EXHIBIT N

NONGENERATING FACILITY INFORMATION

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

Exhibit N requires information about a nongenerating facility. Exhibit N is not required for this application because Orion Sherman County Wind Farm LLC (Applicant) is not proposing to construct a nongenerating energy facility.

EXHIBIT O

WATER RESOURCES

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

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O-1 City of Wasco Agreement to Serve

O-2 City of Wasco Water Right Certificate

O.1 INTRODUCTION

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

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

O.2 SOURCES OF WATER

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

Response:

Construction

During the construction phase for the Facility, a total of approximately 12 million gallons of water will be required for road compaction, underground collection line installation, dust suppression, and concrete mixing. Approximately half the water consumption will be for dust control and the other half for all other construction activities. These usage rates are based on water consumption rates estimated by a construction contractor familiar with construction of wind projects in Oregon. Daily usage for Facility construction will vary, depending on the timing of construction and the weather, since the need for dust control will be greater during the summer than at other times of the year.

The construction contractor will be responsible for arranging for delivery of water to the site via water trucks from a source with an existing water right. The city of Wasco, Oregon (City), has agreed to provide Orion Sherman County Wind Farm LLC (Applicant) contractors with water for construction activities. The City's agreement to provide this water, and the City's water right certificate, are attached as O-1 and O-2. The City's water right and existing water delivery system allow it to provide up to about 125,000 gallons per day. The City water alone should be adequate for all construction needs. If additional water is needed, or if the City determines that at specific periods it will not release water to the Facility because of other water use needs or commitments, the contractor will secure additional water from another permitted source.

The Facility's total water demand during construction represents an insignificant amount of the annual agricultural water use in the surrounding area. It is not expected to injure any existing water rights or exceed the amount of water available for beneficial use within the watershed.

Operations

Once the Facility is operational, only minimal water will be used. This will occur at the operations and maintenance (O&M) facility and will be limited to use at a restroom, kitchen, and utility sink in the building. No other significant water-consuming operations or maintenance activities will occur at the facility.[1] A well will be installed to provide water for the bathroom and kitchen. Water use is not expected to exceed 1,000 gallons per day. Domestic wastewater generated at the O&M facility will drain into an onsite septic system.

A water right is not required for this use because it will qualify as an exempt industrial use. Oregon law allows exempt industrial and commercial uses of up to 5,000 gallons per day. Exempt industrial uses, among others, include water for drinking, flushing toilets, and using sinks. Irrigation of up to one-half acre of landscape is allowed (no irrigation is proposed here).

O.3 WATER RIGHTS

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

Response: As explained previously, a new water right will not be required for either construction or operations.

O.4 WATER USE

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

Response: During the construction phase, water will be pumped into tanker trucks, driven to specific construction sites, and used for a variety of construction activities, including road compaction, underground collection line installation, dust suppression, and concrete mixing.

During the operations phase, water will be for sanitary use at the O&M facility.

O.5 WATER LOSSES

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

Response: During construction, water loss will occur primarily through evaporation from wetted road surfaces and from drying concrete. Because of the dry conditions at the Facility site and the relatively low rates of water use and application, it is expected that all water used during construction will be lost at or very near the Facility site. Moreover, no water used on the Facility site will be discharged into wetlands, lakes, rivers, or streams. Because of the cost and time involved in transporting water by tank

[1] Blade washwater will not be required regularly for Energy Facility operation, although occasional blade washing might be conducted by a contractor, who would purchase water from a private or municipal source with a valid water right.

truck to the work site, water used for road compaction and dust suppression will be applied at the minimum rate needed to perform these functions. An estimated 100,000 gallons of water might be applied daily to roads and construction areas during Facility construction for road compaction and dust suppression.

Similarly, water used for concrete mixing will be applied at the mixing rate required to make concrete. An additional 20,000 gallons of water (approximately) will be used to cure concrete for the turbine pads and transformer pads.

During operations, all water used for sanitary purposes will enter an onsite existing septic system. All stormwater will infiltrate into the ground.

O.6 WATER BALANCE DIAGRAM

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

Response: As noted previously, during the operations phase, the only water used will be for sanitary purposes. Water for domestic uses will flow to a septic system. No water balance diagram is provided because of the simplicity of this water use.

O.7 PERMITS OR TRANSFERS REQUIRED

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

Response: As noted above, water for construction will be purchased from the City of Wasco. No permit or transfer is required because municipal water rights allow use for industrial purposes such as the Energy Facility.

Operations water use will be minimal and will qualify as an exempt industrial use in Oregon, which allows exempt uses up to 5,000 gallons per day. Exempt industrial uses include water for drinking, flushing toilets, using sinks, and other industrial uses. Irrigation of up to one-half acre of landscape is allowed.

O.8 EVIDENCE IN SUPPORT OF PERMITS OR TRANSFERS

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

Response: As noted previously, no permit or transfer from the Oregon Water Resources Department will be required for constructing or operating the Energy Facility.

O.9 MEASURES TO REDUCE CONSUMPTIVE USE OF WATER

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

Response: Predicted consumptive water use already is very low for the Energy Facility and several orders of magnitude lower in comparison to gas-fired electric plants and most industrial uses of any type. Further, because water for Facility construction must be purchased and trucked to the work site, the construction contractor will have an incentive to minimize water use. During the operations phase, water use will be very small and will amount only to domestic use, not estimated to exceed 1,000 gallons per day.

O.10 OTHER MITIGATION MEASURES

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

Response: A key environmental benefit of wind generation is that it requires so little water, particularly during the operations phase. Because no significant impacts on water resources are anticipated, no mitigation is proposed.

O.11 CONCLUSION

Wind generation, by its nature, has minimal requirements for water. During the construction phase, water will be necessary for road compaction, underground collection line installation, dust suppression, and concrete mixing. Water use during operations will be minimal and will qualify as an exempt industrial use in Oregon.

ATTACHMENT O-1

City of Wasco Agreement to Serve

CITY OF WASCO

1017 CLARK STREET P O BOX 26
WASCO, OR 97065
PH 541-442-5515 FAX 541-442-5001

August 17, 2005

ATTN: Kathryn Arbeit
Orion Sherman County Wind Farm LLC
C/O Orion Energy LLC
1611 Telegraph Avenue, Suite 1515
Oakland, CA 94612

RE: CITY OF WASCO WATER USE AUTHORIZATION

Dear Ms. Arbeit:

At the City of Wasco Council Meeting of August 16, 2005, the City Council agreed to provide short-term limited water use as requested in your fax of August 12, 2005. The conditions of water supply by the City are as follows:

1. Water use will be charged to Orion at the rate in effect at the time of use. The present outside water rate established by the City is $25 for the first 10,000 gallons and $3 per each 1000 gallons or portion thereof after the initial use.
2. The City system is generally capable of delivering water at the rate of up to 125,000 gallons per day under normal circumstances. However, supply of water to Orion Energy LLC may be reduced or eliminated at any time, especially to ensure demands within the City are met.
3. The City will determine the place and method of water withdrawal by Orion to monitor use and to ensure a cross-connection does not occur that could create water quality concerns.

Best regards,

Cassie Strege
City Recorder

enc Water Right Permit

c Greg Gosson, Public Works
Terry Angle, City Engineer

ATTACHMENT O-2

City of Wasco Water Right Certificate

STATE OF OREGON

COUNTY OF SHERMAN

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF WASCO
P.O. BOX 26
WASCO, OREGON 97065

503-442-5515

to use the waters of THE CITY AND O'MEARA WELLS in the SPANISH HOLLOW CREEK BASIN for MUNICIPAL USE.

This permit is issued approving Application G-12391. The date of priority is JANUARY 18, 1991. The use is limited to not more than 0.91 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the well.

The well is located as follows:

NE 1/4 SW 1/4, SECTION 4, SE 1/4 NW 1/4, SECTION 9, TOWNSHIP 1 NORTH, RANGE 17 EAST, W.M.; O'Meara Well - 270 FEET SOUTH AND 470 FEET WEST FROM THE CENTER 1/4 CORNER OF SECTION 4; City Well - 1570 FEET SOUTH AND 2380 FEET EAST FROM THE NE CORNER OF SECTION 9.

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

A description of the proposed place of use under this permit is as follows:

S 1/2
SECTION 4
N 1/2
SECTION 9
TOWNSHIP 1 NORTH, RANGE 17 EAST, W.M.

The wells are to be repaired to current well construction standards before using water or as may be ordered by the proper State officer.

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

Within one year of permit issuance, the city shall submit a conservation management plan consistent with Oregon Administrative Rule 690-86.

Measurement, recording and reporting conditions:

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

B. The permittee shall allow the watermaster access to the meter

C. The Director may require the permittee to keep and maintain a record of the amount (volume) of water used and may require the permittee to report water use on a periodic schedule as established by the Director.

In addition, the Director may require the permittee to report general water use information, the periods of water use and the place and nature of use of water under the permit. The Director may provide an opportunity for the permittee to submit alternative reporting procedures for review and approval.

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

Actual construction work shall begin on or before March 14, 1996 and shall be completed on or before October 1, 1997. Complete application of the water shall be made on or before October 1, 1998.

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

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

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

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

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

Issued this date, March 14, 1995.

Martha O. Pagel

Water Resources Department
Martha O. Pagel
Director

EXHIBIT P

Fish and Wildlife Habitats and Species

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

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P.1 INTRODUCTION

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

Response: As required by OAR 345-022-0060, the Energy Facility Siting Council (EFSC) issues certificates only when the facility is deemed to be in accordance with the fish and wildlife habitat mitigation goals and standards of OAR 635-415-0025. The information in Exhibit P about fish and wildlife habitat that might be affected by the Biglow Canyon Wind Farm Facility (Facility) is organized consistently with the Council's application rule, OAR 345-021-0010(1)(p).

P.2 IDENTIFICATION AND DESCRIPTION OF ALL HABITAT WITHIN THE ANALYSIS AREA

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

Response:

P.2.1 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.2.1.1 Habitat Category 1

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

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.2.1.2 Habitat Category 2

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

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.2.1.3 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.

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.2.1.4 Habitat Category 4

Habitat Category 4 is important habitat for fish and wildlife species.

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.2.1.5 Habitat Category 5

Habitat Category 5 is habitat for fish and wildlife having high potential for becoming either essential or important habitat.

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.2.1.6 Habitat Category 6

Habitat Category 6 is habitat that has low potential for becoming essential or important habitat for fish and wildlife.

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

P.2.2 Identification and Description of Fish and Wildlife Habitats in the Analysis Area

Habitats found within the analysis area—750 feet from all Facility components—are identified in Table P-1. Typology and map codes correspond with the locations of each habitat within the analysis area identified in Figures P-1 through P-10. Habitat is characterized within 500 feet of turbine corridors (750 feet from the centerline of the corridor). Habitat is mapped a minimum distance of 750 feet from other Facility components such as overhead transmission lines, collection lines, substations, laydown areas, and meteorological towers.[1]

Table P-1. Habitat Types and Categories within the Biglow Canyon Wind Farm Facility 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 grassland/shrub-steppe in the CRP program that provide important wildlife habitat
			4 – Croplands planted to grassland/shrub-steppe in the CRP program that lack later seral stage vegetative communities and/or are of less importance as wildlife habitat because of land management or topographic locale
Riparian	Riparian trees	RT	2 – Essential and limited habitat for wildlife (documented nest/roost habitat)
	Intermittent Streams	WS	3 – Essential or important fish and wildlife habitat which is limited
	Intermittent Streams/ Riparian trees	WS/RT	2 – Essential and limited habitat for fish and wildlife (documented nest/roost habitat)
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 habitat, and active nest)
			3 – Essential or important habitat for wildlife that is limited

[1] Approximately 6 acres of CRP habitat near meteorological test tower #8 (east of Biglow Canyon, see Figure P-4) were inadvertently not surveyed (this is less than 10 percent of the total CRP patch, the rest of which was surveyed, and deemed to be Category 3 CRP habitat). Based on aerial photographs and site visits, the Applicant's biological consultants have confirmed that this area is also very likely Category 3 CRP habitat; no trees or raptor nests are present on this land. Note there is no temporary disturbance or permanent impact of any facilities on this 6-acre swath of CRP.

Table P-1. Habitat Types and Categories within the Biglow Canyon Wind Farm Facility Area

Habitat Type	Habitat Subtype	Map Code	Habitat Categories
Shrub-steppe	Sagebrush/Shrub-steppe	SS	2 – Essential and limited wildlife habitat (fairly undisturbed old-growth shrub structure; moderate grazing)
			3 – Essential or important wildlife habitat which is limited (e.g., fairly undisturbed habitat; moderate grazing)
			4 – Important wildlife habitat (e.g., moderate-heavy grazing and/or weedy habitat)
Grassland-steppe	Grassland	GR	4 – Important wildlife habitat (e.g., moderate-heavy grazing and/or weedy habitat)
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)
Surface water	Ponds	WP	3 – Essential or important wildlife habitat that is limited (wetland features)

P.2.2.1 Category 1 Habitat – Upland Trees

Upland tree habitats with raptor nests were identified as Category 1 within the habitat analysis area. This habitat is not located within the Facility footprint or within 500 feet of a turbine corridor, but it is fairly close to the transmission line identified as Alternative 2.

Small square and rectangular upland tree habitats scattered across the Facility 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. These habitats were planted either for early twentieth century homesteads or cemeteries or for additional wildlife habitat in the mid-twentieth century. These habitat patches currently provide forage, cover, and nesting habitat for sensitive species such as Swainson's hawks (*Buteo swainsoni*) and potentially could provide habitat for ferruginous hawks (*Buteo regalis*), as well as migratory songbirds.

There are no Category 1 habitats within 500 feet of proposed turbine corridors. There is a Swainson's hawk nest in upland trees along an existing public road approximately 280 meters (919 feet) from a proposed turbine corridor (Figure P-2) and approximately 82 meters (269 feet) north of the proposed alternate transmission line within the habitat analysis area of the northwest region of the Facility (Alternative 2). The nest site could be indirectly affected by construction activities for the overhead transmission line, but impacts to the nest site from operations (potential for collision, noise) are not anticipated to be significant. Three other upland tree active nest sites were located outside the habitat analysis area, including two Swainson's hawk nests, each approximately 500 to 600 meters (1,640 to 1,969 feet) from turbine corridor, and a red-tailed hawk nest 275 meters (902 feet) from a turbine corridor. Another nest located in upland trees is an

inactive nest of unknown species approximately 400 meters (1,312 feet) from a turbine corridor.

P.2.2.2 Category 2 Habitat

Two habitat types were identified as Category 2 within the analysis area: shrub-steppe and intermittent stream/riparian trees. No Category 2 habitat is located within the Facility footprint.

Shrub-Steppe

Category 2 shrub-steppe was identified at the north end of a turbine corridor in the eastern region of the Facility (Figure P-7, section 14). This area has old-growth sagebrush (*Artemesia tridentata*) intermixed with understory native and invasive grasses, forbs, and open areas with larger mammal burrows. One short-eared owl was observed perched on the ground here. Although this area is heavily grazed seasonally, it represents existing horizontal and vertical diverse vegetative structure important to wildlife that is limited within the predominantly cultivated deep-soil landscape. Shrub-steppe with open glades has been utilized by sensitive species such as Swainson's hawks, loggerhead shrikes, grasshopper sparrows, ferruginous hawks, and burrowing owls. No permanent or temporary direct impacts will occur to this area.

Intermittent Stream/Riparian Trees

This habitat exists primarily in the upper reach of Biglow Canyon, in section 17; 0.18 acres are within the habitat analysis area. This habitat is approximately 450 feet from a proposed access road and turbine corridor, but is not within the Facility footprint. White poplar (*Populus alba*), willow (*Salix* sp.), and a few Lombardy poplars (*Populus nigra*) are the primary riparian trees, with adjacent deciduous and sagebrush shrub. The spring-fed intermittent stream ranges in width from approximately 0.5 to 2.0 meters (1.6 to 6.5 feet), with hydrophytes and emergent wetland vegetation interfacing with the terrestrial environment. This habitat provides an important area to wildlife, is essential for food, water, cover, and nesting, and is limited within the landscape. Western toads (*Bufo boreas*) were observed on the existing dirt road adjacent to this habitat.

P.2.2.3 Category 3 Habitat

Five types of habitats were identified as Category 3 within the analysis area: upland trees, shrub-steppe, Conservation Reserve Program (CRP), intermittent stream, and pond.

Upland Trees

Upland tree habitats are described as in the Category 1 habitat, but lack raptor nests. Raptor nests typically persist over time, and are used repeatedly, added to, or rebuilt. Upland tree habitat patches without raptor nests probably lack large-scale environmental, topographic, and/or exposure attributes necessary for successful rearing and fledging of young. However, the habitat quality can still be important for raptor perching and foraging, and for use by resident and migrating songbirds. Approximately 5.5 acres of Category 3 upland tree habitat (no nests) exists within the habitat analysis

area. No upland tree habitat will be permanently or temporarily affected from the Facility footprint.

Shrub-Steppe

Category 3 shrub-steppe was identified primarily at the northern ends of turbine corridor analysis areas in the eastern half of the Facility, typically associated with steeper slopes of John Day River drainages. Two additional areas were noted in Gerking and Scott Canyons, along the alternate transmission line route. Total acreage of this type within the entire analysis area is approximately 216 acres. These areas consist of native sagebrush (*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 lithosol habitat, shallow-soiled areas relatively resistant to invasive species that harbor 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. Sensitive species documented in this habitat type were a ferruginous hawk, Swainson's hawks, and grasshopper sparrows. Less than 0.2 acre of Category 3 shrub-steppe will be permanently affected by the Facility footprint (see alternate transmission line, Figures P-1 and P-3).

Conservation Reserve Program

Large tracts of Category 3 CRP habitats are found in several areas within the habitat analysis area, comprising approximately 710 acres. CRP areas formerly have been 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, such as the tract in the center of the Facility (Figure P-6, section 17), have larger, well-established sagebrush and rabbitbrush shrub cover, in addition to non-native grasses such as intermediate wheatgrass (*Agropyron intermedium*) and crested wheatgrass (*Apropyron cristatum*). 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 were also documented in a few areas. These areas are important because they provide cover and food for wildlife, and suitable habitat for grassland/ground nesting birds. Approximately 7.2 acres of this type are located within the Facility footprint.

Intermittent Streams

Category 3 intermittent streams within the habitat analysis are restricted to less than 0.3 acre near the edge of the habitat analysis boundary in the north-central section of the Facility area. This drainage system is influenced by runoff and an up-drainage spring, and is small, with a width of 1 to 2 meters (3.3 to 6.5 feet). Riparian vegetation is primarily sagebrush. This habitat is at the bottom of a steep drainage and occurs where no access road or other facility is proposed.

Pond

One Category 3 pond was identified within the habitat analysis area (0.26 acre) along Emigrant Springs Road, west of Rayburn Road (Figure P-7, section 27). This area is characterized by dense patches of cattail (*Typha latifolia*) and areas of open water adjacent to a ditch. The areas adjacent to the marsh support other wetland species such as rushes (*Juncus* spp.), sedges (*Carex* spp.), and bulrush (*Scirpus* spp.). Although this area is adjacent to a developed residence, it is still important to wildlife and limited in availability. The area is not within the Facility footprint.

P.2.2.4 Category 4 Habitat

Three types of habitats were identified as Category 4 within the analysis area: shrub-steppe, grassland, and CRP. Approximately 2.7 acres of Category 4 CRP, 0.9 acre of Category 4 grassland, and less than 0.1 acre of Category 4 shrub-steppe will be permanently affected by the Facility.

Shrub-Steppe

Category 4 shrub-steppe is characterized by a relatively short and sparse stand of sage-brush and rabbitbrush with moderate to high levels of interspersed weeds; it comprises 38.8 acres of the habitat analysis area. Heavy grazing by livestock is apparent. Inclusions of any shallow soil areas are predominantly heavily disturbed bare ground. Forbs, grazed grasses, and other prone-oriented vegetation provide some food for wildlife, along with nesting and foraging habitat for small ground-nesting and migratory songbirds. The potential for this habitat to be of higher quality exists if grazing intensity is modified; otherwise, it is currently not essential or limited habitat. Less than 0.1 acre of this habitat type lies within the Facility footprint.

Grassland

Category 4 grasslands consist of a vegetative coverage dominated by non-native weeds with occasional patches of native bunchgrass [e.g., bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), rabbitbrush, or sagebrush]. 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. Total acreage for this habitat is approximately 136 acres. Less than 1 acre lies within the Facility footprint.

Conservation Reserve Program

Category 4 CRP within the habitat analysis area consists of one large tract in the north-central region of the Facility area (Figure P-3, sections 7 and 8), and is not nearly as developed with vegetation as Category 3 CRP. Total acreage within the habitat analysis area is 138.3 acres. This tract was enrolled in the CRP program in 1999. Sparse alfalfa (*Medicago sativa*) clumps provide the only dense cover for grassland birds. Grasshopper sparrows were documented here. Although this area could develop into a more diverse and dynamic wildlife habitat, it is currently not essential or unique to the landscape and has limited wildlife value. Approximately 2.7 acres of this type might be permanently affected by the Facility footprint.

P.2.2.5 Category 5 Habitat

No Category 5 habitat was identified within the analysis area.

P.2.2.6 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 approximately 10,366 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. Approximately 150.3 acres of this type will be permanently affected by the Facility 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 approximately 64 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. Approximately 4.6 acres of this type might be permanently affected by the Facility footprint.

P.3 DESCRIPTION OF BIOLOGICAL AND BOTANICAL SURVEYS

(B) A description of biological and botanical surveys performed that support the information in this exhibit, including a discussion of the timing and scope of each survey;

Response: 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.3.1 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, 2005; USFWS, 2005). Existing literature and scientific data were reviewed to determine species distribution and habitat requirements. A biological protocol was prepared to define the Facility analysis and survey areas and the species that would be included within Exhibits P and Q of this Site Certificate Application (SCA). The wildlife baseline study protocols, the additional surveys protocols, and the results of the wildlife and habitat baseline studies are included as Attachments P-1A, P-1B, and P-2, respectively.

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., January 2002, update July 2005) 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 Facility area (see Exhibit Q). Keith Kohl was contacted in spring 2004 regarding information on sensitive species surveys and issues and concerns. Existing biological data collected for the permitting of the Klondike I and II facilities were also reviewed (e.g., Johnson, 2004; Johnson et al., 2003b, 2002a). This information, along with results from the 2004-2005 Biglow Canyon Wind Farm Facility baseline studies, other baseline and monitoring data of other regional and nonregional 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.3.2 Survey Methods and Relevant Studies

Wildlife surveys were conducted within and near the analysis area from 2001 to 2005. Table P-2 summarizes the Facility and reference area field surveys and other studies that are relevant to the descriptions of wildlife occurrence and impacts from the Facility.

Table P-2. 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	Four-season wildlife baseline study of the Biglow Canyon Facility and reference area
4/04	Biglow Canyon Facility and Reference 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
4/05 –8/05	Biglow Canyon Facility	Vegetation mapping within general Facility area, habitat characterization within habitat analysis area

Table P-2. Summary of Field Surveys

Date	Analysis Area	Description
6/05	Biglow Canyon Facility	Two sensitive wildlife species surveys within a minimum of 837 feet (255 m) of Facility components in non-cultivated habitat
6/05 – 9/05	Biglow Canyon Facility	Rare plant surveys were conducted to document occurrence and habitat of sensitive plant species, including threatened and endangered species; if suitable habitat was identified, then the area located within a 400-foot radius was examined.
8/05, 9/05	Biglow Canyon Sensitive Grassland Species Analysis Area	Two nighttime spotlight surveys for white-tailed jackrabbits in suitable habitat along the facilities
9/05 – 10/05	Biglow Canyon Facility	Additional focused avian use surveys
9/05 – 10/05	Biglow Canyon Facility	Nocturnal anabat surveys

P.3.2.1 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 facility area by birds. Seven circular plots with 0.5-mile radii were established in the Facility area and surveyed on a weekly basis (Figure P-11). Four of the station viewsheds are less than 2 miles from turbines in the Facility 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) in the Facility area. 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 Facility area was highest in winter (34.46 per survey) and lowest in the summer (3.70 per survey). 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 Facility 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 Facility 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 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.3.3 Raptor Nest Surveys—Klondike, May and June 2001, and within 5-Mile Buffer

Aerial raptor nest surveys were conducted to obtain information on nesting species, nest locations, timing, and success in the Facility area (Table P-3). The nest search area included the Klondike facility site and a buffer of approximately 5 miles. Thirty-six active nests were found within an approximate 5-mile buffer of the Klondike site during the May and June 2001 helicopter surveys (Figure P-12). The nests included 35 raptor nests and 1 common raven nest. Red-tailed hawks had the largest number of active nests (16), followed by Swainson's hawk (11), great horned owl (6), and 1 each of the following species: American kestrel, common raven, and golden eagle. Overall raptor nest density was 0.22 active nest per square mile. In addition, 3 common raven nests were recorded. The highest nest densities occurred along Grass Valley Canyon. The one golden eagle nest that was observed in 2001 was located more than 4 miles southeast of the proposed Biglow Canyon Wind Farm Facility turbines.

Thirteen of the raptor nests were located within 2 miles of the Biglow Canyon Facility, including 6 red-tailed hawk, 4 Swainson's hawk, 2 great horned owl, and 1 American kestrel nest site. Estimated nest density within the Facility area and a 2-mile buffer was 0.15 nest per square mile.

Five active raptor nests (Swainson's hawk, red-tailed hawk, and great horned owl) documented within 3 miles of the turbine strings during the 2001 helicopter surveys were visited from the ground during the breeding season in 2002 to determine activity. Active nests at that time were one red-tailed hawk nest and a Swainson's hawk nest located 0.8 kilometers (km; 0.5 mile) from existing turbines. Both were incubating eggs or brooding young at the time.

Table P-3. Results of Raptor Nest Surveys

	2001 Klondike Surveys				2004 Surveys			
	Surveyed Area (150 mi^2)		Within 2 Miles of Biglow Facility		Surveyed Area (325 mi^2)		Within 2 Miles of Biglow Facility	
	No. of Nests	Density (no./$mi.^2$)	No. of Nests	Density (no./$mi.^2$)	No. of Nests	Density (no./$mi.^2$)	No. of Nests	Density (no./$mi.^2$)
American Kestrel	1	0.007	1	0.011	1	0.003	1	0.011
Red-Tailed Hawk	16	0.107	6	0.068	26	0.080	8	0.091
Swainson's Hawk	11	0.073	4	0.045	10	0.031	3	0.034
Great Horned Owl	6	0.040	2	0.023	6	0.018	1	0.011
Golden Eagle	1	0.007	0	0.000	0	0.000	0	0.000
Prairie Falcon	0	0.000	0	0.000	1	0.003	0	0.000
Common Raven	1	0.007	0	0.000	3	0.009	1	0.011
Total Number of Active Nests	36	0.24	13	0.15	47	0.14	14	0.16
Total Number of Raptor Nests	35	0.23	13	0.15	44	0.14	13	0.15

P.3.3.1 Avian and Bat Fatality Monitoring Study—Klondike I, February 2002 to 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 facility 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 entire 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.3.3.2 Wildlife and Habitat Baseline Study—Biglow Canyon Wind Farm Facility, March 2004 to March 2005

The primary objectives of the fixed-point surveys were to (1) quantify and compare the general level of bird use and species composition within the Facility and reference 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 Facility (Attachment P-1A). Point counts (variable circular plots) were conducted on the Facility and reference areas by means of methods described by Reynolds et al. (1980). The points were selected to survey representative habitats and topography of the study sites while also providing relatively even coverage with minimal overlap of surveyed areas, taking into consideration the location of access roads and landowner concerns about impacts to wheat crops. All birds seen during the point counts were recorded. Raptors and other large birds, species of concern, and species not previously seen onsite that were observed between point counts also were recorded; coordinates derived from a GPS were also noted for species of concern.

Nine survey plots were established over the Facility area and 13 plots were established in the reference area (Figure P-11). Several plots for the baseline study for the Klondike I facility also were located within and near the Facility area (Figure P-11). 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.

Survey periods at each point were 30 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.

Four instantaneous counts were made during each 30-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 Facility area. One full year of weekly surveys, occurring approximately twice a month at each station, took place from spring 2004 to spring 2005 (March to March). 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 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, 78 avian species were identified during the avian point count surveys, aerial raptor nest survey, in-transit travel, and incidentally, while conducting other field tasks in the Facility and reference areas (Table P-4). Forty-eight species of birds were observed at the 9 stations in the Facility area and 59 species were observed at the 13 stations in the reference area (Figure P-11; Table P-4). In total, 1,305 groups comprising 6,281 individuals was observed during the study, with 535 groups comprising 2,343 individuals recorded in the Facility area, and 770 groups comprising 3,938 individuals in the reference area (Table P-5). The number of species observed was lower for each season in the Facility area compared to the reference area (Table P-6). Avian richness (defined as number of species per survey) and avian use was generally similar for the Facility area and the reference area with some small seasonal differences. Avian richness was lower in the Facility area in each season and year-round except fall, when it was slightly higher than the reference area (2.556 for Facility versus 2.404 for reference area) (Table P-6). The mean number of birds observed per survey plot was lower in the summer, winter, and year-round for the Facility area compared to the reference area and was higher in the spring and fall (Table P-6). Across all seasons, mean number of birds observed per survey plot was similar but slightly higher on the Reference area (Figure P-14).

Table P-4. List of Avian Species Observed during Fixed-Point Surveys in the Project (Facility) Area and Reference Area during Aerial Raptor Nest Surveys, Sensitive Species Surveys, In-Transit Travel, and Incidentally

Species/Group	Scientific Name	Area[1]	Species/Group	Scientific Name	Area[1]
Great Blue Heron	*Ardea herodias*	R	Horned Lark	*Eremophila alpestris*	B
Ring-Billed Gull	*Larus delawarensis*	P	House Finch	*Carpodacus mexicanus*	B
Sandhill Crane	*Grus canadensis*	B	Lapland Longspur	*Calcarius lapponicus*	B
American Wigeon	*Anas americana*	R	Lark Sparrow	*Chondestes grammacus*	P
Canada Goose	*Branta canadensis*	B	Lincoln's Sparrow	*Melospiza lincolnii*	R
Green-Winged Teal	*Anas crecca*	R	Loggerhead Shrike	*Lanius ludovicianus*	R
Hooded Merganser	*Lophodytes cucullatus*	R	Mourning Dove	*Zenaida macroura*	B
Mallard	*Anas platyrhynchos*	R	Northern Rough-Winged Swallow	*Stelgidopteryx serripennis*	R
Killdeer	*Charadrius vociferus*	R	Northern Shrike	*Lanius excubitor*	B
American Coot	*Fulica americana*	P	Orange-Crowned Warbler	*Vermivora celata*	R
American Kestrel	*Falco sparverius*	B	Pine Siskin	*Carduelis pinus*	P
Cooper's Hawk	*Accipiter cooperii*	P	Red-Breasted Nuthatch	*Sitta Canadensis*	B
Ferruginous Hawk	*Buteo regalis*	N/A	Red-Winged Blackbird	*Agelaius phoeniceus*	R
Golden Eagle	*Aquila chrysaetos*	N/A	Rock Wren	*Salpinctes obsoletus*	R
Great-Horned Owl	*Bubo virginianus*	N/A	Rusty Blackbird	*Euphagus carolinus*	R
Northern Harrier	*Circus cyaneus*	B	Savannah Sparrow	*Passerculus sandwichensis*	B
Prairie Falcon	*Falco mexicanus*	B	Say's Phoebe	*Sayornis saya*	B
Red-Tailed Hawk	*Buteo jamaicensis*	B	Song Sparrow	*Melospiza melodia*	R
Rough-Legged Hawk	*Buteo lagopus*	B	Spotted Towhee	*Pipilo maculates*	R
Sharp-Shinned Hawk	*Accipter striatus*	B	Varied Thrush	*Ixoreus naevius*	R
Short-Eared Owl	*Asio flammeus*	N/A	Vesper Sparrow	*Pooecetes gramineus*	B
Swainson's Hawk	*Buteo swainsoni*	B	Violet-Green Swallow	*Tachycineta thalassina*	P
Turkey Vulture	*Cathartes aura*	B	Western Kingbird	*Tyrannus verticalis*	B
American Crow	*Corvus brachyrhynchos*	P	Western Meadowlark	*Sturnella neglecta*	B
American Goldfinch	*Carduelis tristis*	B	White-Crowned Sparrow	*Zonotrichia leucophrys*	B
American Pipit	*Anthus rubescens*	B	Yellow-Headed Blackbird	*Xanthocephalus xanthocephalus*	N/A
American Robin	*Turdus migratorius*	B	Yellow-Rumped Warbler	*Dendroica coronata*	B
Barn Swallow	*Hirundo rustica*	B	California Quail	*Callipepla californica*	B
Bewick's Wren	*Thryomanes bewickii*	N/A	Chukar	*Alectoris chukar*	B
Black-Billed Magpie	*Pica pica*	B	Gray Partridge	*Perdix perdix*	P
Brewer's Blackbird	*Euphagus cyanocephalus*	B	Ring-Necked Pheasant	*Phasianus colchicus*	B
Brown-Headed Cowbird	*Molothrus ater*	R	Wild Turkey	*Meleagris gallopavo*	N/A

Table P-4. List of Avian Species Observed during Fixed-Point Surveys in the Project (Facility) Area and Reference Area during Aerial Raptor Nest Surveys, Sensitive Species Surveys, In-Transit Travel, and Incidentally

Species/Group	Scientific Name	Area[1]	Species/Group	Scientific Name	Area[1]
Bullock's Oriole	*Icterus bullockii*	N/A	Rock Pigeon	*Columba livia*	B
Cassin's Finch	*Carpodacus purpureus*	P	Northern Flicker	*Colaptes auratus*	B
Cliff Swallow	*Petrochelidon pyrrhonota*	B	Vaux's Swift	*Chaetura vauxi*	R
Common Raven	*Corvus corax*	B	Unidentified gull		P
Dark-Eyed Junco	*Junco hyemalis*	B	Unidentified duck		P
European Starling	*Sturnus vulgaris*	B	Unidentified buteo		R
Golden-Crowned Kinglet	*Regulus satrapa*	R	Unidentified empidonax		N/A
Golden-Crowned Sparrow	*Zonotrichia atricapilla*	R	Unidentified passerine		B
Grasshopper Sparrow	*Ammodramus savannarum*	R	Unidentified sparrow		B

Key:

[1] P = project (Facility) area; R = reference area; B = both project (Facility) and reference area; N/A = not applicable.

TABLE P-5. Avian Species Observed during Fixed-Point Surveys (March 26, 2004, to March 23, 2005) in the Facility Area and Reference Area

	Facility Area		Reference Area		Total	
Species/Group	No. of Obs.	No. of Groups	No. of Obs.	No. of Groups	No. of Obs.	No. of Groups
Waterbirds/Waterfowl	**241**	**18**	**445**	**13**	**686**	**31**
American Coot	6	1	0	0	6	1
American Wigeon	0	0	1	1	1	1
Canada Goose	223	13	343	5	566	18
Great Blue Heron	0	0	1	1	1	1
Green-winged Teal	0	0	1	1	1	1
Hooded Merganser	0	0	2	2	2	2
Mallard	0	0	24	2	24	2
Ring-billed Gull	2	1	0	0	2	1
Sandhill Crane	2	1	73	1	75	2
Unidentified duck	5	1	0	0	5	1
Unidentified gull	3	1	0	0	3	1
Shorebirds						
Killdeer	0	0	3	2	3	2
Raptors	**75**	**75**	**103**	**95**	**178**	**170**
Accipiters	*2*	*2*	*1*	*1*	3	3
Cooper's Hawk	1	1	0	0	1	1
Sharp-shinned Hawk	1	1	1	1	2	2

TABLE P-5. Avian Species Observed during Fixed-Point Surveys (March 26, 2004, to March 23, 2005) in the Facility Area and Reference Area

	Facility Area		Reference Area		Total	
Species/Group	No. of Obs.	No. of Groups	No. of Obs.	No. of Groups	No. of Obs.	No. of Groups
Buteos	**33**	**33**	**71**	**68**	**104**	**101**
Red-tailed Hawk	23	23	34	34	57	57
Rough-legged Hawk	8	8	25	24	33	32
Swainson's Hawk[2]	2	2	9	7	11	9
Unidentified buteo	0	0	3	3	3	3
Northern Harriers						
Northern Harrier	8	8	9	9	17	17
Falcons	**31**	**31**	**18**	**15**	**49**	**46**
American Kestrel	28	28	15	12	43	40
Prairie Falcon	3	3	3	3	6	6
Vultures					**0**	**0**
Turkey Vulture	1	1	4	2	5	3
Passerines	**1945**	**415**	**3248**	**621**	**5193**	**1036**
American Crow	7	2	0	0	7	2
American Goldfinch	56	8	7	4	63	12
American Pipit	250	12	166	11	416	23
American Robin	4	3	10	5	14	8
Barn Swallow	8	3	38	11	46	14
Black-Billed Magpie	17	6	1	1	18	7
Brewer's Blackbird	63	8	74	11	137	19
Brown-Headed Cowbird	0	0	8	2	8	2
Cassin's Finch	9	1	0	0	9	1
Cliff Swallow	3	1	16	3	19	4
Common Raven	60	40	72	50	132	90
Dark-Eyed Junco	7	1	20	3	27	4
European Starling	192	24	672	24	864	48
Golden-Crowned Kinglet	0	0	1	1	1	1
Golden-Crowned Sparrow	0	0	1	1	1	1
Grasshopper Sparrow[b]	0	0	7	6	7	6
Horned Lark	911	197	1236	241	2147	438
House Finch	66	5	22	5	88	10
Lapland Longspur	19	2	34	5	53	7
Lark Sparrow	2	1	0	0	2	1
Lincoln's Sparrow	0	0	1	1	1	1
Loggerhead Shrike[b]	0	0	8	7	8	7
Mourning Dove	14	2	65	20	79	22
Northern Rough-Winged Swallow	0	0	13	2	13	2
Northern Shrike	1	1	2	2	3	3
Orange-Crowned Warbler	0	0	1	1	1	1

TABLE P-5. Avian Species Observed during Fixed-Point Surveys (March 26, 2004, to March 23, 2005) in the Facility Area and Reference Area

	Facility Area		Reference Area		Total	
Species/Group	No. of Obs.	No. of Groups	No. of Obs.	No. of Groups	No. of Obs.	No. of Groups
Pine Siskin	2	1	0	0	2	1
Red-breasted Nuthatch	1	1	1	1	2	2
Red-winged Blackbird	0	0	312	21	312	21
Rock Wren	0	0	2	1	2	1
Rusty Blackbird	0	0	11	2	11	2
Savannah Sparrow	3	2	11	6	14	8
Say's Phoebe	18	16	29	24	47	40
Song Sparrow	0	0	36	16	36	16
Spotted Towhee	0	0	4	4	4	4
Unidentified passerine	17	6	38	13	55	19
Unidentified sparrow	4	3	4	2	8	5
Varied Thrush	0	0	1	1	1	1
Vesper Sparrow	3	1	2	2	5	3
Violet-green Swallow	3	1	0	0	3	1
Western Kingbird	7	4	4	3	11	7
Western Meadowlark[b]	170	57	269	100	439	157
White-crowned Sparrow	14	2	41	7	55	9
Yellow-rumped Warbler	14	4	8	1	22	5
Upland Gamebirds	**70**	**24**	**108**	**31**	**178**	**55**
California Quail	40	5	34	5	74	10
Chukar	3	2	37	10	40	12
Gray Partridge	4	2	0	0	4	2
Ring-necked Pheasant	23	15	37	16	60	31
Doves						
Rock Pigeon	11	2	26	5	37	7
Other Birds	**1**	**1**	**5**	**3**	**6**	**4**
Northern Flicker	1	1	2	2	3	3
Vaux's Swift	0	0	3	1	3	1
Overall Total	**2343**	**535**	**3938**	**770**	**6281**	**1305**

[1] All individuals included, even those outside the 800m viewing shed

[2] Oregon State vulnerable or critical species

Table P-6. Mean Use, Mean Number of Species per Survey, Total Number of Species, and Total Number of Fixed-Point Surveys Conducted by Season and Overall for the Facility Area and Reference Area

Season	Mean Use[1]	Number of Species Per Survey	Number of Species	Number of Surveys Conducted
Facility Area				
Spring	15.644	3.400	31	45
Summer	5.577	2.027	17	24
Fall	11.000	2.556	25	36
Winter	17.857	2.465	25	58
Overall	13.892	2.661	48	163
Reference Area				
Spring	10.631	3.235	35	69
Summer	8.088	2.609	25	37
Fall	10.192	2.404	34	52
Winter	25.855	2.528	34	83
Overall	15.490	2.727	59	241

[1] Number of observations per 30-minute survey.

In spring at the Facility area, passerines were the most abundant group (13.80 per survey), followed by waterbirds/waterfowl (0.69) and upland gamebirds (0.53). Similarly, passerines comprised 88.2 percent of all birds observed, waterbirds/waterfowl comprised 4.4 percent, and upland gamebirds comprised 3.4 percent. Avian groups most frequently occurring were passerines (100.0 percent of surveys), raptors (37.8 percent), and upland gamebirds (26.7 percent). Species with the highest use in spring were horned lark (5.13 per survey), American pipit (3.58), western meadowlark (1.84), European starling (1.11), and Brewer's blackbird (0.56). American kestrel was the most abundant raptor species in the spring (0.22 per survey), followed by northern harrier (0.11), and red-tailed hawk (0.09). Individual species most frequently observed during spring surveys were horned lark (91.1 percent of surveys), western meadowlark (55.6 percent), Say's phoebe (26.7 percent), ring-necked pheasant (24.4 percent), and American kestrel and common raven (20.0 percent each).

In summer, only three groups were observed. Passerines were the most abundant group (4.95 per survey), followed by raptors (0.58), and upland gamebirds (0.05). Similarly, passerines comprised 88.7 percent of all birds observed, raptors comprised 10.4 percent, and upland gamebirds comprised 0.9 percent. Avian groups most frequently occurring were passerines (80.1 percent of surveys), raptors (37.4 percent), and upland gamebirds (4.8 percent). Species with the highest use in summer were horned lark (3.00 per survey), western meadowlark (0.65), American kestrel (0.37), European starling (0.29), and barn swallow (0.21). American kestrel was the most abundant raptor species in the summer (0.37 per survey), followed by red-tailed hawk (0.11), and Swainson's hawk (0.05). Individual species most frequently observed during summer surveys were horned lark

(67.5 percent of surveys), American kestrel (33.7 percent), western meadowlark (26.5 percent), western kingbird (8.5 percent), and red-tailed hawk (7.4 percent).

In fall, passerines were the most abundant group (10.44 per survey), followed by raptors (0.28) and upland gamebirds (0.14). Similarly, passerines comprised 95.0 percent of all birds observed, raptors comprised 2.5 percent and upland gamebirds comprised 1.3 percent. Avian groups most frequently occurring were passerines (97.2 percent of surveys), raptors (25.0 percent), and upland gamebirds (5.6 percent). Species with the highest use in fall were horned lark (3.78/survey), American pipit (1.78), western meadowlark (1.14), Brewer's blackbird (1.03), and American goldfinch (0.64). Red-tailed hawk was the most abundant raptor species in the fall (0.14 per survey), followed by American kestrel (0.08), and Cooper's hawk and sharp-shinned hawk (0.03). Individual species most frequently observed during fall surveys were horned lark (86.1 percent of surveys), common raven (27.8 percent), western meadowlark (22.2 percent), red-tailed hawk (13.9 percent), and Brewer's blackbird and European starling (11.1 percent).

In winter, only four groups were observed. Passerines were the most abundant group (14.81 per survey), followed by waterbirds/waterfowl (1.93), upland gamebirds (0.64), and raptors (0.47). Similarly, passerines comprised 83.0 percent of all birds observed, followed by waterbirds/waterfowl (10.8 percent), upland gamebirds (3.6 percent), and raptors (2.7 percent). Avian groups most frequently occurring were passerines (90.7 percent of surveys), raptors (34.5 percent), upland gamebirds (6.4 percent) and waterbirds/waterfowl (5.7 percent). Species with the highest use in winter were horned lark (8.31 per survey), European starling (2.33), Canada goose (1.93), house finch (1.21), and California quail (0.59). Red-tailed hawk was the most abundant raptor species in the winter (0.14 per survey), followed by rough-legged hawk (0.12), American kestrel (0.10), and northern harrier (0.06). Individual species most frequently observed during winter surveys were horned lark (76.2 percent of surveys), common raven (27.7 percent), western meadowlark (20.9 percent), European starling (15.7 percent), and red-tailed hawk (14.1 percent).

Raptor use was highest near station F and station I, primarily because of higher use by American kestrels (Figure P-15). In general, the results of the 2004-2005 surveys at Biglow Canyon were very similar to the results from the Klondike studies in 2001-2002. More Canada geese were documented during Klondike surveys in winter than during the Biglow Canyon surveys; however, the frequency of observing this species (i.e., percentage of surveys with Canada Geese observed), was similar (11 percent for Klondike I and II, 6 percent for this study). Larger flocks were observed.

P.3.3.3 Raptor Nest Surveys—Biglow Canyon Wind Farm Facility, April 2004

Searches were conducted for raptor, corvid, and large bird nests within 3 miles of the Biglow Canyon Wind Farm Facility area and reference area; this area was extended along the Columbia and John Day Rivers to cover suitable habitat for peregrine falcons (Figure P-16). 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-six red-tailed hawk nests, 10 Swainson's hawk nests, 6 active great-horned owl nests, 1 American kestrel, and 1 prairie falcon nest were observed throughout the entire 325-square-mile nest survey area (Table P-3, Figure P-16). Three common raven nests and 22 inactive nests were also observed. Overall raptor nest density in the entire survey area was 0.14 nests per square mile. One other potential large falcon eyrie was identified within the nest survey area, but it is located more than 10 miles south of the proposed Biglow Canyon Wind Farm Facility area along the John Day River; aerial and river surveys did not document activity at this eyrie in 2004. The prairie falcon eyrie was documented more than 11 miles to the southeast of the Facility area.

Thirteen of the raptor nests were located within 2 miles of the Biglow Canyon Wind Farm Facility, including eight red-tailed hawks, three Swainson's hawks, one great horned owl, and one American kestrel nest site. Estimated nest density within the Facility area and a 2-mile buffer was 0.15 nests per square mile. One Swainson's hawk nest is located along an existing public road approximately 280 meters (919 feet) from a proposed turbine corridor centerline (Figure P-2, Figure P-16), and approximately 82 meters (269 feet) to the north of the proposed alternate transmission line. Four other active nest sites in proximity to turbine corridors include two Swainson's hawk nests at 547 meters (1,795 feet) and 600 meters (1,969 feet), and two red-tailed hawk nests at 275 meters (902 feet) and 372 meters (1,220 feet).

P.3.3.4 General Vegetation Mapping and Habitat Categorization Surveys, April to August 2005

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 1,000 feet of the proposed facilities were analyzed and mapped according to the ODFW Fish and Wildlife Habitat Mitigation Policy. Ground visits during initial habitat mapping in spring 2005 and during the sensitive species surveys in May and June 2005 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 area, as well as the Stateline wind facility area. Figures P-1 through P-10 illustrate the habitat types and categories found within the analysis area.

P.3.3.5 Special Status/ Sensitive Plants and Wildlife, June to September 2005

All federal and state listed species, or candidate species, are addressed in Exhibit Q. However, no federal or state listed species were observed during wildlife, habitat, or plant surveys.

Table P-7 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, 2005; USFWS, 2005; results in Attachments P-3 and P-4, respectively). Notes regarding the potential presence of these species in the analysis area are included. All plant species are addressed in Exhibit Q.

Table P-7. List of State and Federal Special Status/Sensitive Species Occurring in Sherman County, Oregon

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, habitat possible at pond near Emigrant Springs road
Western Toad	*Bufo boreas*	--	SV	Observed in upper Biglow Canyon
Reptiles				
Northern Sagebrush Lizard	*Sceloporus graciosus graciosus*	SoC	SV	Habitat lacking
Painted Turtle	*Chrysemys picta*	--	SC	None observed, habitat possible at pond near Emigrant Springs road
Sharptail Snake	*Contia tenuis*	--	SV	Habitat lacking
Western Rattlesnake	*Crotalus viridis*	--	SV	Observed, likely common in native shrub-steppe and ravine habitat (*C.v. oregonus*)

Table P-7. List of State and Federal Special Status/Sensitive Species Occurring in Sherman County, Oregon

Common Name	Scientific Name	Federal Status	State Status	Notes on Occurrence Within Facility area
Birds				
Bank Swallow	*Riparia riparia*	--	SU	None observed, probably migrant through Facility area
Burrowing Owl	*Athene cunicularia hypugaea*	SoC	SC	Historical county record, 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	County record, possible, esp near riparian areas
Eastern Oregon Willow Flycatcher	*Empidonax traillii adastus*	SoC	SU	None observed, Biglow Canyon habitat possible
Ferruginous Hawk	*Buteo regalis*	SoC	SC	One observation, rare.
Grasshopper Sparrow	*Ammodramus savannarum*	--	SV/SP	Common in non-AG habitat
Lewis's Woodpecker	*Melanerpes lewis*	SoC	SC	No observations, probably migrant through Facility area
Loggerhead Shrike	*Lanius ludovicianus*	--	SV	Uncommon
Long-billed Curlew	*Numenius americanus*	--	SV	Observed south of Facility, ORNHIC lists use along John Day River up to Drapper Canyon mouth, historical nesting sites of broad county canyons
Mountain Quail	*Oreortyx pictus*	SoC	SU	Habitat lacking
Swainson's Hawk	*Buteo swainsoni*	--	SV	18 observations from all surveys
Golden Eagle	*Aquila chrysaetos*	EA	--	Observed near John Day River rock outcrops during raptor nest survey
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, irregular migrant potentially through Facility
Bats				
Hoary Bat	*Lasiurus cinereus*			Probably 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	Probably migrant through Facility area

Table P-7. List of State and Federal Special Status/Sensitive Species Occurring in Sherman County, Oregon

Common Name	Scientific Name	Federal Status	State Status	Notes on Occurrence Within 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 east of John Day on south rim of Columbia River; might use river canyon slopes north and east of Facility
White-tailed Jackrabbit	*Lepus townsendii*	--	SU	Observed, uncommon
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.

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.

Diurnal walking surveys of the Facility site for special status/sensitive species documented 49 grasshopper sparrows, 2 short-eared owls, 1 Swainson's hawk, 1 active Swainson's hawk nest with 2 adults (previously documented as active in 2004 aerial raptor nest survey), 6 white-tailed jackrabbits (2 visual, 4 scat observations), and 1 ferruginous hawk. The ferruginous hawk was an adult hunting in the area where it was observed. Nocturnal jackrabbit surveys were conducted twice in suitable habitat between August 30 and September 12, 2005. Three additional white-tailed jackrabbits were observed during nocturnal surveys. Five western toads were also observed during these surveys.

All surveys, including general wildlife observations, documented the following state species of concern: grasshopper sparrows (49), western meadowlarks (170), loggerhead shrike (1), Swainson's hawk (18), ferruginous hawk (1), California bighorn sheep (5), white-tailed jackrabbit (11), western toad (5), and western rattlesnake (2).

P.3.3.6 Avian Use Survey -- Biglow Canyon Wind Farm Facility, September and October 2005

The primary objectives of the additional fixed-point surveys to be conducted in the fall 2005 are to (1) further quantify and compare the general level of bird utilization and species composition within the Facility area and other regional facilities for the purpose of predicting impacts and (2) provide additional information on spatial avian use of the site, to use with existing information on spatial use and behavior of birds to potentially refine micro-siting of turbines within the existing turbine corridors. The original survey points were selected to survey representative areas and habitats within the Facility area while also providing fairly even coverage with minimal overlap of surveyed area, taking into consideration the location of access roads and landowner concerns over impacts to wheat crops. Additional stations were established to survey in the fall migration 2005, which is a period of higher use, to provide better coverage of the proposed turbine corridors, especially those located closest to the John Day River. All birds seen during the point counts are to be recorded.

Nine survey plots were established over the Facility area, and 13 plots in the reference area during the original study (Figure P-11). Several plots established for the study of the Klondike I facility also were located within and near the Facility area (Figure P-11). For the fall 2005 surveys, (September 15 – October 20), an additional 6 stations were established within the Facility area (Figure P-11, Figure P-13). Survey periods for the fall 2005 surveys at each point are 20 minutes long. Methods for recording data are the same as those used for the yearlong baseline study (see foregoing discussion and Attachment P-1B). The additional fall 2005 surveys will be conducted at a minimum of twice weekly at all 16 Facility stations for 5 weeks; a third survey will usually be conducted each week at stations G, H, I, A4, A5, and A6. The results of the additional fall 2005 avian use surveys will be reported by October 28, 2005.

P.3.3.7 Nocturnal Anabat Surveys – September to October 2005

The objectives of the nocturnal Anabat surveys are (1) to record the presence of echo-locating bats flying through the sampling area during the apparent peak mortality period for migrating bats observed at all other open habitat regional wind facilities in the Pacific Northwest (Johnson et al., 2002a) and (1) to investigate any gross spatial patterns in use between sites nearest the John Day River Canyon and interior Facility sites. These data will be collected in September and October 2005. This information is considered auxiliary to the primary information (mortality data collected at other regional facilities) used in predicting mortality levels and species composition of the Facility. Each sampling night, two Anabat detectors connected to a tape recorder will be used to record echo-locating bat passes for approximately 11 hours each night (7 pm – 6 am). Each sampling night, two Anabat detectors, one located near ends of turbine strings closest to the John Day River Canyon, and one at an interior turbine corridor site will be

sampled concurrently. The locations of the stations will coincide with the avian observation stations and paired stations will include: (1) H-B, (2) I-D, (3) A5-A1, and (4) A6-A2 (Figure P-11, Figure P-13). It is anticipated that 3 to 4 nights of data will be collected at each station during the period of high bat mortality observed at other regional facilities (September - October).

The taped Anabat sessions will be reviewed to record the number of bat passes per sampling period. The number of bat passes will be compared between the sites located near the John Day River Canyon and the interior Facility sites by means of a paired t-test or other appropriate statistical technique. The number of bat passes per sampling period will also be compared to similar metrics collected at two sites with known relatively low bat mortality (Foote Creek Rim, Wyoming, and Buffalo Ridge, Minnesota) and two sites with known relatively high bat mortality (Buffalo Mountain, Tennessee, and Mountaineer, West Virginia). Recorded bat vocalizations will be compared to known species vocalizations to determine species or nearest possible identification (e.g., genus) of bats active in the area. Results will be reported by October 28, 2005.

P.4 HABITAT LOCATIONS

(C) A map showing the locations of the habitat identified in (A);

Response: See Figures P-1 through P-10.

P.5 DESCRIPTION OF SIGNIFICANT IMPACTS

(D) A description of the nature, extent and duration of significant potential impacts on the habitat identified in (A) and wildlife that may 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 Facility area, based on construction, operation, and retirement of the proposed Facility layout. To summarize:

- No Category 1, 2, or 5 habitat will be permanently or temporarily affected.
- 13.6 acres of Category 3 habitat and 4.1 acres of Category 4 habitat will be temporarily affected.
- 7.4 acres of Category 3 habitat and 3.6 acres of Category 4 habitat will be permanently affected.
- 94 percent of temporary impacts and 91 percent of permanent impacts will occur on Category 6 agricultural habitat.

P.5.1 Potential Impacts to Habitats

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 Facility features. Table P-8 summarizes acreage of affected habitat by type and category, fully defined in (A), for (1) the habitat analysis area, (2) temporary facilities, and (3) permanent facilities.

Table P-8. Total Habitat Acreage within Potential Impact Zone and Estimated Quantity of Disturbance or Loss of Categorical Habitats and Associated Habitat Types, within the Biglow Canyon Wind Farm Facility Area

		Impacts	
	Total Acres (within 750 feet of facilities)	**Temporary Facilities[1] (acres disturbed)**	**Permanent Facilities[2] (acres lost)**
Category 1	**2.64**	**0.00**	**0.00**
Upland Trees[3]	2.64	0.00	0.00
Category 2	**13.73**	**0.00**	**0.00**
Intermittent Stream/Riparian Trees	0.18	0.00	0.00
Riparian Trees	0.08	0.00	0.00
Shrub-steppe	13.47	0.00	0.00
Category 3	**931.47**	**13.57**	**7.35**
CRP	709.56	12.40	7.18
Shrub-steppe	215.96	1.17	0.17
Intermittent streams	0.22	0.00	0.00
Upland trees	5.47	0.00	0.00
Pond	0.26	0.00	0.00
Category 4	**313.2**	**4.12**	**3.62**
CRP	138.31	3.06	2.70
Shrub-steppe	38.80	0.06	0.04
Grassland	136.09	1.00	0.88
Category 5	**0.00**	**0.00**	**0.00**
Category 6	**10430.12**	**356.92**	**154.91**
Developed	64.43	3.97	4.58
Agricultural	10365.69	352.95	150.33
TOTAL	**11691.16**	**374.746[4]**	**165.88[4]**

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

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

[3] Habitat with active Swainson's hawk nest (2004 and 2005).

[4] Because some Facility impact areas overlap, the total Facility disturbance to habitat, as shown in Table P-8, is less than the sum of all Facility impact areas, as shown in Table C-1.

P.5.2 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 Facility was not high relative to other wind facility sites in the United States, including other open habitat sites.

- Raptor fatality rates for the Facility are anticipated to be low (< 0.1 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 Facility 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. Less than 1 percent of the area within 150 meters (492 feet) of the Facility is either native grassland or shrub-steppe habitats.
- Results of fatality monitoring for existing Columbia Basin wind facilities indicate a mortality range from 1.0 to 2.5 bats per MW per year. Based on this range and on similar characteristics of the Facility area to these other facilities, it is anticipated that bat mortality will also be similar and primarily involve migratory silver-haired and hoary bats.
- Little risk is expected to nonmigratory bat populations in the Facility area, given the lack of habitat and 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 Facility operations.
- Road and Facility 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.
- 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.

P.5.2.1 Birds

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

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

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

The estimates of operational impacts to birds from wind facilities is based on the site-specific measures of bird use, bird behavior, nesting, habitat, and topography, in combination with existing information on these same metrics in other locations, in addition to direct measures of impact (e.g., mortality and displacement). The Facility 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 facility locations, providing an existing comprehensive data source for predicting impacts to wildlife species.

Measured bird use of the Facility 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 Facility. Primary information from other facilities in the region include:

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

Collision

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

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

For all avian species combined, estimates of the number of bird fatalities per MW per year from individual studies have ranged from 0 at the sites at Searsburg, Vermont (Kerlinger, 1997), and Algona, Iowa (Demastes and Trainer, 2000), to approximately 10 (7.7 per turbine per year) at the site at Buffalo Mountain, Tennessee (Nicholson et. al., 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.

Facility and turbine characteristics of five Pacific Northwest regional wind facilities where standardized fatality monitoring has been conducted are described in Table P-9. 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-10). 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-11). Overall bird use estimated for the Facility was not high, relative to other open-habitat facility sites in the United States, suggesting that mortality estimates observed at these facilities provide a strong basis for predicting mortality impacts for the Facility. 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-9. 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
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-10 Pacific Northwest Regional Annual Fatality Estimates on Per Turbine and Per MW Nameplate Bases for All Birds and for All Raptors[1]

	Bird Fatality Rates		Raptor Fatality Rates	
Pacific Northwest Wind Facility	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 II	1.4	0.9	0.00	0.00
Nine Canyon, Washington, Phase I	3.6	2.8	0.07	0.05
Average	1.9	1.9	0.03	0.04

[1] The Combine Hills facility monitoring and result are not publicly available.

