugus)*	None	Moderate	NA	Closely associated with water. Found in moist forests. In arid parts of state found in riparian woodlands. Often hunts over water. Feeds on flying insects.	50–2500 individuals (avg. 400)	Roosts in buildings, caves, hollow trees.	NA	Winters in caves, tunnels and abandoned mines.

[1] NA = Not Available or Accessible for analysi

The potential for bat collisions with wind turbines is highest in the eastern part of the U.S. (NWCC 2004). Information for potential bat mortality resulting from wind energy projects in the west is limited, though it is indicated that primary impacts would occur to migratory species, especially for open agriculture and grassland projects (Erickson et al. 2002). Nationwide, three species of migratory tree roosting bat species have been associated with the majority of documented wind facility fatalities and include the hoary bat (*Lasiurus cinerus*), eastern red bats (*L. borealis*), and silver-haired bats. According to species distribution maps in Csuti et al. (2006), none of these species regularly occur in Sherman County.

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 Project 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 (Betts 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 Project area. At several wind facilities evaluated in the United States, 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 plant (see 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.

At the large Buffalo Ridge wind facility in Minnesota (more than 300 turbines during the study), based on a 2-year study, bat mortality was estimated to be approximately 3 bats per MW per year (2 bats per turbine per year; Johnson et al., 2003a, 2004). At the Foote Creek Rim wind facility in Wyoming, based on more than 3 years of study, bat mortality was estimated at 2 bats per MW per year, (1.3 bats per turbine per year; Young et al., 2003).

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 one 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, 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). 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. 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).

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). Anabat surveys at the Biglow Canyon wind farm resulted in very low bat call rates (WEST 2005) and bat habitat in the Golden Hills area is very similar. Bat mortality at the adjacent Klondike I and II facilities have also been low. At the present time, the mortality data from adjacent facilities is the best way of predicting mortality at the project. 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 Project area to these other regional facilities, it is anticipated that bat mortality will be approximately 1-3 bats per MW per year. 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.7.2.3 Big Game

Elk (*Cervis elaphus*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), and pronghorn (*Antilocapra americana*) are known to occur on or near the site. Mule deer and elk primarily occupy grassland, shrub-steppe, and riparian habitats within the Project area. Elk were not observed often, and likely occupy riparian areas of the Grass Valley drainage more often except possibly in winter or early spring when seeking forage. Pronghorn occur at random locations throughout the Project area. During the construction period, big game in the Project area will likely be temporarily displaced from these habitats because of the influx of humans and heavy construction equipment and associated disturbance (e.g., blasting). Following completion of Project construction, disturbance levels from construction equipment and humans will diminish significantly and the primary disturbances will be associated with occasional vehicular traffic of O & M personnel, and the presence of turbines and other Project structures.

There is little information regarding wind project effects on big game. At the Foote Creek Rim wind project in Wyoming, antelope observed during raptor use surveys were recorded year round (Johnson et. al. 2000a). The mean number of antelope observed at the six survey points was 1.07 prior to construction of the wind farm and 1.59 and 1.14/survey the two years immediately following construction, indicating no reduction in use of the immediate area. Mule deer and elk also occurred at Foote Creek Rim, but their numbers were so low that meaningful data on wind farm avoidance could not be collected. A more recent study regarding interactions of elk populations with operating wind farms was recently conducted by David Walter in conjunction with the Rocky Mountain Elk Foundation, the Oklahoma Department of Wildlife Conservation, Nature Works, and the Oklahoma Cooperative Fish and Wildlife Research Unit (Walter et al. 2004). The study found no evidence that operating wind turbines have a measurable impact on elk use of the surrounding area. The operating Wild Horse wind facility near Kittitas, Washington, has documented numerous observations of elk near operating wind turbines (WEST biotechnicians, pers. comm.). These observations have noted elk behavior of non-alarm or distress, and include resting, grazing, and walking.

There are published studies of big game winter use related to other human developments such as oil and gas. Indirect impacts associated with human activity or development has been documented with elk (e.g., Lyon 1983, Wisdom et al. 1986, Czech 1991, Morrison et al. 1995, Rowland et al. 2000) and mule deer (e.g., Rost and Bailey 1979, Easterly et al. 1992, Merrill et al. 1994, Sawyer et al. 2004). In south-central Montana, Van Dyke and Klein (1996) documented elk movements through the use of radio telemetry before, during, and after the installation of a single oil well within an area used year round by elk. Drilling activities during their study ceased by November 15, however, maintenance activities continued throughout the year. Elk showed no shifts in home range between the pre and post drilling periods, however, elk shifted core use areas out of view from the drill pad during the drilling and post drilling periods. Elk also increased the intensity of use in core areas after drilling and slightly reduced the total amount of range used. It was not clear if the avoidance of the well site during the post-drilling period was related to maintenance activities or to the use of a new road by hunters and recreationists. The authors concluded that if drilling activities occupy a relatively small amount of elk home ranges, that elk are able to compensate by shifting areas of use within home ranges.

A study by Rost and Bailey (1979) found that wintering mule deer and elk avoided areas within 656 ft (200m) of roads in eastern portions of their Colorado study area, where presumably greater amounts of winter habitat were present. Road avoidance was greater where roads were more traveled. Only mule deer showed a clear avoidance of roads in the western portion of their study area, where winter range was assumed to be more limiting. Mule deer also showed greater avoidance of roads in shrub habitats versus more forested areas. The authors concluded that impacts of roads depended on the availability of suitable winter range away from roads, as well as the amount of traffic associated with roads.

Oregon radio-telemetry studies of elk and mule deer have been conducted in a large fenced experimental research area. Results of spring studies (April – early June) suggest that elk habitat selection may be negatively related to traffic and other human disturbance (Johnson et al. 2000c). Mule deer habitat selection appeared to be related to elk distribution, with mule deer avoiding areas used by elk. Traffic and roads did not appear to be an important factor in spring distribution of mule deer (Wisdom et al. 2002). Distances moved by elk tended to increase as a function of increased use by humans, including ATV use, hiking, and horseback riding. The same was true for mule deer, but the response was less than that of elk (Wisdom et al. 2002). In western Wyoming, a multi-year GPS/radio-telemetry study suggests that winter mule deer habitat selection and distribution patterns have been affected by natural gas development, specifically by road networks and well pads (Sawyer et al. 2004).

We are aware of no studies that have documented population level impacts. Most of the studies have focused on displacement of big game, but have not determined whether these displacement effects result in any significant population level effects such as decreases in survival. Due to the lack of data regarding the potential impacts of energy development on big game, it is difficult to predict with certainty the effects of the Project on wintering mule deer and elk. While human related activity at wind turbines during regular maintenance will be dramatically less than during the construction period, it is not known if human activity associated with regular maintenance activity will exceed tolerance thresholds for wintering elk and mule deer.

Given that the Project is predominantly agriculture and sited in high-elevation open exposed environments, and that low levels of O&M activities are anticipated, no measurable impacts are anticipated to big game from Project operations.

P.7.2.4 Small Mammals

Other mammals that are likely to or do exist within the Project area include, badger, coyote, beaver, pocket gopher, California ground squirrel, and other small mammals such as jackrabbits, voles, and mice.

A colony of small-eared ground squirrels was observed to the east of the Golden Hills Wind Farm during the 04/05 avian use surveys for Biglow Canyon (WEST Inc. 2006) Photographs were taken of the ground squirrels in question and they were positively identified as Merriam's ground squirrels (*Spermophilus canus canus*).
No small-eared true ground squirrels of any species were detected in the Project area during the spring/early summer special status/sensitive species surveys in noncultivated habitat or during any other avian surveys conducted through all seasons, including all activities associated with in-transit travel through noncultivated habitats.

Construction of the Project could affect small mammals through loss of habitat and direct mortality of individuals occurring in construction zones. Excavation for turbine pads, roads, or other facilities could kill individuals in underground burrows. Project construction will result in loss of foraging and breeding habitat for small mammals. Ground-dwelling mammals will lose the use of the permanently affected areas; however, they are expected to repopulate the temporarily affected areas. Approximately 93 percent of the Project's permanent footprint will be on agricultural land, minimizing the impact to small mammal habitat. Some small mammal fatalities can be expected from vehicle activity during operations, but impacts are expected to be very low.

P.7.2.5 Reptiles and Amphibians

Amphibian and aquatic reptile habitat ranges from limited to non-existent near the construction areas. Impacts to reptiles and amphibians onsite (if any) are expected through loss of habitat and direct mortality of individuals occurring in construction zones. No construction impacts to rock outcrops that might be used for hibernacula will occur. If best management practices are employed onsite in accordance with an approved erosion and sedimentation control plan, no amphibians or aquatic reptiles should be affected by construction or operation of the Project. The level of mortality to non-aquatic reptiles onsite associated with construction will be based on the abundance of species onsite. Some mortality can be expected to reptiles that might occur onsite, such as gopher snakes and rattlesnakes. Excavation for turbine pads, roads, or other facilities could kill individuals in underground burrows.

No impacts to amphibians are anticipated during operations. Impacts to reptiles during operation will probably be limited to some potential direct mortality caused by vehicle collisions and are expected to be very low.

P.7.2.6 Plants

All potential impacts to plants are covered in Exhibit Q.

P.8 MEASURES TO AVOID, REDUCE OR MITIGATE IMPACTS

OAR 345-021-0010(1)(p)(G) *A description of any measures proposed by the applicant to avoid, reduce or mitigate the potential adverse impacts described in (F) in accordance with the ODFW mitigation goals described in OAR 635-415-0025 and a discussion of how the proposed measures would achieve those goals.*

Response: Primary mitigation measures adopted early in the design of the Project include a minimum distance for wind turbine locations of 3 miles from the centerline of the Columbia River to minimize or eliminate potential impacts to peregrine falcons and bald eagles (addressed in Exhibit Q), waterfowl, wintering big game, and migrating songbirds and bats.

In general, ridgelines are oriented in a north-south direction. Turbines sited along ridgelines are approximately parallel to the most likely bird movement corridors (i.e., along ridge slopes, canyons, and watersheds), reducing the risk of collision. Turbine corridors for the Project are sited generally on top of the ridge away from the windward side (west side). All turbine corridors are sited on topography with slopes of less than 12 percent.

The following mitigation measures will also be taken in order to minimize or avoid potential adverse impacts to birds and sensitive habitat:

- Permanent meteorological towers will not have guy wires.
- The Applicant will survey the status of known raptor nests in the vicinity of proposed ground-disturbing construction activities (i.e., within .5 mile) before ground-disturbing construction activities begin. If an active nest is found, and ground-disturbing construction activities are scheduled to begin before the end of the sensitive nesting and breeding season (i.e., mid-April to mid-August), the Applicant will not engage in ground-disturbing construction activities within a .25-mile buffer around the nest until the nest fledges young or the nest fails (e.g., is abandoned), unless ODFW approves an alternative plan. If ground-disturbing construction activities continue into the sensitive nesting and breeding season for the following year, the Applicant will not engage in ground-disturbing construction activities within the .25-mile buffer, if the nest site is found to be active, until the nest fledges young or the nests fails (e.g., is abandoned), unless ODFW approves an alternative plan.

The Applicant will also survey the status of known loggerhead shrike nests and visit sites where non-nesting shrikes were observed in order to determine old and new nest sites. Ground-disturbing construction activities will be sequenced as with active raptor nests, however a 150-meter buffer will be used instead of a 0.25 mile buffer; based upon nest failure research for this species at the Yakima Training Center, Washington.

- Category 3 upland tree habitats will be temporarily impacted, but not physically harmed or removed.

- A segment of the underground collection line between turbine corridors A and B goes through trees that have had an active red-tailed hawk nest. The nest tree will not be impacted.
- Approximately 8.6 acres of Category 2 riparian CREP and 0.1 acres of riparian Category 2 will be temporarily impacted. Approximately 0.5 acres of riparian Category 3 will also be temporarily impacted. In total, 4 wetland locations will be impacted temporarily by the installation of underground collector lines crossing each wetland. This will occur during the dry season and no hydraulic or hydrologic changes are expected to occur, as the crossing areas will be restored to their pre-construction contours and condition (see Exhibit J). No impacts are expected to incur to wildlife species due to this installation and restoration approach.
- To mitigate temporary disturbance from Project construction to wildlife habitats such as CRP, CREP, shrub-steppe, and grassland, these areas will be reseeded with the appropriate mixture of grasses and forbs, depending on the habitat and on recommendations from ODFW. Approximately 212 acres of Category 3 habitat and 37 acres of Category 4 habitat are expected to be temporarily disturbed. Because noxious weeds can have detrimental effects on native plant populations, the following additional measures will be implemented to control the introduction and spread of undesirable plants during and after construction:

  (1) Areas disturbed during construction will be revegetated expeditiously.

  (2) A noxious weed control plan will be developed following guidelines based upon consultation with the Sherman County Soil and Water Conservation District.

  (3) The noxious weed control plan will be finalized prior to construction and will be implemented over the life of the Project.

Indirect Project-related impacts to plant species of concern might also occur as a result of changes in fire frequency patterns in the area. Project 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 Project area, the most prudent course of action is to implement measures to maintain existing fire frequency patterns.

- 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.

Permanent direct habitat impacts from the Project footprint that cannot be avoided or minimized will be mitigated by the use of standards and methods that are in compliance with ODFW's Fish and Wildlife Habitat Mitigation Policy. Permanent facilities will directly impact 5.38 acres of Category 3 habitat and 0.77 acres of Category 4 habitat will be directly affected by permanent facilities, and an equivalent acreage will be will be enhanced or created. The Applicant would need to establish an agreement with a willing landowner to pursue mitigation objectives.

The proposed mitigation approach will consist of some or all of the following concepts, and will be finalized by the Applicant in consultation with ODFW:

- The Applicant will provide direct funding, implementation, and monitoring of conversion of tilled agricultural land to high quality wildlife habitat such as shrub-steppe, or rangeland enhancement where such land management tools may include reseeding deep soiled areas, installing water catchments , "guzzlers", for wildlife, and planting shrubs in drainage spring seep sites. If appropriate, the Applicant may use livestock exclosures or fencing to exclude livestock from riparian/shrub-steppe habitats, potentially creating a higher ODFW categorical rating.

- The selected mitigation site may also be augmented by planting upland trees, sagebrush and shrub-steppe shrubs and forbs This enhancement would pursue a more historic shrub-steppe ecosystem and provide perching and nesting habitat for Swainson's hawks, as well as provide new high-quality habitat for foraging and nesting loggerhead shrikes, an obligate shrub steppe species that may be considered a keystone species. This approach would help create new high-quality habitat that also provides habitat and cover for non-game and big game mammal species.

A number of side canyon areas along the Grass Valley Canyon have been identified as potential areas for mitigation. As noted above, the detailed mitigation plan will be finalized with willing landowners, with the concurrence of ODFW regarding mitigation area size, location, and vegetative goals. Both ODFW and the Sherman County Soil and Water Conservation District will be consulted regarding procedures for weed control and vegetation establishment and management.

96.23 acres of Category 6 habitat (agricultural) will be affected by permanent facilities and 709.31 acres will be affected by temporary construction activities. These impacts will be mitigated by:

- Noxious weed control in construction areas, as described previously
- Use of best management practices (BMPs) to minimize topsoil loss, and compliance with an erosion and sedimentation control plan approved by DEQ as part of the NPDES program in areas adjacent to drainage features
- Consulting with Sherman County Soil and Water Conservation District for proper procedures for restoring agricultural quality to its original condition

A monitoring program will be developed to identify post-construction impacts to wildlife, measure the effectiveness of habitat reclamation efforts, and results will be provided to ODOE and ODFW(see section B.9, below). Additional mitigation may also be proposed if estimates of indirect (displacement) impacts to grassland songbirds and/or nesting target raptor species are high.

P.9 MONITORING PROGRAM

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

Response: A monitoring program is being designed to estimate both direct and indirect impacts of the Project on wildlife and habitat. Aspects and objectives of the monitoring proposal will incorporate comments and concerns of ODFW/ODOE, and will probably include standardized casualty searches, searcher efficiency trials, a Wildlife Incidental Response and Handling System for operations and maintenance personnel, and reclamation procedures for habitats temporarily affected during construction. The monitoring program will be submitted to ODOE and ODFW in August 2007 and be incorporated into this SCA at that time.

P.10 REFERENCES

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FIGURES

Figure P-1. Avian observation stations from recent studies in Sherman County.

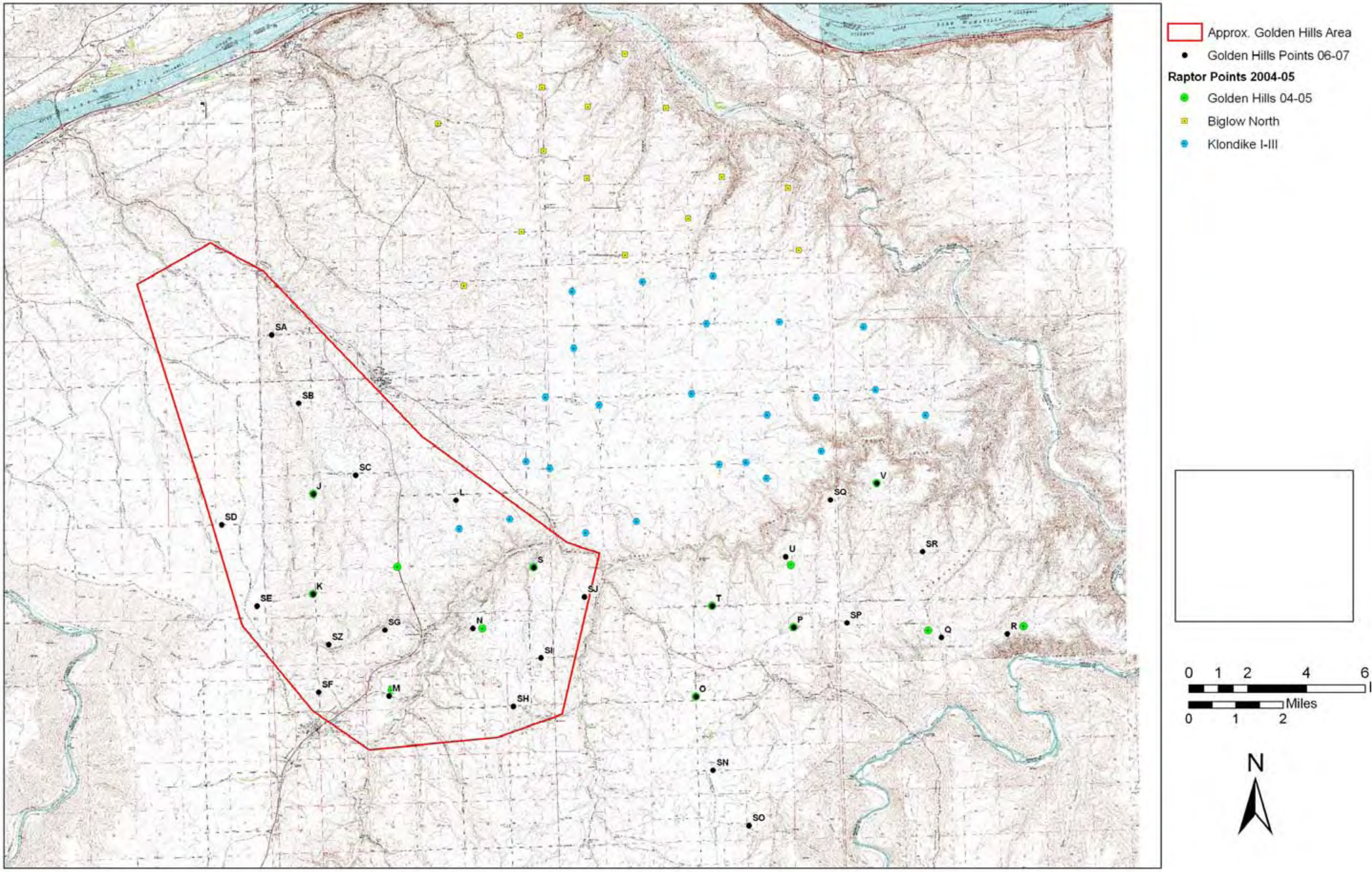


Figure P-2a. Overall raptor use by survey station for 2006 and 2007 of the A06/07 study.

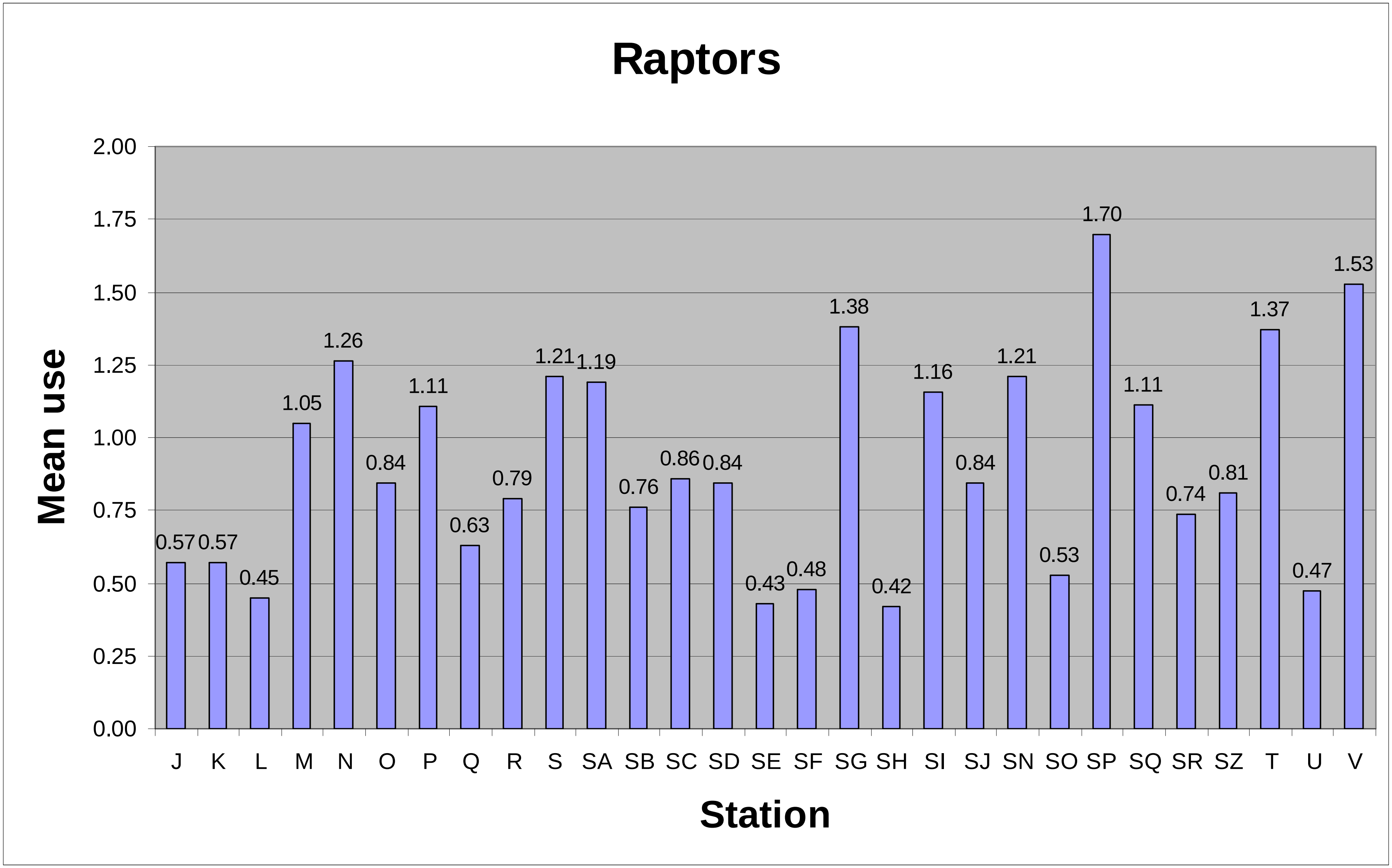


Figure P-2b. Accipiter use by survey station for 2006 and 2007 of the A06/07 study.

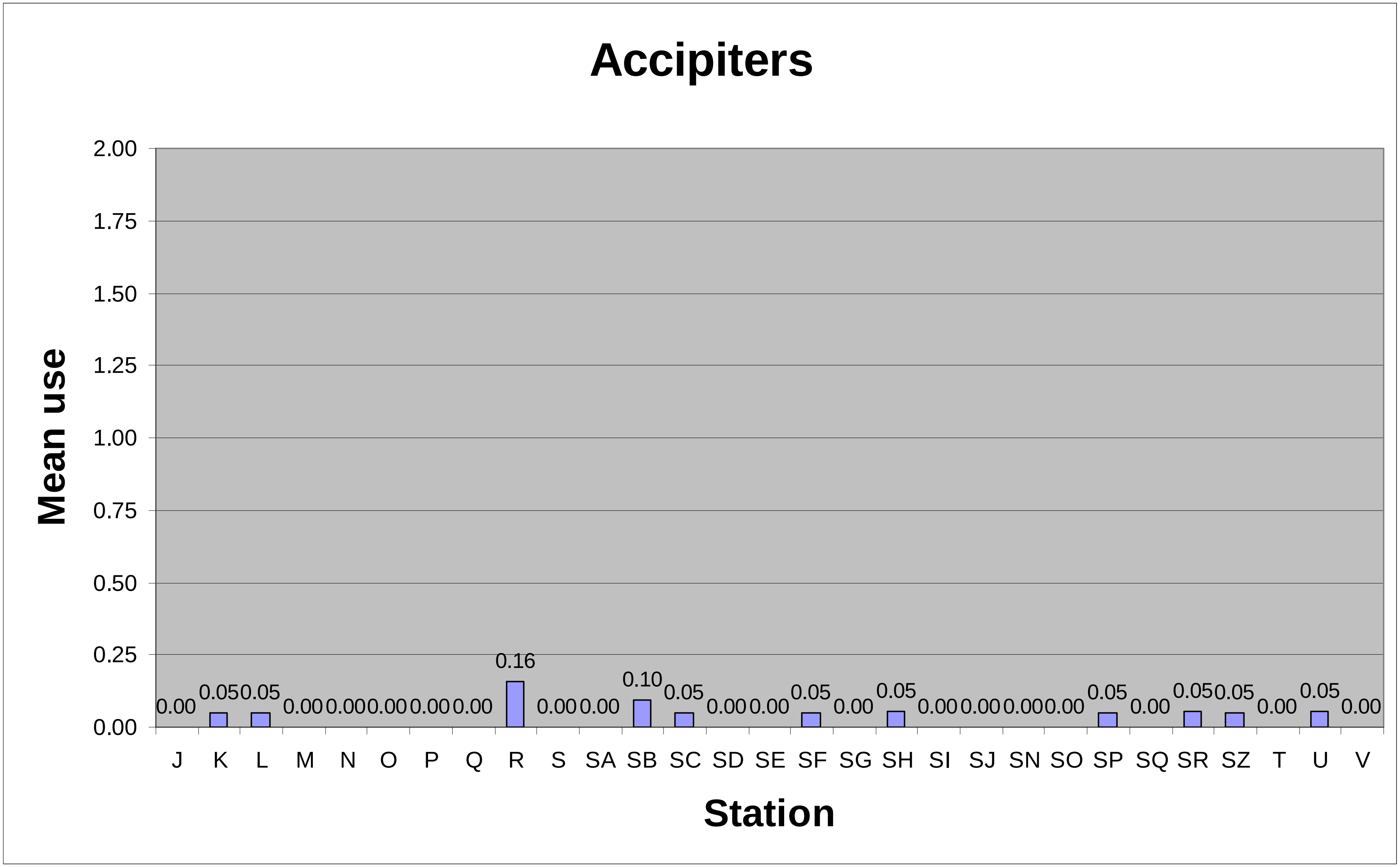


Figure P-2c. Buteo use by survey station for 2006 and 2007 of the A06/07 study.

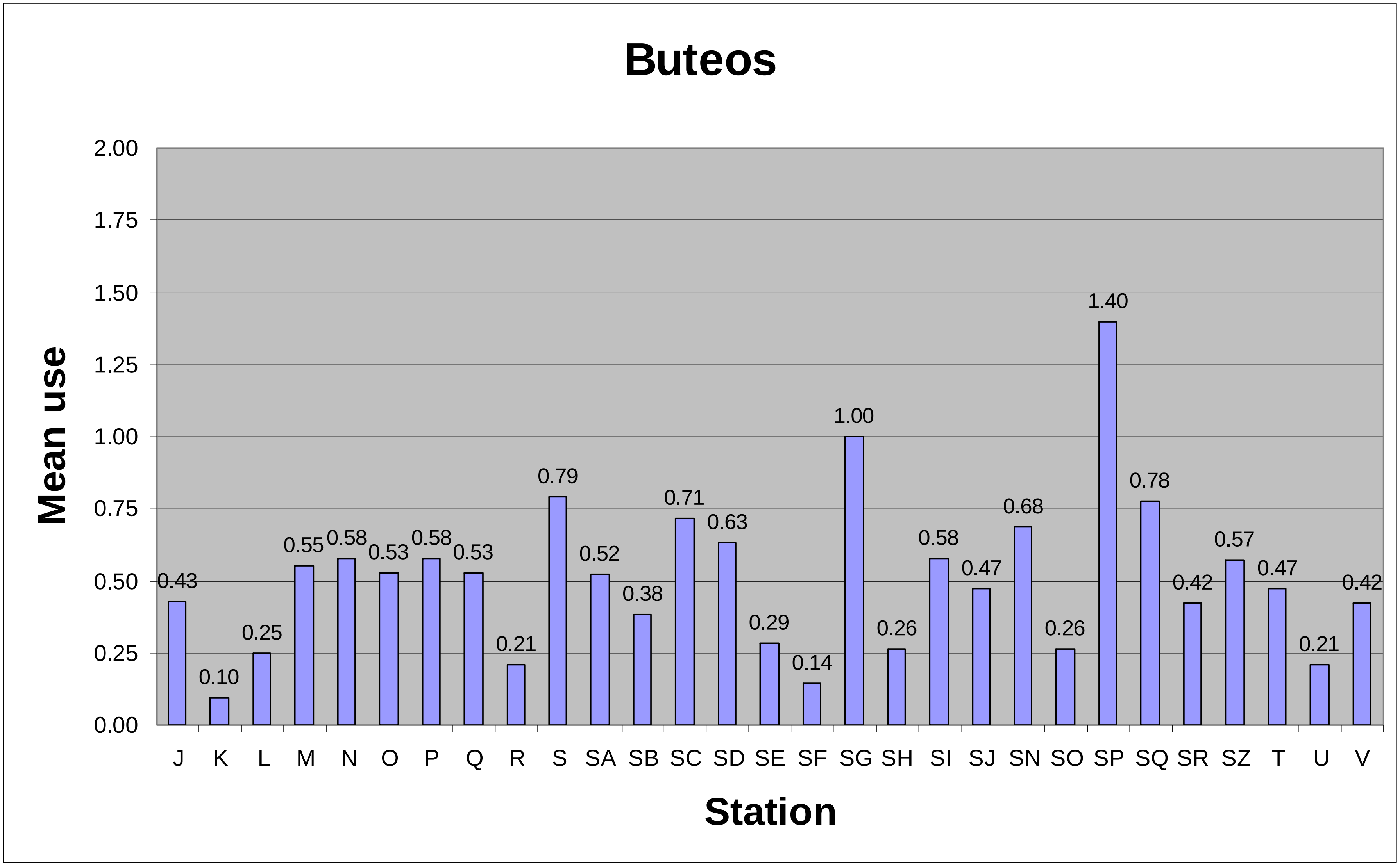


Figure P-2d. Northern harrier use by survey station for 2006 and 2007 of the A06/07 study.

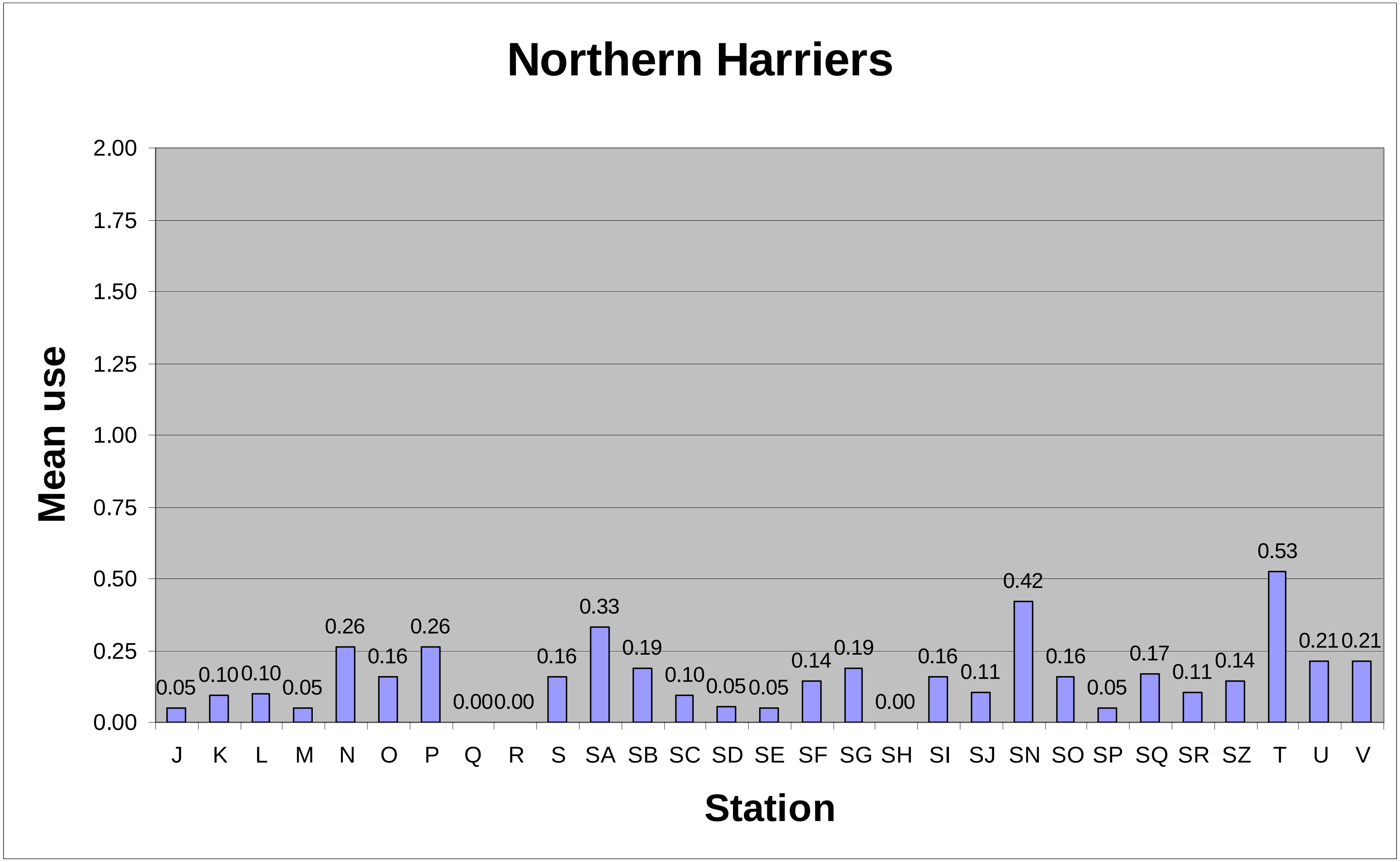


Figure P-2e. Eagle use by survey station for 2006 and 2007 of the A06/07 study.

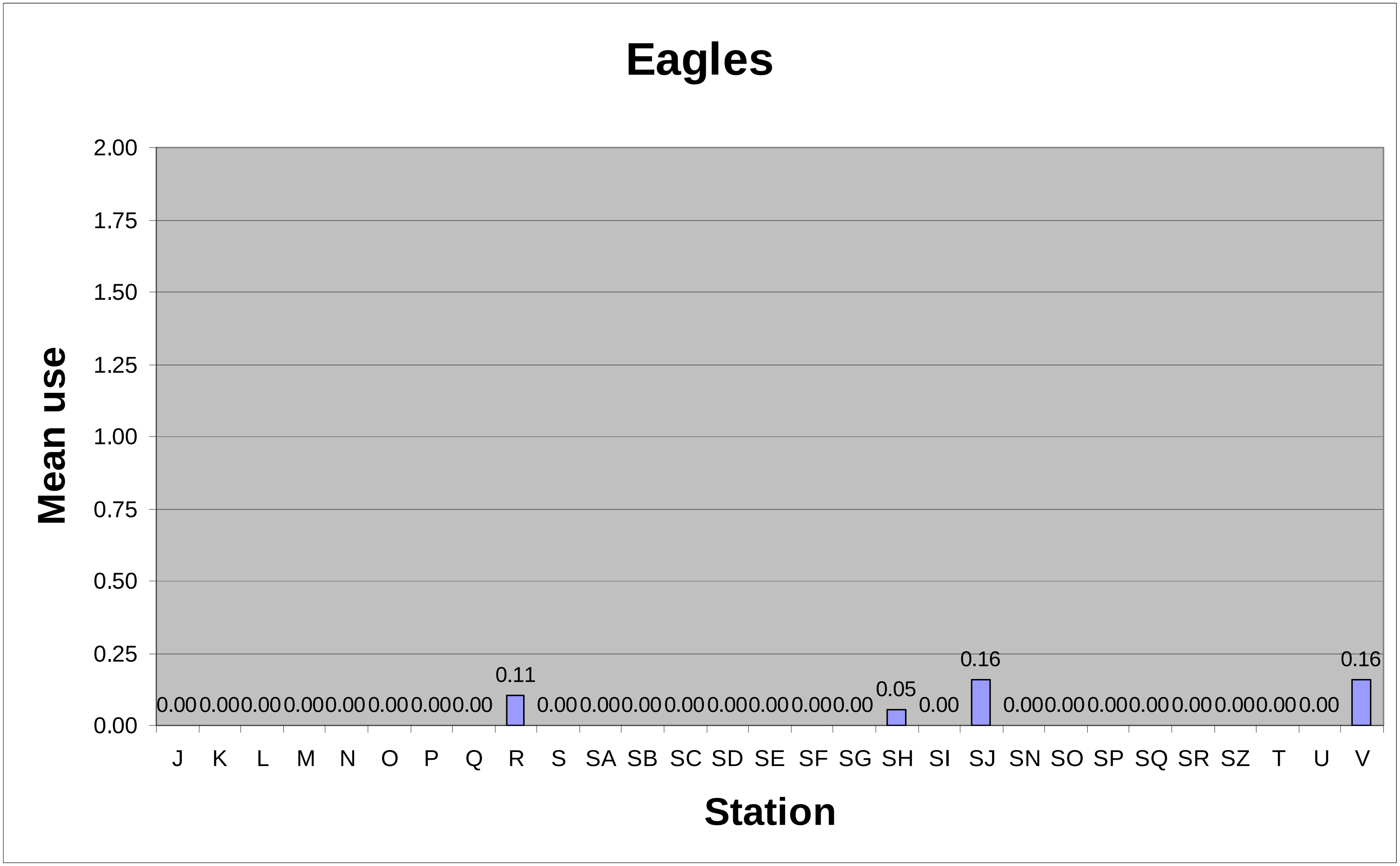


Figure P-2f. Falcon use by survey station for 2006 and 2007 of the A06/07 study.

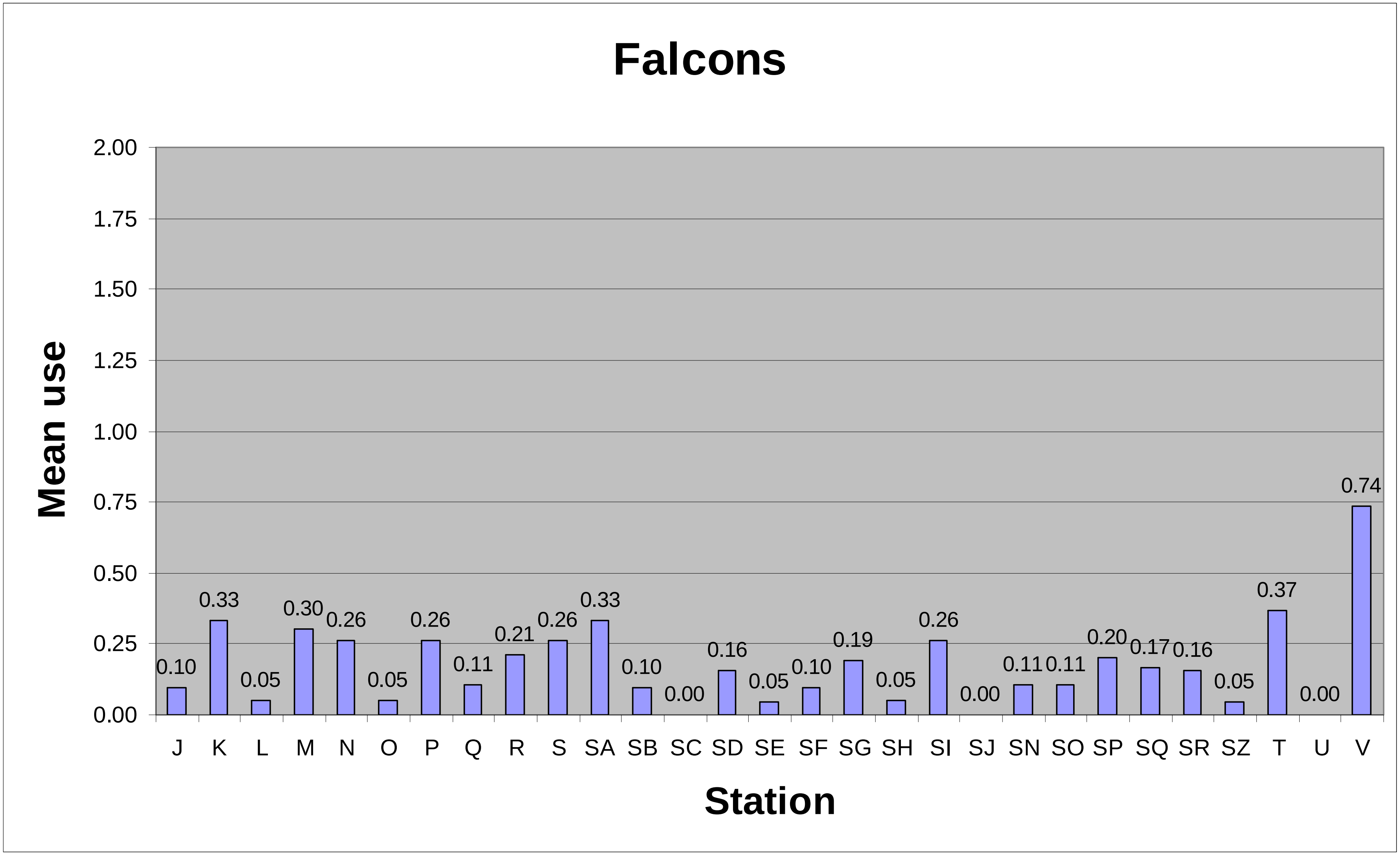


Figure P-2g. Vulture use by survey station for 2006 and 2007 of the A06/07 study.

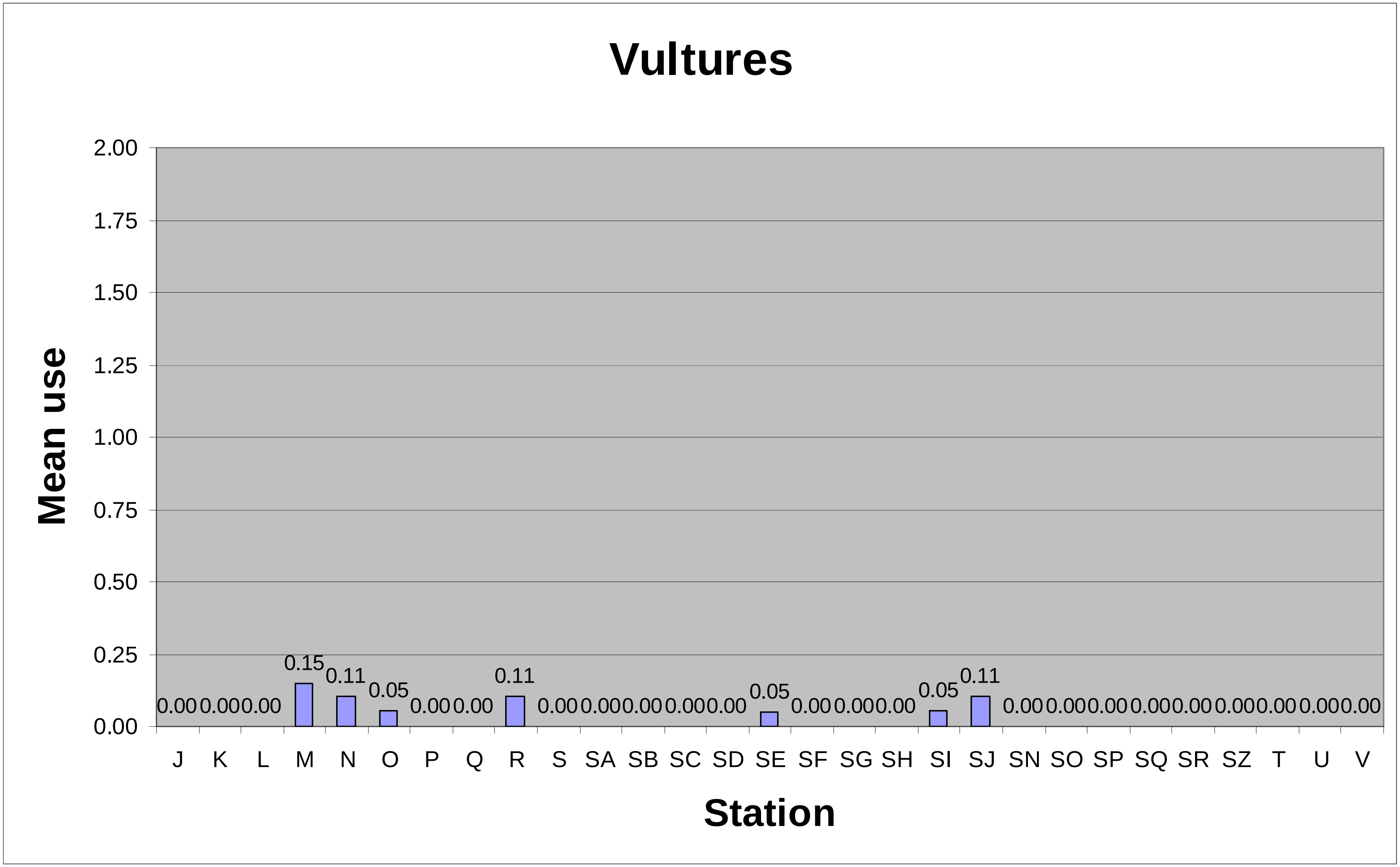


Figure P-3. Raptor nest survey results in 2004.

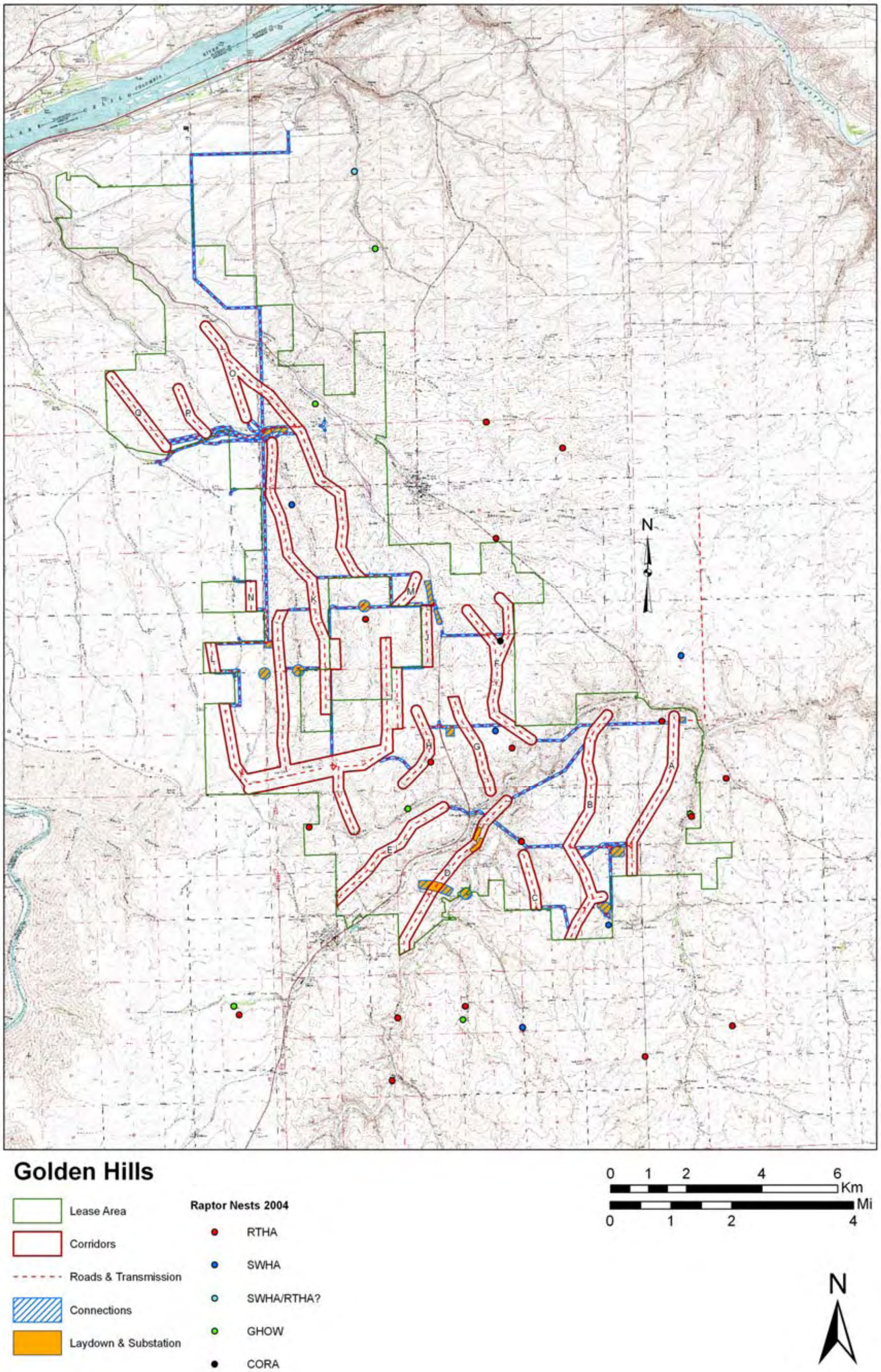


Figure P-4. Raptor nest survey results in 2007.

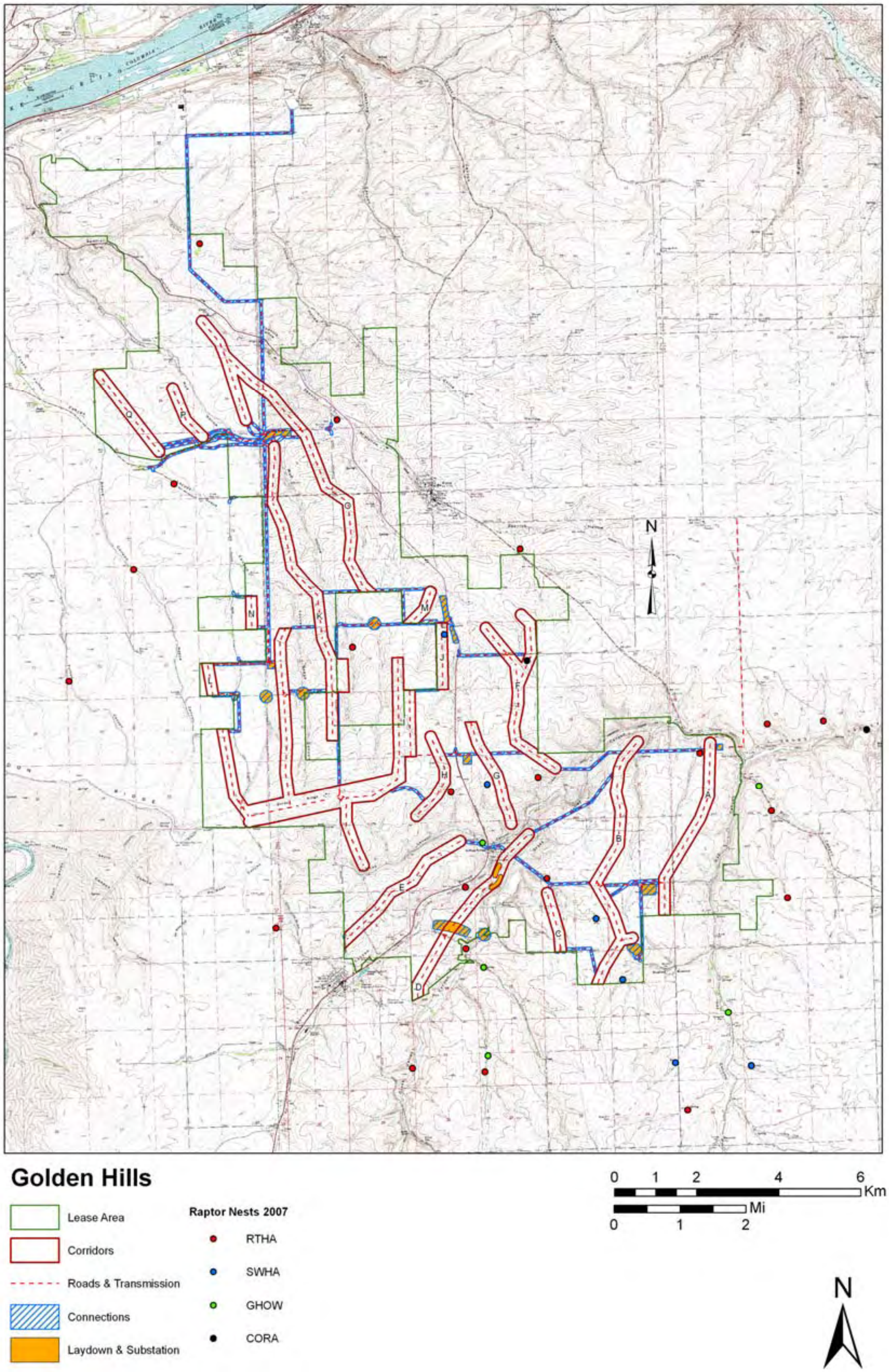


Figure P-5. Golden Hills Wind Project Habiat Analysis Area Overview

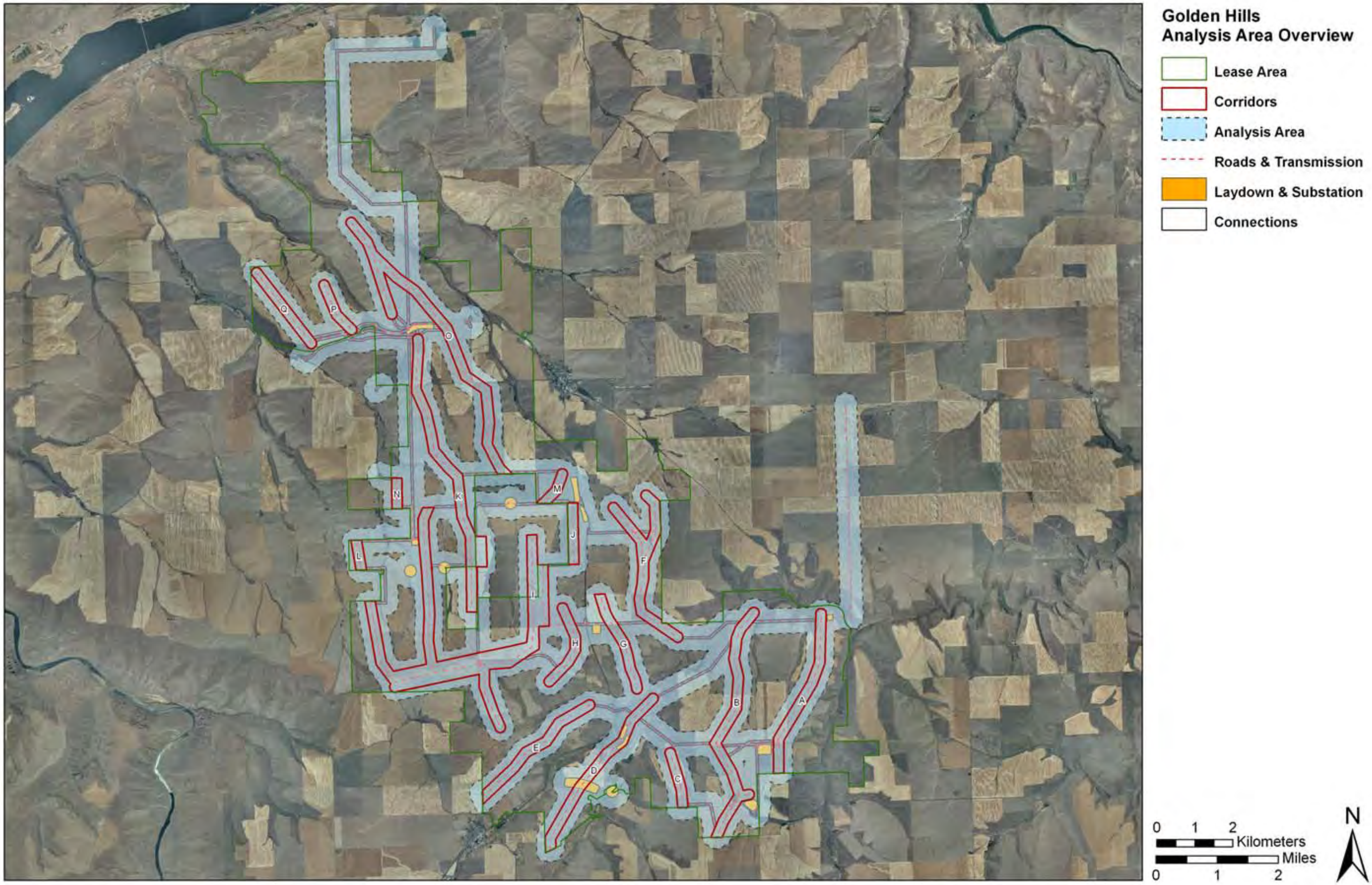


Figure P-6. Golden Hills Wind Farm Facility development corridors, habitats, and ODFW categorizations; Project Tile A-1.

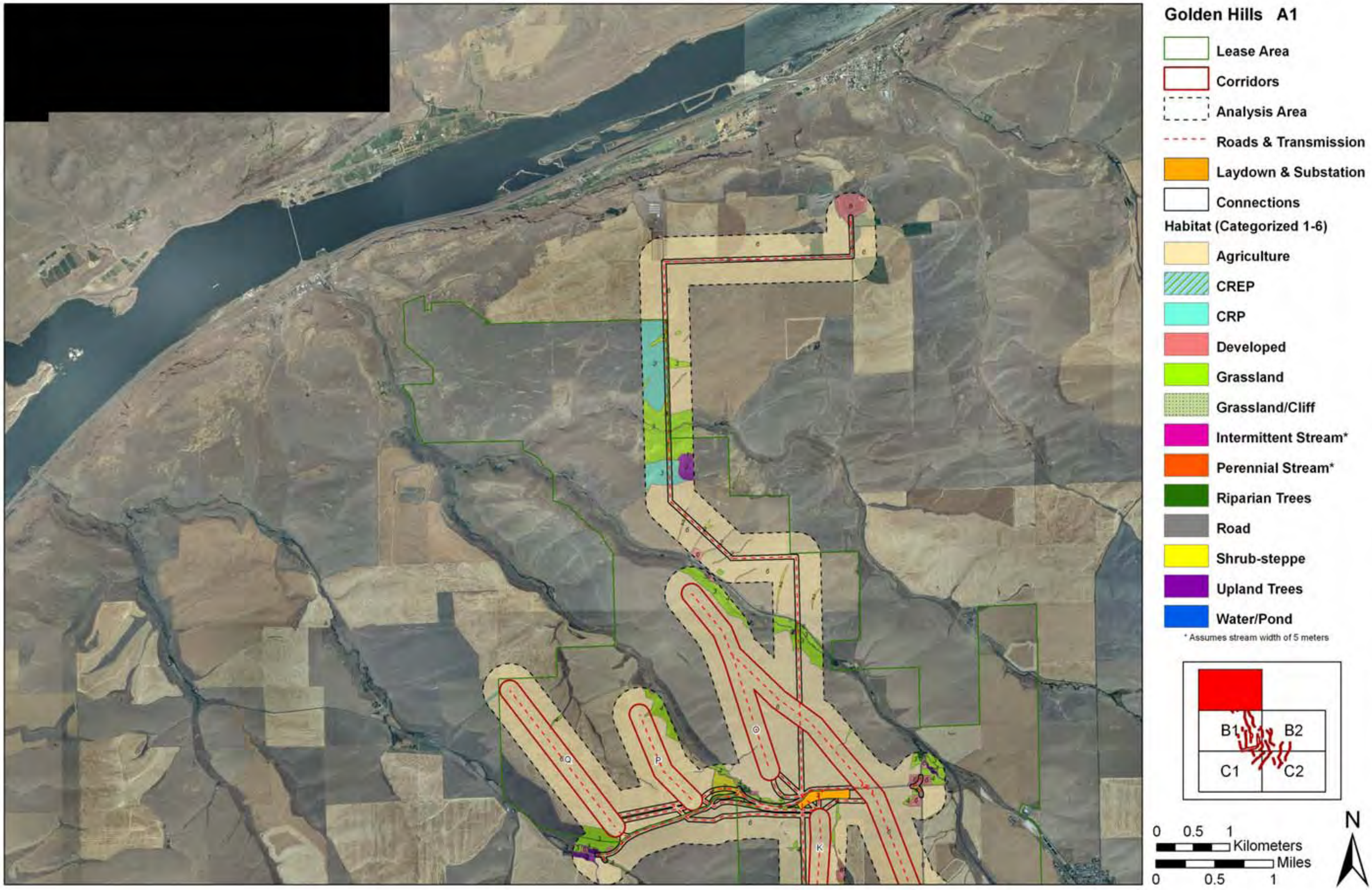


Figure P-7. Golden Hills Wind Farm Facility development corridors, habitats, and ODFW categorizations; Project Tile B-1.

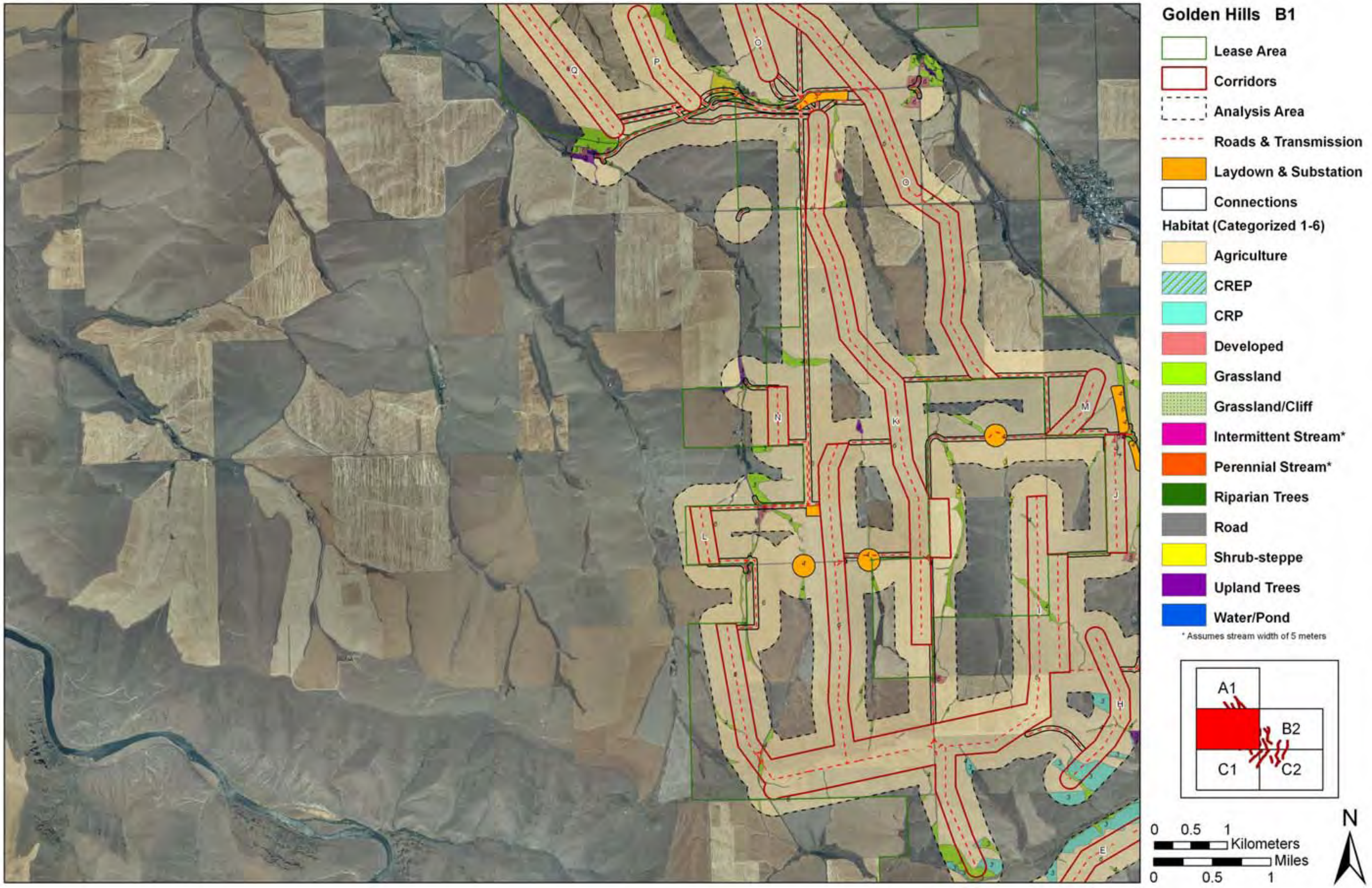


Figure P-8. Golden Hills Wind Farm Facility development corridors, habitats, and ODFW categorizations; Project Tile B-2.

Figure P-9. Golden Hills Wind Farm Facility development corridors, habitats, and ODFW categorizations; Project Tile C-1.

