APPENDIX B
BIOLOGICAL RESOURCES SUPPORTING DATA

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APPENDIX B-1
SAGE-GROUSE WALKING TRANSECT SURVEY REPORT

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APPENDIX B-1: SAGE-GROUSE SURVEY REPORTS

Greater Sage-Grouse (*Centrocercus urophasianus*) survey reports were submitted in Appendix B-1 of both the January 2013 Draft Environmental Impact Statement (DEIS) and January 2015 Supplemental Draft Environmental Impact Statement (SDEIS). The methods used for the DEIS and SDEIS Sage-Grouse Survey Reports were different in that the DEIS used aerial surveys and the SDEIS used ground-based surveys due to the later start for the SDEIS. As described in further detail below, the SDEIS sage-grouse surveys were not started until May 18, 2013, as that is when the need for the SDEIS was identified. May 15 is the latest sage-grouse aerial lek surveys may be conducted, per the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Sage-Grouse survey protocol. In addition, the sage-grouse surveys were conducted in different years and in different locations. The original versions of these documents have been included in Appendix B-1 of this Final Environmental Impact Statement (FEIS), as listed and summarized below:

January 2013 DEIS Appendix B-1: Sage-Grouse Aerial Lek Survey Report, 2010 and 2011

The original proposed Project analyzed in the DEIS consisted of 10 end-to-end alternatives approximately following the southern and eastern flanks of the JBLM YTC. Corresponding route segments for the FEIS include 1a/New Northern Route (NNR)-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, and 3c.

Three rounds of aerial greater sage-grouse lek surveys were each conducted in 2010 and 2011 along all route alternatives that were being considered at the time of the surveys, including a three mile buffer on each side of the route alternatives. The surveys conducted in 2010 included the northern route segments not carried forward in the DEIS due to concerns expressed by JBLM YTC authorities. As a result, potential routes and route segments were subsequently redesigned to avoid the JBLM YTC and to parallel the southern boundary. Only these redesigned southern route segments were surveyed in 2011.

The survey protocol used for the 2010 and 2011 aerial surveys was based on the protocol used by the JBLM YTC for their aerial greater sage-grouse lek surveys. The JBLM YTC greater sage-grouse survey protocol states that aerial greater sage-grouse lek surveys may take place until May 15. Surveys completed in 2010 occurred on April 19, 20, and 22; April 26, 27, and 28; and May 12 and 13. Surveys completed in 2011 occurred on March 29 and 30; April 12, 13, and 14; and April 27, 28, and 29.

POWER Engineers, Inc. (POWER) contracted with Central Valley Helicopters of Ellensburg, Washington to perform the surveys. Data recorded during each flight included start time, end time, wind speed, wind direction, temperature, cloud cover, and any greater sage-grouse occurrences. Areas which were excluded from surveys included highly agricultural areas and slopes greater than 15 percent. Transects flown over suboptimal habitat, such as areas highly fragmented by agriculture, slopes greater than 15 percent or recently burned areas, were farther apart and flown at higher altitudes and faster speeds.

No greater sage-grouse leks were identified during any of the aerial surveys. Two individual Sage-Grouse were observed from the helicopter south of the JBLM YTC during the 2010 surveys. No Sage-Grouse or leks were observed during the 2011 surveys.

January 2015 SDEIS Appendix B-1: Sage-Grouse Walking Transect Survey Report

In early 2013, JBLM YTC authorities approved the possibility of the northern route segments to cross the JBLM YTC property. In April 2013, the NNR was identified using route segments approximately following the northern flank of the JBLM YTC. After the 2013 sage-grouse walking transect surveys,

routing adjustments were made due to new requirements for separation distance from existing transmission lines and concerns about sage-grouse. The locations of the NNR and Manastash Ridge (MR) Subroute were finalized in November 2013. The NNR occurs along the west side of Interstate 82 and then passes through the northern portion of the JBLM YTC to the Vantage Substation. The MR Subroute skirts Manastash Ridge, west of Badger Pocket in the northwestern portion of the JBLM YTC. Corresponding route segments for the FEIS include 1a/NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, and MR-1.

POWER conducted a series of two walking greater sage-grouse brood route surveys for Pacific Power in late May and early July 2013 along the NNR within potentially suitable habitat on the JBLM YTC and Bureau of Land Management (BLM) properties. Aerial lek surveys could not be completed in 2013 because the lekking period had already expired prior to identification of the need for Sage-Grouse surveys. The survey protocol was based on methods described for brood route surveys in Connelly et al. (2003). Data recorded during each survey included observer, location, any Sage-Grouse occurrences or evidence of occurrence (i.e., scat, nests/eggshells, feathers, cecal casts, or tracks), and a track log of the survey route.

The first round of surveys took place from May 18 through May 21, 2013 and the second round of surveys took place from June 29 through July 1, 2013. No Sage-Grouse were observed during either round of surveys. Evidence of Sage-Grouse use was observed in the form of scat on JBLM YTC lands between Manastash Ridge and Boylston Mountains in the central portion of the proposed corridor. The scat appeared to indicate spring, summer, or fall use of the area—no winter-type scat was observed. Most of the NNR that was surveyed occurs on marginal to poor Sage-Grouse habitat. Much of the JBLM YTC lands surveyed are steeply sloped and provide little to no sagebrush cover. A large portion of the BLM lands surveyed were recently burned and had a near monoculture of cheatgrass (*Bromus tectorum*). The best potential habitat occurred on JBLM YTC lands located between Manastash Ridge and Boylston Mountains to the east of the private agricultural area known as Badger Pocket, as identified in the January 2015 SDEIS Appendix B-2: Sage-Grouse Habitat Assessment. Nearly all Sage-Grouse sign observed during the surveys occurred in this area.

In 2012, the Washington Wildlife Habitat Connectivity Working Group (WHCWG) modeled connectivity potential of Sage-Grouse on the Columbia Plateau Ecoregion by identifying various landcover types and anthropogenic disturbances along potential routes that greater sage-grouse may take if they attempted to travel from one Habitat Concentration Area (HCA) to another (WHCWG 2012). Four HCAs were identified for Sage-Grouse in Washington including the population on the JBLM YTC, the Mansfield Plateau/Moses Coulee population, Crab Creek drainage in Lincoln County, and the Yakama Reservation in Yakima County. Connectivity analysis concluded that overall, none of the identified connectivity corridors provide ideal connectivity between the four HCAs for Sage-Grouse in the Columbia Plateau Ecoregion. The report suggests that improvement of connectivity would require expansion of existing HCAs, establishment of new HCAs, and/or improving habitat quality within the connectivity corridors.

Currently, the northern portion of the JBLM YTC contains four existing transmission lines of 230 kV or greater capacity which all occur in close proximity to the NNR Alternative. The addition of the NNR Alternative where it parallels multiple existing transmission lines for approximately 8.3 miles would not increase the connectivity resistance as scored by the WHCWG because of the multiple lines. Implementation of the NNR Alternative would create an additional barrier to Sage-Grouse movement between the JBLM YTC population and the Mansfield Plateau/Moses Coulee population to the north and the Yakama Reservation population to the southwest. However, the impacts of the additional barrier would be minimized by placing the new transmission line adjacent to existing transmission infrastructure. The proposed transmission line would occur for 8.1 miles where it would not be sited directly adjacent to

an existing line; however, an existing 230 kV transmission line is within one mile away for the entirety of the NNR Alternative.

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APPENDIX B-1

SAGE-GROUSE AERIAL LEK SURVEY REPORT 2010 and 2011

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1.0 ACRONYMS AND ABBREVIATIONS

cm	centimeters
DPS	Distinct Population Segment
kg	kilograms
km	kilometers
kV	kilovolt
m	meters
mph	miles per hour
POWER	POWER Engineers, Inc.
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
YTC	Yakima Training Center

2.0 INTRODUCTION

Pacific Power proposes to construct, operate and maintain a new 230 kilovolt (kV) transmission line in the south-central portion of Washington from the Vantage Substation near the Wanapum Dam to the Pomona Heights Substation near Selah, Washington (Project). The last transmission line built by Pacific Power to serve the electrical loads in the Yakima Valley was the Pomona-Wanapum 230 kV transmission line which was constructed in the mid-1970s. Pacific Power planning studies have identified the loss of the existing Pomona-Wanapum 230 kV transmission line as the single most critical outage condition on the Mid-Columbia system. The planned line will mitigate the risk and ensure reliable, efficient service. This line will improve the overall reliability, security and operating flexibility of the electrical system that serves the Yakima area. The Project would be designed for one 230 kV three phase (three conductors) circuit and shield wires. H-frame wood pole structures are proposed for most of the line located in open terrain. The H-frame structures would be between 65 and 90 feet tall (and in some cases 100 feet tall), and spaced approximately 750 to 900 feet apart, depending on terrain. The planned in service date for the new transmission line is late 2013.

2.1 Project Location

The Survey Area is located in south-central Washington between the Pomona Heights Substation east of Selah, Washington and the Vantage Substation east of the Wanapum Dam on the Columbia River. The U.S. Army Yakima Training Center (YTC) lies directly between the two substations and no access is allowed in the center of YTC because it is used by the Army for live fire training operations. Initial routes passed through the northern extent of the YTC and then south to the Pomona Heights Substation on the west side of Interstate 82. The Surveys conducted in 2010 included these routes (Figure 1). However, YTC authorities expressed concern over these potential routes in a letter dated May 28, 2010. In this letter, YTC authorities stated that any future transmission lines to the west of Interstate 82, on YTC property in the northern portion, or directly along the southern boundary must be buried so as to not interfere with military training operations. Alternative routes were subsequently identified to avoid the majority of YTC and to parallel the southern YTC boundary. All of the current routes travel south from the Vantage Substation through private, state, and BLM lands until south of the YTC boundary, at which point they turn west through mostly private property to the Pomona Heights Substation (Figure 2).

2.2 Survey Need

The greater sage-grouse (*Centrocercus urophasianus*) is listed as a Candidate species under the Federal Endangered Species Act and is listed as Threatened by the Washington Department of Fish and Wildlife (WAC 232-12-297). Large expanses of mature sagebrush habitat are a key aspect used by greater sage-grouse throughout the year. Various reports have shown that the presence of transmission lines across these large expanses of mature sagebrush lowers the habitat quality for greater sage-grouse (Graul 1980, Braun 1998, Aldridge and Brigham 2002, Braun et al. 2002, Knock et al. 2003).

The portion of sage-grouse habitat most affected by the presence of transmission lines is the lek. Leks are display grounds used by male sage-grouse to attract females during the breeding season. The same leks are typically used every year and span generations of birds. Researchers have attributed disturbance and abandonment of leks to harassment and predation of greater sage-grouse by common ravens (*Corvus corax*), and various raptors perching on and hunting from overhead utility towers (Graul 1980, Ellis 1987).

A telemetry study conducted in California from 1998 to 2000 found that transmission lines may have effects on sage-grouse lek attendance at distances of over 12 miles. The data also showed that the mean survival of adult greater sage-grouse increased as the distance from a transmission line increased.

However, it was concluded that the data did not indicate that these effects may be limiting to the population for leks more than three miles from the transmission line (Armentrout and Hall 2005).

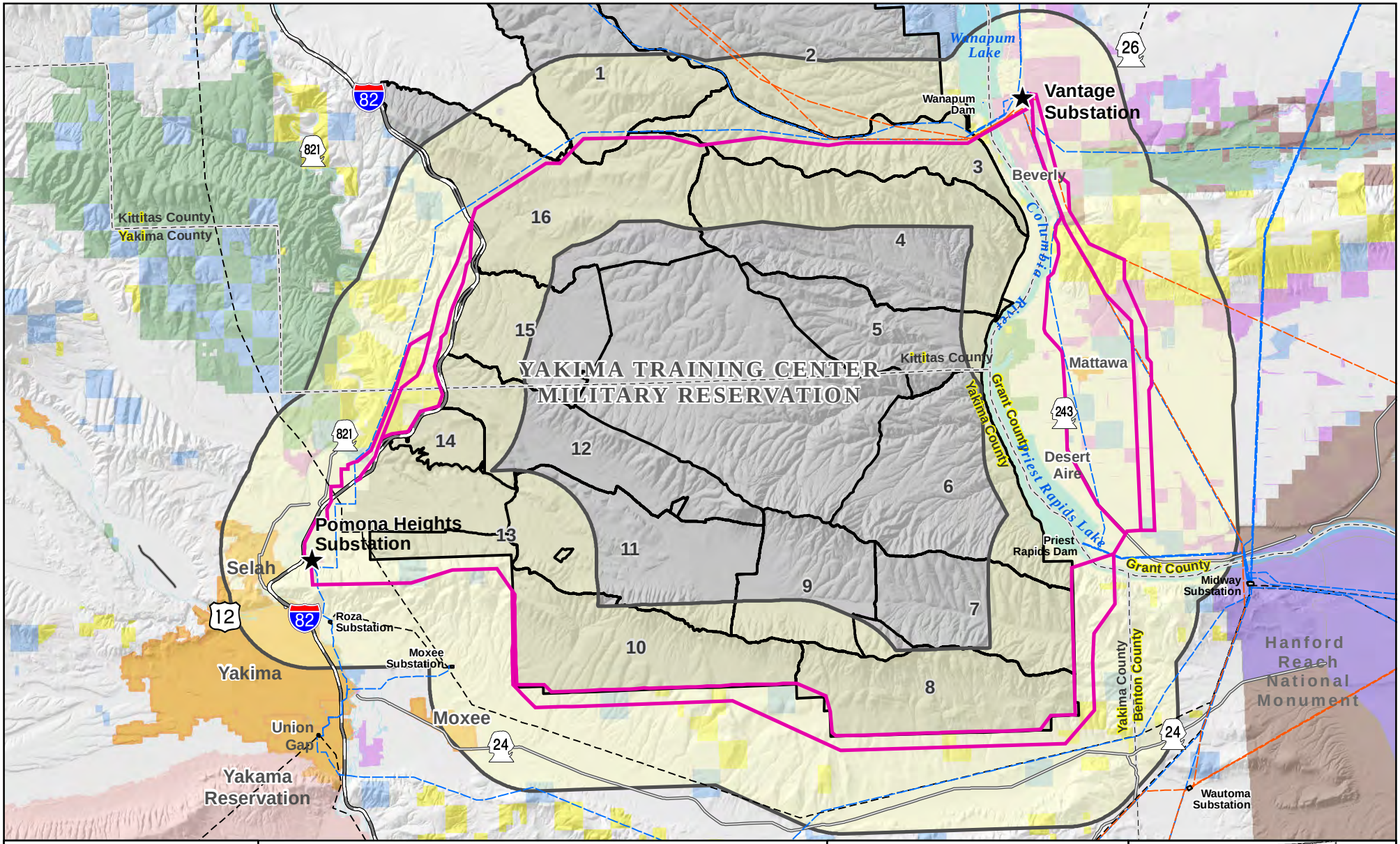
Through discussions with the U.S. Fish and Wildlife Service (USFWS) and the Washington Department of Fish and Wildlife (WDFW), Pacific Power committed to conduct protocol level aerial surveys for leks throughout a corridor consisting of a three mile buffer on each side of all route alternatives. The three mile buffer was based on the research of Armentrout and Hall (2005) described above. Pacific Power contracted with POWER Engineers, Inc. (POWER) to conduct aerial lek surveys for all potential sage-grouse habitat within three miles of the route alternatives, hereafter referred to as the Survey Area. The 2010 and 2011 Survey Areas are different, due to revisions made to the route alternatives based on scoping comments received from YTC (Figures 1 and 2).

3.0 GREATER SAGE-GROUSE

The greater sage-grouse is the largest grouse species in North America with a body length ranging between 55 and 71 centimeters (cm), a wingspan between 83 and 96 cm, and a body weight of 1.3 to 2.7 kilograms (kg). Males are larger and have a distinct white breast, black throat, black belly, and a mottled brown back. When displaying on a lek the tail is raised in a large, distinct fan, the chest is puffed out along with two yellow air sacs just under the neck. Females are smaller than males and are drabber in appearance with mottled brown on the back and chest (Sibley 2003). Females do not display on leks. Instead, they remain in the sagebrush on the periphery of the lek and observe the males.

Greater sage-grouse are closely associated with sagebrush ecosystems of western North America. Sagebrush habitat types have a tremendous amount of natural variation in vegetative composition, habitat fragmentation, topography, substrate, weather, and frequency of fire. Consequently, greater sage-grouse are adapted to a mosaic of sagebrush habitats throughout their range, including relatively tall sagebrush (big sagebrush (*Artemisia tridentata*), three-tip sagebrush (*A. tripartita)*, silver sagebrush (*A. cana)*); relatively low sagebrush (low sagebrush (*A. arbuscula)*, black sagebrush (*A. nova*)); forb-rich mosaics of low and tall sagebrush; riparian meadows; steppe dominated by native grasses and forbs; scrub-willow (*Salix* spp.); and sagebrush savannas (Hays et al. 1998, Connelly et al. 2003).

Leks are annually used display grounds where males gather to display for females during the mating season. Leks are typically barren areas surrounded by high quality habitat of mature sage brush. Leks are rarely located on slopes greater than 10 percent and typically have very good sight lines which provide two major advantages to grouse: 1) it allows females on the periphery of the lek to view the displaying males; and 2) it allows displaying males to spot potential predators approaching. While displaying on the lek, males also make a loud, deep call, called “booming”, which can be heard from over a mile away during favorable conditions. Leks are typically attended in the early morning hours, but males may display well before dawn during a full moon if the sky is clear.



Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1
2010 Scoping Routes and Sage-Grouse Survey Area

Project Features
- Project Substation

Preliminary Routing
- Scoping Route

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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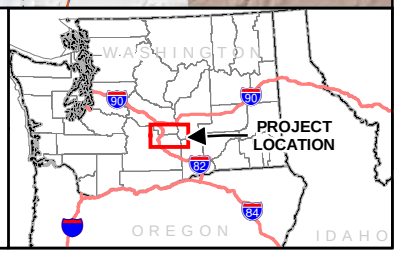
PACIFIC POWER
POWER ENGINEERS



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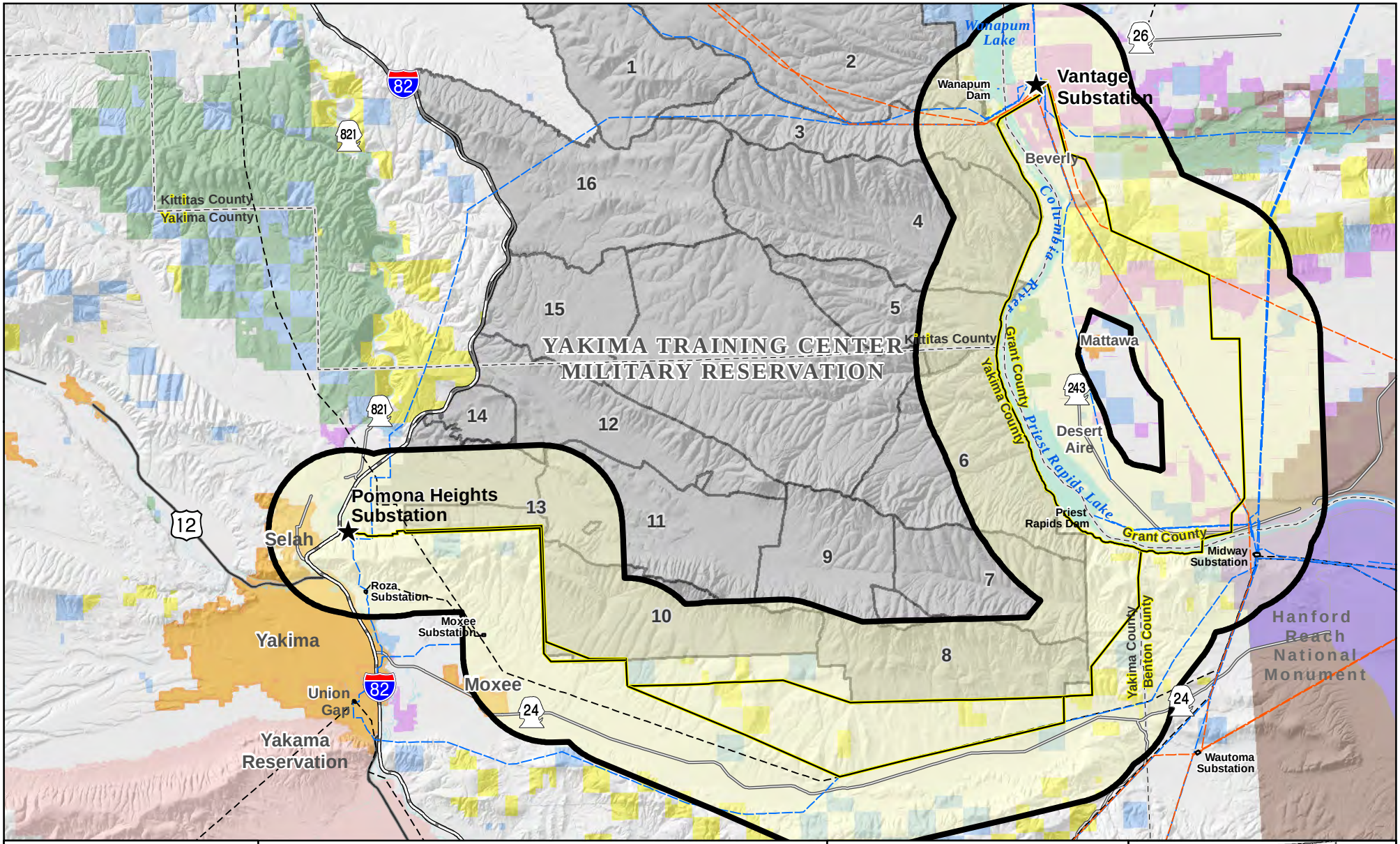

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2
2011 Alternative Routes and Sage-Grouse Survey Area

Project Features
- Project Substation
- Route Alternative

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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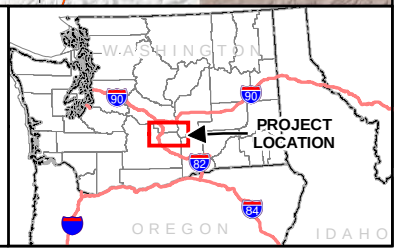

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Nests are placed in thick vegetative cover usually dominated by mature sagebrush. Vegetative diverse habitat may be an important aspect of nesting habitat to offer vertical and horizontal concealment (Connelly et al. 1991, Gregg et al. 1994, Sveum et al. 1998). Density of herbaceous cover can be an important indicator of habitat quality for pre-nesting, nesting, and brood rearing hens. Herbaceous cover averaging 18 cm in height and greater has been identified as an important characteristic of sage-grouse nesting and brood rearing habitat (Wakkinen 1990, Gregg et al. 1994). Average distance between a female's nest and the lek where she was first observed was 4.0 kilometers (km) for 23 nests in Colorado (Petersen 1980), 4.6 km for 36 nests in Idaho (Wakkinen et al. 1992), 3.4 km for 94 nests in Idaho (Fischer 1994), 7.8 km for 138 nests in Washington, and 6.2 km for 10 nests in Wyoming (Goebel 1980).

One reason the greater sage-grouse is so dependent on the presence of mature sagebrush is that leaves of various sagebrush species dominate their diet throughout the fall, winter, and early spring (Patterson 1952). Insects such as grasshoppers (*Orthoptera*), beetles (*Coleoptera*), and ants (*Hymenoptera*) are important for juveniles, particularly during the first three weeks of life, and forbs increase in importance as juveniles' age. Adults will occasionally take insects in the late spring and summer, although forbs and sagebrush make up the bulk of the diet during these times (Patterson 1952, Pyle and Crawford 1996).

Predators of greater sage-grouse include golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), red-tailed hawk (*B. jamaicensis*), Swainson's hawk (*B. swainsoni*), gyrfalcon (*Falco rusticolus*), northern goshawk (*Accipiter gentilis*), cooper's hawk (*A. cooperi*), coyote (*Canis latrans*), red fox (*Vulpes fulva*), and bobcat (*Felis rufus*). Nest predators include ground squirrel (*Spermophilus* spp.), badger (*Taxidea taxus*), weasel (*Mustella* spp.), coyote, common raven, American crow (*Corvus brachyrhynchos*), and black-billed magpie (*Pica pica*).

Golden eagles will commonly attack male greater sage-grouse during display hours on leks. Ellis (1985) observed lekking greater sage-grouse flushing and ceasing lek activities in the presence of a golden eagle perched 2.0 km away. Ellis (1985) also found that golden eagle predation on greater sage-grouse on leks increased from 26 to 73 percent of the total predation after completion of a transmission line within 200 meters (m).

Greater sage-grouse in the Survey Area are a portion of the Columbia Basin Distinct Population Segment (DPS). The YTC supports one of two Washington populations remaining in the Columbia Basin DPS. The second population is located in Douglas and Grant Counties. Annual surveys for leks and lek counts have been conducted by YTC personnel to monitor trends and assess population status. Ten leks have been active since 1999. As of 2001, the ten year population average on the YTC is 289 birds. Starting in 1989 radio telemetry research and population monitoring has shown that adult use and nesting and brood rearing occurs primarily south of Umtanum ridge in proximity to leks.

4.0 METHODOLOGY

POWER conducted a series of three aerial greater sage-grouse lek surveys in 2010 and 2011 along all route alternatives, including a three mile buffer on each side of the route alternatives. The survey protocol used for this project was based on the protocol used by the YTC for aerial greater sage-grouse lek surveys (Appendix A). The YTC greater sage-grouse survey protocol states that aerial greater sage-grouse lek surveys may take place until May 15th.

POWER contracted with Central Valley Helicopters of Ellensburg, Washington to perform the surveys. With the exception of one flight, two surveyors were used for each flight. The aircraft was an Enstrom 480 Helicopter, which has large Plexiglas windows in the foot-wells, doors, and windshield to provide maximum visibility during surveys. A Garmin GPSmap 76CSx handheld GPS unit was used in real-time

tracking mode in coordination with a laptop computer running ArcView GIS 3.3 with aerial imagery to aid in navigation of the helicopter. The helicopter contained a Trimble Trim Flight 3 GPS unit which recorded a track log of the survey routes as well as any waypoints marked during the surveys.

Data recorded during each flight included start time, end time, wind speed, wind direction, temperature, cloud cover, and any greater sage-grouse occurrences (Appendix B). Wind speeds were recorded from the Ellensburg or Yakima Airfield weather report, depending on which was closer to the survey area that day.

Surveys did not take place if winds were greater than 15 miles per hour (mph), if visibility was less than five miles, or if it was raining. Areas which were excluded from surveys included highly agricultural areas, and slopes greater than 15 percent. Transects flown over suboptimal habitat, such as areas highly fragmented by agriculture, slopes greater than 15 percent or recently burned areas, were farther apart and flown at higher altitudes and faster speeds as described in Connelly et al. (2003).

4.1 2010 Survey

Each survey consisted of three mornings to cover the entire Survey Area. The surveys were performed on the following dates: Survey #1 - April 19th, 20th, and 22nd; Survey #2 - April 26th, 27th, and 28th; Survey #3 - May 12th and 13th.

Surveys took place from 0.5 hours before sunrise to approximately 1.5 hours after sunrise. Transects were flow at approximately 60 feet above ground level at 40 to 60 miles per hour. Transects were approximately 0.5 mile apart.

Two surveyors were used for each flight, except the Survey #2 flight on Monday April 26. Only one surveyor and the helicopter pilot were available that morning.

The shape and size of the Survey Area caused each survey to be broken up into three mornings of flying. The Survey Area was broken down into the northern section (YTC Training Areas one, two, three, four, and a small area of private agricultural land known as Badger Pocket), the western section (YTC Training Areas 12, 13, 14, 15, 16, and private and BLM administered lands to the west of Interstate 82), and the southern section (YTC Training Areas 7, 8, 9, 10, 11, and privately held lands to the south of the YTC). The eastern section of the Survey Area is highly agricultural and did not provide suitable greater sage-grouse habitat. Therefore, the eastern section was not surveyed for greater sage-grouse leks. Transects were flown in a north-south or east-west orientation, depending upon the area to be surveyed that day.

Surveys were cancelled during Survey #1 on April 21st due to rain and made up the following day. Surveys were also cancelled during Survey #3 on May 11th due to high winds. These surveys were not made up due to the end of the protocol survey season. Areas excluded from surveys included highly agricultural areas, slopes greater than 15 percent, above 1,100 meters elevation, or below 400 meters feet elevation. The parameters regarding slope and elevation exclusion areas were determined based on results of previous YTC greater sage-grouse surveys. The Survey Area incorporated approximately 479 square miles (306,560 acres).

Radio contact was maintained with Rattlesnake Radio of the YTC every 30 minutes while surveying over airspace controlled by the YTC. Survey areas were planned in advance in consultation with the YTC Range Control to ensure that the training areas scheduled for survey would be safe to access.

4.2 2011 Survey

2011 surveys were repeated three times throughout late March and April with at least one week between surveys. The first survey took place over two days on March 29th and 30th. The second and third surveys were each flown over the course of three days. The second round of surveys took place on April 12th, 13th, and 14th, while the third round of surveys took place on April 27th, 28th, and 29th.

Surveys took place from 0.5 hour before sunrise to approximately 1.5 hours after sunrise. Transects were flow at approximately 60 to 100 feet above ground level at approximately 60 miles per hour. Transects during the first session of surveys were approximately one mile apart; however, after consultation with USFWS, WDFW, and YTC personnel transects were flown at 0.5 mile apart during the second and third sessions of surveys.

The helicopter contained a Trimble Trim Flight 3 GPS unit which recorded a track log of the survey routes as well as any waypoints marked during Survey #1. This track log was used to navigate survey transects for Survey #2 by flying the transects from the Survey #1 and additional transects in between to create more detailed coverage. POWER GIS personnel created transects at exactly 0.5 mile apart for the helicopter to follow during Survey #3 (Figure 2). Two surveyors were used for each flight.

The shape and size of the Survey Area caused each survey to be broken up into multiple mornings of flying. The Survey Area was broken down into the eastern section (YTC Training Areas 3, 4, 5, 6, and 7, and private and BLM lands east of the Columbia River), and the southern section (YTC Training Areas 7, 8, 9, 10, 11, and privately held lands to the south of the YTC). Transects were flown in a north-south or east-west orientation, depending upon the area to be surveyed that day. The eastern section could be covered in one morning of survey, while the southern section was surveyed over the course of two mornings.

The parameters regarding slope and elevation exclusion areas were determined based on results of previous YTC greater sage-grouse surveys.

Survey areas were planned in advance in consultation with the YTC Range Control to ensure that the training areas scheduled for survey would be safe to access.

5.0 RESULTS

The most optimal habitat was located along the western and southern portion of the Survey Area. The northern portion lacks suitable sagebrush cover and includes portions of the Manastash Ridge, making the slopes to high for optimal greater sage-grouse habitat. Optimal habitat locations include the gradual slope of the Saddle Mountains to the east of the Columbia River, and a broad flat valley in YTC training area five. However, it should be noted that the sagebrush cover on the southern slope of the Saddle Mountains lacked a grass and forb rich understory due to the number of cattle being grazed on the slope. Less suitable habitat was located along the southern YTC boundary in the eastern portion of the Survey Area where a recent fire had degraded habitat by removing all sagebrush cover, and to the east of the Vantage Substation where agriculture had highly fragmented the remaining sagebrush habitat. Highly developed agricultural areas such as around the towns of Mattawa, Yakima, Moxee, and Selah were not included in the survey. The western portion of the survey area included suitable greater sage-grouse habitat in the YTC Training Areas 12, 13, 14, 15, and 16, as well as privately held lands to the west of Interstate 82 in the northwestern portion of the Survey Area. However, the privately held lands were grazed by cattle to the point that little to no herbaceous understory occurred underneath the overhead sagebrush cover. This would degrade the suitability of this area to nesting female greater sage-grouse. The southern portion of

the Survey Area offered the most suitable greater sage-grouse habitat of the Survey Area. Mature sagebrush occurred throughout the southern portion, on and off the YTC, and a lack of grazing created a suitable herbaceous understory. Two historically known leks occur on the YTC in the southern portion of the Survey Area. No historically known leks occur on the private lands south of YTC.

It should be noted that no ground based habitat assessment was performed at this time. All estimations on habitat suitability were performed from the helicopter and are qualitative.

Various greater sage-grouse predators observed throughout the Survey Area included coyote, red-tailed hawk, black-billed magpie, American crow, common raven, and golden eagle.

5.1 2010 Survey

5.1.1 Survey #1

No greater sage-grouse individuals or leks were identified during Survey #1 conducted during April 19-22, 2010 (Figure 3).

The northern portion of the Survey Area was surveyed on Monday, April 19th. Surveys began at 6:09 AM and concluded at 8:05 AM. Winds were light and variable from the north at approximately one to two mph. The cloud cover was partly cloudy to overcast. Air temperature at the beginning of the survey was 41˚ Fahrenheit.

The western portion of the Survey Area was surveyed on Tuesday, April 20th. Surveys began at 6:00 AM and concluded at 8:04 AM. Winds were a moderate breeze from the north at approximately seven to nine mph. The cloud cover was partly cloudy to overcast. Air temperature at the beginning of the survey was 53˚ Fahrenheit.

The southern portion of the Survey area was surveyed on Thursday, April 22nd. Surveys began at 5:58 AM and concluded at 7:59 AM. Winds were a moderate breeze from the north at approximately seven to nine miles per hour at the beginning of the survey, but increased to over 20 mph as the survey continued. The survey was continued despite the higher than optimal winds due to budgetary and time constraints with the helicopter. The cloud cover was clear. Air temperature at the beginning of the survey was 44˚ Fahrenheit.

5.1.2 Survey #2

Survey #2 was conducted April 26-28, 2010. Two greater sage-grouse were observed (Figure 4).

The northern portion of the Survey Area was surveyed on Monday, April 26th. Surveys began at 5:55 AM and concluded at 7:35 AM. Winds were light to still at zero to two mph. The cloud cover was partly cloudy. Air temperature at the beginning of the survey was 46˚ Fahrenheit. No greater sage-grouse were observed in the northern portion of the Survey Area at this time.

Only one surveyor and the pilot were available for this survey. However, the northern portion of the Survey Area represents the least suitable greater sage-grouse habitat due to a lack of sagebrush cover and steep slopes formed by the Manastash Ridge. No known historical leks exist in this portion of the Survey Area. Additionally, Central Valley Helicopters pilots regularly participate in game surveys, including greater sage-grouse surveys, and were able to assist in the survey. The less than suitable habitat, absence of known historical leks, and the assistance of the Central Valley Helicopters pilot would negate the effects of only having one surveyor in the helicopter.

Upon completion of the standard survey area for the northern portion of the Survey Area, time still remained in the two hour survey window. At this time, the surveyor flew over a small patch of potential habitat on the eastern side of the Columbia River directly south of the Saddle Mountains. Upon further investigation from the air it was determined that this area did not support suitable greater sage-grouse habitat.

The western portion of the Survey Area was surveyed on Tuesday, April 27th. Surveys began at 5:57 AM and concluded at 7:53 AM. Winds were light to still at zero to two mph. The cloud cover was partly cloudy. Air temperature at the beginning of the survey was 48˚ Fahrenheit. No greater sage-grouse were observed in the western portion of the Survey Area at this time.

The southern portion of the Survey Area was surveyed on Wednesday, April 28th. Surveys began at 5:57 AM and concluded at 7:53 AM. Winds were light to still at zero to two mph. The cloud cover was clear. Air temperature at the beginning of the survey was 41˚ Fahrenheit. Two greater sage-grouse were observed in the YTC Training Area 10 approximately three miles northwest of the Coyote Spring known lek. The birds were flushed from mature sagebrush as the helicopter passed over. The sex of the birds could not be determined. The birds were not displaying when observed. Another unidentified bird was observed in the southeastern portion of the Survey Area south of the YTC Training Area 8. This bird flushed and definitive determination of species could not be made; however it is possible that this bird was a greater sage-grouse. We were unable to relocate the bird from the helicopter.

5.1.3 Survey #3

No greater sage-grouse individuals or leks were observed during Survey #3 (Figure 5).

The northern portion of the Survey Area was scheduled to be surveyed on Tuesday, May 11th, but was cancelled due to high wind conditions. The survey was not able to be made up due to the survey protocol stating that surveys must conclude by May 15th and other scheduling conflicts for Central Valley Helicopters. However, considering that the northern portion of the Survey Area represented the least suitable greater sage-grouse habitat due to a lack of sagebrush cover and steep slopes formed by Manastash Ridge, and the lack of any greater sage-grouse in the northern portion during the first two surveys, it is unlikely that greater sage-grouse inhabit the northern portion of the Survey Area.

The southern portion of the Survey Area was surveyed on Wednesday, May 12th. Surveys began at 5:05 AM and concluded at 7:20 AM. Winds were approximately four mph from the northwest. The cloud cover was clear. Air temperature at the beginning of the survey was 48˚ Fahrenheit.

The western portion of the Survey Area was surveyed on Thursday, May 13th. Surveys began at 5:20 AM and concluded at 7:30 AM. Winds were calm. The cloud cover was clear. Air temperature at the beginning of the survey was 47˚ Fahrenheit.

5.2 2011 Survey

5.2.1 Survey #1

Transects were flown over potential habitat at approximately one mile apart. Transects for Survey #2 and #3 were flown at closer increments after consultation with USFWS, WDFW, and YTC personnel (Figure 6).

No greater sage-grouse were observed in the Survey Area during Survey #1 (Figure 7).

The eastern portion of the Survey Area was surveyed on Tuesday, March 29th. Surveys began at 6:50 AM and concluded at 8:10 AM. Official sunrise on March 29th was 6:49 AM. Winds were light and variable from the northeast at approximately three to five mph. The cloud cover was overcast. Air temperature at the beginning of the survey was 48˚ Fahrenheit.

The southern portion of the Survey Area was surveyed on Wednesday, March 30th. Surveys began at 6:30 AM and concluded at 8:20 AM. Official sunrise on March 30th was 6:47 AM. Winds were light and variable from the west at approximately six mph. The cloud cover was mostly cloudy. Air temperature at the beginning of the survey was 46˚ Fahrenheit.

5.2.2 Survey #2

No greater sage-grouse individuals or leks were observed during Survey #2 (Figure 8).

Survey #2 began in the southern portion of the Survey Area to meet the training needs of the YTC. Training Areas 7, 8, 9, 10, 11, and privately held lands to the south of the YTC were surveyed on Tuesday April 12th beginning at 6:40 AM and ending at 8:00 AM. Official sunrise on April 12th was at 6:22 AM. Winds were calm at zero to one mph. Skies were clear with little to no cloud cover. Air temperature at the beginning of the survey was 37˚ Fahrenheit.

Surveys on the second morning took place on Wednesday April 13th from 0615 until 7:50 AM, and focused on creating more extensive survey coverage of the southern portion of the Survey Area. Official sunrise on April 13th was at 6:20 AM. Winds were calm at zero to one mph. The cloud cover was overcast. Air temperature at the beginning of the survey was 43˚ Fahrenheit.

Surveys on the third morning took place on Thursday April 14th from 6:10 AM until 8:10 AM, and focused on the eastern portion of the Survey Area near the Vantage Substation, Saddle Mountains, Midway Substation, and Training Areas 3, 4, 5, 6, and 7. Official sunrise on April 13th was at 6:18 AM. Winds were light and variable from the east at approximately five mph. The cloud cover was overcast. Air temperature at the beginning of the survey was 34˚ Fahrenheit.

5.2.3 Survey #3

No greater sage-grouse individuals or leks were observed during Survey #3 (Figure 9).

Survey #3 began in the southern portion of the Survey Area to meet the training needs of the YTC. Training Areas 7, 8, 9, 10, 11, and privately held lands to the south of the YTC were surveyed on Wednesday April 27th beginning at 5:20 AM and ending at 7:20 AM. Official sunrise on April 27th was at 5:54 AM. Winds were from the northeast at approximately four mph. The cloud cover was overcast. Air temperature at the beginning of the survey was 39˚ Fahrenheit.

Surveys on the second morning took place on Thursday April 28th from 5:20 AM until 7:20 AM, and focused on the eastern portion of the Survey Area near the Vantage Substation, Saddle Mountains, Midway Substation, and Training Areas 3, 4, 5, 6, and 7. Winds were from the northeast at approximately six mph. The cloud cover was partly cloudy to clear. Air temperature at the beginning of the survey was 34˚ Fahrenheit.

Surveys on the third morning took place on Friday April 29th from 5:20 AM until 7:20 AM, and focused on the private lands around Highway 24 in the southern portion of the Survey Area and the southeastern portion of the Survey Area. Winds were from the northeast at approximately five mph. Skies were clear with little to no cloud cover. Air temperature at the beginning of the survey was 41˚ Fahrenheit.

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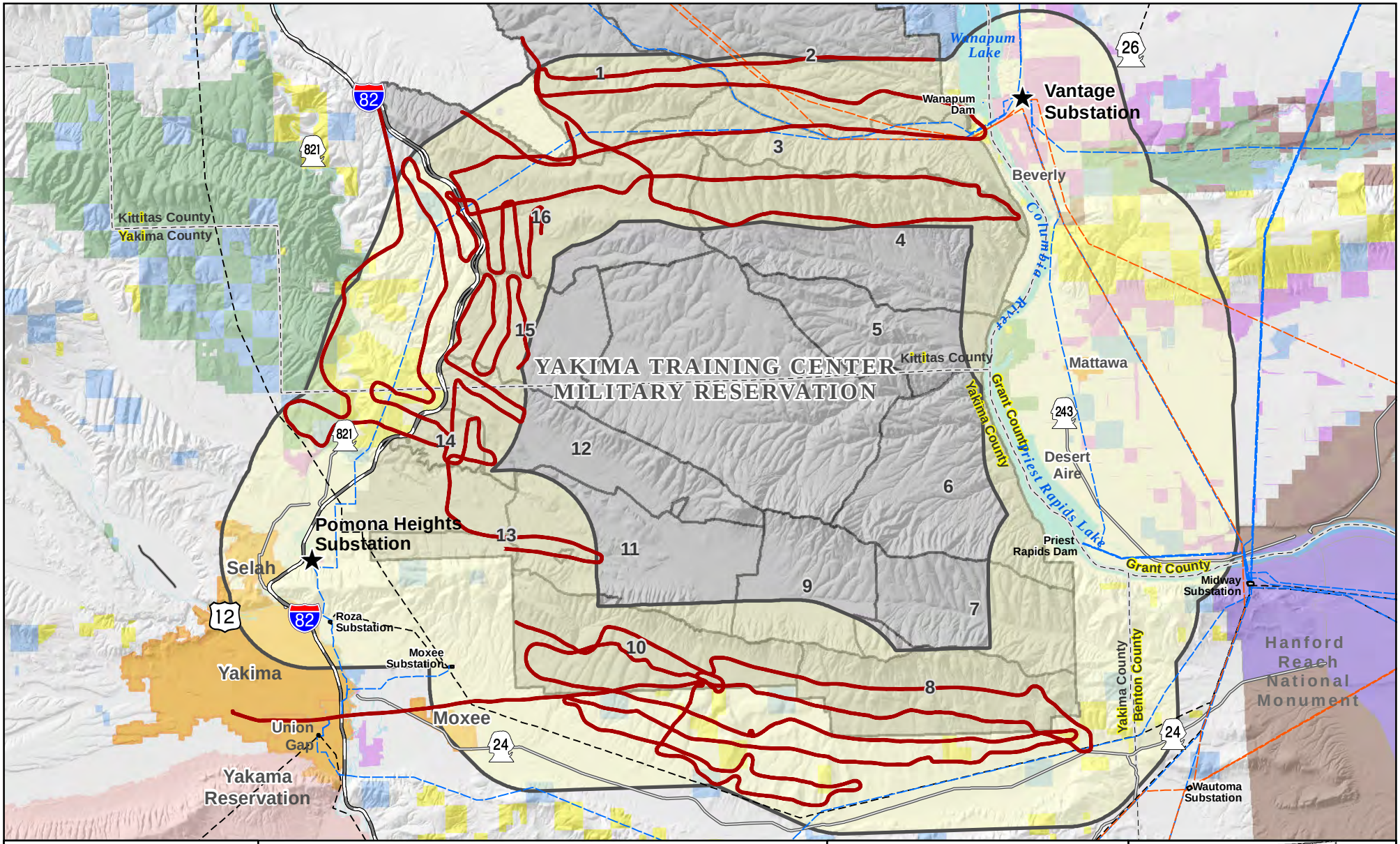

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 3
2010 Sage-Grouse Survey #1

Project Features
- Project Substation

Sage-Grouse Survey
- Survey Flight Path

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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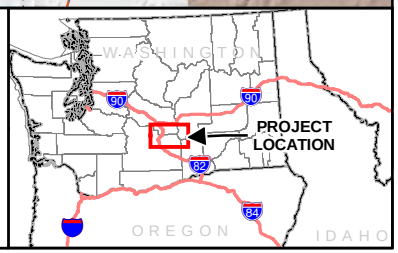

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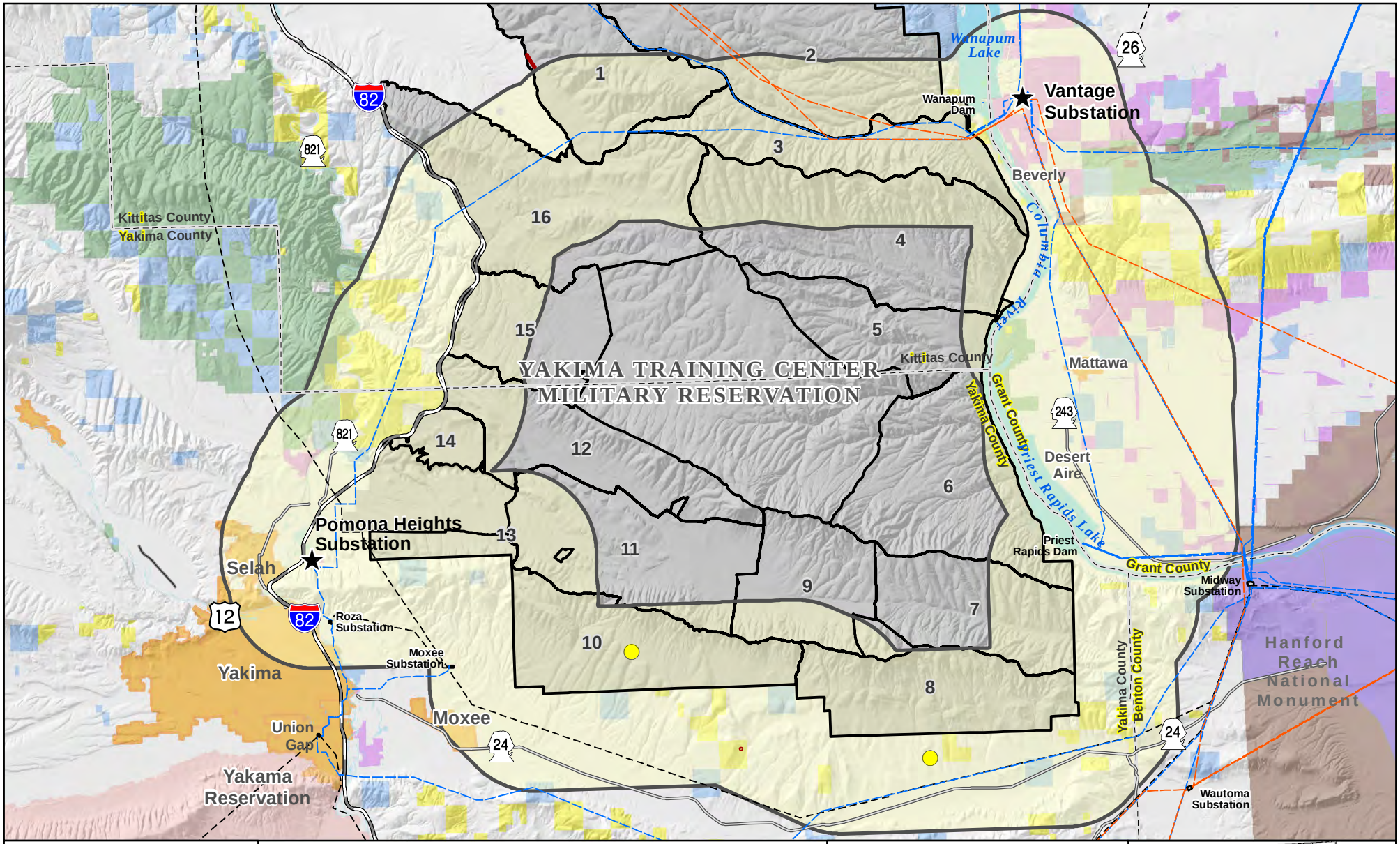

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 4
2010 Sage-Grouse Survey #2

Project Features
- Project Substation

Sage-Grouse Survey
- Sage-Grouse Location
- Survey Flight Path

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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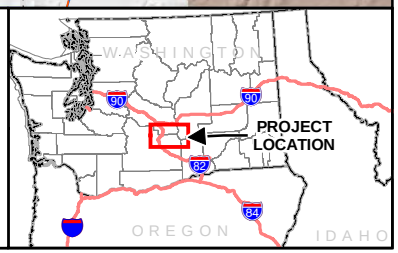

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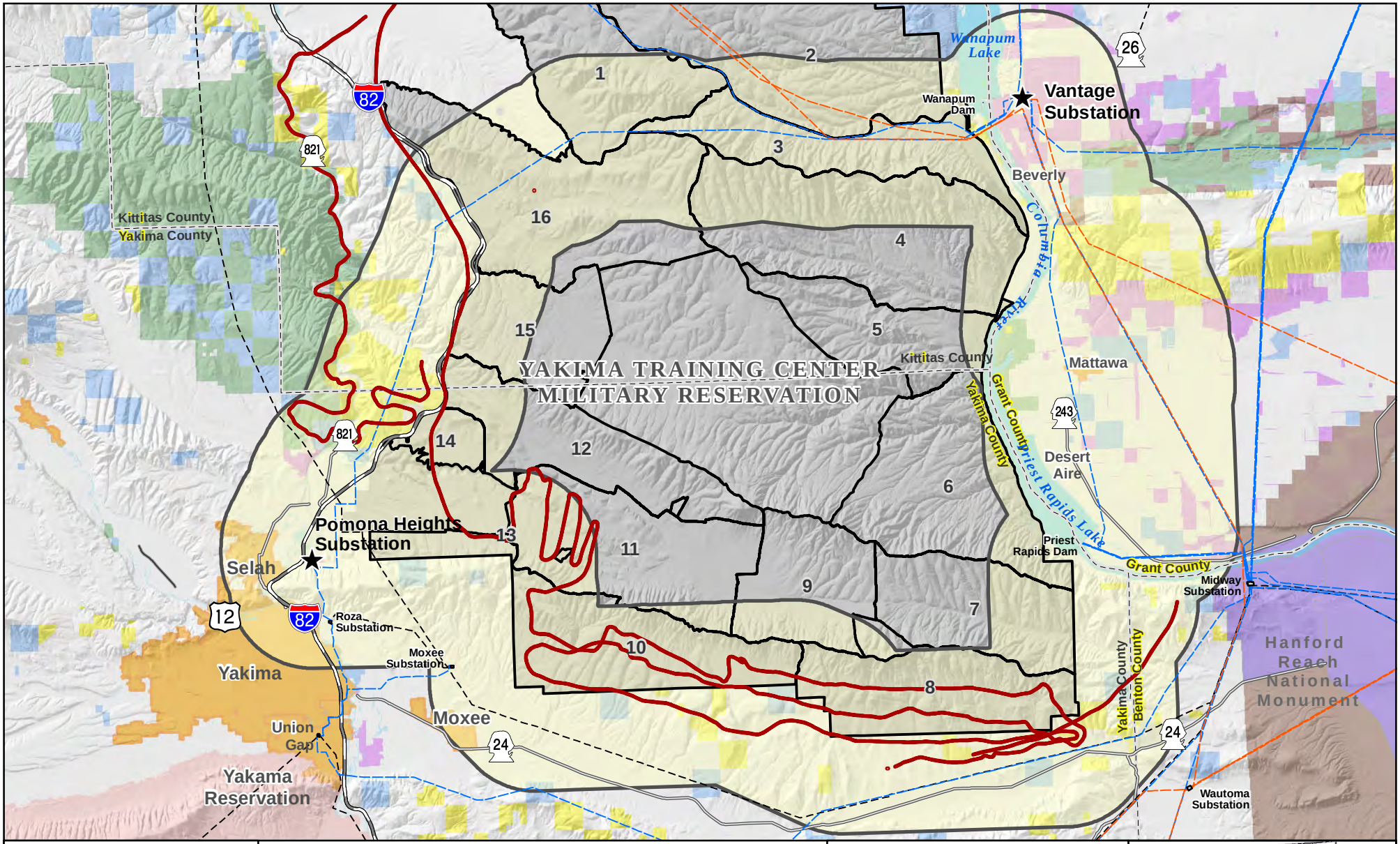

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 5
2010 Sage-Grouse Survey #3

Project Features
- Project Substation

Sage-Grouse Survey
- Survey Flight Path

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
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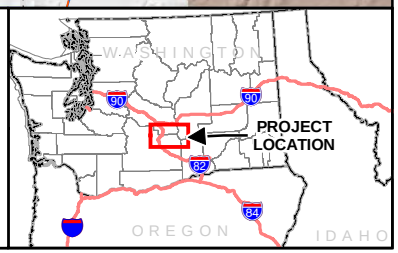

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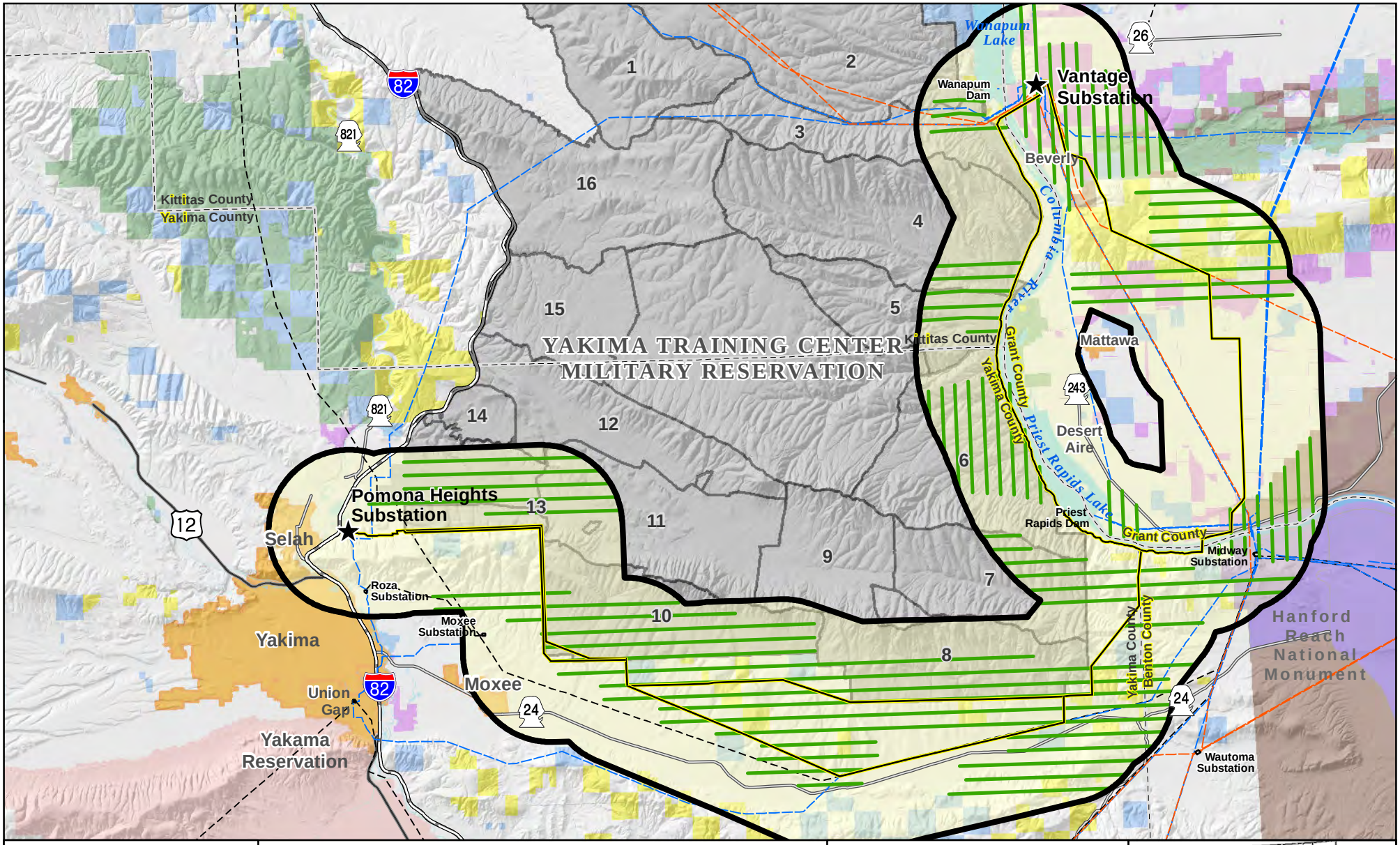

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 6
2011 Transects Spaced to One Half Mile

Project Features
- Project Substation
- Route Alternative

Sage-Grouse Surveys
- Transect

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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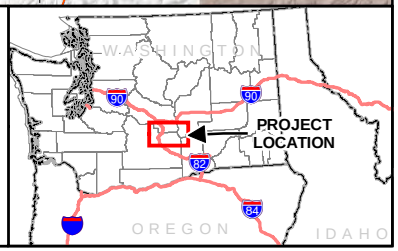

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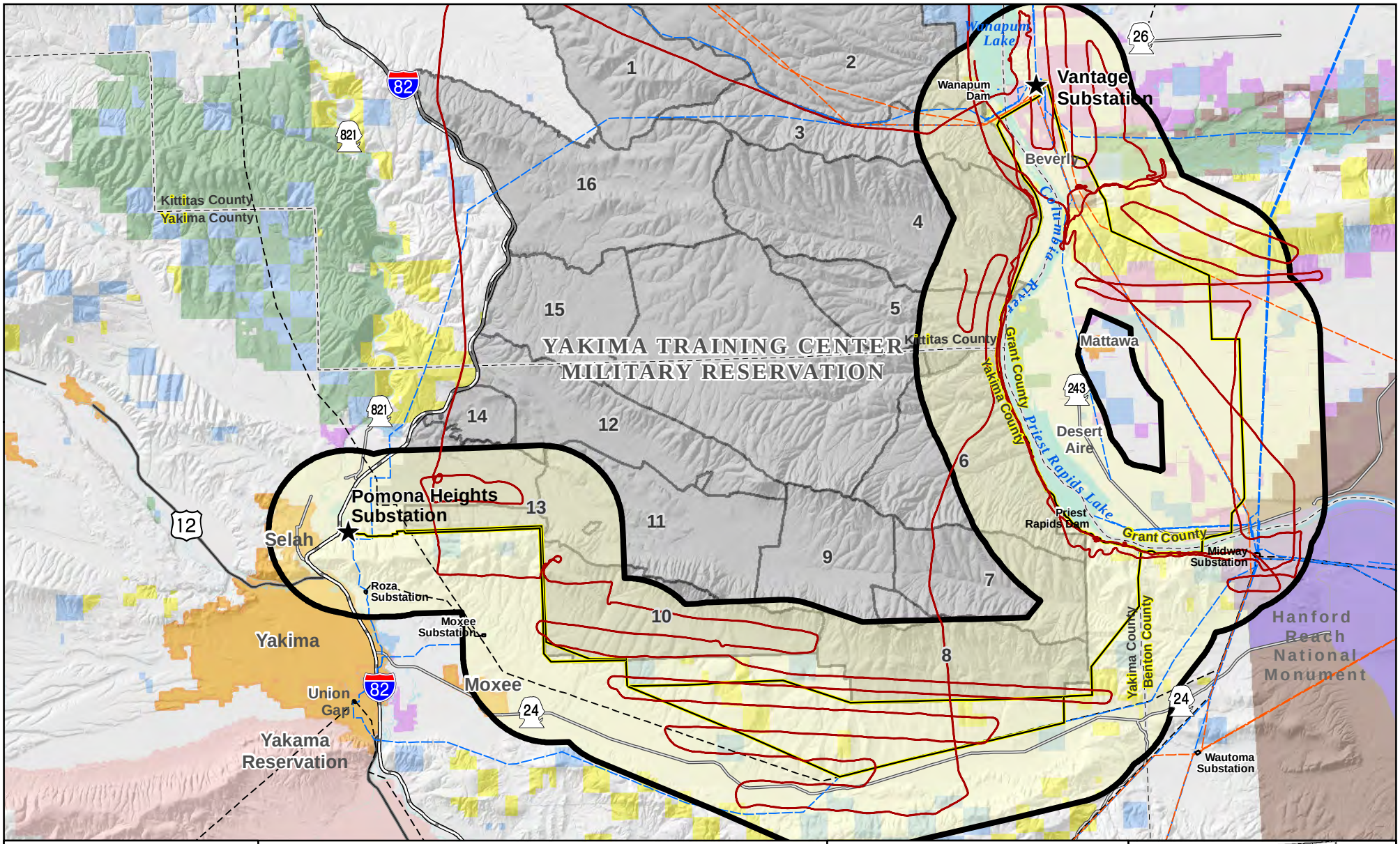

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 7
2011 Sage-Grouse Survey #1

Project Features
- Project Substation
- Route Alternative

Sage-Grouse Surveys
- Survey Flight Path

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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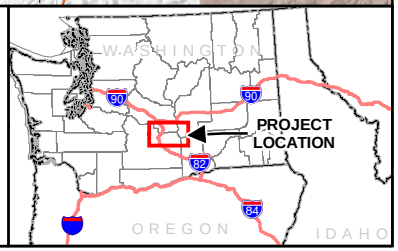

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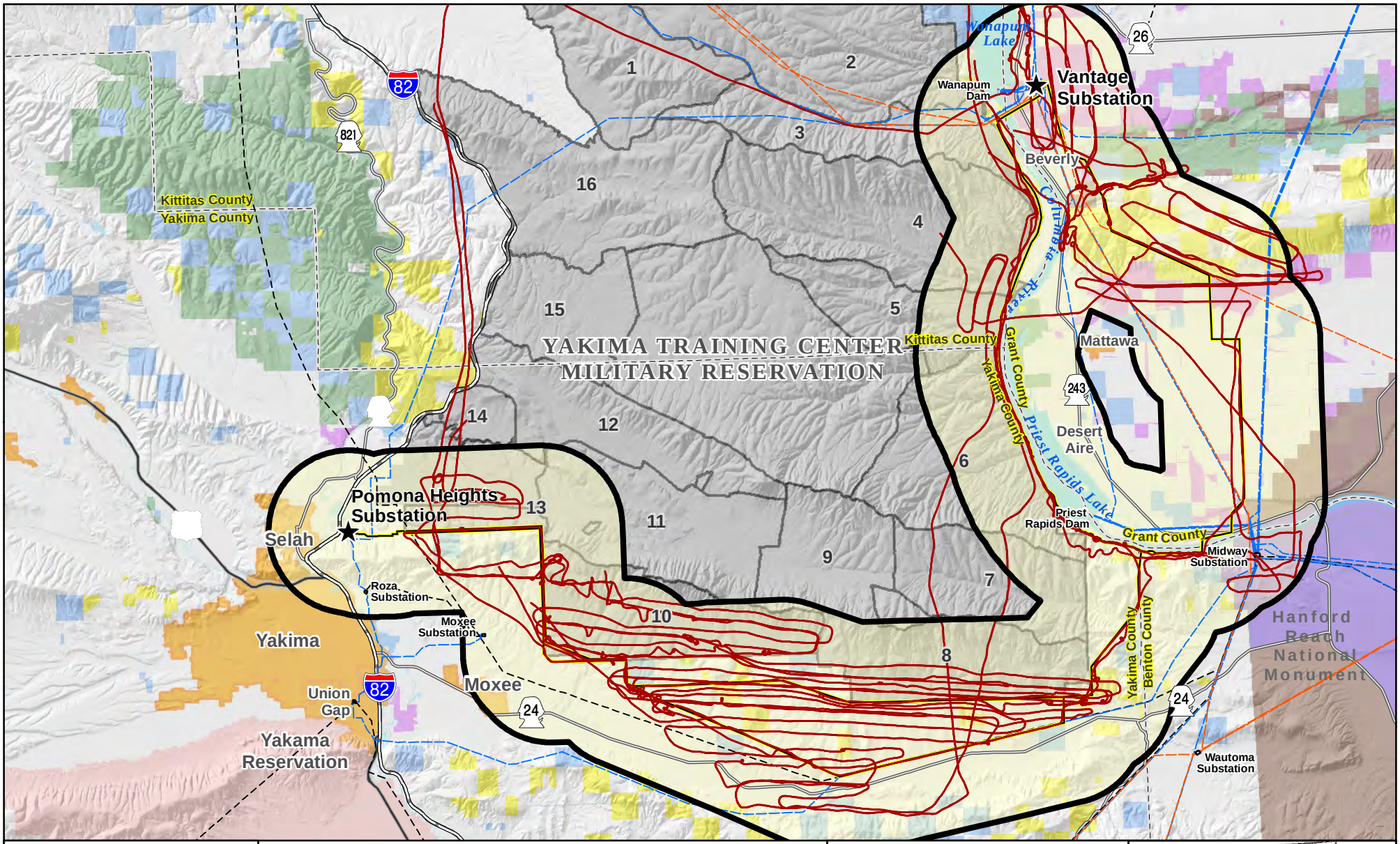

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 8
2011 Sage-Grouse Survey #2

Project Features
- Project Substation
- Route Alternative

Sage-Grouse Surveys
- Survey Flight Path

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
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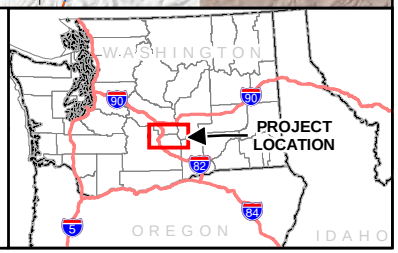

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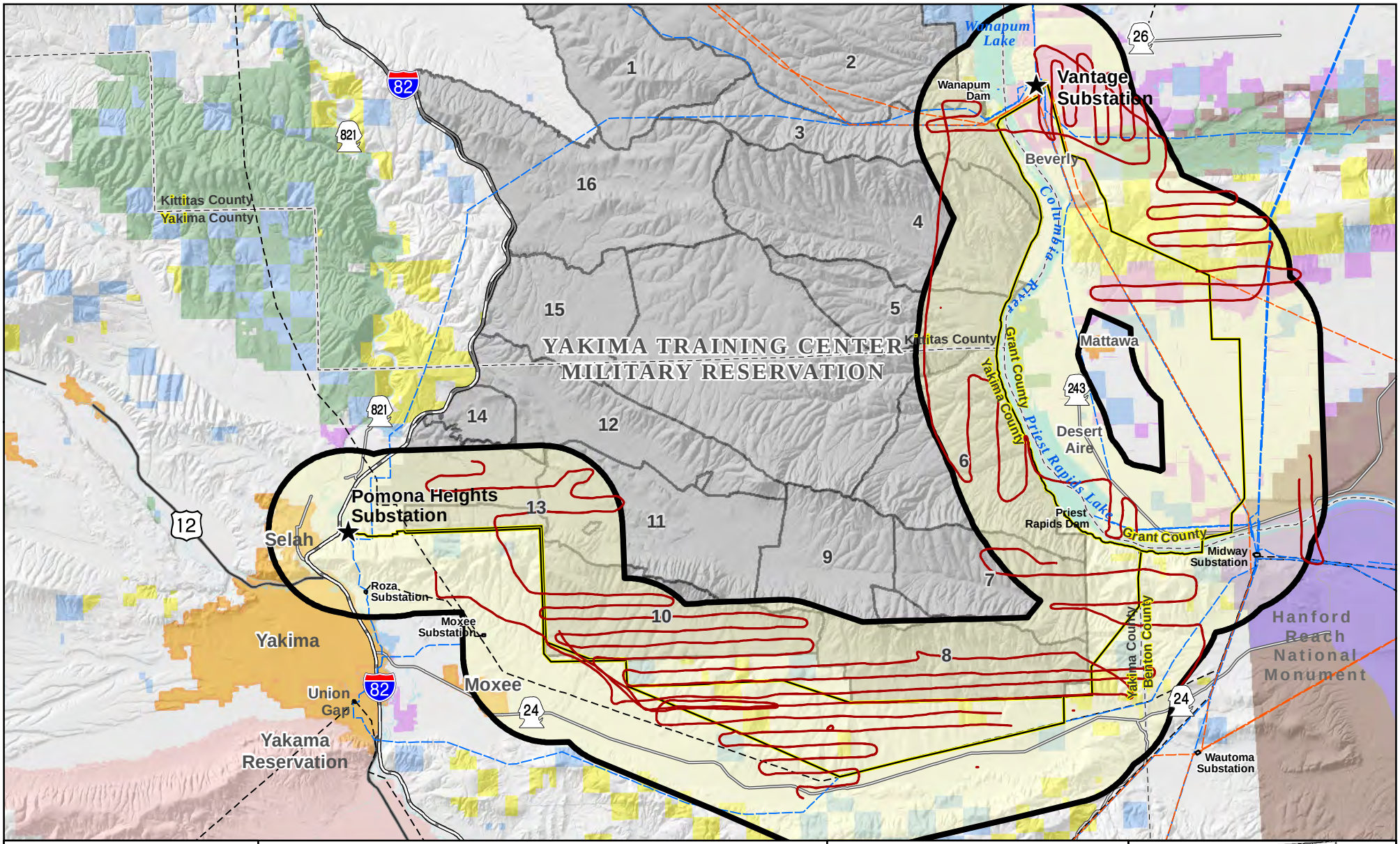

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 9
2011 Sage-Grouse Survey #3

Project Features
- Project Substation
- Route Alternative

Sage-Grouse Surveys
- Survey Flight Path

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
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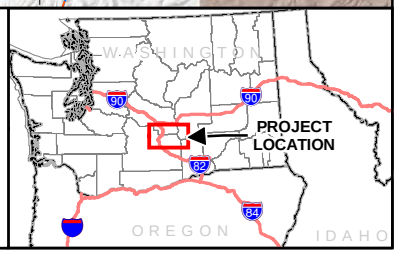

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6.0 CONCLUSIONS

Based on the results of aerial lek surveys in 2010 and 2011, no previously unknown greater sage-grouse leks occur within three miles of any proposed route alternatives for the Vantage to Pomona Heights Project.

