3.4 WETLANDS

3.4.1 Environmental Setting

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (Cowardin et al. 1979). As part of federal regulatory requirements under the Clean Water Act (CWA), inventories of wetlands and other waters of the United States involving field surveys are required along the proposed pipeline ROW and other associated areas of disturbance related to the Project to evaluate the potential for adverse effects to waters of the United States. Information gathered during the inventories will be used to complete notification and permitting requirements under Sections 401 and 404 of the CWA, as managed by U.S. Army Corps of Engineers (USACE) and applicable state agencies under the review of the U.S. Environmental Protection Agency (EPA) with potential veto for projects with unacceptable impacts to wetlands.

Wetland types within the Project area include emergent wetlands, scrub/shrub wetlands, and forested wetlands; and waters include ephemeral, intermittent, and perennial streams and open water (Table 3.4.1-1; Cowardin et al. 1979). Vegetation communities associated with emergent, scrub/shrub and forested wetland types are described in Table 3.5.1-1 for the Project area. Many wetlands in northern Montana and South Dakota are isolated depressional wetlands of the Prairie Potholes region. This formerly glaciated landscape is pockmarked with a large number of potholes that fill with melted snow and rain in spring. The hydrology of prairie pothole marshes varies from temporary to permanent; concentric circle patterns of submerged and floating aquatic plants generally form in the middle of the pothole, with bulrushes and cattails growing closer to shore, and wet sedge marshes next to the upland areas. Isolated depressional wetlands of the Rainwater Basin Complex occur in Nebraska. The Rainwater Basin is a flat or gently rolling topography with a poorly developed surface water drainage system that allows many watersheds to drain into low-lying wetlands. These wetlands are shallow, ephemeral depressions that flood during heavy rainstorms and snowmelt. Much of the Rainwater Basin has been drained and converted to croplands with only about 10 percent of the original area remaining undrained.

Wetlands throughout Montana, South Dakota, Nebraska, Kansas, Oklahoma, and Texas include isolated depressional wetlands, glaciated kettle-hole wetlands, and sinkhole wetlands, as well as isolated floodplain wetlands such as oxbows (naturally caused by changes in river channel configuration or artificially caused by levee construction or other diversions). Montana, South Dakota, Nebraska, Kansas, Oklahoma and northern Texas also contain many wetlands and riparian areas with direct connections to minor and major drainages of the Mississippi River basin; and eastern Texas contains wetlands with connections to Gulf of Mexico drainages. Wetland functions provided by both isolated and connected wetlands include surface water storage (flood control), shoreline stabilization (wave damage protection/shoreline erosion control), stream flow maintenance (maintaining aquatic habitat and aesthetic appreciation opportunities), groundwater recharge (some types replenish water supplies), sediment removal and nutrient cycling (water quality protection), supporting aquatic productivity (fishing, shell fishing, and waterfowl hunting), production of trees (timber harvest), production of herbaceous growth (livestock grazing and haying), production of peaty soils (peat harvest), and provision of plant and wildlife habitat (hunting, trapping, plant/wildlife/nature photography, nature observation, and aesthetics) (EPA 2001).

The Project crosses five USACE districts:

- Steele City Segment: Omaha District (Montana, South Dakota, and Nebraska);

- Cushing Pump Stations: Kansas City District (Kansas);
- Gulf Coast Segment: Tulsa District (Oklahoma), Fort Worth and Galveston districts (Texas); and
- Houston Lateral: Galveston district (Texas).

Each of these districts has slightly different survey and permit requirements. Keystone will continue consultations with the USACE district offices and state resource agencies to develop the specific wetland and waters of the United States information required for permit applications.

Wetland types in the Project area (Table 3.4.1-1) were identified by completing field surveys and reviewing aerial photography. Wetlands and waters of the U.S. were delineated using either field surveys or desktop analysis in accordance with direction provided by the appropriate USACE districts. Wetland data were collected for routine on-site delineations (USACE 1987) where required, following Great Plains regional guidance (USACE 2008b) for the Steele City Segment, and Atlantic and Gulf Coast Plain regional guidance (USACE 2008a) for the Gulf Coast Segment and Houston Lateral. In addition, channel characteristics for drainage crossings, defined bed and bank, and connectivity to navigable waters were evaluated to determine jurisdictional status for all wetland and drainage crossings. Perennial, intermittent, and ephemeral streams were identified at a resolution of about 10 feet.

TABLE 3.4.1-1
Description of Wetland Types in the Keystone XL Project Area

Wetland Type	National Wetland Inventory Code	Description
Palustrine emergent wetland	PEM	Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed. In areas with relatively stable climatic conditions, emergent wetlands maintain the same appearance year after year. In other areas, such as the prairies of the central United States, violent climatic fluctuations cause them to revert to an open water phase in some years. Emergent wetlands are known by many names, including marsh, meadow, fen, prairie pothole, and slough.
Palustrine forested wetland	PFO	Forested wetlands are characterized by woody vegetation that is 6 meters tall or taller. All water regimes are included except subtidal. Forested wetlands are most common in the eastern United States and in those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains. Forested wetlands normally possess an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer.
Palustrine scrub-shrub wetland	PSS	Scrub-shrub wetlands include areas dominated by woody vegetation less than 6 meters tall. Vegetation forms found in this wetland include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. All water regimes are included except subtidal. Scrub-shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable communities.

