3.4 WETLANDS AND RIPARIAN AREAS

This section presents an analysis of the potential effects of the proposed Project on wetlands (Section 3.4.2.1) and riparian areas (Section 3.4.2.2) within the Project area. Wetlands are areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support (and under normal circumstances do support) a prevalence of vegetation typically adapted for life in saturated soil conditions (ACOE 1987). Riparian areas are the areas adjacent to streams and rivers, and have a distinct vegetative community associated with the higher groundwater level adjacent to the drainages.

Wetlands and riparian areas are of critical importance to the protection and maintenance of a large array of plants and animals, including threatened and endangered species, because they provide essential habitats. Wetlands and riparian areas help protect the quality of surface water by impeding the erosive forces of moving water and trapping waterborne sediment and associated pollutants, protecting water supplies by assisting the purification of surface water and groundwater resources, maintaining base flow to surface waters through the gradual release of stored floodwaters and groundwater, and providing a natural means of flood control and storm damage protection through the absorption and storage of water during high-runoff periods.

The wetland and riparian areas potentially affected by the Project are mostly associated with perennial and ephemeral drainages. The wetlands include palustrine emergent (PEM), palustrine shrub scrub (PSS), and palustrine forested (PFO), and palustrine unconsolidated shore (PUS) types. Isolated wetlands also were delineated. Section 404 of the CWA established standards to evaluate and reduce total and net Project effect to wetlands under the regulatory jurisdiction of the U.S. Army Corps of Engineers (ACOE). These standards require avoidance of wetlands where possible and minimization of disturbance where effects are unavoidable. Any unavoidable wetland effects may require compensatory mitigation. All wetland crossings would be subject to review and approval by the Seattle District of the ACOE, whereby the proposed Project would be required to comply with the conditions of any permits issued by the ACOE, including the provisions of any required wetland compensatory mitigation. Similar review and approval would be required by the Oregon Department of State Lands (DSL). Riparian areas in the project area typically have herbaceous or shrub scrub vegetation and are associated with perennial or intermittent streams.

The following analysis assesses potential effects to wetland and riparian resources from the No Action Alternative, the Echanis Wind Energy Project, Alternative B – West Route (including both route options), and Alternative C – North Route.

3.4.1 Methodology

For the purposes of this analysis, the Project area was defined to include the area within the 150-foot wide transmission line right-of-way (ROW) and all areas affected by the construction and operation of access roads, interconnection stations, substations, turbine towers, power collection systems, and other permanent and temporary Project features, including temporary laydown areas and tensioning sites.

Wetlands within the Project area were identified during onsite inspections and use of mapping data available from the National Wetland Inventory (NWI; USGS 2010). Wetlands identified in areas affected by construction of proposed access roads were field-delineated (i.e. the boundary between wetlands and uplands was identified) using The Routine Onsite Determination Method (1987 manual, pp. 52-69) and the Regional Supplement for the Arid West Region to determine presence or absence of State of Oregon wetland boundaries and Federal jurisdictional wetlands.

The following field visits were conducted in 2008 and 2009:

- May 21, 2008 and June 12-17, 2008: The Echanis Project site and main access road were inspected and wetlands were identified, delineated, and mapped. These areas were inspected again in July 2008 to finalize the location of the main access road.
- December 3rd, 7th, and 8, 2009: The Alternative B – West Route alignment (including the two route options) was inspected and wetlands were identified, delineated, and mapped.
- October 8th, 20th, 21st, and December 14, 2009: The Alternative C – North Route alignment was inspected and wetlands were identified, delineated, and mapped.

The majority of the Project area was traversed using all terrain vehicles, with stops to take sample plot data approximately every mile. Sample plots were established wherever wetland indicators were observed. For each sample plot, data on vegetation, hydrology and soils was collected, recorded in the field, and transferred to data forms

Wetlands were not delineated in areas where there would be no direct effect from construction of new access roads; wetland areas within the ROW that would be completely spanned by the transmission line were not delineated. Field delineations were also not conducted in the Cucamonga Creek canyon or Malheur National Wildlife Refuge (MNWR). Information on wetlands in areas where delineations were not conducted was obtained from the National Wetland Inventory (NWI; USGS 2010). All effects on wetlands related to the transmission line alternatives and improvements to existing roads are based on NWI data. Effects from construction of new roads and transmission line components are described as "acres of wetland effect" whereas the amount of wetland area spanned by the transmission line alternatives is described as "miles crossed."

In portions of project area where flowing water or bare creek channels were identified, the ordinary high water mark (i.e. the highest level reached by a body of water) was determined through direct observation. Where creek channels were vegetated, wetland conditions were generally present, and the areas were delineated and mapped as wetlands.

The wetland classification system described by Cowardin et al (1979) was used to classify wetlands based on the following observed categories:

- Palustrine emergent (PEM) include wetlands characterized by erect, rooted, herbaceous hydrophytes (i.e aquatic plants), excluding mosses and lichens (Cowardin et al 1979). Wildlife frequently use these areas for nesting and feeding, particularly during migration.
- Palustrine scrub-shrub (PSS) wetlands include wetland areas dominated by woody vegetation less than 20 feet tall (Cowardin et al 1979). PSS wetlands supply an abundance of food and cover resources for mammals and birds and provide necessary breeding habitat for many migratory bird species.
- Palustrine forested (PFO) wetlands are dominated by woody vegetation that is at least 20 feet tall (Cowardin et al. 1979). PFO wetlands provide a diverse assemblage of vegetation and an abundance of food and water sources for wildlife.
- Palustrine unconsolidated shore (PUS) wetlands are dominated by trees, shrubs, persistent emergent vegetation, and emergent mosses or lichens, with unconsolidated shores characterized by substrates lacking vegetation except for pioneering plants that become established during brief periods when growing conditions are favorable (Cowardin et al. 1979).

Riparian areas (i.e. the interface between land and a stream) are present at all stream crossings locations, as identified in Section 3.2. Vegetation in riparian areas was described as herbaceous or shrub-scrub based on a review of aerial photography, supplemented by from field visits conducted in 2008 and 2009.

This analysis presented in this section was informed by comments received from the public and regulatory agencies during the EIS scoping process. Agency representatives, local organizations and private citizens requested that the following issues be addressed in the EIS:

- Potential effects to wetlands, floodplains, and riparian areas.
- Methods to avoid or mitigate for potential effects to wetlands, floodplains, and riparian areas.
- Compliance with Section 404 of the Clean Water Act and Executive Order 11988.
- Description of all waters of the U.S. that could potentially be affected by the project (if any), and inclusion of maps that clearly identify all waters within the Project Area.

3.4.2 Affected Environment

The Project is within the Basin and Range Province, which is characterized by a fault-block mountain enclosed basin with internal drainages. Steens Mountain is a typical example of the Province. The vegetation is typical of the steppe, shrub-steppe, and desert shrubs zones. The ridge tops tend to be very rocky, and are dominated by very low growing shrubs, such as low sagebrush (*Artemisia arbuscula*). Ground cover is sparse, and is dominated by species including Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa sandbergii*), cheatgrass (*Bromus tectorum*), and bluebunch and crested wheatgrass (*Pseudoroegneria spicata*and *A cristatum*). The side slopes of the ridges typically are a western juniper/big sagebrush (*Juniperus occidentalis/Artemisia tridentata*) community.

Since juniper management has been occurring for the last 30 years, seeps and springs have been emerging where there is no historical record of water presence. This is believed to increase the occurrence of water emerging onto the Echanis Project site. This has been documented by both the EOARC as well as the local ranchers who are reporting more water than was historically present (Schott 2008). Most of the springs are typically dry by May, but in 2008 there was flowing water in June.

Drainages with sufficient water during the year typically have an associated riparian community. Wetter grass-forb communities are dominated by Kentucky bluegrass (*Poa pratensis*), Nebraska sedge (*Carex nebrascensis*) and Baltic rush (*Juncus balticus*). Riparian communities along streams include the aforementioned herb species as well as trees such as water birch (*Betula occidentalis*). An inland saltgrass (*Disticilus spicata*) community was observed in one location during recent site surveys.

Much of the bottomland in the Project area has been under cultivation. These lands are primarily alfalfa (*Medicago sativa*) pastures, which are sprinkler irrigated. Some flood irrigation occurs in the Kiger basin. Wetter areas tend to be dominated by meadow foxtail (*Aleopecurus pratensis*), Kentucky bluegrass (*Poa pratensis*) and Baltic rush (*Juncus balticus*). A few willows (*Salix* sp.) are found along agricultural streams and irrigation ditches.

Alternative B (including the two route options) is located completely within the Donner und Blitzen subbasin. Alternative C is located within the Harney-Malheur Lakes subbasin. Both of these watersheds are within the Oregon Closed Basin. Alternative C is also partially located in the Upper Malheur subbasin, which is part of the Middle Snake Basin. The Echanis Project site is on a ridge between the Donner und Blitzen and Alvord Lake watersheds, also located in the Oregon Closed Basin.

3.4.2.1 Wetlands

Project area wetlands provide valuable tree and understory plant diversity, stable stream banks that can attenuate and alter flood flows, and valuable nesting and foraging habitat for many birds and other wildlife species. In particular, the shallow wetlands associated with the MNWR are managed to provide refuge and breeding ground for resident and migratory birds, because of its location on the Pacific Flyway.

PEM wetlands are the most common wetland type in the Project area. Vegetation in these wetland areas include Baltic rush (*Juncus balticus*), few-flower spikerush (*Eleocharis quinqueflora*), Kentucky bluegrass (*Poa pratensis*), black medic (*Medicago lupulina*), flatsedge, and Nebraska sedge (*Carex nebrascensis*). Common species in adjacent upland areas include cheatgrass, Kentucky bluegrass, western juniper, and mountain brome.

PSS wetlands are less common in the Project area. Vegetation in these wetland areas is dominated by quaking Aspen and Nebraska sedge. NWI maps show an area of PSS wetland along Alternative B where the alignment crosses Cucamonga Creek. NWI maps also show an area of PSS wetlands along a road at the northern end of Alternative C; however field surveys determined no wetlands were present.

Small areas of PFO wetland are present along Mud Creek.

3.4.2.2 Riparian Areas

Riparian corridors are vegetated communities contiguous to and dependent on surface and subsurface water associated with perennial and intermittent waterbodies. Riparian areas are the transitional area between streams and upland features. Riparian vegetation on the Project site consists of forested, shrubby and herbaceous species. The vegetation that comprises riparian corridors is important to stabilizing streambanks and reducing floodwater velocities, which can prevent or limit streambank erosion. Riparian areas are distinctly different from surrounding lands because of the unique soil and vegetation characteristics that are strongly influenced by the presence of water. Many special status species rely on riparian areas during a portion of the year for cover, forage, or breeding habitat. Riparian areas discussed in this section include only areas adjacent to streams, and not any wetland areas extending further from the streams than the stream banks themselves.

3.4.3 Environmental Effects and Mitigation

The primary effects of the proposed Project on wetland and riparian resources would be from the construction and operation of the transmission lines, the Echanis Wind Energy Project, access roads, and other project-related improvements and support facilities. Effects would be both permanent (long-term operational effects) and temporary (associated with Project construction). The potential effects on wetlands and riparian areas identified and analyzed in this section include:

- Alterations to the wetland hydrology;
- Alterations to the wetland plant communities, and
- Loss of wetlands due to filling or sedimentation.

