P-8D – Washington Ground Squirrel Surveys Technical Report

2011 Report

TETRA TECH

Boardman to Hemingway Transmission Line Project

2011 Washington Ground Squirrel Surveys

December 2011
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Boardman to Hemingway Transmission Line Project

2011 Washington Ground Squirrel Surveys

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1.0 INTRODUCTION

This summary report presents the methods and results for the 2011 Washington ground squirrel (*Urocitellus washingtoni*) surveys conducted by Tetra Tech, Inc. (Tetra Tech) for Idaho Power Company (IPC) on the Boardman to Hemingway Transmission Line Project (Project).

IPC is proposing to construct and operate a new, approximately 300-mile-long, single-circuit 500-kilovolt (kV) electric transmission line between northeast Oregon and southwest Idaho (hereinafter the B2H Project or Project). The overhead, 500,000-volt (500-kV) transmission line will carry energy bi-directionally between a Portland General Electric (PGE) planned substation (Grassland Substation) adjacent to the Boardman Generating Plant, near Boardman in Morrow County, Oregon, and IPC's existing Hemingway Substation, located in Owyhee County, Idaho. The Project will traverse federal, state, and private lands in six counties in Oregon and Idaho. Figure 1-1 documents the Project location, proposed route, and route alternatives. All figures are located at the end of this report.

The Project would result in disturbances related to the construction of permanent facilities such as transmission tower pads, substations, communication sites, and permanent access roads, as well as temporary disturbances related to fly yards, lay down areas, tensioning sites, and temporary access roads. To help determine the degree of impact that could occur due to the construction and operation of these Project components, the location and habitat for Washington ground squirrels that occurs along the Project needs to be determined.

The Project, as proposed, would cross both public and private lands. The portion of the Project where Washington ground squirrel habitat occurs is almost entirely in private ownership. Data for these private lands, with the exception of some statewide data gathered by state wildlife management agencies, are largely unavailable. This means that existing databases could not always be used to determine the locations of Washington ground-squirrels and their habitats that could be impacted by the Project. In addition, landowner permission is required prior to surveying private lands, and some private landowners have declined access to their lands for surveys. This means that field surveys could not be conducted along the entire length of the Project within Washington ground squirrel habitat.

The objective of these surveys was to identify the presence and/or absence of Washington ground squirrel colonies in the vicinity of the proposed and alternate Project corridors so that Project impacts to Washington ground squirrels may be avoided and/or minimized.

2.0 SURVEY AREA

The survey area generally extends from the proposed Grassland Substation east to approximately Mile Post 83 with the Proposed route running west and south of the Boardman Bombing Range and the alternate route running north of the Boardman Bombing Range (Figure 2-1). The survey area was located in Morrow and Umatilla counties in northeastern Oregon.

The Oregon Department of Fish and Wildlife (ODFW) typically applies a 785-foot buffer around the outside boundary of Washington ground squirrel colonies as an avoidance area for energy development projects. In order to allow for Project siting changes the survey area for Washington ground squirrels included the 785-foot buffer plus an additional 250-foot area around all Project disturbance areas for a total distance of 1,035 feet. Disturbance areas include transmission towers, substations, communication sites, roads, pulling sites, laydown areas, and fly yards. This survey area included 15,577 acres of potentially suitable Washington ground squirrel habitat (Figure 2-1). The survey area consisted primarily of private lands.

During the survey, Tetra Tech had access to approximately 74 percent of the survey area (Figure 2-1).

3.0 METHODS

The surveys followed methodology developed in the *Status and Habitat Use of the Washington Ground Squirrel on State of Oregon Lands, South Boeing, Oregon* (Morgan and Nugent 1999). This protocol called for line transect surveys conducted on a grid with transects of a re-survey effort running perpendicular to the original line transects. The use of this protocol was approved by ODFW prior to commencing surveys, and clarification on the survey methodology was provided by Russ Morgan and Steve Cherry and Jon Germond of ODFW prior to and during surveys.

3.1 Habitat Assessment and Delineation

The Washington ground squirrel occurs only in the Columbia Basin of eastern Washington and north-central Oregon. In Oregon, the Washington ground squirrel range extends through portions of Gilliam, Morrow, and Umatilla Counties.. The known Oregon population is centered on the Boardman Bombing Range and Boardman Conservation Area (Figure 3-1).

The Washington ground squirrel is a small ground squirrel that is associated with shrub-steppe habitats of the Columbia Basin Ecoregion (Verts and Carraway 1998). Concern for the long-term viability of Washington ground squirrel populations led to the listing of the species by the ODFW as endangered in January of 2000, and the species is currently considered a candidate species for federal listing under the U.S. Fish and Wildlife Service (USFWS) Endangered Species Act (ESA) of 1973.

Washington ground squirrels are most common in shrub-steppe habitats over sandy or silt-loam soils that are deep and support the creation of burrows (Betts 1990, Yensen and Sherman 2003). Sagebrush habitats and bunchgrass grasslands have been found to contain the highest densities of Washington ground squirrels, with lower densities in more degraded habitats, such as low shrub habitats with annual grasses, rabbitbrush (*Ericameria sp*.), and invasive species (Betts 1990). Washington ground squirrels eat a broad range of seeds, forbs, leaves, flowers, and roots (Greene 1999) that provide adequate fat stores to survive the long aestivation/hibernation and reproduction period. Native plants such as Sandberg bluegrass (*Poa secunda*) may play a key role in their diet and survival (Tarifa and Yensen 2004).

Prior to commencing surveys, Tetra Tech identified suitable habitat for the Washington ground squirrel based on aerial photography and guidance from ODFW. Although Washington ground squirrels are found in the highest densities in sagebrush habitats and bunchgrass grasslands with few invasive species (Betts 1990), ODFW advised Tetra Tech that Washington ground squirrel colonies can be found in all habitats, regardless of quality, with the exception of active agricultural fields. In addition, ODFW advised Tetra Tech that Washington ground squirrels can use the burrows of other species and, therefore, holes of the appropriate size could potentially contain this species.

Washington ground squirrels are diurnally active and spend the majority of the year underground. This species aestivates throughout the summer and is thought to transition directly into hibernation (ODFW 1999, Sherman and Shellman Sherman 2005). Adults emerge from burrows between January and March, depending on elevation and weather patterns, and return underground in late May to early June. Juveniles emerge from burrows between March and April and return underground a few weeks after the adults (Carlson et al. 1980).

3.2 Historical Data Review

Tetra Tech conducted a data review of known Washington ground squirrel colonies in the vicinity of the Project. This included reviewing publications that documented Washington ground squirrel burrows on the Boardman Bombing Range and Boardman Conservation Area (Morgan and Nugent 1999, Marr 2004), submitting a data request to the Oregon Biodiversity Information Center (ORBIC 2011), and reviewing the results of Washington ground squirrel surveys for other energy development projects in the vicinity of the Survey Area, including Leaning Juniper I and II Wind Power Projects (NWC and WEST 2005, NWC 2008), and Pebble Springs Wind Project (PPM Energy 2006). Several Washington ground squirrel colonies were found to have been documented in the vicinity of the Survey Area indicating that a thorough survey effort of the proposed Project was necessary in order to map habitat and colony location to avoid or reduce impacts to this species from the Project.

3.3 Survey Schedule

The Survey Area was surveyed twice, once in April and once in May of 2011 to correspond with the highest Washington ground squirrel activity period when juveniles have emerged and alarm calls are most frequent.

3.4 Field Survey Methods

All field crew members were required to pass a hearing test prior to the field season ensuring they were capable of hearing a frequency of 8 kHz, the typical frequency of alarm call vocalizations of ground dwelling squirrels. At the start of the 2011 field season (April 5), the Tetra Tech survey crew met with Leslie Nelson of The Nature Conservancy (TNC) to visit an active Washington ground squirrel colony and received on the ground training in burrow, scat, alarm call, and squirrel identification. The Tetra Tech crew leader provided additional guidance on the natural history, habitat, and survey protocol for Washington ground squirrels. While at the colony site, the squirrels vocalized high pitched alarm and cricket calls, and the field crew members were able to familiarize themselves with the calls specific to this species. This visit also ensured that the squirrels were active in the vicinity of the Survey Area during the time of the scheduled field work.

The Washington ground squirrel is allopatric to the Columbia River Basin area and thus is one of only a few species of ground squirrel known to occur in the vicinity of the Survey Area. Confusing Washington ground squirrel for similar species such as Belding's ground squirrel (*Spermophilus beldingi*) or Townsend's ground squirrel (*Urocitellus townsendii*) is unlikely. Washington ground squirrels have scat that can be differentiated from other burrowing animals by its characteristic size and shape. Washington ground squirrel scat was present at the training site and some pieces were collected to later serve as a comparison when attempting to identify scat in the field surveys.

During surveys, a crew of 2 to 8 biologists walked meandering line transects, each spaced 165 feet (50 meters) apart, to provide survey coverage of the habitat within the Survey Area. The surveys were conducted in the morning (between approximately 7:30 a.m. and 3:00 p.m.) Surveys were not conducted when wind conditions were above 15 miles per hour. Professional judgment was used when wind speeds were greater than 6 miles per hour or when visibility was poor, as both of these conditions could limit the observer's ability to detect alarm calls or observe sign. Surveys commenced at least one hour after sunrise to allow for temperatures to increase sufficiently to support ground squirrel activity.

During all transect surveys, the crew walked transects at a similar pace to ensure there were no gaps in coverage, listened for alarm calls, and scanned the ground for potential burrows. Each crew member was able to communicate findings to the group via a hand-held radio thereby avoiding double recording of data. When surveyors observed potential burrows, potential scat, heard possible alarm calls or inter-colony communications, they alerted the group and then listened and visually scanned the area in detail for any squirrels or additional sign.

Colonies were designated active when Washington ground squirrel activity was confirmed through visual detection of a squirrel, audio confirmations (hearing alarm or social calls), and/or fresh, Washington ground squirrel scat near burrows. Scat samples were collected for confirmation of squirrel presence. A burrow was identified as potential if it was a hole that was freshly dug (no vegetation or cobwebs), that was structurally sound and the appropriate size for this species, but no other Washington ground squirrel sign (scat, visual, audio) was observed.

Each site was resurveyed approximately two weeks after the first survey; spacing the surveys apart by roughly two weeks ensured that ground squirrel activity would be captured despite any local differences in activity level throughout the season. During the second survey, all potential burrows identified during the first survey were revisited and any confirmed activity was documented on the colony field datasheets. During the second survey, 165-foot-wide transects were walked perpendicularly to the first survey transects in order to maximize coverage of the habitat. In areas where no or few potential burrows were found during the first survey, surveyors had the option of walking offset transects parallel to, but between, the original transects (i.e. offset by roughly 82 feet). Any potential burrows identified during the first survey were approached at a 90 degree angle during the second survey in order to minimize the chance of missing a visual or audio detection due to landscape features or prevailing wind directions.

3.5 Recording Data

Potential burrows were recorded on the field datasheet and labeled with a unique numeric identifier. Information recorded on the datasheet for potential burrows included location of burrows, number of burrows, habitat, and identifying features of location. When potential burrows were revisited during the second set of surveys, the date, surveyor, and notes on activity were recorded.

Areas where Washington ground squirrel presence was confirmed were delineated with Trimble® GeoXH global positioning system (GPS) units in the field, and later mapped using Geographic Information System (GIS) software. Confirmed presence was defined as a visual of the species or detection of an audio call. Once a general area was determined to be active based on these cues, all fresh burrows in the vicinity of the cue(s) were included in the colony delineation. Information collected on the Trimble GPS units included activity centers, such as locations where squirrels were observed or heard in high densities, and the colony boundary (i.e. the extent of active burrows on the periphery of activity centers). Colonies were delineated beyond the Survey Area if they straddled or were located just outside the Survey Area boundary and access to the adjacent area had been granted. Information recorded for each colony included habitat characteristics, locations of activity centers and colony boundaries, number of burrows, number of scat, the time and weather conditions under which the colony was discovered, and how the colony was first discovered. Photographs of burrows, scat, and habitat were taken at some active colonies.

Weather, survey personnel, time of day, and areas surveyed were recorded each day surveys were conducted. Precipitation, average wind speed and direction, cloud cover, and temperature were recorded at the start, middle, and end of each survey day.

4.0 RESULTS

Between April 5 and May 16, 2011, Tetra Tech conducted 20 days of Washington ground squirrel surveys divided over two survey periods to coincide with the seasonal activity period of the Washington ground squirrel. The first survey period occurred over a 12 day period starting on April 5 and ending on April 16. Weather was a factor with the majority of one work day (4/6) and all of another (4/11) being cancelled due to wind speeds exceeding that allowed in the Protocol. Temperatures were cool to moderate with lows ranging from 28-38 degrees and highs ranging from 45 to 63 degrees. Precipitation occurred on several survey days and included light rain and sleet however it did not have any noticeable impact on the ability to hear Washington ground squirrel alarm calls. Due to the two lost days as a result of high wind speeds an extension period of 4 days, with a smaller crew, was added in order to complete all accessible portions of the survey area.

The second survey period occurred over an 8-day period starting on May 3 and ending on May 10. Weather during the second survey period was generally good with temperatures ranging from lows near 40 degrees to highs in the mid-60's. Light to moderate rain occurred several times during the survey period however this did not cause any significant delays. On May 3, 2011 and a portion of May 8, 2011 surveys could not be conducted due to wind speeds exceeding that allowed in the Protocol.

Tetra Tech assessed wind speed and weather hourly to determine if the conditions were appropriate to conduct surveys.as wind noise can obscure ground squirrel vocalizations. In the study on which the Project surveys were based, Morgan and Nugent (1999) reported that surveys were halted when wind speeds reached 6-15 mph. Tetra Tech did not conduct surveys during sustained wind speeds of over 15 mph; at times when gusts exceeded 15 mph, Tetra Tech halted surveys. During surveys, the mean wind speed was 5-6 mph with rain occurring during all or part of four days. If Tetra Tech surveyed an area during rain or with winds greater than 10 mph during the first set of surveys, Tetra Tech surveyed the same area during ideal (i.e. low to no wind, no precipitation) conditions during the second set of surveys. When in the field, surveyors used best professional judgment regarding whether or not to continue surveying any time the wind exceeded 6mph (per protocol) and adjusted our surveys to maximize the likelihood of hearing squirrels.

Tetra Tech documented 30 confirmed active colonies during the 2011 surveys (Table 4-1; Figures 4-1 through 4-12). Colony size ranged from .05 acres (Colony 23-3b) to 41 acres (Colony CX-31); all but two colonies were less than 10 acres (Table 4-1; Figures 4-2 through 4-12).

For the purposes of this survey, an active colony was defined as a combination of visual and audible confirmations (hearing alarm calls) and presence of characteristic Washington ground squirrel scat around burrow entrances. Because ground squirrel use of the landscape often changed every day, the colony delineations in this report represent the areas of Washington ground squirrel activity during the delineations. The activity that Tetra Tech delineated likely included individual dispersing juveniles as well as well-established, more permanent colonies.

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Table 4-1. Boardman to Hemingway Transmission Line Project 2011 Washington Ground Squirrel Survey Summary

Colony #	Easting	Northing	Date	Distance to Nearest Project Feature (feet)	Route Name	Colony Acreage	Activity Confirmation	Soil Type	Shrub Cover	Plant Species	Dominant Plant Species	Disturbances
22-3a	119.88076	45.63288	4/7/2011	**73.45** [1]	Proposed Route	1.98	Alarm Call and Scat (2 & 3)	Silty Loam (7)	<1% (1)	neither native or exotics dominate	Bunchgrass, june grass, cheat grass, rabbitbrush	Not Recorded
22-3b	119.89668	45.63431	4/7/2011	**667.13**	Proposed Route	0.05	Alarm Call (2)	Silty Loam (7)	11-20% (3)	Native Species dominant (>60%)	annual grasses, rabbitbrush	Anthropogenic
24-2a	119.72766	45.62877	4/8/2011	**164.88**	Proposed Route	3.22	Alarm Call and Scat (2 & 3)	Silty Loam (7)	61-80% (6)	neither native or exotics dominate	slender wheatgrass, Artemisia tridentata, Sysimbrium altissum, Guterizia sarothrae, Yarrow, Bromus tectorum, Phlox spp., Salsola tragus	Anthropogenic
24-2b	119.72411	45.62509	4/8/2011	**505.76**	Proposed Route	0.59	Alarm Call and Scat (2 & 3)	Silty Loam (7)	1-10% (2)	Native Species dominant (>60%)	Grayia spinosa, slender wheatgrass, Phlox spp., Townsendia spp., Cryptantha spp., Yarrow, Erodium cicutarium, microbiotic soil crusts	None
24-2c	119.72307	45.62602	4/8/2011	902.57	Proposed Route	2.38	Alarm Call and Scat (2 & 3)	Silty Loam (7)	<1% (1)	Native Species dominant (>60%)	slender wheatgrass, yarrow, phlox	None
24-2d	119.71684	45.62648	4/8/2011	2,407.33	Proposed Route	0.42	Alarm Call (2)	Silty Loam (7)	<1% (1)	Native Species dominant (>60%)	slender wheatgrass, yarrow, Salsola tragus	Anthropogenic
24-2e	119.72204	45.62737	4/8/2011	1,071.28	Proposed Route	0.27	Alarm Call and Scat (2 & 3)	Silty Loam (7)	11-20% (3)	Native Species dominant (>60%)	slender wheatgrass, Artemisia tridentata, Gutierizia sarothrae, Phlox, Atriplex corrugata	None
21-1bd	119.91580	45.66657	4/16/2011	**0.00**	Proposed Route	38.47	Alarm Call (2)	Silty Loam (7)	1-10% (2)	Native Species dominant (>60%)	big sagebrush, rabbitbrush, native perennial grass	None
21-1c	119.90600	45.66718	4/16/2011	**389.39**	Proposed Route	1.58	Alarm Call and Scat (2 & 3)	Silty Loam (7)	1-10% (2)	Native Species dominant (>60%)	big sagebrush, rabbitbrush, native perennial grass	None
27-15a	119.25288	45.55620	5/9/2011	**221.99**	Proposed Route	0.60	Alarm Call and Scat (2 & 3)	Silty Loam (7)	<1% (1)	Native Species dominant (>60%)	Bunchgrass, Tetradymiacanescens, Poa secunda, Artemesia tridentata	Anthropogenic
CX-35	119.67875	45.61842	5/10/2011	**17.08**	Proposed Route	1.42	Alarm Call (2)	Silty Loam (7)	<1% (1)	Exotic Species dominant (>60%)	crested wheatgrass, cheat	Anthropogenic
22-3a	119.88076	45.63288	5/11/2011	**73.45**	Proposed Route	1.98	Alarm Call and Scat (2 & 3)	Silty Loam (7)	<1% (1)	neither native or exotics dominate	Bunchgrass, june grass, cheat grass, rabbitbrush	Not Recorded
CX-30	119.90965	45.63344	5/11/2011	**253.46**	Proposed Route	1.75	Alarm Call and Scat (2 & 3)	Silty Loam (7)	1-10% (2)	Exotic Species dominant (>60%)	agropyron cristatum, brumus tectosum, poa secunda, vulpia bromoides, chrysothamus naugeous	None
CX-31	119.94866	45.63398	5/11/2011	**444.73**	Proposed Route	41.03	Alarm Call and Scat (2 & 3)	Silty Loam (7)	11-20% (3)	Native Species dominant (>60%)	tall sagebrush, poa secunda, idaho fescur, phlox longiflora, astragalus purchii	None
7-5.9b	119.18555	45.58680	4/9/2011	**645.06**	Bombing Range North Alternative	0.25	Alarm Call (2)	Silty Loam (7)	11-20% (3)	neither native or exotics dominate	Tetradymia canescens, Brotec	Anthropogenic

