2.0 ENVIRONMENTAL ANALYSIS

In this section, the environmental setting, general construction and operational impacts, and proposed mitigation for each resource are discussed. As part of its Presidential Permit application, Vantage provided information regarding the existing environment in which the Project is located and the Project's impacts on environmental resources. Vantage relied on information identified during its public and agency outreach efforts and its field analysis of the Project area, and information obtained from publically available resources (e.g., publications, electronic databases). Additionally, Vantage, as part of its proposal, agreed to implement certain measures to reduce impacts.

DOS has assessed the Project's impacts on environmental resources and independently evaluated the proposed mitigation measures for their applicability using information provided by Vantage in its application, issues identified during the public scoping process, information provided during agency consultations, information obtained from publically available resources (e.g., publications, electronic databases), experience from recent pipeline projects and other federal agency documents, and subject matter expert knowledge. Conclusion statements of Project impacts are based on DOS and its independent third-party contractor's analysis of the environmental impact of the Project and the following assumptions:

- Vantage would comply with all applicable laws and regulations;
- the facilities would be constructed as described in sections 1.4 and 1.6; and
- Vantage would implement the mitigation measures identified in its application materials and supplemental information submittals to DOS, which include the EPP (see Appendix C for the draft EPP). DOS has reviewed Vantage's Draft EPP and DOS will have the opportunity to review and approve the Final EPP prior to beginning construction.

The environmental consequences of constructing and operating the proposed Project would vary in duration and significance. Using criteria recognized by other federal and state agencies such as the Federal Energy Regulatory Commission and Bureau of Land Management, DOS considered four levels of impact duration: temporary, short-term, long-term, and permanent. Temporary impact generally occurs during construction with the resource returning to preconstruction condition immediately after restoration or within a few months. Short-term impact could continue for up to 3 years following construction. An impact was considered long-term if the resource would require more than 3 years to recover. A permanent impact could occur as a result of any activity that modifies a resource to the extent that it would not return to preconstruction conditions during the life of the Project, such as the construction of aboveground facilities. Further, an impact would be considered significant if it would result in a substantial adverse change in the physical environment.

Additionally, consist with CEQ guidelines from Section 1508.8, the Project's effects were considered either direct or indirect. Direct effects are caused by the action and occur at the same time and place. Indirect effects are also caused by the action but are later in time or farther removed in distance, yet are still reasonably foreseeable.

2.1 GEOLOGY

2.1.1 Environmental Setting

Physiographically, the Project is located within the glaciated section of the Great Plains Province classified as the Missouri Coteau. The Missouri Coteau extends from South Dakota to Saskatchewan in a

band 30 to 40 miles wide, and forms the continental divide between the Gulf of Mexico and Hudson Bay. Regionally, it lies between the Missouri escarpment on the northeast and the well-drained ground moraine adjacent to the Missouri River on the southwest. To the north of the Missouri Coteau are the plains of the Central Lowland Province (Bluemle and Biek, 2007; Freers, 1970; Hansen, 1967).

The Missouri Coteau is comprised of glacial moraine[4] that forms a hummocky topography comprised of low hills, unintegrated[5] surface drainages, and potholes. In this area, the preglacial terrain sloped downwards to the northeast from the more elevated southwestern part of the state. As glaciers advanced along this slope during the Quaternary age (0.01 to 1.6 million years ago), glacial erosion and deposition had the effect of subduing the preglacial topography by filling existing lows and planing off the highs (Sloan, 1972).

Geologically in the Project area, the Missouri Coteau is comprised of Quaternary-age glacial drift overlying bedrock that formed in the Williston Basin (North Dakota, 2011). Glacial drift is a general term used to denote all deposits of glacial origin. Drift includes unsorted ice-laid rock debris called till, sorted meltwater-laid sand and gravel called outwash, and fine-grained sediments laid down in lakes. Usually associated with these drift deposits are windblown deposits of silt and sand referred to as loess. These unconsolidated glacial deposits, with a thickness of more than 500 feet, underlie the entire Project.

The Williston Basin is a large, oval-shaped structural and sedimentary basin formed during the Precambrian Period (about 1.8 to 1.9 billion years ago) that covers approximately 300,000 square miles in eastern Montana, western North and South Dakota, and southern Saskatchewan, Canada. The basin contains more than 14,800 feet of Paleozoic-age (245 to 570 million years ago) through Cenozoic-age (0.01 to 144 million years ago) sedimentary deposits. Directly underlying the glacial drift deposits in the Project area are the Paleocene to Cretaceous-age (57.8 to 144 million years ago) formations of the Bullion Creek Formation, Cannonball Formation, and Sentinel Butte Formation that together reach about 900 feet in thickness. The Bullion Creek Formation consists of yellow-brown silt, sand, clay, sandstone, and lignite. The Sentinel Butte Formation consists of gray-brown silt, sand, clay, sandstone, and lignite. The Cannonball Formation is comprised predominantly of sandstones and mudstone. These formations have limited exposure as small, isolated, bedrock outcrops found chiefly along the Missouri River escarpment in the northeastern part of Divide County, which is approximately 8 miles east and 16 miles south of the Project at the Tioga Gas Plant. Due to the overlying thickness of the glacial deposits, bedrock is not anticipated to be encountered by Project construction.

Mineral Resources

Geological resources that occur or are being exploited in the general vicinity of the Project include petroleum; coal and lignite (and associated potential shallow coal bed methane); trace metals including uranium, molybdenum, and germanium; construction materials including clay, sand, gravel, and scoria; and salts, including sodium sulfate, sodium chloride, and potassium chloride.

With the exception of small sand and gravel borrow sites, there is little active industrial mineral production within the Project area. Based on information provided by Vantage, no sand and gravel pits were identified within 500 feet of the Project. Vantage would obtain sand and gravel as necessary for construction from existing commercial borrow sites; no new sand and gravel borrow sites would be opened by Vantage.

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[4] Glacial moraine is comprised of glacial drift that is deposited chiefly by direct glacial action. Its deposition provides constructional topography independent of control of the landscape on which the drift lies.

[5] "Unintegrated" means that ponds and sloughs are not connected to one another and no streams flow through the area.

There is potential subsurface petroleum and geothermal resources in the Project area, but no active mining operations exploit these resources within the area to be disturbed by construction and operation. Oil and gas wells identified by Vantage within 500 feet of the Project are listed in table 2.1.1-1.

TABLE 2.1.1-1

Oil and Gas Wells within 500 feet of the Vantage Pipeline Project

Milepost	Well American Petroleum Institute Number	Well Owner	Well Name	Well Type [a]
0.7	33-105-00457-00-00	Hess Corporation	Tioga-Madison Unit E-115	WI
0.9	33-105-01394-00-00	Landtech Enterprises, LLC	Rehak 1 Swd	SWD
1.5	33-105-00251-00-00	Amerada Hess Corporation	Tioga-Madison Unit D-118	OG
1.7	33-105-01340-00-00	Hess Corporation	Astrid Ongstad 14-22	GASC
2.0	33-105-00413-00-00	Amerada Hess Corporation	Tioga-Madison Unit D-120	OG
2.6	33-105-01584-00-00	Xto Energy Inc.	Ongstad 41x-15	OG
4.4	33-105-00784-00-00	Texakota, Inc.	M. Borstad 4-4	OG
4.9	33-105-00772-00-00	Texakota, Inc.	H. Borstad 4-3	OG
4.9	33-105-01738-00-00	Texakota, Inc.	H. Borstad 4-5	Confidential
4.9	33-105-90044-00-00	Texakota, Inc.	H. Borstad Swdw 1	SWD
7.7	33-105-01729-00-00	Xto Energy Inc.	Eide 31x-29	OG
13.0	33-105-00808-00-00	Rio Petro Ltd	Sundhagen 1	WS
17.0	33-105-00996-00-00	Diamond Shamrock Exploration Company	Smith 24-31	OG
36.4	33-105-00953-00-00	Terra Resources, Inc.	Thoring 1-4	OG
46.7	33-023-00289-00-00	Atlantic Richfield Company	Wrolson 1	OG
63.2	33-023-00294-00-00	Louisiana Land & Exploration Company	Hagen 21-4 1	OG
67.0	33-023-00220-00-00	Colt Resources Corporation	Laverne Haugen 32-19	OG
68.6	33-023-00317-00-00	Sun Exploration & Production Company	Wehrman 1	OG

[a] WI = water injection
SWD = salt water disposal
OG = oil and gas
GASC = gas condensate
WS = water source

Source: North Dakota Industrial Commission (2011), Department of Mineral Resources, Oil and Gas Division

Because petroleum and geothermal resources are generally produced from depths typically greater than the pipeline (i.e., 4 to 5 feet from the ground surface), it is anticipated that construction and operation of the pipeline would not be expected to affect future petroleum and geothermal production. In areas where Vantage may impede development of subsurface minerals, Vantage would negotiate access rights and easements with existing permitted mineral claim owners to minimize any restrictions to the development of future mineral resources.

Geologic Hazards

Geologic hazards are natural, physical conditions that can result in damage to land and structures or injury to people. In the Project area these hazards potentially include mass movement, flooding, and seismic events. Based on a review of NRCS and USGS data, the resources identified in the Project area, and the pipeline construction methods proposed by Vantage, the potential for geologic hazards to significantly affect construction or operation of the proposed Project is anticipated to be low. The potential geohazards of concern are described in more detail below.

Mass Movement

Mass movement (landslide) is the down slope movement of earth materials under the influence of gravity. Detachment and mass movement of earth materials occurs when the stress imposed on materials is greater than the strength of the material holding it in place. Slopes fail for various reasons including the steepness or angle of the slope, rock type, bedding, and moisture content of the rocks. Most landslides in western North Dakota are rotational slumps. Typically, the part of the slope that breaks apart slides down the slope as a single unit and the beds tilt back in the direction of the slope. Successive landslides may occur at the same location. Over time, the accumulated material from multiple, adjacent landslides can cover an area that is several thousand feet wide and several miles long (Murphy, 2004)

The Project lies on glacial drift left by glaciers that advanced southward into North Dakota. Glacial drift is poorly consolidated and easily erodible and would be subject to erosion and mass movement on steep slopes (slopes greater than 20 percent). Table 2.1.1-2 summarizes locations crossed by or within 500 feet of the Project that, based on NRCS data, have greater than 20 percent slopes (USDA NRCS, 2008).

While approximately 3 miles of steep slopes are within 500 feet of the Project, there is little topographic relief along the entire length of the pipeline right-of-way and slopes are generally gentle (less than 4 percent) Project-wide, making the potential for mass movement to be considered low. There are no known or mapped areas of slope failure within the Project's construction workspace.

Flooding

Based on a review of USGS topographic maps and NRCS slope data, there is little topographic relief and slopes are low in the Project area. Flooding may become more of a nuisance than a hazard when rapid snowmelt occurs prior to the underlying ground having thawed, or in areas where the glacial till has a low permeability reducing infiltration. However, construction would occur in late summer through late fall after snowmelt has occurred. Todhunter and Rundquist (2008) described localized flooding within the North American Prairie Pothole Region of eastern North Dakota, an area physiographically and geologically similar to the Project area. This pothole topography is characterized by a multitude of shallow depressions that have formed in low-permeability glacial till overlying generally low permeability bedrock. The shallow depression potholes are usually filled with standing water, creating numerous prairie wetlands that may be temporary or permanent. Extended wet spells can significantly increase the number, size, and depth of the prairie wetlands (Murphy et al., 2002; LaBaugh et al., 1998; Johnson et al., 2004), leading to flooding that is generally localized to these isolated (unintegrated) topographic depressions.

TABLE 2.1.1-2

Slopes Greater than 20 Percent Crossed by or within 500 feet of the Vantage Pipeline Project

Begin Milepost	End Milepost	Length (feet)	Begin Milepost	End Milepost	Length (feet)
0.6	0.7	378.3	47.0	47.0	44.2
0.8	0.8	136.9	47.4	47.5	542.7
3.2	3.2	122.7	47.8	47.8	57.6
5.6	5.6	295.2	47.9	47.9	63.9
6.0	6.0	201.0	51.1	51.1	133.5
6.6	6.7	640.2	51.2	51.6	1,994.2
10.5	10.5	323.1	51.6	51.6	225.2
15.0	15.1	601.1	52.8	52.8	133.2
29.8	29.9	549.8	59.3	59.3	89.4
29.9	30.2	1,624.4	64.9	64.9	33.8
30.3	30.6	1,715.6	65.8	65.8	95.7
31.5	31.6	380.1	66.0	66.0	192.0
31.8	31.8	112.1	66.7	66.7	57.7
31.8	31.9	72.1	67.6	67.6	104.8
33.7	33.8	119.2	67.6	67.6	39.2
34.9	35.0	222.5	73.4	73.4	134.7
36.0	36.1	387.3	73.9	73.9	187.2
37.8	38.0	633.8	74.1	74.1	46.7
38.0	38.1	674.6	76.6	76.6	58.9
38.2	38.4	1,019.2	77.3	77.3	45.7
38.4	38.6	564.3	77.3	77.4	191.2
41.4	41.5	118.5	77.5	77.5	<0.1
46.8	46.8	78.7	77.6	77.6	92.3
Total					2.9 miles

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, 2008.

Based on information provided by Vantage, three areas with frequent flooding are known to occur within 500 feet of the Project at mileposts (MPs) 2.5, 16.0, and 30.8. Additionally, occasional flooding is known to occur within 500 feet of MP 16.5. However, because these tend to be associated with intermittent or ephemeral waterbodies/wetlands, these flooding events are not considered to have the same significance as regional flooding or flash events along major river ways or coastal flood processes. Because these flooding events are unintegrated and low energy, it is anticipated that flood-based scour in the Project area is unlikely.

Seismic Events (Faults and Earthquakes)

There are no known Quaternary faults in North Dakota (USGS, 2011b). Older, deeper faults do underlie North Dakota but they are generally considered dormant. Based on the state's record of seismic events, Bluemle (2002) concluded "North Dakota is located in an area of low earthquake probability" (and that) "…infrequent, small earthquakes may occur near or within the state, but it is unlikely they would cause any serious damage." The USGS (2012) noted that the first instrumentally located earthquake in the history of North Dakota occurred on July 8, 1968 near Huff. Its intensity did not exceed IV[6] (Modified Mercalli Scale). Bluemle (2002) noted the "1968 Huff earthquake remains the only tremor

[6] A Modified Mercalli Scale value of IV is defined by the U.S. Geological Survey (2009) as "Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably."

with an instrumentally verified epicenter in North Dakota, although it is likely that other small reported tremors have had epicenters within the state." Northwestern North Dakota is located in a seismicity zone where probabilistic ground motion maps for Peak Ground Acceleration show effective peak accelerations as having only a 2 percent chance of exceedance in 50 years (USGS, 2008).

Blasting

Based on information provided by Vantage, and DOS's review of Project mapping and depth-to-bedrock soils information (see table 2.2.1-1), it is unlikely that bedrock would be encountered during Project construction and, therefore, blasting is not anticipated.

Paleontological Resources

Geologic deposits underlying the Project are potentially fossil-bearing. The shallowest bedrock formations (Sentinel Butte Formation, Bullion Creek Formation, and Cannonball Formation) are known to contain vertebrate, invertebrate, and/or plant fossil remains (Hoganson, 2006a and 2006b). However, these rock formations do not crop out in the Project area, nor would Project construction likely encounter buried rock.

Regarding shallower unconsolidated glacial deposits that directly underlie the Project, there have been citations to Quaternary-age mammal fossil remains found in North Dakota glacial deposits (Kihm, 1987; Harrington and Ashworth, 1986; Hoganson, 2003, 2006c, and 2010; Hoganson and McDonald, 2007; Clayton, 1980). Newbrey and Ashworth (2004) report Quaternary-age fossil fishes from the Missouri Coteau area, and beetle assemblages preserved over a 10,000 year period are reported in Missouri Coteau deposits by Ashworth and Brophy (1972). Though fossils are present, they are not necessarily ubiquitous within the underlying glacial deposits.

Consistent with the fossil classification developed by the Bureau of Land Management (USDA, 2007) and based on the potential presence of Quaternary-age fossils, these glacial deposits are considered to have a Probable Fossil Yield Class (PFYC) of 2 or 3. Table 2.1.1-3 lists where Vantage has identified it would cross Quaternary-age geologic deposits with a potential to contain fossils with a PFYC of 2 to 3.

All geologic deposits cited in the table are glacial in origin and a component of the Coleharbor Formation. The Coleharbor Formation is described as a sandy, silty clay with pebbles of limestone, dolomite, granite, gneiss, and basalt; nonorganic, bedded clay, silt, sand, and gravel; and as thick as 600 feet (Clayton, 1980; USGS, 2012a). The pipeline would be installed at a depth of between 4 to 5 feet. Based on the geological setting and classification, it is anticipated that Project activities could disturb Quaternary-age deposits that have a potential to contain fossils.

2.1.2 Construction and Operation Impacts and Mitigation

Because of the anticipated depth of glacial drift underlying the Project, mineral resources associated with the underlying bedrock (oil and gas, salts, etc.) are found at a depth far below the pipeline trench and installation depth. It is anticipated that these resources would be unaffected during Project construction and operation. Further, as discussed in section 2.1.1, impacts associated with natural geologic hazards such as flooding and/or seismic events are not anticipated.

TABLE 2.1.1-3

Geologic Deposits Crossed by the Vantage Pipeline Project with Potential to Contain Significant Fossils

Begin Milepost	End Milepost	Depositional Environment Description	Length (miles)
0.0	0.4	Draped On Older Surf Glacial Deposits	0.4
0.4	5.5	Collapsed Glacial Deposit	5.1
5.5	6.5	Collapsed Glacial Deposit	1.0
6.5	6.9	Ice walled Lake Offshore Deposit	0.4
6.9	7.8	Collapsed Glacial Deposit	0.9
7.8	10.0	Collapsed Glacial Deposit	2.2
10.0	11.9	Draped On Older Surf Glacial Deposits	1.9
11.9	26.0	Transition Sediment Glacial	14.2
26.0	28.9	Collapsed Glacial Deposit	2.9
28.9	31.0	Collapsed Glacial Deposit	2.1
31.0	31.9	Collapsed River Sediment	0.9
31.9	38.9	Collapsed Glacial Deposit	7.0
38.9	41.6	Thrust Masses Glacial Deposit	2.7
41.6	43.5	Collapsed Glacial Deposit	1.9
43.5	44.3	Collapsed River Sediment	0.8
44.3	50.3	Collapsed Glacial Deposit	6.0
50.3	51.6	Collapsed River Sediment	1.3
51.6	52.2	Collapsed River Sediment	0.6
52.2	53.0	Collapsed Glacial Deposit	0.8
53.0	54.4	Collapsed Glacial Deposit	1.4
54.4	58.0	Collapsed Glacial Deposit	3.7
58.0	59.5	Thrust Masses Glacial Deposit	1.5
59.5	61.0	Collapsed Glacial Deposit	1.5
61.0	62.7	Collapsed Glacial Deposit	1.7
62.7	64.4	Collapsed Glacial Deposit	1.7
64.4	67.2	Thrust Masses Glacial Deposit	2.8
67.2	68.1	Collapsed Glacial Deposit	1.0
68.1	71.4	Collapsed River Sediment	3.3
71.4	72.2	Collapsed Glacial Deposit	0.7
72.2	72.9	Collapsed River Sediment	0.7
72.9	77.3	Collapsed Glacial Deposit	4.4
77.3	79.5	Collapsed River Sediment	2.3

The Project is likely to have temporary and direct impacts on the shallow subsurface geologic environment during construction due to the depths associated with trenching, pipe installation, and backfilling activities (4 to 5 feet). During operation, direct impacts on subsurface geologic resources may also occur to the extent erosion is caused by Vantage's vehicles and if construction activities were to cause undercutting, which could initiate slumping, landslides, or other mass movements of surrounding geologic resources.

To reduce potential mass movement concerns, Vantage would grade as necessary cross slope areas. Based on past and recent pipeline construction practices and industry-recognized standards, grading reduces the slope for safe operation of construction equipment and to accommodate pipe-bending limitations. In such areas, the slopes would be excavated prior to pipeline installation and reconstructed to their original contours during restoration. To limit erosion, temporary sediment barriers such as silt fence and straw bales would be installed during clearing to prevent the movement of disturbed soil into wetlands, waterbodies, or other environmentally sensitive areas. Temporary slope breakers, consisting of

mounded and compacted soil, would be installed across the right-of-way during grading, and permanent slope breakers would be installed during restoration.

Direct impacts on paleontological resources may occur during Project construction and significant fossil resources in the underlying glacial deposits may be exposed. To reduce the potential impacts associated with the loss of fossil resources, Vantage would instruct construction personnel about the types of fossils that might be encountered and the steps to take if fossils are uncovered. Should fossil resources be uncovered during surface disturbance, Vantage would immediately notify the appropriate state or federal agency and cease work in the area of the discovery until the fossil remains can be evaluated for scientific significance by a qualified paleontologist. If fossil remains of significance are identified, additional mitigation may be required. Additional mitigation could include collection, identification, and curation of the fossil remains and potentially monitoring of ongoing surface disturbance in the area of discovery, and would be determined with agency personnel depending on the paleontological find.

2.2 SOILS

2.2.1 Environmental Setting

The Project is located in the northern Great Plains Spring Wheat Land Resource Region that includes most of North Dakota, northern Montana, north-central South Dakota, and northwest Minnesota (USDA NRCS, 2006). The majority of the Project is located within the Central Dark Brown Glaciated Plains Major Land Resource Area (MLRA) (MLRA 53B, 76.1 miles), with a minor amount (3.7 miles) in the Northern Dark Brown Glaciated Plains (MLRA 53A) (USDA NRCS, 2006). The two MLRAs share similar physiography, geology, and soils.