Table P-11 Number and Species Composition of Bird Fatalities Found at the Pacific Northwest Regional Wind Facilities

Species	Percent Composition	Number of Fatalities
Horned Lark	37.5	107
Ring-necked Pheasant (N)	9.1	26
Golden-crowned Kinglet	7.7	22
Western Meadowlark	4.9	14
Gray Partridge (N)	4.2	12
White-crowned Sparrow	3.9	11
Chukar (N)	3.5	10
Red-tailed Hawk	3.2	9
European Starling (N)	2.5	7

Table P-11 Number and Species Composition of Bird Fatalities Found at the Pacific Northwest Regional Wind Facilities

Species	Percent Composition	Number of Fatalities
American Kestrel	2.1	6
Unidentified passerine	2.1	6
Yellow-rumped Warbler	1.8	5
Winter Wren	1.8	5
Canada Goose	1.1	3
Dark-eyed Junco	1.1	3
Unidentified bird	1.1	3
House Wren	1.1	3
Unidentified sparrow	0.7	2
Short-eared Owl	0.7	2
Savannah Sparrow	0.7	2
Ruby-crowned Kinglet	0.7	2
Rock Dove (N)	0.7	2
Vesper Sparrow	0.7	2
White-throated Swift	0.7	2
Golden-crowned Sparrow	0.7	2
Red-breasted Nuthatch	0.7	2
Great Blue Heron	0.7	2
Red-winged Blackbird	0.4	1
Black-billed Magpie	0.4	1
Ferruginous Hawk	0.4	1
Grasshopper Sparrow	0.4	1
American Pipit	0.4	1
Mallard	0.4	1
Swainson's Thrush	0.4	1
Swainson's Hawk	0.4	1
Spotted Towhee	0.4	1
Northern Flicker	0.4	1
Lewis's Woodpecker	0.4	1
Macgillivray's Warbler	0.4	1
House Finch	0.4	1
Rough-legged Hawk	0.4	1
Virginia Rail	0.4	1
Total	**100.0**	**287**

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

N = Non-native species.

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).

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

Collisions with wires and electrocutions have been a common source of mortality at Altamont Pass, California (Orloff and Flannery, 1992), and other older wind facilities, whereas electrical collection lines between turbines in new generation wind facilities are typically buried underground to eliminate perching opportunities, collisions with wires, and electrocutions. Overhead lines within new wind facilities are typically designed to be raptor safe from electrocution, and anti-perching devices are often installed (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 facility turn at approximately 20 rpm, compared to greater than 60 rpm for the Kenetech 56-100 downwind turbine, the most common turbine at the Altamont Pass, California, wind facility. Blade tip speeds are similar for both new generation and old generation wind turbines. Although the relationship between blade tip speed and mortality is unknown, it is presumed that rpm is a factor in avian mortality, because avian ability to distinguish blade speed and blade position decreases as rpm increases.

Raptor mortality has been much lower at all new generation wind facilities in the United States, compared with mortality in the APWRA. The highest reported raptor fatality rate at new generation wind facilities occurred at the 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 at the Facility site is relatively low compared to that at several other wind plants in the United States that have been surveyed by means of similar methods (Figure P-17), and much lower than mean raptor use at both the High Winds Facility and the APWRA. Facilities in the region consistently observe red-tailed hawks, American kestrels, northern harriers, and rough-legged hawks (in winter) as the most abundant raptor species.

Raptor nest density within the Facility site and within a 2-mile buffer was 0.15 per square mile, which is slightly below the average raptor nest density for proposed and existing wind facilities located in agricultural landscapes (Table P-12). At Klondike I, Oregon, raptor nest density was also 0.15 per square mile within 5 miles of the Klondike facility area (which overlaps with much of the Facility area), but no raptor mortality was documented during a 1-year fatality monitoring study (Johnson et al., 2003b). At Buffalo Ridge, Minnesota, raptor nest density was also 0.15 per square mile, and the only documented raptor mortality over a 6-year period was a single red-tailed hawk (Osborn et al., 2000; Johnson et al., 2002b). Raptor nest density at the large Stateline wind facility on the Oregon-Washington border was 0.21 per square mile and raptor mortality was estimated to be 0.09 raptor fatalities per MW per year, consisting primarily of red-tailed hawks and American kestrels. Raptor nest density for the 41-MW Combine Hills wind facility, adjacent to Stateline, was estimated to be 0.24 per square mile, and no raptor fatalities were documented the first year of operation (D. Young pers. comm., 2005; Young et al., 2005). Raptor nest density for the recently permitted Hopkins Ridge wind facility in Columbia County, Washington, was 0.43 per square mile. Raptor nest densities are also available for other wind facilities in the region, including Condon, Oregon (0.06 per square mile), Nine Canyon, Washington (0.03 per square mile), and Zintel Canyon, Washington (0.08 per square mile). Very few raptor fatalities have been documented at those smaller facilities (one rough-legged hawk at Condon; an American kestrel and a short-eared owl at Nine Canyon).

Table P-12 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
Biglow Oregon	0.15	0.04	0.08	0.00	0.00	0.00	0.02	0.00
Klondike Oregon	0.16	0.04	0.08	0.00	0.00	0.00	0.04	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

Table P-12 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
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
Average	**0.18**	**0.04**	**0.08**	**0.01**	**0.00**	**0.00**	**0.02**	**0.00**

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 low (≤ 0.1 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, Northern harrier, and some owl species.

Passerines/Songbirds

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

Songbird mortality at operating wind facilities in eastern Oregon and Washington has been reasonably consistent. Horned larks have been the most commonly observed resident songbird fatality at agriculture and grassland facilities in the Pacific Northwest (Table P-11), and have been the most abundant songbird observed during point count surveys at these sites. Based on the U.S. Geological Survey's (USGS) Breeding Bird Survey (BBS) data, horned larks are probably one of the most common birds in the Columbia Plateau. Otherwise, no other resident songbird species has comprised a large proportion of the fatalities observed at the facilities in the Pacific Northwest.

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

facility near the southeastern end of the Stateline facility area, and one to the north of the facility area in Washington. The northern and southern stations had very similar passage rates, suggesting broad front movements throughout the facility site.

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

Tall, lighted structures are suspected of attracting nocturnal migrating birds, especially during inclement weather (Kerlinger, 2000). Lighting at communication towers, where large mortality events have been documented, is typically different from lighting at wind turbines. Communication towers commonly have more than one light location on a tower, whereas wind turbines have only one location for the light (on top of the nacelle, per 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.[2] 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, 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 Facility. The

[2] 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.

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 facility 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 Facility 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. For example, Canada goose use results from the 2001 studies at the nearby Klondike I and II facilities (Johnson et al., 2002a) estimates much higher goose use in the winter (17 individual goose observations per 30-minute survey), although only slightly higher frequency of occurrence (11 percent of surveys with Canada goose observations), than winter goose estimates from the Klondike III facility and this Facility (1–3 geese per 30-minute survey, 6-8 percent frequency of occurrence). 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 use is apparent from results of this study and the studies of the nearby facilities, and is expected based on the landscape characteristics (relatively flat monoculture) of the Facility area and surrounding areas.

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 Facility. However, even if estimates of goose use are near the high end of the range reported near

this Facility, 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*)[3] 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 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

[3] 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.

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 7-8 percent of the approximate Facility footprint is located in noncultivated 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.5.2.2 Bats

Most bat species roost in structures such as buildings, caves, mines, trees, and bridges, which are rare to absent within the Facility area. Foraging habitat is also extremely limited in the Facility area because of a lack of surface water; therefore, the construction and decommissioning of the facility is not anticipated to result in the loss or degradation of bat roosting and foraging habitat in the Facility area. 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). The primary method of predicting impacts is the use of mortality studies at existing wind facilities.

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

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

Bat foraging areas such as riparian zones, shrublands, and streams and other water sources are extremely limited in the Facility area. At several wind facilities evaluated in

the United States, bat collision mortality during the breeding season was virtually 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). 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 Facility site 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.5.2.3 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. Most of the big game observations were made along the John Day River Canyon. Most of the use within the Facility area is associated with the drainages of the John Day River. The elk and mule deer on site occupy primarily the grassland/shrub-steppe habitats and riparian corridors. During the construction period, it is expected that elk and mule deer will be temporarily displaced from these drainages because of the influx of humans and heavy construction equipment and associated disturbance (e.g., blasting). Following completion of the Facility, the disturbance levels from construction equipment and humans will diminish significantly and the primary disturbances will be associated with occasional vehicular traffic of operations and maintenance personnel, and the presence of the turbines and other facilities.

There is limited information regarding wind facility operations on big game. At the Foote Creek Rim wind facility in Wyoming, antelope observed during raptor use surveys were recorded year round (Johnson et. al., 2000a). The mean number of antelope observed at the 6 survey points was 1.07, prior to construction of the wind farm, and 1.59 and 1.14 antelope per survey in the 2 years immediately following construction, indicating no reduction in use of the immediate area. Mule deer and elk also occurred at the Foote Creek Rim, Wyoming, wind facility site, but their numbers were so low that meaningful data on wind farm avoidance could not be collected. A recent study regarding interactions of elk populations with the 74-MW Blue Canyon wind facility (45 1.65 MW turbines) 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. Given the habitats of the Facility area, and the low levels of human activity during operations, especially during the night, no measurable impacts are anticipated to big game from Facility operations.

P.5.2.4 Small Mammals

Other mammals that are likely to or do exist within the Biglow Canyon Wind Farm Facility site 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 in the reference area during avian use surveys (Attachment P-5). Photographs were taken of the ground squirrels in question and they were positively identified as Merriam's ground squirrels

(*Spermophilus canus canus;* Attachment P-5). No small-eared true ground squirrels of any species were detected in the Facility area during the spring/early summer special status/sensitive species surveys in noncultivated habitat (1,500-foot-wide swath centered on center of turbine string corridor) or during any other avian surveys conducted through all seasons, including all activities associated with in-transit travel through noncultivated habitats.

Construction of the Facility 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. Road and facility 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 91 percent of the Facility'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.5.2.5 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 Facility. 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.5.2.6 Plants

All potential impacts to plants are covered in Exhibit Q.

P.6 MEASURES TO AVOID, REDUCE, OR MITIGATE IMPACTS

(E) A description of any measures the applicant proposes to avoid, reduce, or mitigate potential adverse impacts;

Response: Primary mitigation measures adopted early in the design of the Facility are described in Attachment P-6. They include a minimum distance for wind turbine locations of 3 miles from the centerline of the Columbia River and 1 mile from the

centerline of the John Day River. These two design constraints were suggested by ODFW during early discussions of the siting of this Facility, and were intended to minimize or eliminate potential impacts to peregrine falcons and bald eagles (addressed in Exhibit Q), waterfowl, big game, and migrating songbirds and bats.

Additional early design measures employed included adjusting the turbine corridor layout design in order to decrease the probability of raptor and bird exposure to wind turbines. This layout adjustment was conducted by siting turbine corridors away from ridgeline edges where prevailing wind updrafts and steep slopes occur, away from prominent rock outcrops and fence lines that might be used as perches, and away from saddle locations along ridges. Attachment P-6 discusses turbine corridor orientation and defines topography of higher risk based upon avian use and mortality research conducted at other wind facilities. Facility wildlife survey results were used to identify raptor and bird use areas, special status/sensitive species locations, and raptor nest sites. Habitat mapping data were also used. With this body of information, several areas were identified that either contained potentially sensitive habitat or contained terrain features that could be used by raptors.

Nearly all turbine corridors closest to the John Day River were shortened or moved away from the river in order to eliminate direct impacts to native habitat in those areas. In most cases, there is a 250-foot buffer between the end of the turbine corridor and the edge of native habitat. Another turbine corridor was relocated to the west to avoid siting turbines and facilities in CRP.

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 Facility are sited generally on top of the ridge away from the windward side (west side) of the John Day River canyon, and away from the prominent John Day River canyon rim. All ends of turbine corridors are located on topography with slopes of less than 12 percent. Attachment P-6 includes close-up maps detailing the micro-siting of turbines along ridgelines.

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

- Permanent meteorological towers either will not have guy wires, to reduce the potential for collision of birds with guy wires, or if guy wires are used they will be equipped with the type of bird deflectors approved by the BLM.
- The Orion Sherman County Wind Farm LLC (Applicant) will survey the status of known Swainson's hawk 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.

- A segment of the original location of the Alternative 2 transmission line was found to be in proximity to Category 1 habitat with a Swainson's hawk nest previously identified as active. Accordingly, the Applicant revised the routing of the transmission line away from the road to a location south of the Category 1 habitat and the Swainson's hawk nest. The revised route crosses cultivated land.

To mitigate temporary disturbance from Facility construction to wildlife habitats such as CRP, 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 14 acres of Category 3 habitat and 4 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:

- Areas disturbed during construction will be revegetated expeditiously.
- A noxious weed control plan will be developed following guidelines based upon consultation with the Sherman County Soil and Water Conservation District.
- The noxious weed control plan will be finalized prior to construction and will be implemented over the life of the Facility.

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

- A comprehensive fire control plan will be developed before construction and implemented Facility-wide over the life of the Facility (see Exhibit B).
- 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 (i.e., from Facility footprint) that cannot be avoided or minimized will be mitigated by the use of standards and methods that are in compliance with ODFW's habitat mitigation goals and standards. Mitigation approaches will use one of two methods selected by the Applicant in consultation with ODFW:

- Mitigation Option A establishes an agreement with a landowner to enhance existing native habitat for the life of the Facility. An example is the use of livestock exclosures

or fencing to exclude livestock from riparian/shrub-steppe habitats, which creates Category 2 habitat from Category 3 habitat.

- Mitigation Option B establishes an agreement with a landowner that initiates and maintains the conversion of agricultural land to grassland/shrub-steppe habitat, creating Category 2 or 3 habitat from Category 6 habitat. The conservation approach is similar to that deployed under the CRP, and the term would be for the life of the Facility.

Approximately 7 acres of Category 3 habitat and 4 acres of Category 4 habitat will be directly affected by permanent facilities, so at least 11 acres of low quality habitat will be enhanced or created. A number of canyon areas along the John Day River have been identified as potential areas for Mitigation Option A, and a number of ridgeline ends near John Day River canyons have been identified as potential areas for Mitigation Option B. These potential areas are located away from turbine corridors. A 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.

Approximately 155 acres of Category 6 habitat (agricultural) will be affected by permanent facilities and approximately 357 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

In addition, a monitoring program will be used to identify post-construction impacts to wildlife, measure the effectiveness of habitat reclamation efforts, and assess the need for additional mitigation, depending on results of the monitoring program; see response to item (G). Additional mitigation will be proposed if mortality of specific taxonomic groups of birds from turbine collisions is high. Mitigation might also be proposed if estimates of indirect (displacement) impacts to grassland songbirds and/or nesting target raptor species are high.

Estimates of mortality of specific taxonomic groups of birds will be established through site-specific monitoring that will probably include standardized casualty searches, searcher efficiency trials, and a Wildlife Incidental Response and Handling System for operations and maintenance personnel.

Estimates of indirect impacts can be established through site-specific monitoring, a combination of site-specific monitoring and similar monitoring at other wind facilities or control areas in the region, or solely through existing and relevant regional studies. In

lieu of onsite monitoring for indirect impacts, another option that will be considered with ODFW is increasing the acreage in Mitigation Option A or B, according to the anticipated indirect impacts to grassland birds. Estimates of anticipated indirect impacts to grassland birds could be based upon the results of this type of monitoring at other wind facilities in the region.

P.7 EVIDENCE THAT PROPOSED FACILITY COMPLIES WITH GOALS AND STANDARDS

(F) Evidence that the proposed facility, including any proposed mitigation, complies with the fish and wildlife habitat mitigation goals and standards in OAR 635-415-0030; and

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

P.8 MONITORING PROGRAM

(G) The applicant's proposed monitoring program, if any, for impacts to such fish and wildlife species and their habitats;

Response: A monitoring program is being designed to estimate both direct and indirect impacts of the Facility 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 October 2005 and incorporated into this SCA at that time.

P.9 REFERENCES

Arnett, E.B. (technical editor). 2005. *Relationships between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Bat Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines*. Final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas.

Barbour, R.A., and W.H. Davis. 1969. *Bats of America*. University of Kentucky, Lexington.

Barclay, R.M.R., P.A. Faure, and D.R. Farr. 1988. Roosting behavior and roost selection by migrating silver-haired bats (*Lasionycteris noctivagans*). Journal of Mammalogy 69:821-825.

Demastes, J.W., and J.M. Trainer. 2000. *Avian Risk, Fatality, and Disturbance at the IDWGP Wind Farm, Algona, Iowa*. Final report submitted by University of Northern Iowa, Cedar Falls, Iowa. 21 pp.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. *Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003*. Technical report peer-reviewed by

and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Erickson, W.P., B. Gritski, and K. Kronner. 2003. *Nine Canyon Wind Power Project Avian and Bat Monitoring Report, September 2002 – August 2003.* Technical report prepared by WEST, Inc., for Energy Northwest and the Nine Canyon Technical Advisory Committee.

Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa and K. Bay. 2002. *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments.* Technical report prepared by WEST, Inc., for Bonneville Power Administration, Portland, Oregon.

Erickson, W.P., G.D. Johnson, M.D. Strickland, K.J. Sernka, and R.E. Good. 2001. *Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States.* Technical report prepared by WEST, Inc., for the National Wind Coordinating Committee. Available at http://www.west-inc.com.

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. *Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Washington.* Technical Report prepared by WEST, Inc., for Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 21 pp.

Garrettson, P.R., T.J. Moser, and K.A. Wilkins. 2003. Waterfowl Population Status, 2003. U.S. Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C.

Gruver, J.C. 2002. *Assessment of Bat Community Structure and Roosting Habitat Preference for the Hoary Bat (Lasiurus cinereus) near Foote Creek Rim, Wyoming.* M.S. Thesis, University of Wyoming, Laramie.

Hayes, J.P., and D.L. Waldien. 2000. *Potential Influences of the Stateline Wind Project on Bats.* Unpublished report prepared for CH2M HILL, Portland, Oregon.

Isaacs, Frank. 2005. Personal communication, January 2002, update July 2005.

Izor, R.J. 1979. Winter range of the silver-haired bat. Journal of Mammalogy 69:641-643.

Johnson, G.D. 2005. A review of bat mortality at wind-energy developments in the United States. Bat Research News 46:45-49.

Johnson, G.D. 2004. *Analysis of Potential Wildlife and Habitat Impacts from the Klondike II Project, Sherman County, Oregon.* Technical report prepared by WEST, Inc., for CH2M HILL and PPM Energy.

Johnson, G.D. 2003. What is known and not known about bat collision mortality at wind plants? In: R.L. Carlton, editor. *Avian Interactions with Wind Power Structures.* Proceedings of a workshop held in Jackson Hole, Wyoming, USA, October 16-17, 2002. Electric Power Research Institute Technical Report, Palo Alto, California.

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat activity, composition and collision mortality at a large wind plant in Minnesota. Wildlife Society Bulletin 32: 1278-1288.

Johnson, G.D., M.K. Perlik, W.P. Erickson, M.D. Strickland, D.A. Shepherd, and P. Sutherland, Jr. 2003a. *Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota Wind Resource Area: An Assessment of Bat Activity, Species Composition, and Collision Mortality*. Electric Power Research Institute, Palo Alto, California and Xcel Energy, Minneapolis, Minnesota.

Johnson, G.D., W.P. Erickson, and J. White. 2003b. *Avian and Bat Mortality at the Klondike, Oregon, Phase I Wind Plant*. Technical report prepared by WEST, Inc., for Northwestern Wind Power, Cheyenne, Wyoming.

Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. 2002a. *Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon*. Prepared by WEST, Inc., for Northwestern Wind Power, Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002b. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. Wildlife Society Bulletin 30:879-887.

Johnson, G.D., D.P. Young, Jr., C.E. Derby, W.P. Erickson, M.D. Strickland, and J.W. Kern. 2000a. *Wildlife Monitoring Studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999*. Technical Report prepared by WEST, Inc., for SeaWest Energy Corporation and Bureau of Land Management. 195 pp.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000b. *Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-year Study*. Technical Report prepared by WEST, Inc., for Northern States Power Co., Minneapolis, Minnesota. 212 pp.

Kerlinger P. 2004. *Attraction of Night Migrating Birds to FAA and Other Types of Lights*. Curry and Kerlinger, LLC, Cape May, New Jersey.

Kerlinger, P. 2000. *Avian Mortality at Communication Towers: A Review of Recent Literature, Research, and Methodology*. Unpublished report prepared for the U.S. Fish and Wildlife Service, Office of Migratory Bird Management.

Kerlinger, P. 1997. *A Study of Avian Fatalities at the Green Mountain Power Corporation's Searsburg, Vermont, Wind Power Facility – 1997*. Report prepared for Vermont Department of Public Service, Green Mountain Power Corporation, National Renewable Energy Laboratory, and Vermont Environmental Research Associates. 12 pp.

Kerns, J., and P. Kerlinger. 2004. *A Study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual Report for 2003*.

Technical report prepared by Curry and Kerlinger, LLC, for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee.

Koford, R., and A. Jain. 2004. *Avian Mortality Associated with the Top of Iowa Wind Farm.* Technical Report, Iowa Cooperative Fish and Wildlife Research Unit, Iowa State University.

Kunz, T.H. 1982. Lasionycteris noctivagans. Mammalian Species 172:1-5.

Leddy, K.L. 1996. Effects of Wind Turbines on Nongame Birds in Conservation Reserve Program Grasslands in Southwestern Minnesota. M.S. Thesis, South Dakota State University, Brookings. 61 pp.

Leddy, K.L., K.F. Higgins, and D.E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grassland. Wilson Bulletin 111:100-104.

Mabee, T. J., and B. A. Cooper. 2002. *Nocturnal Bird Migration at the Stateline and Vansycle Wind Energy Projects, 2000-2001.* Final report prepared by ABR, Inc., Forest Grove, Oregon, for CH2M HILL and FPL Energy Vansycle, LLC.

McCrary, M.D., R.L. McKernan, W.D. Wagner, and R.E. Landry. 1984. *Nocturnal Avian Migration Assessment of the San Gorgonio Wind Resource study Area, Fall 1982.* Southern California Edison Company. 87 pp.

Nicholson, C.P. 2003. *Buffalo Mountain Wind Farm Bird and Bat Mortality Monitoring Report: October 2001 - September 2002.* Tennessee Valley Authority, Knoxville.

Nordquist, G.E. 1997. Bats in Minnesota. James Ford Bell Museum of Natural History Natural History Leaflet. University of Minnesota.

Oregon Natural Heritage Information Center (ORNHIC). 2005. List of Rare, Threatened, and Endangered Plant and Animal Species in T1N, R17E, S 4, 5, 8 and T2N, R17E, S1, 10-15, 22-27, 33, and 36 and T2N, R18E, S4-10, 14-18, and 20-23, W.M. ORNHIC, Portland, Oregon.

Orloff, S., and A. Flannery. 1996. *A Continued Examination of Avian Mortality in the Altamont Pass Wind Resource Area.* P700-96-004CN. Report from Ibis Environmental Services and BioSystems Analysis, Inc., Santa Cruz, California, for California Energy Commission, Sacramento, California. 55 pp.

Orloff, S., and A. Flannery. 1992. *Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991.* Final Report prepared by BioSystems Analysis, Inc., Tiburon, California, for Alameda, Contra Costa, and Solano Counties and the California Energy Commission.

Osborn, R.G., K.F. Higgins, R.E. Usgaard, C.D. Dieter, and R.G. Neiger. 2000. Bird mortality associated with wind turbines at the Buffalo Ridge Wind Resource Area, Minnesota. American Midland Naturalist 143:41-52.

Osborn, R.G., C.D. Dieter, K.F. Higgins, and R.E. Usgaard. 1998. Bird flight characteristics near wind turbines in Minnesota. American Midland Naturalist 139:29-38.

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

Shump, K.A., Jr., and A.U. Shump. 1982. *Lasiurus cinereus*. Mammalian Species 185:1-5.

Smallwood, K S., and C.G. Thelander. 2004. *Developing Methods to reduce Bird Fatalities in the Altamont Wind Resource Area.* Final report prepared by BioResource Consultants for the California Energy Commission, Public Interest Energy Research-Environmental Area, under Contract No. 500-01-019 (L. Spiegel, Project Manager).

Spaans, A., L. van der Bergh, S. Dirksen, and J. van der Winden. 1998. Windturbines en volgles: hoe hiermee om te gaan? Levende Naturr 99:115-121.

U.S. Fish and Wildlife Service (USFWS). 2005. Federally Listed and Proposed and Endangered and Threatened Species, Candidate Species and Species of Concern that may occur in Sherman County. Received July 7, 2005.

Walter, D., D.M. Leslie, Jr., and J.A. Jenks. 2004. Response of Rocky Mountain Elk (Cervus elaphus) to Wind-power Development in Southwestern Oklahoma. Presentation at the 2004 Wildlife Society Meeting, Fall 2004.

Young, David. Personal communication, 2005.

Young, Jr., D.P., W.P. Erickson, J.D. Jeffrey, K. Bay, and M. Bourassa. 2005. *Eurus Combine Hills Turbine Ranch Phase 1 Post Construction Wildlife Monitoring Final Report February 2004 - February 2005.* Technical Report prepared by Western EcoSystems Technology, Inc., Cheyenne, Wyoming, and Northwest Wildlife Consultants, Pendleton, Oregon, for Eurus Energy America Corporation and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon.

Young, Jr., D.P., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. *Final Report: Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Wind Power Project, Carbon County, Wyoming. November 1998 – June 2002.* Technical report prepared by WEST, Inc., for PacifiCorp, Inc., Portland, Oregon; SeaWest Windpower, Inc, San Diego, California, and Bureau of Land Management, Rawlins, Wyoming.

ATTACHMENT P-1A

Wildlife Baseline Study Protocols

WILDLIFE BASELINE STUDY PROTOCOL

BIGLOW CANYON WIND FARM FACILITY
SHERMAN COUNTY, OREGON

UPDATED AUGUST 2005

WEST Inc.

A wildlife baseline study was conducted to describe temporal and spatial use of wildlife in the proposed 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 is 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 Facility, and identify potential project modifications and/or mitigation measures that could potentially reduce or mitigate negative impacts.

The regional wind facilities from which survey information has been collected include the Klondike I Wind facility, the Klondike II Wind facility, the proposed Klondike III wind facility, the Stateline Wind Facility, the Nine Canyon Wind Facility and the Combine Hills Wind Facility. These projects are all located in landscapes which are similar to the Facility landscape, and they therefore provide one of the most comprehensive databases of existing information to be used in scientifically-sound predictions of impacts to wildlife.

Also utilized in the wildlife baseline study is existing information collected at a nearby reference area.

METHODS

The wildlife baseline studies consist of four 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 3 miles of the project area and reference area, with additional suitable habitat for peregrine falcons surveyed along the Columbia River and John Day River
4) Sensitive Species Surveys
5) General Wildlife Observations

Habitat Mapping

A general habitat map was developed by delineating broad habitat types (cultivated and non-cultivated areas) on digital orthoquads (DOQ). This map was then ground-truthed to separate out native habitats from 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, which are utilized as a foundation for their mitigation standards. General habitat categories were mapped within a minimum of 1,000 feet of all facilities, and also included all areas within the interior of the project site.

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 and reference area with similarly collected information at nearby and other regional projects for the purpose of predicting impacts, and (2) provide information on spatial avian use of the site, to use with existing information on spatial use and behavior of birds to aid in adjusting the locations of Facility components within the broader Facility site. Point counts (variable circular plots) were conducted on the development area using methods described by Reynolds et al. (1980). The points were selected to survey representative areas within the project area 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.

Survey Plots

Nine survey plots were established over the project area (Figure 1), and 13 plots in the reference area (Figure 1). The study of the proposed Klondike I facility also had several plots located within and near the project area (Figure 1). Each survey plot was a variable circular plot centered on an observation point marked in the field. The survey effort was concentrated within an approximate 800 meters (0.5 miles) radius circle centered on the observation point. All birds observed were recorded. Observations of birds beyond the 800 m radius were not included in the analysis so that results were standardized to previous studies as well as between survey locations at the site. Observation points were established to provide good coverage of the habitats and topographic features of the area and, to the extent possible, so that the 800 meter radius buffers around each point did not overlap.

Survey periods at each point were 30 minutes long. 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 (Appendix A). 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 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 30-minute observation period. The first instantaneous count was made at the beginning of the observation period and the remaining counts occurred at 10-minute intervals. 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.

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.

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.

Observation Schedule

Sampling intensity was designed to document avian use and behavior by habitat and season within the project area. One full year of weekly surveys, occurring approximately twice a month at each station, took place from spring 2004 to spring 2005 (March to March). 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.

Big Game Observations

Observations of big game species seen while conducting 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.

Raptor Nest Surveys

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. The nest survey area included the project area, the reference area, and the area within an approximately 3-mile buffer of the project area and reference area; the survey area was extended out along the Columbia and John Day Rivers to cover suitable habitat for peregrine falcons (Figure 1). GPS coordinates (Universal Transverse Mercator, UTM; NAD27) 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.

Locations of all nests, including inactive nests, were recorded as they may be occupied during other years. Survey methods involved flying over the area while searching for suitable nesting areas and substrate (e.g., trees, rock outcrops, cliffs, and other structures, such as power poles and old windmills). Once suitable nesting areas were found they were searched thoroughly from the air, and all nests were given a unique identification number matched with the respective GPS coordinates. Some of the nest sites identified from the air were also surveyed from the ground to verify activity/species. The surveys were conducted by a biologist experienced in raptor nest surveys. Additional data about raptor nest sites that were visible from ground routes traveled by the project biologist were gathered during other surveys in the study area.

Estimates of impacts to raptors/raptor nests will be based on the information collected during the 2004-2005 surveys for this project, as well as results of pre-construction surveys within significant overlap in survey areas that were conducted in 2001 for the Klondike I wind power facility and in 2004 for the Klondike III wind power facility. Estimated nesting densities, species composition and direct measures of impacts from nest monitoring at the Nine Canyon, Stateline, Combine Hills, and Klondike I and other regional wind project facilities (e.g., Hopkins Ridge in Columbia County, Washington, and several Klickitat County, Washington wind projects) were also utilized.

Sensitive Grassland/Shrub-steppe Species Surveys

Within a minimum of 255 meters, or 836 feet, from the turbine corridor centerlines and all other Facility components, areas of non-cultivated land (including grasslands, shrub steppe, and CRP) with the potential to be directly impacted by the Facility were identified. Aerial photographs with topographic overlays were used with ground-truthing efforts to identify and describe habitats within the project area. Areas in non-cultivated or non-developed habitat within at least 255 meters (836 feet) of proposed turbine strings, underground collector lines, new roads, substations, laydown areas, meteorological towers, O&M facilities, and transmission lines were surveyed for sensitive status wildlife

(targeting grasshopper sparrows, white-tailed jackrabbits, burrowing owls and other sensitive grassland/shrub steppe species) twice during the spring nesting/breeding season (May and June 2005). Transects were spaced approximately 50 meters apart, though many of the target species can be observed and identified farther than the 25 meter viewshed. Surveys were conducted primarily in the morning and never went past 1:00 pm. Surveys were only conducted when wind speeds did not consistently exceed 15 mph. Habitat types, mapping codes, and categorization followed definitions of the Oregon Department of Fish and Wildlife to be utilized as a foundation for their mitigation standards.

Nighttime surveys for white-tailed jackrabbits using 200,000 or greater candlepower spotlights will be conducted in August-September 2005 in the same areas surveyed diurnally for sensitive grassland/shrub steppe species to document presence and location of this species. Two surveys will be conducted. 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 siting will be recorded using GPS. Other wildlife observed during these surveys will also be recorded.

General Wildlife Observations

The objective of recording general wildlife observations on the site was to document wildlife other than avian species that may be affected by the proposed development. General wildlife observations were made year round while observers were on site conducting other surveys. All raptors, unusual or unique avian sightings, sensitive species, mammals, reptiles, and amphibians sighted while field observers were on site or traveling between plots were recorded on data sheets for incidental observations. The data recorded were similar to those recorded during the plot studies, such as date, time, temperature, and habitat. GPS coordinates for observations of uncommon species and species of concern were recorded as well.

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

Reynolds, R.T., J.M. Scott, and R.A. Nussbaum. 1980. A Variable Circular-Plot Method for Estimating Bird Numbers. Condor 82(3): 309-313.

ATTACHMENT P-1B

Additional Wildlife Baseline Survey Protocols

ADDITIONAL WILDLIFE BASELINE SURVEY PROTOCOLS

Draft

FALL 2005

BIGLOW CANYON WIND PROJECT

SHERMAN COUNTY, OREGON

A wildlife baseline study was conducted to describe temporal and spatial use of wildlife in the proposed 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 (WEST 2005). This information was 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.

The regional wind facilities from which survey information has been collected include the Klondike I Wind facility, the Klondike II Wind facility, the proposed Klondike III wind facility, the Stateline Wind Facility, the Nine Canyon Wind Facility and the Combine Hills Wind Facility. These projects are all located in similar landscapes as the proposed Biglow Canyon Wind Project, and provide one of the most comprehensive databases of existing information to be used in scientifically-sound predictions of impacts to wildlife.

Also utilized in the wildlife baseline study is existing information collected at a nearby reference area which has the potential for future wind project development. The baseline study conducted between March 2004 and June 2005 consisted of:

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 3 miles of the project area and reference area, with additional suitable habitat for peregrine falcons surveyed along the Columbia River and John Day River
4) Sensitive Species Surveys
5) General Wildlife Observations

Based on their review of the NOI, ODFW identified some areas of concern regarding scope of the baseline studies. Based on these comments, and subsequent conversations with ODFW, some additional surveys were identified to potentially aid in describing impacts to wildlife, and in better understanding and refining the micro-siting of turbines that had already been implemented to reduce and avoid impacts (see Appendix P-X, Exhibit P). Several additional avian use survey stations were identified by WEST and reviewed by ODFW to provide additional coverage of the proposed turbine corridors. Most of these additional survey stations were located along the John Day Canyon, which is an area of concern identified by ODFW, due

to the native habitat, steeper topography, and potentially a higher risk area. While several modifications had already been made to turbine locations along the John Day River, this additional information may help to refine impacts, and evaluate and further inform micro-siting decisions that have already been made. In addition, to augment the information already used to predict impacts to bats, nocturnal Anabat information is being collected during the peak fall migrant bat mortality period consistent observed at the other regional wind projects.

Additional Fixed-Point Avian Use Surveys

The primary objectives of the additional fixed-point surveys to be conducted in the fall 2005 are to (1) further quantify and compare the general level of bird utilization and species composition within the project area and other regional projects for the purpose of predicting impacts, (2) provide additional information on spatial avian use of the site, to use with existing information on spatial use and behavior of birds to potentially refine micro-siting turbines within the existing turbine corridors. The original survey points were selected to survey representative areas and habitats within the project area 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. Additional stations were established to survey in the fall 2005 to provide better coverage of the proposed turbine corridors, especially those located closest to the John Day River. All birds seen during the point counts were recorded.

Survey Plots

Nine survey plots were established over the project area (Figure 1), and 13 plots in the reference area (Figure 1) during the original study. The study of the proposed Klondike I facility also had several plots located within and near the project area (Figure 1). For the fall 2005 surveys, (September 15 – October 20th), an additional 6 stations were established within the project area. Each survey plot was a variable circular plot centered on an observation point marked in the field. The survey effort was concentrated within an approximate 800 meters (0.5 miles) radius circle centered on the observation point. All birds observed were recorded. Observations of birds beyond the 800 m radius were not included in the analysis so that results were standardized to previous studies as well as between survey locations at the site. Observation points were established to provide good coverage of the habitats and topographic features of the area and, to the extent possible, so that the 800 meter radius buffers around each point did not overlap.

Survey periods for the fall 2005 surveys at each point are 20 minutes long. 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. 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 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 30-minute observation period. The first instantaneous count was made at the beginning of the observation period and the remaining counts occurred at 10-minute intervals. 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.

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.

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.

Observation Schedule

Sampling intensity was designed to document avian use and behavior by habitat and season within the project area during the original 12-month study. One full year of weekly surveys, occurring approximately twice a month at each station, took place from spring 2004 to spring 2005 (March to March). 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.

The additional fall 2005 surveys will be conducted at a minimum of twice weekly at all 16 Project stations for five weeks, with a third survey usually conducted each week at stations G, H, I, A4, A5, and A6.

Big Game Observations

Observations of big game species seen while conducting 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

The objective of recording general wildlife observations on the site was to document wildlife other than avian species that may be affected by the proposed development. During the additional fall surveys, general wildlife observations will continue to be recorded. All raptors, unusual or unique avian sightings, sensitive species, mammals, reptiles, and amphibians sighted while field observers were on site or traveling between plots were recorded on data sheets for incidental observations. The data recorded were similar to those recorded during the plot studies, such as date, time, temperature, and habitat. GPS coordinates for observations of uncommon species and species of concern were recorded as well.

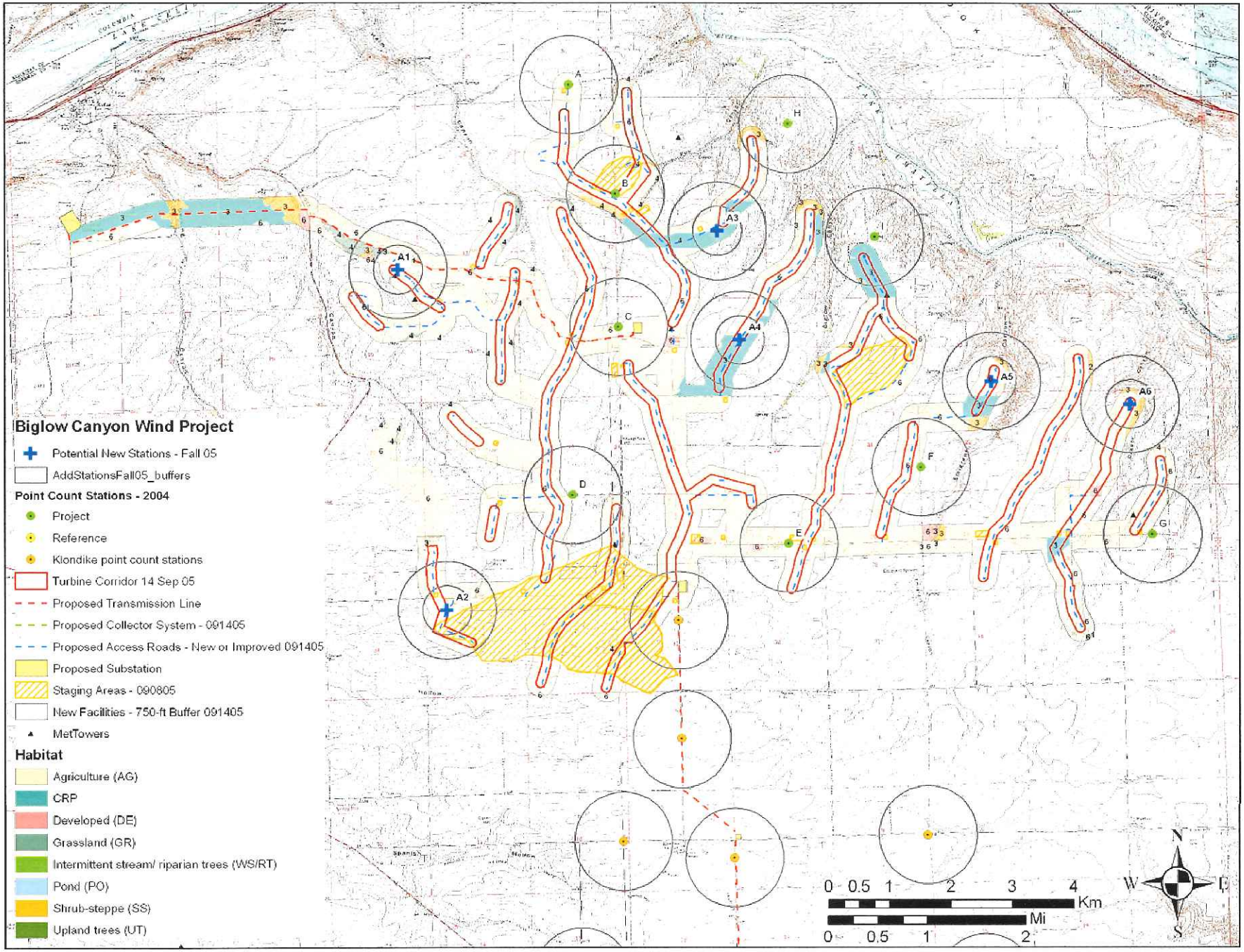
Nocturnal Anabat Surveys

The objectives of the nocturnal Anabat surveys is to record the presence of echo-locating bats flying through the sampling area during the apparent peak mortality period for migrating bats observed at all other open habitat regional wind projects in the Pacific Northwest (Johnson et al. 2002), and to investigate any gross spatial patterns in use between sites nearest the John Day River Canyon and interior project sites. This information is considered auxiliary to the primary information (mortality data collected at other regional projects) used in predicting mortality levels and species composition of the proposed Project. Each sampling night, two AnaBat detectors connected to a tape recorder will be used to record echo-locating bat passes for a minimum 6-hour sampling period. Each sampling night, two AnaBat detectors, one located near ends of turbine strings closest to the John Day River Canyon, and one at an interior turbine corridor site will be sampled concurrent. The taped AnaBat sessions will be reviewed to record the number of bat passes per sampling period. The number of bat passes will be compared between the sites located near the John Day River Canyon to the interior project sites using a paired t-test or other appropriate statistical technique. The number of bat passes per sampling period will also be compared to similar metrics collected at two sites with known relatively low bat mortality (Foote Creek Rim Wyoming and Buffalo Ridge Minnesota) and to with known relatively high bat mortality (Buffalo Mountain Tennessee and Mountaineer West Virginia. Recorded bat vocalizations will be compared to known species vocalizations to determine species or nearest possible identification (e.g., genus) of bats active in the area.

References

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30:879-887.

WEST 2005. Wildlife Baseline Study, Biglow Canyon Wind Project. Sherman County, Oregon. Updated August 2005.


Biglow Canyon Wind Project
Potential New Stations - Fall 05
AddStationsFall05_buffers
Point Count Stations - 2004
Project
Reference
Klondike point count stations
Turbine Corridor 14 Sep 05
Proposed Transmission Line
Proposed Collector System - 091405
Proposed Access Roads - New or Improved 091405
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Habitat
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CRP
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Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Shrub-steppe (SS)
Upland trees (UT)
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ATTACHMENT P-2

Wildlife and Habitat Baseline Study Report

WILDLIFE AND HABITAT BASELINE STUDY FOR THE PROPOSED BIGLOW CANYON WIND POWER PROJECT, SHERMAN COUNTY, OREGON

March 2004 – August 2005

October 2005

Prepared for:

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WEST, Inc.

Specializing in Ecological Field Studies

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INTRODUCTION

Orion Energy LLC and its subsidiary, Orion Sherman County Wind Farm LLC (the Applicant), have proposed a wind power development in Sherman County, Oregon near the towns of Moro, Wasco, and Rufus. Orion contracted Western Ecosystems Technology, Inc. (WEST) to conduct a baseline study assessing wildlife use of the Biglow Canyon Wind Power Project (the "Project" or "BCWPP") area (Figure 1) for the purpose of predicting impacts of project construction and operations on wildlife. The following document contains results of the baseline study conducted between March 2004 and September 2005. Wildlife impact assessment will be included in Exhibits P and Q of the ASC.

Overview of the Baseline Studies

The principal objectives of the baseline study for this proposed Project were to: (1) describe the temporal and spatial use of wildlife in the proposed project area, (2) describe habitat of the project area, (3) describe occurrence of any federal and state threatened, endangered, proposed, candidate, or sensitive-status animals that may be affected by the project, (4) estimate any potential impacts to habitat and wildlife that could result from the construction and operation of the proposed project, and (5) identify potential project modifications and/or mitigation measures that could potentially reduce or mitigate negative impacts.

In addition to site-specific data, the baseline study uses existing information and results of studies conducted at other wind plants in the region. Data collected at existing wind plants have greatly enhanced the ability to estimate potential bird and bat mortality at proposed wind plants. For several wind power projects, standardized baseline data on avian use, raptor nesting, and habitat information have been collected in association with standardized post-construction (operational) monitoring, allowing comparisons of avian use to mortality. Additional information about species occurrence, or likely occurrence, in the vicinity of the proposed wind project was obtained from available agency databases and personal communications with wildlife agency personnel.

The baseline study was composed of the following components: (1) avian use surveys, (2) aerial raptor nest surveys, (3) wildlife habitat mapping, (4) special status/sensitive species surveys, and (5) general wildlife observations.

1. Avian Use Surveys

The objective of avian use surveys is to provide information that can be used to predict potential impacts, and identify methods of avoiding and/or mitigating impacts by estimating temporal and spatial use of the general Project area by birds. Avian use surveys consist of timed bird counts within circular plots centered around fixed observation points. This report presents results for one year, March 2004 through March 2005. Avian use surveys were conducted in the BCWPP and also at a nearby reference area.

2. Aerial Raptor Nest Surveys

The objective of the raptor nest survey was to gather information on 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 on April 20 and 21, 2004, and covered the BCWPP, the reference area, and a buffer of approximately 2 miles.

3. Wildlife Habitat Mapping

Aerial photographs with topographic overlays were used with ground-truthing efforts to identify and describe habitats within the Project area. Results were mapped using GIS and noted as to their categorical classification based upon Oregon Department of Fish and Wildlife habitat and mitigation standards.

4. Special Status/Sensitive Species Surveys

Special Status/Sensitive species walking surveys were conducted in the vicinity of proposed project facilities that are located within grassland/shrub steppe habitats (including Conservation Reserve Program (CRP) lands). The surveys focused on species such as grasshopper sparrows, long-billed curlews, burrowing owls, and small mammals. Additional nighttime surveys were conducted to document white-tailed jackrabbits.

5. Big Game and General Wildlife Observations

The objective of recording general wildlife observations on the BCWPP and reference site was to document wildlife other than avian species that may be affected by the proposed development. These incidental wildlife observations were made year-round while observers were on site conducting the various surveys. All raptors, unusual or unique avian sightings, sensitive species, mammals, reptiles, and amphibians were recorded.

STUDY AREA

The Biglow Canyon Wind Power Project area is located in the northern section of Sherman County, Oregon; the project area is approximately 5 miles southeast of Rufus and approximately 4 miles northeast of Wasco. The general project area and adjacent lands range in elevation from approximately 250 feet above sea level near the mouth of the John Day River to 2,391 feet on Gordon Ridge (Figure 2). The project site is comprised primarily of cultivated agriculture (>90%), with some areas of Conservation Reserve Program grassland (CRP), native shrub-steppe and grassland habitat, with occasional scattered upland trees. The reference area is located south of Grass Valley Canyon, bordered by the John Day River to the southeast and east, west to Moro, and slightly to the northwest halfway between Moro and Wasco. The western section of the reference area is located approximately 4 miles south of Wasco and approximately 3 miles northeast of Moro. The eastern section of the reference area is located approximately 10 miles southeast of Wasco and approximately 10 miles east/northeast of Moro.

METHODS

Fixed-Point Avian Use Survey

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 reference areas with similar information collected at nearby and other regional projects 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 project. Point counts (variable circular plots) were conducted on the development and reference areas using 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 on site that were observed between point counts also were recorded; coordinates derived from a GPS were also noted for species of concern.

Survey Plots

Nine survey plots were established over the project area (Figure 3), and 13 plots in the reference area (Figure 3), for a total of 22 survey plots. The baseline avian use study for the Klondike I & II facilities consisted of 7 survey plots, of which several were located within and near the BCWPP project area (Figure 3). In addition, seventeen survey plots were established for the Klondike III facility, with several located adjacent to the proposed project area (ABR Inc. 2005). Each plot in all three studies consisted of a 2,625-ft (800-m) radius circle centered on an observation point location (Figure 3). Landmarks 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 periods at each point were 30 minutes long. 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 (Figures [8-11]). 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 30-minute observation period. The first instantaneous count was made at the beginning of the observation period and the remaining counts occurred at 10-minute intervals. 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.

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.

Observation Schedule

Sampling intensity was designed to document avian use and behavior by habitat and season within the project area. One full year of weekly surveys, occurring approximately twice a month at each station, took place from spring 2004 to spring 2005 (March to March). 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.

Statistical Analysis

Avian Use

Species lists were generated by season including all observations of birds detected regardless of their distance from the observer. The number of birds seen during each point count survey was standardized to a unit area and unit time surveyed. The standardized unit time was 30 minutes and the standardized unit area was 0.78 mi^2 (2.01 km^2) (i.e., a 2,625 ft (800m) radius viewshed for each station). For example, if four raptors were seen during the 30 minutes at a point with a viewing area of 0.78 mi^2 (2.01 km^2), these data may be standardized to 4/0.78 = 5.13 raptors/mi^2 (1.98 raptors/km^2) in a 30-minute survey. For the standardized avian use estimates, only observations of birds detected within 2,625 ft (800m) of the observer were used. Estimates of avian use (expressed in terms of number of birds/plot/30-minute survey) were used to compare differences in avian use between 1) avian groups and 2) seasons.

Avian Diversity and Richness

The total number of species was calculated by season. The mean number of species observed per survey (i.e., per station per 30-minute survey) was tabulated to illustrate and compare differences in mean number of species per survey between seasons.

Avian Flight Height/Behavior

The flight height recorded was used to estimate percentages of birds flying below, within and above the rotor swept area (RSA). The zone of collision risk used was 82-446 ft (25-136 m) above ground level (AGL).

Avian Exposure Index

A relative index of collision exposure (R) was calculated for bird species observed during the fixed-point surveys using the following formula:

$$R = A * P_f * P_t$$

Where A = mean relative use for species i (observations within 2,625 ft (800 m) of observer) averaged across all surveys, P_f = proportion of all observations of species i where activity was recorded as flying (an index to the approximate percentage of time species i spends flying during the daylight period), and P_t = proportion of all flight height observations of species i within the zone of collision risk. This index does not account for differences in behavior other than flight characteristics (i.e., flight heights and percent of birds observed flying), does not account for the ability of birds to successfully pass through the rotor, and P_t is an overestimate of the proportion of flight heights within the true zone of collision risk, since it uses the maximum lower and upper end of the possible rotor heights for different turbine and tower characteristics.

Avian Flight Patterns and Behavior

Maps of flight paths of raptors and other species of concern were generated to illustrate patterns in flight paths and behaviors.

Data Compilation and Storage

A Microsoft® ACCESS database was developed to store, organize and retrieve field observation data. Data from field forms were keyed into electronic data files using a pre-defined format to facilitate subsequent QA/QC and data analysis. All field data forms, field notebooks, and electronic data files were retained for reference.

Quality Assurance/Quality Control (QA/QC)

QA/QC measures were implemented at all stages of the study, field surveys, data entry, and during data analysis and report writing. At the end of each survey day, each observer was responsible for inspecting his or her data forms for completeness, accuracy, and legibility. Periodically data forms were reviewed by others to ensure completeness and legibility; any problems detected were corrected. Any changes made to the data forms were initialed and dated by the individual making the change.

A sample of records from the electronic files was compared to the raw data forms and any errors found were corrected. Any irregular codes detected, or any data suspected as questionable, was discussed with the observer and study team leader. All changes made to the raw data were documented for future reference. Any errors or suspect data identified in later stages of analysis were traced back to the raw data forms, and appropriate changes in all steps made.

Aerial Raptor Nest Survey

The search for raptor, corvid, and large bird nests within the BCWPP and reference areas included an approximate 2-mile buffer; this area was extended along the Columbia and John Day Rivers to cover suitable habitat for peregrine falcons (Figure 3). 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; 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.

Estimates of impacts to raptors/raptor nests are based on the information collected during the baseline 2004-2005 surveys for this project, 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 nest monitoring at the Nine Canyon, Stateline, Combine Hills, and Klondike I wind project facilities in the region.

Wildlife 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 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 mapped boundaries of each habitat type were then digitized using ArcView™ (Figure 1).

Special Status/Sensitive Species Surveys

Areas of non-cultivated habitat within 255 meters (836 feet) of the centerline of the proposed turbine corridors, new roads, substations, laydown areas, met towers, underground collector lines and transmission lines were surveyed for special status/sensitive wildlife twice during the spring nesting/breeding season (May and June 2005). Surveys consisted of walking transects spaced approximately 50 meters apart, 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.

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 BCWPP and reference site were also recorded to document wildlife other than avian species that may be affected by the proposed development. These incidental wildlife observations were made year round 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.

RESULTS

Avian Use Studies

Species Abundance and Composition

Avian use surveys were conducted from March 26, 2004 through March 23, 2005. A total of 57 avian species were identified during the avian point count surveys, aerial raptor nest survey, in-transit travel, and incidentally while conducting other field tasks on the Project area (Table 1). Forty-eight species of birds were observed during point count surveys at the 9 stations in the project area (Table 2). Over the course of the study, 535 groups comprised of 2,343 individual birds were recorded. The number of birds observed by species is presented in Table 2; only those within the circular survey plot were used to statistically derive use and composition estimates. The number of species observed was lower in the summer (17) than in the fall (25), winter (25), or spring (31) (Table 3). Avian richness (defined as number of species per survey) was lower in the summer (2.03) than in the winter (2.47), fall (2.56), or spring (3.40) (Table 3). The mean number of birds observed per survey plot was lower in the summer (5.58) than in the fall (11.00), spring (15.64), or winter (17.86) (Table 3).

In spring, passerines were the most abundant group (13.80/survey), followed by waterbirds/waterfowl (0.69) and upland gamebirds (0.53). Similarly, passerines composed 88.2% of all birds observed, waterbirds/waterfowl composed 4.4%, and upland gamebirds composed 3.4%. Avian groups most frequently occurring were passerines (100.0% of surveys), raptors (37.8%), and upland gamebirds (26.7%). Species with the highest use in spring were horned lark (5.13/survey), American pipit (3.58), western meadowlark (1.84), European starling (1.11), and Brewer's blackbird (0.56). American kestrel was the most abundant raptor species in the spring (0.22/survey), followed by northern harrier (0.11), and red-tailed hawk (0.09). Individual species most frequently observed during spring surveys were horned lark (91.1% of surveys), western meadowlark (55.6%), Say's phoebe (26.7%), ring-necked pheasant (24.4%), and American kestrel and common raven (20.0% each) (Table 6).

In summer, only three groups were observed. Passerines were the most abundant group (4.95/survey), followed by raptors (0.58) and upland gamebirds (0.05) (Table 4). Similarly, passerines comprised 88.7% of all birds observed, raptors comprised 10.4% and upland gamebirds comprised 0.9%. Avian groups most frequently occurring were passerines (80.1% of surveys), raptors (37.4%), and upland gamebirds (4.8%). Species with the highest use in summer were horned lark (3.00/survey), western meadowlark (0.65), American kestrel (0.37), European starling (0.29), and barn swallow (0.21) (Table 5). American kestrel was the most abundant raptor species in the summer (0.37/survey), followed by red-tailed hawk (0.11), and Swainson's hawk (0.05). Individual species most frequently observed during summer surveys were horned lark (67.5% of surveys), American kestrel (33.7%), western meadowlark (26.5%), western kingbird (8.5%) and red-tailed hawk (7.4%) (Table 6).

In fall, passerines were the most abundant group (10.44/survey), followed by raptors (0.28) and upland gamebirds (0.14) (Table 4). Similarly, passerines comprised 95.0% of all birds observed, raptors comprised 2.5% and upland gamebirds comprised 1.3%. Avian groups most frequently occurring were passerines (97.2% of surveys), raptors (25.0%), and upland gamebirds (5.6%). Species with the highest use in fall were horned lark (3.78/survey), American pipit (1.78), western meadowlark (1.14), Brewer's blackbird (1.03), and American goldfinch (0.64) (Table 5). Red-tailed hawk was the most abundant raptor species in the fall (0.14/survey), followed by American kestrel (0.08), and Cooper's hawk and sharp-shinned hawk (0.03). Individual species most frequently observed during fall surveys were horned lark (86.1% of surveys), common raven (27.8%), western meadowlark (22.2%), red-tailed hawk (13.9%), and Brewer's blackbird and European starling (11.1%) (Table 6).

In winter, only four groups were observed. Passerines were the most abundant group (14.81/survey), followed by waterbirds/waterfowl (1.93), upland gamebirds (0.64), and raptors (0.47) (Table 4). Similarly, passerines

comprised 83.0% of all birds observed, followed by waterbirds/waterfowl comprised 10.8%, upland gamebirds comprised 3.6%, and raptors (2.7%). Avian groups most frequently occurring were passerines (90.7% of surveys), raptors (34.5%), upland gamebirds (6.4%) and waterbirds/waterfowl (5.7%). Species with the highest use in winter were horned lark (8.31/survey), European starling (2.33), Canada goose (1.93), house finch (1.21), and California quail (0.59) (Table 5). Red-tailed hawk was the most abundant raptor species in the winter (0.14/survey), followed by rough-legged hawk (0.12), American kestrel (0.10) and northern harrier (0.06). Individual species most frequently observed during winter surveys were horned lark (76.2% of surveys), common raven (27.7%), western meadowlark (20.9%), European starling (15.7%) and red-tailed hawk (14.1%) (Table 6).

Comparison of Avian Abundance and Composition between Project Area and the Reference Area

The results for the reference area are presented in Appendices A-1 through A-6. A total of 78 avian species were identified during the avian point count surveys, aerial raptor nest survey, in-transit travel, and incidentally while conducting other field tasks in the project and reference areas (Table 1). Forty-eight species of birds were observed at the 9 stations in the project area and 59 species at the 13 stations in the reference area (Table 3). The number of species observed was lower for all seasons in the project area compared to the reference area (Table 3). Avian richness (defined as number of species per survey) was lower for the project area in all seasons and overall except fall when it was slightly higher than the reference area (2.556 for the project area versus 2.404 for the reference area) (Table 3). The mean number of birds observed per survey plot was lower in the summer, winter and overall for the project area compared to the reference area and was higher in the spring and fall (Table 3 and Figure 4).

Overall, no significant differences for mean use, percent composition and percent frequency of occurrence were observed between the project area and the reference area for waterbirds/waterfowl, raptors, or passerines (Figures 4 - 6). Mean use for waterbirds/waterfowl was higher in the winter for the project area and lower in the spring and overall compared to the reference area (Table 4 and Figure 5). The exact opposite was true for percent frequency of occurrence for waterbirds/waterfowl between the project and the reference area (Table 4 and Figure 5). Mean use for raptors was higher at the project area for all seasons and overall except in spring when it was lower than the reference area (Table 4 and Figure 6). Frequency of occurrence was higher at the project area in all seasons and overall compared to the reference area (Table 4 and Figure 6). Mean use for passerines was higher at the project area for spring and fall and lower than the reference area for summer, winter, and overall (Table 4 and Figure 7). For percent frequency of occurrence the same pattern for passerines existed for the project and reference area (Table 4 and Figure 7).

Flight Behavior

During the study, 331 flocks comprised of 1,810 birds were observed flying during point count surveys (Table 7). For all species combined, 67.1% of all flying birds observed were below the rotor-swept height (<25 m), 31.1% were within the potential range of rotor-swept heights[1] (25 – 136 m), and 1.9% were above the rotor-swept height (>136 m) (Table 7). Of only three groups that had at least 10 observations of flying flocks, those most often observed flying within the turbine rotor-swept height were buteos (62.1%), passerines (25.4%) and falcons (20.8%). For all flying raptors combined, 39.1% were observed flying within the rotor-swept height. For identified species with at least 10 observations of flying flocks, those observed more than 50% of the time at rotor-swept heights were red-tailed hawk (57.9%) and American pipit (54.7%) (Table 8).

Turbine Exposure Index

Based on our exposure index, species with the highest probability of turbine exposure were American pipit (0.79), horned lark (0.63), Canada goose (0.49), Brewer's blackbird (0.36), and European starling (0.25) (Table

[1] The actual low and high end of the rotor swept heights will include a smaller airspace, since it very likely that the rotor diameters will be less than 100 m. Therefore these estimates of % of birds flying within the rotor heights are a maximum estimate and should be considered conservative.

