3.6 WETLANDS AND RIPARIAN VEGETATION

3.6.1 Affected Environment

The following sections discuss wetlands and then riparian areas. These sections provide a general overview and a brief discussion of applicable regulations, wetland and riparian area functions, and wetlands and riparian areas within the project area. The project area, for the purposes of this discussion, includes a one-mile area around each of the alternative transmission corridors, with a slightly larger area included along the southern portions of the Valley Floor and Pateros/Twisp routes to include potential access issues associated with the Pateros/Twisp route (Figure 3.1-1). The towns of Twisp and Okanogan were excluded from the project area. A detailed evaluation is made of wetlands and riparian areas located within a 200-foot wide corridor centered on the proposed transmission corridors and associated access roads, as well as the proposed substation site located in the Gold Creek area.

Comments made during public scoping for this project identified the following issues with respect to wetlands and riparian areas:

- Access road and substation construction associated with the proposed Gold Creek Substation site could affect wetlands, springs, and a seasonal creek. The substation was moved to avoid the area in question. The current proposed substation location is addressed with other proposed actions.
- The proposed alternatives have the potential to affect wetlands and riparian areas.

During the scoping process, a request was made to identify and map all wetland and riparian areas along the alternative transmission corridors and evaluate the potential effects of the alternatives on these areas. Section 3.6.2, Environmental Effects, discusses these potential effects.

3.6.1.1 Wetlands

Overview

Wetlands may be defined as "those areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (Environmental Laboratory, 1987). Wetlands are ecologically important because of their beneficial effect on water quality, moderation of flow regimes by retaining and gradually releasing water, and value as wildlife habitat and areas of botanical diversity.

A wetland is an ecosystem that relies on either constant or recurring saturation of the soil to create unique physical, chemical, and biological conditions. Three major features characterize these conditions: 1) presence of water in the soil; 2) physical and chemical features of the soil; and 3) vegetation (Commission of Geoscience, Environment and Resources, 1995). The U.S. Army Corps of Engineers (Corps) Wetland Delineation Manual (Environmental Laboratory, 1987), and the Washington State Wetlands Identification and Delineation Manual (Ecology, 1997) both define wetlands as areas where vegetation, soils, and hydrology combined determine wetland conditions. Specifically, wetlands are areas that: 1) have a predominance of hydric soils; 2) are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and 3) under normal circumstances support a prevalence of this vegetation.

Regulation

For Federal regulatory purposes, wetlands are considered a subclass of Special Aquatic Sites (40 CFR Section 230.3) and have been deemed waters of the United States (33 CFR 328.3). All waters of the United States are subject to regulation through the Clean Water Act by the Corps and the U.S. Environmental Protection Agency (EPA). Sections 404 and 401 of the Clean Water Act were

created specifically with the intent "to restore and maintain the chemical, physical, and biological integrity of our Nation's waters." This mandate includes no net loss of wetlands.

Section 404 (regulation of discharge of dredge/fill materials into waters of the United States, including wetlands) is implemented by the Corps and enforced by EPA and the Corps. The construction of utility lines that directly affect wetlands, through the placement of utility structures, for example, would be addressed under Nationwide Permit No. 12 if the project falls within the requirements and conditions of that permit, including regional conditions. Otherwise, an individual permit is typically required. For this project, there is no planned work in wetlands and no need for a 404 permit under any of the alternatives.

In Washington State, Ecology implements Section 401, regulating impacts to water quality caused by discharge of dredge/fill materials into wetlands. Projects requiring a Federal wetland permit require Water Quality Certification from Ecology. Activities in wetlands in Okanogan County are also regulated through the Okanogan County critical areas regulations.

On Federally owned land, Executive Order 11990, directs Federal agencies "to avoid ... adverse impacts associated with the destruction or modification of wetlands ... wherever there is a practicable alternative." It establishes a sequencing policy of avoidance, minimization, and possible mitigation. Federally owned lands also fall under the jurisdiction of the policies of the Federal agency that manages the land. Actions on National Forest System (NFS) lands are currently governed by the 1989 Okanogan National Forest Land and Resource Management Plan. This plan was amended for the project area in 1995 by the Record of Decision for Amendments to Forest Service and Bureau of Land Management (BLM) Planning Documents within the Range of the Northern Spotted Owl (Northwest Forest Plan), and by the Decision Notice for the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon, Washington, Idaho, and portions of California (PACFISH). Although the analysis area includes a small portion of the Northwest Forest Plan, no project-related activities are proposed in that area[1]. PACFISH applies to Forest Service and BLM land and was created to maintain Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCAs). RHCAs are areas where management activities are subject of specific standards and guidelines. For wetlands greater than 1 acre, the RHCA is the wetland plus the height of one site potential tree or 150 feet (whichever is greatest). For wetlands less than 1 acre, the RHCA is the wetland plus the height of one-half site potential tree or 50 feet (whichever is greatest). (See Section 3.7.) Actions on BLM lands are managed under the Spokane Resource Management Plan (BLM, 1985) and Amendments and PACFISH.

Wetland Functions

Wetlands perform significant functions in a watershed. Functions are processes that occur in wetlands and are generally of value to humanity. Functions attributed to wetlands fall into three broad categories: hydrologic, biogeochemical, and habitat (Mitsch and Gosselink, 1993). These broad categories of wetland functions may be described as follows:

- *Hydrologic functions* include timing and duration of discharge of water to downstream systems, low-flow augmentation and flood-peak attenuation, surface and subsurface water storage, water dissipation through transpiration, and sediment retention. The benefits of these functions include stabilization of stream flow, floodwater attenuation, and improved water quality.
- *Biogeochemical functions* include organic carbon production and export, cycling of elements and compounds, and maintenance of soil conditions that support diverse plant communities. Biogeochemical functions include the maintenance of water quality. The benefits of these

[1] This project is exempt from Regional Forester Amendment #2 (See Chapter 1, Purpose and Need, for further detail.)

functions include food chain support, toxicant and nutrient recycling, natural waste treatment, and substrate for habitat diversity.