The soils crossed by the Project were identified by Vantage and assessed by DOS using the Soil Survey Geographic (SSURGO2) database for Williams and Divide Counties (USDA NRCS, 2011). The SSURGO2 database is a digital version of original and updated county soil surveys developed by the USDA NRCS for use with geographic information systems. It provides the most detailed level of soils information for natural resource planning and management. The attribute data within the SSURGO database give the proportionate extent of the component soils and their properties for each soil map unit (USDA NRCS, 2011). Additional information about the soils in the Project area was obtained by Vantage from Official Soil Series Descriptions and verified by DOS's third-party contractor (USDA NRCS, 2011). Tables 2.2.1-1 and 2.2.1-2 provide soil characteristics and topsoil depth and slope class for soils affected by the Project, respectively.

2.2.1.1 Pipeline Facilities

Pipeline facilities include the 70-foot-wide temporary construction right-of-way and ATWS areas.

Prime Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops (USDA, 2011). This designation includes cultivated land, pasture, woodland, or other lands that are or can be used for food or fiber crops, or are available for these uses. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating). Approximately 1.9 percent (14.1 acres) of the

soils included within the construction footprint is considered prime farmland. Prime farmland is evenly split between those soils where all areas are prime farmland (6.3 acres) and those areas that are prime farmland if drained (7.8 acres). The majority of the prime farmland (13.5 acres) is located within the Williams County portion of the Project (see table 2.2.1-1).

Erosion by Wind and Water

Erosion is a continuing natural process that can be accelerated by pipeline construction activities. Factors such as soil texture, structure, slope, vegetative cover, rainfall intensity, and wind intensity can influence the degree of erosion. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, poor soil-structure resulting in non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Soils typically more resistant to erosion by water include those that occupy low relief areas, are well vegetated, and have high infiltration capacity and internal permeability. Wind erosion processes are less affected by slope angles than water erosion processes. Wind-induced erosion often occurs where vegetative cover is sparse, strong winds are prevalent, and soils have coarse and medium-textured surfaces that are low in clay content. Approximately 31.1 percent (228.2 acres) of the soils within the Project construction area are considered highly susceptible to erosion by water. No soils affected by the Project are considered to be highly susceptible to wind erosion because none of the soils within the Project construction area have a wind erodibility group designation of two or less. Most of the soils that are susceptible to water erosion (166.2 acres, 22.6 percent) in the Project area occurs within Divide County (see table 2.2.1-1).

Hydric Soils

Hydric soils are defined as "soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (FR, 1994). Soils that are artificially drained or protected from flooding (e.g., by subsurface drain tiles or surface ditches) are still considered hydric if the soil in its undisturbed state would meet the definition of a hydric soil. Approximately 5.1 percent (37.8 acres) of the soils affected by the Project are considered hydric (see table 2.2.1-1).

TABLE 2.2.1-1

Soil Characteristics Affected by the Vantage Pipeline Project (acres) [a]

County	Facility	Prime Farmland [b]		Highly Erodible		Hydric [b]	Compact. Prone [e]	Stony/ Rocky [f]	Shallow to Bedrock [g]	Droughty [h]	Saline [i]	Saline/ Sodic [j]
		All Areas	If Drained	Water [c]	Wind [d]							
Williams	Right-of-Way	6.3	7.2	61.6	0.0	17.8	19.9	0.0	0.0	12.3	2.6	0.0
	Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Block Valves	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Contractor Yards	0.0	0.0	0.3	0.0	1.7	1.7	0.0	0.0	0.0	1.7	0.0
Williams Total		6.3	7.2	62.0	0.0	19.5	21.6	0.0	0.0	12.3	4.3	0.0
Divide	Right-of-Way	0.0	0.6	164.7	0.0	18.2	18.6	0.0	0.0	66.2	17.5	0.9
	Access Roads	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Block Valves	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Contractor Yards	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Divide Total		0.0	0.6	166.2	0.0	18.2	18.6	0.0	0.0	66.2	18.1	0.9
Project Total		6.3	7.8	228.2	0.0	37.8	40.2	0.0	0.0	78.6	22.4	0.9

[a] An area may have more than one characteristic.

[b] As designated by the Natural Resources Conservation Service.

[c] Includes land in capability subclasses 4e through 8e and soils with an average slope greater than 8 percent.

[d] Includes soils in wind erodibility group designation of two or less.

[e] Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.

[f] Includes soils with a cobbley, stony, bouldery, shaly, very gravelly, or extremely gravelly modifier to the textural class of the surface layer and/or that have a surface layer that contains greater than 5 percent by weight rock fragments larger than 3 inches.

[g] Includes soils identified as containing bedrock at a depth of 5 feet or less from the surface.

[h] Includes soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained.

[i] Includes soils that have a soil horizon or horizons within the soil profile with an EC > 4 dS/m.

[j] Includes soils that have a soil horizon or horizons within the soil profile with an EC > 4 dS/m and an SAR > 13.

TABLE 2.2.1-2

Topsoil Depths and Slope Class for Soils Affected by the Vantage Pipeline Project (acres) [a]

			Topsoil Depth (inches) [a]				Slope Class (percent)				
County	Facility	Total	0-6	>6 – 12	>12 - 18	>18	0-5	>5-8	>8-15	>15-30	>30
Williams	Right-of-Way	350.4	316.2	11.9	12.2	10.1	255.1	71.3	11.4	11.1	1.5
	Access Roads	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	Block Valves	0.2	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	Contractor Yards	4.0	2.3	1.7	0.0	0.0	3.3	0.7	0.0	0.0	0.0
Williams Total		354.6	318.7	13.6	12.2	10.1	258.6	72.0	11.4	11.1	1.5
Divide	Right-of-Way	375.8	353.9	8.8	0.4	12.7	167.8	101.7	61.1	42.1	3.1
	Access Roads	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	Block Valves	0.2	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
	Contractor Yards	4.0	4.0	0.0	0.0	0.0	1.4	2.6	0.0	0.0	0.0
Divide Total		380.1	358.2	8.8	0.4	12.7	169.4	104.4	61.1	42.1	3.1
Project Total		734.8	676.9	22.4	12.6	22.8	428.0	176.4	72.5	53.2	4.6

[a] Includes A-horizons and subsurface layers with organic matter content > 2 percent by weight.

Note: The totals shown in this table may not equal the sum of addends due to rounding.

Compaction Potential

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity and water movement characteristics of soils. The degree of compaction depends on moisture content, soil texture, and soil structure. Fine-textured soils (i.e., sandy clay loam or finer) with poor internal drainage that are moist or saturated during construction are the most susceptible to compaction and rutting. Approximately 5.5 percent (40.2 acres) of the soils affected by the Project are considered prone to compaction (see table 2.2.1-1).

Stony/Rocky and Shallow-to-Bedrocks Soils

Stony/rocky soils are identified as soils that have a very gravelly, extremely gravelly, cobbley, stony, boulder, or shaly modifier to the textural class of the surface layer, or have a surface layer that contains greater than 5 percent (weight basis) rock fragments larger than 3 inches in diameter. None of the soils within the Project construction area are considered stony rocky soils based on the presence of rocks greater than 3 inches in any dimension in and near the soil surface (see table 2.2.1-1).

No hard bedrock was indicated within the Project construction area. It is possible that some soft (paralithic) bedrock may be present in isolated areas. However, no paralithic bedrock is indicated in the SSURGO2 database, and paralithic bedrock, if encountered, is considered easily excavated with normal construction equipment and should not require blasting for pipeline installation.

Revegetation Concerns

Based on past and recent pipeline construction practices and industry-recognized standards, successful restoration and revegetation are important for maintaining soil productivity and protecting the underlying soil from potential damage, such as erosion. The revegetation potential of soils affected by proposed Project was evaluated by Vantage and DOS based on the soil surface texture, slope, and drainage class. Droughty soils that have a coarse surface texture (i.e., sandy loam or coarser) and are moderately well to excessively drained may prove to be difficult to revegetate because drier soils have less water to aid in seed germination and the eventual establishment of new vegetation. The coarser-textured soils also have a lower water holding capacity following precipitation, which could result in moisture deficiencies in the root zone and create unfavorable conditions for many plants. About 10.7 percent (78.6 acres) of soil within the Project construction area are considered droughty (see table 2.2.1-1). An additional 17.7 percent (130.3 acres) of the soils within the Project construction area have an average slope of greater than 8 percent, which may make the establishment of vegetation difficult. The majority of droughty and steeply sloping soils (greater than 8 percent) are in Divide County (66.2 acres, 9.1 percent and 106.3 acres, 14.4 percent of the total construction footprint, respectively) (see tables 2.2.1-1 and 2.2.1-2, respectively).

Saline and Sodic Soil

Soil salinity describes the amount of soluble minerals that are present in the soil. Soil salinity is evaluated by measuring the electrical conductivity (EC) of a soil solution measured as deci-siemens per meter (dS/m). Soil solutions progressively higher in dissolved solids are progressively better conductors of electricity and have higher electrical conductivity values. When present in high amounts (EC > 4 dS/m), the dissolved ions compete with plant roots for water and can adversely affect seed germination and seedling growth (Richards, 1954).

Soil sodicity is a measure of the amount of sodium (Na^+) in the soil solution and is evaluated by determining the chemically reactive amount of Na^+ relative to other dissolved ions. Soil sodicity is

evaluated by determining the Sodium Adsorption Ratio (SAR). When present as a high relative percentage of all ions (SAR > 13) sodium can adversely affect soil structure resulting in a soil that is hard with massive structure when dry and dispersed and impermeable when wet. Both conditions can adversely affect plant growth (Richards, 1954).

Soil salinity and sodicity are relatively common conditions in northwestern North Dakota. Soils can be saline, sodic, or both saline and sodic. Pipeline construction can aggravate saline and sodic conditions when saline or sodic subsoils that are excavated during trenching are brought into the plant rooting zone during backfill.

The Project construction area would affect 22.4 acres (3.1 percent) and 0.9 acre (0.1 percent) of saline and saline/sodic soils, respectively. No purely sodic soils were identified by Vantage or DOS in the Project area (see table 2.2.1-1).

Topsoil Thickness

Based on past and recent pipeline construction practices and industry-recognized standards, stripping topsoil and replacing the topsoil to the soil surface is important in maintaining soil quality because the topsoil is where crop seed germination and rooting occur and topsoil is typically highest in organic matter and plant nutrients. Vantage proposes several methods to maintain topsoil characteristics of potentially affected soils within the construction footprint by stripping and storing topsoil separately from the underlying subsoils during construction and restoring topsoil to the soil surface during backfill and restoration. These include use of one of the following options, as described in the EPP (see Appendix C for the Draft EPP):

- Option 1 – Full width stripping (for cultivated lands, or grassland and pasture land).
- Option 2 – Full width stripping (for cultivated lands, or grassland and pasture land) same as Option 1 with alternative stockpile locations.
- Option 3 – No stripping within the temporary workspace portion of the right-of-way (pasture or grassland).
- Option 4 – Full width stripping with salvage of the A and B soil horizon (prime farmland).
- Option 5 – Limited stripping over the trench line (wetland/waterbody crossings and frozen conditions).

The majority of soils affected within the Project construction work area (676.9 acres, 92.1 percent) have relatively thin (0-6 inches thick) topsoil (see table 2.2.1-2).

2.2.1.2 Other Project Facilities

Vantage would construct and operate eight MLBVs, permanently affecting 0.4 acre of soil. None of the soils within the area identified for a MLBV site would result in the permanent loss of prime farmland.

Vantage would construct and maintain seven new access roads, permanently affecting 0.2 acre of soil. Soils in areas proposed for access roads have few limitations. None of the areas are hydric, highly

erodible by wind or water, compaction prone, shallow-to-bedrock, saline or saline sodic, or drought-affected.

Vantage would use four contractor/pipe yards during construction, temporarily affecting approximately 8.0 acres of soil. None of the soils within areas proposed for yards are highly susceptible to wind erosion; however, 21.3 percent (1.7 acres) are susceptible to erosion by water, 21.3 percent (1.7 acres) are prone to compaction, and 2.3 acres (28.8 percent) are saline (see table 2.2.1-1). None of the potentially affected yards are expected to have revegetation issues due to the presence of drought affected soils or steep (greater than 8 percent) soils (see tables 2.2.1-1 and 2.2.1-2, respectively). Following construction, the contractor/pipe yard sites would be returned to preconstruction conditions and would not result in permanent impacts on prime farmland.

2.2.2 Construction and Operation Impacts and Mitigation

Based on past and recent pipeline construction experience, nearly every phase of pipeline construction would directly and temporarily affect soils. Construction activities such as clearing, grading, trench excavation, backfilling, and the movement of construction equipment along the right-of-way would result in direct, temporary impacts soil resources. Clearing, although anticipated by Vantage and DOS to be minor along the Project given the topography, removes protective vegetative cover and exposes the soil to the effects of wind, rain, and runoff, which increases the potential for soil erosion and sedimentation in sensitive areas. Grading, spoil storage, and equipment traffic would be extensive and can compact soil, reducing porosity and increasing runoff potential. Trenching of stony/rocky or shallow-to-bedrock soils can bring stones or rock fragments to the surface that could interfere with agricultural practices and hinder restoration of the right-of-way. Construction activities can also affect soil fertility and facilitate the dispersal and establishment of weeds. Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils.

Vantage would implement its EPP (see Appendix C for the Draft EPP) to reduce the impacts of construction on soils (e.g., soil compaction). Vantage would also implement a Soil Conditions Contingency Plan. Aspects of the plan, included as part of the Final EPP, include protective measures for wet soil and high wind conditions, limiting topsoil depth, topsoil identification, constructing in uneven surfaces, construction and post-construction handling of stony soils and shallow bedrock areas, minimizing hazards associated with unstable trench walls, and minimizing soil pulverization. Vantage would also implement a Soil Erosion Contingency Plan as necessary during construction. Aspects of the plan, included as part of the Final EPP, include, but are not limited to: use of silt fences; construction of water bars and berms; use of sandbags and straw bales to filter and direct runoff; application of erosion netting, mulch, and/or tackifiers to limit sediment detachment and transport; and regrading and planting of cover crops. Additionally, Vantage would manage windrow size and, as necessary, apply water to manage fugitive dust resulting from construction activities.

To mitigate for water and wind erosion concerns, Vantage would implement stormwater best management practices (BMPs) as stipulated in a Project-specific SWPPP. Vantage would also comply with all conditions of the Construction Stormwater Permit required by the NDHD.

Grading would be minimized to the extent practicable to reduce the erosion potential and the amount of reclamation required. Some grading would be necessary to prepare a safe construction surface in areas of cross slopes and in steeply sloping areas. Post-construction grading of the right-of-way would restore contours to pre-construction grades and reestablish original drainage patterns to the extent practicable.

Vantage would implement one of five topsoil handling protocols to maintain pre-construction topsoil conditions to the extent practicable within the Project construction area. These topsoil stripping options are dependent on the land use and right-of-way configuration and would range from full right-of-way topsoil stripping (cultivated land, native range, or managed pasture lands) to stripping topsoil over the trench only (wetland and watercourse crossings and winter construction). The handling of topsoil in prime farmland is a special consideration and, as such, Vantage would perform full right-of-way width topsoil (A horizons) and upper subsoil (B horizons) stripping on all areas of prime farmland. Windrows of A and B horizon material would be kept separate from the underlying trench subsoil. A and B horizons would be returned to the trench the opposite order removed.

Vantage would develop and require contractor compliance with a Project-specific SPCC Plan. The plan, included as part of the Final EPP, would provide BMPs for handling spills, and require that equipment refueling and servicing is conducted appropriately and in locations so as to avoid potential contamination of sensitive resources such as wetlands and waterbodies. Vantage would also develop and require contractor compliance with a Project-specific Fuels and Hazardous Materials Spill Contingency Plan. The plan, included as part of the Final EPP, would prescribe procedures to handle the initial spill response and reporting, spill clean-up procedures, and special situations such as spills next to waterbodies. Both plans will be submitted to DOS for approval prior to beginning construction.

To minimize potentially adverse or long-term impacts on soil resources that could occur during clean up and/or restoration activities, Vantage would implement the following mitigation measures.

- Subsoil and topsoil would be replaced to the trench after the pipeline is installed in the reverse order removed, and the disturbed areas would be graded to preconstruction contours.

- A small trench crown may be left on the surface and over the pipeline to account for soil settling in the trench.

- Erosion and sediment control BMPs, including slopebreakers constructed of subsoil material capped with topsoil, would be established and maintained until revegetation successfully stabilizes the area.

- Tillage equipment would be used to smooth the soil surface prior to seeding.

- Compacted soils would be decompacted with appropriate equipment (multi-shank ripper, chisel plow).

- The right-of-way would be seeded with an appropriate seed mix prescribed to match the adjacent land use: native grasslands, wetlands, depressions, saline sites, and pasture lands.

- Fertilizers would be applied according to adjacent land uses as needed and requested by the landowner.

In addition, Vantage would conduct a post-construction soil assessment to document the degree of subsoil compaction, topsoil depth, topsoil and subsoil texture, degree of topsoil and subsoil mixing, contour restoration, and erosion. If issues are identified, Vantage would implement site-specific mitigation measures as soon as feasible.

During operation, direct impacts on soils may also occur as a result of vehicles used to periodically conduct inspection and vegetation maintenance activities along the right-of-way. However, based on recent pipeline projects and the inspection requirements set forth by the DOT in 49 CFR 195, these activities would be limited in scale and time, and are anticipated to result only in temporary, minor, and localized impacts on soils.

2.3 GROUNDWATER

2.3.1 Environmental Setting

In general, groundwater can be potentially impacted by a pipeline construction and is dependent on the groundwater setting of a Project area. Construction activities may affect groundwater quantity and/or quality; however, these impacts are generally temporary to short term, and limited in scale. An evaluation of hydrogeologic resources in the Project area was conducted by Vantage through review of publications and public Geographic Information System databases provided by the EPA, the NDHD, the USGS, and the North Dakota State Water Commission (NDSWC).

As noted in section 2.1.1, the surficial geologic deposits that directly underlie the Project are comprised of unconsolidated glacial drift to a depth of hundreds of feet. Where these glacial deposits have saturated sand and gravel deposits (aquifers), groundwater is appropriated for public water systems, private drinking-water wells, irrigation, and livestock. The named sand and gravel aquifers crossed by the pipeline include the Skjermo Lake aquifer, Yellowstone River Channel aquifer, Little Muddy aquifer, and West Wildrose aquifer. Specific to these aquifers (Armstrong, 1967; NDSWC, 2010; USGS, 2000 and 2003):

- the Project would cross the Skjermo Lake aquifer at its northernmost end near the U.S.-Canada border. This aquifer is approximately 1 million acres in area, with the underlying water table ranging from above ground level to 100 feet below the ground surface. The saturated thickness of the aquifer in this area ranges from 38 to106 feet;

- the Project would cross the northern portion of the Yellowstone River Channel aquifer near the Williams and Divide Counties border. This aquifer runs from the southeast to northwest occupying an area of approximately 4.3 million acres. The saturated thickness of the aquifer in this area ranges from 12 to 20 feet;

- the Project would cross the Little Muddy aquifer north of the Yellowstone River Channel aquifer in Divide County. This aquifer occupies approximately 2.6 million acres and extends northeast of the Little Muddy River just north of the Yellowstone River Channel. The saturated thickness of the aquifer in this area rangers from 0 to 116 feet; and

- the Project would cross the West Wildrose aquifer in the northern portion of Williams County. This aquifer occupies approximately 4.3 million acres. The groundwater table in this area lies at a depth ranging from 88 to 125 feet with a saturated thickness ranging from 15 to 46 feet.

Ambient ground water quality in North Dakota's glacial drift aquifers typically ranges from 200 to thousands of miligrams per liter (mg/L) of total dissolved solids (TDS). The National Secondary Drinking Water Regulations suggest a secondary drinking water standard (MCL) of less than 500 mg/L for TDS. These secondary standards relate to aesthetic water quality (hardness, mineral deposits, colored water, staining, and salty taste) attributes rather than toxicity. Armstrong (1967) reports the TDS levels for the Skjermo Lake aquifer as 907 mg/L, the West Wildrose aquifer as 500 mg/L, and the Little Muddy

aquifer as 1,030 to 2,050 mg/L. Water quality of the Yellowstone River Channel aquifer was not reported due to the lateral and vertical variability in water quality. All of the TDS levels are at or exceed the secondary MCL for TDS.

2.3.1.1 Sole-Source Aquifers

The Sole Source Aquifer Protection Program is authorized by Section 1424(e) of the Safe Drinking Water Act of 1974 (42 U.S.C. 300 et seq.). The EPA defines a principal or sole-source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer (EPA, 2012a). These areas have few to no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water. According to the EPA (2010), NDHD (2008), and correspondence from the NDSWC (2011), there are no designated federal or state sole-source aquifers in North Dakota or the Project area.

2.3.1.2 Public and Private Water Supply Wells

State and federal databases were reviewed by Vantage to identify public water supply wells, springs, wellhead protection areas (WHPAs), and private wells within 150 feet of the Project (NDSWC, 2007; NDHD, 2003). Vantage identified 11 domestic water supply wells are located within 1 mile of the Project; however, no private water supply wells or springs were identified within 150 feet of the Project construction work area. In addition, no public water supply wells are located within 1 mile of the Project. The nearest municipal wells, owned by the City of Tioga, are located approximately 1.4 miles southwest of the southern end of the Project. The North Dakota State Water Commission's website (2012) maps no federal- or state-designated WHPAs in the State of North Dakota.

2.3.1.3 Potential Contaminated Groundwater

The EPA's Geospatial Data Download databases, which include Superfund National Priorities List and RCRA site information, were reviewed by Vantage and DOS's independent third-party contractor to identify known and potential hazardous waste sites that have either impacted or have the potential to impact groundwater. In the general Project area, 10 sites were identified by address only in Tioga by the EPA (2012b). No referenced site had a noted permit violation, contaminant release, or enforcement action. Based on the proposed Project route and the EPA databases, there are no known hazardous or contaminated waste sites within the Project construction work area (EPA, 2010; EPA, 2012b).

2.3.1.4 Hydrostatic Testing

Once pipeline construction is completed, the pipeline would be hydrostatically tested consistent with DOT specifications to ensure pipeline integrity (49 CFR 192). Table 2.3.1-1 lists Vantage's estimated volume of groundwater that would be appropriated from a high capacity well at the Tioga Gas Plant near Tioga, North Dakota to complete the tests.