9). This analysis may provide insight into what species might be the most likely turbine casualties. However, this index only considers relative probability of exposure based on use, proportion of daily activity spent flying, and flight height of each species. It does not take into consideration varying ability among species to detect and avoid turbines, habitat selection and other factors that may influence exposure to turbine collision; therefore, the actual risk may be lower or higher than indicated by these data. For example, in the Altamont Pass WRA in California, mortality among the five most common species was not related to their abundance. American kestrels, red-tailed hawks, and golden eagles were killed more often than predicted based on abundance and turkey vultures and common ravens were killed less often (Orloff and Flannery 1992). Similarly, at the Tehachapi Pass WRA in California, common ravens were found to be the most common large bird in the WRA, yet no fatalities for this species were documented during intensive studies (Anderson *et al.* 1996).

Spatial Use by Raptors

Accipiters were only observed at Points H and I (Figure 8). No buteos were documented at Point A (Figure 9). The stations with the highest buteo use were Points B and H (0.33) (Figure 9). No northern harriers were observed at Points A, B, G, and H and use at the other stations was similar (Figure 10). No falcons were observed at Points D and H (Figure 11). The highest use by this group was at Point F (0.56). Raptors were documented at all 9 Points. For all raptor species combined, the station which received the highest use was Point F (Figure 12), which is located in a wheat field but adjacent to a riparian area where a red-tailed hawk nest was observed. Raptor use and species composition estimates were similar between the BCWPP and reference areas (see section above).

Raptor Nests

Existing Information

Aerial surveys were conducted in May and June 2001 within approximately 5-miles of the Klondike I project area (Figure 3), which includes the Project area. A total of 33 active raptor nests, were observed, including 14 red-tailed hawk, 11 Swainson's hawk, 6 great horned owl, 1 American kestrel and 1 golden eagle nest. Overall raptor nest density was 0.22 active nests/mi^2(Figure 13). In addition 3 common raven nests were recorded. The highest nest densities occurred along Grass Valley Canyon. The one golden eagle nest that was observed in 2001 is located more than 4 miles southeast of the proposed Project turbine corridors.

Thirteen of the raptor nests were located within 2 miles of the Project area, including 6 red-tailed hawk, 4 Swainson's hawk, 2 great horned owl, and one American kestrel nest site. Estimated nest density within the project area and a 2-mile buffer was 0.15 nests/mi^2.

2004 Raptor Nest Surveys

Twenty-six red-tailed hawk nests, 10 Swainson's hawk nests, 6 great-horned owl nests, one American kestrel nest and one prairie falcon nest were observed throughout the entire 325 square miles of nest survey area (Table 10 and Figure 14). Three common raven nests and 22 inactive nests were also observed. Overall raptor nest density in the entire survey area was 0.14 nests/mi^2. One potential large falcon eyrie was identified within the reference area more than 10 miles south of the Project area along the John Day River. Additionally, this eyrie was inactive during the aerial survey and also during a follow-up visit via floating the river by boat; no peregrine falcons were heard or seen one mile upstream or downstream of the eyrie. A prairie falcon eyrie was also documented in the Reference area along the John Day River more than 11 miles to the southeast of the Project area.

Thirteen of the raptor nests were located within 2 miles of the Project area, including 8 red-tailed hawk, 3 Swainson's hawk, 1 great horned owl, and 1 American kestrel nest site. Estimated nest density within project area and a 2-mile buffer was 0.15 nests/mi^2.

There were two active raptor nests within 1000 feet of proposed turbine corridors: one Swainson's hawk and one red-tailed hawk. The Swainson's hawk nest is located along the existing public road approximately 919 ft (280

m) from a proposed turbine corridor centerline in the northwest portion of the project area, and adjacent to the alternative proposed transmission line. The red-tailed hawk nest is located 902 ft (275 m) from a proposed turbine corridor (centerline). Both were in the upland tree habitat type. Two additional Swainson's hawk nests are located 1,794 ft (547 m) and 1,968 ft (600 m) from a proposed turbine corridor centerline. One additional red-tailed hawk nest was documented in riparian trees 1,220 ft (372 m) from a proposed turbine corridor centerline. The only other nest in upland trees is an inactive nest of unknown species 1,591 ft (485 m) from a turbine corridor centerline.

Special Status/Sensitive Species

No federal or state listed species were observed (Table 11). Diurnal walking surveys for sensitive status species documented 49 grasshopper sparrows, 2 short-eared owls, 1 Swainson's hawk, 1 active Swainson's hawk nest with 2 adults, 6 white-tailed jackrabbits (i.e., 2 visual, 4 scat observations), and 1 ferruginous hawk (Figure 15). The ferruginous hawk was an adult hunting in the area where it was observed (Table 10). Nocturnal jackrabbit surveys were conducted twice in suitable habitat between August 30 and September 12, 2005. Three additional white-tailed jackrabbits were observed during nocturnal surveys (see figure 15). Five western toads were also observed during these surveys.

All surveys, including general wildlife observations, documented the following state species of concern: grasshopper sparrows (49), western meadowlarks (170), loggerhead shrike (1), Swainson's hawk (18), ferruginous hawk (1), California bighorn sheep (5), white-tailed jackrabbit (11), western toad (5), and western rattlesnake (2) (Tables 2 and 12).

A colony of small-eared ground squirrels was observed in the references area during avian use surveys (WEST 2005). Photographs were taken of the ground squirrels in question and they were positively identified as Merriam's ground squirrels (*Spermophilus canus canus*; Attachment P-5). No small-eared true ground squirrels of any species were detected in the Facility area during the spring/early summer special status/sensitive species surveys in noncultivated habitat (1,500-foot-wide swath centered on center of turbine string corridor) or during any other avian surveys conducted through all seasons, including all activities associated with in-transit travel through noncultivated habitats.

General Wildlife Observations

Table 12 contains a summary of observations of state or federal-listed species, raptors, other species, and non-avian species observed during in-transit surveys, aerial raptor nest surveys, and sensitive species surveys that were not observed during the fixed-point surveys. Five species, white-crowned sparrow (62 individuals), grasshopper sparrow (49), Canada goose (43), red-tailed hawk (35), and dark-eyed junco (26), made over 60% of the avian observations. Nearly 95% of the mammal observations were mule deer (212 out of 223 individuals).

Habitat, Avian Use, Species Composition, And Raptor Nest Density Comparisons Among Projects

Similar metrics used in comparing bird mortality risk and potential for indirect impacts have been collected at several wind projects in the region and are vital in assessing the potential for impacts from the proposed BCWPP. This section summarizes the results of these comparisons.

At a landscape scale, the proposed BCWPP is dominated by cultivated agriculture, with relative small patches and amounts of non-cultivated agriculture (Table 13 and Figure 1). There is more cultivated agriculture existing in the project vicinity compared to the Hopkins Ridge, WA, Stateline OR/WA, and the Condon Wind Project, OR, areas, suggesting a less diverse habitat at BCWPP.

Overall bird use and mean raptor use at the BCWPP project was relatively low compared to several other wind plants in the U.S that have been surveyed using similar methods (Figure 16 and 17). Raptor use estimates from BCWPP, the reference area and Klondike I were very consistent (0.3 to 0.5), Wind projects in the region consistently observe red-tailed hawk, American kestrel, northern harrier, and rough-legged hawks (in winter) as

the most abundant raptor species.

Raptor nest density within the BCWPP project area and a 2-mile buffer was 0.15/mi^2, which is slightly below the average raptor nest density for other proposed and existing wind projects located in primarily agricultural landscapes (Table 14). At Klondike I, raptor nest density was found to be 0.15/mi^2 within 5 miles of the project area (which overlaps with much of the BCWPP project area) during pre-construction surveys but no raptor mortality was documented during a one-year post-construction monitoring study (Johnson *et al.* 2003a). Similarly, at Buffalo Ridge, Minnesota, raptor nest density was estimated to be 0.15/mi^2, and the only documented raptor mortality over a 6-year monitoring period was a single red-tailed hawk (Osborn *et al.* 2000, Johnson *et al.* 2002). Raptor nest density at the large Stateline Windplant on the Oregon/Washington border was estimated to be 0.21/ mi^2 during pre-construction surveys and raptor mortality was estimated to be 0.09 raptor fatalities/MW/year from post-construction fatality monitoring, and consisted primarily of red-tailed hawks and American kestrels. Raptor nest density for the 41 MW Combine Hills Wind Project, adjacent to Stateline, was estimated to be 0.24/mi^2 during pre-construction surveys, and no raptor fatalities were documented in studies of the first year of operation (Young per comm. 2005). Raptor nest density for the recently permitted Hopkins Ridge Wind Project in Columbia County Washington was estimated at 0.43/mi^2 during pre-construction surveys.

Raptor nest densities are also available for other wind plants in the region, including the existing Condon project, Oregon (0.06/mi^2), the existing Nine Canyon project, Washington (0.03/mi^2), and at Zintel Canyon (Phase II of Nine Canyon), Washington (0.08/mi^2). Very few raptor fatalities have been documented at these smaller facilities (1 rough-legged hawk at Condon; one American kestrel, red-tailed hawk and one short-eared owl at Nine Canyon Phase I and II).

WILDLIFE IMPACT ASSESSMENT

Potential impacts for birds, bats, big game, other mammals, amphibians, and reptiles will be discussed in Exhibits P and Q of the ASC.

REFERENCES

ABR, Inc. 2005. Baseline avian use at the Proposed Klondike III Wind Project, Oregon, Winter 2004/2005. June, 2005. Prepared for PPME, Inc.

Anderson, R. L., J. Tom, N. Neumann, and J. A. Cleckler. 1996. Avian monitoring and risk assessment at Tehachapi Pass Wind Resource Area, California. California Energy Commission, Sacramento. 40pp.

Johnson, G.D., W.P. Erickson, and J. White. 2003a. Avian and bat mortality at the Klondike, Oregon Phase I Wind Plant. Technical report prepared for Northwestern Wind Power by WEST, Inc.

Kunz, T.H. 1982. *Lasionycteris noctivagans*. Mammalian Species 172:1-5.

Orloff, S. and A. Flannery. 1992. Wind turbine effects on avian activity, habitat use, and mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report to Alameda, Contra Costa and Solano Counties and the California Energy Commission by Biosystems Analysis, Inc., Tiburon, CA.

Osborn, R. G., K. F. Higgins, R. E. Usgaard, C. D. Dieter and R. G. Neiger. 2000. Bird mortality associated with wind turbines at the Buffalo Ridge Wind Resource Area, Minnesota. Am. Midl. Nat. 143:41-52.

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. Ground Squirrel Report – Sherman County. Prepared for Orion Energy and ODFW.

Young, Jr., D.P., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. Final Report, avian and bat mortality associated with the initial phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming. November 1998 – June 2002. Technical report prepared by WEST, Inc. for Pacificorp, Inc., Portland, Oregon; SeaWest Windpower, Inc, San Diego, California and Bureau of Land Management, Rawlins, Wyoming. January 10, 2003.

Table 1. List of avian species observed during fixed-point surveys in the Project area, Reference area, aerial raptor nest surveys, sensitive species surveys, in-transit travel, and incidentally.

Species/Group	Scientific Name	Area[a]	Species/Group	Scientific Name	Area[a]
great blue heron	*Ardea herodias*	R	horned lark	*Eremophila alpestris*	B
ring-billed gull	*Larus delawarensis*	P	house finch	*Carpodacus mexicanus*	B
sandhill crane	*Grus canadensis*	B	lapland longspur	*Calcarius lapponicus*	B
American wigeon	*Anas americana*	R	lark sparrow	*Chondestes grammacus*	P
Canada goose	*Branta canadensis*	B	Lincoln's sparrow	*Melospiza lincolnii*	R
green-winged teal	*Anas crecca*	R	loggerhead shrike	*Lanius ludovicianus*	R
hooded merganser	*Lophodytes cucullatus*	R	mourning dove	*Zenaida macroura*	B
mallard	*Anas platyrhynchos*	R	northern rough-winged swallow	*Stelgidopteryx serripennis*	R
killdeer	*Charadrius vociferus*	R	northern shrike	*Lanius excubitor*	B
American coot	*Fulica americana*	P	orange-crowned warbler	*Vermivora celata*	R
American kestrel	*Falco sparverius*	B	pine siskin	*Carduelis pinus*	P
Cooper's hawk	*Accipiter cooperii*	P	red-breasted nuthatch	*Sitta canadensis*	B
ferruginous hawk	*Buteo regalis*	N/A	red-winged blackbird	*Agelaius phoeniceus*	R
golden eagle	*Aquila chrysaetos*	N/A	rock wren	*Salpinctes obsoletus*	R
great-horned owl	*Bubo virginianus*	N/A	rusty blackbird	*Euphagus carolinus*	R
northern harrier	*Circus cyaneus*	B	savannah sparrow	*Passerculus sandwichensis*	B
prairie falcon	*Falco mexicanus*	B	Say's phoebe	*Sayornis saya*	B
red-tailed hawk	*Buteo jamaicensis*	B	song sparrow	*Melospiza melodia*	R
rough-legged hawk	*Buteo lagopus*	B	spotted towhee	*Pipilo maculatus*	R
sharp-shinned hawk	*Accipter striatus*	B	varied thrush	*Ixoreus naevius*	R
short-eared owl	*Asio flammeus*	N/A	vesper sparrow	*Pooecetes gramineus*	B
Swainson's hawk	*Buteo swainsoni*	B	violet-green swallow	*Tachycineta thalassina*	P
turkey vulture	*Cathartes aura*	B	western kingbird	*Tyrannus verticalis*	B
American crow	*Corvus brachyrhynchos*	P	western meadowlark	*Sturnella neglecta*	B
American goldfinch	*Carduelis tristis*	B	white-crowned sparrow	*Zonotrichia leucophrys*	B
American pipit	*Anthus rubescens*	B	yellow-headed blackbird	*Xanthocephalus xanthocephalus*	N/A
American robin	*Turdus migratorius*	B	yellow-rumped warbler	*Dendroica coronata*	B
barn swallow	*Hirundo rustica*	B	California quail	*Callipepla californica*	B
Bewick's wren	*Thryomanes bewickii*	N/A	chukar	*Alectoris chukar*	B

Table 1. List of avian species observed during fixed-point surveys in the Project area, Reference area, aerial raptor nest surveys, sensitive species surveys, in-transit travel, and incidentally.

Species/Group	Scientific Name	Area[a]	Species/Group	Scientific Name	Area[a]
black-billed magpie	*Pica pica*	B	gray partridge	*Perdix perdix*	P
Brewer's blackbird	*Euphagus cyanocephalus*	B	ring-necked pheasant	*Phasianus colchicus*	B
brown-headed cowbird	*Molothrus ater*	R	wild turkey	*Meleagris gallopavo*	N/A
Bullock's oriole	*Icterus bullockii*	N/A	rock pigeon	*Columba livia*	B
Cassin's finch	*Carpodacus purpureus*	P	northern flicker	*Colaptes auratus*	B
cliff swallow	*Petrochelidon pyrrhonota*	B	Vaux's swift	*Chaetura vauxi*	R
common raven	*Corvus corax*	B	unidentified gull		P
dark-eyed junco	*Junco hyemalis*	B	unidentified duck		P
European starling	*Sturnus vulgaris*	B	unidentified buteo		R
golden-crowned kinglet	*Regulus satrapa*	R	unidentified empidonax		N/A
golden-crowned sparrow	*Zonotrichia atricapilla*	R	unidentified passerine		B
grasshopper sparrow	*Ammodramus savannarum*	R	unidentified sparrow		B

[a] The area where the species was observed: B = Both (Project and Reference), P = Project, R = Reference, N/A = incidental

Table 2. Avian species observed while conducting fixed-point surveys (March 26, 2004 - March 23, 2005) in the Project area on the Project Site. [a]

Species/Group	Spring		Summer		Fall		Winter		Grand Total	
	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups
Waterbirds/Waterfowl	**46**	**8**	**0**	**0**	**21**	**2**	**174**	**8**	**241**	**18**
American coot	6	1	0	0	0	0	0	0	6	1
Canada goose	28	3	0	0	21	2	174	8	223	13
ring-billed gull	2	1	0	0	0	0	0	0	2	1
sandhill crane	2	1	0	0	0	0	0	0	2	1
unidentified duck	5	1	0	0	0	0	0	0	5	1
unidentified gull	3	1	0	0	0	0	0	0	3	1
Raptors	**23**	**23**	**15**	**15**	**10**	**10**	**27**	**27**	**75**	**75**
Accipiters	*0*	*0*	*0*	*0*	*2*	*2*	*0*	*0*	*2*	*2*
Cooper's hawk	0	0	0	0	1	1	0	0	1	1
sharp-shinned hawk	0	0	0	0	1	1	0	0	1	1
Buteos	*8*	*8*	*5*	*5*	*5*	*5*	*15*	*15*	*33*	*33*
red-tailed hawk	6	6	4	4	5	5	8	8	23	23
rough-legged hawk	1	1	0	0	0	0	7	7	8	8
Swainson's hawk[b]	1	1	1	1	0	0	0	0	2	2
Northern Harriers	*5*	*5*	*0*	*0*	*0*	*0*	*3*	*3*	*8*	*8*
northern harrier	5	5	0	0	0	0	3	3	8	8
Falcons	*10*	*10*	*9*	*9*	*3*	*3*	*9*	*9*	*31*	*31*
American kestrel	10	10	9	9	3	3	6	6	28	28
prairie falcon	0	0	0	0	0	0	3	3	3	3
Vultures	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*1*	*1*
turkey vulture	0	0	1	1	0	0	0	0	1	1
Passerines	**621**	**148**	**113**	**40**	**376**	**95**	**835**	**132**	**1945**	**415**
American crow	6	1	0	0	1	1	0	0	7	2
American goldfinch	11	2	0	0	23	2	22	4	56	8

Table 2. Avian species observed while conducting fixed-point surveys (March 26, 2004 - March 23, 2005) in the Project area on the Project Site. [a]

	Spring		Summer		Fall		Winter		Grand Total	
Species/Group	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups
American pipit	161	5	0	0	64	4	25	3	250	12
American robin	1	1	0	0	1	1	2	1	4	3
barn swallow	1	1	5	1	2	1	0	0	8	3
black-billed magpie	0	0	0	0	4	2	13	4	17	6
Brewer's blackbird	25	3	1	1	37	4	0	0	63	8
Cassin's finch	0	0	0	0	9	1	0	0	9	1
cliff swallow	0	0	3	1	0	0	0	0	3	1
common raven	20	10	1	1	14	10	25	19	60	40
dark-eyed junco	0	0	0	0	0	0	7	1	7	1
European starling	50	7	6	2	15	4	121	11	192	24
horned lark	231	68	70	21	136	46	474	62	911	197
house finch	0	0	0	0	3	1	63	4	66	5
lapland longspur	0	0	0	0	0	0	19	2	19	2
lark sparrow	2	1	0	0	0	0	0	0	2	1
mourning dove	0	0	2	1	12	1	0	0	14	2
northern shrike	0	0	0	0	0	0	1	1	1	1
pine siskin	0	0	0	0	0	0	2	1	2	1
red-breasted nuthatch	0	0	0	0	1	1	0	0	1	1
savannah sparrow	1	1	2	1	0	0	0	0	3	2
Say's phoebe	12	12	2	1	2	2	2	1	18	16
unidentified passerine	1	1	0	0	6	3	10	2	17	6
unidentified sparrow	2	1	1	1	0	0	1	1	4	3
vesper sparrow	0	0	3	1	0	0	0	0	3	1
violet-green swallow	3	1	0	0	0	0	0	0	3	1
western kingbird	4	2	3	2	0	0	0	0	7	4
western meadowlark[b]	83	30	14	6	41	9	32	12	170	57
white-crowned sparrow	7	1	0	0	0	0	7	1	14	2
yellow-rumped warbler	0	0	0	0	5	2	9	2	14	4

Table 2. Avian species observed while conducting fixed-point surveys (March 26, 2004 - March 23, 2005) in the Project area on the Project Site. [a]

Species/Group	Spring		Summer		Fall		Winter		Grand Total	
	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups
Upland Gamebirds	**24**	**16**	**1**	**1**	**5**	**2**	**40**	**5**	**70**	**24**
California quail	3	2	0	0	0	0	37	3	40	5
chukar	1	1	0	0	0	0	2	1	3	2
gray partridge	4	2	0	0	0	0	0	0	4	2
ring-necked pheasant	16	11	1	1	5	2	1	1	23	15
Doves	**7**	**1**	**0**	**0**	**4**	**1**	**0**	**0**	**11**	**2**
rock pigeon	7	1	0	0	4	1	0	0	11	2
Other Birds	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**1**
northern flicker	0	0	0	0	1	1	0	0	1	1
Overall Total	**721**	**196**	**129**	**56**	**417**	**111**	**1076**	**172**	**2343**	**535**

[a] All individuals included even those outside the 800m viewing shed.
[b] Oregon State vulnerable or critical species.

Table 3. Mean use, mean # species/survey, total number of species, and total number of fixed-point surveys conducted by season and overall in the Project area and Reference area.

Project Area				
Season	Mean Use[a]	# Species/ Survey	# Species	# Surveys Conducted
Spring	15.644	3.4	31	45
Summer	5.577	2.027	17	24
Fall	11.000	2.556	25	36
Winter	17.857	2.465	25	58
Overall	13.892	2.661	48	163
Reference Area				
Season	Mean Use[a]	# Species/ Survey	# Species	# Surveys Conducted
Spring	10.631	3.235	35	69
Summer	8.088	2.609	25	37
Fall	10.192	2.404	34	52
Winter	25.855	2.528	34	83
Overall	15.490	2.727	59	241

[a] # observations per 30-minute survey

Table 4. Mean use, percent composition and percent frequency of occurrence for avian groups by season for the Project area and Reference area.

Project Area

Species/Group	Mean Use (#/30 min. survey)				Group Composition (%)				% Frequency			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
Waterbirds/Waterfowl	0.689	0.000	0.000	1.934	4.40	0.00	0.00	10.83	8.89	0.00	0.00	5.67
Raptors	0.467	0.581	0.278	0.474	2.98	10.41	2.53	2.65	37.78	37.43	25.00	34.47
Accipiters	0.000	0.000	0.056	0.000	0.00	0.00	0.51	0.00	0.00	0.00	5.56	0.00
Buteos	0.133	0.159	0.139	0.261	0.85	2.85	1.26	1.46	11.11	12.17	13.89	22.00
Northern Harriers	0.111	0.000	0.000	0.061	0.71	0.00	0.00	0.34	8.89	0.00	0.00	6.12
Falcons	0.222	0.374	0.083	0.152	1.42	6.71	0.76	0.85	20.00	33.73	8.33	15.19
Turkey Vultures	0.000	0.048	0.000	0.000	0.00	0.85	0.00	0.00	0.00	4.76	0.00	0.00
Passerines	13.800	4.949	10.444	14.814	88.21	88.73	94.95	82.96	100.00	80.09	97.22	90.70
Upland Gamebirds	0.533	0.048	0.139	0.635	3.41	0.85	1.26	3.56	26.67	4.76	5.56	6.35
Doves	0.156	0.000	0.111	0.000	0.994	0.000	1.010	0.00	2.22	0.00	2.78	0.00
Other Birds	0.000	0.000	0.028	0.000	0.00	0.00	0.25	0.00	0.00	0.00	2.78	0.00
Overall	15.644	5.577	11.000	17.857	100.00	100.00	100.00	100.00				

Reference Area

Species/Group	Mean Use (#/30 min. survey)				Group Composition (%)				% Frequency			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
Waterbirds/Waterfowl	0.963	0.000	0.000	1.889	9.05	0.00	0.00	7.31	3.95	0.00	0.00	7.29
Shorebirds	0.042	0.000	0.000	0.000	0.39	0.00	0.00	0.00	1.39	0.00	0.00	0.00
Raptors	0.545	0.502	0.173	0.371	5.13	6.21	1.70	1.44	32.24	32.05	13.46	26.87
Accipiters	0.014	0.000	0.000	0.000	0.13	0.00	0.00	0.00	1.39	0.00	0.00	0.00
Buteos	0.378	0.244	0.173	0.248	3.55	3.01	1.70	0.96	28.07	19.02	13.46	21.01
Northern Harriers	0.082	0.000	0.000	0.040	0.78	0.00	0.00	0.16	6.96	0.00	0.00	2.62
Falcons	0.057	0.182	0.000	0.082	0.54	2.25	0.00	0.32	4.19	13.03	0.00	5.86
Turkey Vultures	0.014	0.077	0.000	0.000	0.13	0.95	0.00	0.00	1.39	2.56	0.00	0.00
Passerines	8.842	7.476	9.115	22.679	83.17	92.44	89.43	87.72	94.44	89.32	88.46	92.12
Upland Gamebirds	0.239	0.109	0.750	0.597	2.25	1.35	7.36	2.31	15.48	10.90	11.54	10.15
Doves	0.000	0.000	0.077	0.307	0.00	0.00	0.75	1.19	0.00	0.00	3.85	2.62
Other Birds	0.000	0.000	0.077	0.012	0.00	0.00	0.75	0.05	0.00	0.00	3.85	1.19
Overall	10.631	8.088	10.192	25.855	100.00	100.00	100.00	100.00				

Table 5. Avian species observed within 800m of the observer and estimated mean use (#/30-minute survey) for large and small birds in the Project area (March 26, 2004 - March 23, 2005).

Large Birds

Spring Species/Group	Use	Summer Species/Group	Use	Fall Species/Group	Use	Winter Species/Group	Use
Canada goose	0.467	American kestrel	0.374	common raven	0.389	Canada goose	1.934
common raven	0.444	red-tailed hawk	0.111	red-tailed hawk	0.139	California quail	0.587
ring-necked pheasant	0.356	Swainson's hawk	0.048	ring-necked pheasant	0.139	common raven	0.438
American kestrel	0.222	turkey vulture	0.048	black-billed magpie	0.111	black-billed magpie	0.215
American coot	0.133	common raven	0.048	American kestrel	0.083	red-tailed hawk	0.141
American crow	0.133	ring-necked pheasant	0.048	Cooper's hawk	0.028	rough-legged hawk	0.120
northern harrier	0.111			sharp-shinned hawk	0.028	American kestrel	0.100
red-tailed hawk	0.089			American crow	0.028	northern harrier	0.061
gray partridge	0.089					prairie falcon	0.052
California quail	0.067					chukar	0.032
ring-billed gull	0.044					ring-necked pheasant	0.016
sandhill crane	0.044						
Swainson's hawk	0.022						
rough-legged hawk	0.022						
chukar	0.022						

Table 5 (continued). Avian species observed within 800m of the observer and estimated mean use (#/30-minute survey) for large and small birds in the Project area (March 26, 2004 - March 23, 2005).

Small Birds

Spring		Summer		Fall		Winter	
Species/Group	Use	Species/Group	Use	Species/Group	Use	Species/Group	Use
horned lark	5.133	horned lark	2.995	horned lark	3.778	horned lark	8.308
American pipit	3.578	western meadowlark	0.646	American pipit	1.778	European starling	2.333
western meadowlark	1.844	European starling	0.286	western meadowlark	1.139	house finch	1.213
European starling	1.111	barn swallow	0.208	Brewer's blackbird	1.028	western meadowlark	0.567
Brewer's blackbird	0.556	cliff swallow	0.143	American goldfinch	0.639	American pipit	0.397
Say's phoebe	0.267	vesper sparrow	0.143	European starling	0.417	American goldfinch	0.358
American goldfinch	0.244	western kingbird	0.122	mourning dove	0.333	lapland longspur	0.311
white-crowned	0.156	Say's phoebe	0.095	Cassin's finch	0.250	unidentified passerine	0.177
rock pigeon	0.156	mourning dove	0.095	unidentified passerine	0.167	yellow-rumped	0.143
western kingbird	0.089	savannah sparrow	0.095	yellow-rumped warbler	0.139	white-crowned	0.111
violet-green swallow	0.067	Brewer's blackbird	0.037	rock pigeon	0.111	dark-eyed junco	0.111
lark sparrow	0.044	unidentified sparrow	0.037	house finch	0.083	Say's phoebe	0.032
unidentified sparrow	0.044			Say's phoebe	0.056	pine siskin	0.032
American robin	0.022			barn swallow	0.056	American robin	0.032
barn swallow	0.022			American robin	0.028	unidentified sparrow	0.020
savannah sparrow	0.022			red-breasted nuthatch	0.028	northern shrike	0.016
unidentified passerine	0.022			northern flicker	0.028		

Table 6. Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds on the in the Project area (March 26, 2004 - March 23, 2005).

Large Birds

Spring		Summer		Fall		Winter	
Species/Group	% freq	Species/Group	% freq	Species/Group	% freq	Species/Group	% freq
ring-necked pheasant	24.44	American kestrel	33.73	common raven	27.78	common raven	27.66
American kestrel	20.00	red-tailed hawk	7.41	red-tailed hawk	13.89	red-tailed hawk	14.06
common raven	20.00	Swainson's hawk	4.76	American kestrel	8.33	rough-legged hawk	9.98
red-tailed hawk	8.89	turkey vulture	4.76	black-billed magpie	5.56	American kestrel	9.98
northern harrier	8.89	common raven	4.76	ring-necked pheasant	5.56	black-billed magpie	6.80
California quail	4.44	ring-necked pheasant	4.76	Cooper's hawk	2.78	northern harrier	6.12
gray partridge	4.44			sharp-shinned hawk	2.78	Canada goose	5.67
American coot	2.22			American crow	2.78	prairie falcon	5.22
Canada goose	2.22					California quail	4.76
ring-billed gull	2.22					chukar	1.59
sandhill crane	2.22					ring-necked pheasant	1.59
rough-legged hawk	2.22						
Swainson's hawk	2.22						
American crow	2.22						
chukar	2.22						

Table 6 (continued). Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds in the Project area (March 26, 2004 - March 23, 2005).

Small Birds

Spring Species/Group	% freq	Summer Species/Group	% freq	Fall Species/Group	% freq	Winter Species/Group	% freq
horned lark	91.11	horned lark	67.46	horned lark	86.11	horned lark	76.19
western meadowlark	55.56	western meadowlark	26.46	western meadowlark	22.22	western meadowlark	20.86
Say's phoebe	26.67	western kingbird	8.47	Brewer's blackbird	11.11	European starling	15.65
European starling	15.56	cliff swallow	4.76	European starling	11.11	American goldfinch	6.80
American pipit	6.67	European starling	4.76	American pipit	8.33	house finch	6.80
Brewer's blackbird	6.67	mourning dove	4.76	unidentified passerine	8.33	American pipit	4.76
American goldfinch	4.44	Say's phoebe	4.76	American goldfinch	5.56	lapland longspur	3.63
western kingbird	4.44	savannah sparrow	4.76	Say's phoebe	5.56	unidentified passerine	3.63
American robin	2.22	vesper sparrow	4.76	yellow-rumped warbler	5.56	yellow-rumped	3.17
barn swallow	2.22	barn swallow	4.17	American robin	2.78	unidentified sparrow	2.04
lark sparrow	2.22	Brewer's blackbird	3.70	barn swallow	2.78	American robin	1.59
savannah sparrow	2.22	unidentified sparrow	3.70	Cassin's finch	2.78	dark-eyed junco	1.59
unidentified passerine	2.22			house finch	2.78	northern shrike	1.59
unidentified sparrow	2.22			mourning dove	2.78	pine siskin	1.59
violet-green swallow	2.22			red-breasted nuthatch	2.78	Say's phoebe	1.59
white-crowned	2.22			rock pigeon	2.78	white-crowned	1.59
rock pigeon	2.22			northern flicker	2.78		

Table 7. Flight height characteristics by avian group during fixed-point surveys in the Project area.

Group	# Birds Flying	# Groups Flying	% Birds Flying	Collision Risk Height (25-136m AGL) below	within	above
Waterbirds/Waterfowl	164	8	68.05	3.05	82.93	14.02
Raptors	64	64	85.33	57.81	40.63	1.56
Accipiters	2	2	100.00	100.00	0.00	0.00
Buteos	29	29	87.88	31.03	65.52	3.45
Northern Harriers	8	8	100.00	87.50	12.50	0.00
Falcons	24	24	77.42	79.17	20.83	0.00
Turkey Vultures	1	1	100.00	0.00	100.00	0.00
Passerines	1535	255	78.92	74.01	25.41	0.59
Upland Gamebirds	36	2	51.43	100.00	0.00	0.00
Doves	11	2	100.00	0.00	100.00	0.00
Other Birds	0	0	0.00	N/A	N/A	N/A
Overall	1810	331	77.25	67.07	31.10	1.82

Table 8. Flight height characteristics by species observed during fixed-point surveys in the Project area.

Species/Group	# Birds Flying	# Groups Flying	% Birds Flying	Collision Risk Height (25-136 m AGL)		
				Below	Within	Above
rock pigeon	11	2	100.00	0.00	100.00	0.00
Cassin's finch	9	1	100.00	0.00	100.00	0.00
American coot	6	1	100.00	0.00	100.00	0.00
Swainson's hawk	2	2	100.00	0.00	100.00	0.00
turkey vulture	1	1	100.00	0.00	100.00	0.00
Brewer's blackbird	63	8	100.00	3.17	96.83	0.00
Canada goose	156	6	69.96	3.21	83.33	13.46
rough-legged hawk	8	8	100.00	25.00	75.00	0.00
red-tailed hawk	19	19	82.61	36.84	57.89	5.26
yellow-rumped warbler	14	4	100.00	42.86	57.14	0.00
American pipit	247	10	98.80	45.34	54.66	0.00
black-billed magpie	15	5	88.24	53.33	46.67	0.00
prairie falcon	3	3	100.00	66.67	33.33	0.00
common raven	50	30	83.33	54.00	28.00	18.00
unidentified passerine	15	4	88.24	73.33	26.67	0.00
European starling	166	19	86.46	77.11	22.89	0.00
American kestrel	21	21	75.00	80.95	19.05	0.00
American goldfinch	53	6	94.64	81.13	18.87	0.00
horned lark	676	117	74.20	85.06	14.94	0.00
northern harrier	8	8	100.00	87.50	12.50	0.00
house finch	66	5	100.00	95.45	4.55	0.00
western meadowlark	67	19	39.41	100.00	0.00	0.00
California quail	34	1	85.00	100.00	0.00	0.00
lapland longspur	17	1	89.47	100.00	0.00	0.00
mourning dove	14	2	100.00	100.00	0.00	0.00
white-crowned sparrow	14	2	100.00	100.00	0.00	0.00
barn swallow	7	2	87.50	100.00	0.00	0.00
dark-eyed junco	7	1	100.00	100.00	0.00	0.00
Say's phoebe	7	5	38.89	100.00	0.00	0.00
western kingbird	7	4	100.00	100.00	0.00	0.00
American robin	3	2	75.00	100.00	0.00	0.00
cliff swallow	3	1	100.00	100.00	0.00	0.00
unidentified sparrow	3	2	75.00	100.00	0.00	0.00
vesper sparrow	3	1	100.00	100.00	0.00	0.00
violet-green swallow	3	1	100.00	100.00	0.00	0.00
gray partridge	2	1	50.00	100.00	0.00	0.00
lark sparrow	2	1	100.00	100.00	0.00	0.00
pine siskin	2	1	100.00	100.00	0.00	0.00

Table 8. Flight height characteristics by species observed during fixed-point surveys in the Project area.

Species/Group	# Birds Flying	# Groups Flying	% Birds Flying	Collision Risk Height (25-136 m AGL)		
				Below	Within	Above
ring-billed gull	2	1	100.00	0.00	0.00	100.00
savannah sparrow	2	1	66.67	100.00	0.00	0.00
Cooper's hawk	1	1	100.00	100.00	0.00	0.00
sharp-shinned hawk	1	1	100.00	100.00	0.00	0.00
American crow	0	0	0.00	N/A	N/A	N/A
chukar	0	0	0.00	N/A	N/A	N/A
northern flicker	0	0	0.00	N/A	N/A	N/A
northern shrike	0	0	0.00	N/A	N/A	N/A
red-breasted nuthatch	0	0	0.00	N/A	N/A	N/A
ring-necked pheasant	0	0	0.00	N/A	N/A	N/A
sandhill crane	0	0	0.00	N/A	N/A	N/A
unidentified duck	0	0	0.00	N/A	N/A	N/A
unidentified gull	0	0	0.00	N/A	N/A	N/A
Overall	1810	331	77.25	67.07	31.10	1.82

Table 9. Mean exposure indices calculated by species observed during fixed-point surveys in the Project area.

Species/Group	Overall Mean Use	% Flying	% Flying within RSA	Exposure Index
American pipit	1.462	98.80	54.66	0.789
horned lark	5.680	74.20	14.94	0.630
Canada goose	0.835	69.96	83.33	0.487
Brewer's blackbird	0.368	100.00	96.83	0.357
European starling	1.285	86.46	22.89	0.254
common raven	0.368	83.33	28.00	0.086
rock pigeon	0.064	100.00	100.00	0.064
American goldfinch	0.331	94.64	18.87	0.059
red-tailed hawk	0.122	82.61	57.89	0.058
Cassin's finch	0.053	100.00	100.00	0.053
yellow-rumped warbler	0.082	100.00	57.14	0.047
black-billed magpie	0.103	88.24	46.67	0.042
rough-legged hawk	0.050	100.00	75.00	0.038
American coot	0.035	100.00	100.00	0.035
unidentified passerine	0.106	88.24	26.67	0.025
American kestrel	0.172	75.00	19.05	0.025
house finch	0.464	100.00	4.55	0.021
Swainson's hawk	0.013	100.00	100.00	0.013
turkey vulture	0.008	100.00	100.00	0.008
northern harrier	0.052	100.00	12.50	0.006
prairie falcon	0.019	100.00	33.33	0.006
American robin	0.023	75.00	0.00	0.000
California quail	0.234	85.00	0.00	0.000
Cooper's hawk	0.006	100.00	0.00	0.000
Say's phoebe	0.109	38.89	0.00	0.000
barn swallow	0.050	87.50	0.00	0.000
cliff swallow	0.023	100.00	0.00	0.000
dark-eyed junco	0.041	100.00	0.00	0.000
gray partridge	0.023	50.00	0.00	0.000
lapland longspur	0.114	89.47	0.00	0.000
lark sparrow	0.012	100.00	0.00	0.000
mourning dove	0.085	100.00	0.00	0.000
pine siskin	0.012	100.00	0.00	0.000
ring-billed gull	0.012	100.00	0.00	0.000
savannah sparrow	0.021	66.67	0.00	0.000
sharp-shinned hawk	0.006	100.00	0.00	0.000
unidentified sparrow	0.025	75.00	0.00	0.000
vesper sparrow	0.023	100.00	0.00	0.000
violet-green swallow	0.018	100.00	0.00	0.000
western kingbird	0.043	100.00	0.00	0.000
western meadowlark	1.036	39.41	0.00	0.000

Table 9. Mean exposure indices calculated by species observed during fixed-point surveys in the Project area.

Species/Group	Overall Mean Use	% Flying	% Flying within RSA	Exposure Index
white-crowned sparrow	0.082	100.00	0.00	0.000
American crow	0.041	0.00	N/A	N/A
chukar	0.018	0.00	N/A	N/A
northern flicker	0.006	0.00	N/A	N/A
northern shrike	0.006	0.00	N/A	N/A
red-breasted nuthatch	0.006	0.00	N/A	N/A
ring-necked pheasant	0.136	0.00	N/A	N/A
sandhill crane	0.012	0.00	N/A	N/A
unidentified duck	N/A	0.00	N/A	N/A
unidentified gull	N/A	0.00	N/A	N/A

Table 10. Results of raptor nest surveys

	2001 Klondike Surveys				2004 Surveys			
	Surveyed Area (150 mi^2)		2-mi of Project area		Surveyed Area (325 mi^2)		2-mi of Project area	
	# nests	density (#/m2)	# nests	density (#/m2)	# nests	density (#/m2)	# nests	density (#/m2)
American kestrel	1	0.007	1	0.011	1	0.003	1	0.011
Red-tailed hawk	14	0.093	6	0.068	26	0.080	8	0.091
Swainson's hawk	11	0.073	4	0.045	10	0.031	3	0.034
Great horned owl	6	0.040	2	0.023	6	0.018	1	0.011
Golden eagle	1	0.007	0	0.000	0	0.000	0	0.000
Prairie falcon	0	0.000	0	0.000	1	0.003	0	0.000
Common raven	1	0.007	0	0.000	3	0.009	1	0.011
Total Number Active Nests	34	0.23	13	0.15	47	0.14	14	0.16
Total Number of Raptor Nests	33	0.22	13	0.15	44	0.14	13	0.15

Table 11. List of State and Federal Sensitive Status Species occurring in Sherman County, Oregon.

Common Name	Scientific Name	Federal Status	ODFW Status	Notes on Occurrence
FISH				
chinook salmon	*Oncorhynchus tshawytscha*	LT	LT	No suitable habitat/tributary
inland/interior redband trout	*Oncorhynchus mykiss*	SoC	SV	Habitat lacking
Pacific lamprey	*Lampetra tridentate*	SoC	SV	Habitat lacking
sockeye salmon	*Oncorhynchus nerka*	LE	--	No suitable habitat/tributary
Steelhead	*Oncorhynchus mykiss*	LT	SC/SV	No suitable habitat/tributary
AMPHIBIANS				
northern leopard frog	*Rana pretiosa*	--	SC	None observed, habitat possible at pond near Emigrant Springs road
western toad	*Bufo boreas*	--	SV	Observed in upper Biglow Canyon
REPTILES				
northern sagebrush lizard	*Sceloporus graciosus graciosus*	SoC	SV	Habitat lacking
painted turtle	*Chrysemys picta*	--	SC	None observed, habitat possible at pond near Emigrant Springs road
sharptail snake	*Contia tenuis*	--	SV	Habitat lacking
western rattlesnake	*Crotalus viridis*	--	SV	Observed, likely common in native shrub-steppe and ravine habitat (*C.v. oregonus*)
BIRDS				
bald eagle	*Haliaeetus leucocephalus*	LT	LT	Infrequent migrant or winter occurrence
bank swallow	*Riparia riparia*	--	SU	None observed, likely migrant through project
burrowing owl	*Athene cunicularia hypugaea*	SoC	SC	Historical county record, 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	County record, possible, esp near riparian areas
eastern Oregon willow flycatcher	*Empidonax traillii adastus*	SoC	SU	None observed, Biglow Canyon habitat possible
ferruginous hawk	*Buteo regalis*	SoC	SC	One observation, rare.
grasshopper sparrow	*Ammodramus savannarum*	--	SV/SP	Common in non-AG habitat
Lewis's woodpecker	*Melanerpes lewis*	SoC	SC	No observations, likely migrant through project
loggerhead shrike	*Lanius ludovicianus*	--	SV	Uncommon
long-billed curlew	*Numenius americanus*	--	SV	Observed south of project, ORNHIC lists use along John Day River up to Drapper Canyon mouth, historical nesting sites of broad county

Table 11. List of State and Federal Sensitive Status Species occurring in Sherman County, Oregon.

Common Name	Scientific Name	Federal Status	ODFW Status	Notes on Occurrence
				canyons
mountain quail	*Oreortyx pictus*	SoC	SU	Habitat lacking
American peregrine falcon	*Falco peregrinus anatum*	--	LE	Year-round, nesting along Columbia river, potential infrequent use within project area
Swainson's hawk	*Buteo swainsoni*	--	SV	18 observations from all surveys
golden eagle	*Aquila chrysaetos*	EA	--	Observed near John Day River rock outcrops during raptor nest survey
western bluebird	*Sialia mexicana*	--	SV	None observed, possible use of project 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, irregular migrant potentially through project
BATS				
hoary bat	*Lasiurus cinereus*			Likely migrant through project
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	Likely migrant through project
western small-footed myotis	*Myotis ciliolabrum*	SoC	SU	Unknown
Yuma myotis	*Myotix yumanensis*	Soc	--	Unknown
MAMMALS				
California bighorn sheep	*Ovis canadensis californiana*	SoC	--	Observed east of John Day on south rim of Columbia River; may use river canyon slopes north and east of project
gray wolf	*Canis lupus*	LE	LE	Extirpated, historical county records only; unsuitable habitat on open high facility ridgelines – No impact
white-tailed jackrabbit	*Lepus townsendii*	--	SU	Observed, uncommon
INVERTEBRATE				
California floater	*Anodonta californiensis*	Soc		Habitat lacking
Oregon snail	*Monadenia fidelis minor*	Soc		Habitat lacking

TABLE 11 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.

Table 12. Summary of observations of state or federal-listed species, raptors, other species, and non-avian species observed during in-transit surveys, aerial raptor nest surveys, and sensitive species surveys.

Species	Scientific Name	# Obs.	# Groups
white-crowned sparrow	*Zonotrichia leucophrys*	62	3
grasshopper sparrow[c]	*Ammodramus savannarum*	49	49
Canada goose	*Branta canadensis*	43	1
red-tailed hawk	*Buteo jamaicensis*	35	33
dark-eyed junco	*Junco hyemalis*	26	1
American kestrel	*Falco sparverius*	20	18
Swainson's hawk[c]	*Buteo swainsoni*	16	14
great-horned owl	*Bubo virginianus*	15	6
wild turkey	*Meleagris gallopavo*	11	2
turkey vulture	*Cathartes aura*	10	2
house finch	*Carpodacus mexicanus*	8	2
ring-necked pheasant	*Phasianus colchicus*	7	1
rough-legged hawk	*Buteo lagopus*	5	5
common raven	*Corvus corax*	4	3
American goldfinch	*Carduelis tristis*	2	1
golden eagle	*Aquila chrysaetos*	2	2
prairie falcon	*Falco mexicanus*	2	2
short-eared owl	*Asio flammeus*	2	2
yellow-headed blackbird	*Xanthocephalus*	2	1
Bewick's wren	*Thryomanes bewickii*	1	1
Bullock's oriole	*Icterus bullockii*	1	1
ferruginous hawk[c]	*Buteo regalis*	1	1
Lincoln's sparrow	*Melospiza lincolnii*	1	1
loggerhead shrike[c]	*Lanius ludovicianus*	1	1
northern shrike	*Lanius excubitor*	1	1
sharp-shinned hawk	*Accipter striatus*	1	1
unidentified empidonax		1	1
western kingbird	*Tyrannus verticalis*	1	1
Avian Subtotal		330	157
mule deer[d]		160	
mule deer		51	11
California bighorn sheep[c]		5	1
American antelope		2	1
Beechey/California ground squirrel		2	2
white-tailed jackrabbit[a]		2	2
coyote		1	1
raccoon[a]			
Mammal Subtotal		223	18

Table 12. Summary of observations of state or federal-listed species, raptors, other species, and non-avian species observed during in-transit surveys, aerial raptor nest surveys, and sensitive species surveys.

Species	Scientific Name	# Obs.	# Groups
western rattlesnake[c]		2	2
gopher snake[b]		1	1
Reptile Subtotal		3	3

[a] A single scat pile was found for the raccoon and 6 scat piles were found for the white-tailed jackrabbit in the Project area, which didn't affect the subtotals.

[b] Two dead snakes were observed on the road, which didn't affect the subtotals.

[c] Oregon State vulnerable species.

[d] Includes aerial raptor survey observations, which could be located in either the Project area or the Reference area, were included in the subtotal for # Obs. only.

Table 13. Comparison of approximate percent composition of general habitats associated with several Pacific Northwest windpower projects. AG=cultivated agriculture, UT/RT/RI=riparian areas and upland and riparian trees, reserve program grasslands. SS/GR=shrub-steppe and native grasslands, CRP=Conservation Reserve Program grassland, DEV=developed, and WA=water.

Project Area	AG	UT/RT/RI	SS/GR	CRP	DEV	WA
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

Table 14. Estimated raptor nest densites from other proposed and existing wind projects that are located in primarily in agricultural landscapes.

	Raptor Nest Density (#/mi^2)						
Project Site	all raptors	SWHA	RTHA	FEHA	GOEA	PRFA	GHOW
Biglow Canyon OR	0.15	0.04	0.08	0.00	0.00	0.00	0.02
Klondike I&II OR	0.16	0.04	0.08	0.00	0.00	0.00	0.04
Stateline OR/WA	0.21	0.03	0.08	0.03	0.00	0.00	0.07
Nine Canyon, WA	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Zintel Canyon, WA	0.08	0.04	0.02	0.02	0.00	0.00	0.00
Buffalo Ridge, MN	0.15	0.07	0.06	0.01	0.00	0.00	0.02
Klickitat County, WA	0.12	0.00	0.09	0.00	0.00	0.01	0.03
Combine Hills, OR	0.24	0.06	0.11	0.01	0.00	0.00	0.00
Columbia Hills, WA	0.30	0.04	0.18	0.00	0.02	0.02	0.02
Ponnequin, CO	0.06	0.06	0.00	0.00	0.00	0.00	0.00
Hopkins Ridge, WA	0.43	0.01	0.27	0.01	0.00	0.00	0.08
Maiden, WA	0.18	0.05	0.04	0.03	0.00	0.03	0.02
Average	0.18	0.04	0.08	0.01	0.00	0.00	0.02

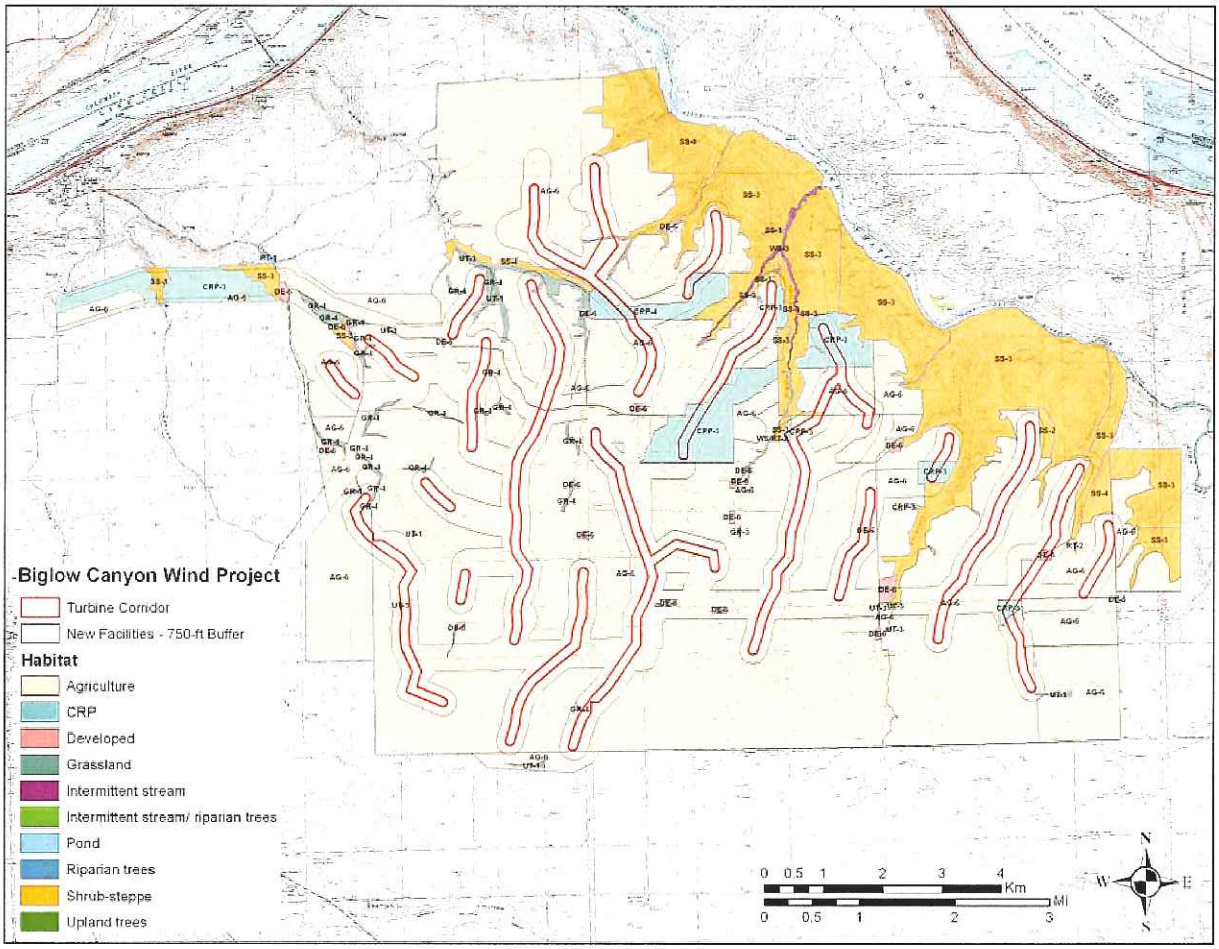


Figure 1. Location and vegetation of the Biglow Canyon Wind Power Project (BCWPP or Project) in Sherman County, Oregon.

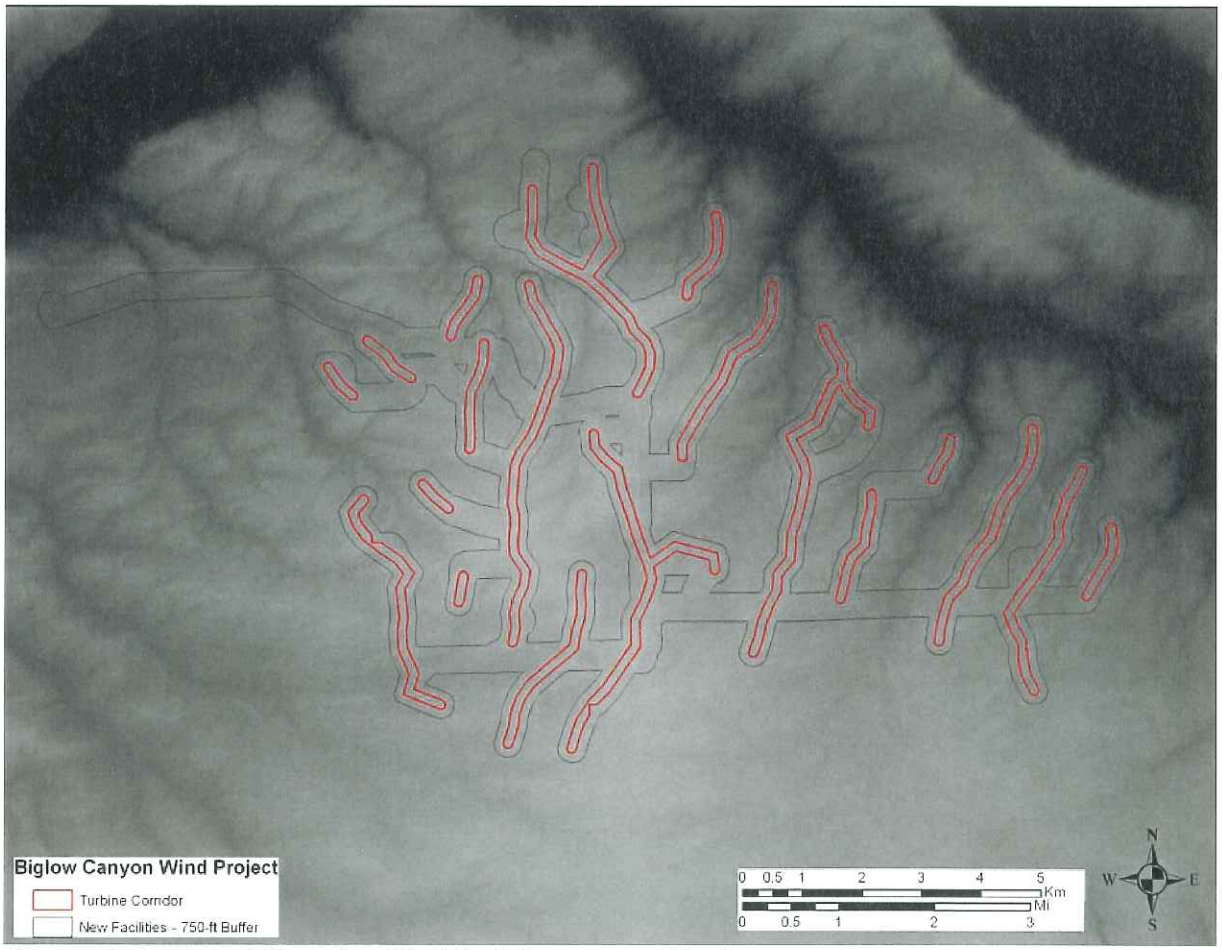


Figure 2. A Digital Elevation Model of the proposedProject area.

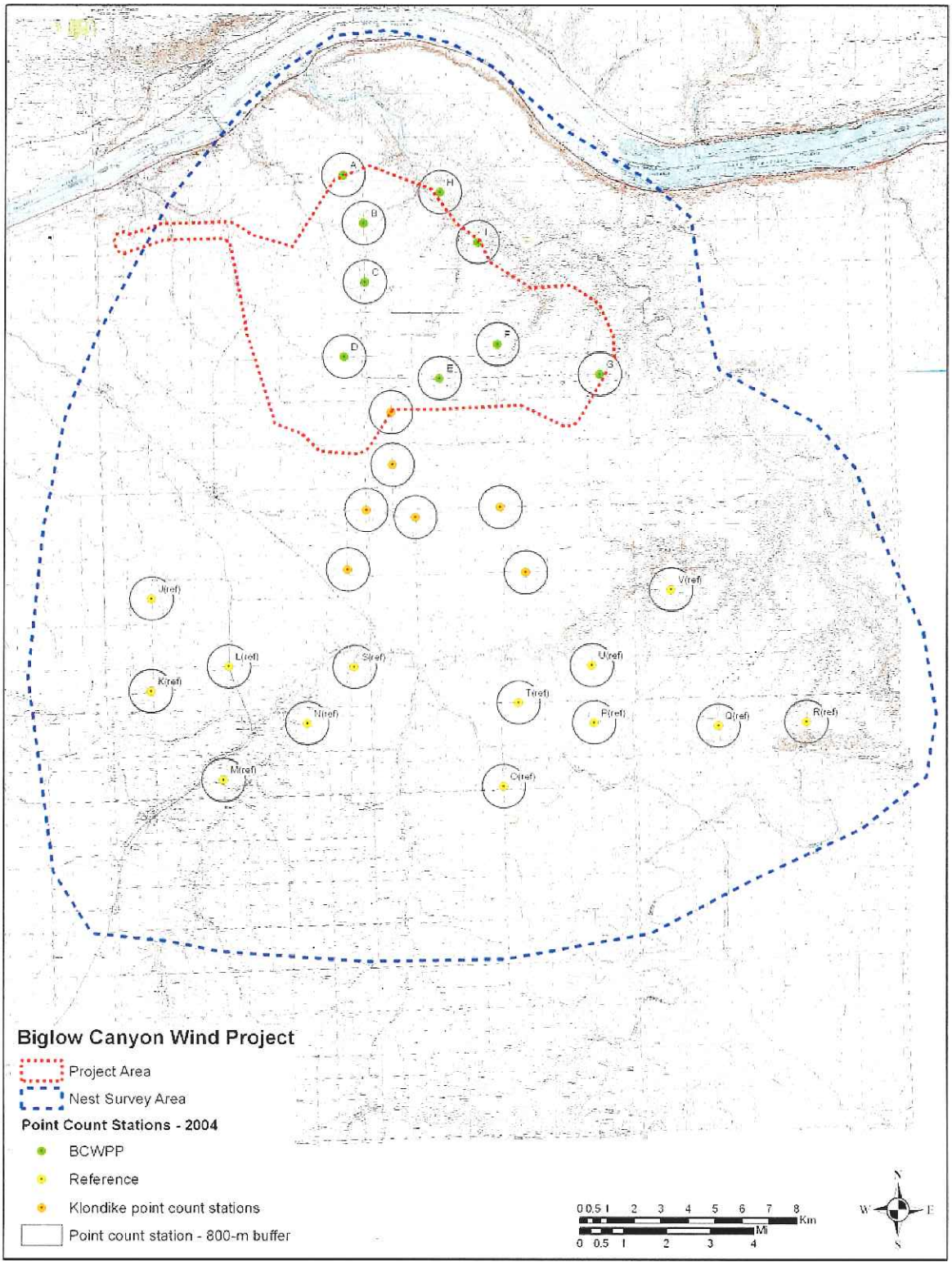


Figure 3. Location of aerial survey routes and avian point count stations for the Project and Reference area.