- *Habitat functions* include interspersion and connectivity of habitat types and maintenance of vegetative community composition. The benefits of these functions include essential habitat for amphibians and aquatic invertebrates, utilization for nesting and feeding by a diversity of birds and mammals, food web support, human aesthetic enjoyment, and connectivity for wildlife movement and refugia during environmental fluctuations.

Past and Present Activities

In the past, many human activities have affected wetlands. Grazing, agriculture, timber harvest, and development, including construction of roads and buildings, have likely altered wetland areas and functions. Grazing has occurred in the area of analysis on private, state, and Federal lands. The areas most affected by grazing are the non-forested areas of the project area with water available (Pateros/Twisp corridor, lower elevation areas of Loup Loup and portions of the Methow Valley). Agriculture has occurred in the Methow Valley floor, parts of the Pateros/Twisp corridor, and lower elevation portions of Loup Loup corridor. Agriculture can directly convert wetlands to uplands and, indirectly, increase nutrients and pesticides in surface and groundwater and reduce water available to wetlands and streams through diversion (Hruby et al., 2004). Agriculture can also, through irrigation run off, create wetlands.

Past logging has primarily occurred in the central Loup Loup corridor with a few logging events in the northern portion of the Pateros/Twisp corridor. While construction of logging roads can create permanent fill or change hydrology of wetlands, the effects of tree removal can decrease over time as replacement trees mature. Current practices in the National Forest protect wetlands and riparian areas from effects due to timber practices. Current practices in areas regulated by the state generally limit the construction of roads to upland unless there is no other practicable choice. Standards of road building have incorporated methods that generally minimize the changes to hydrology due to road building.

Development can fill wetlands, modify hydrology with impervious surfaces or permanently changing vegetation, and contribute sediments, nutrients, and toxics to wetlands. It is not known how many wetlands in the project area have been affected by development, but it is generally thought that relative density of roads is a measure of the overall affect of development on wetlands (Hruby et al., 2004). Past development, including construction of roads and buildings, has been most dense in the Methow River Valley floor and the Okanogan area, and has expanded to include areas further from the large rivers. While no structures are in wetlands, the Loup Loup corridor cleared for the existing powerline crosses wetlands, as do existing maintenance access roads.

Wetlands in the Project Area

The National Wetlands Inventory (NWI) has developed maps of wetlands nationwide based primarily on interpretation of aerial photographs. Identifying wetlands from aerial photographs typically underestimates forested wetlands because the canopy of trees often obscures them. A summary of NWI wetlands identified within the project area is presented in Table 3.6-1.

Based primarily on vegetation, NWI wetland systems in the project area are broadly classified as Riverine, Lacustrine, or Palustrine, according to Cowardin et al. (1979). The Riverine System includes wetlands not dominated by trees, shrubs, or persistent emergents that are contained within a river channel. The Lacustrine System includes wetlands with less than 30 percent coverage of trees, shrubs, or persistent emergents that extend for over 20 acres or occur in basins that include water deeper than 6.6 feet. The Palustrine System includes wetlands dominated by trees, shrubs, and persistent emergent plants associated with water bodies that cover less than 20 acres or with water less than 6.6 feet deep.

Table 3.6-1. Summary of NWI Wetlands Identified within the Project Area[1/]

Wetland Type	Acres
Lacustrine Open Water	218
Palustrine Open Water	27
Riverine Open Water	949
Lacustrine Unconsolidated Bottom	2
Lacustrine Unconsolidated Shore	33
Palustrine Aquatic Bed	14
Palustrine Emergent	278
Palustrine Forested	204
Palustrine Scrub-Shrub	127
Palustrine Unconsolidated Shore	4
Riverine Unconsolidated Shore	65
Riverine Unconsolidated Bottom	192
Total	**2,114**

1/ The project area is defined for the purposes of analysis as a one-mile area around each of the alternative transmission corridors (see Figure 3.1-1).
Source: National Wetlands Inventory, U.S. Fish and Wildlife Service.

Vegetation and wetland surveys were conducted along the alternative transmission corridors during the 2004 field season. Wetlands that could potentially be affected by construction and operation activities under one or more of the proposed alternatives were identified and evaluated. Identified wetlands were rated according to the Washington State Rating System for Eastern Washington (Hruby, 2004). The rating system categorizes wetlands based on their sensitivity to disturbance, their significance, their rarity, the ability to replace them, and the functions they provide.

Wetlands observed along the alternative transmission corridors and the existing valley floor distribution line are summarized by category in Table 3.6-2.

3.6.1.2 Riparian Vegetation

Overview

Riparian areas are less specifically defined than wetlands. A riparian area is broadly defined as a zone of mutual influence between a stream and the adjacent vegetation. The terms riparian habitat, riparian area, riparian ecosystem, and riparian corridor may be used interchangeably to describe the areas adjacent to streams. The Washington State Department of Fish and Wildlife (WDFW) uses the following structural and functional definition of riparian habitat areas based on the riparian influence on fish and wildlife:

> "A riparian habitat area is defined as the area adjacent to aquatic systems with flowing water (e.g., rivers, perennial or intermittent streams, seeps, springs) that contains elements of both aquatic and terrestrial ecosystems, which mutually influence each other" (Knutson and Naef, 1997).