During development of the Project plan, the Project proponent worked with wetland biologists to minimize the effect of project development on wetlands and riparian areas. For example, the original design for the main access road to the Echanis site would have required five stream crossings, but the current plan has only three. In addition, bottomless arch culverts would be used instead of round culverts at several stream crossing

locations along the access road to maintain the integrity of the streambed. These bottomless arch culverts were chosen because they can be installed without impacting the active stream channel.

The potential effects on wetlands and riparian areas during the short-term construction phase and the long-term operational phase of the Project are described below. It should be noted that a variety of project design features and best management practices to reduce the effects on wetlands and riparian areas from both the Echanis project and the transmission line alternatives, would be implemented as part of proposed action. These measures are not repeated in the mitigation sections below, but are summarized in Chapter 2 and are listed in Appendix A.

3.4.3.1 Alternative A – No Action

Under the No Action Alternative, no new transmission lines, substations, interconnection stations, or related wind energy facilities would be constructed and new or improved access roads would not be needed. The Echanis Project site would remain undeveloped and would continue to be used for livestock grazing and the existing HEC distribution line located along South Diamond Lane would remain above ground. Wetlands and riparian areas would continue to be affected by current uses.

3.4.3.2 Echanis Project Effects Common to All Action Alternatives

The permanent and temporary effects on wetlands and riparian areas from construction and operation of the Echanis Project would be the same for all action alternatives (i.e. Proposed Action and Alternative Actions). Because the Echanis Project is a common element to all transmission line alternatives (i.e. a connected non-federal action), the effects from the Echanis Project are described separately from the effects of the transmission line alternatives. The effects associated with each transmission line alternative are described separately below. The combined effects of the Echanis Project and each transmission line alternative on wetlands and riparian areas are described in Section 3.4.3.9.

PERMANENT EFFECTS

The Echanis Wind Energy Project would include the installation and operation of 40 to 69 wind turbines, a main access road to the Echanis site, a substation, an operations and maintenance (O&M) building, on-site access roads (i.e. string roads), and a 1.18 mile overhead power collection line. The Project would include several miles of 34.5-kV underground power collection cables connecting the wind turbines to the Echanis substation. (see Figures 3.4-1 Map Units 1 through 11)

No effects to wetlands or riparian areas would occur on the Echanis site. Construction and improvement of the main access road to the Echanis site (which is a project feature common to all action alternatives) would affect a total of 2.44 acres of wetlands. The new portions of the main access road to the Echanis site would cause a permanent loss of 1.76 acres of wetlands, mostly associated with Mud Creek and a connected tributary (Figure 3.4-1 Map Unit 1). Improvements to the existing portions of the main access road would also affect wetlands and would cause permanent effects to 0.68 acres of wetland area, mostly associated with Kiger Creek and Booners Creek (Figure 3.4-1 Map Unit 3). The majority of the effects on wetlands, 1.91 acres, are to PEM wetlands, with an additional 0.53 acres of effect to PSS wetlands (Table 3.4-1).

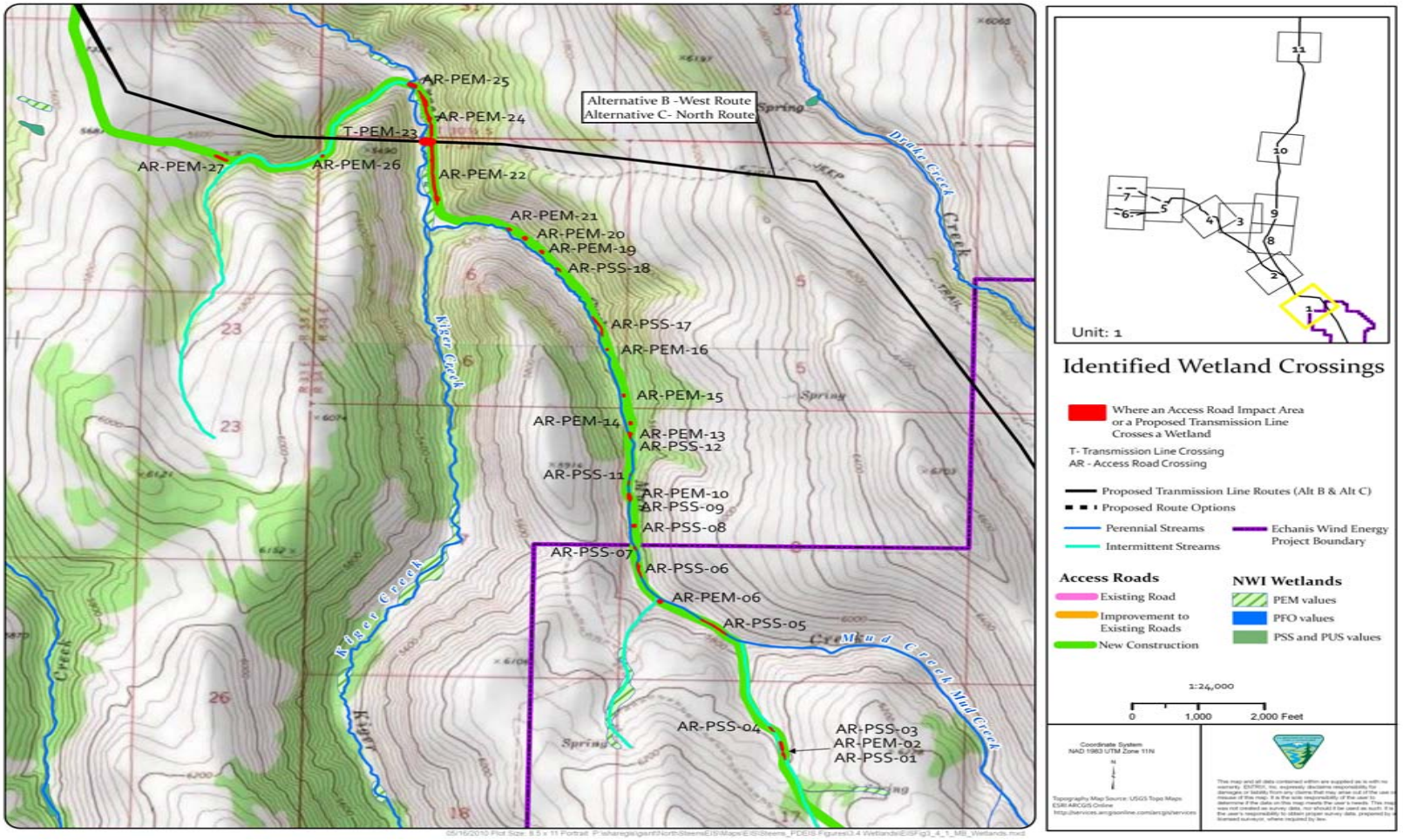

Figure 3.4-1a Unit 1: Wetland Crossings.

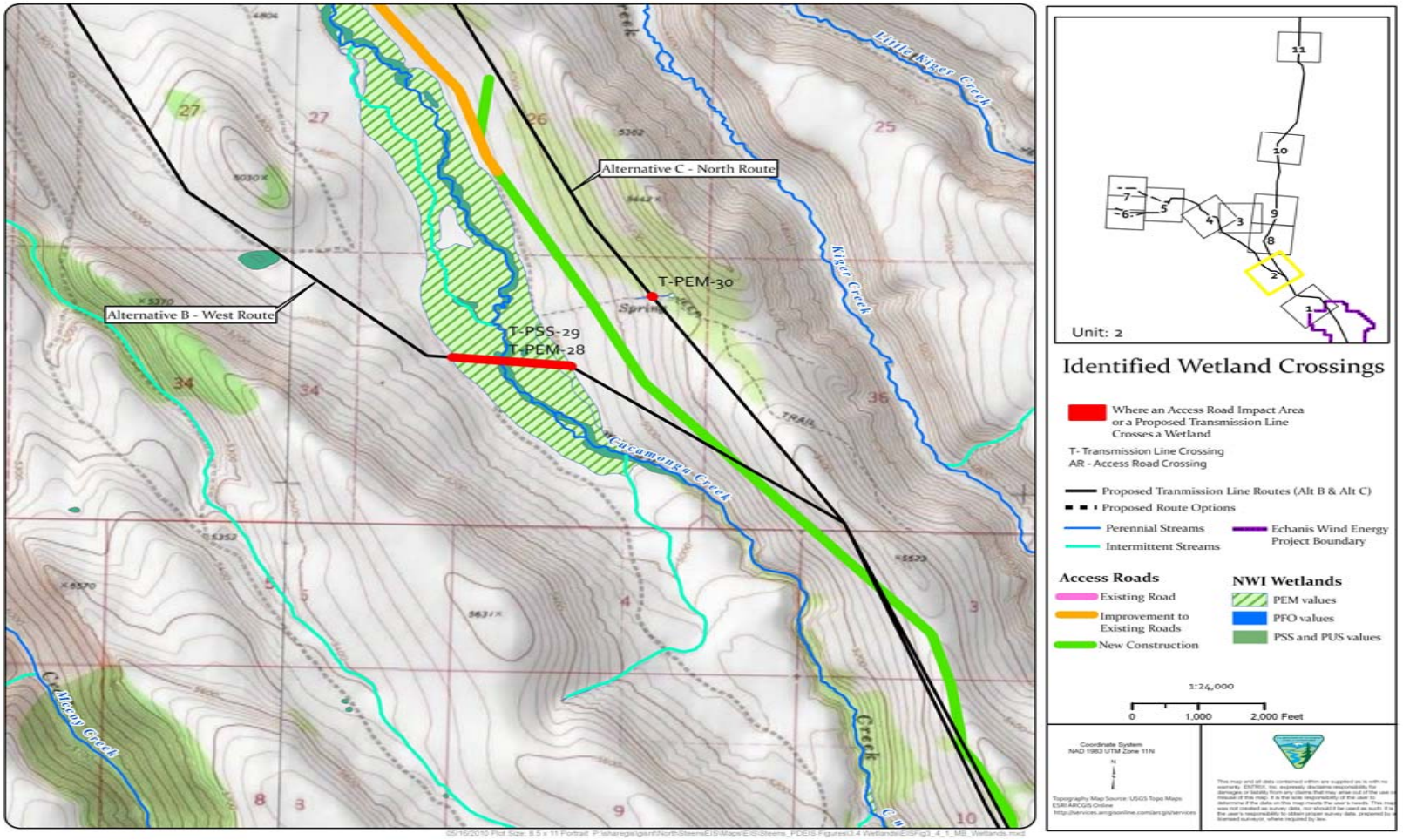

Figure 3.4-1b Unit 2: Wetland Crossings.