TABLE 3.4.1-1 Description of Wetland Types in the Keystone XL Project Area		
Wetland Type	**National Wetland Inventory Code**	**Description**
Riverine-perennial water	R2	The lower perennial subsystem includes low-gradient rivers and streams (riverine system) where some water flows throughout the year and water velocity is slow. The upper perennial subsystem includes high-gradient rivers and streams where some water flows throughout the year, water velocity is high, and there is little floodplain development. Perennial streams have flowing water year-round during a typical year, the water table is located above the stream bed for most of the year, groundwater is the primary source of water, and runoff is a supplemental source of water.
Riverine-intermittent water, ephemeral water	R4	The intermittent subsystem includes channels where the water flows for only part of the year, when groundwater provides water for stream flow. When water is not flowing, it may remain in isolated pools or surface water may be absent. Runoff is a supplemental source of water. Ephemeral streams have flowing water only during, and for a short duration after, precipitation events in a typical year. Groundwater is not a source of water for the stream.
Open water	OW	Open water habitats are rivers, streams, lakes, and ponds (riverine, lacustrine, and palustrine systems) where, during a year with normal precipitation, standing or flowing water occurs for a sufficient duration to establish an ordinary high-water mark. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered as open waters.

Sources: Cowardin et al. 1979, USACE 2009.

3.4.2 Wetlands of Special Concern or Value

Depressional wetlands of the Prairie Potholes region in Montana and South Dakota support large numbers of migrating and nesting waterfowl, as do depressional wetlands associated with the Rainwater Basin in Nebraska (EPA 2008). USFWS has negotiated wetland easements with private landowners in Montana, and South Dakota for some lands crossed by the Steele City Segment to protect depressional wetlands of the Prairie Potholes region. Wetlands are protected by the USFWS easement under 16 USC 668dd(c). USFWS has also negotiated wetland easements with private landowners in Oklahoma and Texas for some lands crossed by the Gulf Coast Segment. The USFWS' procedure with any cooperating entity such as Keystone is to restore the ponding capability of the wetland(s). If fill material remains in any easement wetland(s) after the pipeline is installed, USFWS will work with Project personnel to remove the fill material from the basin. If a wetland(s) no longer ponds water after the pipeline is installed, USFWS will work with Project personnel to improve soil compaction and water retention capability in that wetland(s). If measures taken to restore the ponding capability of a wetland(s) are unsuccessful, USFWS may require Keystone to locate a similar wetland and execute an exchange for a replacement wetland(s) according to USFWS guidance.

Table 3.4.2-1 summarizes wetlands that would be crossed by the Project that are considered of special concern or value—as indicated by inclusion within conservation areas and reserves, wetland easements, wildlife areas, sensitive landscapes, and sensitive wetland vegetation communities. All wetlands in Montana are generally considered of concern because of their rarity and productivity in this semi-arid environment. A total of 264 miles of conservation lands and sensitive landscapes with an unknown quantity of associated wetlands would be crossed by the Project.

3.4.3 Potential Impacts

Wetlands and waters that would be affected by the proposed Project, are summarized in Tables 3.4.3-1 and 3.4.3-2. The summary does not include acres of disturbance associated with pipe storage yards, rail sidings, contractor's yards, access roads, or construction camps. Acres of disturbance provided in the tables were calculated using the data for miles of wetlands crossed by the project (Keystone 2009c), and the proposed widths for construction and permanent ROWs.

The delineation of jurisdictional and non-jurisdictional wetlands will occur in accordance with directions provided by the appropriate USACE districts prior to the issuance of required permits. Wetland impacts that affect non-jurisdictional wetlands under the CWA Section 404 would not require mitigation. Executive Order 11990 directs Federal agencies, in certain circumstances, to avoid and minimize impacts to wetlands. A table of all wetland and water crossings is located in Keystone (2009c, Appendix E).

Emergent wetlands are the most common wetland type crossed by the Steele City Segment in Montana, South Dakota, and Nebraska (Table 3.4.3-1). Most of the emergent wetlands (71 percent, 80 of 113 acres) are located in Nebraska (Table 3.4.3-1). Other wetland areas that would be disturbed by the Steele City Segment include forested wetlands in Nebraska (2 acres), and scrub-shrub wetlands in Montana and South Dakota (1 acre). Forested wetlands are the most common wetland type crossed by the Gulf Coast Segment and the Houston Lateral in Oklahoma and Texas (Table 3.4.3-1). Most of the forested wetlands (97 percent, 261 of 269 acres) are located in Texas (Table 3.4.3-1). Other wetland areas that would be disturbed by the Gulf Coast Segment and Houston Lateral in Oklahoma and Texas include emergent wetlands (149 acres) and scrub-shrub wetlands (20 acres, Table 3.4.3-1). Most of the wetlands crossed by the Gulf Coast Segment and Houston Lateral (96 percent, 420 of 438 acres) are located in Texas. The Project would disturb a total of 554 acres of wetlands, primarily forested wetlands (271 acres) and emergent wetlands (262 acres) (Table 3.4.3-2).