Riparian areas typically extend upward from the ordinary high water line of a stream and away from the stream for a specified distance, depending on the criteria that are applied. One measure of the width of a riparian area is the distance of the height of a site potential tree, based on the rationale that any tree capable of falling into a stream would potentially have a direct effect on the characteristics of the stream. A site potential tree may be generally defined as a tree that has attained the average maximum height possible given the site conditions where it occurs. A riparian area may also be defined to include the entire floodplain of a stream and adjacent wetlands in their entirety. These areas also affect the quality of stream habitat and may both exceed the height of a site potential tree. For the purpose of this analysis, the site potential tree (or wider if it appeared that the vegetation is noticeably

Table 3.6-2. Number and Acres of Wetlands Surveyed in the Alternative Transmission Corridors

Wetland Category [2/]	Transmission Corridors (number of wetlands /acres within corridor)			
	Loup Loup	Pateros /Twisp	Valley Floor [1/]	Existing Valley Floor Distribution [1/]
I	1 / 1.60	-	2 / 0.25	6 / 0.90
II	2 / 1.75	1 / 0.20	-	-
III	3 / 0.29	4 / 0.59	-	-
IV	3 / 0.30	-	-	-

1/ Wetlands along the existing and proposed Valley Floor corridors are adjacent to the Methow River and part of the riparian area.
2/ Wetland categories are determined based on a point system published by the Washington State Department of Ecology. Category I wetlands are those that: 1) represent a unique or rare wetland type; 2) are more sensitive to disturbance than most wetlands; 3) are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or 4) provide a high level of functions. Category II wetlands are difficult, though not impossible, to replace, and provide high levels of some functions. Category III wetlands are 1) vernal pools that are isolated, and 2) wetlands with a moderate level of functions. Category IV wetlands have the lowest levels of functions and are often heavily disturbed.
Sources: Hruby, 2004; Tetra Tech, 2004c.

different from the surrounding areas) was used to determine the width of the analysis area for riparian vegetation. This would be the area that would affect large woody debris in the streams, stream temperature, and bank erosion. Water quality and fish and wildlife habitat effects in the riparian areas are addressed in Sections 3.3, 3.7, and 3.8, respectively.

Regulation

Like wetlands, streams fall under the Clean Water Act (33 CFR as amended), which was created specifically with the intent "to restore and maintain the chemical, physical, and biological integrity of our Nation's waters." Activities in areas adjacent to streams are regulated primarily based on their potential influence to streams and habitat. State and local agencies have established buffer areas for different types of streams in which activities are regulated. Riparian area buffers are designed to maintain riparian functions and protect water quality and aquatic habitat. Actions on NFS lands are currently governed by the 1989 Okanogan National Forest Land and Resource Management Plan (BLM, 1985) and PACFISH. Actions on BLM lands are managed under the Spokane Resource Management Plan and Amendments and PACFISH (see Section 3.7). PACFISH regulates actions on Federal land and establishes RMOs to avoid adverse impacts to listed fish. RMOs include objectives to maintain healthy, functioning riparian areas including guidance for pool frequency, large woody debris, adequate thermal regulation, bank stability, bank angle, and width/depth ratio. See Section 3.7 (Fisheries) for further discussion of adverse impacts to fish and RMOs. PACFISH also regulates RHCAs where management activities are subject to specific standards. The RHCAs for streams described in the Fisheries section (Section 3.7) are:

- Fish-bearing streams receive a 300-foot (slope distance) or the height of two site potential trees (whichever is greatest) RHCA on both sides of the stream.
- Permanently flowing non-fish bearing streams receive a 150-foot or the height of one site potential tree (whichever is greatest) RHCA on both sides of the stream.
- Seasonal or intermittent streams receive 100-foot or the height of one site potential tree (whichever is greatest) RHCAs in Key Watersheds and 50-foot or the height of one-half site potential tree (whichever is greatest) RHCAs in Non-Key Watersheds (USDA Forest Service and BLM, 1994).

Activities in riparian areas that may affect stream habitat are also regulated by NOAA Fisheries or the U.S. Fish and Wildlife Service if the activities may affect species listed under the Federal Endangered Species Act (see Section 3.7).

Functions

Like wetlands, riparian environments are critical linkages and transition zones between upland and aquatic environments. The riparian zone serves a variety of ecosystem functions, including wildlife habitat, contribution to fish habitat, areas of botanical diversity, floodwater attenuation, and contributions to water quality. In land used for livestock grazing, riparian areas may provide high quality forage for livestock. At the same time, riparian areas are vulnerable to inappropriate grazing practices (Crawford, 2003). Riparian areas also filter sediments, provide nutrients, provide large wood to streams, and help maintain channel flow by storing water for low flow periods.

Past and Present Activities

In the past, many human activities have affected riparian vegetation. Streams in the project area have been affected by diversions of water, dams, dikes, and development, including roads that have altered natural hydrologic functions. Grazing, agriculture, timber harvest, and development, including construction of roads and buildings, have altered riparian vegetation. The recent Allotment Management Program signed for managing grazing on Forest Service land is designed to reduce the affects of grazing on upland and riparian vegetation. Grazing was eliminated in the Loup Loup corridor in the project area, protecting riparian vegetation in that area. Current National Forest Practices and state regulations for privately owned land limit harvest adjacent to streams to avoid degrading riparian vegetation.

In the project area, conversion of Methow River riparian areas to residential and agricultural uses has resulted in the loss of side channels and riparian vegetation. County roads and state highways parallel both sides of the Methow River throughout the project area (Northwest Power and Conservation Council, 2004). The Okanogan River in the Loup Loup corridor is similar. There have also been private and public efforts to improve riparian conditions. Organizations such as the Methow Conservancy and others have planted riparian vegetation and purchased development easements along streams to improve riparian conditions.

Riparian Vegetation in the Project Area

The riparian vegetation in the Pateros/Twisp corridor has largely not been directly affected by development and a few streams show evidence of cattle use in grazing areas. Forested riparian vegetation has been removed from the existing ROWs for safety of the existing lines in the Loup Loup corridor and Methow River Valley corridor.