Table 4-1. Boardman to Hemingway Transmission Line Project 2011 Washington Ground Squirrel Survey Summary (continued)

Colony #	Easting	Northing	Date	Distance to Nearest Project Feature (feet)	Route Name	Colony Acreage	Activity Confirmation	Soil Type	Shrub Cover	Plant Species	Dominant Plant Species	Disturbances
7-5.9a	119.18594	45.57885	4/10/2011	**183.06**	Bombing Range North Alternative	1.09	Alarm Call and Scat (2 & 3)	Silty Loam (7)	11-20% (3)	Native Species dominant (>60%)	Slender Wheatgrass, Tetradymia	None
7-5.9c	119.18487	45.58960	4/10/2011	**0.00**	Bombing Range North Alternative	4.74	All three	Silty Loam (7)	41-60% (5)	Native Species dominant (>60%)	Tetradymia canescens	None
7-5a	119.20452	45.65223	4/10/2011	**1.09**	Bombing Range North Alternative	0.24	All three	Silty Loam (7)	41-60% (5)	Native Species dominant (>60%)	rabbit brush, short grass	None
7-5b	119.20574	45.64833	4/10/2011	**684.85**	Bombing Range North Alternative	5.80	Alarm Call and Scat (2 & 3)	Silty Loam (7)	21-40% (4)	Native Species dominant (>60%)	rabbit brush, short native grasses	None
7-5c	119.20119	45.64613	4/10/2011	**285.18**	Bombing Range North Alternative	0.70	Alarm Call and Scat (2 & 3)	Silty Loam (7)	41-60% (5)	Native Species dominant (>60%)	rabbit brush	None
7-5d	119.19897	45.64251	4/10/2011	**425.97**	Bombing Range North Alternative	0.51	Alarm Call and Scat (2 & 3)	Silty Loam (7)	41-60% (5)	neither native or exotics dominate	rabbit brush, cheatgrass, native short grass	None
7-5e	119.18482	45.62631	4/10/2011	**0.00**	Bombing Range North Alternative	7.72	Alarm Call and Scat (2 & 3)	Silty Loam (7)	11-20% (3)	neither native or exotics dominate	rabbit brush, cheatgrass, needle and thread, bluegrass	None
7-5.8a	119.18209	45.59474	4/12/2011	**188.99**	Bombing Range North Alternative	0.41	Alarm Call (2)	Silty Loam (7)	41-60% (5)	Exotic Species dominant (>60%)	redtop, slender wheatgrass, spiderwort, cheatgrass, spineless horsebrush, phlox	Anthropogenic
7-5.8b	119.18473	45.59864	4/12/2011	**29.84**	Bombing Range North Alternative	1.51	Alarm Call and Scat (2 & 3)	Silty Loam (7)	41-60% (5)	Exotic Species dominant (>60%)	Tetradymia canescens, Red top, Brotec, slender wheat grass	Anthropogenic
7-5.8c	119.18072	45.61211	4/12/2011	**651.20**	Bombing Range North Alternative	0.66	Alarm Call (2)	Silty Loam (7)	41-60% (5)	Exotic Species dominant (>60%)	Tetradymia canescens, Red top, Townsendia	Anthropogenic
7-5.8d	119.18928	45.61173	4/12/2011	**603.17**	Bombing Range North Alternative	0.94	Alarm Call and Scat (2 & 3)	Silty Loam (7)	41-60% (5)	Native Species dominant (>60%)	Tetradymia canescens, irodium, Townsendia	Anthropogenic
7-5.8e	119.18548	45.61928	4/12/2011	**0.00**	Bombing Range North Alternative	2.66	Alarm Call and Scat (2 & 3)	Silty Loam (7)	21-40% (4)	Native Species dominant (>60%)	Tetradymia canescens, Red top, Brotec	Anthropogenic
7-5.8f	119.18800	45.61394	5/8/2011	**589.66**	Bombing Range North Alternative	0.70	Alarm Call and Scat (2 & 3)	Silty Loam (7)	21-40% (4)	neither native or exotics dominate	cheatgrass, rabbit brush, sandbergs	None
7-5.9e	119.17800	45.59000	5/9/2011	**332.54**	Bombing Range North Alternative	1.93		Silty Loam (7)	11-20% (3)	neither native or exotics dominate	rabbitbrush, slender wheatgrass, cheatgrass	None

1 Documented colonies within 785 from Project disturbance feature are noted in **bold** text.

Tetra Tech confirmed all active colonies delineated in 2011 by the unique species-specific alarm call. Tetra Tech also observed individual squirrels and/or characteristic scat at over half of the colonies (Table 4-1). Table 4-1 outlines Tetra Tech's observations at each colony, including detailed habitat information, the sign used to confirm activity, and the date Tetra Tech first observed each colony. Table 4-1 additionally lists the acreage of each colony and the distance of each colony's edge to a disturbance feature of the proposed Project (transmission line, roads, substations, laydown and fly yards, or communication sites). Colonies within the 785-foot buffer of the proposed Project features are displayed in bold. All but three of the 30 confirmed colonies intersect the 785-foot buffer of proposed Project features (Table 4-1; Figures 4-2 through 4-12).

Tetra Tech observed Washington ground squirrel activity primarily in sagebrush steppe habitat dominated by big sagebrush (*Artemisia tridentata*), bluebunch wheatgrass (*Pseudoroegneria spicata*), broom snakeweed (*Gutierrezia sarothrae*), Sanberg bluegrass, cheatgrass (*Bromus tectorum*), Idaho fescue (*Festuca idahoensis*) or some combination of these species (Table 1). Shrub cover within colonies ranged from zero to 100 percent; the median range of shrub cover was 1-10 percent with 19 of the 39 colonies falling in this range. Roughly as many colony locations were dominated by exotic species as were dominated by native species. Cheatgrass was by far the most prevalent invasive species found within colonies; other invasive species included storksbill (*Erodium cicutarium*), common velvetgrass (*Holcus lanatus*), spring draba (*Draba verna*), bulbous bluegrass (*Poa bulbosa*), tall tumblemustard (*Sisymbrium altissimum*), diffuse knapweed (*Centaurea diffusa*), medusahead (*Taeniatherum caput-medusae*), Russian thistle (*Salsola tragus*) and jagged chickweed (*Holosteum umbellatum*).

All of the colonies were located in silty loam soil (Table 4-1). Several of the colonies were located in or near disturbed landscapes. Anthropogenic activities within colony boundaries included off-road vehicle use and varying degrees of grazing and cattle activities. Anthropogenic activities and infrastructure occurring or located adjacent to colonies included actively farmed wheat fields, mining operations, major highways, and an existing overhead transmission line. Additionally, herbicide and pesticide spraying occurs within existing colonies (spot spraying by farmers), and on crops adjacent to active colonies (on crop circles and wheat).

5.0 CONCLUSIONS

Current ODFW guidance identifies Washington ground squirrel burrow(s)(including a 785-foot buffer of suitable habitat around the burrow) as an avoidance area for energy development projects.. IPC will use the Washington ground squirrel colony locations from these 2011 surveys to inform siting of transmission line towers. The objective will be to site transmission line towers, in coordination with ODFW, outside the 785-foot buffer of known colonies wherever possible and warranted by site habitat conditions.

The colonies that Tetra Tech observed during surveys were clustered in two general areas: along the margins of and in the vicinity of the Boardman Bombing Range and Boardman Conservation Area. The colonies Tetra Tech observed in the vicinity of the Boardman Bombing Range and in or adjacent to the Boardman Conservation Area belong to a known and well-studied population of Washington ground squirrels that have been previously documented and researched.

The Washington ground squirrel colonies Tetra Tech observed in Umatilla County, located east of the bombing range along the Northern Alternative, are part of a previously undocumented population of the species. Several of the colonies were located outside the ODFW modeled

range for this species (Figure 3-1), and were not included in previous research documenting the geographic distribution of this species (Betts 1990).

5.1 Remaining Survey Work

Surveys for Washington ground squirrel will continue in April and May of 2012 as additional access to suitable habitat on private property within the Study Area becomes available. Colonies delineated in 2011 will also be revisited in 2012 in order to determine 2012 activity. Important areas that remains to be surveyed in 2012 are all proposed route changes made to avoid colonies delineated in 2011 or for engineering or other constraints.

6.0 REFERENCES

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FIGURES

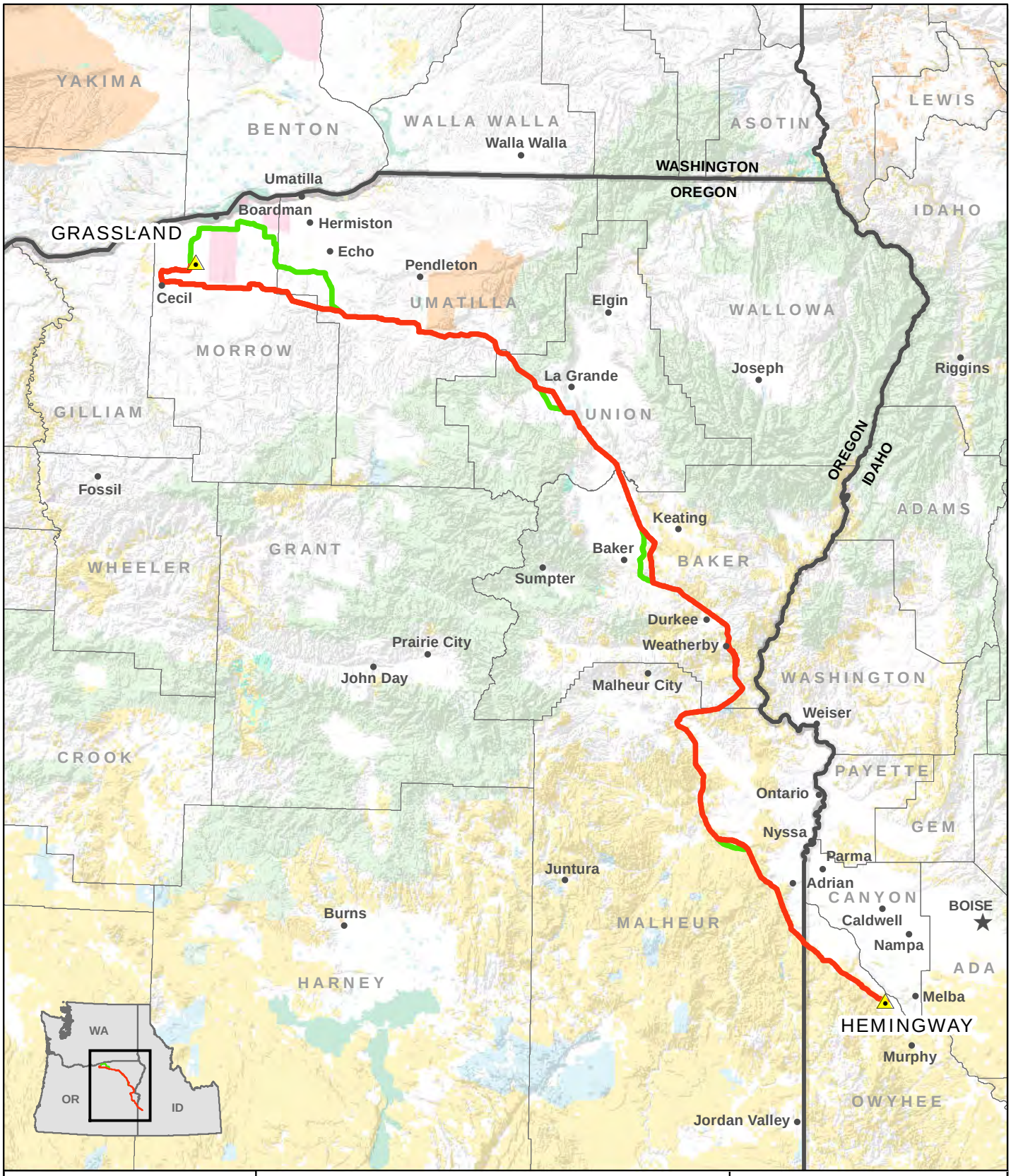

FIGURE 1-1
IDAHO POWER
PROPOSED ROUTE AND ALTERNATIVE ROUTES

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT
DECEMBER 2011

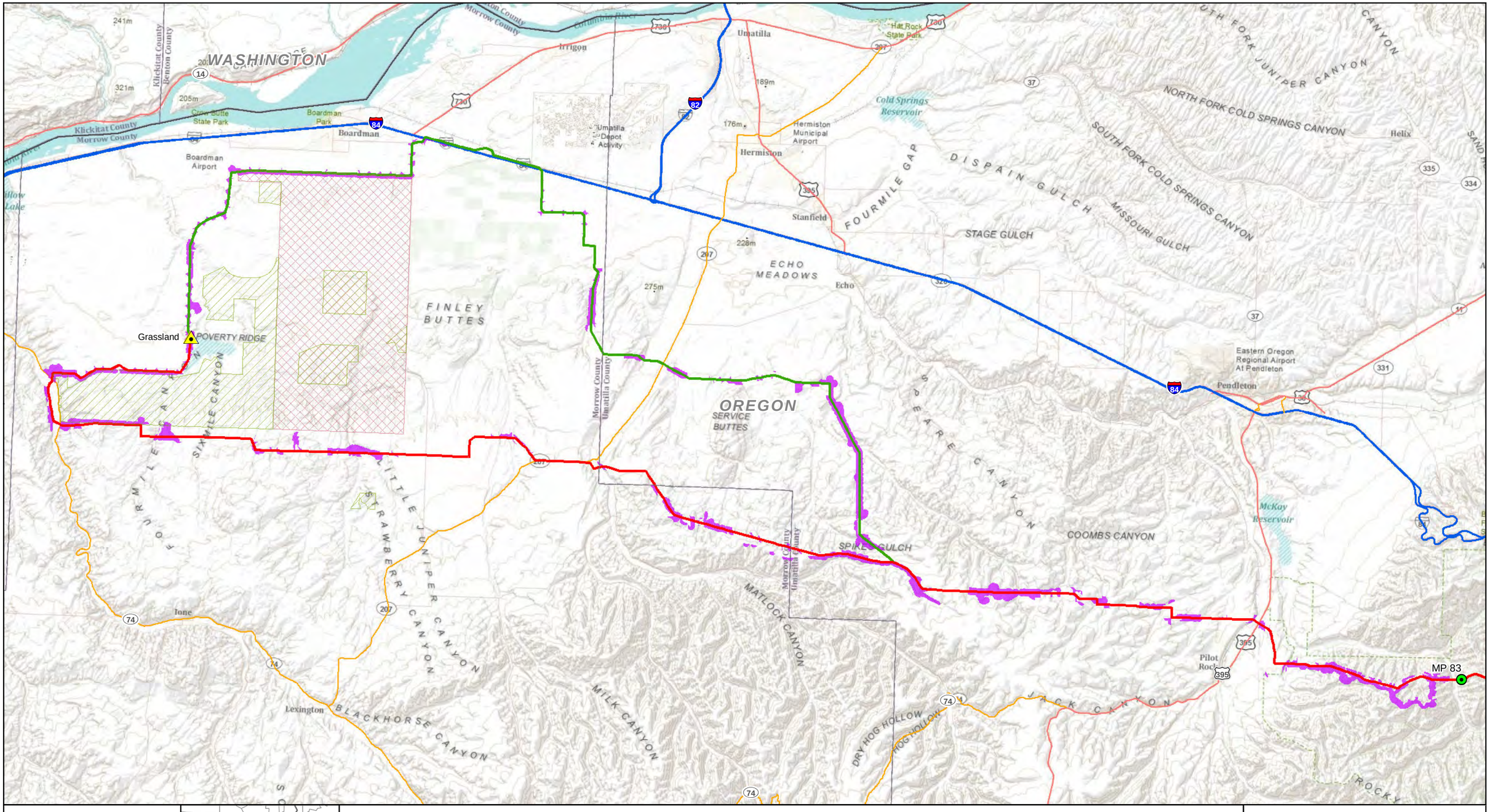

FIGURE 2-1
WASHINGTON GROUND SQUIRREL SURVEY AREA

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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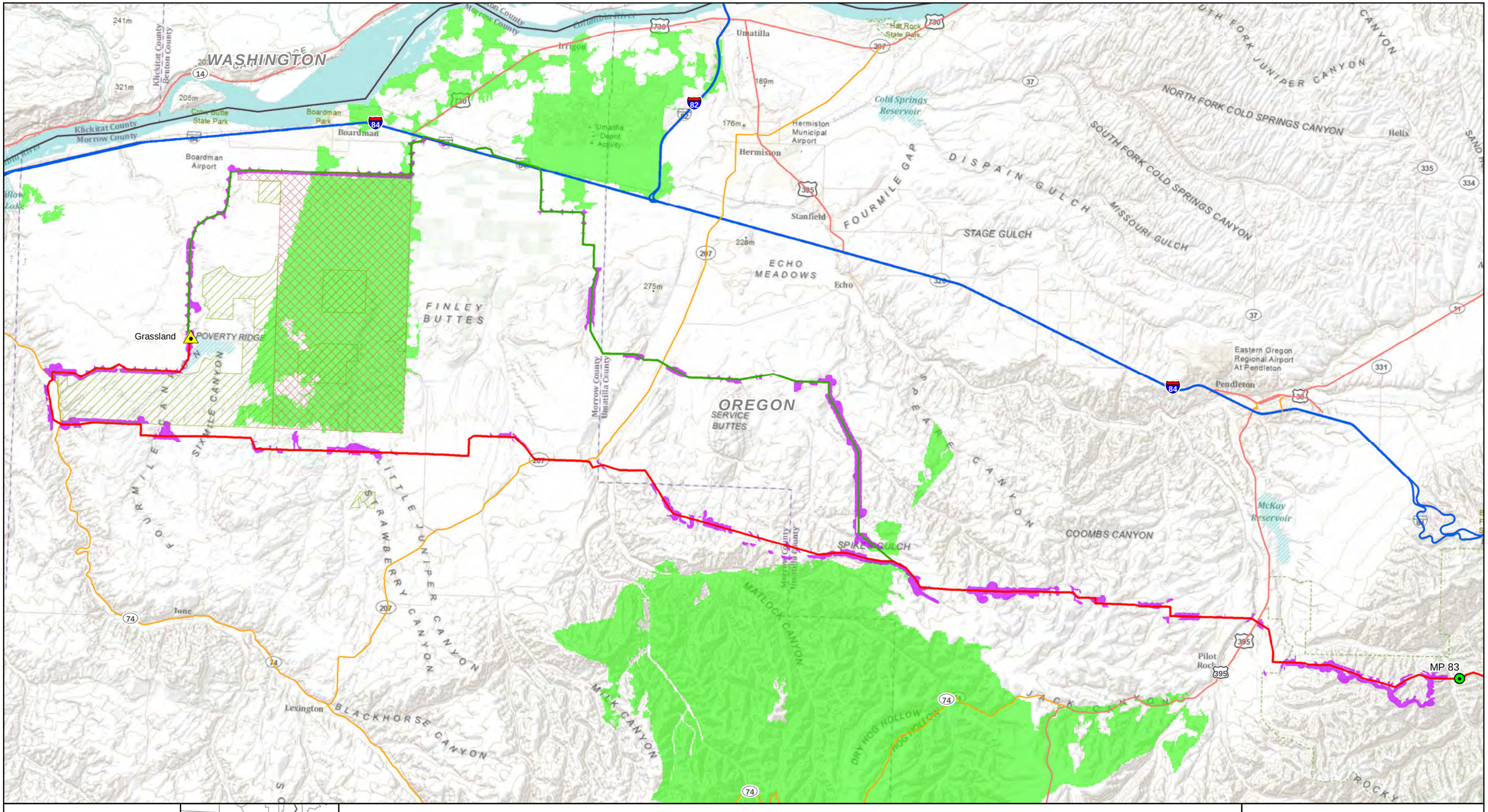