A portion of the wetlands crossed by the Project ROW has been identified as farmed wetlands, and some wetlands are located within grazed rangelands (Keystone 2009c). At present, three mainline valves (MLVs) would be located within wetland areas: MLV 115, MLV 235, and MLV 255. These locations are under evaluation for final siting to avoid or minimize potential wetland impacts. None of the proposed pump stations would be located within wetlands. Additional impacts to wetlands from construction camps and access roads outside of the 110-foot construction right-of-way cannot be assessed until the actual locations for these sites are determined.

TABLE 3.4.2-1
Wetlands of Special Concern or Value Crossed by the Keystone XL Project

Mileposts	Miles Crossed	Name	Ownership	Wetland Types	Wetlands Crossed
Steele City Segment					
Montana					
49, 70	3.0	Cornwell Ranch Conservation Easement	Montana Department of Fish, Wildlife, and Parks	PEM	1
4.2 – 5.0	0.8	Phillips County USFWS Wetland Easement	Private	None	0
Multiple	33.7	Conservation Reserve Program (CRP) Contract Land	Private	PEM	2
South Dakota					
799	0.7	Wetlands of America Trust, Inc.	Private	None	0
Multiple	10.6	CRP Contract Land	Private	PEM	1
Nebraska					
758.0 – 847.4	89.4	Rainwater Basin Wetlands	Unknown	PEM, PFO	10
616.8 – 707.7	90.9	Sandhills Wetlands	Unknown	PEM	37
Multiple	6.4	CRP Contract Land	Private	PEM	1
Gulf Coast Segment and Houston Lateral					
Oklahoma					
22.1 – 23.3	1.2	Deep Fork Wildlife Management Area	Oklahoma Department of Wildlife Conservation	PSS	1
~130	0.02	Wetland Reserve Program (WRP) Contract Land	Private	PEM	1
Texas					
~165	0.2	WRP Contract Land	Private	None	0
256 – 258	1.6	Water Oak – Willow Oak Community	Unknown	PFO	2
309 – 311	1.6	Water Oak – Willow Oak Community	Unknown	PFO	1
334 – 337	2.2	Water Oak – Willow Oak Community	Unknown	PFO	2
347 – 364	5.5	Water Oak – Willow Oak Community	Unknown	PFO	5

TABLE 3.4.2-1
Wetlands of Special Concern or Value Crossed by the Keystone XL Project

Mileposts	Miles Crossed	Name	Ownership	Wetland Types	Wetlands Crossed
366 – 371	5.0	Piney Woods Mitigation Bank	Private – permitted by USACE	PFO, PEM	5
366 – 370		Water Oak – Willow Oak Community	Unknown	PFO	3
HL 18 – 29	10.3	Water Oak – Willow Oak Community	Unknown	PFO	2

Source: see Appendices E and K, Keystone 2009c, Grell 2009, TPWD 2009.
PEM = Palustrine emergent wetland, PFO = Palustrine forested wetland.

TABLE 3.4.3-1 Wetlands Estimated Impact Summary by State for the Keystone XL Project				
Wetland Classification	**Length of Wetlands Crossed (miles)**	**Wetland Area Affected during Construction (acres)[a]**	**Wetland Area Affected by Operations (acres)[a]**	**Number of Wetland Crossings**
Steele City Segment				
Montana				
Palustrine emergent wetland	1.1	15	6	28
Palustrine forested wetland	0.0	0	0	0
Palustrine scrub-shrub wetland	0.1	1	1	2
Riverine/Open water	3.3	48	20	NA
Montana total	*4.5*	*64*	*27*	*30*
South Dakota				
Palustrine emergent wetland	1.2	18	8	37
Palustrine forested wetland	0.0	0	0	0
Palustrine scrub-shrub wetland	<0.1	0	0	1
Riverine/Open water	3.6	50	21	NA
South Dakota total	4.9	68	29	38
Nebraska				
Palustrine emergent wetland	5.0	80	35	53
Palustrine forested wetland	0.1	2	1	3
Palustrine scrub-shrub wetland	0.0	0	0	0
Riverine/Open water	1.6	23	10	NA
Nebraska total	*6.7*	*105*	*46*	*56*
Gulf Coast Segment and Houston Lateral				
Oklahoma				
Palustrine emergent wetland	0.5	8	5	24
Palustrine forested wetland	0.5	8	5	9
Palustrine scrub-shrub wetland	0.1	2	0	3
Riverine/Open water	1.7	22	11	NA
Oklahoma total	*2.8*	*40*	*21*	*36*
Texas				
Palustrine emergent wetland	11.9	141	73	67
Palustrine forested wetland	22.0	261	137	78
Palustrine scrub-shrub wetland	1.5	18	9	10
Riverine/Open water	4.0	49	25	NA
Texas total	*39.4*	*469*	*244*	*155*

Source: See Appendix E, Keystone 2009c.