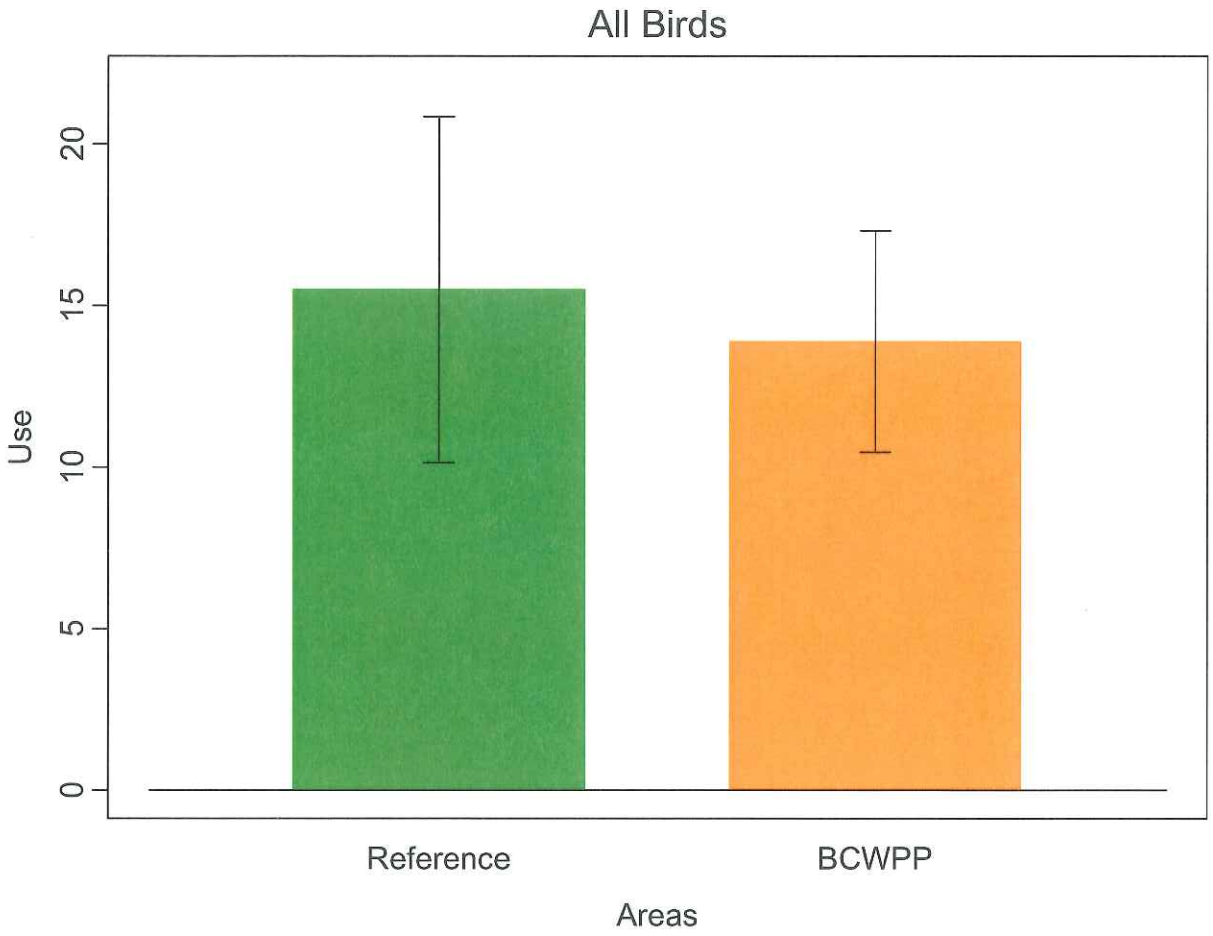


Figure 4. Mean use for All Birds for the Project (BCWPP) and Reference area.

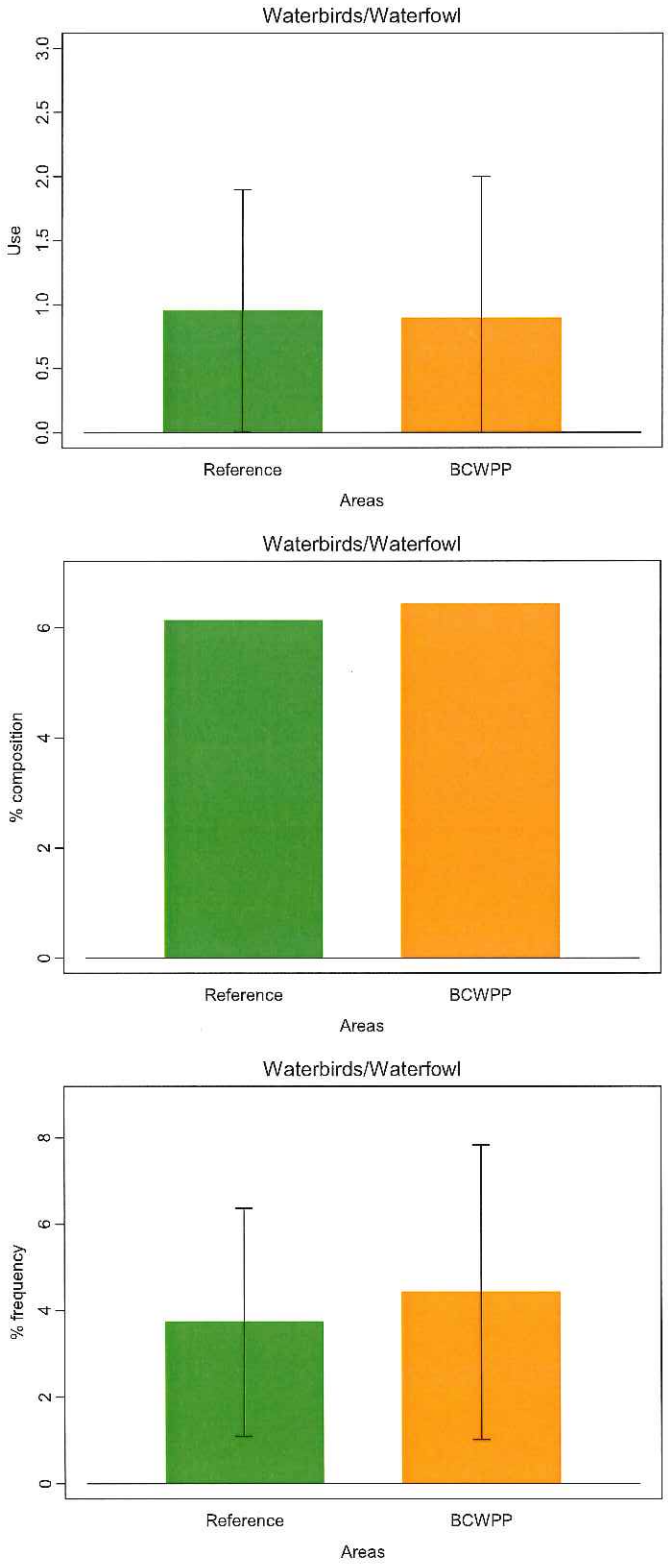


Figure 5. Mean use, percent composition, and percent frequency for Waterbirds/Waterfowl for the Project (BCWPP) and Reference area.

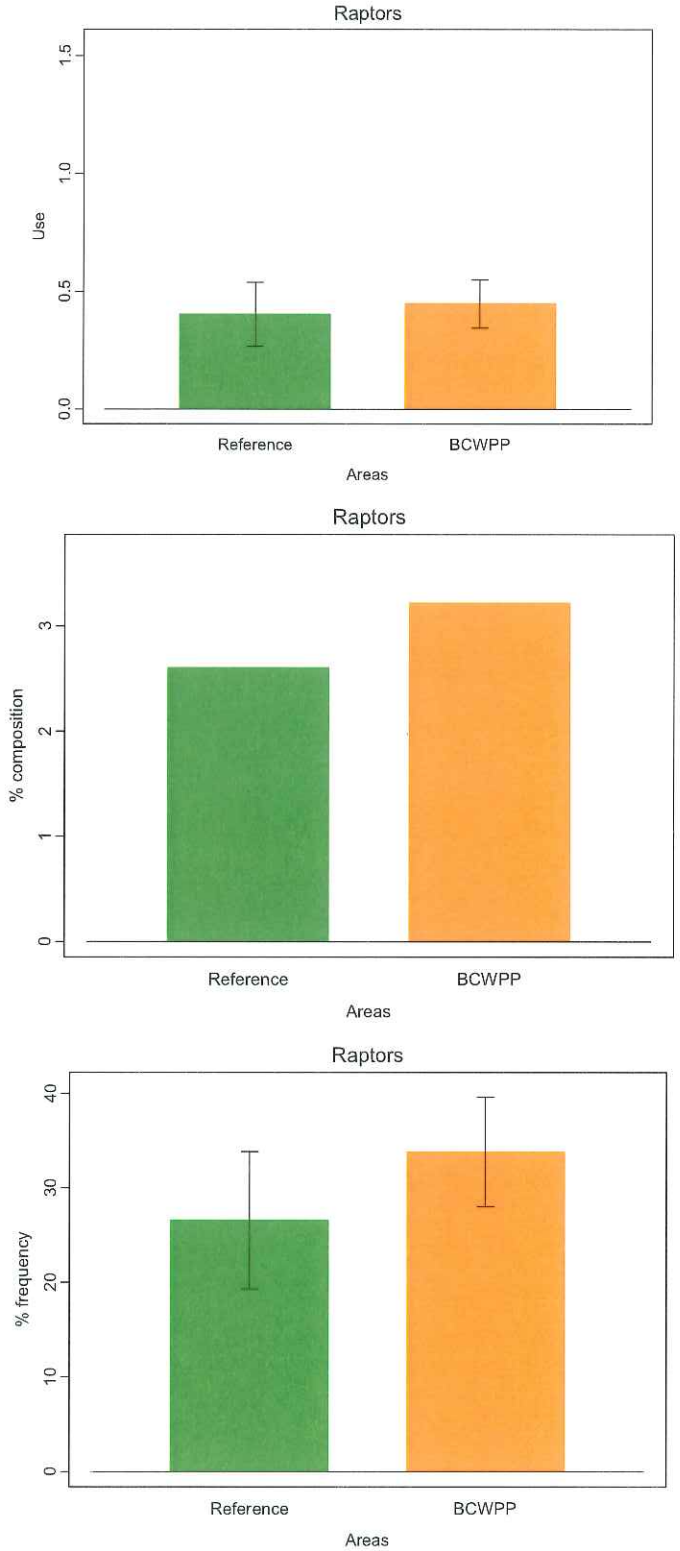


Figure 6. Mean use, percent composition, and percent frequency for Raptors for the Project (BCWPP) and Reference area.

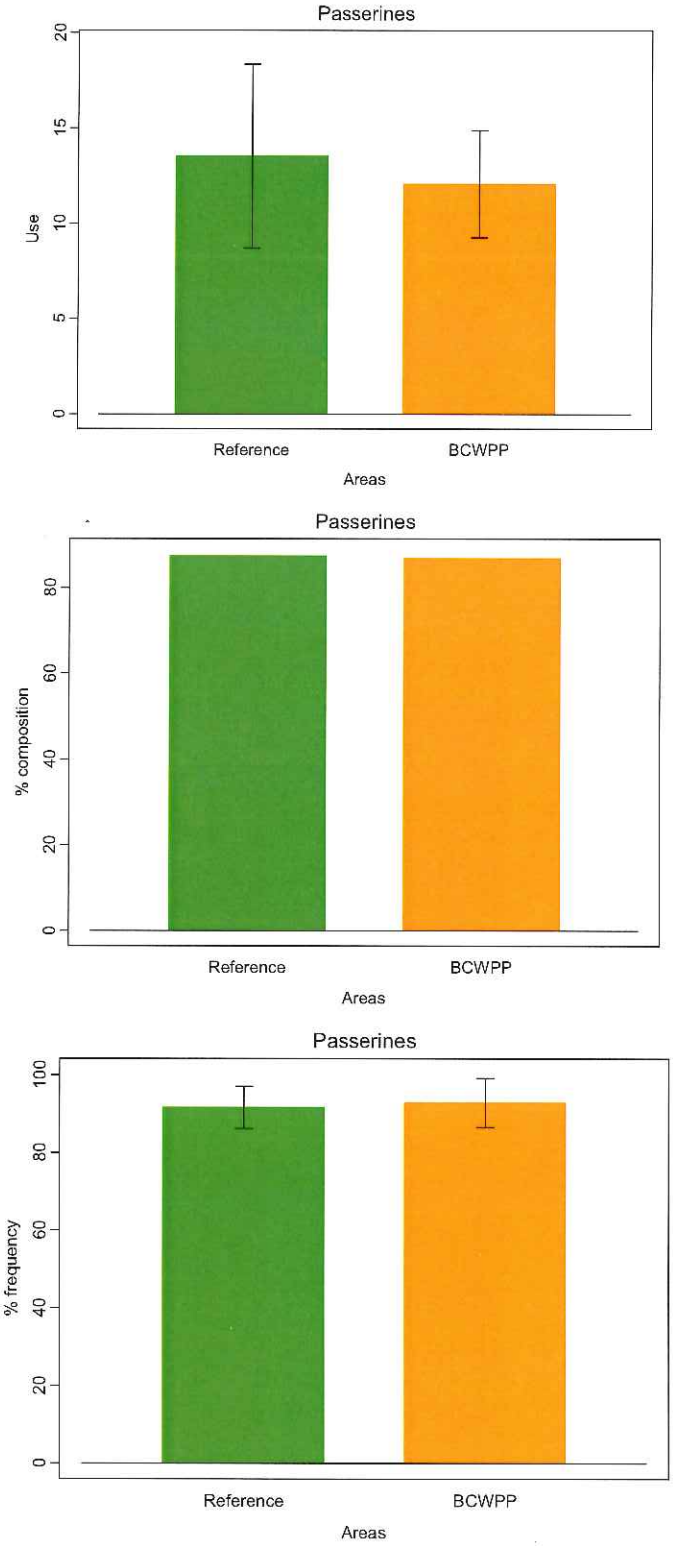
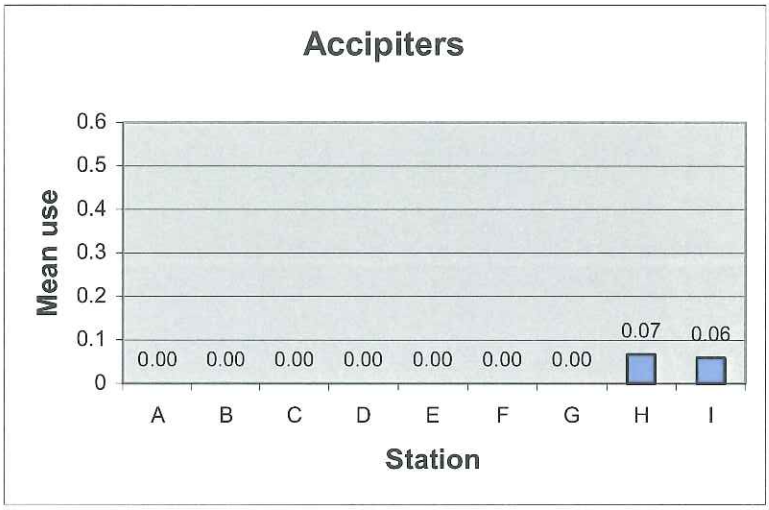


Figure 7. Mean use, percent composition, and percent frequency for Passerines for the Project (BCWPP) and Reference area.



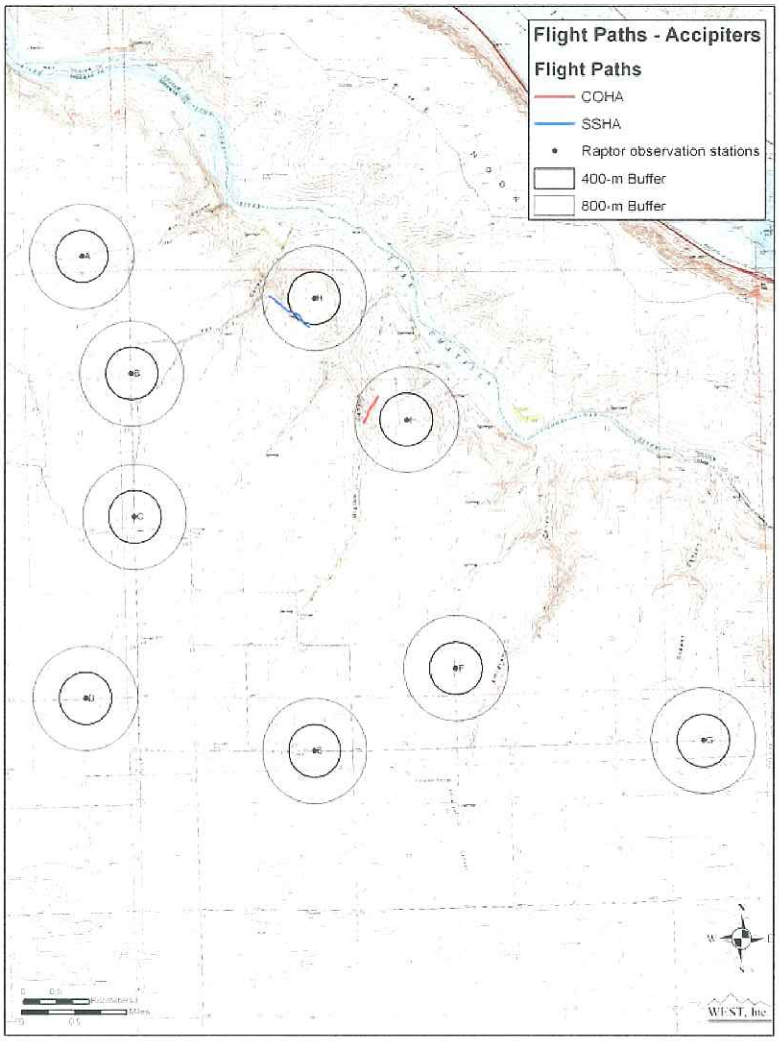
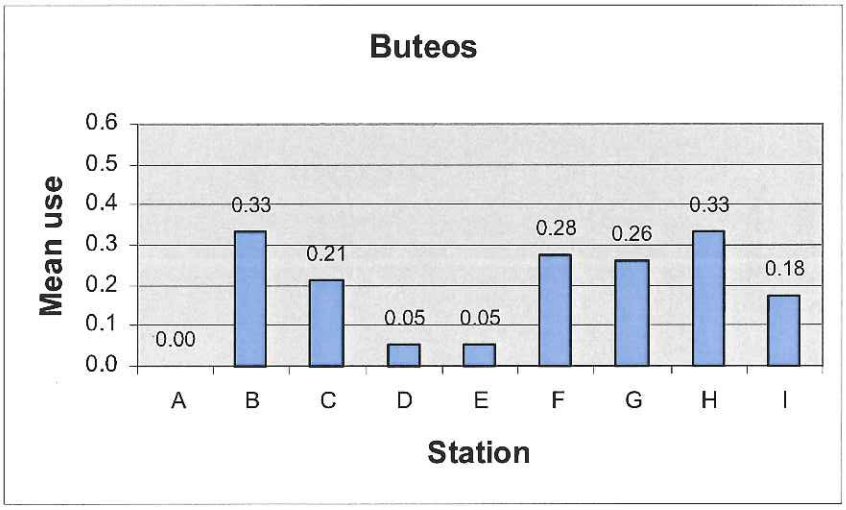


Figure 8. Station use(#/30-min survey) and flight paths for Accipiters for the Project.



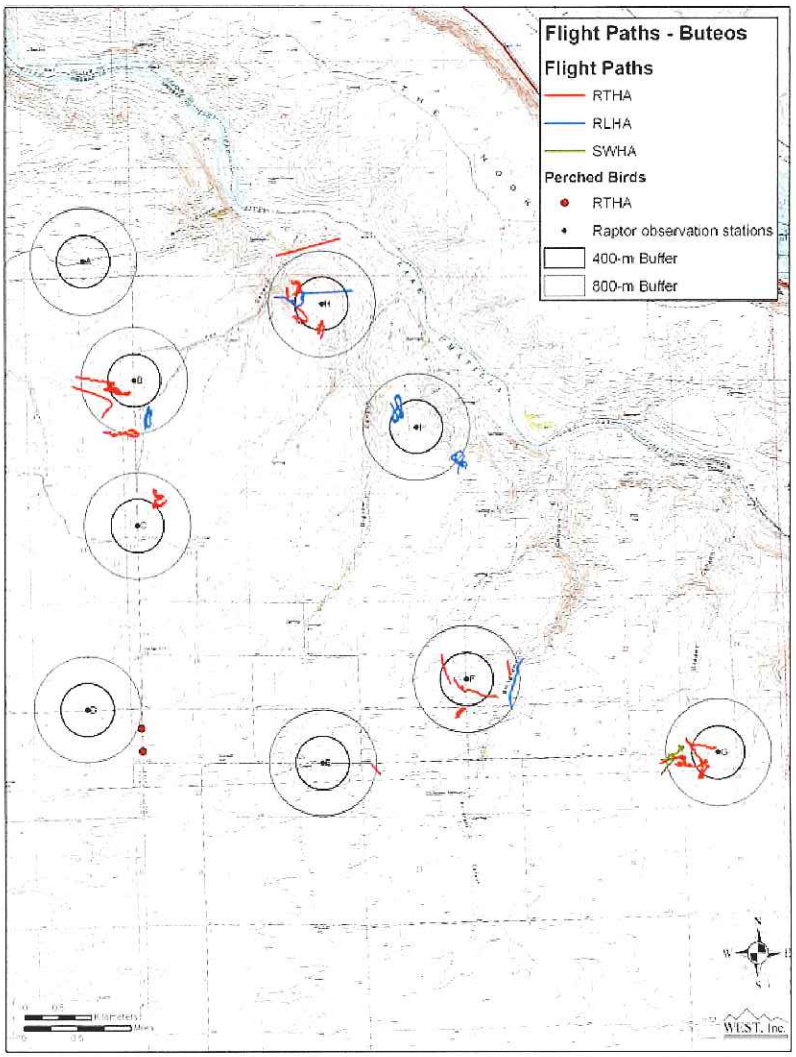
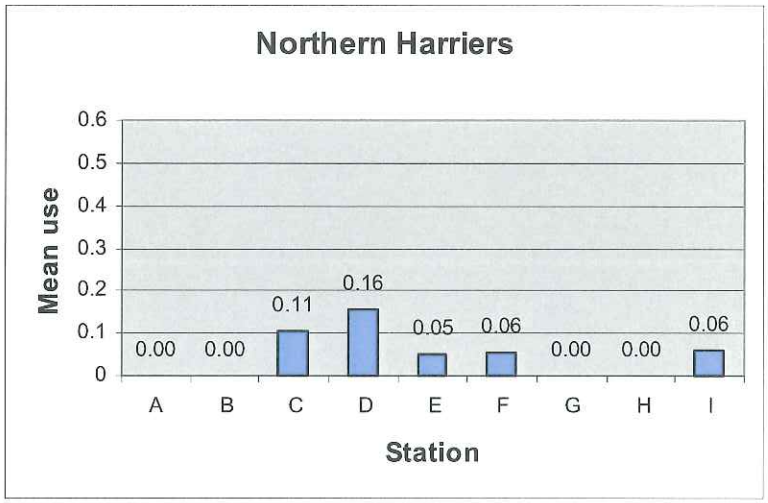


Figure 9. Station use(#/30-min survey), flight paths, and perched points for Buteos for the BWCPP.



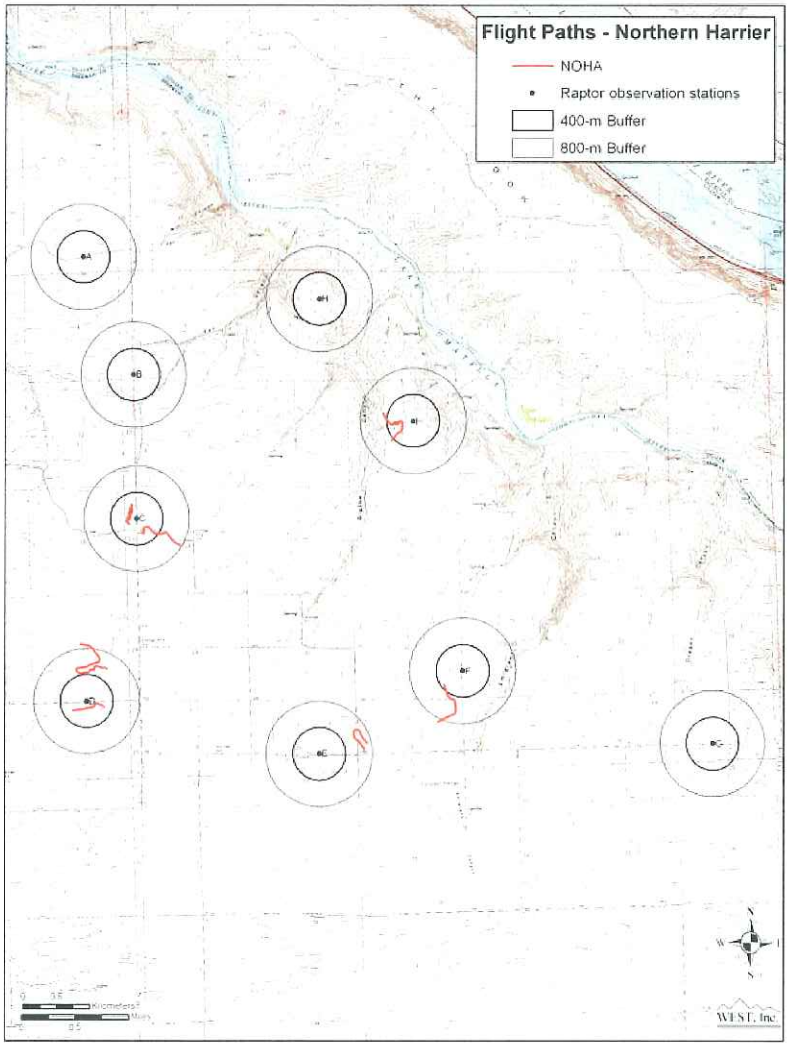
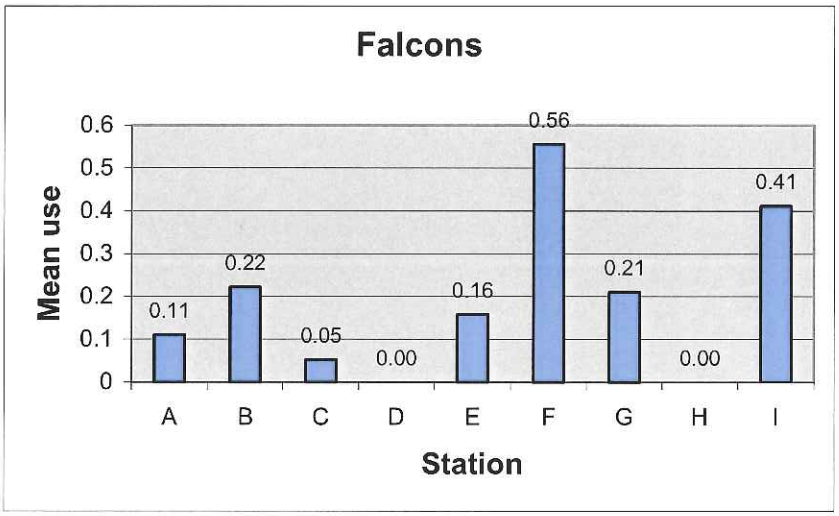


Figure 10. Station use(#/30-min survey) and flight paths for Northern Harriers for the BWCPP.



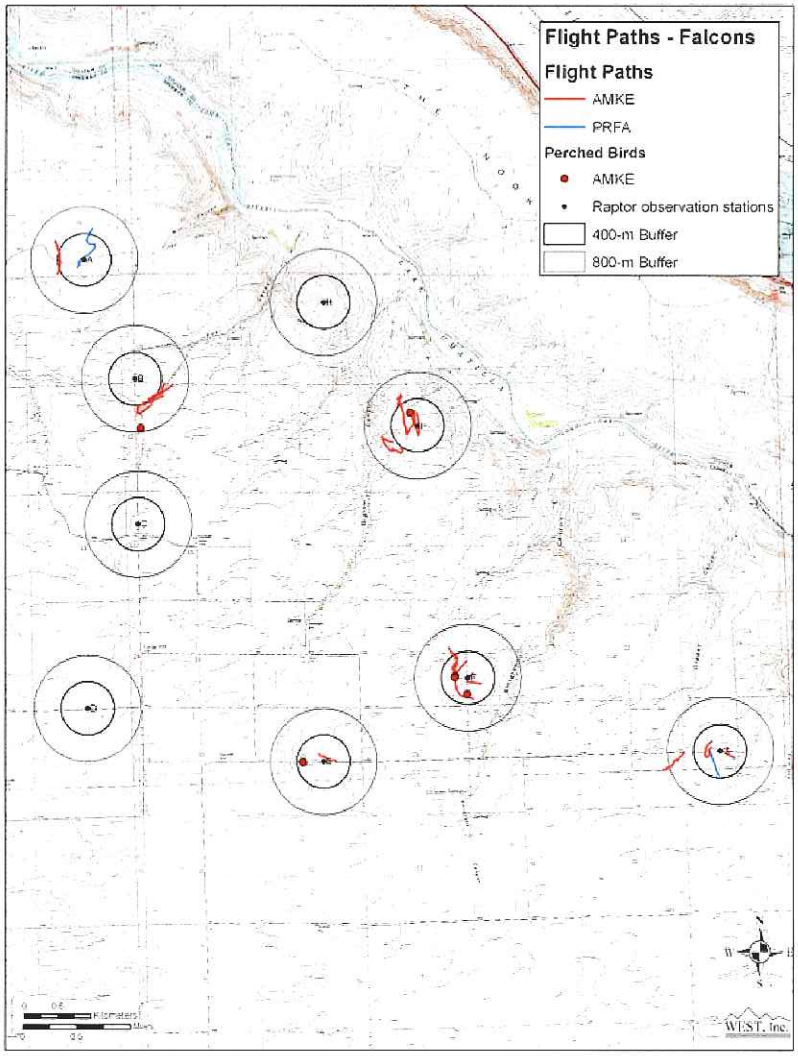


Figure 11. Station use(#/30-min survey), flight paths, and perched points for Falcons for the BWCPP.

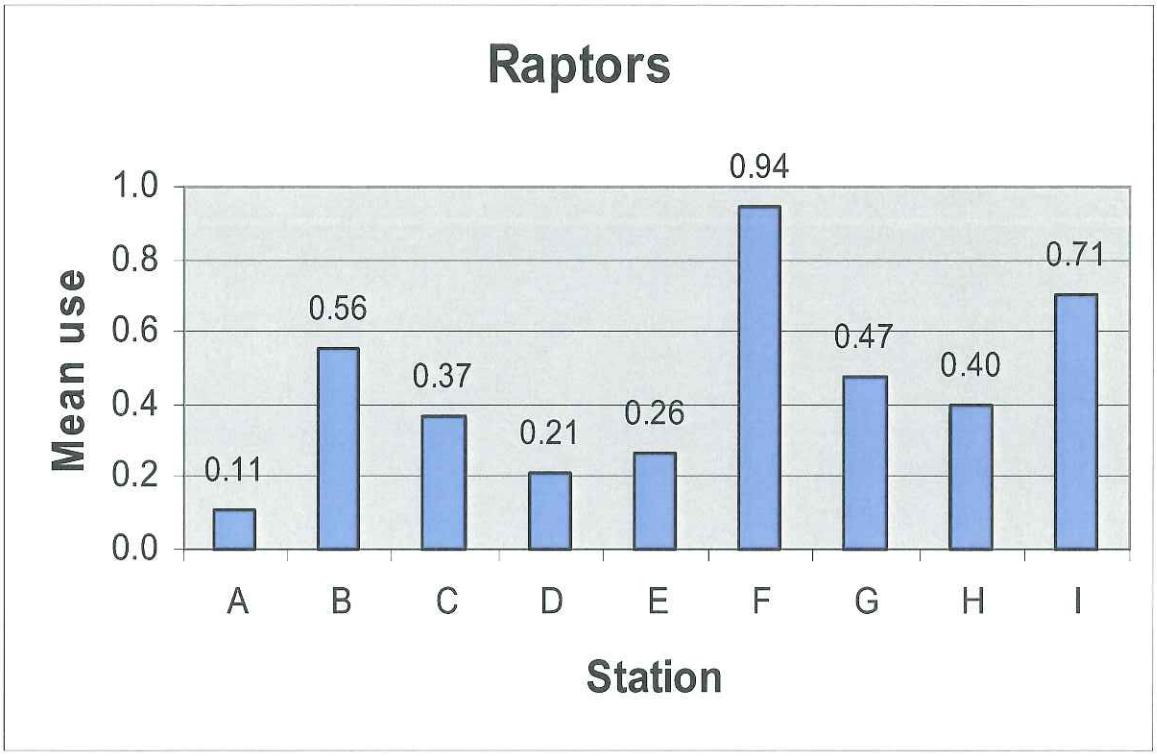


Figure 12. Station use for Raptors for the Project.

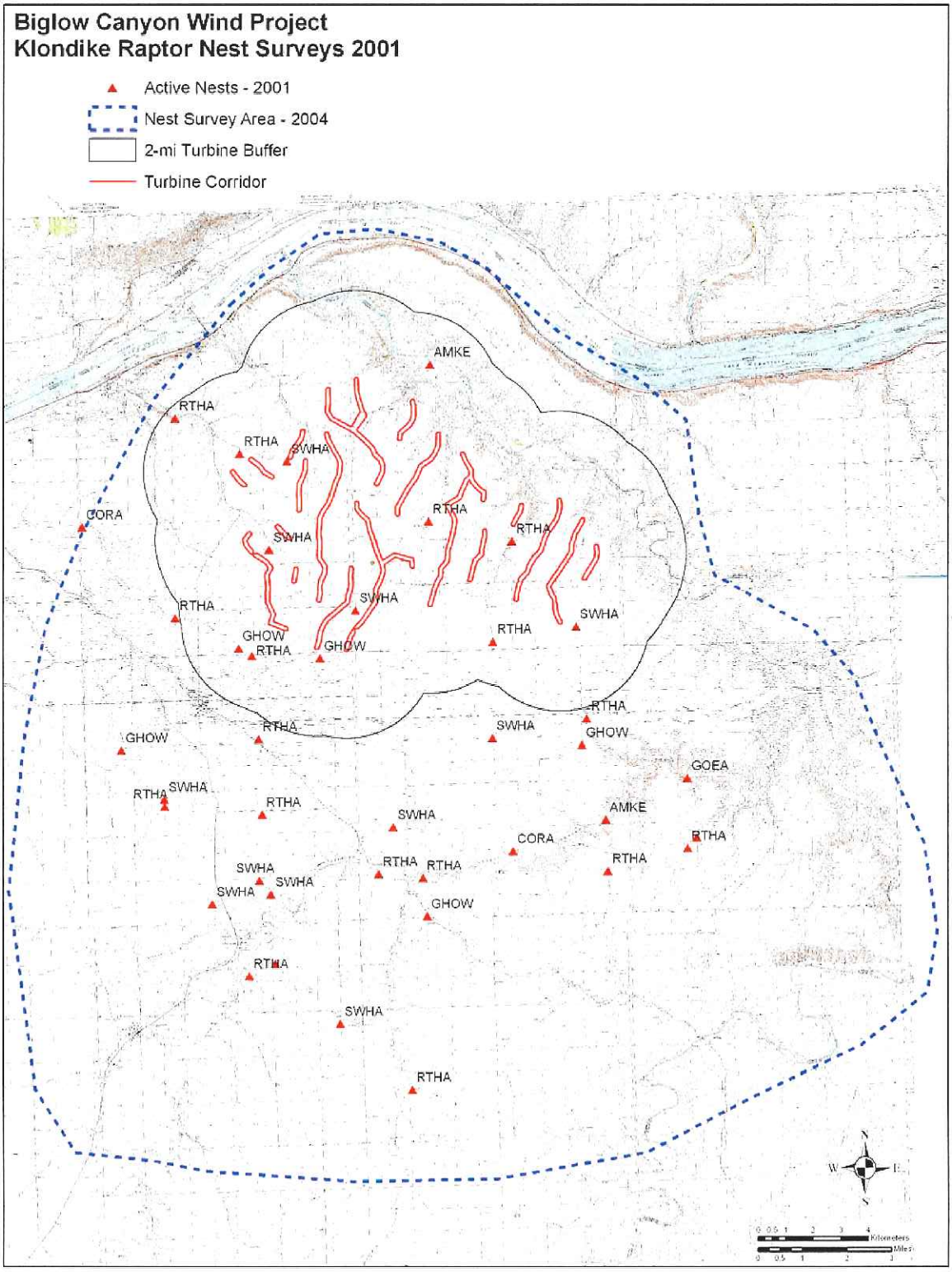


Figure 13. Raptor nest survey results in 2001 from the Klondike I project in relation to the Project.

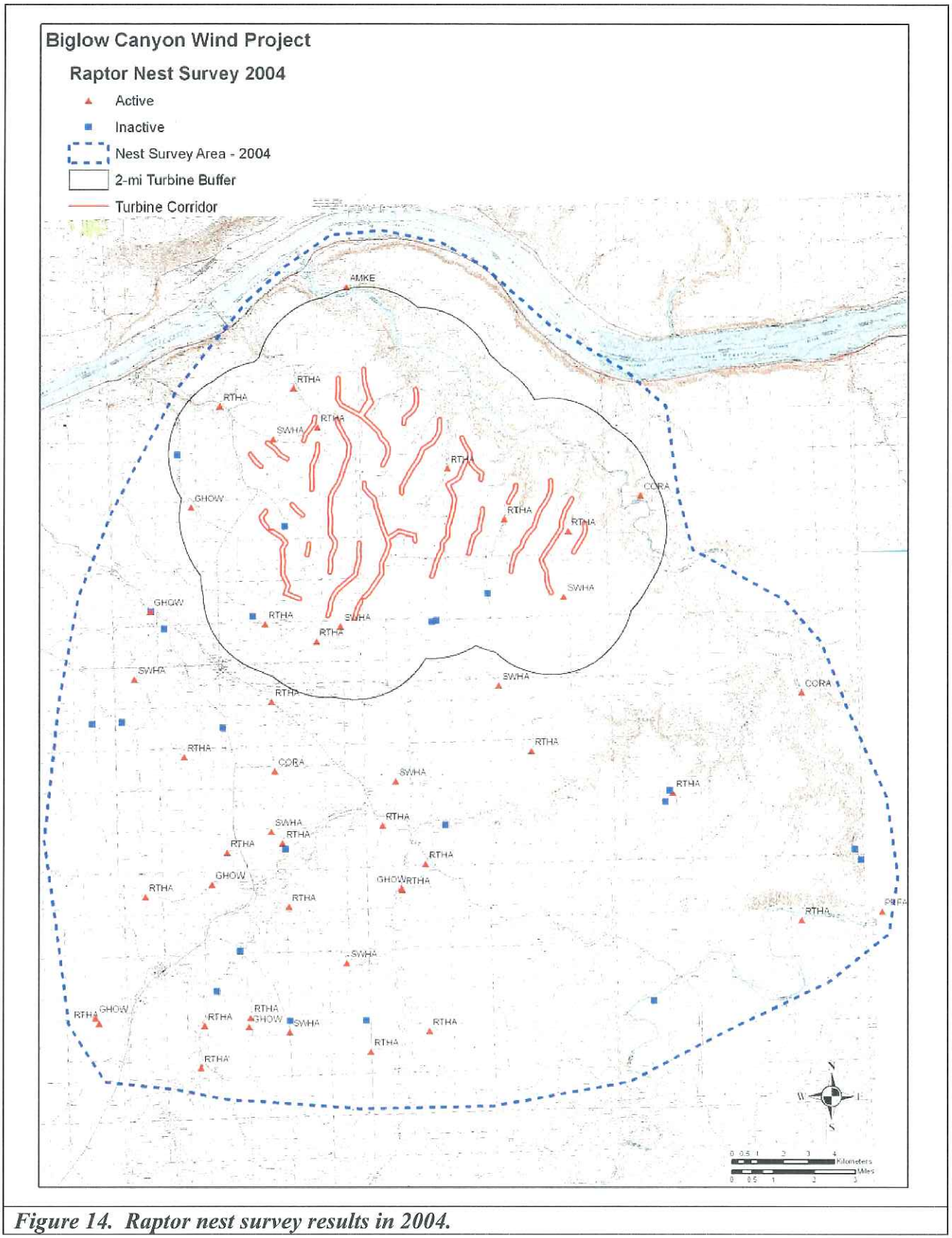


Figure 14. Raptor nest survey results in 2004.

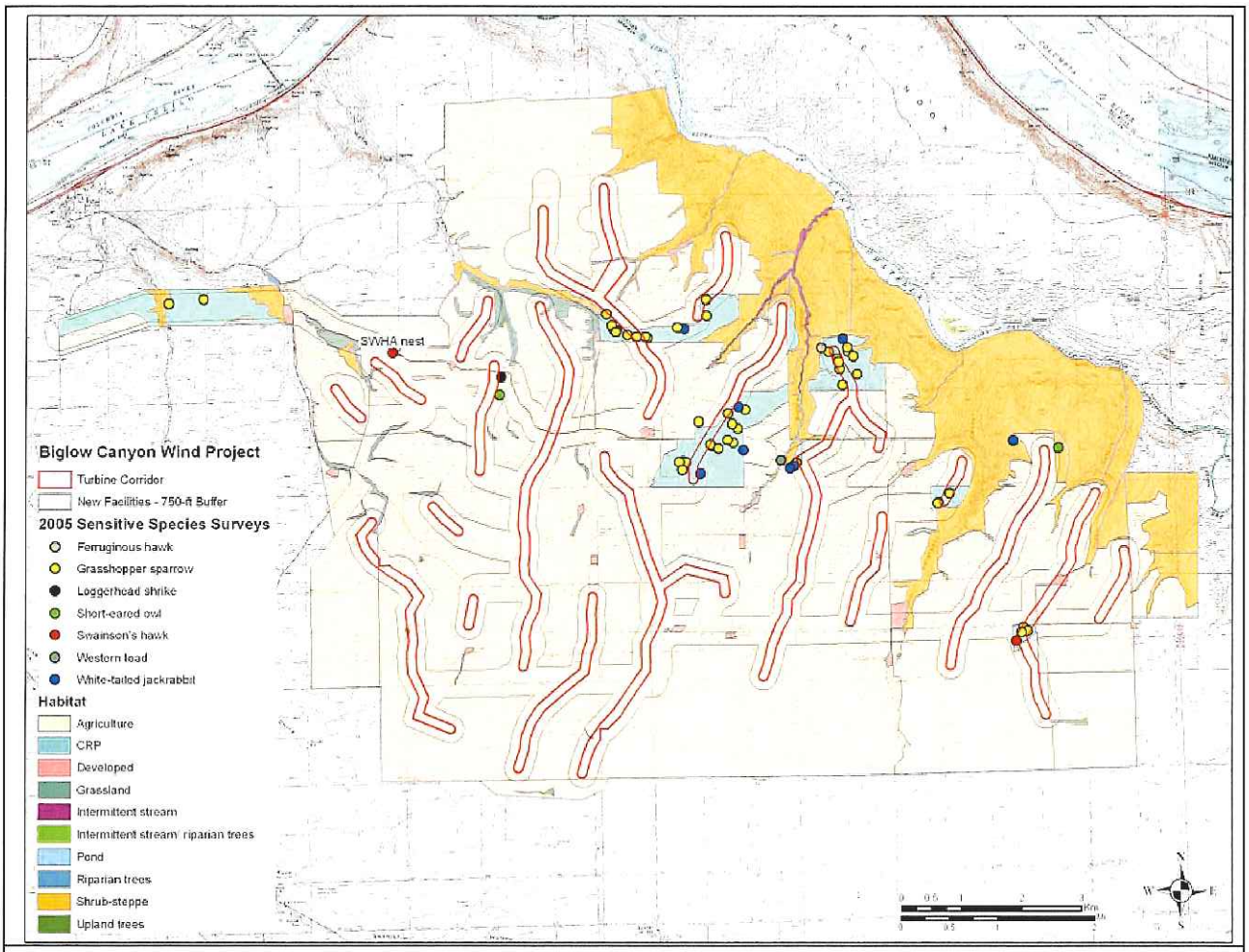


Figure 15. Results of sensitive species surveys conducted in spring 2005.

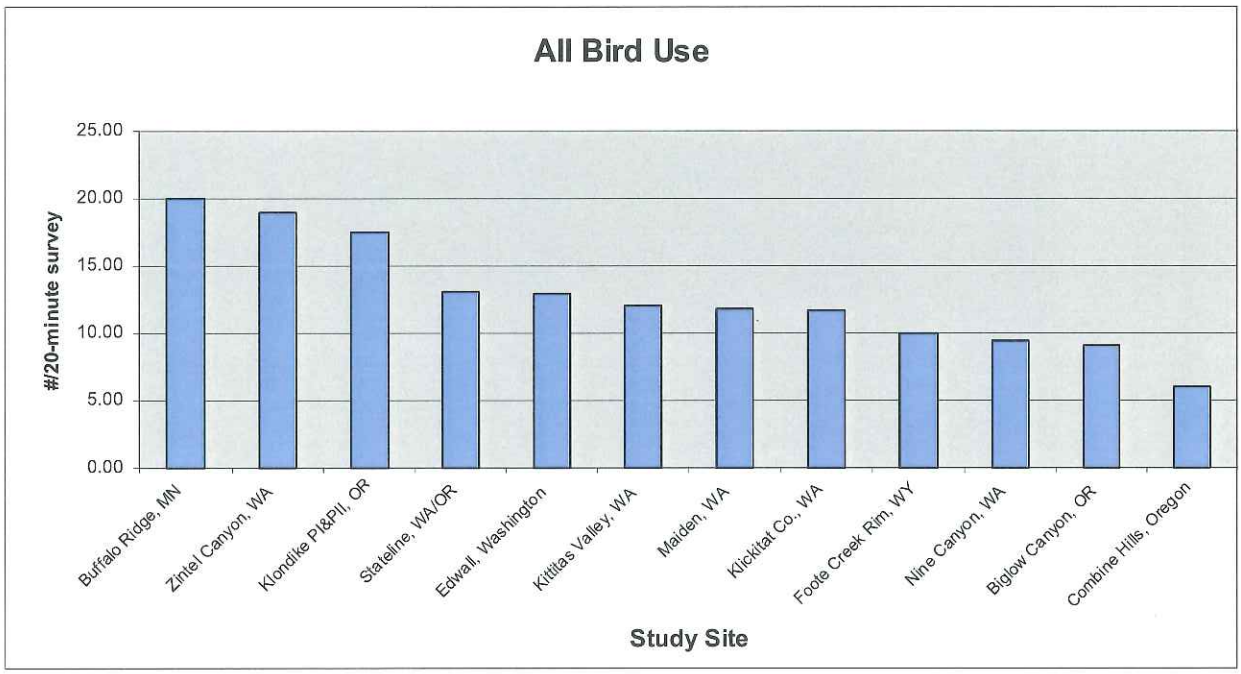


Figure 16. All bird avian use estimates from open habitat projects in the west and midwest that have used similar methods of data collection.

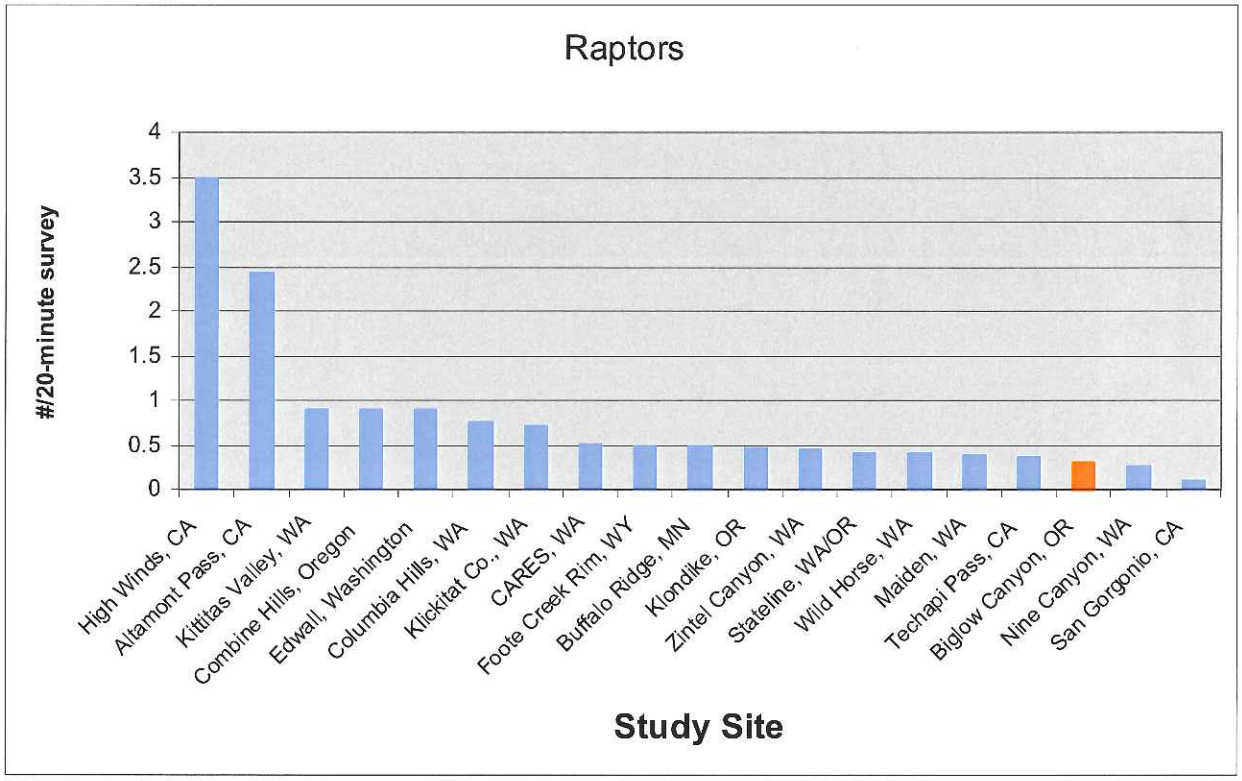


Figure 17. Raptor use estimates from open habitat projects in the west and midwest that have used similar methods of data collection.

Appendix A. Tables of for the Reference area on the Project site.

A-1. Avian species observed while conducting fixed-point surveys (March 26, 2004 - March 23, 2005) in the Reference area. [a]

Species/Group	Spring		Summer		Fall		Winter		Grand Total	
	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups
Waterbirds/Waterfowl	**75**	**3**	**0**	**0**	**0**	**0**	**370**	**10**	**445**	**13**
great blue heron	0	0	0	0	0	0	1	1	1	1
sandhill crane	73	1	0	0	0	0	0	0	73	1
American wigeon	0	0	0	0	0	0	1	1	1	1
Canada goose	0	0	0	0	0	0	343	5	343	5
green-winged teal	0	0	0	0	0	0	1	1	1	1
hooded merganser	2	2	0	0	0	0	0	0	2	2
mallard	0	0	0	0	0	0	24	2	24	2
Shorebirds										
killdeer	3	2	0	0	0	0	0	0	3	2
Raptors	**40**	**38**	**21**	**16**	**11**	**10**	**31**	**31**	**103**	**95**
Accipiters										
sharp-shinned hawk	1	1	0	0	0	0	0	0	1	1
Buteos	*28*	*27*	*11*	*10*	*11*	*10*	*21*	*21*	*71*	*68*
Swainson's hawk[b]	4	4	3	2	2	1	0	0	9	7
red-tailed hawk	14	14	8	8	5	5	7	7	34	34
rough-legged hawk	8	7	0	0	3	3	14	14	25	24
unidentified buteo	2	2	0	0	1	1	0	0	3	3
Northern Harriers										
northern harrier	6	6	0	0	0	0	3	3	9	9
Falcons	*4*	*3*	*7*	*5*	*0*	*0*	*7*	*7*	*18*	*15*
American kestrel	4	3	7	5	0	0	4	4	15	12
prairie falcon	0	0	0	0	0	0	3	3	3	3
Vultures										
turkey vulture	1	1	3	1	0	0	0	0	4	2
Passerines	**617**	**222**	**275**	**95**	**474**	**116**	**1882**	**188**	**3248**	**621**
American goldfinch	1	1	2	1	4	2	0	0	7	4

A-1. Avian species observed while conducting fixed-point surveys (March 26, 2004 - March 23, 2005) in the Reference area. [a]

Species/Group	Spring		Summer		Fall		Winter		Grand Total	
	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups
American pipit	28	4	0	0	9	4	129	3	166	11
American robin	6	4	0	0	0	0	4	1	10	5
barn swallow	8	4	25	6	5	1	0	0	38	11
black-billed magpie	0	0	0	0	0	0	1	1	1	1
Brewer's blackbird	1	1	6	4	8	3	59	3	74	11
brown-headed cowbird	0	0	8	2	0	0	0	0	8	2
cliff swallow	2	1	14	2	0	0	0	0	16	3
common raven	21	14	8	7	19	11	24	18	72	50
dark-eyed junco	0	0	0	0	3	2	17	1	20	3
European starling	39	5	12	2	46	4	575	13	672	24
golden-crowned kinglet	0	0	0	0	1	1	0	0	1	1
golden-crowned sparrow	0	0	0	0	1	1	0	0	1	1
grasshopper sparrow[b]	4	4	3	2	0	0	0	0	7	6
horned lark	269	89	83	29	235	44	649	79	1236	241
house finch	5	2	1	1	4	1	12	1	22	5
lapland longspur	0	0	0	0	0	0	34	5	34	5
Lincoln's sparrow	0	0	0	0	1	1	0	0	1	1
loggerhead shrike[b]	1	1	7	6	0	0	0	0	8	7
mourning dove	16	6	17	5	12	5	20	4	65	20
northern rough-winged swallow	0	0	13	2	0	0	0	0	13	2
northern shrike	0	0	0	0	0	0	2	2	2	2
orange-crowned warbler	0	0	0	0	1	1	0	0	1	1
red-breasted nuthatch	0	0	0	0	1	1	0	0	1	1
red-winged blackbird	25	3	36	4	30	5	221	9	312	21
rock wren	0	0	0	0	2	1	0	0	2	1
rusty blackbird	11	2	0	0	0	0	0	0	11	2
savannah sparrow	5	3	2	1	4	2	0	0	11	6
Say's phoebe	21	17	3	3	1	1	4	3	29	24
song sparrow	11	5	6	2	2	2	17	7	36	16

A-1. Avian species observed while conducting fixed-point surveys (March 26, 2004 - March 23, 2005) in the Reference area. [a]

Species/Group	Spring		Summer		Fall		Winter		Grand Total	
	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups	# obs.	# groups
spotted towhee	1	1	0	0	1	1	2	2	4	4
unidentified passerine	3	2	1	1	20	4	14	6	38	13
unidentified sparrow	0	0	0	0	4	2	0	0	4	2
varied thrush	0	0	0	0	0	0	1	1	1	1
vesper sparrow	1	1	0	0	1	1	0	0	2	2
western kingbird	0	0	4	3	0	0	0	0	4	3
western meadowlark[b]	132	50	24	12	41	12	72	26	269	100
white-crowned sparrow	6	2	0	0	10	2	25	3	41	7
yellow-rumped warbler	0	0	0	0	8	1	0	0	8	1
Upland Gamebirds	**17**	**12**	**4**	**4**	**39**	**7**	**48**	**8**	**108**	**31**
California quail	4	1	1	1	4	1	25	2	34	5
chukar	6	4	0	0	13	2	18	4	37	10
ring-necked pheasant	7	7	3	3	22	4	5	2	37	16
Doves										
rock pigeon	0	0	0	0	4	2	22	3	26	5
Other Birds	**0**	**0**	**0**	**0**	**4**	**2**	**1**	**1**	**5**	**3**
Vaux's swift	0	0	0	0	3	1	0	0	3	1
northern flicker	0	0	0	0	1	1	1	1	2	2
Overall Total	**752**	**277**	**300**	**115**	**532**	**137**	**2354**	**241**	**3938**	**770**

[a] All individuals included even those outside the 800m viewing shed.
[b] Oregon State vulnerable or critical species.

A-2. Avian species observed within 800m of the observer and estimated mean use (#/30-minute survey) for large and small birds in the Reference area (March 26, 2004 - March 23, 2005).

Large Birds

Spring		Summer		Fall		Winter	
Species/Group	Use	Species/Group	Use	Species/Group	Use	Species/Group	Use
sandhill crane	0.936	red-tailed hawk	0.216	ring-necked pheasant	0.423	Canada goose	1.563
common raven	0.299	common raven	0.188	common raven	0.365	California quail	0.311
red-tailed hawk	0.193	American kestrel	0.182	chukar	0.250	common raven	0.293
rough-legged hawk	0.116	ring-necked pheasant	0.081	red-tailed hawk	0.096	mallard	0.290
ring-necked pheasant	0.100	turkey vulture	0.077	California quail	0.077	chukar	0.219
chukar	0.084	California quail	0.028	rough-legged hawk	0.058	rough-legged hawk	0.161
northern harrier	0.082	Swainson's hawk	0.028	unidentified buteo	0.019	red-tailed hawk	0.087
American kestrel	0.057					ring-necked pheasant	0.067
California quail	0.056					American kestrel	0.048
Swainson's hawk	0.054					northern harrier	0.040
killdeer	0.042					prairie falcon	0.035
hooded merganser	0.027					American wigeon	0.012
unidentified buteo	0.015					black-billed magpie	0.012
sharp-shinned hawk	0.014					great blue heron	0.012
turkey vulture	0.014					green-winged teal	0.012

A-2 (continued). Avian species observed within 800m of the observer and estimated mean use (#/30-minute survey) for large and small birds in the Reference area (March 26, 2004 - March 23, 2005).

Small Birds

Spring		Summer		Fall		Winter	
Species/Group	Use	Species/Group	Use	Species/Group	Use	Species/Group	Use
horned lark	3.924	horned lark	2.288	horned lark	4.519	horned lark	7.895
western meadowlark	1.900	red-winged blackbird	0.966	European starling	0.885	European starling	6.555
European starling	0.543	barn swallow	0.692	western meadowlark	0.788	red-winged blackbird	2.618
American pipit	0.364	western meadowlark	0.656	red-winged blackbird	0.577	American pipit	1.821
red-winged blackbird	0.359	mourning dove	0.470	unidentified passerine	0.385	western meadowlark	0.954
Say's phoebe	0.309	cliff swallow	0.359	mourning dove	0.231	Brewer's blackbird	0.659
mourning dove	0.234	northern rough-winged swallow	0.346	white-crowned sparrow	0.192	lapland longspur	0.405
song sparrow	0.152	European starling	0.333	American pipit	0.173	white-crowned sparrow	0.326
rusty blackbird	0.146	brown-headed cowbird	0.222	Brewer's blackbird	0.154	rock pigeon	0.307
barn swallow	0.114	loggerhead shrike	0.188	yellow-rumped warbler	0.154	mourning dove	0.245
American robin	0.085	Brewer's blackbird	0.167	barn swallow	0.096	song sparrow	0.214
white-crowned sparrow	0.077	song sparrow	0.162	American goldfinch	0.077	dark-eyed junco	0.202
house finch	0.071	western kingbird	0.107	house finch	0.077	unidentified passerine	0.173
savannah sparrow	0.066	grasshopper sparrow	0.083	rock pigeon	0.077	house finch	0.143
grasshopper sparrow	0.054	Say's phoebe	0.081	savannah sparrow	0.077	Say's phoebe	0.055
unidentified passerine	0.041	American goldfinch	0.056	unidentified sparrow	0.077	American robin	0.048
cliff swallow	0.030	savannah sparrow	0.056	dark-eyed junco	0.058	spotted towhee	0.026
American goldfinch	0.015	house finch	0.028	Vaux's swift	0.058	northern shrike	0.023
Brewer's blackbird	0.015	unidentified passerine	0.028	rock wren	0.038	northern flicker	0.012
vesper sparrow	0.015			song sparrow	0.038	varied thrush	0.011
loggerhead shrike	0.014			golden-crowned kinglet	0.019		
spotted towhee	0.014			golden-crowned sparrow	0.019		
				Lincoln's sparrow	0.019		
				northern flicker	0.019		
				orange-crowned warbler	0.019		
				red-breasted nuthatch	0.019		

A-2 (continued). Avian species observed within 800m of the observer and estimated mean use (#/30-minute survey) for large and small birds on the in the Reference area (March 26, 2004 - March 23, 2005).