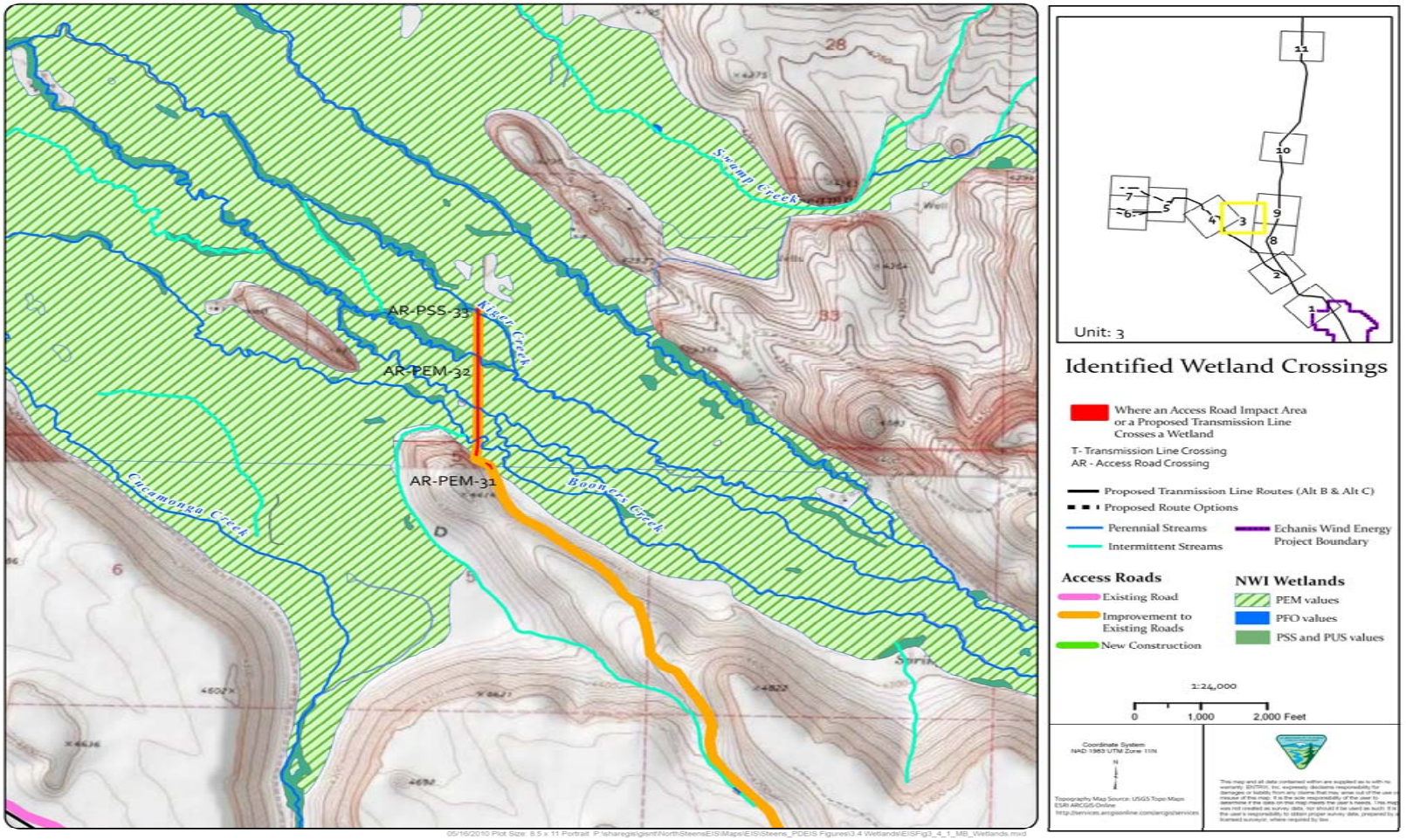

Figure 3.4-1c Unit 3: Wetland Crossings.

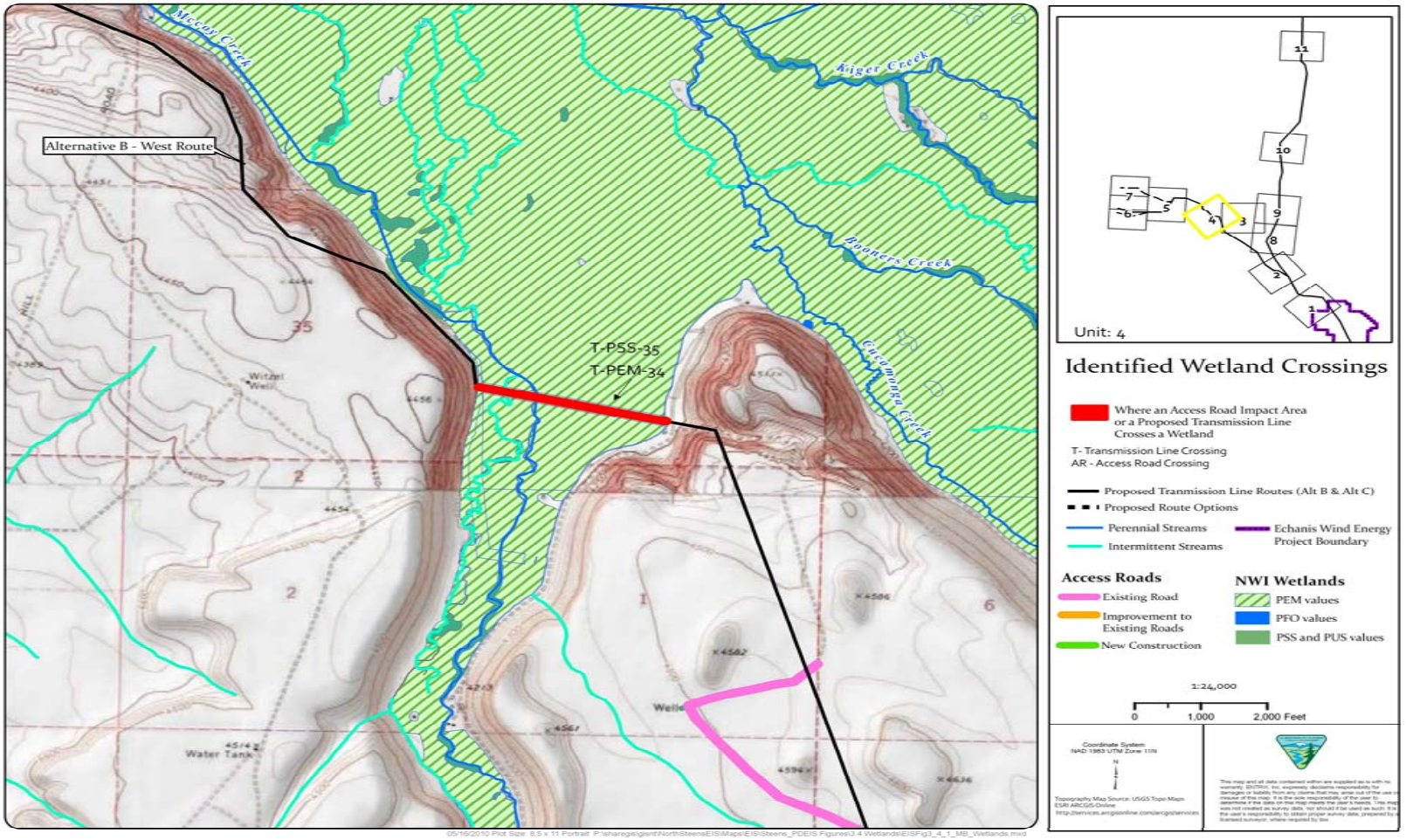

Figure 3.4-1d Unit 4: Wetland Crossings.

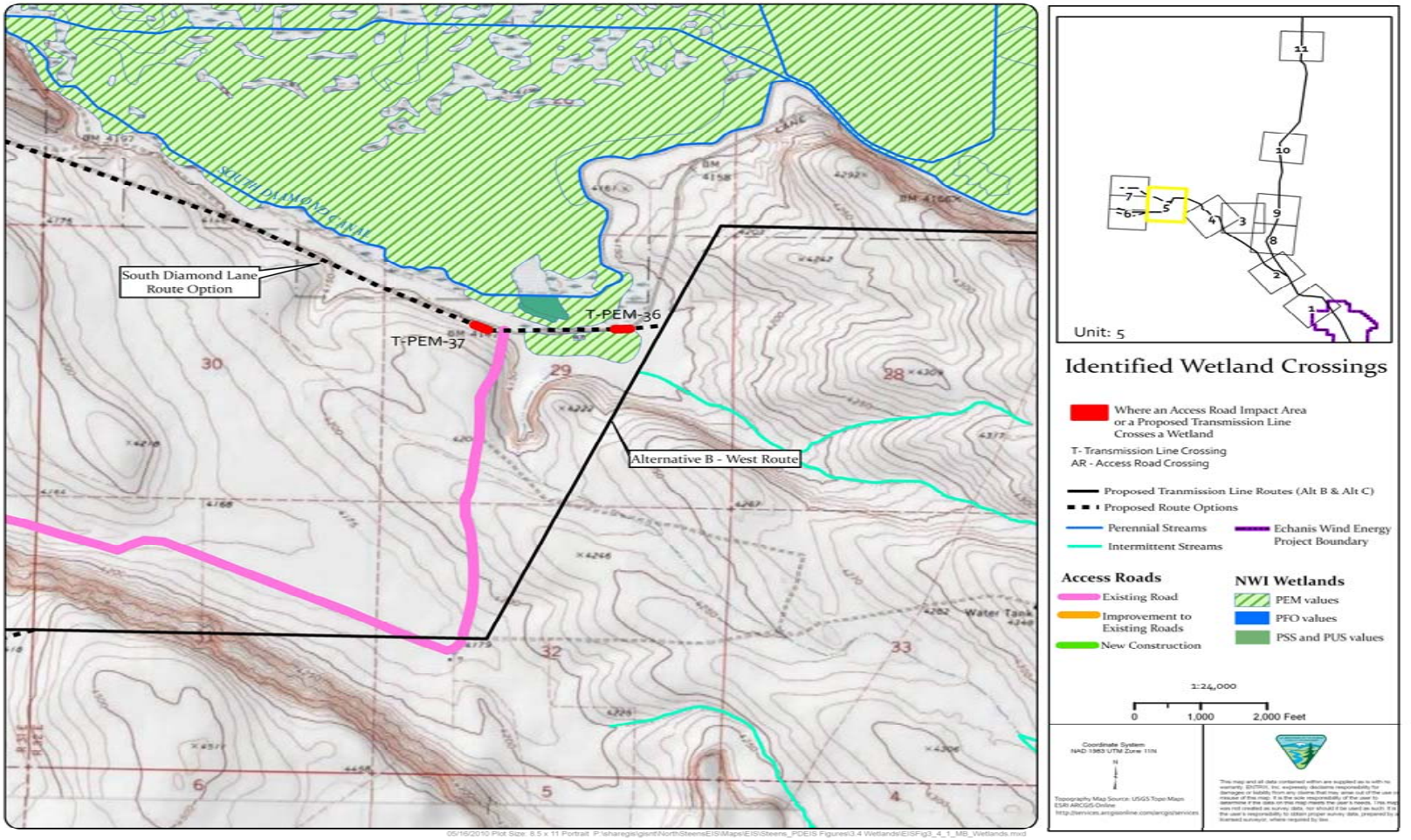

Figure 3.4-1e Unit 5: Wetland Crossings.