6.1 2010 Survey

Greater sage-grouse begin displaying on leks as soon as snow begins to melt and the lek is exposed. Winter 2009 – 2010 was a low snow year for the Yakima region, which would have made the leks available at an earlier date. Accordingly, lekking activities would have ended at an earlier data as well.

Only two greater sage-grouse were observed during the three aerial lek surveys. These two individuals were observed approximately three miles northwest of a known lek and were not attending a lek when observed. The birds were observed at approximately 7:00 AM. At this time of the morning, observations would be expected to occur at a lek site if the lek is still being attended. The observation far away from a known lek, the fact that the individuals were observed late in the protocol survey season, and the low snow year may indicate that birds in this population had concluded lekking activities and were moving to nesting habitat at the time of the aerial lek surveys.

6.2 2011 Survey

The three survey efforts in 2011 did not observe any greater sage-grouse individuals or leks, despite numerous survey flights during the optimal lekking period. Informal communication with YTC biologists revealed that they had counted a large number of grouse attending a known lek in between surveys #1 and #2. This confirms that grouse were lekking at the time of the aerial surveys, but no leks were identified in the Survey Area. This is concurrent with the results of the 2010 aerial lek surveys, which also did not identify any greater sage-grouse leks.

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APPENDIX A

YAKIMA TRAINING CENTER SAGE-GROUSE POPULATION MONITORING PROTOCOL

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SAGE GROUSE POPULATION MONITORING PROTOCOL

INTRODUCTION

YTC's lek monitoring methods are comprised of two types: (1) Lek Surveys and (2) Lek Counts (WDFW 1995). Lek surveys identify active leks. Lek counts entail censuses of the number of male sage grouse observed on an active lek. Females and unknowns are also recorded during counts and surveys, but only males are used for population estimates; females are much less conspicuous and their attendance is less frequent, making their numbers highly variable in comparison to males. Lek surveys and counts are conducted during the months of February through May.

LEK SURVEYS

Lek surveys are a critical component of YTC's sage grouse monitoring program. Lek surveys must be designed to cover an entire area, as opposed to simply visiting known lek sites (Dobkin 1995). Adherence to this requirement reduces the possibility of overlooking active leks. If active leks go undetected, the ability to determine sage grouse population trends is compromised. The number of active leks, as well as the number of males attending leks, is an effective index to lekking species' population trends (Cannon and Knopf 1981). Lek surveys will accomplish two objectives: (1) locate active leks and (2) monitor numbers at leks to determine when to initiate lek counts.

Ground (vehicle) Surveys

Ground surveys will be designed to equalize effort expended at locating leks. The high cost of aerial surveys limits the number that YTC can afford. Therefore, aerial surveys function as a quick reconnaissance to aid vehicle surveys.

Survey Technique: YTC is divided into four areas for lek surveys (Fig 1). Routes will be established along existing roads within each area. An observer will drive a route and stop roughly every half-mile to search the surrounding area with binoculars while listening for displaying grouse. Speed of travel is not important since most observations must be made from outside of the vehicle. Searching is conducted using binoculars (power: 10X) and spotting scopes (power: 32X). It is important to be sure that no sage grouse are displaying ahead along the survey route. There should be a concerted effort to not disturb birds on a lek.

It is critical that all locations suitable for a lek be searched for sage grouse. Adherence to this requirement is the only means to assure that all areas have received equal effort. To assist in the detection of leks, maps will be created each year noting location of active and inactive leks and areas where sign has been observed.

Lek Characteristics: Sage grouse leks on YTC exist in a variety of vegetation cover types. The Lmumma lek is located on basaltic lithosols interspersed with dense crested wheatgrass and big sagebrush. In contrast, the Knuckles and Coffin Ranch leks are exclusively on basaltic lithosols with a cryptogamic crust and stiff sagebrush. Despite these differences, similarities exist among

YTC leks. Leks are ordinarily elevated above the surrounding landscape, which seems to provide grouse with a 360° view. Leks are usually adjacent to dense vegetation or a draw, providing rapid escape from predators (pers. obs.). Cadwell et al. (1997) reported the following physical characteristics for 16 YTC leks: vegetation communities were dominated by sage/wheatgrass; lek elevation was 578 - 904 m, with an average of 716 m; percentage of slope was 1.3 to 7.6%, with an average of 4.0%; and aspect was variable. Leks typically do not occur in low-lying areas or on crests of main ridges such as Yakima or Umtanum.

Beginning of Survey Season: Surveys will begin the first week of February to document initial lek attendance. It is essential that birds be detected as early in February as possible so military restrictions can be enacted to minimize disturbance. After initial attendance is documented, lek surveys will cease until the third week of February. From 1989 through 1997, sage grouse attendance was low the first two weeks of February at YTC. After the third week of February attendance began to increase. A minimum of one complete ground survey (by vehicle) of 30,000 acres of potential lek areas (stratified by vegetation and slope) on YTC will be completed between 15 February and 15 April of each year. Search areas will be selected and prioritized by the wildlife program manager.

The wildlife program manager will be notified in writing within one working day after grouse are initially detected displaying at a lek**.** Information included in this document will include the location of the lek and number of birds observed.

All areas targeted for coverage should be surveyed at least once before peak lek attendance. For the years 1989 through 1997, the dates of peak attendance ranged 7 March through 24 April. The goal is to identify all active leks before male lek attendance peaks. Thus, when the peak occurs, field efforts can concentrate on lek counts. This strategy will increase the maximum number of male sage grouse counted at leks.

Survey frequency: Each area will be surveyed a minimum of once during the season. Surveys will be conducted once per week until lek count frequency increases to two per week (*see below*) at which time lek surveys will be terminated. However, if significant amounts of area still need to be surveyed, then additional personnel will be used to finish surveys.

Time of Surveys and Weather Conditions: Surveys will be conducted as close to sunrise as possible (Jenni and Hartzler 1978). This period corresponds to a half-hour before sunrise to 1.5 hours after sunrise. Weather conditions must meet the following criteria: no precipitation; winds $\leq$ 15 mph; and visibility $\geq$ 5 miles.

Data to be Collected

A. Time
B. Date
C. Survey Area Name
D. Wind speed
E. Wind Direction
F. Temperature
G. Cloud Cover
H. Miles driven
I. Location of detected sage grouse and number of birds

J. GPS file for differential correction of all discovered and suspected leks

Aerial Surveys

Aerial surveys from helicopter will be used to complement ground surveys. Areas identified as inaccessible during ground surveys will be high priority. Impassable roads, such as in the MPRC, or distant areas, such as training areas 1 and 2, limit ground access. Areas selected for aerial surveys will have suitable topographic and vegetation characteristics as described above. The wildlife program manager will be consulted to determine exact survey locations.

During March, one complete aerial survey (to cover a minimum of 50% of YTC) will be conducted where vehicle surveys can not be conducted. Also, surveys will possibly be conducted to follow up on ground observations of grouse. Aerial surveys will be conducted at a maximum of 40 feet above ground level and an approximate ground speed of 40 mph. The helicopter will be flown in a back and forth pattern with an average distance between flight lines of 1/8 mile. A minimum of four observers will be present in the helicopter; all must be capable of identifying sage grouse. Helicopter distance from leks will be sufficient to prevent disruption of sage grouse.

Time of Surveys and Weather Conditions

Surveys will be conducted as close to sunrise as possible (Jenni and Hartzler 1978). This period corresponds to a half-hour before sunrise to 1.5 hours after sunrise. Weather conditions must meet the following criteria: no precipitation; winds $\leq$ 20 mph; and visibility $\geq$ 10 miles.

Data to be Collected

A. Time (Begin and End)
B. Date
C. Wind speed
D. Wind Direction
E. Temperature
F. Cloud Cover
G. Survey hours
H. Location of detected sage grouse and number of birds
I. GPS file for differential correction of all discovered and suspected leks

LEK COUNTS

Lek counts involve the enumeration of sage grouse at active leks. When a lek is documented during a lek survey it is immediately included in the lek count rotation.

Beginning of Season

Jenni and Hartzler (1978) suggest conducting counts after the peak in copulatory activity. Generally male lek attendance peaks shortly after copulations peak and males continue to attend for several weeks after. Counts at leks will begin the first or second week of March. The observation of leks during lek surveys will be the most reliable method of determining when to begin counts.

Frequency of Counts

Lek counts will be conducted once per week until male grouse abundance increases above 10 at two major leks; afterwards two counts per week will be conducted. Counts will continue at two per week until male attendance drops below 10 males at two major leks. Counts will then be conducted once per week. This decrease in male attendance usually occurs by the last week in April. As the end of the season approaches, the rate at which attendance declines will vary between individual leks. Counts will cease at an individual lek when no birds are detected there. Counts will end for the season when no birds are detected at the last remaining active lek.

Lek Count Technique

Observation points (OPs) will be selected for all active leks each year. These OPs will maximize visibility of displaying grouse while minimizing disturbance. It is often necessary to use multiple OPs to observe all grouse on a lek. Observers will use as many OPs as necessary to assure that all grouse are visible at a lek. Binoculars (power: 10X) and scopes (power: 32X) will be used to see grouse.

Time of Count and Weather Conditions

Counts will be conducted as close to sunrise as possible (Jenni and Hartzler 1978). This period corresponds to a half-hour before sunrise to 1.5 hours after sunrise. Weather conditions must meet the following criteria: no precipitation; winds $\leq$ 20 mph; and visibility $\geq$ 5 miles.

Length of Counts

Counts will run for 10 minutes at each lek following the detection of birds. If no birds are present upon arrival, a five minute search period will ensue. If birds are detected within the five minute search period then the 10 minute count period begins. If no birds are detected within the first five minutes then the count ceases. This 10 minute count is a guideline to assure equal effort is expended at enumerating birds, and should be the minimum amount of time spent. Observers should use more time if necessary to obtain an accurate count.

Logistics

Because inter-lek movements by male sage grouse are possible, all leks will be counted on a single day when possible. This step will reduce double counts of males. To reduce timing bias, the order in which leks are visited will be rotated each subsequent survey. However, because time is extremely limited in the morning, only the end leks will be switched as opposed to those in the middle of a lek group. Also, to reduce observer bias, personnel will be rotated among lek groups each subsequent visit.

Data to be Collected

1) date
2) lek name
3) arrival and departure time
4) cloud cover (%)
5) temperature (measured with thermometer in Fahrenheit)
6) wind speed (mph measured with wind meter)
7) wind direction (degrees measured with compass)
8) snow pack on and around lek (%)
9) precipitation (snow, rain)
10) number of males, females, unknowns and total birds
11) comments—presence of predators, troops etc.

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Jenni, D. A., and J. E. Hartzler. 1978. Attendance at a sage grouse lek: implications for spring censuses. J. Wildl. Manage. 42:46-52.

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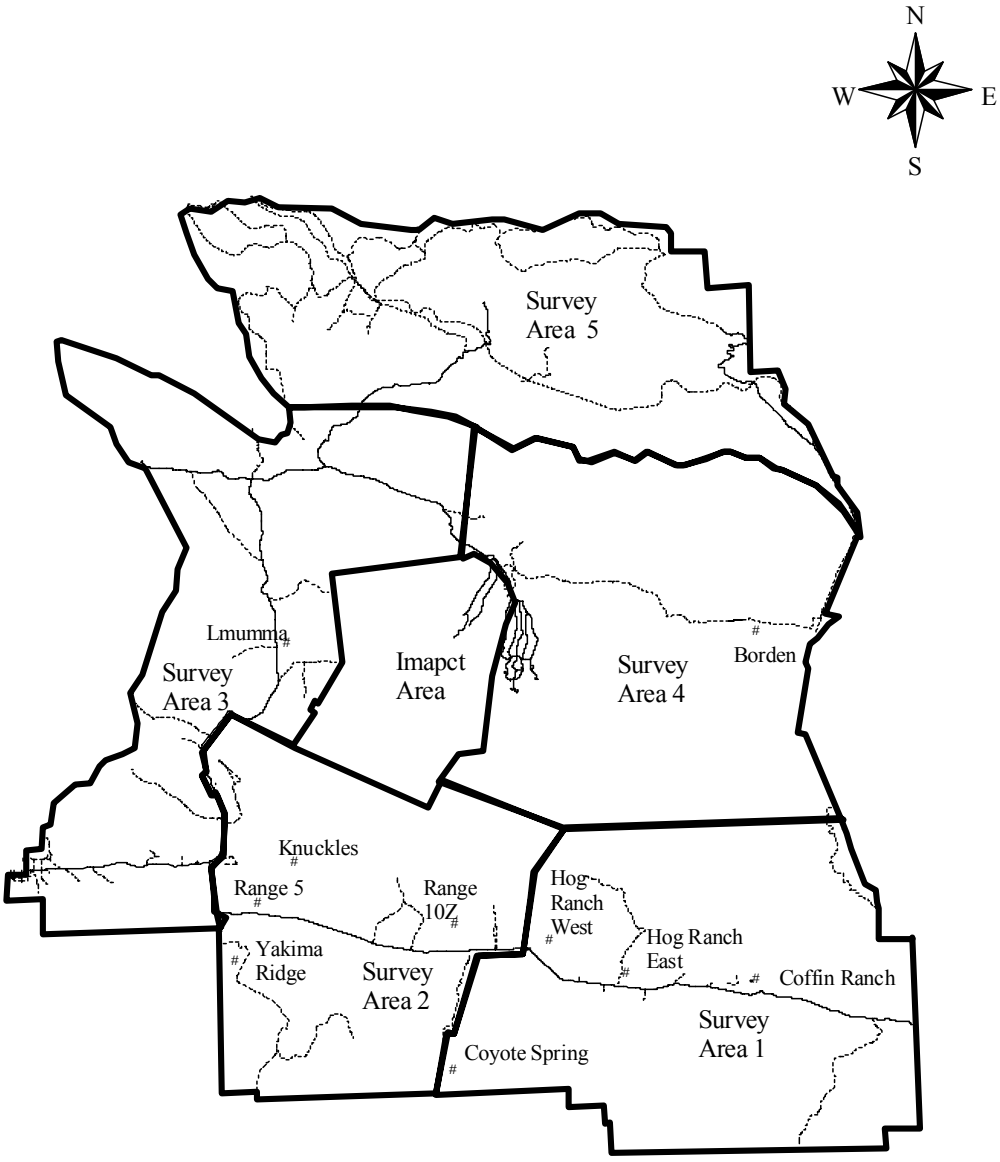

Figure 1. Sage grouse leks and survey areas for the Yakima Training Center, Washington, 1999.

Survey Zones

Sage Grouse Leks

APPENDIX B

SURVEY DATA SHEETS 2010 & 2011

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Vantage to Pomona Heights 230 kV Transmission Line Aerial Sage Grouse Surveys 2010

DATE: _____

TIME BEGIN: _____ TIME END: _____

WIND SPEED: _____ WIND DIRECTION:_____

Beaufort Wind Index

Code	Description of Wind	Observation	M.P.H.
0	Calm	Smoke rises vertically	0 - 0.15
1	Light Air	Direction of wind shown by smoke drift but not by vanes	0.15 - 2.7
2	Light Breeze	Wind felt on face, leaves rustle, ordinary vanes moved by wind	2.7 - 3.6
3	Gentle Breeze	Leaves and small twigs in constant motion, wind extends light flag	3.6 - 7.2
4	Moderate Breeze	Raises dust and loose paper, small branches moved	7.2 - 8.9
5	Fresh Breeze	Small trees in leaf begin to sway	8.9 - 12.5
6	Strong Breeze	Large branches in motion, whistling heard in telegraph wires	12.5 - 14.5
7	Moderate gale	Whole trees in motion, inconvenience felt when walking into wind	14.5 - 20
8	Gale	Twigs broken of trees, generally impeded progress	20 - 22
9(+)	Strong gale +	Straight structural damage, e.g. slates and chimney pots removed from the roofs	> 22

TEMPERATURE: _____ CLOUD COVER: _____

Cloud Cover Index

Code	Sky Description
0	Few Clouds
1	Partly cloudy (scattered) or variable sky
2	Cloudy or overcast
3	Fog or smoke
4	Drizzle or light rain (not affecting hearing ability)
5	Snow
6	Showers (is affecting hearing ability).

SURVEY HOURS: _____

LEK (X)	Estimated # Birds	Coordinates ˚N	Coordinates ˚W	Supplemental Info.

Vantage to Pomona Heights 230 kV Transmission Line Aerial Sage-grouse Surveys 2011

DATE: _____

TIME BEGIN: _____ TIME END: _____

WIND SPEED: _____ WIND DIRECTION:_____

Beaufort Wind Index

Code	Description of Wind	Observation	M.P.H.
0	Calm	Smoke rises vertically	0 - 0.15
1	Light Air	Direction of wind shown by smoke drift but not by vanes	0.15 - 2.7
2	Light Breeze	Wind felt on face, leaves rustle, ordinary vanes moved by wind	2.7 - 3.6
3	Gentle Breeze	Leaves and small twigs in constant motion, wind extends light flag	3.6 - 7.2
4	Moderate Breeze	Raises dust and loose paper, small branches moved	7.2 - 8.9
5	Fresh Breeze	Small trees in leaf begin to sway	8.9 - 12.5
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7	Moderate gale	Whole trees in motion, inconvenience felt when walking into wind	14.5 - 20
8	Gale	Twigs broken of trees, generally impeded progress	20 - 22
9(+)	Strong gale +	Straight structural damage, e.g. slates and chimney pots removed from the roofs	> 22

TEMPERATURE: _____ CLOUD COVER: _____

Cloud Cover Index

Code	Sky Description
0	Few Clouds
1	Partly cloudy (scattered) or variable sky
2	Cloudy or overcast
3	Fog or smoke
4	Drizzle or light rain (not affecting hearing ability)
5	Snow
6	Showers (is affecting hearing ability).

SURVEY HOURS: _____

LEK (X)	Estimated # Birds	Coordinates ˚N	Coordinates ˚W	Supplemental Info.

APPENDIX B-1
SAGE-GROUSE WALKING TRANSECT SURVEY REPORT

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ACRONYMS AND ABBREVIATIONS

BLM	Bureau of Land Management
cm	centimeters
DPS	Distinct Population Segment
GPS	global positioning system
HCA	Habitat Concentration Area
kg	kilograms
kV	kilovolt
lbs	pounds
mph	miles per hour
POWER	POWER Engineers, Inc.
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
WDFW	Washington Department of Fish and Wildlife
WHCWG	Washington Wildlife Habitat Connectivity Working Group
YTC	U.S. Army Yakima Training Center

1.0 INTRODUCTION

Pacific Power proposes to construct, operate and maintain a new 230 kilovolt (kV) transmission line in the south-central portion of Washington State from the Vantage Substation near the Wanapum Dam to the Pomona Heights Substation near Selah, Washington. The last transmission line built by Pacific Power to serve the electrical loads in the Yakima Valley was the Pomona-Wanapum 230 kV transmission line which was constructed in the mid-1970s. Since that time, energy demand in the Yakima Valley has continued to grow. Pacific Power planning studies have identified the loss of the existing Pomona-Wanapum 230 kV transmission line as the single most critical outage condition on the Mid-Columbia system. The planned line will mitigate the risk and ensure reliable, efficient service. This line will improve the overall reliability, security and operating flexibility of the electrical system that serves the Yakima area. The Project would be designed for one 230 kV three-phase (three conductors) circuit and shield wires. H-frame wood pole structures are proposed for most of the line located in open terrain. The H-frame structures would be between 65 and 90 feet tall (and in some cases 100 feet tall), and spaced approximately 750 to 900 feet apart, depending on terrain. The planned in-service date for the new transmission line is late 2015.

1.1 Project Location

The Survey Area is located in south-central Washington between the Pomona Heights Substation east of Selah, Washington and the Vantage Substation east of the Wanapum Dam on the Columbia River. The U.S. Army Yakima Training Center (YTC) lies directly between the two substations; no access is allowed in the center of the YTC because it is used by the Army for live fire training operations. Surveys for greater sage-grouse leks were conducted in 2010 along potential routes which passed through the northern portion of the YTC and then south along the west side of Interstate 82 to the Pomona Heights Substation; along potential routes that avoided the majority of the southern portion of the YTC and paralleled the southern boundary; and along potential routes which did not intersect the YTC lands, traveled south along the eastern side of the Columbia River and then west to the Pomona Heights Substation. Potential routes which avoided the majority of the YTC lands were surveyed for greater sage-grouse leks again in 2011.

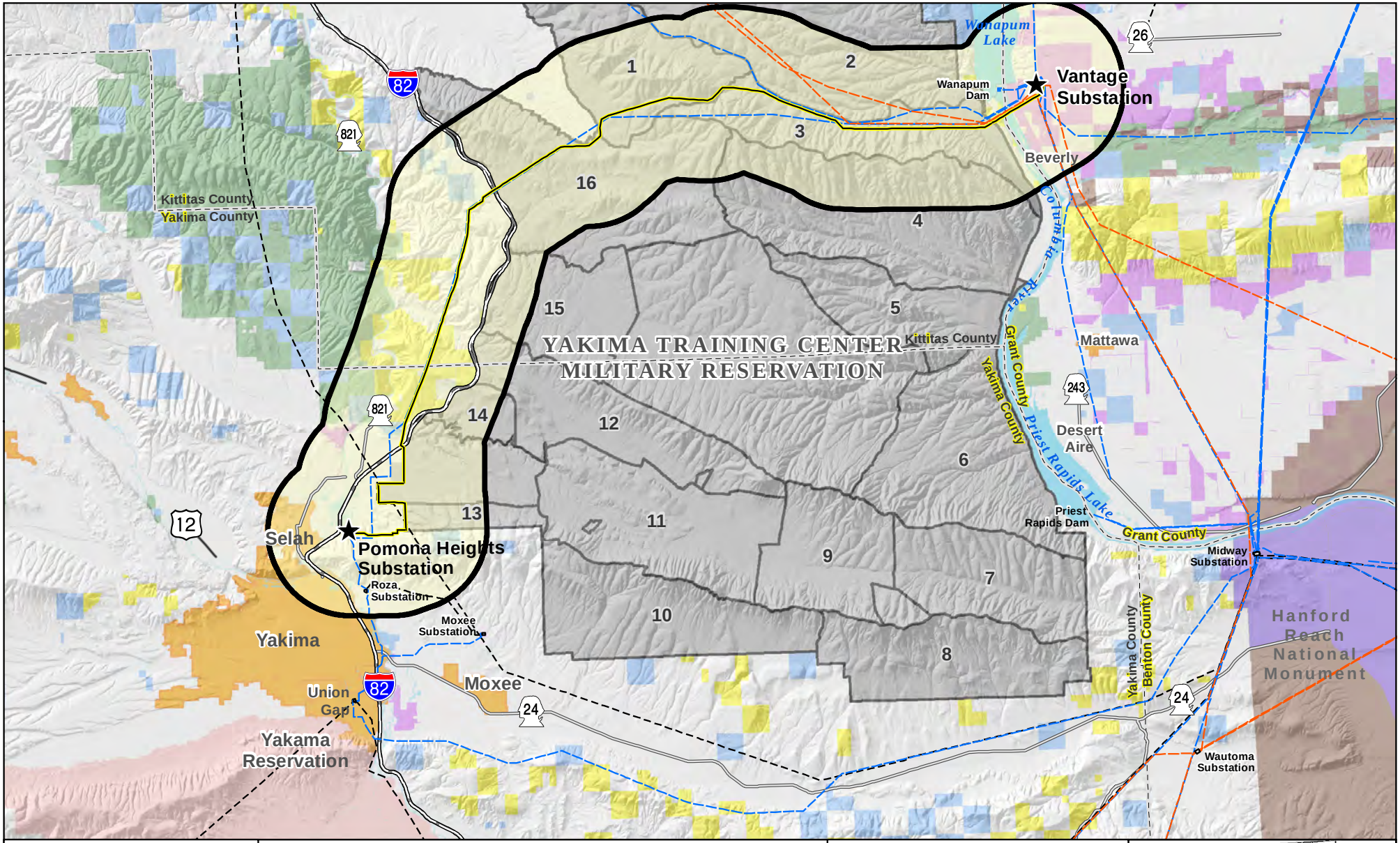
In 2013, the potential routes which passed through the northern portion of the YTC and then south along the west side of Interstate 82 to the Pomona Heights Substation were brought back into consideration. Surveys described in this report only occurred in suitable greater sage-grouse habitat on YTC and BLM properties along this potential route (Figure 1). This route will hereafter be referred to as the Proposed Northern Route.

1.2 Survey Need

The greater sage-grouse (*Centrocercus urophasianus*) is listed as a Candidate species under the Federal Endangered Species Act, as Threatened by the Washington Department of Fish and Wildlife (WDFW) (WAC 232-12-297), and as a Sensitive species by the Bureau of Land Management (BLM). Large expanses of mature sagebrush habitat are a key aspect used by greater sage-grouse throughout the year. While the consensus among some researchers and land managers is that transmission lines present a negative impact on greater sage-grouse (Braun et al. 2002; Knick et al. 2003; Knick et al. 2010; Wisdom et al. 2011), other reports show that the negative impacts may be overstated (Wisinski 2007; Johnson et al. 2010; Nonne et al. 2013).

Through discussions with the U.S. Fish and Wildlife Service (USFWS), the WDFW, and the BLM, Pacific Power has committed to conduct walking brood route surveys (as described in Connelly et al. 2003) for greater sage-grouse occurrence along the Proposed Northern Route within the YTC and BLM lands to the west of Interstate 82. Pacific Power contracted with POWER Engineers, Inc.

(POWER) to conduct these surveys for greater sage-grouse habitat and occurrence along and directly adjacent to the Proposed Northern Route. Aerial lek surveys could not be completed in 2013 because the lekking period had already expired prior to identification of the need for greater sage-grouse surveys.



Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1
2013 NNR Route Alternative and Sage-Grouse Survey Area

Project Features
- Project Substation
- NNR Route Alternative

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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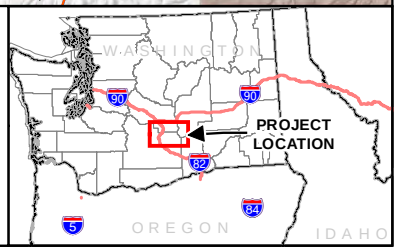

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2.0 SPECIES ECOLOGY

Greater sage-grouse which may occur along the Proposed Northern Route are a portion of the Columbia Basin Distinct Population Segment (DPS). The YTC supports one of two Washington populations remaining in the Columbia Basin DPS. The second population is located in Douglas and Grant Counties. Annual surveys for leks and lek counts have been conducted by YTC personnel to monitor trends and assess population status. Ten leks have been active since 1999. As of 2001, the ten year population average on the YTC is 289 birds. Starting in 1989 radio telemetry research and population monitoring has shown that adult use and nesting and brood rearing occurs primarily south of Umtanum ridge in proximity to leks.

The greater sage-grouse is the largest grouse species in North America with a body length ranging from 55 to 71 centimeters (cm) (22 to 28 inches), a wingspan between 83 and 96 cm (33 to 38 inches), and a body weight of 1 to 3 kilograms (kg) (3 to 6 pounds [lbs]). Males are the larger sex and have a distinct white breast, black throat, black belly, and a mottled brown back. When displaying on a lek, the tail of a male is raised in a large, distinct fan, the chest is extended, and two distinct yellow air sacs just under the neck are inflated and deflated repeatedly. Females are smaller than males and are drabber in appearance with mottled brown on the back and chest (Sibley 2003). Females do not display on leks. Instead, they remain in the sagebrush on the periphery of the lek and observe the males.

Greater sage-grouse are closely associated with sagebrush ecosystems of western North America. Sagebrush habitat types have a tremendous amount of natural variation in vegetative composition, habitat fragmentation, topography, substrate, weather, and frequency of fire. Consequently, greater sage-grouse are adapted to a mosaic of sagebrush habitats throughout their range, including relatively tall sagebrush such as big sagebrush (*Artemisia tridentata*), three-tip sagebrush (*A. tripartita)*, silver sagebrush (*A. cana*); relatively low sagebrush (*A. arbuscula)*, black sagebrush (*A. nova*); forb-rich mosaics of low and tall sagebrush; riparian meadows; steppe dominated by native grasses and forbs; scrub-willow (*Salix* spp.); and sagebrush savannas (Hays et al. 1998; Connelly et al. 2003).

Leks are historical display grounds which are used annually where males gather to display for females during the spring mating season. Lek attendance varies throughout the species range, but typically begins as winter snow begins to melt. Mating typically peaks in early April, but peak male attendance typically occurs later in April or early May when attendance by yearling males begins to increase (Christiansen 2007); however, lek attendance may be delayed by a lingering snow pack. Leks are typically barren areas surrounded by mature sagebrush. Leks are rarely located on slopes greater than ten percent (10%) and typically have open, unobstructed sight lines which provide two major advantages to grouse: 1) it allows females on the periphery of the lek to view the displaying males; and 2) it allows displaying males to spot potential predators. While displaying on the lek, males also make a loud, deep call, called “booming,” which can be heard from over a mile away during favorable conditions. Leks are typically attended in the early morning hours, but males may display well before dawn during a full moon if the sky is clear.

Nests are placed in thick vegetative cover usually dominated by mature sagebrush. Vegetatively diverse habitat may be an important aspect of nesting habitat to offer vertical and horizontal concealment (Connelly et al. 1991; Gregg et al. 1994). Density of herbaceous cover can be an important indicator of habitat quality for pre-nesting, nesting, and brood rearing hens. Herbaceous cover averaging 18 cm (seven inches) in height and greater has been identified as an important characteristic of sage-grouse nesting and brood rearing habitat (Gregg et al. 1994; Schroeder et al. 1999).

One reason the greater sage-grouse is so dependent on the presence of mature sagebrush is that leaves of various sagebrush species dominate their diet throughout the fall, winter, and early spring (Connelly et al. 2003). The presence of tall sagebrush which extends above snow level and is available as forage during the winter months is a key factor in determining greater sage-grouse winter habitat. Insects such as grasshoppers (*Orthoptera*), beetles (*Coleoptera*), and ants (*Hymenoptera*) are important for juveniles, particularly during the first three weeks of life, and forbs increase in importance as juveniles age. Adults will occasionally take insects in the late spring and summer, although forbs and sagebrush make up the bulk of the diet during these times (Schroeder et al. 1999; Pyle and Crawford 1996).

2.1 Previous Surveys

POWER conducted a series of three aerial greater sage-grouse lek surveys for Pacific Power in 2010 and 2011 along all route alternatives, including a three mile buffer on each side of the route alternatives. The surveys conducted in 2010 included the Proposed Northern Route; however, YTC authorities expressed concern over this potential route in a letter dated May 28, 2010. In this letter, YTC authorities stated that any future transmission lines to the west of Interstate 82, on the YTC property in the northern portion, or directly along the southern boundary must be buried so as to not interfere with military training operations. Routes were subsequently redesigned to avoid the YTC and to parallel the southern boundary. Only these redesigned southern routes were surveyed in 2011. In early 2013, YTC authorities approved possibility of the Proposed Northern Route to cross the YTC property.

The survey protocol used for the 2010 and 2011 aerial surveys was based on the protocol used by the YTC for their aerial greater sage-grouse lek surveys. POWER contracted with Central Valley Helicopters of Ellensburg, Washington to perform the surveys. The aircraft was an Enstrom 480 helicopter, which has large Plexiglas windows in the foot-wells, doors, and windshield to provide maximum visibility during surveys. Data recorded during each flight included start time, end time, wind speed, wind direction, temperature, cloud cover, and any greater sage-grouse occurrences. Wind speeds were recorded from the Ellensburg or Yakima Airfield weather report, depending on which was closer to the Survey Area that day.

Surveys did not take place if winds were greater than 15 miles per hour (mph), if visibility was less than five miles, or if it was raining. Areas which were excluded from surveys included highly agricultural areas, and slopes greater than 15%. Transects flown over suboptimal habitat, such as areas highly fragmented by agriculture, slopes greater than 15% or recently burned areas, were farther apart and flown at higher altitudes and faster speeds as described in Connelly et al. (2003). The YTC greater sage-grouse survey protocol states that aerial greater sage-grouse lek surveys may take place until May 15. Surveys held in 2010 occurred on April 19, 20, and 22; April 26, 27, and 28; and May 12 and 13. Surveys held in 2011 occurred on March 29 and 30; April 12, 13, and 14; and April 27, 28, and 29.

No greater sage-grouse leks were identified during any of the aerial surveys. Two individual greater sage-grouse were observed from the helicopter south of the YTC during the 2010 surveys. These individuals were not attending a lek when observed. No greater sage-grouse or leks were observed during the 2011 surveys.

3.0 METHODOLOGY

POWER conducted a series of two walking greater sage-grouse brood route surveys for Pacific Power in late May and early July 2013 along the Proposed Northern Route within potentially suitable habitat on the YTC and BLM properties. The survey protocol used for this Project was based on methods described for brood route surveys in Connelly et al. (2003). While the YTC greater sage-grouse survey protocol states that aerial greater sage-grouse lek surveys may take place until May 15th, all parties agreed that the lekking season likely ended early in 2013 due to the low snow pack and warm, early spring. This necessitated the need for other survey methods, such as brood route surveys.

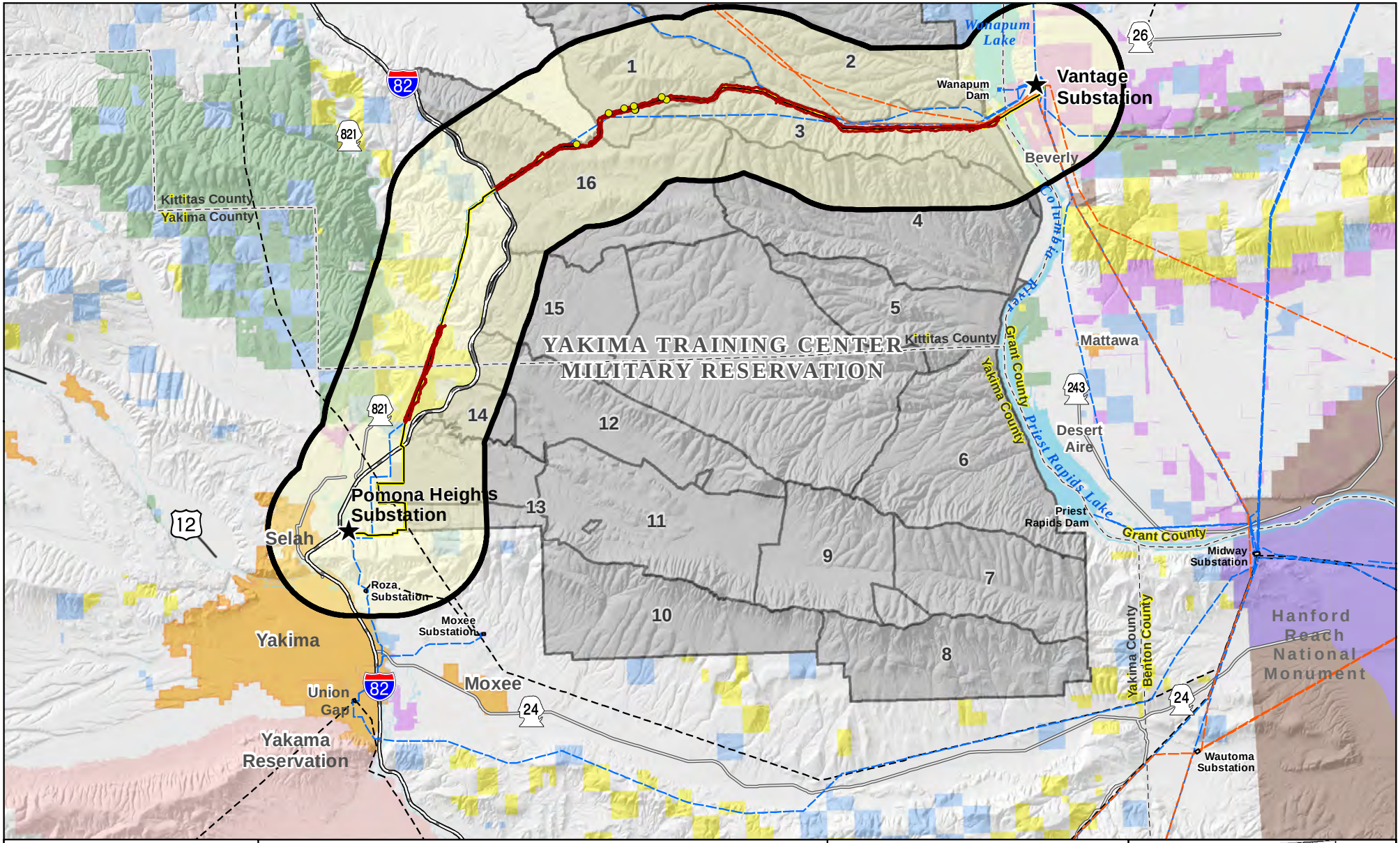
Two surveyors traversed wandering transects along each side of the proposed transmission line route documenting all occurrences, or evidence of occurrence, of greater sage-grouse observed. Wandering transects roughly paralleled the proposed transmission line route approximately 300 feet along each side. A Garmin GPSmap 76CSx handheld global positioning system (GPS) was used to display the proposed transmission line route so that surveyors would have a point of reference during their surveys. Data recorded during each survey included observer, location, and any greater sage-grouse occurrences or evidence of occurrence (i.e., scat, nests/eggshells, feathers, cecal casts, or tracks), and a track log of the survey route (Appendix A).

4.0 RESULTS

Surveys occurred in any lands on the YTC or BLM parcels which presented potentially suitable habitat. It should be noted that the majority of the route surveyed occurs on marginal to poor greater sage-grouse habitat. Much of the lands traversed on the YTC are steeply sloped and provided little to no sagebrush cover. A large portion of the BLM land surveyed was recently burned and now represents a near monoculture of cheatgrass. The best potential habitat occurred on YTC lands located between Manastash Ridge and Boylston Mountains to the east of the private agricultural area known as Badger Pocket. Nearly all greater sage-grouse sign observed during the surveys occurred in this area.

The first round of surveys took place from May 18 through May 21, 2013. Individual survey tracks were recorded using the handheld GPS units and are displayed in Figure 2. No greater sage-grouse were observed during the first round of surveys. Evidence of greater sage-grouse use was observed in the form of scat identified in eight locations. All scat found was located on YTC-lands between Manastash Ridge and Boylston Mountains in the central portion of the proposed corridor (Figure 2). The scat appeared to indicate spring, summer, or fall use of the area—no winter-type scat was observed. Photographs and Universal Transverse Mercators (UTMs) were recorded at each location.

The second round of surveys took place from June 29 through July 1, 2013. Individual survey tracks were recorded using the handheld GPS units and are displayed in Figure 3. No greater sage-grouse were observed during the second round of surveys. Evidence of greater sage-grouse use was observed in the form of scat identified in three locations. All scat found was located on YTC-lands between Manastash Ridge and Boylston Mountains in the central portion of the proposed corridor (Figure 3). The scat was in close proximity to those identified during the first round of surveys. Scat identified appeared to indicate spring, summer, or fall use of the area – no winter-type scat was observed. Photographs and UTMs were recorded at each location.



Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2 May 2013 Sage-Grouse Survey Results

Project Features
- Project Substation
- NNR Route Alternative

Sage-Grouse Surveys
- Sage-grouse Evidence
- Survey Transect

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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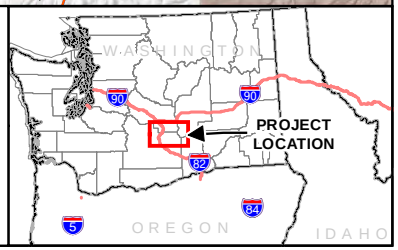

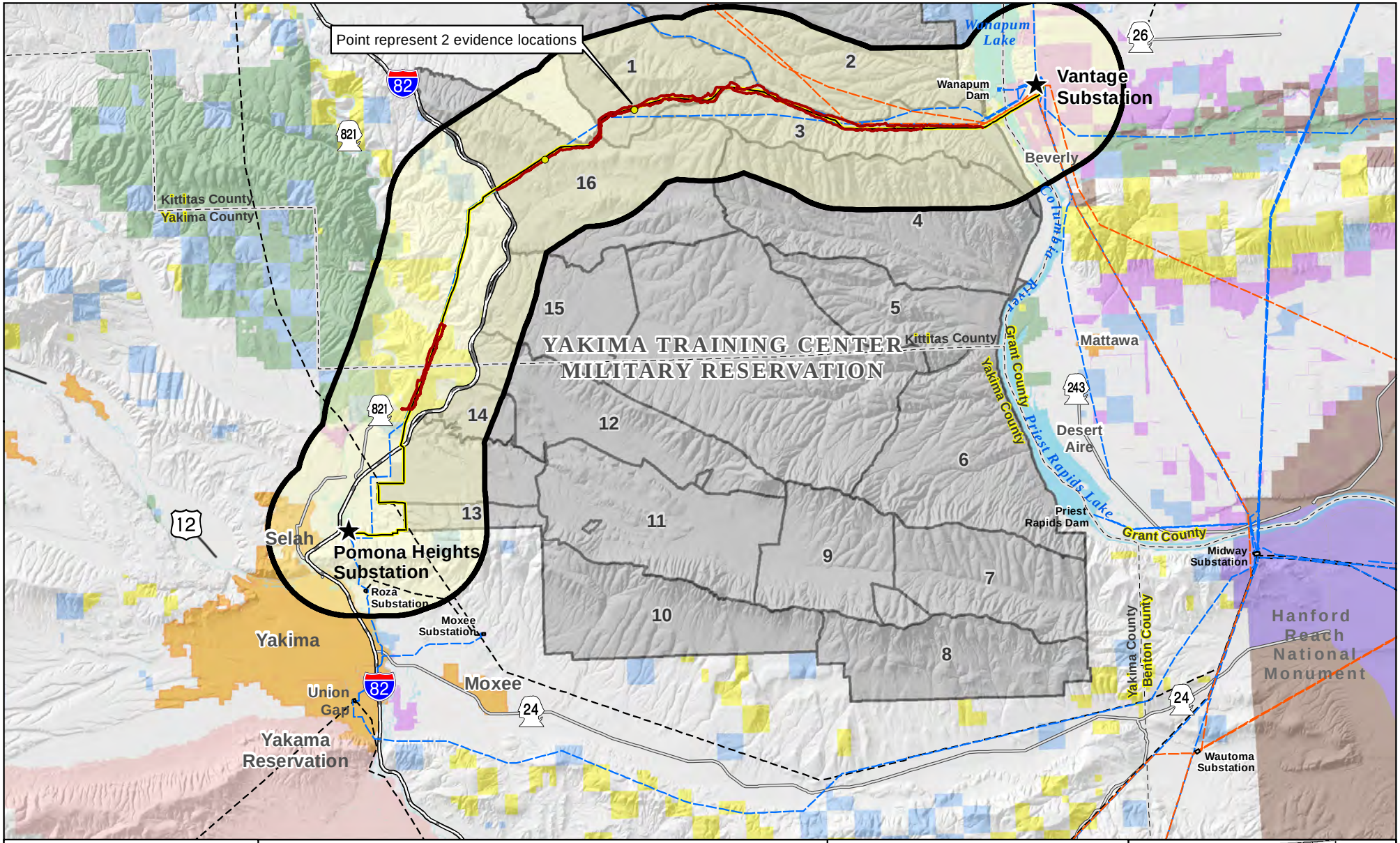

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2 July 2013 Sage-Grouse Survey Results

Project Features
- Project Substation
- NNR Route Alternative

Sage-Grouse Surveys
- Sage-grouse Evidence
- Survey Transect

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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Miles

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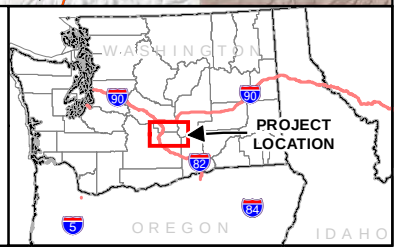


5.0 HABITAT CONNECTIVITY IMPACT ANALYSIS

The Washington Wildlife Habitat Connectivity Working Group (WHCWG) was established in an effort to better protect the natural resources of Washington State. In 2010, the group completed the Washington Statewide Connectivity Analysis, which represents a statewide scientific analysis of connectivity throughout the state (WHCWG 2010). This model was designed to provide an informational tool for land and resources managers, conservationists, private land owners, and other interested parties. After completing the statewide analysis, the group completed a more focused effort on the Columbia Plateau Ecoregion and several species which reside there (WHCWG 2012). Greater sage-grouse was one of 11 species which for which connectivity potential was modeled in detail (Robb and Schroeder 2012).

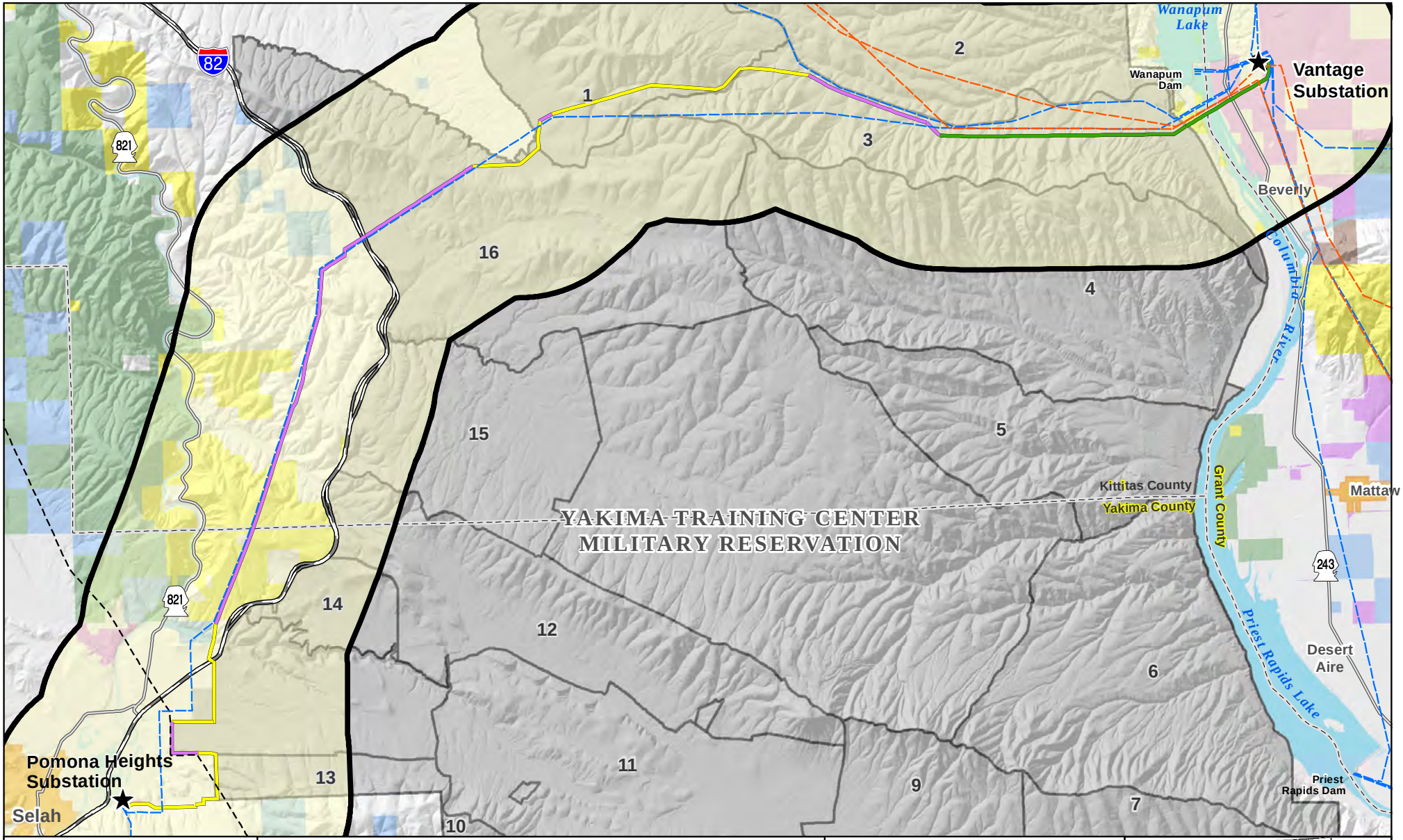
Four Habitat Concentration Areas (HCAs) were identified for greater sage-grouse in Washington and an analysis of the potential connectivity between these areas was completed. The four HCAs included the population on the YTC, the Mansfield Plateau/Moses Coulee population, Crab Creek drainage in Lincoln County, and the Yakima Reservation in Yakima County. A genetic analysis of the two largest HCAs, the YTC and Mansfield Plateau/Moses Coulee, revealed that little to no gene flow occurs between these two populations. This indicates that these two populations are essentially cut off from one another and no birds are currently moving between these populations.

The connectivity analysis was completed by identifying various landcovers and anthropogenic disturbances along potential routes that greater sage-grouse may take if they attempted to travel from one HCA to another. Landcovers and anthropogenic disturbances were given a score depending upon the obstacle to species movement. For instance, a landcover with a score of **0** indicates that the area presents no resistance to species movement; shrubsteppe habitat received a resistance value of **0** in the analysis. Values ranging from **1 – 4** were used to reflect a relatively low resistance to movement; the centerline of local roads received a resistance value of **2**. Landcover and anthropogenic disturbances which received higher scores that would indicate a higher resistance to greater sage-grouse movement include forested areas (19), greater than 20 and less than or equal 40 acres per dwelling unit (19), freeway centerline (24), one transmission line greater than or equal to 230 kV (7), and multiple transmission lines greater than or equal to 230 kV (9).

Modeling of the potential connectivity between the YTC and Mansfield Plateau/Moses Coulee population indicate a potential travel corridor does exist between the two populations, but is constricted at the northern end by development around the Rock Island Dam, and at the southern end by Interstate 90, wind development, and existing transmission lines. Potential connectivity between the YTC and Yakima Reservation population is essentially blocked by development around the city of Yakima, agricultural development, and Interstate 82. The analysis concluded that overall, none of the identified connectivity corridors provide ideal connectivity between the four HCAs for greater sage-grouse in the Columbia Plateau Ecoregion. The report suggests that improvement of connectivity would require expansion of existing HCAs, establishment of new HCAs, and/or improving habitat quality within the connectivity corridors.

Currently, the northern portion of the YTC contains four transmission lines of 230 kV or greater which would all occur in close proximity to the proposed northern route. The Proposed Northern Route would parallel two 500 kV transmission lines with steel lattice support structures and two 230 kV transmission lines with wood H-frame support structures for approximately 8.3 miles near the Vantage Substation, and parallel one 230 kV transmission line with wood H-frame support structures for an additional 17.5 miles. The Proposed Northern Route would not occur directly adjacent to an existing transmission line for approximately 15.2 miles of its entire route (Figure 4). The addition of

the proposed transmission line where it parallels multiple existing transmission lines would not increase the connectivity resistance as scored by the WHCWG because of the multiple lines. The addition of the proposed transmission line would increase the potential connectivity score from seven to nine where it would parallel one 230 kV transmission line through the northwestern portions of the YTC, and then south through privately held property and BLM property before entering Pomona Heights Substation. Implementation of the proposed northern route would create an additional barrier to greater sage-grouse movement between the YTC population and the Mansfield Plateau/Moses Coulee population to the north and the Yakima Reservation population to the southwest. However, the impacts of the additional barrier would be minimized by placing the new transmission line adjacent to existing transmission infrastructure. While the proposed transmission line would occur for 15.2 miles where it would not be cited directly adjacent to an existing line, an existing 230 kV transmission line is never more than one mile away.



Vantage - Pomona Heights 230kV Transmission Line Project

Figure 4 Paralleling Existing Transmission Lines

Project Features
- Project Substation

NNR Route Alternative Paralleling Existing Transmission Lines
- Multiple Lines
- Single Line
- No lines

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- YTC Training Area
- County Boundary
- Survey Buffer (3 mi)
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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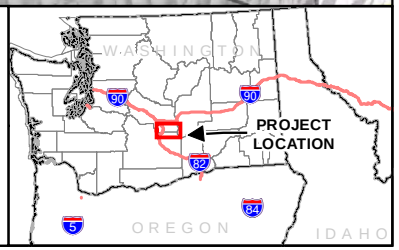

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APPENDIX A FIELD SURVEY FORM

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Sage-Grouse Summer Pedestrian Count (Brood Route)

			Observer		To Grouse		Number of Grouse				
Observer	Date	Time	Unit/ Wypt	NAD 83 UTMs	Distance	Bearing	Juv	Males	Females	Detection (Audio, Visual, scat, Eggshells, etc.)	Comments
				/							
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APPENDIX B-2
SAGE-GROUSE HABITAT ASSESSMENT

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APPENDIX B-2: SAGE-GROUSE HABITAT ASSESSMENT REPORTS

Greater sage-grouse (*Centrocercus urophasianus*) habitat assessment reports were submitted in Appendix B-2 of both the January 2013 Draft Environmental Impact Statement (DEIS) and January 2015 Supplemental Draft Environmental Impact Statement (SDEIS). The methods used for the DEIS and SDEIS sage-grouse habitat assessment reports differed in that sage-grouse habitat assessment data sheets were filled out in the field at 0.25-mile intervals in 2011 for the DEIS and sage-grouse habitat was retrospectively assessed for the SDEIS using general habitat data collected in the field at 0.5-mile intervals for the 2013 special status plant and sage-grouse walking transect surveys (see Appendices B-1 and B-3). For both years, remotely sensed data was used for filling information gaps for inaccessible areas such as private lands. In addition, the sage-grouse habitat assessment reports were conducted in different years and in different locations. The original versions of these documents have been included in Appendix B-2 of this Final Environmental Impact Statement (FEIS), as listed and summarized below:

January 2013 DEIS Appendix B-2: Sage-Grouse Habitat Assessment

The original proposed Project analyzed in the DEIS consisted of 10 end-to-end alternatives approximately following the southern and eastern flanks of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). Federal lands that were accessed included Bureau of Reclamation (Reclamation), Bureau of Land Management (BLM), JBLM YTC, and U.S. Fish and Wildlife Service (USFWS). Of the 674 acres of federal lands within the proposed right-of-way (ROW) corridor, 450 acres were accessible and surveyed. The remaining 224 acres of federal lands that were not surveyed were inaccessible due to restricted access on the JBLM YTC and private lands, dangerously steep terrain, and excessively long distances to access the ROW corridor. Corresponding route segments for the FEIS include 1a/New Northern Route (NNR)-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, and 3c.

Habitat assessments were largely completed during May 16-25, 2011, but additional observations were made in June and August 2011. Sage-grouse habitat assessment protocol was based on "A Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Public Lands in Idaho: Sage-Grouse" (Sather-Blair et al. 2000). Sage-grouse habitat assessment data sheets, photographs, moisture/disturbance conditions, and incidental sage-grouse observations were made at 0.25-mile intervals. Sage-grouse habitat assessment data sheets included an ocular assessment of breeding (nesting and early brood-rearing) and winter habitat during the May survey and of late brood-rearing habitat as needed during the June survey. Priority status of each plant community was also assessed in the field and is based on a list of 2009 Washington Natural Heritage Program Priority Rare Plant Communities or Wetlands.