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Miles

IDAHO POWER
An IDACORP Company

Bordman Bombing Range
The Nature Conservancy Preserve

Survey Features
WAGS Survey Area
WAGS Modeled Range*

Route Features
Proposed
Alternative
Substation
Mile Post (MP)

Highways
Primary Limited Access or Interstate
Primary US and State Highways
Secondary State and County

***Data Source: Oregon GAP Species Distribution**

FIGURE 3-1
WASHINGTON GROUND SQUIRREL HABITAT DISTRIBUTION MAP FOR OREGON

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

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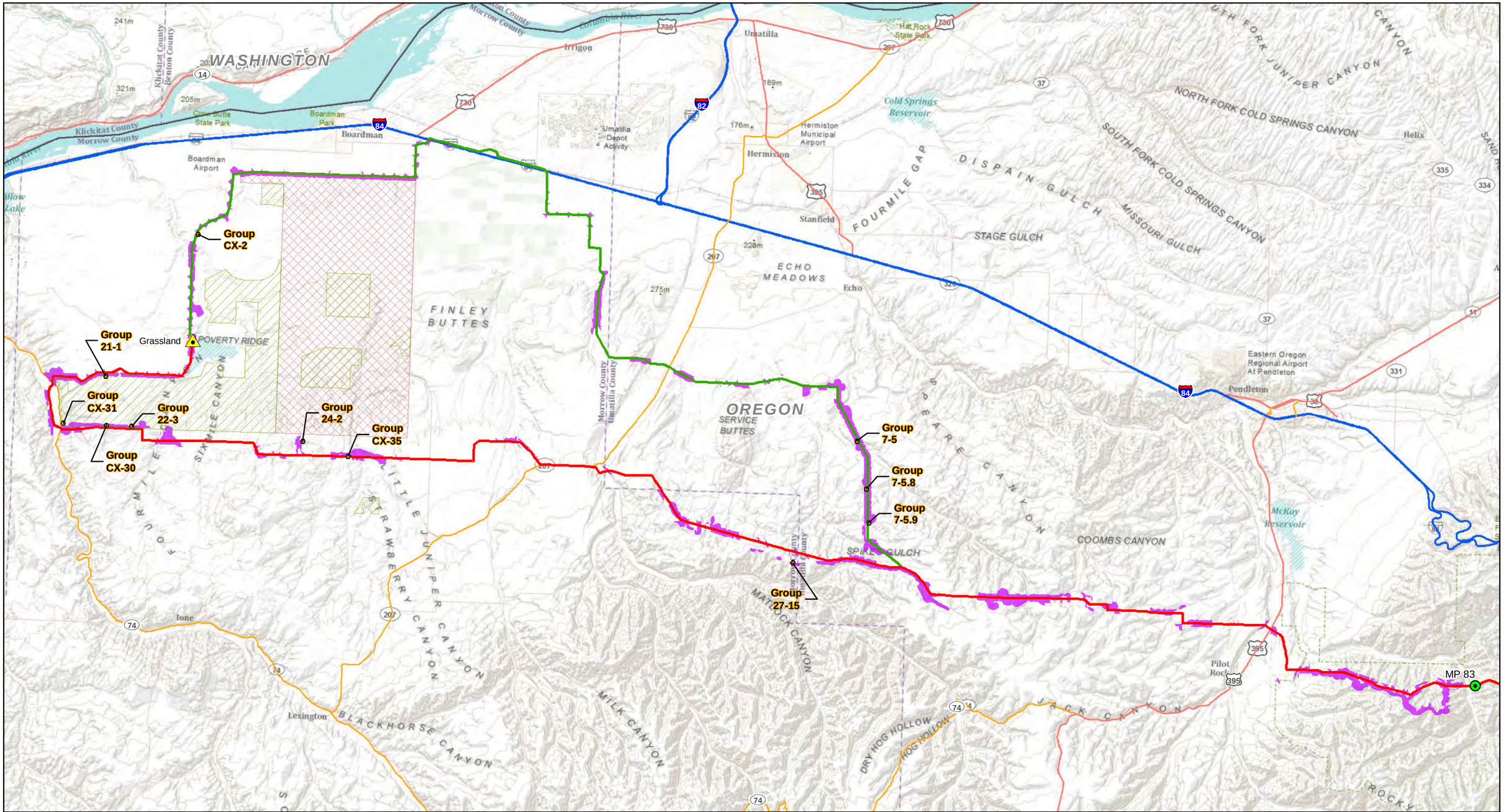

FIGURE 4-1
OVERVIEW OF WASHINGTON GROUND SQUIRREL COLONIES

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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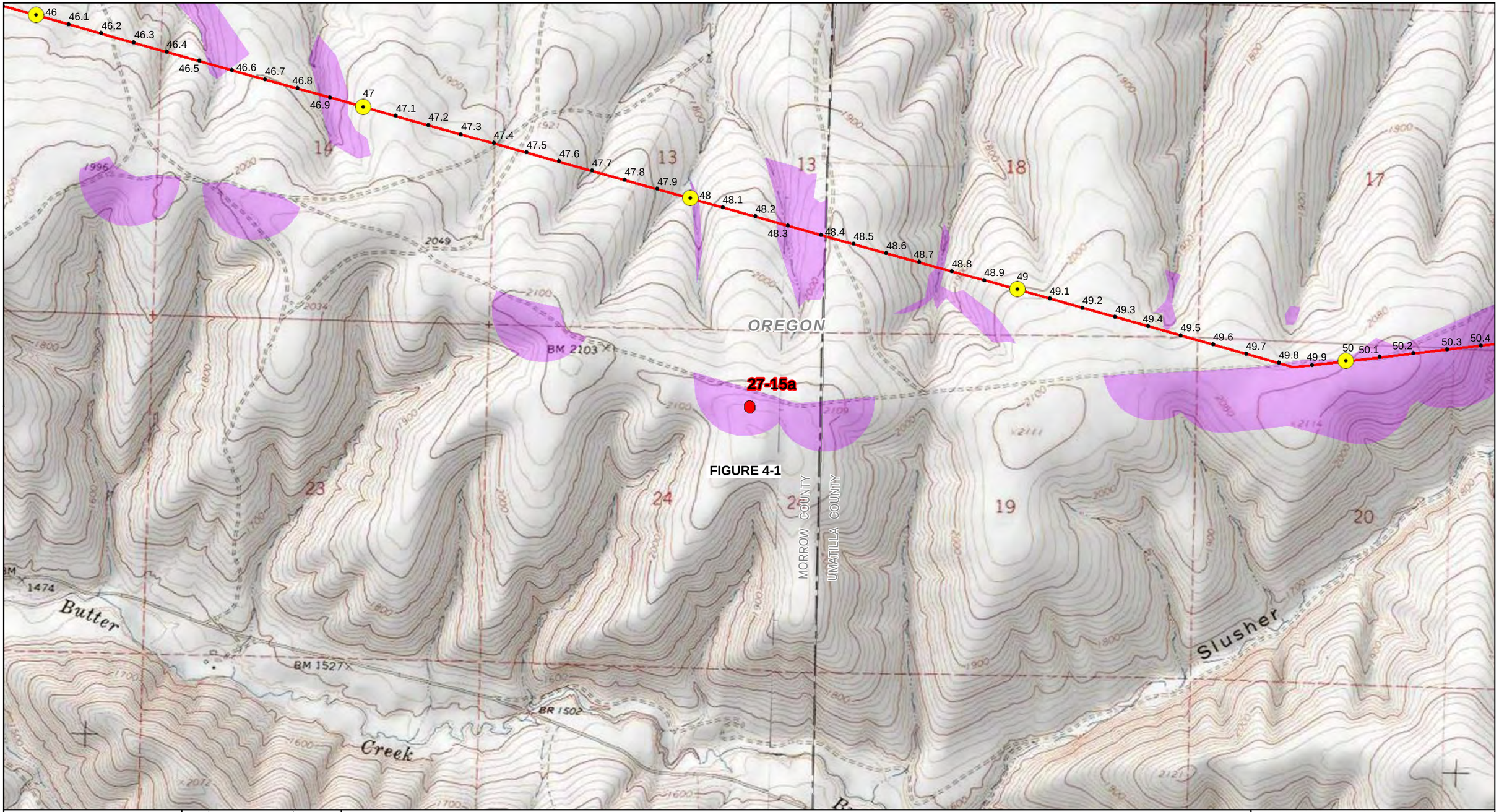
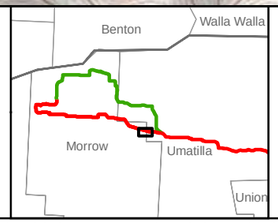


FIGURE 4-1



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Feet

IDAHO POWER
An IDACORP Company

Survey Features
- WAGS Survey Area
- Active WAGS Colony

Route Features
- Proposed
- Alternative

Milepost
- Mile
- Tenth Mile
- End

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-2
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP 27-15

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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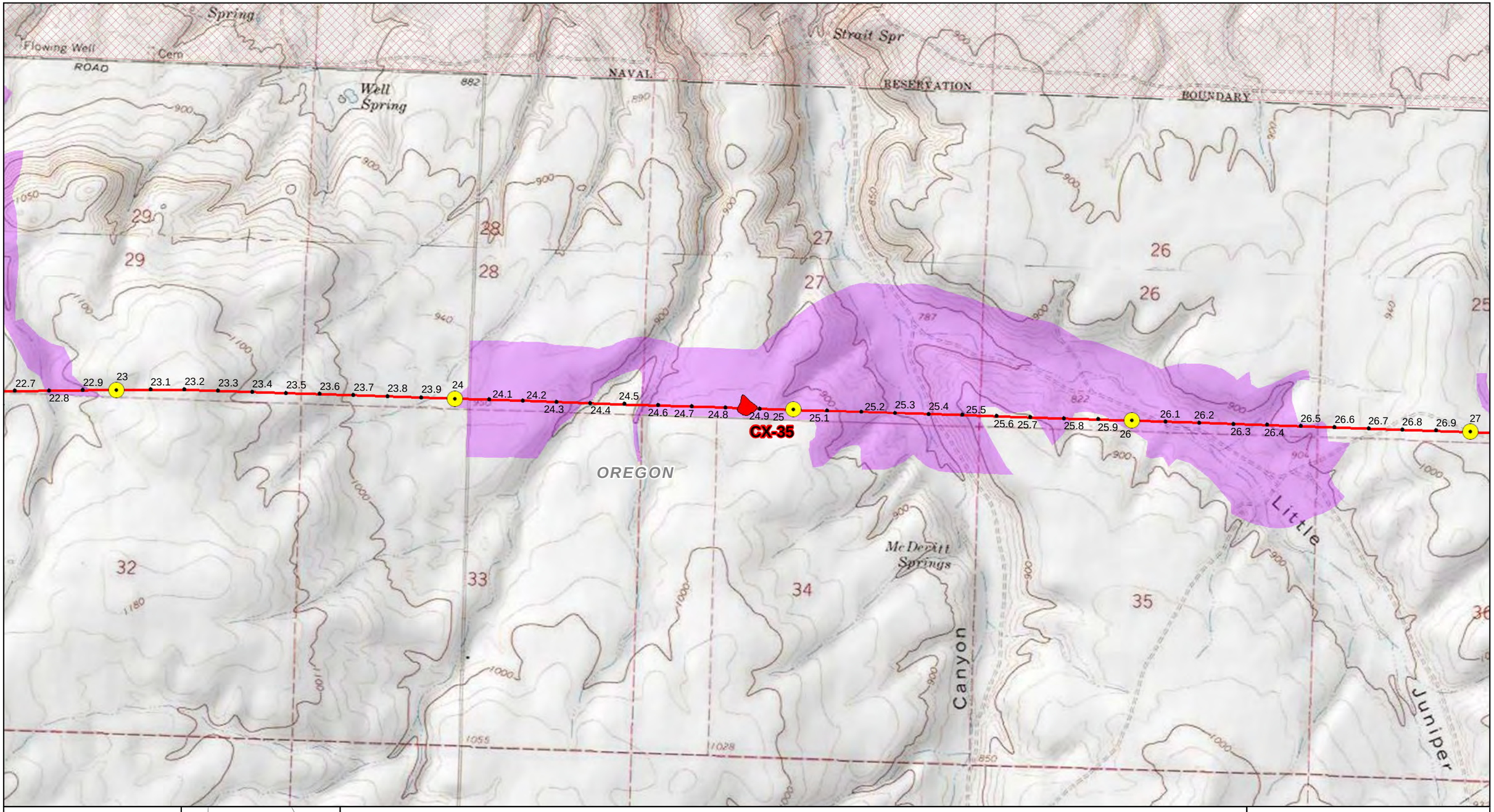

FIGURE 4-3
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP CX-35

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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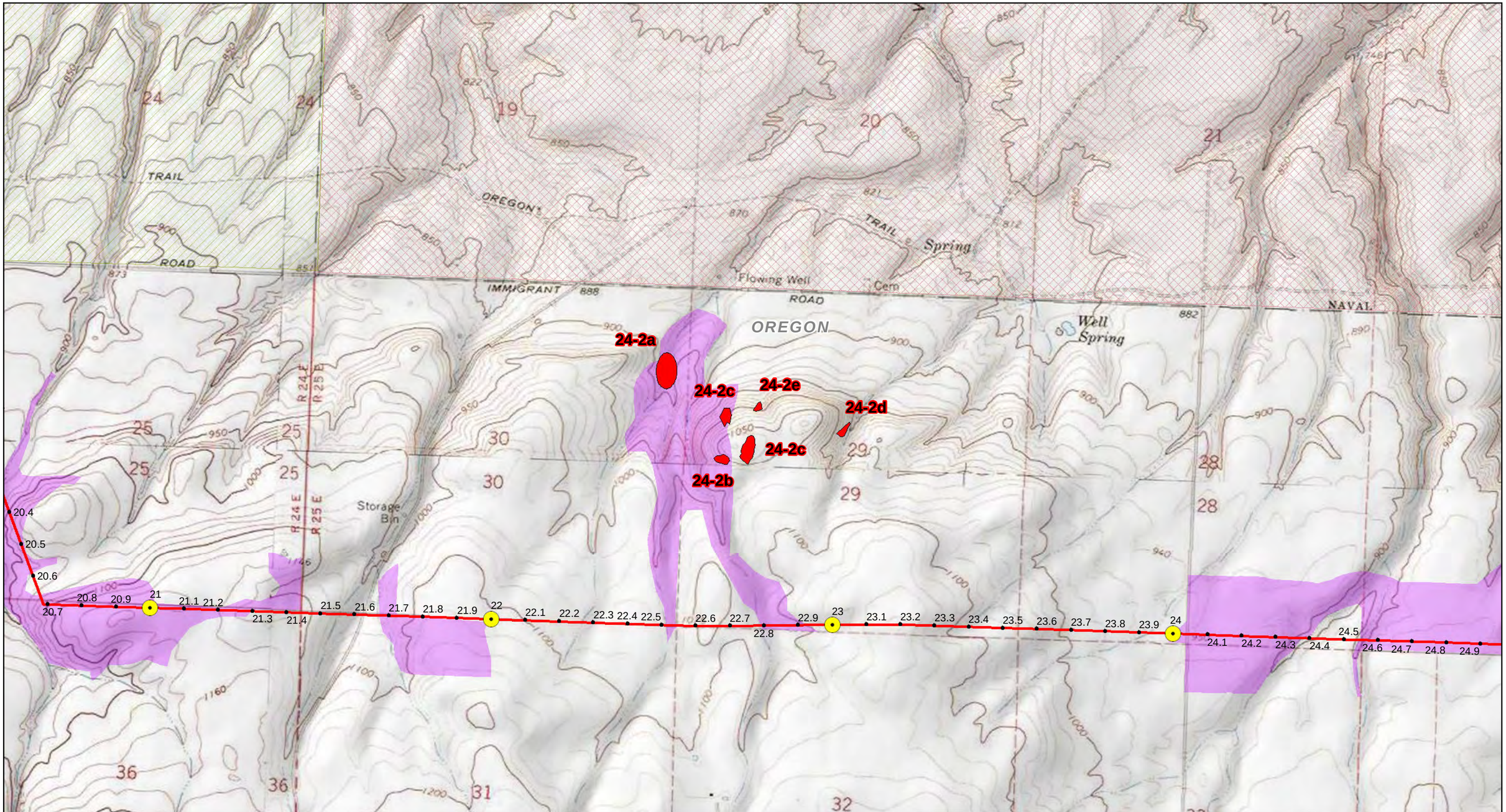

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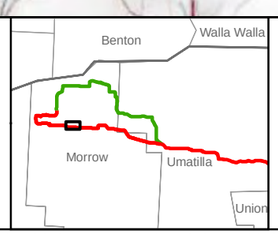
An IDACORP Company



Bordman Bombing Range
The Nature Conservancy Preserve

Survey Features
WAGS Survey Area
Active WAGS Colony

Route Features
Proposed
Alternative

Milepost
Mile
Tenth Mile
End

Highways
Primary Limited Access or Interstate
Primary US and State Highways
Secondary State and County