Small Birds

Spring		Summer		Fall		Winter	
Species/Group	Use	Species/Group	Use	Species/Group	Use	Species/Group	Use
				Say's phoebe	0.019		
				spotted towhee	0.019		
				vesper sparrow	0.019		

A-3. Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds on the in the Reference area (March 26, 2004 - March 23, 2005).

Large Birds

Spring		Summer		Fall		Winter	
Species/Group	% freq	Species/Group	% freq	Species/Group	% freq	Species/Group	% freq
common raven	18.51	common raven	16.24	common raven	21.15	common raven	21.15
red-tailed hawk	15.09	red-tailed hawk	16.24	ring-necked pheasant	7.69	rough-legged hawk	14.91
ring-necked pheasant	10.01	American kestrel	13.03	red-tailed hawk	5.77	red-tailed hawk	7.53
rough-legged hawk	8.80	ring-necked pheasant	8.12	rough-legged hawk	5.77	chukar	5.00
northern harrier	6.96	California quail	2.78	chukar	3.85	American kestrel	4.76
chukar	5.47	Swainson's hawk	2.78	California quail	1.92	Canada goose	3.48
Swainson's hawk	5.45	turkey vulture	2.56	unidentified buteo	1.92	prairie falcon	3.48
American kestrel	4.19					mallard	2.62
hooded merganser	2.67					northern harrier	2.62
unidentified buteo	1.52					ring-necked pheasant	2.62
California quail	1.39					California quail	2.53
killdeer	1.39					American wigeon	1.19
sharp-shinned hawk	1.39					black-billed magpie	1.19
turkey vulture	1.39					great blue heron	1.19
sandhill crane	1.28					green-winged teal	1.19

A-3(continued). Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds in the Reference area (March 26, 2004 - March 23, 2005).

Small Birds

Spring		Summer		Fall		Winter	
Species/Group	% freq	Species/Group	% freq	Species/Group	% freq	Species/Group	% freq
horned lark	87.48	horned lark	54.91	horned lark	69.23	horned lark	72.07
western meadowlark	57.73	western meadowlark	29.91	western meadowlark	21.15	western meadowlark	30.15
Say's phoebe	24.97	barn swallow	16.45	mourning dove	9.62	European starling	15.68
mourning dove	7.32	loggerhead shrike	13.46	red-winged blackbird	9.62	red-winged blackbird	8.72
song sparrow	7.09	mourning dove	10.90	American pipit	7.69	song sparrow	7.62
European starling	6.96	Brewer's blackbird	8.33	European starling	7.69	unidentified passerine	6.10
American robin	5.70	red-winged blackbird	8.12	unidentified passerine	7.69	mourning dove	5.00
barn swallow	5.68	Say's phoebe	8.12	Brewer's blackbird	5.77	lapland longspur	4.76
red-winged blackbird	4.42	western kingbird	8.12	American goldfinch	3.85	Say's phoebe	4.05
grasshopper sparrow	4.08	brown-headed cowbird	5.56	dark-eyed junco	3.85	white-crowned sparrow	3.81
American pipit	4.06	European starling	5.56	rock pigeon	3.85	American pipit	3.72
house finch	2.80	northern rough-winged swallow	5.34	savannah sparrow	3.85	rock pigeon	2.62
savannah sparrow	2.80	song sparrow	5.34	song sparrow	3.85	spotted towhee	2.62
unidentified passerine	2.80	cliff swallow	5.13	unidentified sparrow	3.85	Brewer's blackbird	2.29
rusty blackbird	2.67	American goldfinch	2.78	white-crowned sparrow	3.85	northern shrike	2.29
white-crowned sparrow	2.56	grasshopper sparrow	2.78	barn swallow	1.92	American robin	1.19
American goldfinch	1.52	house finch	2.78	golden-crowned kinglet	1.92	dark-eyed junco	1.19
Brewer's blackbird	1.52	savannah sparrow	2.78	golden-crowned	1.92	house finch	1.19
cliff swallow	1.52	unidentified passerine	2.78	house finch	1.92	northern flicker	1.19
vesper sparrow	1.52			Lincoln's sparrow	1.92	varied thrush	1.10
loggerhead shrike	1.39			northern flicker	1.92		
spotted towhee	1.39			orange-crowned warbler	1.92		
				red-breasted nuthatch	1.92		
				rock wren	1.92		
				Say's phoebe	1.92		
				spotted towhee	1.92		

A-3(continued). Avian species observed within 800m of observer and estimated frequency of occurrence for large and small birds on the in the Reference area (March 26, 2004 - March 23, 2005).

Small Birds

Spring		Summer		Fall		Winter	
Species/Group	% freq	Species/Group	% freq	Species/Group	% freq	Species/Group	% freq
				Vaux's swift	1.92		
				vesper sparrow	1.92		
				yellow-rumped warbler	1.92		

A-4. Flight height characteristics by avian group during fixed-point surveys in the Reference area.

Group	# Birds Flying	# Groups Flying	% Birds Flying	Collision Risk Height (25-136m AGL) below	within	above
Waterbirds/Waterfowl	417	7	93.71	21.10	61.39	17.51
Shorebirds	0	0	0.00	N/A	N/A	N/A
Raptors	99	92	96.12	38.38	56.57	5.05
Accipiters	1	1	100.00	100.00	0.00	0.00
Buteos	68	66	95.77	22.06	70.59	7.35
Northern Harriers	9	9	100.00	66.67	33.33	0.00
Falcons	17	14	94.44	88.24	11.76	0.00
Turkey Vultures	4	2	100.00	25.00	75.00	0.00
Passerines	2154	342	66.32	74.84	25.07	0.09
Upland Gamebirds	45	9	41.67	100.00	0.00	0.00
Doves	26	5	100.00	0.00	100.00	0.00
Other Birds	4	2	80.00	25.00	75.00	0.00
Overall	2745	457	69.71	64.99	32.09	2.91

A-5. Flight height characteristics by species observed during fixed-point surveys in the Reference area.

Species/Group	# Birds Flying	# Groups Flying	% Birds Flying	Collision Risk Height (25-136 m AGL) Below	Within	Above
rock pigeon	26	5	100.00	0.00	100.00	0.00
Vaux's swift	3	1	100.00	0.00	100.00	0.00
rough-legged hawk	24	23	96.00	8.33	91.67	0.00
lapland longspur	22	2	64.71	22.73	77.27	0.00
turkey vulture	4	2	100.00	25.00	75.00	0.00
Canada goose	343	5	100.00	25.36	74.64	0.00
European starling	503	19	74.85	29.22	70.78	0.00
cliff swallow	16	3	100.00	37.50	62.50	0.00
red-tailed hawk	34	34	100.00	35.29	61.76	2.94
Swainson's hawk	7	6	77.78	0.00	57.14	42.86
Brewer's blackbird	18	8	24.32	44.44	55.56	0.00
common raven	46	29	63.89	36.96	58.70	4.35
northern rough-winged	13	2	100.00	53.85	46.15	0.00
red-winged blackbird	90	9	28.85	56.67	43.33	0.00
unidentified passerine	33	8	86.84	57.58	42.42	0.00
northern harrier	9	9	100.00	66.67	33.33	0.00
prairie falcon	3	3	100.00	66.67	33.33	0.00
unidentified buteo	3	3	100.00	33.33	33.33	33.33
barn swallow	38	11	100.00	86.84	13.16	0.00
American kestrel	14	11	93.33	92.86	7.14	0.00
mourning dove	49	17	75.38	93.88	6.12	0.00
horned lark	958	141	77.51	94.68	5.32	0.00
Say's phoebe	19	15	65.52	94.74	5.26	0.00
American pipit	158	8	95.18	99.37	0.63	0.00
sandhill crane	73	1	100.00	0.00	0.00	100.00
western meadowlark	64	25	23.79	100.00	0.00	0.00
white-crowned sparrow	28	4	68.29	100.00	0.00	0.00
ring-necked pheasant	25	6	67.57	100.00	0.00	0.00
dark-eyed junco	20	3	100.00	100.00	0.00	0.00
California quail	18	2	52.94	100.00	0.00	0.00
house finch	18	4	81.82	100.00	0.00	0.00
brown-headed cowbird	8	2	100.00	100.00	0.00	0.00
loggerhead shrike	8	7	100.00	100.00	0.00	0.00
song sparrow	8	4	22.22	100.00	0.00	0.00
yellow-rumped warbler	8	1	100.00	100.00	0.00	0.00
savannah sparrow	7	3	63.64	100.00	0.00	0.00
American goldfinch	4	2	57.14	100.00	0.00	0.00
unidentified sparrow	4	2	100.00	100.00	0.00	0.00
western kingbird	4	3	100.00	100.00	0.00	0.00
Chukar	2	1	5.41	100.00	0.00	0.00

A-5. Flight height characteristics by species observed during fixed-point surveys in the Reference area.

Species/Group	# Birds Flying	# Groups Flying	% Birds Flying	Collision Risk Height (25-136 m AGL)		
				Below	Within	Above
northern shrike	2	2	100.00	100.00	0.00	0.00
spotted towhee	2	2	50.00	100.00	0.00	0.00
vesper sparrow	2	2	100.00	100.00	0.00	0.00
American robin	1	1	10.00	100.00	0.00	0.00
golden-crowned kinglet	1	1	100.00	100.00	0.00	0.00
hooded merganser	1	1	50.00	100.00	0.00	0.00
Lincoln's sparrow	1	1	100.00	100.00	0.00	0.00
northern flicker	1	1	50.00	100.00	0.00	0.00
sharp-shinned hawk	1	1	100.00	100.00	0.00	0.00
varied thrush	1	1	100.00	100.00	0.00	0.00
American wigeon	0	0	0.00	N/A	N/A	N/A
black-billed magpie	0	0	0.00	N/A	N/A	N/A
golden-crowned sparrow	0	0	0.00	N/A	N/A	N/A
grasshopper sparrow	0	0	0.00	N/A	N/A	N/A
great blue heron	0	0	0.00	N/A	N/A	N/A
green-winged teal	0	0	0.00	N/A	N/A	N/A
Killdeer	0	0	0.00	N/A	N/A	N/A
Mallard	0	0	0.00	N/A	N/A	N/A
orange-crowned warbler	0	0	0.00	N/A	N/A	N/A
red-breasted nuthatch	0	0	0.00	N/A	N/A	N/A
rock wren	0	0	0.00	N/A	N/A	N/A
rusty blackbird	0	0	0.00	N/A	N/A	N/A
Overall	2745	457	69.71	64.99	32.09	2.91

A-6. Mean exposure indices calculated by species observed during fixed-point surveys in the Reference area.

Species/Group	Overall Mean Use	% Flying	% Flying within RSA	Exposure Index
European starling	2.684	74.85	70.78	1.422
Canada goose	0.547	100.00	74.64	0.408
horned lark	5.188	77.51	5.32	0.214
red-winged blackbird	1.284	28.85	43.33	0.161
rock pigeon	0.123	100.00	100.00	0.123
common raven	0.294	63.89	58.70	0.110
rough-legged hawk	0.103	96.00	91.67	0.090
red-tailed hawk	0.140	100.00	61.76	0.086
lapland longspur	0.142	64.71	77.27	0.071
unidentified passerine	0.154	86.84	42.42	0.057
Brewer's blackbird	0.291	24.32	55.56	0.039
cliff swallow	0.063	100.00	62.50	0.039
northern rough-winged swallow	0.052	100.00	46.15	0.024
barn swallow	0.157	100.00	13.16	0.021
northern harrier	0.039	100.00	33.33	0.013
mourning dove	0.273	75.38	6.12	0.013
turkey vulture	0.016	100.00	75.00	0.012
Vaux's swift	0.012	100.00	100.00	0.012
Swainson's hawk	0.021	77.78	57.14	0.009
American pipit	0.781	95.18	0.63	0.005
Say's phoebe	0.128	65.52	5.26	0.004
American kestrel	0.061	93.33	7.14	0.004
prairie falcon	0.012	100.00	33.33	0.004
unidentified buteo	0.008	100.00	33.33	0.003
western meadowlark	1.160	23.79	0.00	0.000
sandhill crane	0.281	100.00	0.00	0.000
white-crowned sparrow	0.176	68.29	0.00	0.000
song sparrow	0.153	22.22	0.00	0.000
chukar	0.152	5.41	0.00	0.000
ring-necked pheasant	0.150	67.57	0.00	0.000
California quail	0.145	52.94	0.00	0.000
house finch	0.091	81.82	0.00	0.000
dark-eyed junco	0.082	100.00	0.00	0.000
savannah sparrow	0.044	63.64	0.00	0.000
American robin	0.042	10.00	0.00	0.000
brown-headed cowbird	0.033	100.00	0.00	0.000
loggerhead shrike	0.032	100.00	0.00	0.000
yellow-rumped warbler	0.031	100.00	0.00	0.000
American goldfinch	0.028	57.14	0.00	0.000
spotted towhee	0.017	50.00	0.00	0.000

A-6. Mean exposure indices calculated by species observed during fixed-point surveys in the Reference area.

Species/Group	Overall Mean Use	% Flying	% Flying within RSA	Exposure Index
western kingbird	0.016	100.00	0.00	0.000
unidentified sparrow	0.015	100.00	0.00	0.000
vesper sparrow	0.008	100.00	0.00	0.000
northern shrike	0.008	100.00	0.00	0.000
northern flicker	0.008	50.00	0.00	0.000
hooded merganser	0.008	50.00	0.00	0.000
sharp-shinned hawk	0.004	100.00	0.00	0.000
varied thrush	0.004	100.00	0.00	0.000
Lincoln's sparrow	0.004	100.00	0.00	0.000
golden-crowned kinglet	0.004	100.00	0.00	0.000
mallard	0.102	0.00	N/A	N/A
rusty blackbird	0.044	0.00	N/A	N/A
grasshopper sparrow	0.029	0.00	N/A	N/A
killdeer	0.013	0.00	N/A	N/A
rock wren	0.008	0.00	N/A	N/A
green-winged teal	0.004	0.00	N/A	N/A
great blue heron	0.004	0.00	N/A	N/A
black-billed magpie	0.004	0.00	N/A	N/A
American wigeon	0.004	0.00	N/A	N/A
red-breasted nuthatch	0.004	0.00	N/A	N/A
orange-crowned warbler	0.004	0.00	N/A	N/A
golden-crowned sparrow	0.004	0.00	N/A	N/A

ATTACHMENT P-3

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

August 26, 2005

Wallace P. Erickson
Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, WY 82001

Dear Mr. Erickson:

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 Orion Energy Wind Farm Project in Sherman County.

Thirty (30) records were noted within a five-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
Conservation Information Assistant

encl.: invoice (H-082605-CWA3)
computer printout and data key

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

Invoice Number: H-082605-CWA3
Index: RNR105

INVOICE

TO: Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, WY 82001

ATTN: Accounts Payable

DATE: August 26, 2005

RE: Data system search for rare, threatened and endangered plants and animals in the vicinity of the Orion Energy Wind Farm Project in Sherman County. Requested by Wallace P. Erickson.

For services and products:

Computer records (30 @ $0.50/record)	$ 15.00
Computer fee (flat rate)	$ 40.00
Staff time (0.75 hours @ $75.00/hour)	$ 56.25
TOTAL DUE:	**$ 111.25**

Please make checks payable to: **Oregon Natural Heritage Information Center**

Please include invoice number at top of page with payment.

Terms: **Net 30**

Scientific Name: ***Bufo boreas***
Common Name: **Western toad**
Federal 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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Gilliam	CB	Point [Areal - Estimated (400 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
001N019E	11		45120-E4	McDonald	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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (1500 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
001N017E	16		45120-E6	Wasco	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:

Scientific Name: ***Falco peregrinus anatum***
Common Name: **American peregrine falcon**
Federal Status: GRANK: G4T3 NHP List: 2 Category: Vertebrate Animal
State Status: LE SRANK: S2B HP Track: Y ELCODE: ABNKD06071
EO ID: 25906 First Obs: 1998 Last Obs: 2003 Confirmed:
Directions: Sensitive Data - contact ORNHIC for more information

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N018E	27		45120-F5	Quinton	1707010112 - MIDDLE COLUMBIA-LAKE WALL

Owner Name/Type:
Owner Comments: Private
Managed Area Name:

EO Type: Minimum Elev.(m): Annual Observations
EO Data: Documented nesting site. See 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: G4T3 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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N017E	32		45120-F6	Rufus	1707010508 - 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: G4T3 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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Gilliam	CB	Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N019E	03		45120-F4	Sundale NW	1707010110 - 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, 2 young

EO Comments:
Protection:
Management:
General: Site OE-88

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N016E	17		45120-F7	Biggs Junction	1707010508 - 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: 21864 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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (1500 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N019E	32		45120-E4	McDonald	1707020401 - LOWER JOHN DAY

Owner Name/Type	Owner Comments	Managed Area Name
FEDERAL		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 GRANK: G5T2Q NHP List: 1 Category: Vertebrate Animal
State Status: SV SRANK: S2 HP Track: Y ELCODE: AFCHA02133
EO ID: 948 First Obs: Last Obs: 1996-PRE Confirmed:
Directions: COLUMBIA RIVER & TRIBUTARIES

County Name	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Gilliam		Data currently not available.
Hood River		
Morrow		
Sherman		
Umatilla		
Wasco		

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			45118-H8	Juniper Canyon	17070101 - Middle Columbia-Lake Wallula
			45119-G6	Boardman	17070105 - Middle Columbia-Hood
			45119-G7	Crow Butte	17070204 - Lower John Day
			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	

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: 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	Watershed
			45120-F7	Biggs Junction	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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman		Data currently not available.

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			45120-C6	Rosebush	17070204 - Lower John Day
			45120-D6	Moro	
			45120-E4	McDonald	
			45120-E5	Klondike	
			45120-E6	Wasco	

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: 7681 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: FULTON CANYON AND TRIBUTARIES

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			45120-E7	Locust Grove	1707010508 - SPANISH HOLLOW CREEK
			45120-F7	Biggs Junction	
			45120-F8	Wishram	

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: 12936 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: JOHN DAY RIVER

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			44119-G6	Kimberly	17070204 - Lower John Day
			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	

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: 16333 First Obs: Last Obs: 1999-PRE Confirmed:
Directions: ROCK CREEK

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
			45120-D1	Wolf Hollow Falls	17070204 - Lower John Day
			45120-D2	Mikkalo	
			45120-E2	Shutler Flat	
			45120-E3	Turner Butte	
			45120-E4	McDonald	

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 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: ***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 (8050 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: ***Chrysemys picta***
Common Name: **Painted turtle**
Federal Status: GRANK: G5 NHP List: 2 Category: Vertebrate Animal
State Status: SC SRANK: S2 HP Track: Y 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 | Ecoregion | Source Feature [Uncertainty Type (Distance)]
Sherman | CB | Point [Areal - Estimated (1500 m)]

Town-Range | Sec | Note | QuadCode | QuadName | Watershed
002N016E | 21 | | 45120-F7 | Biggs Junction | 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: GRANK: G1G2 NHP List: 1 Category: Invertebrate Animal
State Status: SRANK: S1S2 HP Track: Y ELCODE: IMGAS93030
EO ID: 26135 First Obs: Last Obs: Confirmed:
Directions: Spring approx. 1mi SW of Rufus.

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N016E	02		45120-F7	Biggs Junction	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: GRANK: G2Q NHP List: 1 Category: Invertebrate Animal
State Status: SRANK: S1 HP Track: Y ELCODE: IMGASB5520
EO ID: 4636 First Obs: 198? Last Obs: 198? Confirmed:
Directions: QUARRY - GRAVEL PIT NEAR RUFUS

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N017E	06		45120-F6	Rufus	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: ***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: 20507 First Obs: Last Obs: Confirmed:
Directions: UNNAMED SIDE SPRING IN SCOTT CANYON SOUTH OF RUFUS.

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N017E	05		45120-F6	Rufus	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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (50 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N017E	35		45120-F6	Rufus	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.

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N018E	32		45120-F5	Quinton	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: 4381 | First Obs: 1888-06 | 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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Sherman	CB	Point [Areal - Estimated (400 m)]

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002N016E	02		45120-F7	Biggs Junction	1707010508 - SPANISH HOLLOW CREEK
002N016E	01				

Owner Name/Type | Owner Comments | Managed Area Name

EO Type: | Minimum Elev.(m): 61 | Annual Observations
EO Data:
EO Comments: GRASSLAND FORMATION. DRY SAND & GRAVEL ALONG THE RIVER; FULLSUN; 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, 6-1888, ORE-88014. 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: 1925 | Last Obs: 1932-04-24 | Confirmed:
Directions: MOUTH OF THE JOHN DAY. SHERMAN COUNTY.

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N017E	23		45120-F6	Rufus	1707020401 - LOWER JOHN DAY

Owner Name/Type | Owner Comments | Managed Area Name

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). ANNOTATED BY S. SUNDBERG 2-82.
EO Comments: SAND ON GRAVEL
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	Ecoregion	Source Feature [Uncertainty Type (Distance)]
Gilliam	CB	Point [Areal - Estimated (800 m)]

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 jungermannioides***
Common Name: **Hepatic monkeyflower**
Federal Status: GRANK: G2 NHP List: 1 Category: Vascular Plant
State Status: C SRANK: S2 HP Track: Y ELCODE: PDSCR1B1J0
EO ID: 12638 First Obs: 1982 Last Obs: 1982-05-29 Confirmed:
Directions: ABT 3 MI E OF JOHN DAY RIVER, HWY U.S. I-84, W OF MILEPOST 117, S SIDE OF FREEWAY AT ROADSIDE. MAP INCL.

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N018E	18		45120-F5	Quinton	1707010112 - MIDDLE COLUMBIA-LAKE WALL

Owner Name/Type | Owner Comments | Managed Area Name: STATE HIGHWAY MAINTENANCE DIST 9

EO Type: Minimum Elev.(m): 107 Annual Observations
EO Data: ABUNDANT IN SMALL AREA, AT LEAST 100 SMALL TO LARGE CLUMPS. BLOOMING, AT PRIME
EO Comments: N FACING MOIST BASALT CLIFF. WITH MIMULUS GUTTATUS, AQUILEGIA FORMOSA
Protection:
Management:
General: SLIDES OF PLANT & HABITAT. COLLECTION. OTHER SITES NOTED

Scientific Name: ***Mimulus jungermannioides***
Common Name: **Hepatic monkeyflower**
Federal Status: GRANK: G2 NHP List: 1 Category: Vascular Plant
State Status: C SRANK: S2 HP Track: Y ELCODE: PDSCR1B1J0
EO ID: 14602 First Obs: 1982 Last Obs: 1986-04-28 Confirmed:
Directions: JOHN DAY DAM, OFF OF I-84 GOING E AT EXIT TO PARKING AREA

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N017E	28		45120-F6	Rufus	1707010112 - MIDDLE COLUMBIA-LAKE WALL 1707010508 - SPANISH HOLLOW CREEK

Owner Name/Type | Owner Comments | Managed Area Name: STATE HIGHWAY MAINTENANCE DIST 9

EO Type: Minimum Elev.(m): 85 Annual Observations
EO Data: LOCALLY ABUNDANT & HEALTHY. A FEW IN BLOOM NEAR TOP OF CLIFF. LOWER 1/2 OF CLIFF HAD BEEN SHEARED TO MAKE ROOM FOR THE EXIT. AREA THEN SEEDED FROM ABOVE
EO Comments: GROWING ON N-FACING CLIFF, MOIST
Protection:
Management:
General: FIRST SEEN IN 1982 BY LOIS KEMP

Scientific Name: ***Mimulus jungermannioides***
Common Name: **Hepatic monkeyflower**
Federal Status: GRANK: G2 NHP List: 1 Category: Vascular Plant
State Status: C SRANK: S2 HP Track: Y ELCODE: PDSCR1B1J0
EO ID: 17672 First Obs: 1989 Last Obs: 1990-05-30 Confirmed:
Directions: ABOUT 1 MI E OF RUFUS. ADJACENT TO THE ROAD TO THE JOHN DAY DAM'S VISITOR CENTER

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N017E	32		45120-F6	Rufus	1707010508 - SPANISH HOLLOW CREEK

Owner Name/Type	Owner Comments	Managed Area Name
JOHN DAY DAM PROJECT	ARMY CORPS OF ENGINEERS	JOHN DAY DAM

EO Type: Minimum Elev.(m): 61 Annual Observations
EO Data: IN FLOWER
EO Comments: VERTICAL BASALT CLIFF FACE. N-FACING.
Protection:
Management:
General: 1990 ONHDB FIELD SURVEY, KAGAN, JIMMY

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		

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
002S019E	22		45120-D3	Devils Backbone	1707020402 - LOWER JOHN DAY
002S018E	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	15				
001S019E	17				
001S018E	14				
001S019E	18				
001S020E	18				
001S019E	11				
001S019E	08				
001S018E	11				
001S019E	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	25
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 (1500 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:

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

Town-Range	Sec	Note	QuadCode	QuadName	Watershed
003N018E	27		45120-F5	Quinton	1707010112 - MIDDLE COLUMBIA-LAKE WALL
003N018E	21				1707020401 - LOWER JOHN DAY
003N018E	22				

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:

30 records total

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-4

USFWS Listed Species

U.S. Fish and Wildlife Service
Oregon State Office
2600 SE 98th Avenue, Suite 100
Portland, OR 97266

Office phone:(503) 231-6179
FAX Number:(503) 231-6195

Date:
Time:

FAX Transmittal

To:
FAX Number:

From: USFWS Oregon Fish & Wildlife Office

Distribution

☐ Urgent - Hand Carry
☐ Call Recipient at #_____
☐ Usual Routing

Subject:

Number of pages (including transmittal sheet):

Comments:

Enclosure A

FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, CANDIDATE SPECIES AND SPECIES OF CONCERN THAT MAY OCCUR IN SHERMAN COUNTY

LISTED SPECIES[1/]

Birds		
Bald eagle[2/]	*Haliaeetus leucocephalus*	T
Fish		
Steelhead (Middle Columbia River)[3/]	*Oncorhynchus mykiss*	**T
Steelhead (Snake River Basin)[4/]	*Oncorhynchus mykiss*	** T
Steelhead (Upper Columbia River)[4/]	*Oncorhynchus mykiss*	** E
Sockeye salmon Salmon River tributary to the Snake River, Idaho.	*Oncorhynchus nerka*	CH **E
Chinook salmon Snake River spring/summer runs	*Oncorhynchus tshawytscha*	CH **T
Chinook salmon Snake River fall runs	*Oncorhynchus tshawytscha*	CH **T
Chinook salmon (Upper Columbia River)[5/]	*Oncorhynchus tshawytscha*	** E

PROPOSED SPECIES

None

CANDIDATE SPECIES[6/]

Birds	
Yellow-billed cuckoo[7/]	*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 trailli adastus*
Yellow-breasted chat	*Icteria virens*
Lewis' woodpecker	*Melanerpes lewis*
Mountain quail	*Oreortyx pictus*

Amphibians and Reptiles	
Northern sagebrush lizard	*Sceloporus graciosus graciosus*
Fish	
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*

(E) - Listed Endangered *(T) - Listed Threatened* *(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered *(PT) - Proposed Threatened* *(PCH) - Critical Habitat has been proposed for this species*
(S) - Suspected *(D) - Documented*

Species of Concern - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

** *Consultation with National Marine Fisheries Service may be required.*

1/ *U. S. Department of Interior, Fish and Wildlife Service, October 31, 2000, 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. 64, No. 57, March 25, 1999, Final Rule - Middle Columbia and Upper Willamette River Steelhead*
4/ *Federal Register Vol. 62, No. 159, August 18, 1997, Final Rule-Upper Columbia and Snake River Steelhead*
5/ *Federal Register Vol. 64, No. 56, March 24, 1999, Final Rule - West Coast Chinook Salmon*
6/ *Federal Register Vol. 69, No. 86, May 4, 2004, Notice of Review - Candidate or Proposed Animals and Plants*
7/ *Federal Register Vol. 66, No. 143, July 25, 2001, 12-Month Finding for a Petition To List the Yellow-billed Cuckoo*

ATTACHMENT P-5

Ground Squirrel Report

Ground Squirrel Report – Sherman County

Location Description:

Orion Biglow Canyon Wind Project Reference Area
UTM Coordinates: 0693645 5042436 NAD27 CONUS
Near Anenometer MFT3706
SW Sec.1, S of Baseline Rd, off of Starvation Ln.

Jay Jeffrey documented ground squirrels in the reference area near met tower MFT3706 and avian use station P. He visited the site several times to get visuals and pictures of the squirrels. We then asked Karen Kronner of NW Consultants Inc. to visit the site with Jay. Both Jay and Karen are familiar with Washington ground squirrels through work at the Stateline Wind Project at other regional projects. Karen and Jay visited the site near MFT3706 the week of May 15th where the ground squirrel colony in question exists. They were able to view different individuals with binoculars and occasionally get decent looks. Belding's ground squirrels are dissimilar from these species, being larger in body size, having larger ears projecting above the head, burrows with excavation piled next to entrance, and having a multiple-note trill alarm call. Karen said her overall experience with Belding's was limited, but tended to agree with these dissimilarities. Jay has been around other projects where Belding's are common and these characteristics have always seemed apparent.

However, difficulty arises in distinguishing between non-Belding species due to the nature of subtle physical characteristics that are quite similar (especially to a non-specialist of these species). Possible species include the Washington ground squirrel (not known to occur west of the John Day River), Townsend's ground squirrel (not known to occur in Oregon, north of Columbia River only), and the Merriam's ground squirrel (known to occur in adjacent Wasco County). All three species have similar habits and alarm calls.

Based upon distribution records and boundaries noted above, it's plausible that Merriam's are more likely to occur in Sherman County because of the lack of a significant geographic barrier, such as a large river system. One physical trait of Merriam's that Karen and I (Jay) could not confirm is having a rusty colored nose, although one subspecies of Merriam's (*Spermophilus canus canus*) evidently lacks or has only traces of rust on the nose.

Washington ground squirrels have conspicuous light spots on their back, Karen and I both could not confirm this, we both could only see flecks or speckles similar to Townsend's and Merriam's. Karen and I agreed the squirrels were likely Merriam's ground squirrels. Karen took photographs of the squirrels with a 400 mm lens (e.g., see attachment A). We recommended to have ODFW visit the site, or have an expert on ground squirrels consulted. Due to landowner concerns and access issues, the latter was chosen, and Dr. Eric Yensen (professor at Albertson College, ID) was consulted and the photographs were sent to him. He reviewed the photographs (May 20th) and confirmed

these squirrels were definitely Merriam's and not Washington's. Last year Dr. Yensen was working on a paper regarding conservation status and distribution of ground squirrels and this location account of Merriam's ground squirrels will likely be a range extension for this species. We mentioned to him that we would probably submit a species range extension/county record note somewhere after finalizing our annual report and conferring with the developer and ODFW.

Because the squirrels were located in the reference area, they were not mentioned in the NOI.

Attachment A
Photographs of habitat and Merriam's ground squirrels located near Station P in the Biglow Canyon Wind Project Reference area.

ATTACHMENT P-6

Biglow Canyon Turbine Micro-Siting Report

Biglow Canyon Turbine Micrositing

Draft, WEST Inc., September 2005

Early drafts of the Biglow Canyon Project Facility Layout were prepared using detailed topographic maps and the results of on-site wind measurements. Through subsequent discussions with Orion Energy and WEST, several areas were identified that either contained or were near native habitat or were otherwise orientated and located in a potential higher risk area for birds, especially raptor, flight paths. The methods employed for micro-siting turbines at this site used site-specific information on topography, habitat, and bird use and behavior (flight paths), and more importantly, extensive literature and knowledge on how birds utilize topography and habitat in general. This document provides details about the general turbine orientations as they related to bird movements, and the modifications that were made to the project layouts to minimize and avoid potential impacts to birds and higher quality habitat. Slope calculations were used in our assessment (see Appendix A). Slopes were calculated from 30-m digital elevation model (DEM) data. The slope was calculated for the last 100 m of the turbine corridor as well as the next 100 m away from the end of the turbine corridor to illustrate changes in topography.

Initial Project Layout

For the initial turbine layout, an approximately 500-ft wide corridor was developed that will eventually accommodate a number of wind machines. The position of these corridors was determined by designing hypothetical layouts for two sizes of machine, using conventional spacing parameters and seeking to optimize energy production. In simple terms this was accomplished by placing machines along ridges running perpendicular to the wind while maintaining a fairly large distance between corridors. The wind resource, in terms of wind direction, is highly concentrated in the westerly direction, so the corridors are oriented roughly north-south (see wind rose, Figure 1).

Siting Turbines Away from Columbia River and John Day River

The project area is generally bounded on the north by the Columbia River and on the east by the John Day River. A pair of major constraints, adopted early in the design process, was setback allowances of 3 miles from the centerline of the Columbia River and 1 mile from the centerline of the John Day River. While the distance was relatively arbitrary, this particular design constraint is anticipated to greatly minimize or eliminate the potential for impacts to peregrine falcons, wintering bald eagles, waterfowl, big game, and migrating songbirds and bats.

Avoiding Direct Impacts to Native Habitat

Nearly all turbine corridors closest to the John Day River were shortened and/or moved slightly to eliminate all direct impacts to native habitat in those areas (see Appendix A). In most cases, a minimum of a 250-ft buffer from the end of the turbine corridor and the edge of native habitat exists. Two other turbine corridors were shortened and/or re-orientated to the west to avoid siting turbines and facilities in CRP or grassland (Appendix A-1 and A-6).

Avoiding Potential Flight Corridors of Birds

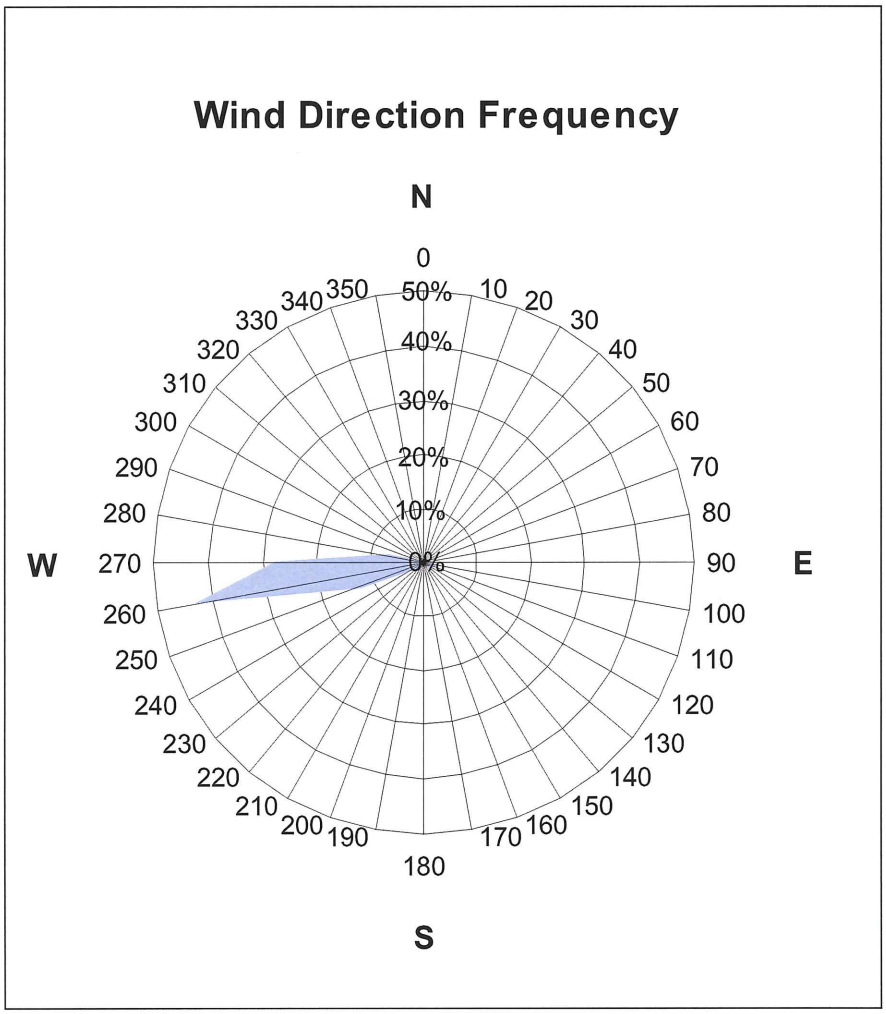
Due to the strong unidirectional westerly winds (Figure 1), and the general orientation of the topography (generally north/south ridgelines and associated canyons), turbine string corridors are sited generally parallel to the most likely bird movement corridors (i.e, the canyons and ridgelines), including the more prominent canyons such as Biglow, Emigrant and Draper Canyons. This corridor siting is likely to reduce collision risk compared to most other ridge and string orientations (Figure 2). In addition to the strings being parallel to the most likely bird movement corridors, turbine strings at this site are usually spaced at least ½ mile apart, and turbine towers are spaced approximately 2 rotor diameters apart, leaving 1 rotor diameter of open space between rotor-swept areas, and additional space below the rotor-swept areas.

One end of a turbine string located between Draper and Emigrant Canyon was eliminated, in part to increase the distance between the end of the string and native habitat, but also to eliminate a distinct change in orientation of the turbine string that was also located within a potential bird movement corridor (head of draw between two ridges, Appendix A-8).

Raptors are known to take advantage of updrafts along ridges, concentrating many of their flight paths on the upwind side of the ridges. Studies at two wind projects have provided some quantification of this behavior, and as a result, preliminary turbine layouts at those projects were modified to avoid or minimize potential bird and wind turbine collision risk. At the Foote Creek Rim Wind Project in Wyoming, raptor use was concentrated off the western side of the mesa rim where turbines were to be sited. Potential turbine locations were modified to allow for a setback away from the rim edge to greatly reduce potential exposure to collision with the turbine blades. A similar result was reported at the Altamont Pass WRA, and siting turbines away from the windward side (prevailing winds) of distinct ridgelines was incorporated into the design of a proposed repowering project at that site. Other projects such as the Stateline Project in Oregon and Washington and the proposed Kittitas Valley Wind Project in Kittitas County Washington used this design guideline to adjust several potential turbine locations away from the west side (windward of prevailing winds) of the ridgeline and more towards the crest or leeward side of the ridgeline. Turbines for this project are sited generally on top of the ridge and not on the windward size (west side) of the ridges.

Turbines located on steep slopes or in canyons have also been associated with higher raptor fatality levels at the APWRA. These turbines are typically at or near the end of turbine strings and are termed an "end row turbine". Turbines for this project are not located on or very near steep slopes or canyons. The siting of turbines away from the John Day River resulted in most potential turbine locations on gentle sloping terrain. In addition, most of the corridors of the turbine strings nearest the John Day were shortened 200 to 500 ft to avoid steep slopes and direct impacts to habitat. None of the ends of the potential turbine corridors are on steep slopes (see Appendix A1-A11). All ends of strings are located on topography with less than or equal to 12% slope.

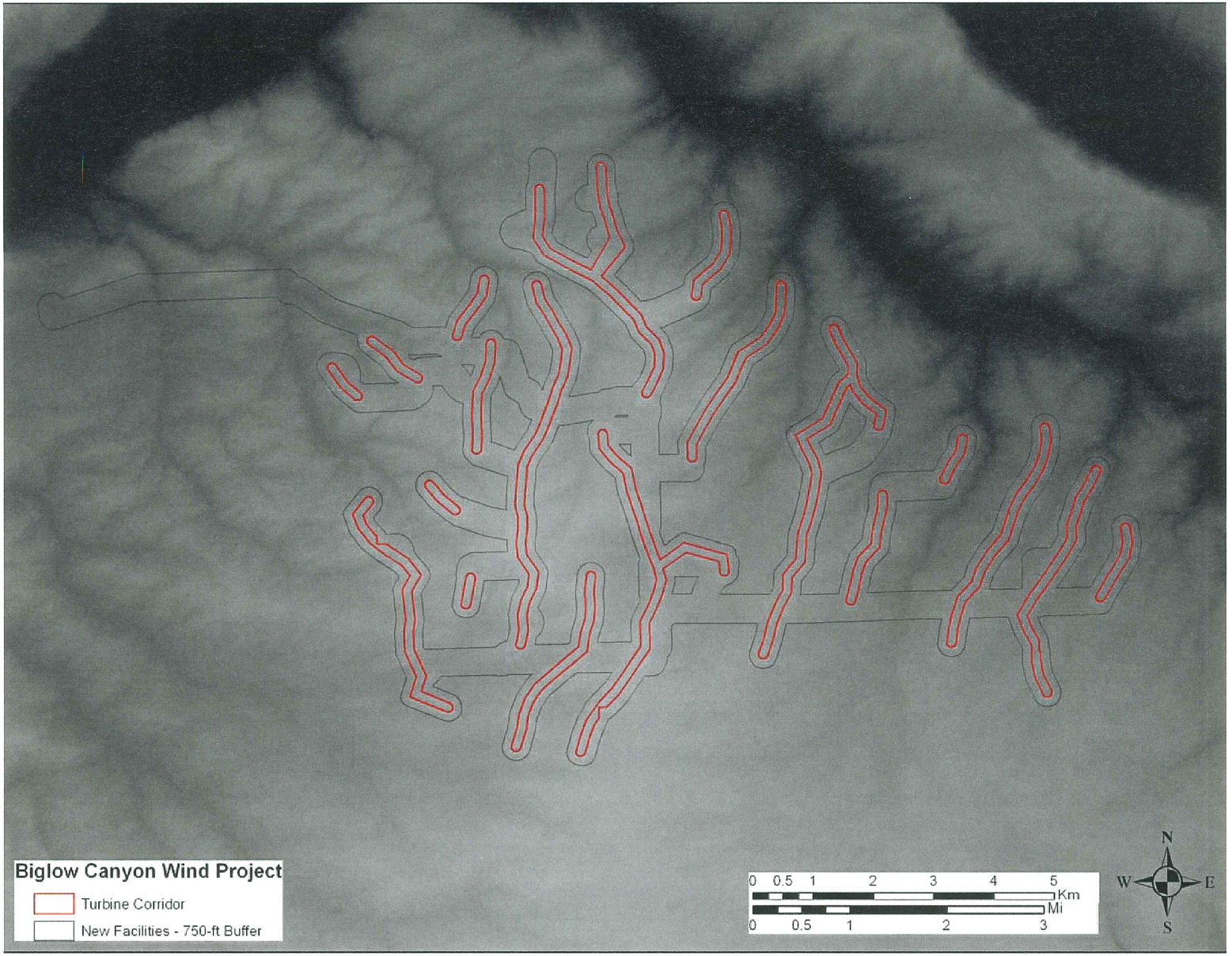
DIRECTION	PERCENT OF ANNUAL TURBINE ENERGY
0	0.01%
10	0.00%
20	0.05%
30	0.13%
40	0.18%
50	0.18%
60	0.18%
70	0.21%
80	0.85%
90	1.33%
100	1.83%
110	1.77%
120	0.49%
130	0.10%
140	0.03%
150	0.01%
160	0.01%
170	0.01%
180	0.00%
190	0.05%
200	0.11%
210	0.18%
220	0.27%
230	0.44%
240	1.83%
250	12.22%
260	41.64%
270	27.34%
280	6.82%
290	1.56%
300	0.13%
310	0.02%
320	0.00%
330	0.00%
340	0.00%
350	0.01%
Grand Total	**100%**



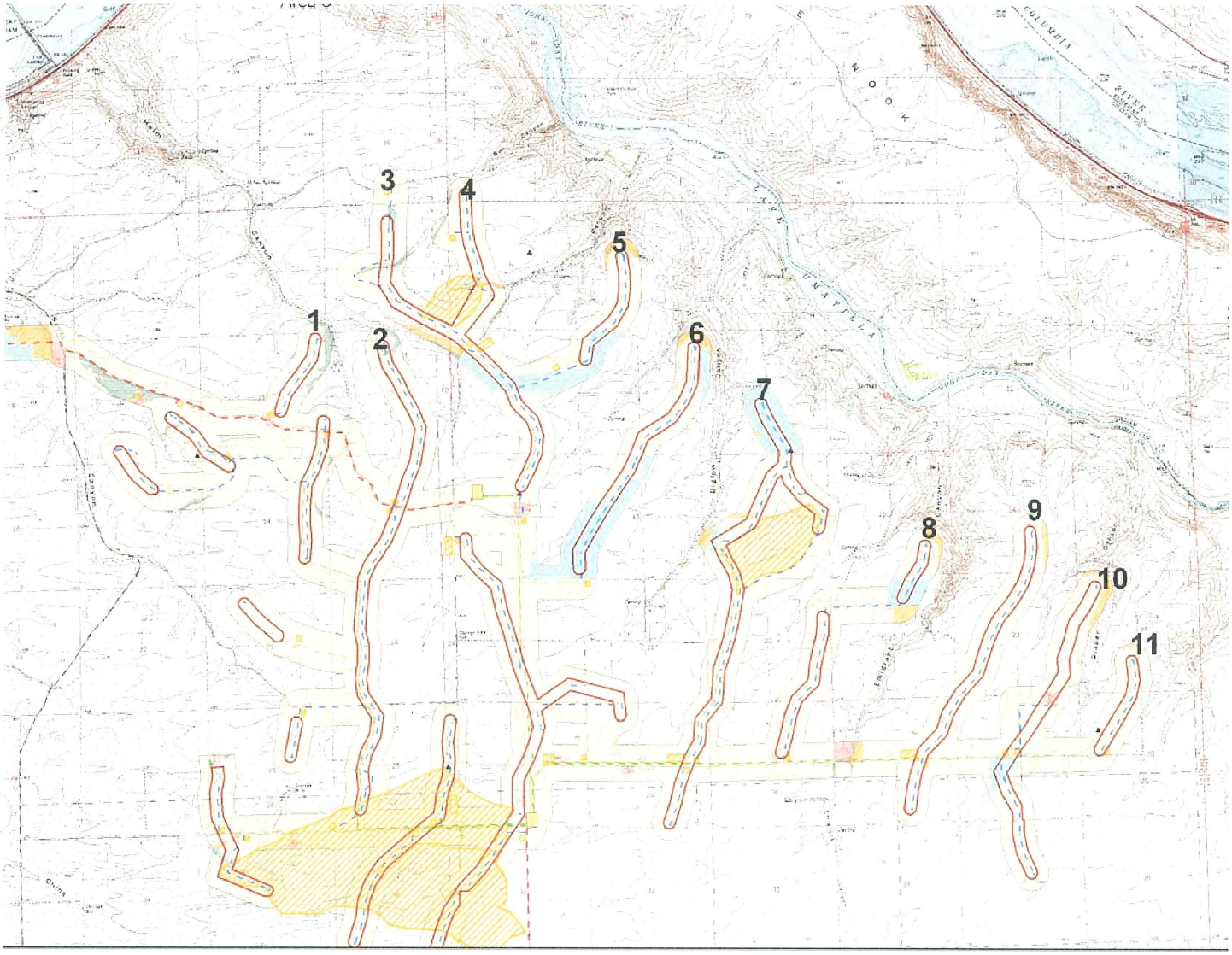
ORION ENERGY LLC

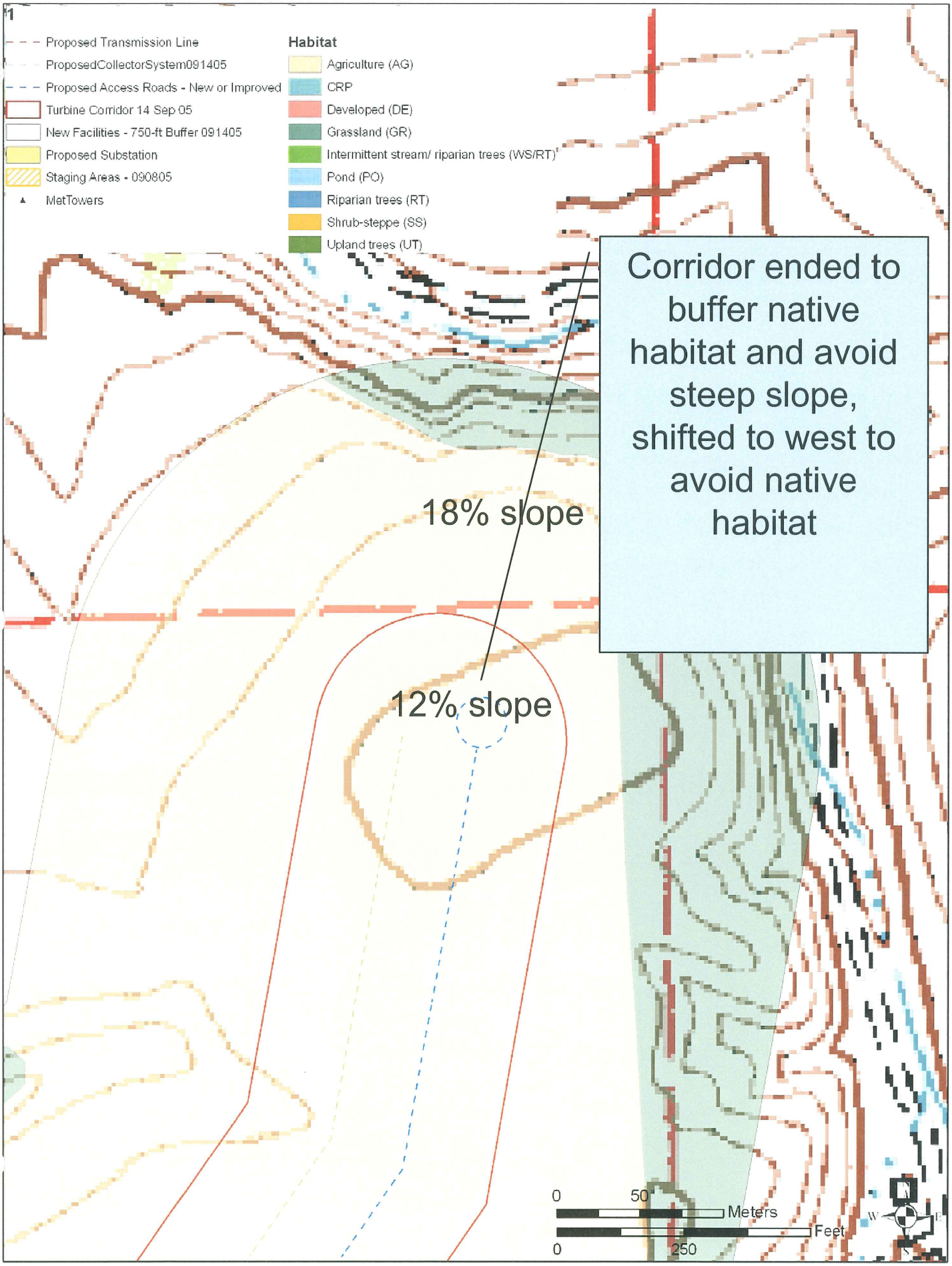
FIGURE
Frequency and Direction of Wind in the Facility Area
BIGLOW CANYON WIND FARM

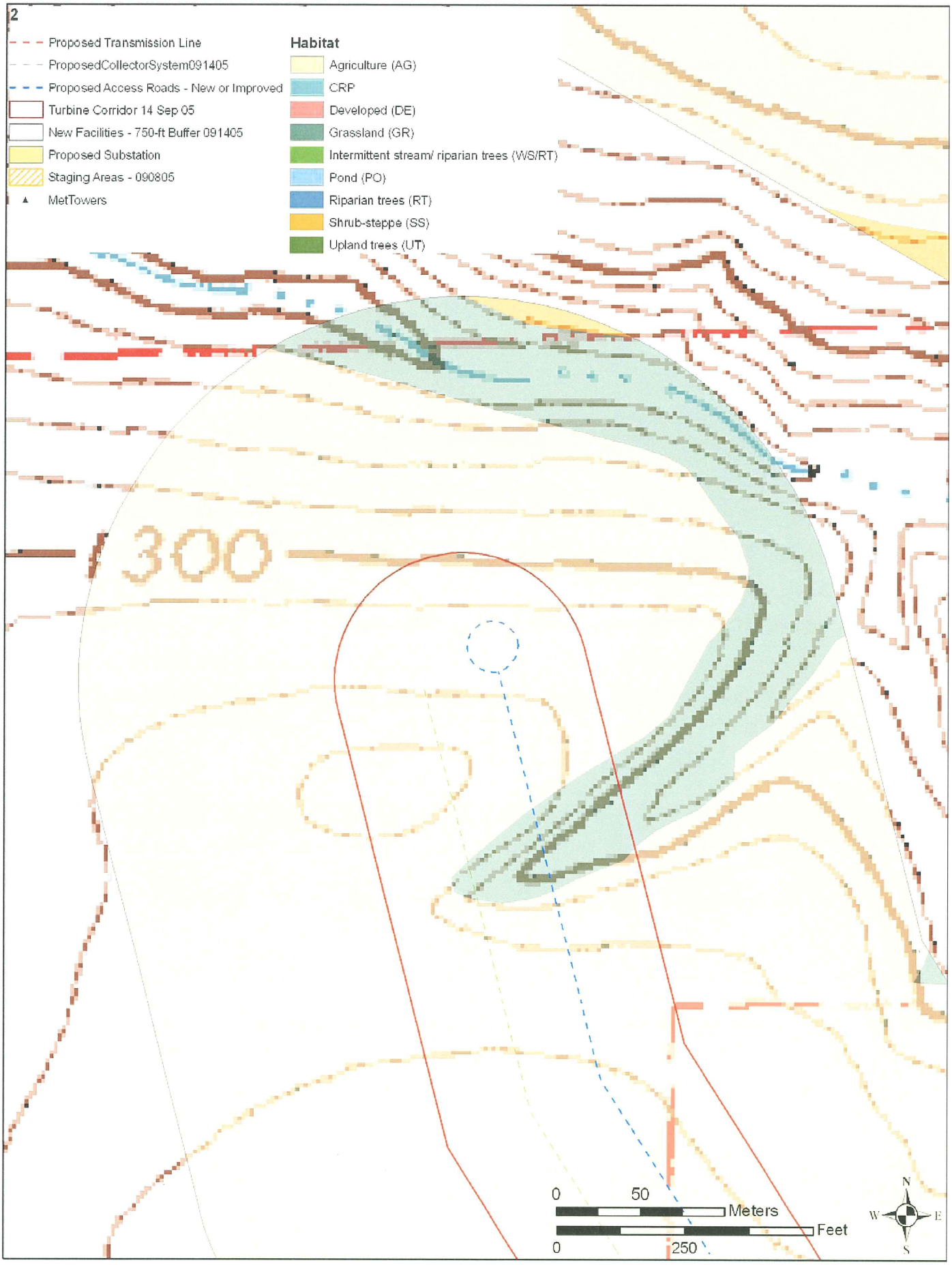
FIGURE 2. Digital Elevation Model for the Project.