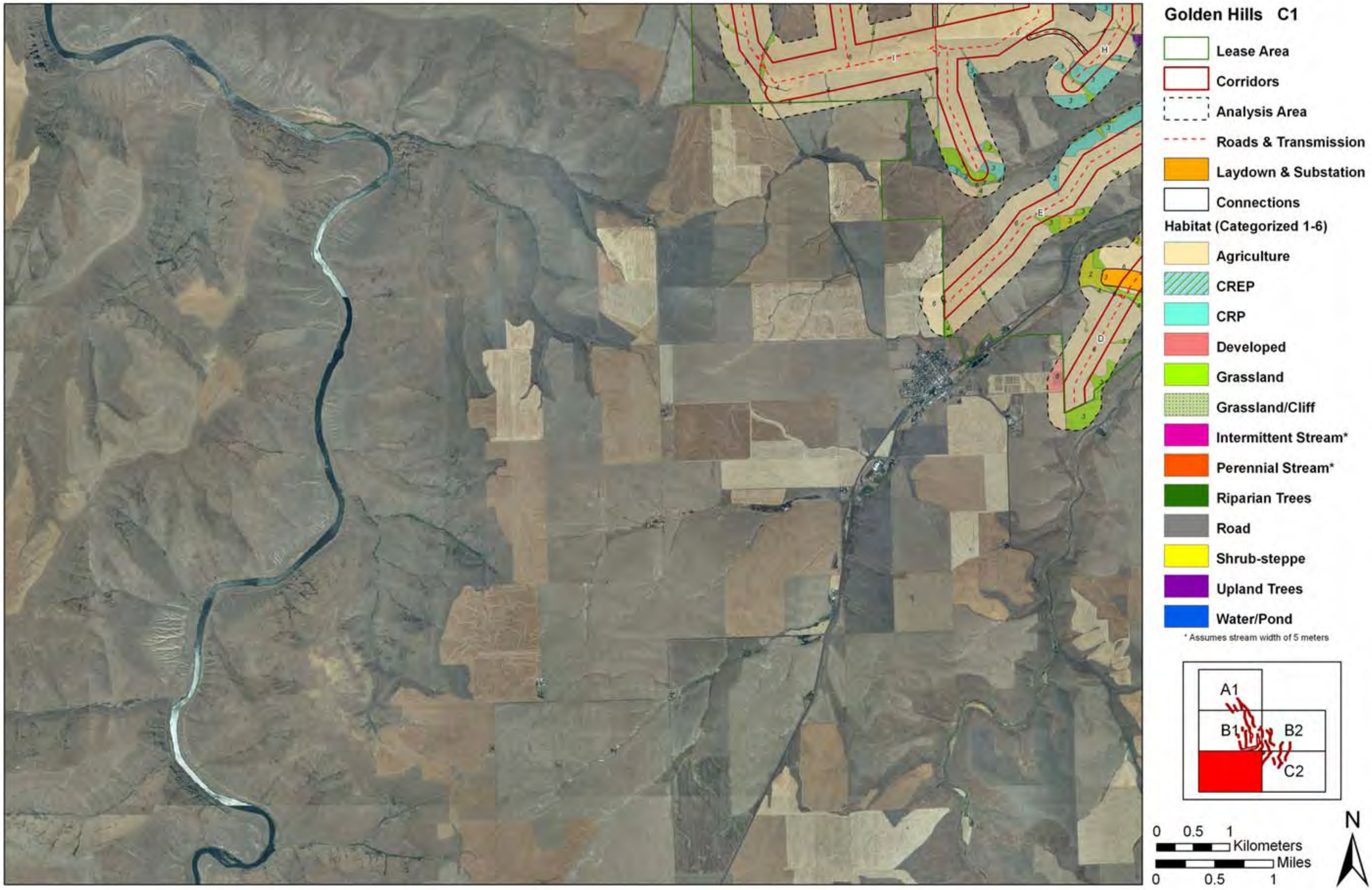


Figure P-10. Golden Hills Wind Farm Facility development corridors, habitats, and ODFW categorizations; Project Tile C-2.

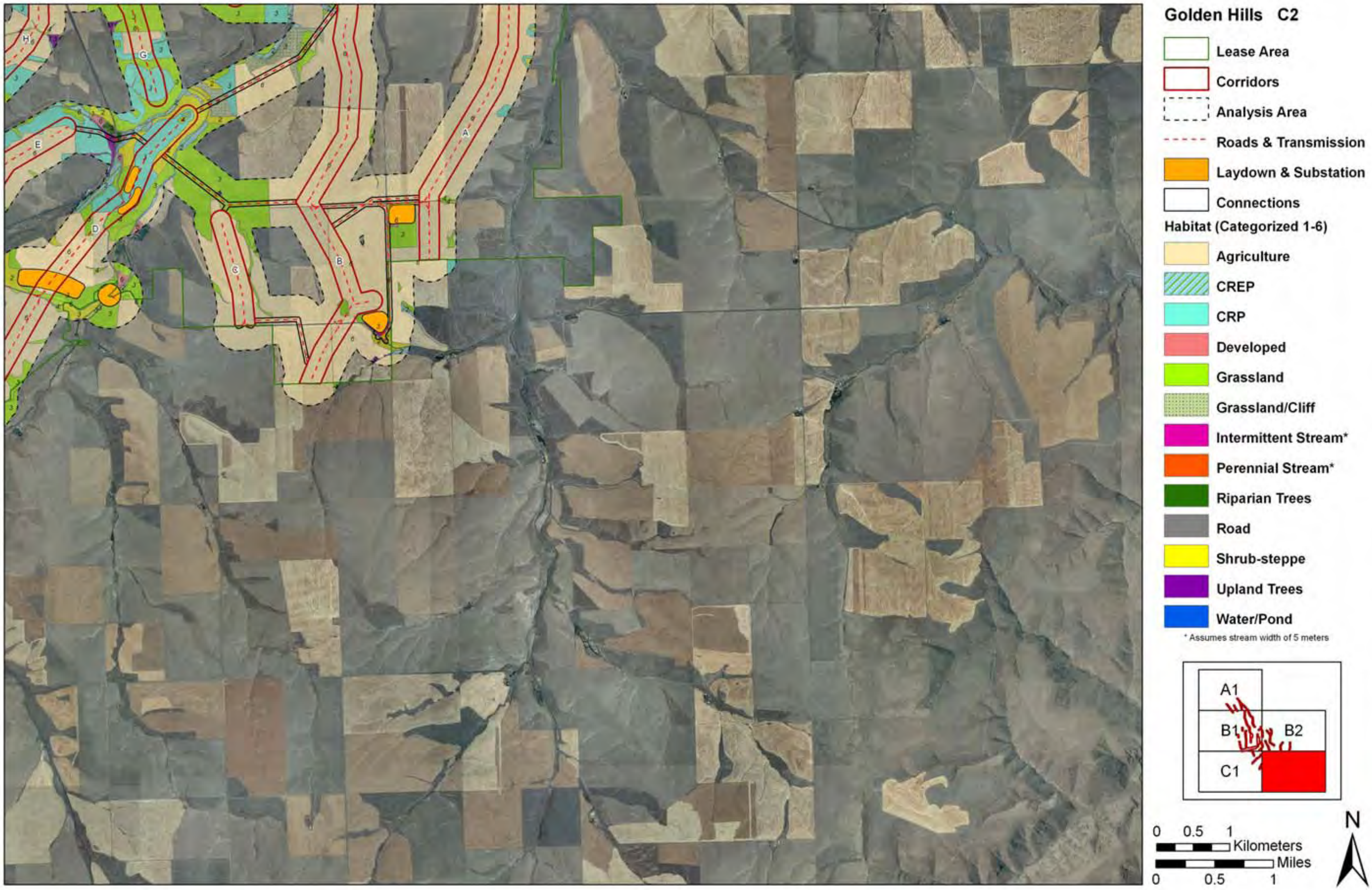


Figure P-11. Locations of loggerhead shrike nests within the proposed Golden Hills Wind Farm Facility in relation to habitats and development corridors and buffers.

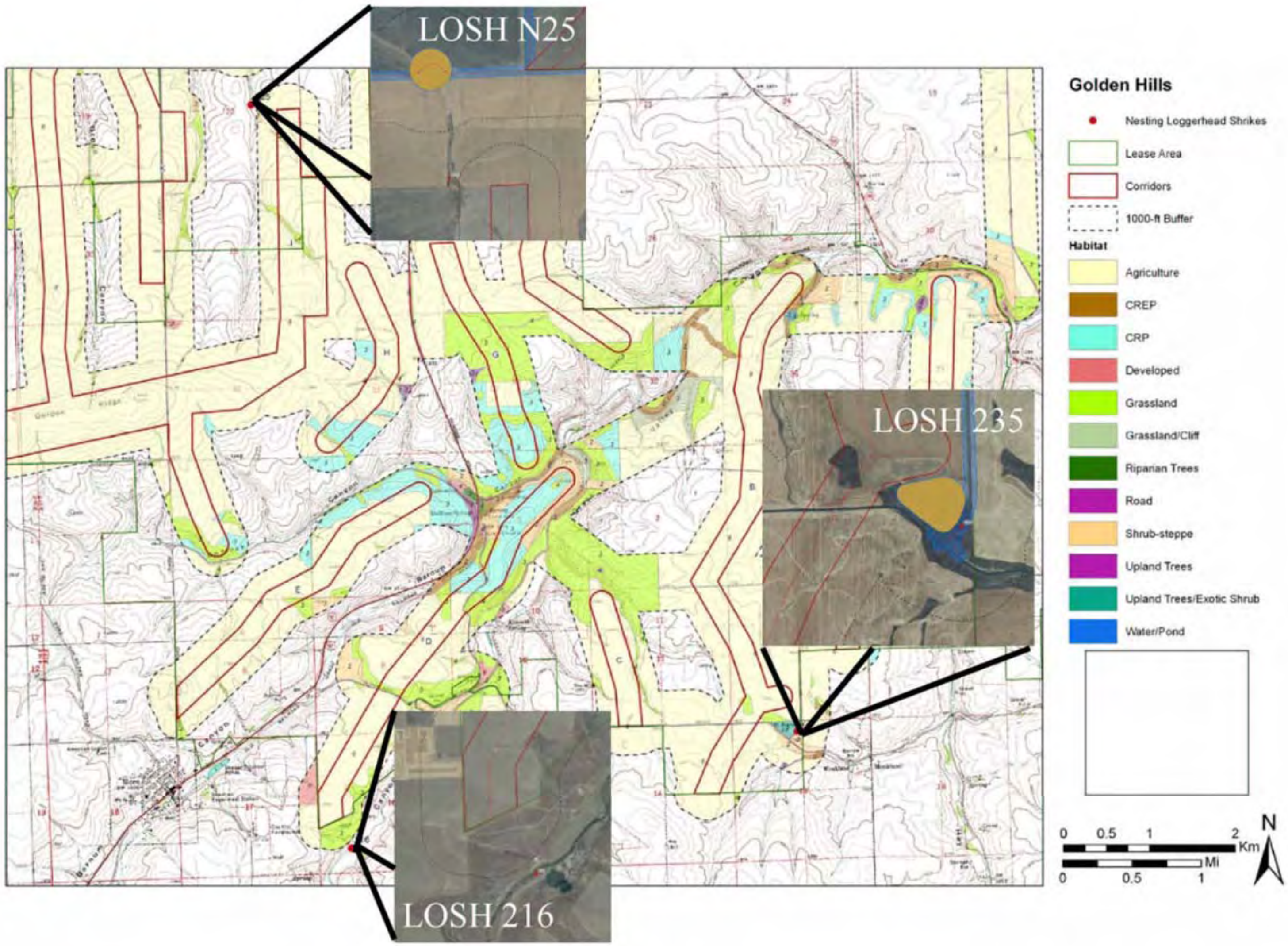


Figure P-12a. Accipiter and harrier flight paths for the A04/05 study, on the west side of the Project area.

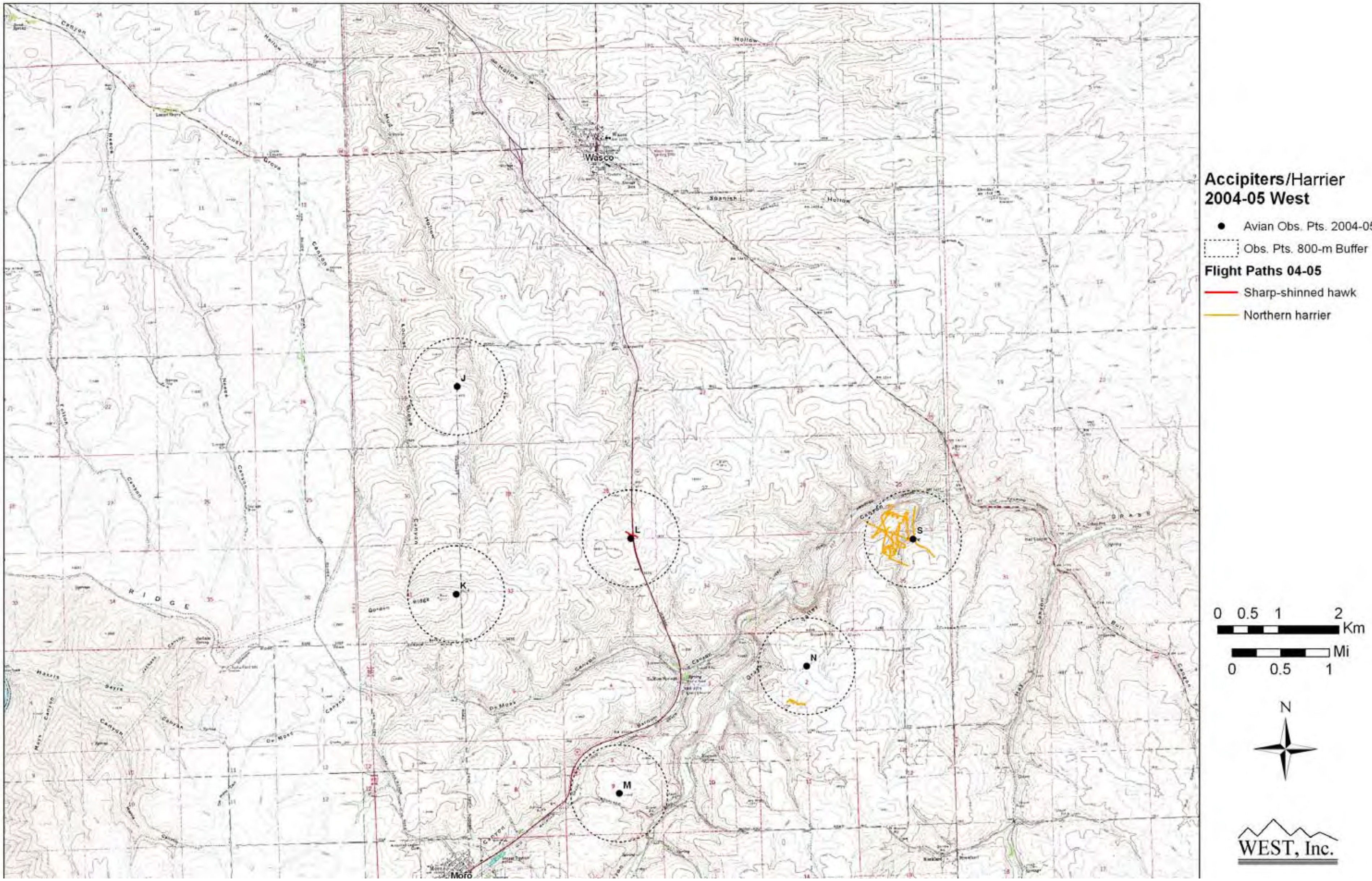


Figure P-12b. Accipiter and harrier flight paths for the 2006 results of the A06/07 study, on the west side of the Project area.

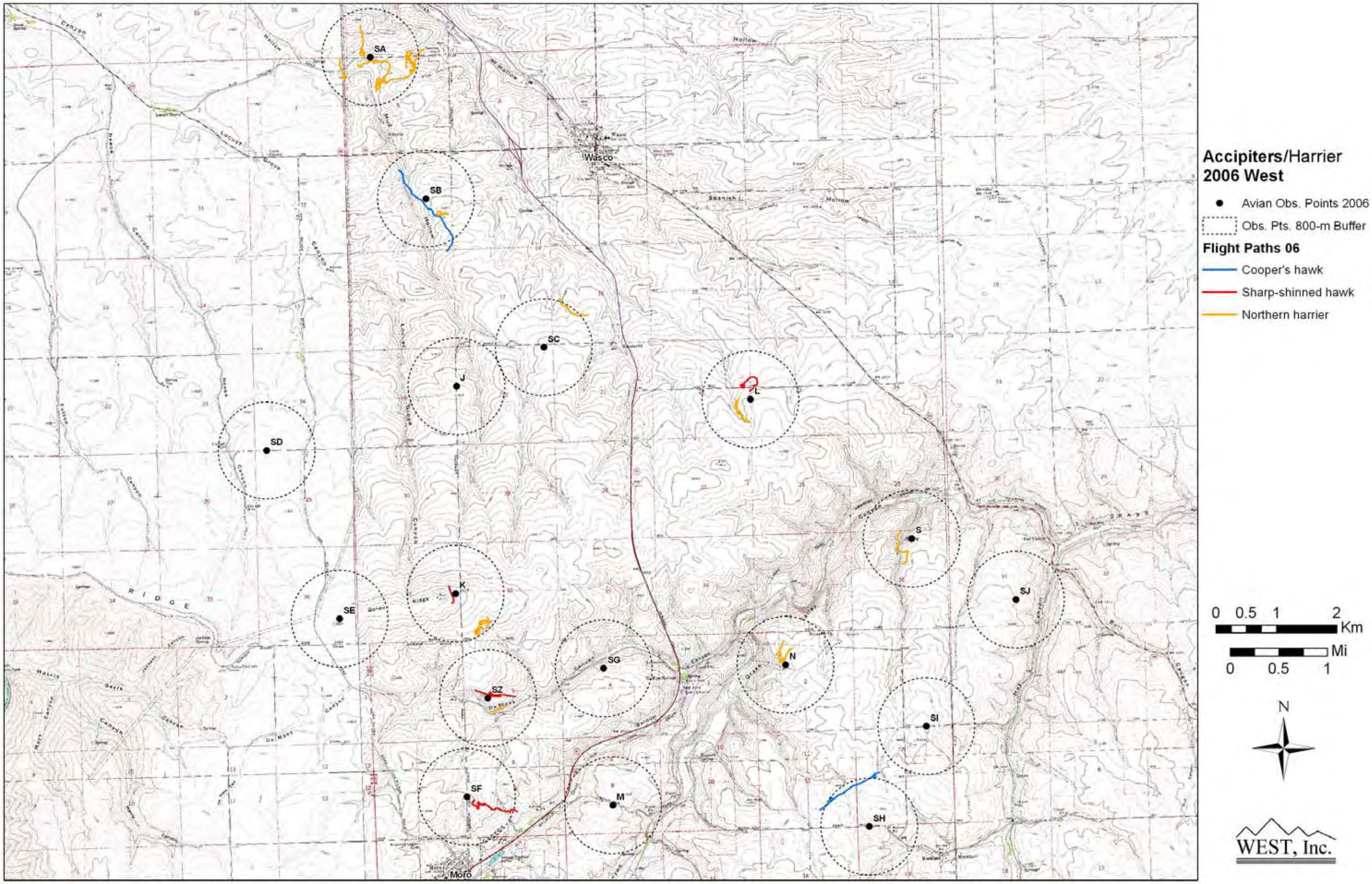


Figure P-12c. Accipiter and harrier flight paths for the A04/05 study, on the east side of the Project area.

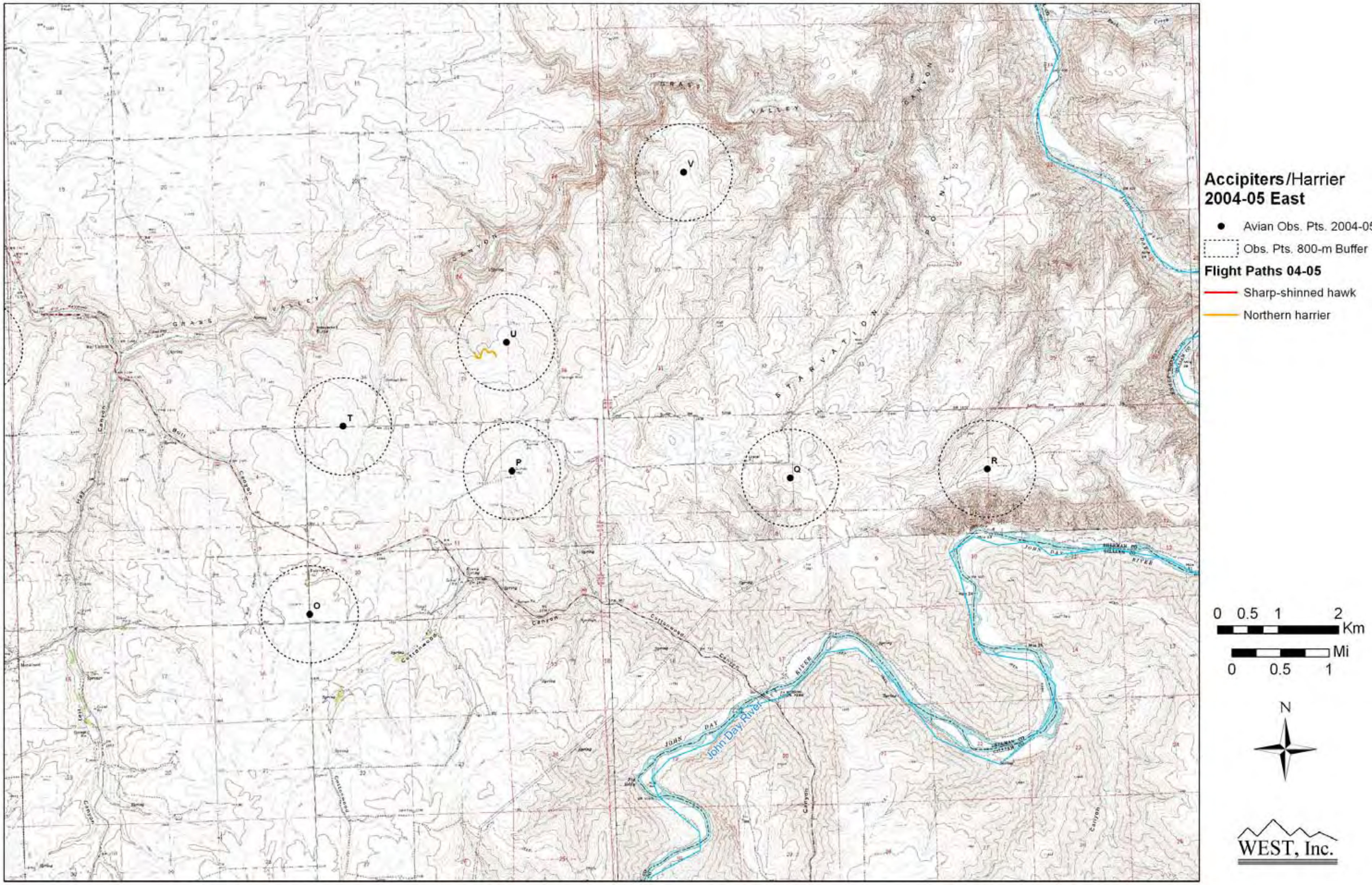


Figure P-12d. Accipiter and harrier flight paths for the 2006 results of the A06/07 study, on the east side of the Project area.

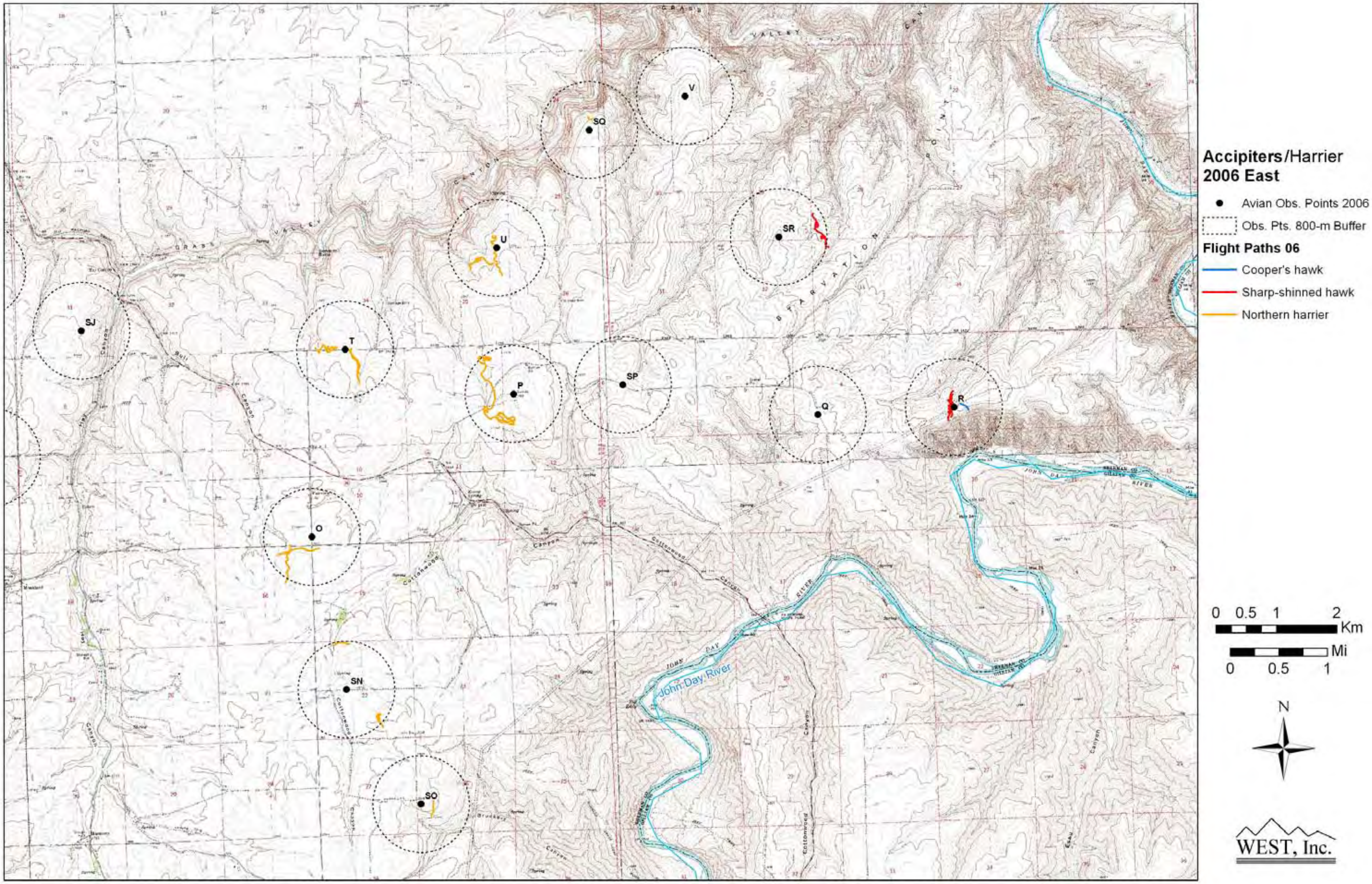


Figure P-12e. Buteo flight paths for the A04/05 study, on the west side of the Project area.

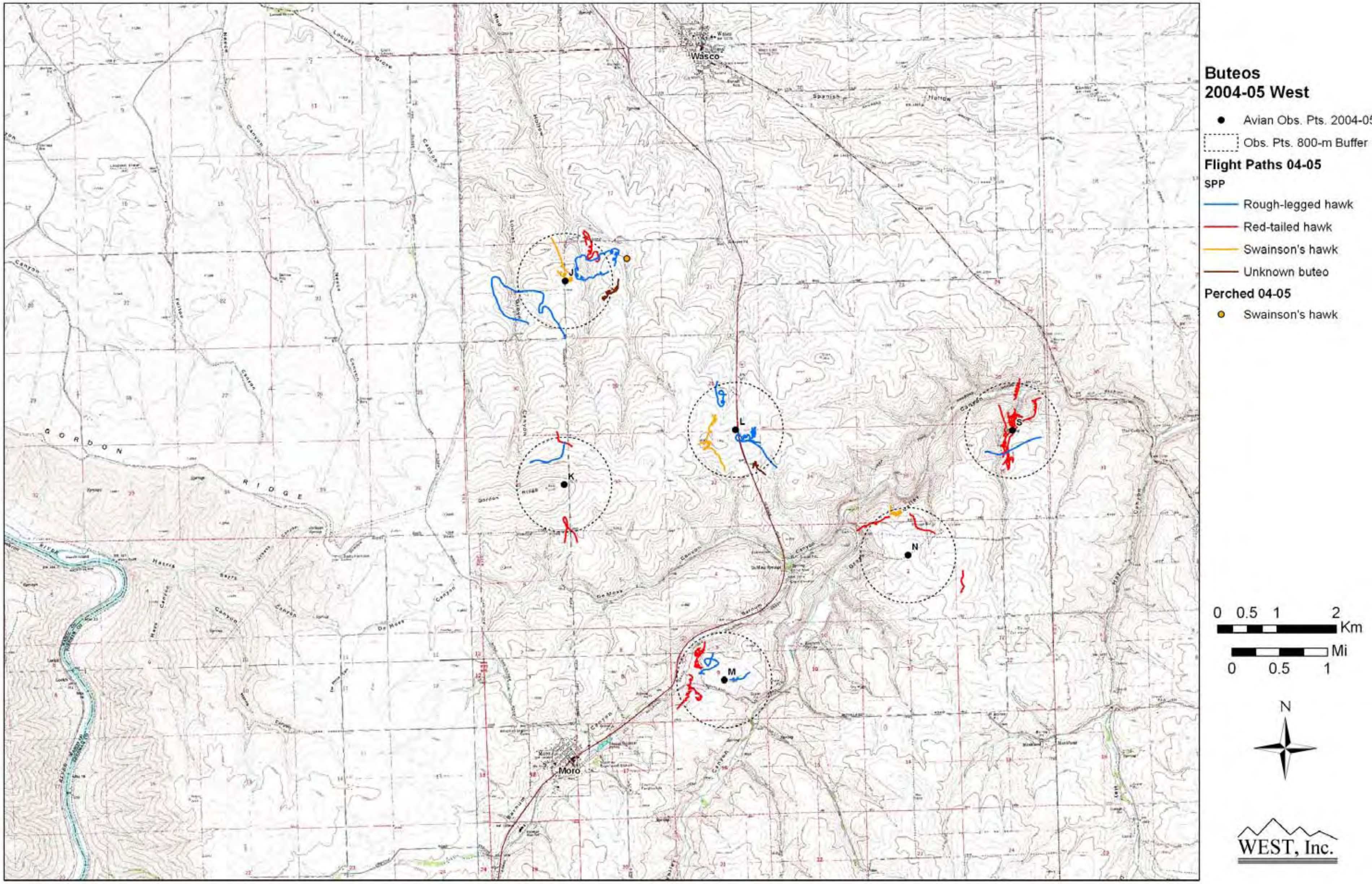


Figure P-12f. Buteo flight paths for the 2006 results of the A06/07 study, on the west side of the Project area

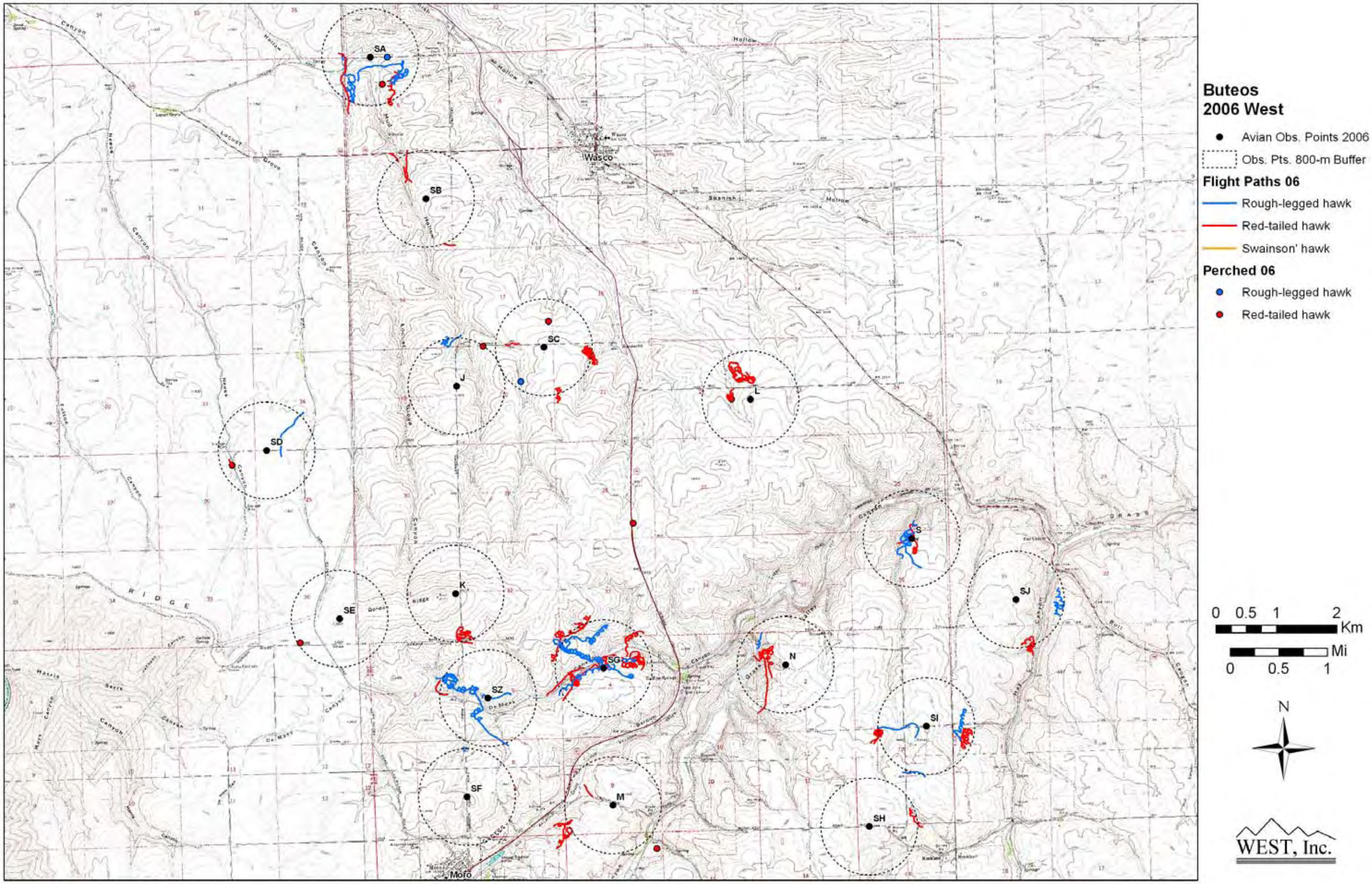


Figure P-12g. Buteo flight paths for the A04/05 study, on the east side of the Project area

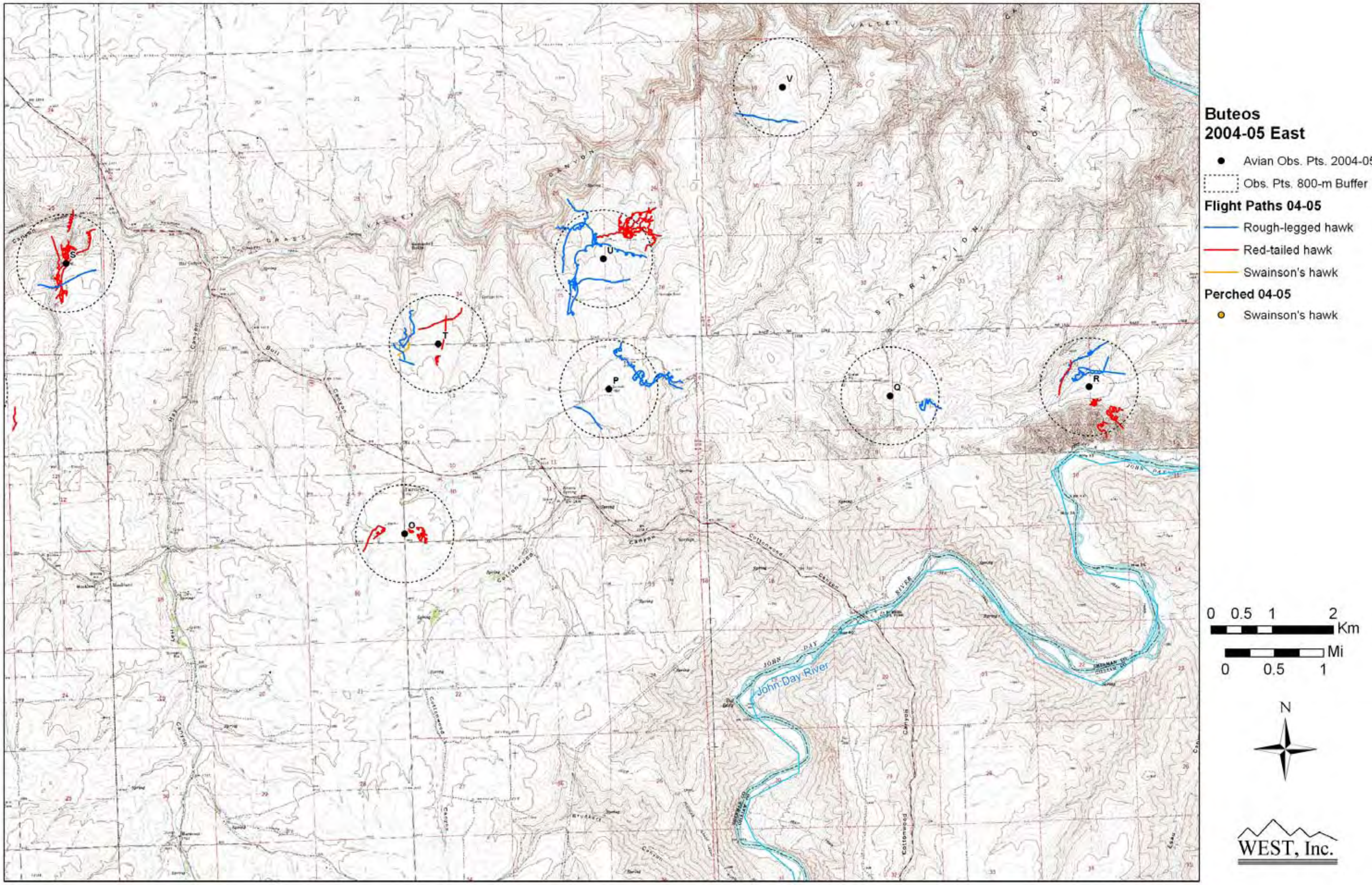


Figure P-12h. Buteo flight paths for the 2006 results of the A06/07 study, on the east side of the Project area

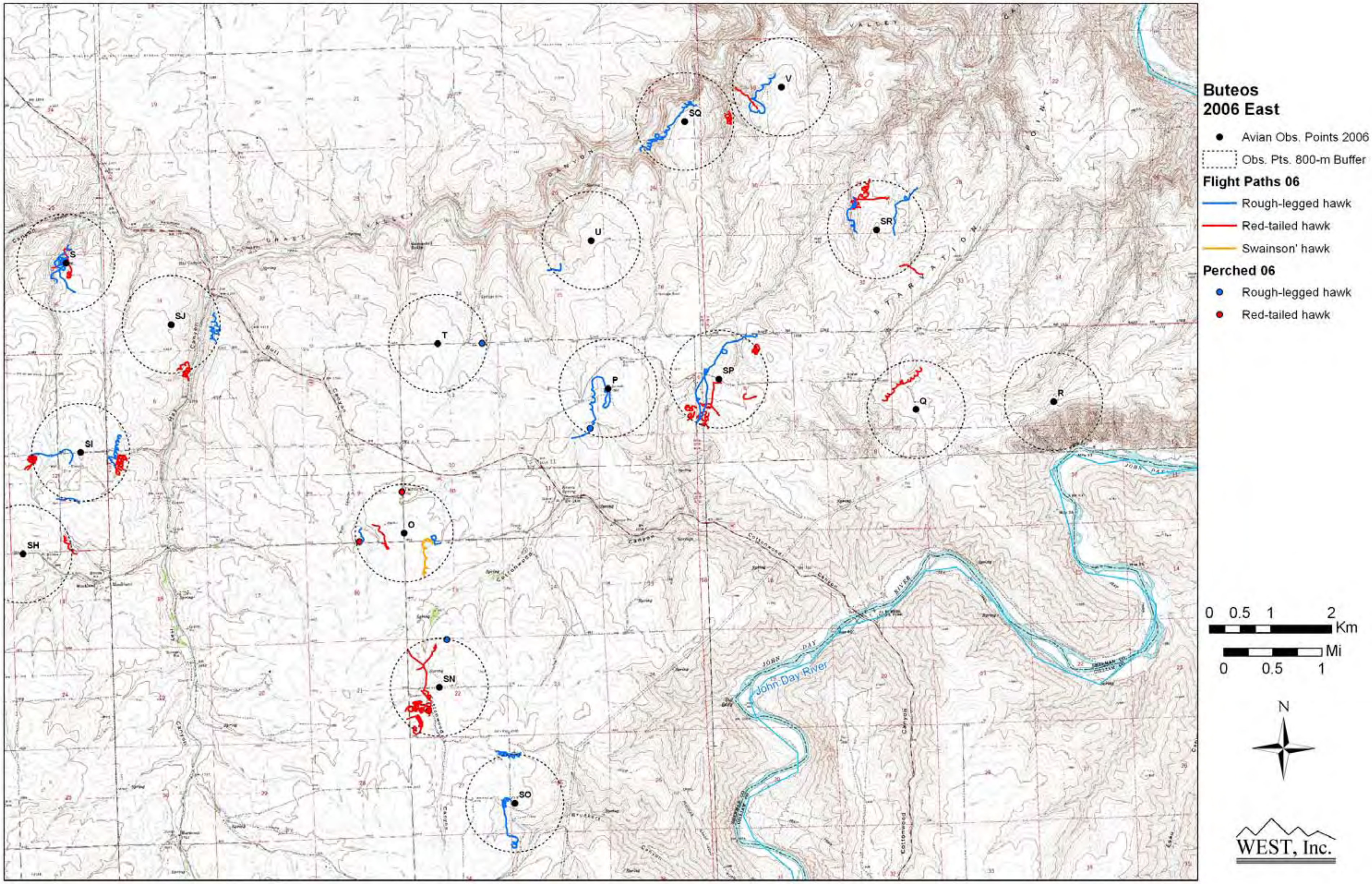


Figure P-12i. Falcon flight paths for the A04/05 study, on the west side of the Project area

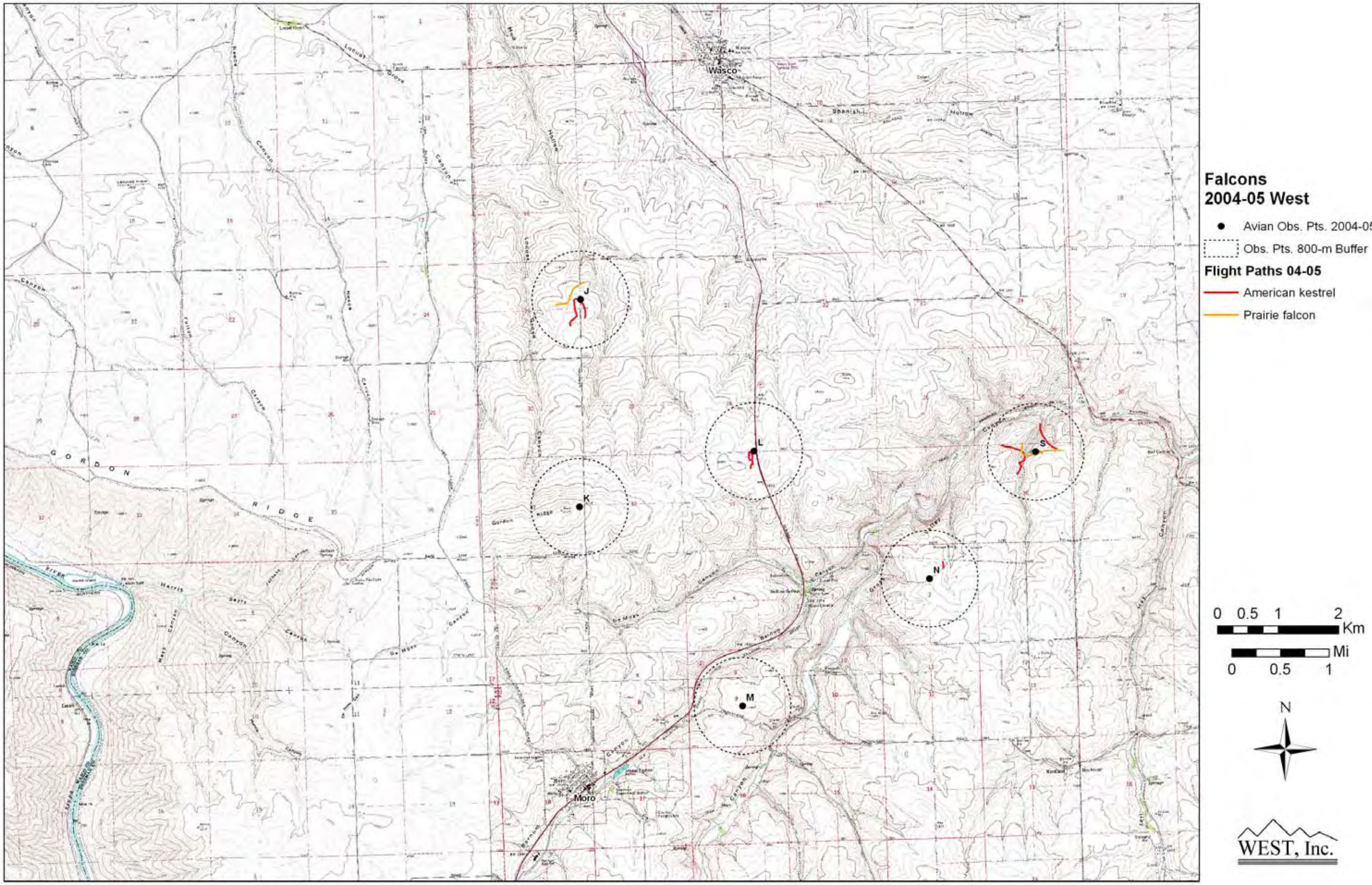


Figure P-12j. Falcon flight paths for the 2006 results of the A06/07 study, on the west side of the Project area

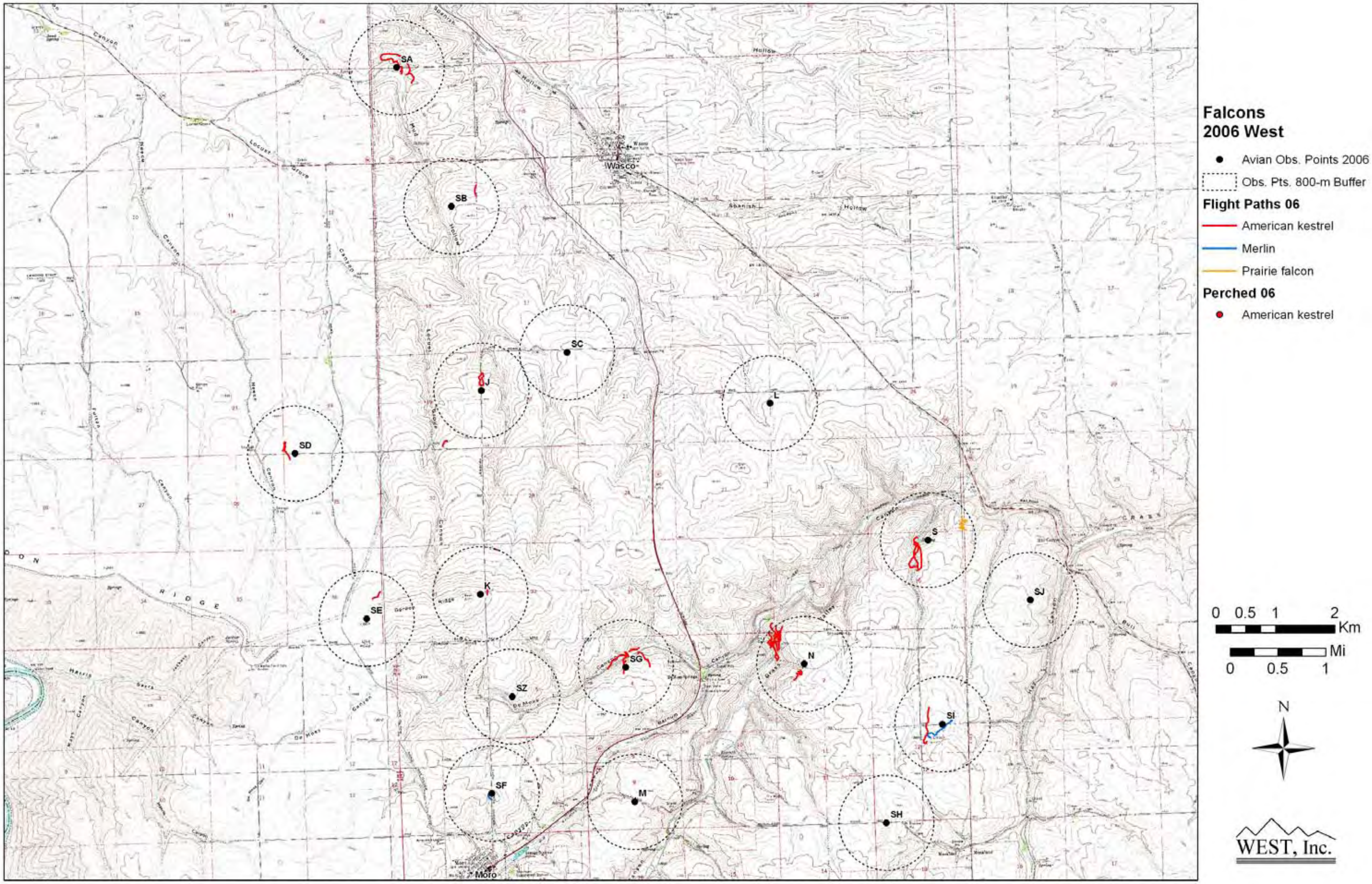


Figure P-12k. Falcon flight paths for the A04/05 study, on the east side of the Project area

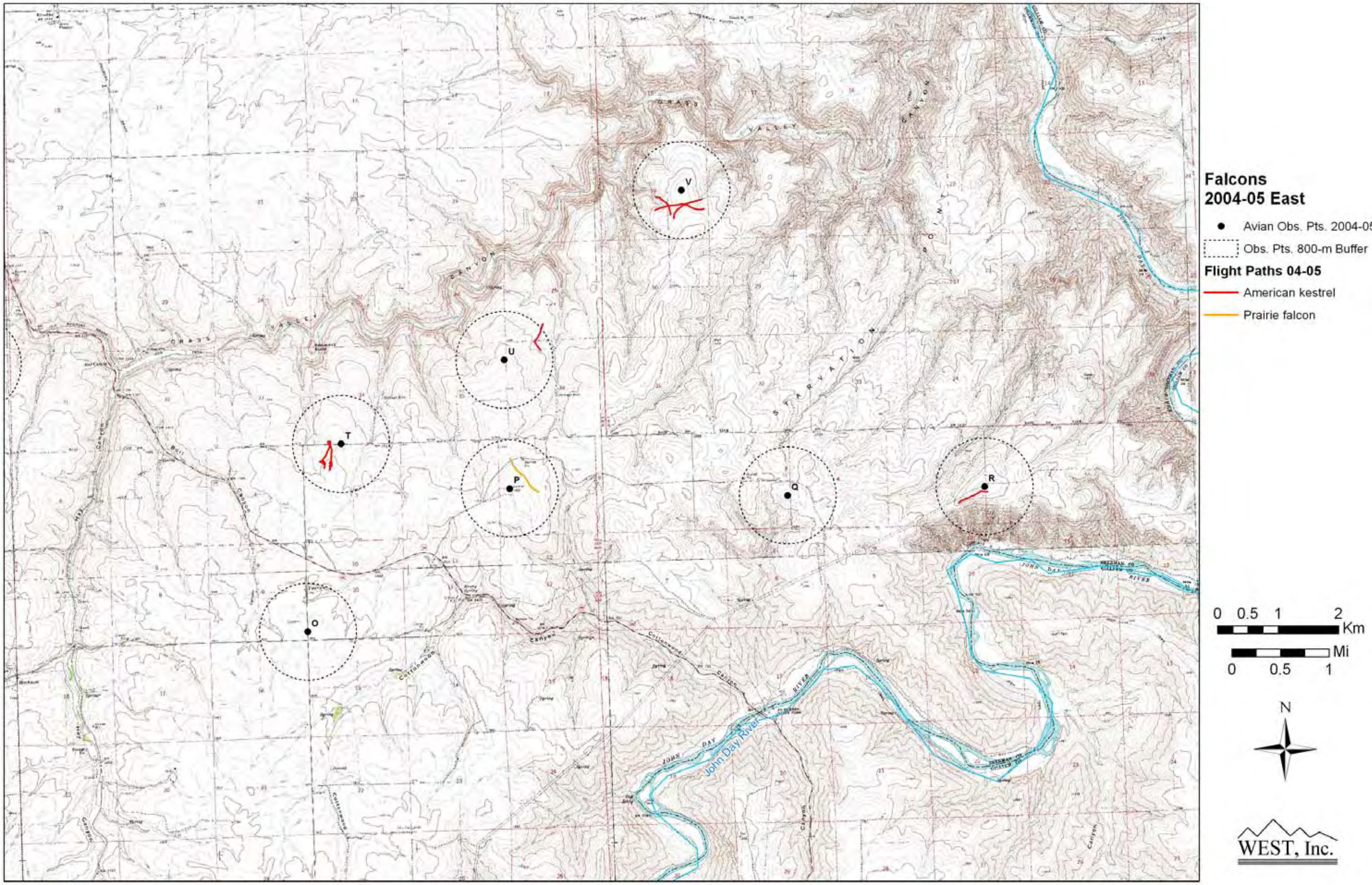


Figure P-12l. Falcon flight paths for the 2006 results of the A06/07 study, on the east side of the Project area

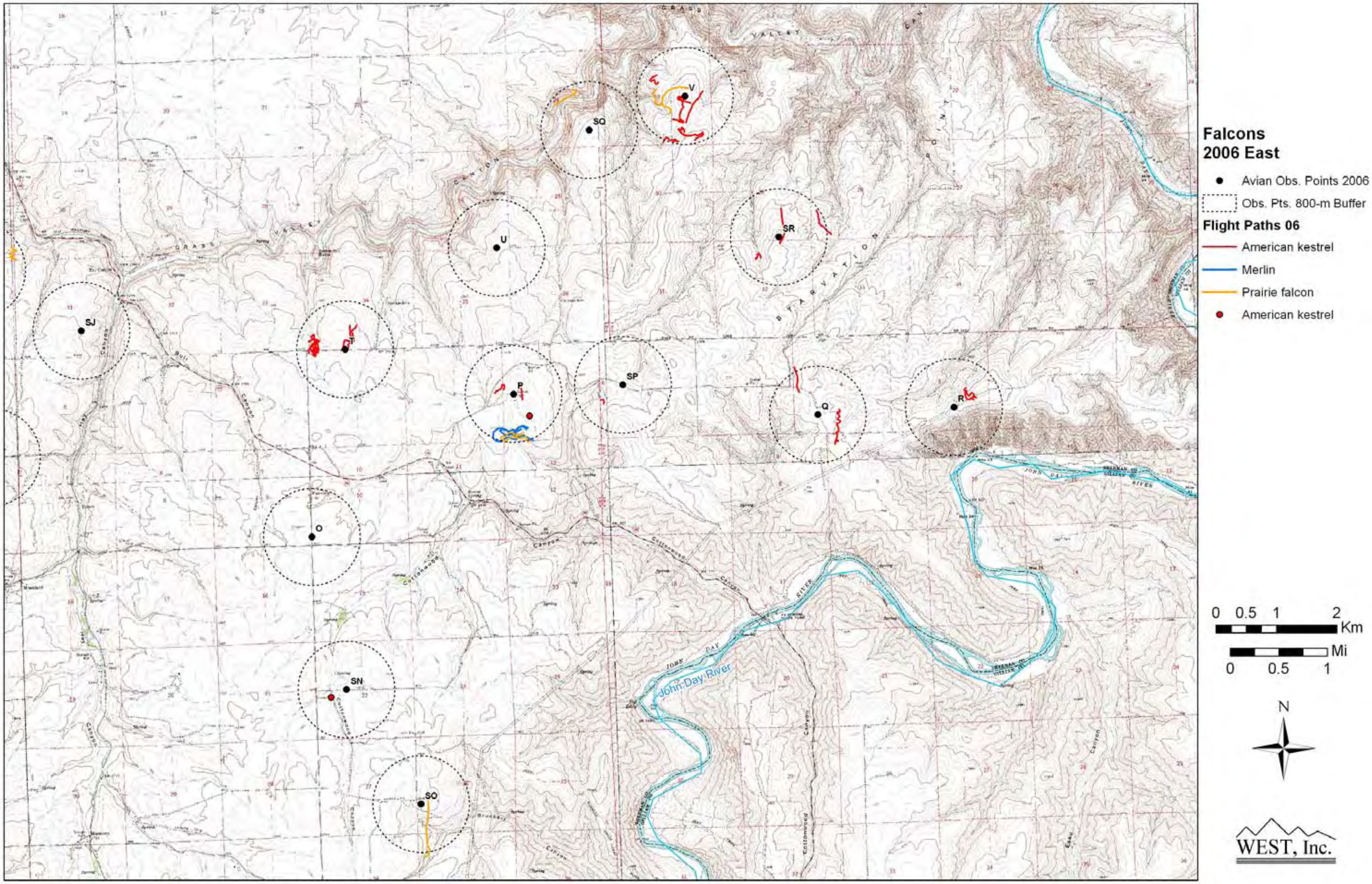


Figure P-12m. Vulture flight paths for theA04/05 study, on the west side of the Project area

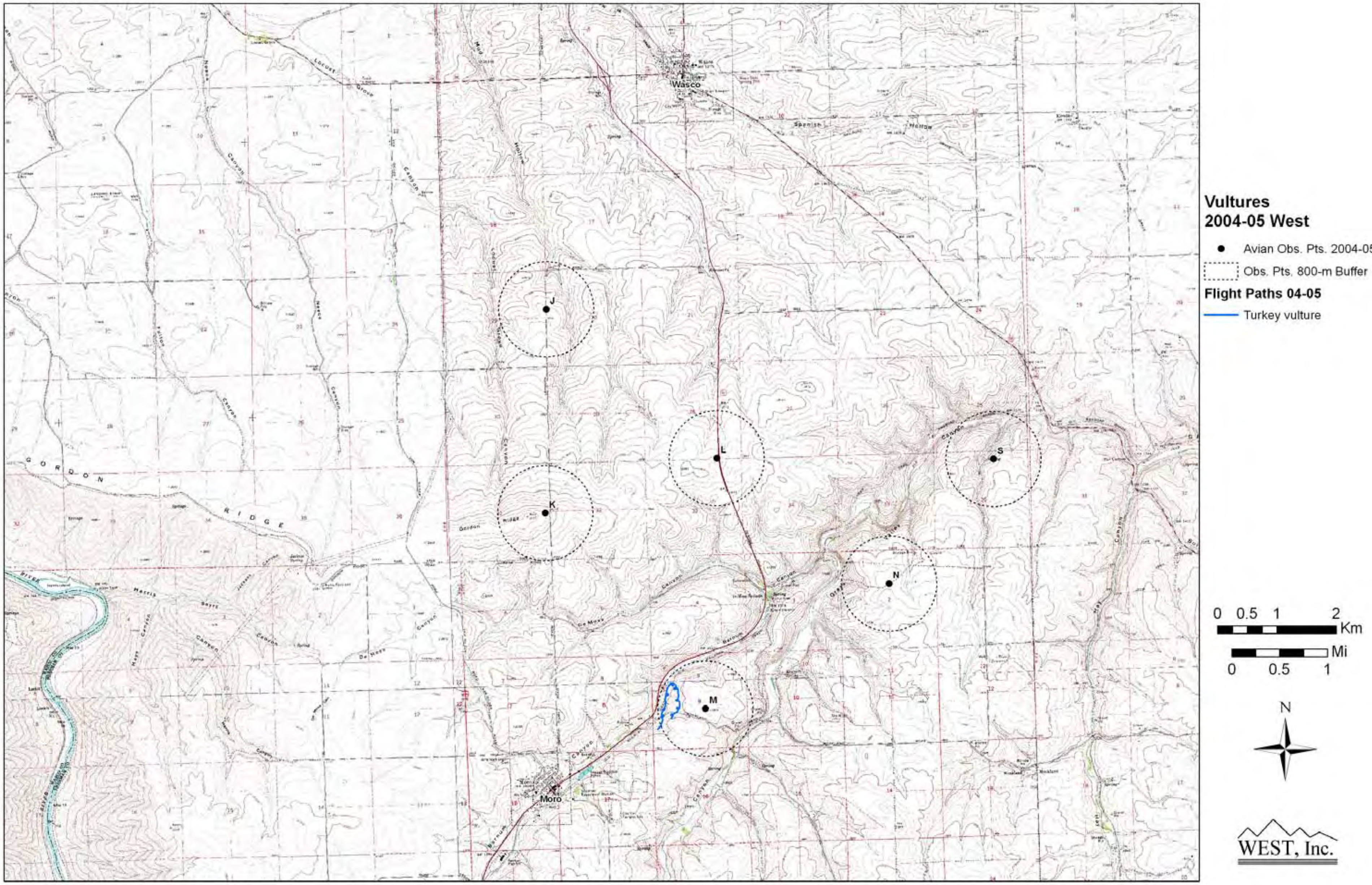


Figure P-12n. Eagle and vulture flight paths for the 2006 results of the A06/07 study, on the west side of the Project area

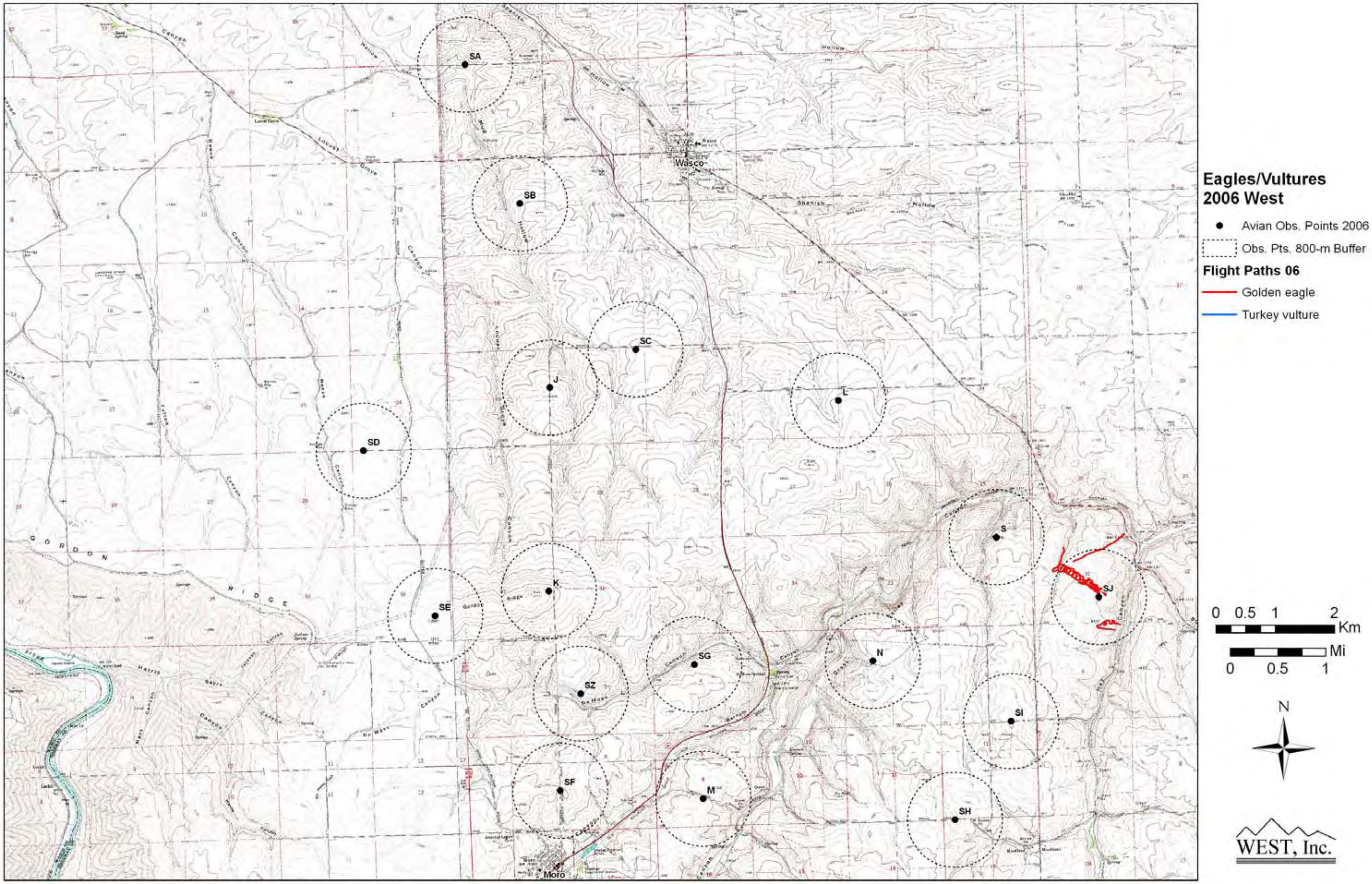


Figure P-12o. Eagle and vulture flight paths for the 2006 results of the A06/07 study, on the east side of the Project area

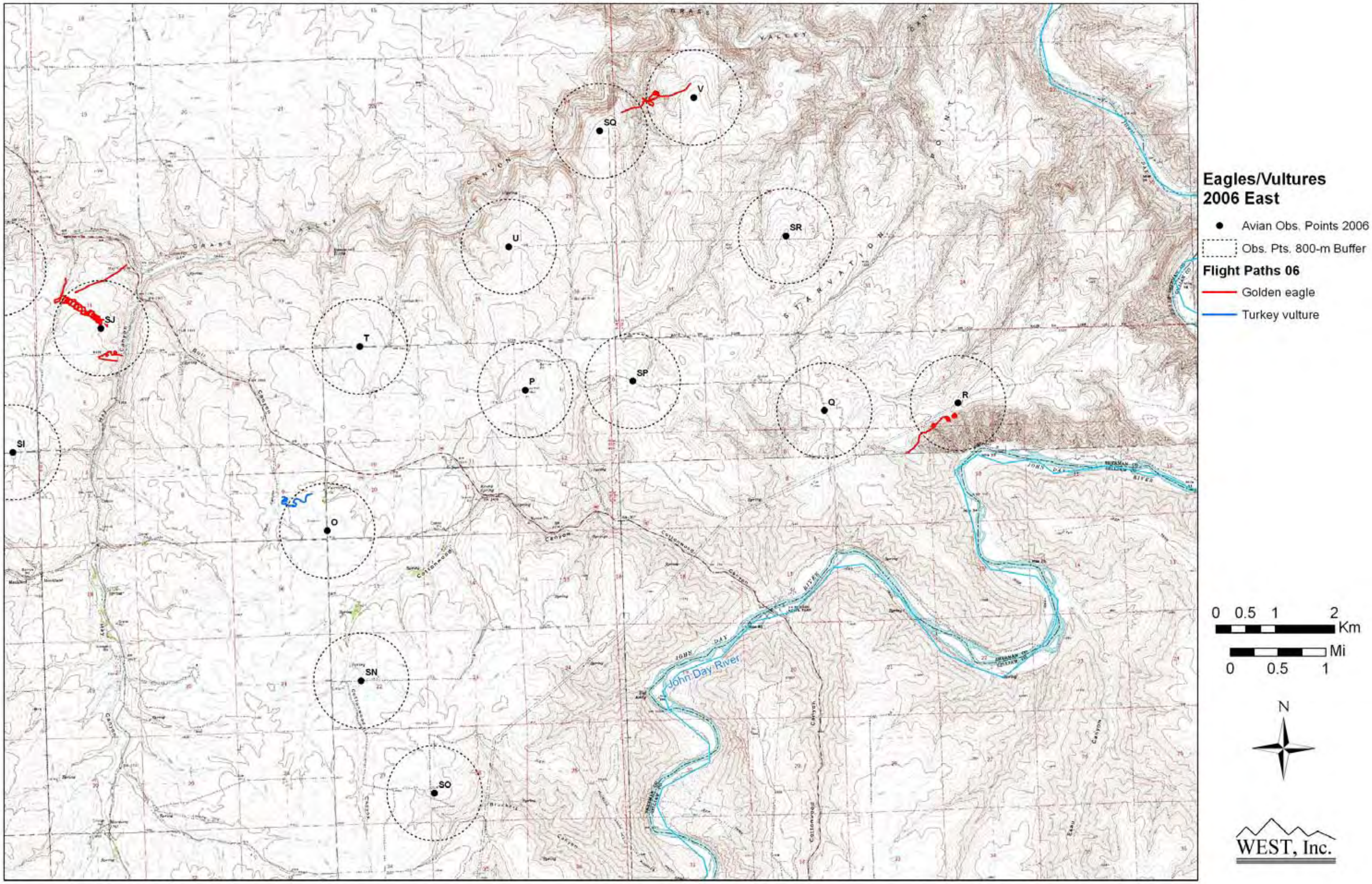


Figure P-13a. Accipiter flight paths for the A06/07 study.