The pipeline would be hydrostatically tested in seven discrete sections to reduce the amount of water required for testing. This procedure requires that the water from one test section be transferred to the adjoining section by means of foam or poly pigs and air pressure; the sequence of testing and transfer would be repeated until all sections have been filled and tested. If any leaks are detected by a failure to maintain pressure, Vantage would identify the precise location of the leak, repair the pipe, and re-pressurize the test section until the DOT specifications are satisfied. Testing would begin on the south end of the pipeline (MP 0.0) and proceed north and west to the end of the U.S. section of the pipeline near MP 79.8.

TABLE 2.3.1-1

Currently Proposed Hydrostatic Test Water Volumes for the Vantage Pipeline Project

Test Section	Start Milepost	End Milepost	Volume of Water (approximate gallons)
1	0.0	7.8	168,038
2	7.8	19.8	258,002
3	19.8	37.5	382,664
4	37.5	52.7	327,350
5	52.7	59.8	153,148
6	59.8	65.2	114,796
7	65.2	71.9	143,870
8	71.9	79.8	171,743

2.3.2 Construction and Operation Impacts and Mitigation

Based on past and recent pipeline construction practices and industry-recognized standards, impacts, if any, on groundwater resources would be temporary and limited to that portion of a groundwater system(s) that is near the land surface, near or within the Project construction work area. The depth to groundwater in the Project area would generally be below the trench excavation depth of 5 feet, as discussed in section 2.3.1. During construction, if the groundwater table is found to be less than 5 feet below the land surface, dewatering may be necessary. Dewatering would temporarily appropriate groundwater resources creating a short-term fluctuation in groundwater levels, and a change in shallow groundwater flow direction. However, it should not change water quality. These impacts would be direct, temporary to short term, and localized to the construction area. As discussed in section 2.3.1, no wells or springs were identified within 150 feet of the Project. Therefore, it is anticipated that area groundwater supply quantity and quality should not be significantly impacted by Project construction and operation.

Blasting could impact groundwater systems creating potential water quality and quantity impacts at nearby water supply wells and springs. However, blasting is not anticipated for the Project (see section 2.1.1).

Shallow groundwater could be vulnerable to contamination caused by inadvertent surface spills of hazardous materials used during construction. Vantage's SPCC Plan would be used to minimize the potential for groundwater impacts associated with an inadvertent spill of fuel, oil, and other hazardous fluids. The SPCC Plan would describe response, containment, cleanup, and reporting procedures. The SPCC Plan would also describe preventative measures such as spill training for construction personnel, regular inspection of equipment for leaks, and construction of containment systems around temporary fuel storage areas. It is anticipated that implementation of the SPCC Plan would reduce the potential for long-term impacts and contamination due to construction activities.

Project construction, including fueling activities and accidental spills of hazardous substances, could potentially impact the water quality and capacity of nearby private water supply wells. Though no water supply wells were identified within 150 feet of the Project, to avoid or minimize potential Project impacts on area water wells, Vantage would prohibit fueling within 200 feet of any identified private wells.

Vantage does not anticipate encountering previously existing contamination but would dispose of or mitigate any hazardous materials uncovered during construction consistent with applicable federal, state, and local requirements.

After successfully testing all sections, Vantage would dewater the last section of pipeline by discharging the hydrostatic test water consistent with Vantage's North Dakota NPDES permit conditions. In addition, Vantage would utilize measures outlined in its EPP (see Appendix C for the Draft EPP) to minimize the potential for erosion during discharge of the hydrostatic test water by regulating the discharge rate, using energy dissipation devices, and installing sediment barriers as necessary. Vantage would obtain approval from and notify the landowner of the hydrostatic test water discharge and approximate volume prior to the release. It is anticipated that water appropriation and discharge for hydrostatic testing is not expected to have a long-term or significant impact on the source aquifers groundwater quantity or quality.

2.4 SURFACE WATER AND WETLANDS

2.4.1 Environmental Setting

The Project is located in the Northwestern Glaciated Plains ecoregion, a region characterized by a semi-arid, continental climate with short, hot summers and long, cold winters (USGS, 2011c). The area is a transitional region between the generally more level, moister, more agricultural Northern Glaciated Plains to the east and the generally more irregular, dryer, Northwestern Great Plains to the west and southwest (USGS, 2010). Located throughout this ecoregion are semi-permanent and seasonal wetlands, locally referred to as Prairie Potholes.

Snowmelt and spring rain runoff over frozen soil discharges the greatest volume of water from the area. Stream flow data for the area obtained by Vantage indicates that on average 64 percent of the volume of water discharged in the Project area occurs in March and April. The lowest stream flows in the Project area occur between August and January (USGS, 2012a). The data suggests that precipitation falling in the period for May through August is lost to evapotranspiration or infiltration.

The Project would cross the prairie pothole region of the Missouri Coteau (Coteau) between approximate MPs 25.5 and 79.8 (Sloan, 1972). The topography of the Coteau was formed by the advance and retreat of glaciers, which resulted in a rolling land surface with numerous depressions ranging in size from less than one acre to more than 10,000 acres. Most of the wetlands (i.e., prairie potholes) in the Coteau are shallow temporary or seasonal basins; however, deeper semi-permanent wetlands and lakes area also scattered throughout the area (FWS, 1988a).

The Project is located in the Lake Sakakawea, Little Muddy, and the Brush Creek Closed sub-basins of the Missouri River Watershed (USGS, 2012c; North Dakota State Water Commission, 2011). Waterbodies crossed by the Project include intermittent and ephemeral drainages that were classified as wetlands during Vantage's surveys. These areas exhibit flow primarily during periods of snowmelt and rainfall, but are more characteristic of wetlands. As such, intermittent and ephemeral drainages affected by the Project are identified as wetlands.

Based on Vantage's correspondence with the USACE (KC Harvey, 2010; Kovach, 2011), the Project would fall under their Nationwide Permit (NWP) 12. However, no mitigation or pre-notification to the USACE would be necessary because Vantage would not trigger any of the seven NWP thresholds that require pre-notification to the USACE. The USACE NWP 12 authorizes work in waters of the United States in association with the construction of utility line crossings, provided that work does not result in the permanent loss of greater than 0.5 acre of waters of the United States and would comply with all general and regional terms and conditions of the NWP 12.

As described in Vantage's Wetland Assessment Report (see Appendix B (included as Appendix A)), National Wetland Inventory (NWI) data was used to conduct preliminary routing and planning,

followed by a wetland survey to field-proof the NWI data along the preliminary pipeline route to more accurately identify the wetlands that could be affected during project construction. Wetlands were identified and mapped by Vantage consistent with the Routing Determination method as specified in the *Corps of Engineers Wetland Delineation Manual* (USACE, 1987). Table 2.4.1-1 lists the wetlands crossed by the pipeline route as identified during the wetland assessment.

TABLE 2.4.1-1

Waterbodies/Wetlands Crossed by the Pipeline Route [a]

Sub-Basins/Feature	MP	Width (feet)	NWI Classification [b]	Fishery	Flow Regime	Crossing Method
Lake Sakakawea Watershed (MPs 0.0 – 19.0)						
Unnamed wetland	2.5	72.9	PEMB/C	None	Intermittent	Bore
Unnamed wetland	9.4	67.7	PEMC/F	None	Ephemeral	Bore
Unnamed wetland	12.8	53.1	PEMB/C	None	Intermittent	Bore
Unnamed wetland	15.0	44.0	PEMB	None	Intermittent	Bore
Unnamed wetland	16.0	24.5	PEMB	None	Intermittent	Bore
Unnamed wetland	18.5	74.6	PEMA	None	Ephemeral	Bore
Little Muddy River Watershed (MPs 19.0 – 46.2)						
Unnamed wetland	25.5	110.4	PEMB/C	None	Basin	Bore
Unnamed wetland	25.9	31.4	PEMB/C	None	Ephemeral	Bore
Unnamed wetland	30.2	121.4	PEMB/C	None	Intermittent	Bore
Unnamed wetland	43.6	326.7	PEMC	None	Basin	Bore
Unnamed wetland	44.8	54.5	PEMB/C	None	Ephemeral	Bore
Brush Lake Closed Basin (MPs 46.2 – 79.8)						
Unnamed wetland	69.5	485.1	PUB	None	Basin	Bore
Unnamed wetland	77.6	51.1	PEMB	None	Basin	Bore

[a] Waterbodies crossed by the Project include intermittent and ephemeral drainages that were classified as wetlands during Vantage's surveys. These areas exhibit flow primarily during periods of snowmelt and rainfall, but are more characteristic of wetlands and have been identified as wetlands.

[b]
- PEMA Palustrine, emergent, temporarily flooded.
- PEMB Palustrine, emergent, saturated.
- PEMC Palustrine, emergent, seasonally flooded.
- PEMC/F Palustrine, emergent, seasonally flooded, semipermanently flooded.
- PUB Palustrine, unconsolidated bottom.

Intermittent streams are defined as those channels or depressions that hold or flow water during wet or seasonal periods of the year, and are fed by groundwater, impoundments, snowmelt, or precipitation, but do not flow continuously. Intermittent stream bed and banks (i.e., channels) are typically well defined but lack the hydrological and biological characteristics associated with perennial streams. Typically during dry periods, flow ceases in intermittent channels and only deeper pools may remain; however, obligate wetland vegetation is present in these areas.

Ephemeral streams or channels are features that hold water only during and immediately after rain events or snowmelt. Ephemeral stream channels are not always well defined and may lie above the water table. In the semi-arid areas of North Dakota, ephemeral waters may also serve as transitional areas between uplands and jurisdictional waterbodies, and support obligate and facultative wetland species throughout the year.

Shallow-basin wetlands in the Project area collect and retain runoff from a relatively small surrounding area and do not outlet water. These wetlands exhibit varying degrees of saturation or inundation during the year and support obligate wetland species.

Intermittent and ephemeral waterbodies support hydrophytic vegetation and are classified as palustrine emergent (PEM) wetlands. Most of the PEM wetlands consist of a broad, vaguely defined channel (i.e., bed and bank) and are vegetated with obligate and facultative wetland species. Water levels and relative flow in the intermittent and ephemeral channels fluctuate dramatically with each season. Peak water levels and flows occur during early spring when snowmelt and rainfall runoff occurs over saturated or frozen soils. Decreasing flow rates are common during the summer, fall, and winter seasons; however, thunderstorms or heavy rains during summer can generate additional flow events (USGS, 2011a). Considering the hydrologic behavior and vegetative community in the intermittent and ephemeral channels, waterbodies and shallow-basin wetlands crossed by the Project were grouped into a single waterbody/wetland category.

With the exception of one palustrine unconsolidated bottom (PUB) wetland type (i.e., an excavated livestock water source), all waterbodies/wetlands crossed by the Project are classified as PEM wetlands (see table 2.4.1-1). The vegetative composition within PEM wetlands is dependent on hydrology, salinity, and dynamics, specifically grazing and cultivation. Vegetation generally occurs in a concentric pattern from a wetter center area dominated by spike rush (*Eleocharis* species). A drier ring of foxtail or wild barley (*Hordeum jubatum*) and an outer margin of western wheatgrass (*Pascopyrum smithii*) or thickspike wheatgrass (*Elymus lanceolatus*) may also be present unless cultivated. The wettest wetland types, where water stands into or through summer, are typically characterized by hardstem bulrush (*Schoenoplectus acutus*), often occurring as a near monoculture, or fringed with soft stem bulrush (*Schoenoplectus tabernaemontani*) or common three-square bulrush (*Schoenoplectus pungens)* along drier margins. Cattails (*Typha* species) are also seen in these wetter systems, although they are typically a minor component. During spring or in permanently flooded sites, aquatic buttercups (*Ranunculus* species), aquatic smartweeds, pondweeds (*Potamogeton* species), or duckweeds (*Lemna* species) may also be common.

PEM wetlands are further categorized into palustrine emergent temporarily flooded wetlands (PEMA), saturated wetlands (PEMB), seasonally flooded wetlands (PEMC), and deep marshes (PEMF). PEMA wetlands located in the Project area may contain standing water for a short period during the growing season, but are usually dry for the majority of the growing season. These wetlands can be cultivated in most years and are considered farmed wetlands. In the Project area, PEMA wetlands were frequently vegetated with smartweed, reed canary grass, foxtail or wild barely, curly leaf dock, field mint, and barnyard grass prior to cultivation. Other species common to PEMA wetlands in the Project area included fox sedge (*Carex Vulpinoidea*), Dudley's rush (*Juncus dudleyi*), Torrey's rush (*J. torreyi*), Macoun's buttercup (*Ranunculus macounii*), marsh cress (*Rorippa islandica*), rough cinquefoil (*Potentilla norvegica*), and biennial wormwood (*Artemisia biennis*).

Wetlands classified as PEMB and PEMC are the most common wetland types within the Project area. Dominant vegetation in PEMB wetlands includes smartweed, reed canary grass, several species of sedges (*Carex* species), and rushes (*Juncus* species). Under prolonged dry conditions, some PEMB wetlands can also be farmed. PEMC wetlands typically have shallow water areas for part or most of the year and are typically vegetated with broad-leaved cattail and soft-stem bulrush. Depending on the amount of spring and summer precipitation, these wetlands may in inundated or saturated throughout the year.

Wetland complexes, consisting of two or more wetlands types (e.g., PEMB/C and PEMC/PEMF), would also be crossed by the Project (see table 2.4.1-1). PEMF wetlands are deeper marshes typically inundated between 3 inches and 3 feet or more of standing water. In the Project area, PEMC wetland types surround the deeper water PEMF wetland types.

High Value Wetland Habitat

The FWS identified two designated critical habitat wetland basins near the proposed Project area: Radar Waterfowl Production Area (WPA) and McCone Lake, which are known to provide breeding habitat for the federally threatened piping plover (FWS, 2011). The FWS also identified Hapet Lake, a known wetland used by piping plover (FWS, 2011). The wetlands at these locations are considered high value and are federally designated as critical habitat for piping plover. The FWS recommended that a 0.5-mile buffer be maintained from the high water mark of a plover nesting basin to avoid disturbance and reduce the possibility of "take." While the Project would be about 0.5 mile from McCone Lake, it would be within about 0.25 mile of Radar WPA near MP 68 and within about 650 feet of Hapet Lake near MP 52. Potential Project impacts and mitigation measures for these areas are discussed in section 2.4.2 below.

Wetland Easements

The FWS's Wetland Easement Program is a legal agreement between landowners and the FWS such that wetlands are protected from draining, filling, leveling, or burning activities (FWS, 2012g; FWS, 2011). Wetlands may be farmed, grazed, or hayed when they naturally dry up (FWS, 2012g). Based on DOS's review of wetland easement maps provided by the FWS, the Project would cross wetland easements at several locations along the pipeline route and three MLBVs appear located within or adjacent to a wetland easement parcel (FWS, 2012b). Potential Project impacts and mitigation measures for these areas are discussed in section 2.4.2 below.

Water Quality

Water quality reporting requirements under Sections 305(b) and 303(d) of the CWA require states to assess the extent to which lakes, reservoirs, rivers, and streams are meeting water quality standards applicable to their waters, including beneficial uses as defined in their state water quality standards. In addition to beneficial uses, applicable water quality standards also include narrative and numeric standards and anti-degradation policies and procedures. While Section 305(b) requires states to provide only a statewide water quality summary, Section 303(d) provides a mechanism by requiring states to identify and list the individual waterbodies that are not meeting applicable water quality standards and to develop Total Maximum Daily Loads (TMDLs) for those waters. Both Section 305(b) reporting and Section 303(d) listings accomplish this assessment by determining whether a waterbody is supporting its designated beneficial uses. Waterbodies (wetlands) affected by the Project, however, have not been assessed or have had TMDLs identified (NDHD, 2010).

"Sensitive waterbodies" include those streams designated as one or more of the following: state-listed impaired waterbodies (Section 303(d)), waterbodies that are crossed less than 3 miles upstream of a potable water intake structure, agency-identified waterbodies of concern, fisheries of concern, streams supporting cold water fisheries, and/or state-designated scenic waterbodies. Based on a review of the State of North Dakota's reports, the Project would not cross or affect sensitive waterbodies, including receiving waterbodies or streams down gradient from the pipeline crossings.

North Dakota's water quality standards provide for four stream classes: I, IA, II, and III, but excludes wetlands. Although wetlands are "waters of the state" and protected under the state's standards, the North Dakota's water quality standards do not define beneficial uses for wetlands. However, the water quality standards apply to intermittent and ephemeral channels, which are crossed by the Project. In all cases, channels with a defined bed and back are considered Class III waters, which are defined as:

The quality of the waters in this class shall be suitable for agricultural and industrial uses. Streams in this class generally have low average flow with prolonged periods of no flow. During periods of no flow, they are of limited value for recreation and fish and aquatic biota. The quality of these waters must be maintained to protect secondary contact recreation uses (e.g., wading), fish and aquatic biota, and wildlife uses (North Dakota Legislation, 2012).

2.4.2 Construction and Operation Impacts and Mitigation

Based on National Wetlands Inventory wetland data and DOS's review of Vantage's Wetland Assessment Report, construction and operation of the Project would primarily affect PEM wetland types (see table 2.4.2-1). Vantage's Wetland Assessment Report is included as part of Appendix B and includes maps of the wetland crossing locations in relation to the pipeline route.

TABLE 2.4.2-1

Wetland Classifications and Areas Affected by the Vantage Pipeline Project

Feature	MP	NWI Classification	Crossing Width (feet)	Area Affected by the Construction (acres) [a]	Area Affected by the Operations (acres) [b]	Proposed Crossing Method
Unnamed wetland	2.5	PEMB/C	72.9	0.0	0.1	Bore
Unnamed wetland	9.4	PEMC/F	67.7	0.0	0.1	Bore
Unnamed wetland	12.8	PEMB/C	53.1	0.0	<0.1	Bore
Unnamed wetland	15.0	PEMB	44.0	0.0	<0.1	Bore
Unnamed wetland	16.0	PEMB	24.5	0.0	<0.1	Bore
Unnamed wetland	18.5	PEMA	74.6	0.0	0.1	Bore
Unnamed wetland	25.5	PEMB/C	110.4	0.0	0.1	Bore
Unnamed wetland	25.9	PEMB/C	31.4	0.0	0.1	Bore
Unnamed wetland	30.2	PEMB/C	121.4	0.0	0.1	Bore
Unnamed wetland	43.6	PEMC	326.7	0.0	0.2	Bore
Unnamed wetland	44.8	PEMB/C	54.5	0.0	<0.1	Bore
Unnamed wetland	69.5	PUB	485.1	0.0	0.3	Bore
Unnamed wetland	77.6	PEMB	51.1	0.0	<0.1	Bore
Project total			**1,517.3**	**0.0**	**1.0**	

[a] Because the pipeline would be installed using the bore crossing method, direct impacts on wetlands as a result of construction would not occur.

[b] Assumes a 30-foot- wide permanent right-of-way. However, no wetlands would be filled or permanently lost, and wetlands would retain functionality similar to that of the pre-construction state.

As previously discussed, the majority of the waterbodies/wetlands that would be crossed by the pipeline are intermittent drainages and washes that are expected to be dry at the time of construction. If the drainages are dry at the time of construction, Vantage would use conventional upland construction methods. The depth of cover over the pipeline once reclaimed would be a minimum of 4 feet. The crossing location would be reclaimed to original contour and preconstruction conditions.

Based on typical pipeline construction practices, impacts on intermittent drainages would be limited to temporary alteration of channel beds and banks and possibly increased sediment load during initial storm events following construction. Vantage would minimize direct impacts on waterbodies/wetlands where water is flowing, including associated floodplains, by installing the pipeline using the horizontal bore technique with the entrance and exit points located outside the wetland boundaries. The horizontal bore method allows for installation of the pipeline beneath a water feature by

eliminating direct surface disturbance to the resource that would result from clearing and grading of streambanks, in-stream trenching, blasting, trench dewatering, and backfilling. Additionally, the horizontal bore method typically installs the pipeline to a depth where surface hydrology is unaffected. Therefore, it is anticipated that surface disturbance to waterbodies/wetland areas would not occur, and it is expected that the value and function of wetland areas would not be significantly affected by construction or operation of the Project.

In addition to preventing direct surface impacts using the horizontal bore method, the risk of stormwater runoff is also minimized using this crossing method. No grading adjacent to the waterbody is required using the horizontal bore method because the drill rig and associated equipment would be staged away from the waterbody. Stormwater runoff from the construction area could indirectly introduce contaminants and sediment into waterways and negatively impact aquatic resources. Vantage would be required, as part of its permitting process with the NDHD, to develop and implement the BMPs outlined in a Project-specific SWPPP. Vantage has also committed to developing with the construction contractor a Project-specific SPCC Plan to reduce the potential occurrence of fuel and chemical spills near waterbodies and to decrease the response time to remove spills should one occur.

Based on Vantage's Wetland Assessment Report, approximately 1.0 acre of PEMA, PEMB, PEMC, PEMF, and PUB wetlands would be located within the permanent right-of-way; however, wetlands would not be filled or permanently lost as a result of operation of the Project and they would retain functionality similar to that of the pre-construction state. Therefore, it is anticipated that operation of the Project would not adversely affect wetland areas.

Construction and operation of the Project is not anticipated to affect the function or compromise the value of wetlands in the prairie pothole region. As stated above, Vantage would use the horizontal bore method to avoid disturbance to wetland hydrology, soils, and vegetation. The drill entrance and exit holes would be located outside the wetland boundaries, and bentonite clay used during the drill would seal the pipe preventing drainage of subsurface water. Restoration of the right-of-way on either side of the wetland to preconstruction contours would reestablish surface hydrology.

The Project would affect several Wetland Easement Program areas. As previously discussed, wetland easements protect basins from being drained, leveled, filled, or burned. As stated above, Vantage would use the horizontal bore method to avoid disturbance to wetlands and, therefore, they are not expected to be drained, leveled, filled, or burned by pipeline construction or operation activities. However, Vantage's MLBVs 5, 6, and 7 may be located within a property parcel where a wetland easement has been established between the landowner and the FWS. DOS expects that Vantage would continue to consult with the FWS regarding wetland easements and measures to avoid significantly impacting a wetland enrolled in the program. Further, Vantage has committed to obtaining the necessary authorizations form the FWS required for construction.

