

4.11 Impacts to Vegetation

This section is discussed in three distinct subsections: vegetation, noxious and invasive species, and wetlands and riparian zones. Impacts to special status plant species are presented in Section 4.15.

Vegetation

This section describes the impacts to vegetation that would result from the proposed project. Impacts to vegetation would occur over a large area but would constitute a small percentage of the overall project area. Impacts to vegetation are primarily related to the direct removal of vegetation associated with grading of roads, pads, and laydown areas for the development of the project. Other impacts may include plant mortality and lower reproduction as a result of construction dust that could impair photosynthesis and plant respiration as well as inhibit pollination. Loss of vegetative cover would be temporary in nature and would either recover naturally from adjacent seed sources or through reclamation following construction. Impacts to vegetation associated with each of the project alternatives are described in the remainder of this section.

The impacts study area for vegetation, totaling approximately 229,077 acres, consists of the applicable action alternative area and those features that fall outside of the alternative boundary such as haul road and transmission lines. Impacts to vegetation were determined by overlaying the alternatives on vegetation mapping (presented in Section 3.11) and calculating both initial and long-term impacts using GIS.

As described in Section 3.11.2, two WHMAs are present within the analysis area; however, project-related impacts to vegetation within these areas would be limited to Alternatives 1R, 2, and 4. The impact analysis for each WHMA is presented below.

Noxious Weeds and Invasive Species

Impacts from noxious weeds and invasive species are expected to be relatively minor, especially with proposed diligence in preventing the importation and spread of weed seed into the Application Area and timely treatment once weeds are detected. Proposed precautionary actions such as equipment and vehicle washing; use of weed-free seed mixtures and erosion control devices; and the implementation of an intensive reclamation and revegetation monitoring program would prevent weeds from gaining a foothold in newly disturbed areas. In addition to the amount of disturbed area, roads provide linear corridors where vehicles, people, wildlife, livestock, wind, and water can carry weed seed and weeds can become established. Disturbance prone species, such as halogeton, could spread more easily in the newly disturbed areas, especially along linear disturbances such as access roads. In addition, road edges tend to receive the most constant disturbance from runoff and vehicles pulling off and parking along the edge. Measures to address the spread of weeds, including those discussed above, are currently being developed in the Master Reclamation Plan and Noxious Weed Plan. Upon project approval, measures to control the spread of weeds contained in these plans will be implemented by the applicant.

Wetlands and Riparian Zones

Wetlands and associated riparian zones would be impacted by the filling of their drainages and associated wetlands and riparian zones at road crossings of perennial and ephemeral drainages. In addition, surface flows would be diverted and concentrated into culverts and surface runoff is likely to increase due to increased impervious surfaces such as roads, turbines, and facilities and the concentration of that water to new areas.

Issues/concerns that were raised during project scoping or cooperating agency meetings and documented in the project *Scoping Summary Report* (BLM 2009c) related to wetlands include:

- Unmitigated loss of wetlands or wetland function (EO 11990 and EO 11988) or activities that would degrade wetland/riparian areas such that, as a minimum physical state, PFC Standards for Healthy Rangelands (BLM 2009b) are not maintained;
- Waterbodies and groundwater resources that will be impacted should be clearly described;
- Mitigation commitments that include the indirect draining of, or direct disturbance of, wetland areas should be avoided if at all possible, and there should be complete avoidance of disturbance to any fen wetlands (EO 11990);
- Recommendation that bridges be used over perennial streams during construction; and
- Conduct a comprehensive analysis of all drainages that are near or intersecting road crossings and laydown areas.

Additional discussion of these issues, insofar as they relate to water resources (e.g., surface water and groundwater quality; and streamflow and stream channel geometry), is presented in Section 4.13.

Issues and Management Considerations

Balancing the conflict between managing and maintaining quality vegetation resources and allowing consumptive uses is one of BLM’s primary management considerations (BLM 2008a). Vegetation resource values include watershed and riparian protection, soil stabilization, maintenance, and enhancement of wildlife habitat. Consumptive uses include livestock and wildlife grazing; forest management; OHV use; vegetation removal by mineral development; ROW construction; and other surface disturbing activities.

This project would have surface disturbing activities that fall into two categories, initial and long-term. Initial impacts are those impacts to vegetation that are related to initial grading, construction, and installation for project components such as wind turbine generators, laydown areas, road surfaces and related cuts and fills, and other remedial grading. These areas would be reclaimed following disturbance and returned to a condition that currently exists within 5 to 10 years following installation of the project. Long-term impacts are those impacts associated with features used for O&M of the project that would not be reclaimed until after the project is decommissioned at the end of the project’s life. Long-term impacts include roads, turbine pads, substations, connector poles, etc. The BLM’s management goals, objectives, and actions for managing for vegetation and consumptive uses are listed in **Table 4.11-1** (BLM 2008a).

Table 4.11-1 Relevant Management Considerations for Vegetation

2008 Rawlins RMP and ROD – Vegetation
<p><u>Management Goals</u></p> <ul style="list-style-type: none"> • Manage vegetation to achieve and maintain proper ecosystem function. • Manage vegetation communities to restore, maintain, or enhance vegetation community health, composition, and diversity to benefit multiple resources and their uses, consistent with site potential. • Manage to protect, preserve, or enhance Special Status Plant Species (T&E and BLM State Sensitive plant species) and unique plant communities. • Manage to control noxious and invasive species. • Manage aspen communities for a healthy mix of successional stages within a natural range of variation.

Table 4.11-1 Relevant Management Considerations for Vegetation

2008 Rawlins RMP and ROD – Vegetation
<p><u>Management Objectives</u></p> <ul style="list-style-type: none"> • Maintain, restore, and enhance vegetation communities to facilitate a healthy mix of successional stages (identified in activity plans) that incorporate age class, structure, and species composition into each vegetation type, consistent with site potential. • Control the introduction and proliferation of noxious and invasive species and reduce established populations to acceptable levels determined through cooperation, consultation, and coordination with local, state, other federal plans, policies, and agency agreements. • Maintain, restore, and enhance the health and diversity of plant communities through the use of management prescriptions (such as prescribed natural fire, burning, plantings, seedings, and chemical, mechanical, biological, and grazing treatments or other treatments) in coordination with local, state, and federal management plans and policies. • Maintain, restore, and enhance riparian, wetland, and upland vegetation to meet the Wyoming Standards for Healthy Rangelands. • Maintain, restore, and enhance aspen communities (BLM 2008a [2008 Rawlins RMP, Appendix 19]). • Maintain, restore, and enhance Special Status Plant Species (T&E and BLM State Sensitive plant species) and unique plant communities. • Utilize inventory and monitoring data to support vegetation management. • Maintain connectivity between large contiguous blocks of public land by minimizing fragmentation of vegetative communities.
<p><u>Management Actions</u></p> <ul style="list-style-type: none"> • Forage allocation on acquired lands will be consistent with the purpose of the acquisition and multiple-use objectives for the area. • All forms of control for noxious and invasive species are allowed in the Application Area on a case-by-case basis (BLM 2008a; [2008 Rawlins RMP Appendix 19]). • Minimize disturbance to vegetation through application of BMPs; mitigation, as appropriate and practical (BLM 2008a; [2008 Rawlins RMP, Appendices 13, 14, 15, and 19]); and reclamation practices (BLM 2008a; [2008 Rawlins RMP, Appendix 36]). • Reclaim disturbed areas in accordance with BLM State Reclamation Policy (BLM memorandum 2009-022). • Manage riparian, wetland, and upland vegetation to meet the Wyoming Standards for Healthy Rangelands. • Maintain, restore, and enhance riparian, wetland, and upland vegetation to meet the Wyoming Standards for Healthy Rangelands RMP (BLM 2008a; [2008 Rawlins RMP, pg 2-93]). • The 2008 Rawlins RMP stipulates that no surface disturbance may occur within 500 feet of surface water or riparian areas (BLM 2008a; [2008 Rawlins RMP, pg 2-99]).

Source: Proposed 2008 Rawlins RMP, Final EIS for the RFO, Chapter 2, Table 2-1, pp 2-93 through 2-99 (BLM 2008a).

Significance Criteria

Impacts on vegetation would be considered potentially significant (BLM 2008a) if the following occurred:

- Any action or event that would remove a community's unique attributes or ability to support other resource values within the planning period, or if corrective actions were beyond the scope of this document.
- Reclaimed areas do not attain adequate vegetation groundcover and species composition to stabilize the site within 5 years from disturbance, or there is invasion and establishment of noxious or invasive weeds that contribute to unsuccessful revegetation.
- Introduction of noxious and invasive weeds into areas considered weed-free, or an increase in weeds where they already exist.
- Impact to unique communities such as cushion plants could be permanent unless successful restoration techniques are developed.
- Any unmitigated loss of wetlands or wetland function (EO 11990 and EO 11988) or activities that would degrade wetland/riparian areas such that PFC Standards for Healthy Rangelands (BLM 1997a) is not maintained.

Assumptions

The following assumptions were used in the analysis for vegetation resources:

- Turbine locations are conceptual and subject to change after the ROD is issued.
- Additional NEPA analysis will be necessary for all project components after the ROD is issued. One outcome of this approach is to better define the resource constraints, standard practices, and mitigation measures that all future NEPA analyses will depend on.
- Reclamation of short-term impacts to vegetation would be initiated during the first year following construction; soil disturbance would be successfully reclaimed within 5 to 10 years.
- Disturbance to cushion vegetation communities (not mapped) occurring along the edge of many of the rocky cliffs would be avoided to the extent practical.

The evaluation assumes that ACMs and BMPs would be successfully implemented for all action alternatives as described in Chapter 2.0 and found in **Appendix C**. Mitigation measure GEN-1, from the Draft EIS, is now part of the alternatives analysis in the Final EIS as it was included as an ACM by the applicant in the January 2012 revised POD (PCW 2012a).

According to the applicant's POD, operators would maintain and monitor vegetation mitigation measures for the approved project in accordance with the Master Reclamation Plan (Appendix E of the POD) and an Environmental Compliance Plan. The applicant's weed management plan is presented as Appendix J in the POD (PCW 2012a).

4.11.1 Impacts to Vegetation from the No Action Alternative

Under the No Action Alternative, the BLM would reject PCW's request to develop wind energy on public lands and deny any request to provide access to private lands for development of the proposed project (see Section 2.3.1).

4.11.1.1 Vegetation

Under the No Action Alternative, no additional disturbance would be permitted; therefore, no impacts to vegetation would be anticipated beyond existing authorizations.

4.11.1.2 Noxious Weeds and Invasive Species

Under the No Action Alternative, no additional disturbance would be permitted; therefore, no impacts to additional noxious weed and invasive species introduction or spread would be anticipated beyond existing authorizations. Existing weed populations would continue to be managed pursuant to existing ranch operations and 2008 Rawlins RMP policies.

4.11.1.3 Wetlands and Associated Riparian Zones

Under the No Action Alternative, no additional disturbance would be permitted; therefore, no impacts to wetlands and riparian zone drainages would be anticipated beyond existing conditions authorizations.

4.11.2 Impacts to Vegetation from Alternative 1R, Applicant Proposed Alternative

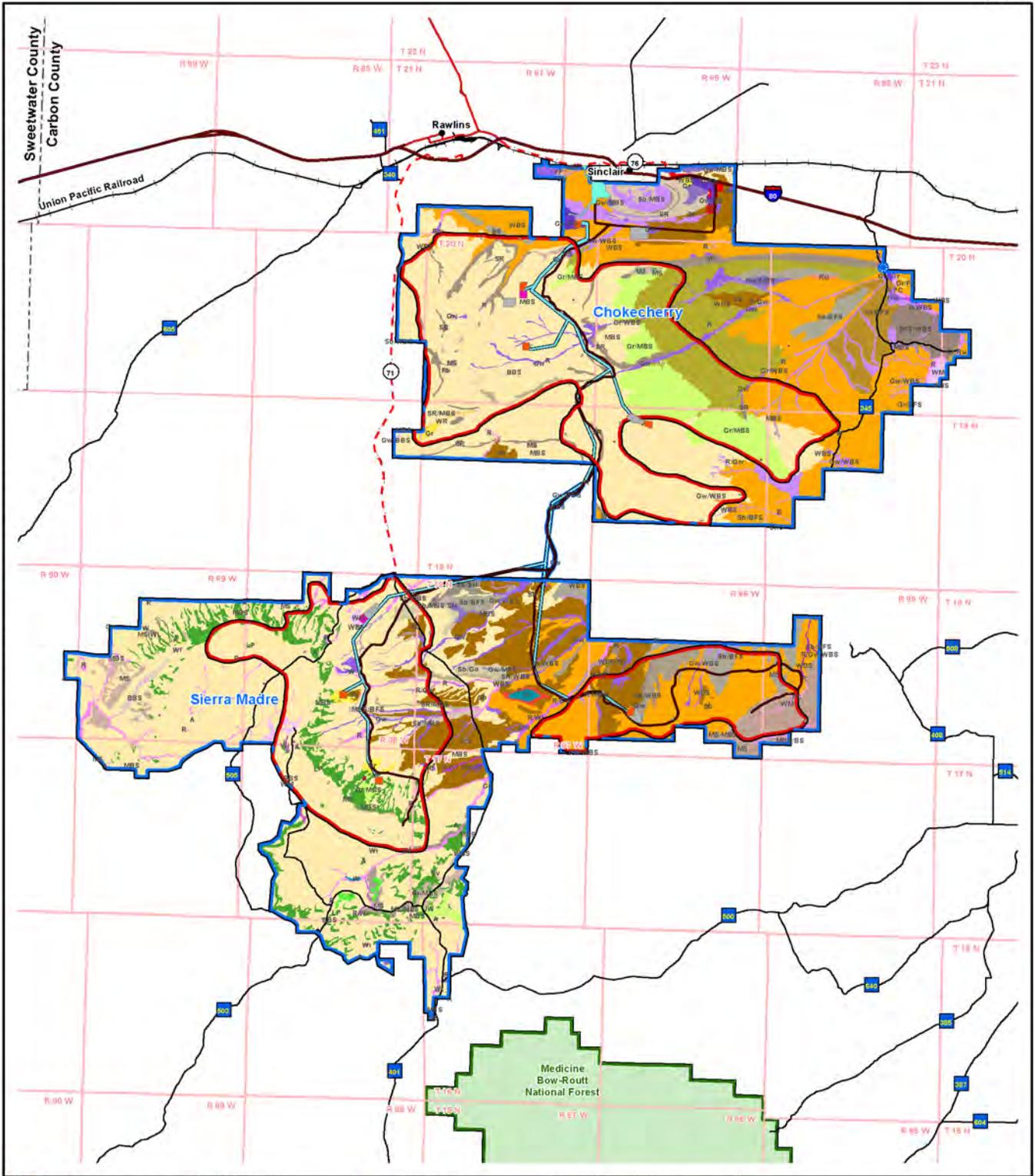
4.11.2.1 Vegetation

Impacts to vegetation would occur from the construction (initial disturbance), operation (long-term disturbance), and decommissioning (temporary disturbance) of this alternative. Direct impacts from project-related activities would include the temporary loss of vegetation as a result of trampling/compaction, clearing of surface cover, and direct removal of aboveground and belowground vegetation as a result of construction implementation. Initial disturbance would be limited to the herbaceous-dominated vegetation cover types within the construction footprint. Although temporary in nature, initial impacts to shrub- and woody-dominated vegetation cover types would extend to approximately 20 years, given the timeframe to achieve successful reclamation. Long-term impacts as a result of operation and maintenance activities would be limited to vegetation communities located within the permanent aboveground footprints.