FIGURE 4-4
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP 24-2

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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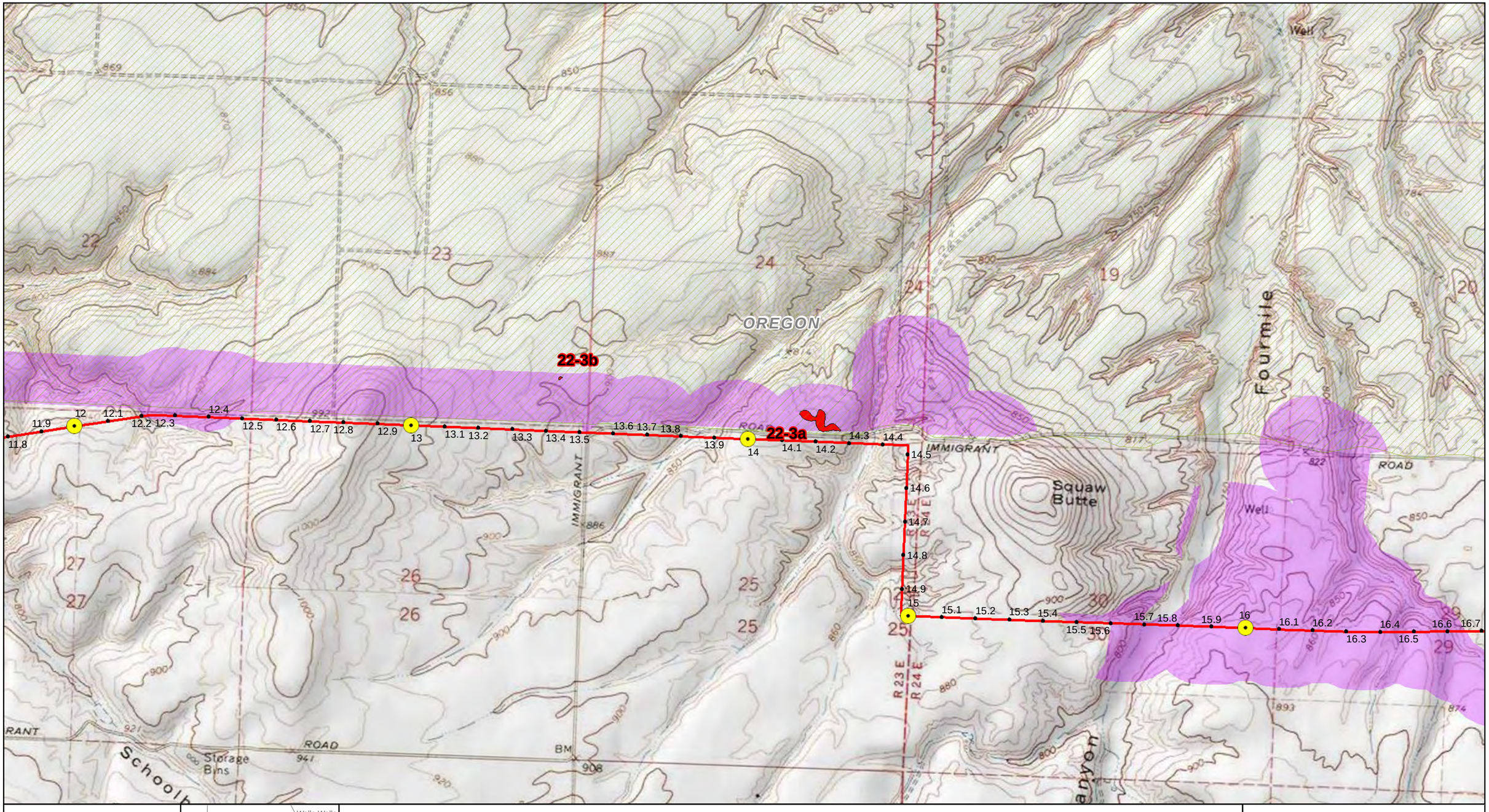

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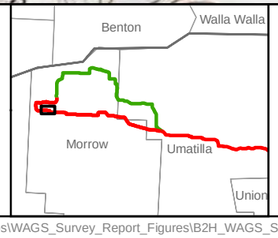
IDAHO POWER
An IDACORP Company



The Nature Conservancy Preserve

Survey Features
- WAGS Survey Area
- Active WAGS Colony

Route Features
- Proposed
- Alternative

Milepost
- Mile
- Tenth Mile
- End

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-5
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP 22-3

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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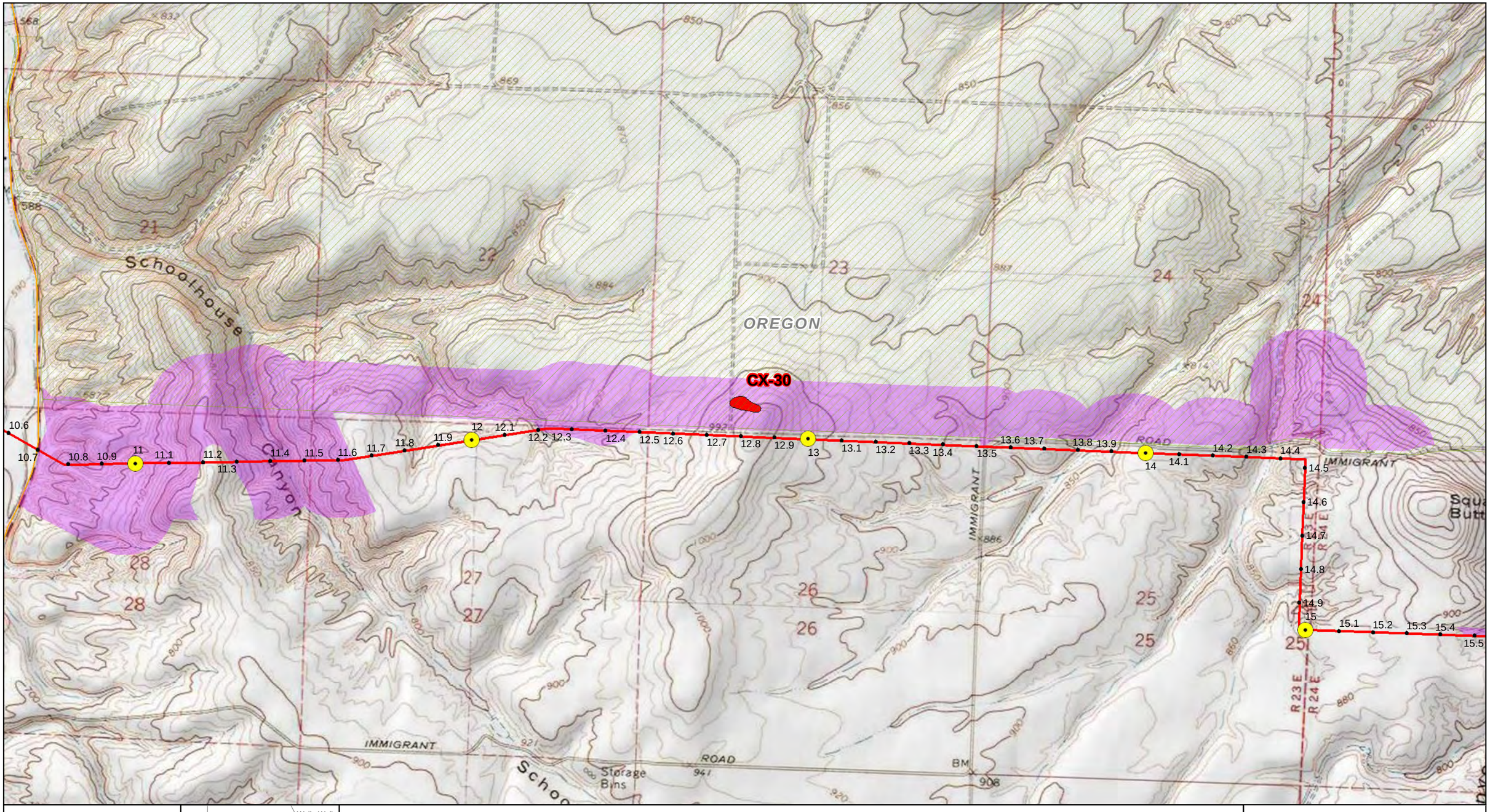

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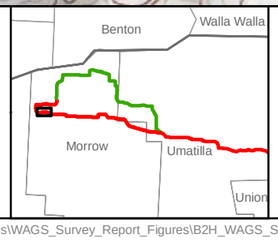
An IDACORP Company



The Nature Conservancy Preserve

Survey Features
- WAGS Survey Area
- Active WAGS Colony

Route Features
- Proposed
- Alternative

Milepost
- Mile
- Tenth Mile
- End

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-6
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP CX-30

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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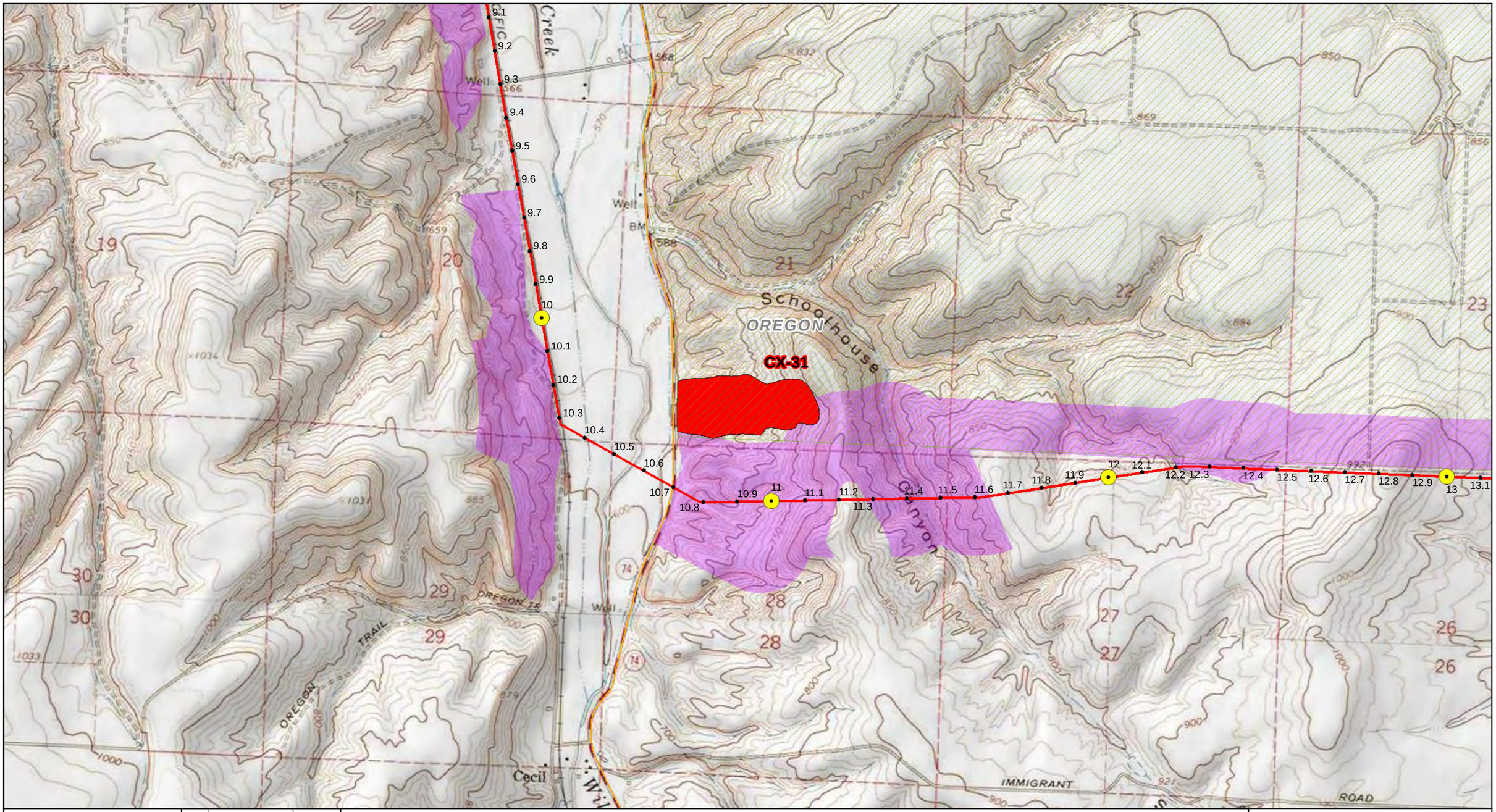

FIGURE 4-7
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP CX-31

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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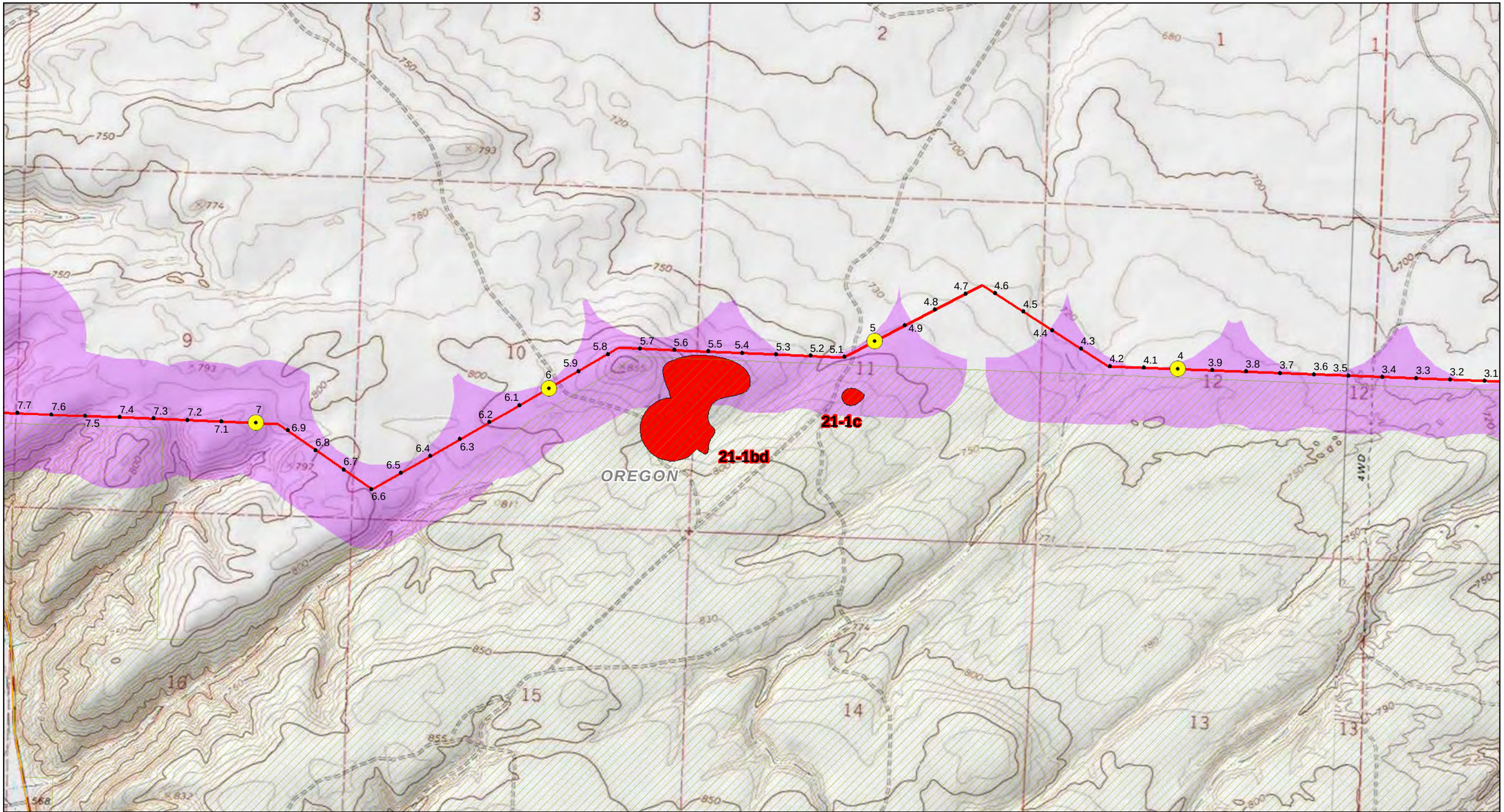

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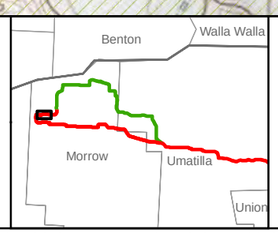

The Nature Conservancy Preserve

Survey Features
- WAGS Survey Area
- Active WAGS Colony

Route Features
- Proposed
- Alternative

Milepost
- Mile
- Tenth Mile
- End

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-8
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP 21-1

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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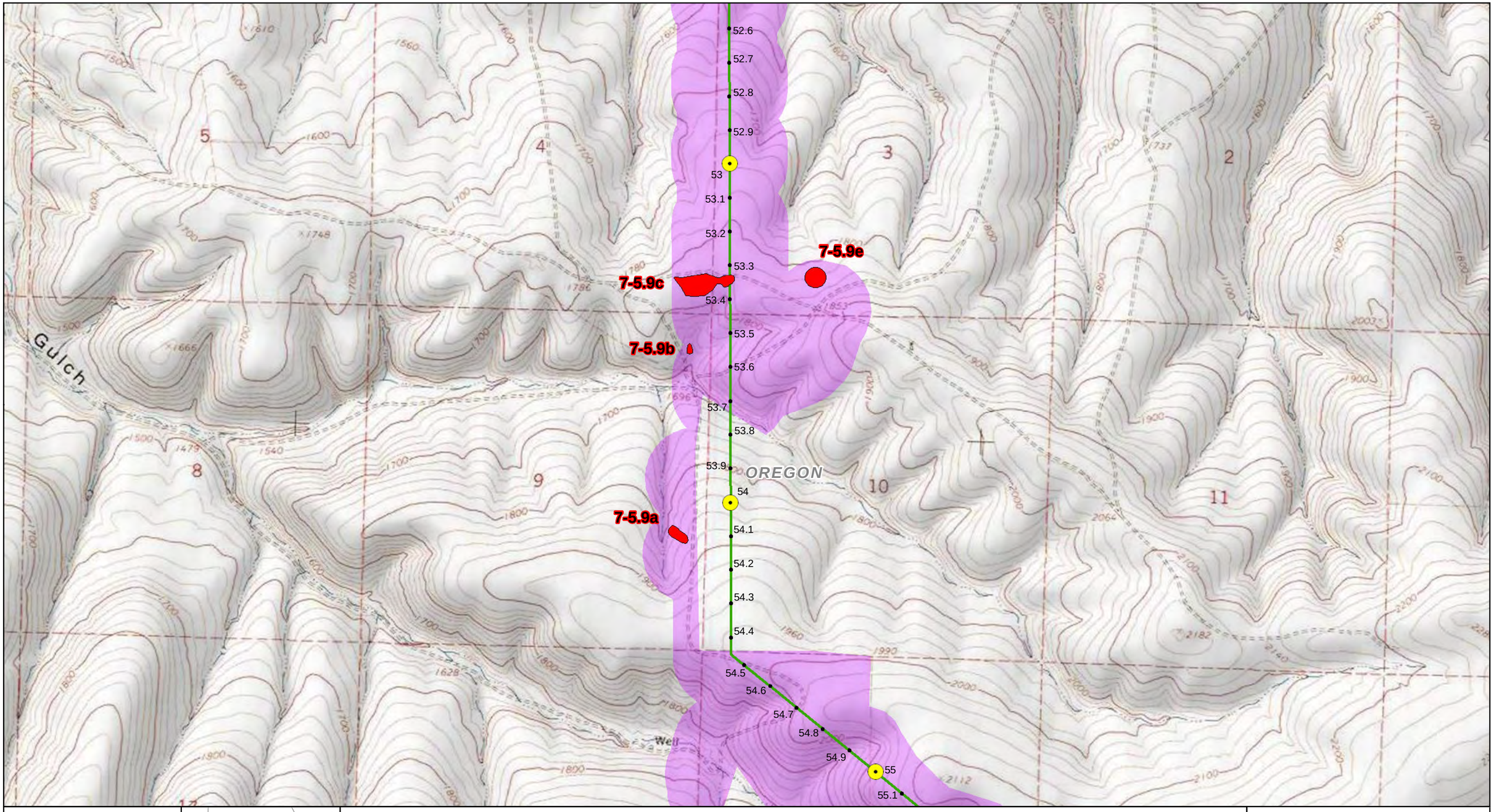