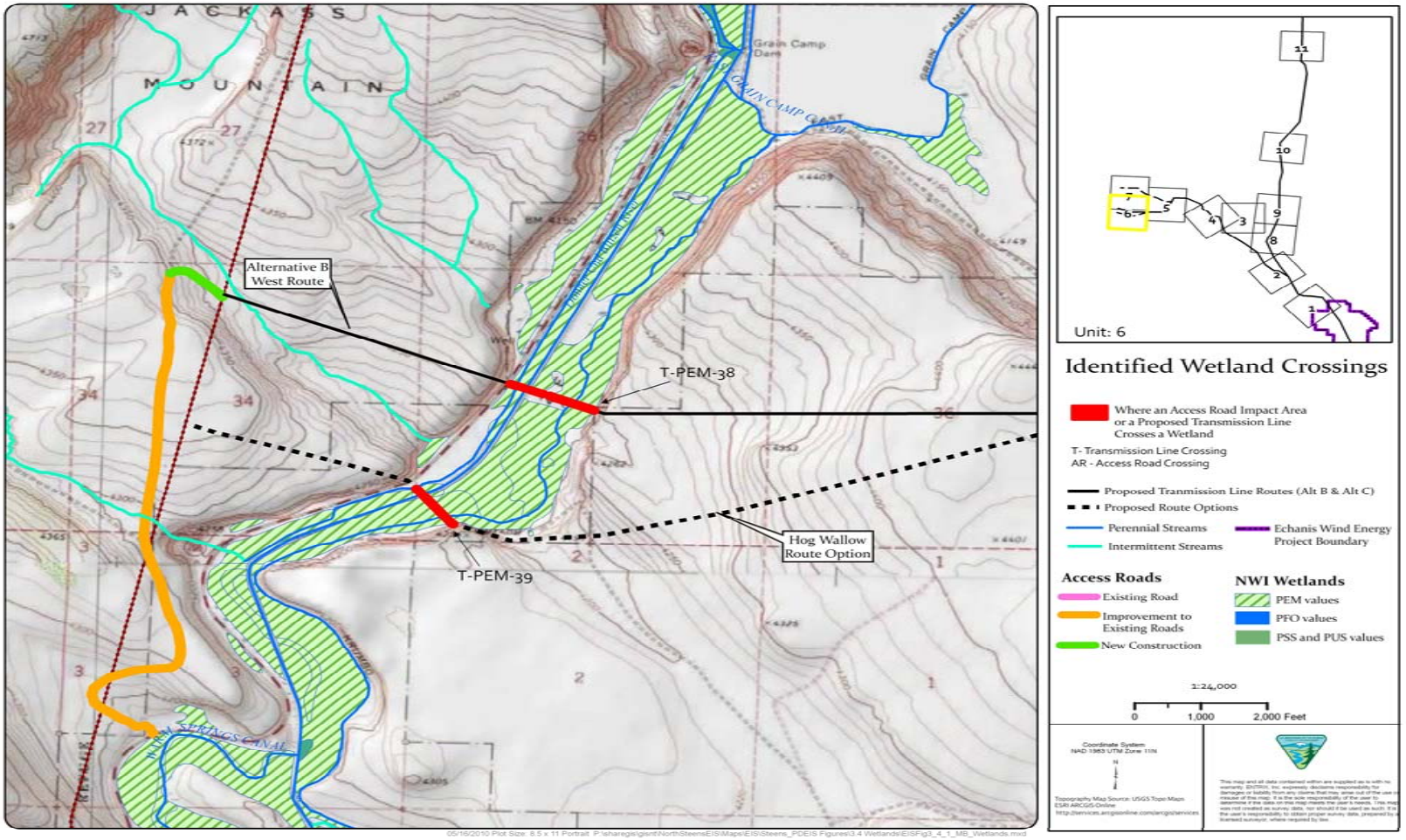

Figure 3.4-1f Unit 6: Wetland Crossings.

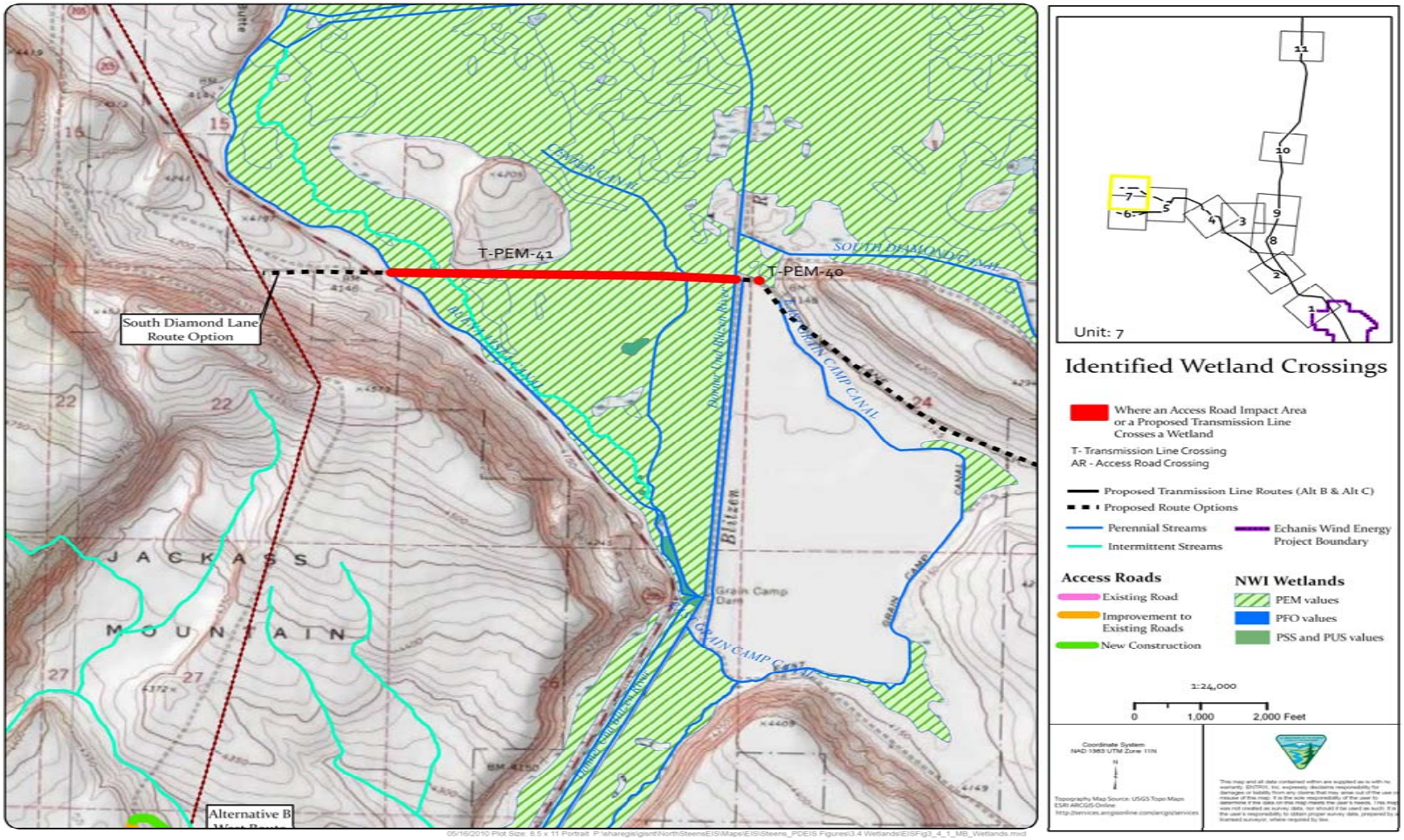

Figure 3.4-1g Unit 7: Wetland Crossings.

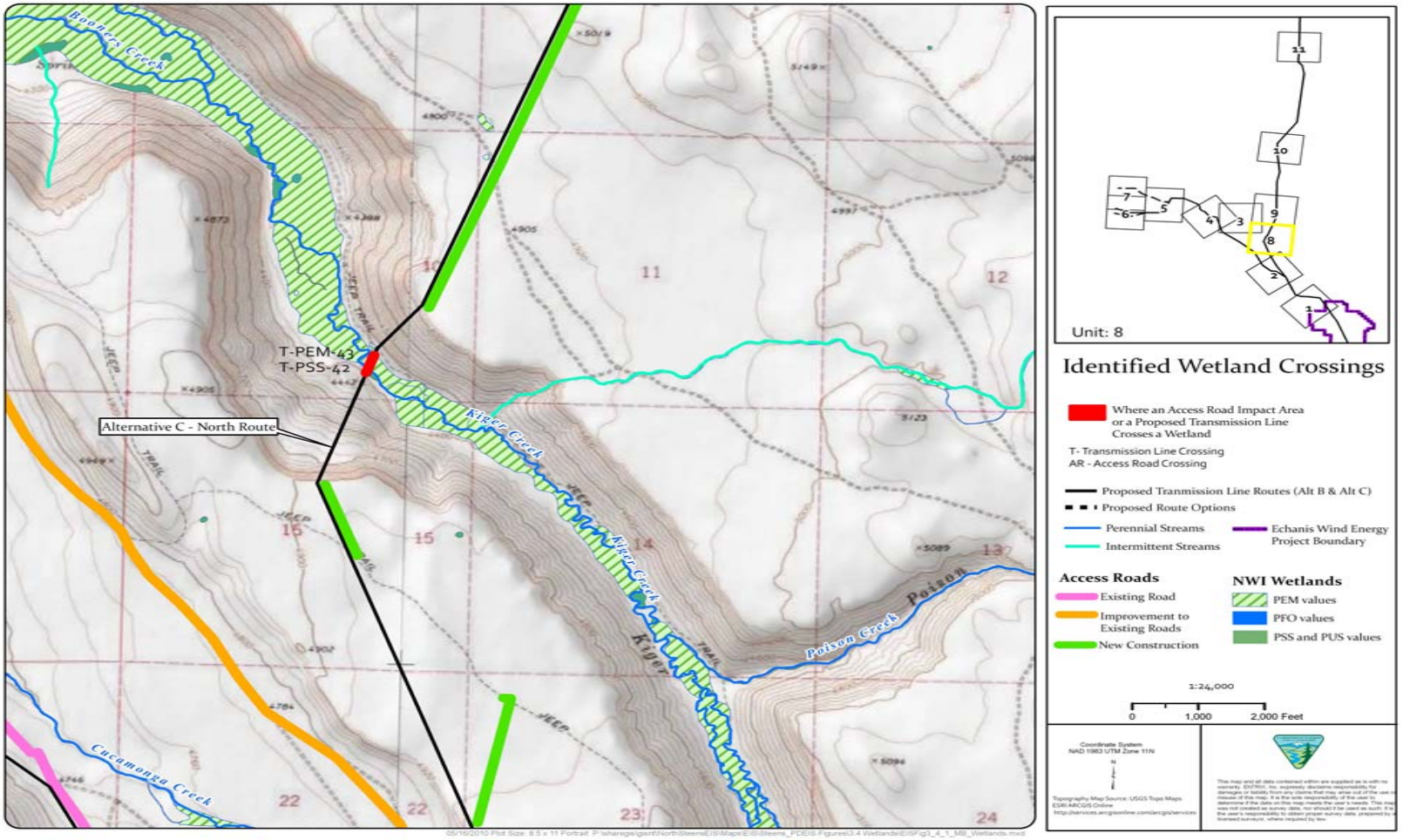

Figure 3.4-1h Unit 8: Wetland Crossings.