While the Project would be within the FWS-recommended 0.5-mile buffer near the Radar WPA and Hapet Lake, because the horizontal bore method would be used, wetland impacts on the basin of the critical habitat would not occur during construction or operation of the Project. Vantage would avoid construction within the breeding season (i.e., between April 1 to September 1) when piping plovers are typically present in the breeding area. Additionally, a 0.5 mile no-entry buffer would be maintained around known or potential nesting habitat during the breeding period. Vantage would limit vehicle use to the construction right-of-way where the pipeline would cross wetlands and vehicle use would be prohibited outside of the construction right-of-way within 200 feet of a wetland edge. As discussed further in section 2.8.1.2, construction and operation of the Project may affect, but is not likely to adversely affect the piping plover, including its high value wetland habitat.

As discussed in section 2.3.1, Vantage would hydrostatically test the pipeline using water obtained from a high capacity well at the Tioga Gas Plant and, therefore, impacts on surface waters or wetlands are not anticipated as a result of hydrostatic testing activities. No wetlands would be affected by construction and operation of the MLBVs, access roads, and contractor/pipe storage yards proposed for the Project.

Based on Vantage's correspondence with the USACE, work in waters of the United States would fall under NWP 12 (see section 1.8.2.1) (KC Harvey, 2010; Kovach, 2011). However, no mitigation or pre-notification to the USACE would be necessary because Vantage would not trigger any of the seven NWP thresholds that require pre-notification to the USACE. The Project also requires NPDES and stormwater authorizations from the NDHD. In addition to the mitigation measures proposed by Vantage, it is expected that it would continue to consult with the FWS regarding wetland easements and comply with any necessary authorizations required for construction. It is also expected that Vantage would be required to comply with the conditions of the USACE's NWP 12 and any special conditions listed in the Certificate of Corridor Compatibility and Route Permit and NPDES and stormwater authorizations applicable to surface water and wetland resources.

Also, as discussed in section 1.8.2.2, the EPA was requested to review and comment in writing on the Draft EA. The proposed Project would be located within EPA Region 8. Prior to issuance of the EA, DOS solicited comments on the EA from Region 8 of the EPA. The EPA's comments on issues related to wetlands and air quality (see section 2.12) have been incorporated into this EA.

2.5 FISHERIES

2.5.1 Environmental Setting

Based on Vantage's review of the Project and field surveys, no game or recreational fisheries are present in the waterbodies crossed by the Project, and no known fisheries considered significant by the NDGF would be affected by construction and operation of the Project. Further, no essential fish habitat under the jurisdiction of the FWS and no naturally reproducing or stocked trout streams are located in the Project area.

The Project would not directly affect perennial streams; however, intermittent and ephemeral conveyances crossed by the Project eventually discharge water into the Little Muddy River or the Missouri River, both of which support a diverse fishery.

Based on a review of USGS topographic maps, one ephemeral channel crossed by the Project at about MP 30.8 discharges directly into Cottonwood Lake in Williams County, a perennial waterbody that supports a stocked, warm water fishery. Cottonwood Lake is located approximately 0.5 mile west of the Project and supports a fishery that is actively managed by the NDGF. Since 1997, the lake has been regularly stocked with yellow perch (*Perca flavescens*), northern pike (*Esox lucius*), and fathead minnows (*Pimephales promelas*), a prey species for yellow perch and northern pike. The lake also has a boat landing and fishing pier. Impacts on fisheries and Vantages' proposed mitigation measures are discussed in section 2.5.2 below.

2.5.2 Construction and Operation Impacts and Mitigation

Based on past and recent pipeline construction experience, impacts on fisheries during pipeline construction are dependent on the resources, construction method, time of the crossing, duration of in-stream construction activities, water volume and velocity of flow, and mitigation measures employed during construction. Impacts related to sedimentation and increased turbidity can also occur after

construction of the stream crossing has been completed, especially if stream banks are not stabilized and revegetated as soon as possible. Fishery resources could also be indirectly affected by improper discharge of hydrostatic test water, spills of hazardous materials, and stormwater runoff.

To minimize adverse impacts on downstream and aquatic resources, Vantage would cross waterbodies using the horizontal bore method (see table 2.4.1-1 and section 2.4.2). Potential impacts from sedimentation, turbidity, and potential contaminants encountered during and after construction would be minimized by Vantage's implementation of the measures included in its EPP (see Appendix C for the Draft EPP). Further, Vantage would be required to develop and implement a Project-specific SWPPP as part of the NDHD permitting process. Sediment and erosion control devices (e.g., straw bales, silt fences, sediment containment berms, and other erosion controls) would be installed to contain soil within the approved work area. If necessary, trench water would be discharged into a straw bale filtering structure. Fuels, lubricating agents, hazardous materials, and chemicals would not be stored within 100 feet of a waterbody or wetland.

Based on correspondence with the NDGF Fisheries Division regarding the Project's potential impacts on the fishery resources located downstream, the Little Muddy River has a diverse fish assemblage but most species are restricted to the lower few miles of the Little Muddy River near the confluence with the Missouri River, which is located outside the Project area. In the headwaters of tributary streams nearer the construction area, the number of species present is significantly reduced to nonexistent (Ryckman, 2011). Therefore, it is anticipated that construction and operation of the Project would not significantly affect fishery resources.

As discussed in section 2.3.1, Vantage would hydrostatically test the pipeline to find leaks and verify the integrity of the pipeline using water obtained from a high capacity well at the Tioga Gas Plant. Impacts on fishery resources are not anticipated because these hydrostatic testing activities would ensure the pipeline is sealed. No fisheries are anticipated to be affected by construction and operation of the MLBVs, access roads, and contractor/pipe storage yards proposed for the Project.

Based on Vantage's correspondence with the USACE, the Project would fall under NWP 12 (see section 1.8.2.1) (KC Harvey, 2010; Kovach, 2011). However, no mitigation or pre-notification to the USACE would be necessary because Vantage would not trigger any of the seven NWP thresholds that require pre-notification to the USACE. The Project also requires NPDES and stormwater authorizations from the NDHD. In addition to the mitigation measures proposed by Vantage, it would also be required to comply with the conditions of the USACE's NWP 12, and any special conditions listed in the NPDES and stormwater authorizations applicable to fisheries.

2.6 VEGETATION

2.6.1 Environmental Setting

The Project is located area within a semiarid continental climatic regime in which, despite maximum summer rainfall, evaporation typically exceeds precipitation. Pre-settlement vegetation was mixed-grass steppe, which included short and tall grass species (e.g., blue grama (*Bouteloua gracilis*), buffalo grass (*Bouteloua dactyloides*), little bluestem (*Schizachyrium scoparium*), needle-and-thread grass (*Hesperostipa comate*)). Woody vegetation was rare, except for cottonwoods (*Populus deltoide*), which were prevalent in riparian areas, floodplains, and wetter sites, and widely distributed Rocky Mountain junipers (*Juniperus scopulorum*) on steep side slopes.

With the settlement of the Northern Plains, native vegetation on land suitable for cultivation was replaced by crops and steep terrain was used for livestock rangeland. As a result, agriculture is the most

extensive land use in the Project area. Agricultural practices in the Project are strongly influenced by the severe winters and limited precipitation of the region. As a result, spring wheat is planted rather than winter wheat and the practice of "summer fallow" is commonly used. The practice involves allowing a field to lie idle during the growing season, tilling as necessary to control weeds and maintain a loose soil surface. This practice reduces moisture loss by soil surface evaporation and evapotranspiration while allowing for efficient catchment of infrequent rain.

The main crop grown in the Project area is durum wheat. Other crops grown include hard red spring, hard white, and soft white spring varieties of wheat, and barley. Sunflowers, oats, safflower, canola, and flax are also important cultivated crops in the Project area (NRCS, 1991).

Conservation Reserve Program

Vantage identified several parcels enrolled in the CRP that would be affected by construction of the Project. The CRP is a voluntary program for agricultural landowners and involves a long-term agreement to conserve vegetative cover on eligible farmland (FSA, 2012). By agreement, each parcel placed in CRP has been planted with a specific seed mix. To preserve the landowner's eligibility in the CRP, the same seed mix identified in the agreement must be planted during restoration of the parcel. Additionally, it would be the landowners responsibility to convey any other requirements contained in the CRP agreement to Vantage prior to construction.

Grassland Easement

The Grassland Easement Program is an agreement between landowners and the FWS such that land is not cultivated in order to preserve grassland (FWS, 2012a). To allow grassland nesting bird species an undisturbed nesting season, mowing, haying, and grass seed harvesting of a grassland easement must be delayed until after July 15 each year. Based on information DOS received from the FWS, the Project would cross about 62 feet of one grassland easement parcel at about MP 59.0 (FWS, 2012b).

Invasive Weeds

North Dakota law (North Dakota Century Code § 4.1-47-02) requires every person to do all things necessary and proper to control the spread of noxious weeds and makes it illegal for any person to distribute, sell, or offer for sale within the state a noxious weed. Authority to carry out the noxious weed law is vested with the North Dakota agriculture commissioner and county and city weed boards. The Noxious Weed Team coordinates the efforts of county weed boards and state and federal land managers to implement integrated weed management programs.

Currently, there are weed boards in all of North Dakota's 53 counties. Each county has the option to add additional species to the state's noxious weed list for enforcement only in their jurisdiction.

Vantage completed weed surveys of the Project area in fall 2010 and DOS used this information to assess the extent of weed infestations in the Project area and the species observed. Weed infestations observed were subsequently compared to federal and state noxious weed lists. Vantage's field surveys indicated that no federally listed noxious weed species were present in the Project area in notable concentrations. Of the weed species on North Dakota list, Canada thistle (*Cirsium arvense*) was commonly found throughout the Project area adjacent to wetlands, field roads, and idle cultivated fields. Musk thistle (*Cardus nutans*) was also observed in isolated locations. No other noxious weed infestations were recorded during Vantage's surveys.

2.6.2 Construction and Operation Impacts and Mitigation

Based on a review of USGS topographic maps and Vantage's correspondence with the FWS and NDGF, construction of the Project would not affect vegetative communities that are designated as unique, significant, or protected. However, as discussed in section 2.8.1.1, FWS-designated critical habitat for piping plovers is located in the Project area. No woodlots or forested areas would be affected by construction; however, some tree lines (i.e., shelter belts) would be crossed by the pipeline route.

Table 2.6.2-1 provides a summary of vegetated land affected by construction and operation of the Project based on a review of aerial photograph and Vantage's field survey observations. Construction within the pipeline right-of-way and use of ATWS would temporarily affect about 726.2 acres of land, of which about 290.5 acres would be retained as new permanent right-of-way. The remaining 435.7 acres used for temporary construction right-of-way and ATWS would be allowed to revert to prior uses following construction.

TABLE 2.6.2-1

Summary of Vegetated Land Affected by Construction and Operation of the Vantage Pipeline Project

	Agricultural [a]		Open Land [b]		Wetlands		Total	
Facility	Con.	Op.	Con.	Op.	Con.	Op.	Con.	Op.
Pipeline Right-of-Way [c, d]								
Williams County	243.2	103.0	74.1	33.3	0.4	0.4	317.6	136.8
Divide County	160.7	68.8	195.7	84.3	0.6	0.6	357.0	153.8
Additional Temporary Workspace	30.7	0.0	20.8	0.0	0.0	0.0	51.6	0.0
Aboveground Facilities – Mainline Valves	0.2	0.2	0.1	0.1	0.0	0.0	0.4	0.4
Access Roads	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.2
Pipe Storage/Contractor Yards	8.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0
Project Total	442.9	172.2	290.8	117.9	1.0	1.0	734.8	291.1

[a] Agricultural land includes cultivated lands.
[b] Open land includes grassland or pasture/hay fields.
[c] Assumes a 70-foot-wide temporary construction right-of-way.
[d] Assumes a 30-foot-wide permanent operational right-of-way.
Note: The totals shown in this table may not equal the sum of addends due to rounding.

Prior to construction of the proposed pipeline facilities, Vantage would clear vegetation from the 70-foot-wide construction right-of-way and ATWS. In cropland, grassland, or improved (managed) pasture land, topsoil would be removed from either the full temporary right-of-way or from over the trench line and trench spoil area. Topsoil stripping and segregation from trench spoil would protect and retain the inherit fertility of the surface layer.

Based on past and recent pipeline construction experience and the facilities proposed, construction of the Project would result in short- to long-term and limited permanent impacts on vegetation. Short-term effects are associated with the length of time to return of the construction right-of-way and other temporary work areas to pre-construction conditions. The primary impact of construction and operation of the Project on vegetation would be the short- to long-term alteration of cover on managed hay land, grassland, and rangeland.

Following removal of the vegetative cover, the construction work area would be susceptible to wind and water erosion. These affects, however, would be minimized by the implementation of BMPs outlined in the Vantage's EPP (see Appendix C for the Draft EPP) to limit temporary impacts on exposed soils. Further, Vantage would be required to develop and implement a Project-specific SWPPP as part of

the NDHD permitting process. Following construction, topsoil replacement would occur and restoration of the right-of-way in disturbed areas not under annually cultivation would be seeded according to landowner's preferences.

Following construction, the majority of disturbed areas would be allowed to revert to preconstruction conditions. The temporary construction right-of-way and ATWS would be allowed to return to pre-construction conditions shortly after construction, although that may require more than one full growing seasons to reestablish a protective vegetative cover. Agricultural lands would be available for planting immediately following restoration of the pipeline right-of-way. Vantage would revegetate disturbed areas consistent with the EPP (see Appendix C for the Draft EPP), other permit requirements, and site-specific landowner requests. Further, Vantage would conduct routine monitoring of the right-of-way throughout the life of the pipeline, as required by the DOT.

Permanent impacts are those associated with operation of the pipeline and would occur where the Project would convert vegetated land to other uses. Construction of the Project would limit conversion of approximately 0.6 acre of native and mixed native vegetation to commercial/industrial uses by the installation of MLBVs and gravel roads providing access to the MLBV sites.

Vantage would mitigate impacts on 60 feet of FWS Grassland Easement Program lands by installing the pipeline under the easement using the horizontal bore method. A horizontal bore under the easement would avoid the need to create a pipeline trench and temporarily disturb existing vegetation.

The success of revegetation would depend on the local climate and soil moistures conditions at the time of planting, subsequent rainfall, soil type, seed, and seeding method. While Vantage's reclamation efforts would reestablish vegetation along the right-of-way, the amount of time required for complete recovery of the right-of-way to pre-construction conditions would vary depending on the species, with some areas restored to pre-construction conditions in 1 to 3 years, while others, such as native prairie, possibly taking 10 years or more for full recovery. To address impacts on CRP land, Vantage would contact landowners enrolled in CRP and determine the seed mix that must be planted to satisfy the conditions of the agreement and the acceptable seeding window as well as determine if there are any other requirements associated with the CRP agreement.

As discussed in section 1.8.2.3, DOS solicited comments on the EA from the FWS North Dakota Field Office prior to issuance of the EA. In its comments on the EA, the FWS recommend that Vantage conduct post-construction reseeding and develop a monitoring protocol to ensure that the habitat along the pipeline right-of-way is returned to pre-Project conditions. The FWS suggested that Vantage consider planting a diverse mixture of native cool and warm season grasses and forbs. Research has suggested that a more diverse mix, including numerous forb species, is not only ecologically beneficial, but is also more weed resistant, allowing for less intensive management and chemical use. In essence, the more species included in a mixture, the higher the probability of providing competition to resist invasion by non-native plants. The FWS recommended that the seed source should be as local as possible, preferably collected from the nearby native prairie, and that seed stock be obtained from nurseries within 250 miles of the Project area to insure the particular cultivars are well adapted to the local climate. The FWS also recommend that Vantage monitor reseeded areas to ensure that the area revegetates as expected.

As stated in its EPP (see Appendix C for the Draft EPP), Vantage would select seed mixes to match the surrounding land use, which would include seed mix recommendations for native grassland, pastureland, and wetland sites; cultivated crop land would be put back into production by the landowner or lessee. Vantage would visually inspect the right-of-way for vegetation issues (e.g., invasive weed infestations, poor vegetation establishment, reduced crop growth along the right-of-way) following construction. If visual differences are noted on and off the right-of-way, plant yield indices such as

height, density, and vigor would be considered. Vantage's post-construction right-of-way inspections would focus on areas with extensive surface disturbance, moderate to steep slopes, waterbody/wetlands crossings, and areas of terrain instability that may be prone to erosion.

Based on past and recent pipeline construction experience, construction activities could potentially result in the spread of noxious weeds. Construction equipment carrying soil with weed seeds and propagules from previous use could introduce noxious weeds to the Project area. Additionally, the spread of weed seeds from an area of infestation to other areas along the pipeline route through transport on construction equipment and vehicles could occur. To mitigate the spread of any noxious weeds, Vantage would implement BMPs and weed control practices discussed in its EPP (see Appendix C). These measures include, but are not limited, to the following:

- equipment would be cleaned prior to mobilizing equipment to the Project area;
- a pre-construction weed survey would be conducted to identify pre-existing weed conditions; and
- Vantage would consult with the Divide and Williams Counties Weed Control Association Boards to discuss information acquired during the survey and develop weed management plans, as necessary.

2.7 WILDLIFE

2.7.1 Environmental Setting

2.7.1.1 Terrestrial Species

The Project area is inhabited by a diversity of large and small mammals, raptors, waterfowl, game and non-game birds, reptiles, and amphibians (see table 2.7.1-1). Upland and wetland wildlife habitats that are present include agricultural lands, improved grassland, CRP land, native grass land, scrub-shrub uplands, riparian areas, and herbaceous wetlands.

Mammal species present in the Project area are typical of those inhabiting mixed short-grass prairie and agricultural areas in northwestern North Dakota. Wildlife diversity and abundance is highest in the native grasslands and agricultural lands enrolled in the CRP, and along fence rows, ditches, and in wetland and riparian areas. The mosaic of these habitats provides wildlife with areas for foraging, cover, and breeding. No forested areas would be affected by construction or operation of the proposed Project.

Of the mammal species potentially present in the Project area, the gray wolf is only federally listed endangered mammal species listed in North Dakota (see section 2.8.1.1).

TABLE 2.7.1-1

Representative Wildlife Species Potentially Present in the Vantage Pipeline Project Area

Species	Species	Species
Mammals		
American badger	Gray wolf - extirpated/rare	Plains harvest mouse
American beaver	Hoary bat	Plains pocket gopher
American mink	House mouse	Plains pocket mouse
Arctic shrew	Keen's myotis	Prairie vole
Baird's shrew	Least chipmunk	Pronghorn
Big brown bat	Least weasel	Pygmy shrew
Black bear	Little brown myotis	Red fox
Black-tailed prairie-dog	Long-eared myotis	Richardson's ground squirrel
Bobcat	Long-tailed weasel	Sagebrush vole
Boreal red-backed vole	Meadow jumping mouse	Silver-haired bat
Bushy-tailed woodrat	Meadow vole	Small-footed myotis
Cinereus or masked shrew	Moose	Snowshoe hare
Common muskrat	Mule or black-tailed deer	Striped skunk
Common porcupine	Northern grasshopper mouse	Thirteen-lined ground squirrel
Common raccoon	Northern myotis	Western harvest mouse
Cottontail	Northern pocket gopher	Western red bat
Coyote	Northern river otter	White-footed mouse
Deer mouse	Northern short-tailed shrew	White-tailed deer
Eastern red bat	Norway rat	Woodchuck
Franklin's ground squirrel	Ord's kangaroo rat	
Reptiles		
Bullsnake	Prairie rattlesnake	Smooth green snake
Common garter snake	Racer	Western hognose snake
Common snapping turtle	Short-horned lizard	Western painted turtle
Plains garter snake		
Amphibians		
Canadian toad	Tiger salamander	Wood frog
Northern leopard frog	Western chorus frog	Woodhouse's toad
Plains spadefoot toad		

As discussed in section 2.4.1, the Project would be located within the prairie pothole region of the Missouri Coteau between approximate MPs 25.5 and 79.8. Prairie potholes are highly productive environments due to the rapid nutrient cycling that sustains colonizing microorganisms, algae, and larger invertebrates. High primary productivity (e.g., vegetative growth) combined with water fluctuations and a severe climate result in rapid nutrient cycling in prairie pothole wetlands. Emergent vegetation acts as a nutrient pump, drawing nutrients from the wetland soil during the growing season. With an abundance of dead vegetation in the spring, runoff water typically provides a flush of nutrients in the form of detritus and soluble water-borne nutrients into the wetland basins. In addition to seasonal flushes, annual variation in water permanence in the basins results in multi-year variation in nutrient cycles as additional plants die and enter the detrital layer. Detritus functions as a substrate for colonizing microorganisms, including a number of algal species that absorb necessary nutrients directly from the water. The algae are subsequently consumed by larger invertebrates. It is the biomass of the larger aquatic invertebrates that are critically important for foraging waterfowl and shorebirds during migration and breeding (FWS, 1988a).

2.7.1.2 Avian Species

The Project is located within the Central Flyway, a bird migration route that encompasses the States of Montana, Wyoming, Colorado, New Mexico, Texas, Oklahoma, Kansas, Nebraska, South

Dakota, and North Dakota, and the Canadian provinces of Alberta, Saskatchewan, and the Northwest Territories (Flyways.us, 2012). A portion of the Project is also located within the Missouri Coteau, which is a narrow band of prairie upland that stretches from southern Saskatchewan to South Dakota. The Missouri Coteau trends parallel to and east of the Missouri River and consists of hummocky topography characterized by unintegrated drainage (i.e., depressions, ponds, and sloughs are not connected to one another and no streams flow out of the area). The depressions, ponds, and sloughs provide valuable and, in some cases, unique waterfowl and shorebird habitat.

The State of North Dakota currently recognizes 365 avian species, of which 353 are considered valid and 12 are hypothetical (USGS, 2012d). A breakdown of this list includes 207 species that nest or have nested in North Dakota, 95 species that occur as migrants, 28 species that are accidental, 21 species that are occasional, 2 species that are extirpated, and 1 that is an extinct species.