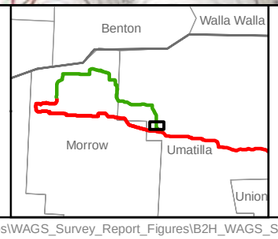

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Feet

IDAHO POWER
An IDACORP Company

Survey Features
- WAGS Survey Area
- Active WAGS Colony

Route Features
- Proposed
- Alternative

Milepost
- Mile
- Tenth Mile
- End

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-9
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP 7-5.9

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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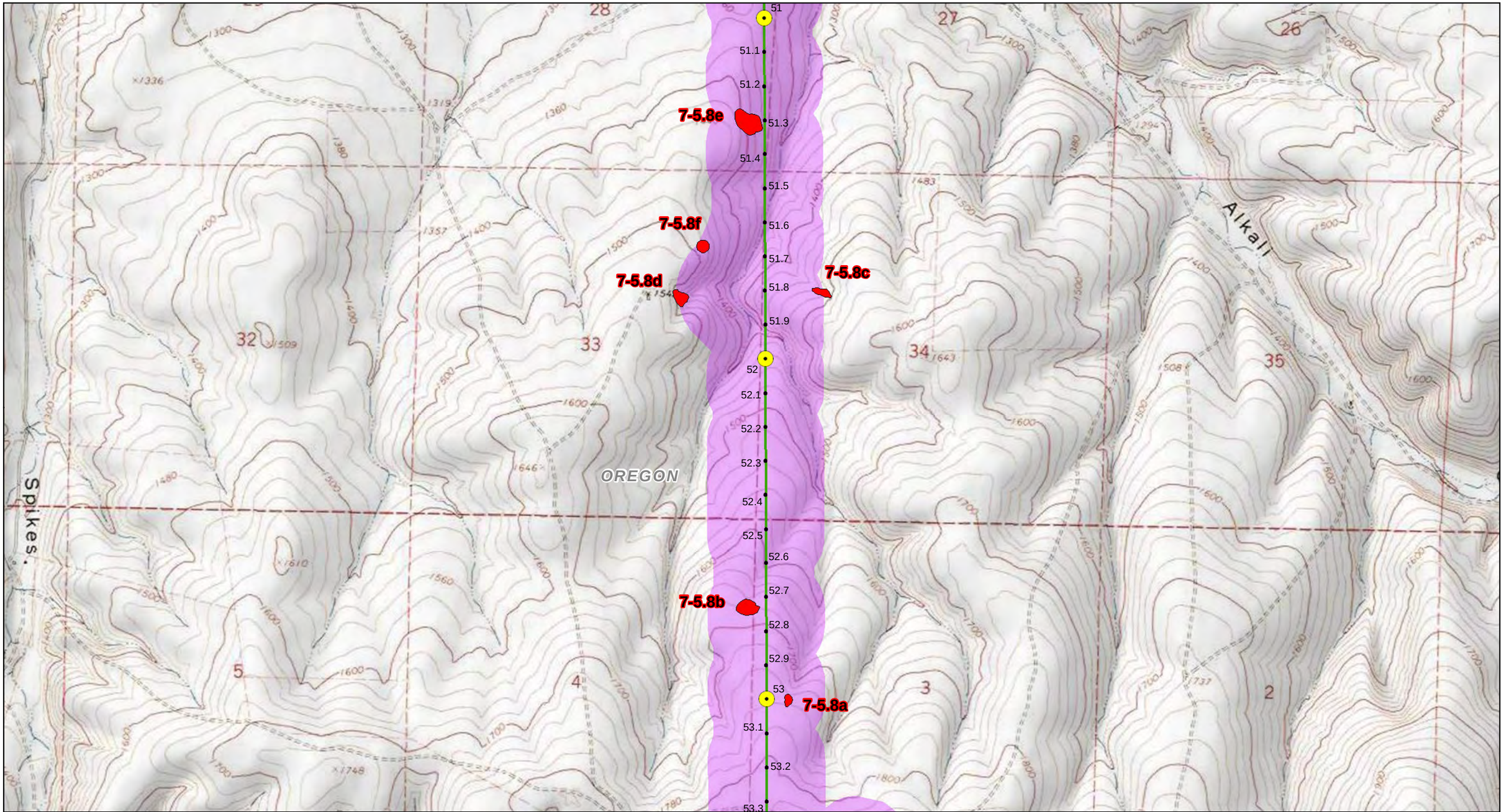

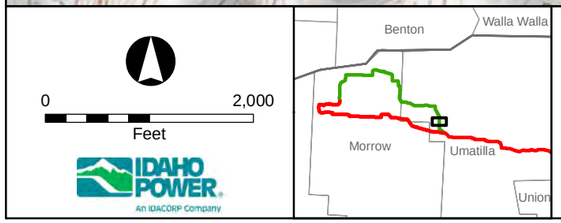

Survey Features
- WAGS Survey Area
- Active WAGS Colony

Route Features
- Proposed
- Alternative

Milepost
- Mile
- Tenth Mile
- End

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-10
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP 7-5.8

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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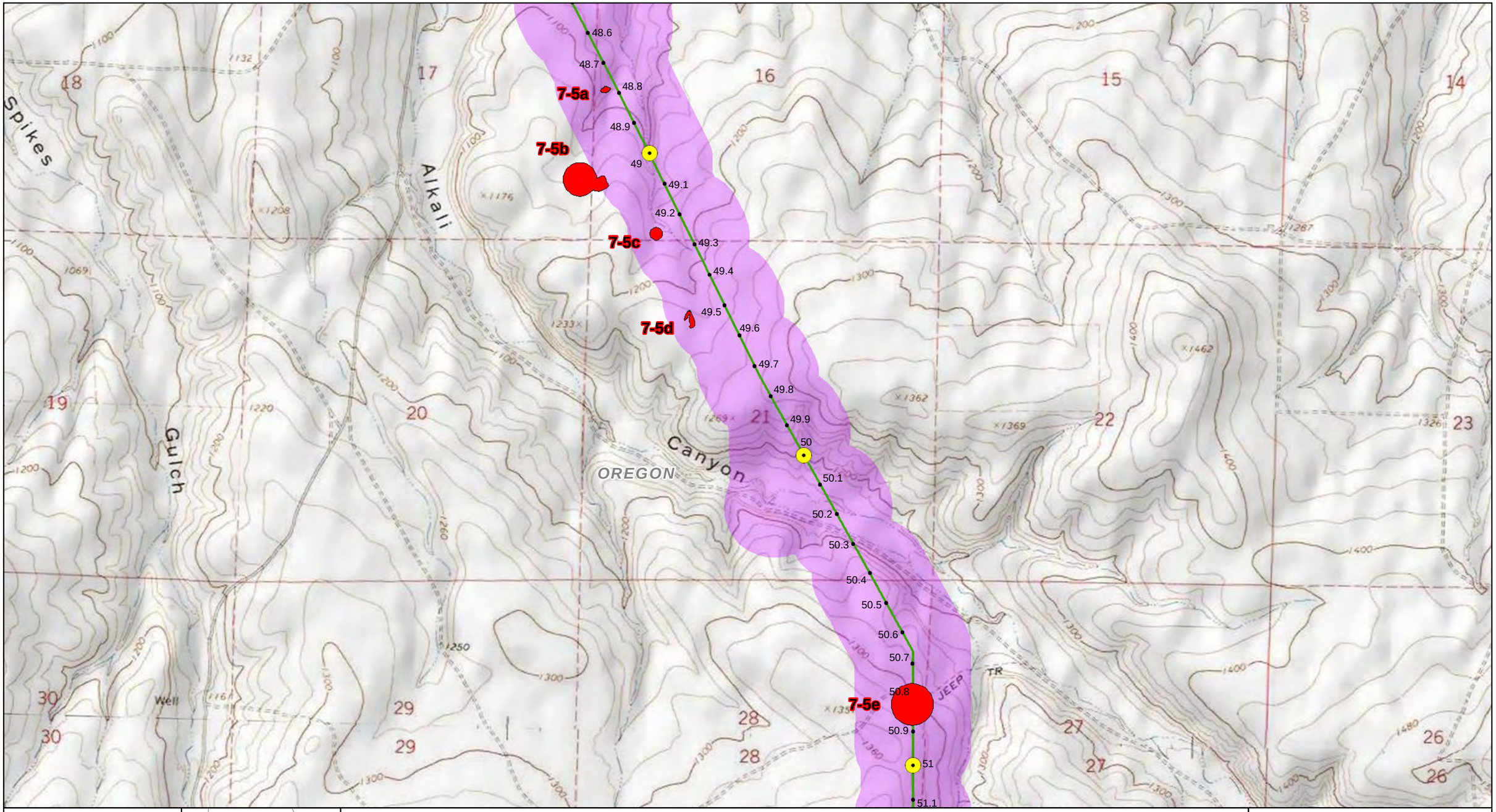

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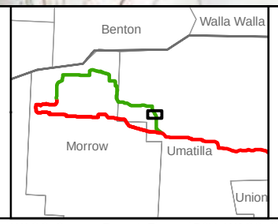

Survey Features
- WAGS Survey Area
- Active WAGS Colony

Route Features
- Proposed
- Alternative

Milepost
- Mile
- Tenth Mile
- End

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-11
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP 7-5

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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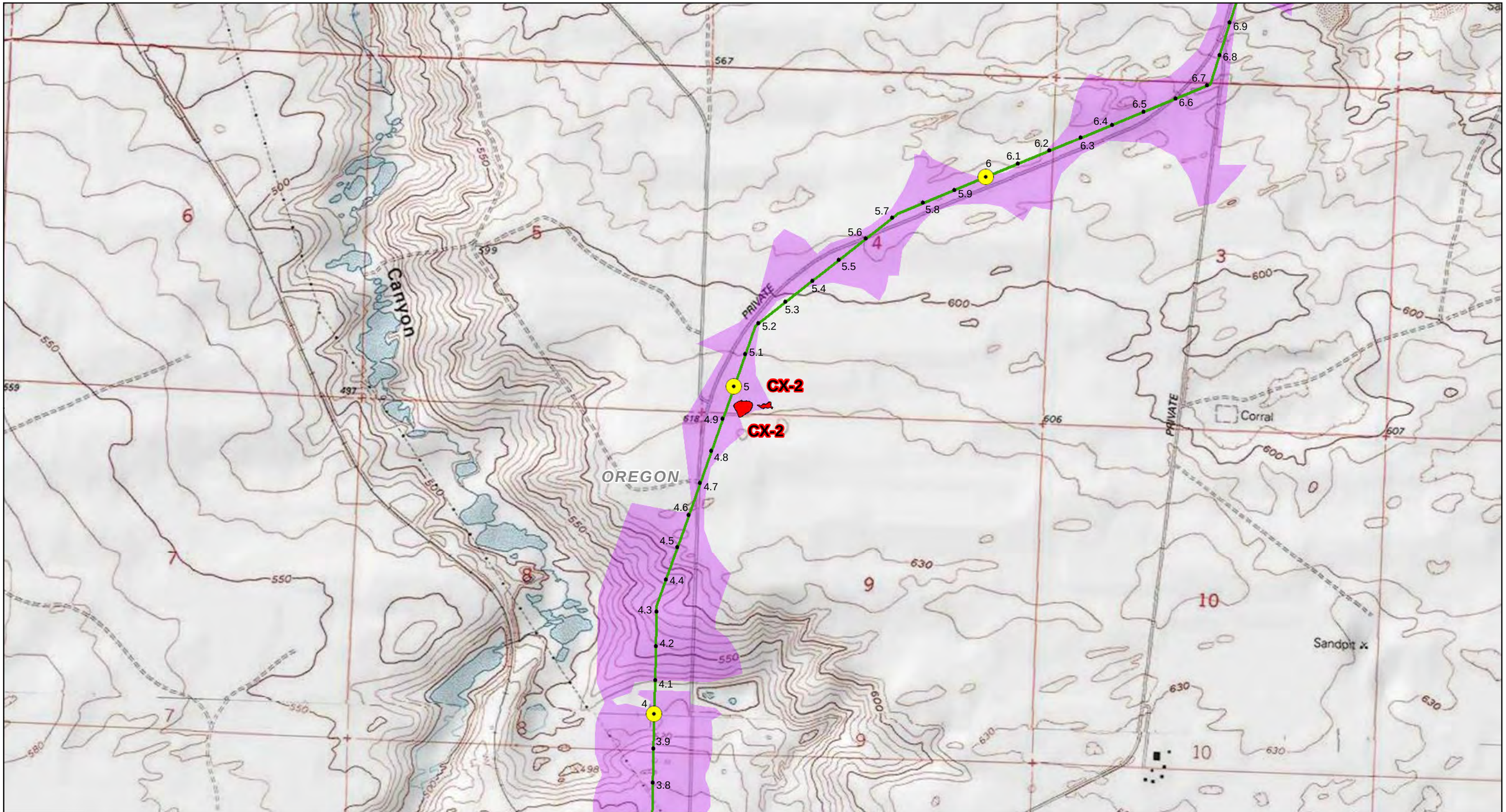

FIGURE 4-12
DETAIL OF
WASHINGTON GROUND SQUIRREL
COLONY GROUP CX-2

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT

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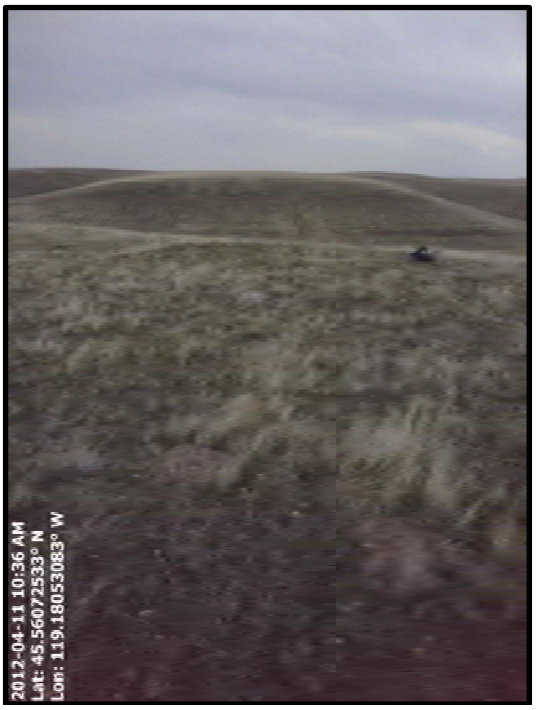
2012 Report

TETRA TECH

Boardman to Hemingway Transmission Line Project

2012 Washington Ground Squirrel Surveys



December 2012
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Boardman to Hemingway Transmission Line Project

2012 Washington Ground Squirrel Surveys

Prepared for:

Idaho Power Company

1221 W. Idaho St.
Boise, Idaho 83702

Prepared by:

Tetra Tech

3380 Americana Terrace, Suite 201
Boise, Idaho 83706
114-540315X.005.002.09

December 2012

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1.0 INTRODUCTION

This summary report presents the methods and results for the 2012 Washington ground squirrel (*Urocitellus washingtoni*) surveys conducted by Tetra Tech, Inc. (Tetra Tech) for Idaho Power Company (IPC) on the Boardman to Hemingway Transmission Line Project (Project).

IPC is proposing to construct and operate a new, approximately 300-mile-long, single-circuit 500-kilovolt (kV) electric transmission line between northeast Oregon and southwest Idaho (hereinafter the B2H Project or Project). The overhead, 500,000-volt (500-kV) transmission line will carry energy bi-directionally between a Portland General Electric (PGE) planned substation (Grassland Substation) adjacent to the Boardman Generating Plant, near Boardman in Morrow County, Oregon, and IPC's existing Hemingway Substation, located in Owyhee County, Idaho. The Project will traverse federal, state, and private lands in six counties in Oregon and Idaho. Figure 1-1 documents the Project location, proposed route, and route alternatives. All figures are located at the end of this report.

The Project would result in disturbances related to the construction of permanent facilities such as transmission tower pads, substations, communication sites, and permanent access roads, as well as temporary disturbances related to multiuse areas, tensioning sites, and temporary access roads. To help determine the degree of impact that could occur due to the construction and operation of these Project components, the location of Washington ground squirrels and their habitat along the Project needs to be identified.

The Project, as proposed, would cross both public and private lands. The portion of the Project where Washington ground squirrel habitat occurs is almost entirely in private ownership. Data for these private lands, with the exception of some statewide data gathered by state wildlife management agencies, are largely unavailable. This means that existing databases could not always be used to determine the locations of Washington ground-squirrels and their habitats that could be impacted by the Project. In addition, landowner permission is required prior to surveying private lands, and some private landowners have declined access to their lands for surveys. This means that field surveys could not be conducted along the entire length of the Project within potential Washington ground squirrel habitat.

The objective of these surveys was to identify the presence and/or absence of Washington ground squirrel colonies in the vicinity of the proposed and alternate Project corridors so that Project impacts to Washington ground squirrels may be avoided and/or minimized. Surveys were conducted in 2011 and 2012. This report summarizes the findings of the 2012 surveys. Findings of the 2011 surveys are presented in the 2011 technical report *2011 Washington Ground Squirrel Surveys* (Tetra Tech 2011).

2.0 SURVEY AREA

Under the Oregon Department of Energy's Energy Facility Siting Council process, the applicant describes a site boundary within which the facility will be permitted by the Department of Energy. The site boundary for the Project includes a 500-foot wide corridor where the transmission line is to be sited; the footprint of substations, tensioning sites, and multiuse areas; and varying sizes of access roads based on the type of disturbance expected. The site boundary was used to guide the establishment of the appropriate survey area.

The survey area generally extends from the proposed Grassland Substation east to approximately milepost 83 with the proposed route running west and south of the Boardman

Bombing Range and the alternate route running north of the Boardman Bombing Range (Figure 2-1). The survey area was located in Morrow and Umatilla counties in northeastern Oregon.

The Oregon Department of Fish and Wildlife (ODFW) recommends a 785-foot buffer in continuous suitable habitat around the outside boundary of Washington ground squirrel colonies as an avoidance area for energy development projects. The survey area for Washington ground squirrels included the site boundary plus a 785-foot buffer of the site boundary in suitable habitat. This survey area included 7,943 acres of potentially suitable Washington ground squirrel habitat (Figure 2-1). The survey area consisted primarily of private lands. During the 2012 survey, Tetra Tech had access to approximately 66 percent of the survey area (Figure 2-1). The 2012 survey area did not include areas that had already been surveyed in 2011, but did include areas that had not been surveyed in 2011 due to denial of access, and new areas added due to alignment changes that occurred between the 2011 and 2012 survey seasons. The 2012 survey area also included colonies identified in 2011 that were still within the current disturbance area.