Alternative 1R would result in direct impacts to 7,691 acres of vegetation within the CCSM areas from the construction of roads, wind turbines, laydown areas, collection poles, turnarounds, and other project components. Following reclamation, Alternative 1R would result in 1,540 acres of long-term impacts within the CCSM areas. The dominant vegetation types impacted include mountain big sagebrush and Wyoming big sagebrush with initial impacts of 4,196 and 1,323 acres, respectively. Long-term impacts to mountain big sagebrush would be 694 acres and Wyoming big sagebrush would be 417 acres. Saltbush is the next most common vegetation type with a total of 442 acres of initial disturbance and 98 acres of long-term disturbance following reclamation. Direct impacts associated with Alternative 1R are shown in **Figure 4.11-1** and in **Table 4.11-2**. Cushion plant communities may be impacted as a result of project implementation; however, quantification of initial and long-term impacts cannot be completed due to lack of data.

Alternative IR would result in initial direct impacts to 68 acres and 305 acres of vegetation within the Red Rim-Grizzly and the Upper Muddy Creek Watershed/Grizzly WHMA, respectively. Long-term impacts from vegetation disturbance or removal would total 11 acres and 50 acres within the Red Rim-Grizzly and the Upper Muddy Creek Watershed/Grizzly WHMA, respectively. Impacts would be primarily associated with the mountain big sagebrush and basin big sagebrush vegetation cover types. The 2008 Rawlins RMP stipulates that surface disturbing activities will be avoided within 500 feet of perennial waters, springs, wetland, and riparian areas; therefore, no impacts to Muddy Spring Creek are anticipated. Heavy equipment used to construct the roads and grade the pads would likely generate an extensive amount of dust that would temporarily affect adjacent vegetation. McCrea (1984) notes that roadside dust causes reduced photosynthesis, leading to the loss of plant yield, and hindering of the pollination of small seeded fruit by insects, thus reducing effective fertility. Indirect impacts to vegetation as a result of dust are likely temporary in nature and would likely only affect adjacent vegetation during construction and heavy road use until it can be washed off by rain or other means. If plant mortality does occur, vegetation would be restored through natural regeneration or reclamation efforts.

X:\06\projects\12907_001_Wyoming_Vegetation\figure4.11-1_Vegetation_Alt1R_impacts_20120222.mxd



<ul style="list-style-type: none"> Project Area Likely Area of Turbine Construction Transmission Line Haul Road 	<ul style="list-style-type: none"> Mixed Shrub Mountain Big Sagebrush (MS/MBS) Mixed Shrub Wetland (MS/WL) Mountain Big Sagebrush (MBS) Mountain Big Sagebrush/ Birds Foot Sagebrush (MBS/BFS) Mountain Big Sagebrush/ Black Sagebrush (MBS/BS) Rabbitbrush (Rb) Saltbush (Sb) Saltbush/ Goldenweed (Sb/Gd) Saltbush/ Birds Foot Sagebrush (Sb/BFS) Saltbush/ Mountain Big Sagebrush (Sb/MBS) Saltbush/ Mountain Big Sagebrush/ Spiny Horsebrush (Sb/MBS/SH) Saltbush/ Wyoming Big Sagebrush (Sb/WBS) Saltbush/ Spiny Horsebrush (Sb/SH) Serviceberry (Sv) Sweep Rocky/ Mountain Big Sagebrush (SR/MBS) 	<ul style="list-style-type: none"> Sweep Rocky/ Wyoming Big Sagebrush (SR/WBS) Sweep Rocky (SR) Wyoming Big Sagebrush (WBS) Wyoming Big Sagebrush/ Rabbitbrush (WBS/Rb) Greasewood/ Basin Big Sagebrush (Gw/BBS) Greasewood/ Grassland (Gw/Gr) Greasewood/ Mountain Big Sagebrush (Gw/MBS) Greasewood/ Saltbush (Gw/Sb) Greasewood/ Wyoming Big Sagebrush (Gw/WBS) Alkali Flat (AF) Grassland (Gr) Grassland/ Birds Foot Sagebrush (Gr/BFS) Grassland/ Mountain Big Sagebrush (Gr/MBS) Grassland/ Ruderal (Gr/Ru) Grassland/ Plains Cottonwood (Gr/PC) 	<ul style="list-style-type: none"> Grassland/ Saltbush (Gr/Sb) Grassland/ Wyoming Big Sagebrush (Gr/WBS) Wild Rye (WR) Riparian (R) Riparian/ Grassland (R/Gr) Riparian/ Greasewood (R/Gw) Riparian/ Greasewood/ Wyoming Big Sagebrush (R/Gw/WBS) Riparian/ Mountain Big Sagebrush (R/MBS) Riparian/ Plains Cottonwood (R/PC) Riparian/ Willow (R/W) Riparian/ Wyoming Big Sagebrush (R/WBS) Wetland (W) Wet Meadow (WM) Willow (W) Cheatgrass (ChG) Ruderal (Ru) Tamarisk (T) Water/ Ruderal (WRu) Developed (D) Water (W)
---	--	---	---

Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-1

Vegetation Impacts within Alternative 1R

1:320,000

Table 4.11-2 Direct Vegetation Impacts Associated with Alternative 1R

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Mountain Big Sagebrush								
Grassland/Mountain Big Sagebrush	391	66	1	0	-	-	392	66
Mixed Shrub/Mountain Big Sagebrush	-	-	17	3	-	-	17	3
Mountain Big Sagebrush	2,451	400	1,730	290	14	4	4,196	694
Mountain Big Sagebrush/Bird's Foot Sagebrush	-	-	16	4	-	-	16	4
Mountain Big Sagebrush/Black Sagebrush	-	-	194	33	-	-	194	33
Steep/Rocky/Mountain Big Sagebrush	2	0	20	3	-	-	22	3
Mountain Big Sagebrush Subtotal¹	2,844	466	1,978	333	14	4	4,837	803
Saltbush								
Grassland/Saltbush	0	0	-	-	-	-	0	0
Saltbush	40	10	335	68	66	20	442	98
Saltbush/Bird's Foot Sagebrush	33	7	76	16	-	-	110	23
Saltbush/Goldenweed	-	-	24	5	-	-	24	5
Saltbush/Mountain Big Sagebrush	5	5	22	6	-	-	27	11
Saltbush/Mountain Big Sagebrush/Spiny Horsebrush	-	-	-	-	-	-	-	-
Saltbush/Spiny Horsebrush	-	-	20	5	1	0	22	5

Table 4.11-2 Direct Vegetation Impacts Associated with Alternative 1R

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Saltbush/Wyoming Big Sagebrush	-	-	44	6	-	-	44	6
Saltbush Subtotal¹	78	22	521	106	67	20	669	148
Wyoming Big Sagebrush								
Grassland/Wyoming Big Sagebrush	290	49	-	-	-	-	290	49
Wyoming Big Sagebrush	624	287	634	112	65	17	1,323	417
Wyoming Big Sagebrush/Rabbitbrush	-	-	4	1	-	-	4	1
Wyoming Big Sagebrush Subtotal¹	914	336	638	113	65	17	1,617	467
Other								
Aspen	-	-	40	6	-	-	40	6
Basin Big Sagebrush	2	0	-	-	-	-	2	0
Black Sagebrush	12	2	-	-	-	-	12	2
Developed	16	5	-	-	-	-	16	5
Grassland	25	5	59	10	-	-	84	15
Grassland/Bird's Foot Sagebrush	-	-	-	-	-	-	-	-
Greasewood	74	9	19	4	8	2	101	15
Greasewood/Basin Big Sagebrush	-	-	-	-	3	1	3	1
Greasewood/Mountain Big Sagebrush	6	6	-	-	-	-	6	6

Table 4.11-2 Direct Vegetation Impacts Associated with Alternative 1R

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Greasewood/Saltbush	51	13	-	-	-	-	51	13
Greasewood/Wyoming Big Sagebrush	37	20	6	1	-	-	43	22
Limber Pine	-	-	-	-	-	-	-	-
Mixed Shrub	38	7	11	2	-	-	49	8
Rabbitbrush	-	-	-	-	-	-	-	-
Riparian	2	0	24	5	1	0	28	6
Riparian/Greasewood	6	2	9	2	-	-	15	4
Riparian/Greasewood/Wyoming Big Sagebrush	-	-	1	0	-	-	1	0
Riparian/Mountain Big Sagebrush	-	-	1	0	-	-	1	0
Steep/Rocky	39	5	-	-	-	-	39	5
Tamarisk	-	-	-	-	-	-	-	-
Utah Juniper	6	1	-	-	-	-	6	1
Wet Meadow	-	-	69	13	-	-	69	13
Wild Rye	3	0	-	-	-	-	3	0
Willow	-	-	-	-	-	-	-	-
Other Subtotal¹	317	75	239	43	12	3	569	121

¹ Total discrepancies are due to rounding.

Note: GIS estimates use assumed component locations to generate disturbance associated with vegetation type. While these estimates may vary somewhat from disturbance estimates that were generated by assuming an average amount of disturbance associated with each project component proposed by alternative (as presented in Chapter 2.0), the difference is estimated to be less than 5 percent.

Sources: AECOM 2009; PCW 2008b.

Impacts resulting from the decommissioning of the project (temporary disturbance) have the potential to occur and would be similar to impact levels resulting from project construction. Decommissioning impacts would include direct impacts resulting from laydown area use and increased dust levels due to increased traffic levels.

By phasing the project, temporal impacts to vegetation loss would be reduced. Reclamation would be initiated and start to establish prior to the disturbance of later phases, thereby limiting the amount of time that native vegetation communities are lost. In addition, phasing would allow for an opportunity to use adaptive management to improve subsequent reclamation techniques and allow for the first phase of reclamation to mature sooner than it would otherwise.

4.11.2.2 Noxious Weeds and Invasive Species

Under Alternative 1R, a total of 7,691 acres of soil would be disturbed. Soil disturbance creates an opportunity for existing weeds to spread and other weed species to become established. Once the short-term impact areas are revegetated, approximately 1,540 acres would remain that are susceptible to invasion by weeds, including areas at the base of power poles, turbine sites, road shoulders, etc. In addition, the 438 miles of roads within Alternative 1R would provide a corridor in which weed seeds can be transported and the edge along reclaimed areas provide good sites for weeds to become established. Although Alternative 1R is the smallest and most compact action alternative, this alternative would impact areas with little previous disturbance such as Miller Hill and the Sierra Madre that are relatively weed free. Direct impacts associated with the introduction and spread of noxious weeds and invasive species would be mitigated through the implementation of the BLM-approved Reclamation Plan. **Figure 4.11-2** shows the noxious and invasive species weeds in the vicinity of Alternative 1R. A summary of potential disturbance acreage for Alternative 1R is provided in **Table 4.11-2**.

Impacts resulting from the decommissioning of the project (temporary disturbance) have the potential to occur and would be similar to impact levels resulting from project construction. Decommissioning impacts would include creating additional opportunities for noxious and invasive weeds to become established and spread.

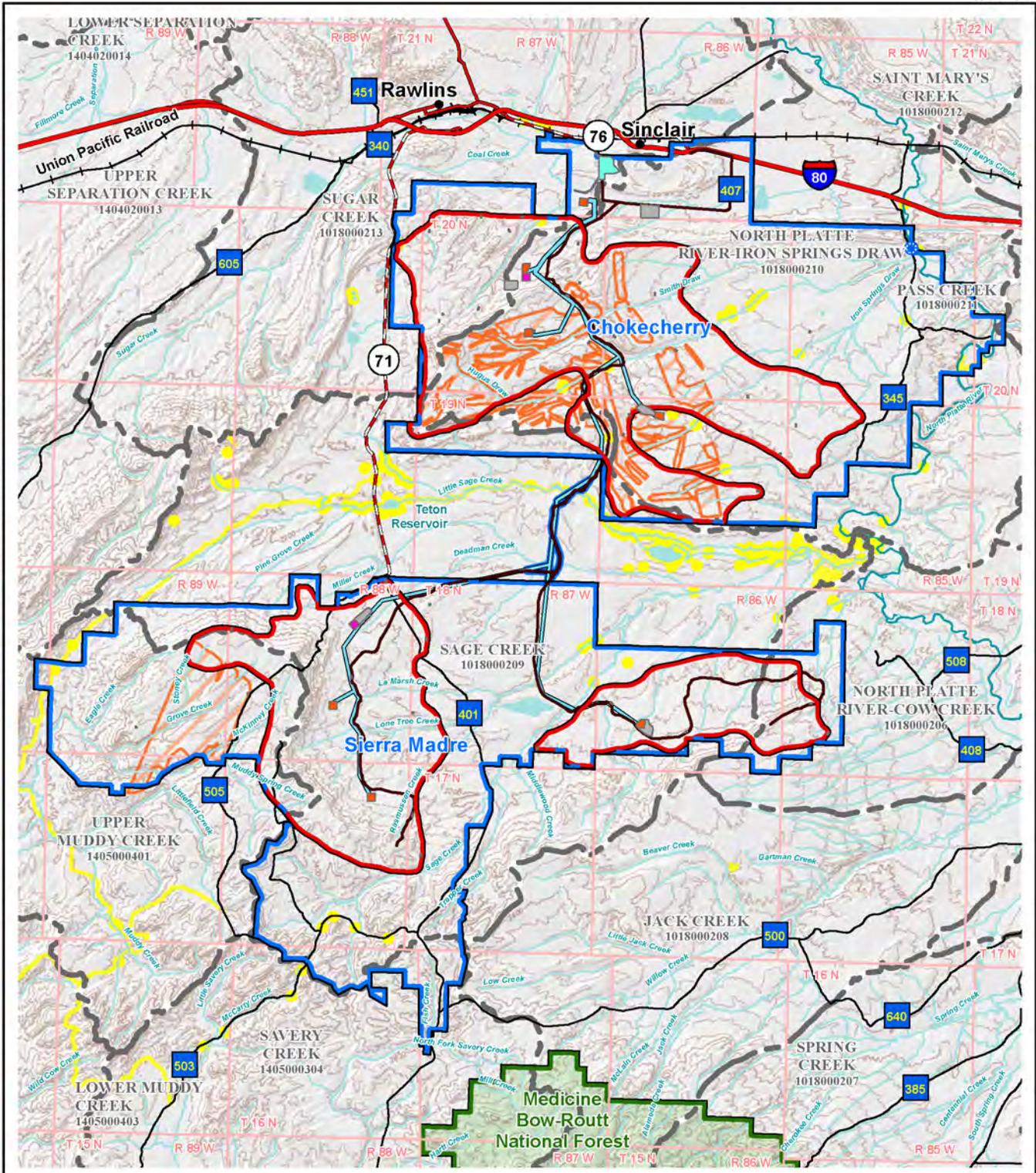
By phasing the project, temporal impacts to vegetation loss would be reduced. Reclamation would be initiated and start to establish prior to the disturbance of later phases, thereby limiting the amount of time that native vegetation communities are lost. Phasing also would decrease the overall risk associated with the introduction and spread of noxious weeds and invasive species due to isolating construction to respective areas under a phased construction sequence. In addition, phasing would allow for an opportunity to use adaptive management to improve subsequent reclamation techniques and allow for the first phase of reclamation to mature sooner than it would otherwise.