The riparian vegetation in the project area is characterized by black cottonwood and quaking aspen, with a rich assemblage of shrubs, including rose species, red osier dogwood, and choke cherry. Vegetation and wetland surveys were conducted along the alternative transmission corridors during the 2004 field season. Streams that could potentially be affected by proposed project activities were identified and characterized. A total of 117 crossings of riparian areas were documented. Data were collected for riparian areas associated with perennial streams, irrigation channels, runoff ditches, and intermittent streams. The riparian areas observed along the alternative transmission corridors and the existing valley floor distribution line are summarized in Table 3.6-3.

3.6.2 Environmental Effects

This section assesses the potential effects of the Methow Transmission Project on wetlands and riparian vegetation. The discussion is divided into four sections. The first section discusses the indicators and significance criteria used to assess the potential effects of the alternatives. The following two sections assess the direct and indirect effects of the alternatives on wetlands and riparian vegetation, respectively. The fourth section discusses the cumulative wetland and riparian area effects associated with the alternatives.

Table 3.6-3. Summary of Riparian Area Crossings in Surveyed Project Corridors

Stream	Existing Loup Loup Transmission Corridor	Proposed Pateros/Twisp Transmission Corridor[1/]	Proposed Valley Floor Transmission Corridor[2/]	Existing Valley Floor Distribution Line
Methow River	0	1	9	23
Okanogan River	1	0	0	0
Perennial Stream	15	4	5	5
Intermittent Stream	13	19	6	7
Irrigation Channel or Runoff	4	3	1	1

1/ Including crossing to the Gold Creek Substation.
2/ All crossings would occur at existing Valley Floor distribution line crossings.
Source: Compilation of data from 2004 field surveys.

3.6.2.1 Evaluation Criteria

Evaluation of the effects of the alternatives involves comparing effects to wetlands and riparian vegetation among the alternatives and evaluating the significance of the potential effects for each alternative. The criteria used to evaluate the effects of the proposed alternatives on wetlands and riparian vegetation are as follows:

- Wetlands: Number, surface area, and category of wetlands crossed by the proposed alternatives and affected by proposed activities.
- Riparian Vegetation: Number of riparian crossings by type of stream (major rivers, perennial and intermittent streams, and irrigation ditches) and number of crossings affected by proposed activities.

The significance of the potential effects to wetlands is based on the following scale:

- Significant effects would occur if the proposed project permanently filled a wetland or altered wetland hydrology, vegetation, or soils in such a way as to permanently reduce the functioning of the wetland.
- Moderate effects would occur if the project degraded a wetland function and recovery required restoration and monitoring.
- Low effects would occur if there were short-term changes in vegetation, soils, or a short-term disturbance of wetland functions.

The significance of the potential effects to riparian vegetation is based on a similar scale:

- Significant effects would occur if vegetation or soils are permanently altered and activities permanently reduce the functioning of the riparian area (e.g., removing trees that provide shading or large woody debris (LWD), where removal affects a relatively large portion of trees or area of stream while also considering the current conditions of the stream). On Forest Service and BLM land this includes adversely affecting the riparian areas and retarding the ability to attain RMOs.
- Moderate effects would occur if an alternative resulted in a loss of riparian function and recovery required restoration and monitoring. On Forest Service and BLM land this includes restoration and monitoring to maintain riparian functioning as measured by RMOs.
- Low effects would occur from short-term changes in vegetation or short-term disturbance of riparian functions such as the effect of crossing a dry intermittent stream during construction. On

Forest Service and BLM land, this includes maintaining riparian functioning as measured by RMOs.

3.6.2.2 Wetlands

The number, acres, and categories of wetlands located in the ROWs associated with the proposed alternatives are summarized in Table 3.6-4. The majority of these wetlands would not be affected by the proposed alternatives. Table 3.6-4 also identifies the number of existing roads that cross wetlands and would require modification, structures that are close to wetlands and would be replaced, and new roads to be constructed adjacent to wetlands, by alternative.

Table 3.6-4. Wetlands Potentially Affected by Proposed Actions, by Alternative[1/]

Alternative	Category of Wetland	Wetlands in ROW (number)	Wetlands in ROW (acres)	Existing Roads Needing Improvements in Wetland(s) (feet)	Structures within 50 feet of Wetlands to be Replaced (number)	New Road Adjacent to Wetland (feet)
2	II	1	0.020	-	-	130
	III	4	0.59	-	-	-
3	I	2	1.75	-	-	-
4	I	7	2.50	-	-	-
	II	2	1.75	-	2	-
	III	3	0.29	60	1	-
	IV	4	0.30	50	1	-
5	I	1	1.60	-	-	-
	II	2	1.75	-	2	-
	III	5	0.49	60	1	-
	IV	4	0.30	50	1	-
6	I	7	2.50	-	-	-
	II	2	1.75	-	2	-
	III	3	0.29	60	1	-
	IV	4	0.30	50	1	-
7	I	7	2.50	-	-	-
	II	2	1.75	-	2	-
	III	3	0.29	60	1	-
	IV	4	0.30	50	1	-

Note:
1/ This table summarizes all wetlands in the ROWs where there are proposed activities, including wetlands that would be avoided and not affected by the proposed activities.
Source: Tetra Tech, 2004c.

Indirect effects of development to wetlands in the general area of proposed activities could include a change in the rate of transpiration in the area close to a wetland due to vegetation removal, alteration of water flow through increases in impervious surfaces, or changes to the soil's ability to hold water (by compaction). These indirect effects could reduce the time that water resides in wetlands or streams in a watershed and leads to greater flooding and more dry spells in streams (Hruby et al., 2004). The magnitude of the effects of construction related activities depends, in part, on the intensity, location, and duration of the activities relative to wetlands. The proposed transmission lines are not a high-density development activity (low vegetation does not requiring removal, and there are few areas with tree removal). The indirect effects associated with the proposed alternatives would not be significant because they would not permanently fill or alter wetlands or their functioning in the general area.