Note: NA = Not Applicable

[a] Acres disturbed on a temporary basis (permanent right-of-way width plus temporary workspace) during construction, and acres disturbed (maintained) on a permanent basis during operation of the proposed Project. Wetland areas for emergent and scrub-shrub wetlands disturbed during construction are generally considered temporary with no impact remaining during operations. Does

not include acres of disturbance associated with pipe storage yards, rail sidings, and contractors yards for 1,261 acres in Oklahoma and Texas. Does not include acres of disturbance associated with access roads or construction camps (Keystone 2009c).

TABLE 3.4.3-2
Wetlands Estimated Impact Summary by Segment for the Keystone XL Project

Wetland Classification	Length of Wetlands Crossed (miles)	Wetland Area Affected during Construction (acres) [a]	Wetland Area Affected by Operations (acres) [a]	Number of Crossings
Steele City Segment				
Palustrine emergent wetland	7.3	113	49	118
Palustrine forested wetland	0.1	2	1	3
Palustrine scrub-shrub wetland	0.2	1	1	3
Riverine/Open water	8.5	121	51	NA
Steele City Segment subtotal	*16.1*	*237*	*102*	*124*
Gulf Coast Segment				
Palustrine emergent wetland	8.4	101	54	82
Palustrine forested wetland	19.9	237	126	78
Palustrine scrub-shrub wetland	1.6	20	9	12
Riverine/Open water	5.4	68	34	NA
Gulf Coast Segment subtotal	*35.3*	*426*	*223*	*172*
Houston Lateral				
Palustrine emergent wetland	4.0	48	24	9
Palustrine forested wetland	2.6	32	16	9
Palustrine scrub-shrub wetland	0.0	0	0	1
Riverine/Open water	0.3	3	2	NA
Houston Lateral subtotal	*6.9*	*83*	*42*	*19*
Project				
Palustrine emergent wetland	19.7	262	127	209
Palustrine forested wetland	22.6	271	143	90
Palustrine scrub-shrub wetland	1.8	21	10	16
Riverine/Open water	14.2	192	87	NA
Project total	**58.3**	**746**	**367**	**315**

Source: See Appendix E, Keystone 2009c.

Note: NA = Not Applicable

[a] Acres disturbed on a temporary basis (permanent right-of-way width plus temporary workspace) during construction and acres disturbed (maintained) on a permanent basis during operation of the proposed Project. Wetland areas for emergent and scrub-shrub wetlands disturbed during construction are generally considered temporary with no impact remaining during operations. Areas presented are those within the permanent right-of-way. Does not include acres of disturbance associated with pipe storage yards, rail sidings, and contractors yards for 1,261 acres in Oklahoma and Texas. Does not include acres of disturbance associated with access roads or construction camps (Keystone 2009c).

Construction of the pipeline would affect wetlands and their functions primarily during and immediately following construction activities, but permanent changes also are possible. Wetlands function as natural sponges that trap and slowly release surface water, rain, snow melt, groundwater, and flood waters. Trees, root mats, and other wetland vegetation slow flood waters and distribute them over the floodplain. Wetlands at the margins of lakes, rivers, and streams protect shorelines and stream banks against erosion. Wetland plants hold the soil in place with their roots, absorb the energy of waves, and break up the flow of stream or river currents. This combined water storage and braking can lower flood heights and reduce erosion. The water-holding capacity of wetlands reduces flooding and prevents water logging of crops. Preserving and restoring wetlands, together with other water retention, can help or supplant flood control otherwise provided by expensive dredge operations and levees (EPA 2001).

Potential construction- and operations-related effects include:

- Loss of wetlands due to backfilling or draining;
- Modification in wetland productivity due to modification of surface and subsurface flow patterns;
- Temporary and permanent modification of wetland vegetation community composition and structure from clearing and operational maintenance (clearing temporarily affects the wetland's capacity to buffer flood flows and/or control erosion);
- Wetland soil disturbance (mixing of topsoil with subsoil with altered biological activities and chemical conditions that could affect reestablishment and natural recruitment of native wetland vegetation after restoration);
- Compaction and rutting of wetland soils from movement of heavy machinery and transport of pipe sections, altering natural hydrologic patterns, inhibiting seed germination, or increasing siltation;
- Temporary increase in turbidity and changes in wetland hydrology and water quality;
- Permanent alteration in water-holding capacity due to alteration or breaching of water-retaining substrates in the Prairie Pothole and Rainwater Basin regions;
- Alteration in vegetation productivity and life stage timing due to increased soil temperatures associated with heat input from the pipeline; and
- Alteration in freeze-thaw timing due to increased water temperatures associated with heat input from the pipeline.