4.11.2.3 Wetlands and Associated Riparian Zones

Under Alternative 1R, wind development would be authorized in the alternative boundary within the TOTCO ranch boundaries. **Figure 4.11-3** shows the wetland and associated riparian zones within Alternative 1R. Impacts to wetlands and riparian zone drainages would occur from the construction footprint during the initial disturbance, operation (long-term disturbance), and decommissioning (temporary disturbance) of this alternative. Initial impacts for wetland and riparian zone drainages would result from construction of the same features as discussed in Section 4.11.8.1 (e.g., roads, turbines, laydown areas, collection poles, turnarounds, etc.). Unlike the upland vegetation, all of the impacts to wetlands and riparian areas would be long-term with the exception of transmission lines. It is assumed that during construction, culverts will be placed in drainages prior to surface-disturbing activities. Surface water hydrology would no longer be available to support wetlands and riparian zones at these locations until the fill and culverts are removed following decommissioning.

It is anticipated that impacts would occur due to construction of project features, such as roads and transmission lines, which cross wetlands. The types of impacts that could occur include the following:

X:\Projects\12907_001_Wyoming_Wind\figures\SIPEIS_2012\Volume2\Figure_4_11-02_Weeds_Alt1R_Impacts_20120222.mxd



Legend			
	Water Extraction Site		Project Area
	Transmission Line		Likely Area of Turbine Construction
	Haul Road		Spike Treatment for Sagebrush Enhancement
	O&M Building		Noxious Weed Location (Not to Scale)
	Rail Distribution Facility		National Forest
	Laydown Area (Construction Only)		Interstate Highway
	Substation		U.S. Highway
			State Highway
			River or Creek
			Lake or Reservoir
			Drainage Basin

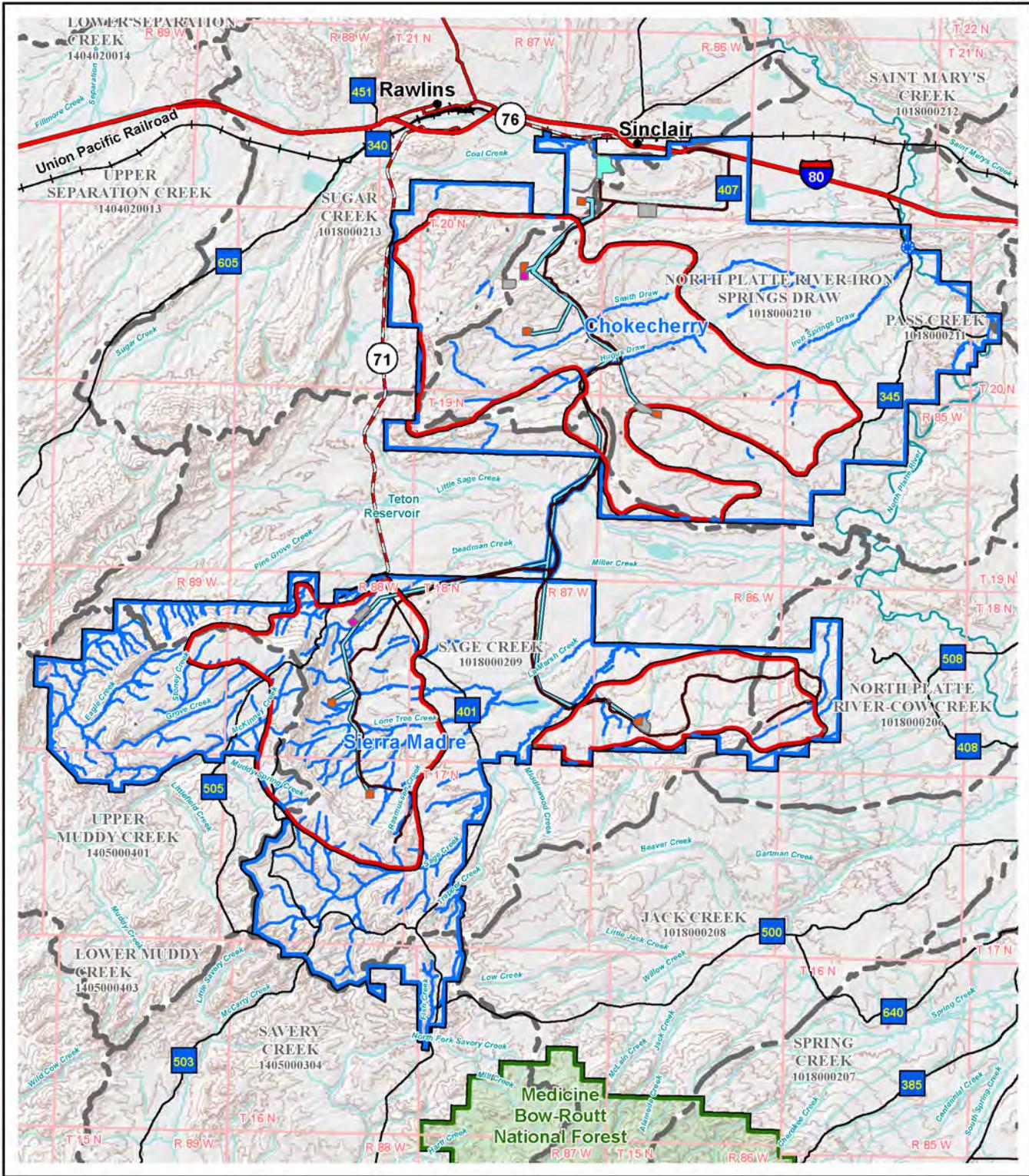
Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-2

Known Noxious Weeds and Invasive Species in the Vicinity of Alternative 1R

1:300,000

X:\Projects\12907_001_Wyoming_Wind\figures\SI\SP/EIS_2012\Volume2\Figure_4_11-03_WetlandRiparian_AIR_Impacts_20120222.mxd



Legend		
Transmission Line	Water Extraction Site	Interstate Highway
Haul Road	Project Area	U.S. Highway
O&M Building	Likely Area of Turbine Construction	State Highway
Rail Distribution Facility	Potential Wetlands and Riparian Zones	River or Creek
Laydown Area (Construction Only)	Potential Wetlands and Riparian Zones	Lake or Reservoir
Substation	National Forest	Drainage Basin

Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-3

Wetland and Riparian Zones in the Vicinity of Alternative 1R

0 1 2 3 4 Miles
0 1 2 3 4 Kilometers

1:300,000

- Direct loss of wetland habitat due to project infrastructure;
- Alteration of the hydrologic processes due to project infrastructure or soil compaction; and
- Altered surface runoff patterns (collection, concentration, and conveyance).

The majority of disturbance would occur in drainages that would be crossed by roads and transmission lines associated with the project. The transmission line disturbances are expected to be temporary in nature. The linear feet of potential disturbance was calculated using the conceptual layout of the alternative in relation to the wetland and associated riparian zone data, as described in Section 3.11.3. Based on this programmatic approach, Alternative 1R would result in the initial impact to 14,989 linear feet of wetlands and riparian zone drainages as a result of dredging, filling, and other construction related disturbances. Wetland and riparian zone drainage impacts would extend over 1,839 linear feet in Chokecherry; 12,407 linear feet in Sierra Madre; and 742 linear feet associated with the 230-kV tower, haul road, and internal resource road. Of these initial impacts, long-term impacts to wetland and riparian zone drainages associated with transmission line operation would extend over a total 2,967 linear feet (716 linear feet in Chokecherry; 1,977 linear feet in Sierra Madre; and 274 linear feet associated with haul road and internal resource road use).

By phasing the project, temporal impacts to wetland loss would be reduced. Reclamation would be initiated and start to establish prior to the disturbance of later phases, thereby limiting the amount of time that wetland communities are lost. In addition, phasing would allow for an opportunity to use adaptive management to improve subsequent reclamation techniques and allow for the first phase of reclamation to mature sooner than it would otherwise.

Impacts resulting from the decommissioning of the project (temporary disturbance) have the potential to occur and would be similar to impact levels resulting from the initial project construction. Decommissioning impacts would include direct impacts resulting from laydown area use and indirect impacts associated with increased dust levels due to increased traffic levels.

Avoidance and mitigation of these potential impacts would be addressed for federal lands through adherence with applicable Rawlins RMP stipulations and plan-specific NEPA assessments. According to the environmental constraints table (**Appendix C, Table C-1**), no disturbance would occur to wetlands and riparian zones mapped on BLM land, and surface disturbing activities within 500 feet of wetlands on BLM land will be avoided. Of the 14,989 linear feet of wetland and riparian zone drainages impacted in Alternative 1R, 2,840 linear feet are located on BLM land, including 949 linear feet in Chokecherry; 1,664 linear feet in Sierra Madre; and 227 linear feet associated with the 230-kV tower, haul road, and internal resource road.

In addition, all wetlands protected under the jurisdiction of the USACE will be avoided on all lands, regardless of surface ownership. Non-USACE protected wetlands on state and privately-owned lands will be protected in accordance with PCW's applicant-committed BMPs. On privately-owned or state managed lands, the applicant will use minimization measures to avoid impacts to wetlands regardless of jurisdiction. All efforts will be taken by the applicant to site-facilities outside of, and with a buffer from, wetland resources.

Of the remaining impacts on private and state land, the applicant has committed to the following BMPs and conservation measures related to wetlands:

- Surface disturbing activities would be avoided to the maximum extent practicable. Where these features cannot be completely avoided, impacts would be minimized through design modifications, as necessary. Facilities (e.g., turbines, substations, laydown areas) would be sited to avoid and/or minimize impacts; however, where impacts are anticipated (e.g., use of project roads), minimization measures would be employed (e.g., use of culverts to maintain downstream flow/drainage).

- All impacts would be the minimum necessary to accomplish the project, would be mitigated, and the appropriate Section 404 permit would be obtained from the USACE Wyoming Regulatory Office prior to the start of construction.
- Any construction that occurs in or adjacent to wetlands and streams would use BMPs to protect surface water quality and to minimize impacts to those resources. PCW would adopt the BMPs developed for the Programmatic EIS on Wind Energy Development (BLM 2005) during construction, operation, and decommissioning of this project.

Due to the current lack of detailed information about the types and spatial of wetland and riparian areas within the project area, significant impacts to these resources could occur. To ensure consistency and compliance with the 2008 Rawlins RMP ROD (2008), pg 2-99; Wyoming BLM Mitigation Guidelines; and EOs 11990 and 11988, additional mitigation measure, WET-1, outlining wetland and riparian zone delineations during the subsequent NEPA tiering process, is recommended to mitigate impacts below the significance threshold.

4.11.3 Impacts to Vegetation from Alternative 2, Checkerboard Only

4.11.3.1 Vegetation

Direct and indirect impacts associated with construction and operation activities would be similar to those presented for Alternative 1R. Alternative 2 would result in total initial direct impacts to 8,503 acres of vegetation within the CCSM areas. Once reclaimed, Alternative 2 would result in 1,619 acres of long-term impacts within the CCSM areas. A summary of the impacts by vegetation type is provided in **Table 4.11-3**. The dominant vegetation types impacted initially include mountain big sagebrush and Wyoming big sagebrush with 3,488 acres and 1,968 acres, respectively. Saltbush is the next most common vegetation type impacted with 710 acres of total disturbance. Direct impacts associated with Alternative 2 are shown in **Figure 4.11.4** and in **Table 4.11-3**. Cushion plant communities may be impacted as a result of project implementation; however, quantification of initial and long-term impacts cannot be completed due to lack of data. Final decommissioning impacts would be similar to the initial disturbance and followed by complete restoration to pre-project conditions.

Alternative 2 would result in initial direct impacts to 166 acres of vegetation within the Upper Muddy Creek Watershed/Grizzly WHMA. The removal of vegetation would create long-term impacts on a total of 26 acres within the Upper Muddy Creek Watershed/Grizzly WHMA. No impacts to the Red Rim-Grizzly WHMA are anticipated. Impacts would be primarily associated with vegetation disturbance and removal in the mountain big sagebrush and basin big sagebrush cover types. The 2008 Rawlins RMP stipulates that surface disturbing activities will be avoided within 500 feet of perennial waters, springs, wetland, and riparian areas; therefore, no impacts to Muddy Spring Creek are anticipated.

4.11.3.2 Noxious Weeds and Invasive Species

Under Alternative 2, a total of 8,503 acres of soil would be disturbed. Impacts associated with noxious weeds and invasive species would be similar to Alternative 1R; however, total disturbance would be 812 acres greater. Long-term disturbance associated with Alternative 2 would be 1,619 acres and include 483 miles of constructed roads. Direct impacts associated with the introduction and spread of noxious weeds and invasive species would be mitigated through the implementation of PCW's Master Reclamation Plan and Weed Management Plan, which are provided in the POD (PCW 2012a). **Figure 4.11-5** illustrates the noxious weeds and invasive species in the vicinity of Alternative 2. Decommissioning of the project would be similar to the initial, construction-related impacts, providing noxious weeds and invasive species an opportunity for establishment. Impact mitigation would be consistent with that employed during construction and operation.

4.11.3.3 Wetlands and Associated Riparian Zones

Under Alternative 2, wind development would only be authorized above Township Line 18 to keep development primarily within the checkerboard landownership pattern.