Alternative 1

There would be no new construction under Alternative 1 and, therefore, no project-related impacts to wetlands. Routine maintenance activities would continue under this alternative. There are no existing structures in wetlands, but maintenance activities would include continued use of roads in wetlands

Alternative 2

Five wetlands (approximately 0.61 acre) are located within the ROW associated with Alternative 2 (Table 3.6-4). The proposed transmission line would span all five of these wetlands and no construction activities would occur in the wetlands. A new track road (not requiring grading or clearing) would, however, extend for approximately 110 feet between two wetlands that are likely hydrologically connected. One of the wetlands (approximately 0.5 acres) is in the proposed ROW and about 40 feet uphill from the second (approximately one acre and 20 feet outside the ROW). Ongoing use of the road for maintenance could compact the soil, affecting subsurface movement of water and increasing sedimentation. WDNR rated this area as medium risk for moist soil compaction potential (See Section, 3.3, Soils, Table 3.3.2). Because effects of compression over time could be significant, this track road would be used for construction activities only and not for subsequent maintenance activities. Mats would be used to minimize compression and sediment controls would be used to minimize potential sediment entry to the wetland (See Appendix E for the Erosion and Sediment Control Plan). As a result, construction activities and use of this track road are expected to have low effects to the wetlands.

Alternative 3

Two Class I wetlands (approximately 1.75 acres) located adjacent to the Methow River are within the proposed ROW for Alternative 3 (Table 3.6-4). The proposed transmission line would span both of these wetlands along with the river and no construction activities would occur in the wetlands. As a result, there would be no effects to these wetlands under this alternative.

Alternative 4

There are 16 wetlands (approximately 4.8 acres) located within the proposed ROW for Alternative 4 (Table 3.6-4). Ten of these wetlands are within the existing Loup Loup ROW. The remaining six are located within the ROW for the existing distribution circuits that follow the valley floor. The proposed transmission line would span all of these wetlands and no construction activities would occur in these wetlands. Three existing roads in the Loup Loup corridor that cross wetlands for approximately 110 feet in shrub-steppe habitat would require bladework for improvement (Table 3.6-4). These roads are used for maintenance of the existing transmission line and would continue to be used for that same purpose after construction activities are completed. With the use of erosion and sediment controls (Appendix E), project-related effects would be temporary and are considered low.

There are also four existing structures adjacent to wetlands (within 50 feet) in the Loup Loup corridor that would require replacement. Replacing structures would cause temporary effects to soils (compaction and sedimentation) and damage or remove vegetation and could affect hydrology, water quality, and habitat functions of the nearby wetlands. These effects would be minimized by using mats to minimize compression and sediment controls to minimize sedimentation in the adjoining wetland. The vegetation would be restored and the restoration monitored. Because there are no new structures and the disturbance would be restored and monitored, the effects are considered moderate.

Alternative 5

There are 12 wetlands with a total of 4.14 acres within the proposed ROWs associated with Alternative 5 (Table 3.6-4). Nine of the wetlands are within the existing Loup Loup ROW. The remaining three are within the ROW of the portion of the proposed Pateros/Twisp transmission line that would be built under this alternative. The proposed transmission line would span all of these wetlands and no construction activities would occur in these wetlands. As in Alternative 4, there are

three existing roads in the Loup Loup corridor that cross wetlands in shrub-steppe habitat and would require bladework for improvements. There are also the four existing structures adjacent to wetlands in the Loup Loup corridor, as described in Alternative 4, that would need to be replaced. The activities and mitigations are the same as described in Alternative 4 and the effects are the same, low for the existing road improvement and moderate for the structure replacement.

Alternative 6

There are 16 wetlands with a total of 4.8 acres within the proposed ROWs associated with Alternative 6 (Table 3.6-4). Ten of these wetlands are within the existing Loup Loup ROW. The remaining six are located within the ROW for the existing distribution circuits that follow the valley floor. All of the wetlands can be spanned, avoiding effects. As in Alternatives 4 and 5, there are three existing roads in the Loup Loup corridor that cross wetlands in shrub-steppe habitat and would require bladework for improvements. Potential effects to these wetlands would be mitigated as described under Alternative 4 and effects are, therefore, expected to be low. Four existing structures in the Loup Loup corridor adjacent to wetlands would also need to be replaced under this alternative. Structure replacement-related disturbance would be slightly less under this alternative than under Alternative 4 because disturbance per structure is estimated to be approximately 900 square feet per structure for a cold rebuild compared to 1,200 for a hot rebuild. The effects would still be in the moderate range due to the need for restoration and monitoring. The mitigations are the same as described in Alternative 4 and the effects are low for the existing road improvement and moderate for the structure replacement.

Alternative 7

There are 16 wetlands with a total of 4.8 acres within the proposed ROWs associated with Alternative 7 (Table 3.6-4). Ten of these wetlands are within the existing Loup Loup ROW. The remaining six are located within the ROW for the existing distribution circuits that follow the valley floor. All of the wetlands can be spanned, avoiding effects. As in Alternatives 4, 5, and 6, there are three existing roads in the Loup Loup corridor that cross wetlands in shrub-steppe habitat and would require bladework for improvements. There are also four existing structures adjacent to wetlands in the Loup Loup corridor that would need to be replaced. Two of the four structures within 50 feet of a wetland would be replaced cold (disturbing approximately 900 square feet each) and then placed 50 feet farther from the wetland, thereby reducing the vegetation and soil effects of the disturbance. The effects would still be in the moderate range due to the need for restoration and monitoring. Replacing the structures further from the wetland could reduce potential future disturbance due to maintenance activities, depending on the maintenance required. Mitigation measures would be the same as described in Alternative 4 and the effects are low for the existing road improvement and moderate for the structure replacement.