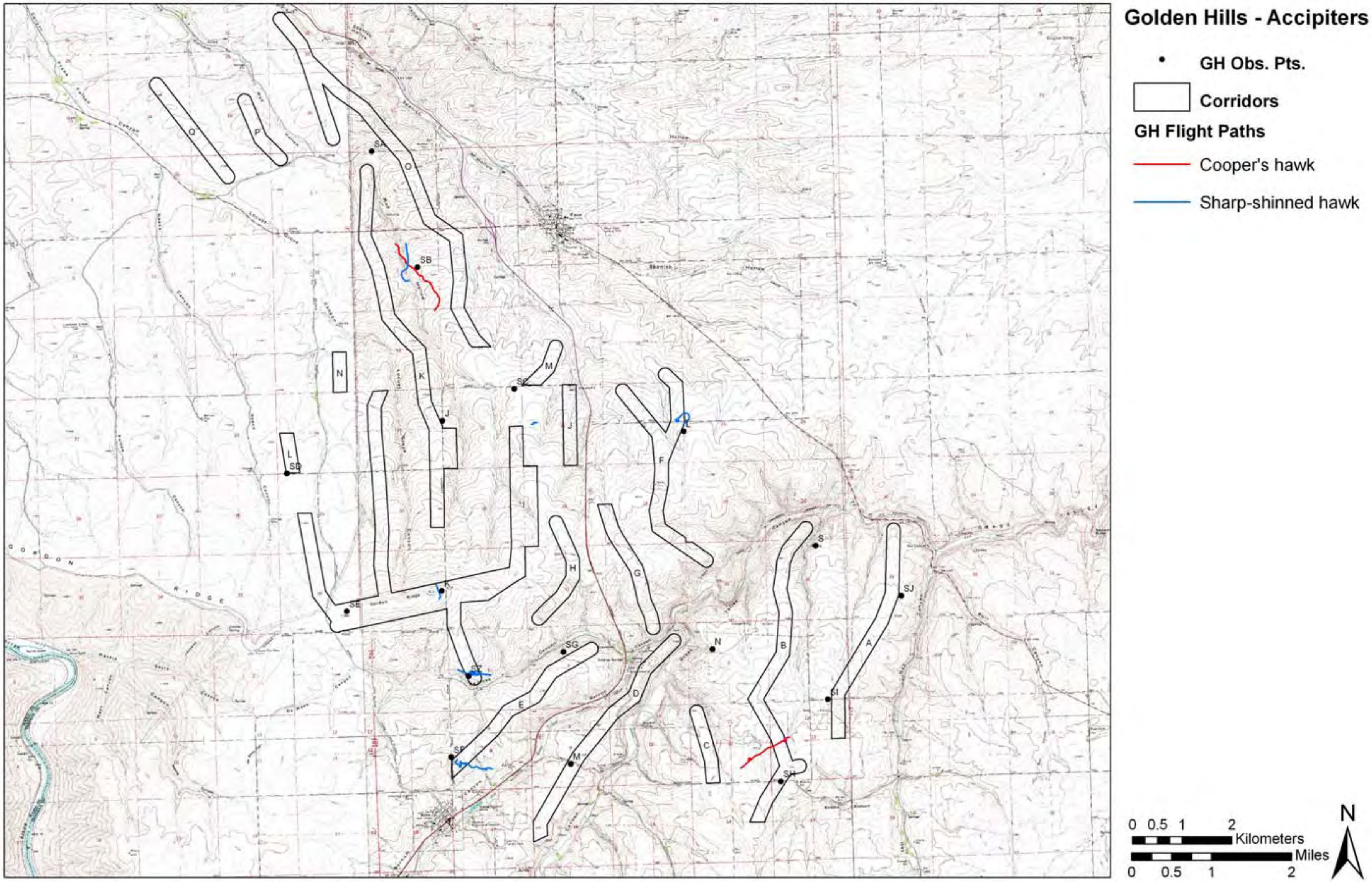


Figure P-13b. Buteo flight paths for the A06/07 study.

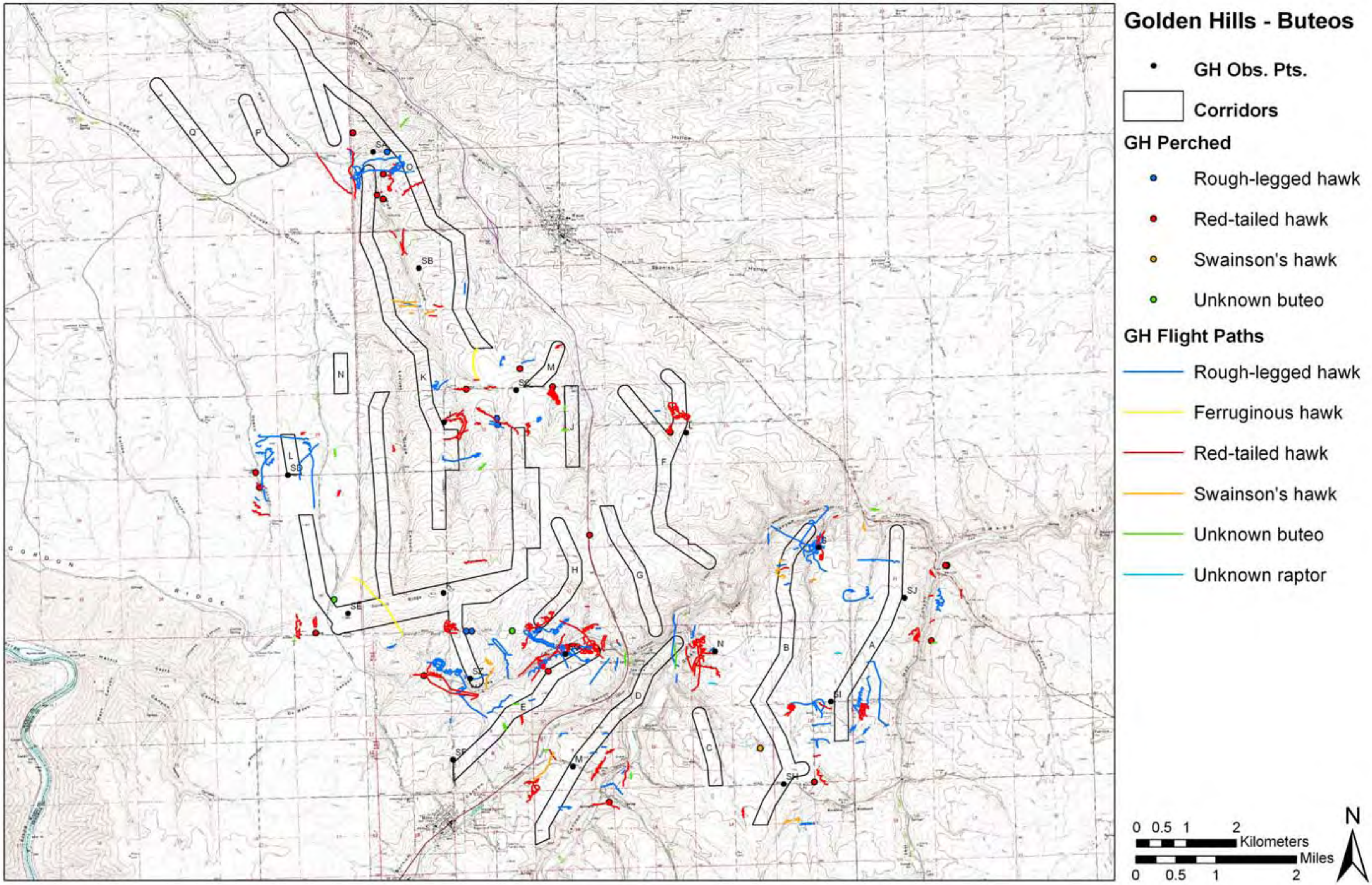


Figure P-13c. Falcon flight paths for the A06/07 study.

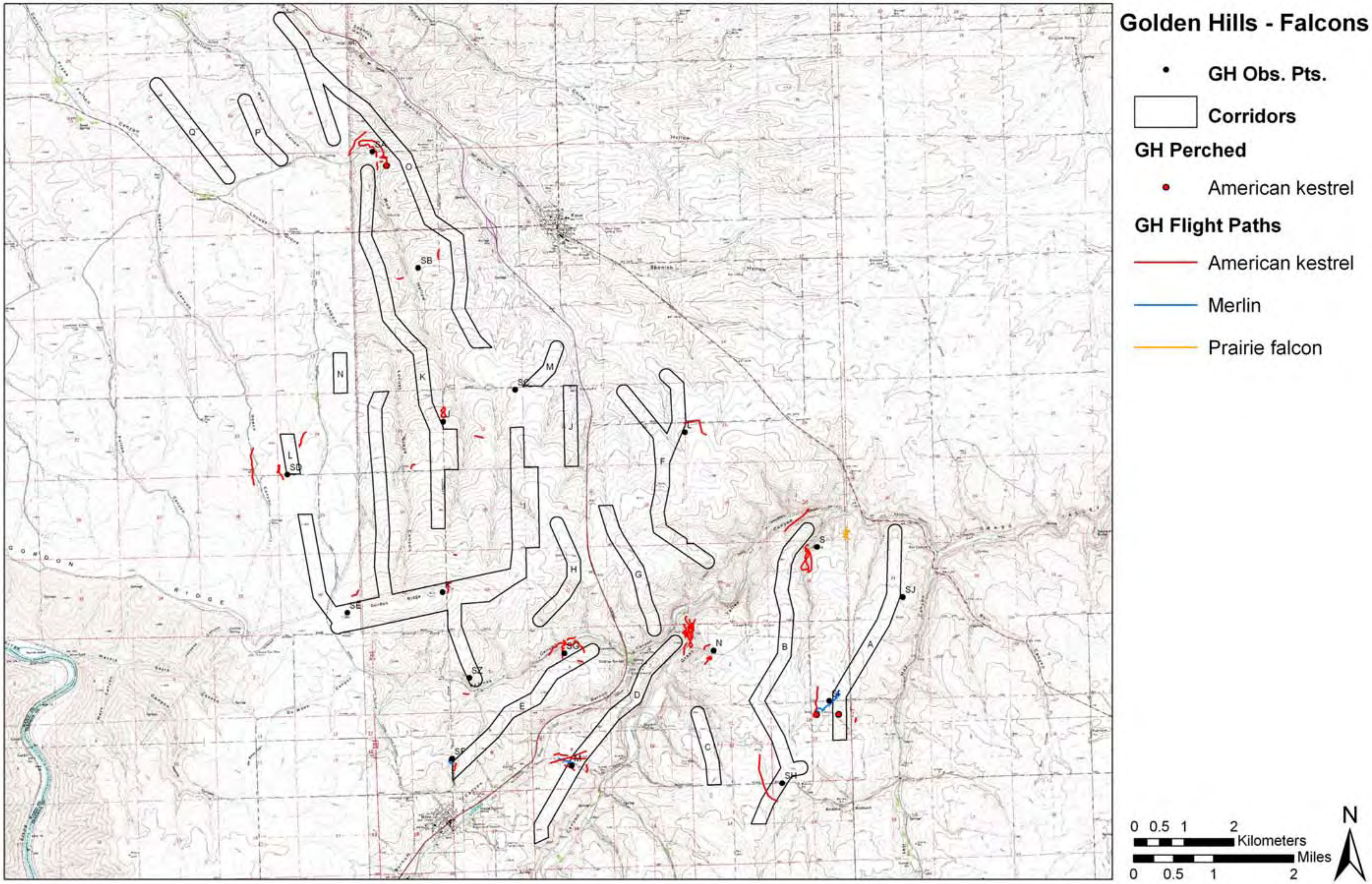


Figure P-13d. Flight paths for other raptors observed during the A06/07 study.

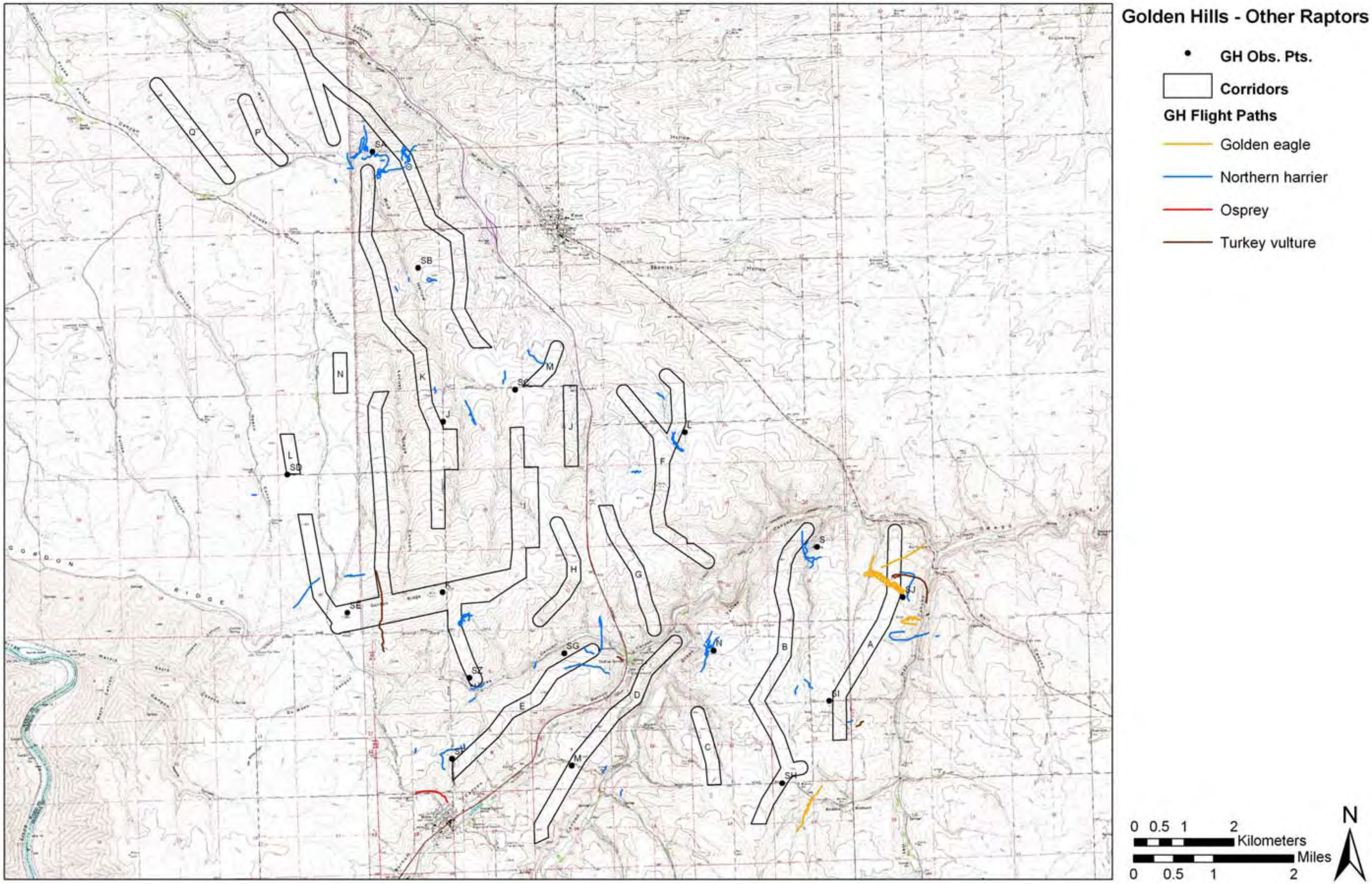
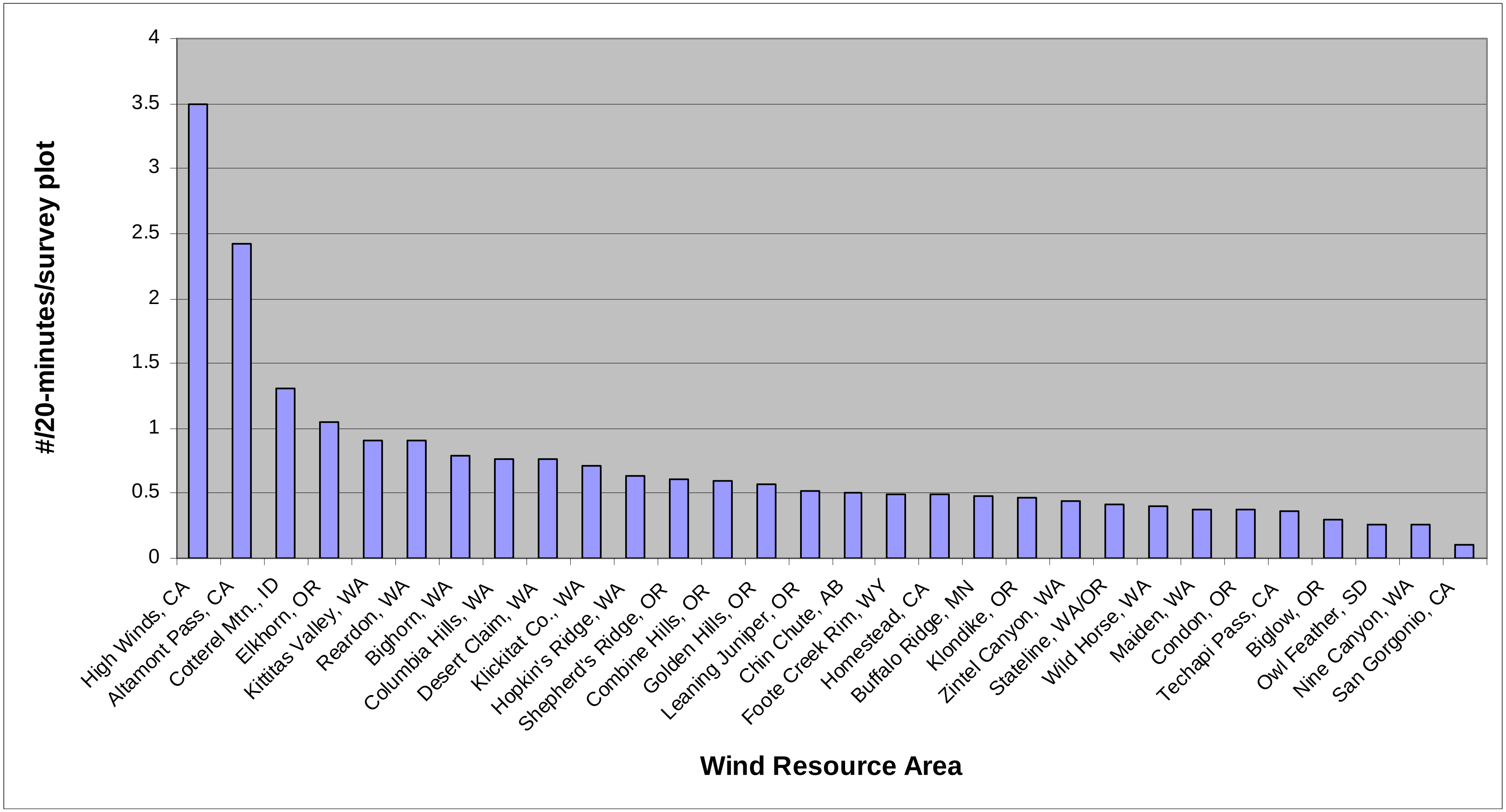


Figure P-14. Raptor Use Estimates from Open Habitat Facilities in the West and Midwest That Have Used Similar Methods of Data Collection.



ATTACHMENTS

ATTACHMENT P-1

Wildlife Baseline Study Protocols

Attachment P-1

PROTOCOL FOR WILDLIFE BASELINE STUDIES

GOLDEN HILLS WIND PROJECT
SHERMAN COUNTY, OREGON

UPDATED JUNE 2007
WEST Inc.

A comprehensive wildlife baseline study has been designed and implemented to describe temporal and spatial use of wildlife in the proposed Golden Hills project area, and to delineate wildlife habitat, as well as determine occurrence of any federal and state threatened, endangered, proposed, candidate, or sensitive-status animals. This information will be utilized in combination with existing pre- and post-construction information collected at several proposed and existing regional wind projects in order to estimate any potential impacts to habitat and wildlife that could result from the construction and operation of the proposed project, and identify potential project modifications and/or mitigation measures that could potentially reduce or mitigate negative impacts.

Several Columbia Basin wind power facilities are located in relatively similar landscapes as the proposed Golden Hills Wind Project, and provide one of the most comprehensive databases of existing information to be used in scientifically-sound predictions of impacts to wildlife. For example, at least nine regional wind facilities have collected pre-construction wildlife baseline survey information. These facilities include Klondike I-III, Leaning Juniper I-II, Stateline, Nine Canyon, Cascade, and Combine Hills. Several of these facilities already have post-construction survey information as well.

In addition to these existing pre-construction studies at nearby facilities, a multi-year wildlife study has been designed and implemented within the Golden Hills Wind Project area. The Golden Hills Project area was considered a reference area for the Biglow Canyon Wind Project. A one-year study was conducted at the Golden Hills Project area and was reported in WEST (2005). The protocol presented here for conducting the various surveys describes the methods used to conduct the WEST (2005) study in the Project area, as well as methods used to conduct a more intensive data collection approach in 2006 and 2007. A list of sensitive species occurring or potentially occurring in Sherman County is shown in Table 1 (Appendix A also provides Oregon Natural Heritage Program data for the Golden Hills Project area).

METHODS

The wildlife baseline studies conducted at the Golden Hills Project consist of five components:

1) Habitat Mapping

2) Fixed-Point Avian Surveys - point count surveys for all birds which target raptors, other large birds, and also big game species within the project area and a reference area
3) Raptor Nest Survey - surveys to locate raptor nests on and within approximately 2 miles of the project area
4) Sensitive Species Surveys - state and federally threatened, endangered, or sensitive-status wildlife and plants
5) General Wildlife Observations

Habitat Mapping

A general habitat map was developed by delineating general habitat types (cultivated and non-cultivated areas) on digital orthoquads (DOQ). This map was then ground-truthed to separate out native habitats from Conservation Reserve Program (CRP) grasslands, and to map other features such as trees and waterbodies. This general habitat map was used to delineate areas needed to be sampled for sensitive wildlife, and to aid in characterizing habitat types, mapping codes, and categorization according to the habitat definitions of the Oregon Department of Fish and Wildlife (ODFW), which are utilized as a foundation for their mitigation standards. The analysis area for characterization of habitat according to ODFW mitigation goals was 750 feet from 500 feet wide turbine and road corridors, and 750 feet from new roads, substations, staging areas, meteorological towers, and overhead transmission lines.

Fixed-Point Avian Use Surveys

The primary objectives of the fixed-point surveys are to (1) quantify and compare the general level of bird utilization and species composition within the project area with similarly collected information at nearby and other projects in the region for the purpose of predicting impacts, and (2) provide spatial and temporal information on avian use and compare with existing information on bird use to aid in siting facilities within the wind power project. Point counts (variable circular plots) were conducted on the project and reference areas using methods described by Reynolds *et al.* (1980). The points were selected to survey representative habitats and topography of the study site while also providing relatively even coverage with minimal overlap of surveyed area, taking into consideration the location of access roads and landowner concerns over 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 on site that were observed between point counts were recorded; coordinates derived from GPS were also noted for species of concern. Site specific data collected at this site will be compared and contrasted to the extensive data sets of similarly collected data in Sherman County and other nearby regions. In Sherman County alone, avian use surveys have been conducted extensively throughout proposed and developed wind project areas, with over 70 stations established, and most surveyed for a minimum of one year (Figure 1)

An avian study was conducted between March 2004 and March 2005 within the general region of the Golden Hills area prior to establishment of a facility layout. This investigation provided reference data for comparison with the Biglow Canyon Wind Project in northern Sherman County (ORION 2005, WEST 2005). This study is referred to hereafter as Avian 04/05 (A04/05). During 2006 an intensive avian study was designed and implemented in July and will be completed in June 2007 with more observation stations surveyed, and surveyed more frequently. This study is referred to hereafter as Avian 06/07 (A06/07).

Survey Plots

Thirteen plots were surveyed in the A04/05 study, and each plot consisted of a 2,625-ft (800-m) radius circle centered on an observation point location (Figure 1). Twenty nine stations were surveyed in the A06/07 study with the same circular point station dimensions (Figure 1). Landmarks and topographic map features were located to aid in identifying the 2,625-ft (800-m) boundary of each observation point. Observations of birds beyond the 2,625-ft (800-m) radius were recorded, but these observations were not included in standardized use estimates. Survey period at each point for the A04/05 study was 30 minutes long, whereas the survey period for
the A06/07 point counts was 20 minutes long (see Figure 2 for datasheet).

For both studies, all raptors and other large birds observed during the survey were assigned a unique observation number and plotted on a topographic map of the survey plot (e.g., Figure 2). 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 class (if identification was possible), distance from plot center when first observed, closest distance, height above ground, activity (behavior), flight direction, and habitat(s) were recorded for each bird observed. Flight or movement paths were mapped for all raptors and large birds and given the corresponding unique observation number. This mapped information, such as point of first observation and later flight path, was digitized for describing spatial use of the site.

Four instantaneous counts were made during each observation period. Instantaneous counts were made at the beginning and end of the observation period with two additional counts in between at quarterly intervals (e.g., 10 and 20 minute marks for a 30 minute survey). An instantaneous count consists of a summary of all birds present in and near the plot at a particular time. During the instantaneous count, the observer scanned the full survey plot recording all birds seen at that moment. For each raptor/large bird seen during an instantaneous count, the approximate height above ground and distance to the observer were recorded (Figure 2).

The behavior of each raptor/large bird observed and the habitat in or over which the bird occurred was recorded. Behavior categories recognized include perched, soaring, flapping, flushed, circle soaring, flap/hover, 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/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 (Figure 2).

Observation Schedule

Sampling intensity was designed to document avian use and behavior by habitat and season within the project area. For the A04/05 study, surveys occurred approximately twice a month at each station from spring 2004 to spring 2005 (March to March). For the intensive A06/07 study, surveys occurred weekly at 18-21 stations, and all 29 stations were surveyed at least three times per month (29 stations were broken into 3 subsets, and 2 subsets were surveyed every week rotating among all subsets in subsequent weeks). Surveys were conducted from late July through mid-December. Spring surveys will be conducted in mid-March through June of 2007. Seasons are defined as spring, March 15 - May 31; summer, June 1- August 14; fall, August 15-October 31; and winter, November 1-March 14. Surveys were conducted during daylight hours and survey periods were varied to approximately cover all daylight hours during a season. To the extent practicable, each station was surveyed about the same number of times each season; however, the schedule varied in response to adverse weather conditions (e.g., fog), which may have caused delays and/or missed surveys.

Aerial Raptor Nest Survey

The objective of the raptor nest surveys was to gather information on species nesting in the area which may be subject to disturbance and/or displacement effects from wind plant construction and operation. Information collected consisted of nesting raptor and large bird species in the area including nest locations, nesting season (timing), and nest status. Locations of inactive nests were also recorded as they may be occupied in subsequent years. An aerial helicopter survey for raptors was conducted during late April, 2004, and covered a buffer of approximately 2 miles. During spring of 2007, two additional flights within a 2-mile buffer of the current facility development corridors will be made to acquire updated results (for example new nest locations for sensitive species such as golden eagle, ferruginous hawk, and Swainson's hawk). Search paths were and will be recorded with a real-time differentially-corrected Trimble Trimflight III Global Positioning System (GPS) at 5-second intervals; coordinates as Universal Transverse Mercator, UTM, NAD27.

Raptor nest surveys were scheduled after most species of raptor finished courtship and were incubating eggs or brooding young. Surveys were also scheduled just prior to the onset of leaf-out to increase the visibility of raptor nests within deciduous habitats. Nest searches were conducted by searching habitat suitable for most aboveground nesting species, such as cottonwood, ponderosa pine, tall shrubs, and cliffs or rocky outcrops. During surveys, the helicopter was flown at an altitude of tree-top level to approximately 250 ft (76m) aboveground. If a nest was observed, the helicopter was moved to a position where nest status and species present could be determined. Efforts were made to minimize disturbance to breeding raptors, including keeping the helicopter a maximum distance from the nest at which the species could be identified. Those distances varied depending upon nest location and wind conditions. Data recorded for each nest location included species occupying the nest, nest status (inactive, bird incubating, young present, eggs present, adult present, unknown or other), nest substrate (pine, oak, cottonwood, juniper, shrub, rocky outcrop, cliff or power line), number of young present, time and date of observation and the nest location (recorded with both a handheld GPS and the differentially-corrected unit). Some nest sites were ground truthed when activity was unknown. GPS coordinates were recorded for all nests located of all raptor or other large bird species and mapped on a GIS ArcView project utilizing USGS topographic maps (1:24000 scale) as the base.

Estimates of impacts to raptors/raptor nests will be provided in the final baseline report and will be based on the information collected during 2004 and 2007, as well as results of pre-construction surveys conducted in 2001 for the Klondike I wind power facility, pre-construction surveys conducted in 2005 for the Klondike III wind power facility, and estimated nesting densities, species composition and direct measures of impacts from post-construction nest monitoring at the Nine Canyon, Stateline, Combine Hills, Klondike I, Leaning Juniper I and II, Cascade Wind, and other regional wind project facilities will also be utilized (e.g., Hopkins Ridge in Columbia County, Washington, and several Klickitat County, Washington wind projects).

Rare Plants

A list of rare plants with potential to occur in the general project area will be compiled based on agency database searches and the Oregon Natural Heritage Program list of species documented to potentially occur within the project area (Appendix A).

Rare plant surveys will be conducted by trained botanists during peak flowering and/or fruiting periods when target species are best identified. Study corridors will include proposed facilities and a 50 meter (164 feet) buffer. During the survey, botanists will follow meandering transects, effectively zigzagging back and forth across the survey corridor. Botanists will maintain a list of all vascular plants encountered, and will make informal collections of unknown species for later identification using *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973). Additional information collected will include general plant associations, land use patterns, unusual habitats, and photographs of habitat types and representative individual plants.

Special Status/Sensitive Species Surveys

Habitat consisting of non-cultivated grassland/shrub-steppe or CRP within 305 meters (1000 feet) of the centerline of proposed turbine corridors were surveyed for special status/sensitive wildlife twice during the spring nesting/breeding season (May and June 2006). The spring surveys focus on species such as grasshopper sparrows, long-billed curlews, burrowing owls, and small mammals. However, all status/sensitive species are recorded if observed. Surveys consisted of walking transects spaced approximately 50 meters apart (scanning 25 m to either side), and were conducted from dawn to no later than 1:00 PM with wind speeds not consistently exceeding 15 MPH. All observations were recorded using GPS and later mapped using GIS. Notes on habitat and condition were also recorded in order to augment ODFW habitat categorical classifications. Additional nighttime surveys were conducted to document white-tailed jackrabbits in late summer 2006. A few additional turbine corridors have been added since 2006 surveys. These areas and proposed underground collector lines, new roads, substations, laydown areas, O&M facilities, and transmission lines will be surveyed in spring 2007 and late-summer 2007 for jackrabbits.

Nighttime surveys for white-tailed jackrabbits will use 200,000 or greater candlepower spotlights and will be conducted twice in August-September. Surveyors will walk or ride ATVs along proposed project facility locations searching along transects no greater than 90 meters from the observer. The location of each observation will be recorded using GPS. Other wildlife observed during these surveys will also be recorded. These same protocols were used in August-September of 2006.

Big Game and General Wildlife Observations

Observations of big game species while conducting avian fixed-point surveys were also recorded. Elk (*Cervis elaphus*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), and pronghorn (*Antilocapra americana*) are known to occur on or near the project site. Observations of these species were plotted on data sheet maps and the number of individuals in each group recorded. The objective of recording these data was to provide baseline information about big game in the project area and estimate seasonal variation in use by these species. General wildlife observations on the Project were also recorded to document wildlife other than avian species that may be affected by the proposed development. These incidental wildlife observations were made while observers were on site conducting the various surveys. All sightings of raptors, unusual or unique birds, sensitive species, mammals, reptiles, and amphibians were recorded.

Statistical Analysis and Products

A relational database will be created to store, retrieve and organize field observations. Quality assurance/quality control (QA/QC) measures will be implemented at all stages of the study, including in the field, during data entry, during data analysis, and report writing.

Statistics/data generated for the study and compared and combined with information from other relevant studies include the following:

- Species lists and observations by season;
- Relative use by species, species group, season, and observation point (habitat);
- Mean frequency of occurrence and species composition;
- Mapped summary of raptor observations and flight paths by species or group;
- Mean flight characteristics by species and species group;
- Exposure indices by species and species group;
- Other wildlife and sensitive species lists and locations mapping;
- Raptor nest location by species mapping;
- Table of raptor nests by species; and
- Comparisons of avian use, raptor nest density, and habitat composition between the proposed project and other new or existing wind plants.
- Estimates of avian and bat mortality from the project

Literature Cited

Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle and London.

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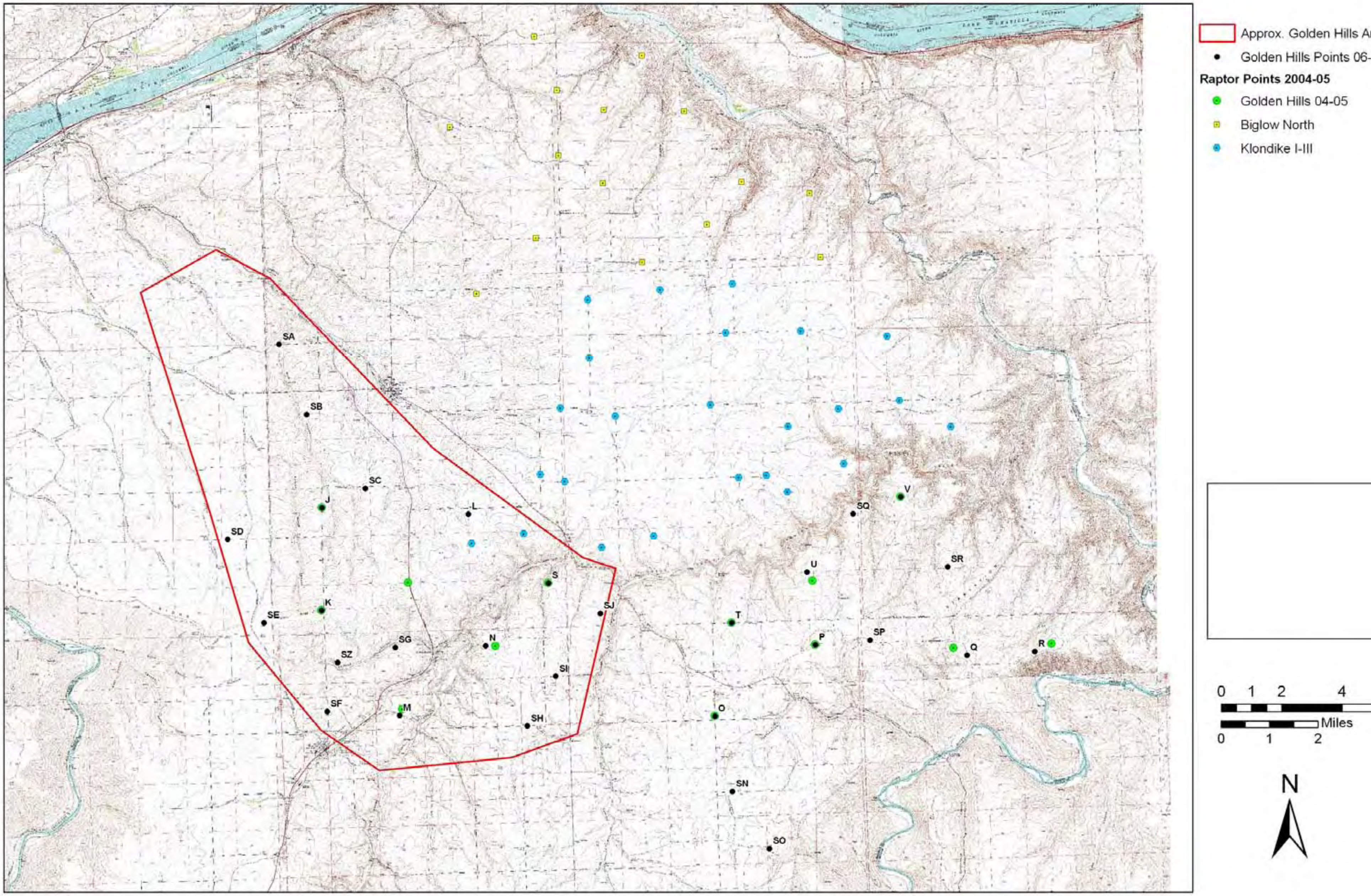
Reynolds, R.T, J.M. Scott, and R.A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82: 309-313.

WEST 2005. Wildlife and habitat baseline study for the proposed Biglow Canyon Wind Power project, Sherman County, Oregon. Technical report prepared by WEST, Inc. for Orion Energy LLC, Oakland CA, October 2005.


Approx. Golden Hills Ap
Golden Hills Points 06-
Raptor Points 2004-05
Golden Hills 04-05
Biglow North
Klondike I-III
0 1 2 4
Miles
0 1 2
N
SA
SB
SC
SD
SE
SF
SG
SH
SI
SJ
SN
SO
SP
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U
V

Figure 2. Example of avian fixed-point count survey datasheet.

AVIAN OBSERVATION DATA SHEET: FIXED POINT **GOLDEN HILLS** **STATION SJ**

DATE: ________ OBSERVER _____ START TIME ______ END TIME ______ PAGE_____ OF_____

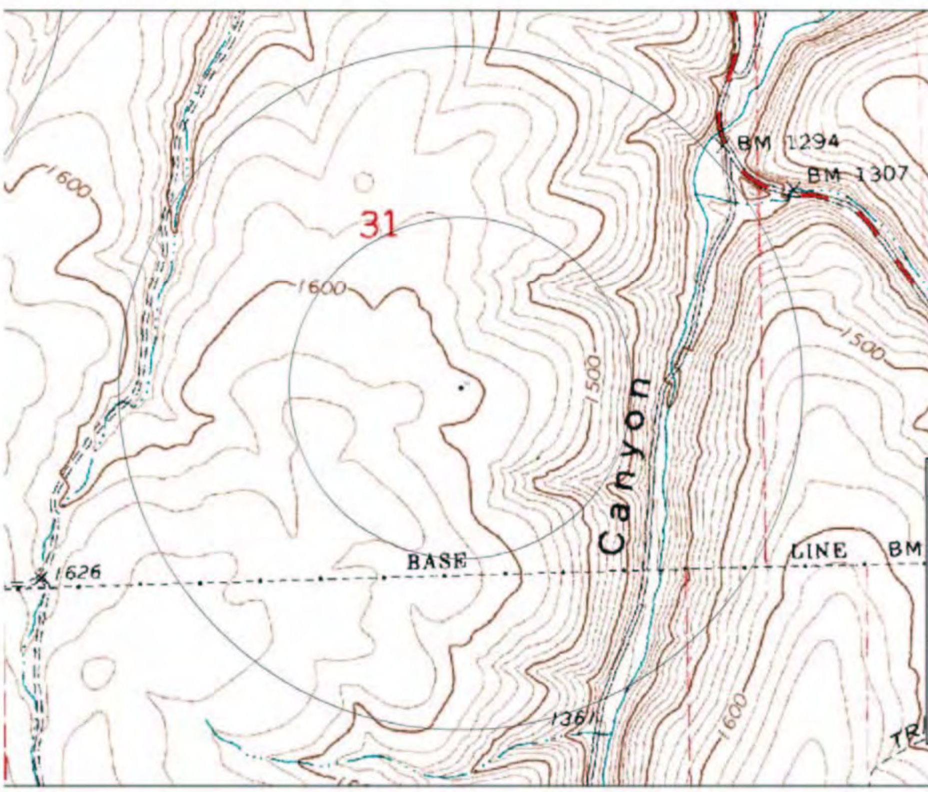
WEATHER: VISIBILITY(CIRCLE ONE) good fair poor CLOUD COVER(%) _____ TEMP(°C) _____

WIND DIRECTION (CIRCLE ONE) N NE E SE S SW W NW n/a SPEED(KPH) Low: _____ High: _____

PRECIPITATION(CIRCLE ONE) none light rain rain light snow snow sleet hail other

Obs. No.	Species	Sex	Age	# Inds	Distance (m) from observer	Activity	Flight Characteristics: Flight Height (m)			Dir.	Habitat	Instantaneous Count (Height/Distance)			A[a]	Notes.
					1st/closest		1st	low	high			0	10	20		
1						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
2						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
3						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
4						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
5						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
6						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
7						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
8						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
9						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					
10						PE SO FL FH / HO ST OT					GS CF DT MF SS / DS OT					

[a] check if Auditory only



Comments ________________

Big Game Observations

Obs. no.	Species	No. of Ind.	Distance from (m) observer

Table 1. List of State and Federal Sensitive Status Species potentially occurring in Sherman County, Oregon.

Common Name	Scientific Name	Federal Status	ODFW Status
FISH			
chinook salmon	*Oncorhynchus tshawytscha*	LT	LT
inland/interior redband trout	*Oncorhynchus mykiss*	SoC	SV
Pacific lamprey	*Lampetra tridentate*	SoC	SV
sockeye salmon	*Oncorhynchus nerka*	LE	--
Steelhead	*Oncorhynchus mykiss*	LT	SC/SV
AMPHIBIANS			
northern leopard frog	*Rana pretiosa*	--	SC
western toad	*Bufo boreas*	--	SV
REPTILES			
northern sagebrush lizard	*Sceloporus graciosus graciosus*	SoC	SV
painted turtle	*Chrysemys picta*	--	SC
sharptail snake	*Contia tenuis*	--	SV
western rattlesnake	*Crotalus viridis*	--	SV
BIRDS			
bald eagle	*Haliaeetus leucocephalus*	LT	LT
bank swallow	*Riparia riparia*	--	SU
burrowing owl	*Athene cunicularia hypugaea*	SoC	SC
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	SoC	--
common nighthawk	*Chordeiles minor*	--	SC
eastern Oregon willow flycatcher	*Empidonax traillii adastus*	SoC	SU
ferruginous hawk	*Buteo regalis*	SoC	SC
grasshopper sparrow	*Ammodramus savannarum*	--	SV/SP
Lewis's woodpecker	*Melanerpes lewis*	SoC	SC
loggerhead shrike	*Lanius ludovicianus*	--	SV
long-billed curlew	*Numenius americanus*	--	SV
mountain quail	*Oreortyx pictus*	SoC	SU
American peregrine falcon	*Falco peregrinus anatum*	--	LE
Swainson's hawk	*Buteo swainsoni*	--	SV
golden eagle	*Aquila chrysaetos*	EA	--

Table 1. List of State and Federal Sensitive Status Species potentially occurring in Sherman County, Oregon.

Common Name	Scientific Name	Federal Status	ODFW Status
western bluebird	*Sialia mexicana*	--	SV
western greater sage-grouse	*Centrocercus urophasianus*	SoC	SV
western meadowlark	*Sturnella neglecta*	--	SC
yellow-breasted chat	*Icteria virens*	SoC	Soc
BATS			
hoary bat	*Lasiurus cinereus*		
long-eared myotis	*Myotis evotis*	SoC	SU
long-legged myotis	*Myotis volans*	SoC	SU
pale western big-eared bat	*Corynorhinus townsendii pallescens*	SoC	SC
pallid bat	*Antrozous pallidus pallidus*	--	SV
silver-haired bat	*Lasionycteris noctivagans*	SoC	SU
western small-footed myotis	*Myotis ciliolabrum*	SoC	SU
Yuma myotis	*Myotix yumanensis*	Soc	--
MAMMALS			
California bighorn sheep	*Ovis canadensis californiana*	SoC	--
gray wolf	*Canis lupus*	LE	LE
white-tailed jackrabbit	*Lepus townsendii*	--	SU
INVERTEBRATE			
California floater	*Anodonta californiensis*	Soc	
Oregon snail	*Monadenia fidelis minor*	Soc	

TABLE 1 KEY

	Federal Status	
LE	*Listed Endangered*	Taxa listed by the USFWS, NMFS, ODA or ODFW as Endangered.
LT	*Listed Threatened*	Taxa listed by the USFWS, NMFS, ODA or ODFW 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.

SoC	*Species of Concern*	Former C2 candidates which need additional information in order to propose as Threatened or Endangered under the ESA. These are specis which the USFWS is reviewing for consideration as Candidates for listing under the ESA.
	ODFW Status	
SC	*Critical*	Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species which are at risk throught their range, and some disjunct populations.
SV	*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.
SP	*Peripheral or naturally rare*	Species whose Oregon populations are on the edge of their range.
SU	*Undetermined Status*	Scientific study required before a judgement can be made.

ATTACHMENT P-2

Oregon Natural Heritage Information Center Data

ATTACHMENT P-2

Oregon Natural Heritage Information Center Data

OREGON NATURAL HERITAGE INFORMATION CENTER

OSU
Oregon State University

Institute for Natural Resources
1322 SE Morrison Street
Portland, Oregon 97214-2423
503.731.3070
http://oregonstate.edu/ornhic

March 29, 2007

Victoria Poulton
WEST, Inc.
2003 Central Ave.
Cheyenne, WY 82001

Dear Ms. Poulton:

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 North-Central Sherman County Wind Power Project in USGS Quads Biggs Junction, Locust Grove, Wasco, Klondike, McDonald, Moro, Harmony and Esau Canyon.

Fifty three (53) records were noted within a two-mile radius of your project 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.

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

Cliff Alton
Conservation Information Assistant

encl.: invoice (H-032907-AEW2)
computer printout and data key

Oregon Natural Heritage Information Center - March 2007 — Sensitive Data - Do Not Distribute

Scientific Name: ***Bufo boreas***
Common Name: **Western toad**
Federal Status: No Status — GRANK: G4 — NHP List: 4 — Category: Vertebrate Animal
State Status: SV — SRANK: S3 — HP Track: N — ELCODE: AAABB01030
EO ID: 8103 — First Obs: 1995-04-04 — Last Obs: 1995-04-04 — Confirmed:
Directions: ESAU CANYON TRIBUTARY

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (400 m)]
Town-Range: 001S019E — Sec: 24 — Note:
QuadCode: 45120-D4 — QuadName: Esau Canyon
Watershed: 1707020406 - LOWER JOHN DAY
Owner Name/Type: FEDERAL
Owner Comments:
Managed Area Name: PRINEVILLE BLM DISTRICT; CENTRAL OREGON RESOURCE AREA

EO Type: — Minimum Elev.(m): 305 — Annual Observations
EO Data: 1995: 2 ADULTS AND 1 EGG MASS.
EO Comments:
Protection:
Management:
General: OBSERVER: MARY DAVERSA, BLM REC #228

Scientific Name: ***Bufo boreas***
Common Name: **Western toad**
Federal Status: No Status — GRANK: G4 — NHP List: 4 — Category: Vertebrate Animal
State Status: SV — SRANK: S3 — HP Track: N — ELCODE: AAABB01030
EO ID: 16173 — First Obs: 1993-09-02 — Last Obs: 1993-09-02 — Confirmed:
Directions: ROCK CREEK AT CONFLUENCE WITH JOHN DAY RIVER.

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (400 m)]
Town-Range: 001N019E — Sec: 11 — Note:
QuadCode: 45120-E4 — QuadName: McDonald
Watershed: 1707020402 - LOWER JOHN DAY
Owner Name/Type: FEDERAL; STATE
Owner Comments:
Managed Area Name: PRINEVILLE BLM DISTRICT; JOHN DAY RIVER STATE SCENIC WATERWAY; CENTRAL OREGON RESOURCE AREA

EO Type: — Minimum Elev.(m): 125 — Annual Observations
EO Data: 1993: 1 ADULT
EO Comments:
Protection:
Management:
General: OBSERVER: R. DEMMER, BLM REC #229

Scientific Name: ***Buteo swainsoni***
Common Name: **Swainson's hawk**
Federal Status: — GRANK: G5 — NHP List: 4 — Category: Vertebrate Animal
State Status: SV — SRANK: S3B — HP Track: N — ELCODE: ABNKC19070
EO ID: 17224 — First Obs: 1978 — Last Obs: 1978-05 — Confirmed: Y
Directions: 1 MILE SOUTH OF WASCO ON HWY 97.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (1600 m)]
Town-Range: 001N017E — Sec: 16 — Note:
QuadCode: 45120-E6 — QuadName: Wasco
Watershed: 1707010508 - SPANISH HOLLOW CREEK
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type: — Minimum Elev.(m): 137 — Annual Observations
EO Data: INDIVIDUAL OBSERVED HERE IN MAY 1978
EO Comments: NEST LOCATED IN BLACK LOCUST TREES ON WEST SIDE OF ROAD.
Protection:
Management:
General:

Sherman County Wind Project - Page 1 of 25

Scientific Name: ***Falco peregrinus anatum***
Common Name: **American peregrine falcon**
Federal Status: GRANK: G4T4 NHP List: 2 Category: Vertebrate Animal
State Status: LE SRANK: S2B HP Track: Y ELCODE: ABNKD06071
EO ID: 25908 First Obs: 1998 Last Obs: 2003 Confirmed:
Directions: Sensitive Data - contact ORNHIC for more information

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range: 003N018E Sec: 27 Note:
QuadCode: 45120-F5 QuadName: Quinton
Watershed: 1707010112 - MIDDLE COLUMBIA-LAKE WALL
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type:
Minimum Elev.(m):
EO Data: Documented nesting site. See annual observations.

Annual Observations
- 2003 - active nest, 3 young
- 2002 - ORNHIC has not received data yet
- 2001 - ORNHIC has not received data yet
- 2000 - ORNHIC has not received data yet
- 1999 - ORNHIC has not received data yet
- 1998 - active nest, 3 young

EO Comments:
Protection:
Management:
General: Site OE-57

Scientific Name: ***Falco peregrinus anatum***
Common Name: **American peregrine falcon**
Federal Status: GRANK: G4T4 NHP List: 2 Category: Vertebrate Animal
State Status: LE SRANK: S2B HP Track: Y ELCODE: ABNKD06071
EO ID: 25907 First Obs: 1998 Last Obs: 2003 Confirmed:
Directions: Sensitive Data - contact ORNHIC for more information

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range: 003N017E Sec: 32 Note:
QuadCode: 45120-F6 QuadName: Rufus
Watershed: 1707010506 - SPANISH HOLLOW CREEK
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type:
Minimum Elev.(m):
EO Data: Documented nesting site. See annual observations.

Annual Observations
- 2003 - active nest, 2 young
- 2001 - ORNHIC has not received data yet
- 2000 - ORNHIC has not received data yet
- 1999 - ORNHIC has not received data yet
- 1998 - occupied nest, inactive

EO Comments:
Protection:
Management:
General: Site OE-58

Scientific Name: ***Falco peregrinus anatum***
Common Name: **American peregrine falcon**
Federal Status: GRANK: G4T4 NHP List: 2 Category: Vertebrate Animal
State Status: LE SRANK: S2B HP Track: Y ELCODE: ABNKD06071
EO ID: 25940 First Obs: Last Obs: 2003 Confirmed:
Directions: Sensitive Data - contact ORNHIC for more information

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range: 002N019E Sec: 03 Note:
QuadCode: 45120-F4 QuadName: Sundale NW
Watershed: 1707010110 - MIDDLE COLUMBIA-LAKE WALL
Owner Name/Type:
Owner Comments:
Managed Area Name:

Oregon Natural Heritage Information Center - March 2007 Sensitive Data - Do Not Distribute

EO Type: Minimum Elev.(m): Annual Observations
EO Data: Documented nesting site. See annual observations. • 2003 - active nest, 2 young
EO Comments:
Protection:
Management:
General: Site OE-88

Scientific Name: *Tympanuchus phasianellus columbianus*
Common Name: **Columbian sharp-tailed grouse**
Federal Status: SOC GRANK: G4T3 NHP List: 2 Category: Vertebrate Animal
State Status: SRANK: S1 HP Track: Y ELCODE: ABNLC13033
EO ID: 14780 First Obs: 1935-04-19 Last Obs: 1935-04-19 Confirmed:
Directions: NEAR MILLER AT THE MOUTH OF THE DESCHUTES RIVER

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (1500 m)]
Town-Range: 002N015E Sec: 24 Note:
QuadCode: 45120-F8 QuadName: Wishram
Watershed: 1707010506 - SPANISH HOLLOW CREEK
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type: Minimum Elev.(m): 213 Annual Observations
EO Data: TWO NESTS RECORDED BY ALEX WALKER 04/19/35. ONE NEST CONTAINED 13 EGGS, NO DATA AVAILABLE ON THE SECOND NEST.
EO Comments: TWO NESTS LOCATED IN SLIGHT HOLLOWS IN A GRAINFIELD, LINED WITH GRASSES, GRAIN STEMS AND FEATHERS.
Protection:
Management:
General: SPECIES ONCE ABUNDANT IN EASTERN OREGON. EXTIRPATED WHEN FARMING AND GRAZING DEPLETED NATIVE BUNCHGRASS HABITAT.

Scientific Name: *Numenius americanus*
Common Name: **Long-billed curlew**
Federal Status: GRANK: G5 NHP List: 4 Category: Vertebrate Animal
State Status: SV SRANK: S3B HP Track: N ELCODE: ABNNF07070
EO ID: 12178 First Obs: 1980 Last Obs: 1980-05-23 Confirmed:
Directions: S OF BIGGS APPROX 0.5 MI NEAR THE FRANK FULTON CANYON

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (1500 m)]
Town-Range: 002N016E Sec: 17 Note:
QuadCode: 45120-F7 QuadName: Biggs Junction
Watershed: 1707010506 - SPANISH HOLLOW CREEK
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type: Minimum Elev.(m): 183 Annual Observations
EO Data: 8 BIRDS, INCLUDING 3 PAIRS WERE OBSERVED ON 5-23-80 BETWEEN 8-10 AM, BY BRIAN SHARP & BRIAN MCKINNEY
EO Comments: FORB-GRASSLAND W/BASALTIC OUTCROPPING. AREA HAS BEEN GRAZED.80% OF THIS AREA IS PLOUGHED W/PATCHES OF GRASSLAND ALONG CONTOURS & ON SLOPES
Protection:
Management:
General:

Scientific Name: *Numenius americanus*
Common Name: **Long-billed curlew**
Federal Status: GRANK: G5 NHP List: 4 Category: Vertebrate Animal
State Status: SV SRANK: S3B HP Track: N ELCODE: ABNNF07070
EO ID: 21884 First Obs: 1987 Last Obs: 1987-06-23 Confirmed:
Directions: NEAR R. M. 16 OF LOWER JOHN DAY RIVER, HARTUNG ALLOTMENT. ACCESSIBLE BY ROAD THROUGH KLONDIKE & WEBFOOT.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (1500 m)]

Sherman County Wind Project - Page 3 of 25

Town-Range Sec Note
002N019E 32

QuadCode QuadName
45120-E4 McDonald

Watershed
1707020401 - LOWER JOHN DAY

Owner Name/Type
FEDERAL

Owner Comments

Managed Area Name
PRINEVILLE BLM DISTRICT
CENTRAL OREGON RESOURCE AREA

EO Type:
Minimum Elev.(m): 427

Annual Observations

EO Data: 1 MALE AND 1 FEMALE OBSERVED. NESTING PAIR MAY BE IN SECTION 32 ON PRIVATE LAND.
EO Comments: SAGE AND STIPA COMATA.
Protection:
Management:
General:

Scientific Name: ***Oncorhynchus mykiss pop. 28***
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT
State Status: SV
EO ID: 948
GRANK: G5T2Q
SRANK: S2
First Obs:
NHP List: 1
HP Track: Y
Last Obs: 1996-PRE
Category: Vertebrate Animal
ELCODE: AFCHA02133
Confirmed:
Directions: COLUMBIA RIVER & TRIBUTARIES

County Name
Gilliam
Hood River
Morrow
Sherman
Umatilla
Wasco

Ecoregion

Source Feature [Uncertainty Type (Distance)]
Data currently not available.

Town-Range Sec Note

QuadCode QuadName
45118-H8 Juniper Canyon
45119-G6 Boardman
45119-G7 Crow Butte
45119-G8 Alderdale
45119-H1 Juniper
45119-H2 Hat Rock
45119-H3 Umatilla
45119-H4 Irrigon
45119-H5 Paterson
45119-H6 Blalock Island
45120-F2 Arlington
45120-F3 Sundale
45120-F4 Sundale NW
45120-F5 Quinton
45120-F6 Rufus
45120-F7 Biggs Junction
45120-F8 Wishram
45120-G1 Heppner Junction
45120-G2 Wood Gulch
45121-E1 Petersburg
45121-E2 The Dalles South
45121-F1 Stacker Butte
45121-F2 The Dalles North
45121-F3 Lyle
45121-F4 White Salmon
45121-F5 Hood River

Watershed
17070101 - Middle Columbia-Lake Wallula
17070105 - Middle Columbia-Hood
17070204 - Lower John Day

Owner Name/Type

Owner Comments

Managed Area Name

EO Type: MIGRATION - fish
Minimum Elev.(m):

Annual Observations

EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:

General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss* pop. 28**
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT   GRANK: G5T2Q   NHP List: 1   Category: Vertebrate Animal
State Status: SV   SRANK: S2   HP Track: Y   ELCODE: AFCHA02133
EO ID: 1686   First Obs: Last Obs: 1999-PRE   Confirmed:
Directions: SCOTT CANYON

County Name: Gilliam
Ecoregion:
Source Feature [Uncertainty Type (Distance)]: Data currently not available.

Town-Range Sec Note

QuadCode	QuadName
45120-D2	Mikkalo
45120-D3	Devils Backbone
45120-E3	Turner Butte

Watershed: 17070204 - Lower John Day

Owner Name/Type
Owner Comments
Managed Area Name

EO Type: SPAWNING & REARING - fish   Minimum Elev.(m):
Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss* pop. 28**
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT   GRANK: G5T2Q   NHP List: 1   Category: Vertebrate Animal
State Status: SV   SRANK: S2   HP Track: Y   ELCODE: AFCHA02133
EO ID: 2336   First Obs: Last Obs: 1999-PRE   Confirmed:
Directions: SPANISH HOLLOW CREEK

County Name: Sherman
Ecoregion:
Source Feature [Uncertainty Type (Distance)]: Data currently not available.

Town-Range Sec Note

QuadCode	QuadName
45120-F7	Biggs Junction

Watershed: 1707010508 - SPANISH HOLLOW CREEK

Owner Name/Type
Owner Comments
Managed Area Name

EO Type: SPAWNING & REARING - fish   Minimum Elev.(m):
Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss* pop. 28**
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT   GRANK: G5T2Q   NHP List: 1   Category: Vertebrate Animal
State Status: SV   SRANK: S2   HP Track: Y   ELCODE: AFCHA02133
EO ID: 3179   First Obs: Last Obs: 1999-PRE   Confirmed:
Directions: GRASS VALLEY CANYON & TRIBUTARY

County Name: Sherman
Ecoregion:
Source Feature [Uncertainty Type (Distance)]: Data currently not available.

Oregon Natural Heritage Information Center - March 2007 Sensitive Data - Do Not Distribute

Town-Range Sec Note

QuadCode QuadName
45120-C6 Rosebush
45120-D6 Moro
45120-E4 McDonald
45120-E5 Klondike
45120-E6 Wasco

Watershed
17070204 - Lower John Day

Owner Name/Type

Owner Comments

Managed Area Name

EO Type: SPAWNING & REARING - fish Minimum Elev.(m):
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.

Annual Observations

EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss pop. 28***
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 6318 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: FERRY CANYON & TRIBUTARIES

County Name
Gilliam

Ecoregion

Source Feature [Uncertainty Type (Distance)]
Data currently not available.

Town-Range Sec Note

QuadCode QuadName
45120-C4 Indian Spring
45120-D4 Esau Canyon
45120-D5 Harmony

Watershed
17070204 - Lower John Day

Owner Name/Type

Owner Comments

Managed Area Name

EO Type: SPAWNING & REARING - fish Minimum Elev.(m):
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.

Annual Observations

EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss pop. 28***
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 7681 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: FULTON CANYON AND TRIBUTARIES

County Name
Sherman

Ecoregion

Source Feature [Uncertainty Type (Distance)]
Data currently not available.

Town-Range Sec Note

QuadCode QuadName
45120-E7 Locust Grove
45120-F7 Biggs Junction
45120-F8 Wishram

Watershed
1707010508 - SPANISH HOLLOW CREEK

Owner Name/Type

Owner Comments

Managed Area Name

Sherman County Wind Project - Page 6 of 25

Oregon Natural Heritage Information Center - March 2007 Sensitive Data - Do Not Distribute

EO Type: SPAWNING & REARING - fish Minimum Elev.(m): Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss pop. 28***
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 8698 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: DESCHUTES RIVER

County Name: Sherman, Wasco
Ecoregion
Source Feature (Uncertainty Type (Distance)): Data currently not available.

Town-Range Sec Note

QuadCode	QuadName
45120-E7	Locust Grove
45120-E8	Emerson
45120-F8	Wishram

Watershed: 1707030601 - LOWER DESCHUTES

Owner Name/Type
Owner Comments
Managed Area Name

EO Type: REARING & MIGRATION - fish Minimum Elev.(m): Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss pop. 28***
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 12936 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: JOHN DAY RIVER

County Name: Gilliam, Grant, Jefferson, Sherman, Wasco, Wheeler
Ecoregion
Source Feature (Uncertainty Type (Distance)): Data currently not available.

Sherman County Wind Project - Page 7 of 25

Town-Range Sec Note

QuadCode	QuadName
44119-G6	Kimberly
44119-G7	Spray
44119-G8	Masiker Mountain
44120-F1	Toney Butte
44120-F2	Sutton Mountain
44120-F3	Painted Hills
44120-G1	Service Creek
44120-G2	Rowe Creek
44120-G3	Jennies Peak
44120-G4	Muddy Ranch
44120-H4	Clarno
45120-A4	Chimney Springs
45120-A5	Bath Canyon
45120-B4	Shoestring Ridge
45120-B5	Horseshoe Bend
45120-C5	Indian Cove
45120-D3	Devils Backbone
45120-D4	Esau Canyon
45120-D5	Harmony
45120-E3	Turner Butte
45120-E4	McDonald
45120-F4	Sundale NW
45120-F5	Quinton
45120-F6	Rufus

Watershed
17070204 - Lower John Day

Owner Name/Type
Owner Comments
Managed Area Name

EO Type: MIGRATION - fish
Minimum Elev.(m):
Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss pop. 28***
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT
GRANK: G5T2Q
NHP List: 1
Category: Vertebrate Animal
State Status: SV
SRANK: S2
HP Track: Y
ELCODE: AFCHA02133
EO ID: 14988
First Obs:
Last Obs: 1999-PRE
Confirmed:
Directions: HAY CREEK & TRIBUTARIES

County Name
Gilliam
Ecoregion
Source Feature [Uncertainty Type (Distance)]
Data currently not available.

Town-Range Sec Note

QuadCode	QuadName
45120-C2	Gwendolen
45120-C3	Igo Butte
45120-D3	Devils Backbone
45120-E3	Turner Butte

Watershed
1707020407 - LOWER JOHN DAY

Owner Name/Type
Owner Comments
Managed Area Name

EO Type: SPAWNING & REARING - fish
Minimum Elev.(m):
Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:

Oregon Natural Heritage Information Center - March 2007 Sensitive Data - Do Not Distribute

General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss* pop. 28**
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 16333 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: ROCK CREEK

County Name: Gilliam
Ecoregion:
Source Feature [Uncertainty Type (Distance)]: Data currently not available.

Town-Range Sec Note

QuadCode	QuadName
45120-D1	Wolf Hollow Falls
45120-D2	Mikkalo
45120-E2	Shutler Flat
45120-E3	Turner Butte
45120-E4	McDonald

Watershed: 17070204 - Lower John Day

Owner Name/Type Owner Comments Managed Area Name

EO Type: REARING & MIGRATION - fish Minimum Elev.(m):
Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss* pop. 28**
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 21176 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: DESCHUTES RIVER AND TRIBUTARIES

County Name: Jefferson, Sherman, Wasco
Ecoregion:
Source Feature [Uncertainty Type (Distance)]: Data currently not available.

Sherman County Wind Project - Page 9 of 25

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			44120-H8	Shaniko Junction	17070306 - Lower Deschutes
			44121-F2	Madras West	
			44121-G1	Gateway	
			44121-G2	Eagle Butte	
			44121-G3	Warm Springs	
			44121-G4	Potters Ponds	
			44121-G5	Sawmill Butte	
			44121-H1	Kaskela	
			45120-A6	Macken Canyon	
			45120-A7	Shaniko	
			45120-A8	Criterion	
			45120-B6	Kent	
			45120-B7	Bronx Canyon	
			45120-B8	Dead Dog Canyon	
			45120-C8	Sinamox	
			45120-D7	Erskine	
			45120-D8	Summit Ridge	
			45120-E7	Locust Grove	
			45121-A1	Dant	
			45121-A2	Maupin SW	
			45121-B1	Maupin	
			45121-B2	Tygh Valley	
			45121-C1	Sherars Bridge	

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: SPAWNING & REARING - fish Minimum Elev.(m): Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Oncorhynchus mykiss pop. 28***
Common Name: **Steelhead (Middle Columbia River ESU, summer run)**
Federal Status: LT GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 22702 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: LITTLE FERRY CANYON & TRIBUTARIES

County Name | Ecoregion | Source Feature [Uncertainty Type (Distance)]
Sherman | | Data currently not available.

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			45120-C5	Indian Cove	1707020406 - LOWER JOHN DAY
			45120-D5	Harmony	

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: SPAWNING & REARING - fish Minimum Elev.(m): Annual Observations
EO Data: SUMMER RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.
EO Comments:
Protection:
Management:
General: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFWS DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Oregon Natural Heritage Information Center - March 2007 | **Sensitive Data - Do Not Distribute**

Scientific Name: ***Salvelinus confluentus pop. 2***
Common Name: **Bull trout (Columbia River population)**
Federal Status: LT | GRANK: G3T2Q | NHP List: 1 | Category: Vertebrate Animal
State Status: SC | SRANK: S2 | HP Track: Y | ELCODE: AFCHA05023
EO ID: 25169 | First Obs: | Last Obs: 1990-PRE | Confirmed:
Directions: DESCHUTES RIVER

County Name
Sherman
Wasco

Ecoregion
CB

Source Feature [Uncertainty Type (Distance)]
Data currently not available.

QuadCode	QuadName
45120-C8	Sinamox
45120-D7	Erskine
45120-D8	Summit Ridge
45120-E7	Locust Grove
45120-E8	Emerson
45120-F8	Wishram
45121-B1	Maupin
45121-C1	Sherars Bridge

Watershed
1707030601 - LOWER DESCHUTES
1707030602 - LOWER DESCHUTES
1707030603 - LOWER DESCHUTES

Town-Range	Sec	Note
002N015E	26	
001S016E	05	
002N015E	23	
001N016E	31	
001N016E	32	
003S015E	05	
002S015E	34	
003S015E	08	
001N015E	36	
003S014E	13	
001S016E	04	
001S016E	08	
001S016E	17	
001N015E	25	
001N015E	26	
002S016E	19	
001N015E	23	
001N015E	14	
002S016E	18	
002S015E	13	
001N015E	12	
002S016E	07	
002S016E	05	
002S015E	24	
002S015E	23	
001N015E	11	
002S015E	27	
002S015E	26	
002S015E	33	
002S016E	06	
001S016E	32	
003S015E	04	
003S016E	03	
001N015E	02	
003S015E	09	
003S016E	07	
003S014E	14	
001S016E	31	
003S015E	18	
003S015E	17	
003S014E	23	
003S014E	26	
003S014E	34	
003S014E	35	
004S014E	03	
001S016E	30	
001N015E	01	
001S016E	19	
004S014E	10	
004S014E	09	
001S016E	20	
002N015E	35	

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: Minimum Elev.(m): Annual Observations

EO Data: ODFW BULL TROUT DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE.