Table 4.11-3 Direct Vegetation Impacts Associated with Alternative 2

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Mountain Big Sagebrush								
Grassland/Mountain Big Sagebrush	236	39	-	-	-	-	236	39
Mixed Shrub/Mountain Big Sagebrush	-	-	16	3	-	-	16	3
Mountain Big Sagebrush	2,192	371	1,265	205	31	10	3,488	585
Mountain Big Sagebrush/Bird's Foot Sagebrush	-	-	25	6	-	-	25	6
Mountain Big Sagebrush/Black Sagebrush	-	-	150	28	-	-	150	28
Steep/ Rocky/Mountain Big Sagebrush	1	0	38	6	-	-	38	6
Mountain Big Sagebrush Subtotal¹	2,429	410	1,494	248	31	10	3,953	667
Saltbush								
Grassland/Saltbush	-	-	-	-	-	-	-	-
Saltbush	227	17	466	74	17	3	710	95
Saltbush/Bird's Foot Sagebrush	73	12	71	15	-	-	144	27
Saltbush/Goldenweed	-	-	42	8	-	-	42	8
Saltbush/Mountain Big Sagebrush	8	5	31	7	-	-	38	12
Saltbush/Mountain Big Sagebrush/Spiny Horsebrush	-	-	1	0	-	-	1	0
Saltbush/Spiny Horsebrush	-	-	14	2	-	-	14	2

Table 4.11-3 Direct Vegetation Impacts Associated with Alternative 2

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Saltbush/Wyoming Big Sagebrush	0	-	19	3	151	44	170	47
Saltbush Subtotal¹	308	34	644	109	168	47	1,119	191
Wyoming Big Sagebrush								
Grassland/Wyoming Big Sagebrush	560	91	-	-	-	-	560	91
Wyoming Big Sagebrush	1,151	361	751	142	66	21	1,968	524
Wyoming Big Sagebrush/Rabbitbrush	-	-	0	0	-	-	0	0
Wyoming Big Sagebrush Subtotal¹	1,711	452	751	142	66	21	2,528	615
Other								
Aspen	-	-	8	1	-	-	8	1
Basin Big Sagebrush	1	0	-	-	-	-	1	0
Black Sagebrush	6	1	-	-	-	-	6	1
Developed	30	7	-	-	-	-	30	7
Grassland	6	2	13	3	-	-	19	4
Grassland/Bird's Foot Sagebrush	75	13	-	-	-	-	75	13
Greasewood	69	14	20	4	-	-	89	17
Greasewood/Basin Big Sagebrush	-	-	-	-	-	-	-	-
Greasewood/Mountain Big Sagebrush	11	6	-	-	-	-	11	6
Greasewood/Saltbush	295	27	-	-	2	1	297	27

Table 4.11-3 Direct Vegetation Impacts Associated with Alternative 2

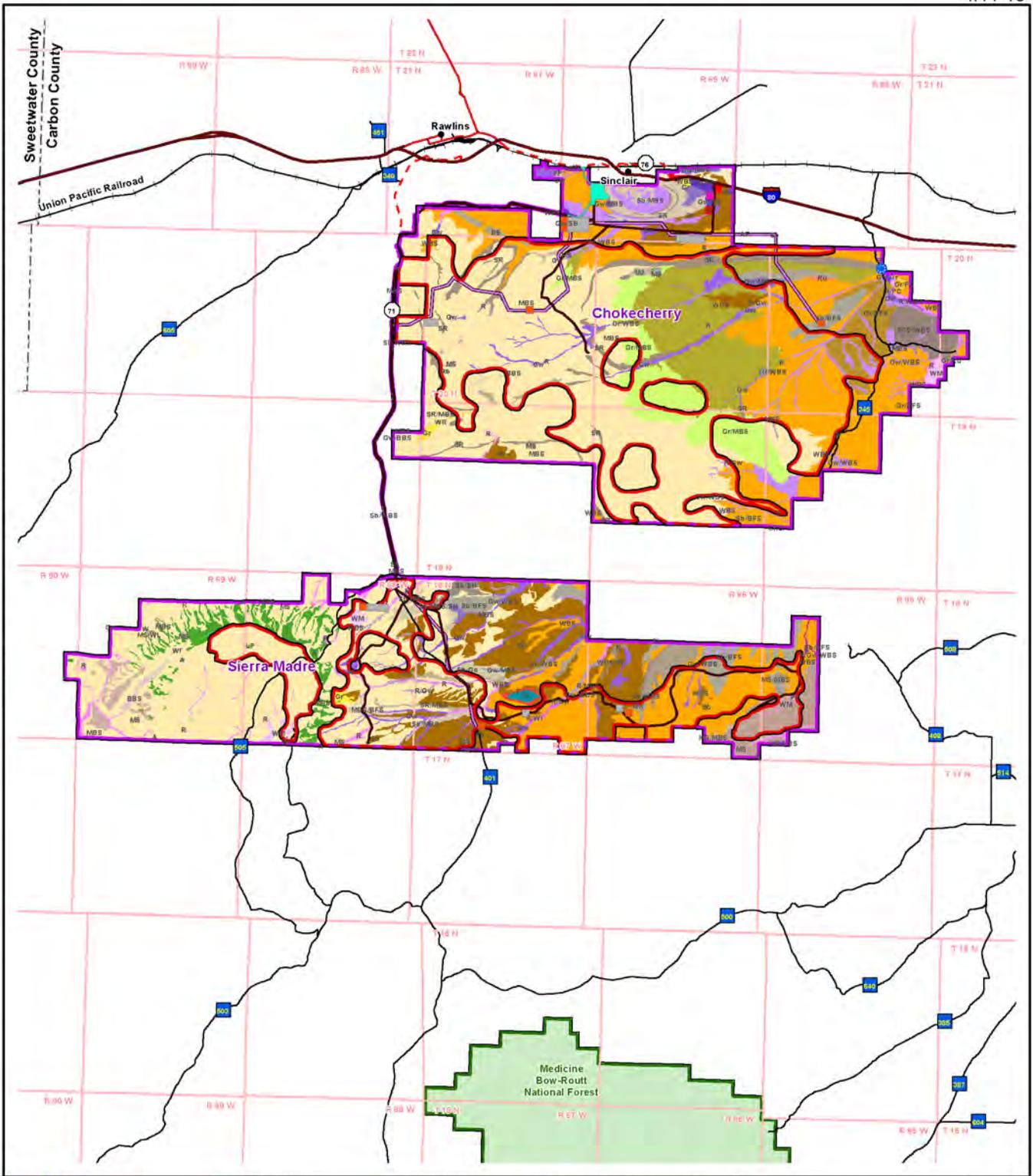
Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Greasewood/Wyoming Big Sagebrush	140	33	2	1	-	-	142	34
Limber Pine	-	-	-	-	-	-	-	-
Mixed Shrub	61	7	8	2	-	-	69	9
Rabbitbrush	1	0	-	-	-	-	1	0
Riparian	4	1	33	6	3	1	40	8
Riparian/Greasewood	11	3	14	2	-	-	25	6
Riparian/Greasewood/Wyoming Big Sagebrush	-	-	1	0	-	-	1	0
Riparian/Mountain Big Sagebrush	-	-	1	0	-	-	1	0
Steep/Rocky	58	9	-	-	-	-	58	9
Tamarisk	-	-	-	-	-	-	-	-
Utah Juniper	8	1	-	-	-	-	8	1
Wet Meadow	-	-	23	4	-	-	23	4
Wild Rye	1	0	-	-	-	-	1	0
Willow	-	-	-	-	-	-	-	-
Other Subtotal¹	777	124	123	23	5	2	905	147

¹ Total discrepancies are due to rounding.

Note: GIS estimates use assumed component locations to generate disturbance associated with vegetation type. While these estimates may vary somewhat from disturbance estimates that were generated by assuming an average amount of disturbance associated with each project component proposed by alternative (as presented in Chapter 2.0), the difference is estimated to be less than 5 percent. Total discrepancies are due to rounding.

Sources: AECOM 2009; PCW 2008b.

X:\08\Projects\12907_001_Wyoming_Vind\figure\SI\SP\SI_2012\Volume2\figure_4_11-04_Vegetation_Alt2_Impacts_20120222.mxd



<ul style="list-style-type: none"> Project Area Likely Area of Turbine Construction Transmission Line High Road Project Facilities <ul style="list-style-type: none"> Water Extraction Site O&M Building Rail Distribution Facility Laydown Area (Construction Only) Substation Vegetation Classification <ul style="list-style-type: none"> Aspen (A) Lumber Pine (LP) Plains Cottonwood (PC) Utah Juniper (UJ) Basin Big Sagebrush (BBS) Bird's Foot Sagebrush/ Wyoming Big Sagebrush (BFS/WBS) Black Sagebrush (BS) Mixed Shrub (MS) Mixed Shrub/ Mountain Big Sagebrush (MS/MSB) Mixed Shrub/ Wetland (MS/WL) Mountain Big Sagebrush (MBS) Bird's Foot Sagebrush (MBS/BFS) Mountain Big Sagebrush/ Black Sagebrush (MBS/BS) Rabbitbrush (Rb) Saltbush (Sb) Saltbush/ Goldenweed (Sb/Gw) Saltbush/ Bird's Foot Sagebrush (Sb/BFS) Saltbush/ Mountain Big Sagebrush (Sb/MBS) Saltbush/ Mountain Spiny Horsebrush (Sb/MS/SH) Saltbush/ Wyoming Big Sagebrush (Sb/WBS) Saltbush/ Spiny Horsebrush (Sb/SH) Steep/ Rocky/ Mountain Big Sagebrush (SR/MBS) Steep/ Rocky/ Wyoming Big Sagebrush (SR/WBS) Steep/ Rocky (SR) Wyoming Big Sagebrush (WBS) Wyoming Big Sagebrush/ Rabbitbrush (WBS/Rb) Greasewood (Gw) Greasewood/ Basin Big Sagebrush (Gw/BBS) Greasewood/ Grassland (Gw/Gr) Greasewood/ Mountain Big Sagebrush (Gw/MBS) Greasewood/ Saltbush (Gw/Sb) Sagebrush (Gw/WBS) Alkali Flat (AF) Grassland (Gr) Grassland/ Bird's Foot Sagebrush (Gr/BFS) Grassland/ Mountain Big Sagebrush (Gr/MBS) Grassland/ Ruderal (Gr/Ru) Grassland/ Plains Cottonwood (Gr/PC) Grassland/ Saltbush (Gr/Sb) Grassland/ Wyoming Big Sagebrush (Gr/WBS) Wild Rye (WR) Riparian (R) Riparian/ Greasewood (R/Gw) Riparian/ Greasewood/ Wyoming Big Sagebrush (R/Gw/WBS) Riparian/ Mountain Big Sagebrush (R/MBS) Riparian/ Plains Cottonwood (R/PC) Riparian/ Willow (R/W) Riparian/ Wyoming Big Sagebrush (R/WBS) Wet Meadow (WM) Willow (W) Cheatgrass (ChG) Ruderal (Ru) Tamarisk (T) Water/ Ruderal (W/Ru) Developed (D) Water (W)

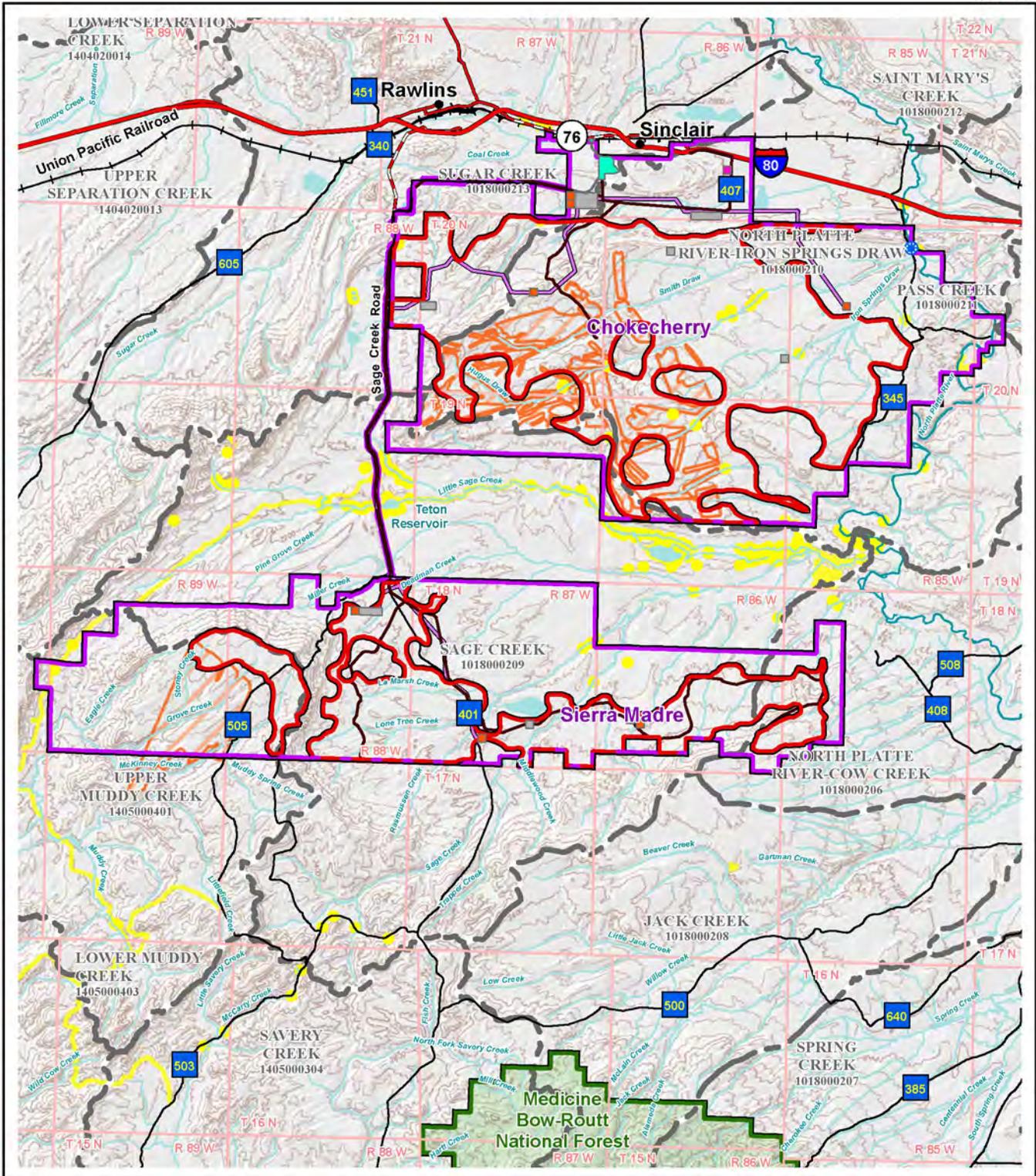
Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-4

Vegetation Impacts within Alternative 2

1:320,000

X:\Projects\12907_001_Wyoming_Wind\figure\SI\SIPEIS_2012\Volume\figure_4_11-05_Weeds_A12_Imports_20120222.mxd



Legend			
	Water Extraction Site		Project Area
	Transmission Line		Likely Area of Turbine Construction
	Haul Road		Spike Treatment for Sagebrush Enhancement
	O&M Building		Noxious Weed Location (Not to Scale)
	Rail Distribution Facility		National Forest
	Laydown Area (Construction Only)		Interstate Highway
	Substation		U.S. Highway
			State Highway
			River or Creek
			Lake or Reservoir
			Drainage Basin

Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-5

Known Noxious Weeds and Invasive Species in the Vicinity of Alternative 2

1:300,000

Impacts to wetlands and riparian zone drainages would be similar to those described for Alternative 1R, except the amount of potential wetland and riparian zone disturbance would be greater. **Figure 4.11-6** shows wetland and riparian zone drainages within Alternative 2. Alternative 2 would result in the initial impact to wetland and riparian zones totaling 19,930 linear feet, of which 4,621 linear feet would be in Chokecherry; 14,725 linear feet would be in Sierra Madre; and 584 linear feet would be associated with the haul road. Similar to Alternative 1R, long-term impacts to wetland and riparian zone drainages associated with transmission line operation would total 3,697 linear feet (1,117 linear feet in Chokecherry; 2,395 linear feet in Sierra Madre; and 184 linear feet associated with haul road use).

Impacts resulting from the decommissioning of the project (temporary disturbance) have the potential to occur and would be similar to impact levels resulting from project operations. Decommissioning impacts would include direct impacts resulting from laydown area use and indirect effects associated with increased dust levels due to increased traffic levels.

As with Alternative 1R, the environmental constraints table (**Appendix C, Table C-1**) states that: 1) no disturbance will occur to wetlands and riparian zone drainages on BLM land; and 2) surface disturbing activities within 500 feet of wetlands on BLM land will be avoided, or if the activity cannot be avoided, protection of wetlands will be provided. Potential impacts to wetlands and riparian zones on BLM land associated with Alternative 2 would be less than under Alternative 1R. Of the 19,930 linear feet of wetland and riparian zone drainages impacted in Alternative 2, 1,827 linear feet are located on BLM land, including 361 linear feet in Chokecherry; 1,050 linear feet in Sierra Madre; and 416 linear feet associated with haul road use. Further wetland evaluation would be needed during the site-specific design process and associated NEPA assessments, to ensure consistency with the 2008 Rawlins RMP ROD (pg 2-99; Wyoming BLM Mitigation Guidelines; EOs 11990 and 11988).