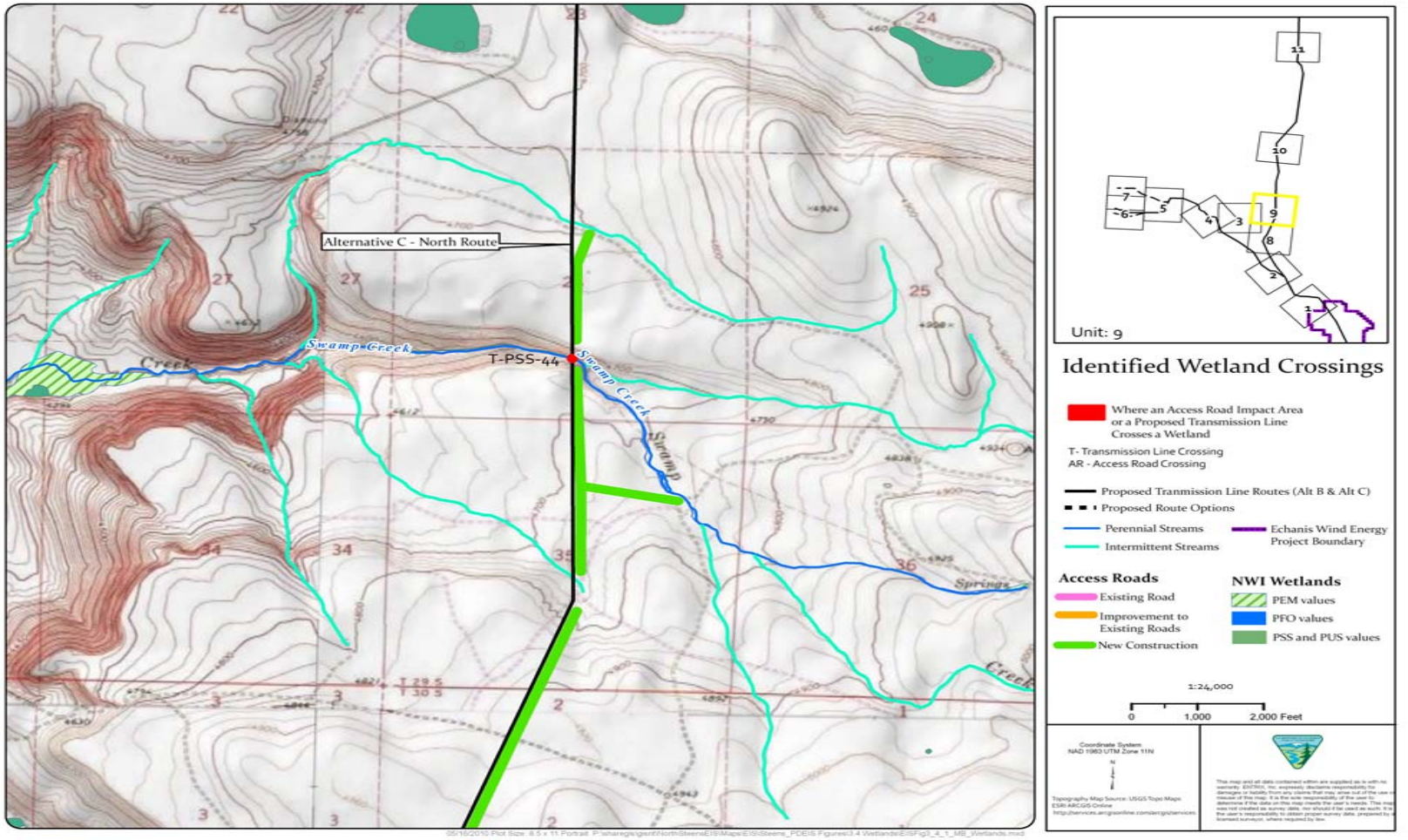

Figure 3.4-1i Unit 9: Wetland Crossings.

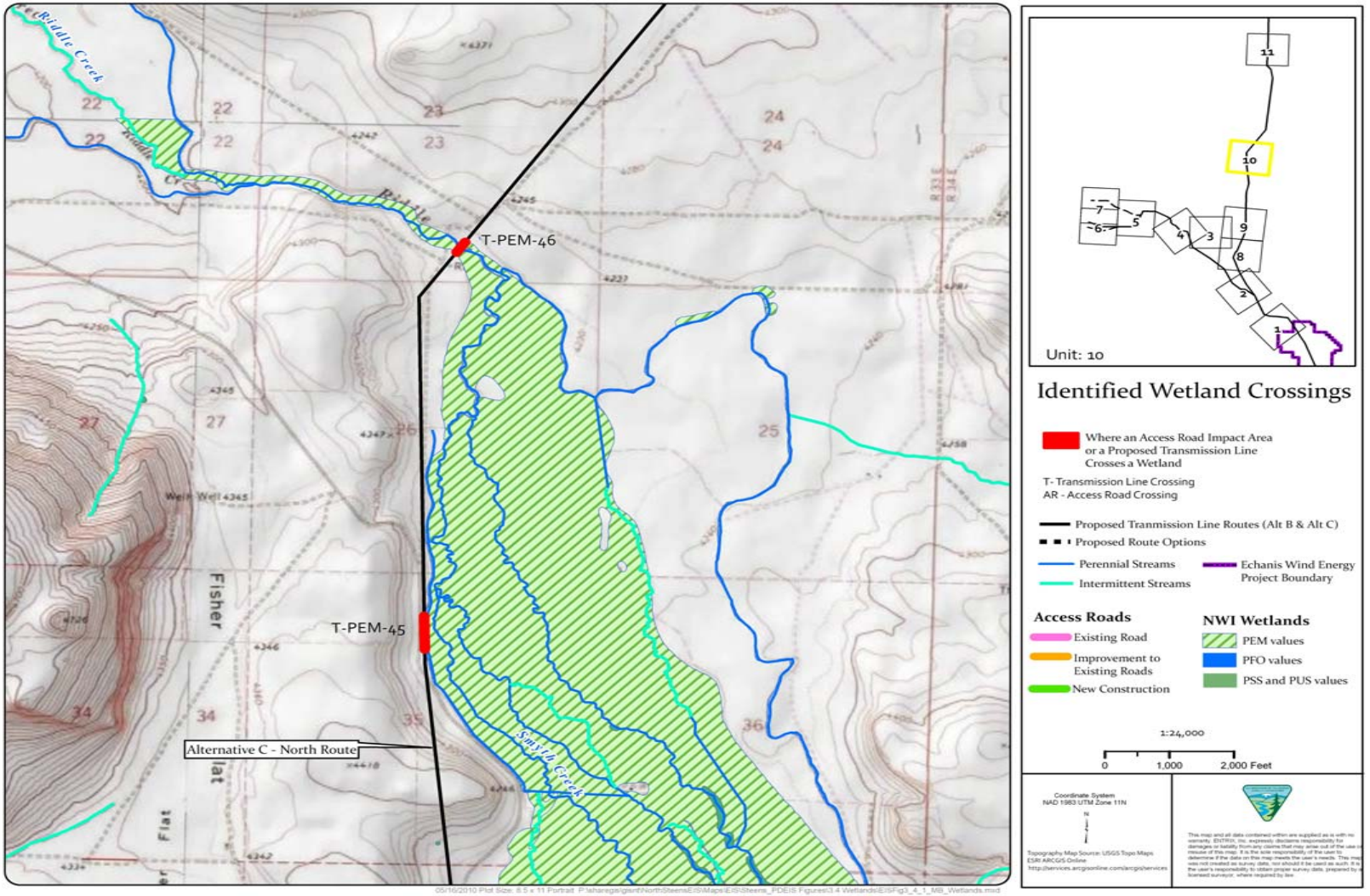

Figure 3.4-1j Unit 10: Wetland Crossings.

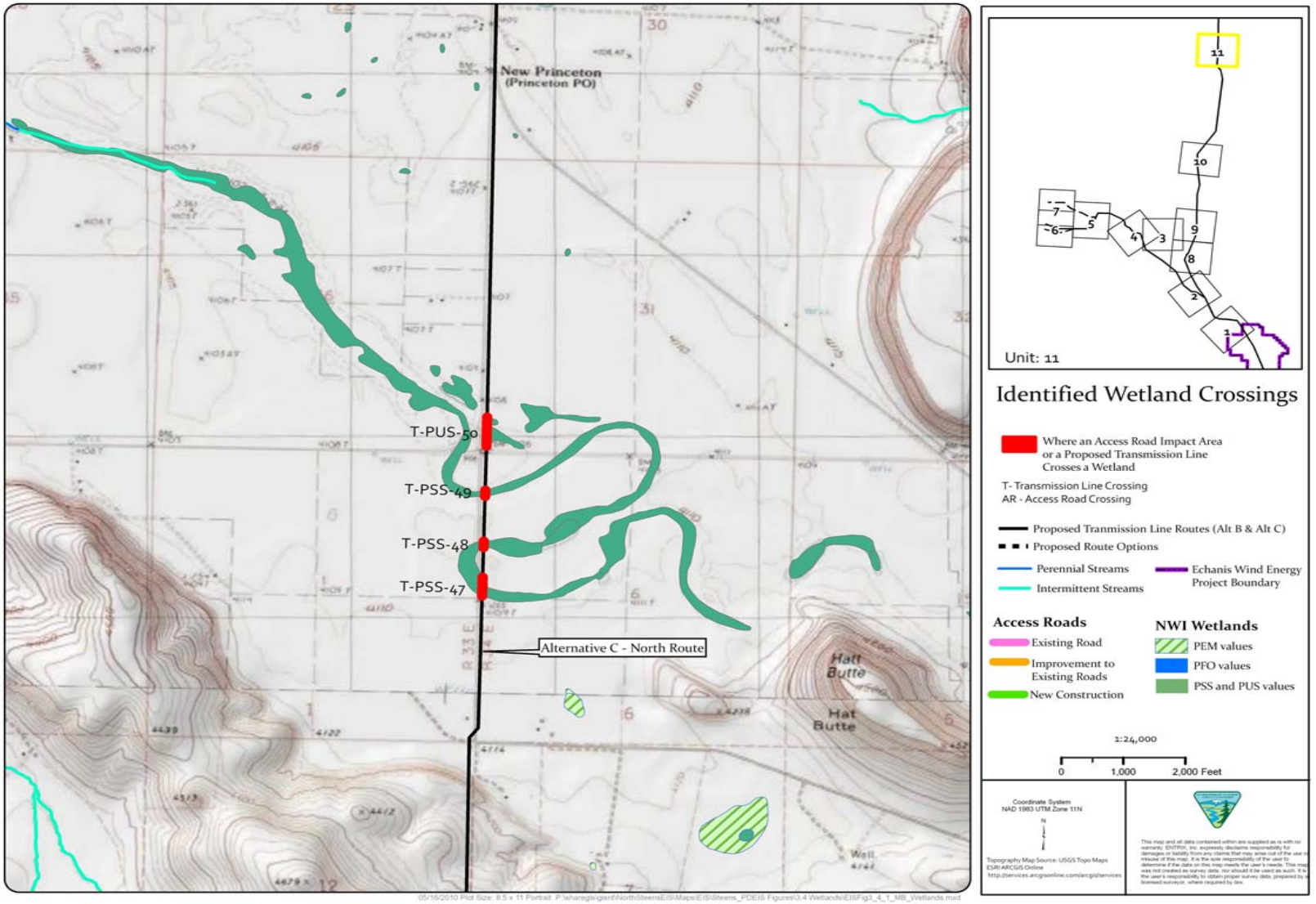

Figure 3.4-1k Unit 11: Wetland Crossings.

Table 3.4-1 Wetland Crossings and Effects Common to All Action Alternatives

Wetland Type	New access roads - effects (acres)	Access road improvement effects (acres)
PEM	1.26	0.65
PSS	0.50	0.03
PUS	0	0
Total	1.76	0.68

New construction for the main access road to the Echanis site would cross riparian areas in nine locations: once over perennial Kiger Creek, three times over perennial Mud Creek, twice over an intermittent tributary to Mud Creek, and three times over an intermittent tributary to Kiger Creek (Table 3.4-2). At the Kiger Creek crossing, a 60-foot long bridge would be constructed to span the creek with footings well outside the channel. The bridge would be placed in an existing break in riparian vegetation to prevent unnecessary woody vegetation removal.