EO Comments:

Protection:

Management:

General: DISTRIBUTION INFORMATION USED IN THE EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND DISTRIBUTED IN 2001. THE ODFW BULL TROUT DISTRIBUTION WAS BASED ON SUMMER/FALL PRESENCE. WINTER DISTRIBUTION COULD VARY SIGNIFICANTLY. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY STATE, FEDERAL AND TRIBAL FISHERY BIOLOGISTS; THE PRESENCE OF BULL TROUT IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

Scientific Name: ***Euderma maculatum***

Common Name: **Spotted bat**

Federal Status: SOC | GRANK: G4 | NHP List: 2 | Category: Vertebrate Animal

State Status: | SRANK: S2 | HP Track: Y | ELCODE: AMACC07010

EO ID: 26600 | First Obs: 2003-09-12 | Last Obs: 2003-09-12 | Confirmed:

Directions: Cottonwood Canyon Bridge over John Day River, just W. of J.S. Burres State Park.

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Gilliam	CB	Point [Areal - Estimated (50 m)]
Sherman		

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
001S019E	17		45120-D4	Esau Canyon	1707020406 - LOWER JOHN DAY

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: Minimum Elev.(m): 150 Annual Observations

EO Data: 2003: bats observed, exact number not specified.

EO Comments: Bridge

Protection:

Management:

General:

Scientific Name: ***Spermophilus washingtoni***

Common Name: **Washington ground squirrel**

Federal Status: C | GRANK: G2 | NHP List: 1 | Category: Vertebrate Animal

State Status: LE | SRANK: S2 | HP Track: Y | ELCODE: AMAFB05020

EO ID: 3345 | First Obs: 1979 | Last Obs: 1979- | Confirmed:

Directions: ABOVE THE SOUTH END OF COTTONWOOD CANYON, OFF OF HWY 206.

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Gilliam	CB	Point [Areal - Estimated (5050 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002S019E	04		45120-D4	Esau Canyon	1707020402 - LOWER JOHN DAY
					1707020406 - LOWER JOHN DAY
					1707020407 - LOWER JOHN DAY
					1707020408 - LOWER JOHN DAY
					1707020409 - LOWER JOHN DAY

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: Minimum Elev.(m): 610 Annual Observations

EO Data: GROUND SQUIRREL COLONY REPORTED BY CARLSON ET AL IN 1979 SURVEY.

EO Comments: SHRUB STEPPE VEGETATION. DISTRIBUTION THROUGHOUT RANGE FRAG-MENTED BY AGRICULTURAL DEVELOPMENT & GRAZING.

Protection:

Management:

General:

Scientific Name: ***Spermophilus washingtoni***
Common Name: **Washington ground squirrel**
Federal Status: C GRANK: G2 NHP List: 1 Category: Vertebrate Animal
State Status: LE SRANK: S2 HP Track: Y ELCODE: AMAFB05020
EO ID: 10304 First Obs: Last Obs: 1989-04-15 Confirmed:
Directions: 1/2 MILE S OF CLEM, GO SE FOR 1 MILE, THEN S FOR ABOUT 1 MILE

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (8050 m)]
Town-Range: 002S021E Sec: 15 Note:
QuadCode: 45120-D2 QuadName: Mikkalo
Watershed:
1707020403 - LOWER JOHN DAY
1707020404 - LOWER JOHN DAY
1707020405 - LOWER JOHN DAY
1707020407 - LOWER JOHN DAY
Owner Name/Type: PRIVATE
Owner Comments:
Managed Area Name:
EO Type: Minimum Elev.(m): 640
Annual Observations
EO Data: RESIDENT SAYS SQUIRRELS ARE PRESENT; USED TO SHOOT THEM.
EO Comments:
Protection:
Management:
General:

Scientific Name: ***Spermophilus washingtoni***
Common Name: **Washington ground squirrel**
Federal Status: C GRANK: G2 NHP List: 1 Category: Vertebrate Animal
State Status: LE SRANK: S2 HP Track: Y ELCODE: AMAFB05020
EO ID: 20378 First Obs: 1989 Last Obs: 1989-04-15 Confirmed:
Directions: ON ROAD LEADING SW SHARPLY UPHILL OVER 1.5 MILES DOWN SCOTT CANYON ROAD

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (4000 m)]
Town-Range: 002S020E Sec: 13 Note:
QuadCode: 45120-D3 QuadName: Devils Backbone
Watershed:
1707020403 - LOWER JOHN DAY
1707020404 - LOWER JOHN DAY
Owner Name/Type: PRIVATE
Owner Comments:
Managed Area Name:
EO Type: Minimum Elev.(m): 671
Annual Observations
EO Data: SQUIRRELS PRESENT
EO Comments:
Protection:
Management:
General:

Scientific Name: ***Spermophilus washingtoni***
Common Name: **Washington ground squirrel**
Federal Status: C GRANK: G2 NHP List: 1 Category: Vertebrate Animal
State Status: LE SRANK: S2 HP Track: Y ELCODE: AMAFB05020
EO ID: 21602 First Obs: 1989 Last Obs: 1989-04-15 Confirmed:
Directions: ON ROAD LEADING SW SHARPLY UPHILL ABOUT 1.5 MILES DOWN SCOTT CANYON

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (4000 m)]
Town-Range: 002S021E Sec: 08 Note:
QuadCode: 45120-D2 QuadName: Mikkalo
Watershed:
1707020403 - LOWER JOHN DAY
1707020404 - LOWER JOHN DAY
Owner Name/Type: PRIVATE
Owner Comments:
Managed Area Name:
EO Type: Minimum Elev.(m): 518
Annual Observations
EO Data: SEVERAL BURROWS WITH FRESH DIGGING
EO Comments:

Protection:
Management:
General:

Scientific Name: ***Spermophilus washingtoni***
Common Name: **Washington ground squirrel**
Federal Status: C GRANK: G2 NHP List: 1 Category: Vertebrate Animal
State Status: LE SRANK: S2 HP Track: Y ELCODE: AMAFB05020
EO ID: 21786 First Obs: 1988 Last Obs: 1989-04-15 Confirmed:
Directions: S OF MIKALO GRAIN ELEVATOR BETWEEN RAILROAD AND PAVED ROAD

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (1500 m)]

Town-Range	Sec	Note
001S021E	19	

QuadCode QuadName: 45120-D3 Devils Backbone
Watershed: 1707020407 - LOWER JOHN DAY
Owner Name/Type: PRIVATE
Owner Comments:
Managed Area Name:
EO Type:
Minimum Elev.(m): 457
Annual Observations
EO Data: DIDN'T FIND ANY IN 1988-05-22, BUT HEARD LOTS, SAW ONE AND FOUND LOTS OF FRESH BURROWS IN 1989.
EO Comments:
Protection:
Management:
General: BETTS, J.B. WASHINGTON GROUND SQUIRREL COMPUTER RECORD PRINTOUT AND ARTICLE FROM NORTHWEST NATURALIST, 71:27-37, AUTUMN 1990

Scientific Name: ***Spermophilus washingtoni***
Common Name: **Washington ground squirrel**
Federal Status: C GRANK: G2 NHP List: 1 Category: Vertebrate Animal
State Status: LE SRANK: S2 HP Track: Y ELCODE: AMAFB05020
EO ID: 22814 First Obs: 1989 Last Obs: 1989-04-15 Confirmed:
Directions: FOLLOW ROAD SOUTH FROM CLEM 1/2 MILE, GO 1/2 MILE W AND CORSS BRIDGE, THEN LEFT HEADED SOUTH UP CANYON. SQUIRRELS ON E-FACING SLOPE ON W SIDE OF CREEK, JUST S OF SCOTT CANYON ROAD ON E EDGE OF SEC 8; ALSO ABOUT 1 MILE FURTHER UP CANYON TO SOUTH ON ROAD T

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (8050 m)]

Town-Range	Sec	Note
002S021E	16	
002S021E	08	
002S021E	21	

QuadCode QuadName: 45120-D2 Mikkalo
Watershed:
1707020403 - LOWER JOHN DAY
1707020404 - LOWER JOHN DAY
1707020405 - LOWER JOHN DAY
1707020407 - LOWER JOHN DAY

Owner Name/Type: PRIVATE
Owner Comments:
Managed Area Name:
EO Type:
Minimum Elev.(m): 610
Annual Observations
EO Data: SAW ONE SQUIRREL IN EACH SITE WELL ENOUGH TO SEE SPOTS. LOOKS LIKE A BIG COLONY TAHT BASICALLY EXTENDS FROM ROAD JUNCTION S UP CANYON FOR ABOUT A MILE BEFORE UNCULTIVATED PATCH STOPS. LOTS OF OTHER COLONIES AROUND, SO LITTLE ISOLATION
EO Comments:
Protection:
Management:
General:

Scientific Name: ***Spermophilus washingtoni***
Common Name: **Washington ground squirrel**
Federal Status: C GRANK: G2 NHP List: 1 Category: Vertebrate Animal
State Status: LE SRANK: S2 HP Track: Y ELCODE: AMAFB05020
EO ID: 22760 First Obs: 1979 Last Obs: 1979- Confirmed:
Directions: OFF OF ROCK CREEK. APPROXIMATELY 1 MILE NORTH OF OLEX

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (8050 m)]

Town-Range Sec Note: 001S021E 03
QuadCode QuadName: 45120-E2 Shutler Flat
Watershed:
1707010111 - MIDDLE COLUMBIA-LAKE WALL
1707010412 - WILLOW
1707020402 - LOWER JOHN DAY
1707020403 - LOWER JOHN DAY
1707020404 - LOWER JOHN DAY

Owner Name/Type
Owner Comments
Managed Area Name

EO Type:
Minimum Elev.(m): 366
Annual Observations
EO Data: GROUND SQUIRREL COLONY REPORTED BY CARLSON ET DURING SURVEY IN 1979.
EO Comments:
Protection:
Management:
General:

Scientific Name: ***Chrysemys picta***
Common Name: **Painted turtle**
Federal Status:
State Status: SC
GRANK: G5
SRANK: S2
NHP List: 2
HP Track: Y
Category: Vertebrate Animal
ELCODE: ARAAD01010
EO ID: 5511
First Obs: 1975
Last Obs: 1985-
Confirmed:
Directions: RUFUS PONDS - 2 MI E OF RUFUS ON OLD HWY 30

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (1500 m)]
Town-Range Sec Note: 002N016E 21
QuadCode QuadName: 45120-F7 Biggs Junction
Watershed: 1707010508 - SPANISH HOLLOW CREEK
Owner Name/Type
Owner Comments
Managed Area Name

EO Type:
Minimum Elev.(m): 55
Annual Observations
EO Data: PAINTED TURTLES OBSERVED OFF & ON FOR THE LAST 10 YEARS, PER JOHN BECK, ODFW
EO Comments: BACK WATER SLOUGH OFF COLUMBIA RIVER
Protection:
Management:
General: TOWNSHIP/RANGE AND DIRECTIONS DON'T MATCH

Scientific Name: ***Cryptomastix hendersoni***
Common Name: **Columbia Gorge oregonian (snail)**
Federal Status:
State Status:
GRANK: G1G2
SRANK: S1S2
NHP List: 1
HP Track: Y
Category: Invertebrate Animal
ELCODE: IMGAS93030
EO ID: 26135
First Obs:
Last Obs:
Confirmed:
Directions: Spring approx. 1mi SW of Rufus.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range Sec Note: 002N016E 02
QuadCode QuadName: 45120-F7 Biggs Junction
Watershed: 1707010508 - SPANISH HOLLOW CREEK
Owner Name/Type
Owner Comments
Managed Area Name

EO Type:
Minimum Elev.(m): 91
Annual Observations
EO Data: Species found at this location. See additional topics.
EO Comments:
Protection:
Management:
General: Distribution information for this EO was derived from ISMS mollusk database produced and distributed in 2003. One record for this EO, rated as best in ISMS mollusk database (best = verified by experts), no observation date given.

Scientific Name: ***Oreohelix variabilis***
Common Name: **Dalles mountainsnail**
Federal Status:
State Status:
GRANK: G2Q
SRANK: S1
NHP List: 1
HP Track: Y
Category: Invertebrate Animal
ELCODE: IMGASB5520
EO ID: 4638
First Obs: 1987
Last Obs: 1987
Confirmed:

Directions: QUARRY - GRAVEL PIT NEAR RUFUS

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (8050 m)]
Town-Range Sec Note: 002N017E 06
QuadCode QuadName: 45120-F6 Rufus
Watershed: 1707010112 - MIDDLE COLUMBIA-LAKE WALL; 1707010508 - SPANISH HOLLOW CREEK; 1707020401 - LOWER JOHN DAY
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type:
Minimum Elev.(m): 91
Annual Observations:
EO Data: SPECIES USED TO INHABIT A 1/2 MILE TALUS BUT IS NOW RESTRICTED TO A 6FT LONG PATCH OF URTICA
EO Comments:
Protection:
Management:
General:

Scientific Name: ***Fluminicola fuscus***
Common Name: **Columbia pebblesnail or spire snail**
Federal Status: SOC
State Status:
GRANK: G2
SRANK: S1
NHP List: 1
HP Track: Y
Category: Invertebrate Animal
ELCODE: IMGASG3040
EO ID: 8860
First Obs: 1988
Last Obs: 1988
Confirmed:
Directions: DESCHUTES RIVER AT BULL RUN CANYON EAST.

County Name: Wasco
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range Sec Note: 001S016E 30
QuadCode QuadName: 45120-D7 Erskine
Watershed: 1707030601 - LOWER DESCHUTES
Owner Name/Type:
Owner Comments:
Managed Area Name: DESCHUTES RIVER STATE SCENIC WATERWAY

EO Type:
Minimum Elev.(m): 139
Annual Observations:
EO Data:
EO Comments: SHALLOW WATER NEAR SHORE
Protection:
Management:
General:

Scientific Name: ***Fluminicola fuscus***
Common Name: **Columbia pebblesnail or spire snail**
Federal Status: SOC
State Status:
GRANK: G2
SRANK: S1
NHP List: 1
HP Track: Y
Category: Invertebrate Animal
ELCODE: IMGASG3040
EO ID: 13791
First Obs: 1988
Last Obs: 1988
Confirmed:
Directions: DESCHUTES RIVER AT RIVER MILE 12.6-12.8, HARRES ISLAND SOUTH.

County Name: Wasco
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range Sec Note: 001S016E 04
QuadCode QuadName: 45120-E7 Locust Grove
Watershed: 1707030601 - LOWER DESCHUTES
Owner Name/Type:
Owner Comments:
Managed Area Name: DESCHUTES RIVER STATE SCENIC WATERWAY

EO Type:
Minimum Elev.(m): 98
Annual Observations:
EO Data:
EO Comments: SHALLOW WATER NEAR SHORE
Protection:
Management:
General:

Scientific Name: ***Fisherola nuttalli***
Common Name: **Shortface lanx (=Giant Columbia River limpet)**
Federal Status:
State Status:
GRANK: G2
SRANK: S1S2
NHP List: 1
HP Track: Y
Category: Invertebrate Animal
ELCODE: IMGASL6010
EO ID: 1816
First Obs: 1988
Last Obs: 1988
Confirmed:

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Directions: DESCHUTES RIVER

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note
001S016E	05	
001S016E	04	

QuadCode QuadName: 45120-E7 Locust Grove
Watershed: 1707030601 - LOWER DESCHUTES

Owner Name/Type
Owner Comments
Managed Area Name: DESCHUTES RIVER STATE SCENIC WATERWAY

EO Type:
Minimum Elev.(m): 98
Annual Observations
EO Data: FREST, WRIGHT & NEITZEL 1988 - PRESENT
EO Comments: STREAM SIZE IS EVIDENTLY NOT A FACTOR IF IT IS RELATIVELY UNPOLLUTED, COLD AND WELL OXYGENATED, WITH PERMANENT FLOW AND A COBBLE-BOULDER SUBSTRATE; THESE CONDITIONS OCCUR IN RAPIDS.
Protection:
Management:
General: SURVEY OF COLUMBIA RIVER BASIN STREAMS FOR GIANT COLUMBIA RIVER SPIRE SNAIL & GIANT COLUMBIA RIVER LIMPET, PACIFIC NW LABORATORY, 10-89. (DOTNUM = SH18)

Scientific Name: ***Fisherola nuttalli***
Common Name: **Shortface lanx (=Giant Columbia River limpet)**
Federal Status:
State Status:
GRANK: G2
SRANK: S1S2
NHP List: 1
HP Track: Y
Category: Invertebrate Animal
ELCODE: IMGASL6010
EO ID: 5436
First Obs: 1988
Last Obs: 1991
Confirmed:
Directions: DESCHUTES RIVER 3 MILES SOUTH OF LOCKIT

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note
001S016E	30	

QuadCode QuadName: 45120-D7 Erskine
Watershed: 1707030601 - LOWER DESCHUTES

Owner Name/Type
Owner Comments
Managed Area Name: DESCHUTES RIVER STATE SCENIC WATERWAY

EO Type:
Minimum Elev.(m): 116
Annual Observations
EO Data: INDIVIDUALS COLLECTED BETWEEN 1988 THROUGH 1991
EO Comments: EXCELLENT MOLLUSC HABITAT
Protection:
Management:
General:

Scientific Name: ***Fisherola nuttalli***
Common Name: **Shortface lanx (=Giant Columbia River limpet)**
Federal Status:
State Status:
GRANK: G2
SRANK: S1S2
NHP List: 1
HP Track: Y
Category: Invertebrate Animal
ELCODE: IMGASL6010
EO ID: 10002
First Obs: 1988
Last Obs: 1991
Confirmed:
Directions: DESCHUTES RIVER 1.0 MI BELOW HARRIS ISLAND

County Name: Wasco
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note
001N016E	31	

QuadCode QuadName: 45120-E7 Locust Grove
Watershed: 1707030601 - LOWER DESCHUTES

Owner Name/Type
Owner Comments
Managed Area Name: DESCHUTES RIVER STATE SCENIC WATERWAY

EO Type:
Minimum Elev.(m): 110
Annual Observations
EO Data: INDIVIDUALS COLLECTED BETWEEN 1988 THROUGH 1991.
EO Comments: EXCELLENT MOLLUSC HABITAT
Protection:
Management:
General:

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Scientific Name: ***Fisherola nuttalli***
Common Name: **Shortface lanx (=Giant Columbia River limpet)**
Federal Status: GRANK: G2 NHP List: 1 Category: Invertebrate Animal
State Status: SRANK: S1S2 HP Track: Y ELCODE: IMGASL6010
EO ID: 10424 First Obs: 1988 Last Obs: 1991 Confirmed:
Directions: ROUTE 206 CROSSING AT JOHN DAY RIVER

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
001S019E	17		45120-D4	Esau Canyon	1707020406 - LOWER JOHN DAY

Owner Name/Type | Owner Comments | Managed Area Name: JOHN DAY RIVER STATE SCENIC WATERWAY

EO Type: Minimum Elev.(m): 168 Annual Observations
EO Data: INDIVIDUALS COLLECTED BETWEEN 1988-1991
EO Comments: MOSTLY WARM WATER
Protection:
Management:
General:

Scientific Name: ***Fisherola nuttalli***
Common Name: **Shortface lanx (=Giant Columbia River limpet)**
Federal Status: GRANK: G2 NHP List: 1 Category: Invertebrate Animal
State Status: SRANK: S1S2 HP Track: Y ELCODE: IMGASL6010
EO ID: 20123 First Obs: 1988 Last Obs: 1991 Confirmed:
Directions: MCDONALD FORD - JOHN DAY RIVER

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
001N019E	02		45120-E4	McDonald	1707020401 - LOWER JOHN DAY

Owner Name/Type | Owner Comments | Managed Area Name: JOHN DAY RIVER STATE SCENIC WATERWAY

EO Type: Minimum Elev.(m): 122 Annual Observations
EO Data: INDIVIDUALS COLLECTED BETWEEN 1988 AND 1991
EO Comments: MOSTLY WARM WATER HABITAT. SNAILS RARE.
Protection:
Management:
General:

Scientific Name: ***Pristinicola hemphilli***
Common Name: **Pristine springsnail**
Federal Status: GRANK: G3 NHP List: 3 Category: Invertebrate Animal
State Status: SRANK: S2 HP Track: N ELCODE: IMGASX0010
EO ID: 16025 First Obs: Last Obs: Confirmed:
Directions: FRANK FULTON CANYON, 2ND ALCOVE ON SOUTH SIDE, EASTSIDE SPRING COMPLEX, PLUS 1ST ALCOVE ON SOUTH SIDE.

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (400 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N016E	19		45120-F7	Biggs Junction	1707010506 - SPANISH HOLLOW CREEK

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: Minimum Elev.(m): 244 Annual Observations
EO Data: MUSEUM COLLECTION
EO Comments: SPRING
Protection:
Management:
General: SPECIMENS EXAMINED FROM NATIONAL MUSEUM OF NATURAL HISTORY, SMITHSONIAN INSTITUTION, WASHINGTON D.C., COLLECTION 854176, 874443.

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Scientific Name: ***Pristinicola hemphilli***
Common Name: **Pristine springsnail**
Federal Status: GRANK: G3 NHP List: 3 Category: Invertebrate Animal
State Status: SRANK: S2 HP Track: N ELCODE: IMGASX0010
EO ID: 16352 First Obs: Last Obs: Confirmed:
Directions: SMALL UNNAMED SPRING WEST OF BIGGS JUNCTION.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (200 m)]
Town-Range: 002N016E Sec: 18 Note:
QuadCode: 45120-F7 QuadName: Biggs Junction
Watershed: 1707010508 - SPANISH HOLLOW CREEK
Owner Name/Type
Owner Comments
Managed Area Name

EO Type: Minimum Elev.(m): 122 Annual Observations
EO Data: MUSEUM COLLECTION
EO Comments: SPRING
Protection:
Management:
General: SPECIMENS EXAMINED FROM NATIONAL MUSEUM OF NATURAL HISTORY, SMITHSONIAN INSTITUTION, WASHINGTON D.C., COLLECTION 874439.

Scientific Name: ***Pristinicola hemphilli***
Common Name: **Pristine springsnail**
Federal Status: GRANK: G3 NHP List: 3 Category: Invertebrate Animal
State Status: SRANK: S2 HP Track: N ELCODE: IMGASX0010
EO ID: 20507 First Obs: Last Obs: Confirmed:
Directions: UNNAMED SIDE SPRING IN SCOTT CANYON SOUTH OF RUFUS.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range: 002N017E Sec: 05 Note:
QuadCode: 45120-F6 QuadName: Rufus
Watershed: 1707010508 - SPANISH HOLLOW CREEK
Owner Name/Type
Owner Comments
Managed Area Name

EO Type: Minimum Elev.(m): 244 Annual Observations
EO Data: MUSEUM COLLECTION
EO Comments: SPRING
Protection:
Management:
General: SPECIMENS EXAMINED FROM NATIONAL MUSEUM OF NATURAL HISTORY, SMITHSONIAN INSTITUTION, WASHINGTON D.C., COLLECTION 874442.

Scientific Name: ***Pristinicola hemphilli***
Common Name: **Pristine springsnail**
Federal Status: GRANK: G3 NHP List: 3 Category: Invertebrate Animal
State Status: SRANK: S2 HP Track: N ELCODE: IMGASX0010
EO ID: 22226 First Obs: Last Obs: Confirmed:
Directions: HELMS SPRINGS, HELMS CANYON.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (50 m)]
Town-Range: 003N017E Sec: 35 Note:
QuadCode: 45120-F6 QuadName: Rufus
Watershed: 1707010508 - SPANISH HOLLOW CREEK
Owner Name/Type
Owner Comments
Managed Area Name

EO Type: Minimum Elev.(m): 305 Annual Observations
EO Data: MUSEUM COLLECTION
EO Comments: SPRING
Protection:
Management:
General: SPECIMENS EXAMINED FROM NATIONAL MUSEUM OF NATURAL HISTORY, SMITHSONIAN INSTITUTION, WASHINGTON D.C., COLLECTION 874438.

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Scientific Name: ***Pristinicola hemphilli***
Common Name: **Pristine springsnail**
Federal Status: | GRANK: G3 | NHP List: 3 | Category: Invertebrate Animal
State Status: | SRANK: S2 | HP Track: N | ELCODE: IMGASX0010
EO ID: 23295 | First Obs: | Last Obs: | Confirmed:
Directions: UNNAMED SPRING AT MOUTH OF FOX CANYON (WESTSIDE).

County Name: Gilliam, Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (400 m)]

Town-Range: 003N018E | Sec: 32 | Note:
QuadCode: 45120-F5 | QuadName: Quinton
Watershed: 1707020401 - LOWER JOHN DAY
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type: | Minimum Elev.(m): 122 | Annual Observations
EO Data: MUSEUM COLLECTION
EO Comments: SPRING
Protection:
Management:
General: SPECIMENS EXAMINED FROM NATIONAL MUSEUM OF NATURAL HISTORY, SMITHSONIAN INSTITUTION, WASHINGTON D.C., COLLECTION 874446.

Scientific Name: ***Artemisia campestris var. wormskioldii***
Common Name: **Northern wormwood**
Federal Status: C | GRANK: G5T1 | NHP List: 1-ex | Category: Vascular Plant
State Status: LE | SRANK: SX | HP Track: Y | ELCODE: PDAST0S0D5
EO ID: 4361 | First Obs: 1886-06 | Last Obs: 1941-04-29 | Confirmed:
Directions: COLUMBIA RIVER, 2 MI. W OF RUFUS, OREGON. Also, included in this occurrence is Howell's herbarium record with the location of "Grants, Eastern Ore". [According to an old map, Grants is about 2 miles west of present day Rufus. It was probably a small RR

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (200 m)]; Point [Areal - Estimated (400 m)]

Town-Range: 002N016E | Sec: 02 | Note:
Town-Range: 002N016E | Sec: 01 | Note:
QuadCode: 45120-F7 | QuadName: Biggs Junction
Watershed: 1707010508 - SPANISH HOLLOW CREEK
Owner Name/Type:
Owner Comments:
Managed Area Name:

EO Type: | Minimum Elev.(m): 61 | Annual Observations
EO Data: Herbarium collections: 1) L.E. Detling, #4646, 4-29-41, ORE-88272. Annotated by S. Sundberg 2-82. 2) T. Howell, 6-1886, ORE-86014. Originally ID as A. candensis. Annotated by S. Sunderberg 2/82 and Chambers 4-2-97.
EO Comments: GRASSLAND FORMATION. DRY SAND & GRAVEL ALONG THE RIVER; FULL SUN; WITH BROMUS TECTORUM, & DESCURAINA PINNATA FILIPES.
Protection:
Management:
General: HERBARIUM COLLECTIONS: 1) L.E. DETLING, #4646, 4-29-41, ORE (#88272). ANNOTATED BY S. SUNDBERG 2-82. 2) T. HOWELL, 6-1886, ORE-86014. ORIGINALLY ID AS A. CANADENSIS. ANNOTATED BY S. SUNDBERG 2/82.

Scientific Name: ***Artemisia campestris var. wormskioldii***
Common Name: **Northern wormwood**
Federal Status: C | GRANK: G5T1 | NHP List: 1-ex | Category: Vascular Plant
State Status: LE | SRANK: SX | HP Track: Y | ELCODE: PDAST0S0D5
EO ID: 10970 | First Obs: 1926-04-08 | Last Obs: 1938-05-08 | Confirmed:
Directions: MOUTH OF THE JOHN DAY. SHERMAN COUNTY.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (800 m)]

Town-Range: 003N017E | Sec: 23 | Note:
QuadCode: 45120-F6 | QuadName: Rufus
Watershed: 1707020401 - LOWER JOHN DAY
Owner Name/Type:
Owner Comments:
Managed Area Name:

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EO Type: Minimum Elev.(m): 91 Annual Observations
EO Data: Herbarium collection: L.F. Henderson, (#5026), 4-8-25 (FL) & 4-24-32 (FRT), ORE (#88012).Henderson, L.F(#14322), 4-24-1925, ORE-88012B. Annotated by S. Sundberg 2-82. Baker, William H. (#746), 5-8-1938. OSC-59771, annotated by KLC, 1988, 1989 and 4-2-1997.
EO Comments: SAND OR GRAVEL
Protection:
Management:
General: Herbarium collection.

Scientific Name: ***Heliotropium curassavicum***
Common Name: **Salt heliotrope**
Federal Status: GRANK: G5 NHP List: 2 Category: Vascular Plant
State Status: SRANK: S2 HP Track: Y ELCODE: PDBOR0J080
EO ID: 24169 First Obs: Last Obs: Confirmed:
Directions: MORO.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (800 m)]

Town-Range	Sec	Note
001S017E	17	
001S017E	07	
001S017E	08	
001S017E	18	

QuadCode QuadName: 45120-D6 Moro
Watershed: 1707020438 - LOWER JOHN DAY

Owner Name/Type
Owner Comments
Managed Area Name

EO Type: Minimum Elev.(m): Annual Observations
EO Data: HERBARIUM COLLECTION
EO Comments:
Protection:
Management:
General: HERBARIUM COLLECTION. THOMAS W. THOMPSON, NO DATE. DET L.J. DENNIS. [TRS NOT PROVIDED]

Scientific Name: ***Astragalus collinus var. laurentii***
Common Name: **Laurence's milk-vetch**
Federal Status: SOC GRANK: G5T1 NHP List: 1 Category: Vascular Plant
State Status: LT SRANK: S1 HP Track: Y ELCODE: PDFAB0F282
EO ID: 17464 First Obs: 1950 Last Obs: 1950-04-29 Confirmed: ?
Directions: JOHN DAY RIVER. 1/2 MI W OF COTTONWOOD BRIDGE, BETWEEN CONDON AND MORO.

County Name: Sherman
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (400 m)]

Town-Range	Sec	Note
001S019E	19	

QuadCode QuadName: 45120-D4 Esau Canyon
Watershed: 1707020406 - LOWER JOHN DAY

Owner Name/Type
Owner Comments
Managed Area Name

EO Type: Minimum Elev.(m): 195 Annual Observations
EO Data: HERBARIUM COLLECTION: CRONQUIST, 4-29-50, #6226, ILL, GH. VARIETY NOT KNOWN.
EO Comments:
Protection:
Management:
General:

Scientific Name: ***Astragalus collinus var. laurentii***
Common Name: **Laurence's milk-vetch**
Federal Status: SOC GRANK: G5T1 NHP List: 1 Category: Vascular Plant
State Status: LT SRANK: S1 HP Track: Y ELCODE: PDFAB0F282
EO ID: 17465 First Obs: 1950 Last Obs: 1950-04-28 Confirmed: ?
Directions: JOHN DAY RIVER. 1 MI ABOVE MOUTH OF ROCK CREEK.

County Name: Gilliam
Ecoregion: CB
Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (800 m)]

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Town-Range	Sec	Note	QuadCode	QuadName	Watershed
001N019E	11		45120-E4	McDonald	1707020401 - LOWER JOHN DAY 1707020402 - LOWER JOHN DAY

Owner Name/Type

Owner Comments

Managed Area Name

JOHN DAY RIVER STATE SCENIC WATERWAY

EO Type:

Minimum Elev.(m): 122

Annual Observations

EO Data: HERBARIUM COLLECTION: CRONQUIST, 4-28-50, #6214, ILL, GH. VARIETY NOT KNOWN.

EO Comments:

Protection:

Management:

General:

Scientific Name: ***Mimulus evanescens***

Common Name: **Disappearing monkeyflower**

Federal Status: SOC GRANK: G2 NHP List: 1 Category: Vascular Plant

State Status: C SRANK: S2 HP Track: Y ELCODE: PDSCR1B370

EO ID: 20236 First Obs: Last Obs: Confirmed:

Directions: COTTONWOOD CANYON

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Gilliam	CB	Point [Areal - Estimated (8050 m)]
Sherman		

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Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002S019E	22		45120-D3	Devils Backbone	1707020402 - LOWER JOHN DAY
002S019E	13		45120-D4	Esau Canyon	1707020406 - LOWER JOHN DAY
002S019E	16		45120-D5	Harmony	1707020407 - LOWER JOHN DAY
002S019E	15		45120-E3	Turner Butte	1707020408 - LOWER JOHN DAY
002S019E	13		45120-E4	McDonald	1707020409 - LOWER JOHN DAY
001N018E	36		45120-E5	Klondike	1707020438 - LOWER JOHN DAY
002S019E	08				
002S019E	10				
002S019E	11				
002S020E	07				
002S019E	04				
002S019E	05				
002S019E	01				
002S019E	06				
002S018E	02				
001S019E	32				
001S019E	35				
001S020E	31				
001S018E	36				
001S018E	34				
001S019E	26				
001S019E	28				
001S019E	29				
001S019E	30				
001S018E	26				
001S019E	21				
001S019E	24				
001S020E	19				
001S018E	23				
001S018E	24				
001S019E	18				
001S019E	17				
001S018E	14				
001S019E	16				
001S020E	18				
001S019E	11				
001S019E	09				
001S018E	11				
001S018E	07				
001S019E	12				
001S019E	02				
001S019E	03				
001S019E	05				
001S018E	01				
001N019E	35				
002S019E	20				
001N019E	32				
002S019E	21				
002S019E	19				
001N019E	33				
001N019E	34				
001S018E	02				
001S019E	06				
001S019E	04				
001S019E	01				
001S020E	07				
001S018E	12				
001S018E	10				
001S019E	09				
001S019E	10				
001S019E	13				
001S018E	13				

001S018E	15
001S019E	14
001S019E	16
001S019E	19
001S018E	22
001S019E	20
001S019E	23
001S019E	22
001S018E	27
001S018E	26
001S020E	30
001S019E	25
001S019E	27
001S018E	35
001S019E	31
001S019E	36
001S019E	34
001S019E	33
002S018E	03
002S018E	01
002S020E	06
002S019E	02
001N019E	31
002S019E	03
002S019E	12
002S019E	09
002S018E	11
002S018E	12
002S019E	07
002S019E	14
002S019E	17
002S018E	14
002S019E	18

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: | Minimum Elev.(m): | Annual Observations
EO Data:
EO Comments:
Protection:
Management:
General: FROM BOB MEINKE'S THESIS, ASSUMED TO BE OLDER COLLECTIONS.

Scientific Name: ***Allium robinsonii***
Common Name: **Robinson's onion**
Federal Status: SOC | GRANK: G3 | NHP List: 2-ex | Category: Vascular Plant
State Status: | SRANK: SH | HP Track: Y | ELCODE: PMLIL021Z0
EO ID: 8409 | First Obs: 1925 | Last Obs: 1942-04-26 | Confirmed:
Directions: BANK OF THE COLUMBIA RIVER, JUST BELOW THE MOUTH OF THE JOHN DAY RIVER (OWNBEY). MOUTH OF THE JOHN DAY (HENDERSON)

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (1600 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N017E	23		45120-F6	Rufus	1707010112 - MIDDLE COLUMBIA-LAKE WALL

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: | Minimum Elev.(m): -339 | Annual Observations
EO Data: HERB COLLECTION: A. OWNBEY, #2536, 4-26-42, WS (TOPOTYPE), IN FLOWER AND L.F. HENDERSON, #5110, 4-8-25, ORE, WILLU (ISOTYPE), IN FLOWER.
EO Comments: IN SAND AMONG THE ROCKS (OWNBEY). SAND AND GRAVEL (HENDERSON
Protection:
Management:

Oregon Natural Heritage Information Center - March 2007 **Sensitive Data - Do Not Distribute**

General:

Scientific Name: ***Allium robinsonii***
Common Name: **Robinson's onion**
Federal Status: SOC GRANK: G3 NHP List: 2-ex Category: Vascular Plant
State Status: SRANK: SH HP Track: Y ELCODE: PMLIL021Z0
EO ID: 24705 First Obs: 1935 Last Obs: 1935-04-17 Confirmed:
Directions: 10 MILES EAST OF RUFUS

County Name: Gilliam

Ecoregion: CB

Source Feature [Uncertainty Type (Distance)]: Point [Areal - Estimated (800 m)]

Town-Range	Sec	Note
003N018E	27	
003N018E	21	
003N018E	22	

QuadCode	QuadName
45120-F5	Quinton

Watershed
1707010112 - MIDDLE COLUMBIA-LAKE WALL
1707020401 - LOWER JOHN DAY

Owner Name/Type

Owner Comments

Managed Area Name

EO Type: Minimum Elev.(m): -339

Annual Observations

EO Data: HERB COLLECTION: J WILLIAM THOMPSON, #11349, 4-17-35, WILLU IN FLOWER
EO Comments: ROCKY SAGEBRUSH SLOPES
Protection:
Management:
General:

53 records total

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Key to Oregon Natural Heritage Information Center Data

Field Name	Description
Scientific Name	The scientific name of the species.
Common Name	The common name of the species.
Category	Value that indicates the broad biological category for each species.
ELCODE	Unique Heritage Program code for identifying this element. 1st and 2nd byte (PD=Plant dict, PM=Plant monocot, PG=Plant gymnosperm, PP=Plant pteridophyte, AA=amphibian, AB=bird, AF=fish, AM=mammal, AR=reptile, I=invertebrate. 3rd-5th byte (family abbreviation). 6th-7th (genus code). 8th-9th (species). 10th (tie breaker).
Federal Status	US Fish and Wildlife Service or NOAA Fisheries status. **LE**=listed endangered, **LT**=listed threatened, **PE** or **PT**=proposed endangered or threatened, **C**=candidate for listing with enough information available for listing, **SOC** or **SC**=species of concern, **PS:**xx=partial status for species.
State Status	For animals, Oregon Department of Fish and Wildlife status; **LE**=listed endangered, **PE**=proposed endangered, **PT**=proposed threatened, **SC** or **C**=sensitive-critical, **SV** or **V**=sensitive-vulnerable, **SP** or **P**=sensitive-peripheral, **SU** or **U**=sensitive-undetermined status. For plants, Oregon Department of Agriculture status; **LE**=listed endangered, **LT**=listed threatened, **C**=candidate.
GRANK/SRANK	ORNHIC participates in an international system for ranking rare, threatened and endangered species throughout the world. The system was developed by The Nature Conservancy and is now maintained by NatureServe in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries. The ranking is a 1-5 scale, primarily based on the number of known occurrences, but also including threats, sensitivity, area occupied, and other biological factors. In this book, the ranks occupy two lines. The top line is the Global Rank and begins with a "G". If the taxon has a trinomial (a subspecies, variety or recognized race), this is followed by a "T" rank indicator. A "Q" at the end of this line indicates the taxon has taxonomic questions. The second line is the State Rank and begins with the letter "S". The ranks are summarized as follows: **1** = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences; **2** = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences; **3** = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences; **4** = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences; **5** = Demonstrably widespread, abundant, and secure; **H** = Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered; **X** = Presumed extirpated or extinct; **U** = Unknown rank; **?** = Not yet ranked, or assigned rank is uncertain.
NHP list	All rare species in Oregon are assigned a list number of 1, 2, 3 or 4, where **1**=threatened or endangered throughout range, **2**=threatened or endangered in Oregon but more common elsewhere, **3**=Review List (more information is needed), **4**=Watch List (currently stable). A null value indicates the species is not currently on our rare species list.
HP Track	We currently obtain and computerize locational information for only those elements marked with **Y**(es). Those species marked with **N**(o) or **W**(atch) have incomplete data because we do not actively track them at this time.
EO ID	Unique identifier for the Element Occurrence (EO).
First_obs	First reported sighting date for this occurrence in the form YYYY-MM-DD.
Last_obs	Last reported sighting date, usually in the form YYYY-MM-DD.
Confirmed	Indication of whether taxonomic identification of the Element represented by this occurrence has been confirmed by a reliable individual. Blank=unknown, assumed to be correctly identified. Y=Yes, confident identification. ?=identification questions.
Directions	Site name and/or directions to site.
County	County name(s) in which EO is mapped.
Ecoregion	Physiographic Province in which EO is mapped: **CR**=Coast Range, **WV**=Willamette Valley, **KM**=Klamath Mountains, **WC**=West slope and crest of the Cascades, **EC**=East slope of the Cascades, **BM**=Ochoco, Blue and Wallowa Mts., **BR**=Basin and Range, **CB**=Columbia Basin, **SP**=Snake River Plains.

Key to Oregon Natural Heritage Information Center Data

Field Name	Description
Source Feature	A Source Feature is the initial translation of a discrete unit of observation data as a spatial feature. Creation of a Source Feature requires an interpretive process. The likely location and extent of an observation is determined through consideration of the amount and direction of any variability between the recorded and actual locations of the observation data. In most cases, the Source Feature is delineated to encompass locational uncertainty. A Source Feature can be a point, line, or polygon. The type of Source Feature developed depends on both the preceding conceptual feature type and the locational uncertainty associated with the feature.
Uncertainty Type (Distance)	The recorded location of an observation of an Element may vary from its true location due to many factors, including the level of expertise of the data collector, differences in survey techniques and equipment used, and the amount and type of information obtained. This inaccuracy is characterized as locational uncertainty, and is assessed for Source Feature(s) based on the uncertainty associated with the underlying information on the location of the observation. Four categories of locational uncertainty have been identified, as follows: Negligible uncertainty is less than or equal to 6.25 meters in any dimension. Source Features with negligible uncertainty are based on a comprehensive field survey with high quality mapping and a high degree of certainty. Linear uncertainty is greater than 6.25 meters, and varies along an axis (e.g., a path, stream, ridgeline). The true location of an observation with linear uncertainty may be visualized as effectively sliding along a line that delineates the uncertainty. Areal delimited uncertainty is greater than 6.25 meters, and varies in more than one dimension. The true location of an observation can be visualized as floating within an area with a boundary that can be specifically delimited. Boundaries can be defined using roads, bodies of water, etc. Areal estimated uncertainty is greater than 6.25 meters, and varies in more than one dimension. A boundary cannot be specifically delimited based on the observation information, i.e., the actual extent is unknown. The true location of the observation can be visualized as floating within an area for which boundaries cannot be specifically delimited. Source Features with areal estimated uncertainty require that the user specify an estimated uncertainty distance to be used for buffering the feature to incorporate the locational uncertainty.
Town-Range, Sec, and Note	United States rectangular land survey (also known as the Public Land Survey System) legal township, range, and section descriptions that best define the location of the Element Occurrence. Township first (4 bytes), range second (4 bytes). For example: 004S029E = Township 4S, Range 29E. All locations are with reference to the Willamette Meridian. Fractional ranges or townships are indicated in the Note field.
Quadcode	USGS code for the USGS topographic quadrangle map(s) where the record is mapped.
Quadname	Name of the USGS topographic quadrangle map(s) where the record is mapped.
Watershed	Watershed(s), identified according to the U.S. Geological Survey (USGS) Hydrologic Unit Map 10-digit code, within which the Element Occurrence is located.
Owner Name/Type and Comments	Federal, State, Private, etc.
Managed Area Name	BLM District, USFS Forest, Private Preserve
EO Type	For animals, type of occurrence, eg. roost, nest, spawning, etc.
EO Data	Species and population biology - numbers, age, nesting success, vigor, phenology, disease, pollinators, etc.
EO Comments	Habitat information, e.g. aspect, slope, soils, associated species, community type, etc.
Minimum Elevation	Minimum elevation of the area covered by the range of the taxon, in meters. -339 or blank=not determined.
Annual Observation	Summary of yearly observation.
Protection	Comments on protectibility and threats.
Management	Comments on how the site is managed.
General	Miscellaneous comments.

ATTACHMENT P-3

USFWS Listed Species

ATTACHMENT P-3

USFWS Listed Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Oregon Fish and Wildlife Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
Phone: (503)231-6179 FAX: (503)231-6195

Reply To: 8330.SP04(07)

April 18, 2007

Kimberly Seymour
David Evans and Associates
2100 SW River Parkway
Portland, OR 97201

Subject: BP Alternative Energy Project
USFWS Reference # D43A689117CCCDFE882572C1007A98FC

Dear Ms. Kimberly Seymour:

This is in response to your request, dated April 18, 2007, requesting information on listed and proposed endangered and threatened species that may be present within the area of the BP Alternative Energy Project in Sherman County(s). The Fish and Wildlife Service (Service) received your correspondence on April 18, 2007.

We have attached a list (Enclosure A) of threatened and endangered species that may occur within the area of the BP Alternative Energy Project. The list fulfills the requirement of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Army Corps of Engineers requirements under the Act are outlined in Enclosure B.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq*., the Army Corps of Engineers is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Enclosure B, as well as 50 CFR 402.12.

If the Army Corps of Engineers determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, the Army Corps of Engineers is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

Enclosure A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published May 11, 2005, in the Federal Register (Vol. 69, No. 86, 24876) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to project completion. Species of concern are those 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.

If a proposed project may affect only candidate species or species of concern, the Army Corps of Engineers is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends minimizing impacts to these species to the extent possible in order to prevent potential future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, the Army Corps of Engineers may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages the Army Corps of Engineers to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Kevin Maurice at (503) 231-6179. All correspondence should include the above referenced file number. For questions regarding salmon and steelhead trout, please contact NOAA Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

For future species list requests, please visit our website (http://www.fws.gov/oregonfwo/Species/RequestList.asp) for instructions on how to make requests.

Enclosures
EnclosureA: Sherman COUNTY.PDF
EnclosureB: EnclosureB_Federal_Agencies_Responsibilities.PDF

ENCLOSURE A

FEDERALLY LISTED THREATENED, ENDANGERED, PROPOSED, CANDIDATE SPECIES AND SPECIES OF CONCERN WHICH MAY OCCUR WITHIN SHERMAN COUNTY, OREGON

LISTED SPECIES[1/]

Birds		
Bald eagle[2/]	*Haliaeetus leucocephalus*	T
Fish		
Steelhead (Snake River Basin)[3/]	*Oncorhynchus mykiss* ssp.	T*
Steelhead (Middle Columbia River)[4/]	*Oncorhynchus mykiss* ssp.	T*
Steelhead (Upper Columbia River)[5/]	*Oncorhynchus mykiss* ssp.	E*
Sockeye salmon (Snake River)[6/]	*Oncorhynchus nerka*	CH E*
Chinook salmon (Upper Columbia River)[7/]	*Oncorhynchus tshawytscha*	E*
Chinook salmon (Snake River)[8/]	*Oncorhynchus tshawytscha*	CH T*

PROPOSED SPECIES

None

CANDIDATE SPECIES[9/]

Birds	
Yellow-billed cuckoo	*Coccyzus americanus*
Plants	
Northern wormwood	*Artemisia campestris* var. *wormskioldii*

SPECIES OF CONCERN

Mammals	
Pale western big-eared bat	*Corynorhinus townsendii pallescens*
Silver-haired bat	*Lasionycteris noctivagans*
Small-footed myotis (bat)	*Myotis ciliolabrum*
Long-eared myotis (bat)	*Myotis evotis*
Long-legged myotis (bat)	*Myotis volans*
Yuma myotis (bat)	*Myotis yumanensis*
California bighorn	*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*
Amphibians and Reptiles	
Northern sagebrush lizard	*Sceloporus graciosus graciosus*
Fishes	
Pacific lamprey	*Lampetra tridentata*
Interior redband trout	*Oncorhynchus mykiss gibbsi*

Invertebrates	
California floater (mussel)	*Anodonta californiensis*
Minor Pacific sideband (snail)	*Monadenia fidelis minor*
Plants	
Henderson ricegrass	*Achnatherum hendersonii*
Robinson's onion	*Allium robinsonii*
Laurence's milk-vetch	*Astragalus collinus* var. *laurentii*
Disappearing monkeyflower	*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*

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 NOAA's National Marine Fisheries Service may be required.*

1/ *U.S. Department of Interior, Fish and Wildlife Service, October 31, 2000, Endangered and Threatened Wildlife and Plants, 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. 62, No. 159, August 18, 1997, Final Rule - Snake River Steelhead*
4/ *Federal Register Vol. 64, No. 57, March 25, 1999, Final Rule - Middle Columbia and Upper Willamette River Steelhead*
5/ *Federal Register Vol. 62, No. 159, August 18, 1997, Final Rule – Upper Columbia River Steelhead*
6/ *Federal Register Vol. 56, No. 224, November 20, 1991, Final Rule - Snake River Sockeye Salmon*
7/ *Federal Register Vol. 64, No. 56, March 24, 1999, Final Rule - West Coast Chinook Salmon*
8/ *Federal Register Vol. 57, No. 78, April 22, 1992, Final Rule – Snake River Chinook Salmon*
9/ *Federal Register Vol. 69, No. 86, May 4, 2004, Notice of Review - Candidate or Proposed Animals and Plants*

EXHIBIT Q

THREATENED AND ENDANGERED SPECIES
OAR 345-021-0010(1)(q) and OAR 345-022-0070

FIGURE

Q.1 INTRODUCTION

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:*

Response: The U.S. Fish and Wildlife Service (USFWS) and the Oregon Natural Heritage Information Center (ORNHIC) were recently queried for information on listed and sensitive species within the 5-mile analysis area. Federal Species of Concern, State Sensitive species and other non-listed, rare species are addressed in Exhibit P; this Exhibit addresses all state and federal listed, candidate and proposed species. Candidate and proposed species are included in Exhibit Q due to their potential for listing during the project application process.

Based upon the database results received from USFWS and ORNHIC (ORNHIC 2007), as well as additional contacts and references consulted during the prefield review, a total of twelve federal and state listed and candidate plant and wildlife species have the potential to exist within the analysis area. The database results identified three species and six Evolutionarily Significant Units (ESUs) of federal listed, proposed, and candidate anadromous fish that occur within the analysis area, including steelhead (three ESUs), sockeye salmon (one ESU), and chinook salmon (two ESUs). All of the state and federal listed species that will be addressed within this Exhibit are listed in Table Q-1.

Table Q- 1. State and Federal Listed, Candidate, and Proposed Species with the Potential to Occur Within the Analysis Area of the Golden Hills Facility

Species	Federal Status[1]	State Status[1]	ORNHIC List[2]	Occurrence	Impacts
Birds					
Bald Eagle (*Haliaeetus leucocephalus*)		LT	4	Potential	Potential
Yellow-billed Cuckoo (*Coccyzus americanus*)	C	--	--	No	No
American Peregrine Falcon (*Falco peregrinus anatum*)	--	LE	2	Potential	Potential
Mammals					
Washington Ground Squirrel	C	LE	1	No	No
Fish					
Steelhead – Mid-Columbia River ESU, summer run	LT	SV	2,3	Yes	No
(*Oncorhynchus mykiss*)					
Steelhead – Snake River Basin ESU	LT	--	2,3	Yes	No
Steelhead – Upper Columbia River ESU	LE	--	--	Yes	No
Sockeye Salmon – Salmon River Tributary to the Snake River (*Oncorhynchus nerka*)	LE	--	--	Yes	No

Species	Federal Status[1]	State Status[1]	ORNHIC List[2]	Occurrence	Impacts
Chinook Salmon – Snake River ESU, spring/summer and fall runs (*Oncorhynchus tshawytscha*)	LT	LT	1	Yes	No
Chinook Salmon – Upper Columbia River ESU	LE	--	--	Yes	No
Plants					
Northern wormwood (*Artemisia campestris* var. *wormskioldii*)	C	LE	1-ex		No
Henderson's needlegrass *(Achnatherum hendersonii)*	SOC	C	2		No
Dwarf suncup *(Camissonia pygmaea)*	SOC	C	1		No
Vernal pool mousetail *(Myosurus sessilis)*	SOC	C	1		No
Whitehead navarretia *(Navarretia leucocephala)*	LE	--	--		No
Laurence's milkvetch (*Astragalus collinus* var. *laurentii*)	SOC	LT	1		No
Disappearing monkeyflower (*Mimulus evanescens*)	SOC	C	1		No
Liverwort monkeyflower (*Mimulus jungermannioides*)	SOC	LT	1		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.

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.

[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

There is no suitable habitat for listed fish species within the site boundary and no aquatic habitat will be impacted by project construction or operation (see Exhibit P). There are dry channels located in the project vicinity that may eventually lead to the Columbia River. However, these channels will not be impacted by the Project. The ORNHIC results for the Washington ground squirrel referenced a siting from 1979; however, their range has been dramatically reduced since then and the Washington ground squirrel's current range is limited to areas east of the John Day River (NEDC et al. 2000). The yellow-billed cuckoo and northern wormwood are considered extirpated from the state and are, therefore, not anticipated to occur within the project vicinity. Because there are no anticipated impacts to fish, the Washington ground squirrel, the yellow-billed cuckoo or northern wormwood, these species will not be addressed further within this Exhibit.

The standard also calls for a description of the nature, extent, locations, and timing of each species occurrence in the analysis area and how the facility might adversely affect each listed, proposed or candidate species (OAR 345-021-0010(q)(B)). The descriptions and evaluation of potential impacts on these species are included in Section Q.4. The measures proposed to avoid and/or reduce the potential impacts are presented in Section Q.5. Sections Q.6 and Q.7 document the likelihood of the Project causing a significant reduction in the likelihood of survival or recovery of the listed species, and Section Q.8 addresses the proposed monitoring approach.

Q.2 ANALYSIS AREA

This section describes the analysis area with regard to threatened and endangered species. The analysis area for threatened and endangered species is defined as the area within the site boundary and five miles from the site boundary (OAR 345-001-0010(53)(b). For purposes of the Project, the site boundary is defined as:

- 900 feet-wide turbine corridors. Turbine strings consist of access road, collector system, and turbines, with the turbine defining the center.
- 30 feet from the centerline of existing county roads that will be graveled and/or will contain a portion of the underground collector system. All county roads in the area are within a right-of-way of a minimum of 60 feet.
- 60 feet from the centerline of proposed overhead line and proposed underground collector system not in the road prism.
- Proposed laydown areas.
- Proposed O & M facility.
- Proposed substation facilities.

Description of Analysis Area:

The analysis area for threatened and endangered plants and wildlife is illustrated in Appendix Q-1. It is requested that the Site Certificate authorize micro-siting "corridors" 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 project site. Because micrositing corridors, for ease of description and depiction, are generally regularly shaped polygons, certain micrositing corridors overlap with patches of Category 1 habitats (see Exhibit P for a description of Category 1 habitat). However, the Applicant will site all permanent facilities outside Category 1 habitat when finalizing the layout. No permanent facilities will be located within Category 1 habitat such as active raptor nest sites.

Threatened and endangered wildlife:

For threatened and endangered animal species the analysis area is within the site boundary and five miles from the site boundary (OAR 345-001-0010(53)(b)). The initial database search was conducted within five miles of the lease boundary. If suitable habitat existed, all areas within 750 feet of the site boundary were surveyed during the spring/summer. Methods for wildlife surveys are described in Exhibit P.

Threatened and endangered plants:

For threatened and endangered plant species the analysis area is within the site boundary and five miles from the site (OAR 345-001-0010(53)). An initial database search was conducted within five miles of the lease boundary. The proposed rare plant survey corridors are designed to take in all ground potentially disturbed by the Project. If suitable habitat exists (generally non-agricultural), ground surveys were conducted within at least 150 feet of the micro-siting corridors. For non-linear facilities, the entire proposed disturbance footprint was surveyed, as well as an additional 150 feet on all sides. General methods for plant surveys are described in Attachment P-1 of Exhibit P. Detailed pre-field methods are described below in Q.2.3. A botanist also performed at least one survey round for threatened, endangered, and sensitive wildlife species in areas 750 feet from mirco-siting corridor edges, and kept records of any notable common or rare plant species.

Q.2.1 Description of Project Vicinity

The vast majority of the project vicinity is under dry land wheat production. Very little acreage of native plant communities remain within the project site, occurring predominantly along the plateau margins and steep side slopes of the Grass Valley. These communities consist of sage and rabbit brush dominated shrub lands and native bunchgrass grasslands, each with varying degrees of invasive species present. Agricultural areas that are enrolled under the Conservation Reserve Program (CRP) are located throughout the analysis area, occurring as narrow strips in previously plowed drainageways, and as large blocks in other areas. CRP areas have been planted with a mix of native and non-native bunchgrasses with the primary intent of increasing wildlife habitat in the area.

Q.3 METHODOLOGY

OAR 345-021-0010(q)(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.3.1 through Q 3.3, below.

Q.3.1 General

Letters were written to USFWS and the ORNHIC requesting information on threatened, endangered and sensitive species within the analysis area (i.e., the area within the site boundary and five miles beyond the site boundary). The results of these database searches provide the basis for the species included in this Exhibit.

Field surveys were conducted for threatened and endangered plants and wildlife in 2006 and 2007.

Q.3.2 Wildlife

Existing literature and scientific data were reviewed and agency and other biologists contacted to determine species distribution and habitat requirements (Keith Kohl, ODFW, personal communication, Frank Isaacs, pers. comm.). The ORNHIC database and USFWS were queried for documented and projected occurrences of threatened, endangered and sensitive (TES) plant and wildlife species in the proposed project area, as well as within the analysis area. Wildlife surveys were conducted by qualified biologists in late April 2004 (raptor nest surveys), March 2004 – March 2005 (avian use surveys), July 2006 – June 2007 and spring 2006 and 2007 (TES surveys and habitat mapping) to document occurrence and habitat of within the analysis area. Threatened and endangered species' occurrence and wildlife habitats were investigated during all of the field surveys. Methods are described in Exhibit P.

Q.3.3 Plants

Rare plant surveys were conducted by trained botanists during peak flowering and/or fruiting periods when target species are best identified. Study corridors included turbine development corridors as well as other facility features: new access roads, overhead and underground collector lines, substations, O&M facility, and laydown areas. Development corridors were intensely scrutinized from a GIS/GPS established centerline with a 150-ft buffer on either side of the corridor. Surveys were conducted during the spring season, 2007. During surveys, botanists followed meandering transects effectively zigzagging back and forth across the survey corridor. Botanists maintained a list of all vascular plants encountered, and if needed made informal collections of unknown species for later identification using *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973). A botanist also performed at least one survey round for threatened, endangered, and sensitive wildlife species in areas 750 feet from the micro-siting corridors, and kept records of any notable common or rare plant species. Additional information collected included general plant associations, land use patterns, and notes on unusual habitats.

Q.3.3.1 Target Species

For the rare plant survey, the target species included all plant taxa listed as 'Endangered' or 'Threatened' by the USFWS under the Endangered Species Act (ESA) that potentially occur in the project area (Table Q-1). In addition, taxa that have been formally proposed or are candidate species for federal listing, or taxa listed as 'species of concern' that potentially occur within the project area were also considered as target species (Table Q-1). The 'species of concern' status is an unofficial status for species that appear to be in jeopardy, but information is insufficient to support listing. Target species also included all plant taxa defined as 'Endangered', 'Threatened', 'Sensitive', Review', or 'Extirpated' by the Oregon Natural Heritage Program (ONHP) that potentially occur within the project area (Attachment P-2 of Exhibit P). The ONHP maintains the most complete database available for state-listed species. Taxa meeting the above criteria were targeted by the investigation to determine their presence or absence within the study area. Determinations of status for rare plant species were based on information provided by the USFWS and the ONHP's list of tracked plant species (Attachment P-3 and P-2, respectively in Exhibit P).

Q.3.3.2 Prefield Review

As part of the investigation, a review of available literature and other sources was conducted to identify the rare plant species potentially found within the project area. As per Section 7(c)(1) of the Endangered Species Act (ESA), a letter was sent to the USFWS requesting a list of federally listed taxa that have potential to occur within the project area. In addition, the ONHP was contacted to obtain element occurrence records for any known rare plant populations in the project vicinity. To supplement the information provided by the above agencies, a number of other sources were consulted. These sources provided additional information such as habitat preferences, morphological characteristics, phenologic development timelines, and species ranges. Sources included taxonomic keys and species guides (USFWS, 2001; Cronquist et al. 1977; Hitchcock and Cronquist, 1973) and online database searches of common and rare plant species (e.g., ONHP; USDA, 2006).

Using data collected during the pre-field review, a list of rare plant species potentially occurring in the project area was compiled (Table Q-1). Habitat preferences and identification periods were derived from the literature for each potential species. Using this information, along with topographic maps of the project area, a field survey plan was developed to guide the timing and intensity of the field surveys.

Q.3.3.3 Field Investigation

Pedestrian surveys for rare plant species were conducted on May 17 through June 18, 2007. Surveys were performed by a qualified WEST botanist, Jerry Baker, from Athena, Oregon. The surveys were timed to locate as many target species as possible, particularly those most likely to occur in the affected habitats (sagebrush steppe and grassland). The survey was accomplished by conducting meander pedestrian transects, zigzagging back and forth across the survey corridor. The intensity of the systematic search and speed the surveyor walked was variable, and depended upon: structural complexity of the habitat, visibility of target species, and probability of sensitive species occurrence in a given area. In habitats of low visibility with high probability of sensitive species occurrence, a tighter grid pattern was walked (transects and zigzagging were often crosschecked with GPS reference coordinates for a given corridor to ensure complete coverage). Care was taken to thoroughly search all unique features and habitats encountered with high probability of occurrence of sensitive species. Aerial photographs with mapped habitats and project layout features, and 7.5' USGS topographic maps of the site were used as well. A list of vascular plant species encountered during the rare plant surveys was maintained.

Q.4 EXISTING CONDITIONS AND POTENTIAL IMPACTS TO STATE AND FEDERAL LISTED, CANDIDATE AND PROPOSED SPECIES

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: Table Q-1 outlines those fish, wildlife and plant species that are either known to occur or considered to have the potential to occur within the analysis area, based on habitat suitability and information received from the USFWS and ORNHIC. Table Q-1 also addresses the potential occurrence of each species within the analysis area and its potential for impacts from the construction and operation of the proposed project based upon the evaluation of fish and wildlife habitats in the analysis area.

The following section describes the "*…nature, extent, location and timing…*" (OAR 345-021-0010(q)(B) of each of the listed species that has the potential to occur within the analysis area or that may be affected by the proposed project. This section also addresses how the construction and operation of the project might affect these species (OAR 345-021-0010(q)(B).

Q.4.1 Wildlife

Bald Eagle

Species Description and Habitat Characteristics

In 1978, the USFWS listed the bald eagle throughout the lower 48 states as endangered except in Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it was listed as threatened (USFWS 1978). In 1995, the bald eagle was reclassified from endangered to threatened in all of the lower 48 states (USFWS 1995b). In July 1999, the USFWS proposed de-listing bald eagle (USFWS 1999). In June 2007, the USFWS delisted the bald eagle. To date, the bald eagle has not been removed from the list of threatened species. The species has been doubling its breeding population every 6-7 years in the lower 48 states since the late 1970's (USFWS 1995b). In 1963, a National Audubon Society survey reported only 417 active nests in the lower 48 states, with an average of 0.59 young produced per active nest. In 1994, about 4,110 occupied breeding territories were monitored with an estimated average of 1.17 young per active nest (USFWS 1995b).

Life History and Habitat Characteristics

The nesting chronology of bald eagles is variable based on latitude. For more northern populations such as Oregon and Washington, nest maintenance and construction occurs during winter months, January and February (Buehler 2000). Eggs are laid between late February and late April, with peak laying during March. Fledging dates vary accordingly with most young leaving the nest between 8 and 14 weeks after hatching (Harmata and Oakleaf 1992, Buehler 2000). Nest production is usually between 1-3 young per year. Little is known of post-fledging behavior; however, bald eagles do not reach sexual maturity until 4-5 years and may live up to 20-30 years (Buehler 2000).

Wintering bald eagles in Oregon are primarily found along major waterways, with some found on upland wintering areas. During migration and at wintering sites, eagles that concentrate on locally abundant food tend to roost communally. Roost sites form critical habitat for wintering birds with some roosts used regularly by large numbers of eagles (Buehler 2000). Bald eagle migration varies by populations and may extend over several months (Buehler 2000). In the Pacific Northwest, bald eagle migrations coincide with salmon runs and both immature and adult bald eagles will move north in the late summer to take advantage of fall run salmon as far north as southern Alaska. These birds and more northern birds will then return south over the fall, arriving on the wintering grounds in November and December (Hodges *et al.* 1987, Hansen *et al.* 1986). Open water and food availability dictate areas of use throughout the winter months. Upland areas may receive considerable use when carrion is available. Important prey includes salmonids, carrion, waterfowl, and small mammals.

Generally, bald eagles require areas in the proximity of water for nesting, and areas with abundant readily available food sources and good roost sites during winter (Harmata 1989, Buehler 2000, Cederholm *et al.* 2001). Bald eagles nest in stands of mature timber with old growth characteristics generally within a mile of large water bodies. Most nest trees are located in timber stands three acres or larger with canopy closure of less than 80 percent and on flat to moderately sloping terrain with northern aspects. Most nests are in mature or over-mature dominant or co-dominant trees (ponderosa pine, Douglas-fir, and cottonwood) with open crowns and sturdy horizontal limbs in line of sight to a lake or reservoir greater than 80 acres in size, or fourth order or larger stream (Buehler 2000, MBEWG 1986).

Wintering bald eagles tend to congregate near bodies of water where they feed on fish, carrion, and waterfowl (Buehler 2000, Cederholm *et al.* 2001). Major river drainages and large lakes constitute the majority of winter habitat use. Winter communal roosts consist of old large trees or snags where visibility is good and which have sturdy lateral limbs near the crown to provide easy entry and exit (USFS 1977, Green 1985). Roosts are usually located in stands of mature old-growth conifer or cottonwoods and may be several miles from feeding sites.

Bald eagles have varying tolerances to human disturbance. Disturbance near winter roosts or at the nest site during egg-laying and incubation may result in abandonment of the roost or nest. However, some eagles develop considerable tolerance to human activity and several have been known to nest within the Seattle city limits (Smith *et al*. 1997). The bald eagle (*Haliaeetus leucocephalus*) is a federal and state listed threatened species. Critical habitat has not been designated for the bald eagle. The three main factors affecting distribution of nests and territories are proximity to water and availability of food; suitable trees for nesting, perching, and roosting; and the number of breeding-aged eagles (Stalmaster et al. 1985). The critical nesting period for the bald eagle is from January 1 to August 15 (USFWS 1986; Stalmaster et al. 1985). Home ranges vary, but are estimated to be within 4 miles of the nest (Brown 1982). The nearest known nest is 10 miles west of the project site along the Columbia River. No impacts to breeding bald eagles are anticipated.

Wintering bald eagles concentrate in areas where food is abundant and disturbance is minimal. The birds use perches during the day, which are selected primarily according to their proximity to a food source. Wintering bald eagles may roost communally at night near major foraging areas. Roosts typically are established in isolated areas in old growth stands that have trees taller than the surrounding trees (USFWS 1986). The key wintering period is from November 15 to March 15 (USFWS 1986; Stalmaster et al. 1985). ODFW and other researchers conduct winter raptor surveys within the project vicinity and they have found that bald eagles are feeding on wintering waterfowl and are, therefore, primarily found along the Columbia River corridor.

The Midwinter Bald Eagle Survey is an annual, national event coordinated by Karen Steenhof, Research Wildlife Biologist, U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Snake River Field Station, Boise, ID. Counts are conducted during the first two weeks of January along standardized survey routes. The purpose of the survey is to determine trends in the number of bald and golden eagles wintering in the lower 48 states.

During January 2003, in Oregon, 225 observer-days covered 105 of 108 routes (97%); 684 bald eagles (526 adult, 144 immature, and 14 age unknown), and 74 golden eagles (60 adult, 12 immature, and 2 age unknown) were tallied.