Of the remaining impacts on private and state land, the applicant has committed to BMPs and conservation measures (Section 4.11.8.3) that would avoid, minimize, or mitigate wetland impacts. This would be ensured through the Section 404 permit process.

4.11.4 Impacts to Vegetation from Alternative 3, No Miller Hill or South Sierra Madre

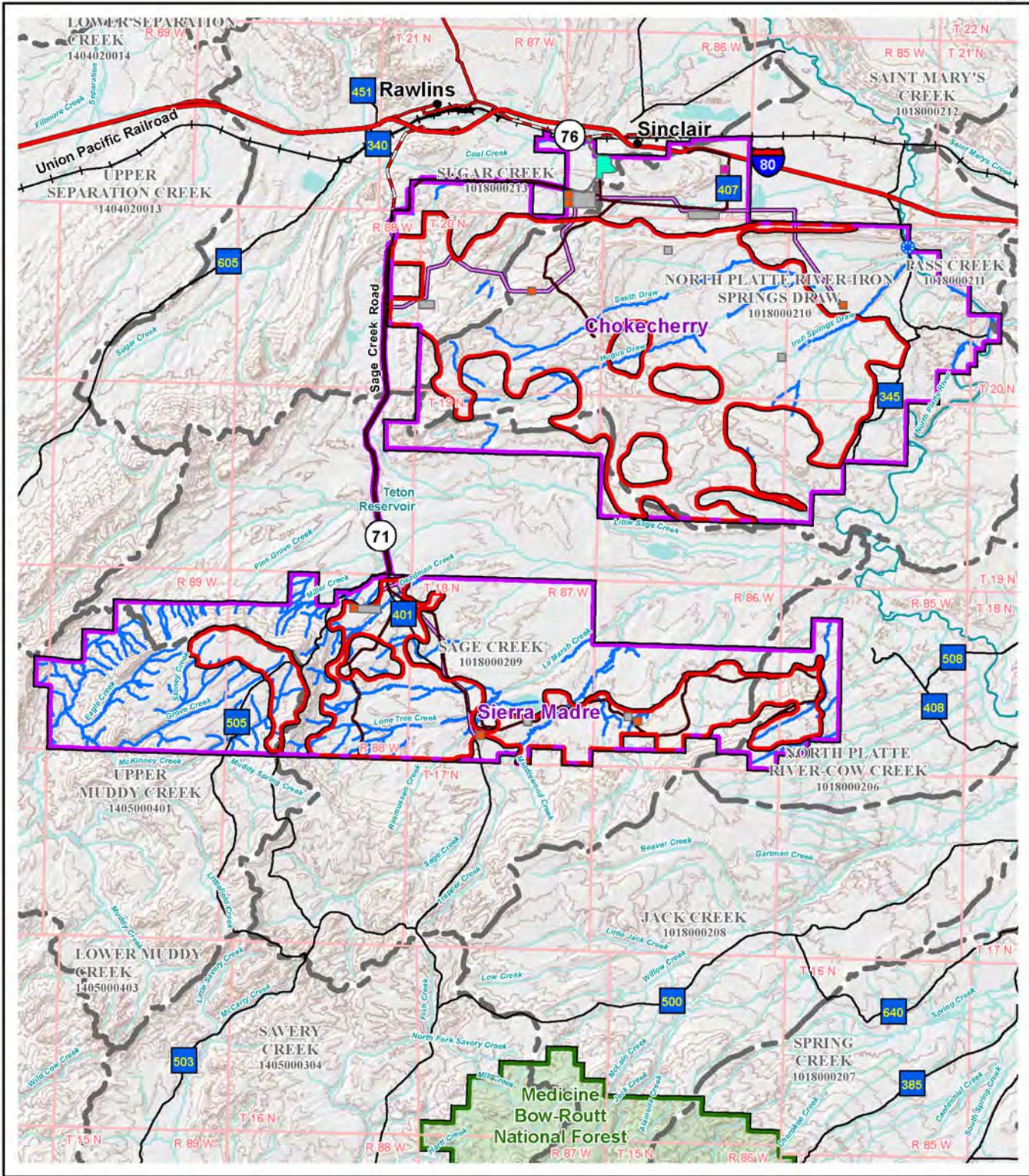
4.11.4.1 Vegetation

Direct and indirect impacts associated with construction and operation activities would be similar to those presented for Alternative 1R. Alternative 3 would result in initial direct impacts to 8,032 acres of vegetation within the CCSM areas. Once reclaimed, Alternative 3 would result in 1,493 acres of long-term impacts within the CCSM areas. A summary of initial and long-term impacts by vegetation type are provided in **Table 4.11-4**. The dominant vegetation types impacted include mountain big sagebrush and Wyoming big sagebrush with 3,123 acres and 1,563 acres, respectively. Saltbush is the next most common vegetation type with 830 acres of total disturbance. Direct impacts associated with Alternative 3 are shown in **Figure 4-11.7** and in **Table 4.11-4**. Cushion plant communities may be impacted as a result of project implementation; however, quantification of initial and long-term impacts cannot be completed due to lack of data. Decommissioning impacts would be similar to initial impacts; however, impacts would be restored to pre-project conditions.

4.11.4.2 Noxious Weeds and Invasive Species

Under Alternative 3, a total of 8,032 acres of soil would be disturbed. Impacts associated with noxious weeds and invasive species would be similar to Alternative 1R; however, disturbance would be 341 acres greater. Long-term disturbance associated with Alternative 3 would be 1,493 acres and include 460 miles of constructed roads. Alternative 3 would avoid additional disturbance to the more weed-free areas of Miller Hill and Sierra Madre. Direct impacts associated with the introduction and spread of noxious weeds and invasive species would be mitigated through the implementation of PCW's Master Reclamation Plan and Weed Management Plan. **Figure 4.11-8** illustrates the noxious weeds and invasive species in the vicinity of Alternative 3.

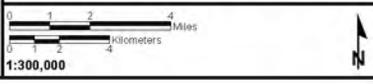
X:\Projects\12907_001_Wyoming_Wind\figures\ELSP\ELSP_2012\Volume2\Figure_4_11-06_WetlandRiparian_A1Z_Impacts_20120222.mxd



- | Legend | | |
|----------------------------------|---------------------------------------|--------------------|
| Transmission Line | Water Extraction Site | Interstate Highway |
| Haul Road | Project Area | U.S. Highway |
| O&M Building | Likely Area of Turbine Construction | State Highway |
| Rail Distribution Facility | Potential Wetlands and Riparian Zones | River or Creek |
| Laydown Area (Construction Only) | Lake or Reservoir | Drainage Basin |
| Substation | National Forest | |

**Chokecherry and Sierra Madre
Wind Energy Project**

**Figure 4.11-6
Wetland and Riparian Zones
in the Vicinity of Alternative 2**



1:300,000

Table 4.11-4 Direct Vegetation Impacts Associated with Alternative 3

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Mountain Big Sagebrush								
Grassland/Mountain Big Sagebrush	310	50	-	-	-	-	310	50
Mixed Shrub/Mountain Big Sagebrush	-	-	14	2	-	-	14	2
Mountain Big Sagebrush	2,327	397	735	101	61	20	3,123	518
Mountain Big Sagebrush/Bird's Foot Sagebrush	-	-	21	4	-	-	21	4
Mountain Big Sagebrush/Black Sagebrush	-	-	122	20	-	-	122	20
Steep/Rocky/Mountain Big Sagebrush	1	0	38	6	0	0	40	6
Mountain Big Sagebrush Subtotal¹	2,638	447	930	133	61	20	3,630	600
Saltbush								
Grassland/Saltbush	56	54	-	-	-	-	56	54
Saltbush	261	43	504	91	64	19	830	154
Saltbush/Bird's Foot Sagebrush	73	12	83	13	-	-	156	24
Saltbush/Goldenweed	-	-	38	6	-	-	38	6
Saltbush/Mountain Big Sagebrush	2	0	22	4	5	2	30	6
Saltbush/Mountain Big Sagebrush/Spiny Horsebrush	-	-	1	0	-	-	1	0
Saltbush/Spiny Horsebrush	-	-	19	3	-	-	19	3

Table 4.11-4 Direct Vegetation Impacts Associated with Alternative 3

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Saltbush/Wyoming Big Sagebrush	0	0	45	8	94	17	139	25
Saltbush Subtotal¹	392	109	712	125	163	38	1,269	272
Wyoming Big Sagebrush								
Grassland/Wyoming Big Sagebrush	577	93	-	-	-	-	577	93
Wyoming Big Sagebrush	930	145	618	106	14	3	1,563	254
Wyoming Big Sagebrush/Rabbitbrush	-	-	1	0	-	-	1	0
Wyoming Big Sagebrush Subtotal¹	1,507	238	619	106	14	3	2,141	347
Other								
Aspen	-	-	1	0	-	-	1	0
Basin Big Sagebrush	1	0	-	-	-	-	1	0
Black Sagebrush	6	1	-	-	-	-	6	1
Developed	26	7	-	-	-	-	26	7
Grassland	7	2	10	2	-	-	17	4
Grassland/Bird's Foot Sagebrush	75	13	-	-	-	-	75	13
Greasewood	52	8	24	4	7	2	83	15
Greasewood/Basin Big Sagebrush	-	-	-	-	-	-	-	-
Greasewood/Mountain Big Sagebrush	173	168	-	-	-	-	173	168
Greasewood/Saltbush	289	20	-	-	-	-	289	20
Greasewood/Wyoming Big Sagebrush	112	15	2	0	-	-	114	15

Table 4.11-4 Direct Vegetation Impacts Associated with Alternative 3

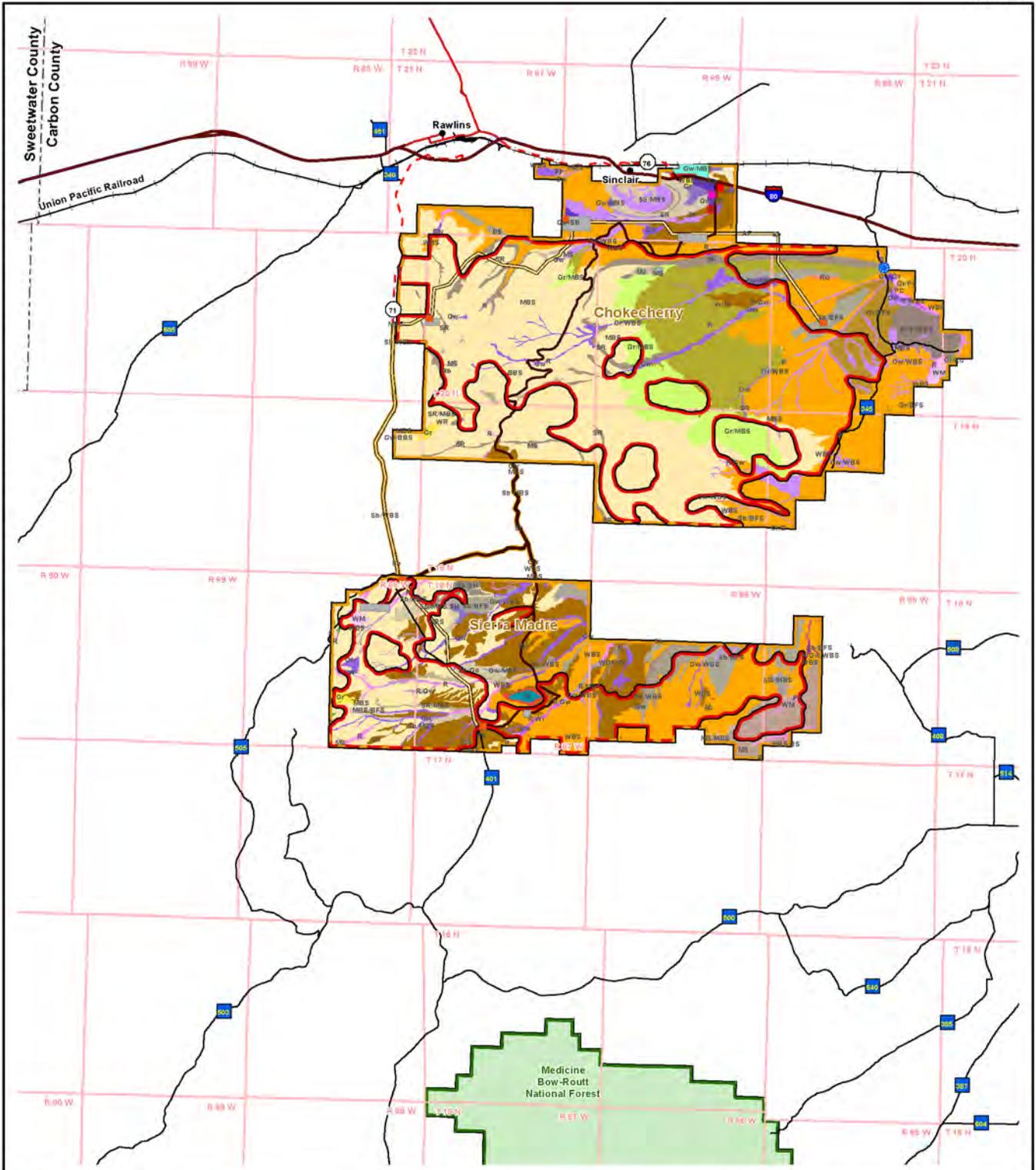
Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Limber Pine	-	-	-	-	-	-	-	-
Mixed Shrub	61	7	4	1	-	-	65	7
Rabbitbrush	1	0	-	-	-	-	1	0
Riparian	7	2	24	3	1	0	31	5
Riparian/Greasewood	9	2	15	2	-	-	25	4
Riparian/Greasewood/ Wyoming Big Sagebrush	-	-	-	-	-	-	-	-
Riparian/Mountain Big Sagebrush	-	-	-	-	-	-	-	-
Steep/Rocky	65	10	-	-	-	-	65	10
Tamarisk	-	-	-	-	-	-	-	-
Utah Juniper	8	1	-	-	-	-	8	1
Wet Meadow	-	-	15	2	-	-	15	2
Wild Rye	1	0	-	-	-	-	1	0
Willow	-	-	-	-	-	-	-	-
Other Subtotal¹	893	256	95	14	8	2	996	272

¹ Total discrepancies are due to rounding.

Note: GIS estimates use assumed component locations to generate disturbance associated with vegetation type. While these estimates may vary somewhat from disturbance estimates that were generated by assuming an average amount of disturbance associated with each project component proposed by alternative (as presented in Chapter 2.0), the difference is estimated to be less than 5 percent. Total discrepancies are due to rounding.

Sources: AECOM 2009; PCW 2008b.