Habitat was estimated through aerial interpretation for federal lands that were not accessible during the surveys and non-federal lands that were not surveyed. Data sources for aerial interpretation included aerial imagery, 2001 JBLM YTC vegetation data, Gap Analysis Program (GAP) data, and fire history data. The aerial imagery data was usually not differentiated sufficiently to allow for classification more detailed than shrubland; grassland; agriculture; developed, road, or firebreak; basal cliff; rock; irrigation canal; trees; water poplar; intermittent stream or dry gully; riparian; or water body.

Federal lands were dominated by sagebrush (*Artemisia* sp.)/perennial grasslands, perennial grasslands, and annual grasslands. Other common habitats included forbs (buckwheats [*Eriogonum* sp.]), rabbitbrush (*Ericameria* sp.)/annual grasslands, and sagebrush/annual grasslands. Sage-grouse habitat was determined to be suitable, marginal, or unsuitable for the following habitat types: breeding, upland and/or riparian/wetland late brood-rearing, and winter habitat. Sagebrush canopy cover was the most heavily weighted factor in assessing breeding and winter sage-grouse habitat.

Route segments 1b, 2b, and 3c had the highest amount of suitable sage-grouse habitat on the federal lands that were surveyed. However, route segments 1b and 3b had a substantial amount of federal lands that were not surveyed because of inaccessible areas. Route segment 1b appeared to have additional suitable sage-grouse habitat on federal lands, based on the amount of shrublands estimated using aerial interpretation. Route segment 3b likely did not have a substantial amount of suitable sage-grouse habitat because it was predominantly grassland habitat, due to large fires in 2004 and the late 1990s.

January 2015 SDEIS Appendix B-2: Sage-Grouse Habitat Assessment

In April 2013, the NNR was identified using route segments that approximately follow the northern flank of the JBLM YTC. After the 2013 field surveys, routing adjustments were made due to new requirements for separation distance from existing transmission lines and concerns about sage-grouse. The locations of the NNR and Manastash Ridge (MR) Subroute were finalized in November 2013. The NNR occurs along the west side of Interstate 82 and then passes through the northern portion of the JBLM YTC to the Vantage Substation. The MR Subroute skirts Manastash Ridge west of Badger Pocket in the northwestern portion of the JBLM YTC. Corresponding route segments for the FEIS include 1a/NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-6, NNR-7, NNR-8, and MR-1.

Sage-grouse habitat assessment in the NNR and MR Subroute ROWs were conducted in 2013 by using a combination of remote sensing data and field data collected during special status plant surveys conducted May 13-23, 2013 and July 25-27, 2013 (Appendix B-3) and sage-grouse walking transect surveys conducted May 18-21, 2013 and June 29-July 1, 2013 (Appendix B-1). The sage-grouse habitat assessment was retrospectively conducted using survey data already collected for the special status plant and sage-grouse walking transect surveys because the appropriate season had already passed prior to identification of the need for sage-grouse habitat assessment.

Breeding (nesting and early brood-rearing), summer (late-brood rearing), and winter habitat suitability along the NNR and MR were designated as suitable, marginal, or unsuitable for each of the three seasonal habitat types. Determinations of suitability were made by qualitatively assessing the vegetation data collected during the special status plant surveys and sage-grouse walking transect surveys following the BLM's Sage-Grouse Habitat Assessment Framework (Stiver et al. 2010), which is similar to the methods used for the 2011 sage-grouse habitat assessment. Habitat determinations were driven largely by sagebrush cover and general understory character (e.g., areas dominated by annual grasses were not considered suitable breeding or summer habitat).

Field data were supplemented with remote sensing data because of inaccessible areas, route adjustments, and new locations identified after the field visits. Remote sensing data and existing datasets that informed the habitat assessment included: Google Earth aerial imagery; JBLM YTC landcover type vegetation data; GAP data; and sage-grouse locations, from data provided by JBLM YTC. Field data collected during May-July 2013 for the habitat assessment included: landcover type designations and landscape photos, documented at 0.5-mile intervals along the NNR (incorrectly noted as 0.25-mile intervals in the January 2015 SDEIS Appendix B-2: Sage-Grouse Habitat Assessment); plant species lists; vegetation survey field notes; and locations and character of sage-grouse sign.

The proposed NNR and MR Subroute avoid the highest concentration of occupied, suitable sage-grouse habitat that occurs closer to the geographic center of the JBLM YTC. The NNR passes through a variety of steppe vegetation, ranging from relatively intact sagebrush with a perennial grass understory, to annual grasslands and disturbed ground. Generally speaking, the central and eastern portions of the proposed ROW contain the most suitable habitat overall, while the relatively disturbed, weedy southern portions contain less suitable habitat. The highest concentration of suitable habitat occurs near the head of Badger Pocket, in Route Segments NNR-4, NNR-5, and the western end of NNR-6 with another concentration of

suitable habitat in NNR-7. Much of the western portion of the ROW is dominated by cheatgrass (*Bromus tectorum*), especially on south-facing slopes.

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APPENDIX B-2

SAGE-GROUSE HABITAT ASSESSMENT

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APPENDIX A

1.0 INTRODUCTION

Habitat assessment was conducted on approximately 450 acres of accessible federal lands within the Study corridor for the proposed 230 kilovolt (kV) Vantage to Pomona Transmission Line (32.5 miles of Study corridor). This work was conducted to provide information about habitat suitability of the greater sage-grouse (sage-grouse; *Centrocercus urophasianus*) specific to this proposed project. In addition, habitat and plant community information was collected to support sage-grouse habitat documentation and for determining habitat suitability of special status plants (Appendix B-3 Special Status Plant Report).

2.0 METHODS

Qualified botanists and natural resource specialists documented habitats and plant communities observed, whether the observed plant community is considered a priority, sage-grouse habitat. Photographs, moisture/disturbance conditions, and incidental sage-grouse observations were made at ¼-mile intervals on accessible federal lands along the alternative route segments. Habitat observations were largely completed during May 16-25, 2011, but additional observations were made during the June 22-29, 2011 and August 8-10, 2011 surveys. Federal lands that were accessed included Bureau of Reclamation (Reclamation), Bureau of Land Management (BLM), Yakima Training Center (YTC), and U.S. Fish and Wildlife Service (USFWS). The assumed ROW width used for the habitat assessment was 160 feet.

Habitat and Plant Community Classification

Plant community is based on the standard of *Steppe Vegetation of Washington* (Daubenmire 1970), per BLM instructions for shrub steppe habitats. In some cases, the observed plant community did not match with this standard, so instead habitat was documented based on the most dominant tree, shrub, grass, and/or forb species (i.e., big sagebrush-cheatgrass). Plant communities were grouped into more generalized habitats (i.e., sagebrush/perennial grassland). Priority status of each plant community is based on a list of 2009 Washington Natural Heritage Program (WANHP) Priority Rare Plant Communities or Wetlands http://www1.dnr.wa.gov/nhp/refdesk/plan/CommunityList.pdf (WANHP 2009). Sources of information for identifying plant species included Vascular Plants of the Pacific Northwest: Vols. I-V (Hitchcock et al. 1969), Flora of the Pacific Northwest (Hitchcock and Cronquist 1973), Field Guide to the Rare Plants of Washington (Camp and Gamon 2011), species-specific literature, and botanists' personal knowledge of the species.

Habitat was estimated through aerial interpretation for federal lands that were not accessible during the surveys and non-federal lands that were not surveyed. Data sources for aerial interpretation included aerial imagery, 2001 YTC vegetation data (YTC 2002), GAP data, and fire history data. Of these, the 2001 YTC vegetation data is the most detailed and has the highest accuracy. The aerial imagery data usually was not sufficiently differentiated to allow for classification more detailed than shrubland; grassland; agriculture; developed, road, or firebreak; basal cliff; rock; irrigation canal; trees; water poplar; intermittent stream or dry gully; riparian; or water body. The 2001 YTC vegetation data and GAP data were also used for showing general habitat in the study corridor.

A list of all habitats and their definitions are provided below:

Agriculture—past or present cultivated land.
Annual grassland—dominated by non-native annual grasses and forbs.
Aspen—dominated by quaking aspen (*Populus tremuloides*).
Basalt cliff—basalt cliffs.
Bitterbrush—dominated by antelope bitterbrush (*Purshia tridentata*).
Developed, road, or firebreak—structures, roads, or firebreaks.
Forbs—dominated by forbs, generally buckwheats (*Eriogonum* spp.).
Grassland—not dominated by shrubs or trees.
Intermittent stream or dry gully—intermittent stream or dry gully.
Irrigation canal—irrigation canals.
Perennial grassland—dominated by native and/or non-native perennial grasses.
Rabbitbrush/annual grassland—dominated by rabbitbrush (*Chrysothamnus* spp.) and non-native annual grasses and forbs.
Riparian—dominated by vegetation associated with moving perennial water.
Rock—basalt scree.
Sagebrush/annual grassland—dominated by sagebrush (*Artemisia* spp.) and non-native annual grasses and forbs.
Sagebrush/perennial grassland—dominated by sagebrush native and/or non-native perennial grasses (although nearly always with native perennial grasses).
Shrubland—dominated by shrubs.
Tree—dominated by trees.
Water body—perennial water.
Watered poplar—dominated by poplars (*Populus* spp.) planted in an agricultural wind row.

Sage-Grouse Habitat Assessment

Sage-grouse habitat assessment was based on *A Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Public Lands in Idaho: Sage-Grouse (Centrocercus urophasianus)* (BLM 2000; Appendix A of this report). This document is consistent with the *State of Washington Greater Sage-Grouse Recovery Plan* (Stinson et al. 2004). These methods include an ocular assessment of breeding (nesting and early brood-rearing) and winter habitat during the May survey and of late brood-rearing habitat during the June and August surveys. Data sheets from BLM (2000, p. 26-31) were used for documenting breeding, late brood-rearing, and winter habitat.

The following data were included on the data sheets and were collected in May, unless otherwise indicated:

- sagebrush canopy cover
- sagebrush height class
- herbaceous perennial forb and grass height
- perennial grass canopy cover
- forb canopy cover
- sagebrush growth form

- forb richness
- sagebrush height and form observations
- proximity of sagebrush cover
- forb availability
- riparian and wet meadow plant community (if applicable, collected in June or August)
- riparian and wet meadow stability (if applicable, collected in June or August)

It was noted if any of the following conditions occur: livestock watering areas or designated livestock trailing stream crossings are within 0.25 mile, riparian areas/wet meadows are located in a deep canyon, and if the slope is >40 percent.

Based on these data, sage-grouse habitat was determined to be suitable, marginal, or unsuitable habitat for breeding, upland and/or riparian/wetland late brood-rearing, and winter habitat. Sagebrush canopy cover was the most heavily weighted factor in assessing breeding and winter sage-grouse habitat. If most of the factors used to assess breeding habitat leaned towards suitable habitat except that sagebrush canopy cover met the lower criteria for marginal habitat, then the overall breeding habitat was classified as marginal. If the same scenario occurred except that sagebrush canopy cover met the higher criteria for marginal habitat, then the overall breeding habitat was classified as suitable. Using the same scenario again, if the sagebrush canopy cover met the criteria for unsuitable habitat, then the overall breeding habitat was classified as unsuitable. If most of the criteria were marginal or unsuitable and the sagebrush canopy cover was suitable, then the overall breeding habitat was classified as whichever selection had the most factors. This approach was similarly used for assessing the suitability of sage-grouse winter habitat.

3.0 RESULTS

Of the 674 acres of federal lands within the 160 foot wide right-of-way (ROW), 450 acres were accessible and surveyed. The remaining 224 acres of federal lands that were not surveyed were inaccessible due to restricted access on the YTC, access issues crossing private lands, dangerously steep terrain, and excessively long distances to hike from car to the ROW corridor. As described in Methods, habitat for inaccessible federal lands was estimated using aerial interpretation of available sources.

Federal lands within the route segment were dominated by sagebrush/perennial grasslands, perennial grasslands, and annual grasslands. Other common habitats included forbs (buckwheats), rabbitbrush/annual grasslands, and sagebrush/annual grasslands. Less common habitats included intermittent stream/dry gully, riparian, aspen, and bitterbrush.

Land area of each habitat along the ROW corridor is provided in Table 1. The overall vegetation of the Project area is shown on the Vegetation and Fire History Map in Appendix A and the more detailed habitat that was documented or estimated along the route segments. Table 2 and Figure 1 shows the suitability of sage-grouse breeding (Figure 2), late brood-rearing, and (Figure 3) winter habitat quality on surveyed federal lands along the ROW corridor centerline. A list of all plant communities observed on federal lands in the ROW corridor is provided in Table 3.

Detailed results on habitats, plant communities, and sagebrush habitat suitability are provided by route segment below.

Route 1a

Vegetation

Route 1a includes one 4.5 acre parcel of land that is managed by Reclamation and the remainder is non-federal lands (39.4 acres). The Reclamation parcel was completely accessible for field surveys. Dominant habitats mapped within the Reclamation parcel include 3.7 acres of sagebrush/perennial grassland and 0.8 acres of developed, road, or firebreak (Table 1). There is no record of a fire on the Route 1a Reclamation lands. No riparian habitats were observed on the Reclamation parcel.

The entire list of plant communities that were documented on the Reclamation parcel are listed below. Dominant plant communities are indicated by an asterisk(*). Priority of plant communities are indicated in parentheses, and are based on the WANHP 2011 Natural Heritage Plan.

Annual grasslands

Non-native annual grassland

Perennial grasslands

Bluebunch wheatgrass-Sandberg bluegrass, Lithosol (Priority 2)
Needle and thread-Sandberg bluegrass (Priority 1)
Basin wildrye-Saltgrass (Priority 1)

Sagebrush/perennial grass areas

Big sagebrush-Bluebunch wheatgrass (Priority 3)*

Based on aerial imagery, non-federal lands are dominated by shrublands (16.0 acres); developed, road, or firebreak (12.0 acres); grasslands (5.8 acres); and smaller amounts of sagebrush/perennial grasslands, agriculture, trees, intermittent stream or dry gully, and irrigation canals (Table 1). GAP data indicates that the habitats of Route 1a are generally characterized as agriculture and annual grasslands.

Sage-Grouse Habitat Assessment

Field observations documented a recently dug east-west trench, its location along a busy road and near residences and a canal, and having an old garbage dump in the northern section. Despite these disturbances, there was high quality, intact big sagebrush (*Artemisia tridentata*) with native perennial bunchgrasses and diverse forb layer. The entire Reclamation parcel totaling 0.3 mile of centerline was classified as suitable breeding, upland late brood-rearing, and winter habitat for sage-grouse (Table 2).

A photograph of the dominant habitat in the Reclamation parcel is provided below.

Photograph 1 - Route 1a - Sagebrush/perennial grass area (Big sagebrush-Bluebunch wheatgrass)

Route 1b

Vegetation

Route 1b includes one 242.2 acre parcel of land that is managed by the YTC and the remainder is on non-federal lands (1.9 acres). Accessible YTC lands comprised 138.5 acres and the remaining 103.7 acres were closed to access.

Dominant habitats mapped within the surveyed portion of the YTC parcel include 46.0 acres of sagebrush/perennial grassland; 37.1 acres of perennial grassland; 24.7 acres of annual grassland, 18.3 acres of developed, road, or firebreak; 9.2 acres of rabbitbrush/annual grassland; 2.5 acres of intermittent stream or dry gully; and 0.7 acre of aspen (Table 1). Fire history records indicate there have been two fires on YTC land, including one small fire from the late 1990s and a larger fire that bisected the ROW corridor area in 2007. The aspen and intermittent stream or dry gully habitats represent the only riparian habitats observed on the YTC parcel.

The entire list of plant communities that were documented on the YTC parcel are listed below. Dominant plant communities are indicated by an asterisk(*). Priority of plant communities are indicated in parentheses, and are based on the WANHP 2011 Natural Heritage Plan.

Annual grasslands

Non-native annual grassland*

Aspen

Quaking aspen-Chokecherry (Priority)

Forb

Thyme buckwheat-Sandberg bluegrass (Priority 3)

Intermittent stream/Dry gully

Greasewood / Saltgrass (Priority 2)

Perennial grasslands

Crested wheatgrass*
Bluebunch wheatgrass-Sandberg bluegrass, Lithosol (Priority 2)*
Idaho fescue-Parsnipflower buckwheat
Needle and thread-Sandberg bluegrass (Priority 1)

Rabbitbrush/annual grass areas

Rubber rabbitbrush-Cheatgrass*

Sagebrush/annual grass areas

Big sagebrush-Cheatgrass

Sagebrush/perennial grass areas

Big sagebrush-Bluebunch wheatgrass (Priority 3)*
Big sagebrush-Idaho fescue (Priority 3)
Big sagebrush-Sandberg bluegrass (Priority 3)*
Stiff sagebrush-Bluebunch wheatgrass*
Stiff sagebrush-Sandberg bluegrass (Priority 3)*

Based on aerial imagery along the ROW corridor, federal lands that were inaccessible are dominated by shrublands (69.7 acres); grasslands (15.6 acres); developed, road, or firebreak (12.3 acres); and smaller amounts of sagebrush/perennial grasslands and intermittent stream or dry gully (Table 1). Based on aerial imagery along the ROW corridor, the small amount of non-federal lands are dominated by sagebrush/perennial grasslands; shrublands; intermittent stream or dry gully; and developed, road, or firebreak (Table 1).

The 2001, YTC vegetation map indicates that the habitats of the YTC portion of Route 1b study are generally characterized as sagebrush/perennial grasslands and perennial grasslands, with smaller amounts of forb, riparian, and disturbed. GAP data indicates that the habitats of the non-YTC portion of Route 1b are generally characterized as annual grassland and agriculture.

Sage-Grouse Habitat Assessment

Field observations documented two firebreaks within most of the ROW corridor. The older firebreak is adjacent to a YTC boundary fence line and is dominated by cheatgrass (*Bromus tectorum*) and Russian thistle (*Salsola kali*). The newer firebreak was recently cleared and is still bare ground. Despite these disturbances, the adjacent habitat was predominantly high quality big sagebrush and stiff sagebrush (*Artemisia rigida*) with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer.

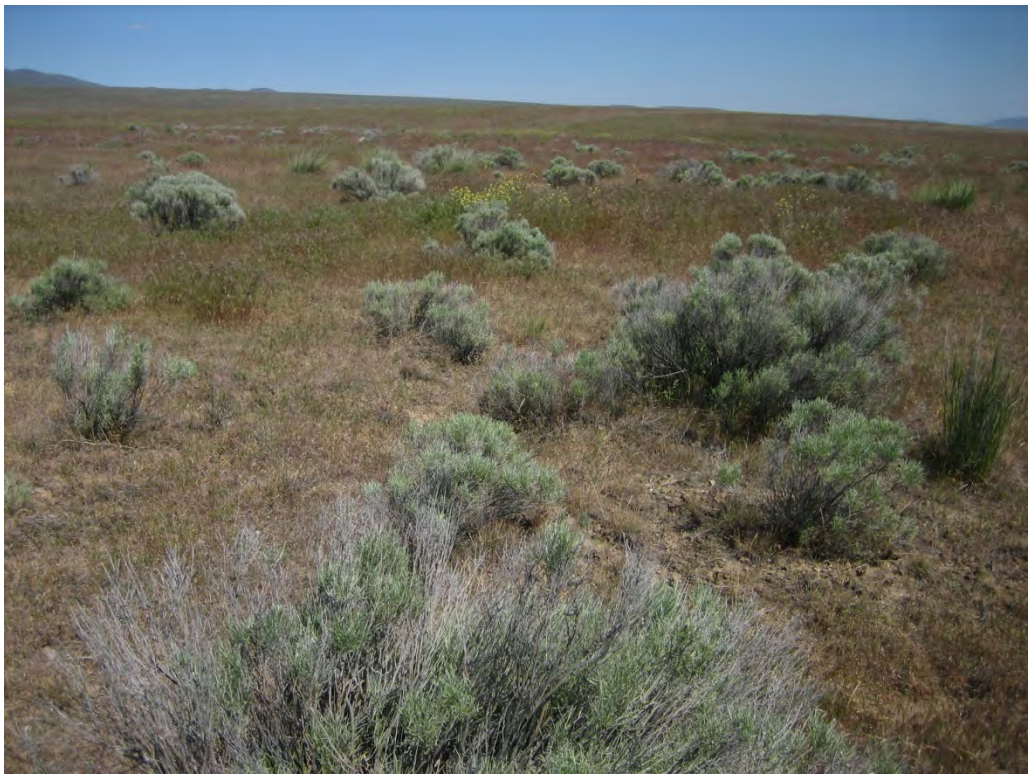
Of the 7.0 miles of centerline (ca 138.5 acres) that were surveyed, sage-grouse breeding habitat included 3.5 miles suitable, 0.3 mile marginal, and 3.3 miles unsuitable (Table 2). Upland late brood-rearing habitat included 4.5 miles suitable, 2.3 miles marginal, and 0.3 mile unsuitable habitat. There were 0.3 mile of marginal riparian late brood-rearing habitat in an intermittent stream, but it was in the same area as documented suitable upland late brood-rearing habitat. There was also another 0.3 mile of suitable riparian late brood-rearing habitat in aspen along an intermittent stream. Winter habitat included 3.2 miles suitable, 0.5 mile marginal, and 3.3 miles unsuitable habitat. A great-horned owl (*Bubo virginianus*) was observed nesting in the aspen on May 19, 2011, representing potential predator issues. On the same day, there was an incidental sage-grouse observation 1/8 mile north of the ROW corridor, just 0.5 mile west of the aspen stand.

Photographs of most dominant habitats in the YTC parcel are provided below.

Photograph 2 - Route 1b - Annual grasslands (Non-native annual grassland)

Photograph 3 - Route 1b - Perennial grasslands (Crested wheatgrass)

Photograph 4 - Route 1b - Perennial grasslands (Bluebunch wheatgrass-Sandberg bluegrass, Li.)



Photograph 5 - Route 1b - Rabbitbrush/annual grass areas (Rubber rabbitbrush-Cheatgrass)

Photograph 6 -Route 1b - Sagebrush/perennial grass area (Big sagebrush-Bluebunch wheatgrass)

Photograph 7 - Route 1b - Sagebrush/perennial grass area (Big sagebrush-Sandberg bluegrass)

Photograph 8 - Route 1b - Sagebrush/perennial grass area (Stiff sagebrush-Sandberg bluegrass)

Route 1c

Vegetation

Route 1c includes several small YTC parcels that comprise 1.7 acres, nearly all which were accessible and surveyed (except for 0.02 acre that was in a restricted area). The remainder is non-federal lands (249.6 acres).

Dominant habitats mapped within the surveyed portion of the YTC parcels include 1.2 acres of developed, road, or firebreak; and 0.5 acre of annual grassland (Table 1). Fire history records indicate there have been no fires on YTC land or the remainder of this route segment.

The entire list of plant communities that were documented on the YTC parcels are listed below. Dominant plant communities are indicated by an asterisk(*). None were priorities based on the WANHP 2011 Natural Heritage Plan.

Annual grasslands

Non-native annual grassland*

Perennial grasslands

Crested wheatgrass*

Based on aerial imagery along the ROW corridor, the small amount of federal lands that were inaccessible are dominated by shrublands (0.02 acre) (Table 1). Based on aerial imagery along the ROW corridor, the non-federal lands are dominated by shrubland; sagebrush/perennial grassland; annual grassland; grassland; perennial grassland; developed, road, or firebreak; and smaller amounts of agriculture; intermittent stream or dry gully; and rabbitbrush/annual grassland (Table 1).

The 2001, YTC vegetation map indicates that the habitats of the YTC portion of the Route 1c segment are generally characterized as sagebrush/perennial grasslands and perennial grasslands, with smaller amounts of forb, riparian, and disturbed. GAP data indicates that the habitats of the non-YTC portion of the Link 1C study corridor are generally characterized as annual grassland and agriculture.

Sage-Grouse Habitat Assessment

Field observations documented that the habitat was highly disturbed and poor quality, and adjacent to agricultural land, roads and residences. The YTC parcels totaling 0.6 mile of the route centerline was classified as unsuitable for breeding, riparian late brood-rearing, and winter habitat for sage-grouse. Due to the presence of forbs and proximity to agricultural lands, nearly all of the route centerline was classified as marginal upland late brood-rearing habitat for sage-grouse.

Photographs of the dominant habitat along Route 1c are provided below.

Photograph 9 - Route 1c - Perennial grasslands (Crested wheatgrass)

Photograph 10 - Route 1c - Annual grassland (Non-native annual grassland)

Route 2a

Vegetation

Route 2a has no federal lands and the non-federal lands comprised 19.3 acres. Fire history records indicate there have been no fires along Route 2a.

Based on aerial imagery, the non-federal lands are dominated by shrubland and grassland, with smaller amounts of sagebrush/perennial grassland (Table 1).

The 2001 YTC vegetation map indicates that the habitats of Route 2a are generally characterized as sagebrush/perennial grasslands and perennial grasslands, with smaller amounts of riparian habitat. GAP data indicates that the habitats of Route 2a are generally characterized as annual grassland and agriculture.

Sage-Grouse Habitat Assessment

Sage-grouse habitat assessment was non-applicable for Route 2a.

Route 2b

Vegetation

Route 2b includes one 44.6 acre parcel of land that is managed by the BLM that was accessible. There was an additional 7.6 acres of BLM land that was not accessible, due to issues with private lands and distance from roads. Most of Route 2b is on non-federal lands (266.9 acres).

Dominant habitats mapped within the surveyed portion of the accessible BLM land include 25.4 acres of sagebrush/perennial grassland; 13.0 acres of developed, road, or firebreak; and smaller amounts of annual grassland, agriculture, and intermittent stream or dry gully (Table 1). Fire history records indicate there have been two large fires on BLM land, including one from the late 1980s and a larger fire in 2009. There were no riparian habitats observed on the BLM land.

The entire list of plant communities that were documented on the BLM parcel are listed below. Dominant plant communities are indicated by an asterisk (*). Priority of plant communities are indicated in parentheses, and are based on the WANHP 2011 Natural Heritage Plan.

Annual grasslands

Non-native annual grassland*

Forb

Arrowleaf buckwheat-Sandberg bluegrass (Priority 3)
Rock buckwheat-Sandberg bluegrass (Priority 3)
Strict buckwheat-Sandberg bluegrass

Perennial grasslands

Crested wheatgrass
Bluebunch wheatgrass-Sandberg bluegrass, Lithosol (Priority 2)*

Sagebrush/perennial grass areas

Big sagebrush-Bluebunch wheatgrass (Priority 3)*
Big sagebrush-Sandberg bluegrass (Priority 3)*
Stiff sagebrush-Sandberg bluegrass (Priority 3)*

Based on aerial imagery, federal lands (BLM) that were inaccessible are dominated by shrublands (4.9 acres); grasslands (2.6 acres); and intermittent stream or dry gully (0.1 acre) (Table 1). Based on aerial imagery, the non-federal lands are dominated by sagebrush/perennial grasslands; shrublands; grasslands; agriculture; developed, road, or firebreak; perennial grassland; and with smaller amounts of annual grassland; intermittent stream or dry gully; and rock (Table 1).

The 2001 YTC vegetation map indicates that the habitats along Route 2b are generally characterized as sagebrush/perennial grassland and perennial grassland. GAP data indicates that the habitats of Route 2b are generally characterized as sagebrush/perennial grassland, agriculture, and annual grassland.

Sage-Grouse Habitat Assessment

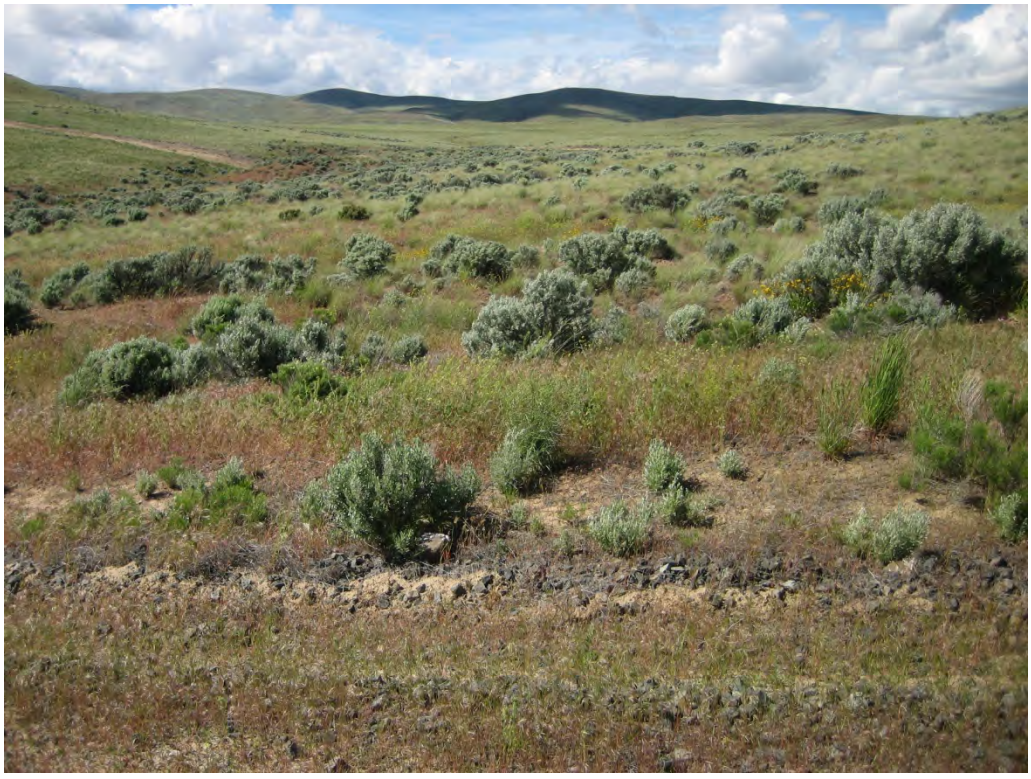
Field observations documented a firebreak within federal lands and habitat adjacent to agriculture. The adjacent habitat is predominantly high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. Some places had lower habitat quality and were dominated by cheatgrass and/or crested wheatgrass (*Agropyron cristatum*).

Of the 7.9 miles of the route centerline (ca 44.6 acres) that were surveyed, sage-grouse breeding habitat included 5.5 miles suitable, 0.5 mile marginal, and 1.9 miles unsuitable (Table 2). Upland late brood-rearing habitat included 6.8 miles suitable, 1.2 miles marginal, and 0.0 miles unsuitable habitat. There was no riparian late brood-rearing habitat. Winter habitat included 6.0 miles suitable, 0.5 mile marginal, and 1.4 miles unsuitable habitat.

Photographs of most dominant habitats on the BLM and YTC lands are provided below.

Photograph 11 - Route 2b - Perennial grassland (Crested wheatgrass)

Photograph 12 - Route 2b - Sagebrush/perennial grass areas (Stiff sagebrush-Sandberg bluegrass)



Photograph 13- Route 2b - Sagebrush/perennial grass areas (Big sagebrush-Bluebunch wheatgrass)

Photograph 14 - Route 2b - Annual grassland (Non-native annual grassland)

Route 2c

Vegetation

Route 2c includes one small BLM parcel that comprises 0.2 acre, which was inaccessible due to issues with private lands and distance from roads. The remainder is on non-federal lands (351.5 acres).

Fire history records indicate there have been no fires on BLM land or the Route 2c.

Based on aerial imagery, the small amount of federal lands that were inaccessible are dominated by annual grasslands (0.1 acre) and grasslands (0.1 acre) (Table 1). Based on aerial imagery, the non-federal lands are dominated by grassland (152.9 acres); shrubland (95.2 acres); agriculture (66.4 acres); developed, road, or firebreak (17.2 acres); annual grassland (10.5 acres); and smaller amounts of intermittent stream or dry gully, sagebrush/annual grassland, rock, and irrigation canal (Table 1).

GAP data indicates that the habitats of Route 2c are generally characterized as agriculture, sagebrush/perennial grassland, and annual grassland.

Sage-Grouse Habitat Assessment

Sage-grouse habitat assessment was non-applicable for Route 2c.

Route 2d

Vegetation

Route 2d includes 19.7 acres that is managed by the BLM that was accessible. There were no other federal lands that were inaccessible. Most of Route 2d was on non-federal lands (117.3 acres).

Dominant habitats mapped within BLM lands include annual grassland (8.2 acres), perennial grassland (6.0 acres), sagebrush/perennial grassland (5.1 acres); and intermittent stream or dry gully (0.4 acre) (Table 1). Fire history records indicate the entire Route 2d area was burned in the 2009 Dry Creek Complex Fire. There were no riparian habitats.

The entire list of plant communities that were documented on the BLM lands are listed below. Dominant plant communities are indicated by an asterisk(*). Priority of plant communities are indicated in parentheses, and are based on the WANHP 2011 Natural Heritage Plan.

Annual grasslands

Non-native annual grassland*

Perennial grasslands

Bluebunch wheatgrass-Sandberg bluegrass, Lithosol (Priority 2)*
Needle and thread-Sandberg bluegrass (Priority 1)

Sagebrush/perennial grass areas

Big sagebrush-Sandberg bluegrass (Priority 3)
Stiff sagebrush-Sandberg bluegrass (Priority 3)*

Based on aerial imagery, the non-federal lands are dominated by grasslands, but there are also smaller amounts of annual grassland; intermittent dry stream or gully; shrubland; perennial grassland; sagebrush/perennial grassland; developed, road, or fire break; basalt cliff; and rock (Table 1).

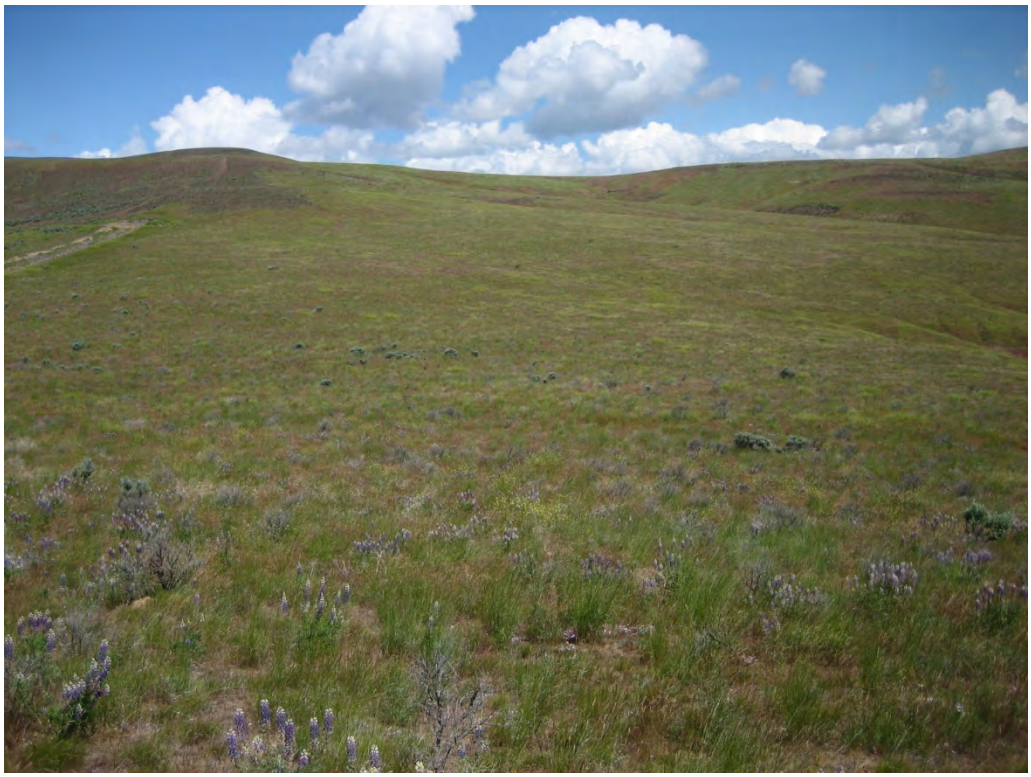
The 2001, YTC vegetation map indicates that the habitats of Route 2d are generally characterized as sagebrush/perennial grassland and perennial grassland. GAP data indicates that the habitats of Route 2d are generally characterized as sagebrush/perennial grassland with a small amount of annual grassland, although this would have likely substantially changed since the 2009 fire.

Sage-Grouse Habitat Assessment

Field observations documented that most of the BLM land had burned recently. Most habitat has been converted to non-native annual grassland habitat, although there were some areas with patches of sagebrush and diverse forbs.

Of the 1.0 mile of centerline (ca 19.7 acres) that were surveyed, sage-grouse breeding habitat included 0.3 mile suitable, 0.0 miles marginal, and 0.8 mile unsuitable (Table 2). Upland late brood-rearing habitat included 0.5 mile suitable, 0.5 mile marginal, and 0.0 miles unsuitable habitat. There was no riparian late brood-rearing habitat. Winter habitat included 0.3 mile suitable, 0.0 miles marginal, and 0.8 mile unsuitable habitat. There was one incidental observation of a pair of sage-grouse that flushed from a small patch of big sagebrush in an area that had high forb diversity native bunchgrass cover.

Photographs of most dominant habitats in the BLM parcel are provided below.



Photograph 15 - Route 2d - Perennial grassland (Bluebunch wheatgrass-Sandberg bluegrass)

Photograph 16 - Route 2d - Annual grassland (Non-native annual grassland)

Photograph 17- Route 2d - Sagebrush/perennial grass areas (Stiff sagebrush-Sandberg bluegrass)

Route 3a

Vegetation

Route 3a had no federal lands and the non-federal lands comprised 3.2 acres. Fire history records indicate there have been no fires along Route 3a.

Based on aerial imagery, the non-federal lands are sagebrush/perennial grassland; and developed, road, or firebreak (Table 1).

GAP data indicates that the Route 3a is generally characterized as sagebrush/perennial grassland.

Sage-Grouse Habitat Assessment

Sage-grouse habitat assessment was non-applicable for Route 3a.

Route 3b

Vegetation

Route 3b includes 61.1 acres of federal lands that were accessible and 110.4 acres that were inaccessible. The federal lands are managed by the BLM, Reclamation, and YTC. All of the Reclamation lands were accessible and all of the BLM lands were accessible, except for parts that were in water or on cliffs. Most of the YTC lands were inaccessible because of access issues across private lands, except for some parts that were accessible from the road. Most of Route 3b is on non-federal lands (250.6 acres).

Dominant habitats mapped within federal lands were predominantly sagebrush/perennial grassland (35.9 acres), with smaller amounts of annual grassland; sagebrush/annual grassland; watered poplar; rabbitbrush/annual grassland; developed, road, or firebreak; perennial grassland; water body; basalt cliff; and riparian (Table 1). Fire history records indicate a large portion of Route 3b was burned in the late-1990s, 2004, and is the 2009 Dry Creek Complex Fire. There were no riparian habitats observed on the accessible federal lands.

The entire list of plant communities that were documented on the federal lands are listed below. Dominant plant communities are indicated by an asterisk(*). Priority of plant communities are indicated in parentheses, and are based on the WANHP 2011 Natural Heritage Plan.

Forb

Shrubby buckwheat

Perennial grasslands

Basin Wildrye-Saltgrass (Priority 1)*
Needle and thread-Sandberg bluegrass (Priority 1)

Rabbitbrush/annual grass areas

Rubber rabbitbrush-Cheatgrass*

Sagebrush/annual grass areas

Big sagebrush-Cheatgrass

Sagebrush/perennial grass areas

Big sagebrush-Bluebunch wheatgrass (Priority 3)*
Big sagebrush-Needle and thread (Priority 1)
Big sagebrush-Sandberg bluegrass (Priority 3)*
Big sagebrush-Western wheatgrass
Stiff sagebrush-Sandberg bluegrass (Priority 3)*

Based on aerial imagery, the federal lands that were inaccessible are dominated by grasslands (60.4 acres); developed, road, or firebreak (24.6 acres); basalt cliff (12.6 acres); and riparian habitat (9.8 acres); with smaller amounts of intermittent stream or dry gully, rock, watered poplar, and water body (Table 1). Based on aerial imagery, the non-federal lands are dominated by grasslands; developed, road, or firebreak; sagebrush/perennial grassland; water body; watered poplar; riparian; and smaller amounts of rabbitbrush/annual grassland, annual grassland, basalt cliff, agriculture, shrubland, sagebrush/annual grassland, intermittent stream or dry gully, and trees (Table 1).

The 2001, YTC vegetation map indicates that the habitats of the YTC portion of the Route 3b are generally characterized as sagebrush/perennial grassland and perennial grassland, along with smaller amounts of riparian, forb, and disturbed habitats. GAP data of Route 3b are generally characterized as sagebrush/perennial grassland, water, annual grassland, agriculture, and disturbed.

Sage-Grouse Habitat Assessment

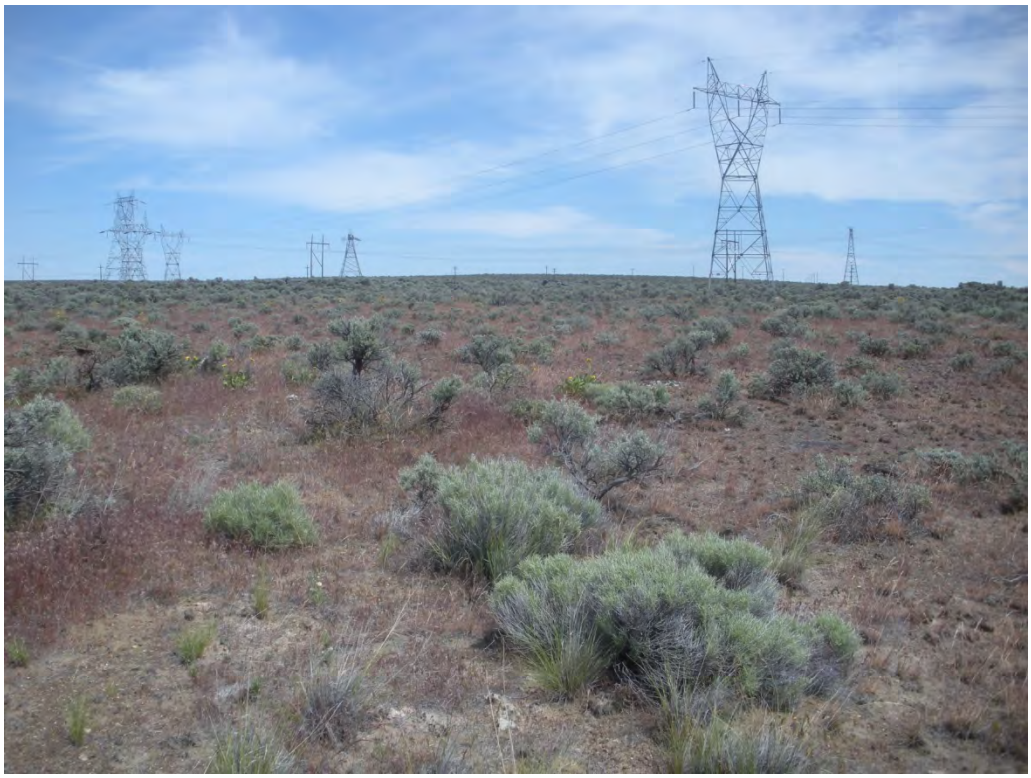
Field observations documented that the federal lands were characterized as a mixture of high quality sagebrush with a diverse forb layer, sagebrush adjacent to agriculture and the watered poplar wind row, basalt cliffs, and seasonally moist alkaline swale habitat resulting from basalt cliff runoff.

Of the 4.1 miles of the route centerline (ca 61.1 acres) that were surveyed, sage-grouse breeding habitat included 1.5 miles suitable, 2.4 miles marginal, and 0.2 mile unsuitable (Table 2). Upland late brood-rearing habitat included 1.7 miles suitable, 1.3 miles marginal, and 1.2 miles unsuitable habitat. There were 0.3 mile of unsuitable riparian late brood-rearing habitat on Reclamation lands. Winter habitat included 2.8 miles suitable, 1.4 miles marginal, and 0.0 miles unsuitable habitat. There were two incidental observations of sage-grouse on YTC lands on May 25, 2011. One observation was of a female sage-grouse in big sagebrush habitat between Huntzinger Road and the watered poplar wind row. The other observation was auditory and also on Reclamation lands, when they were heard near the base of the basalt cliffs. The poplar wind row could also provide raptor perch sites and is adjacent to agricultural fields.

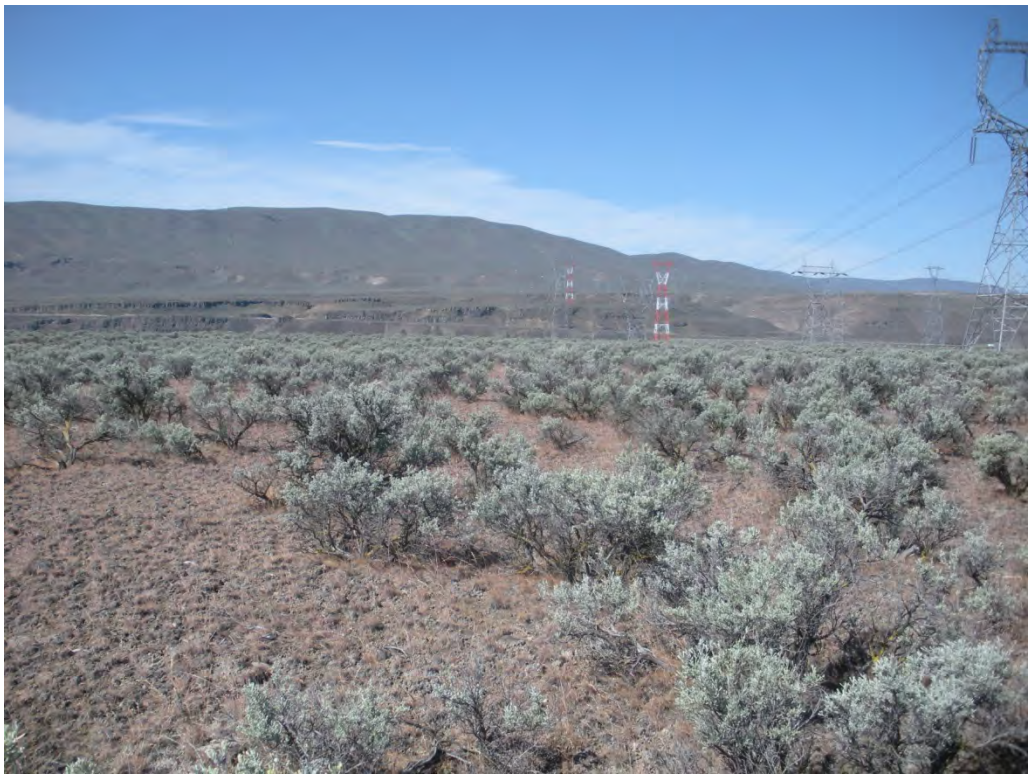
Photographs of most dominant habitats are provided below.

Photograph 18 - Route 3b - Sagebrush/perennial grass areas (Stiff sagebrush-Sandberg bluegrass)

Photograph 19 - Route 3b - Sagebrush/perennial grass areas (Big sagebrush-Bluebunch wheatgrass)



Photograph 20 - Route 3b - Sagebrush/annual grass areas (Big sagebrush-Cheatgrass)



Photograph 21 - Route 3b - Sagebrush/perennial grass areas (Big sagebrush-Sandberg Bluegrass)

Photograph 22 - Route 3b - Rabbitbrush/annual grass areas (Rubber rabbitbrush-Cheatgrass)

Photograph 23 - Route 3b - Perennial grasslands (Basin wildrye-Saltgrass)

Route 3c

Vegetation

Route 3c includes 179.8 acres of federal lands that were accessible and 1.2 acres that were inaccessible. The federal lands are managed by the Reclamation, BLM, and USFWS. All of the BLM lands were accessible. Nearly all of the Reclamation lands were accessible, except for one small parcel blocked by a locked gate and private property signs. There were two USFWS parcels, one which was accessible and the other which was only accessed during August surveys for Ute ladies'-tresses (*Spiranthes diluvialis*), due to the large hiking distance required for access. Most of the ROW corridor in Link 3C was on non-federal lands (308.7 acres).

Dominant habitats mapped within federal lands were predominantly sagebrush/perennial grassland (101.9 acres), rabbitbrush/annual grassland (32.4 acres), annual grassland (20.7 acres), and developed, road, or firebreak (10.2 acres), with smaller amounts of agriculture, irrigation canal, riparian, sagebrush/annual grassland, perennial grassland, water, and intermittent stream or dry gully (Table 1). Fire history records indicate a small portion of Route 3c may have been burned in the 2009 Dry Creek Complex Fire. Route 3c has more riparian habitats than any other route, although there were still very few riparian habitats. These riparian habitats were typically dominated by non-native species, included noxious weeds.

The entire list of plant communities that were documented on the federal lands are listed below. Dominant plant communities are indicated by an asterisk(*). Priority of plant communities are indicated in parentheses, and are based on the WANHP 2011 Natural Heritage Plan.

Annual grasslands

Non-native annual grassland*

Bitterbrush

Antelope bitterbrush-Needle and thread (Priority 1)

Forb

Rock buckwheat-Sandberg bluegrass (Priority 2)*
Shrubby buckwheat
Thyme buckwheat-Sandberg bluegrass (Priority 3)

Perennial grasslands

Cereal ryegrass
Needle and thread-Sandberg bluegrass (Priority 1)*
Saltgrass (Priority 1)
Sand dropseed- Sandberg bluegrass (Priority 2)*

Rabbitbrush/annual grass areas

Rubber rabbitbrush-Cheatgrass*

Riparian

Coyote willow-Common reed

Sagebrush/annual grass areas

Big sagebrush-Cheatgrass*

Sagebrush/perennial grass areas

Big sagebrush-Bluebunch wheatgrass (Priority 3)*
Big sagebrush-Needle and thread (Priority 1)*
Big sagebrush-Sandberg bluegrass (Priority 3)*
Stiff sagebrush (Priority)
Stiff sagebrush-Sandberg bluegrass (Priority 3)*

Based on aerial imagery, the federal lands that were inaccessible are dominated by shrub lands (1.2 acres) (Table 1). Based on aerial imagery, non-federal lands are dominated by agriculture; developed, road, or firebreak; grassland; shrubland; sagebrush/perennial grassland; sagebrush/annual grassland; and annual grassland; with smaller amounts of water body, rabbitbrush/annual grassland, irrigation canal, riparian habitat, rock, basalt cliff, intermittent stream or dry gully, and perennial grassland (Table 1).

GAP data indicates that the habitats Route 3c are generally characterized as agriculture, sagebrush/perennial grassland, annual grassland, sagebrush/annual grassland, riparian, and water.

Sage-Grouse Habitat Assessment

Field observations documented that the federal lands were characterized as a mixture of high quality sagebrush, agriculture including vineyards and orchards, weedy and disturbed habitats, cattle feedlots, garbage dumps, irrigation canals and highways, steep rocky slopes, and a few riparian habitats.

Of the 11.6 miles of the route centerline (ca 179.8 acres) that were surveyed, sage-grouse breeding habitat included 4.5 miles suitable, 2.3 miles marginal, and 4.8 miles unsuitable (Table 2). Upland late brood-rearing habitat included 5.0 miles suitable, 3.1 miles marginal, and 3.5 miles unsuitable habitat. There were 0.3 mile of marginal and 0.3 mile of unsuitable riparian late brood-rearing habitat on Reclamation lands. Winter habitat included 4.2 miles suitable, 2.1 miles marginal, and 5.3 miles unsuitable habitat.

There were four incidental observations of sage-grouse on or near Route 3c. One observation was on May 16, 2011 and of two female sage-grouse crossing O Road (south and west of Road 29 SW) into an alfalfa field one mile west of a Reclamation parcel that was surveyed. One observation was on May 17, 2011 and of two sage-grouse <1/8 mile west of BLM lands. One observation was of a sage-grouse on the edge of an agricultural field adjacent to Reclamation lands on June 22, 2011. One observation was of two female sage-grouse along a agricultural canal on August 10, 2011. A red-tail hawk (*Buteo jamaicensis*) nest was also observed on a transmission line tower on BLM lands.

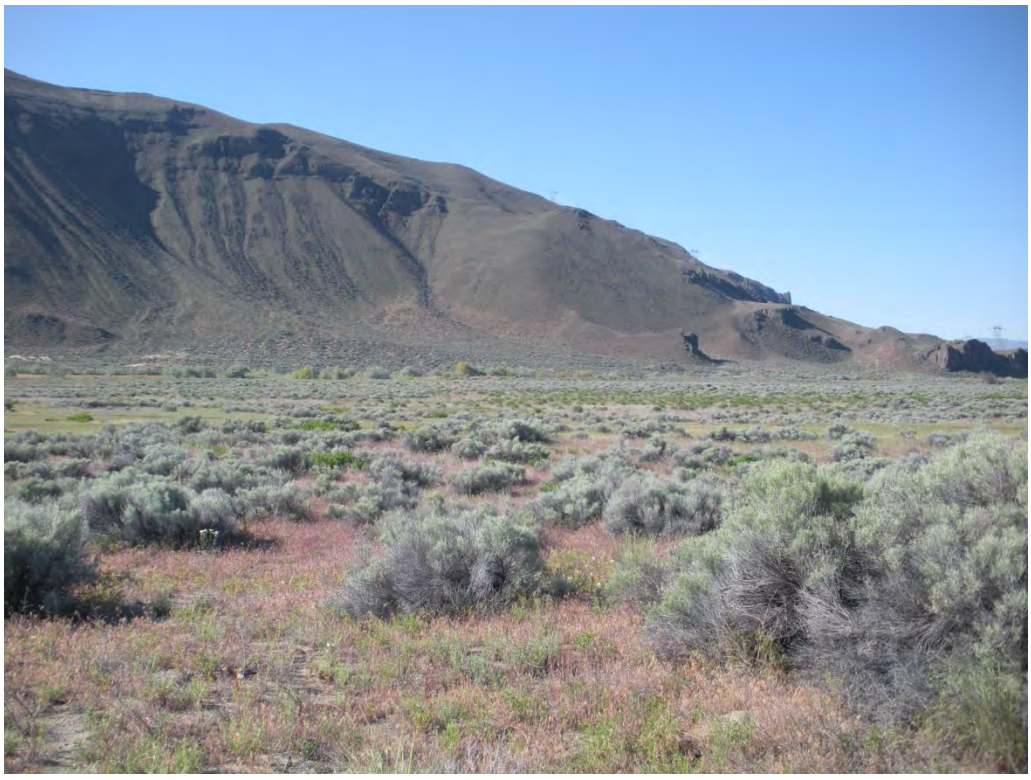
Photographs of most dominant habitats on the federal lands surveyed are provided below.

Photograph 24 - Route 3c - Sagebrush/perennial grass areas (Stiff sagebrush-Sandberg bluegrass)

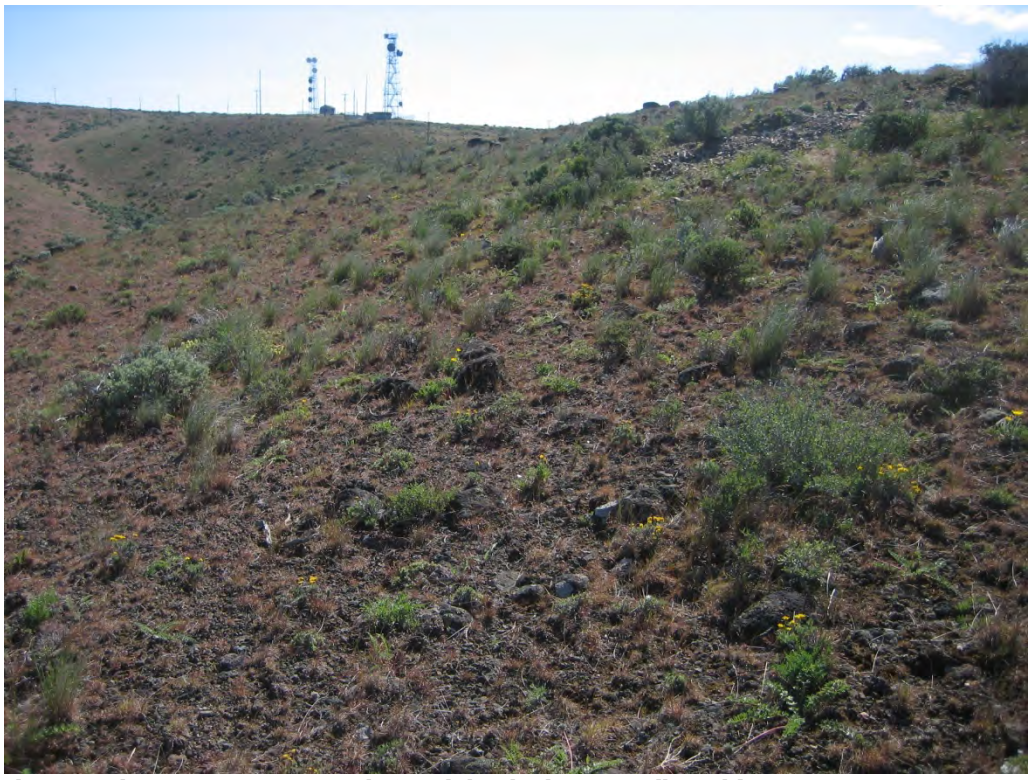
Photograph 25 - Route 3c - Sagebrush/perennial grass areas (Big sagebrush-Bluebunch wheatgrass)

Photograph 26 - Route 3c - Sagebrush/perennial grass areas (Big sagebrush-Sandberg bluegrass)

Photograph 27 - Route 3c - Sagebrush/perennial grass areas (Big sagebrush-Needle and thread)



Photograph 28 - Route 3c - Rabbitbrush/annual grass areas (Rubber Rabbitbrush-Cheatgrass)



Photograph 29 - Route 3c - Forb (Rock buckwheat-Sandberg bluegrass)

Photograph 30 - Route 3c - Annual grasslands (Non-native annual grassland)

Photograph 31 - Route 3c - Perennial grassland (Needle and thread-Sandberg bluegrass)

4.0 SUMMARY

Route 2b, 3c, and 1b (in order) had the highest amount of suitable sage-grouse habitat on federal lands that were surveyed. However, Route 1b and 3b had a substantial amount of federal lands that were not surveyed because they were inaccessible. Route 1b appears to have additional suitable sage-grouse habitat on federal lands, based on the amount of shrublands estimated using aerial interpretation. Route 3b likely did not have a substantial amount of suitable sage-grouse habitat because it was predominantly grassland habitat, due to large fires in 2004 and the late-1990s.

This information should be used to compare the potential effects of the proposed project to sage-grouse and other special status species habitat on federal lands. This data can also be used to inform seasonal restrictions and other mitigation measures for minimizing potential effects to sage-grouse and its habitat.

The following summarizes sage-grouse habitat suitability on federal lands by route segment:

Route 1a—Suitable breeding, late brood-rearing, and winter sage-grouse habitat for 0.3 mile of 0.3 mile of centerline of federal lands surveyed. There were no federal lands that were not surveyed.
Route 1b—Suitable breeding, late brood-rearing, and winter sage-grouse habitat for 3.2 to 4.5 miles of 7.0 miles of centerline of federal lands surveyed. Marginal sage-grouse habitat occurred for 0.3 to 2.3 miles of centerline of federal lands surveyed. There were 5.5 miles of centerline of federal lands that were not surveyed that are predominantly classified as shrublands and potentially represent additional suitable sage-grouse habitat. There was one incidental sage-grouse observation.
Route 1c—Suitable breeding, late brood-rearing, and winter sage-grouse habitat for 0.0 miles of 0.6 mile of centerline of federal lands surveyed. Marginal sage-grouse habitat occurred for 0.0 to 0.5 miles of centerline of federal lands surveyed. There were no federal lands that were not surveyed.
Route 2a—Suitable and marginal breeding, late brood-rearing, and winter sage-grouse habitat for 0.0 miles of 0.0 miles of centerline of federal lands surveyed. There were no federal lands that were not surveyed.
Route 2b—Suitable breeding, late brood-rearing, and winter sage-grouse habitat for 5.5 to 6.8 miles of 7.9 miles of centerline of federal lands surveyed. Marginal sage-grouse habitat occurred for 0.5 to 1.2 miles of centerline of federal lands surveyed. There were 1.3 miles of centerline of federal lands that were not surveyed that are predominantly classified as shrublands and potentially represent additional suitable sage-grouse habitat.
Route 2c—Suitable and marginal breeding, late brood-rearing, and winter sage-grouse habitat for 0.0 miles of 0.0 miles of centerline of federal lands surveyed. There were no federal lands that were not surveyed.
Route 2d—Suitable breeding, late brood-rearing, and winter sage-grouse habitat for 0.3 to 0.5 miles of 1.0 miles of centerline of federal lands surveyed. Marginal sage-grouse habitat occurred for 0.0 to 0.5 miles of centerline of federal lands surveyed. There were no federal lands that were not surveyed. There was one incidental sage-grouse observation.
Route 3a—Suitable and marginal breeding, late brood-rearing, and winter sage-grouse habitat for 0.0 miles of 0.0 miles of centerline of federal lands surveyed. There were no federal lands that were not surveyed.
Route 3b—Suitable breeding, late brood-rearing, and winter sage-grouse habitat for 1.5 to 2.8 miles of 4.1 miles of centerline of federal lands surveyed. Marginal sage-grouse habitat occurred for 1.3 to 2.4 miles of centerline of federal lands surveyed. There were 9.6 miles of centerline of federal lands that were not surveyed that are predominantly classified as grasslands and potentially represent less suitable sage-grouse habitat, although there was also the highest amount of riparian habitat across all the routes; as well as basalt cliff habitat, which is important for other special status species. There were two incidental sage-grouse observations.

Route 3c—Suitable breeding, late brood-rearing, and winter sage-grouse habitat for 4.2 to 5.0 miles of 11.6 miles of centerline of federal lands surveyed. Marginal sage-grouse habitat occurred for 2.1 to 3.1 miles of centerline of federal lands surveyed. There were 0.1 miles of centerline of federal lands that were not surveyed that are predominantly classified as shrublands and potentially represent additional suitable sage-grouse habitat. There were four incidental sage-grouse observations.