Generally, the wetland vegetation community eventually would transition back into a community functionally similar to that of the wetland prior to construction, if pre-construction conditions such as elevation, grade, and soil structure are successfully restored. In emergent wetlands, the herbaceous vegetation would regenerate quickly (typically within 3 to 5 years). In forested and scrub-shrub wetlands, the effects of construction would be extended due to the longer period needed to regenerate a mature forest or shrub community. Following restoration and revegetation, there would be little permanent effects on emergent wetland vegetation because these areas naturally consist of, and would remain as, an herbaceous community. Herbaceous wetland vegetation in the pipeline right-of-way generally would not be mowed or otherwise maintained, although Keystone's CMR Plan (Appendix B) allows for annual maintenance of a 30-foot-wide strip centered over the pipeline. Tree species that typically dominate forested wetlands in the Project area [plains cottonwood (*Populus deltoides*), maple (*Acer* spp.), hickory (*Carya* spp.), oak (*Quercus* spp.), and bald cypress (*Taxodium distichum*)] have regeneration periods of 20 to 50 years. Trees and shrubs would not be allowed to regenerate within the maintained right-of-way except within areas with HDD crossings; therefore, removal of forested and scrub-shrub wetland habitats due to pipeline construction would be long term, and the maintained right-of-way would represent a

permanent conversion of forested and scrub-shrub wetlands to herbaceous wetlands. The total acreage of affected forested wetland during construction would be 271 acres, as is the total acreage of scrub-shrub wetland affected during construction (21 acres). Restoration of some forested and scrub-shrub wetlands may be possible; however, long-term effects would remain.

Operation of the Project would cause slight increases in soil temperatures at the soil surface of 4 to 8˚ F primarily during January to May and November to December along the pipeline route in Montana, South Dakota, and Nebraska (Keystone 2009c, Appendix L). Increases in temperatures at the soil surface would be most pronounced directly over the pipeline in the South Dakota portion of the pipeline. Soil surface temperatures over the pipeline route, and year-round soil surface temperatures would remain unchanged in Oklahoma and Texas. Operation of the Project would cause increases in soil temperature 6 inches below the surface of 10 to 15 ˚F with the largest increases during March and April in the Steele City Segment of the Project (Keystone 2009c, Appendix L).

While many plants, especially herbaceous annuals, would not produce root systems that would penetrate much below 6 inches, some plants, notably native prairie grasses, trees, and shrubs, have root systems penetrating well below 6 inches. Soil temperatures closer to the pipeline burial depth of 6 feet may be as much as 40˚ F warmer than the ambient surrounding soil temperatures (Keystone 2009c, Appendix L). In general, increased soil temperatures during early spring would cause early germination and emergence and increased productivity in wetland plant species (Keystone 2009c, Appendix L). Increased soil temperatures also may stimulate root development (Keystone 2009c, Appendix L). Operation of the Project also would cause slight increases in water temperatures where the pipeline crosses through wetlands. Effects would be most pronounced in small ponds and wetlands, as any excess heat would be quickly dissipated in large waterbodies and flowing waters. Small ponded wetlands may remain unfrozen later than surrounding wetlands and may thaw sooner than surrounding wetlands. Early and late migrant waterfowl may be attracted to and concentrated within these areas during spring and fall migrations.

See Section 3.13.for impacts to wetlands relating to spills and leaks.

3.4.4 Mitigation

To minimize potential construction- and operations-related effects, Keystone would implement procedures outlined in the CMR Plan (Appendix B) for wetland crossings. Keystone would minimize impacts and restore wetlands affected by construction activities, to the extent practicable. Pipeline construction through wetlands must comply with USACE Section 404 permit conditions. Keystone would consult with NRCS offices for state specific Conservation Practice Standards (USDA, NRCS, 2009).

Keystone has committed to the following general measures to protect wetlands in its CMR Plan:

- Avoid placement of aboveground facilities in a wetland, except where the location of such facilities outside of wetlands would preclude compliance with DOT pipeline safety regulations;
- Clearly mark wetland boundaries with signs and/or highly visible flagging during construction and maintain markers until permanent seeding is completed;
- Limit the width of the construction zone to 85 feet through standard wetlands, unless soil conditions require a greater width;
- Locate extra work spaces at least 10 feet away from wetland boundaries, where topographic conditions permit;