Summary

Alternative 1 is the No Action alternative and there are no construction activities to affect wetlands. There would be no effects to wetlands under Alternative 3. Construction activities under Alternative 2 would have low effects on two wetlands that are likely hydrologically connected. Alternatives 4 through 7 would have moderate effects because restoration would be required in four areas along the existing Loup Loup ROW where existing structures would need to be replaced. These potential effects would be slightly lower under Alternative 6 because there would be less disturbance under this alternative. Alternatives 4 through 7 would also have low effects on three wetlands that are crossed by existing roads that would be used for construction. None of the proposed alternatives is expected to have significant effects on wetlands.

3.6.2.3 Riparian Vegetation

The total number of streams that would be crossed by the ROWs associated with the proposed alternatives are identified in Table 3.6-5. The number of stream crossings where riparian vegetation could be affected by the proposed alternatives are identified in Table 3.6-6. The Okanogan and

Table 3.6-5. Number of Streams Crossed by the Proposed Construction Activities, by Alternative

	Alternative					
	2	**3**	**4**	**5**	**6**	**7**
Methow River (Transmission Line)	1	9	-	1	-	-
Methow River (Distribution Line Rebuild)	-	-	23	-	23	23
Okanogan River (Transmission Line)	-	-	1	1	1	1
Perennial Stream	4	5	20	18	20	20
Intermittent Stream	19	6	20	27	20	20
Irrigation Ditch or Runoff Area	3	1	5	6	5	5
Roads through Perennial Streams	-	-	12	12	12	12
Roads through Intermittent Streams	4	-	2	4	2	2

Source: Tetra Tech, 2004c.

Table 3.6-6. Number of Stream Crossings where Riparian Vegetation could be Affected, by Alternative

	Alternative					
	2	**3**	**4**	**5**	**6**	**7**
Methow River: Transmission Line Structure Construction	-	-	-	-	-	-
Methow River: Distribution Line Rebuild (Structure at edge of Riparian Vegetation)	-	-	6	-	6	6
Okanogan River: Transmission Line Construction	-	-	-	-	-	1
Perennial Stream (Structure at edge of Riparian Vegetation)	-	-	3	3	3	3
Perennial Stream: Improvements to Existing Road	-	-	12	12	12	12
Intermittent Stream: New Track Road Crossing	1	-	-	-	-	-
Intermittent Stream: Improvements to Existing Road	4	-	2	4	2	2

Note: Site-specific locations of riparian boundaries are beyond the resolution of GIS analysis. Each stream crossing was field verified for potential effects to riparian vegetation.
Source: Tetra Tech, 2004c.

Methow Rivers are shown separately because they are the largest rivers within the project area. The following sections discuss potential effects to riparian vegetation by alternative.

Disturbance of vegetation in riparian areas could create opportunities for weed establishment. This is addressed in the section about weeds (Section 3.5). Activities in riparian areas could also increase sedimentation and soil compaction, which are addressed in the Fisheries, Hydrology and Water Quality, and Soils sections (Sections 3.7, 3.4, and 3.3, respectively).

Alternative 1

There would be no new construction under Alternative 1 and, therefore, no construction-related impacts to riparian vegetation. Routine maintenance activities would continue under this alternative. Removal of riparian vegetation has occurred as part of ongoing maintenance activities for existing lines and would continue. Continued use of existing roads that cross streams also has the potential to affect adjacent riparian vegetation.

Alternative 2

Under Alternative 2, the proposed Pateros/Twisp transmission line would cross the Methow River once, as well as 4 perennial streams, 19 intermittent streams, 3 irrigation ditches (Table 3.6-5). The proposed transmission line would span these streams and there would be no effect to riparian vegetation. One proposed new track road (not requiring grading or vegetation removal) would cross

an intermittent stream under this alternative (Table 3.6-6). The stream is in a shrub-steppe area with herbaceous plants and sparse shrubs, similar to the surrounding area and does not have a defined bed and bank. The vegetation is the same as the surrounding upland vegetation and the effects to riparian vegetation of driving equipment on the track road would be low. The vegetation is not different than the surrounding upland and it is likely that it would reestablish if needed. There are also four existing track roads through intermittent streams that would require improvements (blading). The disturbance would be limited to the existing road prism already affected by construction of the road, and effects would be low.

Alternative 3

Under Alternative 3, the proposed transmission line would cross the Methow River nine times, as well as five perennial streams, six intermittent streams and one irrigation ditch (Table 3.6-5). All streams would be spanned in this alternative to avoid riparian vegetation disturbance and no road work is needed in riparian vegetation. Therefore, there would be no effect to riparian vegetation under this alternative.

Alternative 4

Under Alternative 4, reconstruction of the existing Loup Loup transmission line would involve replacing conductors that currently span the Okanogan River once, perennial streams 15 times, intermittent streams 13 times, and irrigation channels 4 times. Existing roads that would be used for construction access cross perennial streams 12 times and intermittent streams 2 times. The existing Methow River Valley distribution line crosses the Methow River 23 times, perennial streams 5 times, intermittent streams 7 times, and 1 irrigation channel. These streams would continue to be spanned and there would be no effect to riparian vegetation from replacing the conductors under this alternative.

Three existing structures that would be replaced in the Loup Loup corridor (one close to Tallant Creek and two by an unnamed tributary to Sullivan Creek) and six in the Methow distribution rebuild corridor (close to the Methow River) are located at the edge of riparian vegetation areas that border perennial streams. Replacement activities would disturb vegetation and soils during replacement. Shrub or herbaceous vegetation is at all sites and tree removal would not be required. In the Methow River Valley distribution rebuild, the replacement structures would be 10 feet taller.

Replacement of these structures would include moving the structures further from the stream to lessen future maintenance effects, where possible. Effects of structure replacement or removal in these areas would be mitigated by using mats to minimize soil compression and the vegetation would be restored and the restoration monitored. There would be no new structures in riparian vegetation under this alternative, but the disturbance in adjacent areas would be restored and monitored, so the effects are considered moderate.