3.0 METHODS

The 2011 and 2012 surveys followed methodology developed in the *Status and Habitat Use of the Washington Ground Squirrel on State of Oregon Lands, South Boeing, Oregon* (Morgan and Nugent 1999). The use of this protocol was approved by ODFW prior to commencing the 2012 surveys. Clarification on the survey methodology was provided by Russ Morgan and Steve Cherry and Jon Germond of ODFW prior to and during surveys.

3.1 Habitat Assessment and Delineation

The Washington ground squirrel occurs only in the Columbia Basin of eastern Washington and north-central Oregon. In Oregon, the Washington ground squirrel range extends through portions of Gilliam, Morrow, and Umatilla Counties. The known Oregon population is centered in its predicted habitat on the Boardman Bombing Range and Boardman Conservation Area (Figure 3-1).

The Washington ground squirrel is a small ground squirrel that is associated with shrub-steppe habitats of the Columbia Basin Ecoregion (Verts and Carraway 1998). Concern for the long-term viability of Washington ground squirrel populations led to the listing of the species by the ODFW as endangered in January of 2000, and the species is currently considered a candidate species for federal listing under the U.S. Fish and Wildlife Service (USFWS) Endangered Species Act (ESA) of 1973.

Washington ground squirrels are most common in shrub-steppe habitats over sandy or silt-loam soils that are deep and support the creation of burrows (Betts 1990, Yensen and Sherman 2003). Sagebrush habitats and bunchgrass grasslands have been found to contain the highest densities of Washington ground squirrels, with lower densities in more degraded habitats, such as low shrub habitats with annual grasses, rabbitbrush (*Ericameria sp*.), and invasive species (Betts 1990). Washington ground squirrels eat a broad range of seeds, forbs, leaves, flowers, and roots (Greene 1999) that provide adequate fat stores to survive the long aestivation/hibernation and reproduction period. Native plants such as Sandberg bluegrass (*Poa secunda*) may play a key role in their diet and survival (Tarifa and Yensen 2004).

Prior to commencing surveys, Tetra Tech identified suitable habitat for the Washington ground squirrel based on aerial photography and guidance from ODFW. Although Washington ground squirrels are found in the highest densities in sagebrush habitats and bunchgrass grasslands

with few invasive species (Betts 1990), ODFW advised Tetra Tech that Washington ground squirrel colonies can be found in all habitats, regardless of quality, with the exception of active agricultural fields. In addition, ODFW advised Tetra Tech that Washington ground squirrels can use the burrows of other species and, therefore, holes of the appropriate size could potentially contain this species.

Washington ground squirrels are diurnally active and spend the majority of the year underground. This species aestivates throughout the summer and is thought to transition directly into hibernation (ODFW 1999, Sherman and Shellman 2005). Adults emerge from burrows between January and March, depending on elevation and weather patterns, and return underground in late May to early June. Juveniles emerge from burrows between March and April and return underground a few weeks after the adults (Carlson et al. 1980).

3.2 Historical Data Review

Tetra Tech conducted a data review of known Washington ground squirrel colonies in the vicinity of the Project. This included reviewing publications that documented Washington ground squirrel burrows on the Boardman Bombing Range and Boardman Conservation Area (Morgan and Nugent 1999, Marr 2004), submitting a data request to the Oregon Biodiversity Information Center (ORBIC 2011), and reviewing the results of Washington ground squirrel surveys for other energy development projects in the vicinity of the survey area, including Cascade Crossing Transmission Line Project (PGE 2010 and 2011), Leaning Juniper I and II Wind Power Projects (NWC and WEST 2005, NWC 2008), and Pebble Springs Wind Project (PPM Energy 2006). Several Washington ground squirrel colonies were found to have been documented in the vicinity of the survey area indicating that a thorough survey effort of the proposed Project was necessary in order to map colony locations and to avoid or reduce impacts to this species from the Project.

In addition to the desktop data review, the 28 colonies identified during the 2011 survey efforts were included in preparation for the 2012 survey effort. After routing changes were completed between 2011 and 2012, only 5 colonies identified in 2011 were still within the disturbance area. These 5 colonies were resurveyed in 2012.

3.3 Survey Schedule

The survey area was surveyed twice, once in April and once in May of 2012 to correspond with the highest Washington ground squirrel activity period when juveniles have emerged and alarm calls are most frequent.

3.4 Field Survey Methods

All field crew members were required to pass a hearing test prior to the field season ensuring they were capable of hearing a frequency of 8 kHz, the typical frequency of alarm call vocalizations of ground dwelling squirrels. At the start of the 2011 field season (April 5), the Tetra Tech survey crew met with Leslie Nelson of The Nature Conservancy (TNC) to visit an active Washington ground squirrel colony and receive on the ground training in burrow, scat, alarm call, and squirrel identification At the start of the 2012 field season (April 4), Tetra Tech crew members who had experience from the 2011 surveys conducted a similar training session for the 2012 survey crew at the same location. The Tetra Tech crew leader provided additional guidance on the natural history, habitat, and survey protocol for Washington ground squirrels. While at the colony site, the squirrels vocalized high pitched alarm and cricket calls, and the field crew members were able to familiarize themselves with the calls specific to this species.

This visit also ensured that the squirrels were active in the vicinity of the survey area during the time of the scheduled field work.

The Washington ground squirrel is allopatric to the Columbia River Basin area and thus is one of only a few species of ground squirrel known to occur in the vicinity of the survey area. Confusing Washington ground squirrel for similar species such as Belding's ground squirrel (*Spermophilus beldingi*) or Townsend's ground squirrel (*Urocitellus townsendii*) is unlikely. Washington ground squirrels have scat that can be differentiated from other burrowing animals by its characteristic size and shape. Washington ground squirrel scat was present at the training site and some pieces were collected to later serve as a comparison when attempting to identify scat in the field surveys.

During surveys, a crew of 2 to 8 biologists walked meandering line transects, each spaced 165 feet (50 meters) apart, to provide survey coverage of the habitat within the survey area. The surveys were conducted in the morning (between approximately 7:30 a.m. and 3:00 p.m.). Surveys commenced at least one hour after sunrise to allow for temperatures to increase sufficiently to support ground squirrel activity. During all transect surveys, the crew walked transects at a similar pace to ensure there were no gaps in coverage, listened for alarm calls, and scanned the ground for potential burrows. Each crew member was able to communicate findings to the group via a hand-held radio thereby avoiding double recording of data. When surveyors observed potential burrows, potential scat, heard possible alarm calls or inter-colony communications, they alerted the group and then listened and visually scanned the area in detail for any squirrels or additional sign.

Surveys were not conducted when wind conditions were above 15 miles per hour. In the study on which the Project surveys were based, Morgan and Nugent (1999) reported that surveys were halted when wind speeds reached 6-15 mph. Professional judgment was used when wind speeds were greater than 6 miles per hour or when visibility was poor, as both of these conditions could limit the observer's ability to detect alarm calls or observe sign. Tetra Tech assessed wind speed and weather hourly to determine if the conditions were appropriate to conduct surveys as wind noise can obscure ground squirrel vocalizations. Tetra Tech did not conduct surveys during sustained wind speeds of over 15 mph; at times when gusts exceeded 15 mph, Tetra Tech halted surveys. If Tetra Tech surveyed an area with winds greater than 10 mph during the first set of surveys, Tetra Tech surveyed the same area during ideal (i.e. low to no wind, no precipitation) conditions during the second set of surveys.

Colonies were designated active when Washington ground squirrel activity was confirmed through visual detection of a squirrel, audio confirmations (hearing alarm or social calls), and/or fresh, Washington ground squirrel scat near burrows. Scat samples were collected for confirmation of squirrel presence. A burrow was identified as potential if it was a hole that was freshly dug (no vegetation or cobwebs), that was structurally sound and the appropriate size for this species, but no other Washington ground squirrel sign (scat, visual, audio) was observed.

Each site was resurveyed approximately two weeks after the first survey; spacing the surveys apart by roughly two weeks ensured that ground squirrel activity would be captured despite any local differences in activity level throughout the season. During the second survey, all potential burrows identified during the first survey were revisited and any confirmed activity was documented on the colony field datasheets. During the second survey, 165-foot-wide transects were walked perpendicularly to the first survey transects in order to maximize coverage of the habitat. In areas where no or few potential burrows were found during the first survey, surveyors had the option of walking offset transects parallel to, but between, the original transects (i.e. offset by roughly 82 feet). Any potential burrows identified during the first survey were approached at a 90 degree angle during the second survey in order to minimize the chance of

missing a visual or audio detection due to landscape features or prevailing wind directions. These resurvey methods used at each site were also used for the 2012 resurvey of known or potential colonies identified in 2011.

3.5 Recording Data

Potential burrows were recorded on the field datasheet and labeled with a unique numeric identifier. Information recorded on the datasheet for potential burrows included location of burrows, number of burrows, habitat, and identifying features of location. When potential burrows were revisited during the second set of surveys, the date, surveyor, and notes on activity were recorded.

Areas where Washington ground squirrel presence was confirmed were delineated with Juniper® Mesa global positioning system (GPS) units in the field, and later mapped using Geographic Information System (GIS) software. Confirmed presence was defined as a visual of the species or detection of an audio call. Once a general area was determined to be active based on these cues, all fresh burrows in the vicinity of the cue(s) were included in the colony delineation. Information collected on the Juniper GPS units included activity centers, such as locations where squirrels were observed or heard in high densities, and the colony boundary (i.e. the extent of active burrows on the periphery of activity centers). Colonies were delineated beyond the survey area if they straddled or were located just outside the survey area boundary and access to the adjacent area had been granted. Information recorded for each colony included habitat characteristics, locations of activity centers and colony boundaries, number of burrows, number of scat, the time and weather conditions under which the colony was discovered, and how the colony was first discovered. Photographs of burrows, scat, and habitat were taken at some active colonies.

Weather, survey personnel, time of day, and areas surveyed were recorded each day surveys were conducted. Precipitation, average wind speed and direction, cloud cover, and temperature were recorded at the start, middle, and end of each survey day.

4.0 RESULTS

Between April 4 and May 8, 2012, Tetra Tech conducted 18 days of Washington ground squirrel surveys divided over two survey periods to coincide with the seasonal activity period of the Washington ground squirrel. The first survey period occurred over a 10-day period starting on April 4 and ending on April 13. Temperatures were cool to moderate ranging from 35 to 65 degrees. Most days were partly cloudy to overcast. No precipitation occurred. On the afternoon of April 4, 2012, surveys could not be conducted due to wind speeds exceeding that allowed in the protocol.

The second survey period occurred over an 8-day period starting on May 1 and ending on May 8. Weather during the second survey period was generally good with temperatures ranging from 40 degrees to 70 degrees. Most days were mostly sunny to partly cloudy. No precipitation occurred. On the afternoon of May 4, 2012 surveys could not be conducted due to wind speeds exceeding that allowed in the protocol.

Tetra Tech documented 4 confirmed active colonies during the 2012 surveys (Table 4-1; Figures 4-1 through 4-3). Colony size ranged from 0.01 acres (Colony 762-A) to 1.18 acres (Colony 762-B) (Table 4-1; Figures 4-1, 4-4. 4-6, and 4-7). Five colonies identified in 2011 were resurveyed in 2012 as they are located within the 2012 disturbance area. Only one of these was found to be active (22-3A) (Table 4-1) and is included in the count of four confirmed colonies

(Figure 4-4). The other four colonies identified in 2011, but not reconfirmed in 2012 are presented in Table 4-2; Figures 4-1 through 4-5. Twenty-three colonies identified in 2011 were not resurveyed in 2012 because alignment changes no longer included these colonies within the disturbance area. These colonies are not presented in this report but can be referenced in the 2011 technical report (Tetra Tech 2011). There are a total of 8 colonies that have been identified that are within the 785-foot buffer of the Project disturbance area (Table 4-1 and 4-2).

For the purposes of this survey, an active colony was defined as a combination of visual and audible confirmations (hearing alarm calls) and presence of characteristic Washington ground squirrel scat around burrow entrances. Because ground squirrel use of the landscape often changed every day, the colony delineations in this report represent the areas of Washington ground squirrel activity during the delineations. The activity that Tetra Tech delineated likely included individual dispersing juveniles as well as well-established, more permanent colonies.

Tetra Tech confirmed three of the active colonies delineated in 2012 by the unique species-specific alarm call and the presence of active burrows. The fourth colony was confirmed by the presence of fresh scat and active burrows (Table 4-1). Table 4-1 outlines Tetra Tech's observations at each colony, including detailed habitat information, the sign used to confirm activity, and the date Tetra Tech first observed each colony. Table 4-1 additionally lists the acreage of each colony and the distance of each colony's edge to a disturbance feature of the proposed Project (transmission line, roads, substations, laydown and fly yards, or communication sites). Colonies within the 785-foot buffer of the site boundary are displayed in bold. All four of the confirmed colonies intersect the 785-foot buffer of the site boundary (Table 4-1; Figures 4-2 through 4-12).

In 2012, Tetra Tech observed Washington ground squirrel activity primarily in grassland habitat dominated by bluebunch wheatgrass (*Pseudoroegneria spicata)* and cheatgrass (*Bromus tectorum*) (Table 4-1). Shrub cover within colonies ranged from zero to 80 percent; the median range of shrub cover was 1-20 percent with 3 of the 4 colonies falling in this range. Half of the colony locations were dominated by exotic species and half were dominated by native species. Cheatgrass was the most prevalent invasive species found within colonies.

Two of the colonies were located in silty loam soil and two were located in silty sand or loam with gravel (Table 4-1). One of the colonies was located in or near disturbed landscapes, influenced by agricultural activities. Agricultural activities near colony boundaries included varying degrees of grazing and cattle activities, and actively farmed wheat fields. Additionally, herbicide and pesticide spraying occurs within existing colonies (spot spraying by farmers), and on crops adjacent to active colonies (on crop circles and wheat).

Table 1. Boardman to Hemingway Transmission Line Project 2012 Washington Ground Squirrel Survey Summary – Confirmed Colonies Found During the 2012 Surveys

Colony #	Colony identified in 2011	Easting	Northing	Date	Distance to Site Boundary (feet)[1]	Route Name	Colony Acreage	Activity Confirmation	Soil Type	Shrub Cover	Plant Species	Dominant Plant Species	Disturbances
22-3A	Yes	119.881	45.63317	4/7/2012	154.37	Morrow Proposed	0.09	Alarm Call and Fresh Burrow (2 &4)	Silty Sand or Loam/w Gravel (4)	1-10% (2)	native species present (percent__)	*Agropyron spicatum, Bromus tectorum*	None
7932-A	No	119.521	45.67262	4/9/2012	215.54	Longhorn	0.07	Alarm Call and Fresh Burrow (2 &4)	Silty Loam (3)	11-20% (3)	exotic species dominant (>60%)	*Bromus tectorum, Chrysothamnus viscidiflorus*	None
762-A	No	119.18	45.56078	4/11/2012	736.71	Umatilla Proposed	0.01	Alarm Call and Fresh Burrow (2 &4)	Silty Sand or Loam/w Gravel (4)	61-80% (6)	exotic species dominant (>60%)	*Bromus tectorum*	None
762-B	No	119.182	45.56072	4/11/2012	432.62	Umatilla Proposed	1.19	Scat and Fresh Burrow (3 & 4)	Silty Loam (3)	<1% (1)	native species present (percent__)	*Agropyron spicatum*	Agriculture

[1] Documented colonies within 785 of the site boundary are noted in **bold** text.

Table 2. Boardman to Hemingway Transmission Line Project 2012 Washington Ground Squirrel Survey Summary – Colonies Confirmed During 2011 Surveys That Are Within the 2012 Survey Area

Colony #	Easting	Northing	Date	Distance to Site Boundary (feet)[1]	Route Name	Colony Acreage	Activity Confirmation	Soil Type	Shrub Cover	Plant Species	Dominant Plant Species	Disturbances
22-3b	119.89668	45.63431	4/7/2011	556.2	Morrow Proposed	0.05	Alarm Call (2)	Silty Loam (3)	11-20% (3)	Native Species dominant (>60%)	annual grasses, *Chrysothamnus spp*.	Anthropogenic
CX-35	119.67875	45.61842	5/10/2011	0	Morrow Proposed	1.42	Alarm Call (2)	Silty Loam (3)	<1% (1)	Exotic Species dominant (>60%)	*Agropyron cristatum, Bromus tectorum*	Anthropogenic
CX-30	119.90965	45.63344	5/11/2011	134.5	Morrow Proposed	1.75	Alarm Call and Scat (2 & 3)	Silty Loam (3)	1-10% (2)	Exotic Species dominant (>60%)	*Agropyron cristatum, Bromus tectorum, Poa secunda, Vulpia bromoides, Ericameria nauseosum*	None
CX-31	119.94866	45.63398	5/11/2011	74.5	Morrow Proposed	41.03	Alarm Call and Scat (2 & 3)	Silty Loam (3)	11-20% (3)	Native Species dominant (>60%)	*Artemisia tridentata, Poa secunda, Festuca idahoensis, Phlox longiflora, Astragalus purchii*	None

[1] Documented colonies within 785 of the site boundary are noted in **bold** text.

5.0 CONCLUSIONS

Current ODFW guidance identifies Washington ground squirrel burrow(s) (including a 785-foot buffer of suitable habitat around the burrow) as an avoidance area for energy development projects. Eight colonies were found to be within the 785-foot buffer and therefore IPC will use the Washington ground squirrel colony locations from the 2011 and 2012 surveys to inform siting of the Project. The objective will be to site Project features, in coordination with ODFW, outside the 785-foot buffer of known colonies wherever possible and warranted by site habitat conditions.

The colonies that Tetra Tech observed during surveys were clustered in two general areas: along the margins of and in the vicinity of the Boardman Bombing Range and Boardman Conservation Area, and in Umatilla and Morrow Counties, located east of the bombing range along the Proposed Route and along the Longhorn Alternative. The colonies Tetra Tech observed in the vicinity of the Boardman Bombing Range and in or adjacent to the Boardman Conservation Area belong to a known and well-studied population of Washington ground squirrels that have been previously documented and researched.

The Washington ground squirrel colonies Tetra Tech observed in Umatilla and Morrow Counties, located east of the bombing range along the Proposed Route and along the Longhorn Alternative, are part of, prior to 2011, a previously undocumented population of the species. Several of the colonies were located outside the GAP species distribution (Kagan et al. 1999) for this species (Figure 3-1), and were not included in previous research documenting the geographic distribution of this species (Betts 1990). However, the data readily available during survey planning in 2009 and 2010 should not be considered exhaustive in nature and more recent habitat modeling efforts may indicate that these colonies are distributed within potential or predicted habitat.

In 2011, sites found during the first survey period were often not reconfirmed during the second period. Also, on occasion no colonies were identified during the first survey but colonies were found during the second survey outing. Similar patterns occurred in 2012. Research by Finger (2007) and Delavan (2008) indicate that Washington ground squirrels have strong site fidelity to colonies; however, within and between years there are drift and shifts in home ranges due to local annual variation such as survival, reproduction, food availability, and juvenile dispersal. Due to the relatively narrow width of the study area (approximately 2,000 feet at its widest), surveys may not have encompassed the full extent of these colonies given the spatial and temporal dynamics of the species. Therefore, colonies confirmed at any point during 2011 or 2012, whether or not identified in previous or subsequent surveys that are found within the disturbance area should be considered in any future siting of Project features. The eight colonies identified during the 2011 and 2012 surveys are presented in Table 4-1 and 4-2.