APPENDIX A


1
2
3
4
5
6
7
8
9
10
11


Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
Corridor ended to buffer native habitat and avoid steep slope, shifted to west to avoid native habitat
18% slope
12% slope
0
50
Meters
0
250
Feet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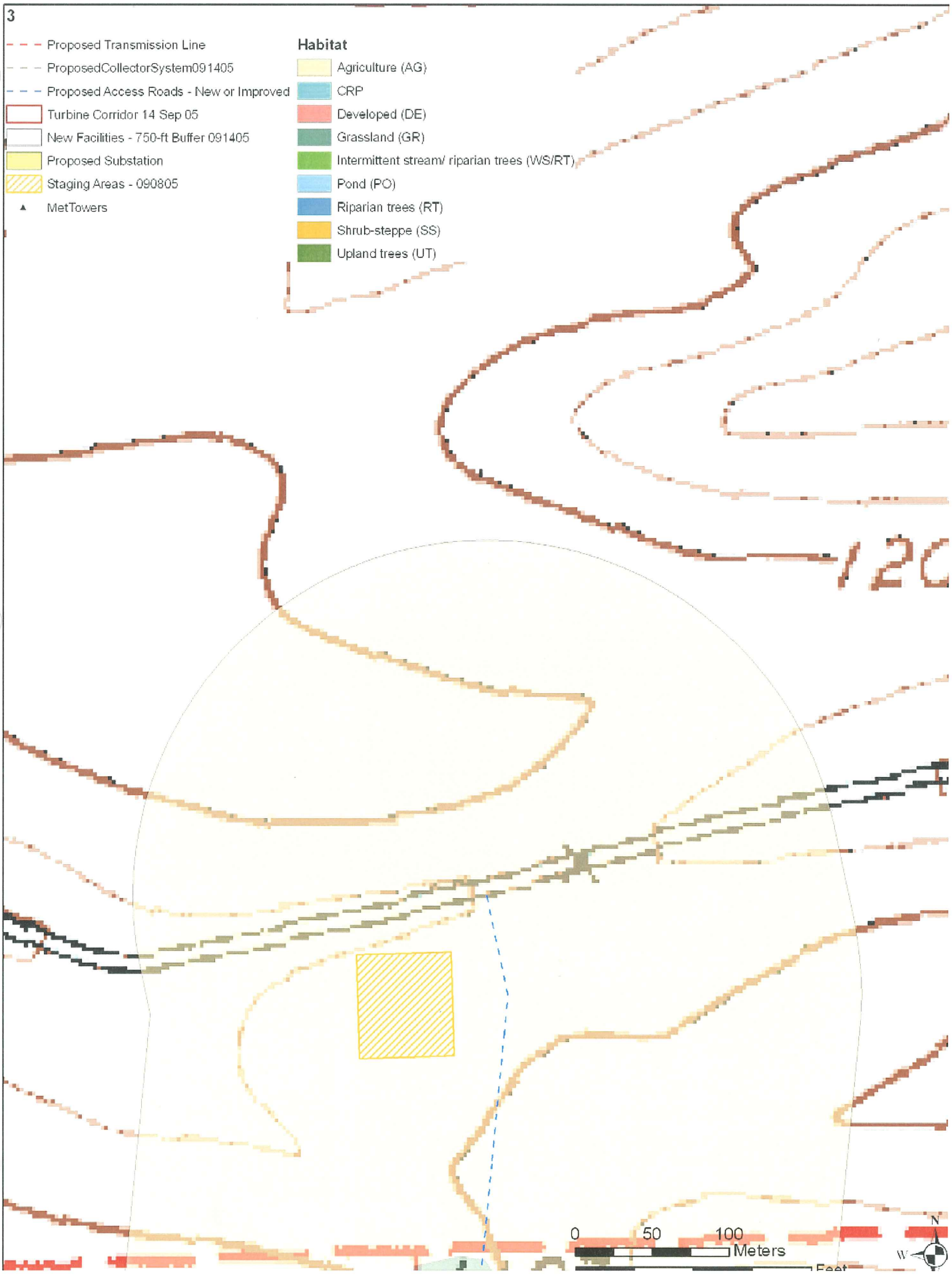
Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
300
0
50
Meters
0
250
Feet
N
W
E
S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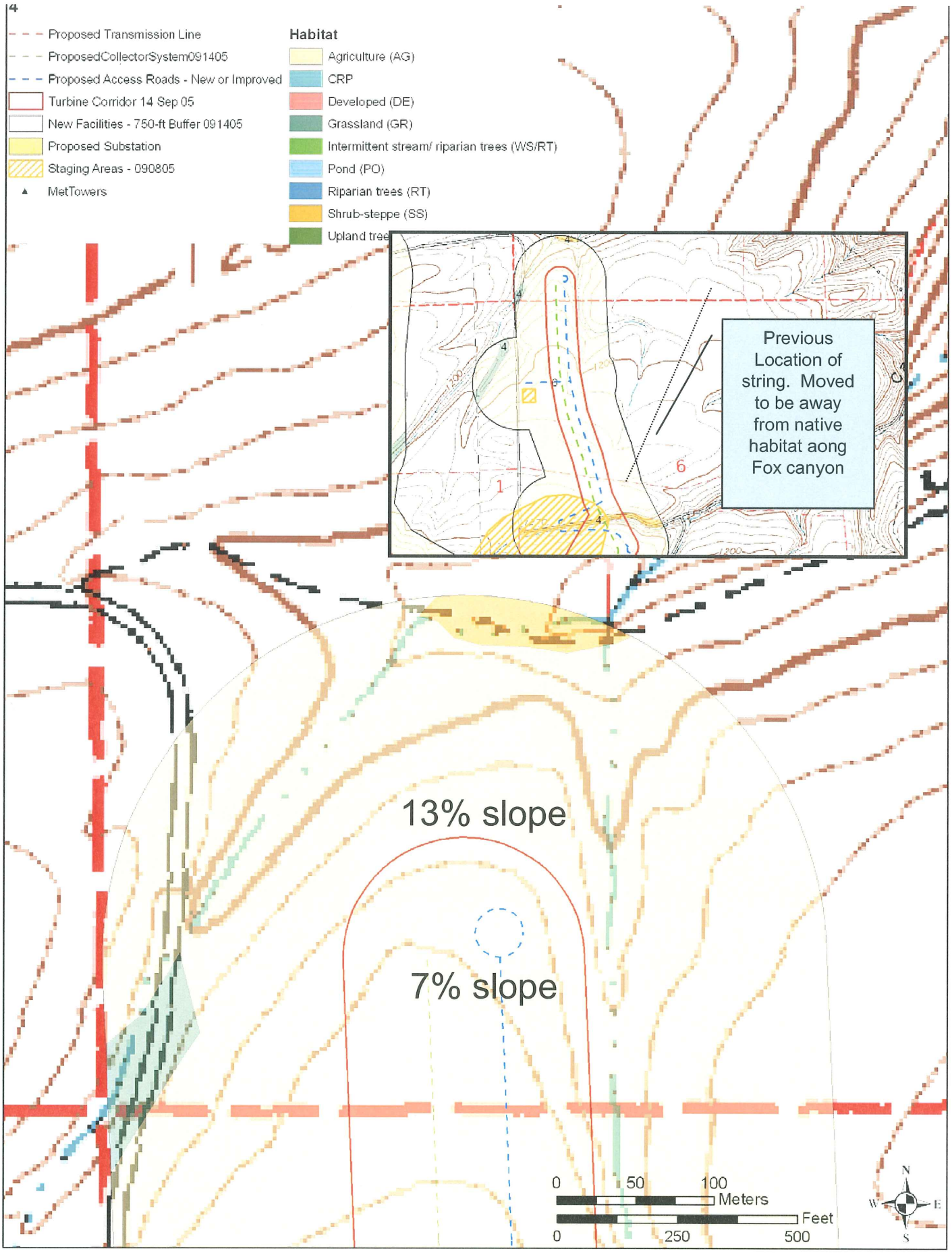
Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
120
0
50
100
Meters
Feet
N
W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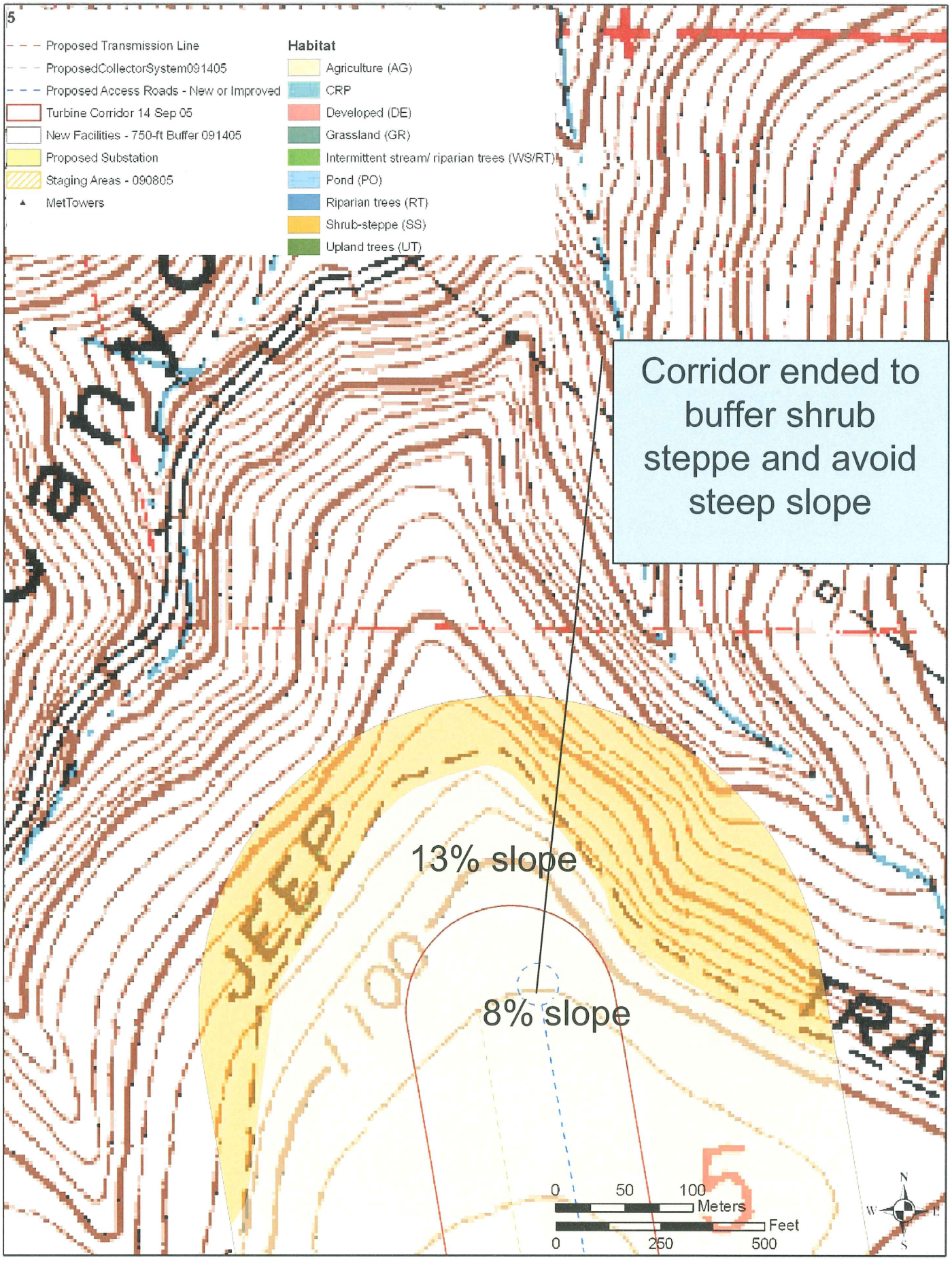
Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland tree
Previous Location of string. Moved to be away from native habitat aong Fox canyon
13% slope
7% slope
0
50
100
Meters
Feet
0
250
500
N
W
E
S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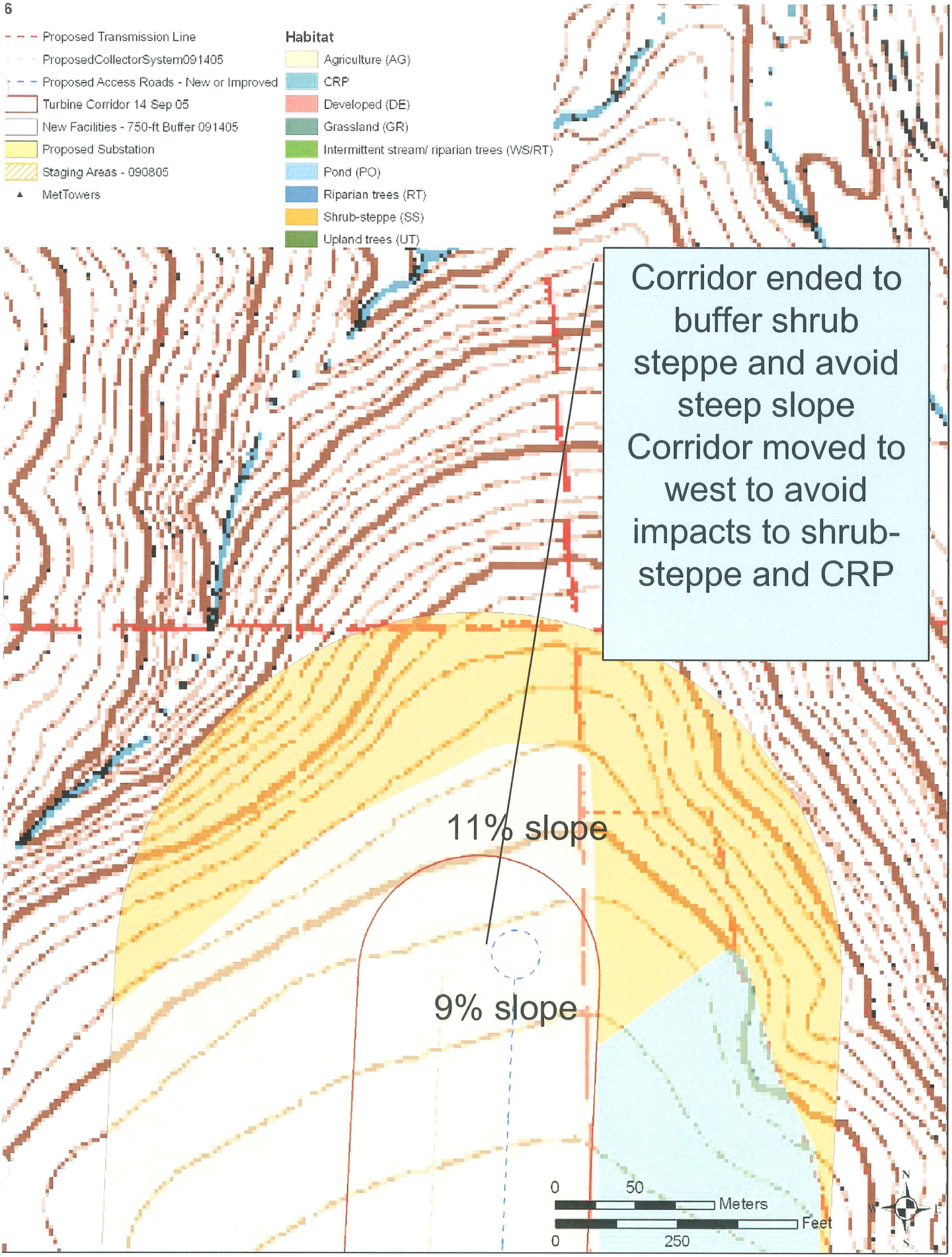
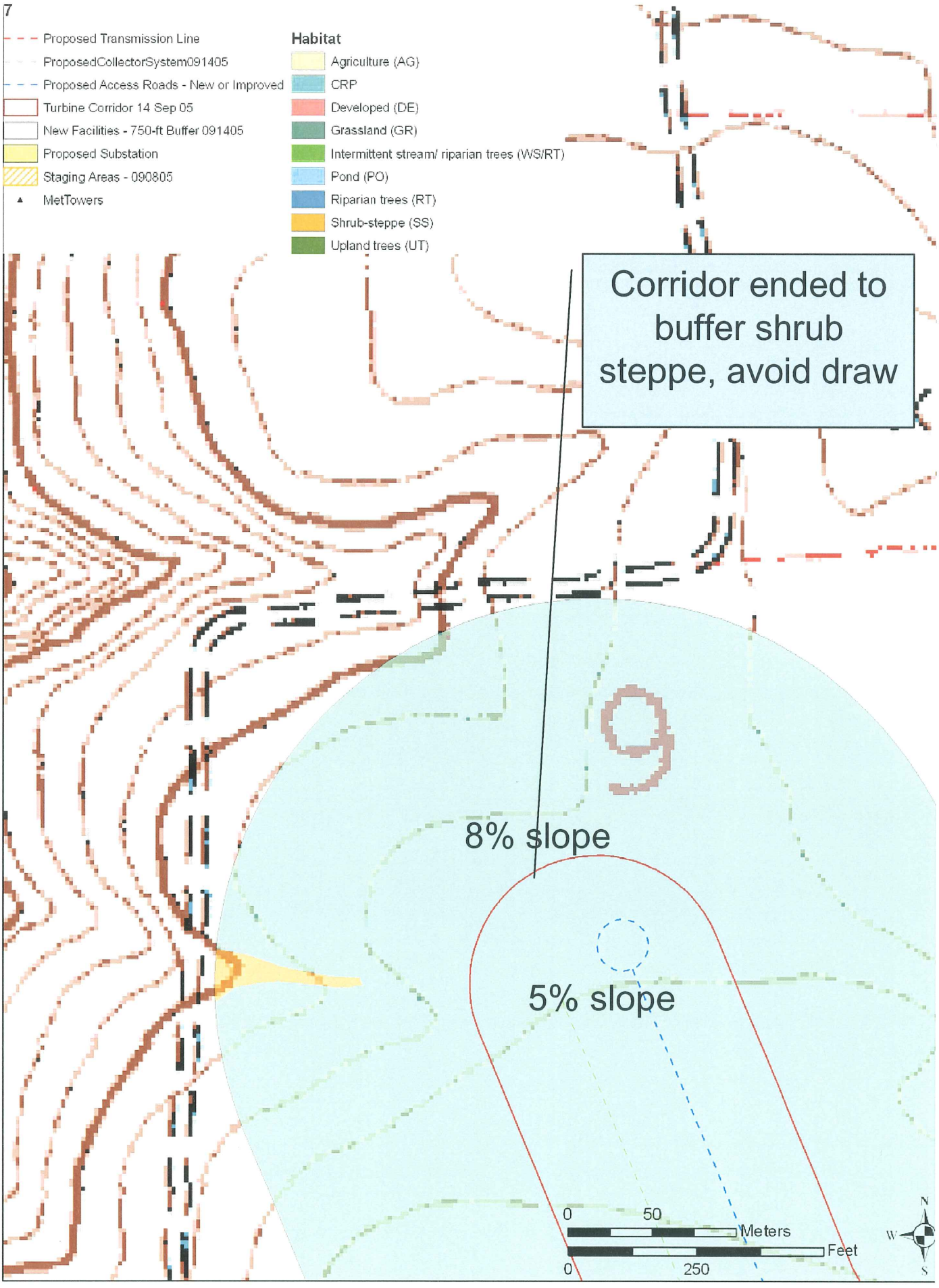
Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
Corridor ended to buffer shrub steppe and avoid steep slope
13% slope
8% slope
JEEP
TRA
0 50 100
Meters
0 250 500
Feet
N
W
E
S


Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
Corridor ended to buffer shrub steppe and avoid steep slope Corridor moved to west to avoid impacts to shrub-steppe and CRP
11% slope
9% slope
0
50
Meters
Feet
0
250
N
E
S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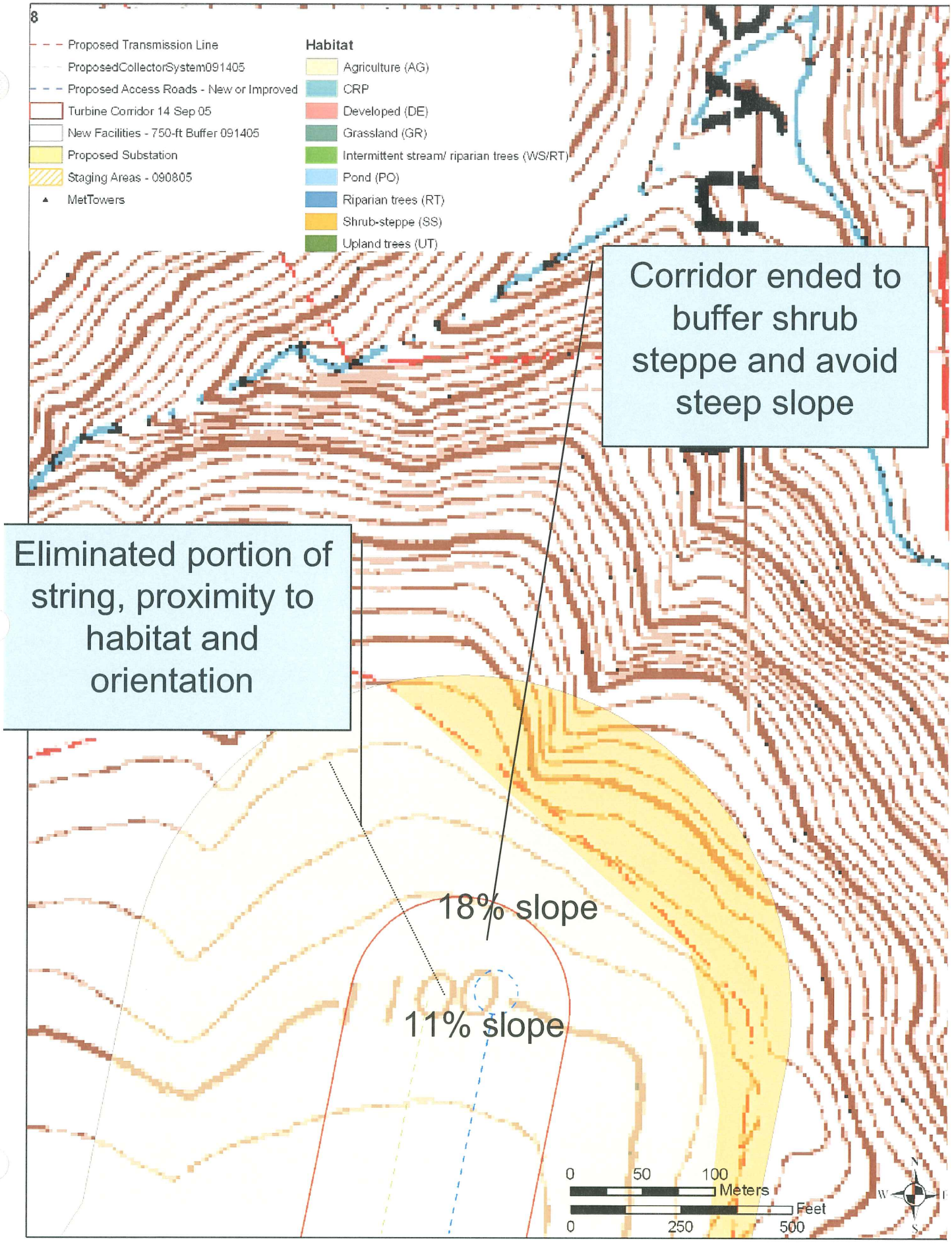
Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
Corridor ended to buffer shrub steppe, avoid draw
9
8% slope
5% slope
0
50
Meters
0
250
Feet
N
W
S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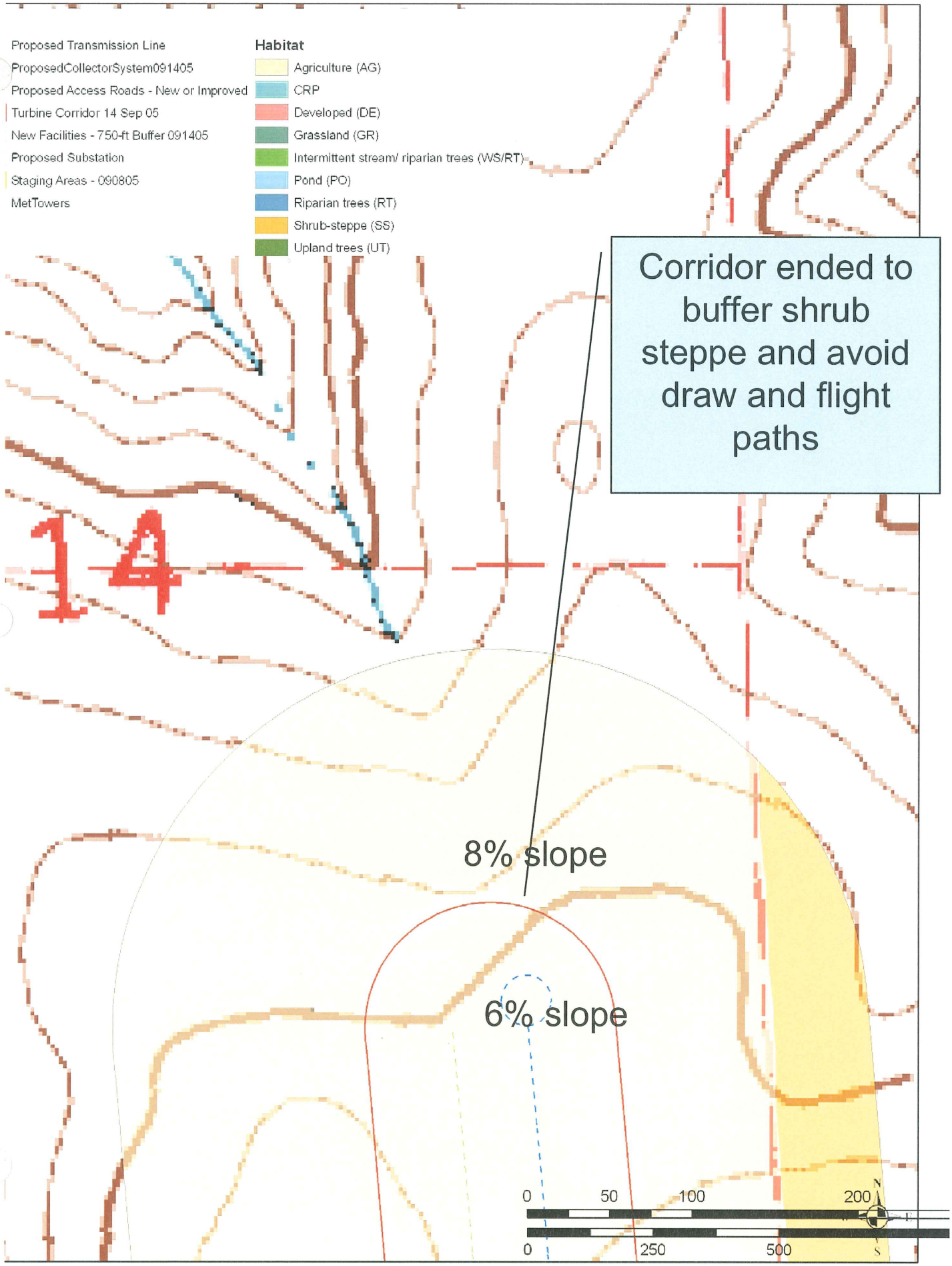
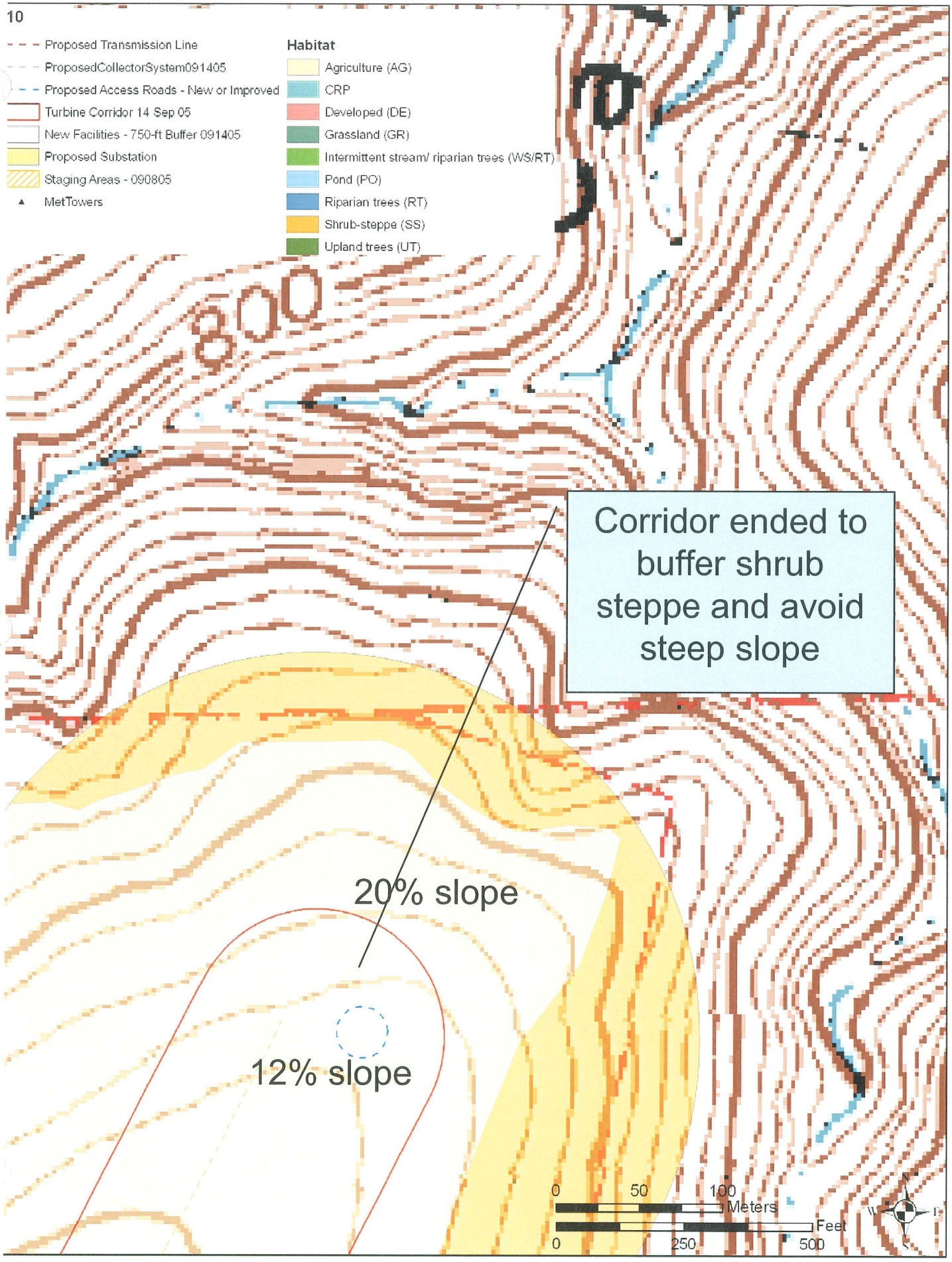
Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
Corridor ended to buffer shrub steppe and avoid steep slope
Eliminated portion of string, proximity to habitat and orientation
18% slope
11% slope
0 50 100
Meters
0 250 500
Feet
N
W
S


Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
Corridor ended to buffer shrub steppe and avoid draw and flight paths
14
8% slope
6% slope
0
50
100
200
0
250
500
N
S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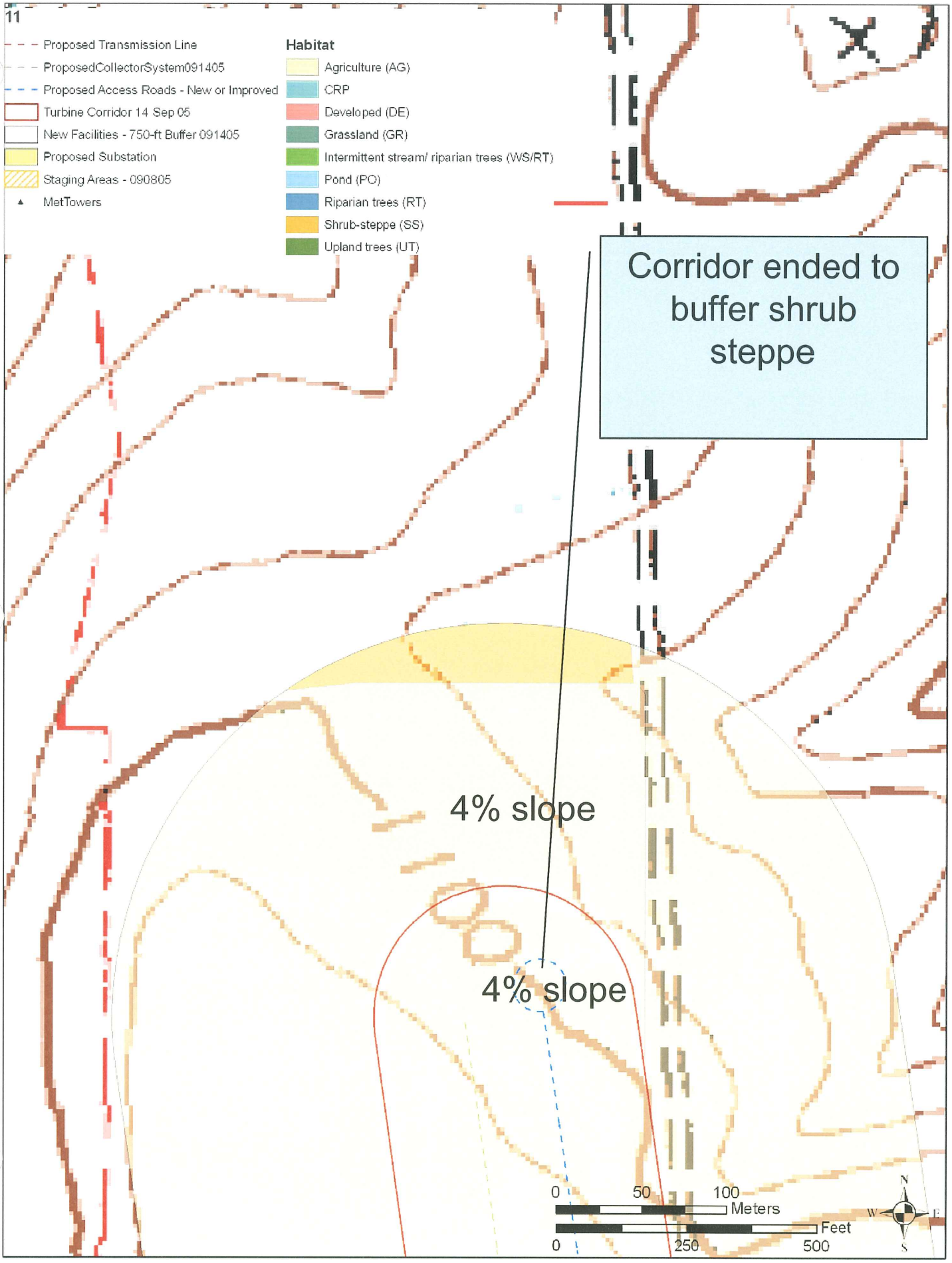
Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
800
Corridor ended to buffer shrub steppe and avoid steep slope
20% slope
12% slope
0
50
100
Meters
0
250
500
Feet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Proposed Transmission Line
ProposedCollectorSystem091405
Proposed Access Roads - New or Improved
Turbine Corridor 14 Sep 05
New Facilities - 750-ft Buffer 091405
Proposed Substation
Staging Areas - 090805
MetTowers
Habitat
Agriculture (AG)
CRP
Developed (DE)
Grassland (GR)
Intermittent stream/ riparian trees (WS/RT)
Pond (PO)
Riparian trees (RT)
Shrub-steppe (SS)
Upland trees (UT)
Corridor ended to buffer shrub steppe
4% slope
4% slope
0
50
100
Meters
0
250
500
Feet
N
W
E
S

Figures

Figure P-1.
Biglow Canyon Wind Project Habitat Analysis Area Overview.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas
- Habitat Analysis Area

N
W E
S

0 0.5 1 2 3
Kilometers

WEST, Inc.

Figure P-2. Biglow Canyon Wind Project Habitat Analysis Area - 1 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6

	A2	A3
B1	B2	B3
C1	C2	C3

N
W E
S

0 0.5 1
Kilometers

WEST, Inc.

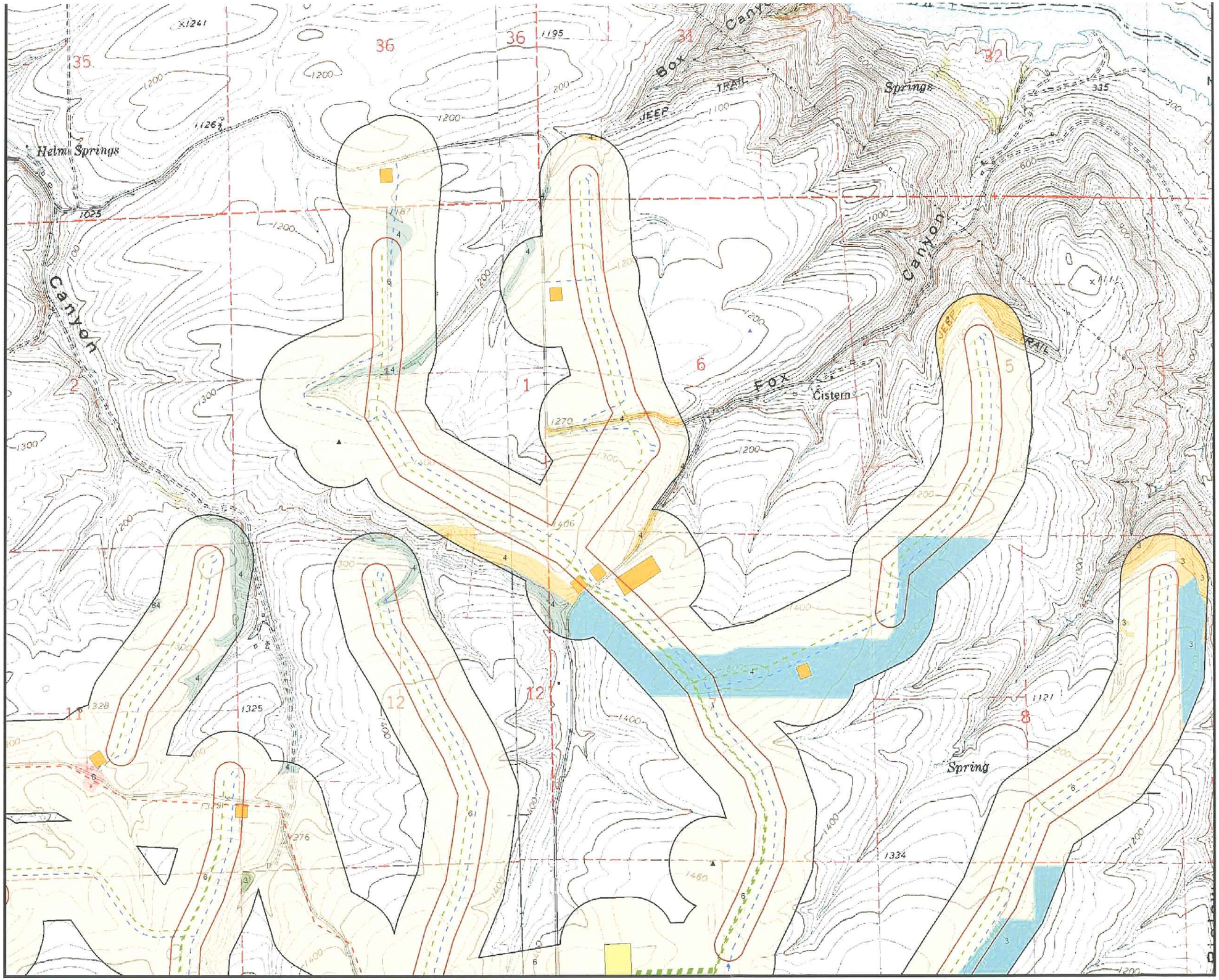


Figure P-3.
Biglow Canyon Wind Project Habitat Analysis Area - 2 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

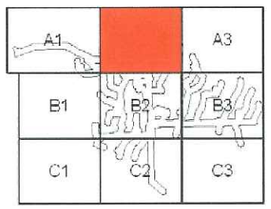
Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6



N
W E
S

0 0.5 1
Kilometers

WEST, Inc.

Figure P-4. Biglow Canyon Wind Project Habitat Analysis Area - 3 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6

A1	A2	
B1	B2	B3
C1	C2	C3

N
W E
S

0 0.5 1
Kilometers

WEST, Inc.

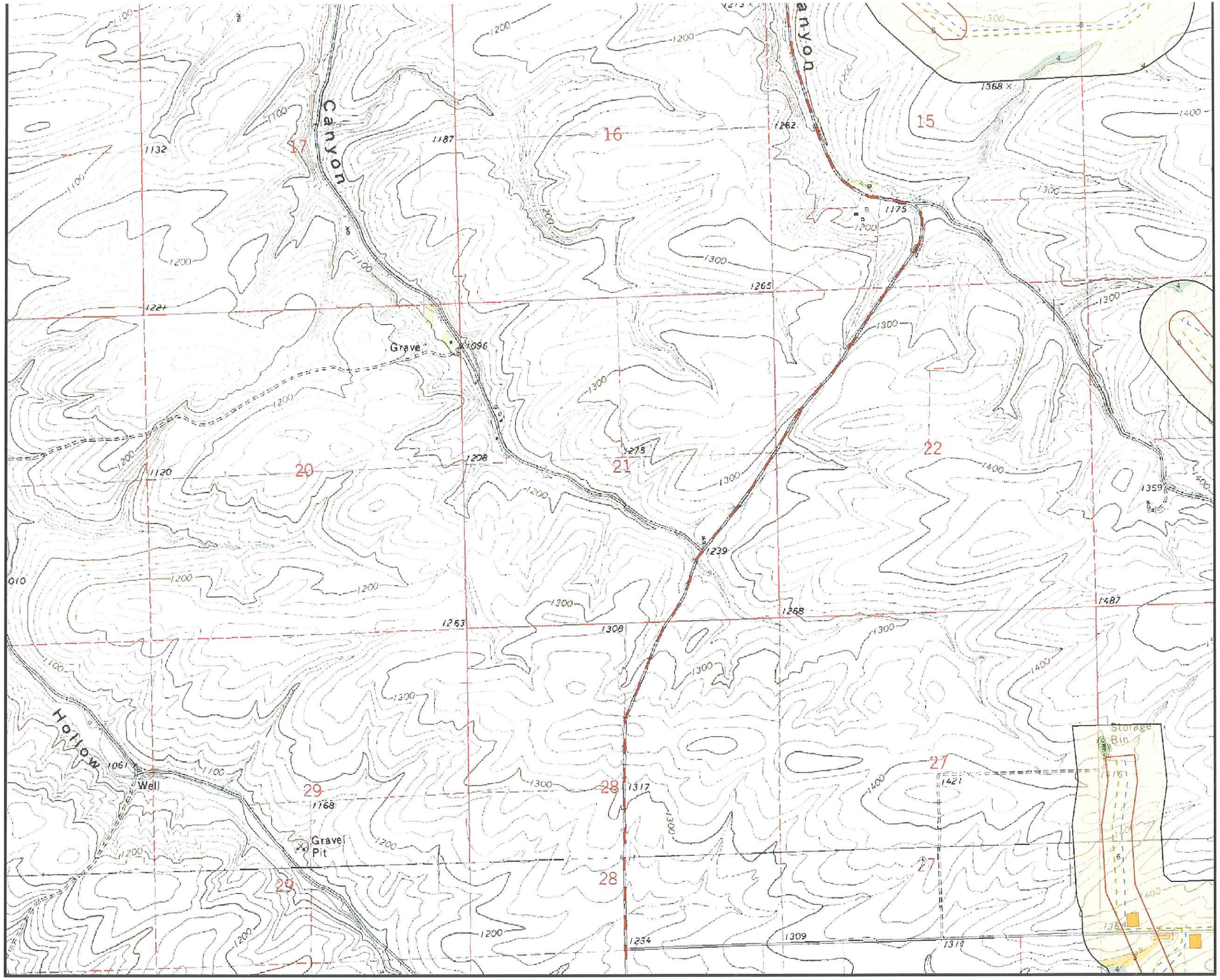


Figure P-5.
Biglow Canyon Wind Project Habitat Analysis Area - 4 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

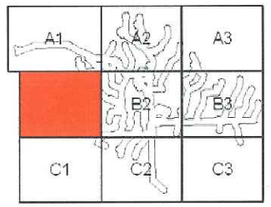
Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6



N
W E
S

0 0.5 1
Kilometers

WEST, Inc.

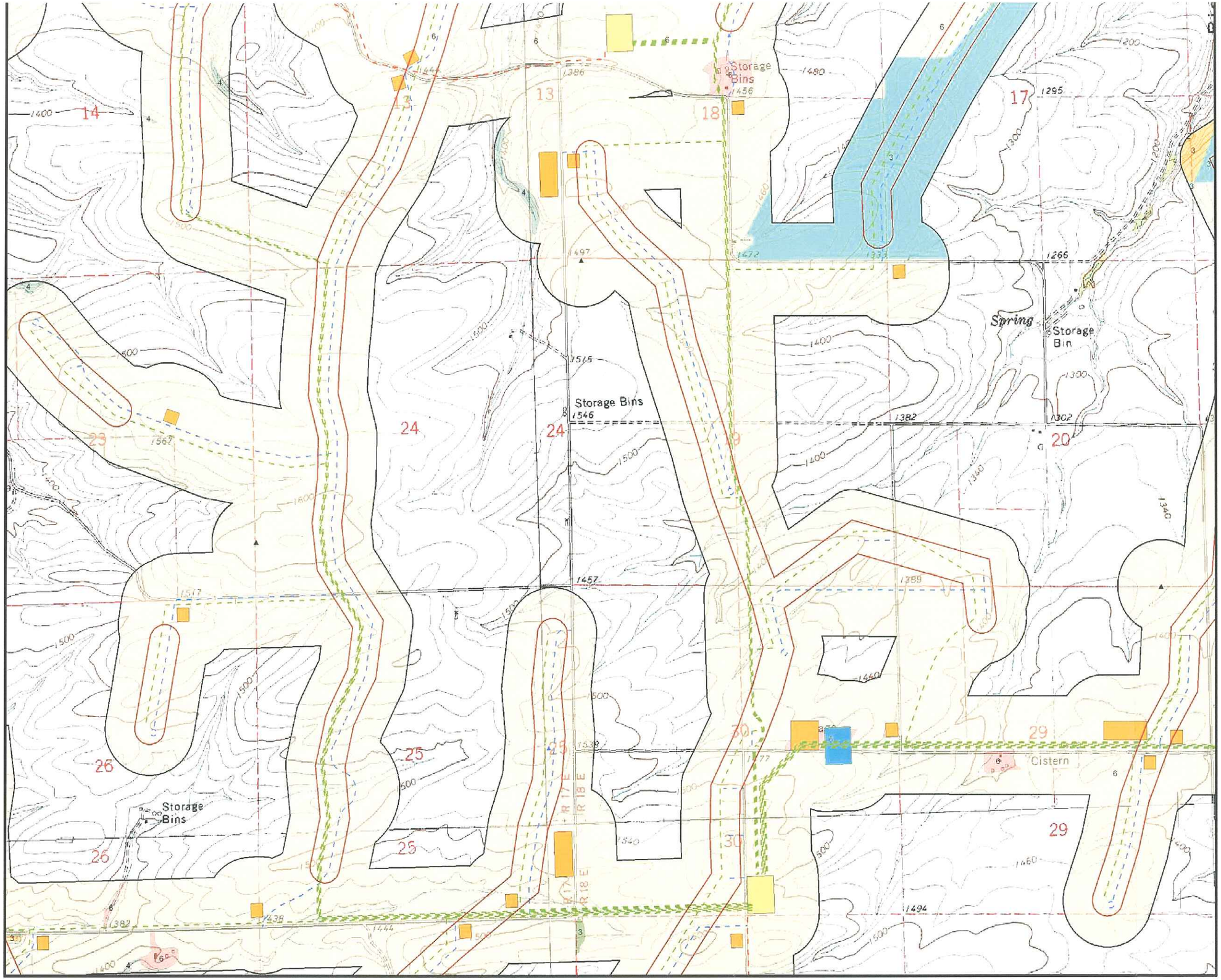


Figure P-6.
Biglow Canyon Wind Project Habitat Analysis Area - 5 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

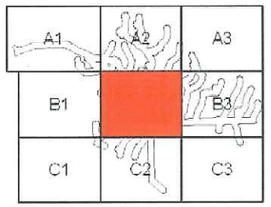
Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6



N
W E
S

0 0.5 1
Kilometers

WEST, Inc.

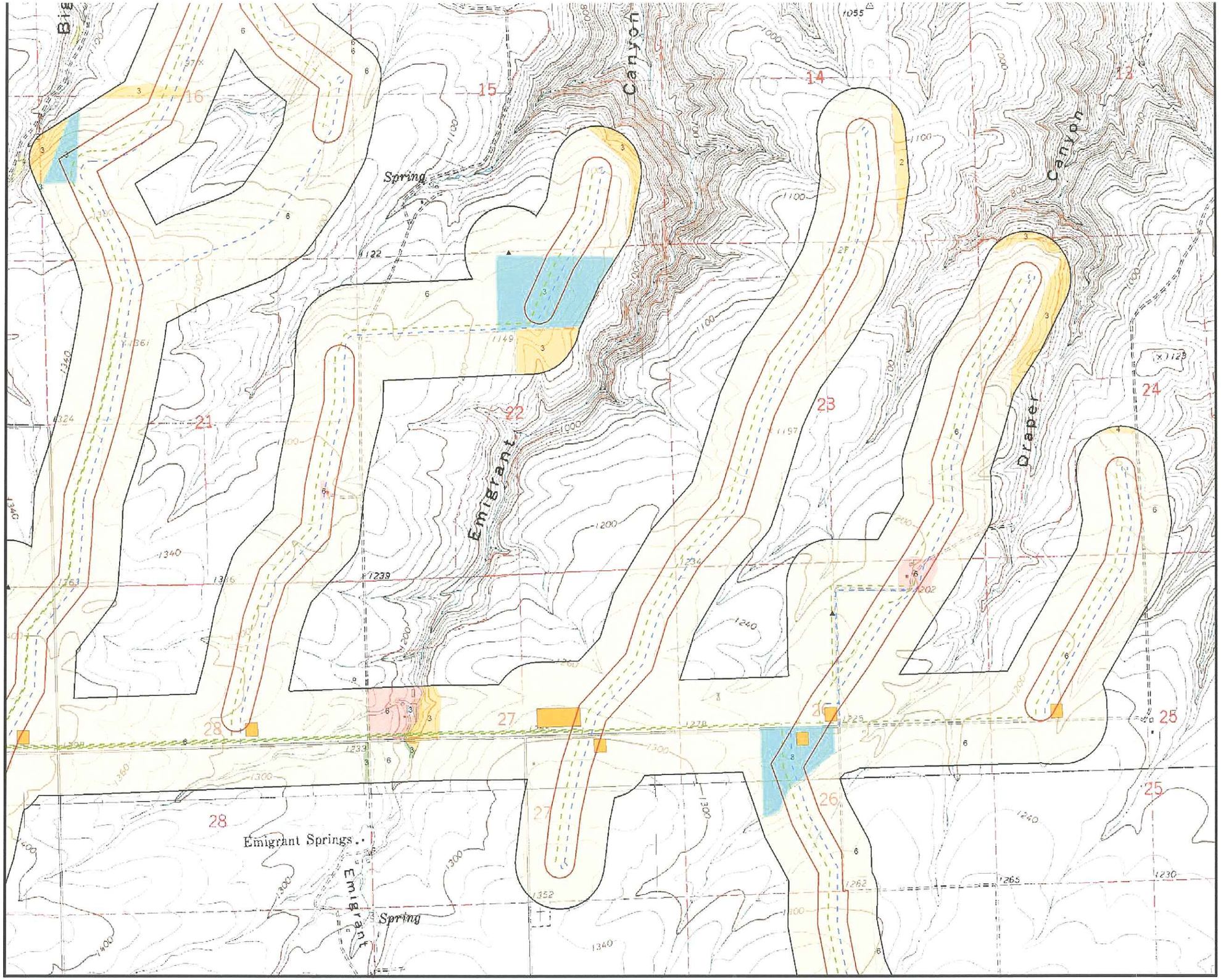


Figure P-7.
Biglow Canyon Wind Project Habitat Analysis Area - 6 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6

A1	A2	A3
B1	B2	
C1	C2	C3

N
W E
S

0 0.5 1
Kilometers

WEST, Inc.

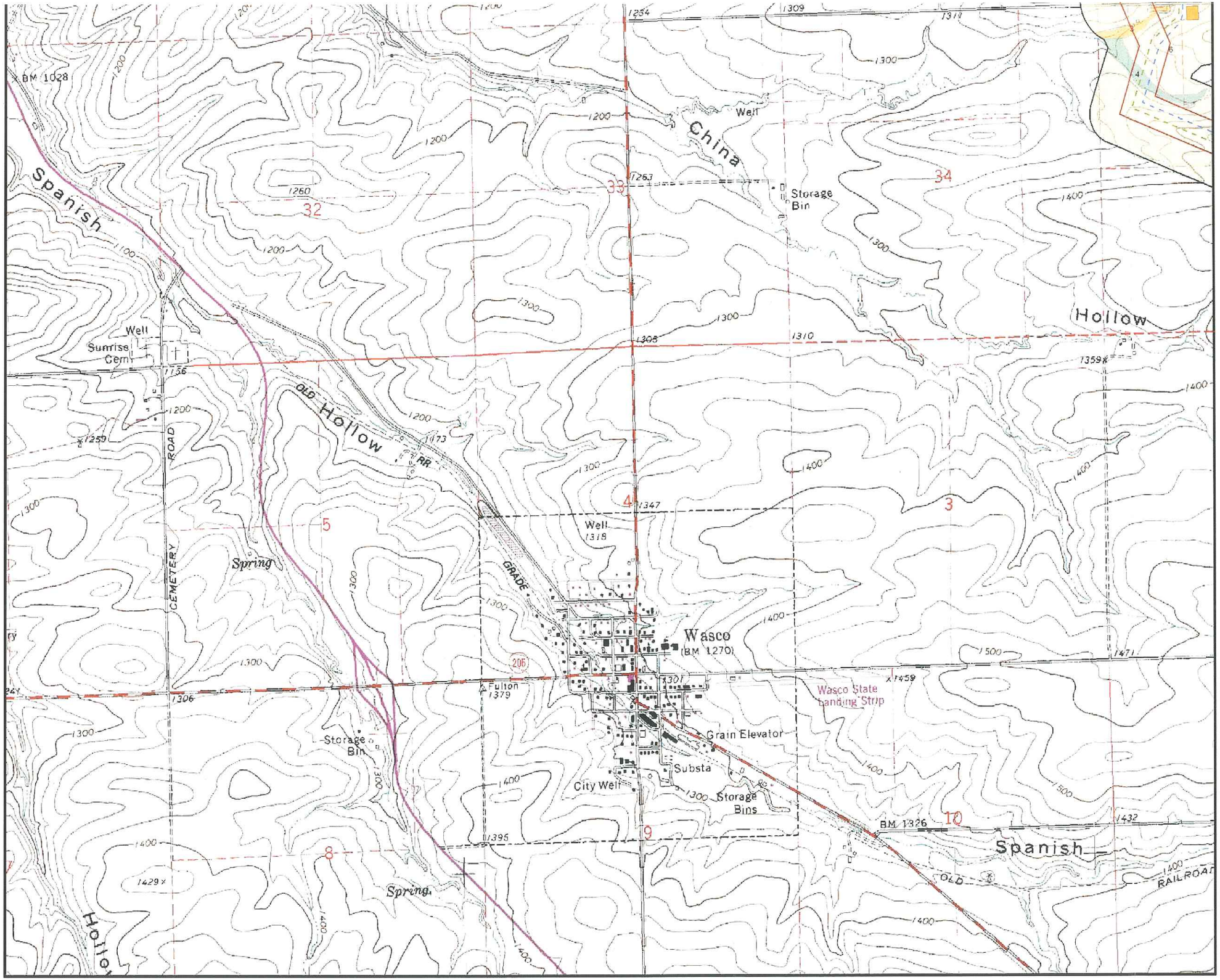


Figure P-8.
Biglow Canyon Wind Project Habitat Analysis Area - 7 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

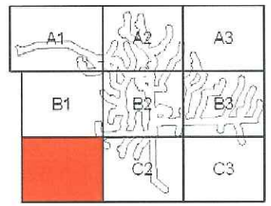
Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6



WEST, Inc.

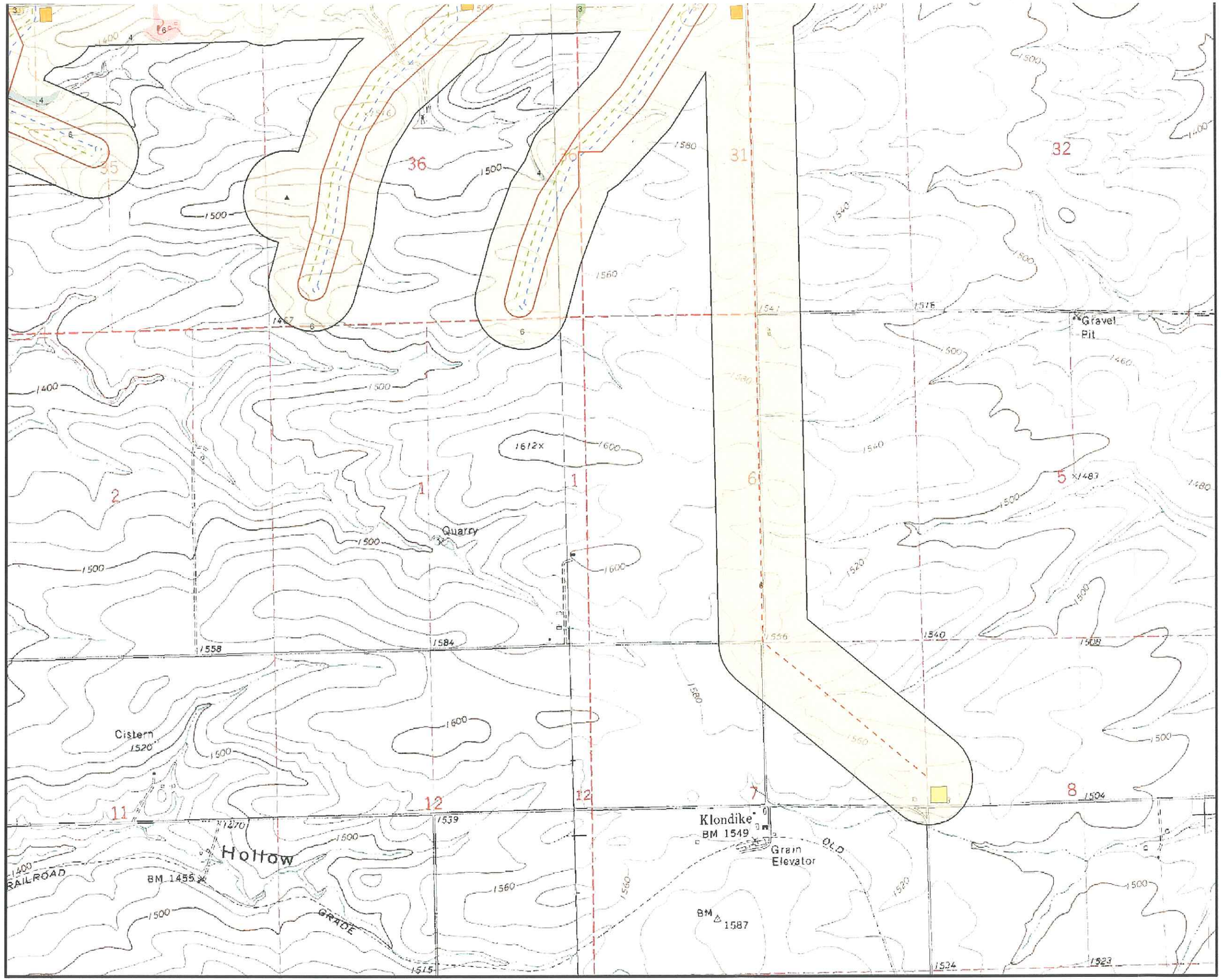


Figure P-9.
Biglow Canyon Wind Project Habitat Analysis Area - 8 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

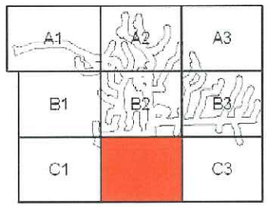
Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

Habitat Categories 1 - 6



N
W E
S

0 0.5 1
Kilometers

WEST, Inc.

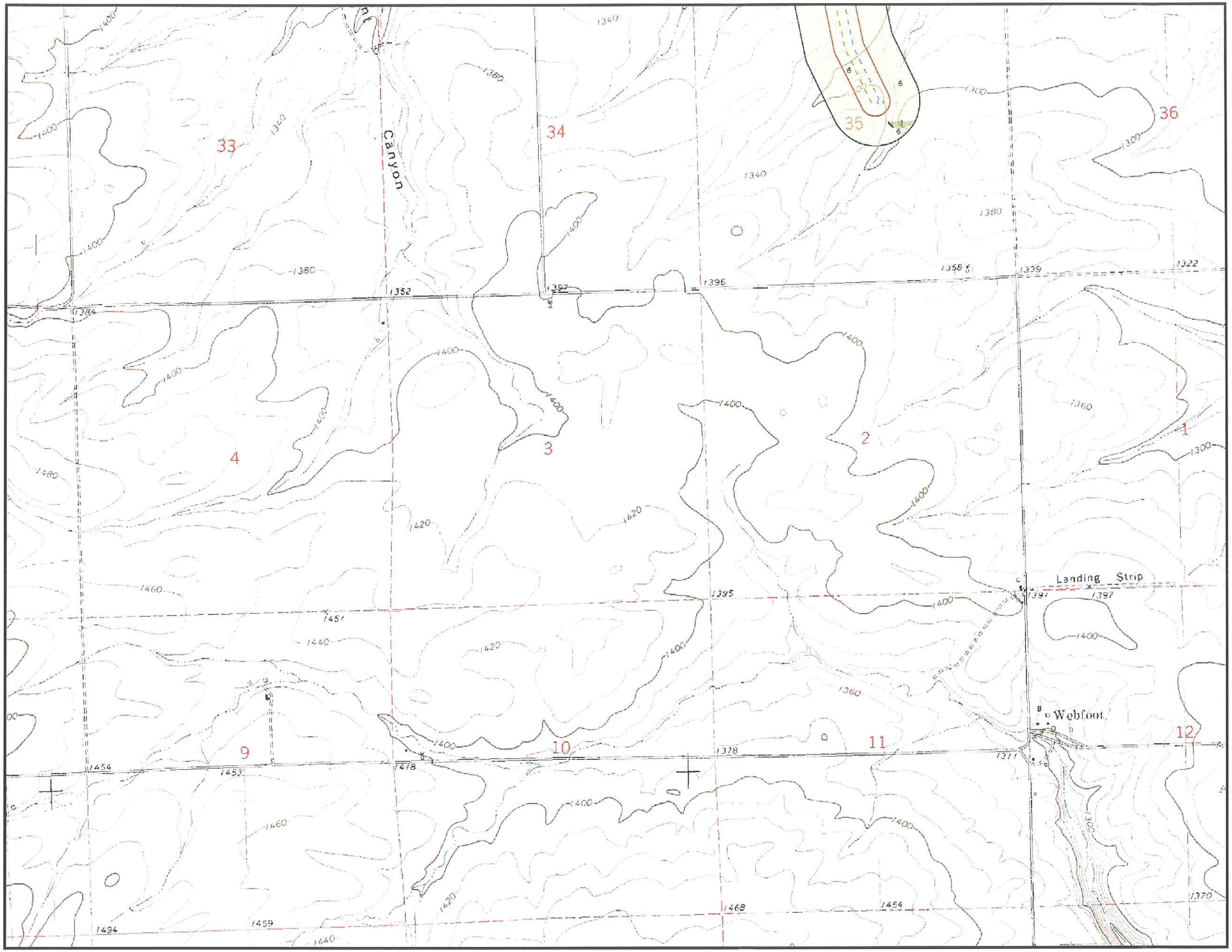


Figure P-10
Biglow Canyon
Wind Project Habitat
Analysis Area - 9 of 9.

- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

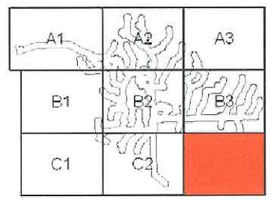
Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

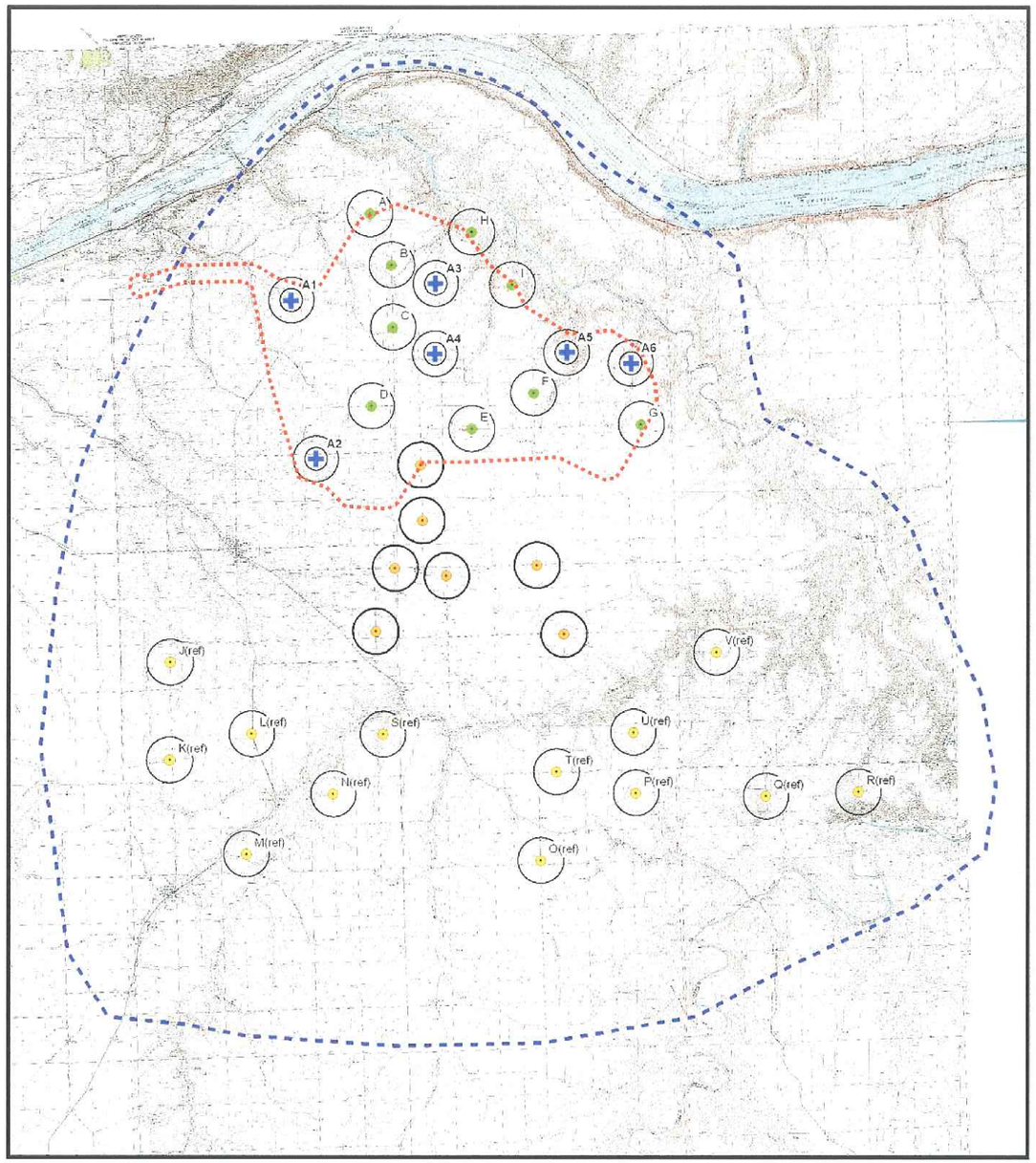
Habitat Categories 1 - 6



N
W E
S

0 0.5 1
Kilometers

WEST, Inc.



Project Area
Nest Survey Area
Potential New Stations - Fall 05
Klondike point count stations

Point Count Stations - 2004

Project
Reference
Point count station - 800-m buffer

N
W E
S

0 1 2 3 4 5
Kilometers

WEST, Inc.

Figure P-11.

Location of avian use stations for the Project Area, Reference Area, and Klondike Phase I and II Areas, with the approximate ratpor nest survey area in 2004. Project Area stations were surveyed between March 2004 and March 2005. Additional Project Area stations were established and surveyed in Fall 2005 (see Figure P-12).

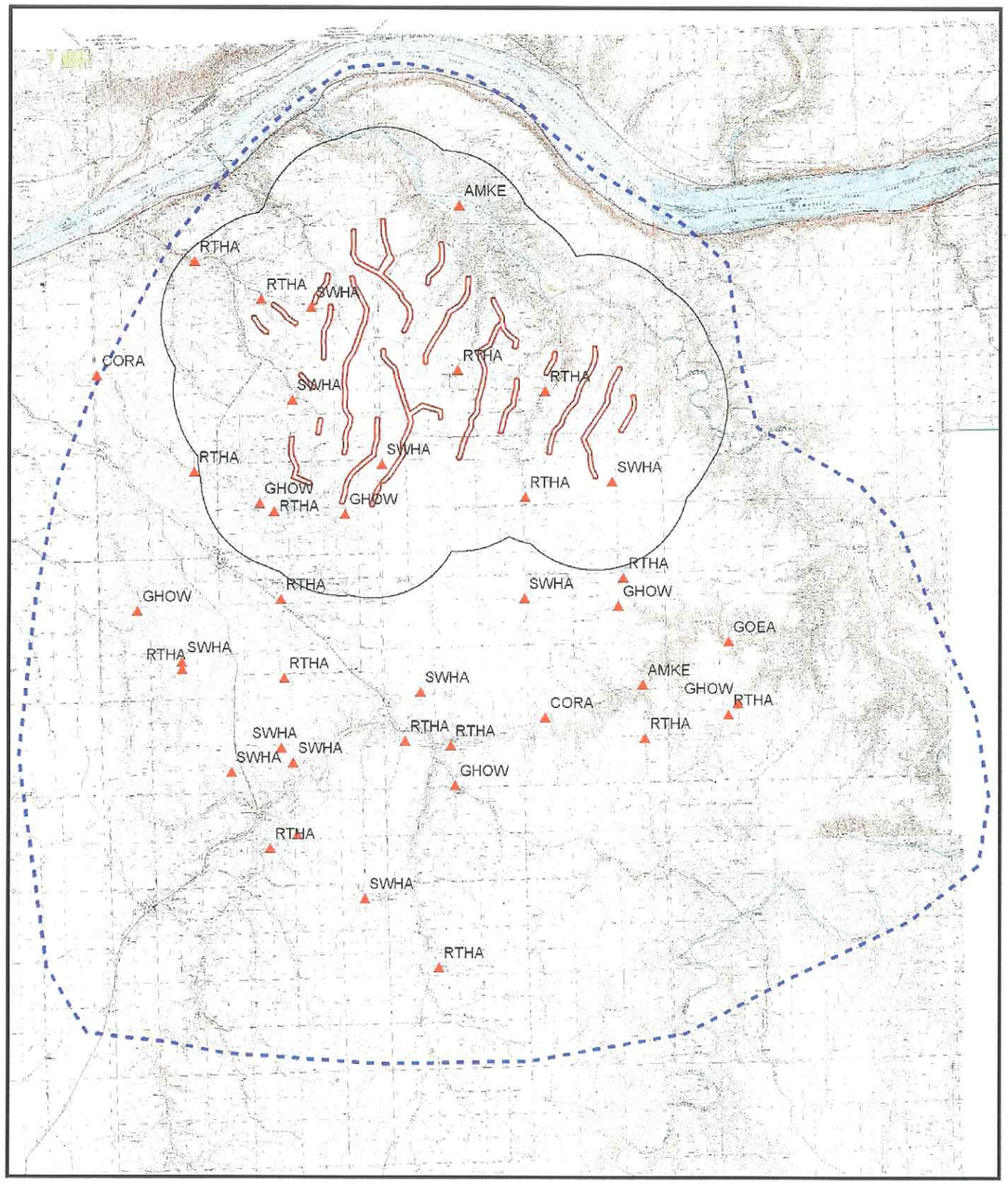


Figure P-12.
Results of 2001 raptor nest surveys for Klondike I and II.

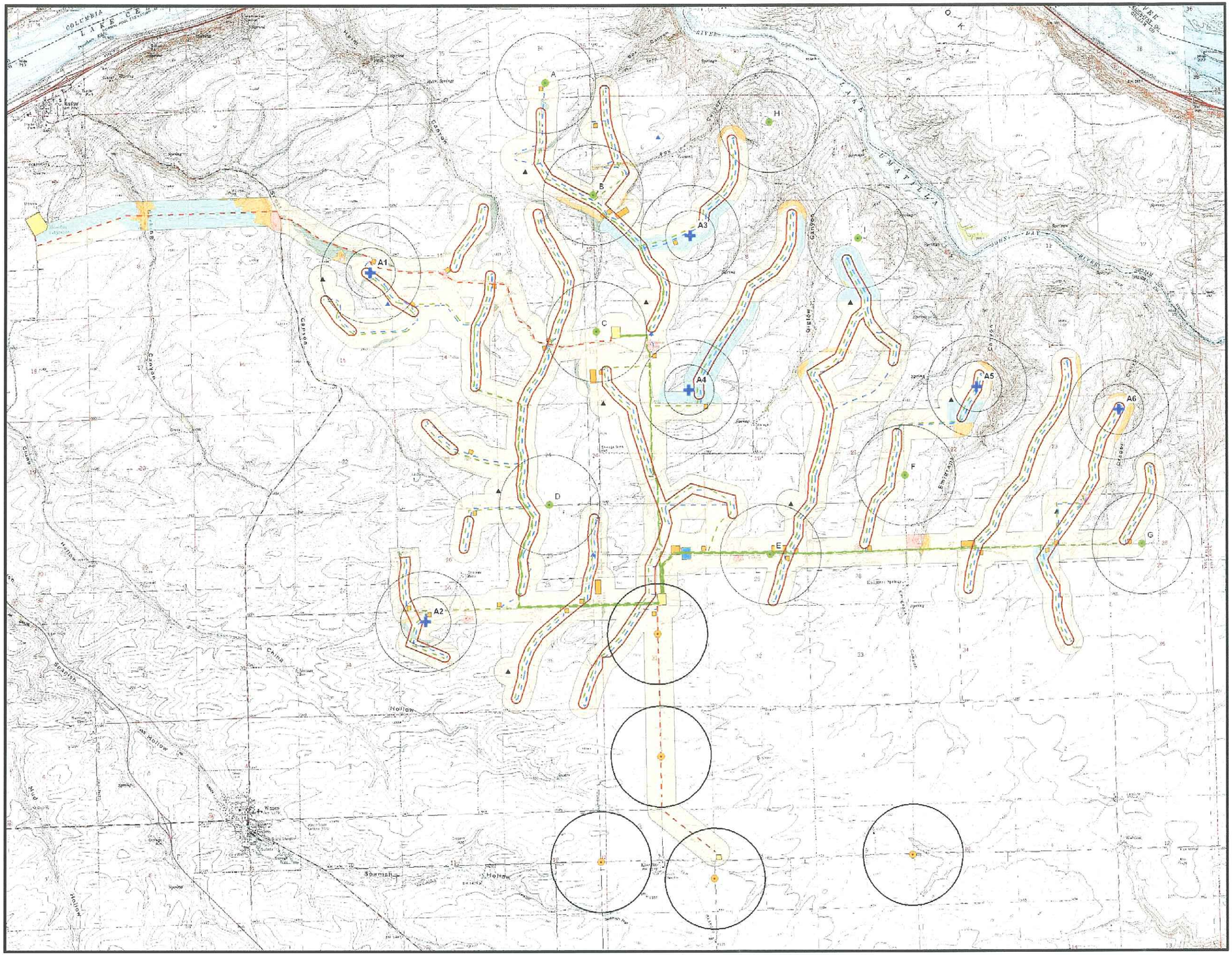


Figure P-13.
Location of avian use stations for the Project Area, including the additional survey stations added in Fall 2005.

- Potential New Stations - Fall 05
- Klondike point count stations

Point Count Stations - 2004

- Project
- Reference
- Point count station - 800-m buffer
- Turbine Corridor
- New Facilities - 750-ft Buffer
- Proposed Transmission Line
- Proposed Collector System
- Access Rds - New or Improved

Met Towers

- Permanent
- Temporary
- Proposed Substation
- O&M Facility
- Staging Areas

Habitat

- Agriculture (AG)
- CRP
- Developed (DE)
- Grassland (GR)
- Stream/ riparian trees (WS/RT)
- Pond (PO)
- Shrub-steppe (SS)
- Upland trees (UT)

N
W E
S

0 1 2
Kilometers

WEST, Inc.

Figure P-14
Mean use for All Birds for the Biglow Canyon Project and Reference Area.

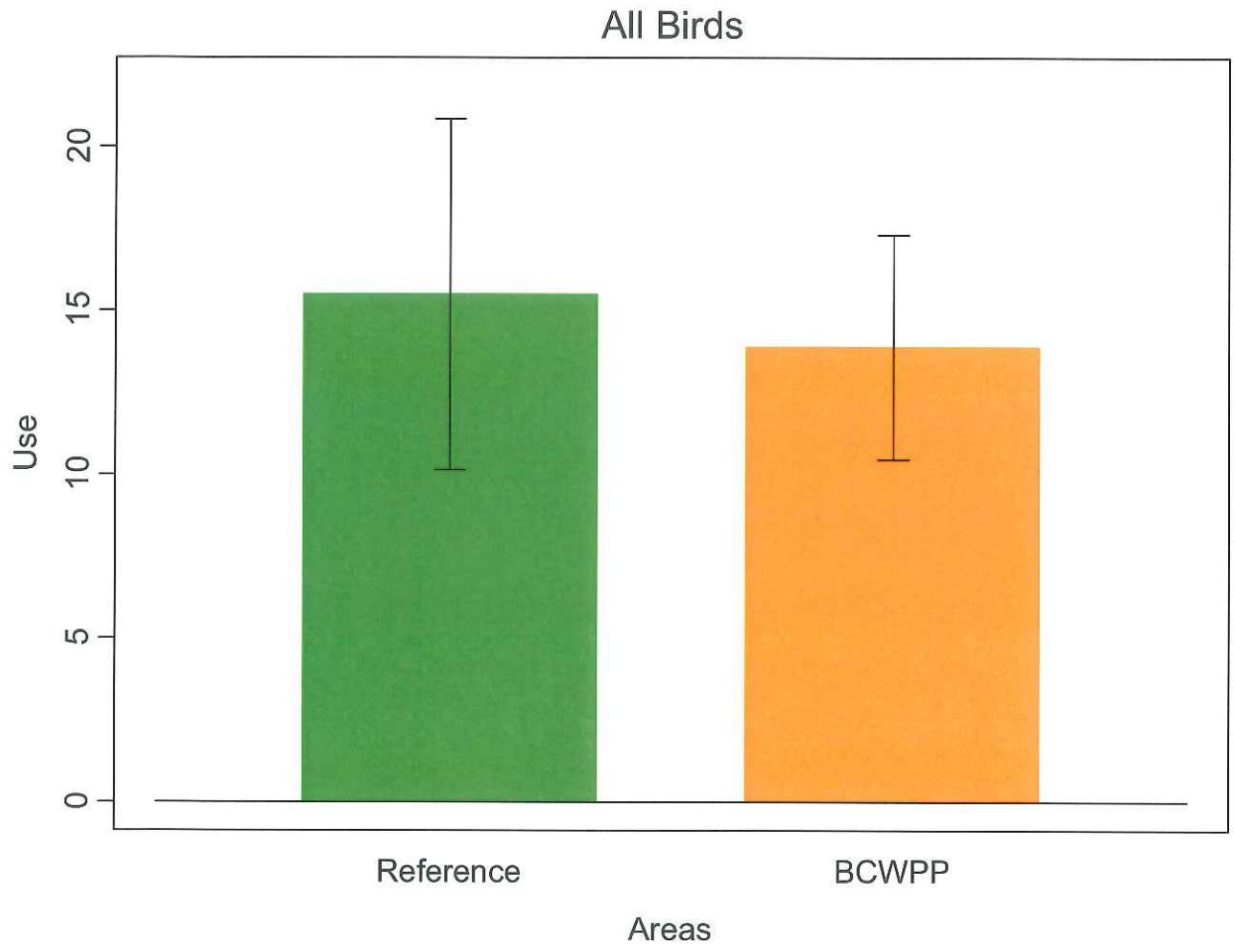
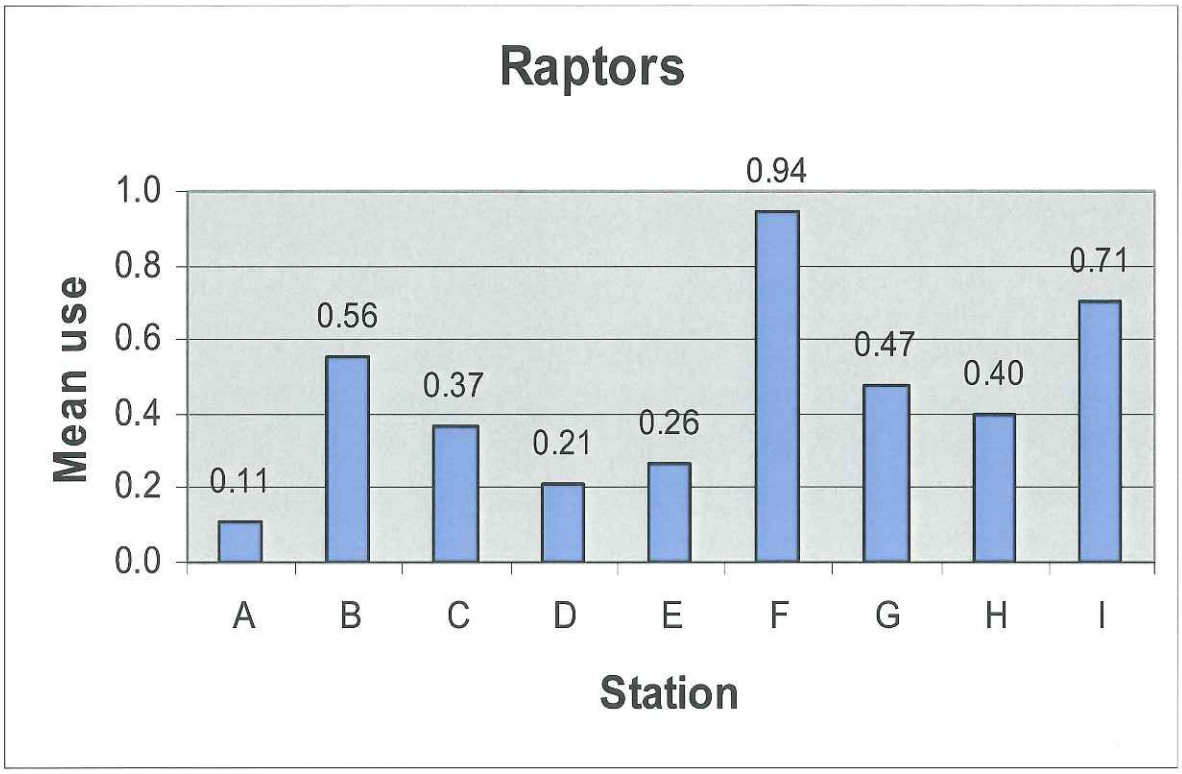


Figure P-15
Station use for Raptors for the Biglow Canyon Project Area.



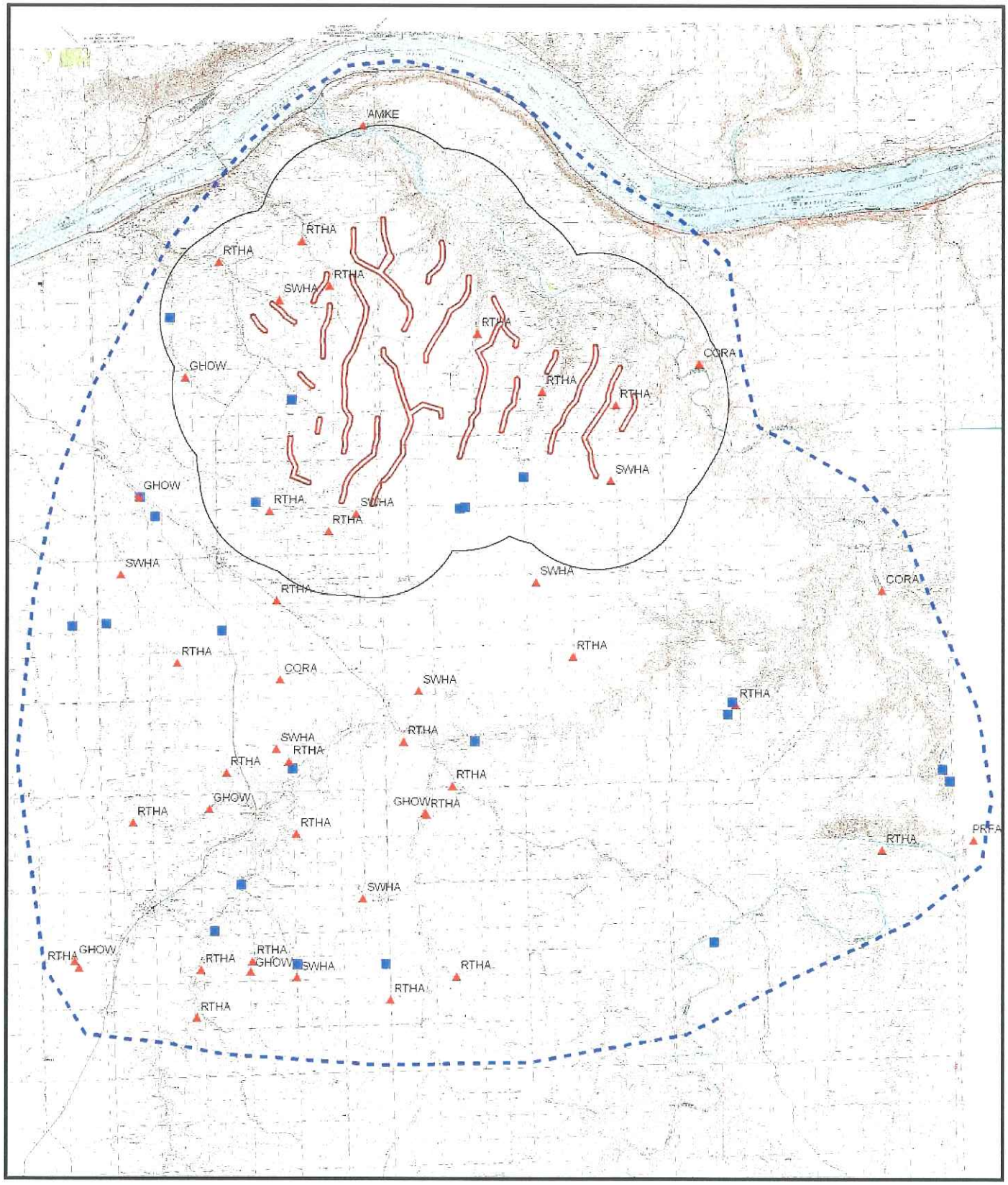


Figure P-16.
2004 raptor nest survey results.

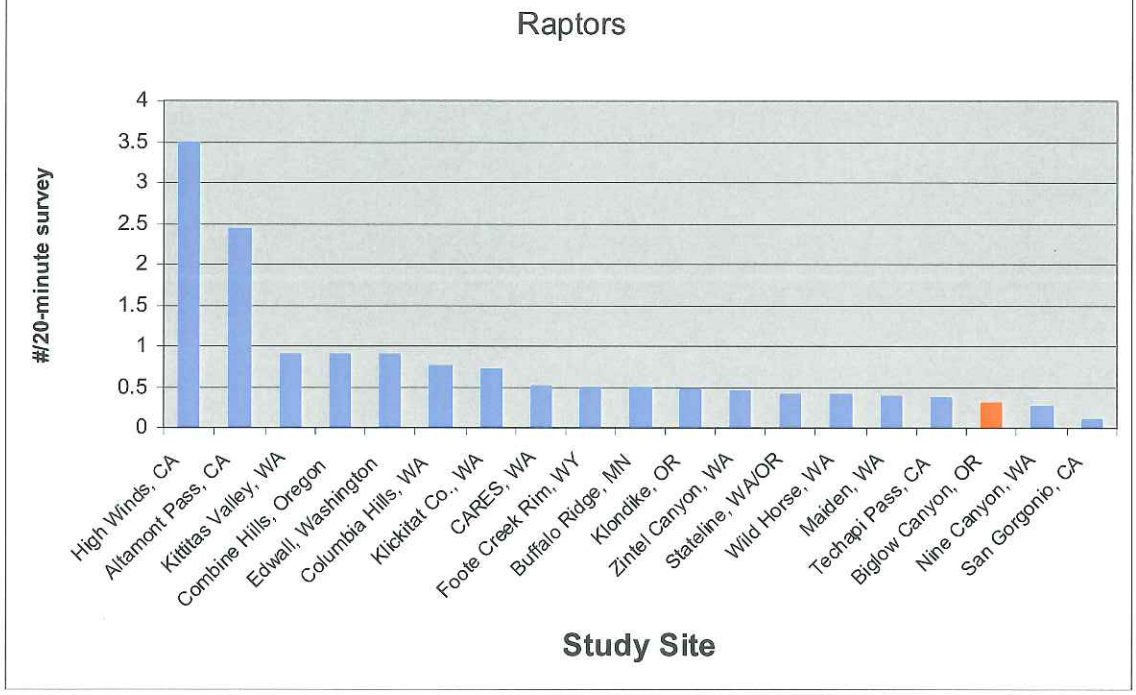


Figure P-17. Raptor use estimates from open habitat projects in the West and Midwest that have used similar methods of data collection.

EXHIBIT Q

THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES

OAR 345-021-0010(1)(q) and OAR 345-022-0070

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Q-1 Federal and State Listed Species Potentially Occurring Within the Analysis Area Q-1

ATTACHMENTS

Q1 Map of Threatened and Endangered Species Analysis Area
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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: Preliminary research consisted of reviewing information publicly available, which included database queries and agency solicitations regarding state or federally threatened, endangered, or candidate wildlife and plant species within 5 miles of the Biglow Canyon Wind Farm (Facility) site boundary, referred to herein as the analysis area. The primary sources were the U.S. Fish and Wildlife Service (USFWS) and the Oregon Natural Heritage Information Center (ORNHIC), which include Oregon state listings (USFWS, 2005; ORNHIC, 2005; results in Exhibit P, Attachments P-1 and P-2). Other federal and state species of special or sensitive status are also considered in Exhibit P. Descriptions of the analysis area, topography, and habitat can be found in Exhibits B, P, and U. All Biglow wildlife and plant field studies, described in Exhibit P, were reviewed, in addition to the preliminary review, and a final assessment is provided here. Nine federal and state listed and candidate wildlife and plant species could exist within the analysis area (Table Q-1, Attachment Q-1), including three bird species, three fish species, and three plant species. The remainder of this exhibit describes (1) these species and the potential impacts to them from Facility development and operation, (2) mitigation approaches, and (3) a monitoring program assessing any impacts from post-construction and operation of the Facility.

Table Q-1 Federal and State Listed Species Potentially Occurring Within the Analysis Area

Common Name	Scientific Name	Federal Status[1]	State Status[1]	Notes on Occurrence—Potential for Impacts
BIRDS				
Bald eagle	*Haliaeetus leucocephalus*	LT	LT	Infrequent migrant or winter occurrence—no impact (at present population levels)
American peregrine falcon	*Falco peregrinus anatum*	--	LE	Year-round, nesting along Columbia river, infrequent within Facility area—low potential impact
Yellow-billed cuckoo	*Coccyzus americanus*	C		Infrequent migrant—very low potential impact
MAMMALS				
Gray wolf	*Canis lupus*	LE	LE	Extirpated, historical county records only; unsuitable habitat on open high facility ridgelines—no impact
FISH				
Steelhead—Mid-Columbia River ESU, summer run	*Oncorhynchus mykiss*	LT	SV	No suitable habitat/tributary—no impact
Steelhead—Snake River Basin ESU	--	LT	--	No suitable habitat/tributary—no impact
Steelhead—Upper Columbia River ESU	--	LE	--	No suitable habitat/tributary—no impact

Table Q-1 Federal and State Listed Species Potentially Occurring Within the Analysis Area

Common Name	Scientific Name	Federal Status[1]	State Status[1]	Notes on Occurrence—Potential for Impacts
Sockeye Salmon—Salmon River Tributary to the Snake River	*Oncorhynchus nerka*	LE	--	No suitable habitat/tributary—no impact
Chinook Salmon—Snake River ESU, spring/summer and fall runs	*Oncorhynchus tshawytscha*	LT	LT	No suitable habitat/tributary—no impact
Chinook Salmon—Upper Columbia River ESU	--	LE	--	No suitable habitat/tributary—no impact
PLANTS				
Northern wormwood	*Artemisia campestris* var. *wormskioldii*	C	LE	Suitable habitat present, no Sherman county records, and no 2005 observations—no impact
Henderson's ricegrass	*Achnatherum collinus* var. *laurentii*	SOC	C	Small areas of suitable habitat, no 2005 observations—no impact
Robinson's onion	*Allium robinsonii*	SOC	-	No suitable habitat—no impact
Laurence's milk-vetch	*Astragalus collinus* var. *laurentii*	SOC	LT	Small areas of suitable habitat, no 2005 observations—no impact

[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.

Q.2 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: Field surveys were conducted for threatened and endangered plants and wildlife in 2004 and 2005.

Q.2.1 Wildlife

Existing literature and scientific data were reviewed and agency and other biologists were contacted to determine species distribution and potential for occurrence (e.g., Keith Kohl and Russ Morgan, ODFW, pers. comm.; Frank Isaacs, Oregon Cooperative Fish and Wildlife Research Unit, pers. comm.). Wildlife surveys were conducted by qualified biologists in late April 2004 (raptor nest surveys), March 2004 through March 2005 (avian use surveys), and May/June and August/September 2005 (walking transect surveys for special or sensitive status, and threatened and endangered species) (Exhibit P, Attachments P-3 and P-4). Threatened and endangered species' occurrence and habitats were investigated during all of the field surveys.

Six listed species were found within the analysis area (see Table Q-1).

Q.2.2 Plants

Existing literature and scientific data were reviewed and agency biologists were contacted to determine species distribution and potential for occurrence within the analysis area. The ORNHIC database and USFWS were queried for documented and potential occurrences of candidate, proposed, and listed species in the analysis area. Rare plant surveys were conducted by qualified biologists in June 2005 to document occurrence and habitat of sensitive plant species, including threatened and endangered species.

ORNHIC and USFWS database searches revealed four listed plant species that might occur within the analysis area: Northern wormwood (*Artemisia campestris* var. *wormskioldii*), Henderson's ricegrass (*Achnatherum collinus* var. *laurentii*), Robinson's onion (*Allium robinsonii*), and Laurence's milk-vetch (*Astragalus robinsonii*).

Q.3 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: All species potentially occurring in Sherman County and in the analysis area are listed in Table Q-1. Ratings for potential impacts to these species from construction and operation of the Biglow Canyon Wind Farm Facility are also noted in this table. Further discussion is provided for the following wildlife and plant species:

- No adverse impacts are anticipated for bald eagles. No observations were made for this species within the analysis area. To date, there have been no reported bald eagle fatalities at wind projects in the United States.
- A very low probability of risk exists for peregrine falcons. No observations were made for this species within the proposed Facility area; however, active nests exist approximately 3 miles from the closest section of the Facility site. To date, there have been no reported peregrine falcon fatalities at wind projects in the United States.
- No adverse affects are anticipated for yellow-billed cuckoos. The proposed Facility area lacks suitable habitat for yellow-billed cuckoos, and no sightings have been recorded in Sherman County. The analysis area is also unlikely to be in a cuckoo migratory corridor, as this species is considered extirpated further north in Washington and British Columbia.

Q.3.1 Wildlife

Q.3.1.1 Bald Eagle

In 1978, the USFWS listed the bald eagle (*Haliaeetus leucocephalus*) as endangered throughout the lower 48 states, 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, 1995). In July 1999, the USFWS proposed de-listing the bald eagle (USFWS, 1999). 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 to 7 years in the lower 48 states since the late 1970s (USFWS, 1995). 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, 1995).

Natural History and Occurrence in the Analysis Area

The nesting chronology of bald eagles is variable based on latitude. For northern populations, such as those in Oregon and Washington, nest construction and maintenance 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 from one to three young per year. Little is known of post-fledging behavior; however, bald eagles do not reach sexual maturity until they are 4 to 5 years old and can live up to 20 to 30 years (Buehler, 2000).

In Oregon, wintering bald eagles are found primarily 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 population and can extend over several months (Buehler, 2000). In the Pacific Northwest, bald eagle migrations coincide with salmon runs, and both immature and adult bald eagles 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 then return south during the fall, arriving at 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 receive considerable use when carrion is available. Important prey includes salmonids, carrion, waterfowl, and small mammals.

Bald eagles generally require areas near water for nesting, 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 of 3 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 streams (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 most winter habitat use. Winter communal roosts consist of old large trees or snags with good visibility and sturdy lateral limbs near the crown for 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 can 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 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 typically are defined as an area within 4 miles of the nest (Brown, 1985). The nearest known nest is 10 miles west of the Facility 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 might 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 Facility 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, Idaho. Counts are conducted during the first 2 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.

Following is a list of annual total bald eagle counts, followed by 5-year averages, percent immature birds, and 5-year averages of percent immature birds, and annual total bald eagle counts. When comparing counts between years, remember that these data have not been adjusted for annual differences in weather, observers, and 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 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 Facility area typically has no bald eagle observations, with a high of 2 counted since 1988.

No bald eagles were observed during the avian use surveys at this site, 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 in Oregon and Washington, Nine Canyon in Washington, Combine Hills in Oregon, and Klondike I, II, and III in Oregon), and is probably lower than at other existing wind projects, such as Foote Creek Rim in Wyoming.

Q.3.1.2 Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) is a State of Oregon endangered species. It was removed from the Federal Endangered Species Act in August 1999 (Federal Registers, 64: 46541-46558). Peregrines hunt chiefly birds, such as starlings, pigeons, blackbirds, jays, shorebirds, and waterfowl. They use a variety of hunting techniques, but prey typically is captured in the air after fast pursuit or a rapid dive. Peregrine falcons frequently nest near water on ledges of rocky cliffs, bridges, or buildings, but occasionally they use abandoned stick nests of other species. Peregrines lay two to four eggs from mid-February through May, which are incubated for about 34 days. The young falcons fledge 5 to 6 weeks after hatching.

Natural History and Occurrence in the Analysis Area

In 2003, the USFWS initiated a 13-year nationwide monitoring program (2003-2015) to collect information on nesting parameters after delisting. In Oregon, surveys were conducted to determine the occupancy and nesting success of 30 breeding areas in Oregon that were selected as part of the nationwide monitoring effort. In addition, additional monitoring was conducted at as many breeding areas in Oregon as possible. This statewide survey resulted in monitoring attempts at over 90 percent of 111 breeding areas, with 14 new breeding areas identified. Of the breeding areas with known outcome, 67 percent were recorded as successful, with 1.54 young per occupied breeding area, and 2.3 young per successful pair (Isaacs, 2004). In 2004, five new breeding areas were identified. Seventy-six percent of breeding areas with known outcome were successful, with 1.7 young per occupied breeding area.

Peregrine falcons can be present in the analysis area year round. There are three peregrine falcon eyries in the vicinity of the Facility. The two closest eyries are approximately 3 miles to the north along the south side of the Columbia River corridor (ORNHIC, 2005; Keith Kohl, ODFW, pers. comm.). Data on these nests indicate they were active in 2003 and 2004, with all nests fledging young in 2003 and all but one nest fledging young in 2004. Juveniles are generally fledged in June. There have been no

sightings of peregrine falcon during avian point-count surveys for this site, for Klondike I and II facilities, or for the Klondike III facility. However, while driving on I-84 after leaving the Facility area in July 2004, observers saw two peregrine falcons flying along a roadside cliff near the John Day River dam (approximately 2.5 miles from the nearest proposed turbine).

In addition to the known eyries along the Columbia River, an inactive large eyrie was identified along the John Day River during the 2004 raptor nest surveys near the analysis area, more than 10 miles south of the site boundary. In early June, this eyrie was still inactive, based upon longer observation from the ground (area accessed by floating the river); no peregrine falcons were heard or seen 1 mile upstream or downstream of the eyrie. Peregrine falcons might occasionally forage in the Facility area, possibly seeking migrating waterfowl or rock doves near abandoned homesteads or grain storage bins. However, forage is probably more common along the Columbia and John Day rivers, especially during the nesting and brood-rearing season.

Q.3.1.3 Yellow-Billed Cuckoo

The yellow-billed cuckoo is a medium-sized bird about 12 inches in length, and weighing about 2 ounces. The species has a slender, long-tailed profile, with a fairly stout and slightly down-curved bill, which is blue-black with yellow on the basal half of the lower mandible. Males and females differ only slightly. The western yellow-billed cuckoo includes all members of the species found in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, and Washington. In the west, based on historic accounts, the species was widespread and locally common in California and Arizona; locally common in a few river reaches in New Mexico; common very locally in Oregon and Washington; generally local and uncommon in scattered drainages of the arid and semiarid parts of western Colorado, western Wyoming, Idaho, Nevada, and Utah; and, probably uncommon and very local in British Columbia.

The species breeds from extreme southern Canada (Quebec and Ontario) south to the Greater Antilles and Mexico. The yellow-billed cuckoo occurs widely and is an uncommon to common breeding bird in the United States east of the Continental Divide. Habitat for the species in the eastern United States, mainly riparian and other broad-leaved woodlands, is widespread. This habitat is in contrast to habitat west of the Continental Divide, where suitable habitat is limited to narrow, and often widely separated, riparian patches. Distribution, population, and trend data indicate that, although regional declines have occurred, the yellow-billed cuckoo is fairly common as a breeding bird in much of the eastern United States. Causes of decline in the West include habitat loss, overgrazing, tamarisk invasion of riparian areas, river management, logging, and pesticides. Local extinctions and low colonization rates have also been identified as factors in the decline (Center for Biological Diversity, 1998).

Natural History and Occurrence in the Analysis Area

Western yellow-billed cuckoos were probably never generally common in Oregon. Historical records for the state show that breeding cuckoos were most often sighted in willow bottoms along the Willamette and Columbia Rivers. There are few records of

cuckoo sightings in eastern Oregon, and none in Sherman County (ORNHIC, 2005). Yellow-billed cuckoos are migratory. Cuckoos historically arrived in Oregon in mid-May and flew south to their wintering grounds in September. Never generally common in Oregon, cuckoos have become rarer with the loss of floodplain forests along the Willamette and Columbia Rivers. The last confirmed breeding records in Oregon were in the 1940s. Most of the recent records of cuckoos are from eastern Oregon at Malheur National Wildlife Refuge in Harney County, and from Malheur and Deschutes Counties. In 1998, the USFWS was petitioned to list the western yellow-billed cuckoo as an endangered species. The USFWS concluded that the western yellow-billed cuckoo is a distinct population segment (DPS) of the yellow-billed cuckoo in North America. The USFWS also determined that the western yellow-billed cuckoo DPS was warranted for listing, but was precluded by other higher priority listing actions, and instead the species was placed on the candidate species list (USFWS, 2005).

Q.3.1.4 Potential Adverse Impacts

Construction and operation of the Biglow Canyon Wind Farm Facility are not anticipated to have adverse impacts on bald eagle or yellow-billed cuckoo, and the risk to peregrine falcon is very low. To date, no bald eagle fatalities at wind projects have been reported (Erickson et al., 2001, 2002). Occasional prairie falcon fatalities have been observed at some wind projects, but there have been no published reports of peregrine fatalities (Erickson et al., 2001, 2002). Extremely low risk is anticipated for species, such as the peregrine falcon, observed within the site boundaries only infrequently; negligible risk is anticipated for species, such as the bald eagle, not observed within the site boundaries. However, the nesting ranges and locations of the peregrine falcon and bald eagle continue to expand, and therefore, risks over time could change.

The Facility will not affect any riparian habitat that could be considered habitat for the western yellow-billed cuckoo. A few cuckoos (yellow-billed and black-billed cuckoos) have been reported as fatalities in the eastern United States (Kerns and Kerlinger, 2004). The possibility exists that yellow-billed cuckoos could migrate over the analysis area; however, it is unlikely that the Facility area would be in a cuckoo migratory corridor, as the species is considered extirpated further north in Washington and British Columbia.

Q.3.2 Plants

Q.3.2.1 Natural History and Potential Occurrence in Analysis Area

Northern wormwood (Artemisia campestris var. wormskioldii)

This species is a federal candidate species. It can be found in arid areas, generally supporting shrub-steppe vegetation (big sagebrush/bluebunch wheatgrass and bluebunch wheatgrass/Sandberg's bluegrass associations). It is a regional endemic, known from two widely disjunctive sites along the Columbia River in Washington, one in Klickitat County and one in Grant County. There are no records of this species within the analysis area.

Henderson's ricegrass (*Achnatherum collinus* var. *laurentii*)

This species is a federal species of concern and is considered a candidate for listing under the Oregon ESA. It occurs in dry, rocky, shallow soil, in sagebrush or ponderosa pine habitats. There are no records of this species within the analysis area.

Robinson's onion (*Allium robinsonii*)

This species is a federal species of concern. It historically occurred on sand and gravel deposits on old terraces of the Columbia River from Vantage, Washington, to the mouth of the John Day River in Oregon. This species is currently considered extinct from the Oregon locale. The ORNHIC database lists two occurrences of this species. In 1925, a specimen was collected on the banks of the Columbia River just below the mouth of the John Day River. In 1935, a specimen was collected 10 miles east of Rufus, along rocky sagebrush slopes (ORNHIC, 2005).

Laurence's milk-vetch (*Astragalus collinus* var. *laurentii*)

This species is a federal species of concern and is listed as threatened under the Oregon ESA. This species grows in prairies, hillsides, and sagebrush valleys in central and southeastern Washington, southeast into Idaho, and in the foothills of the Blue and Wallowa Mountains of northern Oregon. This species occurs in basaltic grasslands and sagebrush deserts. There are no records of this species within the analysis area.

Q.3.2.2 Potential Impacts to Plants

The habitat type for Robinson's onion is not present within the analysis area. Northern wormwood habitat is present; however, this species was not located during the survey. As mentioned previously, it is a regional endemic, known from two widely disjunctive sites along the Columbia River in Washington. The probability of this species being present in the analysis area is very low. Small areas of habitat suitable for Laurence's milk-vetch and Henderson's ricegrass are present in the areas surveyed, but these species were not present; thus, no direct Facility-related impacts are anticipated to any federally or state-listed endangered, threatened, proposed, or candidate species, or any species of concern. None of these species is likely to occur within the Facility site.

Q.4 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: This section discusses actions taken to avoid or minimize impacts to species identified in (A), in order to comply with OAR 345-021-0010.

Q.4.1 Wildlife

Q.4.1.1 Bald Eagle

The Facility will be sited at least 3 miles from the centerline of the Columbia River and 1 mile from the centerline of the John Day River to, in part, avoid and minimize impacts to wildlife, including bald eagles and peregrine falcons, which are likely to be 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.4.1.2 Peregrine Falcon

The Facility will be sited at least 3 miles from both the Columbia River and 1 mile from the John Day River to, in part, avoid impacts to wildlife including bald eagles and peregrine falcons, which are likely to be 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.4.2 Plants

Because no direct Facility-related impacts to any federal or state endangered, threatened, sensitive, proposed, or candidate plant species are anticipated, no species-specific mitigation measures are proposed at this time. 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].

Q.5 FINDINGS THAT THE PROPOSED FACILITY IS NOT LIKELY TO CAUSE A SIGNIFICANT REDUCTION IN THE LIKELIHOOD OF SURVIVAL OR RECOVERY OF THE PLANT SPECIES IDENTIFIED

Q.5.1 Identified Plant Species with an ODA Protection and Conservation Program

OAR 345-021-0010(1)(q)(D) *For each plant species identified under (A), a description of how the proposed facility, including any mitigation measures, complies with the protection and conservation program, if any, that the Oregon Department of Agriculture has adopted under ORS 564.105(3);*

Response: No listed or candidate plant species were identified during the 2005 field investigations. Of the four species listed under (A) that could occur in the analysis area, ODA lists northern wormwood as endangered and Laurence's milk-vetch as threatened. No suitable habitat exists for Robinson's onion, limited areas of potentially suitable habitat exist for Laurence's milk-vetch and Henderson's ricegrass and suitable habitat exists for northern wormwood; however there are no records of this species occurring in Sherman County. The proposed Facility will not conflict with the ODA established protection and conservation programs for threatened and endangered plant species.

Q.5.2 Identified Plant Species without an ODA Protection and Conservation Program

OAR 345-021-0010(1)(q)(E) *For each plant species identified under (A), if the Oregon Department of Agriculture has not adopted a protection and conservation program under ORS 564.105(3), a description of significant potential impacts of the proposed facility on the continued existence of the species and on the critical habitat of such species and evidence that the proposed facility, including any mitigation measures, is not likely to cause a significant reduction in the likelihood of survival or recovery of the species;*

Response: Because no populations of listed plant species were identified within the analysis area, and the area lacks or is limited in suitable habitat for three of the four species, no adverse impacts are expected to occur to any plant species identified in (A) or to its habitat. For this reason, the proposed Facility will not have any significant effects on the long-term survival or recovery of any listed plant species.

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: Because of the low probability of use by the listed birds, plus the lack of presence of listed plants in the analysis area, and incorporating the mitigation measures described above, it is not expected that the Facility will have any significant impact on listed species. Furthermore, construction and operation of the Facility is not expected to have any significant impact on the critical habitat for any of the listed species. Accordingly, the Facility is not likely to cause a significant reduction in survival or recovery of the listed plant, fish or avian species.

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: A monitoring program will be designed to collect data that is standardized with methods used in monitoring programs at regional and national wind power facilities in order to compare and add to an ever-growing dataset important in management decisions. 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 Response and Reporting System for operations and maintenance personnel, and reclamation procedures for habitats temporarily impacted during construction.

Q.8 REFERENCES

Brown, E.R. (Ed.). 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. USDA Forest Service PNW Publication No. R6-F&WL-192-1985. 2 vols. Data cited from Appendix 8, Vol. 2.

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*). In: *The Birds of North America*, No. 506. A. Poole and F. Gill, eds. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Cederholm, D. J., D.H. Johnson, R.E. Bilby, L.G. Dominguez, A.M. Garrett, W.H. Graeber, E.L. Greda, and M.D. Kunze. 2001. Pacific Salmon and Wildlife - Ecological Contexts, Relationships, and Implications for Management. Pages 628-684. In: Honson, D.H. and T.A. Neil (eds.). Wildlife-Habitat Relationships in Oregon and Washington. Oregon State University Press, Corvallis, Oregon.

Center for Biological Diversity. 1998. Petition to list the yellow-billed cuckoo *Coccyzus americanus*as a Federally Endangered Species. Center for Biological Diversity. Endangered Species Report No. 36.

Erickson, W.P., G.D. Johnson, M.D. Strickland, K.J. Sernka, and R.E. Good. 2001. Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States. Prepared for the National Wind Coordinating Committee. Available at http://www.west-inc.com.

Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa and K. Bay. 2002. Synthesis and comparison of baseline avian and bat use, raptor nesting and mortality information from proposed and existing wind developments. Prepared for Bonneville Power Administration, Portland, Oregon.

Green, N.F. 1985. The bald eagle. Audubon Wildl. Rep. 1985. Pages 508-531.

Hansen, A.J., M.I. Dyer, H.H. Shugart, and E.L. Boeker. 1986. Behavioral ecology of bald eagles along the northwest coast: landscape perspective. Oak Ridge Nat. Lab. Environmental Science Div. Publ. No. 2,548. Oak Ridge, Tennessee.

Harmata, A.R. 1989. Bald Eagle *Haliaeetus leucocephalus*. Pages 65-67. In: T.W. Clark, A.H. Harvey, R.D. Dorn, D.L. Genter, and C. Groves (eds.). Rare, sensitive, and threatened species of the Greater Yellowstone Ecosystem. Northern Rockies Conservation Cooperative, Jackson, Wyoming. 186 pp.

Harmata, A.R., and R. Oakleaf. 1992. A management oriented study of bald eagle ecology in the Greater Yellowstone Ecosystem. Wyoming Game and Fish Department, 1 December 1992.

Hodges, J.I., E.L. Boeker, and A.J. Hansen. 1987. Movements of radio-tagged bald eagles, *Haliaeetus leucocephalus*, in and from southwestern Alaska. Can. Field Nat. 101:136-140.

Isaacs, F.B. 2004. Survey of peregrine falcon breeding areas in Oregon during 2004: final report. Oregon Eagle Foundation, Inc. Klamath Falls, Oregon.

Kerns, J., and P. Kerlinger. 2004. A study of bird and bat collision fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: annual report for 2003. Technical report prepared by Curry and Kerlinger, LLC, for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee.

Montana Bald Eagle Working Group (MBEWG). 1986. Montana bald eagle management plan. U. S. Department of the Interior, Bureau of Land Management, Billings, Montana.

Oregon Natural Heritage Information Center (ORNHIC). 2005. List of Rare, Threatened, and Endangered Plant and Animal Species in T1N, R17E, S 4, 5, and 8 and T2N, R17E, S1, 10-15, 22-27, 33, and 36 and T2N, R18E, S4-10, 14-18, and 20-23, W.M. ORNHIC, Portland, Oregon.

Stalmaster, M.V., R.L. Knight, B.L. Holder, and R.J. Anderson. 1985. Bald eagles. Pages 269-290. In: E.R. Brown (ed.). Management of wildlife and fish habitats in forests of western Oregon and Washington. USDA Forest Service, USDI Bureau of Land Management.

Smith, M.R., P.W. Mattocks, Jr., and K.M. Cassidy. 1997. Breeding birds of Washington state location data and predicted distributions. Seattle Audubon Society Publications in Zoology No. 1. Seattle, Washington. 538 pp.

U.S. Fish and Wildlife Service (USFWS). 1978. Determination of Certain Bald Eagle Populations as Endangered or Threatened. Federal Register 43:6230-6233.

U.S. Fish and Wildlife Service (USFWS). 1986. Recovery plan for the Pacific bald eagle. Portland, Oregon

U.S. Fish and Wildlife Service. 1995. Endangered and Threatened Wildlife and Plants: Final Rule to Reclassify the Bald Eagle from Endangered to Threatened in All of the Lower 48 States. Fed. Reg. 60(133):36000-36010.

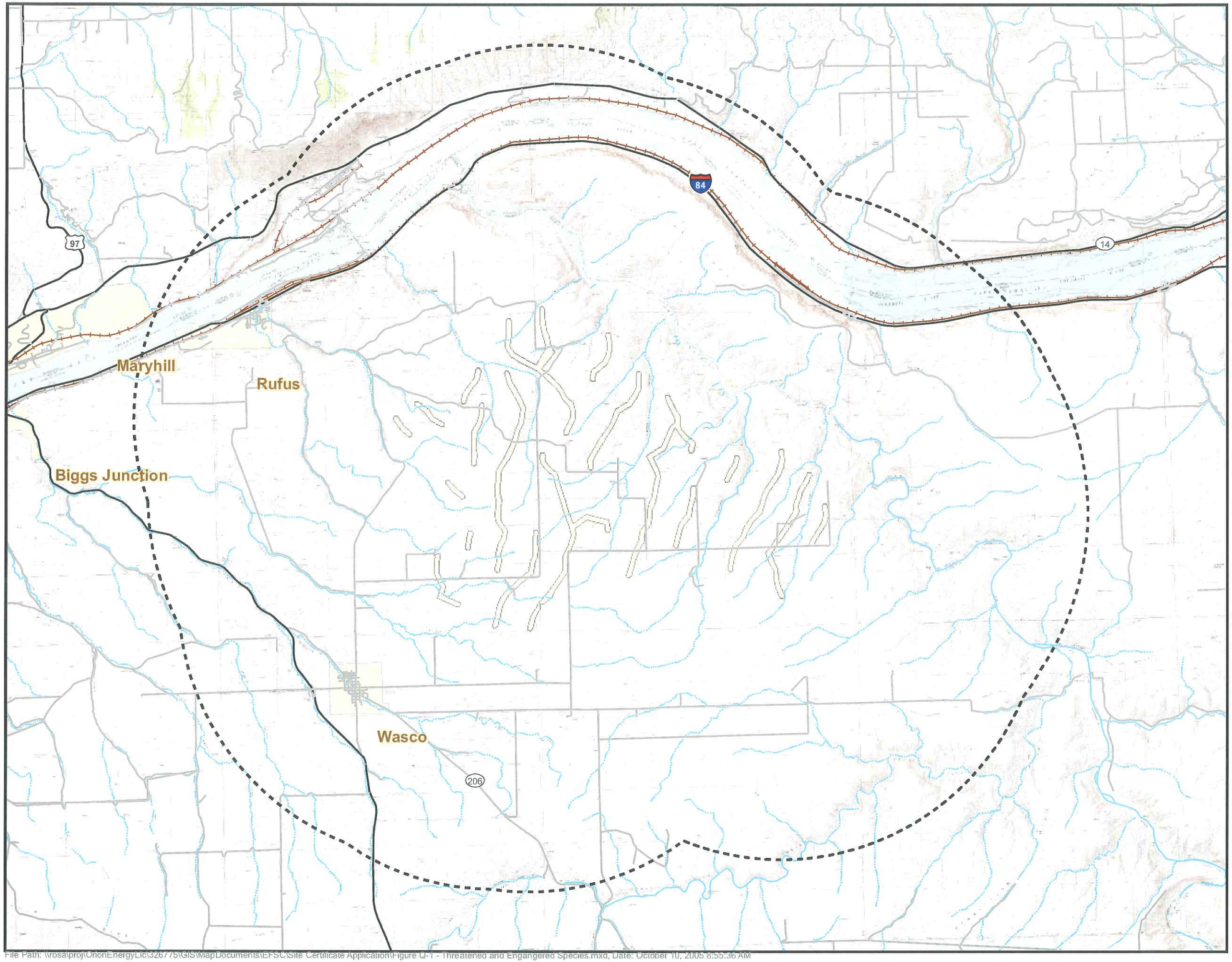
U.S. Fish and Wildlife Service. 1999. Endangered and Threatened Wildlife and Plants: Proposed Rule to Remove the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife. Federal Register 64(128):36454-36464.

U.S. Fish and Wildlife Service (USFWS). 2005. Federally Listed and Proposed and Endangered and Threatened Species, Candidate Species, and Species of Concern that may occur in Sherman County. Received July 7, 2005.

U.S. Forest Service (USFS). 1977. Bald eagle habitat management guidelines. U.S. Department of Agriculture, Forest Service. San Francisco, California.

ATTACHMENT Q-1

Map of Threatened and Endangered Species Analysis Area



Attachment Q-1

Threatened and Endangered Species Analysis Area

Biglow Canyon Wind Farm

ORION ENERGY LLC

Legend

- Highway
- Major Road
- Railroads
- Rivers/Lakes
- Proposed Turbine Corridors
- 5-mile Threatened and Endangered Species Analysis Area

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ATTACHMENT Q-2

Resumes of Plant Surveyors

Nichole Coulter

Staff Scientist II

Education

M.S. Biology with a concentration in Plant Ecology, Drexel University

B.S. Biology, Chestnut Hill College

Distinguishing Qualifications

- Performs wetland delineations and functional assessments for wind and transportation projects in Washington and Oregon
- Performs rare plant surveys for transportation projects in Washington
- Writes expanded SEPA Checklist Document and prepares Conditional Use Permit (CUP) applications for wind projects
- Prepares FAA applications for wind projects
- Prepares Wetland Delineation Technical Reports, Joint Permit Applications (Oregon), and JARPA applications (Washington) for agency submittal
- Assisted in preparing an Oregon Energy Facility Siting Council (EFSC) Site Certificate Applications (SCA) for submittal

Relevant Experience

Nichole Coulter is a biologist with CH2M HILL's Water Business Group in Portland, Oregon. She has 9 years of experience assisting permitting efforts for environmental and transportation projects and performing environmental and biological surveys at the federal and local levels. Prior to joining CH2M HILL, she managed wetland monitoring, environmental cleanup, and biological survey projects for the Port of Vancouver, Washington. She managed the Port's environmental permits for both existing and new development activities and coordinated with various state, local, and federal agencies through the permitting process. At the Academy of Natural Sciences of Philadelphia, she performed botanical surveys for the City's 5,000 acre Fairmount Park System and assisted in the Park's Master Planning effort. As a Fellow with the Environmental Protection Agency (EPA), Nichole evaluated impacts and recommended actions for proposed wetland projects pursuant to Section 404 of the Clean Water Act.

Representative Projects with CH2M HILL

Environmental Permitting; Salmon Creek Waste Management System Project; Clark County, Washington. Led environmental permitting for the Salmon Creek Waste Management System.

Federal 404 and State (DSL) Fill-Removal Permitting. Led this effort for bank stabilization and wetland fill projects.

Biological Assessments; Oregon Department of Transportation (ODOT) and Washington Department of Transportation (WSDOT). Assisted in writing Biological Assessments (BA) for proposed road widening projects for both ODOT and WSDOT.

Nichole Coulter

Wind Energy Permitting: Led the environmental permitting effort for several proposed wind farm developments in eastern WA, including the Last Mile Electric Project and the Hopkins Wind Energy Project. Prepared SEPA Checklists, CUP applications, FAA applications and JARPA permits for submittal to state, federal, and local permitting agencies. Performed wetland delineations for wind energy projects. Coordinated with natural resource agencies and attends public hearings. Participated in the preparation of the OR EFSC application for the Scenic Vista Wind Energy Project.

Experience Prior to CH2M HILL

2/2002-6/2003 Port of Vancouver, Washington. Environmental Specialist.

- Managed wetland monitoring, environmental cleanup and biological survey projects
- Environmental Impact Statement (EIS) review
- Managed the Port's environmental permits for both existing and new development activities and coordinated with various state, local and federal agencies through the permitting process
- Wrote detailed Environmental Standard Operating Procedures (SOPs) as a framework for the Port's Environmental Compliance program and provided staff training. SOPs included: Storm Water pollution Prevention Plan (SWPPP), Osprey Management, Wellhead Protection, and Environmental Auditing.

4/2001-12/2001 Boateng and Associates, Inc., Mercer Island, Washington. Field Biologist/Area Supervisor.

- Supervised fourteen field biologists under a contract with US Forest Service (USFS)
- Performed amphibian and mollusk surveys for highway projects
- Performed rare plant surveys in the National Forests of Oregon and Washington, which entailed the identification of vascular plants, lichens and bryophytes.