The existing Loup Loup transmission line also follows Frazer Creek for approximately 4 miles. The existing ROW crosses the creek nine times. Existing access roads cross Frazer Creek 12 times. These roads would be improved for access by construction equipment. Road improvements would involve blading within the existing roadbed, but would not include tree removal within riparian areas for roading. However, individual trees within the riparian buffer may need to be cut from areas where they have grown into the ROW and pose a safety risk. Trees in riparian areas provide several functions such as streambank stabilization, supply of organic material, and shading, and are a future source of LWD. Removal of trees in riparian areas without mitigation could negatively affect a stream if insufficient LWD is left. Frazer Creek is considered to be functioning at risk as it pertains to LWD (see Section 3.7, Fisheries). The potential effects of this type of tree removal from a stream can be mitigated by placement of equivalent amounts of LWD in the stream. If tree removal is required in riparian areas under this alternative, equivalent amounts of LWD or the trees that are removed would be placed in the affected stream after consulting a local fish biologist for location to meet LWD

requirements. After construction is complete, the vegetation would be restored and monitored. If tree felling and vegetation restoration is needed, with mitigation, effects would be moderate. The effects to riparian vegetation from any needed road bladework, without tree removal, would be low.

Alternative 5

Under Alternative 5, reconstruction of the existing Loup Loup transmission line would involve replacing conductors that currently span the Okanogan River once, perennial streams 15 times, intermittent streams 13 times, and irrigation channels 4 times. Existing roads that would be used for construction access cross perennial streams 12 times and intermittent streams 4 times. The portion of the proposed Pateros/Twisp transmission line that would be constructed from Pateros to a new substation in the Gold Creek area under this alternative would cross the Methow River once, perennial streams 3 times, intermittent streams 14 times, and 2 irrigation channels. These streams would continue to be spanned and there would be no effect to riparian vegetation from conductor replacement under this alternative.

The three existing structures in riparian vegetation in the Loup Loup corridor, as discussed in Alternative 4, would be replaced. The existing structures are at the edge of riparian vegetation and replacement activities would disturb vegetation and soils during replacement. Shrub and herbaceous vegetation are at all sites and tree removal would not be required. Replacement of these structures would include moving the structures further from the stream to lessen future maintenance effects, if possible. Effects of structure replacement or removal in these areas would be mitigated by using mats to minimize soil compression and the vegetation would be restored and the restoration monitored. There would be no new structures in riparian vegetation under this alternative, but the disturbance effects in adjacent areas are considered moderate if tree removal and vegetation restoration is needed.

Alternative 5 would involve a hot rebuild of the existing Loup Loup transmission line and potential effects to Frazer Creek would be the same as they would be under Alternative 4. As discussed for Alternative 4, the potential effects to riparian vegetation associated with proposed improvements to existing roads would be low and the effects of tree removal, if required, would be moderate.

Alternative 6

Under Alternative 6, the same streams are crossed and the same activities would occur as under Alternative 4; however, the effects for the structure replacements are less. Structure replacement-related disturbance would be slightly less under this alternative than under Alternative 4 because disturbance per structure is estimated to be approximately 900 square feet per structure for a cold rebuild compared to 1,200 for a hot rebuild. The effects would still be in the moderate range if riparian vegetation restoration is needed for areas disturbed. The mitigations are the same as described in Alternative 4 and the potential effects would be moderate for the structure replacement, and low for proposed improvements to existing roads.

Alternative 7

Under Alternative 7, the same streams are crossed and the same activities would occur as under Alternative 4. The potential effects for the structure replacements, however, are slightly less because one of the three structures in riparian vegetation would be removed and replaced approximately 50 feet further from the stream. The disturbance associated with removal would be approximately 900 square feet compared to the 1,200 square feet estimated for a “hot” replacement. The effects would still be in the moderate range due to the need for restoration of disturbed vegetation and monitoring. The mitigations are the same as described in Alternative 4 and the effects are moderate for the structure replacement if trees are removed and vegetation restoration is required. Impacts to riparian vegetation from roading would be low.

Under Alternative 7, the line would be moved 50 feet to the north in select areas, paralleling the existing Loup Loup transmission line. There are five black cottonwoods in a developed area along the

Okanogan River, some of which may need to be removed from the proposed ROW for line safety. These trees function primarily as future sources of LWD for the Okanogan River. Because the Okanogan River has low levels of LWD and is not functioning appropriately (see Section 3.7, Fisheries), removal of any trees would be mitigated by placement of any cut trees, or their equivalent amounts of LWD in the river, thereby reducing the potential effects to a low level.

Summary

Alternative 1 is the No Action alternative and there are no construction activities to affect riparian areas. There would be no effects to riparian areas under Alternative 3. Potential effects under Alternative 2 would be low. Alternatives 4 through 7 would have moderate effects because restoration and monitoring would be required where existing structures adjacent to riparian areas would need to be replaced. The number of structures adjacent to riparian areas and the potential areas of disturbance vary by alternative. This type of disturbance would be greatest under Alternative 4 followed by Alternatives 7, 6, and 5 in that order. The existing Loup Loup transmission line would be rebuilt in the vicinity of Frazer Creek under Alternatives 4 through 7. Improvements to existing roads in these areas would have low impacts on riparian vegetation under all four alternatives. If tree removal and vegetation restoration are needed for structure removal and replacement, effects would be moderate. Alternative 7 may also involve removal of some black cottonwoods in a developed area along the Okanogan River, and any cut trees or an equal amount of LWD would be placed in the river. None of the proposed alternatives is expected to have significant effects on riparian vegetation.