Annual total bald eagle counts followed by 5-year averages, percent immatures, and 5-year averages of percent immatures, and annual total golden eagle counts are listed below. When comparing counts between years, remember that these data have not been adjusted for annual differences in weather, observers, or routes.

Bald Eagles counted during Midwinter Bald Eagle Surveys in Oregon:
1979 - 493 (% immature = 37.3)
1980 - 602 (% immature = 28.7)
1981 - 529 (% immature = 33.1)
1982 - 384 (% immature = 38.5)
1983 - 354 (5-yr ave = 472.4) (% immature = 26.8; 5-yr ave = 32.9)

1984 to 1987 - Counts were not conducted.

1988 - 386 (% immature = 44.6)
1989 - 533 (% immature = 43.9)
1990 - 704 (% immature = 34.4)
1991 - 788 (% immature = 35.5)
1992 - 582 (5-yr ave = 598.6) (% immature = 34.3; 5-yr ave = 38.5)
1993 - 676 (5-yr ave = 656.6) (% immature = 35.8; 5-yr ave = 36.8)
1994 - 677 (5-yr ave = 685.4) (% immature = 31.9; 5-yr ave = 34.4)
1995 - 704 (5-yr ave = 685.4) (% immature = 33.9; 5-yr ave = 34.3)
1996 - 648 (5-yr ave = 657.4) (% immature = 27.0; 5-yr ave = 32.6)
1997 - 677 (5-yr ave = 676.4) (% immature = 26.9; 5-yr ave = 31.1)
1998 - 843 (5-yr ave = 709.8) (% immature = 31.6; 5-yr ave = 30.3)
1999 - 611 (5-yr ave = 696.6) (% immature = 25.9; 5-yr ave = 29.1)
2000 - 599 (5-yr ave = 675.6) (% immature = 26.1; 5-yr ave = 27.5)
2001 - 756 (5-yr ave = 697.2) (% immature = 27.9; 5-yr ave = 27.7)
2002 - 805 (5-yr ave = 722.8) (% immature = 30.8; 5-yr ave = 28.5)
2003 - 684 (5-yr ave = 691.0) (% immature = 21.5; 5-yr ave = 26.4)

The Mid-Columbia route of the Midwinter bald eagle survey goes from the Cascade Locks to the Mouth of the John Day River (approximately 70 miles). Surveys conducted since 1988 during the first 2 weeks of January resulted in an average of approximately 6 bald eagles per annual count (2 to 15), or 1 eagle per 11 miles of survey. The John Day to Arlington route to the north and east of the project area typically results in no bald eagle observations with a high of 2 counted since 1988. These winter surveys have not noted any bald eagle use of the upland areas within and/or near the site boundary (Keith Kohl, ODFW, personal communication).

One bald eagle was observed during the avian use surveys for this Project. A few observations of bald eagles were made at the Biglow Canyon Project site along the John Day River. No bald eagles were observed during the avian use surveys at the Klondike I and II sites or the Klondike III expansion area. Bald eagles would be expected to 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 other existing wind projects including the other regional projects (e.g., Stateline OR/WA, Nine Canyon WA, Combine Hills OR, Klondike I, II, & III OR), and is likely lower than other existing wind projects such as Foote Creek Rim Wyoming.

Peregrine Falcon - Natural History and Occurrence in Analysis Area

The peregrine falcon (*Falco peregrinus anatum*) is a State of Oregon endangered species and has no status under the federal Endangered Species Act because it was removed from the federal list of endangered and threatened wildlife on August 25, 1999 (USFWS 1999). Peregrine falcons are limited to areas that contain suitable nesting ledges. Cliffs and bluffs typically found along river courses and other large bodies of water usually provide habitat for nesting peregrines. Peregrine falcons will also use suitable nesting ledges on man-made structures, such as bridges and buildings. Falcons prefer to nest where the concentration of prey, generally smaller birds, is high and where habitat characteristics may increase prey vulnerability. Much of the prey consists of species the size of pigeons and doves; however, avian prey ranges in size from hummingbirds to Aleutian Canada geese. Peregrine falcon courtship begins soon after the winter solstice. Peregrines lay two to four eggs from mid-February through May, and eggs hatch after an incubation period of 31 to 33 days. The young fledge between 37 and 45 days of age, and the juveniles continue to be fed and protected by the adults until they disperse, which can range from three weeks to three months (J. Pagel, USFS, personal communication).

Peregrine falcons may occur in the analysis area year-round. The nearest known eyrie is approximately 5-miles north of the Project. There are no other known eyries in the vicinity of the Project.

The analysis area provides a variety of habitat types, which provides for a diversity of avian prey species. Grain elevators within the project vicinity may be used by rock pigeons for perching and a food supply. Rock pigeons are aprimary prey item for peregrines (Keith Kohl, ODFW personal communication). However, no observations have been made that document use of rock pigeons by peregrines at grain elevators. Rock pigeons are also abundant along the Columbia and John Day Rivers, especially where cliff habitats occur. These areas also provide additional peregrine forage, such as swallow species, swift species, and bat species. The cliff habitats of these rivers provide eyries that have been used for nesting by peregrines. The proposed facility is not near the rivers. However, one peregrine falcon was sighted during the study at station P, 4-miles east of the Project.. No sightings have been made during avian point-counts at the Klondike I,II, or III facilities. One incidental peregrine falcon was observed in the fall season near the Biglow Canyon Project during supplemental 2006 surveys (observed on 1 November, 2006). This bird was an adult perched on a fence post apparently resting, and believed to likely be a migrant.

Potential Impacts to Bald Eagle and Peregrine Falcon

The potential for impacts to bald eagles and peregrine falcons is very low risk. To date, there are no reported bald eagle fatalities at wind projects (Erickson et al. 2001, 2002). Occasional prairie falcon fatalities have been observed at some wind projects (Erickson et al. 2001, 2002). Extremely low risk is anticipated for species only infrequently observed within the site boundaries, such as the peregrine falcon, and an anticipated negligible risk to those species not observed within the site boundaries, such as the bald eagle. The nesting ranges and locations of the peregrine falcon and bald eagle are constantly expanding (Frank Isaacs, personal communication); therefore, the database will be reviewed again should project construction be postponed.

Q.5 DESCRIPTION OF MEASURES PROPOSED TO AVOID OR REDUCE ADVERSE IMPACTS TO 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 following section complies with OAR 345-021-0010 by discussing the possible means by which adverse impacts to state and federal listed species from the proposed project can be avoided or minimized.

Q.5.1 Wildlife

Q.5.1.1 Bald Eagle

Turbines are sited at approximately 4-miles from both the Columbia River and the Deschutes River to, in part, avoid and minimize impacts to wildlife including bald eagles, which are much more concentrated along these features. With this mitigation, there are no anticipated impacts to the bald eagle from the construction and operation of the wind power facility; therefore, no additional mitigation is required.

Q.5.1.2 Peregrine Falcon

The Project was sited at least 4-miles from both the Columbia River and the Deschutes River to, in part, avoid impacts to wildlife including peregrine falcons, which are much more concentrated along these features. With this mitigation, there are no anticipated impacts to the peregrine falcon from the construction and operation of the wind power facility; therefore, no additional mitigation is required.

Q.5.2 Plants

No species-specific mitigation measures are proposed at this time because no direct project-related impacts to any federal or state threatened, endangered, or sensitive (TES), proposed, or candidate plant species are anticipated. No TES plant species were observed, Table Q-2 presents what was observed during surveys. However, several general measures are recommended to mitigate possible indirect effects to other species of concern (if any) potentially in the vicinity, outside of the survey corridors [see (E) of Exhibit P].

Table Q-2. Vascular plant species observed at the Golden Hills Wind Project during rare plant surveys, May 17 - June 18, 2007.

Family	Scientific Name	Common Name
APIACEAE	*Conium maculatum*	poison-hemlock
	Lomatium macrocarpum	large-fruited lomatium
	Lomatium grayi	Gray's desert parsley
	Lomatium nudicaule	barestem lomatium
	Lomatium triternatum	nine-leafed lomatium
	Orogenia linearifolia	linear-leaved orogenia
ASTERACEAE	*Achillea millefolium*	common yarrow
	Agoseris grandiflora	large-flowered agoseris
	Agoseris retrorsa	spear-leafed agoseris
	Antennaria dimorpha	low pussytoes
	Antennaria sp.	pussytoes
	Artemesia arbuscula	low sagebrush
	Artemisia tridentata	big sagebrush
	Balsamorhiza careyana	Carey's balsamroot
	Blepharipappus scaber	blepharipappus
	Centaurea diffusa	diffuse knapweed
	Centaurea sp.	knapweed
	Chaenactis douglasii.	chaenactis
	Chrysothamnus viscidiflorus	green rabbitbrush
	Cirsium arvense.	Canadian thistle
	Ericameria nauseosa sp. *nauseosa*	gray rabbitbrush
	Erigeron filifolius	thread-leaf fleabane
	Erigeron poliospermus	cushion fleabane
	Eriophyllum lanatum	Oregon sunshine
	Gaillardia aristata	Gaillardia
	Helianthus annus	Common sunflower
	Hieracium cynoglossoides	hounds tongue hiercacium
	Lactuca serriola	prickly letttuce
	Lagophylla ramossissma	rabbitleaf
	Madia sp.	tarweed
	Onopordum acanthium	Scotch thistle
	Senecio serra	butterweed groundsel
	Stenotus stenophyllus	woolly goldenweed
	Taraxacum officinale	common dandelion
	Tragopogon dubius	yellow salsify
	Tetradymia canescens	horse-brush

Family	Scientific Name	Common Name
BORAGINACEAE	*Amsinckia sp.*	fiddleneck
	Lithospermum ruderale	columbia puccoon
BRASSICACEAE	*Cardaria chalapensis*	whitetop
	Descurainia sp.	tanseymustard
	Draba verna	spring witlow-grass
	Erysimum asperum	rough wallflower
	Lepidium perfoliatum	clasping peppergrass
	Sisymbrium altissimum	tumble mustard
CHENOPODIACEAE	*Salsola kali*	Russian thistle
CRASSULACEAE	*Sedum lanceolatum.*	stonecrop
CUPRESSACEEAE	*Juniperus occidentalis*	western juniper
FABACEAE	*Astragalus filipes.*	Basalt milkvetch
	Astragalus purshii	wooly-pod milkvetch
	Lupinus holosericeus	little-flowered lupine
	Lupinus sericeus	silky lupine
	Medicago sativa	alfalfa
	Melilotus officinalis	yellow sweet-clover
	Onobrynchis viciaefloia	holy-clover
	Robinia pseudo-acacia	black locust
	Vicia vilosa	wooly vetch
GERANIACEAE	*Erodium cicutarium*	filaree
HYDRANGEACEAE	*Philadephus lewsii*	syringa
HYDROPHYLLACEAE	*Phacelia hastata*	Silver-leafed phacelia
IRIDACEAE	*Sisyrinchium sp.*	grass-widow
JUNCACEAE	*Juncus sp.*	rush
LAMIACEAE	*Mentha arvensis*	field mint
LILIACEAE	*Allium accuminatum*	Hooker onion
	Calochortus macrocarpus.	sagebrush mariposa
	Fritillaria pudica	yellow bell
	Triteleia douglasii	Douglas' triteleia

Family	Scientific Name	Common Name
ONOGRACEAE	*Epilobium sp.*	willow herb
PINACEAE	*Pinus ponderosa*	Ponderosa pine
	Pinus sp.	pine
PLANTAGINACEAE	*Plantago patagonica*	Indian-wheat
POACEAE	*Bromus tectorum*	cheatgrass
	Elymus cinereus	Great Basin wildrye
	Festuca idahoensis	Idaho fescue
	Hesperostipa comata	needle-and-thread grass
	Hordeum jubatum	foxtail barley
	Poa bulbosa	bulbous bluegrass
	Poa pratensis	Kentucky bluegrass
	Poa secunda	Sandberg's bluegrass
	Pseudoroegneria spicata	blue-bunch wheatgrass
POLEMONIACEAE	*Collomia grandiflora*	large flowered collomia
	Phlox longifolia	long-leaf phlox
POLYGONACEAE	*Eriogonum compositum*	northern buckwheat
	Eriogonum douglasii	Douglas' buckwheat
	Eriogonum elatum	tall buckwheat
	Eriogonum nivium	snow buckwheat
	Rumex sp.	sorrel
PRIMULACEAE	*Dodecatheon sp.*	shooting star
RANUNCULACEAE	*Ranunculus testiculatus*	hornseed buttercup
	Ranunculus sp.	aquatic buttercup
ROSACEAE	*Amelanchier alnifolia*	serviceberry
	Holodiscus discolor	ocean spray
	Potentilla glandulosa	sticky cinquefoil
	Prunus virginiana	chokecherry
	Rosa woodsii	Wood's rose
	Sanguisorba occidentallis	burnett
SALICACEAE	*Populus sp.*	poplar
	Salix sp.	willow
SAXIFRAGACEAE	*Lithophragma* sp.	lithophragma

Family	Scientific Name	Common Name
SCROPHULARIACEAE	*Mimulus gutatus*	seep-spring monkey-flower
	Penstemon richardsonii	Richardson's penstemon
	Penstemon sp.	penstemon
	Verbascum thapsus	wooly mullein
	Veronica sp.	speedwell
SOLANACEAE	*Solanum dulcamara*	climbing nightshade
TYPHACEAE	*Typha latifolia*	common cat-tail
ULMACEAE	*Celtis reticulata*	hackberry
URTICACEAE	*Urtica dioica*	stinging nettle

Q.6 FINDINGS THAT THE PROPOSED FACILITY WILL NOT LIKELY CAUSE A SIGNIFICANT REDUCTION IN THE LIKELIHOOD OF SURVIVAL OR RECOVERY OF THE FISH AND WILDLIFE SPECIES IDENTIFIED

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.3 of this Exhibit described the potential impacts of the proposed facility on the continued existence of state and federal species and on the suitable habitat for these species. The mitigation measures described in Section Q.4 were designed to avoid and/or minimize any adverse impacts to the listed wildlife species. Through utilization of these mitigation measures, the construction, operation and maintenance of the proposed facility will not likely cause a significant reduction in the survival or recovery of the bald eagle or the peregrine falcon.

Q.7 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: Programs to monitor the potential impacts to the individual listed species will be developed in coordination with the ODFW for fish and wildlife species. This includes two years of standardized intensive fatality monitoring data, and a long-term fatality monitoring program for the documenting occurrence of fatalities and long-term trends.

Q.8 REFERENCES

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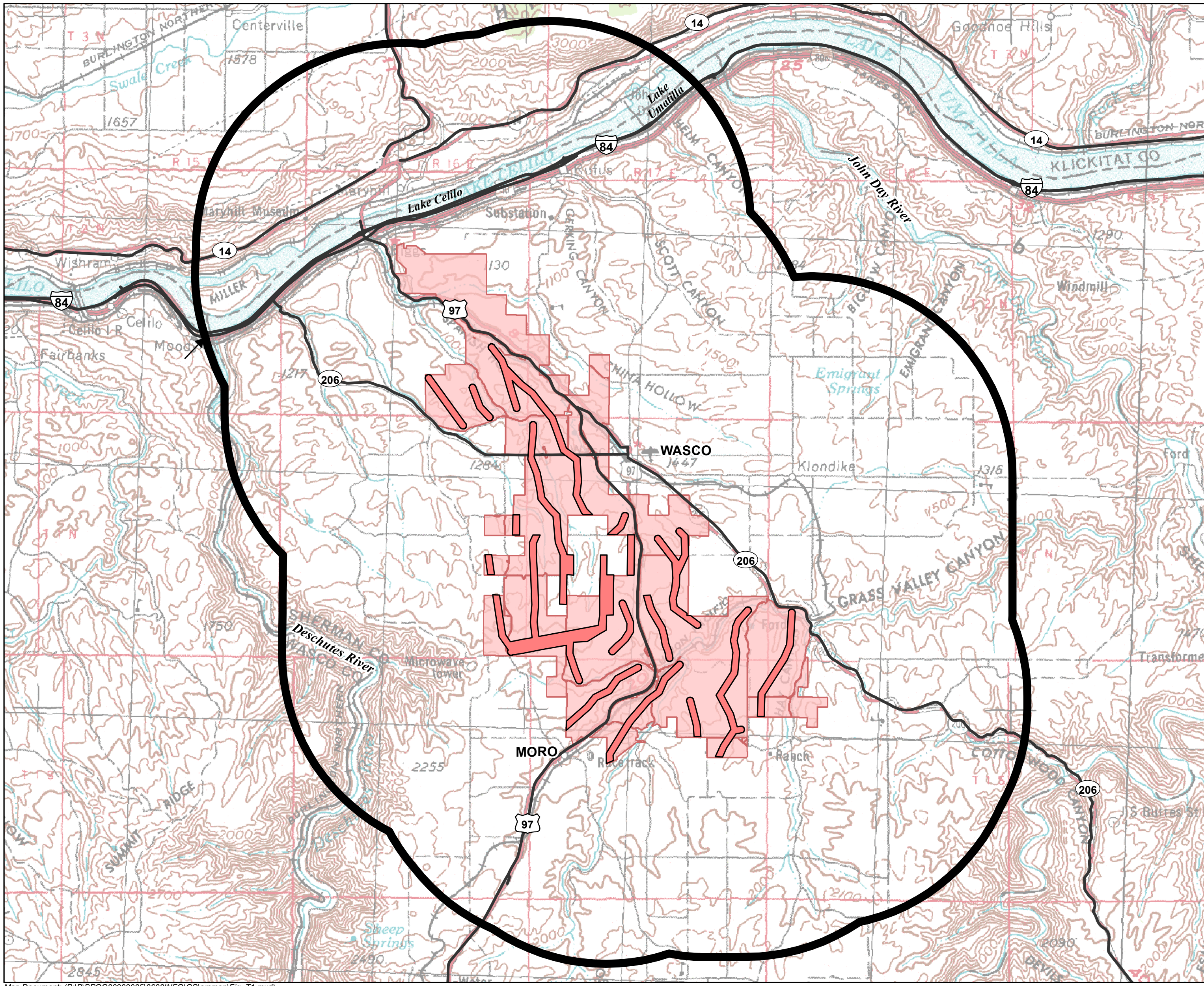
FIGURE

Threatened and Endangered Species Analysis Area - Map



Golden Hills Wind Project

FIGURE Q-1

T & E Analysis Area

T & E Analysis Area
Corridors
Lease Area

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EXHIBIT R

SCENIC AND AESTHETIC VALUES
OAR 345-021-0010(1)(r)

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FIGURES *(located after text)*

ATTACHMENT

R.1 INTRODUCTION

Exhibit R addresses the potential impacts of the proposed project on scenic and aesthetic values in the analysis area, in compliance with OAR 345-021-0010(1)(r), which requires:

OAR 345-021-0010(1)(r) *An analysis of significant potential impacts of the proposed facility, if any, on scenic resources identified as significant or important in local land use plans, tribal land management plans and federal land management plans for any lands located within the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0080, including:*

Response: Pursuant to OAR 345-022-0080(1), "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 local land use plans, tribal land management plans and federal land management plans for any lands located within the analysis area described in the project order."

R.2 LOCAL, TRIBAL AND FEDERAL PLANS

OAR 345-021-0010(1)(r)(A) *A list of the local, tribal and federal plans that address lands within the analysis area.*

Response: The analysis area for Exhibit R includes the area within the site boundary and extends 10 miles beyond the site boundary in Oregon and Washington. The following local, tribal and federal land management plans apply to the analysis area:

- Management Plan for the Columbia River Gorge National Scenic Area, September 1992, revised May 10, 2004,

- John Day Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments and Final Environmental Impact Statement, June 2000 (Record of Decision issued February 2001),

- Management and Use Plan Update Final Environmental Impact Statement Oregon National Historic Trail and Mormon Pioneer National Historic Trail, August 1999 (Record of Decision issued November 1999),

- Lewis and Clark National Historic Trail Comprehensive Plan and Management and Use, January 1982,

- Lower Deschutes River Management Plan and Final Environmental Impact Statement, January 1993 (Record of Decision issued February 1993),

- Proposed Two Rivers Resource Management Plan Final Environmental Impact Statement, September 1985 (Record of Decision issued June 1986),

- Spokane Resource Management Plan Record of Decision, May 1987,

- Proposed Spokane Resource Management Plan Amendment Final Environmental Impact Statement, June 22, 1992,
- Sherman County [Oregon] Comprehensive Land Use Plan 1994, revised June 2003,
- Journey Through Time Management Plan, April 1996 (State Scenic Byway Management Plan referenced in Sherman County Comprehensive Plan),
- Comprehensive Plan for Wasco County [Oregon], August 25, 1983,
- Gilliam County [Oregon] Comprehensive Land Use Plan, October 25, 2000 and
- Klickitat County [Washington] Comprehensive Plan, August, 1977.

R.3 IDENTIFICATION AND DESCRIPTION OF SCENIC RESOURCES IDENTIFIED AS SIGNIFICANT OR IMPORTANT

OAR 345-021-0010(1)(r)(B) *Identification and description of the scenic resources identified as significant or important in the plans listed in (A).*

Response: Significant or important scenic and aesthetic values identified in the applicable plans are illustrated in Figure R-1. In some cases, multiple plans govern the same resources. For example, the John Day River is designated a Federal Wild and Scenic River and a State Scenic Waterway, the rim-to-rim area is designated an Area of High Visual Quality by the Bureau of Land Management (BLM), and the Sherman and Gilliam County Comprehensive Plans identify the rim rocks and outcrops as important resources. When this happens, the management unit boundaries from each plan are shown in Figure R-1; however, the resource is later summarized as a single entity (e.g., "John Day Canyon") for purposes of determining and discussing potential impacts to the resource.

The following plans did not identify significant or important scenic resources in the analysis area:

- Lewis and Clark National Historic Trail Comprehensive Plan and Management and Use, January 1982,
- Spokane Resource Management Plan Record of Decision, May 1987,
- Proposed Spokane Resource Management Plan Amendment Final Environmental Impact Statement, June 22, 1992 and
- Klickitat County [Washington] Comprehensive Plan, August, 1977.

Six significant or important scenic resources in the analysis area have been identified in the applicable management plans:

R.3.1 Columbia River Gorge National Scenic Area

The Columbia River Gorge National Scenic Area (CRGNSA) is managed for an "unparalleled combination of scenery, geology, plants, wildlife, and multicultural history" (Columbia River Gorge Commission and USDA 1992). The exceptional beauty of this region is largely derived from its diverse character. Key viewing areas (KVAs) are important viewpoints open to the public offering opportunities to view the Gorge. KVAs within the analysis area include Interstate 84 (I-84), Washington State Route 14 (SR-14), and the Columbia River. Scenic Travel Corridors in the analysis area include the I-84 and SR-14.

R.3.2 Oregon National Historic Trail High Potential Sites

In 1978, Congress authorized the Oregon National Historic Trail to commemorate this significant travel route and to promote its preservation, interpretation, public use, and appreciation (USDI 1999). The management plan is a coordinating document that provides broad-based polices, guidelines, and standards for administering the trail to guide its protection, interpretation, and continued use. Within the analysis area, the plan identifies three High-Potential Sites based on "historic significance, the presence of visible historic remnants, scenic quality, and relative freedom from intrusion" (USDI 1999). These sites include John Day River Crossing (a.k.a. McDonald Ferry), Biggs Junction, and Deschutes River Crossing. The plan does not identify specific scenic or aesthetic values in the analysis area beyond these three sites.

R.3.3 Lower Deschutes River Canyon

The Lower Deschutes River is a designated Federal Wild and Scenic River and Oregon State Scenic Waterway. The Lower Deschutes Canyon "contains a diversity of landforms, vegetation and color" (USDI 2001) where the river has carved a dramatic canyon through rugged Columbia River basalt flows. Riparian vegetation provides stark contrast against the broken reddish brown canyon walls. Transportation corridors (roads and railroad), and rural development occur in several areas throughout the canyon.

The BLM and Oregon Department of Fish and Wildlife (ODFW) administer the majority of public lands within the canyon. ODFW administered lands are not managed for visual quality, but rather for habitat and recreation (Kohl 2007). The Deschutes River Canyon (i.e., the area rim-to-rim) is identified as an "area of high visual quality" (USDI 1986). BLM manages its lands in this area as a Visual Resource Management (VRM) Class II resource, meaning management activities resulting in changes to the existing character of the landscape may be allowed, provided they do not attract the attention of the casual observer (USDI 2000). BLM's primary concern would be visual impacts seen from the river (Mottl, T. 2007).

The Two Rivers Resource Management Plan Record of Decision identifies the Deschutes River Canyon as a Special Management Area in which "areas of high visual and natural quality will continue to be protected while allowing other compatible uses in the same area" (USDI 1986).

R.3.4 John Day River Canyon

The John Day River system includes more than 500 river miles and is one of the longest free-flowing river systems in the continental United States (USDI 2001). The landscape within the analysis area features high desert communities of sagebrush and juniper with intermingled private ranches adding visual interest along the river (USDI 2000). The John Day River Canyon (i.e., the area rim-to-rim) is also identified as an "area of high visual quality" (USDI 1986) and managed as a VRM Class II resource (USDI 2000).

Beginning at Tumwater Falls near river mile 10 upstream through the analysis area, the river is a designated Federal Wild and Scenic River (WSR) and classified as Recreational, meaning that at the time of designation, the segment was readily accessible by road or railroad, may have some shoreline development, and may have undergone some impoundment or diversion in the past. Outstanding remarkable values in this segment include "scenic, recreation, fish, wildlife, geological, paleontological, and archaeological" values; botanical and ecological values are also deemed significant (USDI 2001). The segment is also designated as a State Scenic Waterway.

The Two Rivers Resource Management Plan Record of Decision identifies two Special Management Areas relevant to this Exhibit: the Oregon Trail Historic Site McDonald Crossing and the John Day River Canyon. For McDonald Crossing, "the unusual qualities of these sites will be maintained and protected" (USDI 1986). For the canyon, "areas of high visual and natural quality will continue to be protected while allowing other compatible uses in the same area" (USDI 1986).

R.3.5 Journey Through Time Scenic Byway

The Journey Through Time Management Plan (JTTMP) is administered through the Oregon Department of Transportation Scenic Byway Program. It is included in this Exhibit because it is referenced in the Sherman County Comprehensive Plan (Comp Plan). The Sherman County Comp Plan provides no additional guidance regarding managing scenic or aesthetic values associated with the Byway. Although the JTTMP and Sherman County Comp Plan do not identify significant or important scenic resources within the analysis area, the Byway has been included in this Exhibit for the sake of completeness.

The JTTMP speaks to the rural heritage and history of the 286-mile route through north central Oregon. The plan establishes four goals: create jobs; maintain rural lifestyles (i.e., support traditional industries of agriculture and timber); protect important values (i.e., historical attractions); and build identity for the north central Oregon region. The plan identifies the communities of Wasco, Moro, and Grass Valley, the Historic Oregon Trail and Barlow Road, and the Sherman County Museum as points of interest within the analysis area (Wetter 1996).

R.3.6 Trees

The Sherman County Comp Plan states 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 2003). Trees within the analysis area are sparsely distributed and primarily occur along riparian corridors and in developed areas such as the rural communities of Wasco and Moro.

R.4 POTENTIAL ADVERSE IMPACTS TO SCENIC RESOURCES

OAR 345-021-0010(1)(r)(C) *A description of the potential adverse impacts to the scenic resources identified in (B), including, but not limited to, impacts such as*:

(i) *Loss of vegetation or alteration of the landscape as a result of construction or operation; and*

Response: Construction will result in the conversion of dry land wheat agricultural lands and some Conservation Reserve Program (CRP) lands to access roads and turbine pads and their appurtenances. The design, construction, operation, and retirement of the facility are not anticipated to impact trees or rock outcroppings. Therefore, there will be no significant adverse impacts to vegetation or alteration of the landscape.

(ii) *Visual impacts of facility structures or plumes.*

Response: An integrated approach including computer modeling and visibility analyses, field investigation, and interviews with local, state, and federal agency staff was used to determine potential visual impacts of the proposed facility.

R.4.1 Computer Modeling Method and Results

Visibility analyses were conducted for the analysis area using Geographic Information Systems (GIS) technology and US Geological Survey (USGS) Digital Elevation Models (DEMs). Visibility analyses and modeling techniques were used to determine areas from which the proposed facility (i.e., any part of any turbine) would potentially be visible. The DEMs used in the analyses have 10-meter resolutions, meaning the ground is represented by a grid of squares that are 10m x 10m, and each square is assigned a single elevation. As such, the resolution of the DEMs is a limiting factor in the precision of these analyses. The models used in the analyses also do not include vegetation or structures, and do not account for variable climatic conditions. Therefore, it should be noted that these analyses generally overestimate areas of visibility.

The results of visibility analysis are shown in Figure R-2. In considering these results, it is important to note that the proposed facility occurs on private lands and is beyond the jurisdiction of many of the agencies administering public lands in the analysis area. The proposed facility is beyond the jurisdiction of the Oregon State Scenic Waterways Act (see ORS 390.805(1), 390.845(2)e; see also OAR 736-040-0015(5) and (10)); it is also beyond the jurisdiction of the Federal Wild and Scenic Rivers Act because the proposed facility is outside the WSR boundary and local land use plans do not place additional restrictions of development relevant to the WSR designation.

R.4.2 Determination of Significance of Potential Impacts

Potential impacts to the significant or important scenic or aesthetic resources are as follows:

R.4.2.1 Columbia River Gorge National Scenic Area

The visibility analysis indicates some portion of the proposed facility would be visible from the approximately three easternmost miles of the CRGNSA within the analysis area (see Figure R-2). Much of the visible area identified in the visibility analysis is not publicly accessible; there are limited roads and most land is held in private ownership. The most likely locations from which to view the proposed project occur along Washington SR-14, near Wishram, Washington where turbines may potentially be visible in the background. Photos R-1 through R-5 depicts conditions in the CRGNSA along SR-14 within the analysis area.

Where visible, the proposed facility would be subordinate to the landscape setting that typically includes significant anthropocentric development such as interstate and rail transportation corridors, transmission corridors, radio and cellular towers, and urban and rural development in the foreground and middleground.

Given the relative amount of existing encroachment in the foreground and middleground views, that proposed turbines (or portions of turbines) would likely be visible in the background, and limited opportunities to view turbines, the proposed facility would result in minimal impacts to the CRGNSA.

R.4.2.2 Oregon National Historic Trail High Potential Sites

Computer modeling results, field investigations, and interviews with agency staff have indicated that the proposed facility would not be visible from the High Potential Sites (i.e., Biggs Junction, the Deschutes River Crossing, and McDonald Crossing) (Mottl, H. 2007, Mottl T. 2007). Therefore, there would be no impact to these resources.

R.4.2.3 Lower Deschutes River Canyon

Computer modeling results indicate the proposed facility would be visible from very limited, isolated rims with very limited access and would not be visible from the canyon's interiors or from the river and its shorelines. Field investigation and interviews with agency staff confirmed these findings (Kohl 2007, Mottl, T. 2007).

The proposed facility would be compatible with BLM visual resource management objectives for the Deschutes River Area of High Visual Quality and would not result in significant adverse impacts to the resource.

R.4.2.4 John Day River Canyon

Similarly to the results for the Lower Deschutes River Canyon, computer modeling indicates the proposed facility would be visible from limited, isolated canyon rims with very limited access. The proposed facility would not be visible from the canyon interiors, river, or shorelines. An interview with agency staff confirmed this finding (Mottl, H. 2007).

The proposed facility would be compatible with BLM visual resource management objectives for the John Day River Area of High Visual Quality and would not result in significant adverse impacts to the resource.

R.4.2.5 Journey Through Time Scenic Byway

As illustrated in the visibility analysis (Figure R-2), portions of the proposed facility would be visible in the foreground and middleground from the Byway for approximately 12 miles between Biggs and Moro. Although portions of turbines would be visible, the proposed facility would be compatible with the JTTMP's stated goals. Because the communities of Wasco and Moro have no stated scenic or visual management goals or objectives and because the Sherman County Comp Plan Goal XVIII supports the development of wind energy (Sherman County 2003), it is concluded that the proposed facility would not have significant adverse effects on the Journey Through Time Scenic Byway. It is possible that the proposed facility would have positive impacts in support of the JTTMP by creating jobs, supporting agriculture, and providing a sense of regional identity supported by local land use plans.

R.4.2.6 Trees (Sherman County)

The proposed facility is not anticipated to impact trees in Sherman County. Therefore, there would be no impact to this resource.

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: Impacts to vegetation on CRP lands and wildlife habitat will be mitigated as described in Exhibit P. Although no significant adverse impacts to scenic and aesthetic resources have been identified, the Applicant will incorporate best management practices such as using matte neutral white or gray finishes for the turbines to further reduce visual impacts of the proposed facility.

R.6 MAP

OAR 345-021-0010(1)(r)(E) *A map or maps showing the location of the scenic resources described under (B).*

Response: Scenic resources located within the analysis area are depicted on Figure R-1.

R.7 MONITORING

OAR 345-021-0010(1)(r)(F) *The applicant's proposed monitoring program, if any, for impacts to scenic resources.*

Response: The proposed facility would not result in significant adverse impacts to scenic and aesthetic values, and therefore, the Applicant does not propose an active monitoring program specific to the monitoring for impacts to scenic and aesthetic values. For those impacts to vegetation on CRP lands that will be mitigated as described in Exhibit P, monitoring, if any, will occur pursuant to Exhibit P. With respect to the Applicant's efforts to incorporate best management practices such as using neutral color matte finishes for the turbines, no ongoing monitoring is proposed for such practices.

R.8 REFERENCES

R.8.1 Telephone Contacts/Personal Interviews

Kohl, Keith. District Wildlife Biologist. Mid-Columbia District. Oregon Department of Fish and Wildlife. Telephone conversation with Sean Sullivan. June 28, 2007.

Mottl, Heidi. Recreation Planner. Prineville District, Bureau of Land Management. Telephone conversation with Sean Sullivan. June 25, 2007.

Mottl, Tom. District Recreation Planner. Prineville District, Bureau of Land Management. Telephone conversation with Sean Sullivan. June 26, 2007.

R.8.2 Website/Document References

Columbia River Gorge Commission and USDA Forest Service, National Scenic Area. Management Plan for the Columbia River Gorge National Scenic Area. September 1992.

Sherman County, Oregon. Comprehensive Land Use Plan 1994, revised June 2003.

USDI Bureau of Land Management. Two Rivers Resource Management Plan Record of Decision. June 1986.

USDI Bureau of Land Management. John Day River Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments and Final Environmental Impact Statement. June 2000.

USDI Bureau of Land Management. John Day River Management Plan, Two Rivers, John Day, and Baker Resource Management Plan Amendments Record of Decision. February 2001.

USDI National Park Service. Management and Use Plan Update Final Environmental Impact Statement Oregon National Historic Trail and Mormon Pioneer National Historic Trail, August 1999.

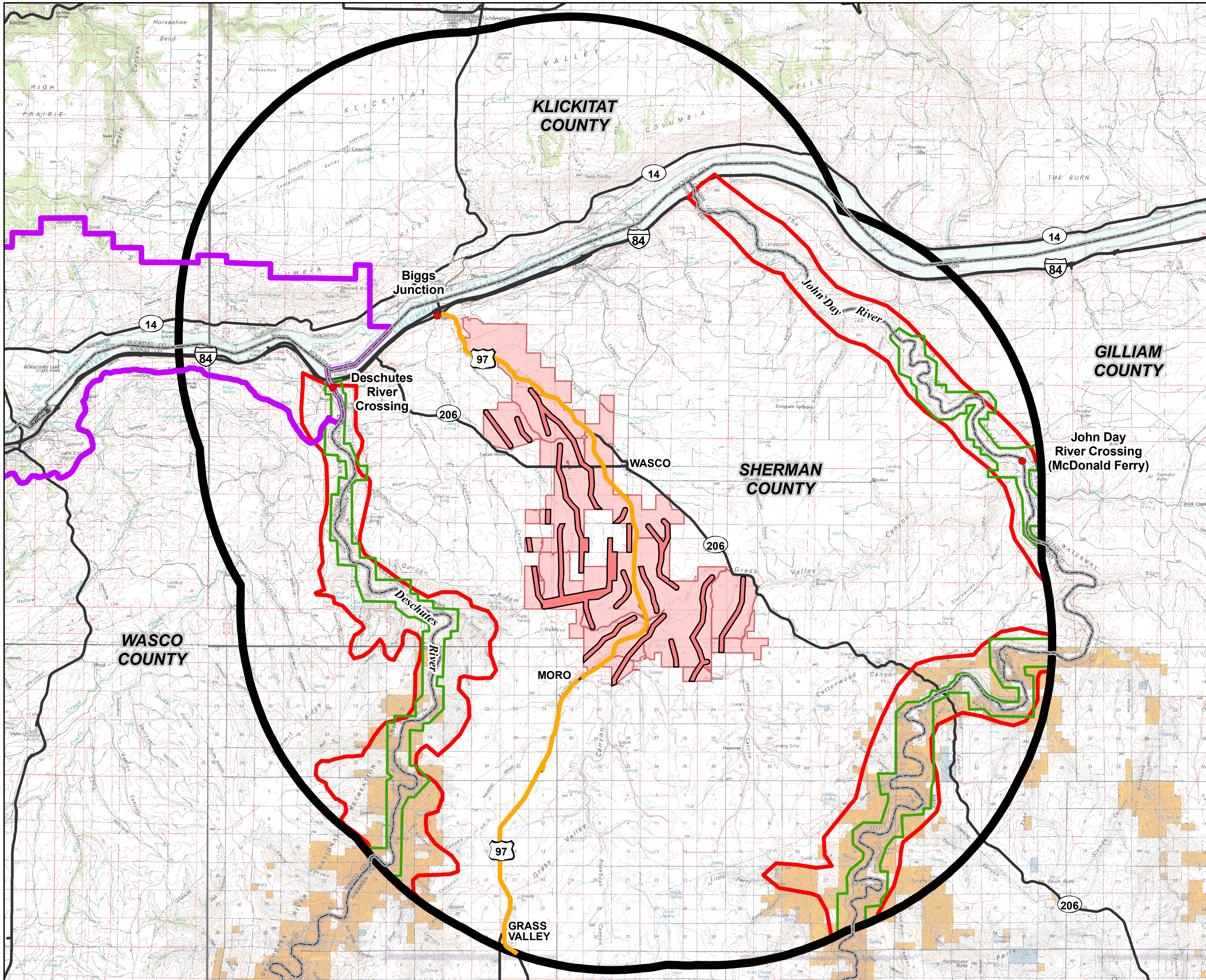
Wetter, Michael et al. Journey Through Time Management Plan, for Oregon Department of Transportation. March, 1996.

Golden Hills Wind Project

FIGURE R-1

Scenic and Aesthetic Values

- Site-Specific Scenic Resource
- Journey Through Time Scenic Byway (US 97)
- Columbia River Gorge National Scenic Area
- Federal Wild and Scenic River
- Area of High Visual Quality (BLM, Prineville Dist.)
- Corridors
- Lease Area
- Scenic and Aesthetic Value Analysis Area
- County Boundary



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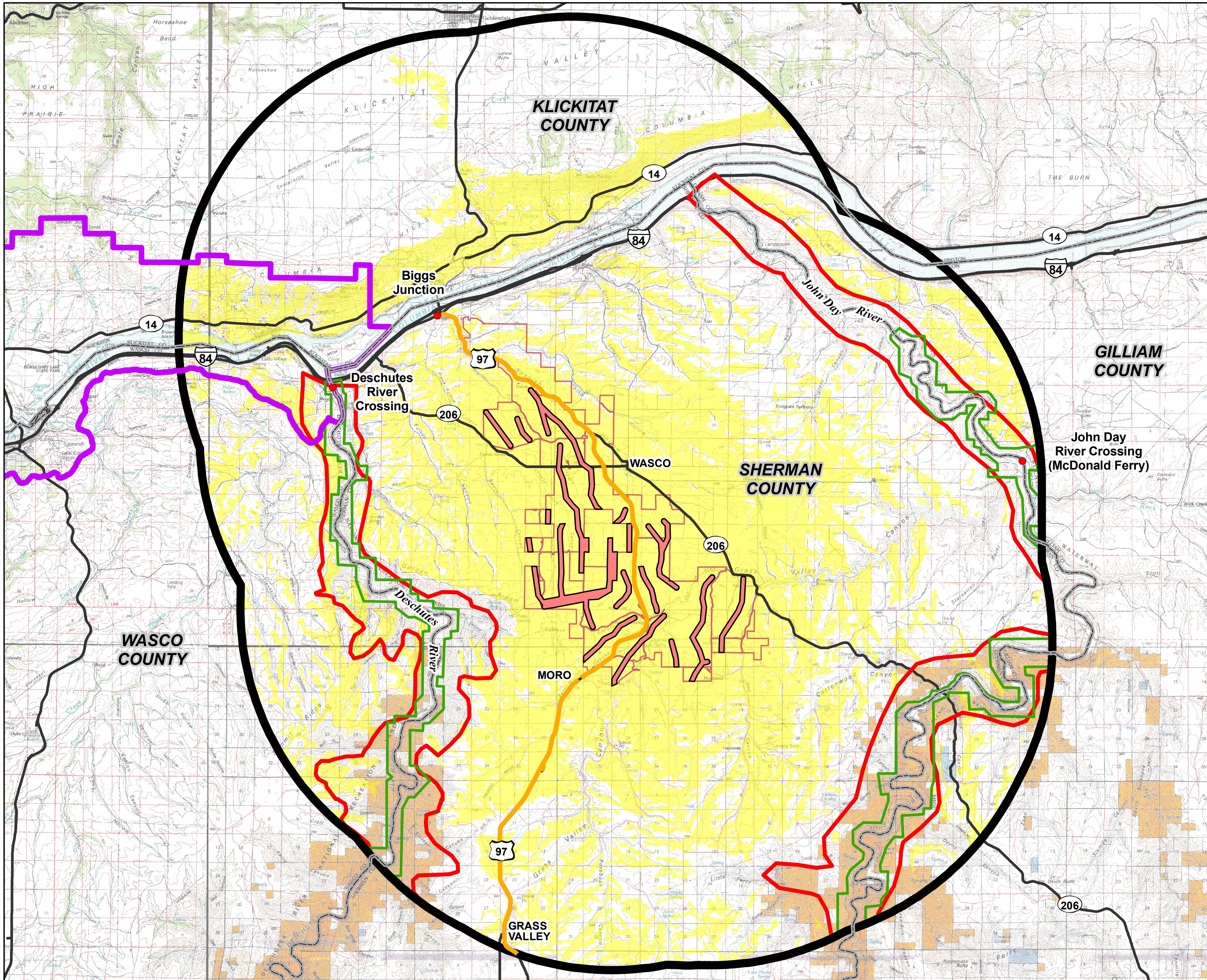

Golden Hills Wind Project

FIGURE R-2

Visibility Analysis

- Site-Specific Scenic Resource
- Journey Through Time Scenic Byway (US 97)
- Columbia River Gorge National Scenic Area
- Federal Wild and Scenic River
- Area of High Visual Quality (BLM, Prineville Dist.)
- Corridors
- Lease Area
- Scenic and Aesthetic Value Analysis Area
- County Boundary

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ATTACHMENT R-1
PHOTOGRAPHS

PHOTO R-1: SR-14 at Milepost 97 looking west.

PHOTO R-2: SR-14 at Milepost 97 looking east.

PHOTO R-3: SR-14 at Milepost 97 looking southeast toward project vicinity. Note transmission towers silhouetted on skyline.

PHOTO R-4: SR-14 at Milepost 97 looking southwest toward confluence of Columbia and Deschutes Rivers.

PHOTO R-5: SR-14 near Milepost 97 looking north. Note microwave towers silhouetted on skyline.

EXHIBIT S

HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

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

TABLE OF CONTENTS

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, including:

Response: This exhibit describes impacts related to the Project on historic, cultural, and archaeological resources in the vicinity. For discussions of Exhibit S, the "analysis area" for archeology is synonymous with the areas of potential effects (APE) from ground disturbances related to project construction, operation and retirement of the facility. The total APE for archaeology is 7,010 acres, including turbine strings on approximately 5,313 acres, crane paths on 127 acres, crane paths and underground collector lines on 146 acres, underground collector lines on 216 acres, existing road improvements on 462 acres, new roads on 58 acres, transmission lines of 360 acres, bridge improvement on 60 acres, laydown areas on 256 acres and substations on 10 acres.

S.2 HISTORIC AND CULTURAL RESOURCES LISTED, OR POSSIBLY ELIGIBILE FOR LISTING, ON THE NATIONAL REGISTER 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 determined to be eligible for listing on, the National Register of Historic Places (NRHP). The Oregon State Historic Preservation Office (OSHPO) maintains files concerning NRHP-listed sites and determinations of eligibility. At present, one historic property, DeMoss Springs Park, is listed on the NRHP within or immediately adjacent to the analysis area for archeology.

DeMoss Springs Park was listed on the NRHP during March 2007. The park includes approximately 2.5 acres along Barnum Creek and east of U.S. Highway 97. Contributing resources include the property setting, landscape features such as the lawn and large trees, the bandstand, pump house, a basalt retaining wall and bridge remnants (Donovan 2006). Most residential and commercial structures associated with the park and the historic community of DeMoss Springs have been demolished over the years. The project APE should be evaluated to identify possible effects on the setting and integrity of the historic property and in consultation with OSHPO.

In addition, the Project crosses portions of the Oregon Trail and the Barlow Cutoff, which are known to be associated with events that have made a significant contribution to the broad patterns of our history (36 CFR 60.4, criterion "a"), and are potentially eligible for the NRHP.

The Oregon Trail alignment bisects the project area at Corridor O (Appendix S-1; Figure 2). The Oregon Trail is designated as a Historic Trail under both federal and Oregon statutes. The alignment of the trail, as compiled by the Oregon State Highway Department in 1959, crosses the APE in section 32 of Township 2 North, Range 17 East, and sections 35 and 36 of Township 2 North, Range 16 East.

Apart from two historic isolated finds located near the presumed route alignment, no physical evidence of the trail was observed at any of the bisections. Farming activity is likely to have obliterated most, if not all, physical traces of the trail. This same physical disturbance makes it difficult to substantively correlate the isolated finds to that of the historic emigrant route.

Oregon Trail Cutoff to the Barlow Road begins at the John Day River Oregon Trail Crossing east of Wasco and runs southwesterly to Grass Valley (follow signs along nearest county roads) and from Grass Valley southwesterly on Highway 216 to Hollenbeck Point where emigrants entered Buck Hollow and the Deschutes River crossing north of present-day Sherar's Bridge.

This historic emigrant route crosses the APE at three points in the southeastern portion of the Project; two of these contacts are virtually perpendicular intersections, but the third falls within proposed turbine Corridor D and associated underground collector route, paralleling for a distance of approximately 2,000 feet (Appendix S-1; Figure 2).

Complete archaeological survey was conducted at each of the above-mentioned contacts (Appendix S-1; Figure 3). No physical evidence of the Barlow Cutoff Route was observed at any of these locations. Farming activity seems to have obliterated most, if not all, physical traces of the trail. This same physical disturbance makes it difficult to substantively correlate the isolated finds to that of the historic emigrant route.

S.3 ARCHAEOLOGICAL OBJECTS AND SITES 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: The OSHPO maintains archaeological records of "isolated finds," (including 9 or fewer artifacts) and archaeological sites within the state. Site file research at OSHPO identified no isolated finds or archaeological sites recorded within the project APE.

S.4 ARCHAEOLOGICAL OBJECTS AND 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: There are no public lands in the project APE.

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: Archival research was conducted at the OSHPO in Salem to review archaeological site records and reports. Additional background literature research was conducted at the Sherman County Historical Society and Museum in Moro, Oregon, and at Wasco County Library in the Dalles, Oregon. Consultation was also undertaken with Native American groups including the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes and Bands of the Yakama Indian Nation, the Colville Confederated

Tribes, the Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe. Copies of letters initiating consultations with Native American tribes are provided in Appendix S-1. No responses from Native American tribes have been received at this time.

Archaeological field investigations were initiated during May and June 2007. The archaeological field investigations were conducted in conformance with professional standards and guidelines of the OSHPO (OSHPO 2006). A pedestrian survey was conducted in areas with good ground visibility in order to identify surface artifacts associated with prehistoric period and historic period archaeological sites. Portions of the project APE that were planted in crops were not surveyed due to poor ground visibility. In portions of the APE where surface visibility was deemed adequate, surface survey was performed by three to six archaeologists walking transects spaced no greater than 25 meters. During the field survey, all archaeological sites, isolates, and historic structures identified within the project APE were documented and mapped using a Trimble GeoXT global positioning system (GPS) unit. Photographs were taken of all cultural resource settings and intermittently throughout the survey area to document landforms, vegetation coverage, and identified disturbances. No subsurface testing or collection of artifacts was conducted at any sites, localities, or isolated finds. Where ground visibility was limited due to vegetation/crop coverage, no surface testing was conducted due to land owner requirements. Special care was taken to identify landforms that were heavily covered with vegetation and may potentially have deeply buried soils likely to contain cultural materials. No such areas were noted. Since the time of the initial pedestrian survey, some project changes have occurred. Therefore, OSHPO may determine that additional archaeological investigations may be required.

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: In total, 3810 acres of the APE were surveyed for the presence of archaeological sites, isolated finds, and potential historic properties. The pedestrian survey included approximately 54 percent of the total project APE. As a result of the initial pedestrian survey, eight archeological sites were identified including two prehistoric-period sites and six historic-period sites. In addition, seven isolated finds were identified, including two prehistoric and five historic isolates. Each of these resources is discussed in Appendix S-1, and full Oregon State Archaeological Inventory forms were prepared and are included in Appendix S-1. Vegetation at the time of the pedestrian survey prevented investigation of approximately 46 percent of the project APE. In addition, since the time of the initial pedestrian survey, some project design modifications have been proposed that should be evaluated for possible effects on archaeologically sensitive areas. Therefore, it is expected that additional archaeological investigations may be required within the project APE.

Recently issued OSHPO guidelines (OSHPO 2006:4) state that archaeological surveys are not required for 100 percent of all locations within development projects. Instead, OSHPO recommends that an agency-approved archaeological sensitivity model be developed to identify areas of high, medium and low probability for prehistoric period and historic period archaeological sites. OSHPO further recommends that 100 percent of high probability areas within a project APE should be surveyed, 20 percent of medium probability areas should be surveyed, and 5 percent of low probability areas should be surveyed. As a check on the validity of low probability zones, OSHPO recommends that at least 20 percent should be surveyed of the overall project area.

An archaeological sensitivity model will be submitted to SHPO that identifies high probability areas, areas that have been surveyed during the preliminary pedestrian survey, and areas that are recommended for additional archaeological surveys. The initial pedestrian survey might be sufficiently rigorous to satisfy OSHPO guidelines for medium and low probability areas. However, several high probability areas could not be surveyed due to standing crops. This plan must be approved by OSHPO. Additional archaeological investigations will include surface reconnaissance in areas of good surface visibility, and shovel probe excavations at a maximum of 30 meter intervals in areas with dense vegetation cover, including croplands, streamside forests and sagebrush flats.

Once consultations with OSHPO regarding sensitivity models have been completed, any additional archaeological survey, inventory, and/or testing deemed necessary will be undertaken.

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

Response: All eight of the archeological sites associated with the study are considered potentially eligible for nomination to the NRHP, and are recommended for avoidance during construction, operation, and retirement of the proposed facilities. Archaeological sites and historic homesteads will be temporarily flagged in the field and on project construction maps before and during construction. Archaeological construction monitors will be present during construction in selected locations to prevent accidental damage to these cultural resources. Additional consultations will be conducted with OSHPO concerning approved avoidance and/or mitigation measures for the Oregon Trail and Barlow Cutoff.

Avoidance strategies for the eight archaeological sites documented in Appendix S-1 are summarized below:

GH Site 1: This prehistoric lithic scatter is situated along Corridor B (Appendix S-1; Figure 4). It will be avoided by re-routing the proposed three foot wide underground collection line trench to pass north of, and outside the established archaeological site boundary. Because this modification will occur within the existing corridor surveyed for the study, no supplemental archaeological inventory is required.

GH Site 2: A historic era refuse deposit located atop a slight rise within an uncultivated portion of agricultural wheat field. A portion of the site lies within a proposed laydown area west of Corridor A (Appendix S-1; Figure 4). The small portion of the laydown area that overlaps the archaeological site will not be utilized, ensuring avoidance.

GH Site 3: A series of historic features and artifacts, GH Site 3 was identified in the laydown area west of Corridor A (Appendix S-1; Figure 4). This portion of the proposed laydown area that overlaps the archaeological site will not be utilized, ensuring avoidance.

GH Site 4: GH Site 4 is located in an area of proposed underground connector west of Corridor A (Figure 4). The underground collector cable route will be moved to the north or south to avoid the archeological site.

GH Site 5: GH Site 5 is located in a proposed underground collector route east of Corridor E (Appendix S-1; Figure 4). The site will be avoided by installing underground collector line via directional boring.

GH Site 6: GH Site 6, a historic wooden pole telegraph transmission line, is located along the southern end of a proposed transmission line east of Corridor A (Appendix S-1; Figure 4). The proposed transmission line, with poles spaced at intervals of 400-500 feet, will avoid GH Site 6 by overhead spanning the features that comprise the archaeological site.

GH Site 7: GH Site 7 is a prehistoric site located along the alternate transmission line route north of Spanish Hollow and U.S Highway 97 (Appendix S-1; Figure 4). The proposed transmission line route has now been realigned to avoid this site. Supplemental archaeological inventory may be required along the realignment route.

GH Site 8: GH Site 8 is located at the north end of the proposed alternate transmission line (Appendix S-1; Figure 4). The proposed transmission line, with poles spaced at intervals of 700 to 800 feet, will avoid GH Site 8 by spanning the features that comprise the archaeological site.

In the event that the Project is changed, or expanded beyond the areas recently surveyed for cultural resources, the Applicant will commission additional cultural resources surveys. The Applicant will design all new or additional facilities to avoid impacts at archaeological sites recommended by the Project archaeological consultant and OSHPO. Only those sites found eligible or potentially eligible to the NRHP need be avoided. A Cultural Resource Management Plan (CRMP) will be developed by the Applicant in coordination with the OSHPO. The CRMP will include specific protocols and procedures for protecting cultural resources, including any additional archeological sites and possible human remains (pursuant to ORS 97.745(4)) accidentally discovered during construction.

In the event that the Project is changed, or expanded beyond the areas recently surveyed for cultural resources, the Applicant will commission additional cultural resources surveys and will design all new or additional facilities to avoid impacts to archeological sites and human remains.

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.

Response: No permit applications have been submitted to the OSHPO 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 its archaeologist to apply for necessary archaeological excavation permits from the SHPO. This requirement will be included in the CRMP.

S.6 PROPOSED MONITORING PROGRAM

(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;

Response: During construction in archeologically sensitive locations, such as near recorded archeological sites, on-site archaeological monitors will be present to ensure that no accidental damage to known cultural resources occurs, if required by OSHPO. The CRMP will address long-term management of the known/recorded resources and will include a section on accidental discovery of cultural resources. This section will provide a detailed plan of protocols and procedures (measures) to be followed if cultural resources are accidentally discovered during construction or operation of the facilities.

S.7 REFERENCES

OSHPO 2006. Oregon State Historic Preservation Office Standards for Conducting Cultural Resources Inventories. Salem, OR.

APPENDIX S-1

Cultural Resources Survey Report
(Contains Sensitive Archaeological Site Location Information, Not for Public Disclosure)

EXHIBIT T

RECREATIONAL FACILITIES AND OPPORTUNITIES
OAR 345-021-0010(1)(t)

TABLE OF CONTENTS

Page

T.1 INTRODUCTION

OAR 345-021-0010(1)(t) *Information about the impacts the proposed facility would have on recreational opportunities in the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0100, including:*

T.2 RECREATIONAL OPPORTUNITIES AND FACILITIES IN THE ANALYSIS AREA

OAR-345-021-0010(1)(t)(A) *A description of important recreational opportunities in the analysis area considering the criteria in OAR 345-022-0100 including information on the factors listed in OAR 345-022-0100(1).*

Response: The analysis area for impacts on recreational opportunities includes the area within the site boundary and extends five miles beyond the site boundary in Oregon and Washington as shown in Figure T-1 (Appendix T-1). In general, recreational activities within the analysis area include upland bird and big game (i.e., deer) hunting, rafting, boating, fishing, sightseeing, nature and wildlife photography, and bicycling. Horseback riding, hiking, and camping may also occur on a limited basis. (Kohl 2007, Mottl, H. 2007, Mottl, T. 2007). Water-based recreation activities occur on the nearby Deschutes River and Columbia River (i.e., Lake Celilo impounded by The Dalles Dam and Lake Umatilla impounded by John Day Dam). Recreational opportunities within the site boundary are generally limited to "access by permission only" upland bird and deer hunting on private property and viewing historic trail alignments from county roads.

OAR 345-022-0100 prescribes criteria used to evaluate 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. No important recreational facilities or opportunities exist within the site boundary. Several potentially important opportunities have been identified in the analysis area:

- Columbia River Gorge National Scenic Area
- Deschutes River Corridor
- Deschutes River State Recreation Area
- Columbia River Corridor (i.e., Lake Celilo and Lake Umatilla)
- Cliffs Park (USACE)
- Giles French Park (USACE)
- Rufus Landing (USACE)
- Maryhill State Park
- Journey Through Time Scenic Byway (US 97)
- Oregon National Historic Oregon Trail, including the Barlow Road Cutoff Trail
- Lewis and Clark National Historic Trail

- Maryhill Museum of Art
- Maryhill's Stonehenge
- Sherman County Historical Museum (Moro, Oregon)
- Sherman County Fairgrounds and RV Park (Moro, Oregon)
- DeMoss Springs Memorial Park
- Moro City Park
- Wasco City Park
- Upland bird and deer hunting

These potentially important recreational facilities and opportunities have been evaluated against the criteria prescribed in OAR 345-022-0100, a summary of which is included in Attachment T-1. Based on this evaluation, thirteen important recreational facilities and opportunities have been identified within the analysis area. It is questionable if DeMoss Springs Memorial Park substantially meets the criteria to be considered important, but has been included as an important facility for the sake of completeness. These facilities and opportunities are described below. Cliffs Park, Giles French Park, Rufus Landing, and Maryhill State Park are all located on the shores of the Columbia River; their descriptions are included in the description for the Columbia River. Similarly, the Deschutes State Recreation Area is included in the description for the Deschutes River.

T.2.1 Columbia River Gorge National Scenic Area

The Columbia River Gorge National Scenic Area (CRGNSA) is managed for an "unparalleled combination of scenery, geology, plants, wildlife, and multicultural history" (Columbia River Gorge Commission and USDA 1992). The exceptional beauty of this region is largely derived from its diverse character. Within an hour's drive, one can experience towering cliffs and forests, orchards and farms, and sweeping grasslands. The Scenic Area Act's first purpose includes a mandate to protect and enhance scenic resources in the gorge (Columbia River Gorge Commission and USDA 1992).

The analysis area for Exhibit T intersects approximately the eastern two miles of the CRGNSA in Washington. The analysis area just intersects the CRGNSA boundary in Oregon. Key viewing areas (KVAs) are important viewpoints open to the public offering opportunities to view the gorge. KVAs within the analysis area include Interstate 84 (I-84), Washington State Route 14 (SR-14), and the Columbia River. SR-14 is also designated a Scenic Travel Corridor (Columbia River Gorge Commission and USDA 1992).

T.2.2 Deschutes River Corridor

The Deschutes River within the analysis area is designated a Federal Wild and Scenic River (WSR) and a State Scenic Waterway. The Federal WSR boundary varies with an average width of approximately ¼-mile on either side of the river. The boundary exists to "protect or enhance the outstandingly remarkable values that caused the river to be designated" (USDI 1993). Public access within the analysis area is generally limited to boat, foot, or bicycle access. An abandoned railroad grade provides foot and bicycle access on the east side of the river. The canyon character is naturally appearing and relatively remote. Primary recreational uses include boating, rafting, and fishing. Secondary uses include upland bird hunting, sightseeing, and nature/wildlife photography (Mottl, T. 2007, Mottl H., 2007). Use levels are generally low to moderate except during the late summer/fall steelhead fishing season when high numbers of anglers use the area (USDI 1993).

The Deschutes State Recreation Area is located at the confluence of the Deschutes and Columbia Rivers on the east bank of the Deschutes. This tree-shaded park allows overnight camping. The park has electrical hookups for RV users, primitive camping sites, restrooms, but no showers.

T.2.3 Columbia River Corridor

The Columbia River Corridor provides water-based recreational activities including picnicking, boating, fishing, swimming, water skiing, camping, and windsurfing. Lake Celilo was created upon completion of The Dalles Dam, a hydroelectric facility, in 1957 that impounds the Columbia River near The Dalles, Oregon. Lake Umatilla was created upon completion of John Day Dam in 1971. Local, state, and federal agencies have developed several parks along the shores of the Columbia within the analysis area including Cliffs Park, Giles French Park, Rufus Landing, and Maryhill State Park.

Cliffs Park is located on the Washington side of the river along a long flat just downstream from John Day Dam. Services are limited. The park is popular among RV users who can park near the shore, fishermen, and windsurfers. The park is managed by the US Army Corps of Engineers (USACE).

Giles French Park and Rufus Landing, located near Rufus, Oregon across the river from Cliffs Park, are also managed by USACE. Giles French Park is more developed with designated RV spaces and a concrete boat ramp. Rufus Landing is immediately downstream of Giles French Park and is popular among windsurfers and fishermen.

Maryhill State Park is operated by Washington State Parks and Recreation Commission. The 99-acre camping park includes 4,700 feet of Columbia River waterfront. Services include boat ramp, picnicking, fishing, swimming, water skiing, windsurfing, and camping. Facilities include trailer hookups, an RV dump station, restrooms, showers, and handicap facilities.

T.2.4 Journey Through Time Scenic Byway

The Journey Through Time Scenic Byway is a designated Oregon State Scenic Byway. The byway runs south out of Biggs along US 97 through the analysis area to Shaniko, where it turns east, and eventually courses to Baker City. The "route celebrates an area of uncommonly rich history. The route is a story of fortunes made and lost, of Chinese laborers and their culture, of towns that boomed and busted, of timber, agriculture, and pioneer settlers" (Wetter 1996). Primary recreational uses include sightseeing and road touring. There are no developed scenic overlooks or waysides along the byway in the analysis area.

T.2.5 Oregon National Historic Trail and Barlow Road Cutoff Trail

Although the trail alignments technically meet the criteria of being important recreational opportunities, agricultural practices and other development activities have destroyed nearly all evidence of the trails in the analysis area. No intact segments have been identified within the site boundary. No intact accessible segments have been identified within the analysis area. Two High Potential Sites, Biggs Junction and Deschutes Crossing, occur within the analysis area (USDI 1999). A small interpretive marker has been placed west of Biggs, Oregon, along US 30.

Trail crossings at county and state roads are occasionally signed within the analysis area. The surrounding landscape is primarily private land cultivated for wheat, so the recreational opportunity is limited to visiting and viewing the approximate historic alignments from county roads.

T.2.6 Lewis and Clark National Historic Trail

Congress designated the Lewis and Clark National Historic Trail in 1978 to commemorate the Lewis and Clark expedition of 1804 through 1806. The Trail is administered by the National Park Service as a component of the National Park System. Many of the historic and cultural resources related to the expedition have either been altered or destroyed; the expedition left practically no visible evidence of its passing. The Lewis and Clark National Historic Trail Comprehensive Plan for Management and Use identifies the primary purpose of the National Historic Trail as "commemoration of the historic events that form the Trail's central theme" (USDI 1982).

There are no intact trail segments or other historic features in the analysis area. Most of the barriers the expedition faced are now inundated by Lake Celilo and Lake Umatilla. Lewis and Clark camped near Cliffs Park on October 21, 1805 (USDI 1982). Interpretive features such as panels and signs have been developed at various locations including pullouts along SR-14, Maryhill Museum of Art, and Deschutes River State Recreation Area.

T.2.7 Maryhill Museum of Art

The Maryhill Museum of Art is situated on 6,000 acres and overlooks the Columbia River from Washington across from Biggs, Oregon. Sam Hill purchased the land in 1907; the Museum is housed in the mansion he began constructing on site in 1914. The Museum has been accredited by the American Association of Museums and seeks to enrich the lives of its visitors by providing access to the Museum's influential history and a broad spectrum of artistic expression (www.maryhillmuseum.org/about.htm). The Museum opened to the public on May 13, 1940.

T.2.8 Maryhill's Stonehenge

Sam Hill built Maryhill's Stonehenge as a tribute to Klickitat County soldiers who lost their lives in World War I. The structure is a full scale replica of England's famous neolithic Stonehenge and was the first monument in the US to honor the dead of World War I. Located about four miles east of Maryhill Art Museum, the location now includes monument to Klickitat County soldiers fallen in World War II, Korea, and Vietnam (www.maryhillmuseum.org/about.htm).

T.2.9 DeMoss Springs Memorial Park

DeMoss Springs Memorial Park is a Sherman County park located between Wasco and Moro on US 97 and marks the location of the DeMoss family townsite. The DeMoss Lyric Bards were a relatively famous family of traveling musicians touring the US and beyond between 1872 and 1933. They studied and played abroad for world leaders and played at five world fairs. The family settled at the current park site in 1883; the park was dedicated to Sherman County in 1921. Park facilities include two shelters, a picnic area, and interpretive signs.

T.3 POTENTIAL ADVERSE IMPACTS TO THE OPPORTUNITIES IDENTIFIED

OAR 345-021-0010(1)(t)(B) *A description 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: The proposed facility would not occur within the boundaries of, nor would it impede access to, any of the recreational opportunities identified.

Regarding the Oregon National Historic Trail, the proposed facility occurs on private property on which no intact trail segments have been identified. Further, the Project would not affect existing locations where the historic trail alignments cross county roads, nor would turbines be constructed over the historic alignments. Access roads would cross the historic alignments in a few locations, but would not impact intact segments because none exist at the proposed access road crossings.

There would be no direct or indirect loss of recreational opportunity as a result of project design, construction, or operation.

(ii) *Noise resulting from facility construction or operation.*

Response: The noise analysis conducted for the proposed facility indicates the proposed facility would be inaudible from all recreational opportunities in the analysis area except the Oregon National Historic Trail, Journey Through Time Scenic Byway, and DeMoss Springs Memorial Park. There are no intact trail segments or developed facilities associated with the Trail in the analysis area, so there would be no impacts to the Trail. It is assumed that recreational use of the Journey Through Time Scenic Byway would primarily be auto touring. It is further assumed that noise resulting from facility operation would not be heard from inside a moving, closed vehicle, or would be drowned out by highway noise from a moving, open vehicle, so no impacts would occur. The maximum noise level at DeMoss Springs Memorial Park would be approximately 48 dBA. This noise level would be audible, and would be below the Oregon Department of Environmental Quality (ODEQ) limit of 50 dBA.

Noise resulting from facility construction or operation would not adversely affect important recreational opportunities and facilities identified in the analysis area.

(iii) *Increased traffic resulting from facility construction or operation.*

Response: A detailed description of traffic resulting from facility construction and operation is included in Exhibit U.

The construction access route includes using US 97 from Biggs Junction at I-84 to the US 97/OR 206 intersection near Wasco. Construction traffic may also approach the site from the south on US 97. Construction traffic would use OR 206 to reach Wasco, and then use a series of local Sherman County roads to reach construction sites within the site boundary. Several local roads would need to be improved to accommodate heavier construction equipment, resulting in a long-term improvement to the local road system.

Temporary impacts such as short-term traffic delays on US 97 and local roads may affect access to Journey Through Time Scenic Byway and DeMoss Springs Memorial Park. Several passing lanes on US 97 would alleviate potential impacts along the travel corridor. Traffic demands on local roads are currently low. Any effects are expected to be temporary, negligible, and would not have detrimental impact on the byway or park. Long-term negative impacts due to traffic would be negligible because the facility would employ 10 to 15 people.