Including those with inferred breeding status, at least 223 species are considered components of the breeding avifauna of North Dakota; however, not all species nest in the Project area. Table 2.7.1-2 lists the most common resident and migratory species that are known to be present during some part of the year in or near the Project area. The highest density and diversity of bird species can be expected to be associated with native prairie, wetlands, prairie potholes and alkaline lakes, and riparian corridors along waterways.

Migratory birds are those species that nest in the United States and Canada during summer and migrate south to the United States, Mexico, Central and South America, and the Caribbean for the winter season (FWS, 2012c). Migratory birds are protected under the MBTA and EO 13186. The MBTA "prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations and does not require intent to be proven." Section 703 of the MBTA states that "unless and except as permitted by regulations it shall be unlawful at any time, by any means or in any manner, to take, capture, kill, attempt to take, capture, or kill, or possess any migratory bird, any part, nest, or eggs of any such bird...." Unlike Section 7 of the ESA, the MBTA has no incidental take permit or its equivalent. Instead, there are only some very specific take permits allowed for specific purposes, such as falconry and scientific collecting. In addition, the MBTA itself authorizes take permits for numerous intentional acts including hunting, and there is a set of regulations specifically for the hunting of migratory birds.

While the MBTA has no provisions for allowing unauthorized take, the FWS has stated they recognize that some birds may be killed during the construction of linear projects even if all known reasonable and effective measures to protect birds are used (FWS, 2011). The FWS's Office of Law Enforcement's mission is to protect migratory birds through investigations and enforcement, as well as by fostering relationships with companies that have implemented effective steps to avoid the take of migratory birds. Companies are encouraged to work closely with the FWS biologists to identify reasonable, prudent, and effective measures to avoid any take.

Vantage conducted a sharp-tailed grouse and nesting habitat aerial survey of a 0.5-mile-wide corridor based on the proposed pipeline centerline in April and May 2011. Nineteen sharp-tailed grouse leks were identified in CRP grasses or native rolling pastures, and where larger tracts of grassland/pasture habitat were intact. One sharp-tailed grouse lek was identified within the construction disturbance area, approximately 15 feet from the pipeline centerline.

TABLE 2.7.1-2

Representative Avian Species Potentially Present in the Vantage Pipeline Project Area

Species	Species	Species	Species
American avocet	Dickcissel	Marsh wren veery	Short-eared owl
American bittern	Double-crested cormorant	Mccown's longspur	Smith's longspur
American coot	Dowitcher	Merlin	Snowy egret
American crow	Dunlin	Mourning dove	Solitary sandpiper
American golden-plover	Eared grebe	Nelson's sharp-tailed sparrow	Sora rail
American kestrel	Eastern kingbird	Northern flicker	Sprague's pipit
American tree sparrow	Ferruginous hawk	Northern harrier	Stilt sandpiper
American white pelican	Franklin's gull	Northern pintail	Swainson's hawk
American wigeon	Gadwall	Northern rough-winged swallow	Swamp sparrow
American woodcock	Golden eagle	Northern saw-whet owl	Trumpeter swan
Baird's sparrow	Grasshopper sparrow	Northern shoveler	Tundra swan
Bald eagle	Great blue heron	Olive-sided flycatcher	Upland sandpiper
Bank swallow	Greater prairie-chicken [a]	Ovenbird	Vesper sparrow
Bell's vireo	Greater sage grouse [a]	Peregrine falcon	Virginia rail
Black tern	Green heron	Philadelphia vireo	Warbling vireo
Black-billed cuckoo	Harris' sparrow	Pied-billed grebe	Western grebe
Black-crowned night heron	Henslow's sparrow	Pileated woodpecker	Western kingbird
Blue-winged teal	Hooded merganser	Piping plover	Western meadowlark
Bobolink	Horned grebe	Prairie falcon	Whimbrel
Bonaparte's gull	Horned lark	Red knot	White-faced ibis
Brewer's sparrow	House wren	Redhead	White-rumped sandpiper
Brown-headed Cowbird	Hudsonian godwit	Red-headed woodpecker	White-throated Sparrow
Buff-breasted sandpiper	Lapland longspur	Red-winged Blackbird	Whooping crane
Burrowing owl	Lark bunting	Ringneck	Willet
Canvasback	Le Conte's sparrow	Ruddy turnstone	Willow flycatcher
Caspian tern	Least tern	Rusty blackbird	Wilson's phalarope
Chestnut-collared Longspur	Lesser scaup	Sanderling	Wood duck
Chestnut-sided warbler	Loggerhead shrike	Sandhill crane	Wood thrush
Cinnamon teal	Long-billed curlew	Sedge wren	Yellow rail
Clay-colored sparrow	Mallard	Semipalmated sandpiper	Yellow-bellied sapsucker
Common goldeneye	Marbled godwit	Sharp-tailed grouse [a]	Yellow-headed Blackbird
Common snipe			
Common tern			

[a] This avian species is not protected by the Migratory Bird Treaty Act (MBTA). All other avian species in this table are protected by the MBTA (FWS, 2012h).

Based on FWS data, bald and/or golden eagles may use the Project area. According to the FWS (2011), golden eagles inhabit a wide variety of habitat types, including open grassland areas. Golden eagles are known to nest on cliffs, in trees, on man-made structures, and on the ground. Bald eagles tend to be more closely associated with forested areas near water; however, the birds have been found to nest in single trees several miles from the nearest water body. Considering the habitats used, there may be a potential for bald eagles to be using nest trees in or near the Project area. Nesting eagles can be very sensitive to disturbances near the nest site and may abandon the nests as a result of low disturbance levels, even those from pedestrian traffic.

Vantage conducted raptor nest location and nest occupancy surveys of a 1-mile-wide corridor based on the proposed pipeline centerline in May 2011. Five northern harriers and a Swainson's hawk

were observed, and one active red-tailed hawk nest (approximately 1,300 feet from the Project) and one inactive buteo nest (approximately 1,200 feet from the Project) were also observed. Northern harrier nests were not identified during the surveys. Additional raptor surveys were conducted in June 2012, which resulted in the identification of no new raptor nests within a 0.5-mile radius of the Project.

2.7.2 Construction and Operation Impacts and Mitigation

2.7.2.1 Terrestrial Species

Based on past and recent pipeline construction experience and the facilities proposed, the primary effect on wildlife would be the temporary loss of habitats and displacement of wildlife during construction. Larger and more mobile wildlife, including bird and large mammals, would vacate the construction area during construction. Large expanses of available habitat lie adjacent to the construction work areas and mobile species would disperse to those areas, thereby only temporary displacement would occur. Smaller, less mobile wildlife species such as voles and mice may experience some direct mortality during clearing and grading activities; however, the losses would most likely be minor and insignificant on the local populations. The most common vole species in the Project area is the meadow vole. This species' population fluctuates in cycles every 2 to 5 years with peak densities of 60 to 250 individuals per acre recorded. After the peak density occurs, the population will often crash to a low as one vole per acre. The common deer mouse has widespread distribution throughout the Project area and population densities vary widely in different habitats and from season to season, but the species is considered generally abundant (Grondahl, No Date). While construction can impact a relatively small numbers of individuals, the overall impact on any species would be negligible.

Wetland areas and waterbodies that provide preferred habitat for frogs, turtles, and some snakes would not be affected by construction because Vantage would cross these areas using the horizontal bore method, thereby preventing impacts on aquatic habitats and minimizing impacts on individuals. Reptiles that prefer upland habitats (e.g., western hog-nose snake, prairie rattlesnake) are expected to be infrequently encountered during construction of the Project as population densities are low (Grondahl, No Date). It is probable that construction could affect a small number of individuals; however, the effect of construction on the total population is expected to be minimal.

The possibility that construction could cause permanent displacement of wildlife or result in a decrease in wildlife population densities due to long-term changes in habitat is highly unlikely. The majority of the Project route (approximately 60 percent) is located in actively managed agricultural land that is periodically plowed, planted, sprayed, and/or harvested. The remaining areas consist of native grassland and many of these parcels support grazing livestock. Wildlife species occupying grassland may disperse into nearby habitats during construction, including marginal habitats, resulting in lowered reproductive success and survival due to increased competition or other effects of being forced into sub-optimal habitats; however, the affected habitat is minimal in relation to the adjacent habitat available. Grassland is anticipated to be restored and returned to a pre-construction condition within 10 years following construction, with the exception of about 0.6 acre of land converted to commercial/industrial use for the MLBVs and access roads. Based on past and recent pipeline projects, wildlife populations are expected to return to levels comparable to adjacent, undistributed areas within a short time period, and it is anticipated that no significant habitat alteration or detrimental affects to local wildlife populations are likely to occur as a result of construction and operation the Project.

2.7.2.2 Avian Species

Based on past and recent pipeline construction experience, disturbance to migratory bird species, including raptor species, during nesting is dependent on site-specific conditions, including vegetation

types, terrain, presence of trees, line of sight, and adaptation of the species to development. Short-term impacts on migratory birds would consist of loss of habitat during construction of the pipeline until the restored area could support vegetation sufficient to replace habitat impacted by construction. During this period, migratory birds that would have nested or fed within, or adjacent to, the area disturbed during construction would be temporarily displaced due to construction activities, noise, and traffic. During the spring and fall, migrating birds would avoid construction-impacted areas and use areas not impacted by construction. Habitat fragmentation created by the temporary loss of habitat and the creation of open early successional and induced edge habitats could also decrease the quality of habitat and food sources (e.g., insects) for some grassland bird species.

To avoid potential impacts on migratory birds, several measures can be used, including effective vegetation removal (i.e., nesting habitat removal) prior to the nesting season; construction after the nesting season has been completed, the young of the year have fledged, and the fledged birds are able vacate the area if disturbed (July 15 in the Project area); and to conduct nest surveys during construction to identify and avoid nests during construction.

Based on correspondence from the FWS, it is recommended that the construction corridor be mowed or disked to remove vegetative cover in the preceding fall to discourage nesting migratory birds from using the area if construction is to occur between the breeding season (i.e., between February 1 and July 15) (FWS, 2011). Vantage intends to conduct construction outside of the breeding season and, therefore, vegetation cover removal is not planned. The FWS has also recommended that Vantage wait until after the young have fledged or coordinate with the FWS on appropriate nest buffers. In the event construction activities occur between February 1 and July 15, Vantage would hire a qualified biologist to conduct bird nest surveys 5 days prior to construction. If migratory birds nests are discovered in the Project construction work area, construction would be halted in that specific area and Vantage would consult with the FWS regarding protection of the nest and the means to allow construction equipment to bypass the nest and proceed along the right-of-way.

Implementing the FWS-recommended measures is anticipated to avoid impacts on the local migratory bird population. In addition, Vantage, in consultation with the FWS and DOS, has prepared a Conservation Plan for the conservation of migratory bird species in furtherance of the MBTA, the BGEPA, and EO 13186. The Conservation Plan represents a voluntary effort by Vantage in agreement with the FWS, and includes conservation measures that avoid and minimize potential adverse impacts on migratory birds and their habitats. The Conservation Plan also provides for compensatory mitigation for loss of "habitat services" from the temporary and permanent loss of migratory bird habitat for construction and operation of the Project. The goal of the Conservation Plan is to aid in the long-term conservation of migratory birds with active management of the species and the habitat on which they depend. The Conservation Plan, signed on February 26, 2013, would be implemented by Vantage during construction and operation of the pipeline. Following construction, Vantage would reclaim disturbed areas to pre-construction habitat conditions consistent with the EPP (see Appendix C for the draft EPP).

Specific to sharp-tailed grouse, Vantage would avoid leks identified within 0.25 mile of the Project during the nesting/breeding season (i.e., between March 1 and May 15). Construction activities would typically not occur until 2 hours after sunrise in order to avoid birds remaining on the lek. If construction occurs within 0.25 mile of an identified lek, Vantage would limit construction hours.

Measures to protect migratory birds would include, but are not limited to, conducting pre-construction surveys, construction monitoring during the nesting season, construction avoidance of sensitive areas or active nests (including sharp-tail grouse leks), nest preclusion by clearing land and removing nesting habitat outside the breeding season, and compensatory mitigation. Following construction, Vantage would reclaim disturbed areas to pre-construction habitat conditions.

Vantage would comply with the provisions of the BGEPA, which prohibits anyone without a permit issued by the Secretary of the Interior from taking bald eagles, including their parts, nests, or eggs. While no bald or golden eagle nests were identified during Vantage's raptor surveys, Vantage has committed to complying with the BGEPA and would continue coordination with the FWS. If Vantage identifies any active nesting sites during construction, construction would be stopped in the specific area and the FWS would be contacted for further direction. Additionally, Vantage would maintain a minimum 0.5-mile buffer around identified bald and golden eagle nest sites.

2.8 THREATENED AND ENDANGERED SPECIES

2.8.1 Federally Listed Threatened and Endangered Species

The FWS is responsible for administering Section 7 consultation pursuant to the ESA. DOS, as the lead federal agency, is responsible for completing Section 7 consultation with the FWS consistent with the ESA to determine effects on federally listed species. DOS is required to consult with the FWS to determine whether any federally listed or proposed endangered or threatened species or their designated critical habitat occur in the vicinity of the proposed Project.

For the proposed Project, DOS designated Vantage and its consultants as the non-federal representative for the purpose of informal consultation with the FWS Service Office of Ecological Services in Bismarck; however, DOS has retained ultimate responsibility for completing the consultation with the FWS. DOS provided the FWS and Vantage with a letter designating the applicant as a non-federal representative to respond to ESA Section 7 consultation matters on behalf of DOS.

During informal consultations, Vantage contacted, met, or had discussions with the FWS on several occasions. These discussions included descriptions of the Project area, construction methods, and project schedule; location maps and Project drawings; a description of listed species that may be affected in the Project area; information related to the ESA baseline; a list of existing scientific information/studies available; identification of needed Project studies or surveys; identification of effects of the Project on listed and proposed species, including direct and indirect effects of the project, as well as any cumulative effects; and potential conservation actions and operational criteria that could be incorporated into Project plans to avoid or minimize effects on listed and proposed species and habitats. During informal consultations, DOS also consulted with the FWS and Vantage. DOS provided guidance and review, and independently reviewed information as it was available. DOS has concluded that the information submitted was the most current and best information available.

Upon review of existing data, several federally protected species under the jurisdiction of FWS were identified that could be potentially affected by the Project (see table 2.8.1-1). This finding required that a BA be prepared to identify the nature and extent of any adverse impacts and to recommend mitigation measures that would avoid the habitat and/or species or that would reduce potential impact to acceptable levels.

TABLE 2.8.1-1

Federally Threatened and Endangered Species in Williams and Divide Counties, North Dakota

Species	Status	County	Habitat Conditions
Whooping crane (*Grus americana)*	Endangered	Williams and Divide	Stopover wetland habitat is present in the Project area.
Gray wolf (*Canis lupus*)	Endangered	Williams and Divide	Habitat is not present or affected in the Project area.
Pallid sturgeon (*Scaphirhynchus albus)*	Endangered	Williams	Habitat is not present or affected in the Project area.
Interior least tern (*Sterna antillarum*)	Endangered	Williams	Habitat is not present or affected in the Project area.
Piping plover (*Charadrius melodus*)	Threatened	Williams and Divide	Designated critical habitat is present in the vicinity of the Project and could be affected.

In addition to the federally listed threatened and endangered species listed in table 2.8.1-1, the Sprague's pipit (a candidate species) and designated critical habitat for the piping plover were identified by the FWS as occurring in the Project area.

The BA includes assessments of potential Project-related impacts on ESA-protected species, candidate species, and designated critical habitat; recommended conservation measures; and effects determinations. The BA is included as Appendix B. The FWS concurred with and acknowledged the determinations presented in the BA). Section 7 informal consultation with FWS has been completed for the Project.

2.8.2 State Sensitive Species

2.8.2.1 Description of Listed Species

In addition to threatened and endangered species, the NDGF has published a North Dakota Comprehensive Wildlife Conservation Strategy (NDCWCS) that identifies Level 1 species. Level 1 species are defined as those species that are of a high level of conservation priority because of declining status either in North Dakota or across their range; or are at a high rate of occurrence in North Dakota constituting the core of the species' breeding range, but are at-risk range wide. Level 1 species identified by the NDGF (2012a) are listed in table 2.8.2-1.

2.8.2.2 Construction and Operation Impacts and Mitigation

Of the Level 1 species listed in the NDCWCS, 20 are avian species. Vantage would avoid disturbance to nesting birds by constructing the facilities after the nesting season has concluded or by removing nesting habitat prior to the nesting season (see section 2.7.2.2). This measure would prevent impacts on grassland birds because no suitable nesting habitat would remain in the right-of-way. Birds would be displaced to adjacent undisturbed areas with suitable nesting habitat.

Impacts on the four fish species would be negligible because no perennial waterbodies would be affected by construction, and the crossings of intermittent and ephemeral streams would be mitigated by use of the horizontal bore crossing method and implementation of erosion and sediment control measure identified in Vantage's EPP (see Appendix C for the Draft EPP). As a consequence, fish species would not be affected by construction and operation activities.

TABLE 2.8.2-1

Level I Species for North Dakota

Common Name	Scientific Name
Birds	
American bittern	*Botaurus lentiginosus*
American white pelican	*Pelecanus erythrorhynchos*
Baird's sparrow	*Ammodramus bairdii*
Black tern	*Chlidonias niger*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Chestnut-collared Longspur	*Calcarius ornatus*
Ferruginous hawk	*Buteo regalis*
Franklin's gull	*Larus pipixcan*
Grasshopper sparrow	*Ammodramus savannarum*
Horned grebe	*Podiceps auritus*
Lark bunting	*Calamospiza melanocorys*
Long-billed curlew	*Numenius americanus*
Marbled godwit	*Limosa fedoa*
Nelson's sharp-tailed sparrow	*Ammodramus nelsonii*
Sprague's pipit	*Anthus spragueii*
Swainson's hawk	*Buteo swainsoni*
Upland sandpiper	*Bartramia longicauda*
Willet	*Catoptrophorus semipalmatus*
Wilson's phalarope	*Phalaropus tricolor*
Yellow rail	*Coturnicops noveboracensis*
Amphibians	
Canadian Toad	*Bufo hemiophrys*
Plains Spadefoot	*Spea bombifrons*
Reptiles	
Smooth Green Snake	*Liochlorophis vernalis*
Western Hognose Snake	*Heterodon nasicus*
Mammals	
Black-tailed Prairie Dog	*Cynomys ludovicianus*
Fish	
Blue Sucker	*Cycleptus elongatus*
Pearl Dace	*Margariscus margarita*
Sturgeon Chub	*Macrhybopsis gelida*
Sicklefin Chub	*Macrhybopsis meeki*

Source: North Dakota Game and Fish Department, 2012a.

Two Level 1 species of toads and two species of snakes (smooth green snake and western hognose snake, discussed below) may be directly affected by construction, but the impacts would be minor. Although the toads are relatively immobile, Vantage would use the horizontal bore method to avoid impacts on wetlands and to the species that inhabit wetland area. The Canadian toad is more aquatic than most toads, typically found in or near the margins of prairie wetlands. The Plains spadefoot is usually found in areas with soft sandy/gravelly soils near permanent or temporary bodies of water. For much of each year the Plains spadefoot lives largely inactive in burrows of its own construction or occupies rodent burrows and enters water only to breed.

The smooth green snake is one of the most widely distributed snake species in North America. Its current longitudinal distribution ranges from the Canadian Maritime Provinces and the Appalachian

Mountains of Virginia to Saskatchewan and Utah. Habitat for the smooth green snake is characterized by mesic sites with thick grassy, herbaceous, and shrubby vegetation, especially wet meadows. Smooth green snakes may not move far because their diminutive size allows them to hibernate in more microhabitats than the communally hibernating garter snakes. If the small daily movements of less than 6 miles per day are typical, smooth green snake populations are probably extremely localized and have very limited dispersions into neighboring habitats. The snake is threatened through the direct and indirect consequences of habitat destruction from cattle grazing, logging, dewatering of streams, road building, pesticide use, and development, particularly in meadows, riparian areas, and mountain foothills.

The western hognose snake's range runs from southern Canada through the central United States into northern Mexico. The snake prefers open, sparsely vegetated habitats on well-drained soils, such as dry prairie or oak savanna. It frequently uses pocket gopher burrows and prefers open, sparsely vegetated habitats on well-drained soils, such as dry prairie or oak savanna. The western hognose snake overwinters below the frost line in a mammal tunnel or self-dug burrow and emerges from hibernation early in the spring.

Potential impacts on snakes are expected to be minor. Disturbance to wetland habitat preferred by the smooth green snake would be minimal as Vantage would adopt the horizontal bore method to cross wetlands. As discussed in section 1.6.1.2, the primary impact that could occur as a result of a horizontal bore is an inadvertent release of drilling mud (frac-out) directly or indirectly into a waterbody or wetland, which, if in large quantities, could affect aquatic organisms by settling in and temporarily inundating the habitats used by these species. Vantage would implement the measures discussed in its EPP (see Appendix C for the Final EPP) that describe how each horizontal bore would be conducted to minimize the potential for an inadvertent release of drilling mud to occur, and the procedures to follow and the NDHD personnel to contact in the event of a drilling fluid release.

Although dry prairie would be affected by construction, a vast area of optimal habitat for the western hognose snake is located adjacent to the construction work area. Additionally, a portion of the construction activity would occur after these species hibernate for the fall and winter seasons.

The black-tailed prairie dog is a large, burrowing, ground squirrel belonging to a group of four other prairie dog species found only in North America. The black-tailed prairie dog is the most abundant and widely distributed prairie dog. In North Dakota, the black-tailed prairie dog present range is confined to areas south and west of the Missouri River. The possibility of black-tailed prairie dogs present in the Project area is highly unlikely.

Based on the construction plans and mitigation measures proposed by Vantage (e.g., horizontal bore method at waterbodies/wetlands), habitat requirements, and the amount of habitat potentially affected for these species, it is anticipated that construction and operation of the Project may result in short-term and temporary but minor impacts on the local population of some Level 1 species of concern.