- Limit clearing of vegetation between extra work areas and the edge of the wetland to the construction right-of-way and limit the size of extra work areas to the minimum needed to construct the wetland crossing;
- Clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way using wide-track or balloon-tire construction equipment and/or conventional equipment operating from timber and slash (riprap) cleared from the right-of-way, timber mats, or prefabricated equipment mats;
- Install and maintain sediment barriers at all saturated wetlands or wetlands with standing water across the entire construction right-of-way upslope of the wetland boundary and where saturated wetlands or wetlands with standing water are adjacent to the construction right-of-way as necessary to prevent sediment flow into the wetland;
- Limit the duration of construction-related disturbance within wetlands to the extent practicable;
- Use no more than two layers of timber riprap to stabilize the construction right-of-way;
- Cut vegetation off at ground level leaving existing root systems in place and remove it from the wetland for disposal;
- Limit pulling of tree stumps and grading activities to directly over the trench line unless safety concerns require the removal of stumps from the working side of the construction right-of-way;
- Segregate and salvage all topsoil up to a maximum of 12 inches of topsoil from the area disturbed by trenching in dry wetlands, where practicable and restore topsoil to its approximate original stratum after backfilling is complete;
- Dewater the trench in a manner to prevent erosion and to prevent heavily silt-laden water from flowing directly into any wetland or waterbody;
- Remove all timber riprap and prefabricated equipment mats upon completion of construction;
- Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable;
- Prohibit storage of hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating activities within a wetland or within 100 feet of any wetland boundary, if possible;
- Perform all equipment maintenance and repairs in upland locations at least 100 feet from waterbodies and wetlands, if possible;
- Avoid parking equipment overnight within 100 feet of a watercourse or wetland, if possible;
- Prohibit washing equipment in streams or wetlands;
- Install trench breakers and/or seal the trench to maintain the original wetland hydrology, where the pipeline trench may drain a wetland;
- Attempt to refuel all construction equipment in an upland area at least 100 feet from a wetland boundary; and
- Avoid sand blasting in wetlands to the extent practicable, if unavoidable place a tarp or suitable material to collect as much waste shot as possible, clean up all visible wastes, and dispose of collected waste at an approved disposal facility.

Restoration and reclamation procedures for wetland crossings outlined in Keystone's CMR Plan (Appendix B) include:

- Remove all timber riprap, timber mats, and prefabricated equipment mats and other construction debris upon completion of construction;
- Replace topsoil, spread to its original contours with no crown over the trench;
- Remove any excess spoil, stabilize wetland edges and adjacent upland areas using permanent erosion control measures and revegetation;
- For standard wetlands, install a permanent slope breaker and trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas where necessary to prevent the wetland from draining;
- Apply temporary cover crop at a rate adequate for germination and ground cover using annual ryegrass or oats unless standing water is present (in the absence of detailed revegetation plans or until appropriate seeding season);
- Apply seeding requirements for agricultural lands or as required by the landowner for farmed wetlands;
- No application of fertilizer, lime, or mulch unless required by the appropriate land management or state agency;
- Restore wetland areas within conservation lands or easements to a level consistent with any additional criteria established by the relevant managing agency;
- Complete topographic surveys for USFWS easement wetlands prior to construction through the wetland, restoring final grades to within 0.1 foot of original elevations; and
- Prohibit use of herbicides or pesticides within 100 feet of any wetland (unless allowed by the appropriate land management or state agency).

Various state and federal agencies have expressed concerns and recommendations for compensatory mitigation of jurisdictional wetland losses. The requirements for compensatory mitigation would depend on final USACE decisions on jurisdictional delineations. Recommendations for compensatory mitigation provided to DOS by the agencies include:

- Pre- and post construction monitoring plans should be developed for depressional wetlands of the Prairie Potholes region in Montana and wetlands that no longer pond water after the pipeline is installed should receive additional compaction, replacement, or at the landowner's or managing agency's discretion compensatory payments should be made for drainage of the wetland (MDEQ).
- Keystone should develop a plan to compensate for permanent wetland losses to include:
  - In areas of concern to NPS, any loss or impact to wetlands from pipeline construction should be fully mitigated by replacement or restoration of an equal or greater acreage in the immediate locale of the impact (NPS).
  - Permanent impacts to forested wetlands in Texas should be calculated to include the total width of area where trees would be removed during long-term maintenance including any removal areas beyond the 10-foot wide maintained area. All forested wetland clearing is considered a permanent impact that would require compensatory mitigation (Texas Parks and Wildlife, TPW).
  - In Texas, the wetland mitigation plan should be developed in consultation with TPW, and TPW requests that Keystone address impacts to all wetland types in the wetland mitigation plan and mitigate for these impacts (TPW).

The actual level of required compensation and mitigation would ultimately be determined by:

- USACE regulatory offices with input from EPA, USFWS Ecological Services field offices, and state fish and wildlife agencies; or
- States in their 401 certifications or certificates of compliance.

Implementation of measures in Keystone's CMR Plan (Appendix B) would avoid or minimize most impacts on wetlands associated with construction and operation activities, and would ensure that potential effects would be primarily minor and short term. Impacts to forested wetlands are long-term and would be considered permanent. Keystone would work with each USACE district to determine what kind of compensation would be required for the permanent conversion of forested wetland to herbaceous wetland, and Keystone will continue to work with the USACE to develop a Wetland Mitigation Plan.