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TABLE 1 HABITAT WITHIN THE ROUTE SEGMENTS (IN ACRES)[1]

DESCRIPTION	1a			1b			1c			2a			2b			2c			2d			3a			3b			3c		
	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL
Agriculture	0	0	1	0	0	0	T	T	9	0	0	0	2	0	23	0	0	66	0	0	0	0	0	0	0	0	3	5	0	85
Developed, Road, or Firebreak	1	0	13	18	12	31	1	0	17	0	0	0	13	0	21	0	0	17	0	0	1	0	0	1	3	25	82	10	0	69
Irrigation Canal	0	0	T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	11
Total Developed	1	0	14	18	12	31	1	T	26	0	0	0	15	0	43	0	0	84	0	0	1	0	0	1	3	25	85	20	0	165
Annual Grassland	0	0	0	25	0	25	0	0	42	0	0	0	2	0	9	0	T	10	8	0	15	0	0	0	6	0	10	21	0	31
Perennial Grassland	0	0	0	37	0	37	0	0	17	0	0	0	2	0	9	0	0	0	6	0	7	0	0	0	2	0	2	1	0	1
Grassland	0	0	6	0	16	16	0	0	29	0	0	5	0	3	54	0	T	153	0	0	101	0	0	0	0	60	141	0	0	40
Total Grassland	0	0	6	62	16	77	0	0	89	0	0	5	4	3	72	0	T	163	14	0	124	0	0	0	8	60	153	21	0	72
Basalt cliff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0	T	13	17	0	0	2
Rock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	T	0	0	T	0	0	0	0	1	1	0	0	4
Total Rock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	T	0	0	1	0	0	0	T	13	18	0	0	5
Rabbitbrush / Annual Grassland	0	0	0	9	0	9	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	9	32	0	40
Sagebrush/ Annual Grassland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0	0	0	0	5	0	6	1	0	13
Sagebrush/ Perennial Grassland	4	0	6	46	4	51	0	0	55	0	0	1	25	0	113	0	0	0	5	0	6	0	0	2	36	0	74	102	0	124
Shrubland	0	0	16	0	70	70	0	T	68	0	0	12	0	5	82	0	0	95	0	0	2	0	0	0	0	0	1	T	1	54
Total Shrubland	4	0	22	55	73	130	0	T	129	0	0	14	25	5	194	0	0	96	5	0	8	0	0	2	44	0	90	136	1	231

DESCRIPTION	1a			1b			1c			2a			2b			2c			2d			3a			3b			3c		
	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL	FS	FU	ALL
Aspen	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tree	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0
Watered Poplar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	21	0	0	0
Total Tree	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	21	0	0	0
Intermittent Stream or Dry Gully	0	0	1	2	2	5	0	0	7	0	0	1	0	T	8	0	0	9	0	0	4	0	0	0	0	1	1	T	0	T
Riparian	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	10	25	3	0	8
Water Body	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	T	29	T	0	9
Total Riparian	0	0	1	2	2	5	0	0	7	0	0	1	0	T	8	0	0	9	0	0	4	0	0	0	1	11	56	3	0	17
Grand Total	5	0	44	138	104	244	2	0	251	0	0	19	45	8	319	0	T	352	20	0	137	0	0	3	61	110	422	180	1	490

[1]Habitats are based on survey results on federal lands (federal surveyed=FS), estimates of inaccessible federal lands that were estimated from aerial interpretation (federal unsurveyed=FU), and the sum total of both of these plus estimates of non-federal lands based on aerial interpretation (ALL). Trace (T) is indicated where land area was 0.49 or less acres.

TABLE 2 SAGE-GROUSE HABITAT QUALITY WITHIN ROUTE SEGMENTS (NUMBER OF MILES OF CENTERLINE)[1]

SAGE-GROUSE HABITAT	ASSESSMENT	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Breeding	Suitable	0.3	3.5	0.0	0.0	5.5	0.0	0.3	0.0	1.5	4.5
	Marginal	0.0	0.3	0.0	0.0	0.5	0.0	0.0	0.0	2.4	2.3
	Unsuitable	0.0	3.3	0.6	0.0	1.9	0.0	0.8	0.0	0.2	4.8
Upland Late Brood-rearing	Suitable	0.3	4.5	0.0	0.0	6.8	0.0	0.5	0.0	1.7	5.0
	Marginal	0.0	2.3	0.5	0.0	1.2	0.0	0.5	0.0	1.3	3.1
	Unsuitable	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.5
Riparian Late Brood-rearing	Suitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Marginal	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unsuitable	0.3	6.5	0.6	0.0	7.9	0.0	1.0	0.0	3.2	10.0
Total Brood-rearing[2]	Suitable	0.3	4.5	0.0	0.0	6.8	0.0	0.5	0.0	1.7	5.0
	Marginal	0.0	2.3	0.5	0.0	1.2	0.0	0.5	0.0	1.3	3.1
	Unsuitable	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.5
Winter	Suitable	0.3	3.2	0.0	0.0	6.0	0.0	0.3	0.0	2.8	4.2
	Marginal	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	1.4	2.1
	Unsuitable	0.0	3.3	0.6	0.0	1.4	0.0	0.8	0.0	0.0	5.3
Total number of miles of centerline on federal lands that were surveyed		0.3	7.0	0.6	0.0	7.9	0.0	1.0	0.0	4.1	11.6
Total number of miles of centerline on federal lands		0.3	12.5	0.6	0.0	9.2	0.0	1.0	0.0	13.7	11.7

[1]Sage-grouse habitat quality was assessed based on A Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Public Lands in Idaho: Sage Grouse (*Centrocercus urophasianus*) (BLM 2000). [2]Total brood-rearing is based on combination of upland and riparian brood-rearing habitat, but with the more optimal habitat included in the total where there is a discrepancy.

TABLE 3 PLANT COMMUNITIES BY HABITAT[1]

HABITAT	PLANT COMMUNITY-COMMON NAME	PLANT COMMUNITY-SCIENTIFIC NAME	PRIORITY
Annual grasslands	Non-native annual grassland*	*Bromus tectorum*	
Aspen	Quaking aspen-Chokecherry	*Populus tremuloides-Prunus virginianus*	*
Bitterbrush	Antelope bitterbrush-Needle and thread	*Purshia tridentata-Stipa comata*	1
Forb	Arrowleaf buckwheat-Sandberg bluegrass	*Eriogonum compositum-Poa secunda*	3
Forb	Rock buckwheat-Sandberg bluegrass*	*Eriogonum sphaerocephalum-Poa secunda*	3
Forb	Shrubby buckwheat	*Eriogonum microthecum*	
Forb	Strict buckwheat-Sandberg bluegrass	*Eriogonum strictum-Sandberg bluegrass*	
Forb	Thyme buckwheat-Sandberg bluegrass	*Eriogonum thymoides-Poa secunda*	3
Intermittent stream/Dry gully	Greasewood-Saltgrass	*Sarcobatus vermiculatus-Distichlis spicata*	2
Perennial grasslands	Basin Wildrye-Saltgrass*	*Elymus cinereus-Distichlis stricta*	1
Perennial grasslands	Bluebunch wheatgrass-Sandberg bluegrass, Lithosol*	*Agropyron spicatum-Poa secunda, Lithosolic Phase*	2
Perennial grasslands	Cereal ryegrass	*Secale cereale*	
Perennial grasslands	Crested wheatgrass*	*Agropyron cristatum*	
Perennial grasslands	Idaho fescue-Parsnipflower buckwheat	*Festuca idahoensis-Eriogonum heracleoides*	
Perennial grasslands	Needle and thread-Sandberg bluegrass	*Stipa comata-Poa secunda*	1
Perennial grasslands	Saltgrass	*Distichlis spicata*	1
Perennial grasslands	Sand dropseed- Sandberg bluegrass*	*Sporobolus cryptandrus-Poa secunda*	2
Rabbitbrush/annual grass areas	Rubber rabbitbrush-Cheatgrass*	*Chrysothamnus nauseosus-Bromus tectorum*	
Riparian	Coyote willow-Common reed	*Salix exigua-Phalaris australis*	
Sagebrush/annual grass areas	Big sagebrush-Cheatgrass*	*Artemisia tridentata-Bromus tectorum*	
Sagebrush/perennial grass areas	Big sagebrush-Bluebunch wheatgrass*	*Artemisia tridentata wyomingensis-Agropyron spicatum*	3
Sagebrush/perennial grass areas	Big sagebrush-Idaho fescue	*Artemisia tridentata-Festuca idahoensis*	3
Sagebrush/perennial grass areas	Big sagebrush-Needle and thread*	*Artemisia tridentata wyomingensis-Stipa comata*	1
Sagebrush/perennial grass areas	Big sagebrush- Sandberg bluegrass*	*Artemisia tridentata wyomingensis-Poa secunda*	3
Sagebrush/perennial grass areas	Big sagebrush- Western wheatgrass	*Artemisia tridentata wyomingensis-Agropyron smithii*	
Sagebrush/perennial grass areas	Stiff sagebrush	*Artemisia rigida*	*
Sagebrush/perennial grass areas	Stiff sagebrush-Bluebunch wheatgrass*	*Artemisia rigida-Agropyron spicatum*	
Sagebrush/perennial grass areas	Stiff sagebrush- Sandberg bluegrass*	*Artemisia rigida-Poa secunda*	3

[1]Plant community names are predominantly based on Steppe Vegetation of Washington (Daubenmire 1970). Where it is not based on Daubenmire 1970, it is based on documenting the dominant tree, shrub, grass, and/or forb species present. An asterisk (*) indicates that the community is a dominant community in at least one route segment. Priority plant community status is based on list of 2009 WANHP Priority Rare Plant Communities or Wetlands http://www1.dnr.wa.gov/nhp/refdesk/plan/CommunityList.pdf.

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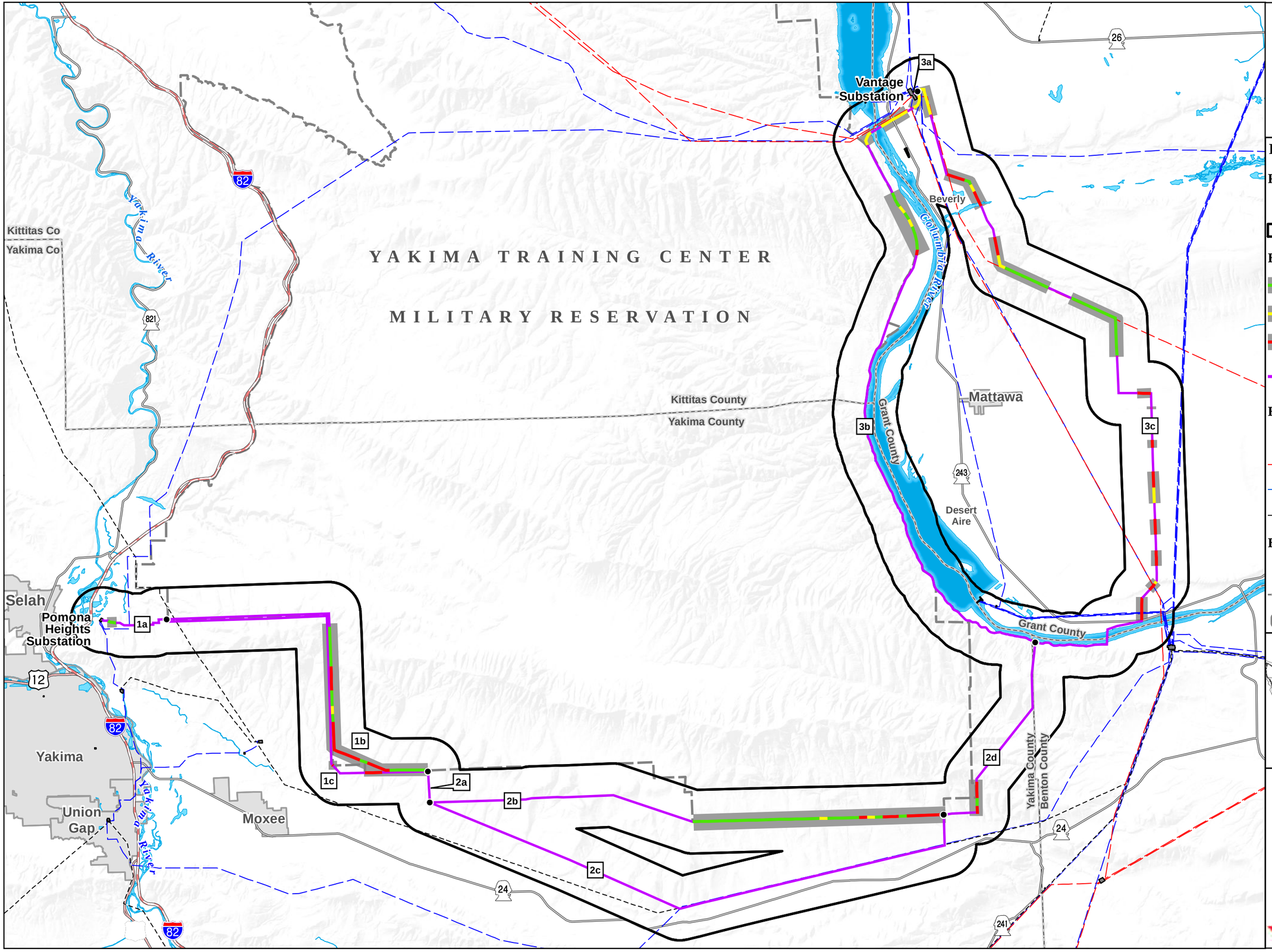
Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1
Sage-Grouse Breeding Habitat



Legend

Routes

- Link Node
- Study Corridor (2 miles)

Breeding Habitat Assessment

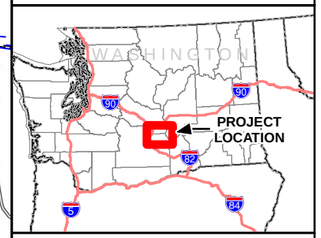
- Suitable
- Marginal
- Unsuitable
- Not Assessed During Field Surveys

Existing Transmission

- Substation
- 500kV
- 230kV
- 115kV

Boundaries

- City Boundary
- County
- Yakima Training Center



Data are projected in UTM Zone 10N, NAD83

0 0.5 1 2 3 4
Miles

PACIFIC POWER
POWER ENGINEERS

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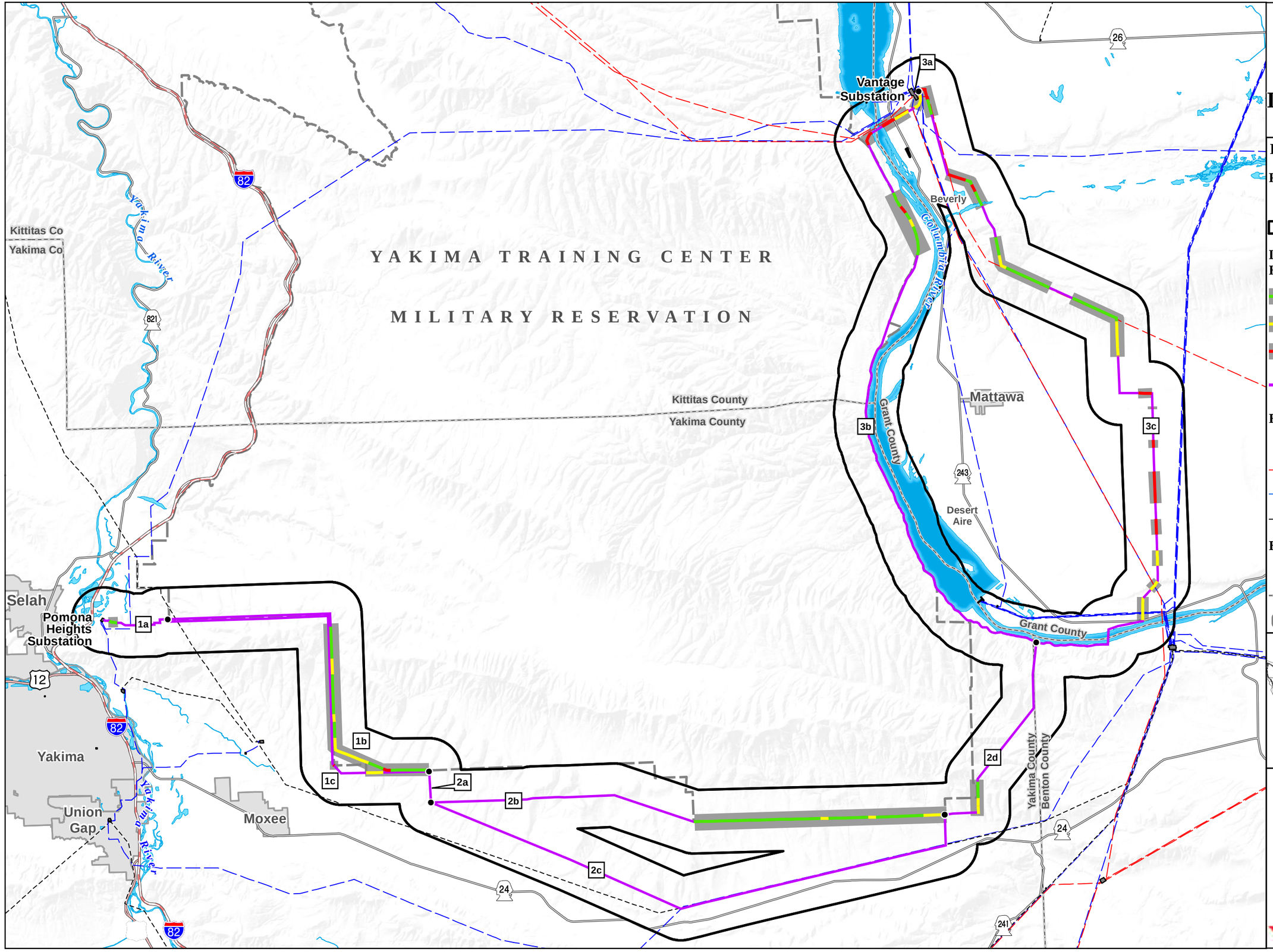
Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2
Sage-Grouse Late Brood-Rearing Habitat



Legend

Routes

- Link Node
- Study Corridor (2 miles)

Late Brood-Rearing Habitat Assessment

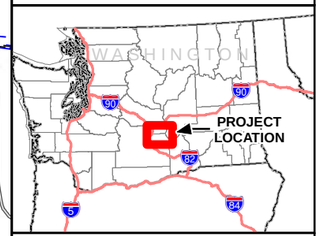
- Suitable
- Marginal
- Unsuitable
- Not Assessed During Field Surveys

Existing Transmission

- Substation
- 500kV
- 230kV
- 115kV

Boundaries

- City Boundary
- County
- Yakima Training Center



Data are projected in UTM Zone 10N, NAD83

0 0.5 1 2 3 4
Miles

PACIFIC POWER
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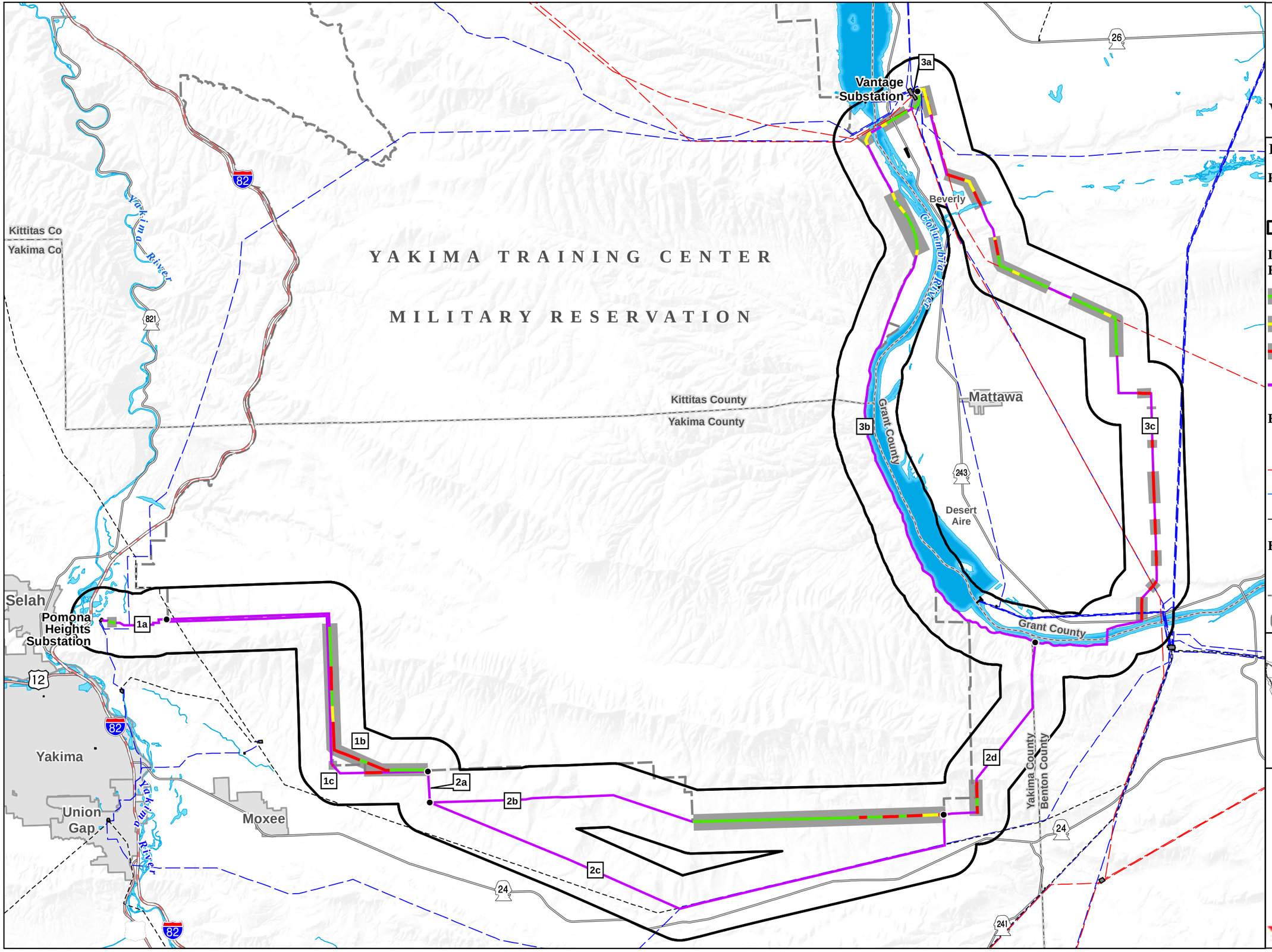
Vantage - Pomona Heights 230kV Transmission Line Project

Figure 3

Sage-Grouse Winter Habitat



Legend

Routes

- Link Node
- Study Corridor (2 miles)

Late Winter Habitat Assessment

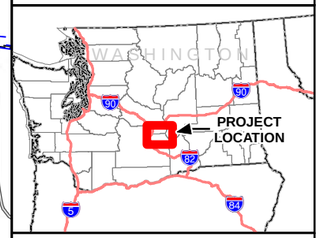
- Suitable
- Marginal
- Unsuitable
- Not Assessed During Field Surveys

Existing Transmission

- Substation
- 500kV
- 230kV
- 115kV

Boundaries

- City Boundary
- County
- Yakima Training Center



Data are projected in UTM Zone 10N, NAD83

0 0.5 1 2 3 4

Miles

PACIFIC POWER

POWER ENGINEERS

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APPENDIX A – A FRAMEWORK TO ASSIST IN MAKING SENSITIVE SPECIES HABITAT ASSESSMENTS FOR BLM-ADMINISTERED PUBLIC LANDS IN IDAHO: SAGE GROUSE (CENTROCERCUS UROPHASIANUS) (BLM 2000)

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A Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Public Lands in Idaho

Sage Grouse
(*Centrocercus urophasianus*)

Prepared by U. S. Bureau of Land Management, Idaho

Signe Sather-Blair, Idaho State Office
Paul Makela, Burley Field Office, Upper Snake River District
Tim Carrigan, Bruneau Field Office, Lower Snake River District
Loren Anderson, Salmon Field Office, Upper Columbia-Salmon Clearwater District

May 2000

A Framework to Assist in Making Sage Grouse Habitat Assessments

Table of Contents Page

Table of Contents Page

I. Introduction

A. Purpose and Need

Sage grouse (*Centrocercus urophasianus*) are North America's largest grouse and found only in habitats dominated by sagebrush (*Artemisia* spp.), particularly big sagebrush (*Artemisia tridentata spp.*). Historical habitat losses and alterations have significantly reduced the range of this species and populations have declined in remaining habitats (Braun 1998, Schroeder et al. 1999). Habitat losses in Idaho have been so severe in recent years as a result of wildfires and subsequent annual grass invasions that conservation efforts are underway to: (1) protect, maintain and enhance existing suitable habitat, (2) improve degraded habitats and (3) restore habitats, where most feasible. They are an Idaho Bureau of Land Management (BLM) sensitive species.

The rate of sagebrush habitat loss has been so great that if conservation measures are not implemented immediately there is a high likelihood that sage grouse and other sagebrush obligate species will warrant listing under the Endangered Species Act within the next 10 years. Recovery or maintenance of sage grouse habitats and populations will be contingent on implementation of land management practices that contribute to, rather than detract from, sage grouse habitat quality and quantity. To complement these efforts we need to have an objective, scientifically-based sage grouse habitat assessment process that can be used for a variety of purposes.

Much of the remaining and restorable sage grouse habitats in Idaho are located on public lands administered by the BLM. This framework is designed to facilitate and standardize sage grouse habitat assessments for BLM lands in a manner that complements management direction in the Interior Columbia Basin Ecosystem Management Project (ICBEMP), fire management planning, sagebrush steppe restoration planning and field evaluations for attainment of land use plan objectives and Idaho Standards for Rangeland Health (USDI 1997) assessments. This framework describes the habitat assessment process Idaho BLM will use to:

5. Identify remaining sage grouse habitat areas and priority habitat restoration areas.

2. Evaluate and document existing sage grouse habitat suitability and habitat restoration needs.

3. Assist in evaluating land uses on public lands that may affect sage grouse habitat conditions or habitat restoration efforts.

4. Assist in evaluating attainment of pertinent land use plan objectives and Standard 8 of Idaho's Standards for Rangeland Health for sage grouse.

This framework is designed acknowledging the immediacy of needed actions. Some of what is outlined in this framework is incomplete and as such it must be considered a dynamic document that will change as we acquire new information. It will remain a draft document through the FY 2000 field season to allow for field testing and review. It is designed to accommodate the realities of current Idaho BLM workforce and budgetary constraints. It is more qualitative than quantitative, although the ability to be more quantitative is provided. It is designed to be applied to a wide range of environmental conditions. This means it must be flexible and can be modified or refined for local conditions; a certain degree of professional judgement will be required in its application.

This habitat assessment framework does not address potential land uses that may directly affect the birds or their behavior and use of areas (e.g., transmission line mortalities, structures near leks or wintering areas that may provide perch sites for raptors). Additional instructions will be developed and provided to the Field Offices at a later date for these types of land uses and related potential effects.

B. Applicability of the Framework for Other Sagebrush Obligates

There are several other animal species that are dependent on the presence of sagebrush for survival. Our information concerning these other species and their habitat needs is generally poor, except for a few exceptions. We do know that populations of many sagebrush obligates are declining Paige and Ritter 1999, Wisdom et al. 1999) and several have been identified as BLM sensitive species.

Sage grouse require large areas of sagebrush to survive and we have considerable knowledge of their habitat requirements in comparison with other sagebrush obligates. *As such, we will use this species as an umbrella species (Noss 1990) and assume that habitat needs for other sagebrush obligate species are also being benefitted as a result of protection, improvement and restoration of sage grouse habitat.* In some cases other sagebrush obligates will have habitat needs in addition to what is outlined in this framework for sage grouse. Biologists with the U.S. Geological Survey and Partners in Flight will be assisting us in evaluating the applicability of this framework and the sage grouse habitat indicators to other sagebrush obligate bird species. Where needed, biologists are encouraged to address the unique, additional habitat needs of other sagebrush obligates on a case-by-case basis.

C. Guidelines for Management of Sage Grouse Populations and Habitats

In 1977 guidelines for sage grouse habitat management were published (Braun et al. 1977). Since then considerably more information has accrued concerning sage grouse population status and habitat needs, and concern has grown over population trends and future of the species (Braun 1998). As a result, new guidelines are being published (Connelly et al. *in press*) in cooperation with the Western Association of Fish and Wildlife Agencies. *Habitat definitions and quality criteria used for this framework document are primarily derived from these guidelines and the reader is encouraged to read them to better understand the rationale for certain habitat indicators.* We provide a brief review of those portions of the guidelines pertinent to this assessment framework.

1. Breeding Habitat

Breeding habitat includes leks, nesting and early brood-rearing areas. Suitable nesting and early brood-rearing habitats are dominated by sagebrush with a healthy herbaceous understory. Connelly et al. (*in press*) recommend that breeding habitats (exclusive of leks) are managed to support 15-25% canopy cover of sagebrush, perennial herbaceous cover averaging at least 18 cm (7 inches) in height with at least 15% grass canopy cover, 10% forb canopy cover and a diversity of forbs.

2. Late Brood-rearing Habitat

From late June to early November sage grouse will use a variety of moist and mesic habitats where succulent forbs are found. These habitats include riparian areas, wet meadows, lakebeds, farmlands, uplands including sagebrush and recently burned areas. Avoiding land uses that reduce soil moisture, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs is recommended.

3. Winter Habitat

During the winter months sage grouse feed almost exclusively on sagebrush. Sagebrush stands with canopy covers of 10-30% (inclusive of big and low species of sagebrush) and winter cover heights of at least 25 cm (10 inches) above the snow is needed. Topographic relief and a diversity of sagebrush heights in an area are important.

II. Regulatory Mechanisms and Management Direction - BLM Land Use Plans, Regulations, Policies and MOU's

The adequacy of existing regulatory mechanisms is one of the five factors that the Fish and Wildlife Service reviews during a species status review for possible listing as threatened or endangered. For BLM-administered public lands federal laws and associated regulations and policies define these regulatory mechanisms. The Federal Land Policy and Management Act (FLPMA) of 1976 is the primary federal law that governs most land uses on BLM-administered lands although other federal laws also provide management direction. Memorandums of Understanding (MOU's) are not binding, decision-making documents but do provide general management direction and emphasis.

It is very important that BLM's existing regulatory mechanisms sufficiently address the habitat needs of sensitive species like sage grouse in decision-making processes to ensure that BLM management is not contributing to the need to list the species. This framework establishes a habitat assessment process to help accomplish this for sage grouse.

Idaho BLM habitat goals for sage grouse, consistent with LUPs and BLM policies and regulations, will be to: (1) protect, maintain and enhance existing suitable habitats, (2) improve degraded sagebrush habitats to suitable conditions, where feasible, and (3) restore habitats to suitable conditions, where most feasible and important for long-term recovery.

A. Existing Land Use Plans

Land use plans (LUP's) in Idaho can be either Resource Management Plans or Management Framework Plans depending on the Resource Area. These plans were developed with public participation and meet the requirements of the FLPMA. These plans establish the management direction for resource uses of public lands administered by the BLM and are, in most cases, the primary decision-making documents (43 CFR 4100).

Most Resource Areas within the range of sage grouse in Idaho have LUP objectives either specific to sage grouse habitat management or general objectives dealing with managing special status species. *This framework document will be used to assess attainment of these objectives as they pertain to sage grouse. In the cases where LUP's do not have either sage grouse or general special status species objectives, other authorities (e.g., grazing regulations) will be used until LUP maintenance, amendment or revision incorporates such objectives. We are assuming that many of the general habitat needs for other sagebrush obligate bird species are similar to those of sage grouse and therefore addressed in this assessment framework. However, there will be areas or circumstances that will warrant species-specific assessment.*

B. Interior Columbia Basin Ecosystem Management Project (ICBEMP)

The draft Supplemental Environmental Impact Statement for ICBEMP is currently out for review. If approved, the Record of Decision will amend all BLM Land Use Plans in Idaho. This project provides a long-term integrated strategy that will provide consistent direction at the regional and subregional levels to assist federal land managers in making land use decisions at a local level within the context of broader ecological considerations. This framework document is consistent with and uses the analysis step-down process outlined for ICBEMP.

C. Idaho Standards for Rangeland Health and Guidelines for Livestock Management

In 1995 new grazing regulations were finalized (60 FR, February 22, 1995) that included Subpart 4180 addressing the "Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration." Within the scope of these regulations, 43CFR 418.2(d), includes specific direction to the BLM State Directors to develop standards that among other things would address:

> "(4) Habitat for endangered, threatened, proposed, candidate, or special status species; and; (5) Habitat quality for native plant and animal populations and communities..." (43 CFR 4180.2 (d)...)

In addition, 43CFR 4180.2(e) requires development of guidelines to address:

> "(9) Restoring, maintaining or enhancing habitats of Federal Proposed, Federal Candidate, and other special status species to promote their conservation;"

In August, 1997 the Secretary of Interior approved Idaho's S&G's. Standard 8 of Idaho's S&G's addresses special status species management:

> "Habitats are suitable to maintain viable populations of threatened and endangered, sensitive, and other special status species."

Since 1997 S&G assessments and determinations have been conducted in Idaho for areas of BLM-administered lands. Unlike other Standards, specific assessment procedures have not been developed for Standard 8, largely due to the diverse array of sensitive species in the state and the difficulties in developing applicable assessment protocols. This framework outlines the habitat assessment procedure for sage grouse, a BLM sensitive species, and will be used by all BLM Field Offices for Standard 8 assessments.

D. BLM National Policy on Special Status Species Management

BLM national policy directs State Directors to afford State-designated sensitive species the same level of protection as provided for federal candidate species (BLM 6840 Manual). Specifically the policy direction states:

> "BLM shall carry out management, consistent with the principles of multiple use, for the conservation of candidate [and sensitive] species and their habitats and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened/endangered. Specifically, BLM shall:
>
> 1. Determine the distribution, abundance, reasons for the current status, and habitat needs for candidate [and sensitive] species occurring on land administered by BLM, and evaluate the significance of lands administered by BLM or actions in maintaining those species.
>
> 2. For those species where lands administered by BLM or actions have a significant affect on their status, manage the habitat to conserve the species by:
>
> a. Including candidate [and sensitive] species as priority species in land use plans.
>
> b. Developing and implementing rangewide and/or site-specific management plans for candidate [and sensitive] species that include specific habitat and population management objectives designed for recovery, as well as the management strategies necessary to meet those objectives.
>
> c. Ensuring that BLM activities affecting the habitat of candidate [and sensitive] species are carried out in an manner that is consistent with the objectives for those species.
>
> d. Monitoring populations and habitats of candidate [and sensitive] species to determine whether management objectives are being met....."

E. Idaho Sage Grouse Management Plan and MOU

Conservation planning for sage grouse began in earnest with development of the Idaho Sage Grouse Management Plan (IDFG 1997). In 1998 Idaho BLM signed a Memorandum of Understanding (MOU) to support the plan. Management objectives for public lands pertinent to habitat assessment include (IDFG 1997:12):

> "1. Manage nesting and early brood habitat to provide 15-25% big sagebrush canopy cover and about 7 inches or more of grass and forb understory during the May nesting period.
>
> 2. Manage for late summer brood habitat that includes a good variety of succulent vegetation adjacent to sagebrush escape and loafing cover.
>
> 3. Manage for winter habitat that has sagebrush exposed under all possible snow depths. This can consist of low sagebrush (*A. arbuscula* or *A. nova)* and big sagebrush *(A. tridentata)* communities. A sagebrush canopy cover of 15-25 % with heights of 10-12 inches above the snow is critical to survival of sage grouse."

Local Sage Grouse Working Groups have been formed to "assist in development of sage grouse management efforts that achieve local population goals" (IDFG 1997, Appendix B). This framework is consistent with the public land habitat management objectives of the Idaho Sage Grouse Management

Plan and should help the local working groups with habitat-related issues for BLM-administered public lands.

III. Habitat Assessment Process

This assessment process is designed hierarchically to complement the step-down analysis direction associated with ICBEMP. It primarily provides guidance at the subbasin (mid-scale), watershed (fine-scale) and project or site-specific levels. Regional or large-scale information are discussed briefly. Information sources and assessment processes vary depending on the scale and project-specific needs.

A. Large-scale Information and Assessment Use

Large-scale sage grouse population and habitat data include information generated at the national and regional levels. Regional vegetation (e.g., GAP data) and sage grouse distribution maps, historical and current, are available from a variety of sources.

The ICBEMP provides general management direction at the regional scale and associated science documents provide additional sagebrush steppe and sage grouse information (Wisdom et al. 1999). Habitat restoration directions for rangelands (includes sagebrush steppe) are outlined and priority restoration subbasins have been identified. Directions are also provided for terrestrial source habitats in priority watersheds, which have also been identified.

B. Mid-Scale Information and Assessment Use

Subbasin reviews are intended to provide an understanding of how management activities in subbasins fit in with the broad-scale ecosystem and public land management emphasis. Broad habitat and population status and condition assessments are appropriate for this scale. Identifying important sage grouse habitats, existing and potential, is important at this level. More detail should be added at the watershed or site-specific levels as needed.

1. Idaho Sage Grouse Habitat Planning Map

Except for a few areas, suitable, current sagebrush steppe vegetation data are lacking to delineate existing and potential habitats at the sub-basin scale. Fires throughout southern Idaho change the landscape patterns so quickly that vegetation mapping efforts soon become obsolete unless updated regularly. Until current vegetation mapping data are available that can discern important vegetation community differences (e.g., sagebrush canopy cover classes, or differentiate perennial grasses from annual grasses or low density sagebrush areas) we will rely on more qualitative information suitable for subbasin planning needs. We have developed the "Sage Grouse Habitat Planning Map" to meet these needs (Appendix A describes mapping process). This map is not provided in this framework document but is available at all Idaho BLM offices and will be available on the Idaho BLM Internet site.

The general purpose of this map is to provide a relatively simple but widely applicable mid-scale, statewide map showing general habitat conditions. Historical and current sage grouse distribution and other habitat information were used to define extent of habitat areas. Five polygon types were used to describe sagebrush steppe habitats based on the following definitions:

Key Habitat Areas: These are generally large-scale, intact sagebrush steppe areas that provide sage grouse habitat.

Restoration Habitats: Areas that currently are or were historically sage grouse habitat that, if restored, would provide better habitat at some time in the future.

Restoration Type 1 (R1): Sagebrush-limited areas with acceptable understory conditions in terms of grass species composition. Includes native and seeded perennial grass rangelands. These are important areas to protect from wildfire and encourage sagebrush establishment and retention. Inexpensive management treatments may be needed (e.g., sagebrush and/or forb seedings).

Restoration Type 2 (R2): Existing sagebrush cover in these areas may or may not be adequate to meet the needs of sage grouse, but understory herbaceous conditions are poor. Undesirable plant species such as cheatgrass (*Bromus tectorum*), medusahead rye (*Taeniatherum caput-medusae*) or other exotic plants are common to dominant. Expensive management treatments are needed for restoration.

Restoration Type 3 (R3): Areas where junipers are encroaching into sage grouse habitat areas. Opportunities exist for improving habitat through appropriate fire management response, prescribed fire, chemical or mechanical means.

Linkage Habitat: Corridors or areas joining Key and/or Restoration Habitats, through which sage grouse currently move or may eventually move or occupy. Protection from wildfire is important, to facilitate sagebrush establishment or retention.

This map will be used for subbasin reviews or other mid-scale or state-wide planning efforts to:

a. Define the analysis areas for sage grouse in Idaho. *BLM activities outside of the areas identified as key or restoration areas will not be considered as existing or potential habitat for sage grouse.* This may not apply to other sagebrush obligate species.

b. Identify watersheds where sage grouse will be an important emphasis for land use management decision-making.

c. Plan and prioritize fire suppression, fuels management and prescriptive activities needed for habitat protection.

d. Plan and prioritize sage grouse large-scale habitat restoration efforts.

This map will be updated annually to keep information current. We fully anticipate that this map will become more refined as our information concerning sage grouse habitat improves.

2. Mid-scale Habitat Assessment Schedule for Ongoing Programs

Because of the large land area involved (>8 million acres of BLM-administered land in Idaho) sage grouse habitat assessments for ongoing programs such as livestock grazing permits will occur over several years. Therefore, it is important that the sequence of evaluations be systematically planned and

designed to address those regions where habitats are most important, most susceptible to change or have the greatest restoration potential. In addition, these priorities must be considered with other BLM management priorities such as ongoing Endangered Species Act and Clean Water Act compliance efforts. *We will use existing processes, the S&G 10-year implementation schedule or subbasin review schedules, to accomplish this melding of priorities and long-term assessment planning. BLM Districts will review these schedules and make necessary adjustments to address important sage grouse habitats and priority restoration areas.*

C. Fine-Scale Information and Assessment Use

Generally, fine-scale is geographically defined by watersheds (DOA/DOI 1995). However, in some cases the fine-scale information for sage grouse may more appropriately be collated at the allotment level depending on local needs. Allotments vary in size from as small as 40 acres to greater that 250,000 acres. In most areas, particularly where small allotments dominate the landscape watersheds should be the fine-scale assessment unit. However, in areas where large allotments (>100,000 acres) dominate the landscape then these may be appropriate fine-scale units. This flexibility allows for better integration of assessment and decision-making processes.

At this level, understanding land uses and the distribution, importance and spatial context of seasonal habitats on the landscape is important for designing appropriate and efficient site-level assessments. A variety of information sources should be reviewed at this level before going into the field for data collection. *It is important at this stage that known historic and existing breeding, brood-rearing and winter habitats are identified and mapped and the Sage Grouse Planning Maps further refined. Detailed mapping is not expected and Field Offices should use the best available information.*

1. Sage Grouse Lek Attendance Data

Current and historical lek information can help to define areas of management and evaluation emphasis. Connelly et al. (*in press*) recommends intensive habitat management for an area 3.2 km (2 miles) around leks for non-migratory populations and 18 km (11 miles) for migratory populations. Sage grouse in Idaho are mostly migratory (pers. commun. J. Connelly, IDFG; Connelly and Markham 1983, Gates 1983, Robertson 1991) and until radio-tagging studies indicate otherwise, we will address habitat needs of sage grouse assuming they are migratory. With this in mind, delineating nesting habitat using the 2-mile radius around an active lek must be applied with caution. This delineation may help to define areas of management emphasis but most remaining large tracts of sagebrush likely provide habitat. In addition, unless recent, intensive lek inventories have been completed historic leks will be used to define these important existing breeding areas where sagebrush vegetation is still dominant on the landscape. Idaho has large, remote areas of BLM-administered public lands that provide habitat but are difficult to inventory for sage grouse lek attendance.

2. Other Historic and Current Sage Grouse Observation Information

Besides leks, historic and current information on sage grouse observations associated with nesting, brood-rearing and wintering areas can be collated at the watershed scale, where available information from local citizens, agency files, and other sources should be used.

3. General Vegetation and Habitat Information

a. Breeding and Winter Habitats: At this scale sagebrush habitat availability and fragmentation patterns are important to consider in relation to the specific pasture or site you are evaluating. Refining the Sage Grouse Habitat Planning Map is important at this stage. Field Offices are not expected to do detailed vegetation mapping but rather make broad delineations based on readily available information. Efforts should be made to further delineate sagebrush steppe vegetation into the following cover types:

(1) **sagebrush/perennial grass areas:** areas with generally *at least* 5% sagebrush canopy cover and a native or seeded perennial grass understory,

(2) **sagebrush/annual grass areas:** areas with generally *at least* 5% sagebrush canopy cover and an annual grass unerstory,

(3) **perennial grasslands:** native or seeded grasslands with generally < 5% sagebrush canopy cover,

(4) **annual grasslands:** areas dominated by annual grasses with generally < 5% sagebrush canopy cover, and

(5) **juniper encroachment areas:** sagebrush or perennial grassland areas with juniper encroachment occurring.

There are a variety of information sources that can help delineate these areas and many are existing GIS data layers though availability varies between BLM Field Offices:

Ecological Site Inventory (ESI) maps
Soil maps
Historic wildlfires - files, maps and dates
Project files and maps of fire rehabilitation efforts
Fuels management files and maps
Project files and maps of land treatments (e.g., seeding and spraying projects)
Any available vegetation maps (e.g., GAP maps)
Aerial photography
Elevational models and topographic maps

b. Late Brood-rearing Habitat: A number of moist or mesic vegetation communities provide late-brood-rearing habitat. Sage grouse generally will move to higher elevations as summer progresses in search of succulent forbs and insects (Schroeder et al. 1999). For some areas this movement can be fairly dramatic (Connelly et al.1988, Connelly et al. *in press*). For other areas where nesting is occurring at higher elevations this movement may not be far. *At this scale it is important to delineate those brood-rearing areas on public lands that are potentially significant.* Field staffing constraints will limit ability to evaluate *all* potential late-brood-rearing habitats so that identifying those of particular concern is important at this stage. Wet meadow complexes, sagebrush areas adjacent to agricultural fields, perennial streams, and lakes, ponds or lakebeds with sagebrush in close proximity are typical late brood-rearing habitats. Riparian and wet meadow areas within very steep canyons are not used by sage grouse and

should not be considered brood-rearing habitat (pers.commun. J. Klott, BLM). Several information sources are important to use at this scale:

National Wetland Inventory (NWI) maps
Water rights files
Riparian Proper Functioning Condition (PFC) assessments and maps
Aerial photography, particularly color infra-red

Late brood-rearing habitats are diverse in terms of vegetation communities. The only common feature that distinguishes suitable brood-rearing habitats is that they are generally rich in forbs and insects (Schroeder et al. 1999, Connelly et al. *in press*). Soil disturbance may promote forbs over grasses and other rhizominous plants. However, this does not imply that riparian or wetland areas with downcutting, erosion and general dessication of the wetland or mesic community is preferred habitat for sage grouse (Connelly et al. *in press*). Availability of forbs in the late summer is the important common denominator of good brood-rearing areas.

At this scale existing information for certain late brood-rearing habitats can be used to improve efficiencies. Most perennial streams on BLM lands in Idaho have been evaluated for PFC with files and photographs (videography in some cases) available. In addition, water rights files contain pictures of developed and undeveloped water sources. This information should be reviewed to determine where field assessments may be warranted. Depending, existing information may be adequate for an assessment. *Generally, we will assume that riparian areas in PFC or functioning-at-risk with upward trend are meeting or moving towards meeting the habitat needs for sage grouse.*

4. General Land Use Information

At this scale some general public land use information can be helpful, dependent on the assessment needs. Such information includes, but not limited to:

Grazing allotment and pasture boundaries
Range improvement projects (e.g., spring developments, pipelines)
Developed recreation areas
Utility corridors
Military sites
Roads

5. Data Compilation

Preferably, as much of the fine-scale information as possible should be displayed on GIS-generated maps contingent on the availability of GIS support. Efforts to compile these data are ongoing throughout the State in cooperation with State and other federal agencies.

D. Project-level Information and Site Assessments

Project or site level assessments will involve either qualitative or quantitative data collection depending on management needs. The site level procedures are to be used for a variety of purposes including general habitat assessments to characterize current habitat conditions to project-specific evaluations that may be for an S&G evaluation of a grazing allotment, a proposed land exchange or proposed prescribed fire project.

Generally, allotment pastures will be a very important subset for any habitat assessment effort because:

a. Livestock stocking rates and seasons-of-use for individual pastures can affect existing sage grouse habitats. Habitat conditions within a particular cover type can vary greatly between pastures.

b. Livestock stocking rates and seasons-of-use for individual pastures can affect restoration potential and need to be considered in any restoration effort.

c. Pastures are the analysis unit for Rangeland S&G's already ongoing throughout Idaho and grazing decisions are usually specific to individual pastures.

1. Qualitative Versus Quantitative Assessment

This assessment framework allows considerable flexibility in data type and detail depending on local needs. Assessment field worksheets (Appendix B) can be filled out without quantitative data collection. While this flexibility is provided, biologists are encouraged to initially quantify all measurements to calibrate their visual estimation abilities. In addition, biologists should quantify their evaluations if issues for an area are complex or controversial. In these situations other information such as livestock utilization rates and patterns of use are important to also have. Random selection of evaluations sites is not required though for some areas this approach may be needed. In many cases, other data are available that should be used in conjunction with this evaluation process. By allowing for qualitative assessments, particularly for lower priority sites, more time and effort can be concentrated on in-depth assessments of the more complex areas. Site evaluation aids such as photo guides are being developed to assist in visual evaluations.

2. Site Selection

Information collated at the fine-scale level should be used to help select sites. However, at this level more detailed land use information should be reviewed prior to site selections, depending on needs. These information needs include, but are not limited to:

Area-specific fire and fire rehabilitation information
Livestock use information at the pasture level (class, stocking rates, season of use, utilization patterns)
Livestock watering sites in pasture or area of concern
Ecological Site Inventory data
Rangeland health and PFC assessments
Other land uses in the area of concern that may affect habitat conditions

Once the additional area-specific information is assembled for the area of concern, evaluation sites can be selected. The number of evaluation sites selected will vary depending on the landscape complexity and level of potential conflict. These sites should be selected by an interdisciplinary team. There are some general rules that will be followed in evaluation site location:

Breeding Habitat:

a. Sage grouse tend to nest more on flat to slightly sloping lands. Evaluation sites should not be located on steep slopes and slopes > 40% should not be considered nesting habitat (pers. commun., J. Connelly, IDFG).

b. Evaluation sites will be located at least 1/4 mile from livestock watering areas.

c. Where possible, existing key use areas set up for rangeland trend monitoring should be used but only if they're representative.

d. Generally, sage grouse nest in big sagebrush (*Artemesia tridentata spp.*). Small inclusions of big sagebrush within vast expanses of low sagebrush (*Artemesia arbuscula*) are common in many areas. These inclusions provide important nesting habitat while the surrounding low sagebrush sites may provide early brood-rearing habitat. In these situations it will be important to evaluate nesting conditions in the big sagebrush inclusions rather than the low sagebrush sites.

e. Where present, representative evaluation sites will be selected from the following major cover types (see Definition and discussion in previous section):

- sagebrush/perennial grass areas
- sagebrush/annual grass areas
- perennial grasslands
- annual grasslands
- juniper encroachment areas

Late Brood-rearing Habitat:

a. Important late brood-rearing sites identified at the mid-level should be evaluated. A variety of riparian, wetland and upland communities may provide brood-rearing habitat.

b. Riparian areas and wet meadows located in deep canyon areas will not be considered as late brood habitat (e.g., Bruneau River, Salmon Falls Creek, etc.).
c. Evaluation sites will not be located in designated livestock trailing stream crossings or water gaps.

Winter Habitat:

a. Low elevation, fragmented sagebrush areas may provide important winter habitat.

b. Winter and breeding habitat will overlap in many areas although low sagebrush areas associated with wind swept ridges are often used.

3. Evaluation Timing

Habitat assessments must be done at the proper time of year. For example, forbs in the sagebrush uplands are very important early in the year for nesting sage grouse hens and early broods. Forbs remain important through the summer though sage grouse will move to higher elevations and more mesic or wetland areas in search of forbs and insects.
Breeding Habitat: Habitat evaluations must be done in May-June as soon as broods are hatched. Timing within this 2-month time frame will vary depending on elevation and annual climatic conditions.

Late Brood-rearing Habitat: Evaluations must be done July - October, unless an adequate assessment can be done with existing data. Where late brood-rearing habitat may be a local habitat need or where controversy is anticipated, biologists are encouraged to conduct field assessments during the July-October period.

Winter Habitat: Evaluations can be done at any time since sagebrush distribution, cover and height are the only factors of concern.

Annual climatic conditions need to be noted on field forms. Winter and spring precipitation can affect annual forb abundance and cover during the breeding season.

4. Field Evaluation Matrices and Data Collection Methods

Field evaluation worksheets (Appendix B) for breeding, late brood-rearing and winter habitats were developed using the Sage Grouse Management Guidelines (Connelly et al., *in press*). For the purpose of standardizing evaluations, discrete ranges of numeric values were used for some habitat indicators to define suitable, marginal and unsuitable habitat. Suitable habitats meet the protective cover (sagebrush and herbaceous indicators) and food (forb indicators) needs of sage grouse while marginal and unsuitable habitat do not. Late brood-rearing and winter habitat matrices are mostly qualitative, emphasizing the need for succulent forbs during the summer and diversity of sagebrush densities and heights in the winter.

It is important to note that not all the indicators need to be in the "suitable habitat" category for a site to be considered as suitable. For example, if a site had suitable breeding habitat conditions for all indicators except sagebrush canopy cover (site had 30% canopy cover) then a site rating of suitable would be appropriate. However, if a site had suitable habitat conditions for all indicators except sagebrush canopy cover was only 5% then this site would be unsuitable since sage grouse must have sagebrush for nesting. Overall site evaluations will be based on best professional judgement with interdisciplinary involvement.

Quantitative field evaluation methods for the habitat indicators (canopy cover measurements, height measurements, etc.) are provided in Appendix C. These methods are consistent with guidance developed by an interagency technical team for rangeland vegetation monitoring (USDI 1996) and Field Office staffs are encouraged to reference this publication for additional guidance.

a. Breeding habitat: Nesting cover and food availability are key components of breeding habitat suitability. Generally, sagebrush stands with a robust understory of grasses and forbs provide excellent sage grouse habitat (Table 1).

Table 1. Nesting and early brood-rearing habitat features and indicators for the habitat assessment matrix.

Habitat Feature	Indicator	Suitable Habitat	Marginal Habitat	Unsuitable Habitat
Nesting Cover	Big sagebrush canopy cover	≥ 15% but ≤ 25%	10-14% or 26-35%	<10% or >35%
Nesting Cover	Big sagebrush height	15-30 inches	10-14 inches or 31-40 inches	<10 inches or > 40 inches
Nesting Cover	Big sagebrush growth form	Spreading form, few if any dead branches	Mix of spreading and columnar growth forms present	Tall, columnar growth form with dead branches
Nesting Cover	Herbaceous perennial grass and forb height	≥ 7 inches	5 - <7 inches	< 5 inches
Nesting Cover & Food	Perennial grass canopy cover	≥ 15%	5 - 14%	<5%
Nesting Cover & Food	Forb canopy cover	≥ 10%	5 - <10%	<5%
Food	Forb richness[1]	High	Low	Very low

[1]Relative to ecological site descriptions.

At this time it will be important to record any site potential considerations that affect suitability. There will be areas that have suitable sagebrush cover but soil conditions and/or dominant grasses provide for unsuitable nesting conditions (e.g., dominant grasses such as Sandberg's bluegrass (*Poa sandbergii*) may not have the growth form to meet perennial herbaceous height criteria). The evaluation worksheets provide for these notations, which will be very important later when evaluations are summarized at the project area level. Adequate justification as to site potential problems must be provided.

At least one field worksheet (Appendix B) will be filled out for each of the major cover types present within the project area of concern. If the area of concern has more than one pasture then at least one worksheet per cover type per pasture is required.

b. Late Brood-rearing Habitat: Food availability (forbs) is the primary habitat feature of importance to sage grouse brood-rearing areas. Healthy riparian, wet meadow and upland plant communities are important where these habitats provide the brood-rearing habitat. Forb abundance, diversity and availability are crucial. Agricultural fields can provide important sage grouse brood-rearing

habitat if good escape cover is nearby (Connelly et al. *in press*). In these cases sagebrush cover on adjacent BLM-administered lands will be the important habitat indicator. However, proximity of good escape cover is important for all brood-rearing areas.

Table 2. Late brood-rearing habitat features and indicators for the habitat assessment matrix.

Habitat Feature	Indicator	Suitable Habitat	Marginal	Unsuitable Habitat
Food	Riparian and wet meadow plant community	Mesic or wetland plant species dominate wet meadow or riparian area	Xeric plant species invading wet meadow or riparian area	Xeric plant species along water's edge or near center of wet meadow
Cover and Food	Riparian and wet meadow stability	No erosion evident; some bare ground may be evident but vegetative cover dominates the site	Minor erosion occurring and bare ground may be evident but vegetative cover dominates the site	Major erosion evident; large patches of bare ground
Food	Forb availability in uplands and wetland areas	Succulent forbs are readily available in terms of distribution and plant structure	Succulent forbs are available though distribution is spotty or plant structure limits effective use	Succulent forbs are not available due to site condition or plant structure
Cover	Proximity of sagebrush cover	Sagebrush cover is adjacent (< 100 yards) to brood-rearing area	Sagebrush cover is in close proximity (100 - 300 yards) of brood-rearing areas	Sagebrush cover is unavailable (> 300 yards).

Field worksheets (Appendix B) will be filled out for areas that were identified as important late brood-rearing areas during the watershed or fine-scale review. Recent, existing information (e.g., PFC assessment and photographs)should be used in conjunction with a field assessment and in some cases can be used instead of a field visit, where appropriate. However, availability of forbs during the summer and fall is the primary habitat feature of concern for these brooding areas and site visits are encouraged.

c. Winter Habitat: Sagebrush cover and availability during the winter are the most important habitat indicators for the food and cover needs of sage grouse (Table 3). Topographic features can provide additional variety of habitats.

Table 3. Winter habitat features and indicators for the habitat assessment matrix.

Habitat Feature	Indicator	Suitable Habitat	Marginal Habitat	Unsuitable Habitat
Cover and Food	Sagebrush canopy cover	10-30%	5- 9% or >30%	< 5%
Cover and Food	Sagebrush height	Normal height relative to site potential	Hedged shrubs, slightly shorter relative to site potential	Severely hedged shrubs and short relative to site potential

Field worksheet (Appendix B) can be filled out at any time and should, in many areas, use the same data set as that collected for the breeding habitat matrix. Wintering areas identified at the watershed or fine-scale should be evaluated. Breeding and winter habitat will overlap in many areas. It will be important to

remember in these areas that sagebrush cover needs in the winter are slightly different than during the breeding season. An area with sagebrush canopy cover exceeding 30% may not provide suitable nesting habitat but may provide important, suitable winter habitat.

5. Organizing Site Evaluations at the Project Area Level

For many public land uses (e.g., livestock grazing permits, habitat restoration projects) organizing the site assessments for the project area will be needed. For small or vegetatively uniform pastures one or two field evaluation sites will adequately characterize current habitat. However, for large and/or complex pastures multiple site evaluations may be necessary. It is important to remember that the purpose of these evaluations is to not only evaluate existing conditions but also provide information on restoration needs. An unsuitable rating for a pasture is not necessarily a "bad" evaluation or a negative reflection on management. For example, using this assessment process, a fire rehabilitation seeding with suitable grass and forb cover but unsuitable sagebrush cover would be classified as currently unsuitable sage grouse habitat. However, the habitat assessment would also indicate that the area may be a priority restoration site for sagebrush seeding. The fact that the grass and forb cover are in the suitable range also may indicate that livestock stocking rates and/or season-of-use would complement restoration goals and expenditure of restoration funds.

At this level organizing evaluations by seasonal use periods (breeding, late brood-rearing and wintering habitats), cover type and pasture is appropriate. Summary forms in Appendix D are provided to help in this regard.

IV. Data Management

As assessments are completed, information will be summarized at the District level. Habitat assessment progress will be collated on a state-wide basis annually concurrently with updating the sage grouse habitat planning map. This reporting process and a GIS-based data management system will be developed during FY 2000 while this framework is being field tested and reviewed.

V. Use of Assessment Framework in Decision-Making Processes

The purposes of and uses of this framework are to:

1. Identify important remaining sage grouse habitat areas and priority habitat restoration areas.

2. Evaluate and document existing sage grouse habitat suitability and habitat restoration needs.

3. Assist in evaluating land uses on public lands that may affect sage grouse habitat conditions or habitat restoration efforts.

4. Assist in evaluating attainment of pertinent land use plan objectives and Standard 8 of Idaho's Standards for Rangeland Health for sage grouse.

All Field Offices will use this assessment framework for subbasin reviews, watershed analyses, S&G evaluations, LUP evaluations, or any proposed projects that may affect existing or potential sage grouse habitat. Overall goals, consistent with LUPs and BLM policies will be to (1) protect and maintain existing suitable habitats, (2) improve degraded habitats to suitable conditions, and (3) restore habitats to suitable conditions, where most feasible and important for long-term recovery.

This habitat assessment framework does not address potential land uses that may directly affect the birds or their behavior and use of areas (e.g., transmission line mortalities, structures in or near leks or wintering areas that may provide perch sites for raptors). Additional instructions will be provided for these types of land uses and related potential effects.

VI. Definitions

Annual Grassland: Areas dominated by either cheatgrass or medusahead rye generally with less than 5% shrub canopy cover present.

Breeding Habitat: Leks, nesting and early brood-rearing occur in breeding habitats (Connelly et al. *in press*).

Condition: The state of historical, current, or potential elements. May be a quantitative or qualitative descriptor.

Habitat Indicator: Component or attribute of habitat that can be observed and/or measured that provides evidence of habitat suitability.

Juniper Encroachment Areas: Sagebrush or perennial grassland areas with juniper encroachment occurring.

Key Habitat Areas: These are generally large-scale, intact sagebrush steppe areas that provide sage grouse habitat. Term is used specifically for the Sage Grouse Planning Map.

Land Use Plan: Land use plans means a resource management plan or management framework plan, developed under the provisions of 43 CFR 1600. These plans are developed through public participation in accordance with the provisions of the Federal Land Policy and Management Act of 1976 and establish management direction for resource uses of public lands (43 CFR 4100).

Late Brood-rearing Habitat: Variety of habitats used by sage grouse from late June to early November. Habitats used include, but not limited to, meadows, farmland, riparian areas, dry lakebeds, sagebrush areas (Connelly et al. *in press*).

Lek: Breeding display area. For sage grouse, leks are usually open areas surrounded by sagebrush (Connelly et al. *in press*).

Perennial Grassland: Area dominated by perennial native or introduced grasses with generally less than 5% canopy cover of shrubs.

Proper Functioning Condition: Lentic riparian areas are functioning properly when adequate vegetation, landform, or debris is present to: dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality; filter sediment and aid floodplain development; improve flood-water retention and ground water recharge; develop root masses that stabilize islands and shoreline features against cutting action; restrict water percolation; develop diverse ponding characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterbird breeding , and other uses; and support greater biodiversity (USDI 1999).

Potential: (a) Capable of being, but not yet in exisitence; latent. (b) The ecological community that would be established if all successional sequences of its ecosystem were completed without additional human-caused disturbance under present environmental conditions; often referred to as "potential natureal community." (DOA/DOI, Regional Ecosystem Office 1995).

Sagebrush Areas: Areas with generally at least 5% sagebrush canopy cover.

Umbrella Species: Species with large area requirements, which if given sufficient protected habitat area, will also provide habitat for many other species (Noss 1990).

Watershed: Any area of land that drains to a common point. A watershed is smaller than a river basin or subbasin, but it is larger than a drainage or site. The term generally describes areas that result from the first subdivision of a subbasin, often referred to as a "fifth field watershed" (DOA/DOI, Regional Ecosystem Office 1995).

Winter Habitat: Sagebrush habitats that provide access to food and cover during the winter (Connelly et al. *in press*).

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Appendix A

Sage Grouse Habitat Planning Map Directions

SAGE GROUSE HABITAT PLANNING MAP

Objective

Create a relatively simple, widely applicable landscape-scale habitat map showing sage grouse distribution and general habitat conditions, using available information.

Purpose and Need

Concerns over sage grouse population trends and habitat quality or quantity have increased. Habitat mapping efforts have occurred or are occurring in certain areas, but techniques, scales, time-frames, and resolutions vary. Vast areas remain unmapped in terms of a consistent methodology that transcends administrative boundaries.

There is an immediate need for a single, overall spatial portrayal of general sage grouse habitat conditions in order for conservation planning to move forward. At present, it is not practical to wait for completion of vegetation mapping efforts before such a landscape-scale, general habitat map is created.