5.1 Remaining Survey Work

No additional surveys are planned for 2013. Preconstruction surveys may need to be conducted in the year that construction commences to ensure no new colonies have been established. Coordination with ODFW will identify any future survey work required for the Project.

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FIGURES

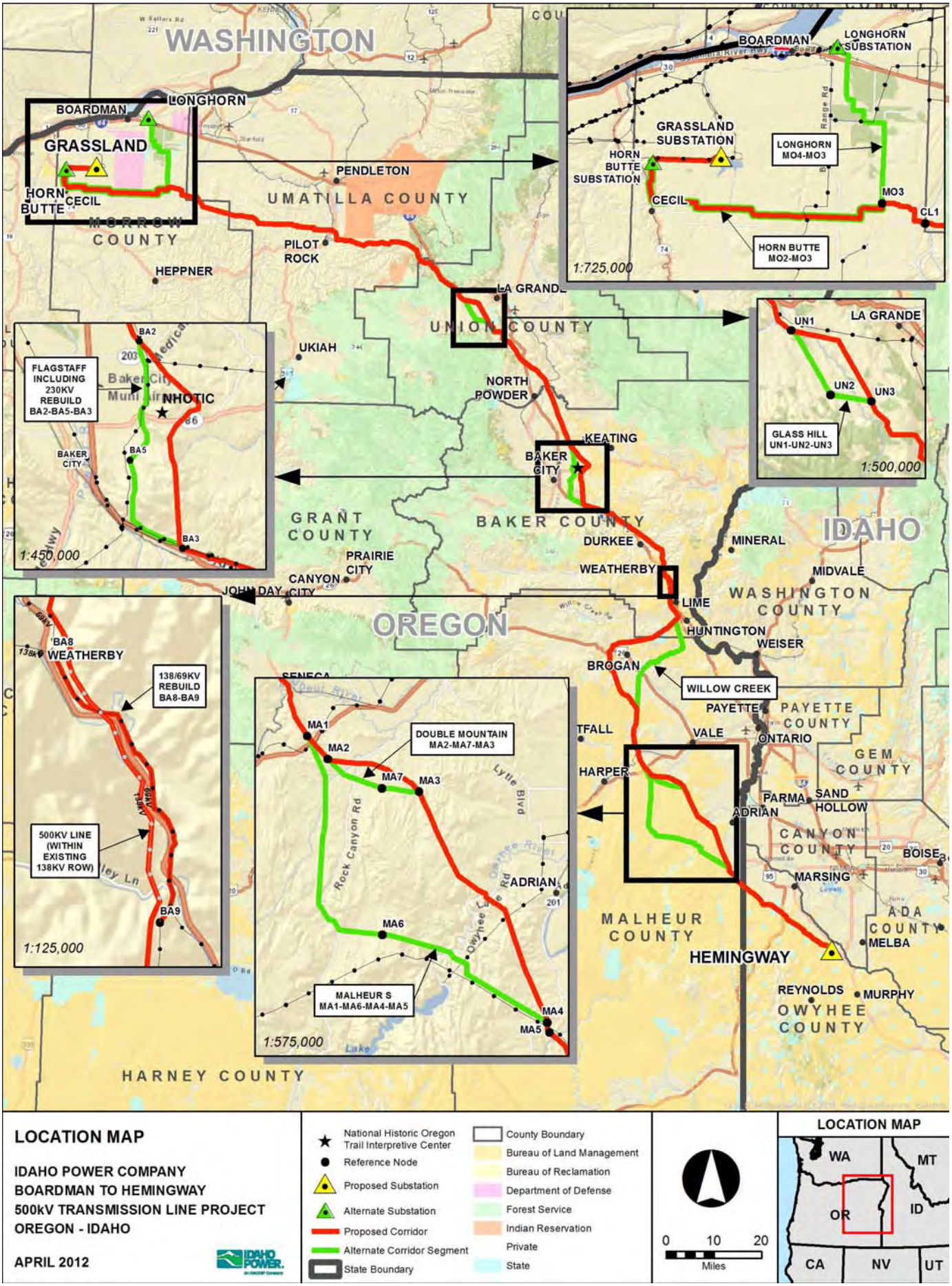


Figure 1-1. Idaho Power Proposed Route and Alternative Routes

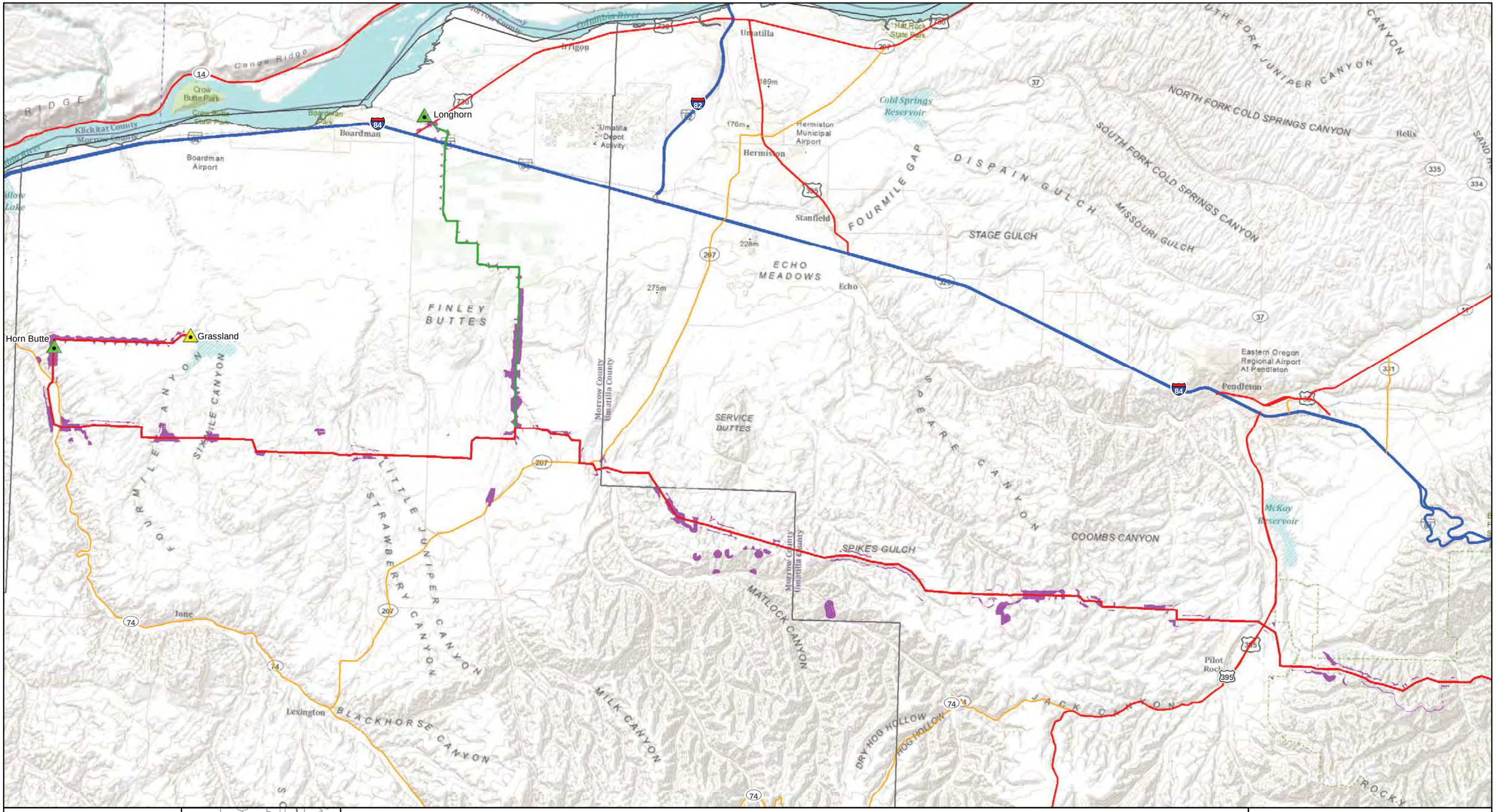
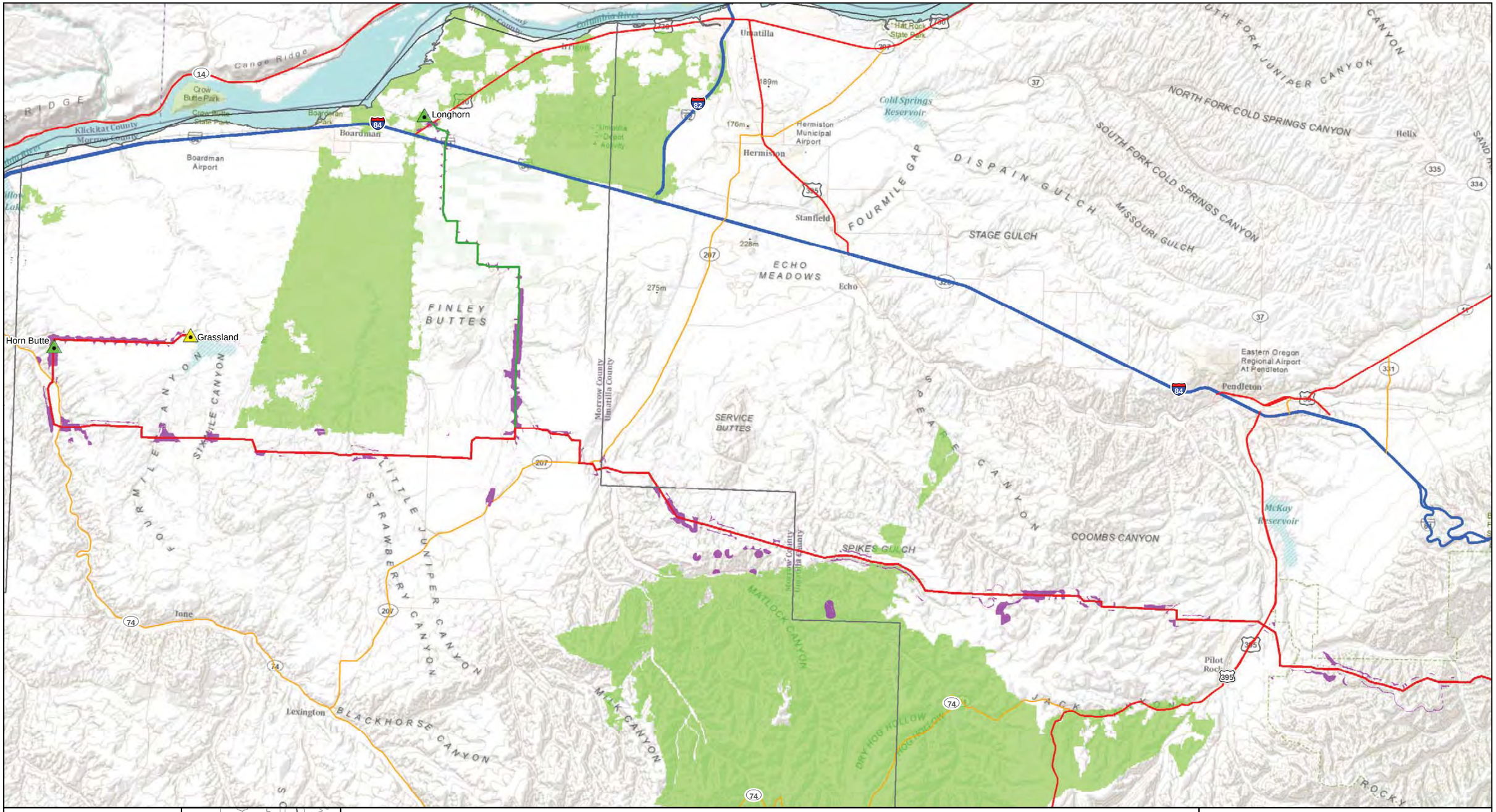


FIGURE 2-1
WASHINGTON GROUND SQUIRREL SURVEY AREA

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012



0 4
Miles

IDAHO POWER
An IDACORP Company

Survey Features
- WAGS Survey Area
- WAGS Modeled Range*

Route Features
- Proposed
- Alternative
- Proposed Substation
- Alternate Substation

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

***Data Source: Oregon GAP Species Distribution**

FIGURE 3-1
WASHINGTON GROUND SQUIRREL HABITAT DISTRIBUTION MAP FOR OREGON

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012

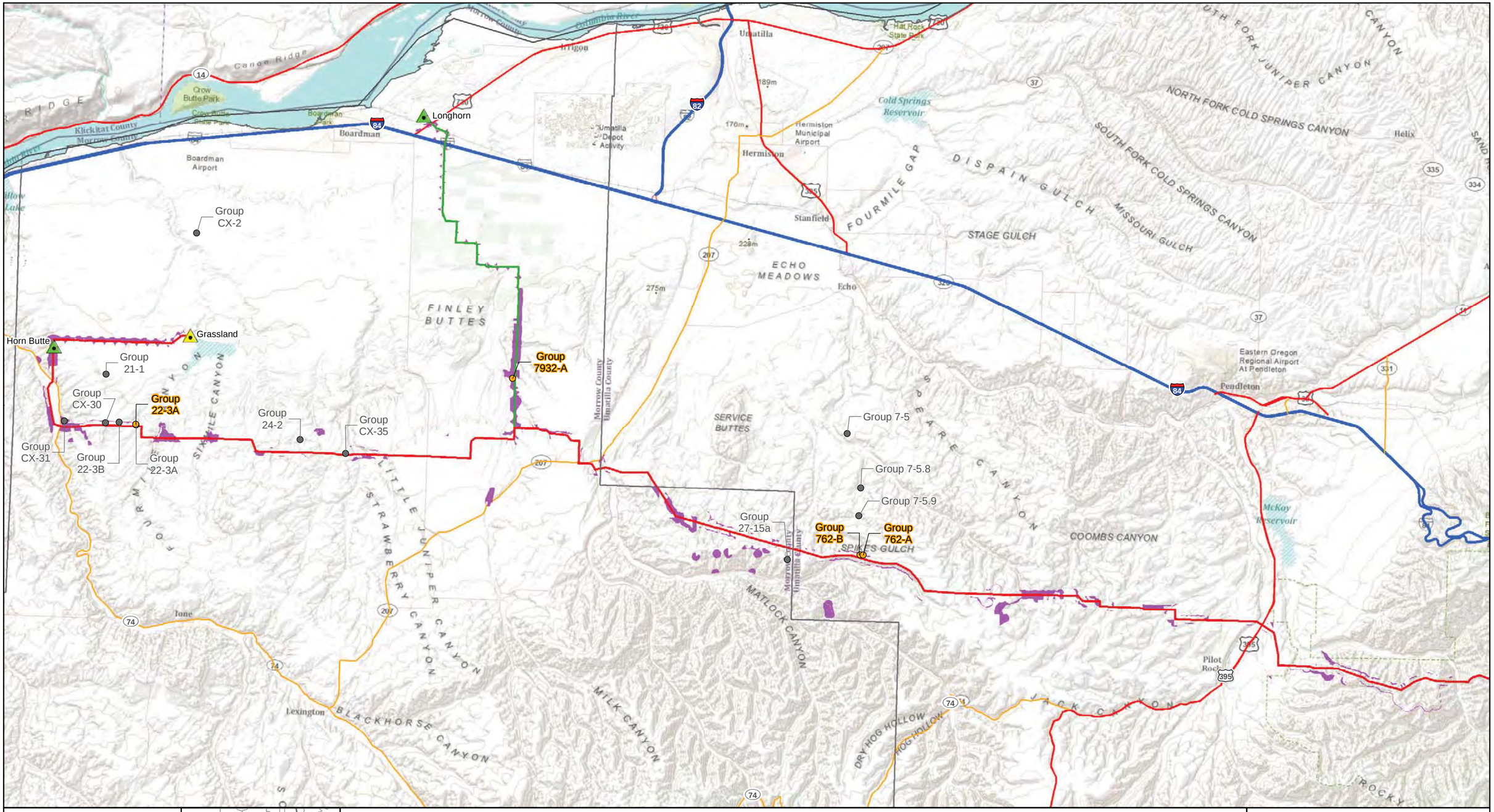
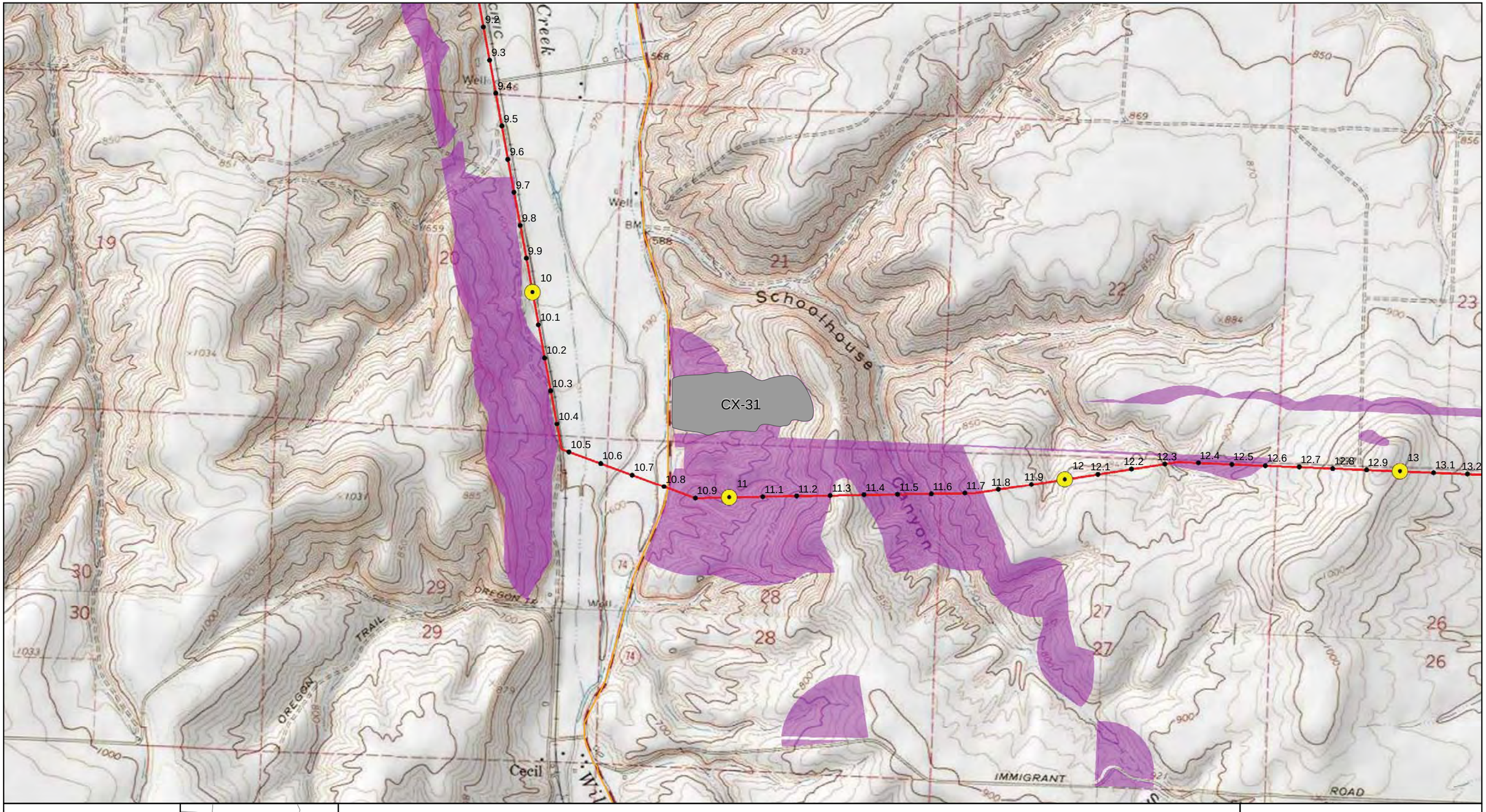