3.4.5 Connected Actions

3.4.5.1 Power Distribution Lines and Substations

Power distribution line construction and operation requires clearing of trees and shrubs, and maintaining vegetation under the power lines in a herbaceous state. Power distribution lines and substations constructed to provide power for the Project pump stations could affect wetland resources through:

- Temporary and permanent modification of wetland vegetation community composition and structure from clearing and operational maintenance (clearing temporarily affects the wetland's capacity to buffer flood flows and/or control erosion);
- Compaction and rutting of wetland soils from movement of heavy machinery and transport and installation of transmission structures, altering natural hydrologic patterns, inhibiting seed germination, or increasing siltation; and
- Temporary increase in turbidity and changes in wetland hydrology and water quality.

The primary impacts on wetlands from construction or modification of distribution lines to provide electrical power to pump stations would be cutting, clearing, or removing the existing vegetation within the construction work area and potential invasion by noxious weeds. In general, distribution line construction impacts to wetlands would be minor as most lines would run alongside existing roadways and smaller wetlands could be spanned. Trees in forested wetlands crossed by the distribution line ROW would be removed, and the ROW would be maintained free of woody vegetation. Approximately 6.6 miles of riverine or open water and 3.2 miles of wetlands including: forested wetlands in South Dakota, Nebraska, Kansas, and Oklahoma; emergent wetlands in Montana, South Dakota, Nebraska, and Oklahoma; and scrub-shrub wetlands in Montana, South Dakota, and Oklahoma could be affected during construction and operation of new distribution lines for the Project (Tables 3.4.5-1 and 3.4.5-2).

TABLE 3.4.5-1 Wetlands Estimated Impact Summary by State for Proposed Electric Distribution Lines for the Keystone XL Project			
Vegetation Community Classification	**Length of Wetlands Crossed (miles)**	**Wetland Area Affected during Construction (acres) [a]**	**Wetland Area Affected by Operations (acres) [a]**
Steele City Segment			
Montana			
Palustrine Emergent wetlands	0.5	1.7	1.2
Palustrine Forested wetlands	0.0	0.0	0.0
Palustrine Shrub-scrub wetlands	0.1	0.4	0.2
Riverine/open water	2.5	8.5	5.9
Montana subtotal	*3.1*	*10.6*	*7.3*
South Dakota			
Palustrine Emergent wetlands	0.6	2.3	1.6
Palustrine Forested wetlands	0.2	1.0	3.6
Palustrine Shrub-scrub wetlands	0.1	0.0	0.0
Riverine/open water	2.4	7.4	5.6
South Dakota subtotal	*3.3*	*10.7*	*10.8*
Nebraska			
Palustrine Emergent wetlands	0.2	0.6	0.4
Palustrine Forested wetlands	0.5	1.7	6.0
Palustrine Shrub-scrub wetlands	0.0	0.0	0.0
Riverine/open water	1.0	3.3	2.4
Nebraska subtotal	*1.7*	*5.6*	*8.8*
Cushing Extension Pump Stations			
Kansas			
Emergent wetlands	0.0	0.0	0.0
Forested wetlands	0.4	1.3	4.8
Shrub-scrub wetlands	0.0	0.0	0.0
Riverine/open water	0.3	1.0	0.7
Kansas subtotal	*0.7*	*2.3*	*5.5*
Gulf Coast Segment			
Oklahoma			
Palustrine Emergent wetlands	0.1	0.4	0.2
Palustrine Forested wetlands	0.4	1.4	4.8
Palustrine Shrub-scrub wetlands	0.1	0.3	0.2
Riverine/open water	0.4	1.3	1.0
Oklahoma subtotal	*1.0*	*3.4*	*6.2*
Texas			
Palustrine Emergent wetlands	0.0	0.0	0.0

TABLE 3.4.5-1 Wetlands Estimated Impact Summary by State for Proposed Electric Distribution Lines for the Keystone XL Project			
Vegetation Community Classification	**Length of Wetlands Crossed (miles)**	**Wetland Area Affected during Construction (acres) [a]**	**Wetland Area Affected by Operations (acres) [a]**
Palustrine Forested wetlands	0.0	0.0	0.0
Palustrine Shrub-scrub wetlands	0.0	0.0	0.0
Riverine/open water	0.0	0.0	0.0
Texas subtotal	*0.0*	*0.0*	*0.0*

Sources: Keystone 2009c.

[a] Temporary disturbance areas include structure pads, access roads, pulling and tension area, turn around areas, and staging areas. Permanent disturbance areas include forested areas within 80 or 150 foot right-of-way, around pole structures, and crossed by operational access roads.