1998-2001 The Academy of Natural Sciences, Philadelphia, Pennsylvania. Research Scientist

- Lead a vegetation assessment of Fairmount Park, which included botanical surveys of the park's 5,000 acres of natural land.
- Wrote detailed master plan reports outlining the findings of the current status of the vegetation of Fairmount Park and the associated restoration recommendations at each site.
- Performed research on the effects of invasive plant species in the urban park system. This involved field and greenhouse experiments with Japanese Knotweed (*Polygonum cuspidatum*) and Norway maple (*Acer platanoides*).
- Performed riparian plant surveys for a under dam removal project. This entailed monitoring the changes in wetland and riparian vegetation using a combination of experimentation and surveys in upstream and downstream locations to assess the effects of dam removal on the riparian plant community.
- Performed two years of plant surveys for stream restoration projects in Pennsylvania under and EPA grant

1994-1997 U.S. Environmental Protection Agency, Philadelphia, Pennsylvania. Fellow.

- Evaluated impacts and recommended actions for proposed wetland projects pursuant to Section 404 of the Clean Water Act in the states of Maryland, Delaware and Virginia
- Reviewed ElSs and EAs for proposed projects pursuant to the Endangered Species Act

Nichole Coulter

- Performed benthic invertebrate sampling and water quality sampling in the Chesapeake Bay on the O.S.V. Peter W. Anderson

Publications/Presentations

Hession, W.C., T.E. Johnson, D.F. Charles, D.D. Hart, R.J. Horwitz, D.A. Kreeger, J.E. Pizzuto, D.J. Velinsky, J.D. Newbold, C. Cianfrani, T. Clason, A.M. Compton, N. Coulter, L. Fuselier, B.D. Marshall, and J. Reed. 2000. Ecological benefits of riparian reforestation in urban watersheds: Study design and preliminary results, Environmental Monitoring and Assessment, 63 (1):211-222.

Jay Lorenz, Ph.D., P.W.S.

Natural Resources/Wetlands
Senior Technologist Habitat Planning and Management

Education

Ph.D. Resource Geography, Oregon State University
M.S. Zoology, University of Massachusetts
B.A. Biology, Hampshire College

Distinguishing Qualifications

- Professional natural resource scientist with 30 years experience, 13 in wetland consulting in Oregon and Washington
- Has conducted more than 300 wetland projects in Oregon and Washington including wetland delineations; state and federal permitting; mitigation landscape design; mitigation installation and monitoring; endangered plant surveys; biological reviews and consultations.
- Large Scale Wetland Inventories
- Mitigation Banking

Relevant Experience

Dr. Lorenz has 30 years of experience in research, teaching, Extension Service education, and consulting. He has been providing wetland consulting services in Oregon and Washington for more than 12 years. Over the course of his career, Dr. Lorenz has organized workshops on principles and practices in watershed management in eastern Oregon and was the co-principal investigator of two large-scale wetland inventories. His work includes complex and large-scale wetland delineations on agricultural land; linear transportation projects and bridge replacements; forensic wetland determinations; wetland inventories; and wetland mitigation banking. He has helped clients through the maize of state and federal wetland permitting including mitigation design, installation, and monitoring. Dr. Lorenz currently serves on a member on a state (Oregon) Technical Advisory Committee whose objective is to provide recommendations for developing a rapid assessment methodology for evaluating wetland functions.

Representative Projects

Wetland Inventories

Project Manager/Co-Principal; Salem-Keizer Urban Growth Area, Oregon; 1997-1998. Served as project manager and principal field investigator for conducting a Local Wetland Inventory to the standards of the Oregon Division of State Lands. Over 1,000 acres of wetlands were mapped within a study area of 46,000 acres. Coordinated data input into GIS format. Functional assessments using the Oregon Freshwater Assessment Methodology were provided for each wetland. Prepared and edited written report, including an assessment of potential sites for wetland mitigation.

Jay Lorenz

Co-Principal; Warms Springs Indian Reservation; Oregon; 1995-1996. A wetland inventory, conducted over two field seasons, was completed for an area of 640,000-acres. The purpose of the inventory was to provide base-line data for the creation of habitat management plans. Wetland habitats included high elevation bogs, Palustrine forest, Palustrine Scrub-shrub, and Palustrine Emergent wetlands. Vernal pools were identified and mapped in the drier, eastern portion of the Reservation. Criteria for rating the quality of wetlands were provided.

Mitigation Banking

Frazier Creek Wetland Mitigation Bank; Wetland Delineation; 2000-present. On 26-acres of farmland, prepared the mitigation bank instrument, coordinating with a mitigation bank review team comprised of state and federal agencies; prepared the landscaping plan; assisted attorney with preparation of conditions, covenants, and restrictions (CC&Rs); prepared the biological assessment and informal ESA consultation; providing annual mitigation monitoring.

Linear/Transportation

Oregon Bridge Delivery Partners, Bundle 218, 2005-present. Environmental task lead for three bridge projects; two replacement and one repair.

Tillamook County Bridges; Tillamook, Oregon, 2004/2005. Environmental task lead. Prepared and obtained state and federal (Section 404) permits for two bridge replacement project. Scouring under one of the bridge abutments was a contributing factor in deciding to replace the bridge. Tasks included coordination with Oregon Department of Fish and Wildlife concerning in-water isolation and fish passage.

Canal Bridge; Lake Oswego, Oregon, 2004/2005. Environmental task lead. Prepared and obtained state and federal (Section 404) permits for a bridge replacement project. Tasks included coordinating with cultural resources staff and fish biologists concerning historic status of the bridge and fish salvage permitting.

Bridge Replacement; City of Keizer, Oregon; 2004. A wetland delineation, Biological Assessment (BA), and a joint federal/state permit applications were prepared for a bridge replacement project.

Bank Repair; Mill Creek; Millbridge Terrace Apartments; Salem, Oregon; 2004. A wetland delineation, BA; Endangered Species Act (ESA) consultation, and a joint federal/state permit application were prepared for a bank stabilization project.

Wetland Consultant; Lane County Department of Public Works; Oregon; 2000-2001. Served as an on-call wetland consultant conducting wetland reconnaissance and wetland delineations for road projects.

Other Delineations and Permitting

Wetland Consultant; Proposed Private High School (50-acre site); Sammamish, Washington; 2001-2004. Conducted and prepared wetland delineations following methods in the *1987 Corps of Engineers Wetlands Manual;* reviewed and commented on draft and final EIS; conducted an endangered plant survey; prepared Joint Aquatic Resources Permit Application (JARPA) and obtained 404 permit.

Jay Lorenz

Wetland Consultant; Multi-Phased Residential/Commercial Development (400-acre site); Timberhill Corporation; Corvallis, Oregon; 1997-2004. A private wetland inventory was conducted for the purpose of preparing a master plan for the site. Numerous formal wetland delineations were completed for specific projects within the overall development area. Four joint federal/state wetland fill permits were prepared, including mitigation design. Conducted endangered plant surveys, particularly for *Sidalcea nelsoniana.* Mitigation monitoring services were provided.

Wetland Consultant; Lexington Subdivision (100-acre site); Albany, Oregon; 1995-2000. Wetlands were delineated on 100-acres of agricultural land. A joint federal/state wetland permit application and mitigation plan was successfully approved. Monitoring services for the 3-acre mitigation site were provided for a period of three years. Emergent and shrub wetlands were successfully established.

Wetland Consultant; Pacific Properties; King County, Washington; 2001-2004. On-call wetland consulting services were provided for one of the regions largest private residential developers. Services included wetland determinations and delineations; local wetland permitting; coordination of mitigation installation; and mitigation monitoring (more than 24 sites).

Wetland Consultant; Big Meadow Subdivision (100-acre site); Molalla, Oregon; 1998-2004. On-site and forensic wetland determinations on farm and forest land were provided. Assisted an attorney, the developer, and project engineer in settling controversial state and federal permitting issues. A wetland mitigation plan for a 14-acre site was prepared. Provided oversight during mitigation installation and prepared the as-built monitoring report.

Wetland Consultant; Ambleside Meadows Subdivision (35-acre site); Springfield, Oregon; 1997-2004. Wetland consulting services were provided beginning with pre-project planning, through permitting and mitigation monitoring. Five years of monitoring a 1-acre wetland mitigation site was completed in 2004.

Professional Registrations

Certified Professional Wetlands Scientist

EXHIBIT R

SCENIC AND AESTHETIC VALUES

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

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TABLE

R-1 Identification of Applicable Federal Land Management Plans and Local Land Use Plans that Pertain to Areas Within 30 Miles of the Facility Site R-3

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R.1 INTRODUCTION

Exhibit R addresses the potential impacts of the proposed Biglow Canyon Wind Farm Facility (Facility) 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 and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans for the analysis area, providing evidence to support a finding by the Council as required by OAR 345-022-0080[.]*

Overview

A systematic analysis was undertaken in response to these requirements. The first step was to create a map displaying the location of the Facility site and the surrounding areas within 30 miles of the site. Within this 30-mile zone, scenic and aesthetic areas were identified based on provisions of applicable federal land management plans and local land use plans. To narrow the area requiring more detailed analysis, a Zones of Visual Influence (ZVI) analysis was conducted to identify the areas from which the proposed Facility's wind turbines might be visible. The ZVI data were overlaid on the map of areas for which federal land management and local land use plans have been prepared. The resulting map is presented as Figure R-1. Review of this map made it possible to identify those scenic areas identified in federal and local management or land use plans from which the Facility might be visible, and for which further analysis was required. At the same time, areas from which the Facility will not be visible were identified and dropped from further evaluation.

The ZVI analysis involved use of the Zones of Visual Influence feature of the Wind Farmer software program, a sophisticated program developed to assist in the planning, design, and environmental assessment of wind power projects. To identify the areas from which the planned turbines might be visible, the ZVI module makes use of a digital height model generated from digital height contour lines. The program calculates lines of sight between each point on the land surface and a defined point on each of the proposed turbines and notes whether there is an unobstructed view toward the turbine. When the analysis is complete, the module produces maps showing the areas from which the turbines might be visible, and creates the maps in a way that indicates the numbers of turbines visible from each point in the surrounding landscape on a clear day.

The ZVI data presented in Figure R-1 represent the potential visibility of the 150-turbine Maximum Turbine Layout. For this purpose, in order to analyze the greatest visual impact, the towers were assumed to be 85 meters (279 feet) tall and the rotors were assumed to be 100 meters (328 feet) in diameter. This ZVI analysis was compared to the ZVI analysis for the 225-turbine Minimum Turbine Layout, where the towers were assumed to be 80 meters (262 feet) tall, and the rotors were assumed to be 82 meters (269 feet) in diameter. Based on a comparison of these two ZVI analyses, the ZVI analysis of

the Maximum Turbine Layout was selected as the "worst case" for use in identifying areas from which the Facility might be visible.

It is important to note that the visibility pattern the ZVI analysis presents is highly conservative. First, in some areas where the model indicates Facility visibility, it might be that the only parts of the Facility that could be seen will be the tips of the blades, which will be hardly noticeable at some locations. In addition, the analysis does not take into account the screening role of structures, vegetation, and trees, so there are some areas where Facility visibility is indicated but where views of the turbines would be screened by trees, vegetation, or other structures in the foreground. Finally, the ZVI model is a line-of-sight model that does not account for attenuating factors such as distance, haze, humidity, background landscape, or weather, which will make the Facility invisible or barely visible from certain locations under many atmospheric or weather conditions.[1]

For two of the areas in which adopted federal land management plans include a focus on aesthetic values, close-up maps are presented (Figures R-2 and R-3) that permit a more detailed understanding of the Facility's potential visibility in these specially managed areas. For these areas, photographs are presented of views that are representative or especially sensitive to provide a tangible feel for the area's aesthetic characteristics. Such an understanding will provide a context for evaluating how the existing visual conditions might be changed by the visibility of the Facility in the views. In evaluating the extent to which the presence of the Facility might adversely affect the scenic and aesthetic values identified in the federal land management plans and in local land use plans, an analysis was conducted following standard professional methods that are based on the procedures for evaluation of aesthetic impacts developed by federal agencies such as the U.S. Bureau of Land Management (BLM), the U.S. Forest Service (USFS), and the Federal Highway Agency (FHA).[2]

OAR 345-022-0080(1) requires that "the Council must find the design, construction, operation, and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area described in the project order."

This Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(r) and provides evidence to support a finding by the Council as required by OAR 345-022-0080.

R.2 APPLICABLE FEDERAL LAND MANAGEMENT PLANS AND LOCAL LAND USE PLANS

OAR 345-021-0010(1)(r)(A) *Identification of the applicable federal land management plans and local land use plans:*

[1] The ZVI analysis is based on visibility that would occur at 2 meters (6.6 feet) above ground level, which is somewhat higher than the average eye level for an upright adult.

[2] These methods are documented in Smardon et al., 1986.

Response: Table R-1 lists the areas indicated on Figure R-1 that are identified in applicable federal land management plans and local land use plans. Those areas from which the Facility will be potentially visible are identified, and pertinent plan documents are listed.[3]

Table R-1 Identification of Applicable Federal Land Management Plans and Local Land Use Plans that Pertain to Areas Within 30 Miles of the Facility Site

Plan Category/Area/Applicable Plans	Facility Not Visible in the Plan Area	Facility Potentially Visible in the Plan Area and Further Analysis Required
Applicable Federal Land Management Plans		
Columbia River Gorge National Scenic Area		
Management Plan for the Columbia River Gorge National Scenic Area, September 1992, revised May 10, 2004		X
Klickitat River	X	
Deschutes River		
Two Rivers Resource Management Plan Record of Decision, 1986	X	
Lower Deschutes River Management Plan Record of Decision, February 1993	X	
John Day River		
Two Rivers Resource Management Plan Record of Decision, 1986		X
Final John Day River Plan Record of Decision, 2001		X
Oregon Trail [1]	X	
Local Land Use Plans		
Sherman County		
Sherman County Comprehensive Land Use Plan, October, 25, 2000		X
Gilliam County		
Gilliam County Comprehensive Land Use Plan, October, 25, 2000		X
Wasco County		
Comprehensive Plan for Wasco County, August 25, 1983		X
Morrow County	X	
Klickitat County, Washington		
Klickitat County Comprehensive Plan		X
Klickitat County Energy Overlay Zone, March 15, 2005		X
Yakima County, Washington	X	
The Dalles	X	
Goldendale Washington	X	

[1] In the Management and Use Plan Update: Final Environmental Impact Statement, Oregon National Historic Trail and Mormon Pioneer National Historic Trail (U.S. National Park Service, August 1999), identification of scenic and aesthetic values is restricted to a selected number of "high-potential sites." The locations of the high-potential sites in the analysis area are indicated on Figure R-1. All of these sites lie outside the areas from which the Facility's turbines might be visible.

[3] Note that scenic or aesthetic areas or values in the State of Washington fall outside of the jurisdiction of the EFSC process, unless they are part of a federal land management plan.

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

OAR 345-021-0010(1)(r)(B) *Identification and description of the scenic and aesthetic values identified as significant or important in the applicable plans;*

Response: Significant or important scenic and aesthetic values for each applicable plan are as follows:

Federal Land Management Plans

Columbia River Gorge National Scenic Area

Management Plan for the Columbia River Gorge National Scenic Area, September 1992, revised May 2004. The Columbia River Gorge National Scenic Area (CRGNSA) consists of the 80-mile corridor extending along the Columbia River from Troutdale to the Deschutes River. The Facility site lies outside of and approximately 10 miles to the east of the Scenic Area's eastern boundary.

The Columbia River Gorge was the first and is still the only National Scenic Area (NSA) in the United States. The federal legislation that established the NSA in 1986 specified that its purposes are to:

- Protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge

- Protect and support the economy of the Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development in a manner that is consistent with protection of resources

The Scenic Area Management Plan, adopted by the Columbia River Gorge Commission in 1991, and concurred with by the U.S. Secretary of Agriculture (the cabinet secretary responsible for the U.S. Forest Service) in 1992, establishes policies and guidelines for resource protection that are implemented by the National Scenic Area Ordinance adopted by the local jurisdictions within the NSA boundaries. The ordinance and management plans designate Urban Areas, General Management Areas, and Special Management Areas. The Urban Areas are exempt from NSA regulations, allowing continuation and expansion of urban uses. The most environmentally and visually sensitive lands in the NSA are designated as Special Management Areas, where development is strictly regulated and limited to agriculture, compatible forestry activities, recreation, and residential development on parcels of 40 acres and larger. The rest of the lands in the Scenic Area are designated as General Management Areas, where a range of compatible land uses and activities is allowed.

The NSA Management Plan and Ordinances also designate key viewing areas within the NSA. The key viewing areas are considered to be the most important vantage points within the Scenic Area from which the public views Scenic Area landscapes. Four of these key viewing areas are located in the Facility's 30-mile radius analysis area. The locations of these four areas – the Columbia River, the Historic Columbia River

Highway, Highway I-84, and Washington State Route 14—are indicated on Figures R-1 and R-2. As discussed in the following paragraphs, review of Figure R-2 indicates that from all four of these areas, the Facility might possibly be visible as a feature in the far distance.

Management plans for the NSA do not apply directly to development, such as the Facility, located outside of the NSA. Chapter 7 of the NSA Management Plan specifies in its savings provisions that "neither the Forest Service nor the Gorge Commission may establish any buffer zones or protective perimeters outside the boundaries of the Scenic Area." Revision of the exterior NSA boundaries can be accomplished only by Congressional action. As a consequence, no direct federal NSA review of activities at the Facility site is required. Nonetheless, in applying the Council's scenic areas standard, the Applicant relies upon the identification and assessment of scenic resources within the NSA, and considers the potential impact of the Facility on these resources.

Deschutes River

Two Rivers Resource Management Plan and Record of Decision, June 1986. The basic policy direction for the management of the public lands along the lower Deschutes River was set by the BLM's 1986 management plan for the BLM Two Rivers management district that encompasses Hood River, Wasco, Sherman, and Gilliam counties as well as parts of Crook and Jefferson counties. This plan identified the areas in the canyons occupied by the Deschutes and John Day rivers as being areas of high visual quality, and it designated these areas as Special Management Areas. The language of this designation specifies:

> "Areas of high visual and natural quality in the canyon areas (approximately 139,000 acres) will continue to be protected while allowing compatible uses in the same area. A cooperative role with the State Parks and Recreation Division of the Oregon Department of Transportation in managing public lands consistent with the intent of the Oregon Scenic Waterways Act will be continued."

It is important to note that BLM's management plans and policies do not apply directly to lands, such as the Facility site, located outside the jurisdictional boundaries of BLM's plans. BLM's plans are helpful, however, in identifying and assessing scenic resources.

The ZVI data displayed on Figures R-1 and R-2 indicate that with the exception of a small area on the upper slopes of the Deschutes River canyon, the Facility's turbines will not be visible from BLM lands within the Deschutes River canyon that fall under the jurisdiction of this plan.

Lower Deschutes River Management Plan Record of Decision, February 1993. More specific policy direction for the management of land along the lower Deschutes River is set in the Lower Deschutes Management Plan for which a Record of Decision (ROD) was issued in February 1993. The geographic jurisdiction of this plan is the river designated as National Wild and Scenic River (WSR), which has a variable boundary averaging approximately ¼ mile on either side of the river. Developments outside of the ¼-mile buffer, regardless of their scenic impacts, are not regulated by this plan. As review of Figure R-1 indicates, the proposed turbines will not be visible in the area at the bottom

of the canyon within the ¼-mile zone on either side of the banks of the Deschutes River. As a consequence, the Facility will not create conflicts with the provisions of this plan.

John Day River

Two Rivers Resource Management Plan and Record of Decision, June 1986. As indicated by the ZVI pattern on the John Day River detailed area map presented as Figure R-3, the Facility will be visible to some degree in scattered locations along the northern reach of the John Day River, up to about river mile 17. The basic policy direction for management of public lands along the lower John Day River was set by the BLM's 1986 management plan for the BLM Two Rivers management district that encompasses Hood River, Wasco, Sherman, and Gilliam counties as well as parts of Crook and Jefferson counties. This plan identified the areas in the canyons occupied by the Deschutes and John Day rivers that are areas of high visual quality, and it designated these areas as Special Management Areas.

The BLM has placed the lands along this segment of the river in VRM Class II, a management classification that permits management activities resulting in changes to the existing character of the landscape, provided that they do not attract the attention of the casual observer.

As with the Deschutes River, it is important to note that BLM's management plans and policies do not apply directly to lands, such as the Facility site, located outside the jurisdictional boundaries of BLM's plans. BLM's plans are helpful, however, in identifying and assessing scenic resources.

Record of Decision John Day Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments, February 2001. Beginning at Tumwater Falls, near river mile 10, and upstream through the study area, the John Day River is designated as a National WSR. The WSR designation and the WSR plan apply to the river itself and to the lands that lie within ¼ mile of each bank. Outstanding remarkable values that the plan identifies along this segment of the river include "scenic, recreation, fish, wildlife, geological, paleontological, and archaeological." Botanical and ecological values are identified as being significant. The plan classifies the WSR segment in this area as Recreational, meaning that at the time of designation, the segment was readily accessible by road or railroad, might have some shoreline development, and might have undergone some impoundment or diversion in the past. The ROD indicates that along the part of the river in the study area, there would be no change in the VRM class, which would mean that the BLM lands in the WSR along this segment of the river would be managed in accordance with VRM Class II standards, permitting changes to the existing character of the landscape that do not attract the attention of the casual observer. Because the area of jurisdiction of this plan is the National Wild and Scenic River, which has a variable boundary that extends only ¼ mile on either side of the river, developments outside of the ¼-mile buffer, regardless of their scenic impacts, are not regulated by this plan.

This same segment of the John Day River, located upstream and south of Tumwater Falls, is also designated as a State Scenic Waterway pursuant to the Oregon State Scenic Waterways Act, ORS 390.805-390.020. The Scenic Waterway designation encompasses

the river itself and the lands that lie within ¼ mile of its high water line. Under the State Scenic Waterways Act, the river segments in the Facility analysis area have been classified as a Scenic River Area, i.e., river segments that are "...accessible by roads in places but contain related adjacent lands and shorelines still largely primitive and undeveloped except for agriculture and grazing. Scenic River Areas are administered to preserve their undeveloped character, maintain or enhance their high scenic quality, recreation, fish, and wildlife values while allowing continued agricultural use." The State's rules for the management of lands in Scenic River Areas (ORS 736-040-0065) include provisions that all new development (e.g., farm-related dwellings) must conform to County land use regulations and that all new development must be screened to the extent feasible. The guideline for new utility facilities in Scenic River Areas (OAR 736-040-0065)is that they share existing utility corridors, minimize ground and vegetation disturbance, and make use of non-visible alternatives when reasonably possible.

While the federal and state management plans are helpful in identifying and characterizing scenic resources along the Deschutes and John Day rivers, the plans are not directly applicable to the proposed Facility because it lies outside of the areas regulated by these plans.

Local County Land Use Plans

Sherman County

Sherman County Comprehensive Land Use Plan 1994, revised June 2003. Physical Characteristics—Section XI of the *Sherman County Comprehensive Plan* identifies important landscape features within the County. These include rock outcroppings, trees, and the John Day and Deschutes River canyons (Sherman County, Oregon, 2003).

The County's Goal X is to "preserve the integrity of the Sherman County Landscape." Policy I of Goal X states "trees should be considered an important feature of the landscape and therefore the County Court shall encourage the retention of this resource when practical" (Sherman County, Oregon, 2003).

Goal XII is to "provide for the rational use of all resources within the designated Deschutes and John Day Oregon State Scenic Waterways." Policy I of Goal XII states "designation of the John Day and Deschutes rivers to the National Wild and Scenic River System shall be opposed" (Sherman County, Oregon, 2003).

Section XV states the County finds it has wind resources that have not been utilized since widespread use of electricity was introduced. Under Goal XVIII to conserve energy resources, the County defines a policy to "cooperate with public agencies and private individuals in the use and development of renewable resources" (Sherman County, Oregon, 2003).

The segment of US 97 extending from Biggs in Sherman County to Baker City in Baker County has been designated by the Oregon Department of Transportation (ODOT) as the Journey Through Time Scenic Byway. A guide to Oregon's Scenic Byways published

by ODOT and the Oregon Tourism Commission (1999) characterizes this byway as celebrating 50 million years of Oregon history by providing a route through an area with abundant fossils, pioneer trails, ghost towns, and other remnants of the old west. Features mentioned by the guide along the segment of the scenic byway in the Facility study area are Biggs, which is characterized as a traditional Native American salmon-harvesting site; Wasco, with its original Columbia Southern Railroad depot; and Moro, home of the Sherman County Historical Museum. Although the Facility will be visible from locations along US 97, there are no scenic overlooks or vista points along the segment of highway in the vicinity of the Facility site. ODOT, which administers US 97, has not identified any specific views in this segment of the route as scenic. The *Sherman County Comprehensive Plan* acknowledges the state Scenic Byway designation for US 97, but provides no specific policies related to its scenic or aesthetic values.

Gilliam County

Gilliam County Comprehensive Land Use Plan, October 25, 2000. Part Five of the County's Comprehensive Plan focuses on conservation of open space and natural and scenic resources, intending to comply with statewide planning Goal 5 (Opens Spaces, Scenic and Historic Areas, and Natural Resources) and Goal 8 (Recreation Needs) (Gilliam County, Oregon, 2000).

In Finding 2 of Part 5, the County identifies "rock outcroppings marking the rim and walls of steep canyon slopes as an important characteristic of the County's landscape" (Gilliam County, Oregon, 2000). In Finding 7 of Part 5, the County identifies the John Day River corridor as an important scenic resource. The County defers to the Oregon State Scenic Waterways Act (ORS 390.805-390.925) to govern this resource and deems additional regulation unnecessary.

Policy 2 of Part 5 states that "it is the policy of Gilliam County to publicize provisions of state law relative to Scenic Waterways, to render all possible assistance in enforcement of the laws, rules, and regulations pertaining to State designated Scenic Waterways and to otherwise aid in the implementation of the declared policy of the State of Oregon with respect to such waterways. Conflicts between agricultural and recreational uses in this area should be resolved in favor of agriculture" (Gilliam County, Oregon, 2000).

Wasco County

Comprehensive Plan for Wasco County, August 25, 1983. The *Comprehensive Plan for Wasco County* identifies the Deschutes and John Day Scenic Waterways, the White River canyon, and the Columbia River Gorge as important scenic resources. Two of these areas, the Columbia River Gorge and the Deschutes River canyon lie within the Facility's 30-mile radius scenic and aesthetic analysis area. These areas are noted on Figures R-1 and R-2, and review of these figures indicates that the Facility's proposed turbines might be visible in distant views from parts of these areas.

Klickitat County, Washington

Klickitat County Comprehensive Plan. August 1977. References to aesthetic values in the *Klickitat County Comprehensive Plan* are limited to those that exist in an urban exempt area outside of White Salmon, which is outside the 30-mile analysis zone, and those related to the Columbia River Gorge National Scenic Area (Herrington, pers. comm.).

In addition to the views related to the NSA, Washington State Highway 14, part of which is in Klickitat County, provides the most readily accessible views toward the Facility site from the part of the NSA that lies within Klickitat County.

Klickitat County Energy Overlay Zone. March 2005. Over a period of three years, Klickitat County studied the potential impacts of future energy projects within its borders and came up with a plan to direct those projects to the most appropriate areas. The county's new "Energy Overlay Zone" is a zoning tool aimed at expediting renewable energy development. The Energy Overlay Zone covers more than 1,000 square miles, two-thirds of Klickitat County. The Final Environmental Impact Statement (FEIS) for the Energy Overlay Zone was released in August 2004 and an Ordinance was adopted on March 15, 2005.

Yakima County, Washington/Yakama Indian Reservation

The ZVI analysis presented in Figure R-1 indicates that turbines in the Facility might be visible in a very small area at the southern edge of Yakima County. This area also falls within the boundaries of the Yakama Indian Reservation. Because this small area is approximately 29 miles from the closest turbine, at the outer edge of the Scenic and Aesthetic study area, the turbines have a low probability of being detectable under most atmospheric and lighting conditions. As a consequence, they are unlikely to have an impact of any kind on views from this area, much less a significant impact. For this reason, no further analysis was done of aesthetic values that might be reflected in plans for Yakima County and the Yakama Indian Reservation.

R.4 SIGNIFICANT POTENTIAL ADVERSE IMPACTS TO SCENIC AND AESTHETIC VALUES

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

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

Response: The Facility is proposed for an agricultural area devoted primarily to dry land winter wheat production where there is little natural vegetation and few significant rock outcrops. As a consequence, although the Facility will result in the conversion of relatively small areas of agricultural lands and a minor amount of Conservation Reserve Program (CRP) lands to access roads and turbine pads, construction, operation, and retirement of these facilities is not anticipated to result in removal of aesthetically important natural vegetation, to require substantial grading, to alter important rock outcroppings, or to require removal of significant numbers of trees (if any). Thus, the Facility will have no

adverse effect on rock outcrops or trees identified as important landscape features in the *Sherman County Comprehensive Plan*, and will be consistent with Policy I, Goal 10 of the plan, which encourages tree retention. Further, the Facility will not create significant adverse impacts to vegetation or to other features of the natural landscape.

(ii) Visual impacts of facility structures, including cooling tower or other plumes, if any; and

Response: Up to approximately 150 to 225 wind turbines are proposed to be mounted on tubular steel towers placed along the turbine corridors shown in Figure R-1. Under the Minimum Turbine Layout being considered, up to 225 turbines would be installed. These turbines would be mounted on towers up to 80 meters (262 feet) in height, and would have rotors with a diameter of up to 82.5 meters (271 feet). Under the Maximum Turbine Layout that is being considered, the towers would be up to 85 meters (279 feet) in height, and the rotors would be up to 100 meters (328 feet) in diameter.

The Facility will require the creation of small, cleared pads at the base of each turbine, and a system of new and improved roads to provide access to each of the turbine locations. Most of the electric lines that will collect power from the turbines and route it to the Facility substation will be underground and thus will not be visible. A new transmission line will be built to carry power from the Facility substation to the Bonneville Power Administration (BPA) system. This line will be either three or seven miles long, depending on the alternative selected. [4] See Exhibit B for a description of these transmission line alternatives. The Facility will also include a substation, O & M building, up to 10 meteorological towers, and related facilities.

The Applicant's visual impact analysis considered all Facility components. However, because of the large distances from most of the designated scenic resources, the limited lines of sight from the closest designated scenic resources, and the dominance of wind turbines compared to other components of the Facility in terms of visual impact, the visual appearance of the Facility from all scenic areas consists almost entirely of the wind turbines. For this reason, the following discussion focuses on the turbines.

In addition, the following analysis is based on the Maximum Turbine Layout because that has been determined to represent the "worst case," i.e., the turbine layout most visible from the most scenic areas. The Applicant also confirmed that the Minimum Turbine Layout, which consists of more, smaller turbines, does not create a materially different visual impression from any of the designated scenic areas.

[4] The 3-mile transmission line represents an alternative scenario in which BPA develops and owns a high-voltage transmission line intended to interconnect the Klondike III and Biglow Canyon Wind Farm facilities, among other potential customers, to the John Day Substation. This BPA project will be permitted under NEPA.

Columbia River Gorge National Scenic Area

Because the Facility lies over 10 miles outside of the closest boundaries of the Columbia Gorge National Scenic Area, it is not directly regulated by the Columbia Gorge Commission's plan policies and regulations. Nonetheless, an analysis is provided here of the Facility's effects on views from the key viewing areas that the NSA has designated as being the most important vantage points within the Scenic Area from which the public views the Scenic Area's landscapes. Of the 26 key viewing areas that the NSA Management Plan designates, the Facility has the potential to be visible from portions of four: the Historic Columbia River Highway, Interstate 84, the Columbia River, and Washington State Highway 14.

Historic Columbia River Highway

The Historic Columbia River Highway is the original automobile highway built to connect Portland with The Dalles in the early part of the 20th Century. At the time it was built, it represented an important engineering feat, and over the years, has become renowned for its beauty. The highway was sited and designed to maximize its integration into the natural landscape. It features attractive stonework walls and bridges, links together many of the scenic sites on the south side of the gorge, and provides a sequence of attractive views. Nearby Interstate 84 now serves as the major traffic artery through the Gorge, so the historic highway now serves primarily as a tourist route and local road. The segment of the Historic Columbia River Highway that extends through the NSA from Troutdale to The Dalles is a designated Oregon Scenic Byway.

As indicated on Figure R-2, a relatively short segment of the Historic Columbia River Highway lies within the Facility's 30-mile radius analysis area. Review of Figure R-2 indicates that with the possibility of one small exception, the Facility will not be visible from the Historic Columbia River Highway. The exception occurs along a small segment of the roadway located at the western edge of The Dalles where the ZVI analysis suggests that the turbines might be visible along about 1 mile of the roadway. However, the likelihood of the Facility having a noticeable effect on views from this road segment is very small. In this area, most views from the roadway toward the Facility site will probably be screened by intervening trees, vegetation, and structures. Moreover, at a distance of 28 miles, the turbines would be invisible in many atmospheric and weather conditions and barely detectable under the most favorable atmospheric conditions. Finally, in this area, the roadway is not oriented in the direction of the Facility site, so that to the extent that the turbines would be detectable in the view, they would not appear in the primary zone of vision of highway travelers. In sum, because of their low potential for visibility and the very small role they would play in the overall view from this area, the Facility's turbines would not have effects of any significance on the character and quality of views from the highway.

Interstate 84

Interstate 84 is a high-speed, four-lane freeway that follows the south bank of the Columbia River and serves as the primary conduit for traffic through the Columbia River Gorge. This route provides the occupants of the large numbers of cars and trucks that use this highway with panoramic views of the river and of the hillsides that define the gorge. Review of Figure R-1 indicates that for the most part, the Facility will not be visible to travelers on I-84. The only places where the Facility's turbines might be seen by travelers on I-84 within the NSA are in a set of short segments, adding up to approximately 3.5 miles, located in the area between The Dalles and the Deschutes River at distances ranging from 13.5 to 18 miles from the Facility site.

Photograph 1 in Figure R-4 is a view from eastbound I-84 in one of these areas, at a point approximately 18 miles west of the Facility site. In this photograph, the Facility site is on the distant ridgeline visible above the point where the roadway fades into the distance. Photograph 2 in Figure R-4 is a view from eastbound I-84 at a point farther east, approximately 15 miles west of the Facility site. This view is generally representative of views toward the site from I-84 in the 13.5- to 16-mile-distance range. From this section of the roadway, the Facility site is visible on the distant ridgeline above the point where the river fades into the distance. Because of the viewing distances involved, from both of these viewpoints, the turbines will appear to be small and not readily detectable elements on the distant horizon and will occupy only a small area of the overall field of view. Thus, the turbines will have little effect on the overall character and quality of the view from I-84. In areas such as the one shown in Photograph 2, where nearby power lines and other structures dominate, the overall impact of the turbines on the view will be even smaller. In views from the limited areas along I-84 where it will be visible, the Facility's effects on the character and quality of the landscapes will be small and insignificant. Thus, the Facility will be consistent with both the objectives of the CRGNSA Management Plan, and the *Comprehensive Plan for Wasco County*, which identifies views from the Columbia River Gorge as an important scenic resource.

Columbia River

As review of Figure R-2 indicates, the Facility's visibility from the Columbia River will be restricted to segments of the river reach between Horsethief Lake and Miller Island. In this reach, the river has been turned into an artificial lake, named Lake Celilo, by The Dalles Dam. Photograph 3 in Figure R-5, a view of the Facility site from the river's north bank at Wishram, is representative of views toward the Facility site from the river in this area. The view seen from this area is of a landscape in which there is a substantial level of human modification that is reflected by the artificial impoundment of the river's waters, the I-84 freeway, large transmission lines, and the wheat fields on the distant ridgelines. Users of the river in this area include boaters, commercial barges, fishermen, and windsurfers. In this view, the site is located along the distant ridgeline in the area to the left of the center of the photo. At this point, the Facility site is

approximately 14 miles away. Under clear atmospheric conditions, many of the Facility's turbines will be visible, but they will appear as relatively tiny elements in the distant landscape. In terms of detectability, they will be harder to make out than the electric transmission towers that now exist closer in the view on the upper ridgeline above and to the left of the freeway segment visible across the river. The wind turbines will be a subordinate element of the landscape and will not bring about a substantial change in the overall character and quality of the landscape seen from this area. As a consequence, the Facility's effects on scenic values of this area of the Columbia River will be less than significant.

Washington State Highway 14

Washington State Highway 14 travels along the north bank of the Columbia River throughout the length of the National Scenic Area. The highway is known for the scenic quality of its views and has been designated as a Scenic Byway by the Washington State Department of Transportation, as well as a key view in the CRGNSA Plan. In addition, the *Klickitat County Comprehensive Plan* identifies views related to the NSA as having important scenic values, and Highway 14 provides the most readily accessible views toward the Facility site from the part of the NSA that lies within Klickitat County. Figure R-2 indicates that the Facility might be intermittently visible along the segment of Highway 14 in the NSA that lies between Highway 197 north of The Dalles and the eastern boundary of the NSA near Maryhill. This highway segment lies 10 to 24 miles to the west of the Facility site. Because the highway in this area is located halfway up the slope of the hills that define the northern edge of the gorge, it provides panoramic views over the gorge and the landscapes to the south.

The most important developed viewpoint along this segment of Highway 14 is the one above Wishram that includes an information kiosk and interpretive panels related to Celilo Falls, an important Native American resource and cultural site that once existed in the river below this viewpoint. Celilo Falls was eliminated when Lake Celilo was created by the construction of The Dalles Dam. Photograph 4 in Figure R-6 represents the view from this area toward the Facility site, which is on the distant ridgeline on the left side of the view. The ZVI pattern in Figure R-2 indicates that a relatively small number of the Facility's turbines might be visible from this viewpoint. Given the viewpoint's 13-mile distance from the Facility site, the turbines will be relatively small elements on the distant skyline, and will be less evident in the view than the existing high voltage electric transmission towers visible on the ridge immediately across the river from the viewpoint. Although the turbines will be visible to some degree in this view, they will not dominate the view and will not create a substantial change in the view's overall character and quality. As a consequence, the Facility's effects on this view's aesthetic values will be less than significant.

A second developed viewpoint exists in this segment of the highway in the area just inside the NSA's eastern boundary at Maryhill. The view from this area is represented by photograph 5 in Figure R-6. Although they are difficult to detect in the photo, many of the turbines in the Klondike I wind project are faintly

visible from this viewpoint on the distant ridgeline in the area to the left of the center of the photo. The proposed Facility turbines will be visible in the area in front of and to the left of the Klondike I turbines. Because the closest turbine in the Facility will be at least 10.5 miles from this viewpoint, the Facility turbines, like the Klondike I turbines, will be visible but not highly evident elements in the landscape, and will not dominate the view. The turbines will be relatively small elements occupying a small part of the view and will be visually consistent with the turbines that are now an established part of the view. As a result, they will not bring about a substantial alteration of the existing visual character of the landscape seen in this view and will not have a significant adverse impact on the area's scenic and aesthetic values.

Deschutes River Canyon

As described in the discussion of the Deschutes River above, review of the results of the ZVI analysis presented in Figures R-1 and R-2 indicates that the Facility will not be visible from the areas in the Deschutes River canyon along the Deschutes Wild and Scenic River and will be visible only from a small area of the BLM lands within and adjacent to the canyon. Furthermore, because none of the BLM or private lands that lie within the canyon will be directly affected by the Facility and because the Facility will not be visible from the interior of the canyon, the Facility will be consistent with the BLM Two Rivers Plan and with the provisions of the Wasco County and Sherman County comprehensive plans that identify the Deschutes River canyon as an important landscape feature.

It is important to note that the BLM's plans and policies do not directly apply to the privately owned lands on which the Facility will be developed. It is reasonable to assume that the BLM lands on the sides of the Deschutes River canyon were given a VRM Class II designation to protect the existing character and quality of views within the canyon, which has a high level of recreational use, as opposed to protecting the views from these river viewshed lands toward areas that lie outside of the canyon. Nevertheless, an assessment has been made of the Facility's impact on the views from these river viewshed lands. The lands from which the Facility will be visible lie a minimum of 12 miles to the west of the closest turbine corridor. Although turbines might be visible from the upper sections of some of these lands, and although their presence might change the view from these areas to some degree, because of the significant viewing distances involved, the turbines will not be visually dominant elements of the view and will not create a substantial change in its character and quality. The visual changes brought about by the presence of turbines in the distant views from these areas will be less than significant, particularly in light of the fact that because these BLM lands have limited access and no developed visitor facilities, their sensitivity to view change is very low, and because the lands on which the Facility will be developed lie far outside the boundaries of the lands under the BLM's jurisdiction.

John Day River

Figure R-3 is a map of the section of the John Day River canyon that is subject to federal or local plans and policies and from which the Facility might be visible. This map essentially encompasses the reach of the river that lies between the Klondike-John Day River Road on the south and the Narrows on the north. This part of the river marks the transition between the free-flowing river and the northern reach, which is a flat water area that is part of Lake Umatilla. The map provides a detailed view of the potential visibility of the proposed Facility's turbines on views from BLM lands in the John Day River canyon and from the segment of the river designated as a Federal Wild and Scenic River and an Oregon Scenic Waterway. As this map indicates, the Facility will be visible to varying degrees from sections of the BLM lands in the canyon and from the Wild and Scenic River/Oregon Scenic Waterway segment of the river and the lands extending ¼ mile on either side of the river.

As with the Deschutes River, it is important to note that BLM's management plans and policies do not apply directly to privately owned lands, such as the Facility site, located outside the jurisdictional boundaries of BLM's plans. However, because BLM's plans are helpful in identifying and assessing scenic resources, an assessment of the Facility's potential effects on views from BLM lands in the John Day River canyon and the corridor along the John Day River Federal Wild and Scenic River and State Waterway was undertaken to evaluate the impacts on the aesthetic qualities of this area. This analysis focuses on the impacts of the Facility on views from the river and from the lands along it in the canyon bottom. This approach was taken because it is reasonable to assume that the BLM lands on the sides of the John Day River canyon were given a VRM Class II designation to protect the existing character and quality of views within the canyon, which has some visual interest and some level of recreational use, as opposed to protecting the views from these river viewshed lands on the canyon's slopes toward areas that lie outside of the canyon. This approach is consistent with the scoping opinion related to the proposed Klondike III wind project by a member of the BLM Prineville District planning staff, who indicated that because access to the rim and canyon walls is very limited, potential impacts to these areas would not be significant and are not the primary concern of the BLM (Mottl, H., pers. comm.).

Photograph 6 is a view looking north up the John Day River canyon from a viewpoint approximately 1.25 miles north of the Oregon Trail McDonald Crossing monument on the Klondike-John Day River Road This photo provides a representative view of conditions in the reach of the river covered in the map presented as Figure R-3. Most of the lands in this area are privately-owned ranch lands that are used for cattle grazing. Although no structures are visible in this photo, there are areas along the river where fences are visible, and where transmission lines of various voltages can be seen on the hills along the edge of the canyon or crossing the canyon.

The primary access to these lands is by primitive jeep trails, some of which can be seen in Photograph 6. Because these trails are located primarily on privately-owned lands, and because access is regulated by a series of locked gates, the general public has no overland access to this area. The only public right-of-way through this area is the river channel itself. During high flow periods in the spring, there is some very limited use of this reach of the river by canoeists and kayakers. As the photo suggests, during the summer months, low flows and a rocky river channel make passage by watercraft infeasible. Although the John Day River has a reputation as a good river for boating and other recreational activities, these activities occur primarily in the reaches of the river that lie to the south of Cottonwood (location indicated in Figure R-1) in an area where the Facility will not be visible. Because of limited accessibility, the numbers of recreational users, and thus potential viewers, is extremely low in this reach of the river where there is some limited potential for Facility visibility.

Photograph 7 is a view looking north along the river from a viewpoint located farther downriver. From the Photo 7 viewpoint, in an area located approximately 2.5 miles from the closest turbine, a small number of turbines might be visible. Although it is difficult to detect in the photo, a transmission line crosses the canyon in the center of this view.

The Facility's turbines will not be at all visible in the view depicted in Photo 6, and likewise will not be visible from approximately 80 percent of the river's length in the reach between the Klondike-John Day Road and Tumwater Falls.

In the limited areas along the river corridor from which Facility's turbines might be visible, few turbines will be visible from any one point, and only the blades are likely to be visible from many locations, rather than the turbines themselves or the support towers. In the places where they are visible, the turbines will appear as elements on the ridgelines in the landscape's background, and will have no direct effect on the appearance of the walls of the canyon or the canyon floor. Although the turbines might be noticeable in some of the views, because of their small numbers, their location in the background, and the viewing distance (which will range from 1 to 3.5 miles), they are not likely to be dominant elements in the scene. To the extent to which they will be visible, the turbines will be subordinate elements of the view, and because views from the canyon already include views of transmission lines of various voltages and are thus not entirely pristine, the presence of the turbines will not substantially alter the existing character and quality of views from the river corridor.

An important factor to consider in evaluating the significance of the effect that visibility of the turbines will have on views from the canyon is that the level of public use of this reach of the river is extremely low. Very few people will see the changes related to the presence of the Facility. Consequently, the Facility's impacts on this reach of the river will not be significant. The Facility will thus be consistent with the BLM Two Rivers and John Day management plans, which set limits on the degree of visual modification of BLM lands in the canyon, and with

the Sherman and Gilliam County comprehensive plans, which identify the John Day River canyon as an important visual resource.

(iii) Visual impacts from air emissions resulting from facility construction or operation, including, but not limited to, impacts on Class 1 visual resources as described in OAR 340-031-0120 [renumbered to 340-204-0050].

Response: During construction, dust might be generated during road construction and during clearing activities for the turbine pads. Dust will be controlled during the construction period by watering. Any potential impacts are anticipated to be temporary and negligible. Because Facility operation will create no air emissions, the Facility will have no impacts on air quality during the operational period.

The minor dust-related issues that could occur during the construction period have no potential for adverse impacts on Class I Prevention of Significant Deterioration Areas. The Facility does not lie within a Class I area, and the closest Class I area, the Mount Hood Wilderness, lies over 45 miles to the west of the Facility site.

R.5 OPPORTUNITY FOR MITIGATION

OAR 345-021-0010(1)(r)(D) *The measures the applicant proposes to avoid, reduce, or otherwise mitigate any significant adverse impacts;*

Response: Impacts to vegetation on CRP lands will be mitigated as described in Exhibits I and P. Although no significant adverse impacts to scenic and aesthetic resources have been identified, the Applicant will incorporate best management practices to minimize the proposed wind farm's visual effects. Measures that will be incorporated into the design of the Facility to assure an attractive appearance and good integration into its landscape setting include:

- Implementation of active dust suppression measures during the construction period to minimize the creation of dust clouds
- Use of wind turbine towers, nacelles, and rotors that are locally uniform and that conform to high standards of industrial design to present a trim, uncluttered, aesthetic appearance
- Use of low-reflectivity, neutral gray, white, off-white, or earth tone finishes for the towers, nacelles, and rotors to minimize contrast with the sky backdrop and to minimize the reflections that can call attention to structures in the landscape
- Use of neutral gray, white, off-white, or earth tone finishes for the small cabinets containing pad-mounted equipment that might be located at the base of each turbine, to help the cabinets blend into the surrounding ground plane

- Restriction of exterior lighting on the turbines to the aviation warning lights required by the FAA, which will be kept to the minimum required number and intensity to meet FAA standards

- Placement of much of the Facility's electrical collection system underground, minimizing the system's visual impacts

- Use of a low-reflectivity finish for the exterior of the O&M facility building to maximize its visual integration into the surrounding landscape

- Restriction of outdoor night lighting at the O&M facility and the substation to the minimum required for safety and security; sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and offsite light trespass

- Use of a low-reflectivity finish for substation equipment to minimize its visual salience

- Use of low-reflectivity insulators in the substations.

- Use of fencing with a dull finish around the substation to reduce the fence's contrast with the surroundings

R.6 MAP

OAR 345-021-0010(1)(r)(E) *A map or maps showing the location of the visible scenic and aesthetic values analyzed under (B)*; and

Response: The analysis area for impacts on scenic and aesthetic values includes the area within the Facility site boundary and extends 30 miles beyond the Facility boundary, encompassing lands in Oregon and, for completeness, in Washington, as shown in Figure R-1. This figure indicates the areas where scenic and aesthetic values have been identified in federal land management plans and in local land use plans and indicates the areas from which the Facility might be visible. Figure R-1 is supplemented by Figures R-2 and R-3, which present more detailed analytic maps that focus on scenic and aesthetic values in the Columbia River Gorge National Scenic Area and in a selected section of the John Day River canyon.

R.7 MONITORING

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

Response: Because the proposed Facility will not result in significant adverse impacts to scenic and aesthetic values, the Applicant does not propose an active monitoring program specific to impacts on scenic and aesthetic values. For impacts on vegetation on CRP lands that will be mitigated as described in Exhibits I and P, monitoring, if any, will occur pursuant to Exhibits I and P. With respect to the Applicant's efforts to incorporate

design measures intended to better integrate the facilities into their landscape setting, no ongoing monitoring is proposed.

R.8 CONCLUSION

The Facility will comply with all applicable regulatory guidelines concerning scenic and aesthetic resources as discussed in the foregoing responses to the criteria contained in OAR 345-021-0010(l)(r)(A), (B), (C), (D), (E), and (F). Based on the foregoing information, the Applicant has satisfied the requirements in OAR 345-021-0010(1)(r), and the Council may find that the standards contained in OAR 345-022-0080 have been satisfied.

R.9 REFERENCES

Bureau of Land Management (BLM). 1985. *Proposed Two Rivers Resource Management Plan Environmental Impact Statement.* U.S. Department of the Interior. September 1985.

Bureau of Land Management (BLM). 1986. *Two Rivers Resource Management Plan Record of Decision.* U.S. Department of the Interior. June 1986.

Bureau of Land Management (BLM). 1993. *Lower Deschutes River Management Plan Record of Decision.* U.S. Department of the Interior. February 1993.

Bureau of Land Management (BLM). 2000. *John Day River Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments and Final Environmental Impact Statement.* U.S. Department of the Interior. June 2000.

Bureau of Land Management (BLM). 2001. *Record of Decision John Day River Management Plan, Two Rivers, John Day, and Baker Resource Management Plan Amendments.* U.S. Department of the Interior. February 2001.

Columbia River Gorge Commission and USDA Forest Service. 1992 and 2004. *Management Plan for the Columbia River Gorge National Scenic Area.* September 1992, revised May 10, 2004.

Federal Register. 1982. *Wild and Scenic Rivers Guidelines.* Vol. 47, No. 173. September 7, 1982.

Gilliam County, Oregon. 2000. *Gilliam County Comprehensive Land Use Plan and Zoning Ordinances.* Amended October 25, 2000.

Herrington. 2005. Janette Herrington, County Planner, Klickitat County Planning Department. Personal communication via telephone conversation with Jennifer Sellers on August 29.

Klickitat County, Washington. 1977. *Klickitat County Comprehensive Plan.* August 1977.

Klickitat County, Washington. 2005. *Energy Overlay Zone Ordinance.* March 2005?

Mottl, Heidi. 2005. Recreation Planner, Prineville District, Bureau of Land Management. Telephone Conversation with Sean Sullivan. March 3, 2005. Cited in Klondike III Wind Project SCA, Exhibit R, April 1, 2005.

Oregon Department of Transportation and Oregon Tourism Commission. 1999. *The Oregon Scenic Byways Guide.*

Sherman County, Oregon. 2003. *Comprehensive Land Use Plan.* Originally published in 1994, revised June 2003.

Smardon, R., J. Palmer, and J. Felleman. 1986. *Foundations for Visual Project Analysis.* John Wiley & Sons, New York, New York.

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

Wasco County, Oregon. 1983. *Comprehensive Plan for Wasco County.*

Figures

Map ID	Scenic and Aesthetic Areas	Distance to Nearest Turbine (miles)
1	Columbia River Gorge National Scenic Area	10
2	Klickat Wild and Scenic River	23
3	Deschutes Canyon BLM Lands	10
4	Deschutes Wild and Scenic River	15
5	John Day Canyon BLM Lands	2
6	John Day Wild and Scenic River & Oregon Trail High Potential Sites	1
7a	Four-Mile Canyon	23
7b	McDonald Crossing	6
7c	Biggs Segment	8
7d	Deschutes River Crossing	11
7e	The Dalles Complex	25

Figure R-1

Scenic and Aesthetic Areas

Biglow Canyon Wind Farm

ORION ENERGY LLC

Legend

- Scenic and Aesthetic Areas
- Highway
- Major Road
- Local Road
- Wild and Scenic Rivers
- Lakes and Rivers
- Proposed Turbine Corridors
- National Forest Lands
- Columbia River Gorge National Scenic Area
- 30-mile Scenic and Aesthetic Areas Buffer
- City Limits
- Counties
- BLM Lands Along Deschutes and John Day Rivers

Areas From Which Turbine and/or Blades Have the Potential to be Visible (ZVI)

Numbers of Turbines Visible, Assuming 150 Turbines, 85-Meter (279-Foot) Hub Height, and 100-Meter (328-Foot) Rotor Length

- 0 - 1 turbines
- 2 - 20 turbines
- 21 - 99 turbines
- 100 - 150 turbines

N W E S

0 5 10 15

Miles

CH2MHILL

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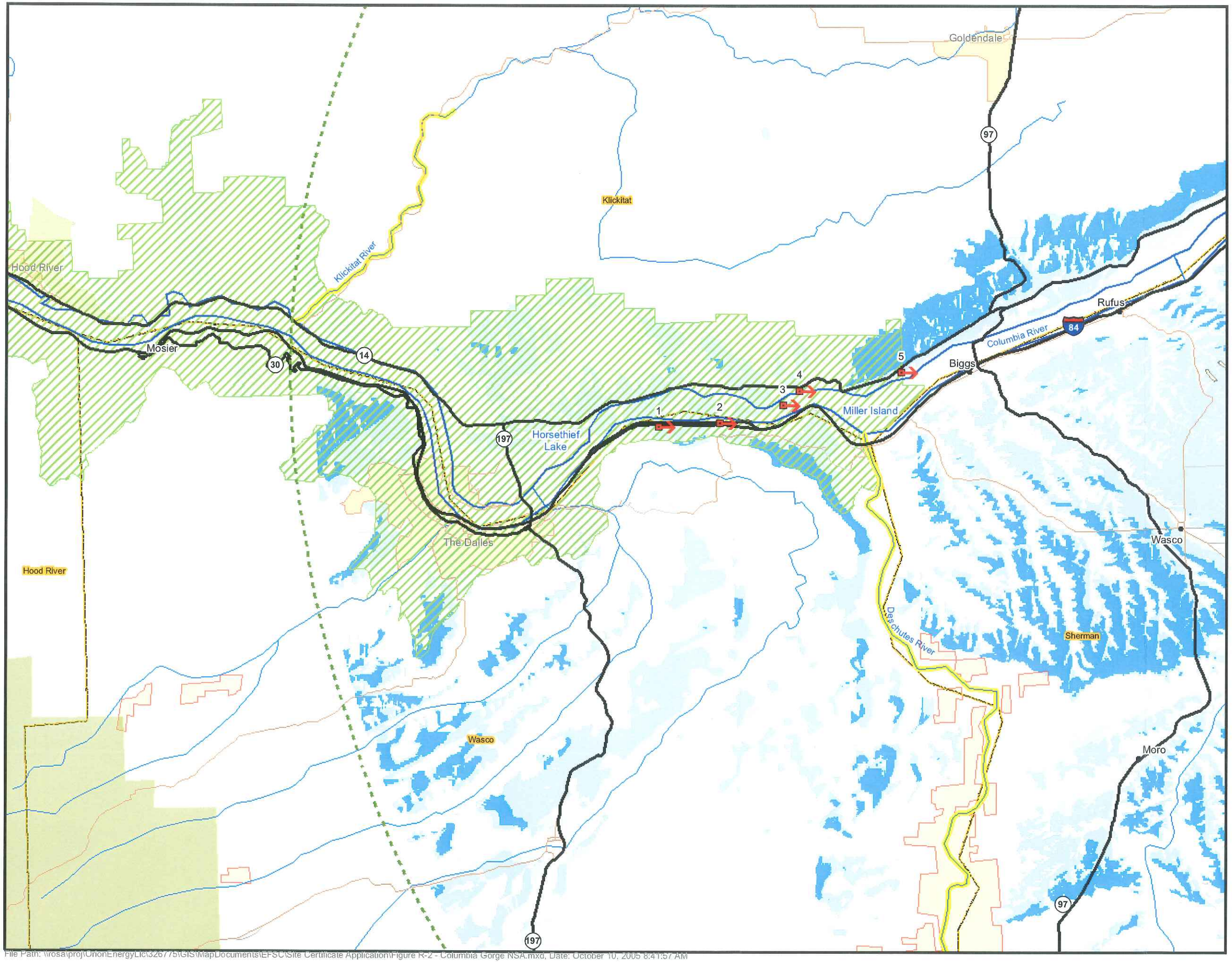
Figure R-2

Columbia River Gorge National Scenic Area within 30-mile Study Area

Biglow Canyon Wind Farm

ORION ENERGY LLC



Legend

- Representative Views - Photo Points
- Highway
- Major Road
- Local Road
- Wild and Scenic Rivers
- Lakes and Rivers
- Proposed Turbine Corridors
- National Forest Lands
- Columbia River Gorge National Scenic Area
- 30-mile Scenic and Aesthetic Areas Buffer
- City Limits
- Counties
- BLM Lands Along Deschutes River

Areas From Which Turbine and/or Blades Have the Potential to be Visible (ZVI)

Numbers of Turbines Visible,
Assuming 150 Turbines,
85-Meter (279-Foot) Hub Height, and
100-Meter (328-Foot) Rotor Length

- 0 - 1 turbines
- 2 - 20 turbines
- 21 - 99 turbines
- 100 - 150 turbines

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Figure R-3

John Day River BLM Lands, Federal Wild and Scenic River, and Oregon Scenic Waterway: Detailed View

Biglow Canyon Wind Farm

ORION ENERGY LLC

Tumwater Falls
The Narrows
Draper Canyon
Emigrant Canyon
Blalock Canyon
Gilliam
7
6
Sherman
Emigrant Springs Rd.
Klondike - John Day River Rd.
McDonald Crossing
John Day River
Grass Valley Canyon

Legend

- Representative Views - Photo Points
- Oregon Trail McDonald Crossing Interpretive Site
- Roads
- Lakes and Rivers
- Proposed Turbine Corridors
- Counties
- BLM Land Along John Day River
- Streams
- Wild and Scenic Rivers and Oregon Scenic Waterways (1/4 mile out from each side of the river channel)

Areas from Which Turbine and/or Blades Have the Potential to be Visible (ZVI)

Numbers of Turbines Visible, Assuming 150 Turbines, 85-Meter (279-Foot) Hub Height, and 100-Meter (328-Foot) Rotor Length

- 0 - 1 turbines
- 2 - 20 turbines
- 21 - 99 turbines
- 100 - 150 turbines

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Photograph 1: View eastbound from I-84, 18 miles west of Project site.

Photograph 2: View eastbound from I-84, 15 miles west of Project site.

FIGURE R-4
VIEWS EASTBOUND FROM I-84
BIGLOW CANYON WIND FARM

Photograph 3: View toward the Project site from the north bank of the Columbia River at Wishram, 14 miles west of the site.

FIGURE R-5
VIEW FROM NORTH BANK OF COLUMBIA RIVER
BIGLOW CANYON WIND FARM

Photograph 4: View in the direction of the Project site from the Lake Celilo overlook on Highway 14, 13 miles west of the site.

Photograph 5: View toward the Project site from the Highway 14 CRGNSA overlook near Maryhill, 10.5 miles west of the site. Turbines at the existing Klondike 1 Wind Project are faintly detectable in the background of the view.

FIGURE R-6
VIEWS FROM HIGHWAY 14
BIGLOW CANYON WIND FARM

Photograph 6: Representative view of conditions in the John Day River canyon. Low river flows and the rocky channel prevent access by boats during the summer months. The rugged jeep trails that provide access to portions of the canyon cross private lands, severely limiting the public's entry into this area.

Photograph 7: View toward the Project site from the John Day River corridor.

FIGURE R-7
VIEWS FROM JOHN DAY RIVER AREA
BIGLOW CANYON WIND FARM