X:\0\Projects\12907_001_Wyoming_Vindot\figure4\SP\ES\2012\Volume2\figure_4_11-07_Vegetation_Alt3_Impacts_20120222.mxd



<ul style="list-style-type: none"> Project Area Likely Area of Turbine Construction Transmission Line Haul Road 	<ul style="list-style-type: none"> Mixed Shrub/ Mountain Big Sagebrush (MS/MBS) Mountain Big Sagebrush (MBS) Mountain Big Sagebrush/ Bird's Foot Sagebrush (MBS/BFS) Mountain Big Sagebrush/ Black Sagebrush (MBS/BS) Rabbitbrush (Rb) Saltbush (Sb) Saltbush/ Goldenweed (Sb/Go) Saltbush/ Bird's Foot Sagebrush (Sb/BFS) Sagebrush (Sb/BS) Saltbush/ Mountain Big Sagebrush (Sb/MBS) Saltbush/ Mountain Big Sagebrush/ Spiny Horsetrue (Sb/MBS/SH) Saltbush/ Wyoming Big Sagebrush (Sb/WBS) Saltbush/ Spiny Horsetrue (Sb/SH) Black Sagebrush (BS) Mixed Shrub (MS) 	<ul style="list-style-type: none"> Steep Rocky/ Wyoming Big Sagebrush (SR/WBS) Steep Rocky (SR) Wyoming Big Sagebrush (WBS) Wyoming Big Sagebrush/ Rabbitbrush (WBS/Rb) Greasewood (Gw) Greasewood/ Basin Big Sagebrush (Gw/BBS) Greasewood/ Grassland (Gw/Gr) Greasewood/ Mountain Big Sagebrush (Gw/MBS) Greasewood/ Saltbush (Gw/Sb) Greasewood/ Wyoming Big Sagebrush (Gw/WBS) Alkali Flat (AF) Grassland (Gr) Grassland/ Bird's Foot Sagebrush (Gr/BFS) Grassland/ Mountain Big Sagebrush (Gr/MBS) Grassland/ Ruderal (Gr/Ru) Grassland/ Plains Cottonwood (Gr/PC) Grassland/ Saltbush (Gr/Sb) 	<ul style="list-style-type: none"> Grassland/ Wyoming Big Sagebrush (Gr/WBS) Wild Rye (WR) Riparian (R) Riparian/ Greasewood (R/Gw) Riparian/ Greasewood/ Wyoming Big Sagebrush (R/Gw/WBS) Riparian/ Mountain Big Sagebrush (R/MBS) Riparian/ Plains Cottonwood (R/PC) Riparian/ Willow (R/W) Riparian/ Wyoming Big Sagebrush (R/WBS) Wet Meadow (WM) Chenopod (ChS) Ruderal (Ru) Tamarisk (T) Developed (D) Water (W)
---	--	--	---

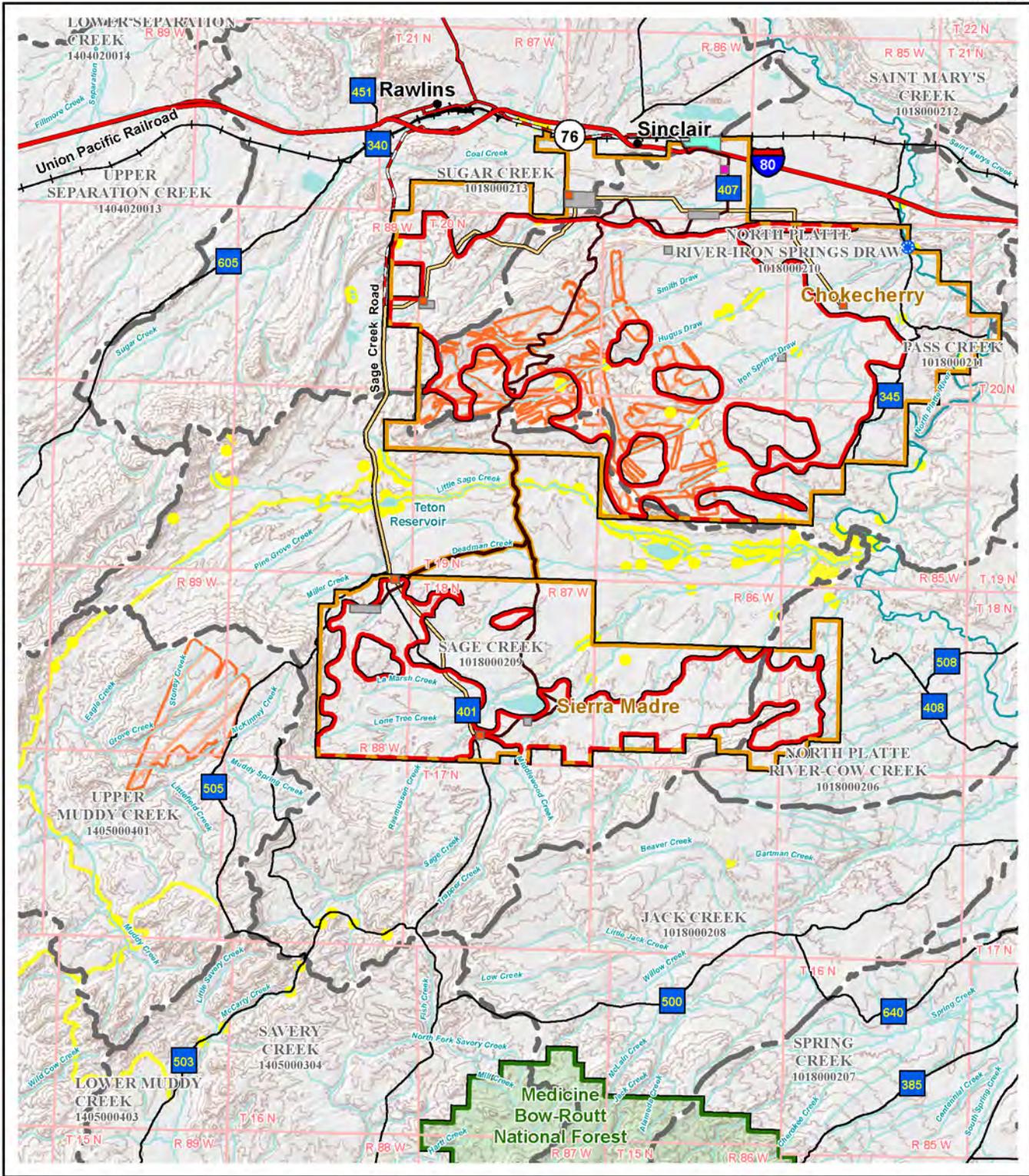
Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-7

Vegetation Impacts within Alternative 3

1:320,000

X:\Projects\12907_001_Wyoming_Wind\figures\SI_SPEIS_2012\Volume2\Figure_4_11-08_Weeds_A113_Impacts_20120222.mxd



Legend			
	Water Extraction Site		Project Area
	Transmission Line		Likely Area of Turbine Construction
	Haul Road		Spike Treatment for Sagebrush Enhancement
	O&M Building		Noxious Weed Location (Not to Scale)
	Rail Distribution Facility		National Forest
	Laydown Area (Construction Only)		Interstate Highway
	Substation		U.S. Highway
			State Highway
			River or Creek
			Lake or Reservoir
			Drainage Basin

Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-8

Known Noxious Weeds and Invasive Species in the Vicinity of Alternative 3

1:300,000

Decommissioning of the project would be similar to the initial, construction-related impacts, providing noxious weeds and invasive species an opportunity for establishment. Impact mitigation would be consistent with that employed during construction and operation.

4.11.4.3 Wetlands and Associated Riparian Zones

Under Alternative 3, wind development would be authorized in the Chokecherry portion of the alternative area and the area from the eastern half of T18, R88 to the east of the Sierra Madre portion of the alternative area to accommodate displaced turbines to achieve up to 1,000 turbines. All lands would be excluded below Township line 18, T18, R89, and the western half of T18, R89. **Figure 4.11-9** shows impacts to wetlands and riparian zone drainages within Alternative 3.

Impacts to wetlands would be as described for Alternative 1R, except the amount of potential wetland disturbance would differ. The amount of linear wetland and riparian zone disturbance would be less than both Alternative 1R and Alternative 2. Under Alternative 3, initial impacts to wetland and riparian zones would total 15,788 linear feet, of which 5,102 linear feet would be in Chokecherry; 10,053 linear feet would be in Sierra Madre; and 633 linear feet would be associated with the 230-kV towers and internal resource road. Similar to Alternative 2, long-term impacts to wetland and riparian zone drainages associated with transmission line operation would total 2,378 linear feet (1,004 linear feet in Chokecherry; 1,292 linear feet in Sierra Madre; and 82 linear feet associated with internal resource road use). Impacts resulting from the decommissioning of the project (temporary disturbance) have the potential to occur and would be similar to impact levels resulting from project construction. Decommissioning impacts would include direct impacts resulting from laydown area use and increased dust levels due to increased traffic levels.

As with the other alternatives, the environmental constraints table (**Appendix C, Table C-1**) states that: 1) no disturbance will occur to wetlands identified on NWI maps on BLM land; and 2) surface disturbing activities within 500 feet of wetlands on BLM land will be avoided, or if the activity cannot be avoided, protection of wetlands will be provided. Of the 15,788 linear feet of wetland and riparian zone drainages impacted in Alternative 3, 424 linear feet are located on BLM land, including 164 linear feet in Chokecherry; 407 linear feet in Sierra Madre; and 391 linear feet associated with the 230-kV towers and internal resource road. Further wetland evaluation would be needed during the site-specific design process to ensure consistency with the 2008 Rawlins RMP ROD (2008, pg 2-99; Wyoming BLM Mitigation Guidelines; EOs 11990 and 11988). Alternative 3 would result in fewer impacts to wetlands and riparian zones on BLM land than Alternatives 1R and 2.

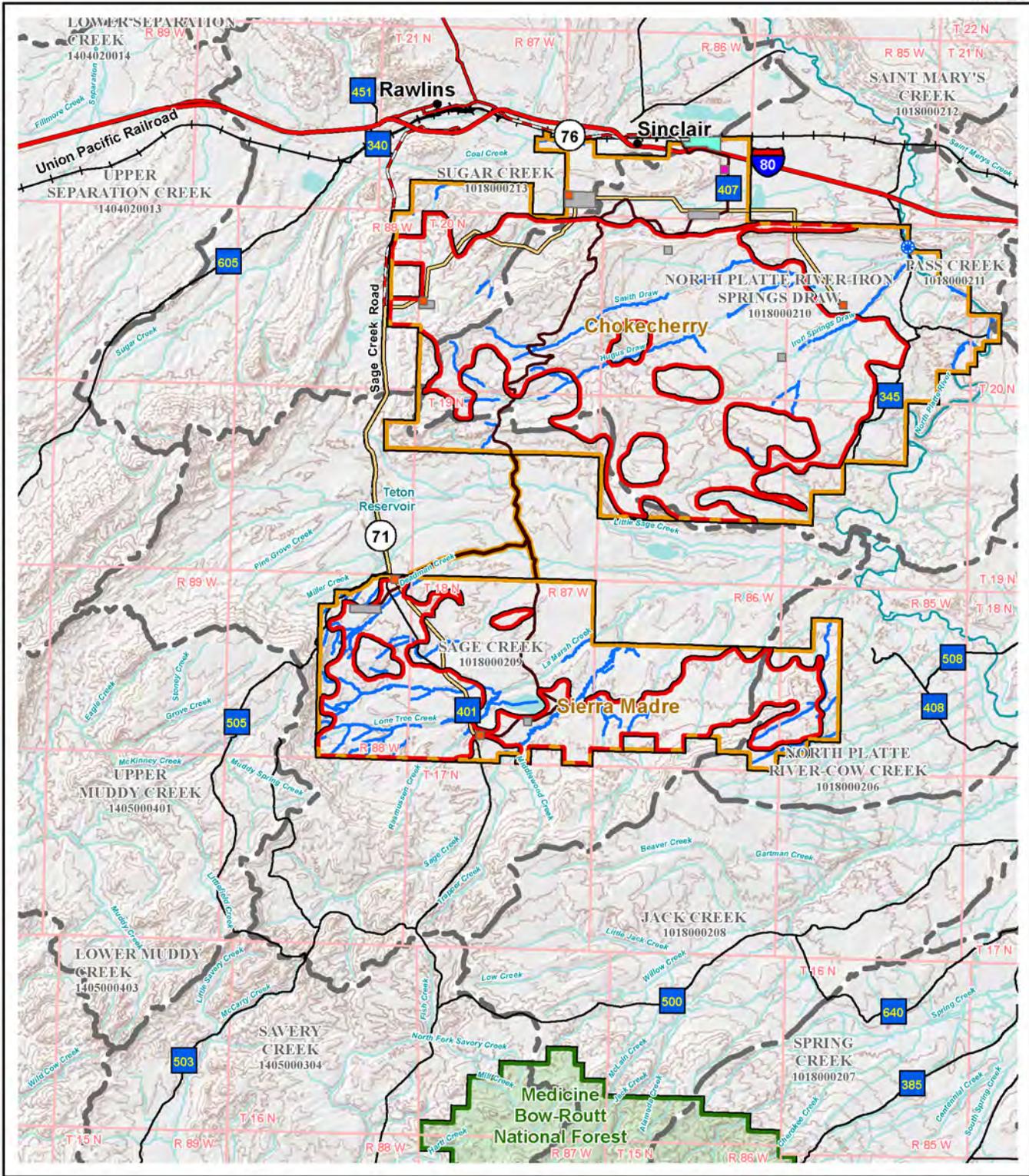
Of the remaining wetland and riparian zone drainage disturbance on private and state lands, the applicant has committed to BMPs and conservation measures (Section 4.11.8.3) that would avoid, minimize, or mitigate wetland impacts. This would be ensured through the Section 404 permit process.