TABLE 3.4.5-2 Wetlands Estimated Impact Summary for Proposed Electric Distribution Lines for the Keystone XL Project			
Vegetation Community Classification	**Length of Community Crossed (miles)**	**Community Area Affected during Construction (acres)[a]**	**Community Area Affected by Operations (acres)[a]**
Steele City Segment			
Palustrine Emergent wetlands	1.3	4.6	3.2
Palustrine Forested wetlands	0.7	2.7	9.6
Palustrine Shrub-scrub wetlands	0.2	0.4	0.2
Riverine/open water	5.9	19.2	13.9
Steele City Segment subtotal	*8.1*	*26.9*	*26.9*
Cushing Extension Pump Stations			
Palustrine Emergent wetlands	0.0	0.0	0.0
Palustrine Forested wetlands	0.4	1.3	4.8
Palustrine Shrub-scrub wetlands	0.0	0.0	0.0
Riverine/open water	0.3	1.0	0.7
Pump Station subtotal	*0.7*	*2.3*	*5.5*
Gulf Coast Segment			
Palustrine Emergent wetlands	0.1	0.4	0.2
Palustrine Forested wetlands	0.4	1.4	4.8
Palustrine Shrub-scrub wetlands	0.1	0.3	0.2
Riverine/open water	0.4	1.3	1.0
Gulf Coast Segment subtotal	*1.0*	*3.4*	*6.2*
Project			
Emergent wetlands	1.4	5.0	3.4
Forested wetlands	1.5	5.4	19.2

TABLE 3.4.5-2 Wetlands Estimated Impact Summary for Proposed Electric Distribution Lines for the Keystone XL Project			
Vegetation Community Classification	**Length of Community Crossed (miles)**	**Community Area Affected during Construction (acres)[a]**	**Community Area Affected by Operations (acres)[a]**
Shrub-scrub wetlands	0.3	0.7	0.4
Riverine/open water	6.6	21.5	15.6
Project total	**9.8**	**32.6**	**38.6**

Sources: Keystone 2009c.

[a] Temporary disturbance areas include structure pads, access roads, pulling and tension area, turn around areas, and staging areas. Permanent disturbance areas include forested areas within 80 or 150 foot right-of-way, around pole structures, and crossed by operational access roads.

Electric service providers would avoid and minimize impacts by spanning wetlands and selecting pole locations away from sensitive habitats (Keystone 2009c).

3.4.5.2 Lower Brule to Witten 230-kV Transmission Line

Upgrades to the power grid in South Dakota to support power requirements for pump stations in South Dakota would include construction of a new 230-kV transmission line and a new substation. As described in Section 4.4 of the EIS, Western and BEPC have identified two alternative corridors ('A' and 'B') for the proposed Lower Brule to Witten 230-kV transmission line project, and there are several route options within each corridor.

Under alternative corridor A, lengths of wetland communities crossed by five route options for the power grid upgrade presented in Table 3.4.5-3 range from 0.3 to 1.4 miles based on National Wetlands Inventory data (USFWS 2009). The proposed routes also cross between 0.3 and 0.6 miles of riverine and open water habitats.

TABLE 3.4.5-3 Wetlands Estimated Impact Summary for Proposed Lower Brule to Witten 230-kV Transmission Line Corridor A Alternatives for the Proposed Project					
Vegetation Community Classification	**Western (miles)**	**BPC-A (miles)**	**BPC-B (miles)**	**BPC-C (miles)**	**BPC-D (miles)**
Palustrine Emergent Wetlands	1.4	0.3	0.3	0.5	0.7
Palustrine Forested Wetlands	0	0	0	0	0
Palustrine Shrub-scrub Wetlands	0	0	0	0	0
Riverine/Open Water	0.6	0.5	0.4	0.3	0.3
Total	*2.0*	*0.8*	*0.7*	*0.8*	*1.0*

Under alternative corridor B, lengths of wetland communities crossed by four route options for the power grid upgrade presented in Table 3.4.5-4 range from 0.4 to 0.9 miles based on National Wetlands Inventory data (USFWS 2009). The proposed routes also cross between 0.2 and 0.5 miles of riverine and open water habitats.

TABLE 3.4.5-4 Wetlands Estimated Impact Summary for Proposed Lower Brule to Witten 230-kV Transmission Line Corridor B Alternatives for the Proposed Project				
Vegetation Community Classification	**BPC-E (miles)**	**BPC-F (miles)**	**BPC-G (miles)**	**BPC-H (miles)**
Palustrine Emergent Wetlands	0.6	0.9	0.4	0.4
Palustrine Forested Wetlands	0	0	0.1	0.1
Palustrine Shrub-scrub Wetlands	0	0	0	0
Riverine/Open Water	0.5	0.3	0.2	0.2
Total	*1.1*	*1.2*	*0.7*	*0.7*

Construction and operation impacts on wetlands would be the same as for the distribution lines discussed above, however, it is likely that the poles would be larger and that the area disturbed around the installation site would likely be larger. Electric service providers would avoid and minimize impacts by spanning wetlands and selecting pole locations away from sensitive habitats (Keystone 2009c).

3.4.6 References

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