The remaining important recreational opportunities and facilities are distant enough from the proposed facility that they would not be affected by increased traffic. In conclusion, increased traffic resulting from facility construction or operation would not adversely impact important recreational opportunities of facilities in the analysis area.

(iv) *Visual impacts of facility structures or plumes.*

Response: The proposed facility would not be visible from the Deschutes River corridor including the Deschutes River State Recreation Area and the Columbia River corridor including Cliffs Park, Giles French Park, Rufus Landing, and Maryhill State Park.

Portions of some turbines and transmission facilities may be visible in the background from Maryhill Museum of Art. The viewshed from the museum is already encroached upon by steel lattice towers and transmission lines, grain elevators, the community of Biggs, Oregon, and interstate highway and rail development. Because of this and because of the relatively long distance from the museum to the turbines, impacts to the museum would be minimal. Impacts to the CRGNSA (viewed from SR-14), Maryhill's Stonehenge, and any interpretive signage associated with the Lewis and Clark National Historic Trail would also be minimal for similar reasons.

The proposed facility would be visible from the Oregon National Historic Trail alignment, but not from the High Potential Sites identified in the Trail's management plan. Further, there are no known intact, accessible trail segments from which the proposed facility would be visible. Therefore, there would be no impact to the Trail.

The proposed facility would be visible from the Journey Through Time Scenic Byway. The Byway's management plan does not prescribe scenic management goals, but rather emphasizes four discrete goals: 1) Create jobs, 2) Maintain rural lifestyles, 3) Protect important values (i.e., historical attractions and artifacts), and 4) Build identity for the North Central Region (Wetter 1996). The proposed facility will create jobs and support farming in this rural area. Therefore, the Project is compatible with the byway management plan goals.

The proposed facility would also be visible from DeMoss Springs Memorial Park. Turbines would be partially screened by existing vegetation. No management plans or visual resource management objectives for with the park have been identified; the Sherman County Comprehensive Plans supports the development of renewable resources, specifically wind (Sherman County 2003). While turbines would be visible, the park is not managed for visual quality.

In conclusion, visual impacts from the design, construction, and operation of the proposed facility would not significantly impact important recreation opportunities identified in the analysis area.

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 adverse impacts identified in (B).*

Response: Because the proposed project would not result in significant adverse impacts, no mitigation is proposed.

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).*

Response: Figure T-1 shows the analysis area for recreational opportunities and facilities and important recreational facilities 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 recreational opportunities.*

Response: Because no significant impacts have been identified and because no mitigation is warranted or proposed, a monitoring plan is not proposed.

T.7 REFERENCES

T.7.1 Telephone Contacts/Personal Interviews

Kohl, Keith. District Wildlife Biologist. Mid-Columbia District. Oregon Department of Fish and Wildlife. Telephone conversation with Sean Sullivan. June 28, 2007.

Mottl, Heidi. Recreation Planner. Prineville District, Bureau of Land Management. Telephone conversation with Sean Sullivan. June 25, 2007.

Mottl, Tom. District Recreation Planner. Prineville District, Bureau of Land Management. Telephone conversation with Sean Sullivan. June 26, 2007.

T.7.2 Website/Document References

Columbia River Gorge Commission and USDA Forest Service, National Scenic Area. Management Plan for the Columbia River Gorge National Scenic Area. September 1992.

Maryhill Museum of Art website. www.maryhillmuseum.org/about.htm. July 2, 2007.

Sherman County, Oregon. Comprehensive Land Use Plan 1994, revised June 2003.

USDI Bureau of Land Management. Lower Deschutes River Management Plan Record of Decision. February 1993.

USDI National Park Service. Lewis and Clark National Historic Trail Comprehensive Plan for Management and Use, January 1982.

USDI National Park Service. Management and Use Plan Update Final Environmental Impact Statement Oregon National Historic Trail and Mormon Pioneer National Historic Trail, August 1999.

Wetter, Michael et al. Journey Through Time Management Plan, for Oregon Department of Transportation. March, 1996.

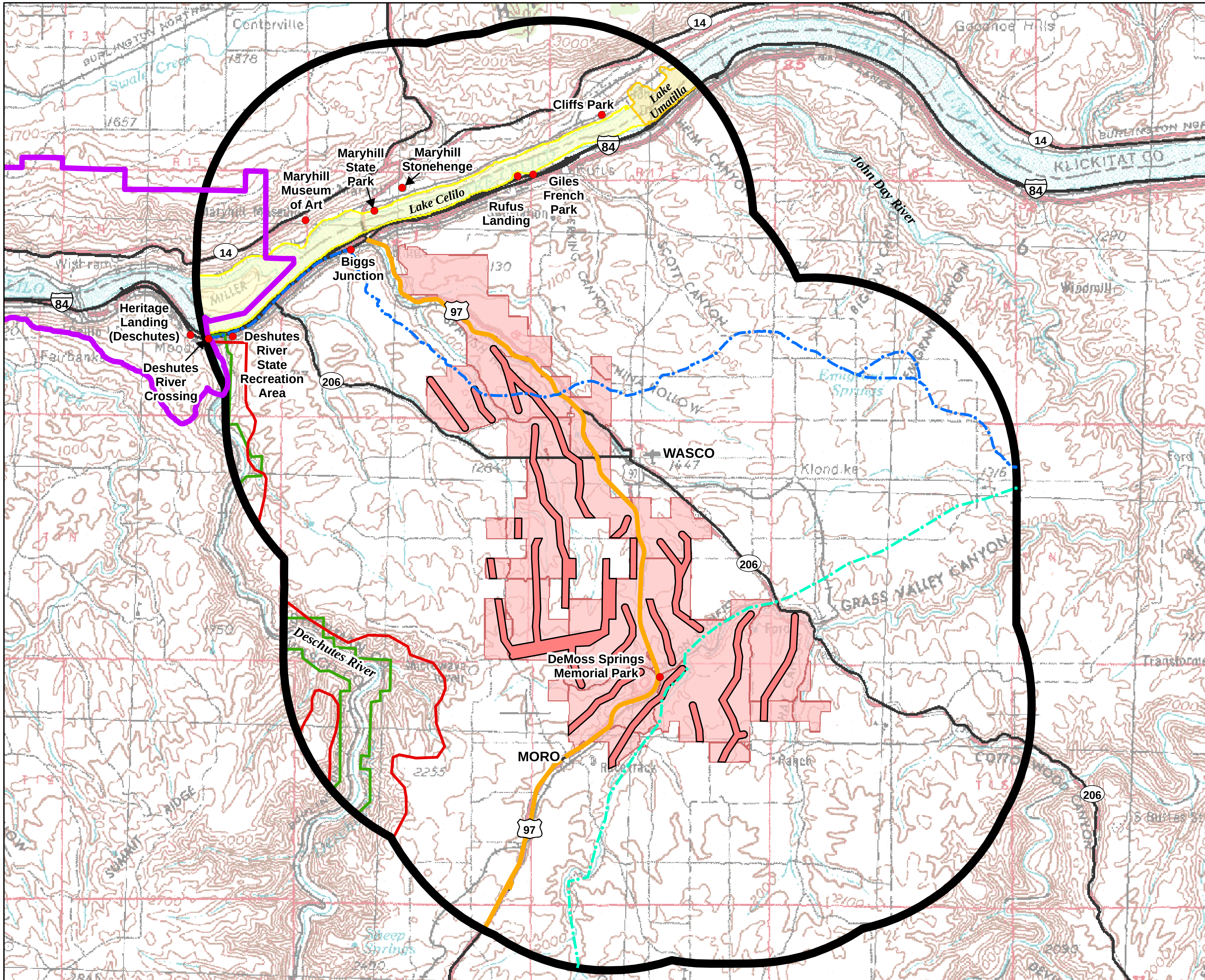
FIGURE T-1

Important Recreational Opportunities

Golden Hills Wind Project

FIGURE T-1

Important Recreational Opportunities



- Site-Specific Recreation Resource
- Historic Oregon Trail
- Barlow Cutoff Trail
- Journey Through Time Scenic Byway (US 97)
- Columbia River Gorge National Scenic Area
- Federal Wild and Scenic River
- Areas of High Visual Quality
- Corridors
- Lake Celilo
- Lake Umatilla
- Recreation Analysis Area

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ATTACHMENT T-1

Summary of Recreational Importance Evaluation

Table T-1 Summary of Recreational Importance Evaluation for Golden Hills Wind Farm

	Criteria					
Facility	**Special Designation/Mgmt**	**Degree of Demand**	**Outstanding / Unusual Quality**	**Availability / Rareness**	**Irreplaceability / Irretrievability**	**Important?**
Columbia River Gorge National Scenic Area	National Scenic Area *Management Plan for the Columbia River Gorge National Scenic Area*	High	Unparalleled combination of scenery, geology, plants, wildlife, and multicultural history[1]	Rare	Irreplaceable	Yes
Deschutes River Corridor including Deschutes River State Recreation Area	Federal Wild and Scenic River (Recreational) State Scenic Waterway State Wildlife Area State Recreation Area *Lower Deschutes River Management Plan* *Two Rivers Resource Management Plan*	High	Outstanding scenic, recreation, fish, wildlife, geological, paleontological, and archaeological; significant ecological, botanical[2]	Uncommon	Irreplaceable	Yes
Columbia River Corridor including Cliffs Park, Giles French Park, Rufus Landing, and Maryhill State Park	No specific management plans identified; resources managed by USACE and Washington State Parks and Recreation Commission for recreational uses.	High	Excellent recreational opportunties and developed facilities for fishing, boating, camping, windsurfing.	Uncommon	Somewhat irreplaceable	Yes
Journey Through Time Scenic Byway	Oregon State Scenic Byway *Journey Through Time Management Plan*	Moderate	Chronicles the history of settlement in Central Oregon	Scenic quality common in analysis area	Somewhat irreplaceable	Yes
Oregon National Historic Trail and Barlow Road Cutoff Trail	National Historic Trail *Management and Use Plan Update FEIS Oregon National Historic Trail*	Moderate	Most trail remnants destroyed due to ag 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	Yes
Lewis and Clark National Historic Trail	National Historic Trail *Lewis and Clark National Historic Trail Comprehensive Plan for Management and Use*	Moderate	Chronicles the Corps of Discovery expedition; no intact trail segments or sites within analysis area; some dispersed interpretive signage exists along trail corridor.	The trail corridor is common; there are no intact trail or campsite remnants.	The trail and campsites are already irretrievably altered.	Yes

Table T-1 Summary of Recreational Importance Evaluation for Golden Hills Wind Farm

	Criteria					
Facility	**Special Designation/Mgmt**	**Degree of Demand**	**Outstanding / Unusual Quality**	**Availability / Rareness**	**Irreplaceability / Irretrievability**	**Important?**
Maryhill Museum of Art	Accreditation by American Association of Museums	Moderate	Provides access to the region's influential history and a broad spectrum of artistic expression.	Uncommon.	Somewhat irreplaceable	Yes
Maryhill's Stonehenge	None known.	Moderate	First monument built in US to honor the dead of World War I.	Rare	Somewhat irreplaceable	Yes
Sherman County Historical Museum (Moro)	None known[3]	Low to Moderate	Typical rural county museum	Common	Replaceable	No
Sherman County Fairgrounds & RV Park (Moro)	None known[3]	Low to Moderate	Typical rural county fairground	Common	Replaceable	No
DeMoss Springs Memorial Park	None known[3]	Moderate	Marks location of 1880s town site; limited facilities	Uncommon given historic context	Somewhat irreplaceable	Questionable, include for completeness
Moro City Park	None known[3]	Low	Not outstanding – limited facilities	Common	Replaceable	No
Wasco City Park	None known[3]	Low	Not outstanding – no facilities	Common	Replaceable	No
Hunting (upland bird and deer)	ODFW hunting regulations	Low to Moderate	Not outstanding	Common	Replaceable / retrievable	No

[1] Management Plan for the Columbia River Gorge National Scenic Area, September 1992, Revised May 10, 2004.
[2] Record of Decision, Lower Deschutes River Management Plan, 1993; Record of Decision, John Day River Management Plan, Two Rivers, John Day, and Baker Resource Management Plan Amendments, February 2001.
[3] Sherman County Comprehensive Land Use Plan applies, but provides no special designation or management objectives.

EXHIBIT U

PUBLIC SERVICES

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

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FIGURE *(located after text)*

ATTACHMENT

U.1 INTRODUCTION

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: Under OAR 345-022-0110(1), the Council must find that the construction and operation of the proposed facility, taking into account mitigation, are not likely to result in significant potential adverse impacts to the ability of the public and private providers in 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.

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: In undertaking this analysis, the Applicant made the following estimates:

A. Facility construction is anticipated to take about nine months and employ an estimated 100 to 120 workers at peak construction periods. Construction workers will include locally hired workers for road and turbine pad construction as local expertise and availability permits; the remaining workers will be from outside the local area. When feasible, preferences will be given to local workers. It is assumed that at least half of the construction workers will come from outside of the area.

B. During the anticipated 25 to 30-year life of the proposed facility, O&M will employ 10 to 15 full-time and part-time employees.

C. The study area includes ten incorporated communities in Oregon and one incorporated community in Washington with a combined 2006 population of 20,435, or about 43% of the combined population for Gilliam, Sherman, Wasco, and Klickitat counties. Unemployment rates in May 2007, as reported by the Oregon Employment Department, range from 3.7% in Gilliam County to 4.4% in Wasco County; Sherman County has an unemployment rate of 4.3%. The Washington State Employment Security Department reported an unemployment rate of 6.1% during the same period for Klickitat County. Based on existing unemployment in the analysis area, it is assumed that approximately 40% of the full-time and part-time operational employees (6 employees) would be hired from within the analysis area, and 60% (9 employees) would be hired from outside the area (in-migrant).

D. Existing capacities of public services were used to estimate the current level of service for the communities within the analysis area.

E. The Applicant will lease land for the facility from local landowners. Land lease payments will be made annually.

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: Responses are provided in sections U.3.1 and U.3.2, below.

U.3.1 Population Within Analysis Area

While the project itself is entirely within Sherman County, the analysis area includes portions of Gilliam, Sherman, Wasco, and Klickitat counties and incorporated communities with a 30-mile radius of the project site. Incorporated communities within the 30-mile analysis area are: Arlington, Condon, Dufur, Grass Valley, Maupin, Moro, Mosier, Rufus, The Dalles, and Wasco in Oregon, and Goldendale in Washington. The 2006 population for all of these communities is 20,435, which accounts for about 43% of the entire population for Gilliam, Sherman, Wasco, and Klickitat counties, as shown in Table U-1. By far the largest community in the project area is The Dalles, located on the far western side of the project area in Wasco County. The Dalles had a 2006 population of 12,625 people, accounting for about 62% of the analysis area's population in incorporated communities. The next largest community is Goldendale (Klickitat County) with 3,715 people.

Between 1990 and 2006, communities in the analysis area added population at varying rates, with the highest percent change occurring in Condon, which grew by nearly 18%, although a closer look at that community population growth actually shows a decline between 1990 and 2000 and then a sharp increase, over 40%, between 2000 and 2006. Other growing communities include Goldendale, Arlington, Moro, Dufur, and The Dalles, which grew from between approximately 10% and 27% between 1990 and 2006.

Growth has occurred throughout the analysis area, but appears to have occurred mainly in western portion of the analysis area in The Dalles, which added 1,604 people since 1990. Other communities have also added residents, as described above, but not to the degree experienced in The Dalles. Sherman County was the only county in the analysis area to lose population, unlike Wasco and Gilliam Counties, which have grown by approximately 9.9% and 8.9%, respectively. Klickitat County experienced the strongest growth of any county, increasing in population by 16.1% since 1990.

Table U- 1. Population of Incorporated Communities within the Analysis Area

	Population				
	1990	**2000**	**2006**	**Percent Change 1990-2006**	**Percent Change 2000-2006**
Gilliam County	1,717	1,915	1,885	8.9%	-1.6%
Arlington	*425*	*524*	*585*	27.4%	10.4%
Condon	*635*	*459*	*770*	17.5%	40.4%
Sherman County	1,918	1,934	1,865	-2.8%	-3.7%
Grass Valley	*160*	*171*	*170*	5.9%	-0.6%
Moro	*292*	*337*	*340*	14.1%	0.9%
Rufus	*295*	*268*	*270*	-9.3%	0.7%
Wasco	*374*	*381*	*400*	6.5%	4.8%
Wasco County	21,683	23,791	24,070	9.9%	1.2%
Dufur	*527*	*588*	*630*	16.3%	6.7%
The Dalles	*11,021*	*12,156*	*12,625*	12.7%	3.7%
Maupin	*456*	*411*	*470*	3.0%	12.6%
Mosier	244	410	460	47.0%	10.9%
Klickitat County	16,616	19,161	19,800	16.1%	3.2%
Goldendale	3,324	3,324	3,715	10.5%	10.5%
Population in Cities	*17,753*	*19,029*	*20,435*		
Percent of Four Counties	*42%*	*41%*	*43%*		

Source: Center for Population Research and Census, 2007; State of Washington Office of Financial Management, 2007

It is likely that full-time, operational in-migrant employees would relocate to one of the above communities within the 30-mile radius of the proposed facility. In-migrants could also potentially relocate to Washington because there is a bridge over the Columbia River near US 97 that would provide a direct connection to the Oregon portion of the project area. There are also small unincorporated communities (where localized census data are not available) within the analysis area boundary. It is possible that workers moving to the area may choose to relocate to one of these communities or choose to live in a rural area outside of a town or city where the residences would likely have private wells and septic systems.

U.3.2 Public and Private Providers

Table U-2 identifies the public service and utility providers for the affected communities in the analysis area that provide the essential governmental services listed in OAR 345-022-0110(1). The following is a description of the current public service providers by community in the analysis area.

Table U- 2. Public Service Providers in the Analysis Area

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Sewers and Sewage Treatment	Condon: City of Condon. Lagoon treatment system with 0.13 mgd capacity. Treatment system built in 1997.	In the process of upgrading wastewater collection system. Have completed portions of the new system. Improvements are ongoing as funds are available.
	Arlington: City of Arlington. Activated sledge plant with a capacity of 85,000 gallons per day. No other information available.	Unknown
	Goldendale (WA): City of Goldendale. Biolac Treatment System". Treats approximately 1.1 mgd. Plant was upgraded in 2003. Drains year-round in the Little Klickitat River.	Changes in Environmental Protection Agency policies required changing the previous treatment system of holding ponds to the new Biolac system, allowing for year around discharge into the Little Klickitat River.
	Grass Valley: City of Grass Valley. No other information available.	Unknown
	Moro: City of Moro. Lagoon treatment system with 0.05 mgd capacity. Stores effluent during winter months and then disperses on city owned land or evaporates in lagoons.	A fourth lagoon will be added to increase winter storage needs and comply with DEQ requirements. The entire wastewater collection system will be replaced as funds are available.
	Rufus: City of Rufus. Lagoon treatment system with 0.40 mgd capacity. Effluent drains to an underground drip system.	Treatment plant recently upgraded and in compliance with DEQ. City has switched from using drainage ditches to sprinklers for effluent removal.
	Wasco: City of Wasco. Lagoon treatment capacity 0.04 mgd/average use 0.024 mgd. Stores effluent during winter months and then applies it to privately owned pasture land.	The City recenty completed construction on a new storage pond. The new capacity will meet the city's needs and compliance issues with DEQ.
	Dufur: City of Dufur. 13 acre foot pond irrigation pump. Treatment capacity unknown. Releases effluent during winter and spring to 15-Mile Creek. Irrigates alfalfa during the summer on city owned land.	Recently installed a third lagoon for storage and built an irrigation system to disperse effluent to city owned land during the summer. The City currently was issued a Memorandum of Aggreement (MOA) for Ammonia.
	The Dalles: City of The Dalles. Treatment capacity 4.14 mgd/average use: 2 to 2.5 mgd. Drains to Columbia River below boat basin. Serves entire city UGB.	Master Plan completed recently. The $7 million upgrade to the treatment facility completed recently.
	Maupin: City of Maupin. Treatment capacity of 1.00 mgd. Drains to Deschutes River.	Preliminary improvement plans underway.
	Mosier: Treatment capacity is 0.085 mgd.	Construction on major updrades to wastewater system. Aging system is undersized. Chlorination issues.

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Water	Condon: City of Condon. Wells within city limits, providing 0.50 mgd. Water stored in reserviors.	In the process of upgrading water pipe lines. Have completed portions of the new system and upgrade on average approximately 1,000 feet per year. Improvements are ongoing as funds are available.
	Arlington: City of Arlington. Two wells within city limits that has a capacity of 0.70 mgd and provides storage for 1.3 million gallons of water and 1,000 gallons per minute. providing.	Wells located at the golf course are pumped to a pond that uses wind power. System upgraded four years ago.
	Goldendale (WA): City of Goldendale. Springwater source 13 miles from city. Five spring collection areas and four well sources. One well structure within city limits that is not a potable source. Water stored in two reservoirs with 2.6 million gallon capacity	None. No issues identified
	Grass Valley: No information available.	Unknown
	Moro: City of Moro. Three wells provide 100% of the city's water. Capacity unknown. Third well is capable of 450 gallons per minute. A 65 foot reservoir holds 350,000 gallons of water.	Prior to drilling the third well, water rationing was required but with the addition of the third well drilled recently, the city has adequate capacity without rationing.
	Rufus: City of Rufus. Operates three wells within the city limits, providing 0.40 mgd. Stores water in one 300,000 gallon reservior.	None. The system was completely reconstructed recently.
	Wasco: City of Wasco. Two wells provide 100% of the city's water. Storage capacity is approximately 0.30 mgd. Well capacity unknown.	The City rebuilt its water system in 2002 and recently updated the #2 well to meet current construction standards. No issues to date.
	Dufur: City of Dufur. Two wells provide 100% of the city's water. Capacity is approximately 0.30 mgd	None. Future plans are to build a line from the well directly to the reservoirs rather than the existing on-demand system.
	Maupin: City of Maupin. Source is artisan springs. Capacity is 1.30 mgd.	Major reservoir renovation and bypass piping project underway.
	Mosier: Stored in three reservoirs. Source is from two groundwater wells. Capacity is 158 mgd. Treatment consists of disifectant.	Engineer study completed in 2006. Mosier aquifer is declining steadily and USGS is currently investigating the cause. Mosier watershed is closed to new well drilling.
	The Dalles: City of The Dalles. 23,000 acre surface watershed provides 80 to 85% of municipal water. Three city wells provide remaining needs during peak times. Live flow permit for 2 cfs and a live flow surface water right at the point of diversion. Earthen dam stores 950 acre feet of water with controlled realease.	A new Water Master Plan was completed in June 2005 that will include a 20 year capital improvement plan.
Storm Water	Condon: City of Condon. The City has a limited stormwater system.	None.

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Storm Water	Arlington. The City of Arlington. The City has storm drains that drain to China Creek. No other information available.	Some streets are curbed and guttered.
	Golldendale (WA): The City of Goldendale. The City has a stormwater distribution system that supply's water to most of the community and it receives natural treatment.	Unknown
	Grass Valley: Unknown	Unknown
	Moro: City of Moro. Conveyance only, no treatment. The City has storm drains that discharge directly into Dry Creek. Provides coverage for entire city.	Some drainage off roofs to sewer ponds.
	Rufus: No system.	N/A
	Wasco: No system.	N/A
	Dufur: Stormwater system goes down Main Street and drains to 15-mile Creek.	N/A
	Maupin: No storm drains.	Improvements on system with treatment ponds planned for 2008.
	Mosier: No storm system. No storm utility.	Isolated storm improvements.
	The Dalles: City of The Dalles provides collection and conveyance. The City also operates 4 out of the 23 oil/water separators.	Completed a Stormwater Master Plan recently.
Solid Waste Management	Condon: Waste Connections Inc., trucked to a transfer station.	See below
	Arlington: City of Arlington. The City provides collection service for the entire city. Trucked to a waste management regional landfill south of town.	None
	Golldendale (WA): Allied Waste.	The project is outside of the service area
	Grass Valley: Sunrise Disposal and Recycling	See below
	Moro: The Dalles Disposal Company	See below
	Rufus: The Dalles Disposal Company	See below
	Wasco: The Dalles Disposal Company	See below
	Dufur: Mel's Sanitary Service	The project is outside of the service area.
	Maupin: Mel's Sanitary Service.	The project is outsie of the service area.
	Mosier: The Dalles Disposal Company	See below
	The Dalles: The Dalles Disposal Company	See below

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Solid Waste Management	Columbia Ridge Recycling and Landfill/ Chemical Waste Management of the Northwest	None. The landfill and recycling portion of the operation serves Oregon, Washington, Idaho, Alaska, Montana, and British Columbia and has approximately 56 years left with the current configuration. The hazardous waste facilties have the same service area, but also accept some materials from other sources nationwide.
	The Dalles Disposal Company: Provides garbage and recycling services to all of Sherman County and portions of Gilliam County.Sherman County facility is located in Moro. Also operates a transfer facility located in The Dalles that is open to the public twice a month. All refuse is transferred to Columbia Ridge Landfill in Arlington and all recycling is sent to Metro Recying in Portland.	No hazardous waste pickup is provided except twice a year at the facility located in The Dalles. Many residents bury paint and pesticides rather than disposing of them appropriately.
Police	Condon: Condon City Police Department. One full-time officer, one reserve staff.	None
	Arlington: Gilliam County Sheriff's Department	None: The Gilliam County Sheriff's Department patrols Gilliam County and provides police service to the City of Arlington. The Sheriff's Department has five full time officers, one office deputy, and one administrative assistant. The station is located in the City of Condon. Staff is adequate to meet the county's needs.
	Goldendale (WA): Goldendale Police Department. Provides police service within Goldendale city limits.	Project site is outside of service area.
	Grass Valley: Sherman County Sheriff's Department Moro: Sherman County Sheriff's Department Rufus: Sherman County Sheriff's Department Wasco: Sherman County Sheriff's Department	None. The Sherman County Sheriff's Department patrols Sherman County and provides police service for the cities of Grass Valley, Moro, Rufus, and Wasco. The Sheriff's Department has five full time officers and one sheriff. The station is located in Moro. Staff is adequate to meet the county's needs.
	Dufur: Wasco County Sheriff's Department Maupin: Wasco County Sherrif's Department. Mosier: Wasco County Sheriff's Department.	None: The Wasco County Sheriff's Department patrols Wasco County and also provides police service to the City of Dufur. The Sheriff's Department has 17 full time officers, including the sheriff. The station is located in The Dalles. Staff is adequate to meet the county's needs.

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Police	The Dalles: The Dalles Police Department. Provides police service within The Dalles city limits. The Wasco County Sheriff's Department provides service to unincorporated areas.	Project site is outside of service area.
Fire Protection and Emergency Response	Condon: City of Condon Fire Department. Serves the city of Condon and outlying areas. 20 volunteer staff. One station with two fire trucks plus rural fire equipment. Douth Gilliam Rural Fire Protection District also assists.	None
	Arlington: North Gilliam County Rural Fire Department	Unknown
	Goldendale (WA). City of Goldendale Volunteer Fire Department.	Project site is outside of service area.
	Grass Valley: South Sherman Fire Department	Unknown
	Moro: City of Moro Rural Fire Protection District. The district serves Moro and outlying areas with fire and ambulance service. The district also provides ambulance service for the North Sherman Fire Protection District. Facilities include one fire station with 11 volunteers, one fire chief and one assistant fire chief. One station with one engine, one tender, two brush rigs, one rescue vehicle, and a command rig.	None
	Rufus: City of Rufus. The City has a volunteer fire department with a single station and two volunteers that serves the city and nearby areas.	None
	Wasco: North Sherman Fire Protection District (NSFPD). Serves North Sherman County and the proposed Golden Hills Wind Farm. 10 volunteers, one fire chief, one assistant fire chief, two lieutenants. One station in Wasco. Two engines, two tenders, one tanker truck, and one jeep.	The wind projects create new challenges that the Sherman County fire and emergency services are not adequately equipped to handle. A primary issue is not having enough volunteers available during the day. The Applicant and project personnel will be trained to respond to certain situations, such as high angle rope rescue and potential oil spills from energized electrical equipment that the local departments are not equipped or trained for) The Applicant will continue discussions with the NSFPD regarding training and response procedures. Discussions have begun regarding coordination efforts between the various wind projects in the area to respond to emergency situations at any of the project sites to assist the NSFPD.

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
	Dufur: City of Dufur Fire and Ambulance. Serves the City and surrounding areas, as needed. 10 to 12 fire volunteers, 15 ambulance volunteers. One station, two fire trucks, one rescue rig, and one ambulance.	None
	Maupin: City of Maupin Fire Department.	Project site is outside of service area.
	Mosier: Mosier Volunteer Fire Department. Two volunteers. Mid-Columbia Fire and Rescue provides support and responds to emergencies.	Project site is outside of service area.
Fire Protection and Emergency Response	The Dalles: Mid Columbia Fire and Rescue. Serves The Dalles and northern Wasco County. One station in The Dalles. One fire chief, one assistant chief, one fire marshall, one administrative assistant, one finance officer, three captains, three lieutenants and 12 engineers. 36 volunteers. Provides fire and ambulance service.	Project site is outside of service area
Health Care (Regional Facilities)	Mid-Columbia Medical Center: Regional Medical Center (The Dalles). Full service facility providing emergency and surgery services.	None. Mid-Columbia Medical Center is a regional full service facility. Emergency services would be able to accommodate emergency situations.
	Klickitat Valley Hospital (Goldendale, WA). 15-bed hospital and a 7-member clinic that serves all of Central and Eastern Klickitat County. Offers inpatient care and some minor surgical procedures.	This is a small facility. Patients would be directed to Mid Columbia Medical Center first.
Education	Condon: Condon School District #25. One K-8 and one high school. Approximately 151 students.	Enrollment has declined consistently for the last 10 years. No facilities issues, but a loss of revenue from fewer students reduces overall revenue for the school district.
	Arlington: Arlington School District #3. One K-8 and one high school. Approximately 124 students.	Enrollment is steady now but was declining in the past. Loss of students equates to a loss of revenue for the school district. There are no outstanding facility issues, other than reduced revenue for upkeep.

Type of Service	Provider by Jurisdiction	Relevant Issues/Concerns:
Education	Goldendale (WA): Goldendale School District 404	Serves the City of Goldendale and surrounding areas. The district has one high school serving approximately 415 students in grades 9 to 12, one middle school serving approximately 415 students in grades 5 to 8, and one primary school serving approximately 415 students in grades kindergarten to 6. In 2006 total student enrollment was 1,108. All facilties are located in Goldendale.
	Grass Valley: Sherman County School District Moro: Sherman County School District Rufus: Sherman County School District Wasco: Sherman County School District	Sherman County School District serves the entire county. The district has one high school with grades 7 to 12 located in Moro. There are two elementary schools in the district providing kindergarten through 6th grade. The elementary schools are located in Wasco and Grass Valley. There are approximately 270 students although enrollment has decreased in the last several years. The district has adequate capacity and there are no facility needs.
	Dufur: Wasco School District #29: One K-12 school located in Dufur.	School enrollment has grown in the last five years to approximately 280 students. The district recently increased its classroom size and built a new gymnasium. There are no facility or capacity issues.
	The Dalles: North Wasco County School District #21. One high school (three campuses), one middle school, four elementary schools (including the charter school). Various sports facilities throughout district. Total enrollment is 2,826 students. Maupin: South Wasco County School District #1. Approximately 264 students. Mosier: N. Wasco County School District #21.. Mosier Community School is a K-6 charter school that has 128 students.	Recently merged with Chenowith School District and replaced The Dalles School District #12. Facilities not considered adequate. The high schools have parking and food service issues. No new facilities planned, hoerver beginning a facilities master plan. Upgrades to track facilties are completed and are now completing deferred maintenance issues. Projecting 1 to 3% growth annually for the next ten years.

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: Responses are provided in sections U.4.1 through U.4.11, below.

U.4.1 Economic and Demographic Impacts

U.4.1.1 Population

In the first five years of operations the Project will have a small operations crew of two or three personnel (the turbines will be under warranty and will be maintained by the employees of the turbine vendor). After five years, the operations personnel employed directly by the Golden Hills Wind Farm will likely increase to 10 to 15 personnel who will take over responsibility for servicing and maintaining the turbines. It is BPAE's intent to hire as many local workers that meet requisite qualifications for the job as possible. The remainder of the operations staff hired non-locally will most likely be relocated to the area.

Limited in-migration for construction-related employment as well as permanent O&M employment is expected to occur as a result of the proposed project, having a beneficial impact on businesses in the nearby communities from increased patronage of area motels, restaurants, and other supporting services. Temporary construction-related jobs filled from outside of the analysis area are anticipated to last approximately nine months, but during that time workers will likely stay in one of the 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 would fill the 10 to 15 permanent full-time and part-time O&M jobs. In-migrant operational staff and their families would not have a significant impact on local population, particularly in Sherman County which has lost population since 1990. Assuming 60% of permanent positions are filled from outside the analysis area, approximately 22 new residents would be added (9 new employees x 2.43 average persons per household) to Sherman County's population, assuming all relocated within the county and not in another county.

U.4.1.2 Economic Activity

During the eight to ten month construction period there will be an average of 100 employees on site. During periods of peak activity, the number of employees may increase to around 175. The amount of employees that are local depends on how many contractors and skilled laborers are in the local area and their availability to do the work. Based on previous projects it is expected that a quarter or more of the employees would be hired locally. The remainder of the employees would be employees of the general contractor and subcontractors that temporarily relocate to the area for construction.

An earlier and unrelated wind power facility (Klondike I, 24 megawatts) was shown to not have any adverse impacts to public and private service providers in the area. In contrast, revenue generated for the local economy has been a boon for public services, including schools and others services Sherman County provides for its residents (Ourderkirk and Pedden, 2004). While Gilliam, Klickitat and Wasco Counties would not gain revenue from the site operation through tax payments, residents from communities within those counties may be employed during the construction or operation phases of the Project. Income earned by those individuals as a result of the proposed facility would contribute to the local economy indirectly through local purchases. In addition, the proposed facility itself would 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 would result in a net inflow of dollars into the local economy that would have a beneficial effect beyond that of the new employment.

U.4.1.3 Tax Revenues

As with other wind power facilities in Sherman County, the proposed facility would be a major new source of tax revenue to local government. This injection of additional tax revenues and/or in-lieu contributions would contribute to the provision of improved roads, quality education, police, fire, and other municipal needs that would benefit the entire community, particularly because the proposed project has shown to have no adverse impacts to existing public facilities, as described below.

No adverse impacts on County tax revenues are expected. Rather, annual property tax revenues to the County will increase as a result of the Project. In addition, development of the Project will lead to increased value of other properties because of the increase in wages and overall economic activity in the analysis area.

U.4.2 Sewers and Sewage Treatment

The proposed project is not located within or near a municipal wastewater treatment system. The nearest system serves the City of Wasco, located approximately one mile east of the nearest turbine. The proposed project would not adversely affect sewer and sewage treatment service or providers within the analysis area because it would not be connected to any existing system identified in the analysis area.

All jurisdictions within the analysis area provide wastewater collection and treatment (within the city limits). All systems are lagoon facilities, with the exception of The Dalles, which operates an activated sludge plant that drains into the Columbia River; Goldendale, which operates a recently completed Biolac facility that drains into the Little Klickitat River; and The City of Arlington, which operates an activated sludge plant. Several improvements to existing systems within these communities have recently occurred or are planned in the near future. The cities of Condon, Goldendale, Moro, Rufus, Wasco, Dufur, Maupin and Mosier and have added capacity or will add capacity to meet DEQ standards for wastewater. Noncompliance of these systems with DEQ standards has generally involved leaking lagoons or capacity issues that required the plants to prematurely discharge effluent into local waterways. Improvements to these systems have included constructing additional lagoons for storage and improving dispersion techniques. Most of the jurisdictions have, or will have enough storage for winter months and then will irrigate city-owned land with the gray water stored throughout the winter. However, The City of Wasco stores effluent during the winter months and then applies it to privately owned pasture land.

Residents living outside of incorporated communities use private subsurface sewage disposal systems. The new O&M facility will include construction of a new subsurface system. Installation of the system will require compliance with any applicable Sherman County and DEQ requirements prior to and during construction, and during system operations.

U.4.3 Water

The nearest municipal water system serves the City of Wasco, located approximately one mile from the nearest turbine.

During construction, water will be trucked in from offsite for dust control, making concrete, etc. To serve the Project during operations, a new well will be drilled near the O&M facility. The well will pump less than 5,000 gallons per day. Wells of this size are exempt from local and state permitting requirement because of their limited output (see Exhibit O).

All jurisdictions in the analysis area rely on wells for drinking water, except for The Dalles, which uses surface water resources to meet approximately 85% of its water need. Three wells meet the remaining water need, although those wells are generally only used during peak summer use periods. Goldendale uses a series of springs in addition to its four well sources.

Existing facilities are generally adequate to meet municipal water needs. The City of Moro recently drilled a third well to meet demand. Prior to the addition of the third well, the City required water rationing during summer months, but with the addition of the well, rationing is no longer required. Other jurisdictions with proposed improvements include the City of Condon, which is in the process of upgrading its water pipelines (as funding allows) and the City of Dufur, which plans to build a water line from its wells directly to the reservoir. The City of Arlington upgraded its system four years ago. The cities of Rufus and Wasco have rebuilt their system recently and have no plans for any future improvements. The City of Maupin has a major reservoir renovation and a bypass piping project underway. The City of Mosier completed an engineering study in 2006 and the USGS is currently investigating the cause of the declining aquifer.

Residents living outside of incorporated communities use private wells. The proposed project will be located outside of these service areas and, therefore, will not affect these providers.

U.4.4 Storm Water

The proposed project is not within any jurisdiction's storm water system and would have no impact to existing storm water systems or providers. Exhibit V describes the proposed stormwater treatment and disposal for the proposed project.

Jurisdictions that provide storm water service generally provide conveyance only and do not offer treatment (except for The Dalles). Jurisdictions that provide conveyance include the cities of Condon (limited), Arlington, Goldendale, Moro, Dufur (down Main Street) and The Dalles. The Dalles provides some treatment; the City operates four out of the 23 operating oil/water separators for industrial uses, but does not treat storm water for the entire city. The Dalles recently completed a storm water master plan.

Construction-related storm water impacts could occur during the construction of the proposed project, likely from road, turbine foundation, and staging area construction. Erosion control measures would be developed to mitigate these potential impacts (see Exhibit I).

U.4.5 Solid Waste Management

Sunrise Disposal and Recycling was recently replaced by The Dalles Disposal Company, which provides solid waste service for all of Sherman County and portions of Gilliam County. The Dalles Disposal Company also operates a transfer station that is open to the public on the second and fourth Saturdays of each month. Twenty, thirty, and forty-yard construction waste disposal boxes are also available. Following pickup, refuse is transported via truck to the Columbia Ridge Recycling and Landfill site located near Arlington. Columbia Ridge is a large regional facility that accepts refuse from the northwest and Canada. The Dalles Disposal Company only provides hazardous waste pickup twice a year. Hazardous waste disposal is available at Chemical Waste Management of the Northwest, a facility located adjacent to the Columbia Ridge facility. Waste Management, Inc. operates both facilities.

Temporary and permanent population increases for construction and operation of the proposed project are minimal compared to the population of the affected communities. The Dalles Disposal Company already provides services for all of Sherman County and has adequate capacity to accommodate construction-related debris and service to the proposed project facility. The proposed project would have no adverse impact on the ability of The Dalles Disposal Company to provide solid waste collection services.

Solid waste generated in the construction and operation of the proposed facility is described in Exhibit V. The proposed project will generate minimal construction waste and very little solid waste when the facility is operational that would require offsite disposal. The nearest landfill is the Columbia Ridge Recycling and Landfill Center located near Arlington. The landfill is not projected to reach capacity for at least 56 years and conversations with landfill operators did not specify any concerns regarding solid waste generation from construction or operation of the proposed project.

Other providers in the analysis area are Waste Connections, Inc., which provides service for The City of Condon, the City of Arlington, which provides refuse and recycling services for the City of Arlington, and Mel's Sanitary Service which provides sanitary service for the cites of Dufur and Maupin. Allied Waste provides refuse and recycling service for Goldendale. The proposed project will be located outside of these service areas and, therefore, will not affect these providers.

U.4.6 Housing

Housing availability and supply in the affected communities is described in Table U-3. According to the 2000 census, there are 8,527 housing units in the affected communities in the analysis area, totaling approximately 60% of all housing units within Gilliam, Sherman, Wasco, and Klickitat counties. Housing vacancy rates in the analysis area are relatively high, averaging approximately 14.6% for the nine communities in the analysis area. Maupin (Wasco County) and Grass Valley (Sherman County) have the highest vacancy rates.

Table U- 3. Housing Supply and Availability in Communities Within the Analysis Area

Jurisdiction	Total Housing Units			Vacancy Rate
	Occupied	Vacant	Total	Percent
Gilliam County	819	224	1,043	21.5%
Arlington	*228*	*50*	278	18.0%
Condon	*357*	*65*	422	15.4%
Sherman County	797	138	935	14.8%
Grass Valley	*74*	*20*	94	21.3%
Moro	*132*	*12*	144	8.3%
Rufus	*128*	*34*	162	21.0%
Wasco	*171*	*28*	199	14.1%
Wasco County	9,401	1,250	10,651	11.7%
Dufur	*254*	*23*	277	8.3%
The Dalles	*4,928*	*318*	5,246	6.1%
Maupin	194	69	263	26.2%
Mosier	183	24	207	11.6%
Klickitat County	7,473	1,160	8,633	13.4%
Goldendale	*1,525*	*180*	*1,705*	*10.6%*

Source: U. S. Census Bureau, 2000 Summary File 3.

The demand for permanent housing in the analysis area is not anticipated to increase significantly because the proposed project would employ about 10 to 15 full-time and part-time employees. Only 9 new employees are assumed to move to the area with the remainder hired locally. Employees hired from the local community would not require new housing and, given the small number of in-migrant households and the housing vacancy rate in the affected communities, there would be no adverse impact in terms of finding permanent housing.

U.4.6.1 Temporary Housing

Approximately 100 to 175 temporary construction workers will be needed for the duration of construction. At least half of the construction workers will likely be hired from outside of the area, identifying a need for temporary housing. There are several potential temporary housing options within the analysis area. When other nearby wind power projects were constructed using similar numbers of workers, construction crews were housed in motels in the communities of Moro and Biggs Junction, and in an RV park in Wasco. There are also several motels located in The Dalles. As a result, there would be no adverse impact to temporary housing and lodging in the analysis area.

U.4.7 Traffic Safety

The project area is served by state highways 97 and 206. Those highways provide access to the nearby commercial centers of The Dalles and Portland via Interstate 84.

Construction-related traffic as a result of the proposed project will use public roads to access the construction staging areas and construct the turbine strings that are located on private property. A construction phase traffic management plan will be developed in consultation with the local community.

The assumed route of construction-related traffic is to take I-84 to US 97 (at Biggs Junction) to the US 97/OR 206 intersection or other local roads providing access to the Project adjacent to the highways. Workers traveling from Washington would take US 97 south across the Columbia River bridge at Biggs Junction and continue south. Construction traffic may also approach the site from the south on US 97. Both US 97 and OR 206 are two-lane paved highways with poor to fair pavement condition. The planned turbine corridors either intersect with or are near county roads which will be used for wind farm construction and operation access.

From the state highways, construction-related traffic will use a series of local Sherman County roads to access private land where the construction staging areas and turbine strings will be located. Local roads are generally gravel rural roadways with little traffic other than local agricultural and residential traffic. Portions of local roads that will be used include: Van Gilder Road, Mud Hollow Road, Lamborn Road, Gordon Ridge Road, Monkland Road, Foss Lane, Sawtooth Road, Smith Lane, Douma Road, Woods Lane, Nish Road, and Hay Canyon Road. In addition, portions of the following roads will be used temporarily during the construction of the transmission lines: Sandon Road, Klondike Road, Tom Lane and China Hollow Creek Road.

Due to this extensive network of local roads, the Project does not require extensive construction of new permanent access roads outside of the turbine corridors. Planned new roads, road improvements, and access improvements are shown in Exhibit C.

Some of the local roadways will require improvements, generally a 6-inch gravel layer placed on top of the existing road, prior to project construction to accommodate the length and weight of vehicles that will deliver the turbine pieces and machinery necessary for construction. Areas where improvements to road surfaces or intersection radiuses will be made are shown in Appendix C-2. Reconstructed roadways will be improved to accommodate two eight-foot travel lanes and will be constructed with six inches of crushed aggregate on top of a geotextile separation fabric. All improvements on local roads will be constructed within the public right-of-way.

Construction-related traffic may cause short-term traffic delays when trucks deliver construction-related equipment and the turbines, but those delays will be temporary and are not anticipated to have an adverse impact on highways in the project area. Construction-related traffic delays on local roadways could occur but are anticipated to be limited due to very low use of these local roadways. Several local roadways will be improved or completely reconstructed to accommodate construction-related traffic. The proposed improvements will have a beneficial long-term impact by improving the quality of the road for all users.

Truck traffic during operations will be considerably lighter than during construction. On an average day there will usually be two or three pickup trucks moving around the site to perform routine services and maintenance on the turbines. Infrequently, larger delivery vehicles will be on site to deliver replacement parts to the turbines or the O&M facility.

Permanent staff for the proposed project, between 10 and 15 employees, will use the improved local road system. Because the traffic generated from these employees is small and existing usage is low, no adverse impacts to the road system as a result of new permanent staff are anticipated.

U.4.8 Police

Some local jurisdictions provide their own police service, while others rely on the county sheriff for police service. The cities of The Dalles, Goldendale, and Condon are the only jurisdictions within the analysis area that provide their own police service.

The Sherman County Sheriff's Department provides police service for all of Sherman County, including the proposed location of the Golden Hills Wind Farm facility. Other sheriff's departments within the analysis area include the Gilliam County Sheriff's Department and the Wasco County Sheriff's Department. The Wasco County Sheriff's is the largest of the three Oregon departments, with 17 full-time officers, due to the much larger population it serves. Sherman and Gilliam Counties employ five full-time officers. All three departments have agreements to provide backup service for each other if needed. The Klickitat Sheriff's Department provides law enforcement for Klickitat County and employs 17 patrol and command staff in addition to jail and detective branches. The project area would be outside of the Klickitat Sheriff's Department service area.

In the event response is required at Project facilities, sheriff services can be accommodated with existing sheriff's department resources. No adverse impacts to the sheriff's department are anticipated as a result of the proposed project.

U.4.9 Fire Protection and Emergency Response

The project site is located in the North Sherman Fire Protection District (District) based in Wasco. The District provides fire protection and has trained EMT volunteers, although the District does not provide ambulance service. The District contracts with the Moro Rural Fire Protection District to provide ambulance service. No incidents at existing wind power facilities within the district have occurred that would require high-angle rescue from towers. The Applicant will coordinate response protocols with the District and Moro Rural Fire Protection District.

Aside from the District, there are ten other fire departments or districts that provide, at minimum, fire protection. Those that provide only fire service contract with other districts that have ambulance service. Communities that provide their own fire service include the cities of Condon, Goldendale, Moro, Rufus, Dufur, The Dalles, Maupin and Mosier. Rural fire districts serving other parts of the analysis area include the North Gilliam County Rural Fire District, the South Sherman Rural Fire District, and Klickitat Rural Fire District #7, which provides service for portions of Klickitat County. Gilliam and South Sherman Rural Fire districts provide fire and emergency response for Arlington and Grass Valley, respectively, as well as for rural county areas.

Local farmers also provide fire suppression and are often the first to respond because of the large service areas. Local service providers indicated that farmers often have their own fire equipment and also often respond to emergencies.

To minimize the potential of fires starting from construction-related activities, roads would be established prior to construction to minimize vehicle contact with dry grass; idling vehicles in grassy areas would be avoided; and open flames, such as cutting torches, would be kept away from grassy areas. Staging areas will be graveled to minimize fire potential; in addition, a water truck should be available on site to respond to any potential fire incidents.

Interviews with both the North Sherman County Rural Fire Protection District and the Moro Rural Fire Protection District indicated that the proposed project could potentially affect department's ability to provide fire protection or ambulance service for their service areas, especially due to the increased potential of incidents that may occur in the construction phase during the workday when volunteer fire fighters are at their day job. Mitigation measures are proposed and are described in U-5.12.

In the event of a critical injury, helicopter service could be dispatched to the project site. Accident victims would be transported to the Mid-Columbia Medical Center in The Dalles.

U.4.10 Health Care

The Mid-Columbia Medical Center, located in The Dalles, is the only full service medical facility located within the analysis area. The Center provides emergency services as well as surgery. If an accident were to occur at the site, ambulance service from the Moro Rural Fire Protection District would transport patients to the hospital. Evacuation via helicopter is also available, if needed.

Klickitat Valley Hospital in Goldendale serves all of Central and Eastern Klickitat County. The hospital offers inpatient care and some minor surgical procedures, but is a small facility and any accidents would likely be directed to Mid-Columbia Medical Center first.

The proposed project would not adversely impact medical services in the analysis area. Mid-Columbia Valley Medical Center in The Dalles would be capable of providing services for construction and operational employees in case of an emergency.

U.4.11 Schools

The Sherman County School District serves all of Sherman County. The school district operates one high school (grades 7 to 12) in Moro and two elementary schools (kindergarten through 6th grade) in Grass Valley and Wasco. The district serves approximately 270 students, although enrollment has declined in recent years due to a lack of employment opportunities in the area.

Other school districts in the analysis area include the Condon School District #25, Arlington School District #3, Wasco School District #29, North Wasco School District #21, Goldendale School District #4, South Wasco County School District #1, and Chenowith School District #9. The Condon and Arlington school districts each operate one kindergarten through 8th grade facility and one 9th grade through 12th grade facility. The Wasco School District serving Dufur operates one kindergarten through 12th grade school. The Goldendale School District operates one kindergarten through 6th grade, one 7th through 8th grade middle school, and one 9th through 12th grade high school.

The North Wasco County and Dufur school districts are the only two districts within the analysis area that are experiencing growth in the student population. The North Wasco County School District expects student enrollment to increase approximately one to three percent annually. Facilities are generally inadequate to accommodate the projected number of students, although the district recently merged with the Chenowith School District and is now in the process of completing deferred maintenance for former Chenowith district facilities. Dufur School District administrators also said their enrollment is growing, primarily because of the district's proximity to The Dalles because Dufur has become somewhat of a bedroom community to The Dalles. The Dufur School District recently expanded its classrooms and built a new gymnasium to accommodate existing and projected student growth. No additional facilities are planned.

No adverse impact to local schools is anticipated to occur as a result of the construction and operation of the proposed project. No demand on school facilities is expected from the construction of the proposed project because the portion of the construction work force that might temporarily live in the area is not expected to include any families. Therefore, temporary increases in the analysis area population caused by in-migration of construction workers would result in little to no increase in the student population.

The number of in-migrant operational staff is anticipated to be small, creating few new households with school-age children. Consequently, there would be no significant increase in the student population. Interviews with local school districts indicated that the small number of potential new students would not have a significant adverse impact on the school districts and all districts would be able to accommodate students with existing capacity. All school districts said that an increase in the number of students would have a beneficial impact on school districts because each additional student would increase revenue for the district without having to add new services or facilities.

U.5 ADVERSE IMPACT TO 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*

<u>Response</u>: Responses are provided in sections U.5.1 through U.5.12, below.

U.5.1 Economic and Demographic Impacts

U.5.1.1 Population

Limited in-migration for construction-related employment as well as permanent O&M employment is expected to occur as a result of the proposed project and would have a beneficial impact on businesses in the nearby communities from increased patronage of area motels, restaurants, and other supporting services. No significant adverse impacts as a result of temporary construction activities are anticipated. In-migrant operational staff and their families would not have a significant impact on local population, particularly in Sherman County, which has lost population since 1990.

U.5.1.2 Economic Activity

The proposed project would not have significant adverse economic impacts to the analysis area. On the contrary, revenue generated for the local economy as a result of the Project may improve Sherman County's ability to provide public services, including schools and others services Sherman County provides for its residents. Increased employment opportunities, both temporary and permanent, may increase the amount of money spent at local businesses. Landowners who receive payments for permitting the location of turbines on their property may also see an increase in income and as a result spend a portion of that at local businesses.

U.5.1.3 Tax Revenues

No adverse impacts on County tax revenues are expected. Rather, annual property tax revenues to the County will increase as a result of the Project. In addition, development of this Project will lead to increased 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 Project will increase the County's resources for providing roadways, police and fire protection, and other services to its citizens.

U.5.2 Sewers and Sewage Treatment

The proposed project is not located within any waste water facility treatment area; therefore, the proposed project would have no impact to existing waste water treatment facilities or collection systems. During construction, a local provider will supply portable toilets to the site, which would be treated at a local treatment facility chosen by the toilet provider. No impacts from using the portable toilets are anticipated because the toilet provider will be required to dispose wastewater in an appropriate manner.

The proposed facility will not be connected to a local wastewater collection system because it will have its own septic system. Sherman County and/or DEQ review and approval will be required prior to installation of the septic system. No significant adverse impacts are anticipated as a result of the septic system installation.

It is assumed that temporary construction and permanent employees will use existing wastewater or private septic systems, and would have no additional impact on facilities in the analysis area. Temporary employees from outside the area would likely stay in one of the area's motels or RV parks and use those facilities, which are adequately sized to provide wastewater service. Permanent employees moving to the area would likely reside in existing dwellings already connected to a public wastewater or private septic system and would not increase need for or have an adverse impact to wastewater collection or treatment systems in the analysis area.

U.5.3 Water

During construction, water will be trucked in from offsite, possibly from a local municipal water supplier, which will be paid for the water. The proposed project is not within the service area of any water system. The proposed O&M facility will have its own well for its water needs. The well will provide less than 5,000 gallons per day, and because of its limited output, is not required to obtain a state water withdrawal permit (see Exhibit O). No adverse impacts to the local water supply are anticipated.

U.5.4 Storm Water

No significant adverse impacts to existing storm water facilities are anticipated. Construction-related storm water drainage impacts could occur during the construction of the proposed project, likely from road, turbine foundation, and staging area construction. Erosion control measures would be implemented as needed to meet any applicable local regulations and reduce the potential for project related erosion (see Appendix I-2).

U.5.5 Solid Waste Management

The Dalles Disposal Company has adequate capacity to accommodate construction-related debris and service to the new facility. The proposed project would have no adverse impact on the ability of The Dalles Disposal Company to provide these services.

Solid waste generated in the construction and operation will require offsite disposal. The nearest landfill is the Columbia Ridge Recycling and Landfill, which is not projected to reach capacity for at least 56 years. Conversations with landfill operators did not specify any concerns regarding solid waste generation from construction or operation of the proposed project. While the proposed project will generate some solid waste, the amount would not have a significant adverse impact on landfill operations that provide solid waste management services in the area.

U.5.6 Housing

No adverse impacts to housing in the analysis area are anticipated as a result of the proposed project. Employees hired from the local community would not require new housing and, given the small number of in-migrant households and the housing vacancy rate in the affected communities, adequate housing is available.

Temporary employees hired from outside the area will likely stay in nearby motels. While the majority of those are concentrated in The Dalles, there are other accommodations (motels, RV parks) in Wasco and in other communities that will meet temporary housing needs. Although not all of these would likely be available at one time, there are many temporary-housing possibilities within these communities compared to the relatively small number of in-migrant construction workers. There would be adequate motel and camping/trailer facilities to accommodate the short-term needs for in-migrant construction workers.

There would be no adverse impact to temporary or permanent housing in the analysis area. On the contrary, businesses would experience a beneficial impact from construction workers renting accommodations and permanent in-migrant workers purchasing homes.

U.5.7 Traffic Safety

Construction-related traffic may cause short-term traffic delays when trucks deliver construction-related equipment and the turbines, but those delays will be temporary and are not anticipated to have an adverse impact on highways in the project area. Construction-related traffic delays on local roadways could occur but are anticipated to be limited due to very low use of these local roadways. Several local roadways will be improved or completely reconstructed to accommodate construction-related traffic. The proposed improvements will have a beneficial long-term impact by improving the quality of the road for all users. A construction phase traffic management plan will be developed in consultation with the local community.

Permanent staff for the proposed project, assumed to be between 10 and 15 employees, will use the improved local road system. Because the traffic generated from these employees is small and existing usage is low, no adverse impacts to the road system as a result of new permanent staff are anticipated

Improvements will remain when construction is complete for local residents to use. While short-term construction-related impacts, primarily traffic delays, may occur, those impacts will be temporary and would not constitute a significant adverse impact.

U.5.8 Police

The small population increase attributed to the proposed facility would not have a significant adverse impact on local police services. Discussions with the Sherman County Sheriff's Department did not identify any concerns about the in-migrant construction workers or any need for increased patrols near the proposed project, either when it is under construction or when it is operational. Therefore, the proposed project would not have a significant adverse impact on police service.

U.5.9 Fire Protection and Emergency Response

Adverse impacts are anticipated to occur to fire protection and emergency services as a result of the proposed project. Existing facilities are not adequately equipped to provide fire and emergency response services. These include high angle rope rescue and potential oil spills from energized electrical equipment, such as the junction boxes located at the base of the turbines. Some of the inadequacies include the extensive training requirements and specialized equipment. To mitigate this, the Applicant will have trained staff and appropriate equipment on site to respond to events that cannot be handled by the fire departments.

According to the North Sherman County Rural Fire Protection District, the Moro Rural Fire Protection District, and Sherman County Emergency Services, coordination between the various wind farm projects in the area to respond to emergency situations is a measure that would address these potentially adverse impacts. Additionally, the fire and emergency personnel expressed a concern with the construction phase of wind farm projects since higher probabilities of incidents occur during the workday when the volunteer fire fighters are at work and not readily available. In general, the primary issues for Sherman County fire and emergency services is not having enough volunteers available during the work week and lack of available water for the rural areas, as fire hydrants are primarily located in urban areas.

Mitigation measures to address this need are described in U.5.12.

U.5.10 Health Care

The proposed project would not adversely impact medical services in the analysis area. The Mid-Columbia Valley Medical Center in The Dalles would be capable of providing services for construction and operational employees in case of an emergency.

U.5.11 Schools

No significant adverse impact to local schools is anticipated to occur. No short-term demand on school facilities is expected from the construction of the proposed project because the portion of the construction work force that might temporarily live in the area is not expected to include any families. The number of in-migrant operational staff is anticipated to be small, creating few new households with school-age children. Consequently, there would be no significant increase in the student population. Interviews with local school districts indicated that any new students would not have a significant adverse impact on the school district. On the contrary, most school districts in the analysis area have lost students; an increase in the student population would have a beneficial impact on school districts because each additional student increases revenue for the district.

U.5.12 Mitigation Measures

The Applicant will coordinate response protocols with the North Sherman Fire Protection District and Moro Rural Fire Protection District and other wind farm projects. The Applicant will also work closely with both of these fire districts to address the potential incidents that may arise from construction related traffic.

The Applicant will have trained staff and appropriate equipment on site to respond to events, such as high angle rescue, that cannot be handled by the fire departments. Project personnel will also be trained to handle small brush fires.

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: No monitoring program is proposed.

U.7 REFERENCES

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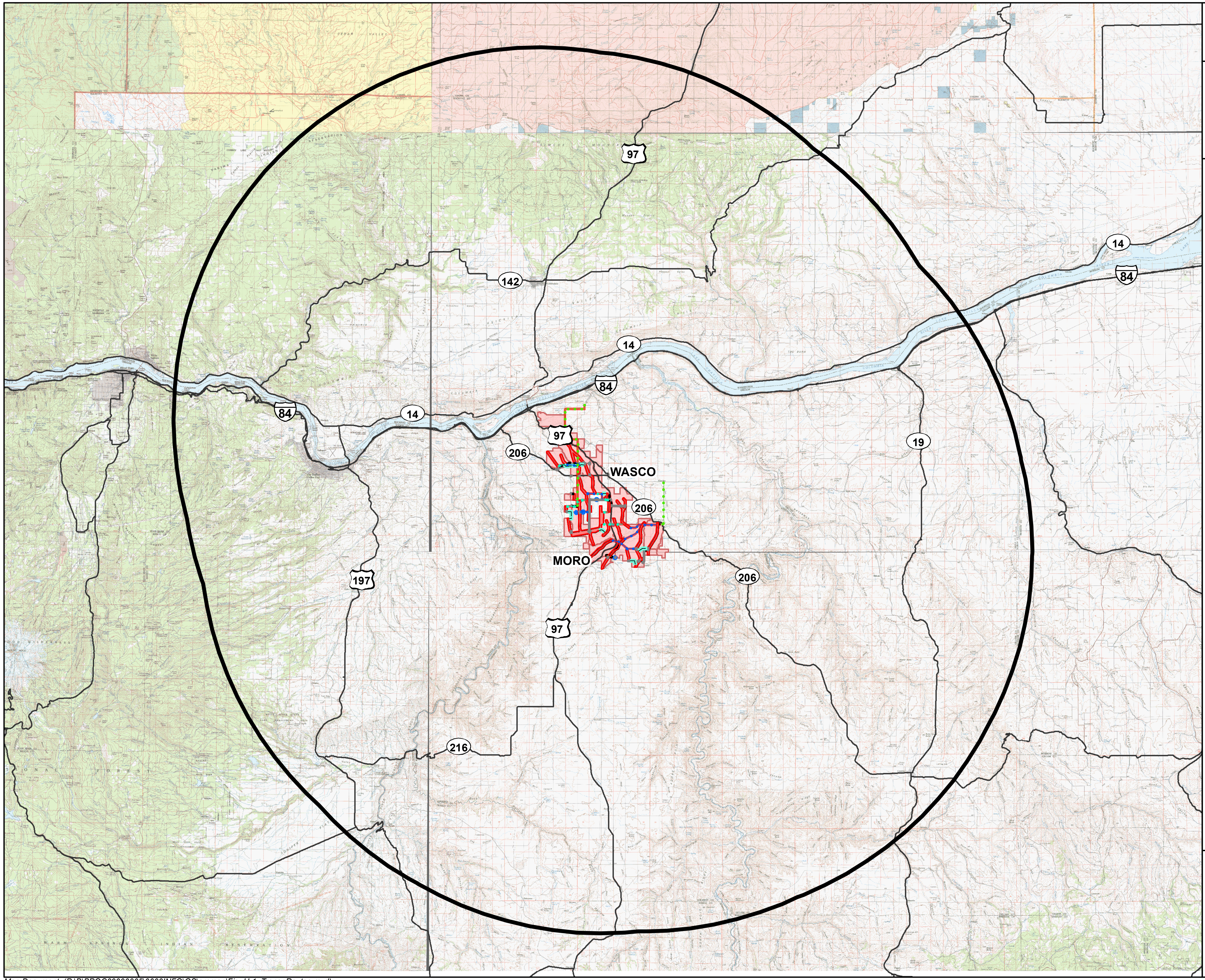
FIGURE U-1

Golden Hills Wind Project

FIGURE U-1

Analysis Area and Transportation Routes



- Analysis Area
- Major Roads
- Underground Collector
- Crane Path and Underground Collector
- Crane Path
- Transmission Line
- New Road
- Existing Road Improvement
- Lease Area
- Corridors
- Connector Corridors 062907
- Bridge area
- Laydown
- OM Building
- Substation
- Survey Corridors 062907

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ATTACHMENT U-1

Correspondence with Sherman County Sheriff's Office and Emergency Services Department

North Sherman County
Rural Fire Protection District
411 Yates Street, PO Box 121
Wasco, Oregon 97065

Tina Osterink
David Evans and Associates, Inc.

Re: impact on Sherman County Emergency Services

The expanding wind energy industry is having an impact on Fire and Ambulance services in Sherman County. Our emergency services are an all volunteer service. Increased activities and population in the County has the potential to result in more emergency calls.

The peak hours for activities at the existing wind farms, including the construction phase and the operational phase, is Monday through Friday during normal work hours. Most of our volunteers have to leave work, many without pay, to respond to calls during these hours.

The wind projects are being sited in remote rural areas that are not protected by a hydrant system for water supply. This increases the need for Tenders (fire service water trucks) to supply the water needed for fire suppression activities.

The wind projects create other new challenges that our departments are not adequately equipped to handle. These include high-angle rope rescue and large oil spills from energized electrical equipment. Some of the inadequacies include the extensive training requirements that can be hard to meet for volunteers and specialized equipment such as compressed air foam systems.

We have very dedicated volunteers in Sherman County. The main issue is that additional activities and population in the County potentially increases the number of emergencies.

The Moro Rural Fire Protection District Chief, Jim Payne and the Sherman County Emergency Services Coordinator Shawn Payne both agree with these concerns.

Respectfully,

Rod Asher Fire Chief

SHERMAN COUNTY
SHERIFF'S OFFICE
508 Court St. / PO Box 424
Moro, OR 97039
(541) 545-3622/Fx (541) 565-3912
Sheriff Brad Lohrey

June 28, 2007

David Evans and Associates, Inc.
2100 SW River Parkway
Portland, Oregon 97201
503.499.0421

To Whom It May Concern:

The Golden Hills Wind Farm, located in Sherman County near Wasco and north of Moro, which includes approximately 150 turbines, will not have any adverse impact on the Sherman County Sheriff's Office.

If you have any questions please feel free to contact me anytime.

Sincerely,

Brad Lohrey, Sheriff

EXHIBIT V

WASTE MINIMIZATION
OAR 345-021-0010(1)(v)

TABLE OF CONTENTS

Page

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 Applicant, as shown in the responses below, meets the Council standards with its solid waste and wastewater plans designed to minimize the generation of solid waste and wastewater and lead to recycling and reuse of such wastes. The Applicant's plans to manage generated waste will result in a minimal impact on the 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, including an estimate of the amount of solid waste and wastewater.*

Response:

Construction-Related Waste Materials

Several types of non-hazardous solid waste will be generated during construction, primarily concrete and wood waste from turbine pad construction, and scrap steel from turbine construction. Miscellaneous materials such as packing materials for turbine parts and electrical equipment, and erosion control materials (straw bales, silt fencing) could also be generated during construction. The local garbage hauler will transport construction-related waste to a regional landfill (see Exhibit U).

Wastewater from vehicle wash down will occur at a local batch plant. Wastewater from portable toilets will be pumped regularly by the toilet contractor. No other wastewater will be generated during construction.

Operation-Related Waste Materials

Little solid waste will be generated during the Project's operation. The primary solid waste from operation of the Project will be paper and other office waste such as food packaging and food scraps at the O & M building. Maintenance at the facility may generate waste such as oily rags and empty containers previously containing lubricants and cleaning supplies (see Exhibit G). Periodic replacement of turbine parts could also generate some solid waste. The local garbage hauler will pick up solid waste and transport it to a regional landfill.

Operation of the Project will not generate any industrial wastewater. The O&M building will generate wastewater from sinks and flushing toilets, which will be disposed of in an on-site septic system. The on-site wells will provide less than 5,000 gallons per day each, therefore, the amount of wastewater generated from operation of the facility will be less than 5,000 gallon per day.

The Project will also generate used oils, which will be recycled. Universal wastes, such as light bulbs and batteries will also be generated, and recycled or disposed of in accordance with applicable regulations.

Decommissioning-Related Waste Materials

When the facility is retired or decommissioned, turbines and other above ground equipment will be removed and reused or sold for scrap metal. This is estimated to be approximately 69,100 tons of steel. Inert underground electrical cables and concrete turbine pads will be left in place with landowner permission. Concrete turbine and transformer pads will be removed up to three feet below the surface of the ground so that agricultural activities can continue. Existing access roads on private property will remain with landowner approval unless the landowner wishes them to be removed. Any improvement to public roads will remain in place with Sherman County approval.

V.3 PLANS FOR MANAGEMENT AND DISPOSAL

OAR 345-021-0010(1)(v)(B) *A description of any structures, systems and equipment for management and disposal of solid waste, wastewater and stormwater.*

Response: Waste minimization and recycling will be implemented during the Project's construction and operation, as described below.