3.6.2.4 Cumulative Effects

This section considers the incremental effects of the proposed alternatives when added to other past, present, and reasonably foreseeable future actions. Past and present actions affecting resources are included in the affected environment portion of this section. In the case of Alternatives 2 and 3, other past, present, and reasonably foreseeable actions include the operation and maintenance of the existing Loup Loup transmission line and the valley floor distribution circuits. As a result, all of the cumulative effects sections assess the effects of Alternative 2 and 3 in conjunction with the existing Loup Loup transmission line and the valley floor distribution circuits. Reasonably foreseeable future actions are defined for the purposes of this analysis as future actions that are planned within or in the immediate vicinity of the project area.

The reasonably foreseeable actions included in this analysis are discussed in Section 3.1. These activities include grazing allotment actions on NFS lands, fuels management and timber salvage projects on NFS lands, Forest Practices approved by WDNR on state and private forestlands, grazing managed by WDNR, and residential and commercial development.

Grazing may affect the physical structure of wetlands and riparian vegetation in areas where cattle have direct access to streams. The reasonably foreseeable grazing permit allotments and leases managed by WDNR include land along all three proposed transmission line corridors. The reasonably foreseeable grazing allotment actions on NFS lands lie primarily along the Loup Loup corridor with two (Benson Creek and Texas Creek) close to the Pateros/Twisp corridor. The current Forest Service standards are intended to reduce grazing impacts to riparian areas and would meet all applicable Forest Plan standards and guidelines intended to protect wetlands, riparian areas, and other resources. A recent plan, the Beaver, Finley, Frazer and Hull Allotment Management Plan, was issued in 2004 and covers lands close to and including the Loup Loup corridor. It is designed to meet PACFISH requirements that require modification of practices that retard or prevent attainment of RMOs. RMOs describe habitat targets for wetlands and streams. The guidelines are expected to reduce grazing impacts to the riparian and wetland areas. The management plan also removes the Frazer Creek corridor and Bear Mountain wetland areas of the Frazer allotment from the grazing rotation to reduce riparian and wetland impacts. Those areas would begin to recover under those guidelines. The Environmental Assessment for the plans acknowledged that while the riparian conditions in the areas covered by the plan would improve slightly, the cumulative downstream effects, when taking into

account activities on adjacent land, could be a decrease in the quality of riparian habitat as the streams reach the Methow and Okanogan Rivers.

Timber harvest and management activities can affect hydrology, soil nutrients, and sediments, and can create an opportunity for weed establishment. In addition, logging roads can alter water flow through increases in impervious surfaces or changes to the soils ability to hold water in a wetland and reduce the time that water resides in wetlands or streams in a watershed. The four reasonably foreseeable fuels management and timber salvage projects on NFS lands are along the Loup Loup corridor and are designed to meet PACFISH requirements that require modification of practices that retard or prevent attainment of RMOs. There are 16 reasonably foreseeable Forest Practices authorized by the WDNR within or in the immediate vicinity of the project area. Approximately three-quarters of the WDNR-approved acres are along the Loup Loup corridor, one small project (36 acres) is along the Pateros/Twisp corridor, and the rest of the projects are west of the Methow River. The WDNR-authorized projects are assumed to meet all Forest Practices rules, which are, among other things, designed to specifically address cumulative effects (WAC 222-12-046). None of the reasonably foreseeable projects is ranked as Class IV by WDNR (potential for substantial effects to the environment).

None of the proposed alternatives would remove trees from wetlands and there would be no removal of trees from riparian areas under Alternatives 1 through 3, beyond trees that might be removed under the current maintenance of existing transmission and distribution lines. Alternatives 4 through 7 in the Loup Loup corridor (where the NFS forest management projects are and the majority of the WDNR-authorized project acres are) may involve removal of additional trees where trees have grown into the ROW or pose a safety risk during construction. Alternatives 4 through 7 may also require removal of individual trees from riparian vegetation adjacent to existing access roads as discussed in the effects section. This removal of individual trees that may be necessary under Alternatives 4 through 7 would contribute, but not substantially, to the potential wetland and riparian vegetation effects associated with other past, present, and reasonably foreseeable future actions.

Land development in previously undeveloped areas typically results in an increase in impervious surface area and may lead to increases in erosion and sedimentation, which have potential for negative effects on wetlands and riparian areas. Alteration of water flow in wetlands, through increases in impervious surfaces or changes to the soils ability to hold water (by compaction), reduces the time that water resides in wetlands or streams in a watershed and leads to greater flooding or more dry spells in streams (Hruby et al., 2004). The reasonably foreseeable residential development projects in the area will increase the amount of impervious surface area within and in the immediate vicinity of the project area. These developments would be required to meet all local, county, and state planning regulations and ordinances, including those designed to protect wetlands and riparian areas. The proposed developments are along the Methow River Valley, primarily along the Valley Floor corridor; two (Tacoma Land Company [approved] and Caribou LLC [approved]) are along the Pateros/Twisp corridor. One proposed development (Tice Ranch) is located approximately 1.5 miles southeast of Twisp and south of State Highway 20. In addition to the aforementioned developments, there are four approved and eight pending reasonable foreseeable residential development projects, and six approved 20-acre exempt segregations in the project area (See Section 3.1). The developments are on land with no wetlands mapped by the National Wetland Inventory (U.S. Fish and Wildlife), but several are close to the Methow River and associated wetlands. Of the corridors considered, the Valley Floor has been the most affected by past development activities and will experience most of the foreseeable future activities.

The proposed alternatives would make only minor contributions to impervious surfaces in the project area as a result of the installation of new structures and the surrounding compacted work areas. New and existing track roads would not be paved but use over the long term may compact soils and reduce their ability to hold water. These potential effects would not make a substantial contribution to the

potential wetland and riparian vegetation effects associated with past, present, and reasonably foreseeable residential and commercial development and other actions that contribute to increases in impervious surface in the project area.