The Sage Grouse Habitat Planning Map will serve several purposes including:

1. Assisting field staff to quickly identify areas that sage grouse will be of primary concern, and those areas where sage grouse will not be an issue,

2. Generally outlining areas in need of restoration with respect to sage grouse habitat quality,

3. Serving as a tool for planning and prioritizing fire suppression, fuels management and prescription activities at the Field, District and State Office levels,

4. Graphically portraying the degree of sage grouse habitat fragmentation on the landscape,

5. Providing large scale information at the State-wide level on habitat conditions after merging of Field Office maps; and

6. Serving as an educational tool for explaining current sage grouse habitat conditions to resource users, cooperators, and interested parties.

Habitat Definitions with General Management Recommendations

Key Habitat Areas: These are generally large-scale, intact sagebrush steppe areas that provide sage grouse habitat. Small inclusions of perennial grasslands, either native or introduced, or other habitats (e.g., mountain mahogany) may be present.

Management recommendation: These areas are extremely important to protect from wildfire. Habitat conditions should be improved, where needed.

Note: Key Habitat Areas will, in many cases, encompass the extent of the circles created by inscribing the 2-mile buffer around leks or lek complexes, but may also include areas of intact habitat well beyond or between the buffer zones. In some cases, biologists may suspect sage grouse occupancy but documentation is lacking; this should not preclude classification as Key Habitat. Local biologists should

use professional judgement in determining the extent of the habitat polygons in such cases, with an explicit goal of conserving occupied and potentially occupied sage grouse habitat.

Restoration Habitats:

Restoration Type 1 (R1): Sagebrush-limited areas with acceptable understory conditions in terms of grass species composition. Includes native and seeded perennial grass rangelands.

Management Recommendation: Areas are very important to protect from wildfire and maintain or restore sagebrush and forb communities, where needed. Restoration costs are relatively inexpensive for these areas.

Note: Such areas are often a result of wildfires or seedings.

Restoration Type 2 (R2): Existing sagebrush cover in these areas may or may not be adequate to meet the needs of sage grouse, but understory herbaceous conditions are poor. Undesirable plant species such as cheatgrass (*Bromus tectorum*), medusahead rye (*Taeniatherum caput-medusae*) or other exotic plants are common to dominant. Expensive management treatments are needed for restoration.

Management Recommendation: Management treatments, such as prescribed fire, chemicals, or seeding are encouraged for certain R2 areas, contingent on site-specific analysis. Opportunities also exist for managing wildfire via Appropriate Management Response to achieve restoration objectives. Restoration can be very expensive.

Note: These areas often result initially from the expansion of invasive exotic herbaceous species into native or marginal seeded rangelands, and are then exacerbated and eventually maintained by frequent wildfire. Lack of direct management intervention will likely lead to perpetual dominance by the invasive species, a shortening of fire return intervals, and loss of shrubs, depending on the site.

Juniper encroachment areas (R3): Sagebrush areas that have juniper encroachment dominate the landscape.

Management Direction: Opportunities exist for improving sage grouse habitat quality and quantity through the use of Appropriate Management Response to wildfire, prescribed fire, chemical or mechanical means. Follow-up rehabilitation with seeding or chemicals may or may not be necessary, contingent on site-specific conditions.

Note: Some sage grouse habitats occurring at or near the sagebrush-steppe-juniper woodland interface are at risk to juniper encroachment or have already been rendered unsuitable for sage grouse due to juniper expansion. Retarding juniper expansion in such situations, with a goal of shrub-steppe restoration, may be advisable.

Linkage Habitat Corridors or areas joining Key and/or Restoration Habitats, through which sage grouse currently move or may eventually move or occupy.

Management recommendations: Protection from wildfire is extremely important for these linkage areas. Restoration efforts in Linkage Habitats, where needed, should be a priority emphasis.

Note: Certain areas or corridors may be used or hypothesized to be used primarily as movement corridors by sage grouse; or could be used as such if habitat conditions were adequate. Linkage areas are of particular concern to migratory sage grouse populations, which may winter and summer in areas separated by vast distances. Protection of intervening corridors may be important, even though breeding-nesting-brood rearing may not occur or have been documented there. The Linkage concept also has merit with respect to non-migratory (resident) sage grouse populations in fragmented habitats. Linkage habitats may not be relevant in all areas (e.g. large, contiguous shrub-steppe habitats), hence their inclusion in the map is contingent on recommendations by local biologists. In general, most linkage habitats will likely be characterized as one or more Restoration types or possibly as Key Habitat. Thus, in delineating a Linkage polygon,, it is important to first describe the appropriate habitat quality category (Key Habitat Area, R1, R2, R3); then, crosshatch or otherwise flag the particular Linkage polygon(s).

Map Preparation Process

1. Compile up-to-date sage grouse lek maps, data, and 1:100,000 land status maps. It is extremely helpful, but not necessary, to have these data available at the same scale (1:100,000) and a GIS plot of all historic and occupied leks. The term *occupied lek* as defined here is one where at least one strutting male has been documented in at least one of the past five years. While the *Guidelines for Management of Sage Grouse Populations and Habitats* (Connelly et al. *in press*) define an occupied lek as one attended by *two* or more males, in at least *two* of the past five years, this definition may be too restrictive in certain situations. Often it is logistically impossible to visit all leks each year, resulting in incomplete data. In a given five-year span, a particular lek may be visited only occasionally, in some cases only once or twice depending on accessibility. In other situations, especially at smaller leks, where counts of males have been in decline, documentation of even one male may be useful in describing the current distribution of breeding activity and delineation of associated habitats.

A 2-mile (3.2 km) radius around each lek, via GIS, helps to portray use *areas* as opposed to points (leks), and is a useful means of showing the general extent of potentially occupied breeding-early brood habitat, particularly for non-migratory populations. In addition, plotting the circular area for *occupied* leks using a distinguishing color (e.g. red) further helps to identify currently occupied areas from historically occupied areas. Since most sage grouse in Idaho are or may be migratory, biologists should use available data and professional judgement in defining Key Habitat Areas and not limit their delineation to the 2-mile radius around known historic and current leks.

2. Meet with local federal and state biologists to delineate existing Key Habitat Areas, Restoration and Linkage Habitat polygons onto the 1:100,000 land status maps. The intent is to develop a broad, landscape-scale map so polygons will usually be very large depending on habitat heterogeneity and the biologist's knowledge of the area. Landscapes with a fragmented ownership pattern or complex mix of rangeland-agricultural interfaces may include smaller polygons, as deemed appropriate.

3. After delineating polygons, coordinate with GIS staff to create mylars and digitizeor scan the polygons into a GIS. Create one theme for the Linkage polygons, and one encompassing the exist habitat and restoration polygons. This will allow users to overlay Linkage areas onto the existing habitat and restoration habitat polygons, as needed. For consistency between Field Offices, color code Key Habitat

Areas as Red; R1 habitats as light green; R2 habitats as medium green; R3 habitats as dark green; and linkage zones as crosshatching. Field Office GIS staff should coordinate closely, to ensure the use of identical colors, layouts etc. to facilitate merging of maps at District and Statewide scales.

4. Develop and plot planning maps at appropriate scales, (1:100,000 scale or higher). Since the map polygons were initially delineated at 1:100,000 scale, and specific polygon boundaries are thus somewhat subjective, creation of finer scale (e.g. 1:24,000) maps will proportionally amplify errors. Additional detail can be added at finer scales (e.g., delineating sagebrush-dominated annual grasslands from annual grasslands without shrubs).

5. Store GIS data and 1:100,000 maps in safe, accessible location. These maps will be updated annually to incorporate new habitat information, make corrections and changes due to fires or other land use changes.

Appendix B

Field Assessment Worksheets

Sage Grouse Habitat Assessment Worksheet - Breeding Habitat (5/23/01)

Date:	Project or Allotment Name/#:	
Pasture Name/#:	Site #:	FO:
Legal Description: T. R. Section , 1/4, 1/4		GPS File #:
Evaluator(s):	Ecological Site:	
Site Info. (circle one): Arid Site, Mesic Site	UTM:	
Landscape Site (circle one): Key Habitat , R1, R2, R3		
Cover Type (circle one): Sagebrush, Perennial Grassland (native, introduced), Annual Grassland with Sagebrush, Annual Grassland, Juniper Area		

Habitat Indicator	Suitable Habitat		Marginal Habitat		Unsuitable Habitat	
Average Sagebrush Canopy Cover	≥ 15% but ≤ 25%		10-<15% or >25%		<10%	
Average Sagebrush Height Mesic Site Arid Site	 15-30" 12-30"		 10-14" or > 30" 10-11" or >30"		 <10" <10"	
Sagebrush Growth Form	Spreading form, few, if any, dead branches for most plants		Mix of spreading and columnar growth forms present		Tall, columnar growth form with dead branches for most plants	
Average Grass and Forb Height	≥ 7"		5 - < 7"		< 5"	
Average Perennial Grass Canopy Cover Mesic Site Arid Site	 ≥ 15% ≥ 10%		 5 - <15% 5 - <10%		 <5% < 5%	
Average Forb Canopy Cover Mesic Site Arid Site	 ≥ 10% ≥ 5%		 5 - <10% 3 - <5%		 < 5% < 3%	
Preferred Forb Abundance and Diversity[1]	Forbs common with at least a few preferred species present		Forbs common but only 1 or 2 preferred species present		Forbs rare to sparsely present	
Overall Site Evaluation						

Rationale for Overall Rating and Comments:

Comments on Restoration Potential:

[1]**Relative to site potential and site guides.**

General Directions:

5. Sites should be located on flat to slightly sloping lands. Slopes greater than 40% are unsuitable nesting habitat.

6. Breeding habitat must be evaluated as close to the end of nesting as possible (May- June). For low elevation areas this will be May, for higher elevation areas it will be June.

7. Precipitation can affect annual forb growth - if precipitation is an interpretation factor then this should be noted in the comment section.

8. Good nesting habitat may be provided disproportionately in small inclusions of big sagebrush surrounded by low sagebrush. In these situations nesting conditions should be measured in the big sagebrush patches. However, the low sagebrush community likely provides important pre-nesting and early brood-rearing habitat and should be evaluated for the forb composition indicators (canopy cover, abundance and diversity).

Worksheet Directions:

1. Fill out all site location information at top of sheet. Most of the information should be self explanatory except for the following:

   Arid Site = Sites are generally in the 10-12" precipitation zone and *Artemesia tridentata wyomingensis* is the common big sagebrush sub-species in the area.

   Mesic Site = Sites are generally in a >12" precipitation zone and *Artemesia tridentata vaseyana* is the common big sagebrush sub-species in the area.

2. A. Each indicator must be marked as either suitable, marginal or unsuitable.
   B. Numeric values should be written in when quantitative data are collected and recorded on provided field data forms.
   C. The Site Preferred Forb Abundance and Diversity Form should be used to determine preferred forb abundance and diversity suitability.
   D. Qualitative evaluations should only have a in the box.

3. If site potential is a factor for an indicator being either marginal or unsuitable put an asterisk (*) by the indicator and discuss in the comments section. Referencing site potential as per the site guides is recommended.

4. Overall site evaluation is based on professional judgement, not all indicators need to be in the suitable range for an overall suitable evaluation. Where needed, explain rationale in comments section.

5. There will be unique field situations that will need professional judgement in data interpretation for the evaluation form. The most obvious example of a unique situation is illustrated by a site dominated by Sandberg's bluegrass. Due its density on the site it could skew the average height measurements of grasses downward even though the site has good nest screening cover present. A site dominated by short statured forbs such as Hood's phlox could also have the same skewing effect on the data. In these situations the biologist must use his/her professional judgement and explain the rationale for the data interpretation as it pertains to sage grouse habitat needs.

6. If site potential is a factor for an overall evaluation of marginal or unsuitable put an asterisk(*) after "Overall Site Evaluation" in the last row. Explain rationale in notes section.

7. Attach field data sheet(s) used for this site evaluation.

Sage Grouse Habitat Assessment Worksheet - Late Brood-rearing (5/23/01)

Date:	**Project or Allotment Name/#:**	
Pasture Name/#:	**Site #:**	**FO:**
Legal Description: T. R. Section , 1/4, 1/4		**GPS File #:**
Evaluator(s):	**Ecological Site:**	**UTM #**
Landscape Site (circle one): Key Habitat , R1, R2, R3		
Site Description (circle one): riparian area/perennial stream, riparian area/intermittent stream, wet meadow, lakebed, upland sagebrush site		

Habitat Indicator	**Suitable Habitat**		**Marginal Habitat**		**Unsuitable Habitat**	
Riparian and Wet Meadow Communities:						
Riparian and wet meadow plant community	Mesic or wetland plant species dominate wet meadow or riparian area		Xeric plant species invading wet meadow or riparian area		Xeric plant species along water's edge or near center of wet meadow	
Riparian and wet meadow stability	No erosion evident; some bare ground may be evident but vegetative cover dominates the site		Minor erosion occurring and bare ground may be evident but vegetative cover dominates the site		Major erosion evident; large patches of bare ground	
Forb availability	Succulent, green forbs are readily available in terms of distribution and plant structure		Succulent, green forbs are available though distribution is spotty or plant structure limits effective use		Succulent, green forbs are scarce or not available	
Proximity of sagebrush cover	Sagebrush cover is adjacent to brood-rearing area (<100 yards)		Sagebrush cover is in close proximity (> 100 yards but < 300 yards) of brood-rearing areas		Sagebrush cover is unavailable (> 300 yards)	
Overall Riparian/Wet Meadow Site Evaluation						
Upland Sagebrush Communities:						
Forb availability	Succulent, green forbs are readily available in terms of distribution and plant structure		Succulent, green forbs are available though distribution is spotty or plant structure limits effective use		Succulent, greeen forbs are scarce or not available despite favorable growing conditions	
Overall Upland Site Evaluation						

Comments:

General Directions:

8. Worksheet should be filled out for areas identified as important late brood-rearing habitats during fine-scale review.

9. Riparian areas and wet meadows located in deep canyon should not be considered brood-rearing habitat.

10. Evaluation sites should not be located in designated livestock stream crossings or water gaps.

Worksheet Directions:

1. Site Description: Identify what type of habitat is being evaluated.

2. Put a in the appropriate suitability category for each indicator that best describes the site.

3. Forb availability and plant structure:

   A. In some cases forbs may be present on the site but trampling or grazing intensity may affect availability.

   B. Upland sites should only be evaluated if green, succulent forbs are present at the time of the site visit. Evaluating an area after forbs have desicated is not advised even if site may provide late brood-rearing habitat

Sage Grouse Habitat Assessment Worksheet - Winter Habitat (5/23/01)

Date:		**Project or Allotment Name/#:**		
Pasture Name/#:		**Site #:**	**FO:**	
Legal Description: T. R. Section , 1/4, 1/4,			**GPS File #:**	
Evaluator(s):		**Other Location Info.:**		
Ecological Site:		**UTM:**		
Landscape Site (circle one): Key Habitat , R1, R2, R3				
Site Description:				
Habitat Indicator	**Suitable Habitat**	**Marginal Habitat**	**Unsuitable Habitat**	
Sagebrush canopy cover	10-30%	5- 9% or >30%	< 5%	
Sagebrush height (availability during the winter)	Generally tall or a diversity of sagebrush heights present relative to species and site potential	Some tall plants but generally more moderate to short plants relative to species and site potential	Poor height diversity with generally short plants relative to species and site potential	
Overall Site Evaluation				
Comments:				

General Directions:

1. Form should be completed for areas that were identified as winter areas during the fine-scale review.

Worksheet Directions:

1. Site Description: provide a brief description of the site.

2. Sagebrush Canopy Cover: Insert the canopy cover into the appropriate suitability box. If it was measured using line intercept or line point transect put in the measured value. If you visually estimated the percent then use the .

3. Sagebrush Height: Measuring sagebrush heights above the snow during the winter would be difficult for many areas. Since the evaluation site is located in a known or suspected wintering area sagebrush heights in the area relative to sagebrush species and ecological site is an important habitat indicator. Put a in the appropriate suitability category that best describes the site.

Appendix C

Field Methods

Protocol for Line Intercept Transect and Daubenmire Frames (5/23/01)

Equipment:

Tape, 100-foot
Stakes for tape (at least two spikes; old, medium-large screwdrivers work well)
Daubenmire frame 20 x 50 cm
Yardstick (for measuring shrub and grass/forb heights)
Compass
Random numbers table, wristwatch with second hand, or calculator with random function etc.
Camera and print film, extra camera battery; extra film.
Photo cards and markers; or small dry-erase board and marker
Topographic map with project area, general cover types, and pasture boundaries delineated
Aerial photographs
Soil Survey/Ecological Site Guides
GPS unit
Pencils
Colored pencils for sketching plant communities
Calculator

Protocol:

1. Sites have been selected stratified by major cover type and pasture (see framework document for directions).

2. Randomly select a compass azimuth, using a random numbers generator, wristwatch with second hand, or other objective means. Make sure transect is at least 0.25 miles from disturbances such as roads, water sources etc.

3. Anchor a 100-foot tape with a stake (spike, screwdriver, etc.) and extend it snugly along the random azimuth. Secure end with a second stake.

4. As a minimum, accurately locate the transect's location on a 1:24000 USGS map. Use GPS and differentially correct if at all possible. It will be important to be able to return to the area for follow up monitoring or photos in some instances.

5. On the data form, record shrub canopy cover by species using the line intercept method. Record cover increments to the nearest 0.1 ft or other convenient increment (e.g., inches). Record only live (green) canopy. Ignore spaces or gaps in the canopy less than 2 inches across. Gaps in the live canopy in excess of 2 inches will not be included as canopy intercepts. It may also be helpful to separately record dead/decadent shrub cover if it appears to be a significant component of the community; however only live sagebrush cover will be of consequence to the habitat assessment for sage grouse.

6. At each 5-foot increment along the tape:

   a. Place a 20 x 50 cm Daubenmire frame (n=20 plots per transect). For each plot, estimate and record cover for perennial grasses, annual grasses, perennial forbs, annual forbs. Note predominant species.

   b. Record the height of the nearest sagebrush plant.

   c. At each 5-foot increment point record the maximum "natural" or droop height of the nearest perennial grass or perennial forb within a 2.5-foot, 180^0 arc around the point that ends at the tape line. [Natural = the highest point of a leaf or seed stalk is measured with no straightening by the observer]. This includes seed stalks when they contribute to the body of the plant that provides screening cover. There will be instances (e.g., certain *Poa* spp.) when only a few, sparse seed stalks are present and extend well above the body of the plant that provides the cover.

In these cases the bulk or droop height of the plant *exclusive of the seed stalks* should be measured. This will require some professional judgement on the part of the biologist. If no plants are within this arc then record a dash and move on to the next point.

7. Summarize data at the bottom of each form.

8. Photographs. At least one photograph must be taken at each transect/ evaluation area. Photos will prove invaluable in locating evaluation areas in subsequent years. They will also be of substantial utility in the office when preparing evaluation documents and documenting habitat condition.

a. Complete a Photo Card, showing, as a minimum, the date, location, allotment, and sagebrush canopy cover percentage.

b. With the photo card near the "zero" end of the tape, take a general photo of the area, sighting down the tape from eye level, showing landmarks in the background, if possible.

c. In a representative location along or near the tape, place the photo card near the base of a sagebrush plant, and take a tangential close-up photo from near ground level (2-3 ft) toward the shrub/ground interface, to document herbaceous conditions and cover.

d. Optional: take one or more other close-ups or panoramic photos as needed.

9. Depending on the complexity of the evaluation area, several line transects within a cover type may be necessary to characterize the area using this technique.

10. Complete the Site Preferred Forb Abundance and Diversity Form.

Line Intercept and Daubenmire Frame Data Form for Sage Grouse Evaluations (5/23/01)

Date:	Project or Allotment Name/#:	
Pasture Name/ #:	Site #:	FO:
Legal Descript.: T. R. Section , 1/4, 1/4,	UTM:	
Other Location Info.:	Ecological Site:	
Examiner(s):	Transect Length:	GPS File:

Shrub Line Intercept Canopy Cover

Shrub Species	**Intercept (feet or other suitable increment)**	**Total**	**% Cover**
	All Shrubs		

Daubenmire Cover Class & Vegetation Height Data (recorded at 5-foot intervals)

Cover Type	Estimated Cover Class for Each Plot*																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Perennial Grass																				
Annual Grass																				
Perrenial Forb																				
Annual Forb																				
*Cover Classes: 1=0-5%, 2=6-15%, 3=16-25%, 4= 26-50%, 5=51-75%, 6=76-95%, 7=96-100%																				

Cover Type	**Vegetation Height for Each Plot (record to nearest 1 inch)**																			
Big Sagebrush																				
Other Sagebrush spp.																				
Perennial Grass																				
Perennial Forb																				

Summary

Cover Class:	Sagebrush:	P. Grasses:	Perennial & Annual Forbs:	
		Annual Forbs:	P. Forbs:	A. Grasses:
Vegetation Height:	Sagebrush Avg. Ht.		Perennial Grass Avg. Ht. (Optional):	
	Perennial Grass and P. Forb Avg. Ht.:		Perennial Forb Avg. Ht. (Optional):	

Line-Point Intercept Method (transect or step-point techniques) (5/23/01)

Equipment:

Tape, 100-foot (optional)
Stakes for tape (at least two spikes; old, medium-large screwdrivers work well)
Pin flag or Pointer or Other Point Intercept Device: straight piece of wire or rod at least 30" long and less than 2.5mm in diameter. (see Appendix XX for photos)
Yardstick (for measuring shrub and grass/forb heights)
Compass
Random numbers table, wristwatch with second hand, or calculator with random function etc.
Camera and print film, extra camera battery; extra film.
Photo cards and markers; or small dry-erase board and marker
Topographic map with project area, general cover types, and pasture boundaries delineated
Aerial photographs
Soil Survey/Ecological Site Guides
GPS unit
Pencils
Colored pencils for sketching plant communities
Calculator

Protocol:

Sites have been stratified by major cover types and pastures prior to field evaluation (see framework document for more directions).

If you use a tape:

1. Anchor the tape with a steel pin and pull tape out 100 feet. Keep tape as taught and straight as possible. Anchor tape on far end.

2. Begin at "0" end of tape.

3. Every 2 feet drop the pin flag or pointer to the ground so that it falls precisely vertically and touches the near side of the tape at the correct mark (every 2 feet for 50 marks).

4. Record the species when possible using the scientific name acronyms (e.g., *Artemesia tridentata wyomingensis* = ARTRw). When this can't be done use the following abbreviations: S = Shrub; PG = Perennial Grass; PF = Perennial Forb; AG = Annual Grass; AF = Annual Forb.

5. Canopy Cover and Measurements:

   A. Start by recording the plant with the highest leaf or stem touching the pin. Record only live canopies of shrubs and live or residual cover of herbaceous plants (remember that residual plant cover can be very important for sage grouse nesting) under the "Species" column using the species acronyms.

   B. Record the next plant with the next highest live leaf or stem touching the pin as described in Step 4. Record these under the "Species" column within the "Lower Layers" columns.

6. Height Measurements:

A. Shrubs: Record the maximum height of the shrub that is touched by the pin.

B. Perennial Grasses and Forbs: Record maximum "natural" or droop height of the perennial grass or perennial forb. [Natural = the highest point measured with no straightening by the observer]. This includes seed stalks when they contribute to the body of the plant that provides screening cover. There will be instances (e.g., certain *Poa* spp.) when only a few, sparse seed stalks are present and extend well above the body of the plant that provides the cover. In these cases the maximum droop height of the plant *exclusive of the seed stalks* should be measured. This will require some professional judgement on the part of the biologist (see illustration).

7. Proceed to next point or intercept and repeat.

8. Review the data for sample size adequacy, particularly the grass and forb heights. If data are insufficient for a good sample size then the transect should be extended another 100 feet or 50 points (or to whatever is necessary).

9. Summarize data at the bottom of each form. Only one hit per lifeform per point can be used in the summary.

Sagebrush Canopy Cover = # of sagebrush hits divided by the total number of transect points.
PG Canopy Cover = # of perennial grass hits divided by total number of transect points
Forb Canopy Cover = # of perennial and annual forb hits divided by total number of transect points. There may be instances where a perennial and annual forb hit is recorded for one point. In these instances the upper layer hit is the only one that should be included for that point in calculating combined cover.
Annual Grass Canopy Cover = # of annual grass hits divided by total number of transect points
Annual Forb Canopy Cover = # of annual forb hits divided by total number of transect points
Other Shrub Canopy Cover = # of shrub hits divided by total number of transect points.

Avg. Sagebrush Height = sum total of all sagebrush recorded heights divided by total number of sagebrush measured.
Avg. Perennial Grass and Perennial Forb Heights Combined (Avg. PG&PF Heights) = sum total of all perennial grass and perennial forb recorded heights divided by total number measured.
Avg. Perennial Grass Height = sum total of all perennial grass recorded heights divided by total number of perennial grass measured.
Avg. Perennial Forb Height = sum total of all perennial forb recorded heights divided by total number of perennial forb measured.

10. Photographs. At least one photograph must be taken at each transect/ evaluation area. Photos will prove invaluable in locating evaluation areas in subsequent years. They will also be of substantial utility in the office when preparing evaluation documents and documenting habitat condition.

a. Complete a Photo Card, showing, as a minimum, the date, location, allotment, and sagebrush canopy cover percentage.

b. With the photo card near the "zero" end of the tape, take a general photo of the area, sighting down the tape from eye level, showing landmarks in the background, if possible. A cover board or meter stick should be in the picture for a frame of reference.

c. In a representative location along or near the tape, place the photo card near the base of a sagebrush plant, and take a tangential close-up photo from near ground level (2-3 ft) toward the shrub/ground interface, to document herbaceous conditions and cover. A cover board or meter stick should be in the picture for a frame of reference.

d. Optional: take one or more other close-ups or panoramic photos as needed.

11. Complete the Site Preferred Forb Abundance and Diversity Form.

If you use step-point method:

1. Determine the number of paces between points prior to starting. If the area you are evaluating is large then you may want to have more paces between points in order to cover more land area.

2. Select a focal point on the horizon to focus on.

3. Take the selected number of paces toward the focal point staying on a straight line. You must walk in a straight line and maintain a constant pace length through sagebrush or other shrubs. If this is difficult to do because of shrubs heights, it's recommended that you use a tape to help you stay on a straight line. Drop the pin flag just out from the tip of your foot so that it falls precisely vertical.

4. Follow direction 4-11 under the above line transect directions.

Line Point Transect Data Form for Sage Grouse Evaluations (see directions provided) (5/23/01)

Date:	Project or Allotment Name/#:		
Pasture Name/ #:	Site#:	FO:	GPS File:
Legal Description: T. R. Section , 1/4, 1/4		UTM #:	
Cover Type:	Ecological Site:	Tape or Pace Transect? (circle one)	
Examiner(s):	Location Info.:		

Points	Top Layer Hits		Lower Canopies				Points	Top Layer Hits		Lower Canopies			
			Layer 2 Hits		Layer 3 Hits					Layer 2 Hits		Layer 3 Hits	
	Species	Heightt	Species	Height	Species	Height		Species	Height	Species	Height	Species	Height
1							26						
2							27						
3							28						
4							29						
5							30						
6							31						
7							32						
8							33						
9							34						
10							35						
11							36						
12							37						
13							38						
14							39						
15							40						
16							41						
17							42						
18							43						
19							44						
20							45						
21							46						
22							47						
23							48						
24							49						
25							50						

DATA SUMMARIES FOR ASSESSMENT WORKSHEET (see directions)

Sagebrush Canopy Cover	Avg. Sagebrush Height	Avg. PG&PF Heights	PG Canopy Cover	Forb Canopy Cover
Hits_____, %_____			Hits_____, %_____	Hits_____, %_____

OPTIONAL DATA SUMMARIES (see directions)

Annual Grass Cover	Annual Forb Cover	Avg. Perennial Grass Height	Avg. Perennial Forb Height	Other Shrub Cover
Hits_____, %_____	Hits_____, %_____			Hits_____, %_____

Site Preferred Forb Abundance and Diversity Form for Sage Grouse Evaluations (5/23/01)

Date:	Project or Allotment Name/#:	Ecological Site:
Pasture Name/ #:	Site#:	Examiner(s):
Legal Descript.: T. R. Section , 1/4, 1/4	GPS File#	UTM:

Sage Grouse Preferred Forbs	**Rare**	**Sparse**	**Common**
Broomrape (*Orobanche* spp.)			
Composites			
Daisies (*Erigeron* and *Aster* spp.)			
Dandelion, C.(*Taraxacum officinale*)			
Dandelion, Mt. (Agoseris spp.)			
Hawksbeard (*Crepis* spp.)			
Microsteris (*Microseris* spp.)			
Prickly lettuce (*Lactuca serriola*)			
Salsify (*Tragopogan dubius*)			
Desert-parsley (*Lomatium* and *Cymopterus*)			
Everlasting (*Antennaria* spp.)			
Groundsmoke (*Gayophytum* spp.)			
Knotweed (*Polygonum* spp.)			
Legumes (other than *Lupinus* spp.)			
Alfalfa (*Medicago* spp.)			
Bird's foot tre-foil *(Lotus* spp.)			
Clover (*Trifolium* spp.)			
Sweet clover (*Melilotus* spp.)			
Sweet vetch (*Hedysarum* spp.)			
Vetch (*Vicia* spp.)			
Milkvetch (*Astragalus* spp.)			
Peppergrass (*Lepidium* spp.)			
Phlox (*Phlox* spp.)			
Prairie star flower (*Lithophragura* spp.)			
Yarrow (*Achillea millifolium*)			
Other Forbs / Noxious Weeds:			
Comments on Abundance and Diversity:			

Site Summary (see directions)	Suitable	Marginal	Unsuitable
Circle One of the Following:	Forbs are common with at least a few preferred species present	Forbs are common but only 1 or 2 preferred species present	Forbs are rare to sparsely present

Directions:

1. Walk around the area and observe the relative abundance and diversity of forbs. Subjectively put observed forbs into one of the abundance criteria:

Rare
Sparse
Common

The expected abundance of forbs is related to the ecological site and biologists are encouraged to visit reference areas and refer to site guides for calibration.

2. Determine the overall site evaluation by circle one of the suitability categories. It is important to remember that a site may have several preferred forbs present that are only rare or sparsely distributed. These sites may be suitable due to the combined abundance of the species and the species diversity. Species diversity determines the difference between suitable and marginal. Unsuitable sites are lacking in abundance and diversity.

Appendix D

Site Evaluations Summary Form

Sage Grouse Habitat Summary Evaluation Sheet

Date:			Project or Allotment Name/#:				
Project Description:							
Recorder:			FO:		5th HUC #:		
Habitat Use Period	Pasture/ Site No.	Cover Type	Dominant Species	Ecological Site	Habitat Evaluation Results	Site Potential Limiting? (Y/N)	Estimated % of Project Area

Directions:

Summarize information from the field worksheets using this form.

Date: Date this form was filled out.

Project or Allotment Name: Identify project or allotment being evaluated.

Watershed (5th HUC): Identify the watershed(s) that the project is in.

Project Description: Describe the project (e.g., S&G evaluation, prescribed fire project; restoration project, land exchange, etc.).

Habitat Use Period: Use one of the following: Breeding (B), Brood-rearing (BR), Wintering (W).

Pasture/Site No.: Should correspond with Field Worksheet Pasture and/or Site Numbers.

Cover Type: Use one of the following or other unique descriptor: Sagebrush (SG), Perennial Grassland - native (PGN), Perrenial Grassland - Seeded Non-native (PGS), Annual Grassland (AG), Annual Grassland with Sagebrush Cover (AGSG), Juniper (J), Riparian (R), Wet Meadow (WM), Lakebed (LB), Spring (SP). Should correspond to habitat type on Field Worksheet.

Dominant Species: List the primary shrub and/or understory grass species. Intended for upland areas. Optional for brood-rearing habitats. Use species codes.

Ecological Site: Use appropriate name of ecological site descriptor from site guidesor soil surveys (upland sites only).

Habitat Evaluation Results: Transfer site evaluation summary from Field Worksheets here: Suitable (S), Marginal (M) or Unsuitable (US).

Site Potential Limiting ? (Y/N): Indicate here if site potential limits achieving suitable habitat objectives. Response needed for all sites identified as marginal or unsuitable habitats.

Estimated % of Pasture or Project Area: Estimate based on available information.

APPENDIX B-2
SAGE-GROUSE HABITAT ASSESSMENT

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ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
BLM	U.S. Bureau of Land Management
DEIS	Draft Environmental Impact Statement
GAP	Gap Analysis Program
GIS	geographic information system
I-82	Interstate 82
JBLM YTC	Joint Base Lewis-McChord Yakima Training Center
kV	kilovolt
MR	Manastash Ridge Subroute
NNR	New Northern Route
POWER	POWER Engineers, Inc.
ROW	right-of-way
USGS	U.S. Geological Survey

1.0 INTRODUCTION

Pacific Power proposes to construct, operate and maintain a new 230 kilovolt (kV) transmission line in the south-central portion of Washington State from the Vantage Substation near the Wanapum Dam to the Pomona Heights Substation near Selah, Washington. The original proposed project analyzed in the Draft Environmental Impact Statement (DEIS) consists of three route alternatives (consisting of 10 variations) approximately following the southern and eastern flanks of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). In April, 2013 the New Northern Route (NNR) was identified (hereafter Preliminary-NNR). Vegetation and grouse surveys were conducted on accessible portions of the route during May to July, 2013. Subsequent to the field surveys, routing adjustments were made due to new requirements for separation distance from existing transmission lines and concerns about sage-grouse. The locations of the NNR and Manastash Ridge (MR) Subroute were finalized in November, 2013. The Final-NNR passes through the northern portion of the JBLM YTC and then south along the west side of Interstate 82 to the Pomona Heights Substation. The MR skirts Manastash Ridge, west of Badger Hollow in the northwestern portion of the JBLM YTC (Figure 1). To facilitate analysis and discussion the new routes are broken into eight NNR segments (NNR-1 through NNR-8) and one MR segment (MR-1).

A greater sage-grouse (*Centrocercus urophasianus*) habitat assessment was conducted on each of the route alternatives. In 2011, the three southern alternatives were assessed using a combination of quantitative ground-based surveys (on accessible public lands) and analysis of remote-sensing data (on inaccessible private lands). The details of the methods and results are described in the Sage-grouse Habitat Assessment in Appendix B-2 of the Vantage to Pomona Heights DEIS (POWER 2011). The Final-NNR and MR were assessed in 2013 using a blend of remote sensing data and field data collected during vegetation and grouse surveys conducted on the Preliminary-NNR during May-July, 2013.

2.0 METHODS

Greater sage-grouse habitat assessments in the NNR and MR rights-of-way (ROW) were conducted in 2013 by using a combination of remote sensing data and field data collected during vegetation surveys conducted May 13-23, 2013 and July 25-27, 2013 (POWER 2013a), and sage-grouse walking transect surveys conducted May 18-21, 2013, and June 29-July 1, 2013 (POWER 2013b).

Breeding (nesting and early brood-rearing), summer (late-brood rearing), and winter habitat suitability was mapped within a 150-foot corridor along the NNR and MR (the final ROW will vary from 120 feet to 150 feet wide). Areas were designated as suitable, marginal, or unsuitable for each of the three seasonal habitat types. Determinations of suitability were made by qualitatively assessing the habitat indicators described in the U.S. Bureau of Land Management's (BLM's) Sage-Grouse Habitat Assessment Framework (Stiver et al. 2010). BLM's habitat indicators are adapted from and similar to previously published habitat indicators (Connelly et al. 2000; Sather-Blair et al. 2000; Hagen et al. 2007) that have been in wide use for over a decade and were used during the 2011 sage-grouse habitat assessments of the southern alternatives (POWER 2011). Habitat determinations were driven largely by sagebrush cover, and general understory character (e.g., areas dominated by annual grasses were not considered suitable breeding or summer habitat). Wherever supported by data, the other habitat indicators (Stiver et al. 2010) were used as well (e.g., sagebrush height, sagebrush growth form, perennial grass and forb heights and cover, preferred forb availability).

It was necessary to supplement the field data with remote sensing data because portions of the proposed ROW on non-federal lands were not accessible, portions of the ROW were adjusted due to

decreased line separation requirements that allowed the proposed NNR and the existing Pomona-Wanapum line to be placed closer together, or were new locations identified after the field visits. Specifically, while the majority of the Final-NNR route within segments NNR-1, NNR-2, and NNR-8 remained unchanged (a small portion of the Final-NNR in these segments deviates by about 30 meters from the Preliminary-NNR), the majority of the portion within segments NNR-3, NNR-4, and NNR-5 deviates by approximately 30 meters, and the majority of the route within segments NNR-6 and NNR-7 deviates by 60 meters to 1.6 kilometers. Route MR-1 had not yet been identified and thus was not visited during surveys.

Remote sensing data and existing datasets that informed the habitat assessment included:

- Aerial imagery from July 9, 2013 (Google Earth) was used to assess sagebrush cover, proximity to sagebrush (summer habitat), the amount of human infrastructure, and the greenness of the herbaceous cover in July. Green vegetation was assumed to indicate mesic or moist vegetation and was also used as a rough proxy for perennial grass and forb cover and forb availability. Green upland areas were assumed to be suitable summer (late brood-rearing) habitat as long as proximity to sagebrush was <100 meters. Areas dominated by bare ground, by the annual exotic cheatgrass (*Bromus tectorum*), or by the native but typically xeric Sandberg bluegrass (*Poa secunda*) were quite brown in the July imagery. These assumptions were cross-referenced and validated by field observations and photographs.
- Landcover type geographic information system (GIS) layers were used to determine general overstory (e.g., sagebrush vs. grassland) and understory (perennial grass/forb vs. annual grass) vegetation. The JBLM YTC landcover type vegetation data was used on JBLM YTC lands and U.S. Geological Survey (USGS) Gap Analysis Program (GAP) data (USGS 2010; 2012) was used for portions of the ROW outside of the JBLM YTC.
- Google Earth was used to assess elevation, slope, and aspect as secondary considerations when assessing habitat suitability. For example, riparian areas in heavily incised drainages were not considered suitable summer habitat. For another example, it was assumed that north and east facing slopes and swales would require taller sagebrush to provide suitable winter habitat compared with sagebrush heights on windswept/solar south and west facing slopes.
- Sage-grouse locations, from telemetry and observation data provided by JBLM YTC (Cadwell et al. 1998; Livingston and Nyland 2002; JBLM YTC 2009), were used to assess historic occupancy and seasonality of sage-grouse use in or near the ROW.

Data collected along the Preliminary-NNR by POWER Engineers, Inc. (POWER) botanists and wildlife biologists during May-July 2013 that informed the habitat assessment included:

- Landcover type designations, identified at 0.25-mile intervals along the Preliminary-NNR were used to determine general overstory and understory vegetation.
- Landscape photos, typically taken at 0.25-mile intervals along the Preliminary-NNR, were used to qualitatively assess shrub height and cover, sagebrush growth form (columnar or spreading), grass and forb height and cover, and species composition.
- Plant species lists, collected for each Preliminary-NNR segment, were used to assess preferred forb availability.
- Vegetation survey field notes sometimes provide additional location-specific information about vegetation composition and structure.
- Locations and character of grouse sign identified during 2013 surveys were used to assess occupancy and seasonality of sage-grouse use in or near the ROW.

3.0 RESULTS AND DISCUSSION

The proposed NNR and MR avoid the highest concentration of occupied, suitable sage-grouse habitat that occurs closer to the geographic center of the JBLM YTC. NNR closely follows an existing 230 kV transmission line for its entire length—generally paralleling within 200 feet, and deviating by up to one mile for three short stretches. For the eastern nine miles, along NNR-7 and NNR-8, two existing 500 kV transmission lines also occur within one mile of the proposed route. Elevations range from approximately 500 to 3,350 feet above mean sea level (amsl) as the proposed ROW passes through a variety of steppe vegetation, ranging from relatively intact sagebrush with a perennial grass understory, to annual grasslands and disturbed ground. Consequently the seasonal habitat suitability is somewhat patchy and differs among the route segments. Generally speaking, the central and eastern portions of the proposed ROW contain the most suitable habitat overall (i.e., considering all seasonal habitats), while the relatively disturbed, weedy southern portions contain less suitable habitat. The highest concentration of suitable habitat occurs near the head of Badger Pocket, in Route Segments NNR-4, NNR-5, and the western end of NNR-6, with another concentration of suitable habitat in NNR-7. Suitability, often differed by seasonality. For instance the relatively high-elevation portion of the ROW (greater than 3,000 feet amsl) traversing the north-facing slopes of the Saddle Mountains, where high cover of sagebrush was often confined to swales and drainages, crosses suitable summer (late-brood rearing) and breeding habitat, but does not have suitable winter habitat because north facing swales at this elevation are likely to harbor some of the deepest patches of snow on the entire JBLM YTC landscape. Much of the western portion of the ROW is dominated by cheatgrass, especially on south-facing slopes. Areas with adequate sagebrush cover and a cheatgrass understory may provide suitable winter habitat, when sagebrush is the primary food resource, but are not suitable habitat during the breeding and summer seasons when forb and perennial grass cover is important (Stiver et al. 2010). Some areas, particularly within NNR-6 and NNR-7, had a moderate cover of sagebrush, estimated to be between 10 and 15 percent cover. These areas were delineated as suitable winter and summer habitat, but marginal breeding habitat due to the need for higher sagebrush density during the breeding season (Stiver et al. 2010).

A sense of habitat occupancy can be gleaned from telemetry and observational data provided by JBLM YTC and presence data collected along ground-based transect surveys by POWER biologists in 2013. The preponderance of documented grouse locations occurred greater than three miles to the south and east of the proposed NNR and MR. Moderate use was documented near route segments NNR-4, NNR-5, and NNR-6. No grouse were seen during ground transect surveys conducted in May and July of 2013; scat was observed in six locations adjacent to NNR-6, one location on NNR-5, and one location on NNR-4. Based on scat characteristics all of the observed scat appeared to be from spring and summer use; no winter scat was found. Based on 2011 data, there are two active leks and 12 historic leks within four miles of the proposed route. JBLM YTC defines a historic lek as a lek that has not been active for at least ten years. The nearest active lek is 3.3 miles east of Route Segment NNR-3.

Overall 221 acres (23 percent) of the ROW is classified as suitable breeding habitat and 368 acres (39 percent) is marginal breeding habitat. For winter habitat, 413 acres (44 percent) is suitable and 232 acres (24 percent) is marginal. During the summer (late brood-rearing) season 330 acres (35 percent) provides suitable habitat and 306 acres (32 percent) provides marginal habitat. Specific habitat delineations are described for each route segment below, and summarized in Table 1. Habitat suitability maps are shown for breeding habitat (Figure 2), winter habitat (Figure 3), and summer habitat (late brood-rearing habitat; Figure 4). A summary of vegetation type for each route segment, compiled from GAP data, JBLM YTC vegetation data, and botanical data collected during 2013 field surveys, is shown in Table 2.

3.1 Route Segment NNR-1

Route Segment NNR-1 is a short segment, passing through a suburban residential area with heavily fragmented shrub-steppe and a prevalence of disturbed ground and cheatgrass. Other infrastructures in the vicinity include existing 115 kV and 230 kV transmission lines. Within the ROW, the entire 43-acre segment (100 percent) was classified as unsuitable grouse habitat in all seasons, due to anthropogenic disturbance and vegetation condition. Available occupancy data supports our classification. According to JBLM YTC telemetry and observational data, the nearest documented sage-grouse use is over one mile from the segment, with documented regularly occupied habitats beginning about three miles east of the segment and extending east and north throughout much of the central portions of YTC. The nearest lek is over five miles away.

3.2 Route Segment NNR-2

Route Segment NNR-2 winds through and is adjacent to residential and non-vegetated urban areas in the JBLM YTC Cantonment area and ends where the route segment crosses Interstate 82 (I-82). Other infrastructures in the vicinity include existing 115kV and 230kV transmission lines. Disturbed ground, weeds, and annual grassland are the prevalent cover types. On the outskirts of the developed areas, the route passes through a few patches of sagebrush with a primarily annual grass understory. These patches (29 acres; 31 percent) were classified as marginal winter habitat due to adequate sagebrush cover but proximity to developed areas. No suitable habitat was identified for any season within Route Segment NNR-2. The entire segment was considered unsuitable during the breeding and summer seasons due to proximity to developed areas and the prevalence of a cheatgrass understory—as opposed to the native bunchgrasses and forbs that sage-grouse rely on for food and cover during the breeding and summer seasons. As with Route Segment NNR-1, JBLM YTC data indicates that the nearest documented sage-grouse use is over one mile from the segment, with documented occupied habitats beginning about three miles east of the segment and extending east and north throughout much of the central portions of the JBLM YTC. There is one active lek, Beller DZ, and three historic leks within four miles of the segment. The historic leks are in close proximity to the Beller DZ lek, which is 3.6 miles northeast of the segment. It was first discovered in 2011 with seven males displaying; six males attended the lek in 2012 and four attended in 2013. In 2011 a secondary (satellite) lek was used, located approximately 2,000 feet away. Use was not observed at the secondary lek in 2013. The authors suspected the presence of a nearby satellite lek that might explain the apparent decline in lek counts (SEE 2013).

3.3 Route Segment NNR-3

Route Segment NNR-3 runs west of I-82, closely following an existing 230 kV transmission line and roughly paralleling the highway. Suitable habitat is restricted to the northern two-thirds of this route segment. Much of this segment consists of annual grassland and perennial grassland, especially on south-facing slopes near the southern end of the segment. The northern two-thirds of the route segment are dominated by sagebrush steppe with a perennial grass understory. Habitat suitability is influenced largely by varying densities of sagebrush. Overall, roughly one-third of the route segment was considered unsuitable habitat for any season. Roughly one-third of the segment held suitable winter and summer habitat, and the remaining one-third provides marginal habitat during winter and summer. Due to a need for higher sagebrush densities during the breeding season, some of the suitable winter and summer habitat only provides marginal breeding habitat—overall 19 percent of the segment had enough sagebrush to be considered suitable for breeding and 47 percent was classified as marginal breeding habitat. JBLM YTC data documents very little sage-grouse use to the west of the segment—nearly all documented use occurs east of I-82, greater than one mile from the segment. The nearest single documented grouse location was a transmittered bird that occurred 0.6 mile west of the north end of the segment, in April 2005. The preponderance of JBLM YTC data

indicates a general lack of movement across the Route Segment NNR-3. During 2013 ground-based surveys on public lands within NNR-3 no sign of grouse use was observed (POWER 2013b). There is one active lek and seven historic leks within four miles of the segment. The active lek, Beller DZ, is located 3.3 miles east of the south end of the segment; this is the same lek discussed in Section 3.2.

3.4 Route Segment NNR-4

Still closely paralleling an existing 230 kV transmission line, Route Segment NNR-4 turns east, crosses I-82 and Manastash Ridge, and ends just south of agricultural land within Badger Pocket. Sagebrush cover is relatively high, though patchy, throughout this relatively flat segment. West of the highway the segment is largely dominated by sagebrush with an annual grass understory, whereas east of the highway, a perennial grass understory becomes prevalent. The majority of this segment provides suitable or marginal sage-grouse habitat. Designations were driven largely by sagebrush cover.

Specifically, suitable breeding and summer habitat occurs on 39 percent of the 83-acre segment —all of it occurring east of I-82; an additional 53 percent is marginal breeding habitat, and 57 percent is marginal summer habitat. Suitable winter habitat occurs on 65 percent of the segment, including the areas west of I-82 with a sagebrush overstory and cheatgrass understory. Marginal winter habitat composes 31 percent of the segment. There are six historic leks within four miles of the route segment; all of them are southeast of the segment. The nearest active lek is 5.4 miles southeast of the segment. Several data-points from the 1990s document sage-grouse use of the vicinity, and of the area to the northwest of the segment and southwest of Badger Pocket. A few data points from 2005 indicate continued use of the area. Four walking transects during two visits in May and July of 2013 revealed just one instance of sign of recent grouse use of the segment (POWER 2013b). While the data indicates movement across this segment between the core JBLM YTC area and the small area of habitat on and near Manastash Ridge between NNR-4 and MR-1, movements between the JBLM YTC grouse population and the Mansfield Plateau/Moses Coulee population in Douglas County may be unlikely to occur across this segment because grouse would have to cross the agriculturally developed Badger Pocket and/or Ellensburg area, as well as the I-90 highway corridor. The Badger Pocket gap in sagebrush habitat ranges from about 1.5 miles wide at the southeast end to over 10 miles wide at the northwest end. Modeling by Washington Habitat Connectivity Working Group did not identify the area west of Badger Pocket as an important linkage zone to connect sage-grouse populations (Robb and Schroeder 2012).

3.5 Route Segment NNR-5

This short route segment briefly diverges from the existing 230 kV transmission line by approximately 0.5 mile to bypass agricultural land within Badger Pocket. This flat area is nearly uniformly covered by relatively dense sagebrush steppe with a perennial grass understory. The segment overlaps 31 acres of suitable year-round habitat, covering 95 percent of the ROW. The remaining five percent of the segment contains marginal winter and summer habitat and unsuitable breeding habitat. JBLM YTC data contains several grouse locations within a mile of the segment, primarily from the 1990s and mainly to the south of the ROW. There are five historic leks within four miles of the route segment, but the nearest active lek is approximately 4.6 miles southeast of the segment. Four walking transects during two visits in May and July of 2013 revealed just one instance of sign of recent grouse use of the segment (POWER 2013b).

3.6 Route Segment NNR-6

Route Segment NNR-6 climbs to an elevation of over 3,300 feet amsl as it traverses the rugged north slopes of the Saddle Mountains. NNR-6 consists almost entirely of relatively intact sagebrush steppe

with a perennial grass understory, but in most areas the sagebrush cover is relatively low (e.g., less than 5 to 10 percent). Pockets of dense sagebrush primarily occur in swales and drainages—these are the same areas that would be expected to collect deep deposits of windblown snow on the relatively high elevation north facing slopes, likely limiting winter suitability during typical-weather years. But these same areas harbor relatively mesic pockets of sagebrush with a lush, forb-rich understory that likely stays relatively green during the summer months in typical years.

Overall, the 117-acres within the ROW for this segment consists of suitable summer habitat for 33 percent of its length and marginal summer habitat for 28 percent, while breeding habitat is suitable for 14 percent of its length and marginal for 36 percent, and winter habitat is suitable for 16 percent of the segment and marginal for 23 percent. JBLM YTC telemetry and observational data indicates some use of the area near and also north of the route segment, though density of grouse observations in this area do not approach densities in the core use areas that occur greater than six miles south of the segment. Ground based surveys of the Preliminary-NNR in May and July of 2013 revealed grouse sign in six locations near this segment—each of these was located a few hundred meters north of the western half of Route Segment NNR-6, generally near Foster Creek (POWER 2013b). The nearest active lek is located approximately 3.5 miles south of the route segment. Three males were observed attending this lek in 2013. After the lek's discovery in 2007, lek counts have ranged from zero to three males and averaged two males. Additionally, five historic leks are located within four miles of the route segment. The nearest of these is approximately 1.4 miles from the centerline. Based on Washington Habitat Connectivity Working Group modeling, NNR-6 and NNR-7 cross the most promising linkage zone connecting the JBLM YTC sage-grouse population with the Mansfield Plateau/Moses Coulee population in Douglas County (Robb and Schroeder 2012).

3.7 Route Segment NNR-7

Route Segment NNR-7 continues along the north slope of the Saddle Mountains, gradually dropping in elevation from 2,400 feet at the west end to 900 feet near the Columbia River. The segment continues to closely follow the existing 230 kV transmission line for its entire length; for the eastern five miles an existing 500 kV transmission line also closely parallels the proposed route segment. The vegetation is relatively intact sagebrush steppe with a perennial grass understory. The western three miles of the segment have moderate cover of sagebrush, providing mainly marginal habitat. Much of the eastern five miles contains higher cover of sagebrush, much of which provides apparently suitable grouse habitat, though relatively little use of the area has been documented.

Overall, the 150-acre route segment is composed of 43 percent suitable breeding habitat and 57 percent marginal breeding habitat. Winter and summer habitat is suitable for 67 percent of the segment and marginal for 32 percent of the segment. JBLM YTC data documents less sage-grouse use in the NNR-7 area than in the areas surrounding NNR-4, NNR-5, and NNR-6. A small number of locations have been documented within two miles on either side of the route segment, mostly from data collected during the 1990s. POWER biologists did not observe any sign of use during 2013 surveys. The nearest active lek is approximately 4.5 miles southwest of the route segment. There is one historic lek within four miles of the segment—it is located 0.75 mile north of the centerline. Based on Washington Habitat Connectivity Working Group modeling, NNR-6 and NNR-7 cross the most promising linkage zone connecting the JBLM YTC sage-grouse population with the Mansfield Plateau/Moses Coulee population in Douglas County (Robb and Schroeder 2012).

3.8 Route Segment NNR-8

This short route segment parallels the existing 230 kV and 500 kV transmission lines as it crosses the Columbia River and ends at the Vantage Substation. Patchy sagebrush with a perennial grass

understory covers roughly half of the ROW; most of the remaining area is either rocks and open water or cheatgrass and other weeds. Breeding habitat is classified as suitable for 26 percent of the 50-acre segment, and marginal for 23 percent of the area. Winter and summer habitat is classified as suitable for 34 percent of the ROW and marginal for 15 percent of the area.

Though apparent habitat exists within Route Segment NNR-8, there is no evidence of occupied habitat. This segment lies northeast of the JBLM YTC population. Two isolated observations have been documented 0.7 and 1.6 miles southwest of the segment. Very few grouse observations have been documented east of the Columbia River, where most of NNR-8 lies; the nearest is 3.6 miles away. The nearest documented active lek is 11 miles west of the segment, and the one historic lek within four miles of the segment is located 2.1 miles northwest of the segment.

3.9 Route Segment MR-1

This 12-mile subroute is a proposed alternative to the 4.5-mile NNR-4 route segment. Shaped like a horseshoe, it circumnavigates Manastash Ridge on the west, north, and east, avoiding most of the grouse habitat in the vicinity of Route Segment NNR-4. Vegetation along the route includes sagebrush with a perennial grass understory, sagebrush with an annual grass understory dominates the western part of the route segment, and weedy disturbed ground is prevalent along parts of the eastern stretch adjacent to agricultural Badger Pocket. The route contains apparent habitat, but based on JBLM YTC data, generally lies beyond the perimeter of habitat with documented occupancy (Cadwell et al. 1998; Livingston and Nyland 2002; JBLM YTC 2009).

Breeding habitat is classified as suitable along 15 percent of the route and marginal on 49 percent. Summer habitat is suitable for 26 percent of the route and marginal for 53 percent. Winter habitat is suitable for 62 percent and marginal for 16 percent. Most of the west arm of the segment has adequate sagebrush cover for winter use, but an annual grass understory that limits suitability for breeding and summer use.

Several sage-grouse locations are documented along the MR-1 and between this route segment and NNR-4, but MR-1 likely follows the edge of potential habitat. Only two grouse locations have been documented north or northwest of the segment. Some of the agricultural land in Badger Pocket could possibly provide summer habitat, depending on what crops are grown. Two historic locations occurred within Badger Pocket and a few locations are documented within the sagebrush close to the edge of the agricultural fields. The nearest active lek is located 5.4 miles southeast of the segment. There are five historic leks within four miles of the segment. While the data indicates sage-grouse habitat use near MR-1, movements between the JBLM YTC grouse population and the Mansfield Plateau/Moses Coulee population in Douglas County may be unlikely to occur across this segment because grouse would have to cross the agriculturally developed Badger Pocket and/or Ellensburg area. The Badger Pocket gap in sagebrush habitat ranges from about 1.5 miles wide at the southeast end to over 10 miles wide at the northwest end. Modeling by Washington Habitat Connectivity Working Group did not identify the area west of Badger Pocket as an important linkage zone to connect sage-grouse populations (Robb and Schroeder 2012).