Recycling During Construction

Generation of wastes from construction will be minimized through estimating of materials needs and through efficient construction practices. Waste generated during construction or operation of the Project will be recycled when feasible. Solid waste such as steel, wood, paper and other materials will be sorted and stored in dumpsters, which will be transported by a local garbage hauler to the regional landfill that provides recycling services (see Exhibit U). Any concrete waste will be used onsite as fill or transported to the regional landfill. Packaging wastes will be separated and recycled. Non-recyclable materials will be collected and transported to the regional landfill.

Wastewater from vehicle wash down will occur at a local batch plant on pervious surface, and is expected to infiltrate into the ground. Wastewater from portable toilets will be pumped regularly by the toilet contractor.

No construction-related storm water measures are proposed other than erosion-control measures such as using straw bales and silt fencing, as needed (see Exhibit I).

Recycling During Operations

Minimal solid waste will be generated during operation and will be primarily paper and other typical office waste. Operations solid waste will be collected in garbage cans and transported by a local garbage hauler to the regional landfill. A solid waste recycling program will be implemented at the O&M facility.

Little wastewater will be generated during operations. The O&M building will generate wastewater from sinks and flushing toilets, which will be disposed of in an on-site septic system. The on-site well will provide less than 5,000 gallons per day, therefore, the amount of wastewater generated from operation of the facility will be less than 5,000 gallons per day. Operation of the Project will not generate any industrial wastewater.

No operation-related storm water measures are proposed because the area will have minimal impervious surface; all storm water will infiltrate into the soils.

Recycling During Retirement

In the event of decommissioning, waste will be removed and reused as described in *Recycling During Construction*, above.

V.4 PLANS FOR CONSUMPTIVE WATER

OAR 345-021-0010(1)(v)(C) *A discussion of any actions or restrictions proposed by the Applicant to reduce consumptive water use during construction and operation of the facility.*

Response: Water, as described in Exhibit G, will be used for dust suppression, road compacting and concrete mixing. This water will be transported to the Project via water truck and will be used only as needed for construction of the facility. Water used during construction will likely come from an offsite permitted source capable of meeting the water demand for construction of the Project.

The O&M facilities will have a dedicated well for domestic water uses (see Exhibit O) that will produce less than 5,000 gallons per day each. Periodically, turbine rotors and other equipment may be washed. No other water use is anticipated.

V.5 PLANS FOR SOLID WASTE AND WASTEWATER

OAR 345-021-0010(1)(v)(D) *The Applicant's plans to minimize, recycle or reuse the solid waste and wastewater described in (A).*

Response: As described in response to OAR 345-021-0010(1)(v)(B), the Applicant plans to minimize construction waste through detailed estimating of materials needs and through efficient construction practices to sort construction and operational-related waste to recycle as much as is practical.

Little solid waste or wastewater are expected to be generated during the construction or operation of the Project. Operations-related waste will be sorted and recycled to the extent feasible.

V.6 ADVERSE IMPACT FROM SOLID WASTE, WASTEWATER AND STORMWATER

OAR 345-021-0010(1)(v)(E) *A description of any adverse impact on surrounding and adjacent areas from the accumulation, storage, disposal and transportation of solid waste, wastewater and stormwater during construction and operation of the facility.*

Response: No large accumulation of solid waste, wastewater, or storm water will occur that would constitute an adverse impact. Solid waste from construction and operation of the Project will be separated and loaded into dumpsters and transported as needed to the regional landfill by a local garbage hauler. The landfill has adequate capacity to accommodate the small amount of construction debris (Exhibit U). Where practical construction and operation-related waste will be recycled.

Little wastewater will be generated. Truck wash down will occur in designated areas on pervious surface to allow the water to infiltrate the ground. Wastewater generated during operation of the O&M building will be collected in an on-site septic system approved by the County. No adverse impacts are anticipated.

No storm water facilities are proposed. The Project would add little impervious surface, generally from the turbine and transformer pads and roadways. Any stormwater would drain to the surrounding land and infiltrate the ground.

V.7 EVIDENCE THAT ADVERSE IMPACTS WOULD BE MINIMAL

OAR 345-021-0010(1)(v)(F) *Evidence that adverse impacts described in (D) are likely to be minimal, taking into account any measures the Applicant proposes to avoid, reduce, or otherwise mitigate the impacts.*

Response: The Applicant's proposed measures to avoid, reduce, and recycle materials will result in minimal impacts on the site or to adjacent land; these measures are discussed above and in Exhibit G. They include storing all 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 on-site temporary storage facilities to respond to accidental spills that may occur. Further, during construction, equipment (*e.g.*, graders, dozers) will be available to respond to spills and to quickly construct berms or ditches for containment and cleanup if necessary.

Disposal of materials as fill on-site 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, and concrete that does not contain contaminants that could adversely affect waters of the state or the United States. To meet the clean fill definition, any inert construction debris to be disposed of on-site will be separated from other debris that is not inert.

The only clean fill that has the potential to be disposed of on-site 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) on-site. In such cases, the material will be placed in an excavated hole, covered with at least three feet of topsoil, and regraded to match existing contours.

Any packing materials, paper, and office materials will be separated, accumulated in dumpsters, and periodically removed for recycling or disposal by a licensed waste hauler. Portable toilets will be provided for on-site sewage handling during construction and will be pumped and cleaned regularly by the construction contractor.

V.8 PROPOSED MONITORING PROGRAM

OAR 345-021-0010(1)(v)(G) *The Applicant's proposed monitoring program, if any, for minimization of solid waste and wastewater impacts.*

Response: Because no significant impact is anticipated, no monitoring program is proposed. Waste-management activities will be subject to periodic inspections by the Applicant to ensure compliance with applicable regulations.

EXHIBIT W

FACILITY RETIREMENT AND SITE RESTORATION
OAR 345-021-0010(1)(w)

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ATTACHMENT

W.1 INTRODUCTION

OAR 345-021(1)(w) *Information about site restoration, providing evidence to support a finding by the Council as required by OAR 345-022-0050(1). The Applicant shall include:*

W.2 ESTIMATED USEFUL LIFE

OAR 345-021(1)(w)(A) *The estimated useful life of the proposed facility.*

Response: The useful life of the proposed project is 25 to 30 years. At that time, the facility may be re-powered with newer generation equipment or retired.

W.3 ACTIONS FOR SITE RESTORATION

OAR 345-021(1)(w)(B) *Specific actions and tasks to restore the site to a useful, non-hazardous condition.*

Response: The Applicant will take the following measures to restore the site at retirement of the facility:

- Remove turbines, towers and blades, using cranes and other conventional equipment. Recyclable and reusable materials will be recycled and reused to the extent practical. Other materials will be disposed of in accordance with all applicable federal, state and local laws, in nearby landfills.
- Remove concrete foundations to a minimum of three feet below the ground level, and grade adjacent soils to cover, so that tilling and farming can resume. Concrete would be disposed at a landfill or buried on the property at least three feet below the ground level, with the landowners' permission.
- Remove roads, unless the farmer(s) desire to have the road remain on their property. Gravel would be removed by standard equipment and used for another project or disposed of in accordance with all federal, state and local laws. Areas beneath removed roads would be disked or tilled to restore compacted soils to farmable condition.
- Underground collector lines would be abandoned in place, at least three feet below the ground level.
- Remove transformers and other substation equipment and recycle or reuse these materials to the extent practical. Remove gravel for reuse in another project or dispose of at a local landfill. Areas beneath removed substations would be disked or tilled to restore compacted soils to farmable condition.
- The O&M building would be demolished using conventional equipment. Recyclable and reusable materials would be recycled and reused to the extent practical. Other materials will be landfilled in accordance with all federal, state

and local laws. Areas beneath the removed O&M facilities would be disked or tilled to restore compacted soils to farmable condition.

- Overhead transmission lines may be transferred to another entity for power transmission.

W.4 ESTIMATED COSTS OF SITE RESTORATION

OAR 345-021(1)(w)(C) *An estimate, in current dollars, of the total and unit costs of restoring the site to a useful, non-hazardous condition.*

Response: An estimate of the total and unit costs of the restoring the site to a useful, non-hazardous condition is included as Attachment W-1.

W.5 METHODS AND ASSUMPTIONS TO ESTIMATE SITE RESTORATION COSTS

OAR 345-021(1)(w)(D) *A discussion and justification of the methods and assumptions used to estimate site restoration costs.*

Response: To prepare the estimate for the decommissioning costs of the Project, the Applicant largely used a decommissioning cost model worksheet previously submitted under the EFSC process (the only addition was a line for the cost of removing of the 500kV transmission line). Unit costs used in this cost model worksheet were compared to decommissioning estimates BPAE has received for another project and discussed with contractors to ensure validity. The values appropriate for the Project were then put into the model.

BPAE is able to compare decommissioning costs against a current BPAE re-power project in southern California. As a part of this California project BPAE explored multiple decommissioning options, proposals and estimates. Based on knowledge gained through this California project, BPAE is confident that the amount included in Attachment W-1 will be sufficient for the decommissioning of a 400 MW wind facility.

Exhibit M provides a discussion of the security the Applicant proposes to cover this amount.

W.6 MONITORING PLAN

OAR 345-021(1)(w)(E) *For facilities that might produce site contamination by hazardous materials, a proposed monitoring plan, such as periodic environmental site assessment and reporting, or an explanation why a monitoring plan is unnecessary.*

Response: Wind power generating facilities typically do not use large quantities of hazardous materials. A Spill Prevention, Control and Countermeasures (SPCC) Plan will be in place for the appropriate storage and use of any hazardous materials. Spills, if any, will be immediately cleaned up in accordance with state and federal laws. If spills do occur, monitoring in accordance with the SPCC Plan with appropriate agency oversight.

ATTACHMENT W-1

Retirement Cost Estimate

Attachment W-1

Cost Estimate for Site Restoration	(Cost Guide, 6/6/07)		
	Quantity	Unit Cost	Extension
Turbines			
Disconnect electrical and ready for disassembly (per turbine)	160	$1,001	$160,160
Remove turbine blades, hubs and nacelles (per turbine)	160	$5,206	$832,960
Remove turbine towers (per net ton of steel)	33600	$67	$2,251,200
Remove and load pad transformers (per turbine)	160	$2,249	$359,840
Foundation and transformer pad removal (per cubic yard)	5920	$32	$189,440
Restore turbines pads and turnouts (per turbine)	160	$1,297	$207,520
Met Towers			
Dismantle and dispose of met towers (per tower)	4	$9,635	$38,540
Substation and O&M Building			
Dismantle and dispose of substation	2	$133,585	$267,170
Dismantle and dispose of O&M Building	1	$58,936	$58,936
Transmission Line			
Removal of 230 kV transmission line (per mile)	5	$16,031	$80,155
Removal of 500 kV transmission line (per mile)	11	$18,500	$203,500
Removal of 34.5 kV aboveground transmission line (per mile)	0	$3,389	$0
Junction boxes - remove electrical to 4' below grade (each)	9	$1,321	$11,889
Access Roads			
Road removal, grading and seeding (per mile)	35.7	$74,474	$2,658,722
Temporary Areas			
Regrading and reseeding area disturbed during restoration work (per acre)	175	$2,775	$485,625
Gross Cost Estimate			**$7,805,657**
Performance Bond		1%	$78,057
Administration and Project Management		10%	$780,566
Future Developments Contingency		10%	$780,566
Subtotal			$9,444,845
Total (full cost)			**$9,444,845**
Total financial assurance amount (rounded to nearest $1,000)			**$9,445,000**
scrap value	*33600*	*$149*	*$5,006,400*
Total (less scrap value)			*$4,438,445*
Total (less scrap value) rounded to nearest $1,000			***$4,438,000***

EXHIBIT X

NOISE
OAR 345-021-0010(1)(x)

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TABLES

FIGURES

ATTACHMENT

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:*

Response:

The following general information on noise is provided to assist the reader in understanding noise and how noise assessments are prepared. Definitions of some common acoustical terms are provided in Table X-1.

Table X-1. Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the sound pressure to the reference pressure which is 20 micropascals (20 micronewtons per square meter).
A-Weighted Sound 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.
Equivalent Noise Level (L_{eq})	The energy-averaged A-weighted noise level during the measurement period.
Statistical or Exceedance Noise Level (L_n)	The noise level exceeded during n % of the measurement period, where n is a number between 0 and 100 (e.g., L_{90})
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. The ambient level is typically defined by the L_{eq} level.
Background Level	The underlying ever-present lower level noise that remains in the absence of intrusive sounds. Distant sources, such as traffic, typically make up the background. The background level is generally defined by the L_{90} statistical level.
Intrusive Level	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level. The intrusive level is generally defined by the L_{10} statistical level.

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. In this section, some statistical noise levels are stated in terms of dBA. Noise levels stated in terms of dBA reflect the variable frequency response of the human ear by filtering out some of the noise in the low and high frequency ranges that the ear does not detect well. The A-weighted scale is used in most ordinances and standards. The equivalent sound pressure level (L_{eq}) is defined as the average noise level, on an energy basis, for a stated period of time (e.g., hourly). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electronic filter corresponding to the A-weighted curve. The sound level meter also performs the calculations required to determine the L_{eq} and other statistical measures for the measurement period.

Statistical measures are used to give insight into the noise level distribution over the measurement period. The L_{90} statistical or exceedance level is a measurement that represents the noise level that is exceeded during 90 percent of the measurement period. L_{90} is indicative of the background sound level in the absence of intrusive sounds. Similarly, the L_{10} represents the noise level exceeded for 10 percent of the measurement period. L_{10} is indicative of nearby traffic noise and other intrusive intermittent sounds. L_{50} is the median sound level, where during half the period the sound level is higher or lower.

In determining the daily level of environmental noise, the difference in response of people to daytime and nighttime noise exposure must be accounted for. During the nighttime, exterior background noise levels are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes more noticeable. Further, most people sleep at night and are sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, most ordinances and standards set the allowable nighttime noise limit 5 to 10 dBA lower than the daytime limit. The daytime and nighttime periods are typically as follows:

- Daytime: 7 a.m.–10 p.m.
- Nighttime: 10 p.m.–7 a.m.

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, learning
- Physiological effects such as startle and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants may experience noise effects in the last category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of standard is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is by comparing it to the existing or "ambient" environment to which that person has adapted. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by the listeners.

With regard to increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this section:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.

- In a laboratory, a 3 dBA change is considered a just-perceptible difference.

- A change in noise level of at least 5 dBA is required before any noticeable change in response would typically be observed outside a controlled laboratory environment.
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and would likely cause an adverse community response.

Table X-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry.

Table X-2. Typical A-Weighted Sound Levels

Sound Level (dBA)	Location/Source	Subjective Impression
180	Rocket Engine @ 3 feet	Severe pain
160	Sonic Boom	
140	Threshold of Pain	Slight Pain
130	Hydraulic Press @ 3 feet	
120	Pneumatic Riveter @ 3 feet	Extremely Loud
110	Unmuffled Motorcycle @ 3 feet	
100	Chain Saw @ 3 feet	Very Loud
90	Train @ 100 feet	
80	Truck Traffic @ 50 feet	Moderately Loud
70	Auto Traffic @ 50 feet	
60	Normal Conversation	Typical
50	Typical Office	
40	Bedroom at Night	Quiet
30	Soft Whisper	
20	Sound Test Booth	Very Quiet
10	Breathing	
0	Threshold of Hearing	No Sound

Source: Various sources. Compiled by T. Adams.

* A-weighted sound levels are levels that have been adjusted to match the frequency response of the human auditory system.

X.1.1 Study Area and Facility Site

The study area for noise impacts includes all areas that have the potential to be affected by construction or operational noise resulting from the Project.

The Project site consists of hilly agricultural lands with scattered rural residences. The nearest residence to any of the turbine strings is about 1,000 feet away. This residence is owned by a participating landowner.

X.1.2 Existing Noise Conditions

A noise survey was conducted at four monitoring locations starting on May 16, 2007, and ending on May 23, 2007. Four Larson-Davis Laboratories Model 820 Precision Integrating Sound Level Meters that meet the requirements of American National Standards Institute

(ANSI) Standard S1.4-1983 for Type 1 meters were used for the survey. The microphones were mounted at a height of about 3 feet above the ground to minimize the generation of noise at the microphone diaphragms by wind, and they were also fitted with foam windscreens to further reduce wind-generated noise. Wind speed decreases dramatically at ground level and even the difference between the standard 5-foot microphone position and the 3-foot position used for the survey reduced the rumbling and popping sound created by wind at the microphone.

The meters were programmed to measure and record the 10-minute Leq, L_{10}, L_{50} and L_{90} statistical levels. Only the L_{50} levels are presented in this report to correspond with OAR 340-035-0035 Noise Control Regulations for Industry and Commerce requirements. Measurements were conducted by a Board Certified Member of the Institute of Noise Control Engineering, in accordance with ISO 1996 standards and good engineering practice.

The monitoring locations were selected to be representative of residences throughout the project area. The specific locations are described below. The noise monitoring locations are shown in Figure X-1. A full report of the noise survey and methodology and results are presented in Attachment X-1.

The measurement results are presented graphically in Attachment X-1 (Figures 6 through 9) along with the corresponding wind speeds measured at four on-site meteorological towers and extrapolated to the turbine nacelle height of 80 meters. A regression analysis was then performed on these data to determine the relationship between wind speeds and ambient sound levels. The ambient sound levels determined through this process are presented in Table X-3. These levels range from 28 to 32 dBA when the turbine just begins to operate at its cut-in wind speed. At full load, the levels range from 44.4 to 49.7 dBA in strong winds.

Table X-3. Existing Ambient Sound Levels at Different Wind Speeds

Noise Monitoring Location	Regression Equation*	Calculated Existing Noise Level				
		Cut-In at 5.6 m/s	Quarter Load at 7.0 m/s	Half Load at 8.4 m/s	3/4 Load at 9.8 m/s	Full Load at 13.9 m/s
Loc 1	y = 1.9681x + 17	28.0 dBA	30.8 dBA	33.5 dBA	36.3 dBA	44.4 dBA
Loc 2	y = 2.1385x + 17	32.0 dBA	35.0 dBA	38.0 dBA	41.0 dBA	49.7 dBA
Loc 3	y = 1.9001x + 17	30.6 dBA	33.3 dBA	36.0 dBA	38.6 dBA	46.4 dBA
Loc 4	y = 1.9594x + 17	31.0 dBA	33.7 dBA	36.5 dBA	39.2 dBA	47.2 dBA

* where y is the predicted sound level and x is the wind speed (see regression charts in Attachment X-2, Figures 10 through 13)

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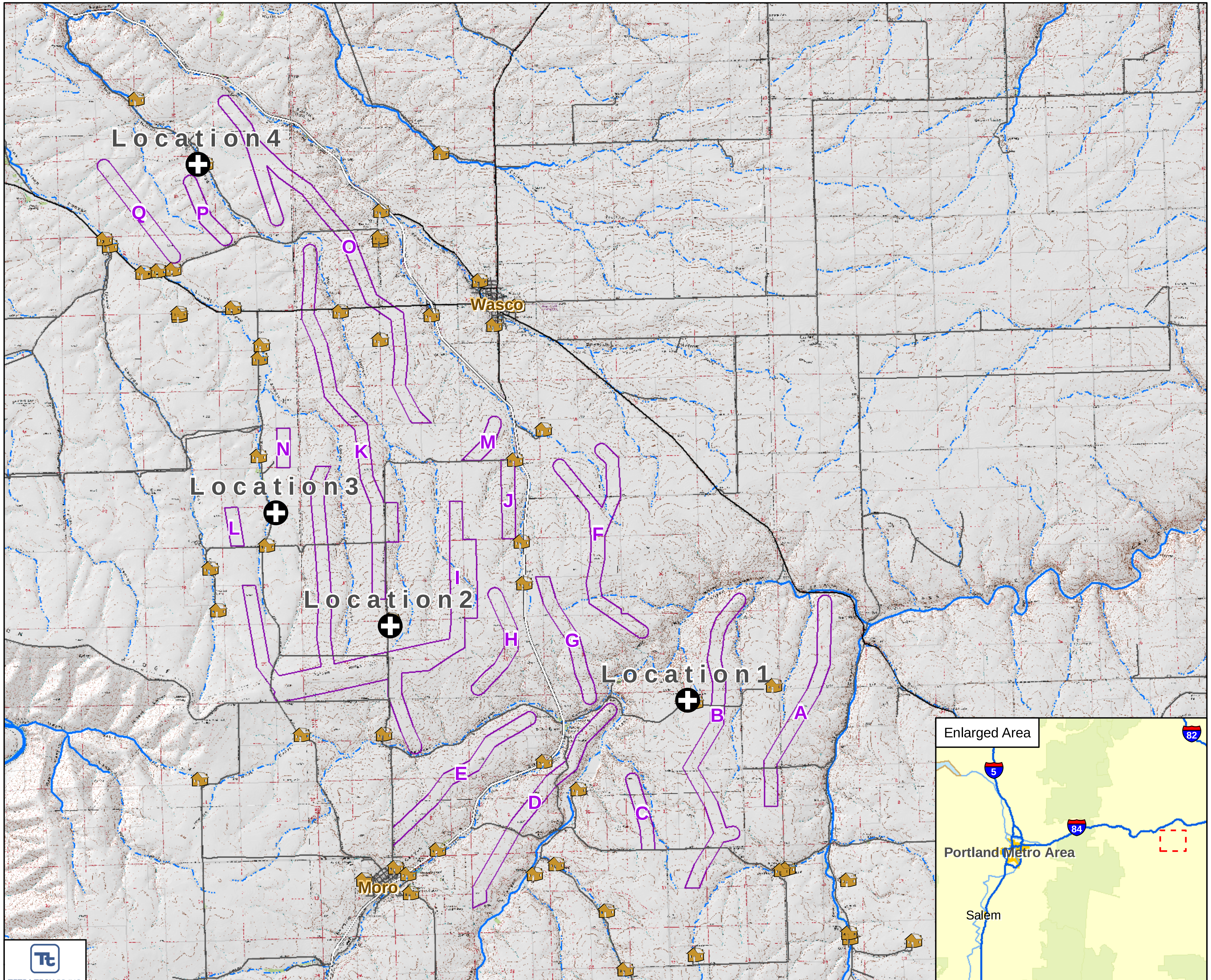

Figure X-1
Noise Monitoring Locations

BP Golden Hills
Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Monitoring Microphone
Dwelling
Project Components
Turbine Corridor
Transportation
Interstate Highway
State Highway
Major Road
Local Road

N
1:80,025
0 1 2 3
Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

X.2 PREDICTED NOISE LEVELS

OAR-345-021-0010(1)(x)(A) *Predicted noise levels resulting from construction and operation of the proposed facility.*

Response:

Noise will be generated during both construction (short-term) and operation (long-term) of the Project.

X.2.1 Construction

Construction of a wind project differs from typical large industrial projects, such as power plants, because the activities are distributed over such a large area and only a small number of construction equipment items are ever in operation simultaneously at a single location. The phases of construction are nonetheless similar to projects of any size. These include: earth moving/excavation for access roads and foundations; concrete pouring for foundations; erection of steel; installation of mechanical and electrical equipment; and site cleanup. Table X-4 lists equipment that may be in use for each phase along with the typical noise level at the standard reference distance of 50 feet.

Table X-4. Typical Sound Levels of Construction Equipment

Construction Equipment	Typical Sound Level at 50 feet
Air Compressor, Portable	81
Backhoe	85
Concrete Mixer Truck	85
Crane, Mobile Tracked	83
Dozer	80
Generator, Portable	78
Grader	85
Loader	79
Pneumatic Tool	85
Truck	85
Welder, Portable	85

Source: EPA, 1971

The most prevalent sound source during construction is anticipated to be the internal combustion engines used to provide mobility and operating power to construction equipment. The sound level impacts at noise sensitive areas from construction operations will depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the sound source and sensitive site. All of these factors will be constantly changing throughout the construction period, making the calculation of an expected noise level at any residence difficult.

Construction noise mitigation, if required, will include limiting noisy construction activities to daylight hours, ensuring that trucks and portable air compressors are in compliance with federal regulations limiting noise, and ensuring that equipment and sound muffling devices provided by the manufacturers of all equipment are kept in good working condition.

A worst-case scenario might include three pieces of equipment operating at full load at the levels shown in Table X-4 at a single tower site located closest to a residence. Three items at 85 dBA would total 90 dBA at 50 feet. This combined level would attenuate to approximately 64 dBA at the nearest residence approximately 1,000 feet away. Any other combination of turbine site and residence would result in a lower level. A level of 64 dBA during daylight hours would be noticeable but would not constitute a significant noise impact because of the short duration that such maximum levels would exist.

X.2.2 Operation

Computer modeling was used to calculate sound levels that would be generated by operation of the proposed 267 wind turbines. A specific turbine model has not been selected at this point and this analysis is based on a generic 1.5-MW turbine. When the actual turbines to be installed have been selected, additional computer modeling will be performed to verify the specific predicted levels. Should greater noise impacts be shown in that analysis, appropriate measures such as moving or eliminating some turbines will be taken to limit the potential impacts. A report of this analysis will be sent to Oregon Department of Energy (ODOE) for review and approval prior to starting construction of the Project.

The commercially available CadnaA model (DataKustik, 2006) was used for this analysis. The software takes into account spreading losses, ground and atmospheric effects, shielding from terrain, barriers and buildings, and reflections from surfaces. The software is standards-based and the ISO 9613 Part 2 standard was used for air absorption and other noise propagation calculations (ISO, 1993). By default, the model assumes that all receptors are downwind of the noise sources thereby producing a conservative result. The following model options were selected:

- The ground absorption coefficient was selected as 0.5 where a value of 0 is a highly reflective ground surface such as pavement or calm water, and 1 is a highly absorptive surface such as plowed fields, wheat fields, and areas with trees and brush. A value of 1 would be most realistic for the project area, but the value of 0.5 yields a conservative result to avoid under-predicting expected noise levels.
- Standard atmospheric conditions were selected (temperature of 50 degrees Fahrenheit and a relative humidity of 70 percent), which are favorable to the propagation of sound. This is also a conservative selection since different combinations more applicable to the site will generally produce slightly lower modeled results on the order of tenths of a decibel.

- The search radius was set to 5 kilometers. This means that the contributions of all turbines within 5 km of each receptor were calculated in the total for receptors. Because of the scattering of sound in the atmosphere, particularly when it is windy, noise from the more distant turbines should not realistically have any contribution, although the model would show a slight increase.

Turbine noise levels were modeled at five different load levels ranging from cut-in, when the turbine just begins to operate, to full load when it is producing the maximum amount of noise. This full range of loads was selected because the turbines produce less noise at low loads but the wind speeds are also lower, resulting in lower ambient noise levels. It is not clear, without a full analysis, whether the greatest increases in ambient levels occur at full load or at some lower load. For this Project, the greatest increases were found to occur at half load. Often, the greatest increases occur at cut-in when the ambient noise levels are generally the lowest.

Table X-5 shows the sound power levels used in the model, by octave band, of the turbines at the five load levels analyzed. Sound power is the total acoustic power produced by a noise source and it is independent of the distance from the source.

Table X-5. A-Weighted Sound Power Levels of a Generic 1.5-MW Wind Turbine (re 10^{-12} watts)

Turbine Load Level	WS at Hub	Octave Band Center Frequency (Hz)*								Total dBA
		63	125	250	500	1,000	2,000	4,000	8,000	
Cut-in	5.6	79.1	88.0	91.2	92.6	91.9	88.5	81.3	72.1	98.0
1/4 load	7.0	82.2	91.1	94.3	95.7	95.0	91.6	84.4	75.2	101.1
1/2 load	8.4	86.1	95.0	98.2	99.6	98.9	95.5	88.3	79.1	105.0
3/4 load	9.8	87.1	96.0	99.2	100.6	99.9	96.5	89.3	80.1	106.0
Full Load	13.9	87.1	96.0	99.2	100.6	99.9	96.5	89.3	80.1	106.0

* Levels in the 31.5-Hertz (Hz) band were not reported.

The model results are presented in two ways. The first is a noise contour map that shows the distribution of noise levels over the entire project area from 35 to 60 dBA with all the turbines operating at full load (Figure X-2). Similar maps are presented in Attachment X-1 for the other four load conditions analyzed. The noise contours are overlaid on a map of the area with all 267 turbines and all 56 of the closest residences shown. The noise contour map of the maximum noise levels shows that there are no residences within the 50 dBA or higher contours.

The second method of presentation is a table showing the calculated sound levels at specific receptor points, which are the nearest residences to the turbines in different areas of the Project (Table X-6). In order to reduce the size of the table and present only the most relevant information, the results for only the top 10 residences are shown. These are sorted from the highest to the lowest. The complete table is included in Attachment X-2 (Table 5). Table X-6 shows that the maximum calculated sound level at any residence is 46.3 dBA at

3/4 and full load, which is below the 50 dBA limit set by ODEQ. Thus, the Project is expected to be in full compliance with this item of the regulations.

Table X-6. Modeled Turbine Noise Levels for Five Loads at Each Receptor

Receptor ID	Modeled Levels Sorted from Highest to Lowest				
	Cut-In dBA	1/4 Load dBA	1/2 Load dBA	3/4 Load dBA	Full Load dBA
25	38.3	41.4	45.3	46.3	46.3
4	38.1	41.2	45.1	46.1	46.1
11	38.0	41.1	45.0	46.0	46.0
42	37.5	40.6	44.5	45.5	45.5
3	37.4	40.5	44.4	45.4	45.4
48	37.3	40.4	44.3	45.3	45.3
37	37.1	40.2	44.1	45.1	45.1
46	36.9	40.0	43.9	44.9	44.9
47	36.6	39.7	43.6	44.6	44.6
5	36.5	39.6	43.5	44.5	44.5

The ODEQ also limits the increases in existing ambient noise levels caused by wind turbines to no greater than 10 dBA unless a signed waiver is obtained from the affected land owner by the Applicant. For this analysis, the site was divided into quadrants and houses within each quadrant were assumed to experience the same ambient noise levels that were measured in the quadrant. The modeled level at each receptor was first added, using decibel addition (Equation 1), to the ambient level to produce the expected future level with the Project operations. The existing ambient level was then subtracted arithmetically from this future level to determine the increase (Table X-7).

Equation 1 $\quad$ Future Level = 10 log ((10^ (L_A/10) + (10^ (L_P/10))

Where: L_A = Ambient Level
L_P = Project Level

As above, Table X-7 shows the results for the top 10 out of 56 residences. The complete table is presented in Attachment X-1 as Table 6. The maximum increase in ambient levels exceeds the 10 dBA limit set by ODEQ at 2 residences at cut-in and 3/4 load, 3 residences at 1/4 load, 4 residences at 1/2 load, and no residences at full load. The increases range from 0.1 to 11.9 dBA. The last column of the table shows whether the land owner is involved in the Project or not. All four of the land owners affected by the increases exceeding 10 dBA (receptor IDs 4, 11, 3, and 5) are involved. The Applicant will obtain signed waivers from these four landowners.

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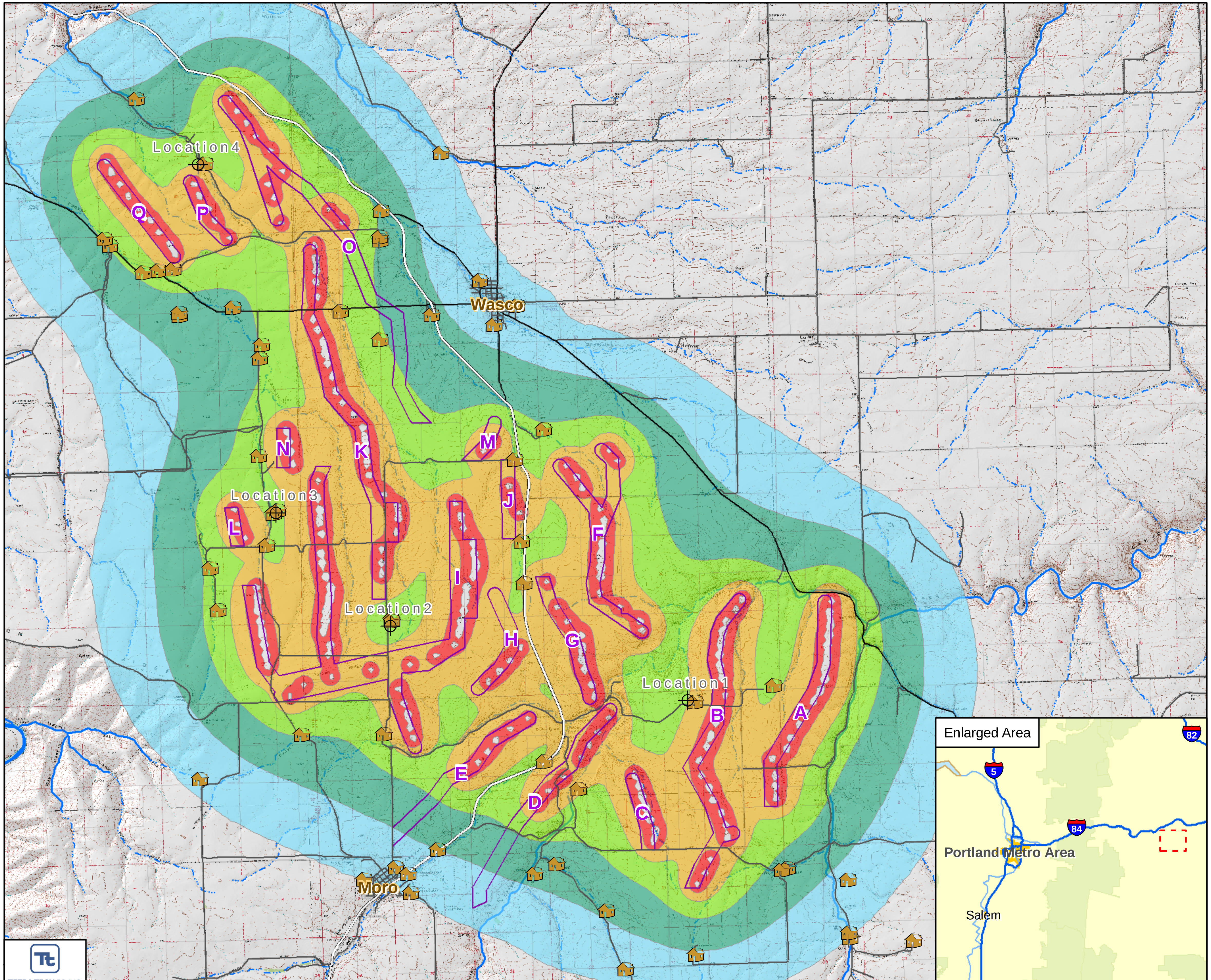

Figure X-2
Predicted Operational Noise Level Contours at Full Load

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Noise Level (dBA)
- 30.0 - 35.0
- 35.1 - 40.0
- 40.1 - 45.0
- 45.1 - 50.0
- 50.1 - 55.0

Monitoring Microphone
Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway
State Highway
Major Road
Local Road

N

1:80,025

0 1 2 3
Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

A comparison was also made of the maximum predicted octave band levels at any residence, with the ODEQ octave band limits presented below in Table X-8. Table X-8 summarizes the information presented in Table X-10, but includes two additional rows to show the maximum predicted levels and the difference from the standards levels. All of the predicted octave band levels are below the ODEQ octave band standards, and are thus in compliance with the standard.

Table X-7. Calculated Increases in Ambient Levels for Each Receptor

Calculated Increases are Sorted from Highest to Lowest										Land Owner Involved or Not Involved
Cut-In Load		1/4 Load		1/2 Load		3/4 Load		Full Load		
Receptor ID	Increase dBA	Receptor ID	Increase dBA	Receptor ID	Increase dBA	Receptor ID	Increase dBA	Receptor ID	Increase dBA	
4	10.5	4	10.8	4	11.9	4	10.2	4	3.9	inv
11	10.4	11	10.7	11	11.8	11	10.1	11	3.9	inv
3	9.9	3	10.1	3	11.2	3	9.6	3	3.5	Inv
5	9.1	5	9.3	5	10.4	5	8.8	5	3.1	Inv
25	8.0	25	8.4	25	9.3	25	7.9	25	2.6	not
42	7.4	37	7.7	37	8.7	37	7.4	37	2.4	not
37	7.4	42	7.7	42	8.6	42	7.2	42	2.2	Inv
35	6.9	35	7.2	35	8.2	35	6.9	35	2.2	not
36	6.8	36	7.1	36	8.1	36	6.8	36	2.1	Inv
57	6.5	57	6.8	57	7.7	34	6.3	34	1.9	Inv

Table X-8. State of Oregon Octave Band Limits Compared Against the Maximum Predicted Octave Band Noise Levels at any Residence

	Octave Band Center Frequencies								
Hertz (cps)	31.5	63	125	250	500	1,000	2,000	4,000	8,000
ODEQ Nighttime Limit (dB)	65	62	56	50	46	43	40	37	34
Project Maximum Predicted Levels (dB)	n.a.*	60	54	48	44	40	31	9	0
Difference	n.a.	-2	-2	-2	-4	-3	-9	-28	-34

* Sound Power Levels in the 31.5-Hz band are typically not reported for wind turbines.

X.3 COMPLIANCE WITH APPLICABLE NOISE REGULATIONS

OAR 345-021-0010(1)(x)(B) *An analysis of the proposed facility's compliance with the applicable noise regulations in OAR 340-035-0035, including a discussion and justification of the methods and assumptions used in the analysis.*

Response:

The results presented in the preceding section indicate that the Project will be in compliance with all aspects of the regulations. The regulations and results indicating compliance are presented in this section.

X.3.1 Summary of Regulations

OAR Chapter 340, Division 35, was recently revised to specifically address wind energy facilities. Specifically:

- 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 International Electrotechnical Commission Standard (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 level, 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)(IV) 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 proposed wind facility's turbines are operating at the maximum sound power level.

OAR Chapter 340, Division 35 contains noise regulations applicable throughout the state of Oregon. Statistical noise limits applicable to the operation of new industrial and commercial noise sources are summarized in Table X-9.

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 p.m.)	Nighttime (10 p.m.–7 a.m.)
L_{50}	55	50
L_{10}	60	55
L_{1}	75	60

Source: Table 8 of OAR 340-35-0035

Also, per OAR 340-35-0035(1)(b)(B), the existing ambient L_{50} or L_{10} noise levels cannot be increased by more than 10 dBA.

In addition to the above limits, OAR 340-35-0035(1)(f) establishes standards to regulate octave band sound pressure levels and audible discrete tones. Such standards can be applied by the ODEQ when ODEQ believes subsections (1)(a), (b), or (c) (summarized in Table X-9) do not adequately protect the health, safety or welfare of the public.

The most restrictive octave band limits from Table 10 of OAR 340-35-0035 are for nighttime operation and are presented in Table X-10 below.

Table X-10. State of Oregon Octave Band Limits for Industrial and Commercial Sources Operating at Night (OAR-340-35-0035)

	Octave Band Center Frequencies								
Hertz (cps)	31.5	63	125	250	500	1,000	2,000	4,000	8,000
Nighttime Limit (dB)	65	62	56	50	46	43	40	37	34

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:

- Twenty-five feet 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 in not Noise Sensitive Property unless it meets the above criteria in more than an incidental manner." Residences are the only noise sensitive property identified in the project area.

X.3.2 Construction

OAR 340-35-0035(5)(g) specifically exempts noise from construction activity. Thus, by regulatory definition, there will be no construction noise impacts. Additionally, the maximum expected construction noise level of 64 dBA at the closest receptor is on the same level as conversation speech and would not constitute a significant noise impact during the day in any case. Also, most of the area residences are much further from the turbines than the closest residence analyzed.

Noise generated during the testing and commissioning phase of the Project would not involve heavy construction equipment, and would not be expected to be substantially different from that produced during normal full load operation (see operational impacts below).

Decommissioning activities would be similar in type but shorter in duration as those anticipated for the construction phase. Therefore, decommissioning would not be a significant impact.

X.3.3 Operation

The estimated maximum operational noise levels from the wind turbines are compared with the DEQ L_{50} statistical noise level limits in Table X-9. Since the noise level from the turbines is assumed to be constant, the nighttime L_{50} limit of 50 dBA will be the most restrictive statistical noise limit. The maximum predicted level during full load operation is below 50 dBA at only 46.3 dBA.

The ODEQ also does not allow noise from new projects to increase the existing ambient noise levels by more than 10 dBA at any noise sensitive property unless the property owner has waived the requirement. If the property owner is a participant in the Project, he would likely be willing to waive this very stringent requirement. The analysis presented above shows that only four residences are likely to experience increases in the ambient level of more than 10 dBA (up to 11.9 dBA) and all four are project participants. The Applicant will obtain waivers from these participating landowners, thus ensuring compliance with the ambient increase standards.

Table X-8 presented a comparison of the maximum expected octave band levels at any receptor along with the limits for each band established in OAR 340-35-350. The predicted levels are less than the regulated limits in every band by a minimum of 2 dB.

It has been demonstrated that the Project is expected to be in compliance with all three elements of the noise standards.

X.4 DESCRIPTION OF PROPOSED MITIGATION MEASURES

OAR 345-021-0010(1)(x)(C) *Any measures the applicant proposes to reduce noise levels or noise impacts or to address public complaints about noise from the facility.*

<u>Response:</u>

The primary mitigation measure is to obtain waivers of the noise standards from any landowners that are expected to be impacted relative to the standards. The Applicant will obtain signed waivers from the four landowners identified in Attachment X-1 as being affected by increases above 10 dBA.

Should complaints arise about noise from the completed facility; a noise survey will be conducted to ensure that the noise does not exceed any component of the standards. If the survey results indicate that the complaints are justified, additional measures will be considered at that time.

X.5 ASSUMPTIONS AND METHODS

OAR 345-021-0010(1)(x)(E) *The assumptions and methods used in the noise analysis; and*

Response:

The assumptions and methods used for these analyses are summarized in the above sections and are described in more detail in Attachment X-1.

X.6 MONITORING PROGRAM

OAR 345-021-0010(1)(x)(D) *Any measures the applicant proposes to monitor noise generated by operation of the facility.*

Response:

At this time, no operational noise monitoring program is planned since no noise impacts are anticipated. As stated above, a noise survey will be performed if noise complaints are received.

X.7 CONCLUSION

The noise development presented above and in Attachment X-1 conclude that the Golden Hills Wind Farm will be in compliance with all aspects of the ODEQ noise standards contained in OAR-340-35-035.

X.8 REFERENCES

DataKustik GmbH, 2006. *Computer Aided Noise Abatement Model CadnaA*, Version .6. Munich, Germany.

ISO, 1993. International Organization for Standardization. Standard ISO 9613-2 *Acoustics – Attenuation of Sound During Propagation Outdoors, Part 2 General Method of Calculation.* Geneva, Switzerland.

U.S. Environmental Protection Agency (EPA). 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.

ATTACHMENT X-1

Golden Hills Wind Farm Noise Assessment Report

ATTACHMENT X-1 OF EXHIBIT X
GOLDEN HILLS WIND ENERGY DEVELOPMENT
NOISE ASSESSMENT REPORT

Prepared For

BP Alternative Energy

Prepared By

Tetra Tech EC, Inc.

Dawsonville, GA

July 2007

GOLDEN HILLS WIND ENERGY DEVELOPMENT
NOISE ASSESSMENT REPORT
SHERMAN COUNTY, OREGON

Prepared For

bp

BP Alternative Energy

Prepared By

Thomas Adams
Senior Noise Analyst

Tetra Tech EC, Inc.
1219 Auraria Road
Dawsonville, GA 30534

July 2007

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
dB	decibel
dBA	A-weighted sound level
GPS	global positioning system
HWY	Highway
Hz	Hertz
IEC	International Electrotechnical Commission
m/s	meters per second
MW	megawatt
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality

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1.0 INTRODUCTION

A noise impact assessment was performed for the proposed Golden Hills Wind Energy Development (Project) in Sherman County, Oregon. The project is expected to produce a maximum power generating capacity of up to 400 megawatts (MW) using up to 267 wind turbines. The noise assessment consists of four parts. The first is a discussion of the relevant parts of the Oregon Department of Environmental Quality (ODEQ) noise standards for wind farms. The second is an ambient noise survey of existing noise levels in the Project area. These will be used as a basis for comparison with predicted levels at all area residences from the turbines. The third part is computer modeling of wind turbine noise levels to determine the expected operational noise levels from the Project at the residences. The fourth component is the impact assessment that compares overall predicted levels and predicted increases above the existing ambient levels with the 50 A-weighted sound level (dBA) upper limit and the maximum allowable increase of 10 dBA from the ODEQ noise standards.

2.0 SUMMARY OF REGULATIONS OAR 345-021-0010(1)(X)(C)

Oregon Administrative Rules (OAR) Chapter 340, Division 35, was recently revised to specifically address wind energy facilities. Specifically:

- 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 or to conduct a background noise survey at the proposed site to establish actual levels of ambient noise.

- 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 International Electrotechnical Commission standard 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} or L_{50} noise level, 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)(IV) requires that the facility predict compliance with the "Table 8" limits set forth in the regulations, which are summarized in Table 1. 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 proposed wind facility's turbines are operating at the maximum sound power level.

Also, per OAR 340-35-0035(1)(b)(B), the existing ambient L_{50} or L_{10} noise levels cannot be increased by more than 10 dBA.

In addition to the above limits, OAR 340-35-0035(1)(f) establishes standards to regulate octave band sound pressure levels and audible discrete tones. Such standards can be applied by the ODEQ when ODEQ believes subsections (1)(a), (b), or (c) (summarized in Table 1) do not adequately protect the health, safety, or welfare of the public.

Table 1. 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 p.m.)	Nighttime (10 p.m.–7 a.m.)
L_{50}	55	50
L_{10}	60	55
L_1	75	60

Source: Table 8 of OAR 340-35-0035

The most restrictive octave band limits from Table 10 of OAR 340-35-0035 are for nighttime operation and are presented in Table 2 below.

Table 2. State of Oregon Octave Band Limits for Industrial and Commercial Sources Operating at Night (OAR 340-35-0035)

	Octave Band Center Frequencies								
Hertz (cps)	31.5	63	125	250	500	1,000	2,000	4,000	8,000
Nighttime Limit (dB)	65	62	56	50	46	43	40	37	34

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:

- Twenty-five feet 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 above criteria in more than an incidental manner." Residences are the only noise sensitive property identified in the Project area.

3.0 AMBIENT NOISE SURVEY

The ODEQ allows applicants to use an assumed background noise level of 26 dBA for impact assessment purposes if no background noise survey is conducted. However, a level of 26 dBA is very quiet and does not provide an appropriate comparison with actual background levels under typical wind turbine operating conditions that occur during high winds with resulting higher background levels. Consequently, the Applicant opted to conduct a survey over a 1-week period to document existing noise levels at a wide range of wind speeds to establish the relationship between wind speed and existing sound level. Wind speeds were concurrently measured at four existing on-site meteorological towers during the week-long noise survey.

The noise survey was conducted at four monitoring locations starting on May 16, 2007, and ending on May 23, 2007. Four Larson-Davis Laboratories Model 820 Precision Integrating Sound Level Meters that meet the requirements of American National Standards Institute (ANSI) Standard S1.4-1983 for Type 1 meters were used for the survey. The microphones were mounted at a height of about 3 feet above the ground to minimize the generation of noise at the microphone diaphragms by wind and they were also fitted with foam windscreens to further reduce wind-generated noise. Wind speed decreases dramatically at ground level and even the difference between the standard 5-foot microphone position and the 3-foot position used for this surevy reduced the rumbling and popping sound created by wind at the microphone.

The meters were programmed to measure and record the 10-minute Leq, L_{10}, L_{50} and L_{90} statistical levels. Only the L_{50} and L_{10} levels are presented in this report to correspond with OAR 340-035-0035 Noise Control Regulations for Industry and Commerce requirements. Measurements were conducted by a Board Certified Member of the Institute of Noise Control Engineering, in accordance with ISO 1996 standards and good engineering practice.

The monitoring locations were selected to be representative of residences throughout the Project area. The specific locations are described below. The distances relative to the farm houses and adjacent roads were measured with a laser range finder. Coordinates of the microphone locations were determined using a Garmin Model 60CSX handheld Global Positioning System (GPS) receiver. The noise monitoring locations are shown in Figure 1 and described below.

Monitoring Location 1—About 210 feet northwest of the Hart rental house and 140 feet from the road in a grassed area where small farm implements were stored. The house is located on north side of DeMoss Springs Lane about 1.9 miles east of Highway (Hwy) 97. Coordinates of the microphone location are N 45^{o} 31' 01.3" latitude and W 120^{o} 39' 01" longitude.

Monitoring Location 2—On the Pinkerton farm about 180 feet south of the farm house and 206 feet from the road in the edge of a wheat field where the wheat was about 15-inches tall. The farm is located on the east side of Sawtooth Road about 3.25 miles north of the Town of Moro. Coordinates of the microphone location are N 45^{o} 31' 56.7" latitude and W 120^{o} 43' 41.4" longitude.

Monitoring Location 3—On the Blaylock farm about 195 feet south of the farm house and 363 feet from the road in the edge of a wheat field where the wheat was also about 15-inches tall. The farm is located on the east side of VanGilder Road about 2.6 miles south of Hwy 206. Coordinates of the microphone location are N 45^{o} 33' 14.3" latitude and W 120^{o} 45' 26.9" longitude.

Monitoring Location 4—On the Blau/Larimore farm about 150 feet north of the farm house and 169 feet from the road in the middle of a grassy area where the grass was about 12-inches tall. The farm is located on the west side of Mud Hollow Road about 2.8 miles south of the intersection with Hwy 97. Coordinates of the microphone location are N 45^{o} 37' 08.2" latitude and W 120^{o} 46' 31.8" longitude.

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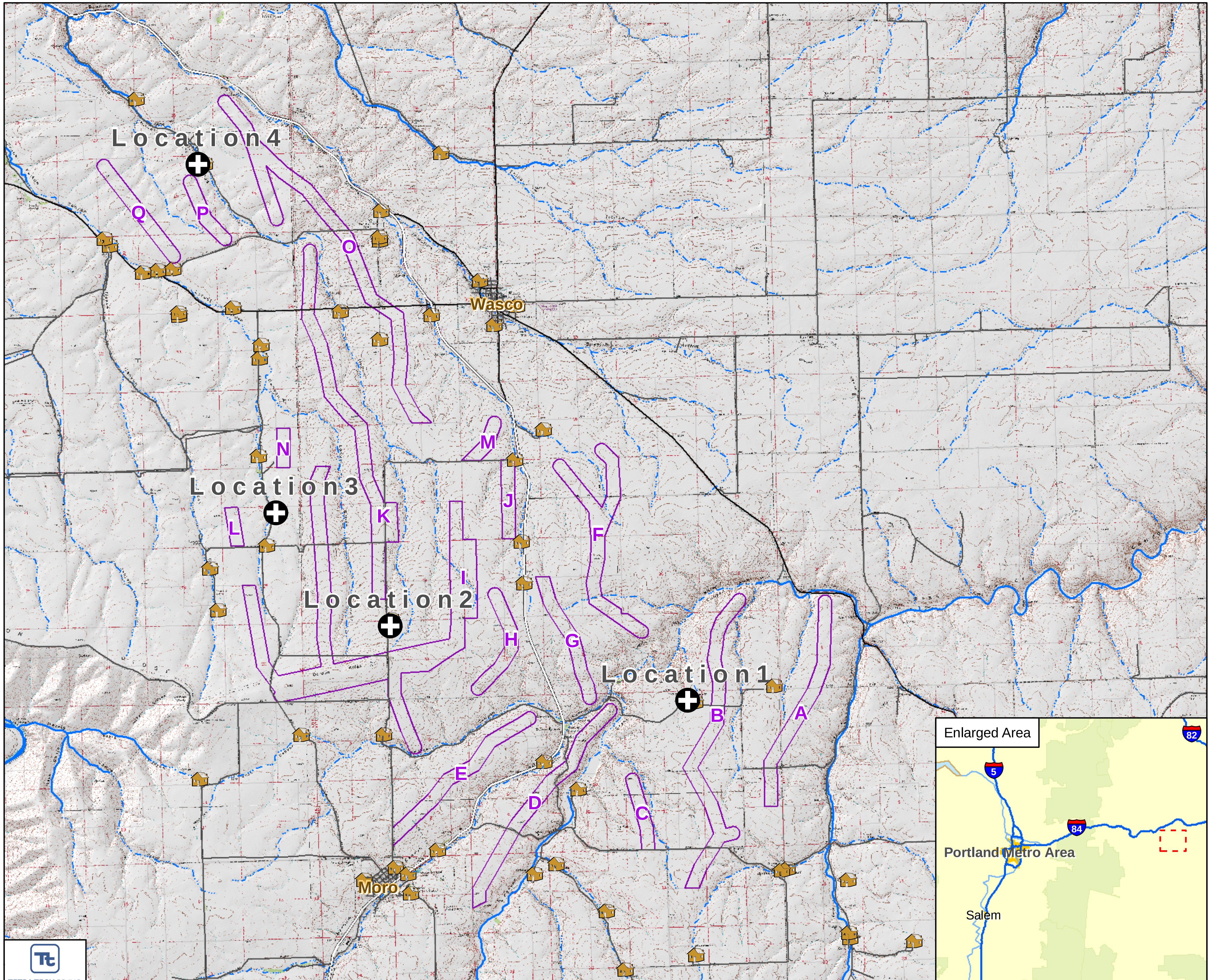

Figure 1
Noise Monitoring Locations

BP Golden Hills
Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

N

1:80,000

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

Photographs of the four noise monitoring locations were taken from the microphone location toward the farm houses and they are presented below.

Figure 2. Photograph of Noise Monitoring Location 1

Figure 3. Photograph of Noise Monitoring Location 2

Figure 4. Photograph of Noise Monitoring Location 3

Figure 5. Photograph of Noise Monitoring Location 4

The results of the noise monitoring are presented only for the L_{50} statistical level because this is the metric most applicable to the ODEQ regulations. The L_{50} level is the median level or the level that is exceeded for 50 percent of each measurement period. The measurements were taken over continuous 10-minute intervals throughout the week-long survey and they were then summarized into hourly levels by arithmetic averaging. Because of the large volume of data, the measurement results are presented in four graphs (Figures 6 through 9) instead of a tabular format.

In order to conduct a regression analysis of noise level versus wind speed, the wind speed data were obtained from the on-site meteorological towers and are presented along with the measured noise levels in the four charts. Two things are immediately obvious in the charts. The first is that there is a definite diurnal cycle in both the sound levels and wind speeds with minimums late at night and maximums during the day. The second is that the noise levels appear to track the wind speeds relatively closely, thereby suggesting that the wind is the primary source of noise at the rural sites. This result was expected for the rural area where there are no primary sources of manmade noise such as industrial facilities, major highways, and airports. Farming activities produce intermittent noise that is generally filtered out of the L_{50} metric.

Another feature seen in the charts is that the minimum sound levels measured were about 29 to 30 dBA. This level is typically the minimum that most sound levels meters will measure, including those used in this survey. Levels below 30 dBA are usually not significant contributions to any noise impact assessment. However, to overcome this instrument limitation, the regression analysis was set to extrapolate lower noise levels by using a linear regression with the Y-intercept set to 17 dBA which represents a best fit to the data. Levels lower than 17 dBA, are seldom encountered in nature and have only been observed by the author once in a very remote desert environment when using a special noise monitor that had a low noise floor. Setting the Y-intercept to 17 dBA essentially means that, when the wind is calm, the sound level is 17 dBA. See the regression charts following these four charts for the results of the extrapolation.

The next four charts (Figures 10 through14) show the results of the linear regression analyses. At moderate to high wind speeds, the wind is clearly controlling the noise environment, but it falls apart at the lower end, partly because of the instrument limitation, but more importantly because other noise sources not related to wind come into play. These sources could include insect noise, very distant traffic, and high altitude aircraft. Thus, by treating the effect of the wind on noise as a linear function, the lower noise levels can be extrapolated from the moderate to high level wind correlation fairly accurately or at least in a conservative manner. This essentially means that, when the wind is calm, the ambient noise level is 17 dBA, which is likely somewhat lower than actual levels at the site.

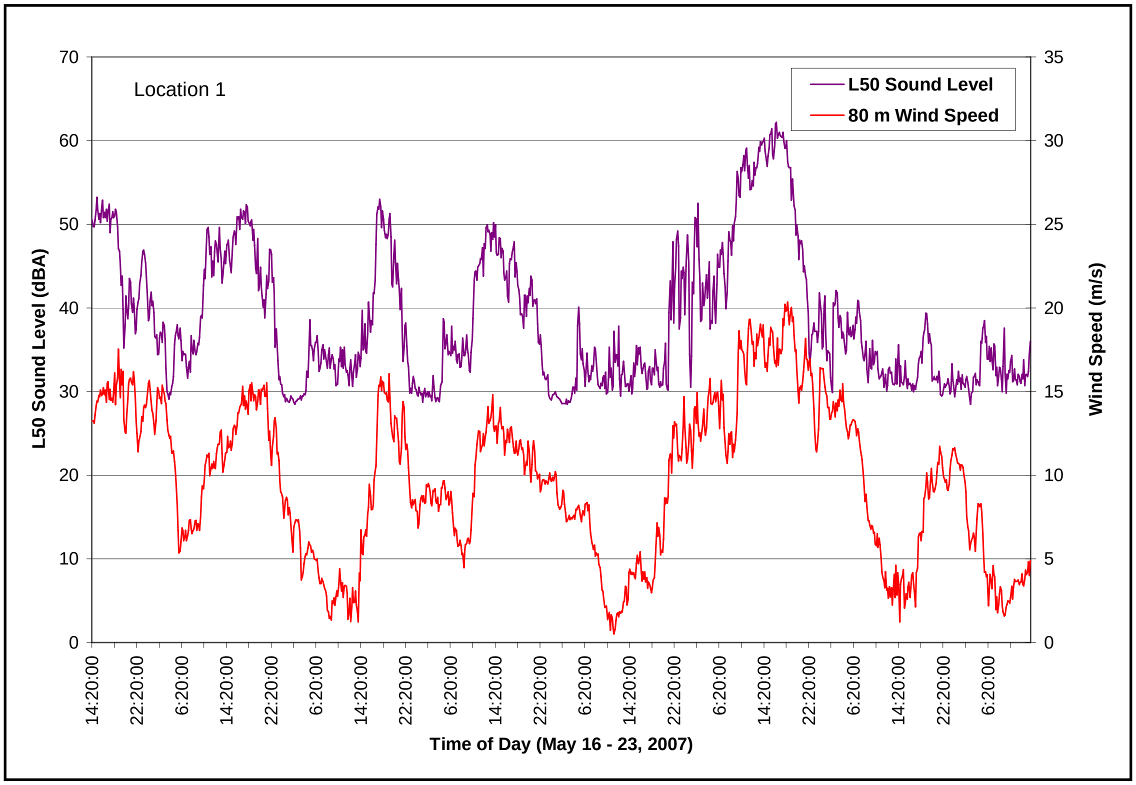

Figure 6. Location 1, 10-Minute Interval L_{50} Statistical Noise Levels and Wind Speed

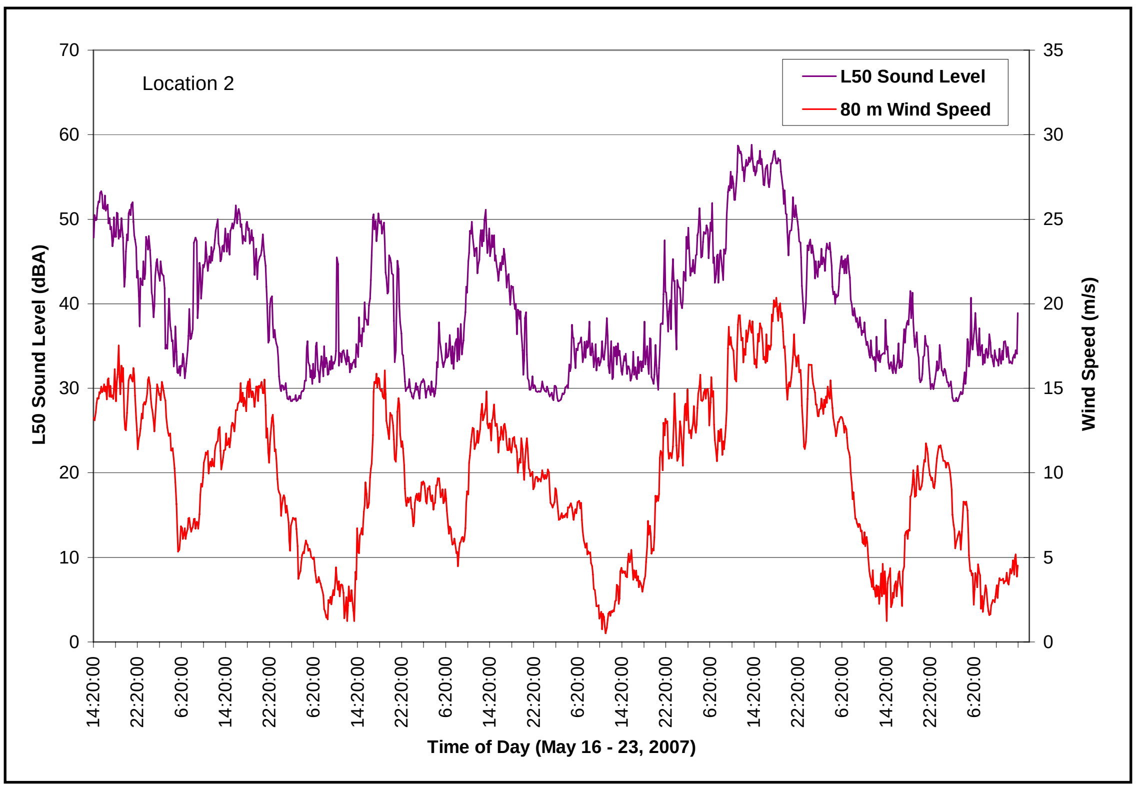

Figure 7. Location 2 , 10-Minute Interval L_{50} Statistical Noise Levels and Wind Speed

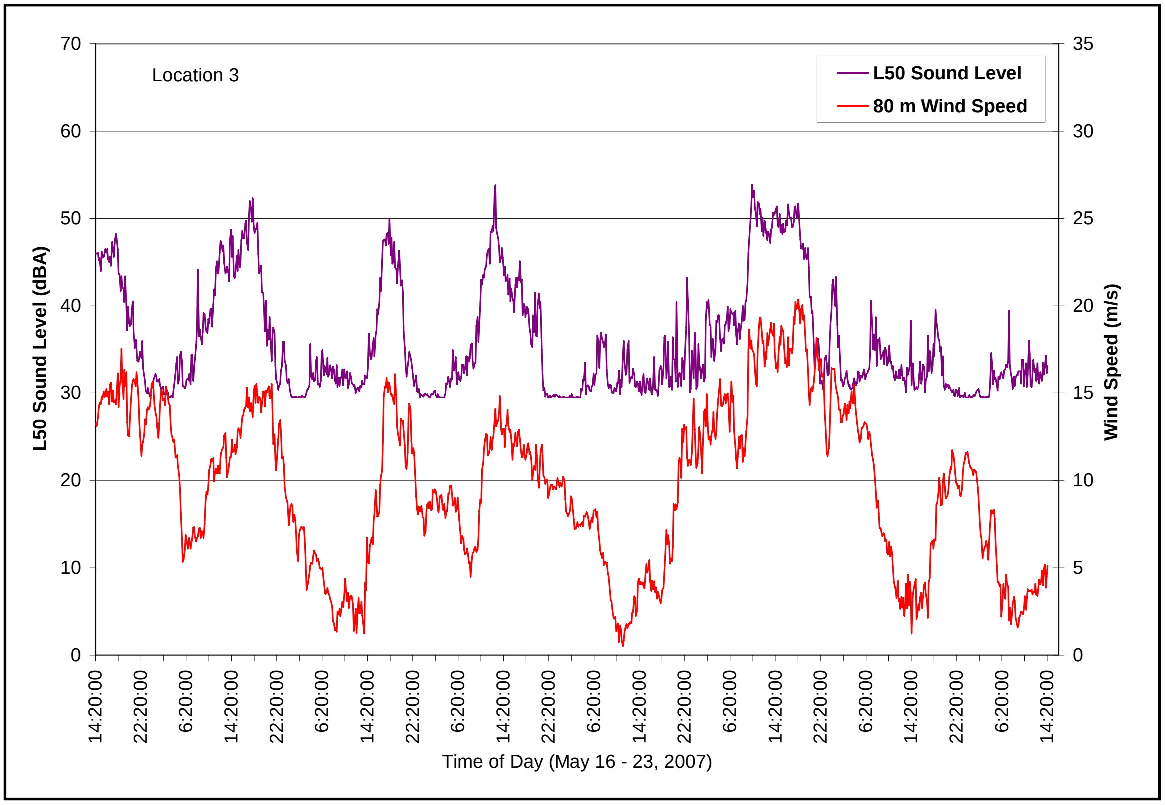

Figure 8. Location 3, 10-Minute Interval L_{50} Statistical Noise Levels and Wind Speed

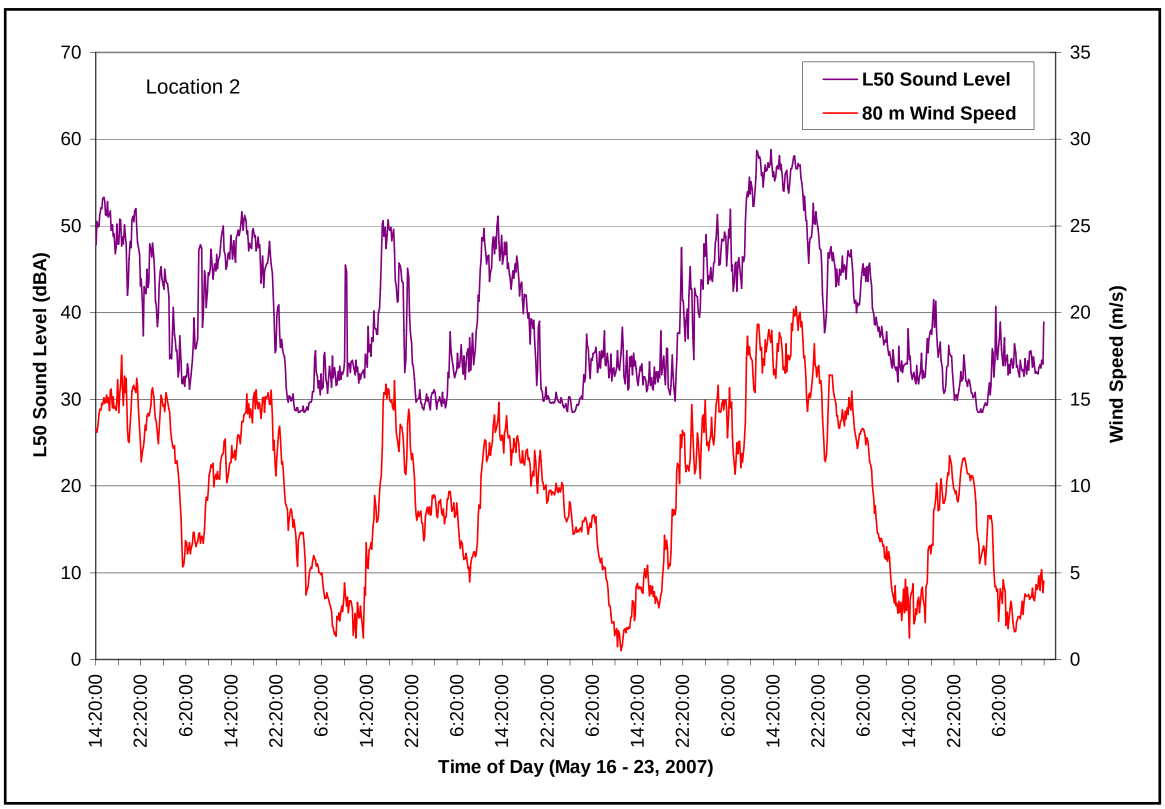

Figure 9. Location 4, 10-Minute Interval L_{50} Statistical Noise Levels and Wind Speed