4.11.5 Impacts to Vegetation from Alternative 4, Private Lands Only

4.11.5.1 Vegetation

Direct and indirect impacts associated with construction and operation activities would be similar to those presented for Alternative 1R. Alternative 4 would result in direct impacts to 8,109 acres of vegetation with the CCSM areas. Once reclaimed, Alternative 4 would result in 1,530 acres of long-term impacts within the CCSM areas. A summary of initial and long-term impacts by vegetation type are provided in **Table 4.11-5**. The dominant vegetation types impacted initially include mountain big sagebrush and Wyoming big sagebrush with 3,027 acres and 1,551 acres, respectively. Saltbush is the next most common vegetation type with 994 acres of total disturbance. Direct impacts associated with Alternative 4 are shown in **Figure 4-11.10** and in **Table 4.11-5**. Cushion plant communities may be impacted as a result of project implementation; however, quantification of initial and long-term impacts cannot be completed due to lack of data. Decommissioning of the project would result in impacts to vegetation that

X:\Projects\12907_001_Wyoming_Wind\figures\ELSP\ELSP_2012\Volume\figure_4_11-09_WetlandRiparian_Alt3_Impacts_20110222.mxd



- | | | |
|----------------------------------|---------------------------------------|--------------------|
| Transmission Line | Water Extraction Site | Interstate Highway |
| Haul Road | Project Area | U.S. Highway |
| O&M Building | Likely Area of Turbine Construction | State Highway |
| Rail Distribution Facility | Potential Wetlands and Riparian Zones | River or Creek |
| Laydown Area (Construction Only) | National Forest | Lake or Reservoir |
| Substation | | Drainage Basin |

**Chokecherry and Sierra Madre
Wind Energy Project**

**Figure 4.11-9
Wetland and Riparian Zones
in the Vicinity of Alternative 3**

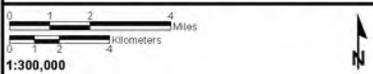


Table 4.11-5 Direct Vegetation Impacts Associated with Alternative 4

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Mountain Big Sagebrush								
Grassland/Mountain Big Sagebrush	290	50	11	2	-	-	301	52
Mountain Big Sagebrush	1,824	328	1,134	165	69	20	3,027	513
Mountain Big Sagebrush/Bird's Foot Sagebrush	-	-	18	3	-	-	18	3
Mountain Big Sagebrush/Black Sagebrush	-	-	79	14	-	-	79	14
Steep/ Rocky/Mountain Big Sagebrush	2	0	33	5	0	0	36	6
Mountain Big Sagebrush Subtotal¹	2,116	378	1,275	189	69	20	3,461	588
Saltbush								
Grassland/Saltbush	56	54	-	-	-	-	56	54
Saltbush	268	45	657	113	69	19	994	177
Saltbush/Bird's Foot Sagebrush	103	17	95	16	1	0	199	32
Saltbush/Goldenweed	-	-	25	5	-	-	25	5
Saltbush/Mountain Big Sagebrush	2	0	19	3	6	2	27	5
Saltbush/Mountain Big Sagebrush/Spiny Horsebrush	-	-	1	0	-	-	1	0
Saltbush/Spiny Horsebrush	-	-	33	6	-	-	33	6
Saltbush/Wyoming Big Sagebrush	0	0	78	14	94	17	172	31

Table 4.11-5 Direct Vegetation Impacts Associated with Alternative 4

Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Saltbush Subtotal¹	429	116	908	157	170	38	1,507	310
Wyoming Big Sagebrush								
Grassland/Wyoming Big Sagebrush	491	81	-	-	1	0	492	81
Wyoming Big Sagebrush	920	149	611	105	20	3	1,551	257
Wyoming Big Sagebrush/Rabbitbrush	-	-	5	1	-	-	5	1
Wyoming Big Sagebrush Subtotal¹	1,411	230	616	106	21	3	2,048	339
Other								
Aspen	-	-	18	3	0	0	18	3
Basin Big Sagebrush	1	0	-	-	-	-	1	0
Black Sagebrush	6	1	-	-	-	-	6	1
Developed	26	7	-	-	-	-	26	7
Grassland	11	3	20	4	-	-	31	7
Grassland/Bird's Foot Sagebrush	105	18	-	-	-	-	105	18
Greasewood	52	9	39	7	7	2	98	19
Greasewood/Basin Big Sagebrush	-	-	-	-	-	-	-	-
Greasewood/Mountain Big Sagebrush	174	168	0	0	0	-	174	168
Greasewood/Saltbush	289	20	-	-	-	-	289	20
Greasewood/Wyoming Big Sagebrush	130	18	7	1	2	0	138	19
Limber Pine	-	-	-	-	-	-	-	-

Table 4.11-5 Direct Vegetation Impacts Associated with Alternative 4

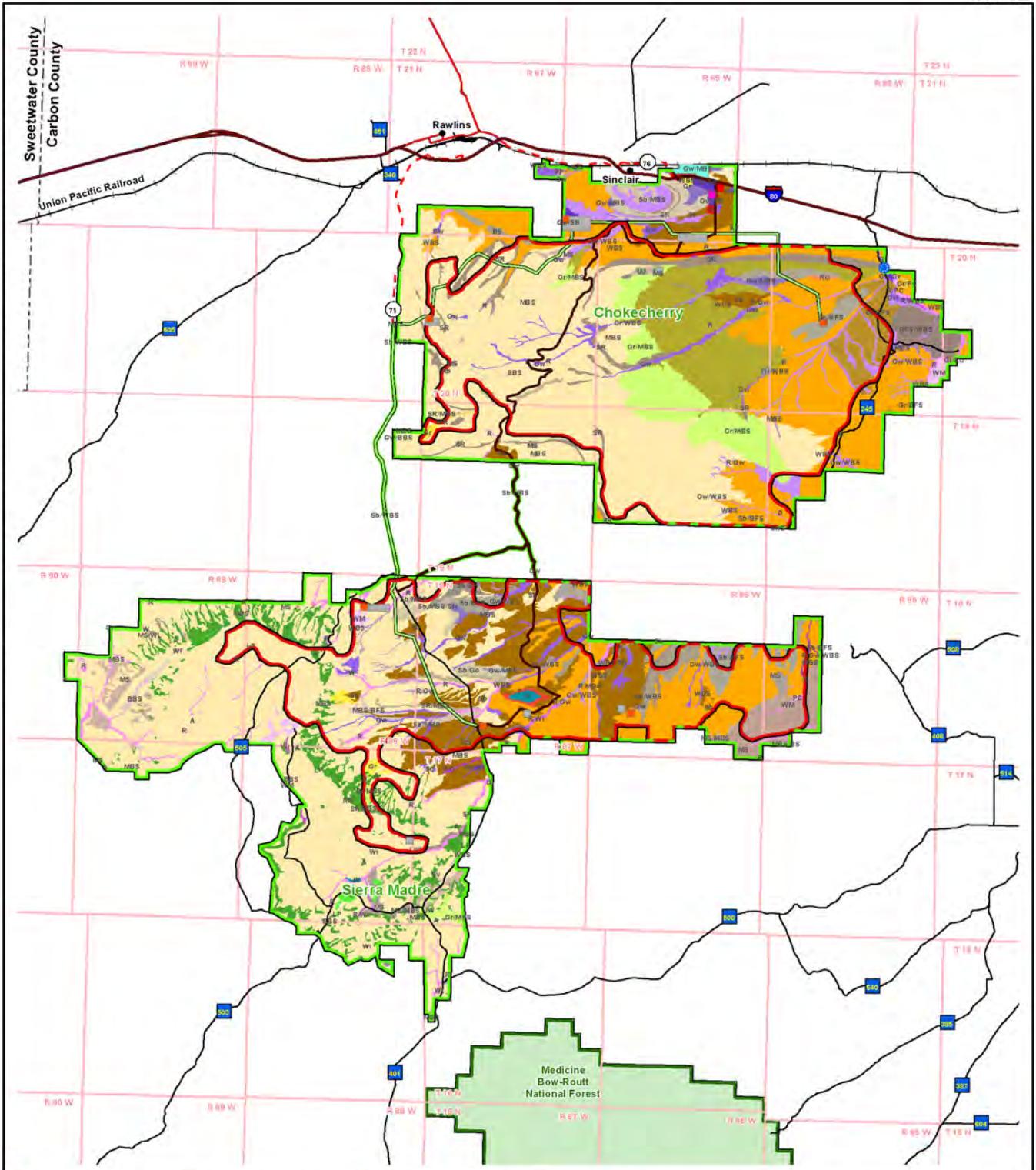
Vegetation Community	Chokecherry		Sierra Madre		Haul Road/Transmission Lines		Total ¹	
	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)	Initial Disturbance (acres)	Long-term Disturbance (acres)
Mixed Shrub	54	6	3	1	0	0	57	7
Mixed Shrub/Mountain Big Sagebrush	-	-	-	-	-	-	-	-
Rabbitbrush	1	0	-	-	-	-	1	0
Riparian	6	2	28	4	1	0	35	6
Riparian/Greasewood	10	2	16	3	0	0	26	4
Riparian/Greasewood/Wyoming Big Sagebrush	-	-	0	0	-	-	0	0
Riparian/Mountain Big Sagebrush	-	-	0	0	-	-	0	0
Steep/Rocky	60	10	-	-	1	0	60	10
Tamarisk	-	-	4	1	-	-	4	1
Utah Juniper	6	0	-	-	-	-	6	0
Wet Meadow	-	-	16	2	-	-	16	2
Wild Rye	3	1	-	-	-	-	3	1
Willow	-	-	-	-	-	-	-	-
Other Subtotal¹	934	265	151	26	11	2	1,094	293

¹ Total discrepancies are due to rounding.

Note: GIS estimates use assumed component locations to generate disturbance associated with vegetation type. While these estimates may vary somewhat from disturbance estimates that were generated by assuming an average amount of disturbance associated with each project component proposed by alternative (as presented in Chapter 2.0), the difference is estimated to be less than 5 percent. Total discrepancies are due to rounding.

Sources: AECOM 2009; PCW 2008b.

X:\06\projects\12907_001_Wyoming_Vindot\figure4\SP\FIGS_2012\Volume2\figure_4_11-10_Vegetation_Alt4_Impacts_20120222.mxd



<ul style="list-style-type: none"> █ Project Area █ Likely Area of Turbine Construction — Transmission Line — Haul Road <p>Project Facilities</p> <ul style="list-style-type: none"> █ Water Extraction Site █ O&M Building █ Rail Distribution Facility █ Laydown Area █ (Construction Only) █ Substation <p>Vegetation Classification</p> <ul style="list-style-type: none"> █ Aspen (A) █ Juniper Woodland (JW) █ Limber Pine (LP) █ Plains Cottonwood (PC) █ Utah Juniper (UJ) █ Basin Big Sagebrush (BBS) █ Birds Foot Sagebrush/Wyoming Big Sagebrush (BF3WBS) █ Black Sagebrush (BS) █ Mixed Shrub (MS) █ Mixed Shrub/ Mountain Big Sagebrush (MS/MSB) █ Mixed Shrub/ Wetland (MS/WL) █ Mountain Big Sagebrush (MBS) █ Mountain Big Sagebrush/ Birds Foot Sagebrush (MBS/BFS) █ Mountain Big Sagebrush/ Black Sagebrush (MBS/BS) █ Rabbitbrush (Rb) █ Saltbush (Sb) █ Saltbush/ Goldenweed (Sb/Gw) █ Saltbush/ Bird's Foot Sagebrush (Sb/BFS) █ Saltbush/ Mountain Big Sagebrush (Sb/MBS) █ Saltbush/ Mountain Big Sagebrush/ Spiny Horsebrush (Sb/MBS/SH) █ Saltbush/ Wyoming Big Sagebrush (Sb/WBS) █ Saltbush/ Spiny Horsebrush (Sb/SH) █ Serviceberry (Sv) █ Steep/ Rocky/ Mountain Big Sagebrush (SR/MSB) █ Steep/ Rocky/ Wyoming Big Sagebrush (SR/WBS) █ Steep/ Rocky (SR) █ Wyoming Big Sagebrush (WBS) █ Wyoming Big Sagebrush/ Rabbitbrush (WBS/Rb) █ Greasewood (Gw) █ Greasewood/ Basin Big Sagebrush (Gw/BS) █ Greasewood/ Grassland (Gw/Gr) █ Greasewood/ Mountain Big Sagebrush (Gw/MBS) █ Greasewood/ Saltbush (Gw/Sb) █ Greasewood/ Wyoming Big Sagebrush (Gw/WBS) █ Alkali Flat (AF) █ Grassland (Gr) █ Grassland/ Bird's Foot Sagebrush (Gr/BFS) █ Grassland/ Mountain Big Sagebrush (Gr/MBS) █ Grassland/ Ruderal (Gr/Ru) █ Grassland/ Plains Cottonwood (Gr/PC) █ Grassland/ Saltbush (Gr/Sb) █ Grassland/ Wyoming Big Sagebrush (Gr/WBS) █ Wild Rye (WR) █ Riparian (R) █ Riparian/ Grassland (R/Gr) █ Riparian/ Greasewood (R/Gw) █ Riparian/ Greasewood/ Wyoming Big Sagebrush (R/Gw/WBS) █ Riparian/ Mountain Big Sagebrush (R/MBS) █ Riparian/ Plains Cottonwood (R/PC) █ Riparian/ Willow (R/W) █ Riparian/ Wyoming Big Sagebrush (R/WBS) █ Wetland (Wt) █ Wet Meadow (WM) █ Willow (W) █ Chaptalgrass (ChG) █ Ruderal (Ru) █ Tamarisk (T) █ Water/ Ruderal (W/Ru) █ Developed (D) █ Water (W)
--

**Chokecherry and Sierra Madre
Wind Energy Project**

**Figure 4.11-10
Vegetation Impacts within
Alternative 4**

1:320,000

are similar in size and nature to the initial impacts; however, all impacts would be restored back to pre-project conditions.

Alternative 4 would result in initial direct impacts to 56 acres of vegetation within the Upper Muddy Creek Watershed/Grizzly WHMA. Long-term impacts would total 12 acres within the Upper Muddy Creek Watershed/Grizzly WHMA. No impacts to the Red Rim-Grizzly WHMA are anticipated. Impacts would be primarily associated with the mountain big sagebrush and basin big sagebrush vegetation cover types. The 2008 Rawlins RMP states the avoidance of surface disturbing activities within 500 feet of perennial waters, springs, wetland, and riparian areas; therefore, no impacts to Muddy Spring Creek are anticipated.

4.11.5.2 Noxious Weeds and Invasive Species

Under Alternative 4, a total of 8,109 acres of soil would be disturbed. Impacts associated with noxious weeds and invasive species would be similar to Alternative 1R; however, disturbance would be 418 acres greater. Long-term disturbance associated with Alternative 4 would be 1,530 acres and include 488 miles of constructed roads. Direct impacts associated with the introduction and spread of noxious weeds and invasive species would be mitigated through the implementation of PCW's Master Reclamation Plan and Weed Management Plan as presented in the POD (PCW 2012a). **Figure 4.11-11** illustrates noxious weeds and invasive species in the vicinity of Alternative 4. Decommissioning of the project would be similar to the initial, construction-related impacts, providing noxious weeds and invasive species an opportunity for establishment. Impact mitigation would be consistent with that employed during construction and operation.