TABLE 1 SUMMARY OF HABITAT SUITABILITY WITHIN THE ROW BY SEASON AND ROUTE SEGMENT

Route Segment	Breeding Habitat						Winter Habitat						Summer Habitat					
	Suitable		Marginal		Unsuitable		Suitable		Marginal		Unsuitable		Suitable		Marginal		Unsuitable	
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
NNR-1		0%		0%	43.4	100%		0%		0%	43.4	100%		0%		0%	43.4	100%
NNR-2		0%		0%	91.2	100%		0%	28.6	31%	62.6	69%		0%		0%	91.2	100%
NNR-3	32.6	19%	78.9	47%	57.2	34%	59.2	35%	59.4	35%	50.0	30%	57.0	34%	54.5	32%	57.2	34%
NNR-4	32.1	39%	43.3	53%	7.0	8%	53.4	65%	25.4	31%	3.7	4%	32.1	39%	46.6	57%	3.7	4%
NNR-5	30.6	95%		0%	1.8	5%	30.6	95%	1.7	5%	0.1	0%	30.6	95%	1.7	5%	0.1	0%
NNR-6	16.1	14%	42.7	36%	58.4	50%	19.0	16%	26.7	23%	71.5	61%	38.5	33%	33.0	28%	45.7	39%
NNR-7	63.7	43%	85.0	57%	0.9	1%	100.1	67%	48.5	32%	0.9	1%	100.1	67%	48.5	32%	0.9	1%
NNR-8	12.9	26%	11.7	23%	25.3	51%	17.0	34%	7.6	15%	25.3	51%	17.0	34%	7.6	15%	25.3	51%
MR-1	32.7	15%	105.8	49%	77.0	36%	134.6	62%	34.3	16%	46.5	22%	55.1	26%	113.9	53%	46.5	22%
Total	220.7	23%	367.5	39%	362.2	38%	413.9	44%	232.4	24%	304.0	32%	330.4	35%	305.9	32%	314.0	33%

TABLE 2 SUMMARY OF LANDCOVER TYPES WITHIN THE ROW BY ROUTE SEGMENT

VEGETATION TYPE	TYPICAL HABITAT SUITABILITY FOR SAGE-GROUSE	ACRES AND PERCENTAGES WITHIN RIGHT-OF-WAY (75 FEET FROM EITHER SIDE OF ROUTE SEGMENT CENTERLINES)									
		NNR- 1	NNR-2	NNR-3	NNR-4	NNR-5	NNR-6	NNR-7	NNR-8	MR-1	ALL
Sagebrush/ Perennial Grassland	Potentially suitable, year-round.	18%	22%	58%	47%	90%	93%	100%	51%	37%	58%
Sagebrush/ Annual Grassland	Potentially suitable in winter. Unsuitable in breeding and summer seasons	0%	9%	4%	16%	0%	0%	0%	4%	0%	3%
Bitterbrush/ Perennial Grass	Potentially suitable in breeding and summer seasons, depending on surrounding vegetation. Unsuitable in winter.	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Unspecified Shrubland	Potentially suitable, year-round.	33%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Non-forested Riparian, Intermittent Stream or Dry Gully	Potentially suitable, especially during breeding and summer seasons.	1%	0%	0%	0%	2%	0%	0%	1%	0%	0%
Agriculture	Potentially suitable during summer season, depending on surrounding vegetation. Unsuitable during winter and breeding seasons.	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Perennial Grassland	Potentially suitable during summer season, depending on surrounding vegetation. Unsuitable during winter and breeding seasons.	0%	3%	5%	2%	0%	7%	0%	4%	0%	2%
Unspecified Grassland	Potentially suitable during summer season, depending on surrounding vegetation. Unsuitable during winter and breeding seasons.	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Rabbitbrush/Annual Grassland	Generally unsuitable	0%	5%	0%	0%	0%	0%	0%	1%	0%	0%
Annual Grassland and Noxious Weeds	Unsuitable	4%	31%	28%	31%	3%	0%	0%	19%	41%	21%
Developed, Disturbed, or Firebreak	Unsuitable	31%	27%	1%	1%	5%	0%	0%	4%	22%	10%
Trees	Unsuitable	1%	3%	0%	0%	0%	0%	0%	0%	0%	0%
Rocks and Open Water	Unsuitable	0%	0%	3%	0%	0%	0%	0%	16%	0%	1%
Total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1 Supplemental DEIS Project Overview

Legend

Routes

- New Northern Route (NNR) Alternative
- Manastash Ridge Subroute
- Route Segment Node
- Proposed Underground Design Option Analysis Area
- Project Substation

Existing Transmission

- 500kV
- 115kV
- 230kV
- Substation

Jurisdiction

- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

Roads

- Interstate Highway
- US Highway
- State Highway

Special Management Areas

- BLM Area of Critical Environmental Concern (ACEC)

Base Features

- County Boundary
- Municipality

0 0.5 1 2 3 4 Miles

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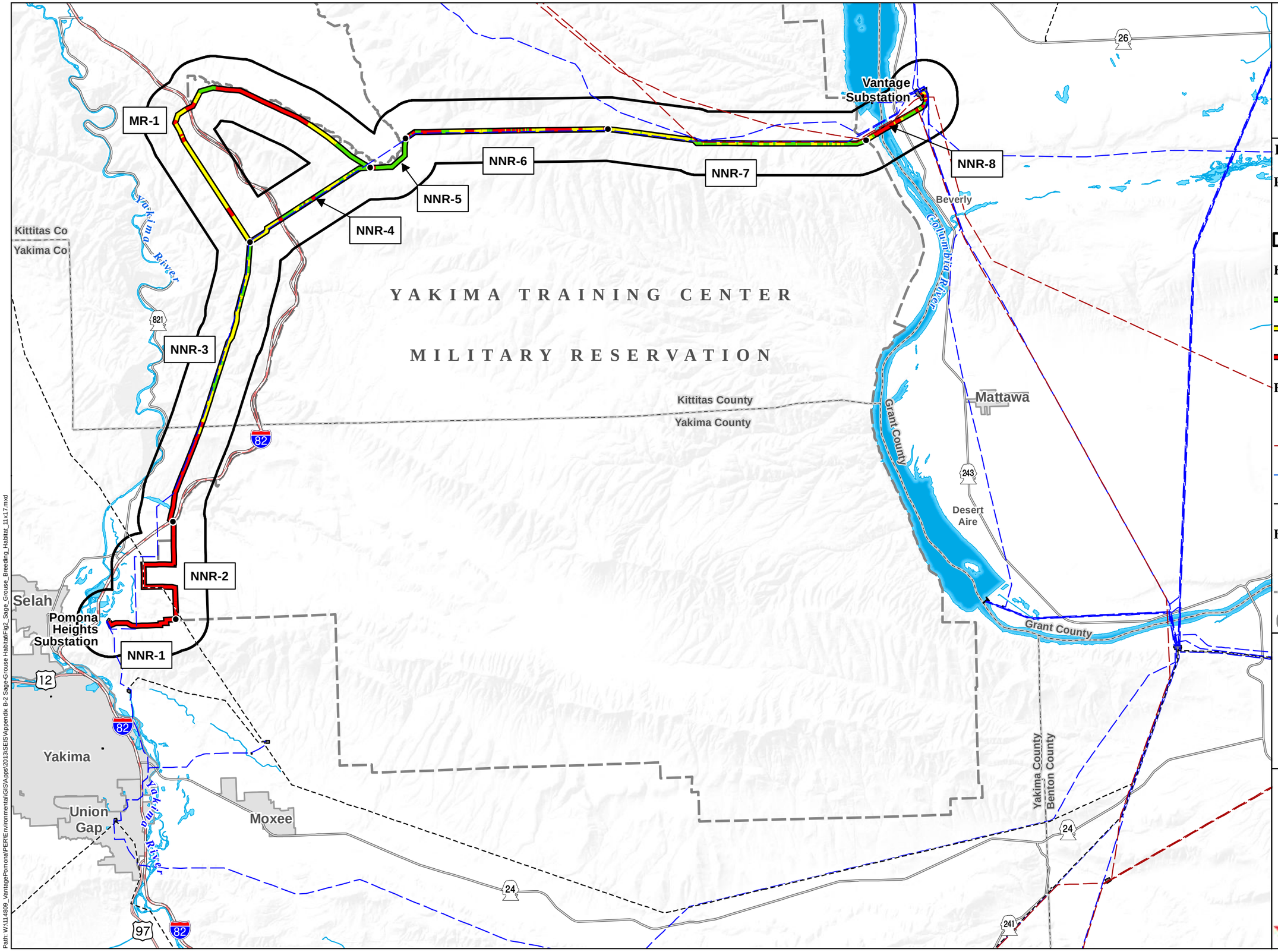
Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2
Sage-Grouse Breeding Habitat



Legend

Routes

- Link Node
- Study Corridor (2 miles)

Breeding Habitat Assessment

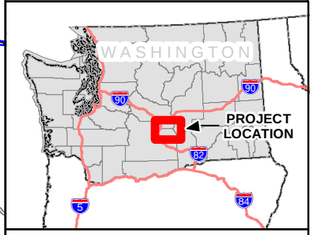
- Suitable
- Marginal
- Unsuitable

Existing Transmission

- Substation
- 500kV
- 230kV
- 115kV

Boundaries

- City Boundary
- County
- Yakima Training Center



Data are projected in UTM Zone 10N, NAD83

0 0.5 1 2 3 4
Miles

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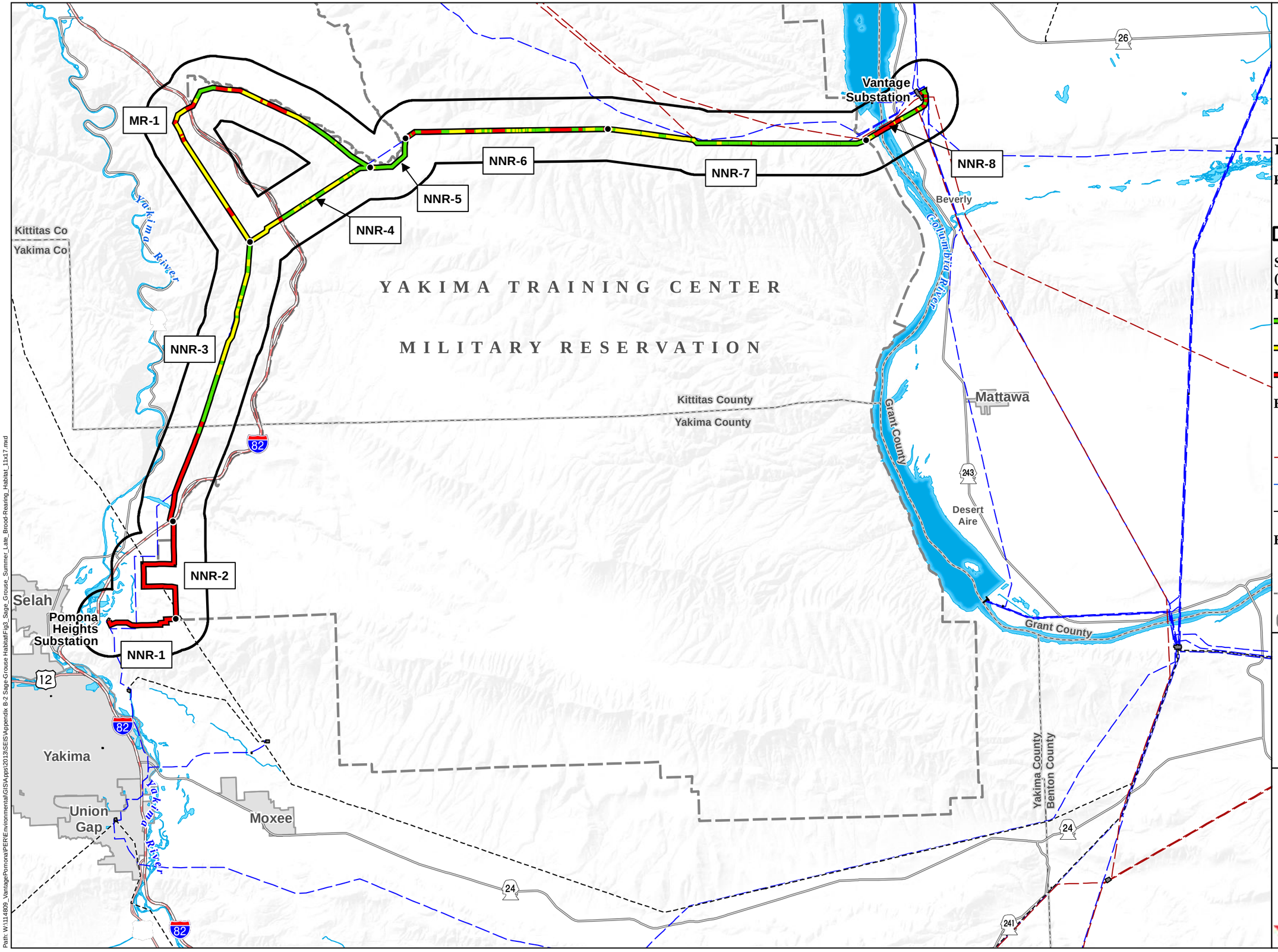
Vantage - Pomona Heights 230kV Transmission Line Project

Figure 3
Sage-Grouse Summer Habitat



Legend

Routes

- Link Node
- Study Corridor (2 miles)

Summer (Late Brood-Rearing) Habitat Assessment

- Suitable
- Marginal
- Unsuitable

Existing Transmission

- Substation
- 500kV
- 230kV
- 115kV

Boundaries

- City Boundary
- County
- Yakima Training Center

Data are projected in UTM Zone 10N, NAD83

0 0.5 1 2 3 4
Miles

PACIFIC POWER
POWER ENGINEERS

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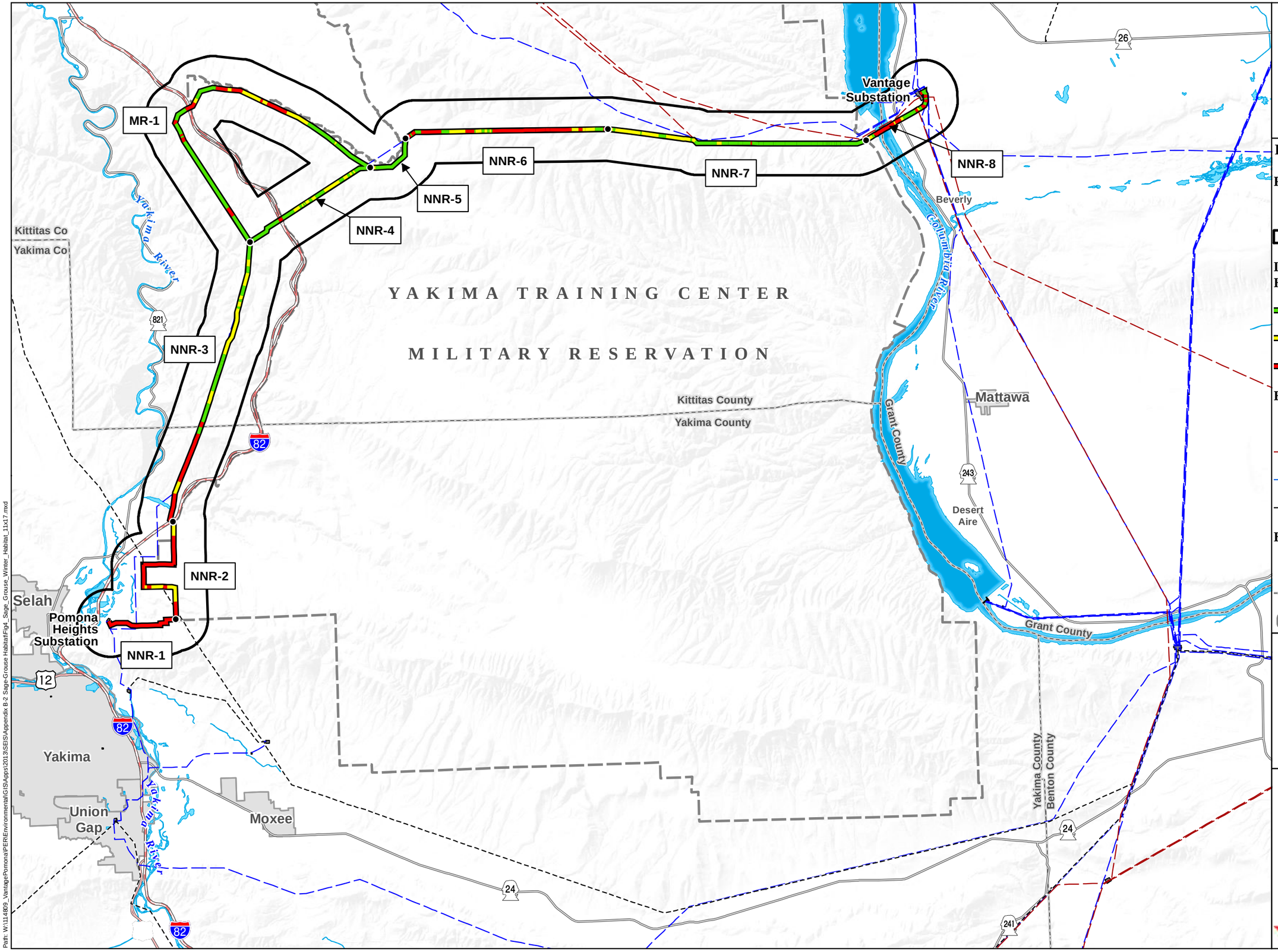
Vantage - Pomona Heights 230kV Transmission Line Project

Figure 4

Sage-Grouse Winter Habitat



Legend

Routes

- Link Node
- Study Corridor (2 miles)

Late Winter Habitat Assessment

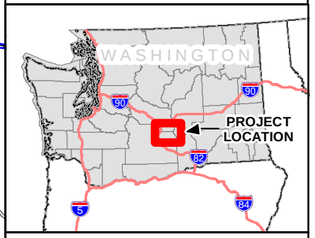
- Suitable
- Marginal
- Unsuitable

Existing Transmission

- Substation
- 500kV
- 230kV
- 115kV

Boundaries

- City Boundary
- County
- Yakima Training Center



Data are projected in UTM Zone 10N, NAD83

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APPENDIX B-3
SPECIAL STATUS PLANTS REPORT

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APPENDIX B-3: SPECIAL STATUS PLANTS REPORTS

Special status plant reports were submitted in Appendix B-3 of both the January 2013 Draft Environmental Impact Statement (DEIS) and January 2015 Supplemental Draft Environmental Impact Statement (SDEIS). The methods used for the DEIS and SDEIS Special Status Plant Reports are generally the same, except that the special status plant surveys were conducted in different years and in different locations. The original versions of these documents have been included in Appendix B-3 of this Final Environmental Impact Statement (FEIS), as listed and summarized below:

January 2013 DEIS Appendix B-3: Special Status Plants Report

The original proposed Project analyzed in the DEIS consisted of 10 end-to-end alternatives approximately following the southern and eastern flanks of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). Federal lands that were accessed included Bureau of Reclamation (Reclamation), Bureau of Land Management (BLM), JBLM YTC, and U.S. Fish and Wildlife Service (USFWS). Of the 674 acres of federal lands within the right-of-way (ROW) corridor, 450 acres were accessible and surveyed. The remaining 224 acres of federal lands that were not surveyed were inaccessible due to restricted access on the JBLM YTC, access issues crossing private lands, dangerously steep terrain, and excessively long distances to hike from a vehicle to the ROW corridor. Corresponding route segments for the FEIS include 1a/New Northern Route (NNR)-1, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, and 3c.

The DEIS special status plant surveys were coordinated so that the first two surveys (May 16-25 and June 22-29, 2011) took place in all habitats within accessible federal lands. The third survey (August 8-10, 2011) took place only at wetlands and riparian areas along accessible federal lands to target Ute ladies'-tresses (*Spiranthes diluvialis*) during its blooming period. A complete pedestrian survey was conducted with a 25-meter separation between surveyors, covering the 160-foot (48.8-meter) wide ROW corridor. Eight occurrences of special status plants were located, including two occurrences of snowball cactus (*Pediocactus nigrispinus* [synonym = *P. simpsonii var. robustior*]), three occurrences of Columbia milkvetch (*Astragalus columbianus*), one occurrence of caespitose evening-primrose (*Oenothera caespitosa ssp. caespitosa*), and two occurrences of Nuttall's sandwort (*Minuartia nuttallii* var. *fragilis*). Note that where synonyms are provided in this abstract indicates where a different species name was accepted at the time of the DEIS special status plant surveys. Special status plant occurrences were documented on Route Segments 1b, 2b, 2d, and 3b. These four route segments and Route Segment 3c had the highest amount of potentially suitable habitat for special status plants.

January 2015 SDEIS Appendix B-3: Special Status Plants Report

In April 2013, the NNR was identified using route segments approximately following the northern flank of the JBLM YTC. After the 2013 special status plant field surveys were completed, routing adjustments were made due to new requirements for separation distance from existing transmission lines and concerns about sage-grouse. The locations of the NNR and Manastash Ridge (MR) Subroute were finalized in November 2013. The NNR occurs along the west side of Interstate 82 and then passes through the northern portion of the JBLM YTC to the Vantage Substation. The MR skirts Manastash Ridge, west of Badger Pocket in the northwestern portion of the JBLM YTC. The 2013 special status plant surveys were conducted on approximately 584 acres or 30.5 of 41.2 centerline miles of federal and Washington State Department of Transportation (WSDOT) lands on the NNR and MR Subroute route segments. Portions of Reclamation and BLM lands which had been surveyed for the DEIS in 2011 and incorporated into the NNR were not revisited in 2013. Corresponding route segments for the FEIS include 1a/NNR-1, NNR-2, NNR-3, NNR-4, NNR-5, NNR-7, NNR-8, and MR-1. The 2013 special status plant field surveys did not occur on Route Segment NNR-6, due to route changes that occurred after the surveys had been completed.

The SDEIS special status plant surveys were coordinated such that a pedestrian survey was conducted May 13-20, 2013 for special status plant species on federal and WSDOT lands within the ROW corridor. A second survey was conducted during July 25-27, 2013 to survey for Ute ladies'-tresses in two wetland areas and at a dodder (*Cuscuta* sp.) location identified during the May 2013 survey which was not blooming in May and could not be identified to species until summertime. Plant phenology was at least one month early in 2013, resulting in mid-May 2013 conditions being similar to late June 2011. This was likely due to the unusually dry and slightly warmer weather conditions during the 2012-2013 water year. The term "water year" is defined as the 12-month period starting October 1 for any given year through September 30 of the following year and is more relevant to vegetation growth, flowering, and senescence than a calendar year. Based on these conditions, the survey targeting late April to mid-May special status plant species may be incomplete because many early species probably would not have been detectable, although information about the potential for suitable habitat was assessed. Botanists walked roughly parallel intuitive meandering transects while they were targeting habitats most likely to support special status plant species, with a 40-foot (12-meter) separation between surveyors. This is a narrower separation distance than the 25-meter width used for the DEIS surveys, due to differences in logistics and a slightly narrower ROW width (150- versus 160-foot).

Eight occurrences of special status plants were located (including new and prior known occurrences), including four occurrences of snowball cactus, one occurrence of Pauper milkvetch (*Astragalus misellus* var. *pauper*), one occurrence of Hoover's desert-parsley (*Lomatium tuberosum*), one occurrence of longsepal globemallow (*Iliamna longisepala*), and one occurrence of weakstem cryptantha (*Cryptantha flaccida* [synonym = *C. rostellata*]). Of these, only one occurrence of snowball cactus and the occurrences of Pauper milkvetch and Hoover's desert-parsley correspond to the current route segments, all within the NNR-3 ROW. There were additional occurrences from the Washington Natural Heritage Program database along NNR-3, NNR-6, NNR-7, and NNR-8 which were not documented during the surveys.

APPENDIX B-3

SPECIAL STATUS PLANTS REPORT

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TABLES

APPENDICES

1.0 INTRODUCTION

The special status plant survey was conducted on approximately 450 acres of accessible federal lands within the right-of-way (ROW) corridor for the proposed 230 kilovolt (kV) Vantage to Pomona Transmission Line (ca 32.5 miles of ROW corridor centerline) between the existing Pomona Heights Substation near Yakima, Washington, and the Vantage Substation located adjacent to the Columbia River and north of Beverly, Washington. This work was conducted to provide information about special status plants that have the potential to occur on federal lands specific to the proposed project. Sage Grouse assessment and noxious weed surveys were coordinated at the same time as the special status plant surveys, but these are discussed in separate reports, Appendix B-2 and Appendix B-4.

2.0 METHODS

Qualified botanists documented target special status plant species on accessible federal lands within the ROW corridor for each alternate route segment. Federal lands were considered inaccessible due to: restricted access on the Yakima Training Center (YTC); access issues crossing private lands; dangerously steep terrain; and excessively long distances (greater than one mile) to hike from car to the ROW corridor. Three surveys were conducted to address the different phenology (timing of flowering and/or fruiting) of the target special status plant species. Federal lands that were accessed included Bureau of Reclamation (Reclamation), Bureau of Land Management (BLM), YTC, and U.S. Fish and Wildlife Service (USFWS). Pre-construction clearance surveys will be identified and detailed in the Plan of Development (POD).

Surveyor Qualifications

Special status plant surveys were conducted by botanists who have the following minimum qualifications:

- An academic background (bachelor's degree or higher in botany) or equivalent experience in plant taxonomy;
- The taxonomic experience to identify, through personal knowledge or the use of technical floras, most species encountered in the field, and an understanding of how to contact taxonomic experts for species that they are unable to identify;
- The skills to use GPS to adequately map occurrences of special status plant species; and
- Familiarization of the potential special status plant species in the project area.

Field Preparation

The special status plant species list was developed by compiling a list of all special status species known to project counties (Benton, Grant, Kittitas, and Yakima), data which was accessed from the Washington Natural Heritage Program (WANHP; 2010) and BLM (M. Boyter, pers. comm. March 2011) (Appendix A). This study followed BLM Procedures for Vegetation Inventory and Rare Plant Clearances, which was provided by the BLM. The list was further refined by only including those species with special status from the USFWS (USFWS 2011), and WANHP (2010), Inter-agency Special Status / Sensitive Species Program (ISSSSP) species (2008a, b). Most special status plant species occur in highly specific habitats, which require an understanding of the associated plant community, co-occurring species, geology, soils, elevation, and topographic location for each species.

Sources of information for plant species included the *Vascular Plants of the Pacific Northwest: Vols. I-V* (Hitchcock et al. 1969), *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973), the WANHP

plant guide (WANHP and BLM 2005), *Field Guide to the Rare Plants of Washington* (Camp and Gamon 2011), WANHP special status plant data within the study corridor, BLM (M. Boyter, pers. comm. March 2011), species-specific literature, and botanists' personal knowledge of the species.

Each species was evaluated for whether it should be targeted during surveys. All special status plant species known to occur within 0.25 mile of the alternative route segments were automatically included as target species. In addition, all special status plant species that are known to occur on or near the YTC were also included (Fort Lewis Directorate of Public Works 2010). Species documented or suspected to occur on the BLM Spokane District were not automatically included due to the large area encompassed; although species were given additional consideration as target species if they were documented or suspected to occur on the BLM Spokane District. All species were then evaluated by assessing their habitat requirements and elevation with the elevation (400 to 2,850 feet) and GAP vegetation within 0.25 mile of the alternate routes. Species associated with forested habitats and high elevations were typically removed from the list, while species associated with sagebrush steppe, basalt cliffs, rivers, etc. were included. Wetlands and riparian areas occur on federal lands along the alternative route segments, so species associated with these habitats were also included.

The phenology for each species is important since many special status plant species can only be accurately identified when they are flowering and/or fruiting. The phenology of all target special status species was assessed to determine when and how many surveys would be needed to accurately survey for all special status plant species. Based on this, complete surveys were determined to be needed during April/May and June/July so that all species are surveyed (preferably late April to mid-May and mid-June to mid-July). A third survey was also determined to be needed for wetlands and riparian areas in mid-August, to address special status plants associated with these habitats that have a late-summer phenology, including Ute ladies'-tresses (*Spiranthes diluvialis*), a federally threatened plant species.

Field Survey

The first two surveys (May 16-25 and June 22-29, 2011) took place in all habitats within accessible federal lands. The third survey (August 8-10, 2011) took place only at wetlands and riparian areas along accessible federal lands. During the first two surveys, wetland and riparian habitat were identified to focus the area for the final survey. A complete pedestrian survey was conducted for the target special status plant species on accessible federal lands with a 25 meters separation between surveyors, covering the 160 foot (ca 49 meter) ROW corridor. Botanists walked roughly parallel intuitive meandering transects so that habitats most likely to support special status plant species were most intensively surveyed. The survey was floristic, meaning that all taxa were identified to the level necessary to determine if they are special status plant species (except if the plant was in an unidentifiable stage; i.e., from grazing).

All methods followed the BLM Procedures for Vegetation Inventory and Rare Plant Clearances, which was provided by the BLM botanist. An OR/WA BLM GeoBOB Flora/Fauna Survey Form (V. 1.4) was completed for each of the route segments surveyed, by landowner (includes information on survey location and acreage, observers, date(s) surveyed, plant species encountered, target special status plant species, and habitat/environmental conditions).

Habitat and plant community information collected to support sage grouse habitat assessment Appendix B-2 was used for assessing potential suitable habitat for special status plants. In addition, the following information was collected during the surveys: names of all plant species observed and whether it is a dominant species, presence and percent cover of cryptogamic crusts, moisture/ disturbance/soil

conditions, and elevation/aspect/slope. This was largely done during the May survey, but additional species and observations were added during the June and August surveys.

If any target special status plant species were discovered, information about each species/location were filled out in an OR/WA BLM GeoBOB Site and Observations Form (V. 1.4; includes information on species, location, observers, date observed, phenology, reproduction/health, threats, associated species, and habitat/environmental conditions). A survey-grade GPS was used to document the survey route and the occurrence of target special status plant species discovered.

Very steep slopes and other conditions that posed a safety hazard were not surveyed. Very steep slopes are typically avoided for installation of transmission line structures or structures are installed using special methods such as helicopters, minimizing ground disturbance. In addition, botanists communicated with YTC personnel to ensure surveys were coordinated with training activities.

3.0 RESULTS

Of the 674 acres of federal lands within the 160 foot wide ROW, 450 acres were accessible and surveyed. The remaining 224 acres of federal lands that were not surveyed were inaccessible due to restricted access on the YTC, access issues crossing private lands, dangerously steep terrain, and excessively long distances to hike from car to the ROW corridor.

Eight occurrences of special status plants were located, including two occurrences of hedgehog cactus (*Pediocactus simpsonii var. robustior*), three occurrences of Columbia milkvetch (*Astragalus columbianus*), one occurrence of caespitose evening-primrose (*Oenothera caespitosa ssp. caespitosa*), and two occurrences of Nuttall's sandwort (*Minuartia nuttallii* var. *fragilis*) (Table 1). Columbia milkvetch, caespitose evening-primrose and Nuttall's sandwort occurrences were located during the May surveys, but some were confirmed and expanded during the June surveys. Hedgehog cactus was located during the May and June surveys, but was not determined to be a special status plant until after the surveys were complete. Therefore, its mapped location is based on notes and retrospective mapping. Columbia milkvetch, caespitose evening-primrose, and Nuttall's sandwort have the status as BLM Sensitive species, although Columbia milkvetch is also a USFWS Species of Concern. Washington state status also varies, so that Nuttall's sandwort is a state Threatened species and the other two are state Sensitive species. Hedgehog cactus is currently a Washington State Sensitive species and listing as a BLM Sensitive species is anticipated in the future (Brooks, personal communication 2011).

No other species in Appendix A were located on accessible federal lands within the ROW corridor of the route segments. As with all special status plant surveys, there is always the potential that a special status plant occurs but is not detected, especially where there are annual species that may remain in the seedbank. In addition, multiple surveys were conducted for nearly all species during their species-specific optimal phenology for surveying.

TABLE 1 SPECIAL STATUS PLANT SPECIES LOCATIONS AND HABITAT SUITABILITY FOR SPECIAL STATUS PLANTS ON FEDERAL LANDS, BY ROUTE SEGMENT

Route	Special Status Plants Documented	Suitable Habitat	Marginal Habitat	Unsuitable Habitat	Unknown Habitat
1a	none	4 acres (all sagebrush/perennial grassland)	none	1 acre	none
1b	Nuttall's sandwort (*Minuartia nuttallii* var. *fragilis*) and hedgehog cactus (*Pediocactus simpsonii var. robustior*)	55 acres of suitable habitat (predominantly sagebrush/perennial grassland, with some intermittent stream or dry gully)	34 acres	31 acres	122 acres
1c	none	none	trace	2 acres	trace
2a	none	none	none	none	none
2b	Basalt milkvetch (*Astragalus columbianus*)	26 acres (predominantly sagebrush/perennial grassland, with some intermittent stream or dry gully)	3 acres	15 acres	9 acres
2c	none	none	none	none	trace
2d	Basalt milkvetch (*Astragalus columbianus*)	6 acres (predominantly sagebrush/perennial grassland, with some intermittent stream or dry gully)	8 acres	none	6 acres
3a	none	none	none	none	none
3b	Basalt milkvetch (*Astragalus columbianus*), caespitose evening-primrose (*Oenothera caespitosa ssp. caespitosa*), and Nuttall's sandwort (*Minuartia nuttallii* var. *fragilis*)	62 acres (sagebrush/perennial grassland, basalt cliff, and riparian; with a small amount of rock, water body, and intermittent stream or dry gully)	14 acres	32 acres	63 acres
3c	none	106 acres (predominantly sagebrush/perennial grassland, with a small amount of riparian, water body, and intermittent stream or dry gully)	54 acres	20 acres	trace

Habitats classified for the Sage-Grouse Habitat Assessment Report (Appendix B-2) were used to estimate potentially suitable habitat for special status plants on all federal lands within each route segment. Unsuitable habitat included agriculture; developed, road, or firebreak; irrigation canal; and watered poplar. Marginal habitat included annual grassland, rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included basalt cliff, rock, sagebrush/perennial grassland, aspen, tree, intermittent stream or dry gully, riparian, and water body. Unknown habitat was too coarsely defined to estimate and included grassland, perennial grassland, and shrubland. Table 1 shows a comparison of the results by link and Appendix B shows the data used for making these calculations. Appendix C shows a list of all plant communities that were documented on accessible federal lands within each link.

Based on this information, Link 1B has two special status plant occurrences and provides better habitat for special status plants compared to Link 1C. Link 2B also has one special status plant occurrence and provides better habitat for special status plants compared to Link 2C; and 2D also has one special status plant occurrence and some suitable and marginal habitat. Link 3B has three special status plant occurrences compared to none for Link 3C. Link 3C appears to have more suitable habitat, but Link 3B has more species-specific habitats (basalt cliffs and rocks) and a substantial amount of habitat of unknown suitability, so Link 3B likely has better habitat for special status plants too.

A list of all plant species documented during the surveys is provided in Appendix D. Photographs of most occurrences documented are provided in Appendix E. The BLM has requested that GeoBOB survey forms and special status plant site observation forms be filled out for the surveys, and these will be provided separately. The GeoBOB survey forms provide more information about the environmental conditions along each link. The GeoBOB site observation forms provide more information about each special status plant species occurrence. The list of target special status plants in Appendix A indicates during which survey(s) each species was targeted, and this is designed to be used with the GeoBOB survey forms.

4.0 SUMMARY

Special status plant occurrences were documented in Routes 1b, 2b, 2d, and 3b. These four routes plus Route 3c had the highest amount of potentially suitable habitat for special status plants. This information should be used to compare the potential effects of the proposed project to special status plant species on federal lands. In addition, WANHP data on special status plant occurrences that are mapped as intersecting the ROW corridor should be included in comparing potential effects, although most of these occurrences include large buffers so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor.

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APPENDIX A – LIST OF TARGET SPECIAL STATUS PLANT SPECIES

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APPENDIX A LIST OF TARGET SPECIAL STATUS PLANT SPECIES (PLANTS DOCUMENTED ON ACCESSIBLE FEDERAL LANDS ARE IN BOLD).

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Aliciella leptomeria	Great Basin gilia	WT			Open sandy or rocky areas; dry open places at low elevations, especially in sandy or sandy soil, gravelly bluffs, and on caliche; associated with sagebrush steppe; 470-6,890 ft.	mid May to June	X		
constrictum	constricted Douglas' onion	BLM-S, WS	DOC		Rocky benches; vernally moist areas on flat basalt and drier lithosols and around the margins of rocky vernal ponds. Grows in stiff sagebrush/Sandberg's bluegrass habitat type; 2,070-2,550 ft.	May to July	X	X	
Ammannia robusta	grand redstem	BLM-S, WT	SUS		Moist, heavy soil around ponds, rivers, and other wet places; deep sandy loam to gravelly soils. Along the Columbia River in riparian mudflat wetlands dominated by annual species.	May to July	X	X	
Anagallis minima	chaffweed	WT			Moist ground or around vernal pools from the coast to the interior valleys; 400-2,340 ft.	May to August (September)	X	X	X
Antennaria parvifolia	Nuttall's pussy-toes	BLM-S, WS	DOC		Dry open areas, often sandy or in Ponderosa pine forest openings.	May to July	X	X	
Artemisia borealis var. wormskioldii	Wormskiold's northern wormwood	C, BLM-S, WE	SUS		Sandy soil with cobble on low ground along Columbia River; sandy soil with cobbles, on low ground near the edge of the river.	April to May	X		
Astragalus arrectus	Palouse milk-vetch	BLM-S, WT	SUS		Grassy hillsides to sagebrush flats, river bluffs, and open ponderosa pine/Douglas-fir forests in grassy or shrub dominated openings; 1,000-4,000 ft.	(late April) May to June (early July)	X	X	
Astragalus columbianus	**Columbia milk-vetch**	**SOC, BLM-S, WS**	**DOC**	**DOC**	**Dry often sandy places with sparse vegetation usually on slopes but sometimes on flats; associated with shrub-steppe vegetation zone; 500-2,100 ft.**	**March to May**	**X**	**X**	

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Astragalus geyeri	Geyer's milk-vetch	BLM-S, WT	DOC	DOC	Arid sandy soils, flat to dunes; sandy desert, especially on dunes; 630-670 ft.	April to July	X	X	
Astragalus microcystis	least bladdery milk-vetch	BLM-S, WE	DOC		Open prairies, foothills, and ponderosa pine forests.	May to July	X	X	
Astragalus misellus var. pauper	Pauper milk-vetch	BLM-S, WS	DOC	DOC	Sagebrush steppe, often in low sage open areas; open ridgetops and upper slopes, and rarely middle and lower slopes; 500-3,000 ft.	April to June		X	
Astragalus sinuatus	Whited's milk-vetch	BLM-S, WE	DOC		Rocky hillsides with sagebrush	April to June	X	X	
Camissonia pygmaea	dwarf evening-primrose	BLM-S, WS	DOC	DOC	Sagebrush and lower foothills; unstable soil or gravel in steep talus slopes, dry washes, banks and roadcuts; growing with big sagebrush and wild buckwheat.	May to July		X	
Camissonia scapoidea ssp. scapoidea	naked-stemmed evening-primrose	BLM-S, WS	DOC		Mostly in the sagebrush desert; especially on rocky or sandy soil; 600-900 ft.	May to July	X	X	
Carex comosa	bristly sedge	BLM-S, WS	DOC		Marshes, lake shores, and wet meadows; 50-2000 ft.	May to August	X	X	X
Carex macrochaeta	large-awn sedge	BLM-S, WT	SUS		Marshes, shores and other moist or wet open places, often near the beach.	mid-May to July; summer	X	X	
Cistanthe rosea	rosy pussypaws	BLM-S, WT	SUS		Sagebrush desert to arid montane forest; within low swales in sandy soil among big sagebrush; 520-530 ft.	May to June	X	X	
Collomia macrocalyx	bristle-flowered collomia	BLM-S, WS	DOC		Dry, open places at lower elevations; sparsely vegetated and associated with sagebrush steppe; a cryptogram crust is present on the rocks and soil; early spring, flowers ephemeral; 850-2,100 ft.	April to May	X		
Cryptantha gracilis	narrow-stem cryptantha	BLM-S, WS	DOC		Talus and pockets of silt; associated with sagebrush steppe; in Washington this species has been found in talus and pockets of silt; 1,250-2,680 ft.	May to June	X	X	

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Cryptantha leucophaea	gray cryptantha	SOC, BLM-S, WS	DOC	DOC	Dry, often sandy places; with sparse vegetation, usually on slopes but sometimes on flats; near the Columbia and lower Yakima rivers; 300-2500 ft.	April to May	X		
Cryptantha rostellata	beaked cryptantha	BLM-S, WT	DOC	DOC	Dry, open places; 600-2,900 ft.	April to June	X		
Cryptantha scoparia	miner's candle	BLM-S, WS	DOC		Dry, open slopes and flats, commonly among sagebrush; gravel bars and alluvial slopes and thin gravelly soil over basalt; 1,200-1,280 ft.	May to July	X	X	
Cryptantha spiculifera	Snake River cryptantha	BLM-S, WS	DOC	DOC	Sandy knolls and badlands and talus at low elevations; dry, open, flat or sloping areas in stable or stony soils.	April to July	X	X	
Cuscuta denticulata	desert dodder	WT			Occurs on various shrubs (*Artemisia* and *Chrysothamnus*) within desert areas; 880 ft.	June to September		X	
Eatonella nivea	white eatonella	BLM-S, WT	DOC		Dry, sandy desert or volcanic areas; populations are on bare soil in sparsely vegetated sagebrush steppe, associated with other annuals.	April to May	X		
Eleocharis rostellata	beaked spike-rush	WS	DOC	DOC	Marshes and boggy sites around lakes, in alkaline or highly calcareous areas, often around hot springs; also in coastal salt marshes; 500-1,850 ft.	June to September		X	X
Erigeron basalticus	basalt daisy	SOC, BLM-S, WT	DOC	DOC	Cliff crevices on basalt cliffs, in rocky canyons; Yakima River and Selah Creek. Associated with the Yakima Basalt Formation, which occurred during the late Miocene; 1,250-1,500 ft.	May to June	X	X	
Erigeron piperianus	Piper's daisy	BLM-S, WS	DOC	DOC	Dry, open places, often among sagebrush; 400-2,250 ft.	May to June	X	X	

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Eriogonum codium	Umtanum desert buckwheat	C, WS	SUS		Flat to gently sloping microsites near the top of the steep, north-facing basalt cliffs near salt scrub habitats overlooking the Columbia River; restricted to the exposed top of the basalt Lolo Flow. Assoc. include spiny hopsage, *Phacelia linearis*, *Cryptantha pterocarya*, *Camisonia minor*, and cheatgrass; 1,100-1,320 ft.	May to late-August	X	X	
Hackelia diffusa var. diffusa	diffuse stickseed	BLM-S, WT	DOC		Shaded areas, cliffs, talus, wooded flats, and slopes; along and near the Columbia River; 300-1,200 ft.	May to June	X	X	
Hackelia hispida var. disjuncta	sagebrush stickseed	BLM-S, WS	DOC		Rocky, unstable talus slopes and cliffs, usually with little other vegetation; 600-2,100 ft.	May to July	X	X	
Heterotheca oregona var. oregona	Oregon goldenaster	BLM-S, WT	SUS		On sand and gravel bars along rivers; chiefly west of the Cascade Mountains but also occasionally along their eastern base; 2,600 ft.	June to September		X	
Iliamna longisepala	longsepal globemallow	BLM-S, WS	DOC		Dry open hillsides and gravelly streamsides of sagebrush and open ponderosa pine forests; lower levels on the east side of the Cascade Mountains; 500-4,500 ft.	June to September		X	
Juncus hemiendytus var. hemiendytus	dwarf rush	WT			Mud flats, the edge of vernal pools, and moist to wet meadows; 2,300-2,430 ft.	May to July	X	X	
Juncus howellii	Howell's rush	BLM-S, WT	SUS		Moist ground in the mountains; 2,840 ft.	July to August			X
Juncus uncialis	inch-high rush	BLM-S, WS	DOC		Open fields to montane meadows; swales, moist places and vernal pools; associated with channeled scablands and mound and swale topography; 2,100-2,290 ft.	June to August		X	X
Lipocarpha aristulata	awned halfchaff sedge	BLM-S,WT	SUS	DOC	Wetlands along the Columbia River, wet soil and mud in bottomlands; sandbars and beaches; 328-1,312 ft.	June to September		X	X
Lobelia kalmii	Kalm's lobelia	WE	DOC	DOC	Marl or peat bogs, along shores and in other wet places.	late July to August			X

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Loeflingia squarrosa var. squarrosa	loeflingia	WT			Low swales within sandy areas and associated with *Artemisia tridentata*; 400-500 ft.	May	X		
Lomatium serpentinum	Snake Canyon desert-parsley	BLM-S, WS	DOC		Lower elevations just above river level in moderately deep sandy or rocky soil and/or open rocky slopes.	April to June (July)	X	X	
Lomatium tuberosum	Hoover's desert-parsley	SOC, BLM-S, WS	DOC	DOC	Loose rocky slopes and basalt drainage channels; rocky hillsides; 600-2,300 ft.	March to May	X		
Micromonolepis pusilla	red poverty-weed	WT			Desert regions, often on alkaline soils; salt-encrusted soil around/beneath *Sarcobatus* shrubs; 1,950-2,210 ft.	April to June	X	X	
Mimulus jungermannioides	hepatic monkeyflower	SOC, WX			Moss mats on cliffs at the eastern end of the Columbia River gorge and Deschutes River; 500-3,300 ft.	May to late-August	X	X	
Mimulus suksdorfii	Suksdorf's monkey-flower	BLM-S, WS	DOC		Open, moist or rather dry places, from the valleys and foothills to rather high elevations in the mountains; associated with sagebrush steppe.	May to August	X	X	
Minuartia nuttallii ssp. fragilis	**Nuttall's sandwort**	**BLM-S, WT**	**DOC**	**DOC**	**Dry basalt scree slopes, open, gravelly benches, or limestone talus from open sagebrush hills to alpine slopes; 5,413-7,874 ft.**	**April to May (August)**	**X**	**X**	
Nicotiana attenuata	coyote tobacco	BLM-S, WS	DOC	DOC	Dry, sandy bottom lands, dry rocky washes, and in other dry open places; 400-10,000 ft.	June to August		X	
Oenothera caespitosa ssp. caespitosa	**caespitose evening-primrose**	**BLM-S, WS**	**DOC**	**DOC**	**Talus slopes, road cuts, and dry hills; as well as along the flat river terrace of the Columbia River; associated with *Artemisia tridentata* or *Artemisia rigida*; 400-1,200 ft.**	**June to August**	**X**	**X**	
Ophioglossum pusillum	Adder's-tongue	BLM-S, WT	DOC		Meadows, pastures, old fields, roadside ditches, and flood plain woods in seasonally wet, rather acid soil; circumboreal, but not at the highest latitudes; 40-2,300 ft.	June to September		X	

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Orthotrichum praemorsum	bryophyte	SOC, WE			Rocks, rarely lava, dry montane areas; middle elevations		X	X	
Oxytropis campestris var. wanapum	Wanapum crazyweed	SOC, BLM-S, WE	DOC		Gravelly floodplains of the Columbia River; big sagebrush/bluebunch wheatgrass.	May to June	X		
Pediocactus simpsonii var. robustior	**Hedgehog cactus**	**BLM-STR, WS**		**DOC**	**Thin, rocky soil on ridge tops, desert valleys, and low mountains; found at elevations from 1000 to 4000 feet in Washington; associated with *Artemisia rigida*.**	**May to August**	*	*	*
Penstemon eriantherus var. whitedii	fuzzytongue penstemon	BLM-S, WS	DOC		Dry, open places in between shrubs; in the plains, valleys, and foothills, sometimes ascending to moderate elevations in the mountains; associated with *Artemisia tridentata*, *Purshia tridentata*, *Salvia dorrii*, *Eriogonum* sp., and *Chysothamnus nauseosus*; 525-3,835 ft.	May to June	X	X	
Penstemon wilcoxii	Wilcox's penstemon	BLM-S, WS	SUS		West facing slopes of small canyons, and in dry and rocky habitats; open or often wooded, sometimes rocky places, from the foothills to moderate elevations in the mountains; associated species include *Holodiscus discolor*, *Physocarpus malvaceus*, *Rosa* sp., and *Symphoricarpos albus*; 2,300-4,200 ft.	May to June (July)	X	X	
Phacelia tetramera	dwarf phacelia	BLM-S, WS	DOC		Alkaline flats, sinks, depressions, and washes; occurs in *Artemisia tridentata/Poa secunda* and *Artemisia rigida/Poa secunda* plant communities; 1,200-2,200 ft.	April to June	X	X	
Physaria douglasii ssp. tuplashensis	White Bluffs bladderpod	C, WT	SUS		Big sagebrush/bluebunch wheatgrass association, restricted to dry, barren, nearly vertical exposures of calcium carbonate soil.	June to July		X	

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Polyctenium fremontii var. fremontii	Fremont's combleaf	BLM-S, WT	DOC		Gravelly clay, sagebrush desert, damp or wet meadows, near shallow ponds, stony swales, dried vernal pools, and banks and beds of vernal streamlets. In Washington the species occurs on a plateau, close to a road in the shallow silty loam soil of a vernal pond depression within sagebrush steppe and lithosol communities; 2,300 ft.	May to June	X	X	
Polygonum austiniae	Austin's knotweed	WT			Dry to moist flats or banks, from the sagebrush plains into the lower mountains, often in *Pinus ponderosa* forest.	June to August		X	X
Rorippa columbiae	Columbia Cress	SOC, BLM-S, WE	DOC	DOC	Moist, sandy or cobbly soil, such as river floodplains and ephemeral ponds. Associated with the Columbia River, snow -fed streams and lakes, wet meadows, irrigation ditches and roadside ditches; apparently requires wet soil throughout the growing season.	(April) July to October			X
Rotala ramosior	lowland toothcup	BLM-S, WT	SUS		Wet, swampy places, lakes and pond margins, and along free-flowing river reaches in association with *Juncus* and *Eleocharis* species; 200-2,259 ft.	June to August		X	X
Scouleria marginata	marginate splashzone moss	WT	DOC		On rocks in streams and rivers in splash zone	July to October			X
Sidalcea oregana var. calva	Wenatchee Mountain checker-mallow	E, WE	SUS		Dry forests to moist meadows; sagebrush plains, meadowland, and ponderosa pine forest; 1,900-3,200 ft.	May to June (mid-August)		X	
Silene seelyi	Seely's silene	SOC, BLM-S, WS	SUS		Cliffs and talus slopes; basalt and granitic crevices on rock outcrops in absence of other species; 1,500-7,000 ft.	May to August	X	X	
Sisyrinchium sarmentosum	pale blue-eyed grass	SOC, BLM-S, WT	SUS		Dry to moist meadows, swampy areas, sealevel to moderate elevations in the mountains.	July to August		X	

Scientific Name	Common Name	Status[1,2,3]	SUS/DOC on BLM or YTC[4]	DOC[1] within 0.25 mile or within TRS of Alt Routes[5]	Habitat Required[6]	Phenology[6]	May Target	June Target	August Target
Spiranthes diluvialis	Ute ladies'-tresses	T, WE	SUS		Moist meadow habitats along floodplains, oxbows, and stream and river terraces; subirrigated or spring-fed abandoned stream channels and valleys; and lakeshores; specifically, swales, narrow meander channels, and similar wetland and riparian habitats in valley bottom landscapes that retain moisture through late-summer.	mid-July to August			X
Spiranthes porrifolia	western ladies-tresses	BLM-S, WS	SUS		Moist swampy areas, wet meadows, along streams, in bogs, and on seepage slopes. At some Washington locations, is known to be associated with special status plant species *Ophioglossum pusillum*.	(May) July to September		X	X
Tauschia hooveri	Hoover's tauschia	SOC, BLM-S, WT	DOC	DOC	Sagebrush scablands, often barren rocky clay.	March to May	X		
Texosporium sancti-jacobi	woven-spored lichen	BLM-S, WT	DOC		In the Pacific Northwest, *T. sancti-jacobii*, is found in arid to semi-arid shrub steppe, grassland or savannah communities up to 3,300 ft. (1,000 M) in elevation.	April to June	X	X	
Utricularia minor	lesser bladderwort	WA-STR, WR1	SUS		In shallow, standing or slow moving water; circumboreal; 135-4,000 ft.	June to August		X	X

[1]ISSSSP=Inter-agency Special Status / Sensitive Species Program species (ISSSSP) 2008[a,b], [2]WAHNP 2010. [3]USFWS 2011. [4]Habitat required and phenology data are based on Hitchcock et al. (1969), Hitchcock and Cronquist (1973), WANHP and BLM (2005), WANHP (2010), and Camp and Gamon (2011). Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; BLM-STR – BLM Washington Strategic; WE – Washington State Endangered; WT – Washington State Threatened; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; WM – Washington State Monitor; WR1 – Washington State review group 1; and WX – Washington State possibly extinct or extirpated. SUS/DOC (suspected or documented) on BLM or YTC[4] is based on ISSSSP (2008a,b) and Fort Lewis Directorate of Public Works (2010). DOC within 0.25 mile or within TRS of Alternates[5] is based on data which was accessed from the Washington Natural Heritage Program (WANHP; 2010) and BLM (M. Boyter, pers. comm. March 2011). Habitat required and phenology data[6] are based on Hitchcock et al. (1969), Hitchcock and Cronquist (1973), WANHP and BLM (2005), WANHP (2010), and Camp and Gamon (2011). **Pediocactus simpsonii var. robustior* (hedgehog cactus) was not determined to be a special status plant until after the surveys were complete, so it's mapped location is based on notes and retrospective mapping.

APPENDIX B – HABITAT WITHIN THE ROW CORRIDOR AND SUITABILITY FOR SPECIAL STATUS PLANT SPECIES, BY ROUTE SEGMENT

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APPENDIX B HABITAT WITHIN THE ROW CD CORRIDOR AND SUITABILITY FOR SPECIAL STATUS PLANT SPECIES[1], BY ROUTE (IN ACRES)[2].

	1a			1b			1c			2a			2b			2c			2d			3a			3b			3c		
DESCRIPTION	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT
Agriculture	0	0	1	0	0	0	T	T	9	0	0	0	2	0	23	0	0	66	0	0	0	0	0	0	0	0	3	5	0	85
Developed, Road, or Firebreak	1	0	13	18	12	31	1	0	17	0	0	0	13	0	21	0	0	17	0	0	1	0	0	1	3	25	82	10	0	69
Irrigation Canal	0	0	T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0	0	0	0	0	0	0	5	0	11
Watered Poplar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	21	0	0	0
TOTAL UNSUITABLE	1	0	14	18	12	31	1	T	26	0	0	0	15	0	43	0	0	84	0	0	1	0	0	1	7	25	106	20	0	165
Annual Grassland	0	0	0	25	0	25	T	0	42	0	0	0	2	0	9	0	0	10	8	0	15	0	0	0	6	0	10	21	0	31
Rabbitbrush/ Annual Grassland	0	0	0	9	0	9	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	9	32	0	40
Sagebrush/ Annual Grassland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0	0	0	0	5	0	6	1	0	13
TOTAL MARGINAL	0	0	0	34	0	34	0	0	48	0	0	0	2	0	9	0	0	10	8	0	15	0	0	0	14	0	25	54	0	84
Basalt cliff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0	T	13	17	0	0	2
Rock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	T	0	0	T	0	0	0	0	1	1	0	0	4
Sagebrush/ Perennial Grassland	4	0	6	46	4	51	0	0	55	0	0	1	25	0	113	0	0	0	5	0	6	0	0	2	36	0	74	102	0	124
Aspen	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tree	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0	0
Intermittent Stream or Dry Gully	0	0	1	2	2	5	0	0	7	0	0	1	T	T	8	0	0	9	T	0	4	0	0	0	0	1	1	T	0	T
Riparian	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	10	25	3	0	8
Water Body	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	T	29	T	0	9
TOTAL	4	0	8	49	6	57	0	0	62	0	0	2	26	T	122	0	0	9	5	0	11	0	0	2	38	25	147	105	0	146

	1a			1b			1c			2a			2b			2c			2d			3a			3b			3c		
DESCRIPTION	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT	FS	FU	TOT
SUITABLE																														
Grassland	0	0	6	0	16	16	0	0	29	0	0	5	0	3	54	0	T	153	0	0	101	0	0	0	0	60	141	0	0	40
Perennial Grassland	0	0	0	37	0	37	0	0	17	0	0	0	2	0	9	0	0	0	6	0	7	0	0	0	2	0	2	1	0	1
Shrubland	0	0	16	0	70	70	0	T	68	0	0	12	0	5	82	0	0	95	0	0	2	0	0	0	0	0	1	T	1	54
TOTAL UNKNOWN SUITABILITY	0	0	22	37	85	123	0	T	115	0	0	17	2	7	145	0	T	248	6	0	110	0	0	0	2	60	144	T	1	94
GRAND TOTAL	5	0	44	138	104	244	2	T	251	0	0	19	45	8	319	0	T	352	20	0	137	0	0	3	61	110	422	180	1	490

[1]Suitability for special status plant species is defined as the potential of each habitat to support special status plant species listed in Appendix A. Unsuitable habitats have zero potential to support any of the special plant species. Marginal habitats have potential to support fringe habitat for some of the special status plant species, and/or are generally lower quality habitats in the field. Suitable habitats have the potential to support characteristic habitat for some of the special status plant species, and/or are generally higher quality habitats in the field. Habitats with unknown suitability do not provide enough information to designate them into the marginal or suitable habitats, but do have enough information to determine they are not unsuitable.

[2]Habitats are based on survey results on federal lands (federal surveyed=FS), estimates of inaccessible federal lands that were estimated from aerial interpretation (federal unsurveyed=FU), and the sum total of both of these plus estimates of non-federal lands based on aerial interpretation (ALL). Trace (T) is indicated where land area was 0.49 or less acres. See *Sage Grouse Habitat Assessment Report* (2011) for methods and full results.

APPENDIX C - LIST OF PLANT COMMUNITIES AND ASSOCIATED ROUTE SEGMENTS

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APPENDIX C LIST OF PLANT COMMUNITIES AND ASSOCIATED ROUTE SEGMENTS

Habitat	Plant Community or Dominant Species Present-Common Name	Plant Community or Dominant Species Present-Scientific Name	Priority	Route
Perennial grasslands	Crested wheatgrass*	*Agropyron cristatum*		1b, 1c, 2b
Perennial grasslands	Bluebunch wheatgrass-Sandberg bluegrass, Lithosol*	*Pseudoroegneria spicata-Poa secunda, Lithosolic Phase*	2	1a, 1b, 2b, 2d
Sagebrush/perennial grass areas	Stiff sagebrush	*Artemisia rigida*	*	3c
Sagebrush/perennial grass areas	Stiff sagebrush-Bluebunch wheatgrass*	*Artemisia rigida-Pseudoroegneria spicata*		1b
Sagebrush/perennial grass areas	Stiff sagebrush- Sandberg bluegrass*	*Artemisia rigida-Poa secunda*	3	1b, 2b, 2d, 3b, 3c
Sagebrush/perennial grass areas	Big sagebrush- Western wheatgrass	*Artemisia tridentata-Pascopyrum smithii*		3b
Sagebrush/perennial grass areas	Big sagebrush-Bluebunch wheatgrass*	*Artemisia tridentata-Pseudoroegneria spicata*	3	1a, 1c, 2b, 3b, 3c
Sagebrush/annual grass areas	Big sagebrush-Cheatgrass*	*Artemisia tridentata-Bromus tectorum*		1b, 3b, 3c
Sagebrush/perennial grass areas	Big sagebrush-Idaho fescue	*Artemisia tridentata-Festuca idahoensis*	3	1b
Sagebrush/perennial grass areas	Big sagebrush- Sandberg bluegrass*	*Artemisia tridentata-Poa secunda*	3	1b, 2b, 2d, 3b, 3c
Sagebrush/perennial grass areas	Big sagebrush-Needle and thread*	*Artemisia tridentata-Hesperostipa comata*	1	3b, 3c
Annual grasslands	Non-native annual grassland*	*Bromus tectorum*		1a, 1b, 1c, 2b, 2d, 3c
Rabbitbrush/annual grass areas	Rubber rabbitbrush-Cheatgrass*	*Ericameria nauseosa -Bromus tectorum*		1b, 3b, 3c
Perennial grasslands	Saltgrass	*Distichlis spicata*	1	3c
Perennial grasslands	Basin Wildrye-Saltgrass*	*Leymus cinereus-Distichlis stricta*	1	1a, 3b
Forb	Arrowleaf buckwheat-Sandberg bluegrass	*Eriogonum compositum-Poa secunda*	3	2b
Forb	Shrubby buckwheat	*Eriogonum microthecum*		3b, 3c
Forb	Rock buckwheat-Sandberg bluegrass*	*Eriogonum sphaerocephalum-Poa secunda*	3	2b, 3c
Forb	Strict buckwheat-Sandberg bluegrass	*Eriogonum strictum-Poa secunda*		2b
Forb	Thyme buckwheat-Sandberg bluegrass	*Eriogonum thymoides-Poa secunda*	3	1b, 3c
Perennial grasslands	Idaho fescue-Parsnipflower buckwheat	*Festuca idahoensis-Eriogonum heracleoides*		1b
Aspen	Quaking aspen-Chokecherry	*Populus tremuloides-Prunus virginiana*	*	1b
Bitterbrush	Antelope bitterbrush-Needle and thread	*Purshia tridentata-Hesperostipa comata*	1	3c
Riparian	Coyote willow-Giant reed	*Salix exigua-Phragmites australis*		3c
Intermittent stream/Dry gully	Greasewood-Saltgrass	*Sarcobatus vermiculatus-Distichlis spicata*	2	1b
Annual grasslands	Cereal ryegrass	*Secale cereale*		3c
Perennial grasslands	Sand dropseed- Sandberg bluegrass*	*Sporobolus cryptandrus-Poa secunda*	2	3c
Perennial grasslands	Needle and thread-Sandberg bluegrass	*Hesperostipa comata-Poa secunda*	1	1a, 1b, 2d, 3b, 3c

[1]Plant community names are predominantly based on Steppe Vegetation of Washington (Daubenmire 1970). Where it is not based on Daubenmire 1970, it is based on documenting the dominant tree, shrub, grass, and/or forb species present. An asterisk (*) indicates that the community is a dominant community in at least one link within the ROW corridor. Priority plant community status is based on list of 2009 WANHP Priority Rare Plant Communities or Wetlands http://www1.dnr.wa.gov/nhp/refdesk/plan/CommunityList.pdf (WANHP 2009).