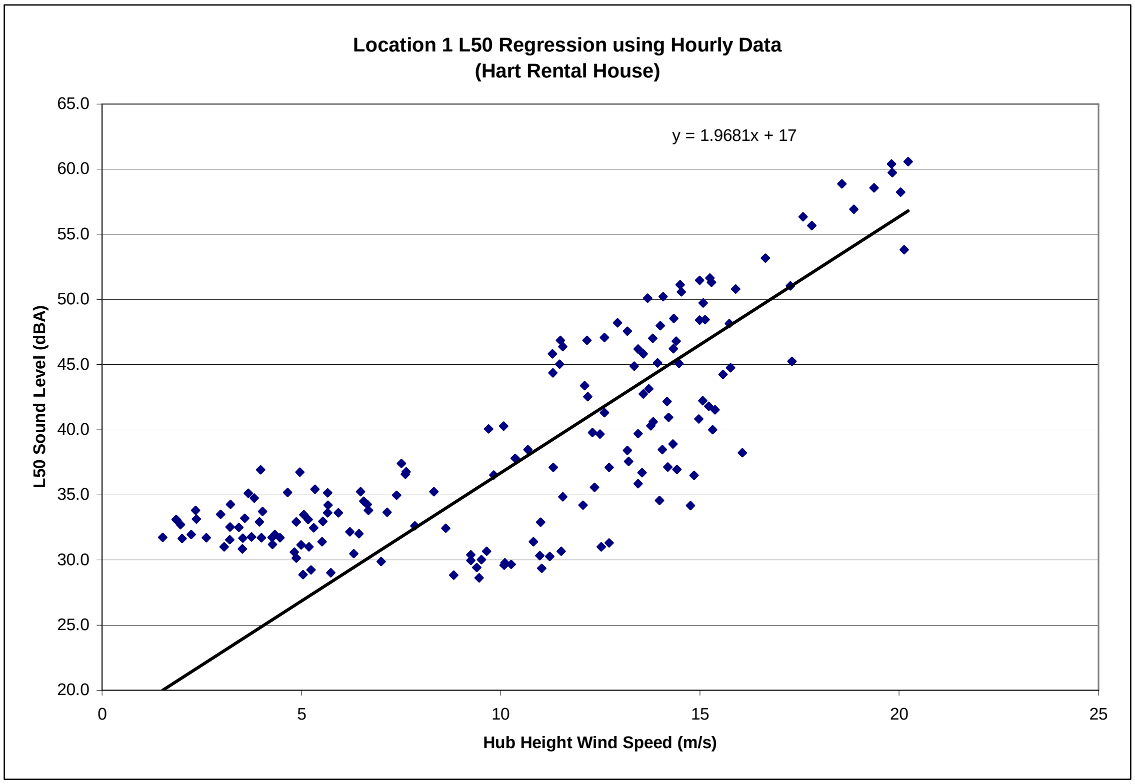

Figure 10. Location 1 Regression Chart

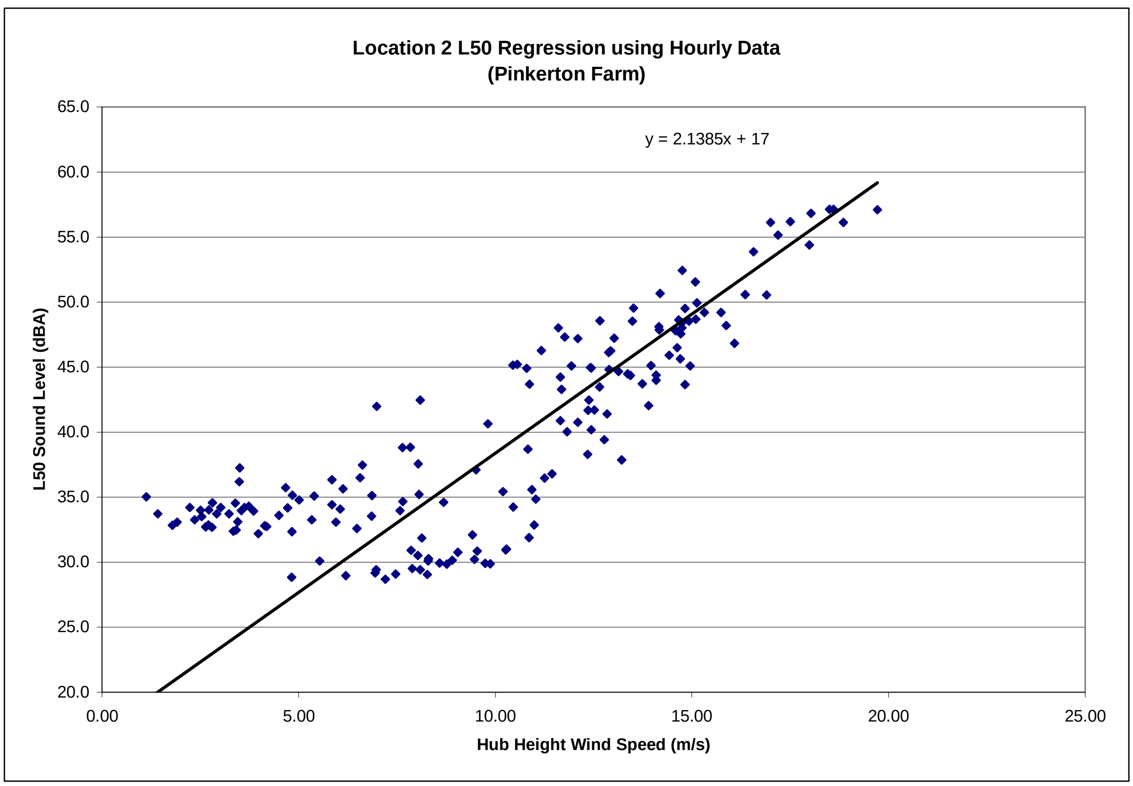

Figure 11. Location 2 Regression Chart

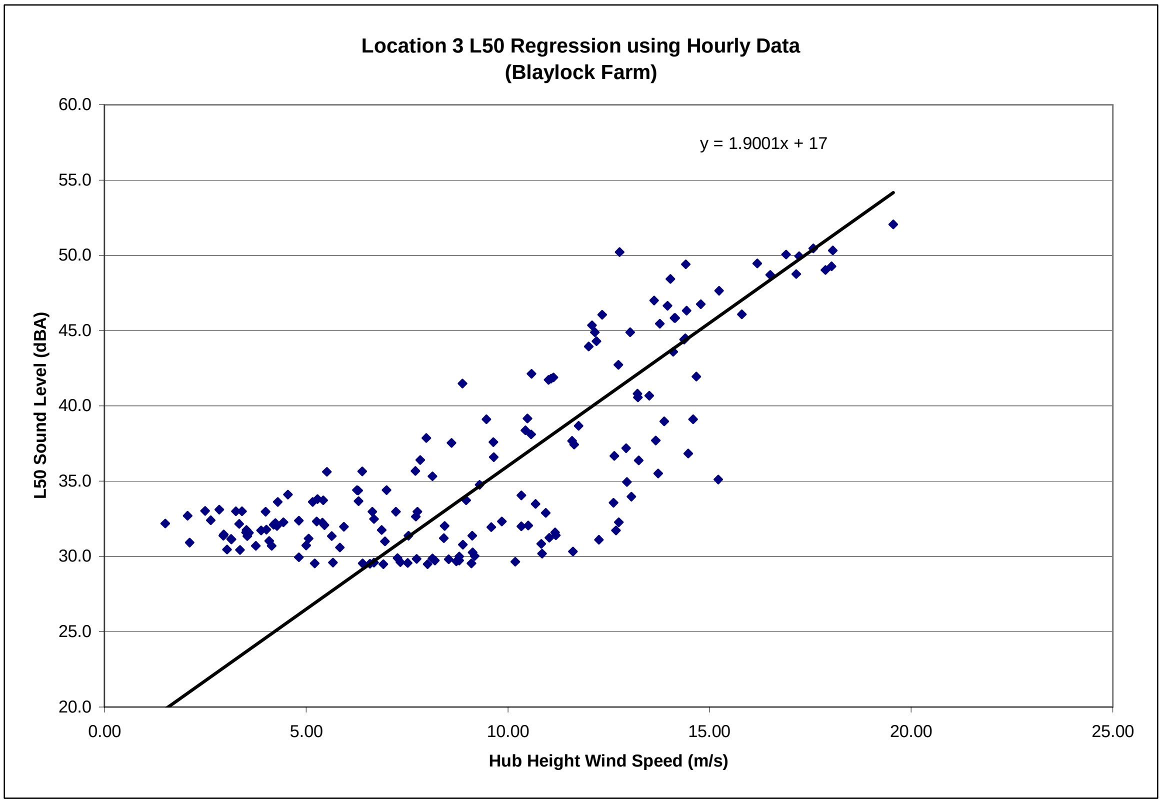

Figure 12. Location 3 Regression Chart

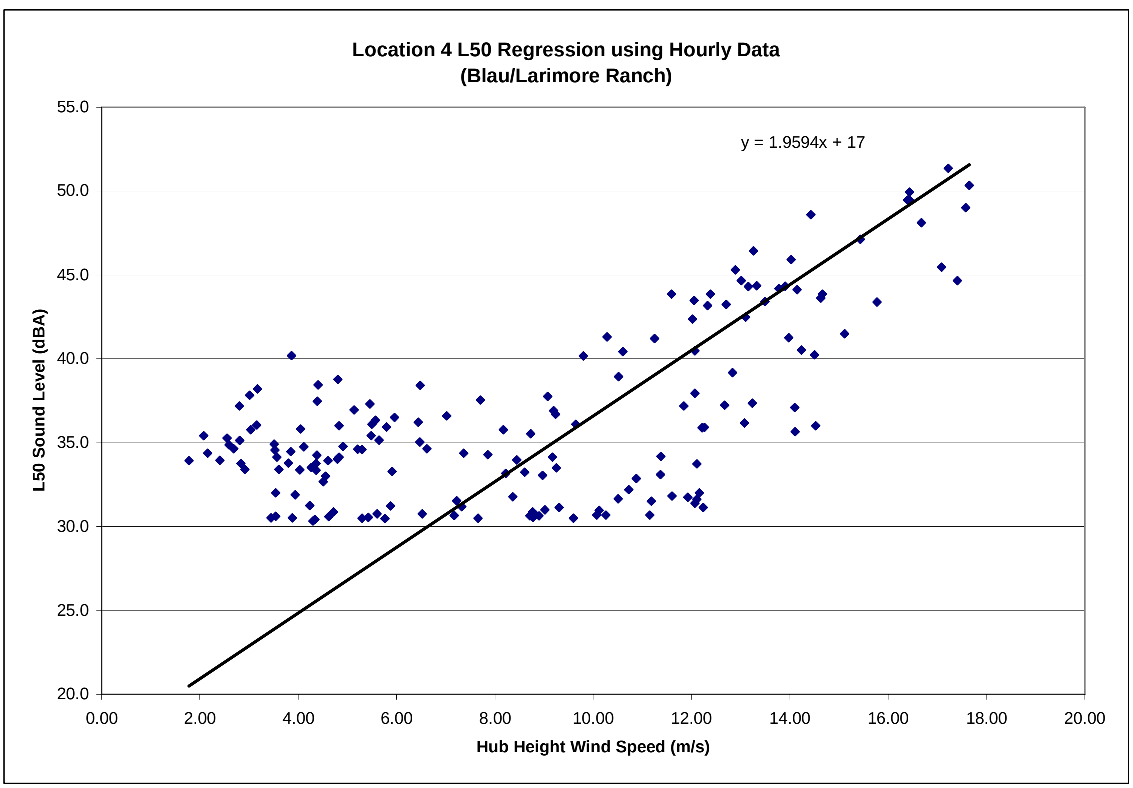

Figure 13. Location 4 Regression Chart

The product of the regression analysis is a determination of the existing sound levels expected at the specific wind speeds associated with wind turbine operation at different load levels ranging from cut-in to full load (5.6 meters per second (m/s) to 13.9 m/s and above at hub height). These values, calculated from the regression equation shown in each chart and presented in Table 3, will be compared with the turbine operational noise predicted at each residence to determine the expected increase in the ambient sound levels produced by Project operation. These levels range from 28 to 32 dBA when the turbine just begins to operate at its cut-in wind speed. At full load, the levels range from 44.4 to 49.7 dBA in strong winds.

Table 3. Existing Ambient Sound Levels at Different Wind Speeds

Noise Monitoring Location	Regression Equation*	Calculated Existing Noise Level				
		Cut-In at 5.6 m/s	Quarter Load at 7.0 m/s	Half Load at 8.4 m/s	3/4 Load at 9.8 m/s	Full Load at 13.9 m/s
Loc 1	y = 1.9681x + 17	28.0 dBA	30.8 dBA	33.5 dBA	36.3 dBA	44.4 dBA
Loc 2	y = 2.1385x + 17	32.0 dBA	35.0 dBA	38.0 dBA	41.0 dBA	49.7 dBA
Loc 3	y = 1.9001x + 17	30.6 dBA	33.3 dBA	36.0 dBA	38.6 dBA	46.4 dBA
Loc 4	y = 1.9594x + 17	31.0 dBA	33.7 dBA	36.5 dBA	39.2 dBA	47.2 dBA

* where y is the predicted sound level and x is the wind speed

4.0 WIND TURBINE NOISE MODELING

Computer modeling was used to calculate sound levels that would be generated by operation of the proposed 267 wind turbines. A specific turbine model has not been selected at this point and this analysis is based on a generic 1.5-MW turbine. When the actual turbines to be installed have been selected, additional computer modeling will be performed to verify the specific predicted levels. Should greater noise impacts be shown in that analysis, appropriate measures such as moving or eliminating some turbines will be taken to limit the potential impacts.

The commercially available CadnaA model (DataKustik, 2006) was used for this analysis. The software takes into account spreading losses, ground and atmospheric effects, shielding from terrain, barriers and buildings, and reflections from surfaces. The software is standards-based and the ISO 9613 Part 2 standard was used for air absorption and other noise propagation calculations (ISO, 1993). By default, the model assumes that all receptors are downwind of the noise sources, thereby producing a conservative result. The following model options were selected:

- The ground absorption coefficient was selected as 0.5 where a value of 0 is a highly reflective ground surface such as pavement or calm water and 1 is a highly absorptive surface such as plowed fields, wheat fields, and areas with trees and brush. A value of 1 would be most realistic for the Project area, but the value of 0.5 will yield a conservative result to avoid under-predicting expected noise levels.

- Atmospheric conditions were selected as the standard atmosphere, which is a temperature of 50 degrees Fahrenheit and a relative humidity of 70 percent. This is also a conservative selection since different combinations more applicable to the site will generally produce slightly lower modeled results on the order of tenths of a decibel.

- The search radius was set to 5 kilometers. This means that the contributions of all turbines within 5 km of each receptor were calculated in the total for receptors. Because of the scattering of sound in the atmosphere, particularly when it is windy, noise from the more distant turbines should not realistically have any contribution, although the model results would show a slight increase.

Turbine noise levels were modeled at five different load levels ranging from cut-in, when the turbine just begins to operate, to full load when it is producing the maximum amount of noise. This full range of loads was selected because the turbines produce less noise at low loads but the wind speeds are also lower resulting in lower ambient noise levels. It is not clear, without a full analysis, whether the greatest increases in ambient levels occur at full load or at some lower load. For this Project, the greatest increases were found to occur at half load. Often, the greatest increases occur at cut-in when the ambient noise levels are generally the lowest. This result will be clearer as the methodology is described more fully below.

Table 4 shows the sound power levels used in the model, by octave band, of the turbines at the five load levels analyzed. Sound power is the total acoustic power produced by a noise source and it is independent of the distance from the source. Although sound power and sound pressure are both measured in terms of decibels, the scales are different because sound power is referenced to watts, which is a measure of power and pressure is referenced to pressure as indicated by the name. Thus, a sound power level of 106 dBA for the generic turbine will not sound like a level of 106 dBA even when right at the nacelle. Noise levels at the nacelle of a wind turbine would likely be on the order of 70 to 80 dBA sound pressure. At ground level, the sound pressure level would be significantly lower.

Table 4. A-Weighted Sound Power Levels of a Generic 1.5-MW Wind Turbine (re 10^{-12} watts)

Turbine Load Level	WS at Hub	Octave Band Center Frequency (Hz)*								Total dBA
		63	125	250	500	1,000	2,000	4,000	8,000	
Cut-in	5.6	79.1	88.0	91.2	92.6	91.9	88.5	81.3	72.1	98.0
1/4 load	7.0	82.2	91.1	94.3	95.7	95.0	91.6	84.4	75.2	101.1
1/2 load	8.4	86.1	95.0	98.2	99.6	98.9	95.5	88.3	79.1	105.0
3/4 load	9.8	87.1	96.0	99.2	100.6	99.9	96.5	89.3	80.1	106.0
Full Load	13.9	87.1	96.0	99.2	100.6	99.9	96.5	89.3	80.1	106.0

* Levels in the 31.5-Hz band were not reported.

The model results are presented both graphically and in tabular form. A series of noise contour maps (Figures 14 through 17) show the distribution of expected noise levels from the turbines over the entire Project area from 35 to 60 dBA. The noise contours are overlaid on the topographic map of the area with all 267 turbines and all 56 of the closest residences shown. The noise contour maps show that there are no residences within the 50 dBA or higher contours. Table 5 shows that the maximum calculated sound level at any residence is 46.3 dBA at 3/4 and full load, which is below the 50 dBA limit set by ODEQ. Thus, the project is expected to be in full compliance with this item of the regulations.

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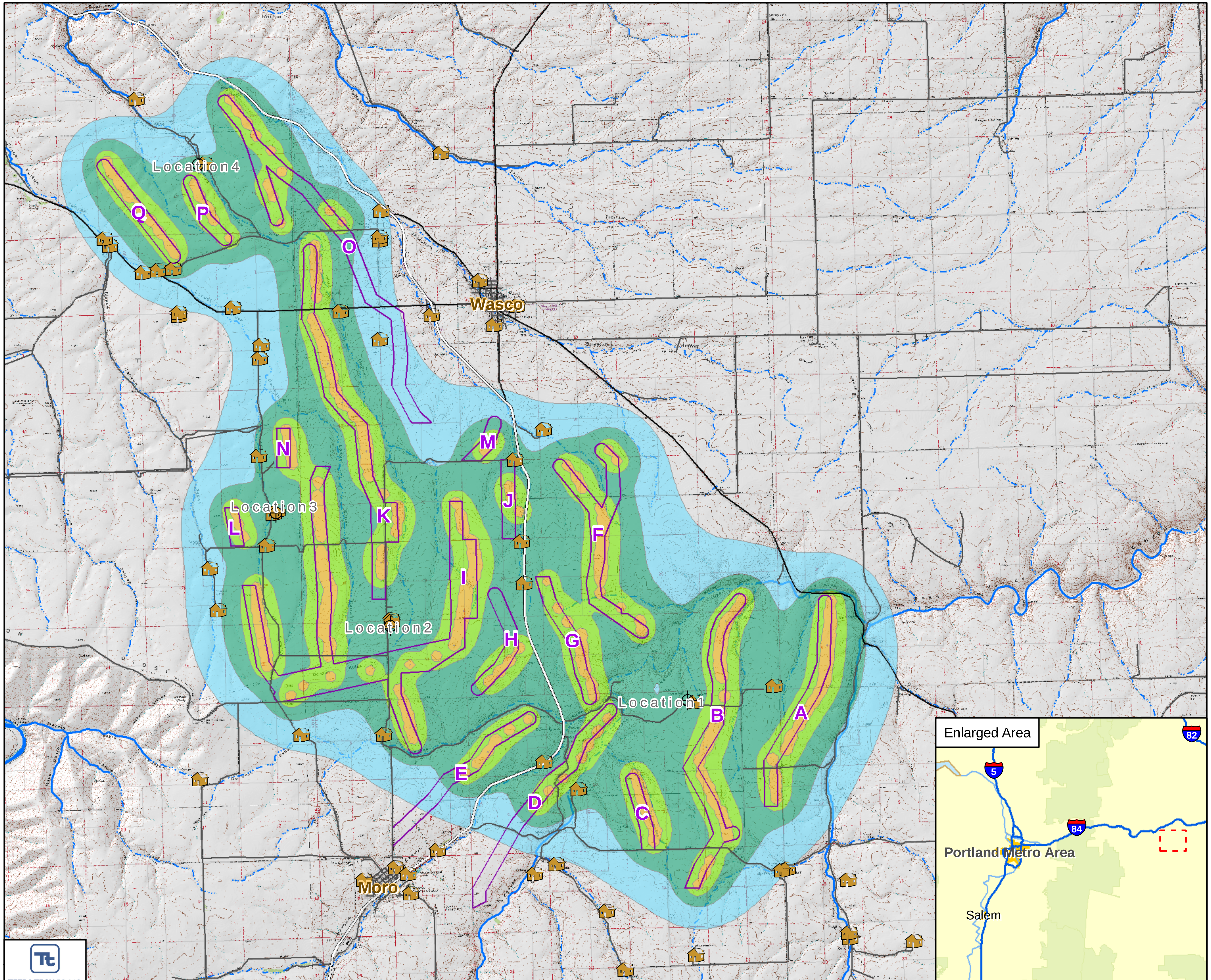

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Figure 14
Predicted Operational Noise Level Contours at Cut-In

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Noise Level (dBA)

- 30.0 - 35.0
- 35.1 - 40.0
- 40.1 - 45.0
- 45.1 - 50.0

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

N

1:80,000

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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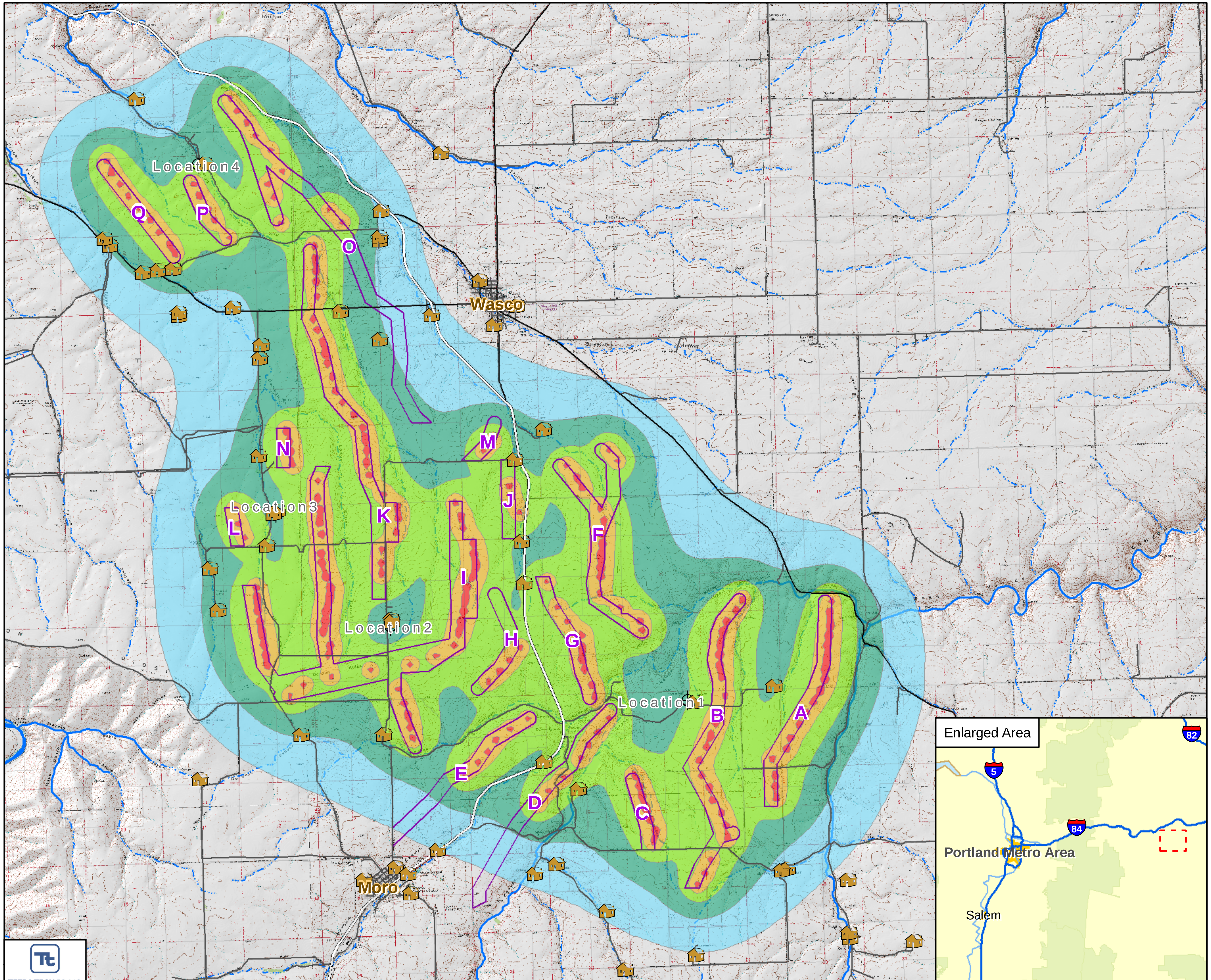

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Figure 15
Predicted Operational Noise Level Contours at 1/4 Load

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Noise Level (dBA)

- 30.0 - 35.0
- 35.1 - 40.0
- 40.1 - 45.0
- 45.1 - 50.0
- 50.1 - 55.0

Monitoring Microphone
Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway
State Highway
Major Road
Local Road

N

1:80,000

0 1 2 3
Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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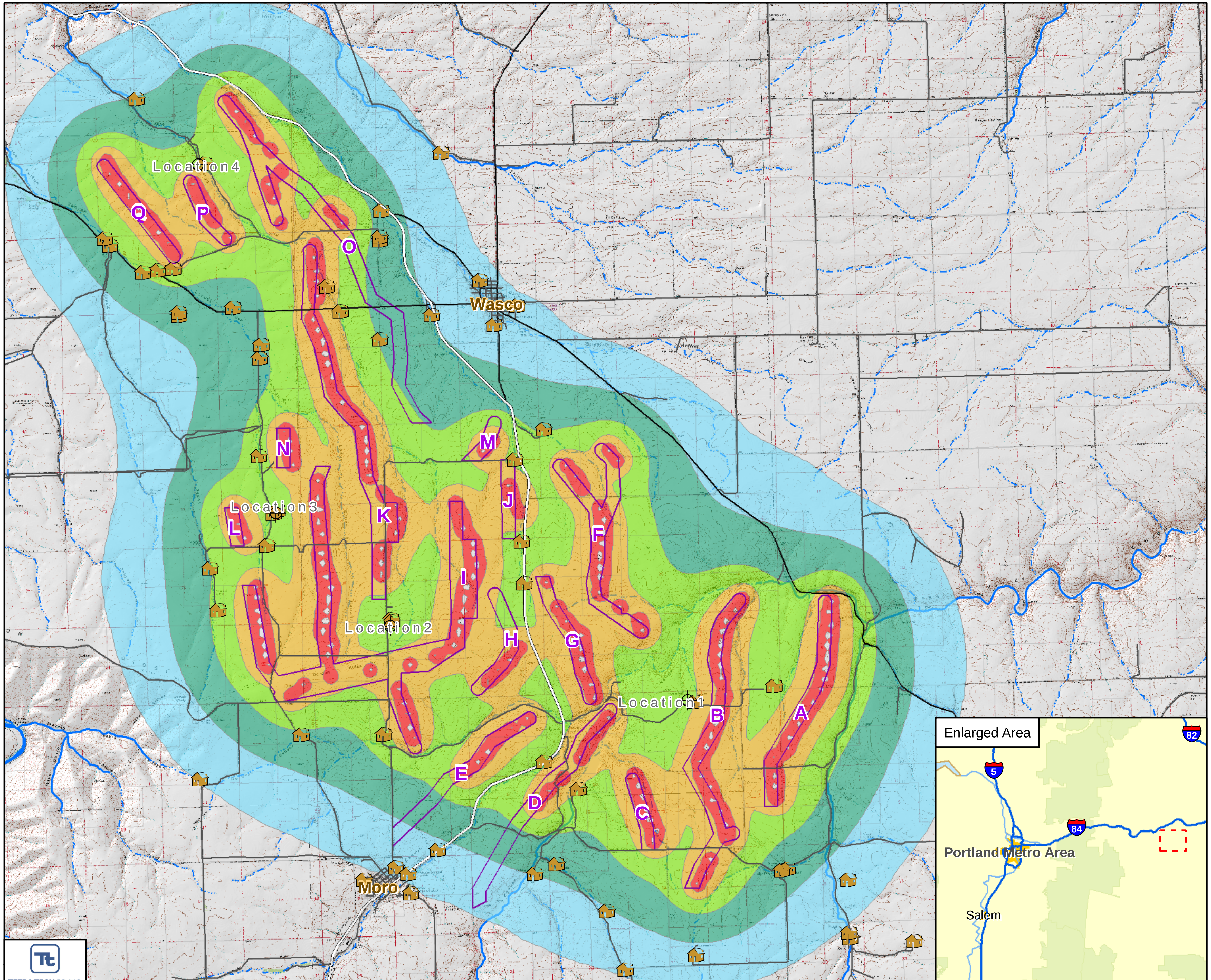

Figure 16
Predicted Operational Noise Level Contours at Half Load

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Noise Level (dBA)

- 30.0 - 35.0
- 35.1 - 40.0
- 40.1 - 45.0
- 45.1 - 50.0
- 50.1 - 55.0

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

1:80,000

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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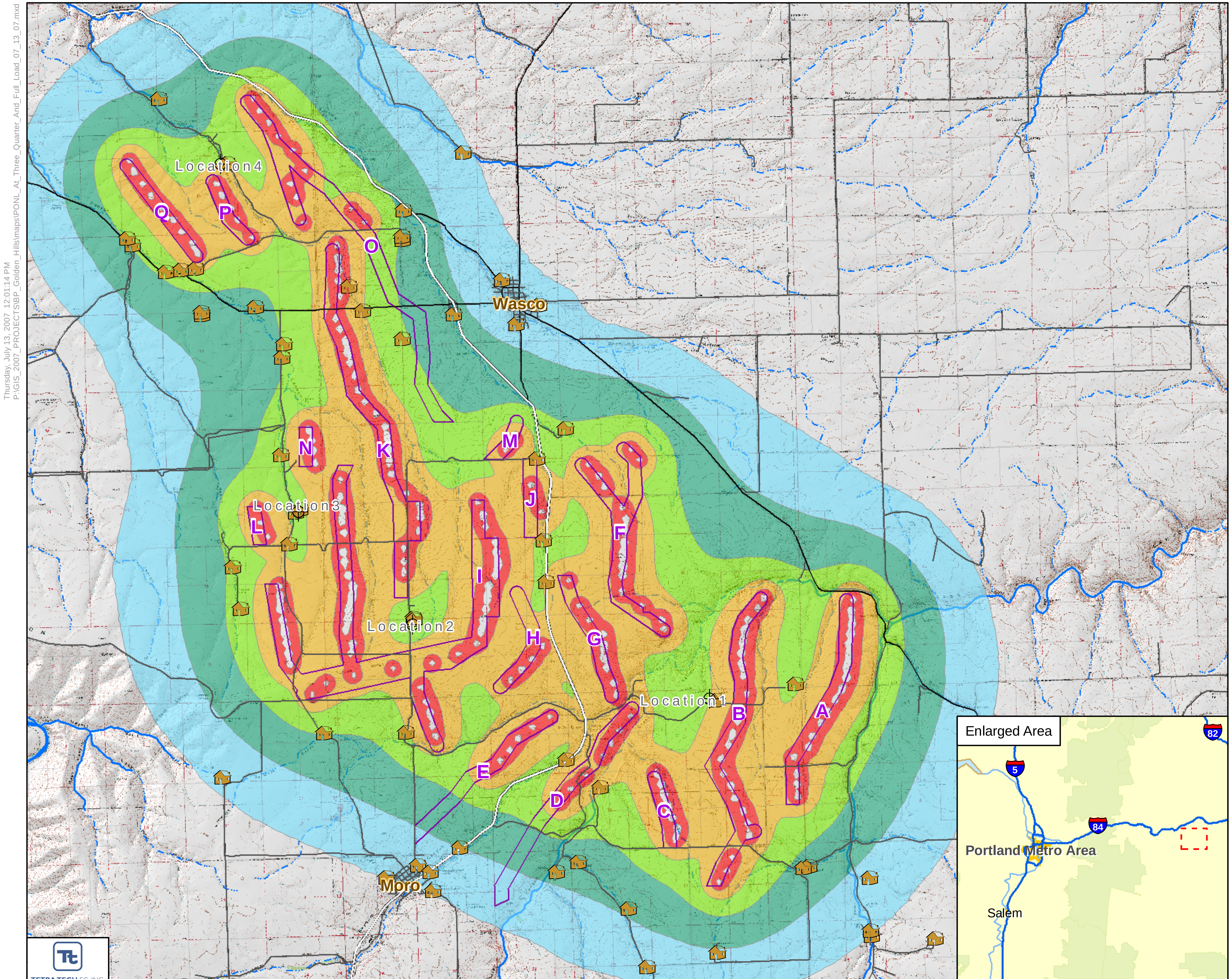

Figure 17
Predicted Operational Noise Level Contours at 3/4 and Full Loads

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Noise Level (dBA)

- 30.0 - 35.0
- 35.1 - 40.0
- 40.1 - 45.0
- 45.1 - 50.0
- 50.1 - 55.0

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

1:80,025

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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Table 5. Modeled Turbine Noise Levels for Five Loads at Each Receptor

	Modeled Levels Sorted from Highest to Lowest				
	Cut-In	1/4 Load	1/2 Load	3/4 Load	Full Load
Receptor ID	dBA	dBA	dBA	dBA	dBA
25	38.3	41.4	45.3	46.3	46.3
4	38.1	41.2	45.1	46.1	46.1
11	38.0	41.1	45.0	46.0	46.0
42	37.5	40.6	44.5	45.5	45.5
3	37.4	40.5	44.4	45.4	45.4
48	37.3	40.4	44.3	45.3	45.3
37	37.1	40.2	44.1	45.1	45.1
46	36.9	40.0	43.9	44.9	44.9
47	36.6	39.7	43.6	44.6	44.6
5	36.5	39.6	43.5	44.5	44.5
35	36.5	39.6	43.5	44.5	44.5
36	*36.4*	*39.5*	*43.4*	*44.4*	*44.4*
57	36.4	39.5	43.4	44.4	44.4
16	36.0	39.1	43.0	44.0	44.0
17	36.0	39.1	43.0	44.0	44.0
21	35.9	39.0	42.9	43.9	43.9
34	35.8	38.9	42.8	43.8	43.8
40	34.4	37.5	41.4	42.4	42.4
22	33.4	36.5	40.4	41.4	41.4
41	*32.9*	*36.0*	*39.9*	*40.9*	*40.9*
27	32.8	35.9	39.8	40.8	40.8
44	32.7	35.8	39.7	40.7	40.7
23	32.4	35.5	39.4	40.4	40.4
24	*32.4*	*35.5*	*39.4*	*40.4*	*40.4*
32	32.3	35.4	39.3	40.3	40.3
33	32.1	35.2	39.1	40.1	40.1
39	32.1	35.2	39.1	40.1	40.1
30	31.6	34.7	38.6	39.6	39.6
29	31.5	34.6	38.5	39.5	39.5
31	31.1	34.2	38.1	39.1	39.1
28	31.0	34.1	38.0	39.0	39.0
18	30.5	33.6	37.5	38.5	38.5
6	30.2	33.3	37.2	38.2	38.2
20	29.7	32.8	36.7	37.7	37.7
13	29.5	32.6	36.5	37.5	37.5
19	29.5	32.6	36.5	37.5	37.5
26	28.2	31.3	35.2	36.2	36.2
12	28.1	31.2	35.1	36.1	36.1
45	27.9	31.0	34.9	35.9	35.9
14	27.7	30.8	34.7	35.7	35.7
15	27.0	30.1	34.0	35.0	35.0
1	26.5	29.6	33.5	34.5	34.5

Table 5. .Modeled Turbine Noise Levels for Five Loads at Each Receptor (Concluded)

	Modeled Levels Sorted from Highest to Lowest				
	Cut-In	1/4 Load	1/2 Load	3/4 Load	Full Load
Receptor ID	dBA	dBA	dBA	dBA	dBA
51	25.6	28.7	32.6	33.6	33.6
7	25.5	28.6	32.5	33.5	33.5
50	24.3	27.4	31.3	32.3	32.3
52	24.0	27.1	31.0	32.0	32.0
53	23.8	26.9	30.8	31.8	31.8
56	23.8	26.9	30.8	31.8	31.8
2	23.7	26.8	30.7	31.7	31.7
38	23.2	26.3	30.2	31.2	31.2
58	22.8	25.9	29.8	30.8	30.8
9	22.4	25.5	29.4	30.4	30.4
55	22.3	25.4	29.3	30.3	30.3
8	22.0	25.1	29.0	30.0	30.0
54	22.0	25.1	29.0	30.0	30.0
10	17.3	20.4	24.3	25.3	25.3

The ODEQ also limits the increases in existing ambient noise levels caused by wind turbines to no greater than 10 dBA unless a signed waiver is obtained from the affected land owner by the Applicant. Table 3 presents the applicable existing ambient noise levels at different wind speeds associated with the wind turbine operation at the five load levels. For this analysis, the site was divided into quadrants and houses within each quadrant were assumed to experience the same ambient noise levels that were measured in the quadrant. The modeled level at each receptor was first added, using decibel addition (Equation 1), to the ambient level to produce the expected future level with the Project in operation. The existing ambient level was then subtracted arithmetically from this future level to determine the increase.

Equation 1 Future Level = 10 log ((10^ (L_A/10) + (10^ (L_P/10))

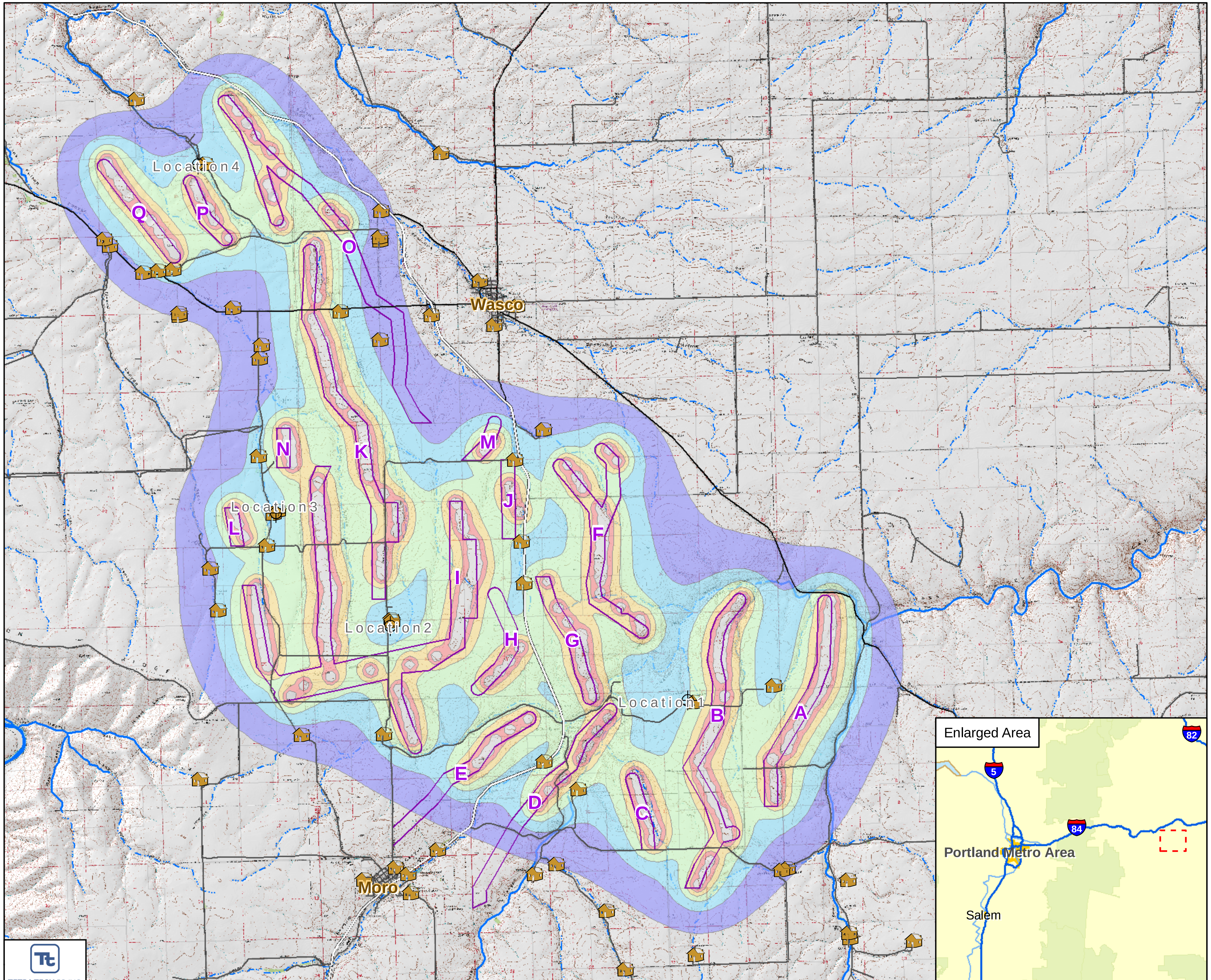
Where: L_A = Ambient Level
L_P = Project Level

Note that in Table 5, the predicted turbine noise levels are identical at the 3/4 and full load conditions. However, the increases in ambient levels are different because the ambient levels at 3/4 load winds are lower than the ambient levels at the higher full load winds. Thus, five noise contour maps were required to show these increases throughout the area at the different loads (Figures 18 through 22). Note that there are no large differences in the first four load levels, but at full load, the increases are dramatically lower because of the higher ambient levels. Since the noise model will not accept ambient levels for individual receptors, the levels for all four locations were averaged for each load level to produce these maps. However, the table of increases (Table 6) is based on the specific ambient noise levels for each receptor and these values are used for determination of compliance with the ODEQ standards.

Figure 18
Predicted Increases in Ambient Noise Levels at Cut-In

BP Golden Hills Wind Resource Area

Sherman County, OR



alternativenergy
Powered by BP

Ambient Noise Increase (dBA)

- 2.5 - 5.0
- 5.1 - 7.5
- 7.51 - 10.0
- 10.1 - 12.5
- 12.51 - 15.0

Dwelling

Monitoring Microphone

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

1:80,025

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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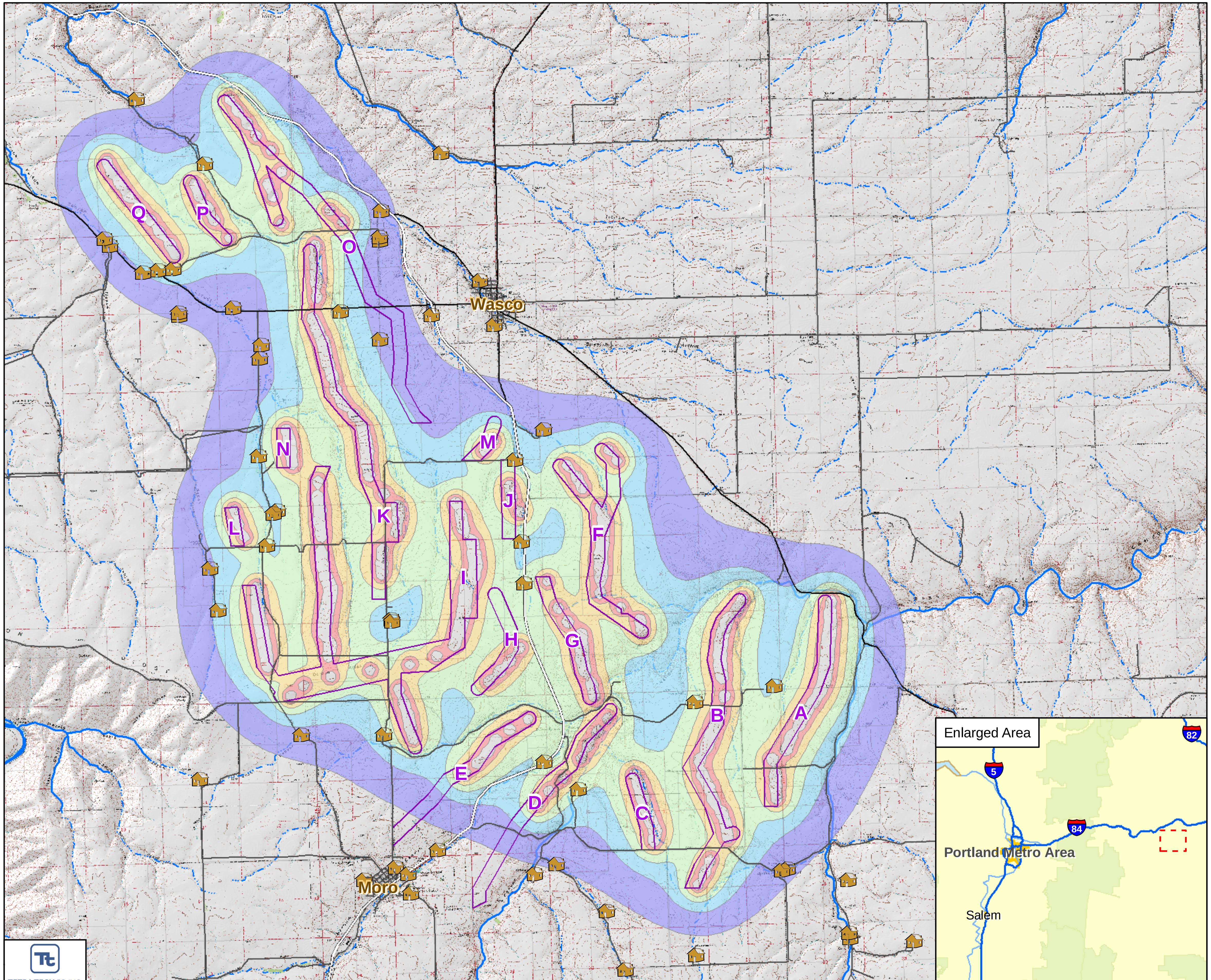
Figure 19
Predicted Increases in Ambient Noise Levels at 1/4 Load

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP



Ambient Noise Increase (dBA)

- 2.5 - 5.0
- 5.1 - 7.5
- 7.51 - 10.0
- 10.1 - 12.5
- 12.51 - 15.0

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

- Interstate Highway
- State Highway
- Major Road
- Local Road

N

1:80,000

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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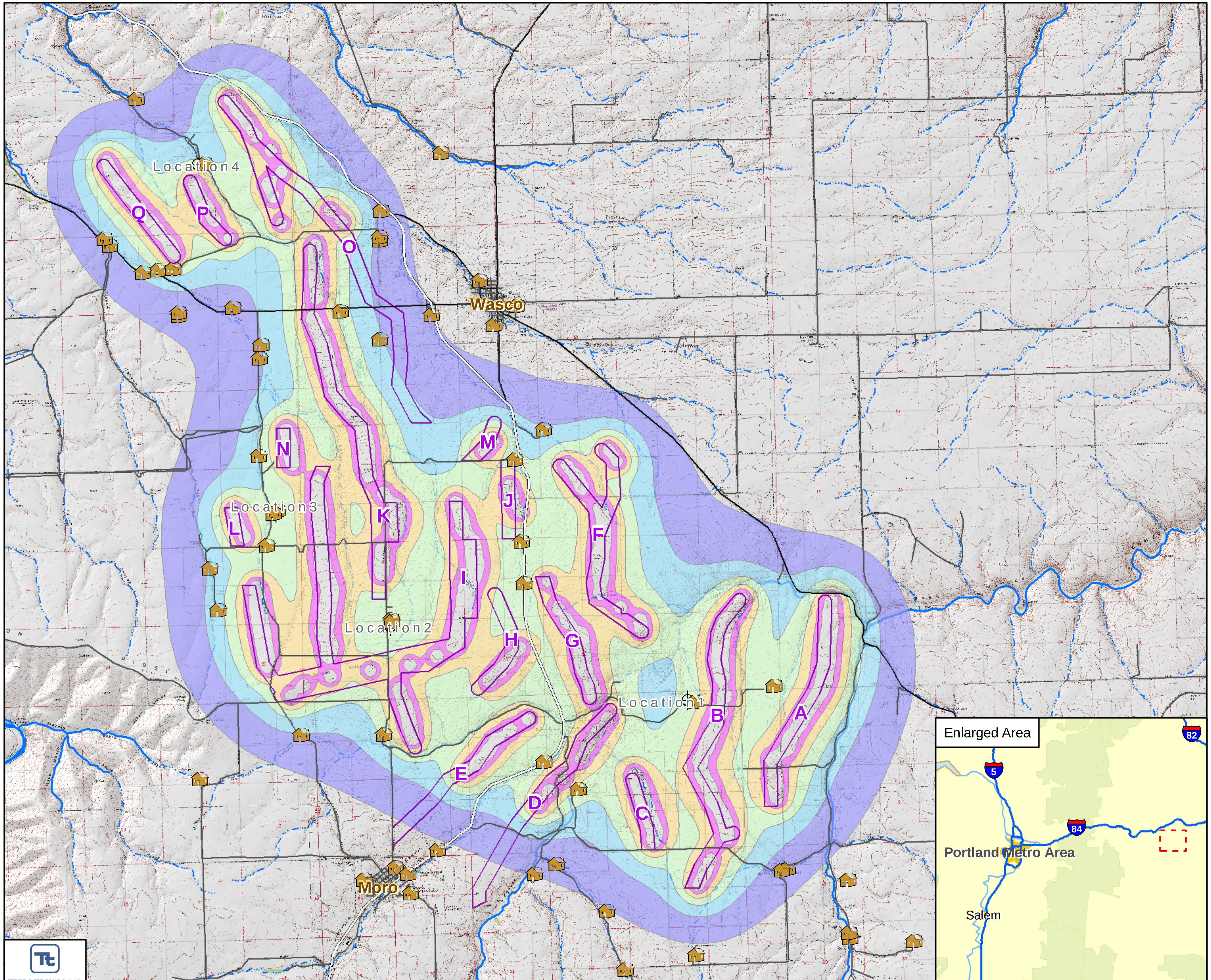
Figure 20
Predicted Increases in Ambient Noise Levels at Half Load

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP



Ambient Noise Increase (dBA)

- 2.5 - 5.0
- 5.1 - 7.5
- 7.51 - 10.0
- 10.1 - 12.5
- 12.51 - 15.0

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

1:80,000

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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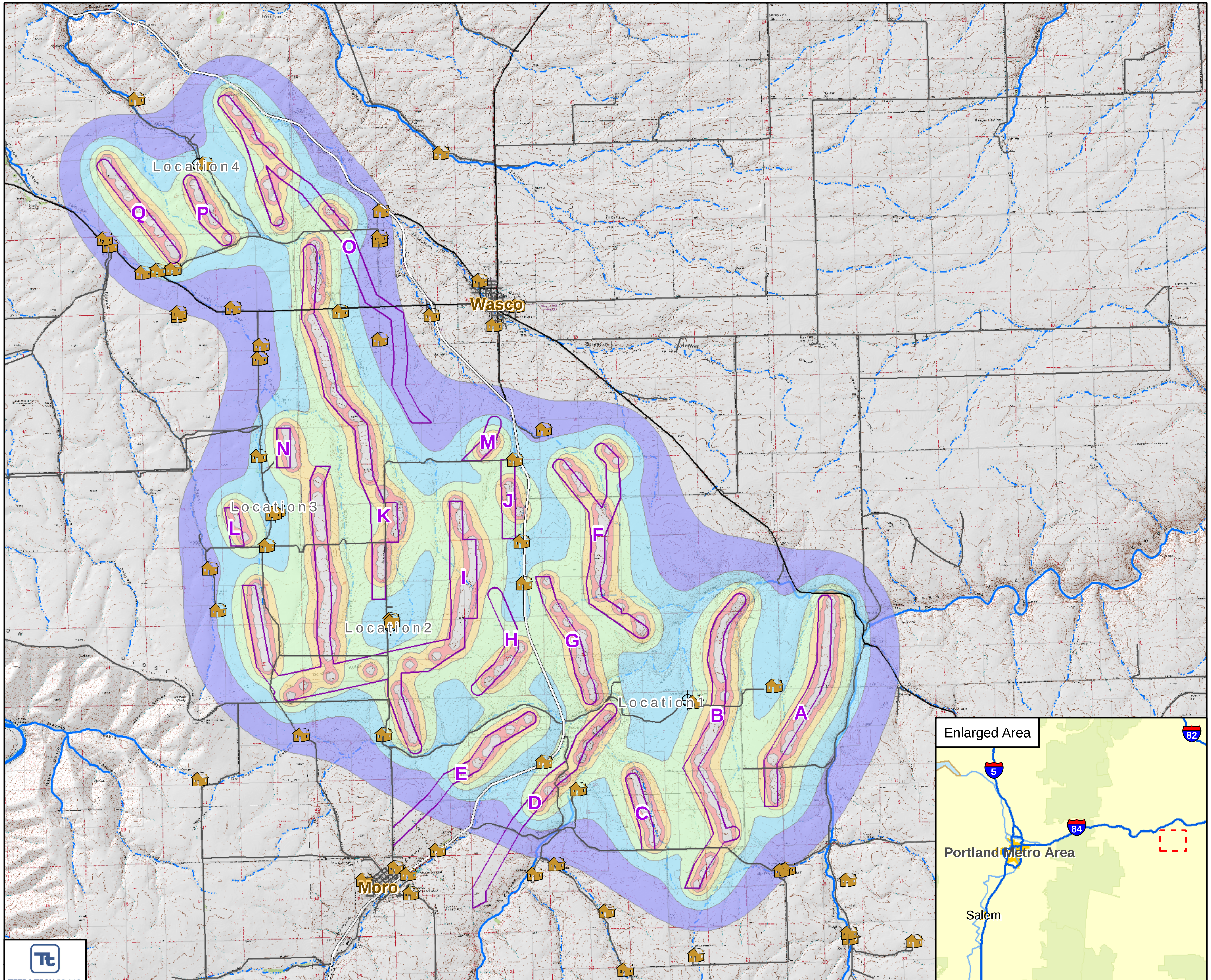

Figure 21
Predicted Increases in Ambient Noise Levels at 3/4 Load

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Ambient Noise Increase (dBA)

- 2.5 - 5.0
- 5.1 - 7.5
- 7.51 - 10.0
- 10.1 - 12.5
- 12.51 - 15.0

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

N

1:80,000

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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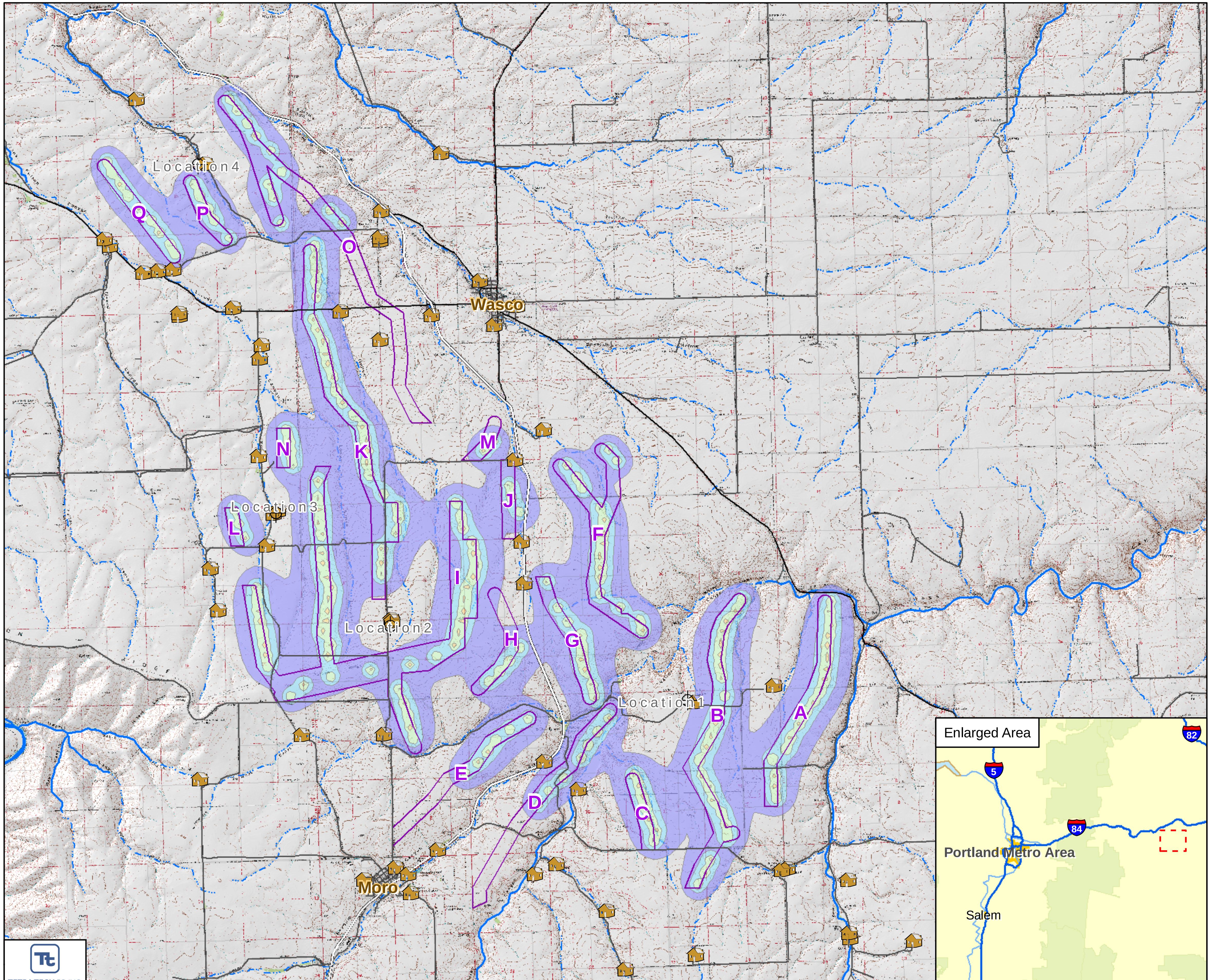

Figure 22
Predicted Increases in Ambient Noise Levels at Full Load

BP Golden Hills Wind Resource Area

Sherman County, OR

alternativenergy
Powered by BP

Ambient Noise Increase (dBA)

- 2.5 - 5.0
- 5.1 - 7.5
- 7.51 - 10.0

Monitoring Microphone

Dwelling

Project Components

Turbine Corridor

Transportation

Interstate Highway

State Highway

Major Road

Local Road

1:80,025

0 1 2 3

Miles

Data Sources:
USGS, National Geographic Maps, Delorme
June 22, 2007

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Table 6 shows that the maximum increase in ambient levels exceeds the 10 dBA limit set by ODEQ at 2 residences at cut-in and 3/4 load, 3 residences at 1/4 load, 4 residences at 1/2 load, and no residences at full load. The increases range from 0.1 to 11.9 dBA. The last column of the table shows whether the land owner is involved in the Project or not. All four of the land owners affected by the increases exceeding 10 dBA (receptor IDs 4, 11, 3, and 5) are involved. The Applicant will obtain signed waivers from these four landowners. The involvement shown in the last column corresponds exactly with the receptor IDs in the Full Load column only. Generally, the receptor IDs are the same across any row of the table, but not always.

Table 6. Calculated Increases in Ambient Levels for Each Receptor

Calculated Increases are Sorted from Highest to Lowest										Land Owner Involved or Not Involved
Cut-In Load		1/4 Load		1/2 Load		3/4 Load		Full Load		
Receptor ID	Increase dBA	Receptor ID	Increase dBA	Receptor ID	Increase dBA	Receptor ID	Increase dBA	Receptor ID	Increase dBA	
4	10.5	4	10.8	4	11.9	4	10.2	4	3.9	inv
11	10.4	11	10.7	11	11.8	11	10.1	11	3.9	inv
3	9.9	3	10.1	3	11.2	3	9.6	3	3.5	Inv
5	9.1	5	9.3	5	10.4	5	8.8	5	3.1	Inv
25	8.0	25	8.4	25	9.3	25	7.9	25	2.6	not
42	7.4	37	7.7	37	8.7	37	7.4	37	2.4	not
37	7.4	42	7.7	42	8.6	42	7.2	42	2.2	Inv
35	6.9	35	7.2	35	8.2	35	6.9	35	2.2	not
36	6.8	36	7.1	36	8.1	36	6.8	36	2.1	Inv
57	6.5	57	6.8	57	7.7	34	6.3	34	1.9	Inv
48	6.4	34	6.7	34	7.6	57	6.3	57	1.8	Inv
34	6.3	48	6.5	21	7.3	21	6.0	21	1.7	not
21	6.1	21	6.4	48	7.2	48	5.7	40	1.5	not
46	6.1	46	6.2	46	6.9	46	5.4	48	1.3	Inv
47	5.9	47	6.0	47	6.7	40	5.3	46	1.2	Inv
16	5.5	40	5.6	40	6.5	47	5.2	47	1.2	Inv
17	5.5	16	5.5	16	6.2	16	4.8	41	1.1	not
40	5.3	17	5.5	17	6.2	17	4.8	16	1.0	not
18	4.4	18	4.6	18	5.5	41	4.3	17	1.0	Inv
22	4.4	22	4.6	41	5.4	18	4.2	22	1.0	Inv
41	4.3	41	4.6	22	5.4	22	4.2	18	1.0	Inv
6	4.2	6	4.4	6	5.2	6	4.1	6	0.9	not
44	3.9	44	4.2	44	4.9	44	3.8	39	0.9	not
13	3.8	39	4.1	39	4.8	39	3.8	44	0.9	not
39	3.8	13	4.0	13	4.8	13	3.7	23	0.8	Inv
23	3.8	23	4.0	23	4.7	23	3.7	24	0.8	not
24	3.8	24	4.0	24	4.7	24	3.7	32	0.8	not
32	3.7	32	3.9	32	4.6	32	3.6	13	0.8	Inv
33	3.6	33	3.8	33	4.5	33	3.5	33	0.8	Inv
27	3.4	30	3.5	30	4.2	30	3.2	30	0.7	not
30	3.3	27	3.5	29	4.1	29	3.2	29	0.7	Inv
29	3.3	29	3.5	27	4.0	31	3.0	31	0.6	Inv
12	3.1	31	3.3	12	3.9	27	2.9	28	0.6	not

Table 6. Calculated Increases in Ambient Levels for Each Receptor (Concluded)

Calculated Increases are Sorted from Highest to Lowest										Land Owner Involved or Not Involved
Cut-In Load		1/4 Load		1/2 Load		3/4 Load		Full Load		
Recep-tor ID	Increase dBA	Recep-tor ID	Increase dBA	Recep-tor ID	Increase dBA	Recep-tor ID	Increase dBA	Recep-tor ID	Increase dBA	
31	3.1	12	3.2	31	3.9	12	2.9	12	0.6	not
28	3.0	28	3.2	28	3.8	28	2.9	14	0.5	Inv
14	2.9	14	3.0	14	3.7	14	2.7	27	0.5	Inv
20	2.4	20	2.6	20	3.1	20	2.3	20	0.5	not
1	2.3	19	2.5	1	3.0	19	2.2	19	0.4	not
19	2.3	1	2.5	19	3.0	1	2.2	1	0.4	not
7	1.9	7	2.0	7	2.5	7	1.8	7	0.3	Inv
26	1.8	26	2.0	26	2.4	26	1.8	26	0.3	Inv
45	1.7	45	1.9	45	2.3	45	1.7	45	0.3	Inv
15	1.6	15	1.7	15	2.1	15	1.6	15	0.3	not
2	1.4	2	1.5	2	1.8	2	1.3	2	0.2	not
51	1.1	51	1.2	51	1.5	51	1.1	51	0.2	not
9	1.1	9	1.1	9	1.4	9	1.0	9	0.2	Inv
8	1.0	8	1.0	8	1.3	8	0.9	8	0.2	Inv
50	0.8	50	0.9	53	1.1	53	0.8	53	0.1	not
53	0.8	53	0.9	56	1.1	56	0.8	56	0.1	not
56	0.8	56	0.9	50	1.1	50	0.8	50	0.1	not
52	0.8	52	0.9	52	1.1	52	0.8	52	0.1	not
38	0.7	38	0.8	38	1.0	38	0.7	38	0.1	not
58	0.6	58	0.7	55	0.8	55	0.6	55	0.1	not
55	0.6	55	0.7	58	0.8	58	0.6	58	0.1	not
54	0.6	54	0.6	54	0.8	54	0.6	54	0.1	not
10	0.4	10	0.4	10	0.5	10	0.3	10	0.1	Inv

A comparison was also made of the maximum predicted octave band levels at any residence with the ODEQ octave band limits presented in Table 2. Table 7 summarizes the information from Table 2, but includes two additional rows to show the maximum predicted levels and the difference from the standards levels. All of the predicted octave band levels are below the ODEQ octave band standards and are thus in compliance with the standard.

Table 7. State of Oregon Octave Band Limits Compared Against the Maximum Predicted Octave Band Noise Levels at any Residence

	Octave Band Center Frequencies								
Hertz (cycles per second)	31.5	63	125	250	500	1,000	2,000	4,000	8,000
ODEQ Nighttime Limit (dB)	65	62	56	50	46	43	40	37	34
Project Maximum Predicted Levels (dB)	n.a.*	60	54	48	44	40	31	9	0
Difference	n.a.	-2	-2	-2	-4	-3	-9	-28	-34

* Sound Power Levels in the 31.5-Hz band are typically not reported for wind turbines.

5.0 SUMMARY

An ambient noise survey was conducted at four locations at the site to determine the levels of ambient noise (L_{50} in this case) that correlate with different wind speeds related to the full operating range of the turbines from cut-in to full load. These levels ranged from 28 to 49.7 dBA.

Computer modeling was performed to determine the turbine operational noise levels at five different loads ranging from cut-in to full load. The maximum predicted level at any residence was only 46.3 dBA, which is below the 50 dBA limit established by the ODEQ. Thus, the Project is expected to be in compliance with this requirement.

Modeled levels were combined with existing levels to determine the future noise levels with the Project in operation at the five different loads. Then the existing ambient levels were subtracted from the future level to determine the expected increases in the ambient levels. The predicted increases exceeded the 10 dBA increase ODEQ standard at four residences, which are all Project participants. The maximum predicted increase was 11.9 dBA at half load. The Applicant will obtain written and signed waivers of this standard from the four affected landowners. The Project will then be in compliance with this standard.

Predicted octave band levels were compared with the ODEQ octave band standards and all were found to be a minimum of 2 dB below the most stringent octave band limits. Thus, the Project is also expected to be in compliance with this standard.

Overall, the Project should be in compliance with all aspects of the ODEQ noise standards relevant to wind farms.

6.0 REFERENCES

DataKustik GmbH, 2006. *Computer Aided Noise Abatement Model CadnaA*, Version .6. Munich, Germany.

ISO, 1993. International Organization for Standardization. Standard ISO 9613-2 *Acoustics – Attenuation of Sound During Propagation Outdoors, Part 2 General Method of Calculation.* Geneva, Switzerland.

EXHIBIT Y

CARBON DIOXIDE EMISSIONS
OAR 345-021-0010(1)(y)

Not Applicable

EXHIBIT Z

COOLING TOWERS
OAR 345-021-0010(1)(z)

Not Applicable