Table 3.4-2 Riparian Areas Crossed by Echanis Wind Farm Access Roads

		Project Components
Water Body	Water Body Types	Access road
Kiger Creek	Perennial Stream	1-PSS; 1-PEM
Mud Creek	Perennial Stream	3-PSS
Booners Creek	Perennial Stream	1-PEM
Tributary to Mud Creek	Intermittent Stream	2-PSS
Tributary 1 to Kiger Creek	Intermittent Stream	3-PSS
Tributary 2 to Kiger Creek	Intermittent Stream	1-PEM
Tributary 3 to Kiger Creek	Intermittent Stream	1-PEM

Numbers indicate number of crossings; - PEM/PSS indicates dominate vegetation types at the crossings

The access road to the Echanis site would parallel Mud Creek for 2.5 miles, an intermittent tributary of Mud Creek for another 1.2 miles, and an unnamed tributary to Kiger Creek in Wildcat Canyon for 0.7 miles. The road bed would be constructed through cut and fill—upslope materials would be removed and placed downslope to build the road bed. The road alignment would be placed as far as possible from the creek. The minimum distance from the creek as allowed by canyon width and the position of creek meanders would range from six feet to greater than 50 feet. Exact locations of the road have not yet been finalized. All construction would be outside of the channel and bed of the stream (Kane, Marl. 2010. Personal communication, January 12). The proposed alignment would be within approximately 75 feet of waterbodies, therefore has the most likelihood of affecting riparian areas, at the following locations:

- Kiger Creek Tributary 1, for approximately 0.7 miles.
- Mud Creek, for 1.9 miles.
- Mud Creek Tributary, for approximately 0.7 miles.

Roads would not be paved with impervious surfaces, but would be cleared and graded. Permanent effects would include reduced interception and infiltration of precipitation. In addition, the grading of roads and

construction of the bridge has the potential to increase erosion near and in stream channels. These potential effects would be minimized by the design practices described in Chapter 2.

Additional access road improvements would occur on roads that currently cross the riparian areas of Kiger Creek, Booners Creek, and two intermittent tributaries to Kiger Creek on existing bridges. The effects of the transmission line are discussed below.

TEMPORARY EFFECTS

While most of the project features common to all action alternatives would be located outside of wetlands and riparian areas, ground disturbance and construction activities could cause temporary effects to nearby wetland and riparian areas. The main access road will parallel waterbodies for a total distance of approximately 3.3 miles and will cross waterbodies 13 times, as discussed above, and may have temporary, construction-related to nearby wetland and riparian areas, including effects of equipment working within and adjacent to these areas. During construction of the main access road and road crossings, BMPs would be followed to minimize erosion and other effects to wetlands and riparian areas. These BMPs are outlined in the Application for Conditional Use Permit for the Echanis Wind Farm (CEP 2007) and in the Erosion and Sediment Control (ESC) Plans for the Echanis Wind Farm Access Road (Westlake Consultants, Inc. 2008), in accordance with the ODEQ National Pollutant Discharge and Elimination System Stormwater Discharge Permit (ODEQ 2005) and pursuant to Oregon Revised Statutes 468B.050 and Section 402 of the Federal Clean Water Act.

Best management practices (as described in Chapter 2) would be implemented during construction to decrease temporary effects of project construction.

MITIGATION

Wherever possible, wetlands were avoided when determining the alignment of the main access road to the Echanis Project site. Specific mitigation measures for the effects related to construction of the main access road will be described in the Compensatory Wetland Mitigation (CWM) Plan in a revised Joint Permit Application that will be submitted to the ACOE and DSL. The objective of the CWM will be to create new PEM and PSS wetland areas at a ratio of 1:1.5 to replace the wetland area lost due to construction of the main access road. The CWM would be designed to create additional high quality emergent wetlands to increase water storage and water delay functions, sediment stabilization, nutrient retention and wildlife habitat functions within the Project area. Mitigation would consist of wetland creation and riparian enhancement planting. The replacement wetlands would be vegetated with emergent and shrub scrub species native to the site. Vegetation would be salvaged from higher quality onsite wetlands.

The CWM plan will propose to create 3.66 acres of wetland to compensate for the 2.44 acres of wetland affected by construction of the access road. Mitigation through wetland creation is expected to directly replace the lost wetland area, and more than compensate for lost wetland functions by maintaining the type and diversity of vegetation, as well as providing an enhanced riparian buffer for portions of the onsite drainage. Vegetation and topsoil in existing higher quality wetlands would be removed with the topsoil intact and re-established in the mitigation area. Where inadequate plants exist in the replaced topsoil additional cuttings would be collected from other portions of the site.

Additional project design features and best management practices (BMPs), as described in Chapter 2, would be implemented on BLM-administered land and recommended to private landowners to minimize the effects on wetlands and riparian areas described above.

3.4.3.3 Alternative B – West Route (Proposed Action)

Construction and operation of Alternative B (including route options) would also have permanent and temporary effects on wetlands and riparian areas.

PERMANENT EFFECTS

Alternative B would extend 28.87 miles from the proposed substation at the Echanis site to the proposed Interconnection Station (ICS) west of Highway 205. The transmission line would span 1.16 miles of wetlands, including five wetland crossings and ten riparian areas associated with four perennial streams and six intermittent streams or canals (Figure 3.4-1 Map Units 2, 4, 5 and 7; Table 3.4-3; Table 3.4-4). Approximately 196 poles would be installed for Alternative B. Where the length of the wetlands spanned is less than 600 feet, pole locations would be selected to avoid riparian areas and wetlands. However, at some locations poles would be placed in wetland areas. A wetland adjacent to Cucamonga Creek is approximately 1,000 feet wide, so one pole would be placed in the wetland at that crossing (Figure 3.4-1; PEM 28, PSS 29). McCoy Creek would be crossed at a location where wetlands are more than 2,000 feet wide, so three poles would be placed in wetlands at that crossing (Figure 3.4-1; PEM 34, PSS 35). One wetland approximately 1,800 feet wide would be crossed at the Donner und Blitzen River valley; however this wetland would be completely spanned by placing transmission line towers in upland areas on either side of the valley (Figure 3.4-1; PEM 38). Where wetlands are affected, installation of each pole would result in permanent loss of 31 square feet of wetland area, totaling 124 square feet for Alternative B, or less than 0.01 acres.

Table 3.4-3 Wetland Crossings and Effects for Alternative B – West Route

Wetland Type	T-line Crossings (miles)	Poles (acres)	Overland Access Roads (acres)	Access Road Construction and Improvement (acres)
PEM	1.13	< 0.01	0.74	0
PSS	0.03	0	0	0
Total	1.16	< 0.01	0.74	0

Table 3.4-4 Riparian Crossings Associated with Alternative B – West Route

		Project Components	
Water Body	Water Body Types	Transmission Lines/ Vegetation Type	Access road**/ Vegetation Type
Cucamonga Creek	Perennial Stream	1/Herbaceous	1/Scrub Shrub
Donner und Blitzen River	Perennial Stream	1/Herbaceous	0
Kiger Creek	Perennial Stream	1/Scrub Shrub	0
McCoy Creek	Perennial Stream	1/Herbaceous	0
Drake Creek	Intermittent Stream	1*/Herbaceous	0
Tributary to Kiger Creek in Wildcat Canyon	Intermittent Stream	1/Herbaceous	0
Grain Camp feeder ditch	Intermittent Ditch/canal	1/Herbaceous	0
Tributary to McCoy Creek	Intermittent Stream	1/Herbaceous	0
Tributary to Donner und Blitzen River	Intermittent Stream	1/Herbaceous	1/Herbaceous
South Swamp Canal	Intermittent Ditch/canal	1/Herbaceous	0

Numbers indicate number of crossings

** Includes only permanent access roads, does not include overland routes (WILL BE ADDED LATER)

New gravel access roads would be constructed and some existing access roads would be widened. New and widened access roads on public lands would include a permanent 40-foot wide ROW to accommodate construction, drainage improvements, snowplowing and maintenance activities. These roads and improvements would not affect wetlands. Overland access roads with no roadbed improvements would also be developed during the construction and operation of Alternative B. Approximately 26.07 miles of 8-foot wide overland access road would be required affecting approximately 0.74 acres of PEM wetlands

Access roads for Alternative B would cross riparian areas associated with one perennial stream (Cucamonga Creek) and one intermittent stream (Tributary to Donner und Blitzen River) permanently displacing riparian area. Overland roads would cross or encroach into riparian areas along Cucamonga Creek (two locations), Kiger Creek, Booners Creek, and McCoy Creek (Table 3.4-4; Figure 3.4-1). In areas where additional woody vegetation would be removed to allow wide construction vehicles to pass, the vegetation would be allowed to return outside of the permanent access road footprint. The long-term effects from access roads may include run-off and associated erosion of road materials into riparian areas associated with heavy rainfall, snowmelt, and maintenance activities. These potential effects would be minimized by implementing the project design features and BMPs described in Chapter 2.

TEMPORARY EFFECTS

Temporary effects may occur during installation of the Alternative B transmission line poles, ICS, new and widened access roads, and other project features, particularly in areas where poles would be placed in wetlands. These effects would be associated with vehicles and equipment accessing areas of construction and surface disturbance in the area around each pole from equipment operation and materials stockpiling. Additionally, one tensioning site would be located in a wetland, and would temporarily affect 0.25 acres. As discussed above, woody vegetation would be removed at some overland road locations to allow wide construction vehicles to pass. At these locations, vegetation removal outside the permanent access road footprint would be temporary; this vegetation would be allowed to return.

Wetlands would also be temporarily affected by the relocation and burial of the HEC distribution line in the area of the Donner und Blitzen River and associated wetlands. The 1.35 mile excavation would be entirely within wetland areas and would cause a total of 2.45 acres of surface disturbance. Low impact construction techniques would be used. The equipment used to bury the line would move along the alignment at a slow pace, digging a narrow (less than two feet wide) trench, inserting the line, and burying it all in one pass. Disturbed areas would be restored to preexisting conditions. Mats would be used if necessary to prevent damage to vegetation from the wheels or tracks of construction equipment.

Where the relocated distribution line would cross the Donner und Blitzen River and the Buena Vista Canal, directional boring methods would be used (Kane, Marl. 2010. Personal communication, January 8). This method involves drilling a pilot hole under the waterbody and banks, then enlarging the hole through successive ream borings. Depending on the angle of approach of the pipeline alignment to the water crossing, a temporary work area may need to be cleared. This method generally reduces effects to the water body banks, bed, riparian areas, and water quality. The distribution line burial also crosses two intermittent water courses: Center Canal and an unnamed stream. These would be crossed by trenching through the water courses when they are dry. If groundwater is encountered and must be pumped out of the trench the BMPs described in Chapter 2 would be applied.

Riparian areas would also be temporarily affected by access road construction at two locations. At the Cucamonga Creek crossing, woody vegetation in the riparian zone would be removed during construction to allow wide construction vehicles to pass. Shrubs and trees would be removed manually, to minimize ground disturbance and damage to adjacent riparian vegetation. The loss of woody riparian vegetation would represent a small decrease in riparian area over the short term (0 to 3 years), but would recover through the long term (3 to 10 years). At the crossing of the Tributary to Donner und Blitzen River crossing, only herbaceous vegetation would be affected, and the area would be replanted after construction is complete.