2.9 LAND USE, RECREATION, SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

2.9.1 Land Use

2.9.1.1 Environmental Setting

As discussed in section 2.6.2, the Project would affect agricultural, open, and wetland land uses. Agricultural lands impacted by the pipeline and ATWS are primarily used for raising crops. Spring wheat, barley, and oats are the most common commodities grown in farmed areas (Find the Data, 2007, 2008). Based on information from Vantage, no organic farms would be crossed by the pipeline. Vantage

has identified about 23.3 miles of land enrolled in the NRCS FSA's CRP that would be crossed. The CRP is a voluntary landowner reserve program that allows for long-term preservation of vegetative land cover and is discussed in sections 2.6.1 and 2.6.2.

Open land impacted by the pipeline and ATWS primarily consists of grasslands and pasture and hay fields used for livestock grazing. The proposed pipeline would cross wetlands at 12 locations; no ATWS would be located within wetlands (see section 2.4.2).

2.9.1.2 Construction and Operation Impacts and Mitigation

Table 2.6.2-1 summarizes the acres of each land use type that would be affected by construction and operation of the Project. Land use impacts associated with the proposed pipeline would include the disturbance of existing land uses during construction and retention of an expanded permanent right-of-way during operation of the facilities. Vantage proposes to generally use a 70-foot-wide construction right-of-way for the 79.8-mile-long pipeline, of which 6.3 miles (8 percent) would be adjacent to and within 100 feet of existing rights-of-way. Vantage would also utilize ATWS during construction at locations such as road and waterbody crossings.

The permanent right-of-way would typically be 30 feet wide, consisting of 25 feet and 5 feet on either side of the pipeline centerline. The land retained as permanent right-of-way would generally be allowed to revert to former use; however, certain activities such as the construction of aboveground structures would be prohibited. To facilitate pipeline inspection, operation, and maintenance, the entire permanent right-of-way in upland areas would be cleared of woody vegetation and maintained in an herbaceous/scrub-shrub vegetated state. Drawings depicting the construction and permanent right-of-way configurations for the proposed pipeline are included in Vantage's EPP (see Appendix C for the Draft EPP)). Construction on agricultural and open land use types would be conducted as described in section 1.6.1.1. Waterbody/wetland construction techniques are described in section 1.6.1.2.

Based on past and recent pipeline construction practices and industry-recognized standards, the effects of pipeline construction and use of ATWS on land uses are expected to be direct and short term (i.e., less than 3 years). Short-term impacts on land uses would include the loss of standing or row crops and vegetation within the construction work area, the disruption of farming operations for the growing season during the year of construction, and the disruption of livestock grazing activities during the active construction period.

To reduce short-term impacts, Vantage would adhere to the measures outlined in its EPP (see Appendix C for the Draft EPP). Mitigation measures include implementing pipeline industry-recognized BMPs such as salvaging topsoil and preventing mixing of topsoil with subsoil; installing erosion control devices; and coordination with landowners to provide for livestock passage and providing temporary fencing and gates to protect livestock from construction-related hazards. Additionally, as discussed in its EPP (see Appendix C for the Draft EPP), Vantage would make arrangements for a landowner or lessee to harvest hay or cereal grain crops prior to stripping, if possible.

Following construction, Vantage would implement the restoration practices outlined in its EPP (see Appendix C for the Draft EPP) and agricultural, open, and wetland land uses would continue as before construction, with the exception of the loss of trees (e.g., agricultural windbreaks) and shrubs within the permanent right-of-way, which would not be revegetated following construction. Fences and gates would be rebuilt to original condition or better. Additionally, for CRP lands crossed, Vantage has committed to restoring these areas consistent with FSA requirements. Post-construction monitoring measures would include a post-construction soil assessment and visual inspections of the right-of-way to identify locations of invasive weed infestations, poor vegetation establishment, and reduced crop growth.

MLBVs would be installed at eight locations along the pipeline (see table 1.4.2-1). While land uses within the operational pipeline right-of-way would be allowed to revert to preconstruction conditions, operation of the MLBV sites would result in a permanent impact on about 0.2 acre of agricultural land and 0.1 acre of open land (see table 2.6.2-1). Visual impacts associated with the operation of these facilities are discussed separately in section 2.9.7.

While public roads and the construction right-of-way would be used for primary access to the pipeline during construction, Vantage proposes to construct seven new roads for access to MLBVs (see table 1.4.3-1). The effects of access road operation would permanently impact about 0.1 acre of agricultural land and 0.1 acre of open land (see table 2.6.2-1).

Vantage has identified four locations for temporary use as a contractor/pipe yard to support construction activities (see section 1.4.4). These yards would result in short-term impacts on about 8.0 acres of agricultural land. Upon completion of construction, prior use of the sites would continue, resulting in no anticipated long-term or permanent impact.

As described in section 1.6.1.1, during and following construction, Vantage would collect and dispose of all construction garbage and debris at an approved facility. Additionally, Vantage would adhere to any special landowner requirements (e.g., seeding, restoration measures) in addition to permit requirements. As discussed further in section 2.9.2 below, Vantage would compensate landowners for the loss of land, crops, non-renewable, or other resources, and restoration of any unavoidable damage to personal property during construction.

2.9.2 Land Ownership and Easement Requirements

To construct, operate, and maintain the proposed Project, Vantage would need the rights to easements along the entire proposed route. Vantage is responsible for negotiating easement agreements with landowners along the route. The easement agreements would list the conditions that both the landowner and Vantage agree to, including financial compensation to the landowners in return for granting easements. Compensation would also be made for loss of use during construction, crop loss, loss of non-renewable or other resources, and restoration of any unavoidable damage to personal property during construction. DOS expects Vantage to negotiate fairly, honestly, and respectfully with landowners when they negotiate an easement. However, those negotiations and final agreements are private business concerns between the landowners and Vantage.

If Vantage obtains all necessary permits and approvals and an easement negotiation cannot be completed in a manner suitable to both parties, Vantage may use state eminent domain laws, as appropriate, to obtain easements needed for pipeline construction, maintenance, and operation. State laws dictate under what circumstances eminent domain may be used and define the eminent domain process within the state. The level of compensation would be determined by a court according to applicable state law.

State or local trespass and access laws are applicable along the entire route. A landowner who considers Vantage to be out of compliance with an easement agreement may take up the matter with Vantage or local law enforcement officials.

2.9.3 Existing Residences, Commercial Facilities, and Planned Developments

Based on information provided by Vantage and review of aerial photographs, no residences or commercial facilities would be within 50 feet of the Project's construction workspace.

Vantage contacted county and local officials in Williams and Divide Counties and the City of Tioga to identify planned residential or commercial developments within 0.25 mile of the Project. One planned, approximately 80-acre commercial and residential property located on the west side of Highway 40, between the highway and the Tioga Medical Center/Tioga Dam Property, was identified near the beginning of the Project (MP 0.0). The construction timeframe for the planned development is unknown (Eraas, 2011).

Consistent with its EPP (see Appendix C for the Draft EPP), Vantage would contact agency personnel (i.e., Williams and Divide Counties' Planning and Zoning Administrators, City of Tioga Auditor) prior to construction and would maintain coordination with these personnel until Project completion. Vantage has committed to developing, if necessary, mitigation strategies in consultation with local governments and landowners for any potential disruptions to planned residential or commercial development in the vicinity of the Project.

Section 2.15 discusses the cumulative impacts of the Project and other projects (e.g., planned developments) in the general Project area.

2.9.4 Recreation and Special Interest Areas

2.9.4.1 Environmental Setting

The nearest federally designated recreation or special interest area to the Project is the Lake Zahl National Wildlife Refuge, which is about 7 miles southwest of the Project (FWS, 2012d; FWS, 2012e). Several WPAs also exist in Divide and Williams Counties. These WPAs range in size from 12 acres to 2,270 acres, are managed by the Crosby Wetland Management District of the FWS, and may be used for hunting during established seasons, which typically begin in mid to late September for waterfowl and sharptail, partridge, ruffed grouse, early October for pheasant, and early November for white-tailed deer (gun) (FWS, 2012f; NDGF, 2012b). Additionally, small ponds, lakes, and impoundments within the two Project-affected counties support recreational fishing. However, the Project would not directly impact these areas. High value and critical habitats are discussed in section 2.8.

Based on information provided by Vantage and DOS and its independent third-party contractor's review of the NDGF's publically available interactive mapping guide, the Project would cross approximately 4.9 miles of Private Land Open to Sportsman (PLOTS) between approximate MPs 30.6 and 31.6, MPs 49.6 and 50.2, MPs 61.3 and 64.5, and MPs 64.5 and 64.7, and less than 0.1 mile between MPs 32.2 and 32.3 (NDGF, 2012c). PLOTS lands are defined as lands open to hunting through agreements between the NDGF and private landowners, as well as public lands such as wildlife management and WPAs (NDGF, 2012c). The PLOTS lands crossed by the Project are privately owned. The Project's impacts on and the mitigation measures for construction that Vantage would provide on PLOTS lands is discussed in section 2.9.4.2 below.

2.9.4.2 Construction and Operation Impacts and Mitigation

Based on past and recent pipeline construction experience, one of the primary concerns when crossing recreation and special interest areas is the impact of construction on the purpose for which the area was established (e.g., the recreational activities, public access, resources the area aims to protect). As discussed previously, the Project would not directly affect federally, state-, or locally designated recreation areas.

The Project would temporarily affect about 42 acres of PLOTS land during construction. To mitigate for and minimize disruptions to PLOTS land, Vantage would contact the NDGF prior to

construction and would maintain coordination with agency contacts until Project completion. In addition, during preconstruction activities, Vantage and its construction contractor would implement landowner notification and coordination procedures to develop, if necessary, mitigation to avoid disruptions to hunting on PLOTS parcels.

Indirect effects on recreational and special interest areas farther removed from the Project would include noise and visual impacts. Construction would alter visual aesthetics of the area by removing existing vegetation and disturbing soils. Construction would also generate dust and noise, which could be a nuisance to recreational users. Construction could also interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing trails. These impacts would be temporary and limited to the period of active construction, which typically would last only several days to several weeks in any one area. Impacts on the recreational or special interest function of these areas would be minimized by implementing Vantage's EPP (see Appendix C for the Draft), which includes commitments by Vantage to coordinate with agency personnel and landowners. Following construction, Vantage would restore and revegetate disturbed areas in coordination with landowners and agency personnel, and the recreational function of the areas would be able to revert to their former uses.

2.9.5 Coastal Zone Management Act

Based on DOS and independent third-party contractor's review of the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resource Management's website, the Project falls outside of the geographical boundaries of a designated coastal zone, and, therefore, is not subject to coastal consistency (National Oceanic and Atmospheric Administration, 2012; North Dakota RUS Bulletin, 2007).

2.9.6 Hazardous Waste

The EPA's Geospatial Data Download databases, which include Superfund National Priorities List and RCRA site information, were reviewed by Vantage and DOS to identify known and potential hazardous waste sites in the Project area. No known hazardous or contaminated waste sites were identified within the Project construction work areas (EPA, 2010; EPA, 2012b).

In the event hazardous material is encountered during construction, Vantage would implement the protocols described in its EPP (see Appendix C for the Draft EPP) and SPCC Plan. The SPCC Plan describes response, containment, cleanup, and reporting procedures and preventative measures such as spill training for construction personnel, regular inspection of equipment for leaks, and construction of containment systems around temporary fuel storage areas.

2.9.7 Visual Resources

2.9.7.1 Environmental Setting

Visual resources along the proposed pipeline route are a function of geology, climate, and historical processes, and include topographic relief, vegetation, water, wildlife, land use, and human uses and development. Williams County is characterized by rolling to hilly plains while Divide County is generally a hummocky plain punctuated by numerous prairie potholes. Predominant visual features of the Project area consist of private, large farms; native or restored grasslands; mid- to moderate-sized towns with scattered rural housing; east-west railroad corridors and primary road networks; and petroleum and natural gas development facilities. About 8 percent of the pipeline would be installed parallel to existing rights-of-way, which are maintained periodically on different schedules, using different methods of

maintenance. As a result, some areas along the proposed Project have been previously affected by other visual impacting activities.

The Project would not affect designated scenic highways or byways (America's Byways, 2012; North Dakota Parks and Recreation Department, 2012).

2.9.7.2 Construction and Operation Impacts and Mitigation

Visual impacts associated with the construction right-of-way and ATWS would include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, blasting (if required), rock formation alteration or removal, and machinery and tool storage. Other visual effects would result from the removal or alteration of vegetation that may currently provide a barrier, such as windbreaks, or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture.

Based on past and recent pipeline construction experience, visual impacts would be greatest where the pipeline route would parallel or cross roads and the pipeline right-of-way may be seen by passing motorists, and on residences near windbreaks where trees would be removed and prevented from re-establishing on the permanent right-of-way. The duration of visual impacts would depend on the type of vegetation that is cleared or altered. The impact of vegetation clearing would be short term and temporary in areas consisting of short grasses and in agricultural crop and pasture lands where the re-establishment of vegetation following construction would be relatively fast (generally less than 5 years). Long-term and permanent impacts would occur in clearing trees associated with windbreaks. However, based on a review of aerial photography, very few to no tree clearing would be required for the Project.

After construction, disturbed areas would be restored and returned to preconstruction conditions consistent with Vantage's EPP (see Appendix C for the Draft EPP), landowner agreements, and Vantage's easement requirements, with the exception of aboveground facility sites, discussed further below. Based on other pipeline examples located throughout the country, the operational pipeline right-of-way is anticipated to become almost undistinguishable from its surroundings.

MLBVs would be the most visible features and would result in a direct, permanent impact on visual resources. The magnitude of these impacts depends on factors such as the existing landscape, the remoteness of the location, and the number of viewpoints from which the facility could be seen. The 20-foot by 30-foot MLBV sites would include an exposed segment of the pipeline, fittings, a small building, and chain-link fencing. Also, direct, permanent visual impacts would occur from pipeline warning signs and markers.

Vantage would not visually screen MLBVs or pipeline signs and markers. While the aboveground features would likely stand out in contrast to the surrounding agricultural and open lands, these features are not out of character with the landscape of Divide and Williams Counties based on review of aerial photographs and the ongoing oil and gas development activities in the area. While permanent, MLBVs are not anticipated to have an adverse impact on the visual landscape of the area because of the modest changes in elevation characteristic of this terrain, which tends to obscure low-lying features.

In addition to using existing public roads, Vantage would build seven new gravel roads to the MLBV sites, resulting in a direct, permanent visual impact. However, gravel roads are not out of character with the landscape of Divide and Williams Counties and the roads would be located along the permanently maintained right-of-way.

The primary visual impact associated with the proposed contractor/pipe yards would be the storage of equipment, materials, and heavy machinery during Project construction. All of these uses would be short term and temporary and generally concurrent with pipeline construction activities. Upon completion of construction, the contractor/pipe yards would be cleared of construction equipment and debris and be allowed to return to their original use. As a result, there would be no permanent impacts on visual resources associated with the use of these yards.

2.10 SOCIOECONOMICS

Construction and operation of the Project could impact socioeconomic resources in the area. Some of these potential effects are related to the number of construction workers that would work on the Project and their impact on population, public services, and temporary housing during construction. Other potential effects are related to construction activities, such as increased traffic or disruption of normal traffic patterns. Other effects associated with the Project include increased property tax revenue, increased job opportunities, and increased income associated with local construction employment.

2.10.1 Socioeconomic Setting

Population, Economy, and Employment

Table 2.10.1-1 provides a summary of selected demographic and socioeconomic conditions for affected communities within the Project area. Prior to the recent economic expansion related to natural resource development, resident population in the region had been in long-term decline. In 2005, the estimated population of Williams County was 19,136, nearly 2,000 fewer residents than in 1990. However, the county's population has since increased, to 22,398 in 2010. Population density in Williams County is similar to that of the state.

TABLE 2.10.1-1

Existing Economic Conditions in the Vicinity of the Vantage Pipeline Project

State/County	Population (2010) [a]	Population Density (persons/sq. mile, 2010) [a]	Per Capita Income (2010) [a]	Civilian Workforce (2005-2009) [b]	Unemployment Rate, 2005-2009 (percent) [c]	Top Three Industries [c]
North Dakota	672,591	9.7	$24,978	358,902	3.6	E, R, A
Divide	2,071	1.6	$27,954	1,026	0.3	A, E, P
Williams	22,398	10.8	$27,293	10,900	1.2	A, E, R

[a] Source: U.S. Census Bureau, Census, 2010a.
[b] Source: U.S. Census Bureau, Census, 2005-2009a.
[c] Source: U.S. Census Bureau, Census, 2005-2009b.
[d] A = Agriculture, forestry, fishing and hunting, and mining
E = Education services, and health care and social assistance
P = Public administration
R = Retail trade

In contrast to the recent population gains in Williams County, the population in Divide County has declined from 2,899 in 1990 to 2,071 in 2010. Population density for Divide County is significantly lower than that of the state and Williams County.

The major occupations in the Project area are in agriculture, forestry, fishing and hunting, and mining. Education, health, and social services are also main industries in the area. The counties affected

by the Project have per capita incomes that are higher than the state average of $24,978. Unemployment rates within the counties affected by the Project are also lower than the state average.

Table 2.10.1-2 provides the non-farm employment statistics in Divide and Williams Counties. Compared to Williams County, Divide County's economy is smaller (596 non-farm jobs compared to 13,055 in Williams County in 2009) and agriculture remains an important element of its economic base (503 farms totaling 708,000 acres and 678 operators) (USDA, 2009). Farming added another 466 jobs in Divide County in 2008 (U.S. Department of Commerce, Bureau of Economic Analysis, 2012). Divide County also has oil and gas production (1.9 percent of state-wide oil production and 2.4 percent of state-wide natural gas production in 2009) (North Dakota Oil and Gas Division, 2010a and b). Total employment in Divide County has trended downward over the last decade, losing about 10 percent of locally based jobs.

Williams County has more land in farms and more employment in the agricultural sector than Divide County (857 farms totaling 1,445,000 acres, 1,151 operators) but farm employment totals approximately 5 percent of county-wide employment. Since 2005, Williams County has hosted a booming oil and gas industry. In 2009, the local mining sector (which is primarily oil and gas) had average annual employment of 3,069 jobs, or 23.5 percent of all non-farm employment in the county, 7 percent of state-wide oil production, and 22 percent of state-wide gas production. Driven by the increase in mining sector employment, total employment in the county has increased by more than 4,200 jobs since 2005.

TABLE 2.10.1-2

2009 Non-Farm Covered Employment by Industrial Sector for Divide and Williams Counties, North Dakota

	Divide County		Williams County	
Industrial Sector	Average Annual Employment	Share of Non-Farm Employment (percent)	Average Annual Employment	Share of Non-Farm Employment (percent)
Accommodation and Food Services	43	7.2	953	7.3
Administrative and Waste Services	9	1.5	340	2.6
Agriculture, Forestry, Fishing & Hunting	n/a	n/a	n/a	n/a
Arts, Entertainment, and Recreation	n/a	n/a	177	1.4
Construction	12	2.0	722	5.5
Educational Services	n/a	n/a	n/a	n/a
Finance and Insurance	31	5.2	348	2.7
Health Care and Social Assistance	151	25.3	1,546	11.8
Information	17	2.9	150	1.1
Management of Companies & Enterprises	0	0.0	n/a	n/a
Manufacturing	n/a	n/a	317	2.4
Mining, including oil and gas	n/a	n/a	3,069	23.5
Other Services, Ex. Public Admin	15	2.5	344	2.6
Professional and Technical Services	15	2.5	325	2.5
Public Administration	82	13.8	444	3.4
Real Estate and Rental and Leasing	3	0.5	332	2.5
Retail Trade	72	12.1	1,407	10.8
Transportation and Warehousing	17	2.9	595	4.6
Utilities	n/a	n/a	74	0.6
Wholesale Trade	n/a	n/a	988	7.6
Total Employment	596	100.0	13,055	100.0

Note: "n/a" as reported above totals 129 jobs in Divide County and 924 jobs in Williams County.
Source: Job Service of North Dakota, 2010.

Housing

Housing statistics for the counties affected by the Project are presented in table 2.10.1-3. In 2010, the counties in the Project area had between 347 and 1,171 vacant housing units with a rental vacancy rate of between 1.5 and 4.2 percent, which is lower than the state average, likely as a result of the increase in oil and gas industry jobs in the area.

TABLE 2.10.1-3

Housing Statistics by County in the Vicinity of the Vantage Pipeline Project

State/County	Owner occupied (percent) (2010) [a]	Renter occupied (percent) (2010) [a]	Median Monthly Housing Costs (with a mortgage/not mortgaged) (2000) [b]	For Seasonal or Occasional Use (2010) [a]	Vacant Housing Units (2010) [a]	Rental Vacancy Rate (percent) [a]
North Dakota	65.4	34.6	$818/$270	11,483	36,306	7.1
Divide	80.2	19.8	$654/$252	104	347	1.5
Williams	69.3	30.7	$529/$226	417	1,171	4.2

[a] Source: U.S. Census Bureau, 2010b.
[b] Source: U.S. Census Bureau, 2000.

Temporary housing availability varies seasonally and geographically within the counties and communities near the proposed facilities. Temporary housing is available in the form of daily, weekly, and monthly rentals in motels, hotels, campgrounds, and recreational vehicle parks. The demand for temporary housing in the Project area is generally greatest during the summer months when tourism and seasonal work are at their highest. Table 2.10.1-3 provides the vacant housing units and median monthly housing costs in the counties crossed by the proposed facilities.

Table 2.10.1-4 provides temporary housing resources from hotel/motel, recreational vehicle (RV) parks, and guesthouse/lodges in Divide and Williams Counties. Temporary housing resources are located in most communities near the proposed pipeline corridor. The inventory conducted for this assessment (November 2010) identified a total of 778 hotel/motel rooms, 410 RV park pads and 32 guesthouse/lodge rooms in the two-county area. Several new motels were completed in the Williston area during the past several years, at least in part to meet demand associated with conventional oil and gas, more recently, the Bakken Shale resources (Loomer, 2010). In addition to those included in table 2.10.1-4, a 127-bed commercial hotel-style worker camp was opened in 2010 in the Williston area (Williston Herald, 2010), and more such facilities are being considered.