FIGURE 4-1
OVERVIEW OF WASHINGTON GROUND SQUIRREL COLONIES

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012



0 2,000 Feet

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Survey Features
- 2012 WAGS Survey Area
- 2011 Active WAGS Colony

Route Features
- Proposed
- Alternative

Mile Markers
- Mile
- Tenth Mile

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

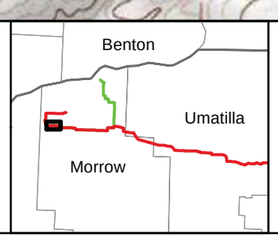
FIGURE 4-2
DETAIL OF WASHINGTON GROUND SQUIRREL COLONY CX-31

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012

0 2,000 Feet

IDAHO POWER
An IDACORP Company



Survey Features
- 2012 WAGS Survey Area
- 2011 Active WAGS Colony

Route Features
- Proposed
- Alternative

Mile Markers
- Mile
- Tenth Mile

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-3
DETAIL OF WASHINGTON GROUND SQUIRREL COLONY CX-30

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012

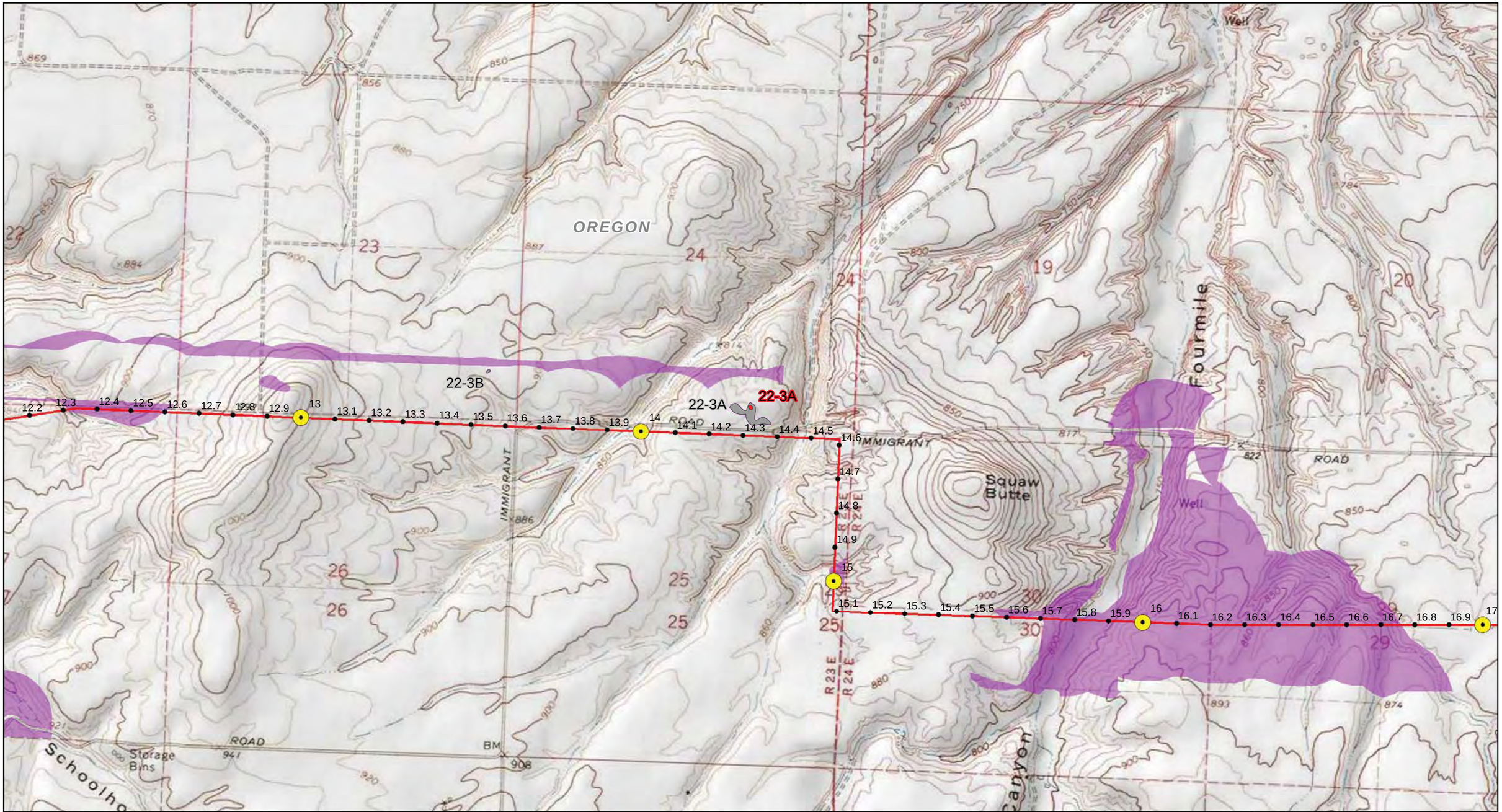
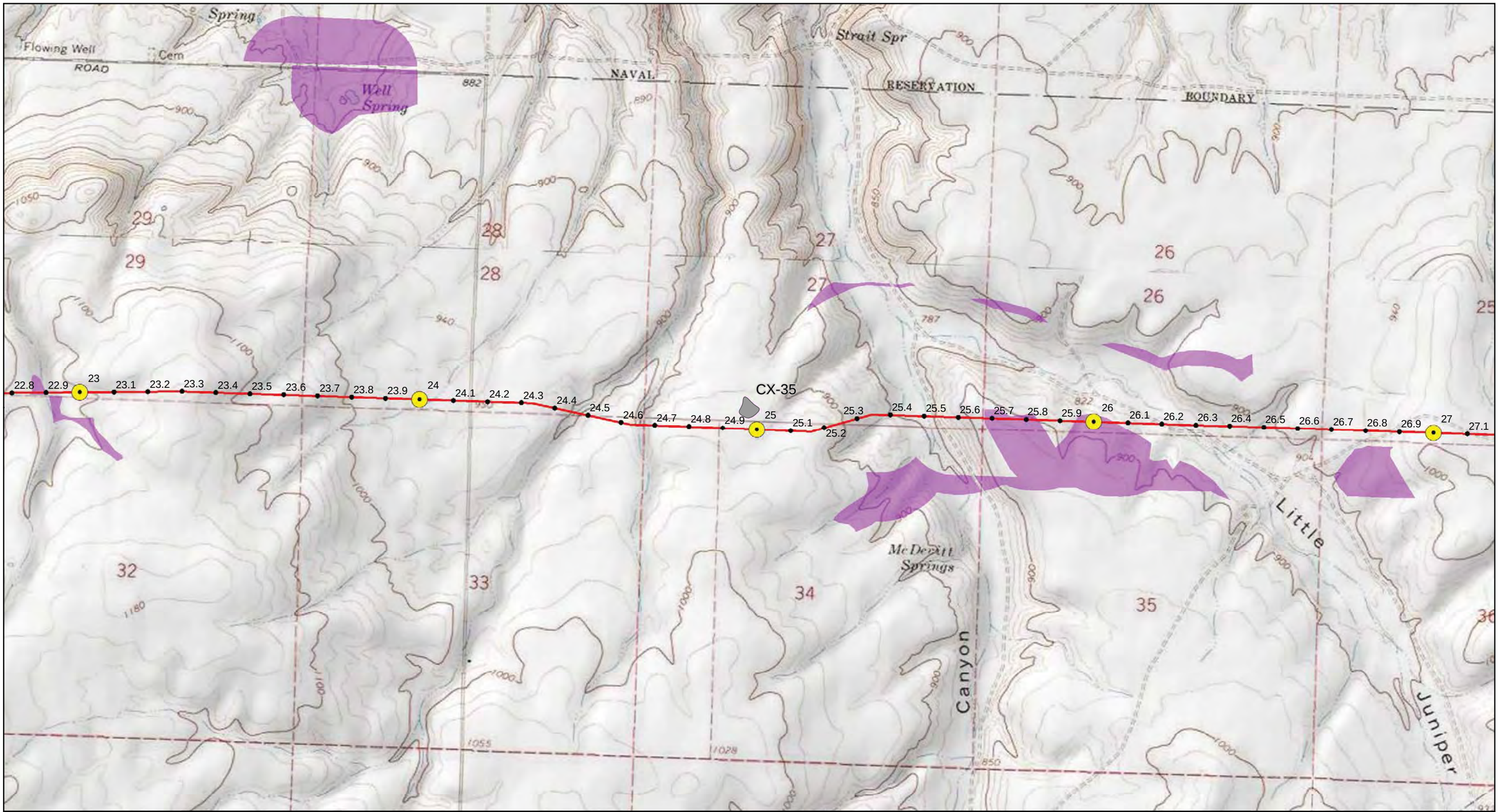
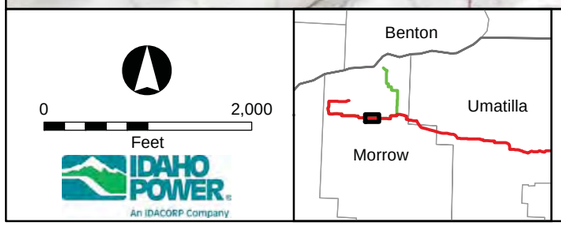


FIGURE 4-4
DETAIL OF WASHINGTON GROUND SQUIRREL COLONY GROUP 22-3

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012





Survey Features
- 2012 WAGS Survey Area
- 2011 Active WAGS Colony

Route Features
- Proposed
- Alternative

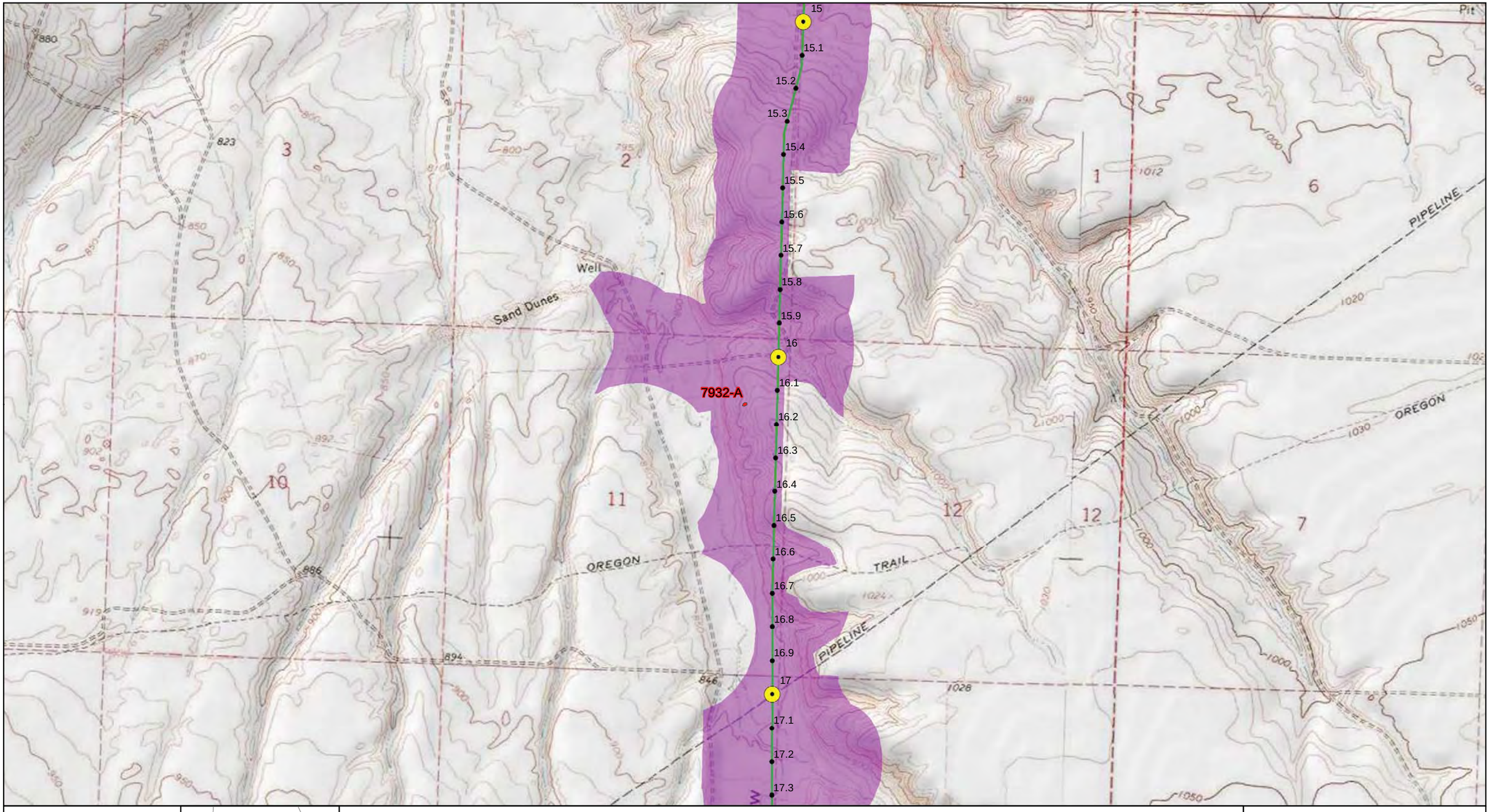
Mile Markers
- Mile
- Tenth Mile

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-5
DETAIL OF WASHINGTON GROUND SQUIRREL COLONY CX-35

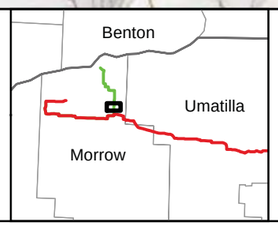
IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012



0 2,000
Feet

IDAHO POWER
An IDACORP Company



Survey Features
- 2012 WAGS Survey Area
- 2012 Active WAGS Colony

Route Features
- Proposed
- Alternative

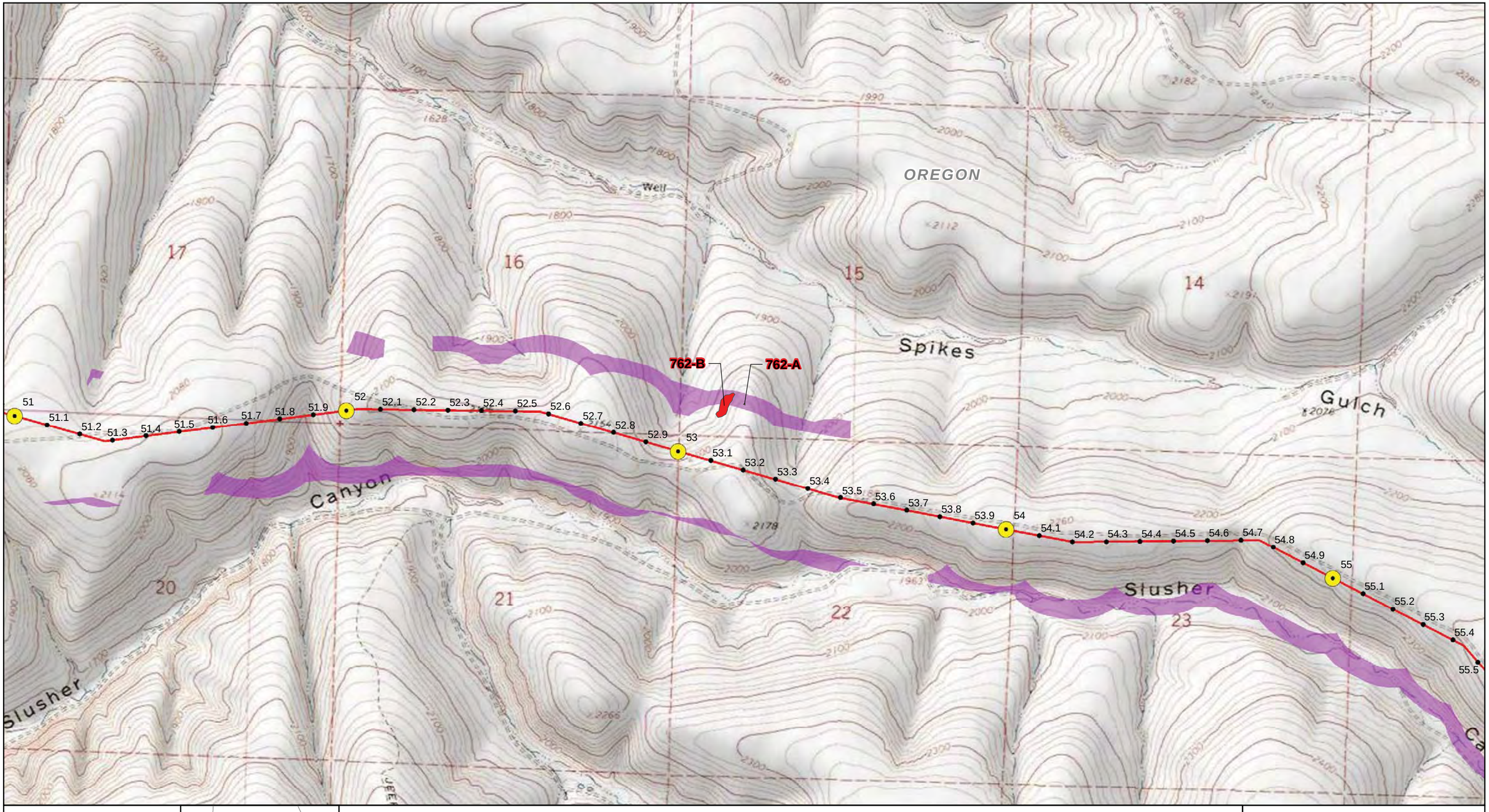
Mile Markers
- Mile
- Tenth Mile

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-6
DETAIL OF WASHINGTON GROUND SQUIRREL COLONY 7932-A

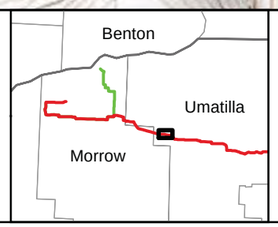
IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012



0 2,000
Feet

IDAHO POWER
An IDACORP Company



Survey Features
- 2012 WAGS Survey Area
- 2012 Active WAGS Colony

Route Features
- Proposed
- Alternative

Mile Markers
- Mile
- Tenth Mile

Highways
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County

FIGURE 4-7
DETAIL OF WASHINGTON GROUND SQUIRREL COLONY GROUP 762

IDAHO POWER COMPANY
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

September, 2012