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a full double-circuit 230-kV transmission line would require a second construction phase at a future date when additional capacity is required on the transmission line. During the second construction phase, wetland and riparian area would experience similar temporary construction related effects as described above, including the disruptive effects due to equipment operation, additional surface disturbance, and vegetation damage.

MITIGATION

Because wetlands would be affected by overland roads, specific mitigation measures would be developed for these effects and would be described in the Project's Compensatory Wetland Mitigation (CWM) Plan submitted with the Project's Joint Permit Application. The goal of the CWM plan for the Alternative B area would be to create 1.11 acres of wetland to compensate for the 0.74 acres of wetland affected by the proposed overland road construction associated with this transmission line alternative. The mitigation would replace the lost area at a ratio of 1:1.5 and would compensate for lost wetland functions by maintaining the type and diversity of vegetation, as well as by providing an enhanced riparian buffer for portions of the onsite drainage. Vegetation and topsoil in existing higher quality wetlands would be removed with the topsoil intact and re-established in the mitigation area. Where inadequate plants exist in the replaced topsoil additional cuttings would be collected from other portions of the site.

Additional project design features and best management practices (BMP's), as described in Chapter 2, would be implemented on BLM-administered land and recommended to private landowners to minimize the effects on wetlands and riparian areas described above.

South Diamond Lane Route Option

PERMANENT EFFECTS

The South Diamond Lane Option would extend 28.26 miles from the Echanis substation to the tie-in with the HEC 115-kV line. The transmission line would cross 1.98 miles of wetlands (Figure 3.4-1) and riparian areas associated with four perennial streams and seven intermittent streams or canals (Table 3.4-5). Where wetlands are less than 600 feet wide, pole locations would be selected to avoid riparian areas and wetlands. A wetland adjacent to Cucamonga Creek is approximately 1,000 feet wide, so one pole would be placed in the wetland at that crossing (Figure 3.4-1; PEM 28, PSS 29. McCoy Creek would be crossed at a location where wetlands are more than 2,000 feet wide, so three poles would be placed in wetlands at that crossing (Figure 3.4-1; PEM 34, PSS 35). One wetland approximately 5,500 feet wide would be crossed at the Donner und Blitzen River valley, and nine poles would be located in this wetland (Figure 3.4-1; PEM 41). Each pole would result in permanent loss of 31 square feet of wetland area, so thirteen poles would cause the loss of a total of 403 square feet or less than 0.01 acres.

New gravel access roads would be constructed and some existing access roads would be widened. New and widened access roads on public lands would include a permanent 40-foot wide ROW to accommodate construction, drainage improvements, snowplowing and maintenance activities. These gravel roads and improvements would not affect wetlands. Approximately 21.68 miles of 8-foot wide overland access road would be required for the South Diamond Lane Route Option affecting approximately 0.74 acres of wetlands.

Roads would not be constructed adjacent to riparian areas; effects to riparian areas would occur only at stream crossings. Riparian areas associated with one perennial stream and one intermittent stream crossing would be permanently displaced by construction of new access roads or improvements to existing roads (Table 3.4-6). In addition, overland roads would cross or encroach into the same riparian areas described for Alternative B – West Route, including areas along Cucamonga Creek (two locations), Kiger Creek, Booners Creek, and McCoy Creek. Transmission lines associated with the South Diamond Lane Route Option would span

riparian areas of perennial streams three times and span riparian areas of intermittent streams or canals six times (Table 3.4-6).

Table 3.4-5 Wetland Crossings and Effects for the South Diamond Lane Route Option

Wetland Type	T-line Crossings (miles)	Poles (acres)	Overland Access Roads (acres)	Access Road Construction and Improvement (acres)
PEM	1.94	< 0.01	0.74	0
PSS	0.04	0	0	0
Total	1.98	< 0.01	0.74	0

Table 3.4-6 Riparian Areas Crossed by the Alternative B – South Diamond Lane Option

		Project Components	
Water Body	Water Body Types	Transmission Lines/ Vegetation Type	Access road**/ Vegetation Type
Cucamonga Creek	Perennial Stream	1/Herbaceous	1/Scrub Shrub
Donner und Blitzen River	Perennial Stream	1/Herbaceous	0
McCoy Creek	Perennial Stream	1/Herbaceous	0
Kiger Creek	Perennial Stream	1/Scrub Shrub	0
Tributary to McCoy Creek	Intermittent Stream	1/Herbaceous	0
Tributary to Donner und Blitzen River	Intermittent Stream	0	1/Herbaceous
Tributary to Center Canal	Intermittent Ditch/canal	1/Herbaceous	0
Buena Vista Canal	Intermittent Ditch/canal	1/Herbaceous	0
Center Canal	Intermittent Ditch/canal	1/Herbaceous	0
South Swamp Canal	Intermittent Ditch/canal	1/Herbaceous	0
Drake Creek	Intermittent Stream	1*/Herbaceous	0
Tributary to Kiger Creek in Wildcat Canyon	Intermittent Stream	1/Herbaceous	0

Numbers indicate number of crossings.

** Includes only permanent access roads, does not include overland routes (WILL BE ADDED LATER)

TEMPORARY EFFECTS

Temporary effects for this option would be the same as discussed for Alternative B – West Route.

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a full double-circuit 230-kV transmission line would require a second construction phase at a future date when additional capacity is required on the transmission line. During the second construction phase, wetland and riparian area would experience similar temporary construction related effects as described above, including the disruptive effects due to equipment operation, additional surface disturbance, and vegetation damage.

MITIGATION

The same mitigation described above for Alternative B would apply to the South Diamond Lane Transmission Line Option.

Hog Wallow Route Option

PERMANENT EFFECTS

The Hog Wallow Route transmission line would cross a total of 29.06 miles of ROW from the Echanis substation to the substation interconnection, including crossing 1.06 miles of wetlands (Figure 3.4-1; Table 3.4-7) and riparian areas associated with four perennial streams and six intermittent streams or canals (Table 3.4-7). Where wetlands are less than 600 feet wide, pole locations would be selected to avoid riparian areas and wetlands. A wetland adjacent to Cucamonga Creek is approximately 1,000 feet wide, so one pole would be placed in the wetland at that crossing (Figure 3.4-1; PEM 28, PSS 29. McCoy Creek would be crossed at a location where wetlands are more than 2,000 feet wide, so three poles would be placed in wetlands at that crossing (Figure 3.4-1; PEM 34, PSS 35). One wetland approximately 1,200 feet wide would be crossed near the Donner und Blitzen River; however, as described for Alternative B - West Route, this wetland would also be completely spanned by placing towers in upland areas on either side of the valley (Figure 3.4-1; PEM 39). Each pole would result in permanent loss of 31 square feet of wetland area, so four poles would cause the loss of 124 square feet or less than 0.01 acres of wetlands within the ROW at these locations. All poles would be placed in PEM wetlands and would avoid effects to PSS wetlands.

Table 3.4-7 Wetland Crossings and Effects for the Hog Wallow Route Option

Wetland Type	T-line Crossings (miles)	Poles (acres)	Overland Access Roads (acres)	Access Road Construction and Improvement (acres)
PEM	1.03	< 0.01	0.74	0
PSS	0.03	0	0	0
PUS	0	0	0	0
Total	1.06	< 0.01	0.74	0

New gravel access roads would be constructed and some existing access roads would be widened. New and widened access roads on public lands would include a permanent 40-foot wide ROW to accommodate construction, drainage improvements, snowplowing and maintenance activities. These gravel roads and improvements would not affect wetlands. Approximately 26.38 miles of 8-foot wide overland access road would be required for the Hog Wallow Route Option affecting approximately 0.74 acres of wetlands.

The transmission line would cross riparian areas associated with four perennial streams and five intermittent streams or canals (Table 3.4-8). From the Echanis substation to the tie-in, approximately 198 towers would be located outside of riparian areas to the degree possible. The pole locations have not yet been identified. The ROW would be cleared of vegetation only as needed and the pole locations would be selected to avoid riparian areas where possible. The pole spans are sufficient to cross all wetland areas.

Approximately 30.64 miles of access roads would be needed for access during construction and for long-term maintenance of the Hog Wallow Route transmission line. Roads would not be constructed adjacent to riparian areas; effects to riparian areas would occur only at stream crossings. Access roads constructed or improved would cross riparian areas associated with one perennial stream and one intermittent stream.

TEMPORARY EFFECTS

Temporary effects for this option would be the same as discussed for Alternative B – West Route.

Table 3.4-8 Number of Riparian Crossings for the Hog Wallow Route Option

		Project Components	
Water Body	Water Body Types	Transmission Lines	Access road**
Cucamonga Creek	Perennial Stream	1/Herbaceous	1/Scrub Shrub
Donner und Blitzen River	Perennial Stream	1/Herbaceous	0
Kiger Creek	Perennial Stream	1/Scrub Shrub	0
McCoy Creek	Perennial Stream	1/Herbaceous	0
Grain Camp feeder ditch	Intermittent Ditch/canal	1/Herbaceous	0
Tributary to McCoy Creek	Intermittent Stream	1/Herbaceous	0
Tributary to Donner und Blitzen River	Intermittent Stream	1/Herbaceous	1/Herbaceous
Drake Creek	Intermittent Stream	1*/Herbaceous	0
Tributary to Kiger Creek in Wildcat Canyon	Intermittent Stream	1/Herbaceous	0

Numbers indicate number of crossings.

** Includes only permanent access roads, does not include overland routes (WILL BE ADDED LATER)

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a full double-circuit 230-kV transmission line would require a second construction phase at a future date when additional capacity is required on the transmission line. During the second construction phase, wetland and riparian area would experience similar temporary construction related effects as described above, including the disruptive effects due to equipment operation, additional surface disturbance, and vegetation damage.

MITIGATION

The same mitigation described above for Alternative B would apply to the South Diamond Lane Transmission Line Option.

115-kV Transmission Line Option

The 115-kV Transmission Line Option would be a reduced capacity design configuration constructed along the same transmission line alignments described above for Alternative B – West Route and the South Diamond Lane and Hog Wallow Route Options. The 115-kV Transmission Line Option would include a single three-phase (i.e. three conductors) 115-kV circuit. The alignment of the transmission line, pole heights and spacing, ROW width, construction methods, interconnection points, and access requirements would be the same as described for Alternative B, and the two route options, described above, except that there would not be the temporary impacts from the phased construction of adding a future circuit.

PERMANENT AND TEMPORARY EFFECTS

Permanent and temporary effects to wetlands and riparian areas from this option would be similar to those presented above for each transmission line action alternative during the first phase of development. The permanent effects of this design option on wetlands and riparian areas would be the same as described for Alternative B, and the South Diamond Lane and Hog Wallow Route Options. However, this option would have lower temporary construction related effects on wetlands and riparian areas because workers and equipment would not be operating near these areas during two separate construction phases, thereby reducing the potential for additional surface disturbance and vegetation damage. Ongoing operations and maintenance activities would be the same as described for Alternative B and the two route options above.

MITIGATION

Mitigation for the same as described for Alternative B and the route options above.

3.4.3.4 Alternative C – North Route

In addition to the permanent and temporary effects on wetlands and riparian areas resulting from construction and operation of the Echanis Project, the various components of Alternative C would also have permanent and temporary effects on wetlands and riparian areas.