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APPENDIX D – List of Plant Species Documented on Federal Lands within the ROW Corridor, by Route Segments

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APPENDIX D LIST OF PLANT SPECIES DOCUMENTED ON FEDERAL LANDS WITHIN THE ROW CORRIDOR, BY ROUTE SEGMENT.1

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Amaranthaceae	*Amaranthus blitoides*	Mat amaranth										X
Amaranthaceae	*Amaranthus retroflexus*	Red-root pigweed	X						X		X	X
Anacardiaceae	*Rhus glabra*	Smooth sumac		X							X	
Anacardiaceae	*Toxicodendron radicans*	Poison ivy									X	
Apiaceae	*Ligusticum canbyi*	Canby's licorice-root										X
Apiaceae	*Ligusticum grayi*	Gray's licorice-root										X
Apiaceae	*Lomatium canbyi*	Canby's biscuitroot		X							X	
Apiaceae	*Lomatium dissectum*	Fern-leaf biscuitroot		X	X		X		X		X	X
Apiaceae	*Lomatium geyeri*	Geyer's biscuitroot		X								X
Apiaceae	*Lomatium grayi*	Gray's biscuitroot	X	X			X				X	
Apiaceae	*Lomatium macrocarpum*	Bigseed biscuitroot		X					X		X	
Apiaceae	*Lomatium sp.*	Biscuit root									X	X
Apiaceae	*Lomatium triternatum*	Nine-leaf biscuitroot		X					X			X
Apiaceae	*Pteryxia petraea*	Rockloving wavewing					X				X	X
Apocynaceae	*Apocynum cannabinum*	Indian hemp									X	
Apocynaceae	*Apocynum sp.*	Dogbane										X
Asclepiadaceae	*Asclepias speciosa*	Showy milkweed	X	X					X		X	X
Asteraceae	*Achillea millefolium*	Common yarrow	X	X			X		X		X	X
Asteraceae	*Acroptilon repens*	Russian knapweed									X	
Asteraceae	*Agoseris aurantiaca*	Orange agoseris		X								X
Asteraceae	*Agoseris retrorsa*	Spearleaf agoseris		X			X				X	X
Asteraceae	*Ambrosia acanthicarpa*	Flatspine bur ragweed									X	X
Asteraceae	*Antennaria dimorpha*	Low pussytoes		X			X		X		X	X
Asteraceae	*Artemisia dracunculus*	Tarragon									X	
Asteraceae	*Artemisia rigida*	Scabland sagebrush		D			D		D		D	D
Asteraceae	*Artemisia tridentata*	Big sagebrush	D	D	X		D		X		D	D
Asteraceae	*Artemisia tridentata ssp. tridentata*	Basin big sagebrush					X				D	X
Asteraceae	*Artemisia tridentata ssp. wyomingensis*	Wyoming big sagebrush	X	X	X				X		D	D
Asteraceae	*Balsamorhiza careyana*	Carey's balsamroot	X	X			X		X		X	D
Asteraceae	*Balsamorhiza hookeri*	Hooker's balsamroot		X								X
Asteraceae	*Balsamorhiza rosea*	Cutleaf balsamroot		X					X			
Asteraceae	*Centaurea diffusa*	Diffuse knapweed	X	X	X						X	D

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Asteraceae	*Centaurea sp.*	Knapweed										X
Asteraceae	*Chaenactis douglasii*	Douglas' dustymaiden	X	X	X		X		X		X	X
Asteraceae	*Chondrilla juncea*	Rush skeletonweed										X
Asteraceae	*Chrysothamnus viscidiflorus*	Yellow rabbitbrush	X	D	X		X		X		D	D
Asteraceae	*Cirsium arvense*	Canada thistle	X	X							X	X
Asteraceae	*Cirsium sp.*	Thistle (native)			X		X				X	
Asteraceae	*Cirsium undulatum*	Wavyleaf thistle		X								
Asteraceae	*Conyza canadensis*	Canadian horseweed										X
Asteraceae	*Crepis acuminata*	Tapertip hawksbeard		X					X			X
Asteraceae	*Crepis atribarba*	Slender hawksbeard	X	X	X		X		X		X	X
Asteraceae	*Crepis intermedia*	Limestone hawksbeard		X								
Asteraceae	*Crepis modocensis*	Modoc hawksbeard		X					X		X	X
Asteraceae	*Crepis occidentalis*	Largeflower hawksbeard		X								
Asteraceae	*Crepis runcinata*	Fiddleleaf hawksbeard		X								
Asteraceae	*Ericameria nauseosa*	Rubber rabbitbrush	X	D	X		X		X		D	D
Asteraceae	*Erigeron corymbosus*	Longleaf fleabane	X	X								
Asteraceae	*Erigeron filifolius*	Threadleaf fleabane	X								X	X
Asteraceae	*Erigeron foliosus*	Leafy fleabane										X
Asteraceae	*Erigeron linearis*	Desert yellow fleabane	X	X			X		X		X	X
Asteraceae	*Erigeron poliospermus*	Purple cushion fleabane		X			X				X	X
Asteraceae	*Erigeron pumilus*	Shaggy fleabane	X	X			X		X		X	X
Asteraceae	*Erigeron sp.*	Fleabane	X	X					X		X	X
Asteraceae	*Eriophyllum lanatum*	Common woolly sunflower	X	X			X		X		X	X
Asteraceae	*Grindelia squarrosa*	Curlycup gumweed		X								
Asteraceae	*Haplopappus sp.*	Goldenweed		X								
Asteraceae	*Helianthus cusickii*	Cusick's sunflower		X			X					
Asteraceae	*Hymenopappus filifolius*	Fineleaf hymenopappus		X								
Asteraceae	*Hypochaeris radicata*	Hairy cat's ear										X
Asteraceae	*Iva axillaris*	Poverty weed										X
Asteraceae	*Lactuca serriola*	Prickly lettuce	X	X	X				X		X	X
Asteraceae	*Layia glandulosa*	Whitedaisy tidytips	X	X							X	D
Asteraceae	*Lygodesmia juncea*	Rush skeletonplant					X					
Asteraceae	*Machaeranthera canescens*	Hoary tansyaster	X	X			X		X		X	D

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Asteraceae	*Madia exigua*	Small tarweed		X								
Asteraceae	*Madia gracilis*	Grassy tarweed		X			X				X	
Asteraceae	*Madia sativa*	Coast tarweed										X
Asteraceae	*Microseris laciniata*	Cutleaf silverpuffs									X	
Asteraceae	*Microseris nutans*	Nodding microseris							X			X
Asteraceae	*Microseris sp.*	Silverpuffs										X
Asteraceae	*Nestotus stenophyllus*	Narrowleaf mock goldenweed		X			X		X		X	X
Asteraceae	*Northocalais troximoides*	Sagebrush false dandelion	X	X			X		X			X
Asteraceae	*Onopordum acanthium*	Scotch thistle		X								
Asteraceae	*Senecio vulgaris*	Old-man-in-the-Spring										X
Asteraceae	*Solidago sp.*	Goldenrod		X							X	
Asteraceae	*Sonchus oleraceus*	Common sowthistle										X
Asteraceae	*Stenotus lanuginosus*	Woolly mock goldenweed										X
Asteraceae	*Stephanomeria paniculata*	Tufted wirelettuce		X							X	X
Asteraceae	*Stephanomeria minor*	Narrowleaf wirelettuce		X							X	X
Asteraceae	*Taraxacum officinale*	Common dandelion		X							X	X
Asteraceae	*Tetradymia canescens*	Spineless horsebrush		X							X	X
Asteraceae	*Townsendia florifer*	Showy Townsend daisy		X			X		X		X	X
Asteraceae	*Tragopogon dubius*	Yellow salsify	X	D	X		X		X		X	D
Asteraceae	*Tragopogon lamottei*	Jack-go-to-bed-at-noon		X								
Asteraceae	*Xanthium strumarium*	Rought cocklebur										X
Betulaceae	*Alnus incana*	Gray alder		X								
Betulaceae	*Betula sp.*	Birch									X	
Boraginaceae	*Amsinckia menziesii var. intermedia*	Common fiddleneck										X
Boraginaceae	*Amsinckia lycopsoides*	Tarweed fiddleneck										X
Boraginaceae	*Amsinckia menziesii*	Menzies' fiddleneck	X	X					X			
Boraginaceae	*Amsinckia tessellata*	Bristly fiddleneck		X	X		X		X		X	X
Boraginaceae	*Cryptantha circumscissa*	Cushion cryptantha		X							X	X
Boraginaceae	*Cryptantha flaccida*	Weakstem cryptantha		X								X
Boraginaceae	*Cryptantha pterocarya*	Wingnut cryptantha		X			X				X	X
Boraginaceae	*Cryptantha simulans*	Pinewoods cryptantha							X			
Boraginaceae	*Cryptantha sp.*	Cryptantha		X					X			X
Boraginaceae	*Hackelia diffusa var. arida*	Sagebrush stickseed										X

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Boraginaceae	*Lithospermum ruderale*	Western stoneseed	X	X							X	X
Boraginaceae	*Myosotis laxa*	Bay forget-me-not		X								
Boraginaceae	*Myosotis stricta*	Strict forget-me-not		X								
Brassicaceae	*Alyssum alyssoides*	Pale madwort	X	X								
Brassicaceae	*Arabis cusickii*	Cusick's rockcress		X								
Brassicaceae	*Arabis lignifera*	Desert rockcress		X								
Brassicaceae	*Arabis sp.*	Rockcress									X	
Brassicaceae	*Cardaria draba*	Hoary cress		D								
Brassicaceae	*Chorispora tenella*	Crossflower	X	X	D		D					X
Brassicaceae	*Descurainia pinnata*	Western tansymustard	X	X	X		X		X		X	X
Brassicaceae	*Descurainia incana*	Mountain tansymustard										X
Brassicaceae	*Descurainia sophia*	Herb sophia	X	X							X	X
Brassicaceae	*Draba sp.*	Draba									X	X
Brassicaceae	*Erysimum asperum*	Western wallflower										X
Brassicaceae	*Erysimum occidentale*	Pale wallflower							X		X	X
Brassicaceae	*Lepidium densiflorum*	Common pepperweed		X	X							X
Brassicaceae	*Lepidium latifolium*	Broadleaved pepperweed		X	X							D
Brassicaceae	*Lepidium perfoliatum*	Clasping peppergrass	X	X	X		X				X	X
Brassicaceae	*Lepidium sp.*	Pepperweed					X					X
Brassicaceae	*Nasturtium officinale*	Watercress		X								X
Brassicaceae	*Phoenicaulis cheiranthoides*	Wallflower phoenicaulis		X							X	
Brassicaceae	*Physaria douglasii ssp. douglasii*	Twinpod									X	X
Brassicaceae	*Sisymbrium altissimum*	Tall tumblemustard	X	D	X		X		D		X	D
Brassicaceae	*Sisymbrium loeselii*	Small tumbleweed mustard			X		X					X
Brassicaceae	*Thelypodium integrifolium*	Entireleaved thelopody		X								
Brassicaceae	*Thelypodium laciniatum*	Cutleaf thelepody									X	
Brassicaceae	*Thelypodium milleflorum*	Manyflower mustard									X	
Brassicaceae	Unknown Brassicaceae sp.	Mustard										X
Cactaceae	*Opuntia polyacantha*	Plains pricklypear	X									
Cactaceae	*Pediocactus simpsonii var robustior*	Hedgehog cactus		X								
Campanulaceae	*Mertensia longiflora*	Small bluebells		X								X
Caprifoliaceae	*Sambucus nigra ssp. cerulea*	Blue elderberry		X								
Caprifoliaceae	*Symphoricarpos occidentalis*	Western snowberry		X								

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Caryophyllaceae	*Arenaria franklinii*	Franklin's sandwort		X					X			X
Caryophyllaceae	*Holosteum umbellatum*	Jagged chickweed	D	D	D		D		D		D	D
Caryophyllaceae	*Minuartia nuttallii ssp. fragilis*	Nuttall's sandwort		X							X	
Caryophyllaceae	*Moehringia macrophylla*	Largeleaf sandwort	X									
Caryophyllaceae	*Silene menziesii*	Menzies' campion		X								
Caryophyllaceae	*Spergularia rubra*	Red sandspurry			X		X					X
Chenopodiaceae	*Bassia hyssopifolia*	Fivehorn smotherweed									X	X
Chenopodiaceae	*Bassia scoparia*	Burningbush	X	X	X						X	D
Chenopodiaceae	*Chenopodium album*	Lambsquarters	X				X				X	X
Chenopodiaceae	*Chenopodium simplex*	Mapleleaf goosefoot		X								
Chenopodiaceae	*Chenopodium leptophyllum*	Narrowleaf goosefoot		X								
Chenopodiaceae	*Grayia spinosa*	Spiny hopsage		X			X		X		D	D
Chenopodiaceae	*Krascheninnikovia lanata*	Winterfat										X
Chenopodiaceae	*Salsola tragus*	Prickly Russian thistle	D	D	D		D		X		X	D
Chenopodiaceae	*Sarcobatus vermiculatus*	Greasewood		X								
Clusiaceae	*Hypericum perforatum*	Common St. Johnswort									X	
Commelinaceae	*Tradescantia sp.* (near residential areas, possible horticultural escape)	Spiderwort			X							
Convulvulaceae	*Convolvulus arvensis*	Field bindweed		X							X	
Cornaceae	*Cornus sericea ssp. sericea*	Redosier dogwood		X								
Crassulaceae	*Sedum sp.*	Stonecrop										X
Cyperaceae	*Carex douglasii*	Douglas' sedge		X								
Cyperaceae	*Carex spp.*	Sedge		X							X	
Cyperaceae	*Schoenoplectus tabernaemontani*	Softstem bulrush										X
Elaeagnaceae	*Elaeagnus angustifolia*	Russian olive									X	D
Equisetaceae	*Equisetum arvense*	Field horsetail									X	
Equisetaceae	*Equisetum hyemale*	Scouring rush horsetail									D	
Euphorbiaceae	*Chamaesyce glyptosperma*	Ribseed sandmat		X							X	X
Fabaceae	*Astragalus caricinus*	Buckwheat milkvetch		X							X	X
Fabaceae	*Astragalus columbianus*	Columbia milkvetch					X		X		X	
Fabaceae	*Astragalus filipes*	Basalt milkvetch	X	X							X	X
Fabaceae	*Astragalus leibergii*	Leiberg's milkvetch									X	
Fabaceae	*Astragalus lyallii*	Lyall's milkvetch		X							X	

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Fabaceae	*Astragalus purshii*	Woollypod milkvetch	X	X			X		X		X	X
Fabaceae	*Astragalus reventiformis*	Yakima milkvetch	X	X								
Fabaceae	*Astragalus sclerocarpus*	Woollypod milkvetch									X	X
Fabaceae	*Astragalus spaldingii*	Spalding's milkvetch							X			
Fabaceae	*Astragalus speirocarpus*	Threadstalk milkvetch		X			X				X	X
Fabaceae	*Astragalus succumbens*	Columbia milkvetch	X						X		X	
Fabaceae	*Cleome lutea*	Yellow spiderflower									X	
Fabaceae	*Lotus unifoliolatus var. unifoliolatus*	American bird's-foot trefoil									X	
Fabaceae	*Lupinus argenteus*	Silvery lupine									X	X
Fabaceae	*Lupinus pusillus*	Rusty lupine									X	
Fabaceae	*Lupinus sericeus*	Silky lupine	X	X			X		X		X	X
Fabaceae	*Lupinus sp.*	Lupine	X	X			X		X			
Fabaceae	*Lupinus sulphureus*	Sulphur lupine	X	X					X		X	
Fabaceae	*Medicago polymorpha*	Burclover	X		X						X	X
Fabaceae	*Medicago sativa*	Alfalfa		D							X	X
Fabaceae	*Melilotus alba*	Sweetclover	X								X	X
Fabaceae	*Melilotus officinalis*	Yellow sweet-clover	X									X
Fabaceae	*Oxytropis campestris* (not var. *wanapum* b/c fewer than 17 leaflets)	Field locoweed									X	
Fabaceae	*Psoralidium lanceolatum*	Lemon scurfpea									X	D
Fabaceae	*Trifolium macrocephalum*	Largehead clover		X							X	
Fabaceae	*Trifolium sp.*	Clover									X	
Fabaceae	*Vicia americana*	American vetch		X								X
Geraniaceae	*Erodium cicutarium*	Redstem stork's bill		X	X		X		X		X	X
Grossulariaceae	*Ribes aureum*	Golden currant		X								
Grossulariaceae	*Ribes cereum*	Wax currant		X								
Hydrangeaeceae	*Philadelphus lewisii*	Lewis' mock orange									X	
Hydrophyllaceae	*Hydrophyllum capitatum*	Ballhead waterleaf		X							X	
Hydrophyllaceae	*Nemophila breviflora*	Basin nemophila		X								
Hydrophyllaceae	*Phacelia hastata*	Silverleaf phacelia	X	X					X		X	X
Hydrophyllaceae	*Phacelia heterophylla*	Varileaf phacelia		X								
Hydrophyllaceae	*Phacelia linearis*	Threadleaf phacelia	X	X			X		X		X	X
Hydrophyllaceae	*Phacelia ramosissima*	Branching phacelia	X									

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Juncaceae	*Juncus arcticus ssp. littoralis*	Mountain rush		X								X
Juncaceae	*Juncus sp.*	Rush									X	D
Lamiaceae	*Agastache occidentalis*	Western giant hyssop		X								
Lamiaceae	*Agastache urticifolia*	Nettleleaf giant hyssop		X			X					
Lamiaceae	*Mentha arvensis*	Wild mint		X								
Lamiaceae	*Nepeta cataria*	Catnip		X								
Lamiaceae	*Salvia dorrii*	Purple sage	X	X					X		D	D
Liliaceae	*Allium acuminatum*	Tapertip onion		X							X	X
Liliaceae	*Allium amplectens*	Narrowleaf onion									X	
Liliaceae	*Allium scilloides*	Fragile onion		X								
Liliaceae	*Asparagus officinalis*	Garden asparagus									X	
Liliaceae	*Brodiaea coronaria*	Crown brodiaea										X
Liliaceae	*Triteleia hyacinthina*	White brodiaea									X	X
Liliaceae	*Calochortus macrocarpus*	Sagebrush mariposa lily	X	X			X		X		X	X
Liliaceae	*Maianthemum stellatum*	Starry false lily of the valley		X								
Liliaceae	*Triteleia grandiflora var. grandiflora*	Largeflower triteleia		X			X		X		X	X
Liliaceae	*Zigadenus paniculatus*	Foothill deathcamas	X	X							X	X
Liliaceae	*Zigadenus venenosus*	Meadow deathcamas		X					X		X	X
Loasaceae	*Mentzelia albicaulis*	Whitestemm blazingstar					X				X	X
Loasaceae	*Mentzelia laevicaulis*	Smoothstem blazingstar	X								X	X
Lythraceae	*Lythrum salicaria*	Purple loosestrife										X
Malvaceae	*Sphaeralcea grossulariifolia*	Gooseberryleaf globemallow									X	
Marsilaceae	*Marsilea vestita*	Hairy waterclover										X
Moraceae	*Morus alba*	White mulberry									X	
Onagraceae	*Camissonia andina*	Blackfoot River evening primrose		X								X
Onagraceae	*Camissonia hilgardii*	Hilgard's suncup		X								
Onagraceae	*Camissonia minor*	Small eveningprimrose										X
Onagraceae	*Chamerion angustifolium*	Fireweed									X	
Onagraceae	*Epilobium ciliatum ssp. glandulosum*	Fringed willowherb										X
Onagraceae	*Epilobium brachycarpum*	Tall annual willowherb	X	X	X		X				X	X
Onagraceae	*Gaura mollis*	Velvetweed		X								X
Onagraceae	*Gayophytum diffusum*	Spreading groundsmoke		X								

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Onagraceae	*Oenothera caespitosa var. caespitosa*	Caespitose evening primrose									X	
Onagraceae	*Oenothera pallida*	Pale evening primrose	X	X			X				X	D
Orobanchaceae	*Orobanche californica*	California broomrape		X							X	
Orobanchaceae	*Orobanche corymbosa*	Flat-top broomrape	X						X		X	X
Orobanchaceae	*Orobanche fasciculata*	Clustered broomrape									X	X
Orobanchaceae	*Orobanche pinorum*	Conifer broomrape										X
Orobanchaceae	*Orobanche uniflora*	Oneflowered broomrape										X
Pinaceae	*Pinus contorta*	Lodgepole pine									X	
Plantaginaceae	*Plantago lanceolata*	Narrowleaf plantain									X	X
Plantaginaceae	*Plantago major*	Common plantain										X
Poaceae	*Achnatherum hymenoides*	Indian ricegrass	X	X			X		X		X	D
Poaceae	*Achnatherum thurberianum*	Thurber's needlegrass									X	X
Poaceae	*Agropyron cristatum*	Crested wheatgrass	X	D	D		D				X	D
Poaceae	*Avena sativa*	Common oat										X
Poaceae	*Bromus arvensis*	Field brome		D	X				X		X	X
Poaceae	*Bromus hordeaceus*	Soft brome	X	X								
Poaceae	*Bromus tectorum*	Cheatgrass	D	D	D		D		D		D	D
Poaceae	*Dactylis glomerata*	Orchardgrass									X	
Poaceae	*Dichanthelium acuminatum*	Western panicgrass										X
Poaceae	*Distichlis spicata*	Saltgrass	X	X			X				D	X
Poaceae	*Elymus caninus*	Bearded wheatgrass										X
Poaceae	*Elymus elymoides*	Squirreltail	X	D			X		X		X	X
Poaceae	*Elymus lanceolatus*	Thickspike wheatgrass		X								
Poaceae	*Eremopyrum triticeum*	Annual wheatgrass										X
Poaceae	*Festuca idahoensis*	Idaho fescue	X	X	X		X		X		X	X
Poaceae	*Hesperostipa comata*	Needle and thread	X	X			X		X		X	D
Poaceae	*Hordeum jubatum*	Foxtail barley	X	X								X
Poaceae	*Hordeum marinum*	Seaside barley		X	X							
Poaceae	*Hordeum murinum*	Mouse barley			X		X				X	X
Poaceae	*Hordeum vulgare*	Common barley										X
Poaceae	*Koeleria cristata*	Prairie Junegrass										X
Poaceae	*Leymus cinereus*	Basin wildrye	X	X	X		X				X	X
Poaceae	*Leymus triticoides*	Beardless wildrye										X

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Poaceae	*Pascopyrum smithii*	Western wheatgrass	X	X							X	X
Poaceae	*Phalaris arundinacea*	Reed canarygrass										X
Poaceae	*Phragmites australis*	Common reed										X
Poaceae	*Poa bulbosa*	Bulbous bluegrass	X	X	X		X		X		X	X
Poaceae	*Poa pratensis*	Kentucky bluegrass		X							X	X
Poaceae	*Poa secunda*	Sandberg bluegrass	D	D	D		D		D		D	D
Poaceae	*Pseudoroegneria spicata*	Bluebunch wheatgrass	D	D			D		D		D	D
Poaceae	*Schedonorus pratensis*	Meadow fescue		X								
Poaceae	*Secale cereale*	Cereal rye										X
Poaceae	*Sporobolus airoides*	Alkali sacaton									X	
Poaceae	*Sporobolus cryptandrus*	Sand dropseed	X	D							X	X
Poaceae	*Triticum aestivum*	Common wheat										X
Poaceae	*Vulpia bromoides*	Brome fescue										X
Poaceae	*Vulpia microstachys*	Small fescue	X	X			X				X	X
Poaceae	*Vulpia octoflora*	Sixweeks fescue		X							X	
Poaceae	*Vulpia sp.*	Fescue										X
Polemoniaceae	*Collomia grandiflora*	Grand collomia	X	X					X			X
Polemoniaceae	*Collomia heterophylla*	Variableleaf collomia		X								X
Polemoniaceae	*Collomia linearis*	Tiny trumpet										X
Polemoniaceae	*Collomia tinctoria*	Staining collomia		X								
Polemoniaceae	*Eriastrum sparsiflorum*	Great Basin woollystar										X
Polemoniaceae	*Gilia inconspicua*	Inconspicuous gilia										X
Polemoniaceae	*Gilia sinuata*	Shy gilia									X	X
Polemoniaceae	*Gilia sp.*	Gilia	X	X	X						X	X
Polemoniaceae	*Ipomopsis aggregata*	Scarlet gilia		X								X
Polemoniaceae	*Leptosiphon septentrionalis*	Northern linanthus										X
Polemoniaceae	*Linanthus pungens*	Granite prickly phlox	X	X	X				X		X	X
Polemoniaceae	*Microsteris gracilis*	Slender phlox		X								X
Polemoniaceae	*Navarretia sp.*	Pincushionplant							X			
Polemoniaceae	*Phlox aculeata*	Sagebrush phlox					X					X
Polemoniaceae	*Phlox hoodii*	Spiny phlox	X	X					X		X	X
Polemoniaceae	*Phlox longifolia*	Longleaf phlox	X	X			X		X		X	X
Polemoniaceae	*Phlox speciosa*	Showy phlox									X	

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Polygonaceae	*Chorizanthe watsonii*	Fivetooth spineflower	X	X								X
Polygonaceae	*Eriogonum cernuum*	Nodding buckwheat										X
Polygonaceae	*Eriogonum compositum*	Arrowleaf buckwheat	X						X		X	
Polygonaceae	*Eriogonum douglasii*	Douglas' buckwheat		X							X	
Polygonaceae	*Eriogonum flavum*	Alpine golden buckwheat	X								X	
Polygonaceae	*Eriogonum heracleoides*	Parsnipflower buckwheat		X							X	X
Polygonaceae	*Eriogonum maculatum*	Spotted buckwheat										X
Polygonaceae	*Eriogonum microthecum*	Slender buckwheat	X	X							X	X
Polygonaceae	*Eriogonum niveum*	Snow buckwheat		X					X		X	D
Polygonaceae	*Eriogonum nudum*	Naked buckwheat										X
Polygonaceae	*Eriogonum pyrolifolium*	Shasta buckwheat	X	X							X	X
Polygonaceae	*Eriogonum sphaerocephalum*	Rock buckwheat	X	X			X				X	X
Polygonaceae	*Eriogonum strictum*	Blue Mountain buckwheat		X			X		X		X	X
Polygonaceae	*Eriogonum thymoides*	Thymeleaf buckwheat		X			X		X		X	X
Polygonaceae	*Eriogonum vimineum*	Wickerstem buckwheat										X
Polygonaceae	*Oxytheca dendroidea*	Narrowleaf oxytheca		X								
Polygonaceae	*Polygonum aviculare*	Prostrate knotweed									X	
Polygonaceae	*Polygonum lapathifolium*	Curlytop knotweed		X								X
Polygonaceae	*Polygonum sp.*	Knotweed	X									X
Polygonaceae	*Rumex crispus*	Curly dock										X
Polygonaceae	*Rumex venosus*	Veiny dock										X
Portulacae	*Lewisia rediviva*	Bitter root		X					X			X
Portulaceae	*Cistanthe umbellata*	Mt. Hood pussypaws									X	X
Portulaceae	*Claytonia parviflora*	Streambank springbeauty		X								
Portulaceae	*Claytonia perfoliata*	Miner's lettuce		X							X	X
Primulaceae	*Dodecatheon conjugens*	Bonneville shootingstar										X
Ranunculaceae	*Aquilegia formosa*	Western columbine		X								
Ranunculaceae	*Ceratocephala testiculata*	Curveseed butterwort		X	X		D					X
Ranunculaceae	*Clematis ligusticifolia*	Western white clematis		X							D	
Ranunculaceae	*Delphinium glaucum*	Sierra larkspur		X								
Ranunculaceae	*Delphinium nuttallianum*	Twolobe larkspur					X		X		X	X
Ranunculaceae	*Delphinium sp.*	Larkspur										X
Ranunculaceae	*Ranunculus sp.*	Buttercup		X								

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Ranunculaceae	*Ranunculus uncinatus*	Woodland buttercup		X								
Ranunculaceae	*Thalictrum occidentale*	Western meadow-rue		X								
Rhamnaceae	*Frangula purshiana*	Cascara buckthorn										X
Rosaceae	*Amelanchier alnifolia*	Saskatoon serviceberry									X	
Rosaceae	*Prunus virginiana*	Chokecherry		X								
Rosaceae	*Purshia tridentata*	Antelope bitterbrush	X	X							D	D
Rosaceae	*Rosa woodsii*	Woods' rose		X							X	
Rubiaceae	*Galium aparine*	Stickywilly	X	X							X	X
Rubiaceae	*Galium multiflorum*	Shrubby bedstraw	X	X							X	X
Salicaceae	*Populus alba*	White poplar									X	X
Salicaceae	*Populus balsamifera ssp. trichocarpa*	Black cottonwood	X	X							X	
Salicaceae	*Populus tremuloides*	Quaking aspen		X								
Salicaceae	*Salix amygdaloides*	Peachleaf willow										X
Salicaceae	*Salix exigua*	Narrowleaf willow		X								X
Santalaceae	*Comandra umbellata*	Bastard toadflax	X								X	X
Scrophulariaceae	*Castilleja cervina*	Deer Indian paintbrush		X								X
Scrophulariaceae	*Castilleja thompsonii*	Thompson's Indian paintbrush	X	X			X				X	X
Scrophulariaceae	*Collinsia parviflora*	Maiden blue eyed Mary		X							X	X
Scrophulariaceae	*Linaria dalmatica*	Dalmatian toadflax	X	X								X
Scrophulariaceae	*Lithophragma parviflorum*	Smallflower woodland-star		X							X	X
Scrophulariaceae	*Mimulus gutattus*	Common monkey-flower		X								
Scrophulariaceae	*Orthocarpus barbatus*	Grand Coulee owl's-clover										X
Scrophulariaceae	*Penstemon acuminatus*	Sharp-leaf penstemon										X
Scrophulariaceae	*Penstemon deustus*	Scabland penstemon									X	
Scrophulariaceae	*Penstemon gairdneri*	Gairdner's beardtongue		X								X
Scrophulariaceae	*Penstemon glandulosus var. chelanensis*	Stickystem penstemon		X								
Scrophulariaceae	*Penstemon richardsonii var. richardsonii*	Richardson's penstemon		X							X	
Scrophulariaceae	*Penstemon sp.*	Penstemon	X	X							X	X
Scrophulariaceae	*Penstemon speciosus*	Royal penstemon	X	X								X
Scrophulariaceae	*Verbascum thapsus*	Common mullein	X	X							X	X
Scrophulariaceae	*Veronica americana*	American speedwell		X								
Selaginellaceae	*Selaginella wallacei*	Wallace's spikemoss	X	D			D		X			X
Solanaceae	*Solanum tuberosum*	Irish potato										X

FAMILY	SPECIES	COMMON NAME	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Typhaceae	*Typha latifolia*	Broadleaf cattail										X
Ulmaceae	*Ulmus pumila*	Siberian elm	X								X	
Urticaceae	*Urtica dioica*	Stinging nettle		X								
Valerianaceae	*Plectritis macrocera*	Longhorn plectritus	X	X								X
Verbenaceae	*Verbena bracteata*	Bigbract verbena	X	X							X	X
Violaceae	*Viola trinervata*	Rainier violet		X			X				X	X
Zygophyllaceae	*Tribulus terrestris*	Puncturevine	X									X

[1]Dominant species with >5% cover are indicated by a "D". All other species are indicated by an "X".

APPENDIX E – Photographs of Plant Species Documented on Federal Lands within the ROW Corridor

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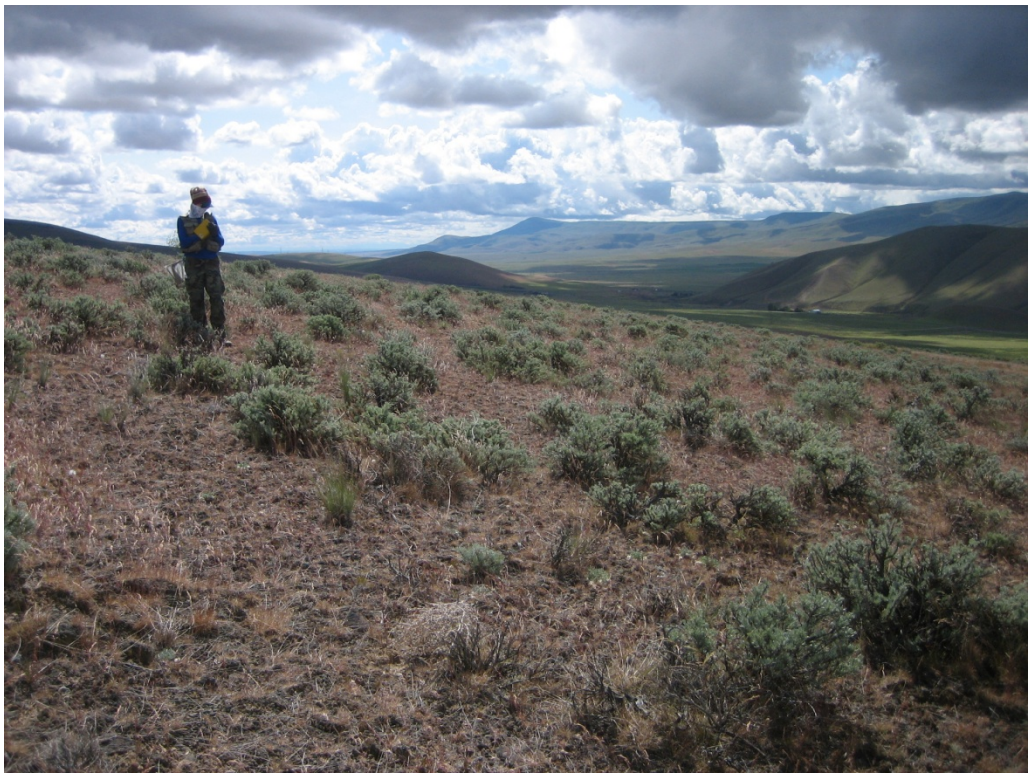
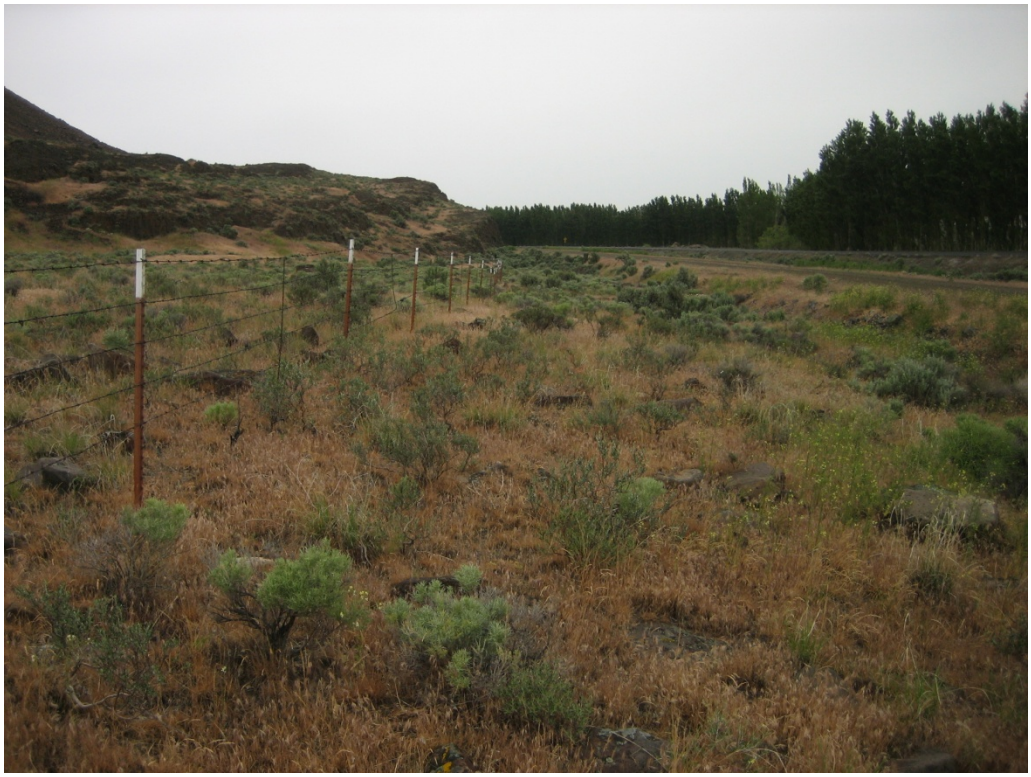
Columbia milkvetch (*Astragalus columbianus*) on YTC lands (YTC5) within Route 2b

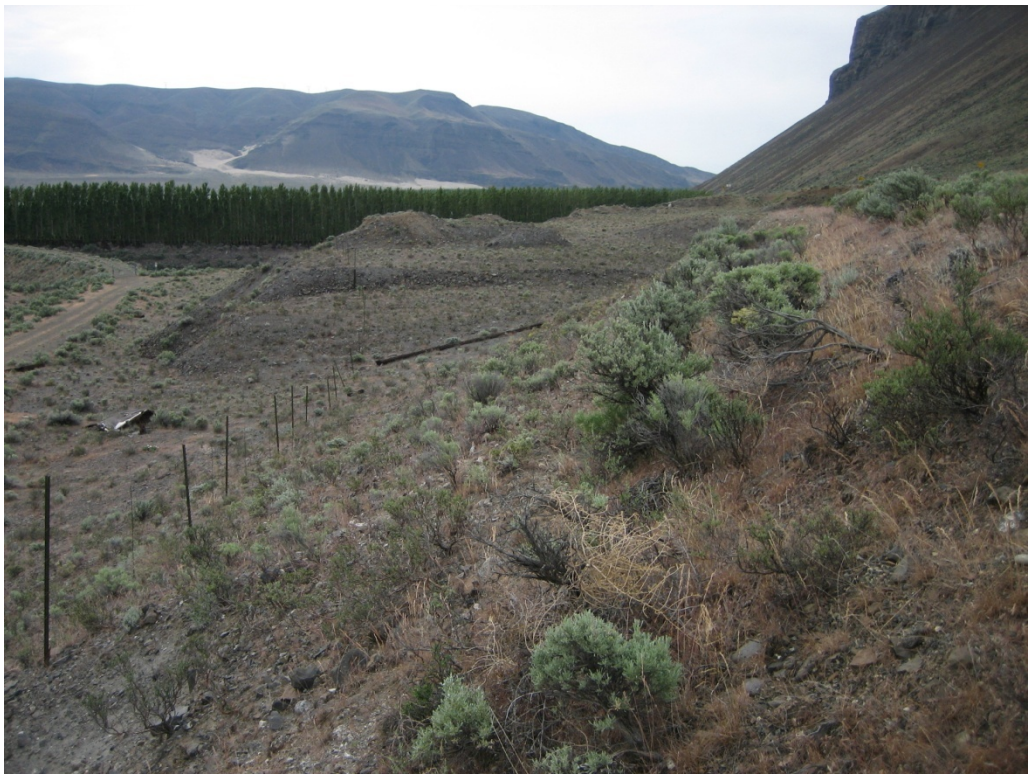


Columbia milkvetch (*Astragalus columbianus*) on BLM lands (BLM4) within Route 2b

Columbia milkvetch (*Astragalus columbianus*) on YTC lands (YTC6) within Route 3b [Cluster 1]



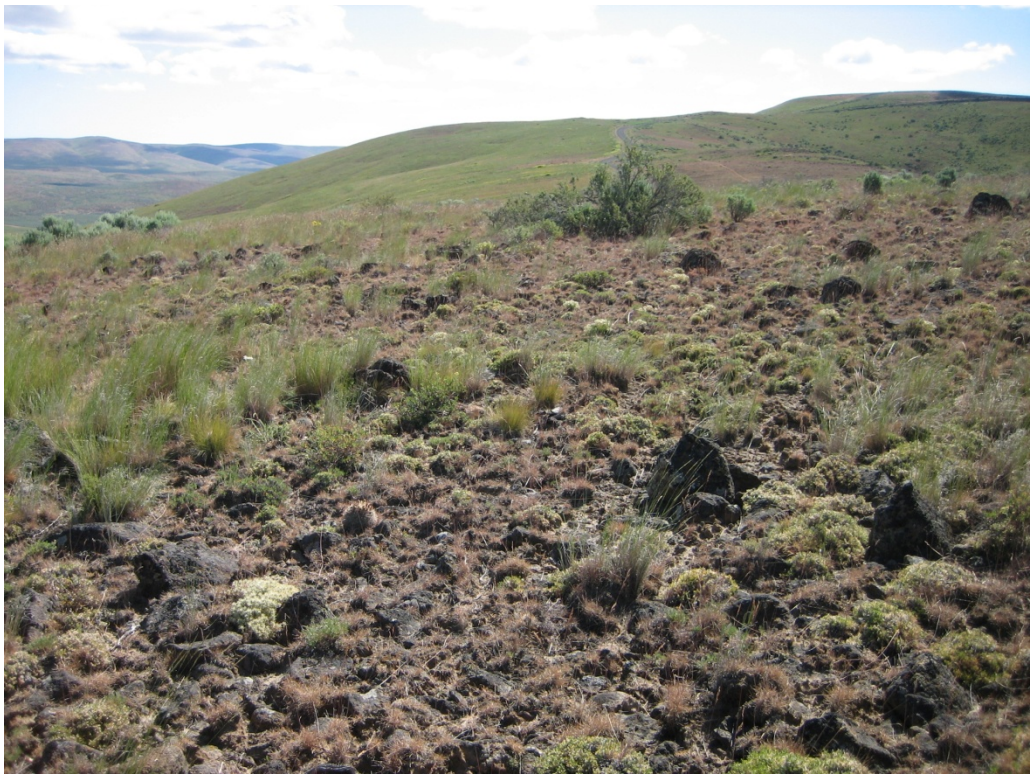
Columbia milkvetch (*Astragalus columbianus*) on YTC lands (YTC6) within Route 3b [Cluster 2]



Nuttall's sandwort (*Minuartia nuttallii var. fragilis*) on YTC lands (YTC6) within Route 3b [Cluster 2]

Caespitose evening-primrose (*Oenothera caespitosa ssp. caespitosa*) on YTC lands (YTC6) within Route 3b [Cluster 1]

Caespitose evening-primrose (*Oenothera caespitosa ssp. caespitosa*) on YTC lands (YTC6) within Route 3b [Cluster 2]



Hedgehog cactus (*Pediocactus simpsonii var. robustior*) on YTC lands (YTC1) within Route 1b.

APPENDIX B-3
SPECIAL STATUS PLANTS REPORT

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TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

BLM	U.S. Bureau of Land Management
DEIS	Draft Environmental Impact Statement
GAP	Gap Analysis Program
GPS	global positioning system
ISSSSP	Inter-agency Special Status / Sensitive Species Program
JBLM YTC	Joint Base Lewis-McChord Yakima Training Center
kV	kilovolt
MR	Manastash Ridge Subroute
NNR	New Northern Route
POD	Plan of Development
Reclamation	Bureau of Reclamation
ROW	right-of-way
SDEIS	Supplemental Draft Environmental Impact Statement
USFWS	U.S. Fish and Wildlife Service
WNHP	Washington Natural Heritage Program
WSDOT	Washington State Department of Transportation

1.0 INTRODUCTION

Pacific Power proposes to construct, operate and maintain a new 230 kilovolt (kV) transmission line in the south-central portion of Washington from the Vantage Substation near the Wanapum Dam to the Pomona Heights Substation near Selah, Washington. The original proposed Project analyzed in the DEIS consisted of 10 end-to-end alternatives approximately following the southern and eastern flanks of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). In April, 2013 the New Northern Route (NNR) was identified (hereafter Preliminary-NNR). Special status plant surveys were conducted on accessible portions of that route during May and July 2013. After the field surveys, routing adjustments were made due to new requirements for separation distance from existing transmission lines and concerns about sage-grouse. The locations of the NNR and Manastash Ridge Subroute (MR) were finalized in November 2013. The Final-NNR occurs along the west side of Interstate 82 and then passes through the northern portion of the JBLM YTC to the Vantage Substation. The MR skirts Manastash Ridge, west of Badger Pocket in the northwestern portion of JBLM YTC. To facilitate analysis and discussion the new routes are broken into eight NNR segments (NNR-1 through NNR-8) and one MR subroute (MR-1).

The 2013 special status plant surveys were conducted on approximately 584 acres or 30.5 centerline miles of federal and Washington State Department of Transportation (WSDOT) lands on the Preliminary-NNR segments. Portions of Bureau of Reclamation (Reclamation) and U.S. Bureau of Land Management (BLM) lands which had been surveyed for the Draft Environmental Impact Statement (DEIS) in 2011 and were incorporated into the Preliminary-NNR and the Final-NNR were not revisited. Noxious weed surveys coincided with the special status plant surveys, and these are discussed in a separate report (Appendix B-4 of the Supplemental Draft Environmental Impact Statement [SDEIS]).

Due to the routing adjustments that occurred following the special status plant surveys, 43 percent (16.2 of the total 37.7 centerline miles) of federal and WSDOT lands within the Final-NNR were surveyed in 2013 (14.6 miles) and 2011 (1.6 miles). Table 1 shows how the Preliminary-NNR and the Final-NNR segments correspond to each other and the centerline miles surveyed during 2011and 2013, by land jurisdiction, that are still part of the Final-NNR. In this report, special status plants that were documented in 2013 are included whether or not they still occur in the Final-NNR, but it is noted whether they are in the Final-NNR. Habitat and general plant species lists (Appendix C) show the Preliminary-NNR route segments where they were documented and the corresponding Final-NNR segments.

TABLE 1 SPECIAL STATUS PLANT SURVEY STATUS AND CENTERLINE MILES FOR THE FINAL-NNR

FINAL-NNR ROUTE SEGMENTS			PRELIMINARY-NNR ROUTE SEGMENTS WHERE 2011/2013 SURVEYS WERE CONDUCTED AND ARE STILL PART OF FINAL-NNR[b] (MILES)					
SEGMENT NUMBER	JURIS-DICTION[a]	TOTAL MILES	NNR-1	NNR-2	NNR-3	NNR-4	NNR-5	TOTAL SURVEYED
NNR-1	Reclamation	0.2	0.2 (0.1 miles in 2011 and 0.1 miles in 2013)					0.2
	Private	2.1						
	TOTAL	2.4	0.2					0.2
NNR-2	Private	<0.1						
	WSDOT	<0.1						
	JBLM YTC	5.0		5.0 (2013)				5.0
	TOTAL	5.0		5.0				5.0

FINAL-NNR ROUTE SEGMENTS			PRELIMINARY-NNR ROUTE SEGMENTS WHERE 2011/2013 SURVEYS WERE CONDUCTED AND ARE STILL PART OF FINAL-NNR[b] (MILES)					
SEGMENT NUMBER	JURIS-DICTION[a]	TOTAL MILES	NNR-1	NNR-2	NNR-3	NNR-4	NNR-5	TOTAL SURVEYED
NNR-3	BLM	3.6			3.6[c] (entire length of ROW but only 1/3 its width; 2013)			3.6[c]
	Private	5.0						
	WSDOT	0.7			0.5 (2013)			0.5
	TOTAL	9.3			4.1[c]			4.1[c]
NNR-4o/NNR-4u	Private	1.2						
	WSDOT	0.1						
	JBLM YTC	3.3				3.3[c] (2.9 of this is for entire length of ROW but only 1/3 its width; 2013)		3.3[c]
	TOTAL	4.5				3.3[c]		3.3[c]
NNR-5	JBLM YTC	1.8				1.6 (2013)		1.6
NNR-6o/NNR-6u	JBLM YTC	6.4						
NNR-7	JBLM YTC	8.2				0.1 (2013)		0.1
NNR-8	BLM	0.4					0.4 (0.1 miles in 2011 and 0.3 miles in 2013)	0.4
	Reclamation	1.4					1.4 (2011)	1.4
	Private	0.5						
	Water	0.4						
	TOTAL	2.7					1.8	1.8
MR-1	DNR	1.7						
	Private	3.5						
	JBLM YTC	6.6				<0.1 (2013)		<0.1
	TOTAL	11.9				<0.1		<0.1
GRAND TOTAL		52.3	0.2	5.0	4.1[c]	5.0[c]	1.8	16.2[c]

[a]Special status plant surveys are required on lands managed by the BLM, Reclamation, JBLM YTC, and WSDOT, which cumulatively total 37.7 centerline miles of the Final-NNR.
[b]There were 1.6 centerline miles surveyed in 2011 and 14.6 centerline miles surveyed in 2013 that are still within the Final-NNR.
[c]Even though only 1/3 of the width of the right-of-way (ROW) were surveyed in 2013, these values are included in the grand total, as they are fairly representative of the entire ROW for the Final-NNR.

2.0 METHODS

In 2013, qualified botanists surveyed for target special status plant species on federal and WSDOT lands within the right-of-way (ROW) corridor for the Preliminary-NNR alternate route segments west of the Columbia River, which was almost entirely accessible. Methodology for 2013 surveys is described below. In addition, 2011 special status plant survey data for the portion of Final-NNR-8 east of the Columbia

River is also included in this document, for ease of evaluating the entire NNR. This survey followed BLM Procedures for Vegetation Inventory and Rare Plant Clearances, which was provided by the BLM (M. Boyter, March 2011).

Surveyor Qualifications

Special status plant surveys were conducted by botanists who have the following minimum qualifications:

- An academic background (bachelor's degree or higher in botany) or equivalent experience in plant taxonomy;
- The taxonomic experience to identify, through personal knowledge or the use of technical floras, most species encountered in the field, and an understanding of how to contact taxonomic experts for species that they are unable to identify;
- The skills to use global positioning system (GPS) to adequately map occurrences of special status plant species; and
- Familiarization of the potential special status plant species in the Project area.

All of the botanists who conducted special status plant surveys in 2013 had also been involved in conducting the 2011 botanical surveys.

Field Preparation

As the habitat of the Preliminary-NNR (and subsequently the Final-NNR) corresponded with the habitat surveyed in 2011, 2013 surveys used the same target special status plant list updated to account for changes in species status (ISSSSP 2012; WNHP 2012a,b,c; USFWS 2012, 2013a,b; Appendix A). There were a few additions and a few deletions of species based on agency updates to the list, but overall it is nearly identical to the list used in 2011.

In 2011, the special status plant list was developed by compiling a list of all special status species known to project counties (Benton, Grant, Kittitas, and Yakima), data which was accessed from the Washington Natural Heritage Program (WNHP) and BLM (M. Boyter, March 2011). The list included those species listed by the U.S. Fish and Wildlife Service (USFWS) or State of Washington, classified as Washington Sensitive on the Inter-agency Special Status / Sensitive Species Program (ISSSSP) species list, or addressed as sensitive in the Final Environmental Impact Statement for the Fort Lewis Army Growth and Force Structure Realignment: Fort Lewis and Yakima Training Center, Washington (Fort Lewis Directorate of Public Works 2010).

The special status plant list was further refined to only include species meeting any of the following criteria:

- All special status plant species known to occur within 0.25 mile of the any of the Preliminary-NNR or DEIS alternatives (M. Boyter, March 2011, May 2013; WNHP 2013);

- All special status plant species that are known to occur on or near the JBLM YTC (Fort Lewis Directorate of Public Works 2010);

- Washington BLM Sensitive species documented or suspected to occur on the BLM Spokane District having potentially suitable habitat in the Preliminary-NNR or DEIS alternatives. This was defined as elevation (400 to 2,850 feet) and Gap Analysis Program (GAP) vegetation (GAP 2012; 2010) within 0.25 mile of the alternate routes surveyed in 2011 and 2013. Species associated with

forested habitats and high elevations were typically removed from the list, while species associated with sagebrush steppe, basalt cliffs, rivers, etc. were included. Wetlands and riparian areas occur on federal lands along the alternative route segments, so species associated with these habitats were also included. Habitat surveyed along the Preliminary-NNR in 2013 corresponds to similar habitat requirements as the 2011 surveys.

Most special status plant species occur in highly specific habitats, which require specific information on the associated plant community, co-occurring species, geology, soils, elevation, and topographic location for each species. Sources of information for plant species included the *Vascular Plants of the Pacific Northwest: Vols. I-V* (Hitchcock et al. 1969), *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973), the WNHP plant guide (WNHP and BLM 2005), *Field Guide to the Rare Plants of Washington* (Camp and Gamon 2011), WNHP special status plant data within the study corridor (WNHP 2013), BLM (M. Boyter, March 2011, May 2013), species-specific literature, and botanists' personal knowledge of the species.

The phenology for each species is important since many special status plant species can only be accurately identified when they are flowering and/or fruiting. The phenology of all target special status species was assessed to determine when and how many surveys would be needed to accurately survey for all special status plant species. Based on this, complete surveys were determined to be needed during April/May and June/July so that all species are surveyed (preferably late April to mid-May and mid-June to mid-July). A third survey was also determined to be needed for wetlands and riparian areas in late-July to mid-August, to address special status plants associated with these habitats that have a late-summer phenology, including Ute ladies'-tresses (*Spiranthes diluvialis*), a federally threatened plant species.

However, weather conditions and plant phenology during the first round of botanical surveys in mid-May indicated that conditions were one month early in 2013, which required adjustment of the desired survey windows. Nearly all plants species, except wetland species and some noxious weeds only identifiable to genus, were identifiable during the 2013 mid-May surveys, including target special status plant species with a June survey window. Plant phenology in mid-May 2013 was similar to conditions during late June 2011. To address these unusual conditions, it was determined that the mid-May survey should serve as the late June survey, and a follow-up survey in late July would be conducted in wetland habitats (including surveying for Ute ladies'-tresses). The follow-up survey in late July included re-surveying where potential noxious weed or special status plant species were potentially located. In addition, since the Preliminary-NNR underwent route adjustments following the 2013 surveys, portions of the Final-NNR have not been surveyed for special status plants.

Field Survey

A pedestrian survey was conducted May 13-20, 2013 for special status plant species on federal and WSDOT lands within the 150 foot (ca 46 meter) ROW corridor. Botanists walked roughly parallel intuitive meandering transects while they were targeting habitats most likely to support special status plant species, with a 40 foot (12 meter) separation between surveyors. The survey was floristic, meaning that all taxa were identified to the level necessary to determine if they are special status plant or noxious weed species.

A second survey was conducted during July 25-27, 2013 in the two wetland areas identified during the May 2013 survey, one which had potential habitat for Ute ladies'-tresses. In addition, noxious weed sites were re-visited if they were only identifiable to genera during the May 2013 survey. There was also one dodder (*Cuscuta* sp.) having the potential to be a special status or noxious weed species which was re-

visited due to its late summer bloom time required for species identification. The dodder was determined to have neither status.

All methods followed the BLM Procedures for Vegetation Inventory and Rare Plant Clearances, which was provided by the BLM botanist. An OR/WA BLM GeoBOB Flora/Fauna Survey Form (V. 1.4) was completed for each of the route segments surveyed, which included information on landowner, survey location and acreage, observers, date(s) surveyed, plant species encountered, target special status plant species, and habitat/environmental conditions.

Habitat and plant community information was collected for assessing potential suitable habitat for special status plants. In addition, the following information was collected during the surveys: names of all plant species observed and whether it is a dominant species, presence and percent cover of cryptogamic crusts, moisture/ disturbance/soil conditions, and elevation/aspect/slope. This was largely done during the May survey, but additional species and observations were added during the July survey.

If any target special status plant species were discovered, information about each species/location were filled out using an OR/WA BLM GeoBOB Site and Observations Form (V. 1.4; includes information on species, location, observers, date observed, phenology, reproduction/health, threats, associated species, and habitat/environmental conditions). A survey-grade GPS was used to document the survey route and the occurrence of target special status plant species discovered.

Very steep slopes and other conditions that posed a safety hazard were not surveyed, although this seldom occurred along the Preliminary-NNR. Very steep slopes are typically avoided for installation of transmission line structures. In addition, botanists communicated with JBLM YTC personnel to ensure surveys were coordinated with training activities.

3.0 RESULTS

There were 30.5 of 41.2 centerline miles of the Preliminary-NNR surveyed in 2013, with the following exceptions: a 0.1 mile section on WSDOT lands that was too steep to be safely completed and another small area between interstate lanes; a 0.4 mile section crossing the Columbia River; 8.7 miles of private land; and a 1.4 mile section east of the Columbia River which was surveyed in 2011. As previously described, there are 16.2 centerline miles surveyed in 2011 or 2013 that are still part of the Final-NNR (which includes 37.7 centerline miles on federal or WSDOT lands).

Plant phenology was at least one month early in 2013, so that mid-May 2013 conditions were similar to late June 2011 (see Field Preparation above). This was likely due to the unusually dry, slightly warmer weather conditions during the 2012-2013 water year (October to September). Total precipitation during the year-to-date water year (October 2012 to April 2013) was just 18 percent below the 1981-2010 mean. However, total precipitation during January to April 2013 was 58 percent below the 1981-2010 mean (NOAA 2013), which explains the dry conditions and early phenology in 2013. Based on these conditions, the survey targeting late April to mid-May special status plant species may be incomplete because many early species probably would not have been detectable, although information about the potential for suitable habitat is assessed in this document.

The list of target special status plants in Appendix A indicates during which survey(s) each species was targeted and is designed to be used with the GeoBOB survey forms. Table 2 shows a comparison of the habitat suitability by route segment and Appendix B shows the data used for making these calculations. Appendix C presents a list of all plant communities that were documented on accessible federal lands for

each route segment. A list of all plant species documented during the surveys is provided in Appendix D. The BLM has requested that GeoBOB survey forms and special status plant site observation forms be filled out for the surveys, and these are provided separately and include photographs and maps. The GeoBOB survey forms provide more information about the environmental conditions along each route segment. The GeoBOB site observation forms provide more information about each special status plant species occurrence.

All special status plant species detected in 2013 or in the WHNP database are listed in Table 2. There were no 2011 or 2013 special status plant occurrences detected in surveyed portions of Final-NNR segments NNR-1, NNR-2, NNR-4, NNR-5, NNR-7, NNR-8, or MR-1. No portion of Final-NNR-6 was surveyed. There are WNHP database records that intersect the ROW of Final-NNR segments NNR-2, NNR-6, NNR-7, and NNR-8 (Table 2).

During 2013 surveys, there were two occurrences of Hoover's desert parsley (*Lomatium tuberosum*) documented on BLM lands that were also in the WNHP database, although only one of these occurrences is in the Final-NNR-3 (Table 2). One very extensive occurrence of Pauper milkvetch (*Astragalus misellus* var. *pauper*) was documented on BLM lands within the ROW of the Final-NNR-3. This occurrence was much more extensive in the Preliminary-NNR-3. The Preliminary-NNR-3 ROW was adjusted so that one-third of the ROW width still overlaps the Final-NNR-3.Pauper milkvetch is presumably also extensive within the adjacent portion of ROW not surveyed in 2013. There was also one occurrence of snowball cactus (*Pediocactus simpsonii* var. *robustior*) documented on BLM lands in the ROW of Final-NNR-3, which also extends into adjacent areas that were part of the Preliminary-NNR-3. In addition, the WNHP database (2013) has one occurrence of Hoover's tauschia (*Tauschia hooveri*) known to private lands on the Final-NNR-3, so there may be potential for this species on public lands in the vicinity.

Other special status plants that were detected in 2013 but are no longer in the Final-NNR (previously in Preliminary-NNR-4 on JBLM YTC lands) are listed in Table 2. These include occurrences of weakstem flaccida (*Cryptantha flaccida*), snowball cactus, and longsepal globemallow (*Iliamna longisepala*). Weakstem cryptantha documented in the ROW of Preliminary-NNR-4 was keyed and verified to be *C. flaccida* in the 1973 Hitchcock treatment, and not *C. rostellata*, which has recently been merged into *C. flaccida*. This means that the *C. flaccida* documented in Preliminary-NNR-4 may or may not be a special status species, but it was documented as if it is a special status species until taxonomic issues can be resolved. Both weakstem cryptantha occurrences were re-visited during the July 2013 surveys, and collected specimens, but the seeds on the collections were not identifiable. However, this is likely no longer an issue because this species is not currently known to the Final-NNR, just the Preliminary-NNR. In addition, this species locally inhabits the sideslopes of dry drainages which would be spanned if it were present but not yet detected in the Final-NNR.

Habitats documented during 2013 surveys were used to estimate potentially suitable habitat for special status plants on all lands surveyed. Unsuitable habitat included: agriculture; developed, road, or firebreak; irrigation canal; noxious weeds; turf grass; planted trees; and water body. Marginal habitat included annual grassland, perennial grassland, rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included aspen, basalt cliff/rock, forested riparian, intermittent stream or dry gully, native trees, non-forested riparian, and sagebrush/perennial grassland. Unknown habitat was too coarsely defined to estimate and included grassland and shrubland.

TABLE 2 2013 SPECIAL STATUS PLANT SPECIES LOCATIONS AND HABITAT SUITABILITY ON FEDERAL OR WSDOT LANDS, BASED ON SURVEY AND WNHP DATA[1]

FINAL NNR ROUTE SEGMEN	SPECIAL STATUS PLANTS IN ROW	DATA SOURCE AND LAND OWNERSHIP	OCCUPIED HABITAT	PERCENT SURVEYED	SUITABLE HABITAT	MARGINAL HABITAT	UNSUITABLE HABITAT
NNR - 1	None	N/A	None	100.0% (0.2/0.2 miles)	1.1 acres (sagebrush/ perennial grassland)	Trace[2]	1.8 acres
NNR – 2	None	N/A	None	100.0% (5.0/5.0 miles)	20.0 acres (sagebrush/ perennial grassland with trace[2] amount of riparian)	30.3 acres	40.2 acres
NNR - 3	Basalt daisy (*Erigeron basalticus*)	WNHP database/ private and WSDOT	2007 record in WNHP database, but species not observed during survey (steep basalt area at canyon bottom)	96.5% (4.1/4.3 miles) 3.7 of 4.1 miles was surveyed entire length of ROW but only 1/3 its width	26.1 acres (sagebrush/ perennial grassland, basalt cliff/rock, and trace[2] amount of intermittent stream/dry gully and native trees)	50.7 acres	0.7 acre
	Pauper milkvetch (*Astragalus misellus* var. *pauper*)	2013 survey/ BLM	34.6 acres documented during 2013 survey, survey, but only 12.7 acres is in proposed ROW due to route adjustments since the 2013 survey; also documented from 2009 record in WNHP database				
	Hoover's desert-parsley (*Lomatium tuberosum*)	2013 survey/ BLM; WHNP database/ BLM and private	0.3 acre documented during 2013 survey, but only 0.2 acre is in proposed ROW due to route adjustments since the 2013 survey; also documented from 2008 records in WNHP database				
	Snowball cactus (*Pediocactus simpsonii* var. *robustior*)	2013 survey/ BLM	4.6 acres documented during 2013 survey, but only 0.9 acres is in proposed ROW due to route adjustments since the 2013 survey; no records in WNHP database for ROW				
	Hoover's tauschia (*Tauschia hooveri*)	WNHP database/ private	Documented from 1990 records in WNHP database, but species not observed during survey. This could be				

FINAL NNR ROUTE SEGMEN	SPECIAL STATUS PLANTS IN ROW	DATA SOURCE AND LAND OWNERSHIP	OCCUPIED HABITAT	PERCENT SURVEYED	SUITABLE HABITAT	MARGINAL HABITAT	UNSUITABLE HABITAT
			due to when the survey was conducted; Hoover's tauschia is identifiable only in early spring.				
NNR - 4	None	N/A	None	97.4% (3.3/3.3 miles) 2.9 of 3.3 miles was surveyed entire length of ROW but only 1/3 its width	41.4 acres (sagebrush/ perennial grassland, forb, bitterbrush/ perennial grassland, and trace[2] amount of intermittent stream/dry gully		
NNR - 5	None	N/A	None	91.6% (1.6/1.8 miles)	29.8 acres (sagebrush/ perennial grassland and intermittent stream/dry gully	None	2.6 acres
NNR – 6	Suksdorf's monkey-flower (*Mimulus suksdorfii*)	WNHP database/ JBLM YTC	Documented from 1995 records in WNHP database. The species was not observed during survey; however, surveys were not conducted on this entire route segment.	0.0% (0.0/6.4 miles)	109.9 acres (sagebrush/ perennial grassland and forb)	7.2 acres	None
NNR - 7	Dwarf evening-primrose (*Camissonia pygmaea*)	WNHP database/ BLM & JBLM YTC lands	Documented from 1995 records in WNHP database. The species was not observed during survey; however, surveys were conducted on a small portion (1.6%) of this route segment.	1.6% (0.1/8.2 miles)	149.5 acres (sagebrush/ perennial grassland)	None	Trace[2]
	Bristle-flowered collomia (*Collomia macrocalyx*)	WNHP database/ JBLM YTC	Documented from 1995 records in WNHP database. The species was not observed during survey; however, surveys were conducted on a small portion (1.6%) of this route segment.				
	Gray cryptantha (*Cryptantha leucophaea*)	WNHP database/ BLM and	Documented from 2003 records in WNHP database. The species was not observed during survey; however,				

FINAL NNR ROUTE SEGMEN	SPECIAL STATUS PLANTS IN ROW	DATA SOURCE AND LAND OWNERSHIP	OCCUPIED HABITAT	PERCENT SURVEYED	SUITABLE HABITAT	MARGINAL HABITAT	UNSUITABLE HABITAT
		JBLM YTC	surveys were conducted on a small portion (1.6%) of this route segment.				
	Miner's candle (*Cryptantha scoparia*)	WNHP database/ JBLM YTC	Documented from 2002 records in WNHP database. The species was not observed during survey; however, surveys were conducted on a small portion (1.6%) of this route segment.				
	Suksdorf's monkey-flower (*Mimulus suksdorfii*)	WNHP database/ JBLM YTC	Documented from 1995 records in WNHP database. The species was not observed during survey; however, surveys were conducted on a small portion (1.6%) of this route segment.				
	Caespitose evening-primrose (*Oenothera caespitosa ssp. caespitosa*)	WNHP database/ JBLM YTC	Documented from 1994 records in WNHP database. The species was not observed during survey; however, surveys were conducted on a small portion (1.6%) of this route segment.				
NNR – 8	Dwarf evening-primrose (*Camissonia pygmaea*)	WNHP database/ BLM and JBLM YTC	Documented from 1995 records in WNHP database, but species not observed during survey				
	Gray cryptantha (*Cryptantha leucophaea*)	WNHP/ BLM and JBLM YTC	Documented from 2003 records in WNHP database, but species not observed during survey				
MR – 1	None	N/A	None	0.5% (0.03/6.6 miles)	72.6 acres (sagebrush/ perennial grassland)	31.8 acres	47.7 acres
Special status plants	Snowball cactus (*Pediocactus*	2013 survey/ JBLM YTC	<0.1 acres documented during 2013 survey, but none is in proposed ROW			No longer applicable	

FINAL NNR ROUTE SEGMEN	SPECIAL STATUS PLANTS IN ROW	DATA SOURCE AND LAND OWNERSHIP	OCCUPIED HABITAT	PERCENT SURVEYED	SUITABLE HABITAT	MARGINAL HABITAT	UNSUITABLE HABITAT
documented in 2013 that are no longer in Final-NNR	*simpsonii* var. *robustior*)		due to route adjustments since the 2013 survey; no records in WNHP database for ROW				
(all on Preliminary-NNR 4/JBLM YTC lands)	Longsepal globemallow (*Iliamna longisepala*)	2013 survey/ JBLM YTC	0.2 acres documented during 2013 survey, but none is in proposed ROW due to route adjustments since the 2013 survey; no records in WNHP database for ROW				
	Snowball cactus (*Pediocactus simpsonii* var. *robustior*)	2013 survey/ JBLM YTC	3.6 acres documented during 2013 survey, but none is in proposed ROW due to route adjustments since the 2013 survey; no records in WNHP database for ROW				
	Weakstem cryptantha (*Cryptantha flaccida*) (re keyed to the 1973 treatment of *C. flaccida*)	2013 survey/ JBLM YTC	1.4 acres documented during 2013 survey, but none is in Final-NNR				
	Snowball cactus (*Pediocactus simpsonii* var. *robustior*)	2013 survey/ JBLM YTC	<0.1 acres documented during 2013 survey, but none is in Final-NNR				

[1]Data sources include 2011/2013 field surveys and special status plant data from the WNHP (2013) and BLM (M. Boyter, May 2013). There is no unknown habitat on federal or WSDOT lands within the NNR, due to nearly complete habitat accessibility. Habitat suitability corresponds to values shown in Appendix B.
[2]Trace is indicated where habitat land area was 0.49 acre or less.

Ute ladies'-tresses (*Spiranthes diluvialis*) was surveyed during July 25-27, 2013 in the two wetlands located on federal lands at the time of surveys. One wetland is located in Final-NNR-2. The other wetland is located near Final-NNR-6, but is no longer inside the ROW. During the mid-May 2013 survey, both locations appeared to have marginal habitat for Ute ladies'-tresses consisting of disturbed wetlands. Surveys were conducted during the appropriate time of year at both wetlands to verify presence or absence of the species. Two botanists thoroughly surveyed both small wetland areas to ensure 100% survey, and no Ute ladies'-tresses plants were found. In addition, both wetlands appeared to have even less suitable habitat by the time the wetlands were revisited in late-July. One portion of the wetland in Final-NNR-2 was completely dry by late July and the second portion was dominated by noxious weeds and invasive species, such as purple loosestrife (*Lythrum salicaria*). For the second wetland located near Final-NNR-6 (outside of the ROW), the potential Ute ladies'-tresses habitat was dry by mid-July and completely dominated by perennial pepperweed (*Lepidium latifolium*)

The Final-NNR-2 wetland is bisected by a paved road in the JBLM YTC Cantonment Area. The north side of the road has a small drainage pond with standing water and tall herbaceous and woody vegetation, which abruptly changes to upland habitat on the wetland edge. The south side of the road is a small wetland shaded by trees that was completely dry by late July. A drainage culvert connects the wetland. Vegetation present included species such as narrowleaf willow (*Salix exigua*), purple loosestrife, water speedwell (*Veronica anagalis-aquatica*), mountain rush (*Juncus arcticus* ssp. *littoralis*), common rush (*Juncus effusus*), slenderbeak sedge (*Carex athrostachya*), water horsetail (*Equisetum fluviatile*), and hardstem bulrush (*Schoenoplectus acutus* var. *acutus*).

The wetland in Preliminary-NNR-4 that was visited is closest to Final-NNR-6, but since it is 1.0 mile away from Final-NNR-6 this wetland is no longer relevant to the SDEIS. This wetland is along Foster Creek and water is present at the bottom of this narrow, steep ravine. Herbaceous wetland vegetation is only present at the bottom of the ravine, although trees and shrubs associated with wetlands occur between the bottom and top of the ravine. This is the same location where longsepal globemallow was documented. There is an area that was wet in mid-May adjacent and east of the ravine, but it had completely dried up by late-July and completely dominated by perennial pepperweed, a noxious weed. Several bird nests were observed in shrubs and trees in Foster Creek. Vegetation present included species such as black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), willow (*Salix* spp.), chokecherry (*Prunus virginiana*), Lewis' mock orange (*Philadelphus lewisii*), panicled bulrush (*Scirpus microcarpus*), field horsetail (*Equisetum arvense*), Kentucky bluegrass (*Poa pratensis*), western columbine (*Aquilegia formosa*), and western white clematis (*Clematis ligusticifolia*).