TABLE 2.10.1-4

Hotels/Motels, RV Parks, and Other Area Lodging in the Vantage Pipeline Project Area

	Hotel/Motel		Recreational Vehicle Parks		Guesthouse/Lodges	
County/Community	Motels	Rooms*	Parks	Spaces*	Lodges	Rooms*
Divide County						
Alkabo	--	--	1	5	--	--
Crosby	1	40	1	5	1	3
Fortuna	--	--	1	8	3	10
Noonan	--	--	4	54	--	--
Williams County						
Epping	--	--	2	56	--	--
Ray	--	--	3	40	3	15
Tioga	1	28	4	64	1	4

TABLE 2.10.1-4

Hotels/Motels, RV Parks, and Other Area Lodging in the Vantage Pipeline Project Area

	Hotel/Motel		Recreational Vehicle Parks		Guesthouse/Lodges	
County/Community	Motels	Rooms*	Parks	Spaces*	Lodges	Rooms*
Trenton	--	--	1	15	--	--
Wildrose	--	--	1	--	--	--
Williston	8	710	6	163	--	--
Totals	10	778	24	410	8	32

Source: North Dakota Tourism Division, 2010; Williston Convention and Tourism Bureau, 2010; Camp Scout, 2010.

Transportation and Traffic

The local road and highway system in the vicinity of the proposed Project facilities consists of U.S. highways, state highways, secondary state highways, county roads, and private roads. The principal roadways crossed by the Project are U.S. Highway 85, and State Highways 5, 50 and 40. Six of the roads crossed by the proposed route are paved. In addition to highway crossings, 39 gravel road crossings and 48 trail crossings provide access to the pipeline right-of-way during construction.

Public Services

Law enforcement, fire suppression, and emergency medical response services in Divide and Williams Counties are located in a number of communities. The Williams County and Divide County sheriffs' departments are primarily responsible for law enforcement in the unincorporated area of their respective counties. Williston and several other communities in the region maintain municipal police departments as well. There are three hospitals in the area: the Tioga Medical Center, Mercy Medical Center in Williston, and Saint Luke's Hospital in Crosby.

Environmental Justice

Other demographic characteristics of the local population are important to consider when evaluating potential environmental justice impacts of the Project. Environmental justice refers to the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." An analysis of potential environmental justice effects is included in this EA pursuant to EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994). Related guidance, *Environmental Justice: Guidance under the National Environmental Policy Act* (1997), has also been prepared by the CEQ.

In 2010, minority residents comprised an estimated 2.0 percent of the Divide County population and 7.9 percent of the Williams County population, as compared to 10.0 percent for North Dakota (U.S. Census Bureau, 2010b). Individuals with per capita income below the poverty level (2009) include 11.6 percent of the Divide County population and 8.6 percent of the Williams County population, compared to the 11.7 percent state-wide (U.S. Census Bureau, 2010a).

2.10.2 Construction and Operation Impacts and Mitigation

Construction and operation of the Project could impact socioeconomic resources in the area. Some of these potential effects are related to the number of construction workers that would work on the Project and their impact on population, public services, and temporary housing during construction.

Other potential effects are related to construction, such as increased traffic or disruption of normal traffic patterns. Other effects associated with the Project include increased property tax revenue, increased job opportunities, and increased income associated with local construction employment. DOS has reviewed the Project-specific information projected by Vantage (e.g., proposed construction workforce, construction plans, and tax revenues). The following analysis of potential socioeconomic effects is based on this review.

Population, Economy, and Employment

As identified in its application to DOS, Vantage estimates that construction of the Project would employ a temporary workforce averaging 60 to 70 workers, and would take about 6 months beginning during summer 2012. Based on the population statistics listed in table 2.10.1-1, this would represent a 0.2 to 0.3 percent increase in the combined local populations of Divide and Williams Counties during the 6-month construction period.

Vantage anticipates that operation of the Project would employ two to three permanent staff, augmented periodically by employees of pipeline service companies contracted by Vantage to support operations. The permanent staff would be based in the Tioga area. In addition, ongoing operations and maintenance expenditures by Vantage, along with the consumer expenditures by Project staff, would support a comparable number of jobs elsewhere in the regional economy. The total long-term employment impact in the region, including the incremental indirect and induced positions, would likely be equivalent to 6 to 8 jobs over the operating life of the Project. These jobs would likely be filled by current residents. The small employment increment would have a small beneficial effect on local labor markets. While it is expected that the permanent Vantage positions and potential incremental employment positions in the Project area would be filled by current residents, in the event workers relocate to the area for them, the combined addition of these positions in the Project area would represent less than a 0.05 percent increase in the combined local populations of Divide and Williams Counties.

Because of the existing construction and oil and gas industries in the area, a substantial pool of skilled workers exists in the region and would likely fill many of the direct construction jobs associated with the Project. Construction of the proposed pipeline through portions of northwestern North Dakota would result in limited effects on the existing population. These effects would be temporary and result from the influx of non-local construction workers to work on the pipeline. Fewer than 50 non-local workers would be expected due to the scale of the overall Project and availability of local skilled workers, which would represent about 0.2 percent of the local population.

It is anticipated that Project-area impacts during construction are expected to be temporary and minor. The total population change would equal the total number of non-local construction workers, plus any family members that accompany them. Based on similar pipeline construction projects in the area, Vantage expects that most non-local construction workers would not be accompanied by other family members while working on the Project. Based on the county populations within the Project area, the additional people that might temporarily relocate to the area would not result in a significant change. A brief decrease in the unemployment rate could occur as a result of hiring local workers for construction and increased demands on the local economy, including purchases by Vantage, its construction contractors, and workers employed on the Project. Most of these jobs would be in local trade, services, transportation, and construction industries.

Because of the small number of jobs required during operation of the Project and likely availability of local labor to fill those jobs, it is anticipated that the Project would not result in long-term effects on regional population.

Housing

Construction of the Project could affect the availability of housing in the Project area. The Project would likely have a short-term positive impact on the area rental industry through increased demand and higher rates of occupancy; however, no significant impacts on the local housing markets would be expected. Given the vacancy rates, the number of rental housing units in the area, hotel/motel rooms, and campgrounds available in the nearby communities, construction crews should not encounter difficulty in finding temporary housing. While construction activities may occur during the peak tourism/ summer construction season, temporary housing would likely be available, but may be more difficult to find, and/or more expensive to secure.

Due to the small number of jobs associated with Project operations and the likely availability of local labor to fill those jobs, operations of the Project is anticipated to result in negligible long-term effects on housing conditions in the region.

Transportation and Traffic

Construction of the proposed Project could result in minor, short-term impacts along some roads and highways due to the movement and delivery of equipment, materials, and workers.

To reduce impacts on the flow of traffic, Vantage would coordinate and limit the hours of construction, including scheduling the transportation of construction materials and the daily arrival and departure of workers to occur generally outside peak commuting hours. Multi-lane highways would be used to the extent possible for the transport of heavy, slow moving equipment to minimize impacts on traffic flow by allowing traffic to pass utilized construction equipment.

Traffic impacts at pipeline crossings would further be minimized by using a horizontal bore method at all gravel and paved road crossings, where possible. Vantage would also prepare detours in locations requiring open cuts. Where crossings are open cut, temporary measures would be available to allow for emergency crossings. During construction, Vantage would monitor and remove soil transport onto paved highways during passage to and from the construction site.

Following construction, Vantage would repair any damage to road quality caused by the transport of heavy construction equipment or other procedures related to pipeline construction to pre-existing conditions.

Public Services

The influx of non-local workers and any family members would likely be small relative to the current populations in the Project area. This would result in minor, temporary impacts on local community facilities and services, such as police, fire, and medical services. The counties and communities in the Project vicinity presently have adequate infrastructure and services to meet the needs of the non-local workers and family members. Because few or no construction workers are expected to bring family members to the Project area, an increase in the enrollments in area schools or demand for family-based services such as child care and social services is expected to be limited.

Short-term impacts on public services could include the need for localized police assistance to control traffic flow during construction activities. Also, construction-related injuries could occur as a result of unanticipated accidents or emergencies. Given that most construction workers are likely to be non-local and not have established relationships with physicians, they are likely to seek urgent care or hospital emergency room facilities for treatment of non-emergency injuries or illnesses. The anticipated

demand for police, fire, and medical services is not expected to exceed the existing capability of the infrastructure in the Project area to provide them, as the Project would result in a temporary addition of 60 to 70 workers in the area and these services are expected to be used only in emergencies. The law enforcement, fire suppression, and emergency medical response and treatment services would likely not be strained in providing services to the Project -related construction workforce, although response times to certain areas of the pipeline corridor could be lengthy.

Due to the small number of jobs associated with Project operations and likely availability of local labor to fill those jobs, Project operations are anticipated to result in negligible long-term demand for local government facilities and services.

Environmental Justice

The Project would not be expected to result in adverse impacts that would fall disproportionately on minority or low-income populations located along the Project route. Construction impacts would be restricted to the brief construction period along the proposed pipeline route, and impacts would diminish once construction activities end. These impacts would be spread equally among the counties and communities affected by the Project, and the environmental justice populations within the Project area are not meaningfully greater than the state totals. No group is greater than 50 percent of the state average. No adverse or disproportionate impacts on environmental justice populations are expected as a result of construction and operation of the Project.

2.10.3 Tax Revenues

The Project would cross the jurisdictional boundaries and service areas of Divide and Williams Counties, four public school districts, and numerous special service districts. The Project would also pass near the towns of Tioga, Alamo, and Fortuna. Construction and operation of the Project is anticipated to have beneficial impacts on local sales tax revenue. Payroll taxes would also be collected from the workers employed on the Project. The State of North Dakota would receive approximately $1.38 million in a one-time tax revenue owed due to the construction of the Project. Additional revenue would accrue from taxable expenditures by contractors and workers directly and indirectly employed by the Project. In addition, some communities along the construction corridor would realize temporary revenues from local option taxes on lodging, meals, and beverages in restaurants and bars and other convenience retail purchases as the construction workforce passes through the area. Due to the availability of temporary lodging, Williston could realize gains as well, as some workers might choose to stay in the community and commute, assuming availability of temporary housing resources. These gains would be short-term and largely beneficial. Although relatively small in magnitude for any given community, the gains in relative terms could still be important.

During operation of the Project, Divide and Williams Counties, local school districts, townships, and other local taxing jurisdictions would realize ad valorem/property tax revenues assessed on the pipeline. Over the first 15 years of operations, total ad valorem/property tax revenues, based on current tax rates, is anticipated by Vantage to exceed $3.4 million, approximately half of which would accrue to taxing entities in each county. These taxes are anticipated by Vantage to, among others, benefit local schools.

2.11 CULTURAL RESOURCES

Cultural resources include the locations of human activity, occupation, or usage that contain materials, structures, or landscapes that were used, built, or modified by people. For example, for the proposed Project, cultural resources include precontact Native American archaeological sites, historic

period farmsteads, railroads, and properties of religious and cultural significance. For the purposes of the proposed Project, field studies to identify and assess archaeological resources (sites), and historic resources (buildings, structures, objects, and districts) were conducted. Tribal field studies to identify sites of religious and cultural significance to Indian tribes were conducted for a portion of the Project route in 2012, and will be conducted in 2013 according to the provisions in the PA prepared for the Project. The PA is included as Appendix D and discussed further below. Paleontological resources are discussed in section 2.1.1.

2.11.1 Section 106 of the National Historic Preservation Act

The proposed Project is considered an undertaking under Section 106 of the NHPA. DOS is acting consistent with Section 106 of the NHPA in parallel with NEPA (FR, Volume 76, No. 7, page 1659 and Volume 76, No. 239, page 77583). Vantage provided information, analyses, and recommendations to assist DOS in its review. Vantage's contractor, Ethnoscience, assisted with conducting cultural resources investigations and consultations. Section 106 states that federal agencies must take into account the effects of a proposed undertaking on any historic properties situated within the APE and must give the ACHP an opportunity to comment on the Project. DOS, and, by way of assistance, the Project applicant, consulted with the North Dakota SHPO, federally recognized Indian tribes, other federal agencies with concurrent undertakings as a result of the Project, local governments, and other interested parties regarding the proposed undertaking and its potential effects on historic properties.

The effects to historic properties are analyzed consistent with the regulations of Section 106 as potential Project "effects." A "historic property" is defined as any district, archaeological site, building, structure, or object that is either listed, or eligible for listing, in the NRHP. For the purposes of this EA, the term "historic resource" refers to buildings, structures, objects, and districts that may or may not meet NRHP criteria of evaluation. Likewise, "archaeological resource" refers to a site that may or may not meet the criteria for NRHP listing. The term "sites of religious and/or cultural significance" refers to areas of concern to Indian tribes that may or may not be eligible for listing in the NRHP. If certain criteria are met, these locations may also be considered Traditional Cultural Properties (TCPs).

DOS, and, by way of assistance, the Project applicant, have identified historic properties that may be affected by the proposed undertaking; assessed the undertaking's effects on those properties; and engaged in consultation that seeks ways to avoid, reduce, or mitigate adverse effects on NRHP-listed or eligible properties. Potential effects in such an analysis may include, but are not limited to, destruction or alteration of all or part of a property; isolation from or alteration of its surrounding environment; introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting; transfer or sale of a federally owned property without adequate conditions or restrictions regarding preservation, maintenance, or use; and neglect of a property resulting in its deterioration or destruction.

Review consistent with Section 106 is referred to as a process because the discovery, evaluation, and mitigation of effects on historic properties involve numerous parties and tasks. The Section 106 process is not complete for the proposed Project and would continue under the PA signed by DOS, the ACHP, the North Dakota SHPO, and invited Indian tribes. DOS has received no comments specific to cultural resources issues on the Project in response to the NOI or the EA. The results of surveys conducted to date and summary of cultural resources identified is discussed in section 2.11.4 below.

National Register of Historic Places

Not all archaeological resources, historic resources, or sites of religious or cultural significance are considered historic properties under Section 106. To be designated as a historic property, the resource must be listed, or eligible for listing, in the NRHP. To be considered eligible, properties must first retain integrity of location, materials, setting, design, association, workmanship, and feeling, and be at least 50 years old. The criteria (36 CFR 60.4 [a–d]) used to evaluate the significance of a resource are as follows:

a) it is associated with events that have made a significant contribution to the broad patterns of American history; or

b) it is associated with the lives of past significant persons; or

c) it embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d) it has yielded or may be likely to yield, information important in history or prehistory.

The analysis in the EA provides a summary of the cultural resources that have been reported to DOS to date for the proposed Project. This includes cultural resources assessed as being eligible and ineligible for listing in the NRHP, and cultural resources for which NRHP eligibility has not been evaluated. The reported cultural resources are divided into three main temporal groupings: precontact period, historic period, and multi-component. Precontact resources are sites that contain material evidence of Native American activities before Europeans entered the proposed Project area. Examples of precontact sites include, but are not limited to stone features, such as stone rings, cairns, alignments, effigies, and utilized rocks. Historic period resources can include historic Native American sites but generally reflect Euro-American activities of the last 250 years. The historic sites are barrow pits, a church and cemetery, a coal mine, farmsteads/homesteads, an outbuilding and corral, trash scatters, and two railroad lines. Multi-component resources are locations where both Historic period and precontact cultural material is present.

Historic properties can include sites of religious or cultural significance (including TCPs) that meet the NRHP criteria of eligibility. National Register Bulletin 38 defines TCPs as locations that embody the "beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices" (Parker and King 1990, revised). It should be noted that the ACHP is currently reassessing the definition of TCPs, especially as the term relates to large-scale properties of multiple linked features that are better described as Traditional Cultural Landscapes. The ACHP sponsored a forum in August 2011 that resulted in an action plan to address the challenges of defining and protecting Traditional Cultural Landscapes (ACHP, 2011). DOS has consulted and would continue to consult with American Indian tribes to identify, evaluate, and mitigate potential effects to properties with religious or cultural significance to the tribes. The summary of tribal consultation is provided in section 2.11.3.

2.11.2 Agency Consultations

DOS has consulted with the appropriate state, tribal, and federal agencies regarding the proposed undertaking. The SHPO is appointed by each state to protect the interests of its citizens with respect to

issues of cultural heritage. Section 101(b)(3) of the NHPA provides each SHPO a prominent role in advising the responsible federal agencies and ACHP. In addition to the SHPO, the lead federal agency works with state and local governments, private organizations, and individuals during the initial planning and development of the proposed Project.

State Historic Preservation Office Consultation

Vantage contacted the North Dakota SHPO on August 11 and 12, 2010. The North Dakota SHPO participated in a Project meeting among state agencies on August 18, 2010. The North Dakota SHPO also attended a federal and state agency meeting held in Bismarck on December 7, 2010. Vantage has consulted with the North Dakota SHPO regarding the APE, field survey methodology, recording practices, and other regulatory topics throughout the Class III cultural resources inventory planning, field survey, and reporting effort.

As discussed in section 1.3, DOS issued the *Notice of Intent to Prepare an Environmental Assessment and Request for Comments on Environmental Issues, and to Initiate Consultation Under Section 106 of the National Historic Preservation Act for the Proposed Vantage Pipeline Project* for the Project to the North Dakota SHPO, as well as other agencies, in August and December 2011. In a letter to the North Dakota SHPO dated December 16, 2011, DOS authorized the Project applicant, Vantage, consistent with 36 CFR 800.2(c)(4), to consult directly with the state agency. Vantage submitted the Class III cultural resources inventory report to the North Dakota SHPO on December 29, 2011. Details regarding the areas surveyed and report findings are discussed in section 2.11.4. On January 11, 2012, the North Dakota SHPO submitted a letter to DOS stating that it concurred with the Class III cultural resources inventory report's "no historic properties affected" and "no significant sites affected" determinations.

Representatives of the North Dakota SHPO attended a March 21, 2012 tribal consultation meeting in New Town (see section 2.11.3), and participated by telephone in the July 11, 2012 tribal consultation meeting in Minot, North Dakota. The North Dakota SHPO also attended tribal consultation meetings on January 14 and February 8, 2013 held in Bismarck, North Dakota.

The North Dakota SHPO assisted with preparation of the PA. The North Dakota SHPO reviewed and commented on an outline of the PA, which was distributed by DOS in July 2012, and four subsequent draft versions of the PA. The agency also participated in the PA collaborative editing and writing sessions at the February 8, 2013 meeting hosted by DOS in Bismarck. The North Dakota SHPO signed the final PA on April 9, 2013, and as provided in the provisions, will continue to provide guidance to the Project.

Advisory Council of Historic Preservation Consultation

On January 28, 2012 DOS contacted a representative of the ACHP, provided background information about the Project, and identified those American Indian tribes with whom they had consulted to date. In July 2012, DOS consulted with the ACHP regarding the preparation of a PA to address the requirements of Section 106, notably the identification of historic properties of religious and cultural significance to Indian tribes. The ACHP attended two tribal consultation meetings on January 14 and February 8, 2013 in Bismarck, North Dakota. The ACHP also formally entered consultation for the Project by sending a letter to DOS Secretary John F. Kerry stating their intention to enter the consultation process. The ACHP is a party to the PA (Appendix D).

North Dakota Department of Transportation

Vantage contacted the NDDOT on August 23, 2010 to inform it of the Project. The NDDOT stated that it would not be a regulatory agency for the Project and, therefore, would not participate in the Section 106 process.

U.S. Fish and Wildlife Service

The FWS participated in the August 18, 2010 meeting of state agencies discussed above. Vantage contacted the FWS Region 6 Dakotas Zone Archaeologist on August 23, 2010 to discuss crossing FWS easements during the Class III field survey. The FWS issued an Archaeological Resources Protection Act (ARPA) permit to Vantage's cultural resources consultant Ethnoscience on September 8, 2010 and extended the permit June 2011 to conduct field surveys on FWS easement land. The results of the field surveys are included in the Class III survey report.

Public Outreach

Vantage reported as part of its Class III survey report that on July 6, 2011 it contacted a local historian regarding the Bethel Lutheran Cemetery, which is located near the Project, and inquired about the possibility for burials to be located outside of the church grounds. Vantage further reported that Ms. Stepanek stated that there are no records of burials outside the church cemetery.

2.11.3 Tribal Consultations

Section 106 recognizes the importance of consulting with American Indian tribes when federal undertakings occur. Specifically, 36 CFR 800.2(c)(2)(ii) notes: "Section 101(d)(6)(B) of the NHPA requires the agency official to consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural importance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of the historic property." In addition, 36 CFR 800.2(c)(2)(ii)(B) says the "Federal Government has a unique legal relationship with Indian tribes set forth in the Constitution of the United States, treaties, statutes, and court decisions. Consultation with Indian tribes should be conducted in a sensitive manner respectful of tribal sovereignty. Nothing in this part alters, amends, repeals, interprets or modifies tribal sovereignty, any treaty rights, or other rights of an Indian tribe, or preempts, modifies or limits the exercise of any such rights."

Consistent with 36 CFR 800, DOS has engaged American Indian tribes in government -to - government consultation (see below). Vantage also contacted Indian tribes as part of their efforts to assist DOS in gathering information. Both DOS and Vantage as the Project applicant would continue to work with American Indian tribes who are interested in the Project.

In an August 17, 2010 letter, Vantage contacted the following American Indian tribes to inform them of the Project: the Rosebud Sioux Tribe, the White Earth Band of the Minnesota Chippewa Tribe, the Lower Sioux Indian Community of Minnesota, the Crow Creek Sioux Tribe, the Standing Rock Sioux Tribe, the Sisseton-Wahpeton Oyate, the Yankton Sioux Tribe, the Lower Brule Sioux Tribe, the Northern Cheyenne Tribe, the Fork Peck Assiniboine and Sioux Tribes, the Upper Sioux Community of Minnesota, the Flandreau Santee Sioux Tribe, the Oglala Sioux Tribe, the Turtle Mountain Band of Chippewa Indians, the Crow Tribe of Montana, the Spirit Lake Tribe, the Cheyenne River Sioux Tribe, and the Three Affiliated Tribes of the Fort Berthold Reservation. The letter introduced the Project, provided a Vantage-produced color brochure describing the Project, and reported that a cultural resources reconnaissance survey would be completed along the Project route.