PERMANENT EFFECTS

Alternative C would extend 45.95 miles from the proposed substation at the Echanis site to the proposed Interconnection Station near Crane. The transmission line for the Alternative C would cross wetland areas for a total of 0.62 miles (Figure 3.4-1; Table 3.4-9) and riparian areas associated with three perennial stream crossings and five intermittent stream crossings (Table 3.4-10). Additionally, the transmission line would be adjacent to Smyth Creek. The right-of-way may affect Smyth Creek's riparian area three times where Smyth Creek meanders in and out of the transmission line alignment (Table 3.4-10). The pole locations would not be placed in wetland areas, and would be sited to avoid wooded riparian areas where possible.

Table 3.4-9 Wetland Crossings and Effects for Alternative C – North Route

Wetland Type	T-line Crossings (miles)	Poles (acres)	Overland Access Roads (acres)	Access Road Improvement (acres)
PEM	0.33	< 0.01	0.49	0
PSS	0.19	0	0	0
PUS	0.10	0	0	0
Total	0.62	< 0.01	0.49	0

A total of approximately 5.03 miles of existing access roads would be improved during construction and used for long term maintenance. These road improvements are not near wetlands, and no wetland effects are anticipated. No new access roads would be constructed, however, approximately 25.05 miles of overland vehicle access routes would be developed during construction and operation of Alternative C. Overland access roads would affect approximately 0.49 acres of wetland and riparian area.

Roads would not be constructed adjacent to riparian areas. Improved access roads would cross wooded riparian areas associated with one perennial stream (Table 3.4-10). The stream crossing would occur over existing bridges.

TEMPORARY EFFECTS

There would be no temporary effects to wetland resources from construction of Alternative C, because the transmission line poles and supporting permanent access road construction would not occur in wetland areas.

Woody vegetation would be removed during construction by transmission lines at three locations (two at Kiger Creek and one at Swamp). Shrubs and trees would be removed manually, to minimize ground disturbance and damage to adjacent riparian vegetation. The loss of woody riparian vegetation would represent a minimal decrease in wildlife habitat over the short term.

Table 3.4-10 Number of Riparian Crossings for Alternative C – North Route

		Alternative C	
Water Body	Water Body Types	Transmission Lines	Access road**
Kiger Creek	Perennial Stream	2/Scrub Shrub	0
Riddle Creek	Perennial Stream	1/Herbaceous	0
Swamp Creek	Perennial Stream	1/Scrub Shrub	0
Tributary to Kiger Creek (Wildcat Canyon)	Intermittent Stream	1/Herbaceous	0
Tributary to Smyth Creek	Intermittent Ditch/canal	3*/Herbaceous	0
Intermittent stream 1 (adobe flat area)	Intermittent Stream	1/Herbaceous	0
Intermittent stream 2 (adobe flat area)	Intermittent Stream	1/Herbaceous	0
Drake Creek	Intermittent Stream	1*/Herbaceous	0
Tributary to Kiger Creek (Wildcat Canyon)	Intermittent Stream	1/Herbaceous	0

Numbers indicate number of crossings; - PEM/PSS indicates dominate vegetation types at the crossings Crossings marked with an asterisk (*) are areas where the ROW intersects or is adjacent to the riparian area, but does not cross the stream

** Includes only permanent access roads, does not include overland routes (WILL BE ADDED LATER)

MITIGATION

Mitigation for the small amount of wetland affected by overland roads would be developed and described in the Project's Compensatory Wetland Mitigation (CWM) Plan submitted with the Project's Joint Permit Application. The goal of the CWM plan for the Alternative C area would be to create 0.74 acres of wetland to compensate for the 0.49 acres of wetland affected by the proposed overland road construction associated with this transmission line alternative. The mitigation would replace the lost area at a ratio of 1:1.5 would compensate for lost functions by maintaining the type and diversity of vegetation, as well as by providing an enhanced riparian buffer for portions of the onsite drainage. Vegetation and topsoil in existing higher quality wetlands would be removed with the topsoil intact and re-established in the mitigation area. Where inadequate plants exist in the replaced topsoil additional cuttings would be collected from other portions of the site.

Additional project design features and best management practices (BMPs), as described in Chapter 2, would be implemented on BLM-administered land and recommended to private landowners to minimize the effects on wetlands and riparian areas described above.

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a full double-circuit 230-kV transmission line would require a second construction phase at a future date when additional capacity is required on the transmission line. During the second construction phase, wetland and riparian area would experience similar temporary construction related effects as described above, including the disruptive effects due to equipment operation, additional surface disturbance, and vegetation damage.

115-kV Transmission Line Option

The 115-kV Transmission Line Option would be a reduced capacity design configuration constructed along the same transmission line alignments described above for Alternative C – North Route. The 115-kV Transmission Line Option would include a single three-phase (i.e. three conductor) 115-kV circuit. The alignment of the transmission line, pole heights and spacing, ROW width, construction methods,

interconnection points, and access requirements would be the same as described for Alternative C, above, except that there would not be the temporary impacts from the phased construction of adding a future circuit.

PERMANENT AND TEMPORARY EFFECTS

Permanent and temporary effects to wetlands and riparian areas from this option would be similar to those presented above for each transmission line action alternative during the first phase of development. The permanent effects of this design option on wetlands and riparian areas would be the same as described for Alternative C. However, this option would have lower temporary construction related effects on wetlands and riparian areas because workers and equipment would not be operating near these areas during two separate construction phases, thereby reducing the potential for additional surface disturbance and vegetation damage. Ongoing operations and maintenance activities would be the same as described for Alternative C, above.

MITIGATION

Mitigation for the 115-kV Transmission Line Option would be the same as described for Alternative C, above.

3.4.3.5 Residual Effects after Mitigation

Residual effects related to the proposed action that would occur during construction include vegetation degradation and disturbance to wetland buffer vegetation and soil. Residual effects that would last at least as long as the life of the project (an expected 40 years) and would include wetland fill and floodplain encroachment.

3.4.3.6 Summary Comparison of Alternatives

The loss of wetlands from development of the Echanis wind development, primary access road, and each alternative is compared in Table 3.4-11. The table includes the effect to wetland areas along the primary access road to Echanis in addition to wetland effects from each alternative. Total wetland effects in the table are the sum of effects from new and improved access roads and overland roads. Table 3.4-12 provides a comparison of the number of riparian crossings, as well as the extent of the ROW that would be within 75 feet of streams, that would be needed for each action alternative. Table 3.1-13 presents a summary of the effects of each alternative on both wetlands and riparian areas.

Table 3.4-11 Comparison of Effects – Wetlands

			Crossings and Effects							
	Alternative A – No Action	Echanis Wind Energy Project	Alternative B		How Wallow		Diamond Lane		Alternative C	
Wetland Type		Access roads (acres)	T-line crossing (miles)	Access roads (acres	T-line crossing (miles)	Access roads (acres)	T-line crossing (miles)	Access roads (acres)	T-line crossing (miles)	Access roads (acres)
PEM	-	1.19	1.13	1.46	1.03	1.46	1.94	1.46	0.33	1.21
PSS	-	0.53	0.03	0.53	0.03	0	0.03	0	0.19	0
PUS	-		0	0	0	0	0	0	0.10	0

Table 3.4-12 Comparison of Effects – Riparian Crossings

Riparian Vegetation-Waterbody type	Alternative A – No Action	Echanis Wind Energy Project	Crossing and Effects							
			Alternative B		Hog Wallow		Diamond Lane		Alternative C	
		Access roads	T-line crossing	Access roads	T-line crossing	Access roads	T-line crossing	Access roads	T-line crossing	Access roads
ROW riparian area intersection (number of locations)										
Herbaceous-Perennial	-	2	3	0	3	0	3	0	1	0
Scrub Shrub-Perennial	-	4	1	1	1	1	1	1	3	0
Herbaceous-Intermittent	-	2	6	1	5	1	6	1	8	0
Scrub Shrub-Intermittent	-	4	0	0	0	0	0	0	0	0
Additional ROW adjacency (miles)										
Herbaceous or Scrub Shrub-Perennial	-	3.3 miles	0	0	0	0	0	0	0	0

Table 3.4-13 Summary of Effects – Wetland and Riparian Areas

		Alternative B			
Alternative A No Action	Echanis Wind Energy Project	West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	Alternative C North Route
Under the No Action Alternative, no new transmission lines, substations, interconnection stations, or related wind energy facilities would be constructed and new or improved access roads would not be needed. The Echanis Project site would remain undeveloped and would continue to be used for livestock grazing and the existing HEC distribution line located along South Diamond Lane would remain above ground. Wetlands and riparian areas would continue to be affected by current uses.	The main access road to the Echanis site would affect 1.91 acres of PEM wetlands and 0.53 acres of PSS wetlands for a total wetland impact of 2.44 acres. Main access road to the Echanis site would cross riparian areas in nine locations, including Kiger Creek (once by bridge), Mud Creek (3 times), an intermittent tributary to Mud Creek (2 times), and an intermittent tributary to Kiger Creek (3 times). Main access road to the Echanis site would parallel streams, therefore affect riparian areas of Kiger Creek tributary 1 (0.7 miles), Mud Creek (1.9 miles) and Mud Creek Tributary (0.7 miles). Temporary effects could include sedimentation and vegetation damage in wetlands and riparian areas adjacent to areas of construction.	Transmission line would span 1.16 miles of wetland area, including five wetland crossings and ten riparian areas associated with four perennial streams and six intermittent streams or canals. Six poles would be placed in wetland areas resulting in permanent loss of 186 square feet or less than 0.01 acres. Overland access roads would affect 0.74 acres of PEM wetlands, possibly requiring removal of woody vegetation. Permanent access roads would cross riparian areas associated with one perennial stream (Cucamonga Creek) and one intermittent stream (Tributary to Donner und Blitzen River). Temporary effects would include surface disturbance and vegetation damage from vehicles and equipment accessing pole locations, including one tensioning site that would temporarily affect 0.25 acres of wetland. Relocation and burial of the HEC distribution line would temporarily affect 2.45 acres of wetlands and potentially affect riparian areas at two intermittent waterbodies. Access road construction would temporarily remove woody vegetation at the crossing of Cucamonga Creek, and herbaceous vegetation at the crossing of the Tributary to the Donner und Blitzen River.	Transmission line would span 1.98 miles of wetlands, including riparian areas associated with four perennial streams and seven intermittent streams or canals. Thirteen poles would be placed in wetland areas resulting in permanent loss of 403 square feet or less than 0.01 acres. Overland access roads would affect 0.74 acres of PEM wetlands, possibly requiring removal of woody vegetation. Permanent access roads would cross the same riparian areas as described for Alternative B. Temporary effects from vehicles and equipment accessing pole locations and tensioning sites, the relocation and burial of the HEC distribution line, and access road construction would be the same as described for Alternative B.	Transmission line would span 1.06 miles of wetlands, including riparian areas associated with four perennial streams and six intermittent streams or canals. Five poles would be placed in wetland areas resulting in permanent loss of 155 square feet or less than 0.01 acres. Overland access roads would affect 0.74 acres of PEM wetlands, possibly requiring removal of woody vegetation. Permanent access roads would cross the same riparian areas as described for Alternative B. Temporary effects from vehicles and equipment accessing pole locations and tensioning sites, the relocation and burial of the HEC distribution line, and access road construction would be the same as described for Alternative B.	Transmission line would span 0.62 miles of wetland area, including riparian areas associated with three perennial streams and six intermittent streams. Overland access roads would affect 0.49 acres of PEM wetlands, possibly requiring removal of woody vegetation. Permanent access roads would cross a riparian area associated with one perennial stream, crossing the stream on an existing bridge. Temporary effects would include removal of woody riparian vegetation at three transmission line crossing locations (two on Kiger Creek and one on Swamp Creek) during construction.

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