4.11.5.3 Wetlands and Associated Riparian Zones

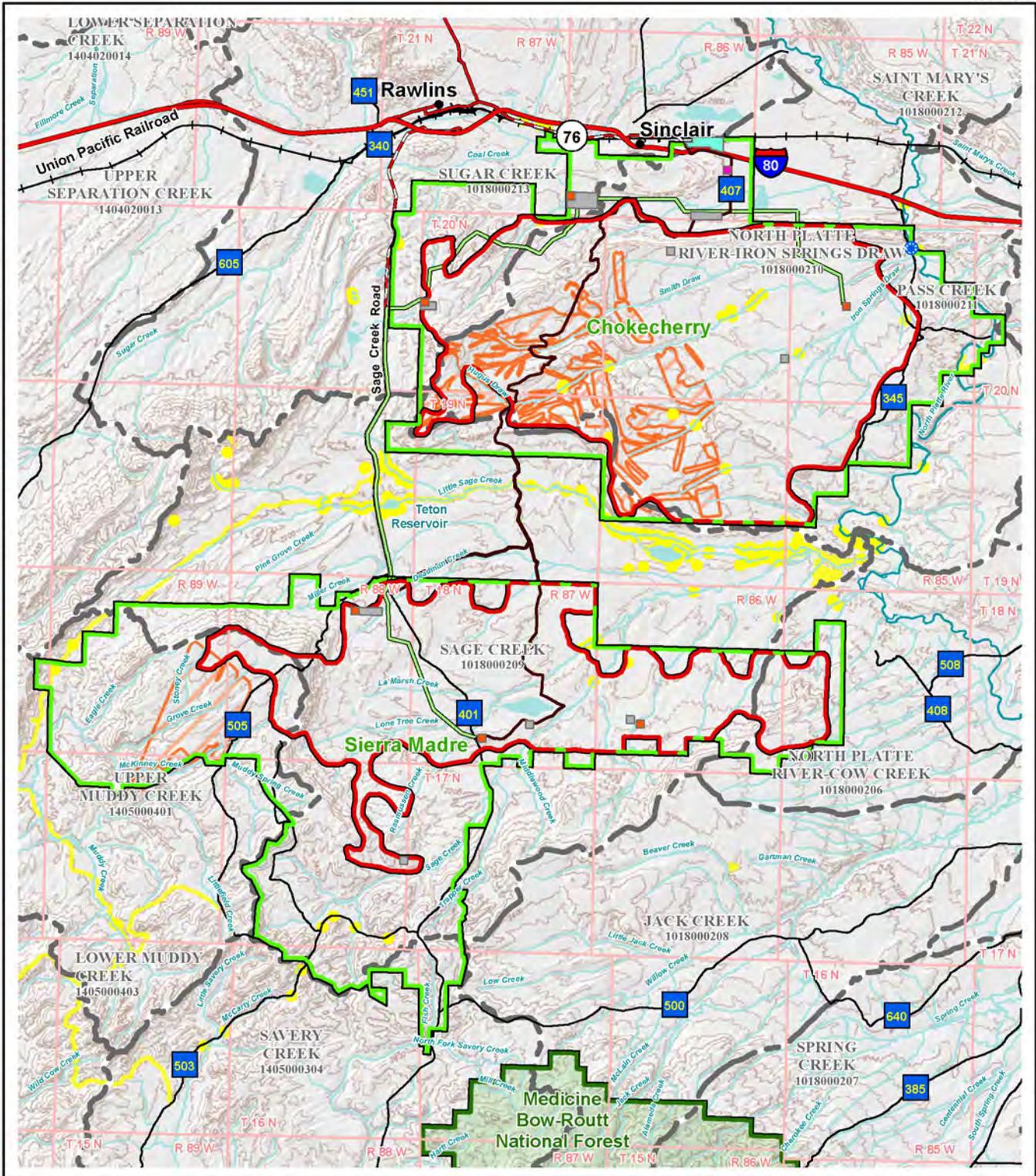
As described in Chapter 2, under Alternative 4, wind development would not be authorized on BLM lands. BLM would provide reasonable access to private lands to allow the applicant to relocate up to 846 turbines to private lands in the alternative boundary.

The types of impacts to wetlands would be as described for the other action alternatives, except the amount of potential wetland disturbance would be greatest under Alternative 4. **Figure 4.11-12** shows wetland and riparian zone drainages within Alternative 4. Under Alternative 4, a total of 22,579 linear feet of wetland and riparian zone drainage would be initially impacted of which 5,840 linear feet would be in Chokecherry; 16,106 linear feet would be in Sierra Madre; and 634 linear feet would be associated with the 230-kV tower and internal resource road. Of the initial impacts, long-term impacts to wetland and riparian zone drainages associated with transmission line operation would total 3,404 linear feet (1,169 linear feet in Chokecherry; 2,152 linear feet in Sierra Madre; and 82 linear feet associated with internal resource road use).

Impacts resulting from the decommissioning of the project (temporary disturbance) have the potential to occur and would be similar to impact levels resulting from project construction. Decommissioning impacts would include direct impacts resulting from laydown area use and increased dust levels due to increased traffic levels.

As with the other alternatives, the environmental constraints table (**Appendix C, Table C-1**) states that: 1) no disturbance will occur to wetlands and riparian zone drainages on BLM land; and 2) surface disturbing activities within 500 feet of wetlands on BLM land will be avoided, or if the activity cannot be avoided, protection of wetlands will be provided. Of the 22,579 linear feet of wetland and riparian zone drainages impacted in Alternative 4, 482 linear feet are located on BLM land, including 38 linear feet in Chokecherry; 180 linear feet in Sierra Madre; and 264 linear feet associated with the 230-kV tower and internal resource road use). Further wetland evaluation would be needed during the site-specific design process to ensure consistency with the 2008 Rawlins RMP ROD (pg 2-99; Wyoming BLM Mitigation Guidelines; EOs 11990 and 11988). Impacts to wetlands and riparian zones on BLM land associated with Alternative 4 are less than Alternatives 1 and 2, but greater than Alternative 3.

X:\Projects\12907_001_Wyoming_Wind\figure\SI\SP\SI_2012\Volume\figure_4_11-11_Weeds_A14_Imports_20120222.mxd



Legend			
	Water Extraction Site		Project Area
	Transmission Line		Likely Area of Turbine Construction
	Haul Road		Spike Treatment for Sagebrush Enhancement
	O&M Building		Noxious Weed Location (Not to Scale)
	Rail Distribution Facility		National Forest
	Laydown Area (Construction Only)		Interstate Highway
	Substation		U.S. Highway
			State Highway
			River or Creek
			Lake or Reservoir
			Drainage Basin

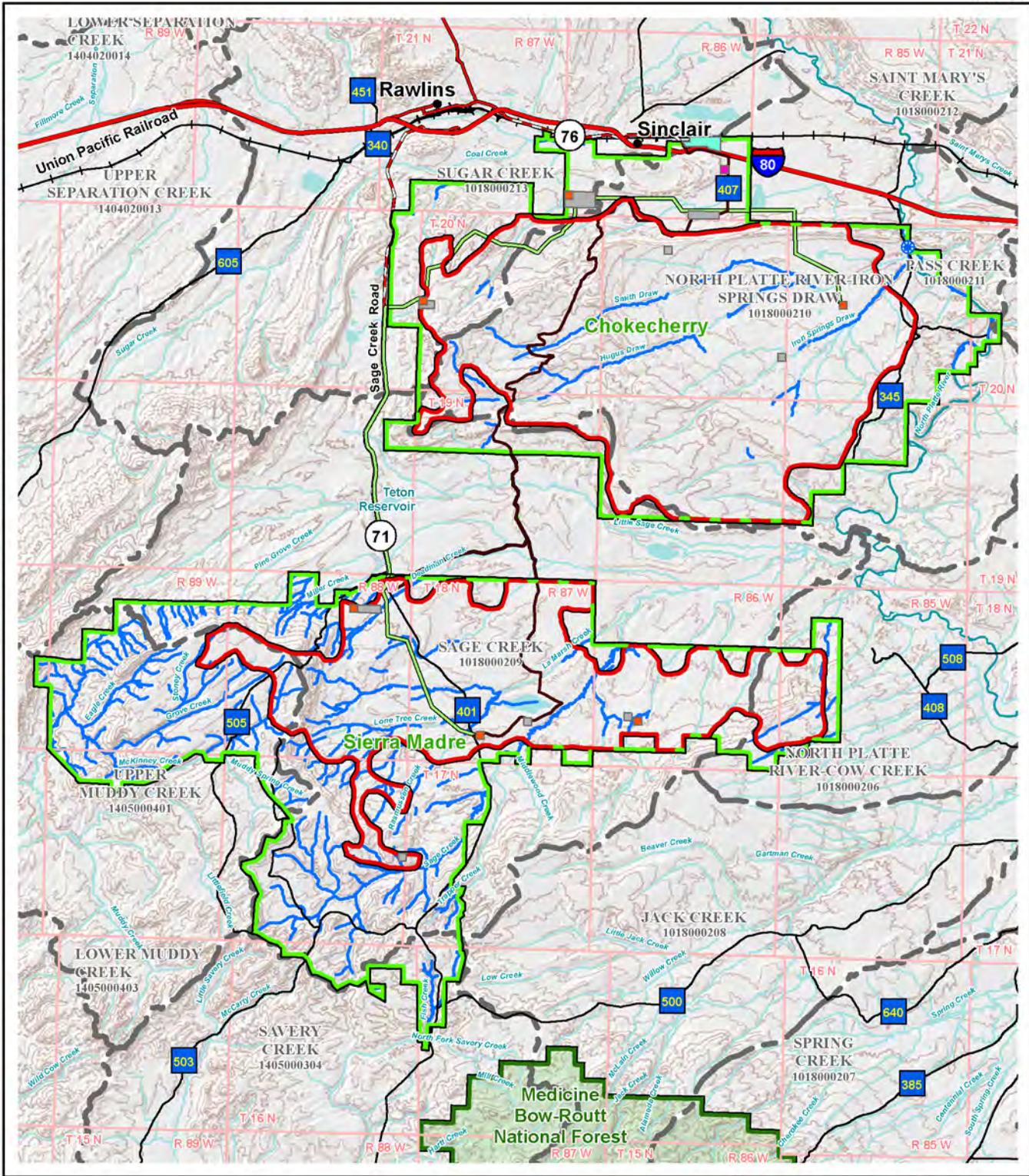
Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-11

Known Noxious Weeds and Invasive Species in the Vicinity of Alternative 4

1:300,000

X:\Projects\12907_001_Wyoming_Wind\figures\ELSP\ELSP_2012\Volume\figure_4-11-12_WetlandRiparian_Alt4_Impacts_20110222.mxd



Legend		
Transmission Line	Water Extraction Site	Interstate Highway
Haul Road	Project Area	U.S. Highway
O&M Building	Likely Area of Turbine Construction	State Highway
Rail Distribution Facility	Potential Wetlands and Riparian Zones	River or Creek
Laydown Area (Construction Only)	National Forest	Lake or Reservoir
Substation		Drainage Basin

Chokecherry and Sierra Madre Wind Energy Project

Figure 4.11-12

Wetland and Riparian Zones in the Vicinity of Alternative 4

1:300,000

Of the remaining acreage on private and state land, the applicant has committed to BMPs and conservation measures (Section 4.11.8.3) that would avoid, minimize, or mitigate wetland impacts. This would be ensured through the Section 404 permit process.

4.11.6 Mitigation and Mitigation Effectiveness

Mitigation measures are meant to minimize adverse contrasts of project components with the existing landscape. The measures should be applied to all proposed components, even those that meet vegetation objectives. Mitigation would enable proposed project activities to harmonize with the surrounding landscape to the extent feasible. Mitigation measures do not include ACMs or BLM standard mitigation, which are incorporated into the proposed project. In general, resource protection measures are proposed for erosion control, road construction, rehabilitation and revegetation.

VEG-1: Survey and mark the disturbance boundary to minimize unintentional surface disturbance. Actively monitor construction to ensure construction and staff stays within the defined limits.

Effectiveness: Marking the planned disturbance boundary will control the extent of impacts to vegetation.

VEG-2: Salvage vegetative debris and redistribute to reclaimed surface areas in order to reduce erosion and preserve native organic material and seed sources.

Effectiveness: Soils within the Application Area have relatively low productivity. Integrating slash on top of the soil surface improves moisture holding capacity of the soil. As long as the amount of vegetative material is somewhat dispersed, heating through composting and nitrogen sinks will be avoided. In addition, the slash material will reduce wind and water erosion by increasing the roughness of the soil surface. In addition, there are many native plant species that are not economically feasible to collect and any opportunity to preserve and utilize this seed source will help maintain the site's species diversity during reclamation.

VEG-3: In areas where excavating soil is not necessary, such as temporary laydown areas or temporary access roads, avoid disturbing native soil and root zones where possible to preserve soil structure and soil biology and improve the success for reclamation.

Effectiveness: Minimizing disturbance to the root zone helps maximize the opportunity that soil structure will remain intact and that beneficial soil microbes will be preserved. In some cases, plants can resprout from the roots, if not excessively damaged.

WET-1: Conduct on-site delineations of all waters of the U.S., including wetlands and waterbodies within the Alternative Development Area prior to construction. The surveys would be performed and documented by qualified wetland scientists to determine the types and spatial extent of site-specific wetland and riparian features. Current resource mapping (e.g., USGS topographic maps, USFWS NWI maps, FEMA floodplain maps, AECOM wetland and riparian data, NRCS soils data, etc.) would be used to guide this future delineation effort. All features would be recorded using a GPS unit with sub-meter accuracy, in addition to photographic and written documentation of each feature according to standardized USACE delineation data requirements and any additional BLM data requirements. Subsequent NEPA tiering would include the site-specific waters of the U.S. delineation results.

Effectiveness: The spatial extent of wetland and riparian zones has not been field-verified; therefore, the aforementioned impact analyses are based on a programmatic approach. The measure is necessary to properly assess the nature and spatial extent of wetland and waterbody features and establish a baseline for wetland features within the Application Area; enable site-specific design; and support the Section 404 permit process.

Mitigation measure GEN-1, from the Draft EIS, is now part of the alternatives analysis in the Final EIS as it was included as an ACM by the applicant in the January 2012 revised POD (PCW 2012a).

4.11.7 Residual Impacts

If the vegetation mitigation measures, along with the Reclamation Plan, are effectively implemented, no residual impacts are expected. Once interim and final reclamation (following decommissioning) are completed and the vegetation communities have time to mature and natural ecological functions and processes are restored, the vegetation is expected to return to pre-project conditions. However, if cushion plant communities are impacted, the experimental nature of cushion plant restoration makes residual impacts of this community uncertain.

4.11.8 Irreversible and Irrecoverable Commitment of Resources

Irreversible commitments are permanent or essentially permanent resource uses or losses; they cannot be reversed, except in the extreme long-term. Once the life of the project is completed, the facilities would be decommissioned and the project area reclaimed. With proper soil salvage and subsoil segregation, native vegetation would grow back, so that vegetation removal would not cause irreversible impacts. It is estimated that grass and forb vegetation communities would recover within 5 years of reclamation. The recovery period for sagebrush shrublands (including vascular plants, fungi, mosses, lichen, bacteria and algae) may be much longer and is estimated to be between 15 to 50 years to reach full climax community conditions (Nelle et al. 2000; Ziegenhagen 2004). However, less mature shrubs that would be similar in size and stature would be established before that timeframe. Forested or woodland communities would recover in 20 to 100 years depending upon the current age of the existing communities. The effects of noxious and invasive species would be controlled through the diligent implementation of the Reclamation Plan and the Weed Management Plan, and would not be irreversible or irretrievable. If unique communities (such as cushion plant communities) are unable to be restored, these impacts would be considered irreversible and irretrievable.

None of the alternatives are expected to result in irreversible commitment of wetland resources. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time. An irreversible commitment of a resource is one that cannot be reversed (e.g., extinction of a species). While any of the alternatives might result in conversion of wetland to upland (e.g., if a road crosses through a wetland), this impact would be quantified through the Section 404 permit process, and mitigated typically through enhancement, restoration, or replacement. The USACE typically requires in-kind, on-site replacement of wetlands. Since any wetlands lost would be replaced, while there may be irretrievable impacts until the replacement wetland is functioning, no irreversible or irretrievable commitment of wetland resources would occur.

4.11.9 Relationship between Local Short-term Uses and Long-term Productivity

Both local short-term uses and long-term productivity would be diminished until the reclaimed areas can be restored to a mature vegetation community. These temporal losses consist of the lag time it takes to develop to pre-construction conditions, generally 5 to 20 years. In some cases, this would require plant community succession from grassland, to shrubland, to woodland, to forest. Several weed species may affect short-term uses, but long-term productivity would not likely be impacted.

Because of the measures in place that require avoidance, minimization, and mitigation of wetland impacts, long-term productivity of wetlands would not be impacted. While short-term losses of wetland could occur under any of the action alternatives, mitigation requires replacement of these wetlands, therefore, over the long-term the productivity and function of wetlands would be restored.