Late July 2013 photograph of NNR–2 wetland (north side of paved road)

Late July 2013 photograph of NNR–2 wetland (south side of paved road)

Mid-May 2013 photograph of NNR–6 wetland

Late-July 2013 photograph of NNR–6 wetland (from a distance) and the adjacent perennial pepperweed field in area that was wet in mid-May

The special status plant species and habitat suitability information that is still current for the Final-NNR should be used to assess potential effects of the proposed Project to special status plant species on federal lands. In addition, WNHP data on special status plant occurrences that are mapped as intersecting the Final-NNR ROW corridor should be included in comparing potential effects, although most of these occurrences include large buffers so it is difficult to accurately determine whether these occurrences truly intersect the ROW.

4.0 RECOMMENDATIONS

Pacific Power is committed to protecting and preserving special status plants during construction, operation, and maintenance of the proposed Project. A Special Status Plant Protection Plan will be developed and incorporated into the final Plan of Development (POD) for the proposed 230 kV Vantage to Pomona Transmission Line Project. The Plan will be developed in consultation with the agencies and will describe:

- Regulations related to special status plant management;
- List of all special status plants suspected to occur in the Project area, and whether they are also known to occur within the ROW corridor;
- Procedures for pre-construction special status plant surveys; and
- Procedures for minimizing and avoiding special status plant occurrences during construction, operations, and maintenance activities for the proposed Project.

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APPENDIX A – LIST OF TARGET SPECIAL STATUS PLANT SPECIES

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APPENDIX A LIST OF TARGET SPECIAL STATUS PLANT SPECIES

SCIENTIFIC NAME	COMMON NAME	STATUS[1,2,3]	SUS/DOC ON BLM OR JBLM YTC[4]	DOC[1] WITHIN 0.25 MILE OF ALL ALT. ROUTES[5]	HABITAT REQUIRED[6]	PHENOLOGY[6]	LATE-APRIL/MID-MAY TARGET	MID-JUNE/MID-JULY TARGET	LATE-JULY/AUGUST TARGET
Aliciella leptomeria	Great Basin gilia	WT			Open sandy or rocky areas; dry open places at low elevations, especially in sandy or sandy soil, gravelly bluffs, and on caliche; associated with sagebrush steppe; 470-6,890 ft.	mid May to June	X		
Allium bisceptrum	twincrest onion	BLM-S, WS	SUS		Meadows and aspen groves, less frequently on open slopes.	June to July		X	
Allium constrictum	constricted Douglas' onion	BLM-S	DOC		Rocky benches; vernally moist areas on flat basalt and drier lithosols and around the margins of rocky vernal ponds. Grows in stiff sagebrush/Sandberg's bluegrass habitat type; 2,070-2,550 ft.	May to July	X	X	
Ammannia robusta	grand redstem	BLM-S, WT	SUS		Moist, heavy soil around ponds, rivers, and other wet places; deep sandy loam to gravelly soils. Along the Columbia River in riparian mudflat wetlands dominated by annual species.	May to July	X	X	
Anagallis minima	chaffweed	WS			Moist ground or around vernal pools from the coast to the interior valleys; 400-2,340 ft.	May to August (September)	X	X	X
Antennaria parvifolia	Nuttall's pussy-toes	BLM-S, WS	DOC		Dry open areas, often sandy or in Ponderosa pine forest openings.	May to July	X	X	
Artemisia borealis var. wormskioldii	Wormskiold's northern wormwood	C, BLM-S, WE	SUS		Sandy soil with cobble on low ground along Columbia River; sandy soil with cobbles, on low ground near the edge of the river.	April to May	X		
Astragalus arrectus	Palouse milk-vetch	BLM-S, WT	SUS		Grassy hillsides to sagebrush flats, river bluffs, and open ponderosa pine/Douglas-fir forests in grassy or shrub dominated openings; 1,000-4,000 ft.	(late April) May to June (early July)	X	X	
Astragalus columbianus	Columbia milk-vetch	SOC, BLM-S, WS	DOC	DOC	Dry often sandy places with sparse vegetation usually on slopes but sometimes on flats; associated with shrub-steppe vegetation zone; 500-2,100 ft.	March to May	X	X	
Astragalus geyeri	Geyer's milk-vetch	BLM-S, WT	DOC	DOC	Arid sandy soils, flat to dunes; sandy desert, especially on dunes; 630-670 ft.	April to July	X	X	

SCIENTIFIC NAME	COMMON NAME	STATUS[1,2,3]	SUS/DOC ON BLM OR JBLM YTC[4]	DOC[1] WITHIN 0.25 MILE OF ALL ALT. ROUTES[5]	HABITAT REQUIRED[6]	PHENOLOGY[6]	LATE-APRIL/MID-MAY TARGET	MID-JUNE/MID-JULY TARGET	LATE-JULY/AUGUST TARGET
Astragalus microcystis	least bladdery milk-vetch	BLM-S, WS	DOC		Open prairies, foothills, and ponderosa pine forests.	May to July	X	X	
Astragalus misellus var. pauper	Pauper milk-vetch	BLM-S, WS	DOC	DOC	Sagebrush steppe, often in low sage open areas; open ridgetops and upper slopes, and rarely middle and lower slopes; 500-3,000 ft.	April to June		X	
Astragalus sinuatus	Whited's milk-vetch	BLM-S, WE	DOC		Rocky hillsides with sagebrush	April to June	X	X	
Camissonia pygmaea	dwarf evening-primrose	BLM-S, WS	DOC	DOC	Sagebrush and lower foothills; unstable soil or gravel in steep talus slopes, dry washes, banks and roadcuts; growing with big sagebrush and wild buckwheat.	May to July		X	
Camissonia scapoidea ssp. scapoidea	naked-stemmed evening-primrose	BLM-S, WS	DOC	DOC	Mostly in the sagebrush desert; especially on rocky or sandy soil; 600-900 ft.	May to July	X	X	
Carex comosa	bristly sedge	BLM-S, WS	DOC		Marshes, lake shores, and wet meadows; 50-2,000 ft.	May to August	X	X	X
Carex macrochaeta	large-awn sedge	BLM-S, WT	SUS		Marshes, shores and other moist or wet open places, often near the beach.	mid-May to July; summer	X	X	
Cistanthe rosea	rosy pussypaws	BLM-S, WT	SUS		Sagebrush desert to arid montane forest; within low swales in sandy soil among big sagebrush; 520-530 ft.	May to June	X	X	
Collomia macrocalyx	bristle-flowered collomia	BLM-S, WS	DOC	DOC	Dry, open places at lower elevations; sparsely vegetated and associated with sagebrush steppe; a cryptogram crust is present on the rocks and soil; early spring, flowers ephemeral; 850-2,100 ft.	April to May	X		
Cryptantha flaccida (recently changed from *C. rostellata*)	weakstem cryptantha	BLM-S, WT	DOC	DOC	Dry, open places; 600-2,900 ft.	April to June	X		
Cryptantha gracilis	narrow-stem cryptantha	BLM-S, WS	DOC		Talus and pockets of silt; associated with sagebrush steppe; in Washington this species has been found in talus and pockets of silt; 1,250-2,680 ft.	May to June	X	X	

SCIENTIFIC NAME	COMMON NAME	STATUS[1,2,3]	SUS/DOC ON BLM OR JBLM YTC[4]	DOC[1] WITHIN 0.25 MILE OF ALL ALT. ROUTES[5]	HABITAT REQUIRED[6]	PHENOLOGY[6]	LATE-APRIL/MID-MAY TARGET	MID-JUNE/MID-JULY TARGET	LATE-JULY/AUGUST TARGET
Cryptantha leucophaea	gray cryptantha	SOC, BLM-S, WS	DOC	DOC	Dry, often sandy places; with sparse vegetation, usually on slopes but sometimes on flats; near the Columbia and lower Yakima rivers; 300-2,500 ft.	April to May	X		
Cryptantha scoparia	miner's candle	BLM-S, WS	DOC	DOC	Dry, open slopes and flats, commonly among sagebrush; gravel bars and alluvial slopes and thin gravelly soil over basalt; 1,200-1,280 ft.	May to July	X	X	
Cryptantha spiculifera	Snake River cryptantha	BLM-S, WS	DOC	DOC	Sandy knolls and badlands and talus at low elevations; dry, open, flat or sloping areas in stable or stony soils.	April to July	X	X	
Cuscuta denticulata	desert dodder	WT			Occurs on various shrubs (*Artemisia* and *Chrysothamnus*) within desert areas; 880 ft.	June to September		X	X
Eatonella nivea	white eatonella	WT	DOC		Dry, sandy desert or volcanic areas; populations are on bare soil in sparsely vegetated sagebrush steppe, associated with other annuals.	April to May	X		
Eleocharis rostellata	beaked spike-rush	WS	DOC	DOC	Marshes and boggy sites around lakes, in alkaline or highly calcareous areas, often around hot springs; also in coastal salt marshes; 500-1,850 ft.	June to September		X	X
Erigeron basalticus	basalt daisy	SOC, BLM-S, WT	DOC	DOC	Cliff crevices on basalt cliffs, in rocky canyons; Yakima River and Selah Creek. Associated with the Yakima Basalt Formation, which occurred during the late Miocene; 1,250-1,500 ft.	May to June	X	X	
Erigeron piperianus	Piper's daisy	BLM-S, WS	DOC	DOC	Dry, open places, often among sagebrush; 400-2,250 ft.	May to June	X	X	
Eriogonum codium	Umtanum desert buckwheat	T, BLM-S, WE	SUS		Flat to gently sloping microsites near the top of the steep, north-facing basalt cliffs near salt scrub habitats overlooking the Columbia River; restricted to the exposed top of the basalt Lolo Flow. Assoc. include spiny hopsage, *Phacelia linearis, Cryptantha pterocarya, Camisonia minor*, and cheatgrass; 1,100-1,320 ft.	May to late-August	X	X	
Hackelia diffusa var. diffusa	diffuse stickseed	BLM-S, WT	DOC		Shaded areas, cliffs, talus, wooded flats, and slopes; along and near the Columbia River; 300-1,200 ft.	May to June	X	X	
Hackelia hispida var. disjuncta	sagebrush stickseed	BLM-S, WS	DOC		Rocky, unstable talus slopes and cliffs, usually with little other vegetation; 600-2,100 ft.	May to July	X	X	

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Heterotheca oregona var. oregona	Oregon goldenaster	BLM-S, WT	SUS		On sand and gravel bars along rivers; chiefly west of the Cascade Mountains but also occasionally along their eastern base; 2,600 ft.	June to September		X	
Iliamna longisepala	longsepal globemallow	BLM-S, WS	DOC	DOC	Dry open hillsides and gravelly streamsides of sagebrush and open ponderosa pine forests; lower levels on the east side of the Cascade Mountains; 500-4,500 ft.	June to September		X	
Juncus hemiendytus var. hemiendytus	dwarf rush	WT			Mud flats, the edge of vernal pools, and moist to wet meadows; 2,300-2,430 ft.	May to July	X	X	
Juncus howellii	Howell's rush	BLM-S, WT	SUS		Moist ground in the mountains; 2,840 ft.	July to August			X
Juncus uncialis	inch-high rush	BLM-S, WS	DOC		Open fields to montane meadows; swales, moist places and vernal pools; associated with channeled scablands and mound and swale topography; 2,100-2,290 ft.	June to August		X	X
Lipocarpha aristulata	awned halfchaff sedge	BLM-S,WT	SUS	DOC	Wetlands along the Columbia River, wet soil and mud in bottomlands; sandbars and beaches; 328-1,312 ft.	June to September		X	X
Lobelia kalmii	Kalm's lobelia	WE	DOC	DOC	Marl or peat bogs, along shores and in other wet places.	late July to August			X
Loeflingia squarrosa var. squarrosa	loeflingia	WT			Low swales within sandy areas and associated with *Artemisia tridentata*; 400-500 ft.	May	X		
Lomatium serpentinum	Snake Canyon desert-parsley	BLM-S, WS	DOC		Lower elevations just above river level in moderately deep sandy or rocky soil and/or open rocky slopes.	April to June (July)	X	X	
Lomatium tuberosum	Hoover's desert-parsley	SOC, BLM-S, WS	DOC	DOC	Loose rocky slopes and basalt drainage channels; rocky hillsides; 600-2,300 ft.	March to May	X		
Micromonolepis pusilla	red poverty-weed	WT			Desert regions, often on alkaline soils; salt-encrusted soil around/beneath *Sarcobatus* shrubs; 1,950-2,210 ft.	April to June	X	X	
Mimulus suksdorfii	Suksdorf's monkey-flower	BLM-S, WS	DOC	DOC	Open, moist or rather dry places, from the valleys and foothills to rather high elevations in the mountains; associated with sagebrush steppe.	May to August	X	X	

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Minuartia nuttallii ssp. fragilis	Nuttall's sandwort	BLM-S, WT	DOC	DOC	Dry basalt scree slopes, open, gravelly benches, or limestone talus from open sagebrush hills to alpine slopes; 5,413-7,874 ft.	April to May (August)	X	X	
Nicotiana attenuata	coyote tobacco	BLM-S, WS	DOC	DOC	Dry, sandy bottom lands, dry rocky washes, and in other dry open places; 400-10,000 ft.	June to August		X	
Oenothera caespitosa ssp. caespitosa	caespitose evening-primrose	BLM-S, WS	DOC	DOC	Talus slopes, road cuts, and dry hills; as well as along the flat river terrace of the Columbia River; associated with *Artemisia tridentata* or *Artemisia rigida*; 400-1,200 ft.	June to August	X	X	
Ophioglossum pusillum	Adder's-tongue	BLM-S, WT	DOC		Meadows, pastures, old fields, roadside ditches, and flood plain woods in seasonally wet, rather acid soil; circumboreal, but not at the highest latitudes; 40-2,300 ft.	June to September		X	
Orthotrichum praemorsum	bryophyte	SOC, WE			Rocks, rarely lava, dry montane areas; middle elevations		X	X	
Oxytropis campestris var. wanapum	Wanapum crazyweed	SOC, BLM-S, WE	DOC		Gravelly floodplains of the Columbia River; big sagebrush/bluebunch wheatgrass.	May to June	X		
Pediocactus simpsonii var. robustior	snowball cactus	BLM-S, WS	DOC	DOC	Thin, rocky soil on ridge tops, desert valleys, and low mountains; found at elevations from 1000 to 4000 feet in Washington; associated with *Artemisia rigida*.	May to August	X	X	X
Penstemon eriantherus var. whitedii	fuzzytongue penstemon	BLM-S, WS	DOC		Dry, open places in between shrubs; in the plains, valleys, and foothills, sometimes ascending to moderate elevations in the mountains; associated with *Artemisia tridentata*, *Purshia tridentata*, *Salvia dorrii, Eriogonum* sp., and *Chrysothamnus nauseosus*; 525-3,835 ft.	May to June	X	X	
Penstemon wilcoxii	Wilcox's penstemon	BLM-S, WS	SUS		West facing slopes of small canyons, and in dry and rocky habitats; open or often wooded, sometimes rocky places, from the foothills to moderate elevations in the mountains; associated species include *Holodiscus*	May to June (July)	X	X	

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					discolor, *Physocarpus malvaceus*, *Rosa* sp., and *Symphoricarpos albus*; 2,300-4,200 ft.				
Phacelia tetramera	dwarf phacelia	BLM-S, WS	DOC		Alkaline flats, sinks, depressions, and washes; occurs in *Artemisia tridentata/Poa secunda* and *Artemisia rigida/Poa secunda* plant communities; 1,200-2,200 ft.	April to June	X	X	
Physaria douglasii ssp. tuplashensis	White Bluffs bladderpod	T (but not known to project counties), BLM-S, WT	SUS		Big sagebrush/bluebunch wheatgrass association, restricted to dry, barren, nearly vertical exposures of calcium carbonate soil.	June to July		X	
Pinus albicaulis	whitebark pine	C, BLM-S			A timberline tree, rarely below 4,500-5,000 ft.	Year round	X	X	X
Polyctenium fremontii var. fremontii	Fremont's combleaf	BLM-S, WT	DOC		Gravelly clay, sagebrush desert, damp or wet meadows, near shallow ponds, stony swales, dried vernal pools, and banks and beds of vernal streamlets. In Washington the species occurs on a plateau, close to a road in the shallow silty loam soil of a vernal pond depression within sagebrush steppe and lithosol communities; 2,300 ft.	May to June	X	X	
Polygonum austiniae	Austin's knotweed	WT			Dry to moist flats or banks, from the sagebrush plains into the lower mountains, often in *Pinus ponderosa* forest.	June to August		X	X
Rorippa columbiae	Columbia Cress	BLM-S, WE	DOC	DOC	Moist, sandy or cobbly soil, such as river floodplains and ephemeral ponds. Associated with the Columbia River, snow -fed streams and lakes, wet meadows, irrigation ditches and roadside ditches; apparently requires wet soil throughout the growing season.	(April) July to October			X
Rotala ramosior	lowland toothcup	BLM-S, WT	SUS		Wet, swampy places, lakes and pond margins, and along free-flowing river reaches in association with *Juncus* and *Eleocharis* species; 200-2,259 ft.	June to August		X	X
Scouleria marginata	marginate splashzone moss	BLM-S, WT	DOC		On rocks in streams and rivers in splash zone	July to October			X

SCIENTIFIC NAME	COMMON NAME	STATUS[1,2,3]	SUS/DOC ON BLM OR JBLM YTC[4]	DOC[1] WITHIN 0.25 MILE OF ALL ALT. ROUTES[5]	HABITAT REQUIRED[6]	PHENOLOGY[6]	LATE-APRIL/MID-MAY TARGET	MID-JUNE/MID-JULY TARGET	LATE-JULY/AUGUST TARGET
Sidalcea oregana var. calva	Wenatchee Mountain checker-mallow	E (but not for project counties), WE	SUS		Dry forests to moist meadows; sagebrush plains, meadowland, and ponderosa pine forest; 1,900-3,200 ft.	May to June (mid-August)		X	
Silene seelyi	Seely's silene	SOC, BLM-S, WS	SUS		Cliffs and talus slopes; basalt and granitic crevices on rock outcrops in absence of other species; 1,500-7,000 ft.	May to August	X	X	
Sisyrinchium sarmentosum	pale blue-eyed grass	SOC, BLM-S, WT	SUS		Dry to moist meadows, swampy areas, sea level to moderate elevations in the mountains.	July to August		X	
Spiranthes diluvialis	Ute ladies'-tresses	T, WE	SUS		Moist meadow habitats along floodplains, oxbows, and stream and river terraces; subirrigated or spring-fed abandoned stream channels and valleys; and lakeshores; specifically, swales, narrow meander channels, and similar wetland and riparian habitats in valley bottom landscapes that retain moisture through late-summer.	mid-July to August			X
Spiranthes porrifolia	western ladies-tresses	BLM-S, WS	SUS		Moist swampy areas, wet meadows, along streams, in bogs, and on seepage slopes. At some Washington locations, is known to be associated with special status plant species *Ophioglossum pusillum*.	(May) July to September		X	X
Tauschia hooveri	Hoover's tauschia	SOC, BLM-S, WT	DOC	DOC	Sagebrush scablands, often barren rocky clay.	March to May	X		

[1]ISSSSP=Inter-agency Special Status / Sensitive Species Program species (ISSSSP) 2008a,b; 2012, [2]WNHP 2012a,b,c; and [3]USFWS, 2012, 2013a,b,c. [4]Habitat required and phenology data are based on Hitchcock et al. (1969), Hitchcock and Cronquist (1973), WNHP and BLM (2005), WNHP (2013), Camp and Gamon (2011), and USFWS (2013c). Key: ft = feet; E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; P – Federal Proposed; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WT – Washington State Threatened; WC – Washington State Candidate, and WS – Washington State Sensitive. SUS/DOC (suspected or documented) on BLM or JBLM YTC[4] is based on ISSSSP (2008a,b and 2012) and Fort Lewis Directorate of Public Works (2010). DOC within 0.25 mile or within TRS of Alternates[5] is based on data which was accessed from the Washington Natural Heritage Program (WNHP 2010, 2013) and BLM (M. Boyter, March 2011 and May 2013). Habitat required and phenology data[6] are based on Hitchcock et al. (1969), Hitchcock and Cronquist (1973), WNHP and BLM (2005), WNHP (2010), and Camp and Gamon (2011).

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APPENDIX B – HABITAT WITHIN THE ROW CORRIDOR AND SUITABILITY FOR SPECIAL STATUS PLANT SPECIES, BY ROUTE SEGMENT

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APPENDIX B HABITAT WITHIN THE FINAL-NNR ROW CORRIDOR AND SUITABILITY FOR SPECIAL STATUS PLANT SPECIES[1], BY LAND OWNERSHIP (IN ACRES)[2].

HABITAT DESCRIPTION	NNR – 1		NNR – 2		NNR – 3		NNR – 4O/ NNR-4U		NNR – 5		NNR – 6O/ NNR-6U		NNR – 7		NNR – 8		MR – 1	
	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	PUBLIC	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER
Agriculture		0.5															T	
Developed, Road, or Firebreak	T	13.5	22.3	0.6	0.6	0.6	1.0	T	1.7				T		1.2	0.9	47.7	
Irrigation Canal									T									
Noxious Weeds	1.7	T	13.1		T	T	11.8		0.9						T			
Turf Grass			1.8															
Planted Trees/ Watered Poplar		T	3.0															
Water Body		T													T	7.9		
TOTAL UNSUITABLE	1.8	14.5	40.2	0.6	0.7	0.6	12.8	T	2.6	0.0	0.0	0.0	T	0.0	1.3	8.8	47.7	0.0
Annual Grassland			15.0	T	42.0	5.1	1.0	12.0							5.6	3.7	31.8	56.8
Perennial Grassland			2.7		7.7	1.2	1.8				7.2				2.1			
Rabbitbrush/ Annual Grassland	T	T	4.1	T											T			
Sagebrush/ Annual Grassland			8.5		1.1	6.4	3.8	9.3							0.9	0.9		
TOTAL MARGINAL	T	T	30.3	T	50.7	12.7	6.6	21.3	0.0	0.0	7.2	0.0	0.0	0.0	9.1	4.6	31.8	56.8
Basalt cliff/rock					3.3	1.1									T			
Bitterbrush/ Perennial Grass							1.1											
Forb							2.5				14.6							
Forested Riparian			T			T												
Intermittent Stream or Dry Gully		0.6			T	T	T	T	0.7									
Native Trees					T	T												
Non-Forested Riparian			T			T									T	T		
Sagebrush/ Perennial Grassland	1.1	6.7	19.9		22.5	76.1	37.7	T	29.1		95.3		149.5		21.7	3.8	72.6	6.6
TOTAL SUITABLE	1.1	7.3	20.0	0.0	26.1	77.7	41.4	T	29.8	0.0	109.9	0.0	149.5	0.0	22.1	3.9	72.6	6.6
Grassland		4.3																
Shrubland		14.5																

HABITAT DESCRIPTION	NNR – 1		NNR – 2		NNR – 3		NNR – 4O/ NNR-4U		NNR – 5		NNR – 6O/ NNR-6U		NNR – 7		NNR – 8		MR – 1	
	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	PUBLIC	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER	PUBLIC	OTHER
TOTAL UNKNOWN SUITABILITY	0.0	18.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAND TOTAL	2.8	40.6	90.5	0.7	77.6	91.1	60.8	21.7	32.4	0.0	117.1	0.0	149.6	0.0	32.6	17.4	152.1	63.4

[1]Suitability for special status plant species is defined as the potential of each habitat to support special status plant species listed in Appendix A. Unsuitable habitats have zero potential to support any of the special plant species. Marginal habitats have potential to support fringe habitat for some of the special status plant species, and/or are generally lower quality habitats in the field. Suitable habitats have the potential to support characteristic habitat for some of the special status plant species, and/or are generally higher quality habitats in the field. Habitats with unknown suitability do not provide enough information to designate them into the marginal or suitable habitats, but do have enough information to determine they are not unsuitable. Since the DEIS, "perennial grassland" has been changes from unknown to marginal, and several other values have also been added.

[2]Habitats are based on survey results on federal and state lands (PUBLIC) and estimates of non-federal lands based on aerial interpretation (OTHER). Trace (T) is indicated where land area was 0.49 or less acres.

APPENDIX C - LIST OF PLANT COMMUNITIES AND ASSOCIATED ROUTE SEGMENTS

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APPENDIX C LIST OF PLANT COMMUNITIES DOCUMENTED DURING 2013 SURVEYS

HABITAT	PLANT COMMUNITY OR DOMINANT SPECIES PRESENT-COMMON NAME	PLANT COMMUNITY OR DOMINANT SPECIES PRESENT-SCIENTIFIC NAME	PRIORITY	PRELIMINARY-NNR SEGMENT(S)	CORRESONDING FINAL-NNR SEGMENT(S)
Perennial grasslands	Crested wheatgrass*	*Agropyron cristatum*		NNR-1, NNR-2, NNR-4	NNR-1, NNR-2, NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Sagebrush/perennial grass areas	Stiff sagebrush-Bluebunch wheatgrass*	*Artemisia rigida-Pseudoroegneria spicata*		NNR-4	NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Sagebrush/perennial grass areas	Stiff sagebrush- Sandberg bluegrass*	*Artemisia rigida-Poa secunda*	3	NNR-3, NNR-4	NNR-3, NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Sagebrush/perennial grass areas	Big sagebrush-Bluebunch wheatgrass*	*Artemisia tridentata-Pseudoroegneria spicata*	3	NNR-1, NNR-2, NNR-3, NNR-4, NNR-5	NNR-1, NNR-2, NNR-3, NNR-4o/NNR-4u, NNR-5, NNR-7, NNR-8, and MR-1
Sagebrush/annual grass areas	Big sagebrush-Cheatgrass*	*Artemisia tridentata-Bromus tectorum*		NNR-2, NNR-3, NNR-5	NNR-2, NNR-3, and NNR-8
Sagebrush/perennial grass areas - Non-native	Big sagebrush-Bulbous bluegrass*	*Artemisia tridentata-Poa bulbosa*		NNR-3	NNR-3
Sagebrush/perennial grass areas	Big sagebrush-Idaho fescue*	*Artemisia tridentata-Festuca idahoensis*	3	NNR-4	NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Sagebrush/perennial grass areas	Big sagebrush-Sandberg bluegrass*	*Artemisia tridentata-Poa secunda*	3	NNR-4, NNR-5	NNR-4o/NNR-4u, NNR-5, NNR-7, NNR-8, and MR-1
Sagebrush/perennial grass areas	Big sagebrush-Needle and thread*	*Artemisia tridentata-Hesperostipa comata*	1	NNR-3	NNR-3
Annual grasslands	Non-native annual grassland*	*Bromus tectorum*		NNR-2, NNR-3, NNR-4	NNR-2, NNR-3, NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Noxious weeds	Non-native perennial grassland*	*Centaurea sp.*		NNR-2	NNR-2
Rabbitbrush/annual grass areas	Rubber rabbitbrush-Cheatgrass*	*Ericameria nauseosa -Bromus tectorum*		NNR-2, NNR-5	NNR-2, NNR-8
Perennial grasslands	Needle and thread-Sandberg bluegrass	*Hesperostipa comata-Poa secunda*	1	NNR-5	NNR-8
Perennial grasslands	Sandberg bluegrass-Narrowleaf mock goldenweed*	*Poa secunda-Nestotus stenophyllus*		NNR-4	NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Perennial grass areas - Non-native	Bulbous bluegrass-Cheatgrass*	*Poa bulbosa-Bromus tectorum*		NNR-2	NNR-2
Forested Riparian	Black cottonwood-?	*Populus balsamifera ssp. trichocarpa-?*		NNR-4	NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Forested Riparian	Black cottonwood-Coyote	*Populus balsamifera ssp.*		NNR-2	NNR-2

HABITAT	PLANT COMMUNITY OR DOMINANT SPECIES PRESENT-COMMON NAME	PLANT COMMUNITY OR DOMINANT SPECIES PRESENT-SCIENTIFIC NAME	PRIORITY	PRELIMINARY-NNR SEGMENT(S)	CORRESONDING FINAL-NNR SEGMENT(S)
	willow	*trichocarpa-Salix exigua*			
Perennial grasslands	Bluebunch wheatgrass*	*Pseudoroegneria spicata*		NNR-1, NNR-4	NNR-1, NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Perennial grasslands	Bluebunch wheatgrass-Hooker's balsamroot*	*Pseudoroegneria spicata-Balsamorhiza hookeri*		NNR-3	NNR-3
Perennial grasslands	Bluebunch wheatgrass-Stiff sagebrush*	*Pseudoroegneria spicata-Artemisia rigida*		NNR-4	NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Perennial grasslands	Bluebunch wheatgrass-Cheatgrass*	*Pseudoroegneria spicata-Bromus tectorum*		NNR-3	NNR-3
Bitterbrush	Antelope bitterbrush-Bluebunch wheatgrass*	*Purshia tridentata-Pseudoroegneria spicata*	2	NNR-4	NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1
Non-forested Riparian	Coyote willow	*Salix exigua*		NNR-4	NNR-4o/NNR-4u, NNR-5, NNR-7, and MR-1

[1]Plant community names are predominantly based on Steppe Vegetation of Washington (Daubenmire 1970). Where it is not based on Daubenmire 1970, it is based on documenting the dominant tree, shrub, grass, and/or forb species present. An asterisk (*) indicates that the community is a dominant community in at least one link within the ROW corridor. Priority plant community status is based on list of 2009 WNHP Priority Rare Plant Communities or Wetlands http://www1.dnr.wa.gov/nhp/refdesk/plan/CommunityList.pdf (WNHP 2009).

APPENDIX D – List of Plant Species Documented on Federal Lands Within the ROW Corridor, by Route Segment

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APPENDIX D LIST OF PLANT SPECIES DOCUMENTED ON FEDERAL AND WSDOT LANDS WITHIN THE PRELIMINARY-NNR ROW CORRIDOR AND CORRESPONDING FINAL-NNR ROUTE SEGMENTS.[1]

FAMILY	CODE	SPECIES	COMMON NAME	FINAL-NNR ROUTE SEGMENTS				
				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Asteraceae	ACMI2	*Achillea millefolium*	Common yarrow	X	X	X	X	D
Poaceae	ACHY	*Achnatherum hymenoides*	Indian ricegrass		X	X	X	X
Poaceae	ACLE8	*Achnatherum lemmonii*	Lemmon's needlegrass		X		X	
Poaceae	ACTH7	*Achnatherum thurberianum*	Thurber's needlegrass	X	X	D	X	X
Asteraceae	ACRE3	*Acroptilon repens*	Russian knapweed		D			
Lamiaceae	AGUR	*Agastache urticifolia*	Nettleleaf giant hyssop				X	
Asteraceae	AGHE2	*Agoseris heterophylla*	Annual agoseris		X		X	
Poaceae	AGCR	*Agropyron cristatum*	Crested wheatgrass	D	D	D	X	
Poaceae	AGSC5	*Agrostis scabra*	Rough bentgrass		X			
Alismataceae	ALTR7	*Alisma triviale*	Northern water plantain		X			
Liliaceae	ALAC4	*Allium acuminatum*	Tapertip onion		X	X	X	X
Liliaceae	ALAM2	*Allium amplectens*	Slim-leaf onion					X
Poaceae	ALAE	*Alopecurus aequalis*	Shortawn foxtail				X	
Brassicaceae	ALAL3	*Alyssum alyssoides*	Pale madwort		X	X	X	
Amaranthaceae	AMAL	*Amaranthus albus*	Prostrate pigweed		X			
Amaranthaceae	AMRE	*Amaranthus retroflexus*	red-root pigweed					X
Rosaceae	AMAL2	*Amelanchier alnifolia*	Saskatoon serviceberry			X	X	X
Boraginaceae	AMSIN	*Amsinckia sp.*	Fiddleneck				X	
Boraginaceae	AMTE3	*Amsinckia tessellata*	Bristly fiddleneck		X	X	X	X
Asteraceae	ANMA	*Anaphalis margaritacea*	Western pearly everlasting		X			
Asteraceae	ANDI2	*Antennaria dimorpha*	Low pussytoes	X	X	X	X	X
Asteraceae	ANMI3	*Antennaria microphylla*	Littleleaf pussytoes			X	X	
Asteraceae	ANRO2	*Antennaria rosea*	Rosy pussytoes			X		
Ranunculaceae	AQFO	*Aquilegia formosa*	Western columbine				X	
Brassicaceae	ARCU	*Arabis cusickii*	Cusick's rockcress				X	
Brassicaceae	ARLE	*Arabis lemmonii*	Lemmon's rockcress			X	X	
Brassicaceae	ARABI2	*Arabis sp.*	Rockcress			X	X	
Brassicaceae	ARSP	*Arabis sparsiflora*	Sicklepod rockcress				X	
Asteraceae	ARCTI	*Arctium sp.*	Burdock		X			
Caryophyllaceae	ARFR	*Arenaria franklinii*	Franklin's sandwort				X	
Asteraceae	ARFU3	*Arnica fulgens*	Foothill arnica			X	X	
Asteraceae	ARDR4	*Artemisia dracunculus*	Tarragon			X		
Asteraceae	ARLU	*Artemisia ludoviciana*	White sagebrush			X	X	

FAMILY	CODE	SPECIES	COMMON NAME	FINAL-NNR ROUTE SEGMENTS				
				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Asteraceae	ARRI2	*Artemisia rigida*	Scabland sagebrush			D	D	D
Asteraceae	ARTR2	*Artemisia tridentata*	Big sagebrush	D	D	D	D	D
Asteraceae	ARTRT	*Artemisia tridentata ssp. tridentata*	Basin big sagebrush			D	D	X
Asteraceae	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	Wyoming big sagebrush		D	D	D	D
Asteraceae	ARTR4	*Artemisia tripartita*	Threetip sagebrush			X		
Asclepiadaceae	ASSP	*Asclepias speciosa*	Showy milkweed		X	X	X	
Liliaceae	ASOF	*Asparagus officinalis*	Garden asparagus					X
Boraginaceae	ASPR	*Asperugo procumbens*	German-madwort				X	
Fabaceae	ASCA12	*Astragalus caricinus*	Buckwheat milkvetch		X	X	X	X
Fabaceae	ASCO11	*Astragalus conjunctus*	Idaho milkvetch			X	X	
Fabaceae	ASFI	*Astragalus filipes*	Basalt milkvetch	X	X	X	X	X
Fabaceae	ASLE8	*Astragalus lentiginosus*	Freckled milkvetch				X	
Fabaceae	ASMIP	*Astragalus misellus var. pauper*	Pauper milkvetch			X		
Fabaceae	ASPU9	*Astragalus purshii*	Woollypod milkvetch	X	X	X	X	X
Fabaceae	ASSC6	*Astragalus sclerocarpus*	Stalked-pod milk-vetch					X
Fabaceae	ASTRA	*Astragalus sp.*	Milkvetch		X		X	
Fabaceae	ASSP7	*Astragalus speirocarpus*	Threadstalk milkvetch		X	X	X	X
Fabaceae	ASSU7	*Astragalus succumbens*	Columbia milkvetch					X
Chenopodiaceae	ATCA2	*Atriplex canescens*	Fourwing saltbush				X	
Asteraceae	BACA3	*Balsamorhiza careyana*	Carey's balsamroot		X	X	X	D
Asteraceae	BAHO	*Balsamorhiza hookeri*	Hooker's balsamroot			D	X	
Asteraceae	BARO2	*Balsamorhiza rosea*	Cutleaf balsamroot				D	X
Chenopodiaceae	BASC5	*Bassia scoparia*	Burningbush		X			X
Asteraceae	BROB	*Brickellia oblongifolia*	Mojave brickellbush			X	X	
Poaceae	BRAR5	*Bromus arvensis*	Field brome				X	X
Poaceae	BRCA5	*Bromus carinatus*	California brome				X	
Poaceae	BROMU	*Bromus sp.*	Brome				X	
Poaceae	BRTE	*Bromus tectorum*	Cheatgrass	X	D	D	D	D
Boraginaceae	BUAR3	*Buglossoides arvensis*	Corn gromwell			X		
Liliaceae	CAMA5	*Calochortus macrocarpus*	Sagebrush mariposa					X
Brassicaceae	CAMI2	*Camelina microcarpa*	littlepod false flax				X	
Onagraceae	CAAN14	*Camissonia andina*	Blackfoot River evening primrose				X	
Brassicaceae	CADR	*Cardaria draba*	Hoary cress		X		X	

FAMILY	CODE	SPECIES	COMMON NAME	FINAL-NNR ROUTE SEGMENTS				
				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Asteraceae	CAAC	*Carduus acanthoides*	Spiny plumeless thistle		X		X	
Cyperaceae	CAAT3	*Carex athrostachya*	Slenderbeak sedge		X			
Cyperaceae	CADO2	*Carex douglasii*	Douglas' sedge				X	
Scrophulariaceae	CACE4	*Castilleja cervina*	Deer Indian paintbrush		X			
Scrophulariaceae	CASTI2	*Castilleja sp.*	Indian paintbrush				X	
Asteraceae	CEDI3	*Centaurea diffusa*	Diffuse knapweed	X	D	X	X	X
Caryophyllaceae	CERAS	*Cerastium sp.*	Chickweed				X	
Ranunculaceae	CETE5	*Ceratocephala testiculata*	Curveseed butterwort		X		X	
Asteraceae	CHDO	*Chaenactis douglasii*	Douglas' dustymaiden	X	X	X	X	X
Euphorbiaceae	CHGL13	*Chamaesyce glyptosperma*	Ribseed sandmat					X
Onagraceae	CHANA2	*Chamerion angustifolium ssp. angustifolium*	Fireweed					X
Brassicaceae	CHTE2	*Chorispora tenella*	Crossflower		X	X	X	
Polygonaceae	CHORI2	*Chorizanthe sp.*	Spineflower				X	
Asteraceae	CHVI8	*Chrysothamnus viscidiflorus*	Yellow rabbitbrush	X	X	X	X	D
Poaceae	CILA2	*Cinna latifolia*	Drooping woodreed				X	
Asteraceae	CIAR4	*Cirsium arvense*	Canada thistle	X	X		X	
Asteraceae	CIVU	*Cirsium vulgare*	Bull thistle				X	
Portulaceae	CLPE	*Claytonia perfoliata*	Miner's lettuce			X	X	
Portulaceae	CLAYT	*Claytonia sp.*	Springbeauty				X	
Ranunculaceae	CLLI2	*Clematis ligusticifolia*	Western white clematis	X	X	X	X	
Fabaceae	CLLU2	*Cleome lutea*	Yellow spiderflower					X
Scrophulariaceae	COPA3	*Collinsia parviflora*	Maiden blue eyed Mary		X	X	X	X
Polemoniaceae	COGR4	*Collomia grandiflora*	Grand collomia	X	X	X	X	
Polemoniaceae	COLI2	*Collomia linearis*	Tiny trumpet				X	
Santalaceae	COUM	*Comandra umbellata*	Bastard toadflax	X			X	X
Convulvulaceae	COAR4	*Convolvulus arvensis*	Field bindweed		X			X
Asteraceae	COCA5	*Conyza canadensis*	Canadian horseweed		X			
Asteraceae	CRAC2	*Crepis acuminata*	Tapertip hawksbeard			X	X	X
Asteraceae	CRAT	*Crepis atribarba*	Slender hawksbeard	X	X	X	X	
Asteraceae	CRIN4	*Crepis intermedia*	Limestone hawksbeard				X	
Asteraceae	CRMO4	*Crepis modocensis*	Modoc hawksbeard		X	X	X	
Asteraceae	CROC	*Crepis occidentalis*	Largeflower hawksbeard				X	
Asteraceae	CREPI	*Crepis sp.*	Hawksbeard					X
Boraginaceae	CRCI2	*Cryptantha circumscissa*	Cushion cryptantha				X	X

FAMILY	CODE	SPECIES	COMMON NAME	FINAL-NNR ROUTE SEGMENTS				
				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Boraginaceae	CRFL4	*Cryptantha flaccida*	Weakstem cryptantha				X	
Boraginaceae	CRIN8	*Cryptantha intermedia*	Clearwater cryptantha			X		
Boraginaceae	CRPT	*Cryptantha pterocarya*	Wingnut cryptantha			X	X	X
Boraginaceae	CRSI2	*Cryptantha simulans*	Pinewoods cryptantha			X		
Boraginaceae	CRYPT	*Cryptantha sp.*	Cryptantha				X	X
Cuscutaceae	CUEP	*Cuscuta epithymum*	Clover dodder				X	
Ranunculaceae	DELI3	*Delphinium lineapetalum*	Thinpetal larkspur				X	
Ranunculaceae	DENU2	*Delphinium nuttallianum*	Twolobe larkspur					X
Ranunculaceae	DELPH	*Delphinium sp.*	Larkspur			X	X	X
Brassicaceae	DEPI	*Descurainia pinnata*	Western tansymustard		X		X	
Brassicaceae	DESO2	*Descurainia sophia*	Herb sophia	X	X	X	X	
Brassicaceae	DESCU	*Descurainia sp.*	Tansymustard		X		X	
Dipsacaceae	DIFU2	*Dipsacus fullonum*	Fuller's teasel				X	
Primulaceae	DOPU	*Dodecatheon pulchellum*	Darkthroat shootingstar			X	X	
Brassicaceae	DRVE2	*Draba verna*	Spring draba	X	X	D	X	
Dryopteridaceae	DRYOP	*Dryopteris sp.*	Woodfern			X	X	
Elaeagnaceae	ELAN	*Elaeagnus angustifolia*	Russian olive		X			
Poaceae	ELEL5	*Elymus elymoides*	Squirreltail		X	X	X	X
Onagraceae	EPBR3	*Epilobium brachycarpum*	Tall annual willowherb	X	X	X	X	X
Onagraceae	EPCI	*Epilobium ciliatum*	Fringed willowherb		X		X	
Equisetaceae	EQAR	*Equisetum arvense*	Field horsetail				X	X
Equisetaceae	EQFL	*Equisetum fluviatile*	Water horsetail		X			
Asteraceae	ERNA10	*Ericameria nauseosa*	Rubber rabbitbrush	X	D	X	D	D
Asteraceae	ERFI2	*Erigeron filifolius*	Threadleaf fleabane			X	X	X
Asteraceae	ERLI	*Erigeron linearis*	Desert yellow fleabane	X	X	X	X	D
Asteraceae	ERPO2	*Erigeron poliospermus*	Purple cushion fleabane		X	X	X	X
Asteraceae	ERPU2	*Erigeron pumilus*	Shaggy fleabane	X	X	X	X	X
Asteraceae	ERIGE2	*Erigeron sp.*	Fleabane				X	X
Polygonaceae	ERCO12	*Eriogonum compositum*	Arrowleaf buckwheat				X	X
Polygonaceae	ERDO	*Eriogonum douglasii*	Douglas' buckwheat				X	X
Polygonaceae	EREL5	*Eriogonum elatum*	Tall woolly buckwheat				X	
Polygonaceae	ERHE2	*Eriogonum heracleoides*	Parsnipflower buckwheat		X	X	X	X
Polygonaceae	ERMI4	*Eriogonum microthecum*	Slender buckwheat		X	X	X	X
Polygonaceae	ERNI2	*Eriogonum niveum*	Snow buckwheat					X
Polygonaceae	EROV	*Eriogonum ovalifolium*	Cushion buckwheat				X	

FAMILY	CODE	SPECIES	COMMON NAME	FINAL-NNR ROUTE SEGMENTS				
				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Polygonaceae	ERSP7	*Eriogonum sphaerocephalum*	Rock buckwheat			X	D	X
Polygonaceae	ERST4	*Eriogonum strictum*	Blue Mountain buckwheat	X	X	X	X	X
Polygonaceae	ERTH4	*Eriogonum thymoides*	Thymeleaf buckwheat		X	D	D	X
Asteraceae	ERLA6	*Eriophyllum lanatum*	Common woolly sunflower	X	X	X	D	
Geraniaceae	ERCI6	*Erodium cicutarium*	Redstem stork's bill	X	X	X	X	X
Brassicaceae	ERCA14	*Erysimum capitatum*	Sanddune wallflower	X			X	
Poaceae	FEID	*Festuca idahoensis*	Idaho fescue	X	X	D	D	X
Oleaceae	FRPE	*Fraxinus pennsylvanica*	Green ash		X			
Liliaceae	FRPU2	*Fritillaria pudica*	Yellow fritillary		X	X	X	X
Rubiaceae	GAAP2	*Galium aparine*	Stickywilly		X	X	X	
Rubiaceae	GABO2	*Galium boreale*	Northern bedstraw			X	X	
Rubiaceae	GAMEA2	*Galium mexicanum ssp. asperulum*	Mexican bedstraw	X				
Rubiaceae	GAMU2	*Galium multiflorum*	Shrubby bedstraw				X	
Rubiaceae	GALIU	*Galium sp.*	Bedstraw		X		X	
Polemoniaceae	GISI	*Gilia sinuata*	Rosy gilia					X
Polemoniaceae	GILIA	*Gilia sp.*	Gilia					X
Chenopodiaceae	GRSP	*Grayia spinosa*	Spiny hopsage		X	X	X	D
Asteraceae	GUSA2	*Gutierrezia sarothrae*	Broom snakeweed				X	
Boraginaceae	HADIA	*Hackelia diffusa var. arida*	Sagebrush stickseed				X	
Asteraceae	HECU2	*Helianthus cusickii*	Cusick's sunflower		X	X	X	
Poaceae	HECO26	*Hesperostipa comata*	Needle and thread	X	X	D	X	X
Caryophyllaceae	HOUM	*Holosteum umbellatum*	Jagged chickweed	X	X	D	X	X
Poaceae	HOMU	*Hordeum murinum*	Mouse barley		X			
Poaceae	HORDE	*Hordeum sp.*	Barley			X	X	
Hydrophyllaceae	HYCA4	*Hydrophyllum capitatum*	Ballhead waterleaf				X	
Clusiaceae	HYPE	*Hypericum perforatum*	Common St. Johnswort				X	
Brassicaceae	IDSC	*Idahoa scapigera*	Oldstem idahoa				X	
Malvaceae	ILLO2	*Iliamna longisepala*	Longsepal wild hollyhock				X	
Juncaceae	JUAC	*Juncus acuminatus*	Tapertip rush		X			
Juncaceae	JUARL	*Juncus arcticus ssp. littoralis*	Mountain rush		X			
Juncaceae	JUDU2	*Juncus dudleyi*	Dudley's rush		X			
Juncaceae	JUEF	*Juncus effusus*	Common rush		X			
Juncaceae	JUNO2	*Juncus nodosus*	Knotted rush		X			
Poaceae	KOMA	*Koeleria macrantha*	Prairie Junegrass			X	X	X
Asteraceae	LASE	*Lactuca serriola*	Prickly lettuce		X	X	X	X

FAMILY	CODE	SPECIES	COMMON NAME	FINAL-NNR ROUTE SEGMENTS				
				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Boraginaceae	LAOCO	*Lappula occidentalis var. occidentalis*	Flatspine stickseed		X		X	
Asteraceae	LAGL5	*Layia glandulosa*	Whitedaisy tidytips					X
Brassicaceae	LEDE	*Lepidium densiflorum*	Common pepperweed				X	
Brassicaceae	LELA2	*Lepidium latifolium*	Broadleaved pepperweed				X	
Brassicaceae	LEPE2	*Lepidium perfoliatum*	Clasping peppergrass	X	X	X	X	
Brassicaceae	LEPID	*Lepidium sp.*	Pepperweed			X	X	
Portulacae	LERE7	*Lewisia rediviva*	Bitter root			X	X	
Poaceae	LECI4	*Leymus cinereus*	Basin wildrye		X	X	X	X
Polemoniaceae	LIPU11	*Linanthus pungens*	Granite prickly phlox			X	X	X
Scrophulariaceae	LIDA	*Linaria dalmatica*	Dalmatian toadflax	X	X			
Saxifragiaceae	LIGL2	*Lithophragma glabrum*	Bulbous woodland-star				X	
Saxifragiaceae	LIPA5	*Lithophragma parviflorum*	Smallflower woodland-star			X	X	
Boraginaceae	LIRU4	*Lithospermum ruderale*	Western stoneseed		X	X	X	
Apiaceae	LOCA4	*Lomatium canbyi*	Canby's biscuitroot		X	X	X	X
Apiaceae	LOCU2	*Lomatium cuspidatum*	Wenatchee desertparsley				X	
Apiaceae	LODI	*Lomatium dissectum*	Fern-leaf biscuitroot			D	X	X
Apiaceae	LONU2	*Lomatium nudicaule*	Barestem biscuitroot			X		
Apiaceae	LOQU2	*Lomatium quintuplex*	Umtanum desertparsley				X	
Apiaceae	LOMAT	*Lomatium sp.*	Biscuit root		X	X	X	X
Apiaceae	LOTR2	*Lomatium triternatum*	Nine-leaf biscuitroot		X	D	X	
Apiaceae	LOTU	*Lomatium tuberosum*	Hoover's desert-parsley			X		
Caprifoliaceae	LOIN5	*Lonicera involucrata*	Twinberry honeysuckle				X	
Fabaceae	LOUNU	*Lotus unifoliolatus var. unifoliolatus*	American bird's-foot trefoil					X
Fabaceae	LUAR3	*Lupinus argenteus*	Silvery lupine		X		D	
Fabaceae	LUBI	*Lupinus bicolor*	Miniature lupine		X			
Fabaceae	LUPU	*Lupinus pusillus*	Rusty lupine					X
Fabaceae	LUSE4	*Lupinus sericeus*	Silky lupine			X	X	X
Fabaceae	LUPIN	*Lupinus sp.*	Lupine	X	X	X	D	
Lamiaceae	LYCOP4	*Lycopus sp.*	Waterhorehound		X			
Lythraceae	LYSA2	*Lythrum salicaria*	Purple loosestrife		X			
Asteraceae	MACA2	*Machaeranthera canescens*	Hoary tansyaster		X		X	X
Asteraceae	MAEX	*Madia exigua*	Small tarweed		X	X	X	X
Asteraceae	MAGR3	*Madia gracilis*	Grassy tarweed					X
Fabaceae	MEPO3	*Medicago polymorpha*	Burclover					X
Fabaceae	MESA	*Medicago sativa*	Alfalfa		X	X		X

FAMILY	CODE	SPECIES	COMMON NAME	FINAL-NNR ROUTE SEGMENTS				
				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Fabaceae	MEOF	*Melilotus officinalis*	Yellow sweet-clover	X	X	X	X	X
Loasaceae	MEAL6	*Mentzelia albicaulis*	Whitestem blazingstar					X
Campanulaceae	MELO4	*Mertensia longiflora*	Small bluebells			X	X	
Campanulaceae	MERTE	*Mertensia sp.*	Bluebells				X	
Asteraceae	MILA	*Microseris laciniata*	Cutleaf silverpuffs					X
Polemoniaceae	MIGR	*Microsteris gracilis*	Slender phlox			X	X	
Scrophulariaceae	MIGU	*Mimulus gutattus*	Common monkey-flower				X	
Scrophulariaceae	MIMUL	*Mimulus sp.*	Monkey-flower		X			
Caryophyllaceae	MINUN2	*Minuartia nuttallii ssp. nuttallii*	Nuttall's sandwort				X	X
Lamiaceae	MOOD	*Monardella odoratissima*	Mountain monardella				X	
Moraceae	MOAL	*Morus alba*	White mulberry					X
Boraginaceae	MYLA	*Myosotis laxa*	Bay forget-me-not				X	
Boraginaceae	MYSC	*Myosotis scorpioides*	True forget-me-not				X	
Boraginaceae	MYOSO	*Myosotis sp.*	Forget-me-not				X	
Brassicaceae	NAOF	*Nasturtium officinale*	Watercress				X	
Hydrophyllaceae	NEBR	*Nemophila breviflora*	Basin nemophila	X		X	X	
Lamiaceae	NECA2	*Nepeta cataria*	Catnip		X		X	
Asteraceae	NEST5	*Nestotus stenophyllus*	Narrowleaf mock goldenweed		X	D	D	
Asteraceae	NOTR2	*Nothocalais troximoides*	Sagebrush false dandelion		X	X	X	
Onagraceae	OEPA	*Oenothera pallida*	Pale evening primrose					X
Cactaceae	OPPO	*Opuntia polyacantha*	Plains pricklypear		X	X		
Orobanchaceae	ORCA2	*Orobanche californica*	California broomrape					X
Orobanchaceae	ORCO5	*Orobanche corymbosa*	Flat-top broomrape					X
Orobanchaceae	ORFA	*Orobanche fasciculata*	Clustered broomrape					X
Orobanchaceae	ORABA	*Orobanche sp.*	Broomrape				X	
Scrophulariaceae	ORBA2	*Orthocarpus barbatus*	Grand Coulee owl's-clover	X	X	X	X	
Asteraceae	PACA15	*Packera cana*	Woolly grounsel				X	
Vitaceae	PAVI5	*Parthenocissus vitacea*	Woodbine		X			
Poaceae	PASM	*Pascopyrum smithii*	Western wheatgrass				X	X
Boraginaceae	PESE	*Pectocarya setosa*	Moth combseed				X	
Boraginaceae	PECTO	*Pectocarya sp.*	Combseed				X	
Cactaceae	PESIR	*Pediocactus simpsonii var. robustior*	Snowball cactus			X	X	
Scrophulariaceae	PEDE4	*Penstemon deustus*	Scabland penstemon					X
Scrophulariaceae	PEGA	*Penstemon gairdneri*	Gairdner's beardtongue			X	X	

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				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Scrophulariaceae	PEGL4	*Penstemon glandulosus*	Stickystem penstemon				X	
Scrophulariaceae	PEHU	*Penstemon humilis*	Low beardtongue			X		
Scrophulariaceae	PERIR	*Penstemon richardsonii var. richardsonii*	Richardson's penstemon			X	X	
Scrophulariaceae	PERY	*Penstemon rydbergii*	Rydberg's penstemon				X	
Scrophulariaceae	PESP	*Penstemon speciosus*	Royal penstemon			X		
Hydrophyllaceae	PHHA	*Phacelia hastata*	Silverleaf phacelia		X	X	X	X
Hydrophyllaceae	PHHE2	*Phacelia heterophylla*	Varileaf phacelia		X			
Hydrophyllaceae	PHLI	*Phacelia linearis*	Threadleaf phacelia			X	X	X
Hydrophyllaceae	PHACE	*Phacelia sp.*	Phacelia				X	
Poaceae	PHAR3	*Phalaris arundinacea*	Reed canarygrass		X			
Portulaceae	PHSP10	*Phemeranthus spinescens*	Spiny fameflower				X	
Hydrangeaeceae	PHLE4	*Philadelphus lewisii*	Lewis' mock orange			X	X	X
Polemoniaceae	PHAC2	*Phlox aculeata*	Sagebrush phlox		X		X	
Polemoniaceae	PHHO	*Phlox hoodii*	Spiny phlox	X		X	D	X
Polemoniaceae	PHLO2	*Phlox longifolia*	Longleaf phlox		X	X	X	X
Polemoniaceae	PHSP	*Phlox speciosa*	Showy phlox		X		X	X
Brassicaceae	PHCH	*Phoenicaulis cheiranthoides*	Wallflower phoenicaulis			X	X	
Brassicaceae	LEDO2	*Lesquerella douglasii (=Physaria douglasii ssp. douglasii)*	Douglas' bladderpod					X
Pinaceae	PICO	*Pinus contorta*	lodgepole pine					X
Plantaginaceae	PLLA	*Plantago lanceolata*	Narrowleaf plantain					X
Valerianaceae	PLMA4	*Plectritis macrocera*	Longhorn plectritus	X	X	X	X	
Poaceae	POBU	*Poa bulbosa*	Bulbous bluegrass	X	D	D	X	X
Poaceae	POCO	*Poa compressa*	Canada bluegrass				X	
Poaceae	POCU3	*Poa cusickii*	Cusick's bluegrass				X	
Poaceae	POPR	*Poa pratensis*	Kentucky bluegrass		X		X	
Poaceae	POSE	*Poa secunda*	Sandberg bluegrass	X	D	D	D	D
Polygonaceae	POAV	*Polygonum aviculare*	Prostrate knotweed		X			X
Polygonaceae	POHY2	*Polygonum hydropiperoides*	Swamp smartweed		X			
Poaceae	POMO5	*Polypogon monspeliensis*	Annual rabbitsfoot grass		X			
Salicaceae	POBAT	*Populus balsamifera ssp. trichocarpa*	Black cottonwood		D	D	X	X
Salicaceae	POTR5	*Populus tremuloides*	Quaking aspen				X	
Rosaceae	POBI7	*Potentilla biennis*	Biennial cinquefoil		X			
Rosaceae	PORE5	*Potentilla recta*	Sulphur cinquefoil				X	

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				NNR-1 (NNR-1)[2]	NNR-2 (NNR-2)	NNR-3 (NNR-3)	NNR-4o/NNR-4u, NNR-5, & NNR-7[3] (NNR-4)	NNR-8 (NNR-5)
Rosaceae	PRVI	*Prunus virginiana*	Chokecherry			X	X	
Poaceae	PSJU3	*Psathyrostachys juncea*	Russian wildrye			X		
Poaceae	PSSP6	*Pseudoroegneria spicata*	Bluebunch wheatgrass	D	D	D	D	D
Apiaceae	PTTE	*Pteryxia terebinthina*	Turpentine wavewing			X	X	
Rosaceae	PUTR2	*Purshia tridentata*	Antelope bitterbrush	X	X	X	D	D
Ranunculaceae	RASC3	*Ranunculus sceleratus*	Cursed buttercup				X	
Anacardiaceae	RHGL	*Rhus glabra*	Smooth sumac			X		X
Grossulariaceae	RIAU	*Ribes aureum*	Golden currant		X		X	
Grossulariaceae	RICE	*Ribes cereum*	Wax currant			X	X	
Grossulariaceae	RIBES	*Ribes sp.*	Currant				X	
Fabaceae	ROPS	*Robinia pseudoacacia*	Black locust		X			
Rosaceae	ROGY	*Rosa gymnocarpa*	Dwarf rose				X	
Rosaceae	ROSA5	*Rosa sp.*	Rose		X		X	
Rosaceae	ROWO	*Rosa woodsii*	Woods' rose				X	X
Rosaceae	RUBU5	*Rubus sp.* (not noxious, no flowers/fruits)	Blackberry		X			
Polygonaceae	RUCR	*Rumex crispus*	Curly dock		X			
Polygonaceae	RUMEX	*Rumex sp.*	Dock				X	
Salicaceae	SAEX	*Salix exigua*	Narrowleaf willow		D	D		
Salicaceae	SALIX	*Salix sp.*	Willow		X		D	
Chenopodiaceae	SATR12	*Salsola tragus*	Prickly Russian thistle		X	X	X	X
Lamiaceae	SADO4	*Salvia dorrii*	Purple sage		X	X	X	D
Caprifoliaceae	SAMBU	*Sambucus sp.*	Elderberry				X	
Cyperaceae	SCACA	*Schoenoplectus acutus var. acutus*	Hardstem bulrush		X			
Cyperaceae	SCAM6	*Schoenoplectus americanus*	Chairmaker's bulrush		X			
Cyperaceae	SCMI2	*Scirpus microcarpus*	Panicled bulrush				X	
Selaginellaceae	SELAG	*Selaginella sp.*	Spikemoss			X	X	X
Asteraceae	SEIN2	*Senecio integerrimus*	lambstongue ragwort				X	
Asteraceae	SEVU	*Senecio vulgaris*	Old-man-in-the-Spring				X	
Brassicaceae	SIAL2	*Sisymbrium altissimum*	Tall tumblemustard	X	D	D	D	X
Asteraceae	SOCA6	*Solidago canadensis*	Canada goldenrod		X			
Asteraceae	SOLID	*Solidago sp.*	Goldenrod			X		
Sparganiaceae	SPARG	*Sparganium sp.*	Bur-reed		X			
Poaceae	SPCR	*Sporobolus cryptandrus*	Sand dropseed					X
Asteraceae	STMIM	*Stephanomeria minor var. minor*	Narrowleaf wirelettuce					X

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Asteraceae	STPA2	*Stephanomeria paniculata*	Tufted wirelettuce		X			X
Asteraceae	STEPH	*Stephanomeria sp.*	Wirelettuce			X	X	
Caprifoliaceae	SYAL	*Symphoricarpos albus*	Common snowberry				X	
Asteraceae	TAOF	*Taraxacum officinale*	Common dandelion				X	
Asteraceae	TECA2	*Tetradymia canescens*	Spineless horsebrush			X	X	
Poaceae	THIN6	*Thinopyrum intermedium*	Intermediate wheatgrass		X			
Asteraceae	TOFL5	*Townsendia florifer*	Showy Townsend daisy		X	X	X	X
Anacardiaceae	TOXIC	*Toxicodendron spp.*	Poison oak				X	
Asteraceae	TRDU	*Tragopogon dubius*	Yellow salsify	X	X	X	X	X
Fabaceae	TRMA3	*Trifolium macrocephalum*	Largehead clover			X	X	
Liliaceae	TRITE	*Triteleia hyacinthina*	White brodiaea		X	X	X	X
Typhaceae	TYPHA	*Typha sp.*	Cattail		X			
Ulmaceae	ULPU	*Ulmus pumila*	Siberian elm		X			X
Urticaceae	URDI	*Urtica dioica*	Stinging nettle				X	
Scrophulariaceae	VETH	*Verbascum thapsus*	Common mullein		D	X	X	X
Scrophulariaceae	VEAN2	*Veronica anagallis-aquatica*	Water speedwell		X		X	
Violaceae	VITR3	*Viola trinervata*	Rainier violet		X	D	X	
Poaceae	VUBR	*Vulpia bromoides*	Brome fescue		X			
Poaceae	VUOC	*Vulpia octoflora*	Sixweeks fescue			X	X	X
Poaceae	VULPI	*Vulpia sp.*	Fescue	X	X		D	
Dryopteridaceae	WOOR	*Woodsia oregana*	Oregon cliff fern			X	X	
Liliaceae	ZIPA2	*Zigadenus paniculatus*	Foothill deathcamas					X
Liliaceae	ZIGAD	*Zigadenus sp.*	Deathcamas		X		X	X
Liliaceae	ZIVE	*Zigadenus venenosus*	Meadow death camas					X

[1]All plant nomenclature is based on USDA Plants Database (USDA 2013). Dominant species with >5% cover are indicated by a "D". All other species are indicated by an "X".
[2]Preliminary-NNR Route Segments are provided in parentheses.
[3]No surveys were conducted within Final-NNR-6, but Preliminary-NNR-4 would be the closest route segmen