Vantage asked the Fork Peck Assiniboine and Sioux Tribes and the Three Affiliated Tribes of the Fort Berthold Reservation to provide monitors during the Class III field inventory surveys. Vantage explained that although numerous tribes have traditional ties to the region, these two tribes occupy reservations closest to the Project area. Tribal monitors accompanied the survey crews, and provided cultural and historic information for several of the recorded archaeological sites.

On December 15, 2011, DOS contacted the same Indian tribes that Vantage contacted and one additional tribe, the Santee Sioux Nation of Nebraska. DOS's letter was sent to the tribal council chairperson for each tribe and, if applicable, the Tribal Historic Preservation Office (THPO). The letter described the Project and DOS's role, and invited government-to-government consultation. On December 20, 2011, the THPO for the Yankton Sioux Tribe responded to DOS's letter, asked to be a consulting party to the Project, and requested a copy of the Class III inventory survey report. At the request of DOS, Vantage provided the report to the Yankton Sioux THPO on December 30, 2011.

In January 2012, DOS received a return mailer to its government-to-government consultation letter from the Standing Rock Sioux Tribe's THPO. The mailer noted that the Standing Rock Sioux Tribe would like to participate in government-to-government consultation regarding the Project, and that it traditionally occupied lands within or close to the Project, the Project would affect its native culture, and the Project would affect archaeological sites, historic structures, or places with religious or traditional cultural significance.

Follow-up telephone calls were made to tribes between January 23 and 25, 2012. In some cases, if telephone contact was not successful, emails were sent to THPO officers. During the course of follow-up phone calls, the Northern Arapaho Tribe was added to the invitation list on February 14, 2012 at the request of another tribe. Two tribes, the Lower Brule Sioux Tribe and the Lower Sioux Indian Community of Minnesota, stated that they were not interested in consulting but would like to remain on the Project mailing list. In an email correspondence, the Fort Peck Assiniboine and Sioux Tribes stated that they have concerns about the Project area and are interested in consulting with DOS. The Rosebud Sioux Tribe responded that they are interested in consulting on the Project. A representative of the Sisseton-Wahpeton Oyate sent an email explaining that he is the current THPO for the Sisseton-Wahpeton Oyate, and he is interested in consulting on the Project. Also, a representative of the Turtle Mountain Band of Chippewa called and requested the survey report and shapefiles of the survey area, and stated that he would conduct ethnographic research for his tribe within the area of the Project.

On February 14, 2012, DOS issued a letter to tribal leaders and, if available, THPO representatives from the 19 tribes inviting them to attend a conference call on March 1, 2012 hosted by DOS. The intent of the call was to solicit comments and concerns about the Project, and consider the need to have face-to-face meetings and the need to conduct a study for historic properties of religious and cultural significance to an Indian tribe. In addition to the letter, DOS attempted to personally contact each tribe via telephone or email to gather updated contact information and provide a reminder about the conference call. The March 1, 2012 telephone conference call hosted by DOS was attended by representatives from the Sisseton-Wahpeton Oyate, the Standing Rock Sioux Tribe, the White Earth Band of the Minnesota Chippewa Tribe, the Cheyenne River Sioux Tribe, the Yankton Sioux Tribe, and the Turtle Mountain Band of Chippewa Indians, as well as representatives from DOS's independent third-party contractor and Vantage and its contractors. NEPA Compliance Officer Mr. Alexander Yuan and Director of the Office of Environmental Policy Mr. George Sibley represented DOS. During the call, the tribes expressed dissatisfaction that government-to-government consultation was not started sooner; concern about the cultural resources studies completed to date and the lack of tribal input; interest in a face-to-face meeting with DOS; and interest in conducting a study for historic properties of religious and cultural significance to an Indian tribe. During the conference call, DOS committed to attending a meeting in North Dakota in late March 2012.

Vantage organized and sponsored tribal consultation meetings in New Town, North Dakota on March 21 and 22, 2012. DOS sent invitations to the meetings to the 19 consulting tribes on March 9, 2012 and made follow-up phone calls and emails. During these calls, a tribal member requested that the Cheyenne and Arapaho be included in consultation; an invitation to consult and attend the March 21 and 22 meetings was sent to their respective Governor and THPO.

Representatives from the Crow Tribe of Montana, Cheyenne River Sioux Tribe, Crow Creek Sioux Tribe, Fort Peck Assiniboine and Sioux Tribes, Northern Cheyenne Tribe, Sisseton-Wahpeton Oyate, Three Affiliated Tribes of the Fort Berthold Reservation, Standing Rock Sioux Tribe, and Yankton Sioux Tribe, as well as the North Dakota SHPO attended the meetings in New Town, North Dakota held at the 4 Bears Casino and Lodge on the Fort Berthold Reservation. Mr. George Sibley represented DOS and was accompanied by representatives of DOS's independent third-party contractor. Mr. David Schmunk and Mr. Terry Killackey represented Vantage; Ms. Lynelle Peterson of Ethnoscience attended as Vantage's cultural resources contractor. On March 21, Vantage began the information portion of the meetings by explaining how the proposed pipeline would transport ethane to industrial facilities in Alberta, Canada. Vantage's contractor, Ethnoscience, spoke about the cultural resources inventories, and explained that the survey corridor for the Class III inventory was 300 feet wide to allow for avoidance where archaeological sites were present and further explained that tribal monitors from the closest reservations to the Project area were invited to accompany the field survey. After a question and answer period, the information session ended and the tribal representatives caucused among themselves.

The meeting reconvened on March 22. Tribal representatives stated that they believed DOS should have consulted sooner to allow the tribes an opportunity to participate in pipeline routing to avoid sensitive Native American sites. The tribal representatives also expressed concern that the Class III inventory report included sensitive information provided by tribal monitors.

Tribal representatives formally requested a study for historic properties of religious and cultural significance. It was noted by the tribes that the archaeologists who conducted the Class III cultural resources inventory may not recognize their important sites. Tribal representatives recommended that an experienced and familiar surveyor be hired to conduct the survey in spring 2012. Vantage agreed to sponsor the study for historic properties of religious and cultural significance to an Indian tribe and a follow-up phone call to organize the logistics for such a study was planned, with consideration for a pre-survey visit to the Project area.

DOS sent a letter to the tribal government leader and the THPO for each of the consulting tribes on April 3, 2012, recapping the March meetings in New Town, North Dakota and inviting participation in the upcoming tribal survey.

In May 2012, DOS sent a CD containing the EA to the tribal government leader and the THPO for each of the consulting tribes. To date, DOS has not received any comments from the tribes regarding the EA.

As agreed to during the March meetings in New Town, North Dakota, the Vantage-sponsored tribal survey was conducted by the company Makoche Wowapi between June 2 and June 17, 2012. After the survey was completed, DOS hosted a conference call on June 27, 2012 with the tribes who assisted with planning the tribal survey and the Makoche Wowapi Project Manager to discuss issues surrounding the tribal survey. During the call, the tribes invited DOS to visit the Project area and hear their concerns.

In response to the invitation extended to DOS during the June 27, 2012 conference call, DOS traveled to North Dakota and visited the Project area on July 10, 2012. Representatives of the Standing Rock Sioux Tribe and the Sisseton-Wahpeton Oyate escorted DOS to select locations. DOS also hosted a

tribal consultation meeting in Minot, North Dakota on July 11, which was attended by representatives of the Standing Rock Sioux Tribe and the Three Affiliated Tribes, with representatives from the Yankton Sioux Tribe, the Sisseton-Wahpeton Oyate, and the North Dakota SHPO participating on a conference call line. The parties did not agree on the adequacy of the tribal surveys, or on a resolution to the disagreements regarding survey work.

The President of the Rosebud Sioux Tribe sent a letter dated July 17, 2012 to DOS inviting the agency and Vantage to attend a Tribal Council meeting on July 25, 2012. DOS responded in a July 23, 2012 letter that it was unable to attend, but was available to consult via telephone. Representatives from the Rosebud Sioux Tribe attended tribal consultation meetings in January and February 2013 (see below).

The Chairman of the Crow Creek Sioux Tribe of Fort Thompson, South Dakota sent a letter dated June 20, 2012 to DOS, inviting the agency to consult with the Tribe regarding potential impacts to a sensitive tribal site along the Vantage Pipeline Project route. DOS responded by requesting additional information in a July 30, 2012 letter. Representatives from the Crow Creek Sioux Tribe attended tribal consultation meetings in January and February 2013 (see below).

On July 27, 2012, DOS issued to the consulting tribes the outline of a PA and requested comments and input for preparation of the final PA. The Upper Sioux Community of Minnesota responded that they had no comments on the outline. The Santee Sioux Nation THPO provided several comments, including a request for tribal monitoring and a request for tribal notification if any human remains are discovered during project activities.

On August 24, 2012, DOS issued to the consulting tribes the Draft PA that stipulated the actions of all parties in order to identify, evaluate, and avoid impacts on any historic properties that had not been identified to date. The Rosebud Sioux Tribe THPO commented indirectly by copying DOS on an email to the ACHP; the Tribe requested signatory status to the PA, and additional time to review the Draft PA. The Sisseton-Wahpeton Oyate THPO commented by telephone, expressing dissatisfaction with DOS's tribal consultation efforts. The Tribal Archaeologist for the Standing Rock Sioux Tribe expressed dissatisfaction with the Draft PA, requested signatory status for the tribe, and requested additional time to review the Draft PA. The Fork Peck Assiniboine and Sioux Tribes THPO expressed in a phone call frustration with DOS's government-to-government consultation and dissatisfaction with the Draft PA because it believed it did not include tribal input.

DOS revised the Draft PA according to comments received by consulting parties, and reissued it on January 9, 2013 for review and comment. A representative of the Standing Rock Sioux Tribe commented that his tribe does not recognize the discussions and meetings referenced in the PA as government-to-government consultation because his tribal government was not involved. A representative of the Yankton Sioux Tribe commented that stipulations regarding qualifications for tribal monitors should state that each tribe will establish the appropriate qualifications for their own tribe. The Oglala Sioux Tribe provided several comments to the January 9, 2013 version of the PA, including a request that DOS will assure access to the Project route for tribal surveys, and a request to add references in the PA to Presidential EOs that address tribal consultation or sacred tribal sites.

DOS hosted a government-to-government tribal consultation meeting on January 14, 2013 in Bismarck, North Dakota. The main topic of this meeting was the PA and tribal surveys. The North Dakota SHPO and the ACHP attended this meeting, along with representatives of the Apsaalooke Crow Tribe, Cheyenne River Sioux Tribe, Crow Creek Sioux, Fort Peck Assiniboine and Sioux Tribes, Northern Cheyenne Tribe, Oglala Sioux Tribe, Rosebud Sioux Tribe, Standing Rock Sioux Tribe, Three Affiliated Tribes, and the Yankton Sioux Tribe.

DOS hosted a government-to-government tribal consultation meeting on February 8, 2013 in Bismarck, North Dakota. The topic of this meeting was the PA, which was collaboratively reviewed, edited, and written by attendees. The North Dakota SHPO and the ACHP attended this meeting, along with representatives of the Fort Peck Assiniboine and Sioux Tribes, Three Affiliated Tribes, Yankton Sioux Tribe, Cheyenne River Sioux Tribe, Northern Cheyenne Tribe, Sisseton-Wahpeton Oyate, Rosebud Sioux Tribe, Turtle Mountain Band of Chippewa Indians, and Standing Rock Sioux Tribe.

DOS made revisions to the PA following the February 8, 2013 meeting and in response to further comments from the North Dakota SHPO. DOS distributed the March 15, 2013 version of the PA to the consulting parties, including Indian tribes. No comments were received to this version of the PA. DOS distributed a final revised version of the PA dated April 3, 2013 for a final review and a comment period. On April 8, 2013, the PA was signed by DOS and distributed to the other signatory parties for signature between April 9 and 10, 2013.

In addition to the tribal consultations discussed above, in an August 9, 2012 phone call, Dr. Carson Murdy, the Great Plains Regional Archaeologist for the Bureau of Indian Affairs contacted DOS. Dr. Murdy requested information about the Project location so that he could determine if there was any American Indian trust assets involved. DOS provided the Class III Ethnoscience survey report (Mandelko, et al., 2011), including maps, and the Turtle Mountain Band's ethnographic study (Ferris, May 2012).

2.11.4 Cultural Resources Surveys

Vantage has conducted Class III cultural resources inventory surveys of all currently identified Project locations. The survey covered approximately 150 linear miles using the 300-foot-wide corridor for the proposed pipeline route, and other non-linear project locations, totaling approximately 5,466 acres. This total includes the survey of alternative pipeline routes that have since been abandoned. The Class III cultural resources report specifies that the inventory survey did not consider TCPs or Traditional Cultural Landscapes.

The APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). For the purposes of the proposed Project and Section 106 of the NHPA, the APE consists of a 300-foot-wide survey area that includes a 70-foot-wide construction corridor and a 30-foot-wide permanent right-of-way. The 300-foot-wide corridor would allow for minor adjustments or route variations as needed. ATWS, access roads, and ancillary facilities (e.g., yards) that lie outside of the proposed construction corridor are also part of the proposed APE. The APE for indirect effects was defined as 0.25 mile around the same Project locations.

2.11.4.1 Cultural Resources Overview and Class III Survey Results

Vantage conducted a literature review of the previously recorded archaeological and historic resources, and previously conducted inventory surveys for the Project APE. This review revealed that three archaeological sites, two segments of railroad, and one standing structure were previously recorded within the Project's 300-foot-wide corridor. The following describes the results of the Class III cultural resources survey, site recommendations, and North Dakota SHPO consultation.

Vantage recorded 79 archaeological sites and 19 isolated finds during the Class III cultural resources inventory. Of the 79 sites, 50 are precontact, 22 are historic, and 7 contain both precontact and historic components. The precontact sites are lithic scatters and stone features, such as stone rings, cairns,

alignments, effigies, and utilized rocks. The historic sites are barrow pits, a church and cemetery, a coal mine, farmsteads/homesteads, an outbuilding and corral, two railroad lines, and trash scatters.

The 19 isolated finds, which range from single precontact lithic tools to isolated farm machinery parts, are not considered eligible for listing on the NRHP because the objects do not have any archaeological context and offer no potential for additional study. They are not studied beyond their recordation.

Vantage recommends that 17 of the total 79 sites are not eligible for listing on the NRHP, and that 2 sites are eligible for listing. The two sites recommended as eligible for the NRHP are the Bethel Lutheran Church and Cemetery (32WI0887) and a segment of the Soo Line railroad (32DV0057). The NRHP eligibility for the remaining 60 sites is undetermined. To avoid adverse impacts on the NRHP-unevaluated archaeological sites, Vantage would provide a minimum 45-foot buffer and/or has realigned the construction centerline, narrowed the construction workspace, and/or rerouted the construction corridor. Vantage has also committed to using tribal and environmental monitors during construction.

The original pipeline route was moved so that the Bethel Lutheran Church and Cemetery would be more than 100 feet from the pipeline centerline. Vantage would use a horizontal bore to install the pipeline under the Soo Line railroad near MP 64 in order to avoid adverse impacts to the site. Because use of the horizontal bore method would avoid the site, additional avoidance treatment measures are not recommended by DOS. Vantage would also horizontal bore beneath a section of the Great Northern Railroad near MP 31, which is not recommended as eligible for NRHP listing at this time.

Vantage proposes to construct eight MLBVs as part of the Project. Vantage has recommended a 0.25-mile APE around each MLBV site to assess potential visual impacts on historic properties. Vantage recommended in their Class III inventory report that no NRHP-eligible sites are located within this APE, and there would be no visual impacts on historic properties at the MLBV locations.

Vantage submitted to DOS the Class III inventory survey report in September 2011. In January 2012, Vantage submitted a revised version of the report that included reroutes and comments from DOS and its independent third-party contractor. Vantage submitted the revised inventory survey report to the North Dakota SHPO on December 30, 2011. As discussed in section 2.11.2, the North Dakota SHPO concurred that if the proposed Project follows the recommendations of the cultural resources report, no historic properties would be affected by the proposed Project. This determination does not apply to TCPs, which were not considered in Vantage's Class III cultural resources inventory.

2.11.4.2 Traditional Cultural Properties, Traditional Cultural Landscapes Study

Vantage sponsored a tribal survey to locate and identify historic properties of religious and cultural significance to an Indian tribe or Traditional Cultural Landscapes in the uncultivated portions of the Project corridor. Makoche Wowapi, the contractor selected by the attending tribes at the March 20-21, 2012 meetings (as discussed in section 2.11.3), conducted a field survey between June 2 and June 17, 2012. Makoche Wowapi reported that they did not have access to land parcels that required survey and they considered their work incomplete. DOS hosted conference calls and face-to-face meetings with tribal representatives and Vantage to discuss the need for additional tribal surveys to identify properties of religious and cultural significance to Indian tribes, and subsequently developed the PA in consultation with the ACHP, North Dakota SHPO, Vantage, and Indian tribes. The PA provides for additional Vantage-sponsored tribal surveys, as well as tribal monitoring during construction. Tribes have expressed concerns about the sensitive nature of traditional tribal sites and of information they might share about traditional practices. The PA addresses confidentiality regarding tribal information, and includes a provision for returning tribal information to each tribe who provided it at the conclusion of the Project.

Vantage also sponsored an ethnographic study of the Turtle Mountain Band of Chippewa. This Tribe, which has a reservation by Turtle Mountain near the Canadian border in northeastern North Dakota, has historically documented ties to the Project area, including land allotments granted to individual tribal members as part of a 1904 land settlement. The study did not identify any TCPs or Turtle Mountain land allotments in the Project APE (Ferris, 2012).

2.11.4.3 Pending Studies

Cultural resources surveys for any changed locations of Project facilities would be reported to DOS. These reports would be reviewed by DOS and then forwarded to the applicable consulting parties consistent with 36 CFR 800.

Vantage would sponsor and organize a tribal field survey of the unbroken areas of the Project route, consistent with the provisions in the PA. This survey would be conducted before Project construction and reported to consulting parties. The report would be reviewed by DOS and forwarded to the consulting parties for their review, consistent with the provisions in the PA.

2.11.5 Public Involvement

Consistent with 36 CFR 800.2(d)(1–3), DOS has followed ACHP guidance in its efforts to seek the views of the public in the Section 106 process through the NEPA process. As stated previously, DOS placed notices in the FR. Additionally, DOS provided direct mailings of its NOI to stakeholders through mailing lists that included over 200 individuals and organizations.

With the exception of correspondence received from the North Dakota SHPO and Indian tribes discussed in sections 2.11.2 and 2.11.3, no comments have been received relating to the protection of historic properties and the Section 106 consultation process.

2.11.6 Unanticipated Discovery Plan

Unanticipated discovery plans are approved by DOS for the proper response and treatment of any discoveries that are made during construction. Discoveries can be buried archaeological resources, or human remains. The main topics of an unanticipated discovery plan are the circumstances when work is stopped and resumed, and the proper chain of contact when a discovery is made. Vantage would implement these plans in the event that unanticipated cultural materials or human remains are encountered during the construction phase of the proposed Project.

Vantage has prepared an unanticipated discovery plan (included as part of the PA in Appendix D), referred to as the Cultural Resources Contingency Plan (also referred to as the Unanticipated Discoveries Plan). The PA also contains provisions to deal with unanticipated discoveries made during Project construction.

2.11.7 On-going Section 106 Process

The Section 106 process for the Project is not complete. Additional studies for historic properties of religious and cultural significance to an Indian tribe, a tribal monitor plan, site treatment plans, and other documentation are pending. Vantage would submit to DOS all cultural resources Project reports, plans, correspondence, and other documentation as required. The PA, which DOS prepared in consultation with the ACHP, North Dakota SHPO, Vantage, and the consulting American Indian Tribes (see sections 2.11.2 and 2.11.3) and signed on April 8, 2013, stipulates the actions of all parties in order to adhere to the requirements of Section 106 of the NHPA throughout the duration of the Project. DOS

2.12 AIR QUALITY

2.12.1 Environmental Setting

As discussed in section 1.5, DOS has determined that a heater associated with the Tioga Gas Plant modifications would be a connected action to the proposed Project for the purposes of this NEPA review consistent with 40 CFR 1508.25(a)1. The Tioga Gas Plant is located in Tioga, North Dakota and, due to its proximity to the Project, the environmental setting of the connected action is similar to that of the proposed Project as described below.

Air quality is influenced not only by pollutant emissions but also the meteorology and climate of the region in which they are emitted or transported. The Project would be located in northwest North Dakota, within a semiarid to continental climate typified by low to moderate precipitation, hot summers, and winter temperatures cold enough to support a fixed period of annual snow cover. The closest climate measurements to the Project area were recorded at Tioga, North Dakota (1905–2010) at an elevation of 2,260 feet above mean sea level, as summarized in table 2.12.1-1 (High Plains Regional Climate Center, 2010).

Wind characteristics in the Project area can affect the dispersion and transportation of air pollutants. These wind characteristics include wind direction, speed, and atmospheric stability. High frequency of a particular wind direction with low wind speeds and stable atmosphere can result in poor air pollutant dispersion. Table 2.12.1-2 summarizes the wind characteristics in the Project area based on the closest wind measurement data collected at the Williston Airport in Williston, North Dakota. There is no dominant wind direction, wind speeds vary but are generally moderate with few extremely low wind speed conditions, and atmospheric stability is generally neutral.

TABLE 2.12.1-1

Temperature, Precipitation, and Snowfall at Tioga, North Dakota (1905-2010)

Season	Month	Average Temperature Range (° F)	Average Total Precipitation (inches)	Average Total Snowfall (inches)
Spring	March	13.6-34.9	0.5	5.1
	April	27.9-52.6	1.1	3.6
	May	39.5-65.8	1.9	0.9
	Total Spring Average	27.0-51.1	3.5	9.6
Summer	June	49.3-74.6	2.8	0.0
	July	53.8-81.5	2.1	0.0
	August	51.6-81.4	1.7	0.0
	Total Summer Average	51.6-79.2	6.6	0.0
Fall	September	40.5-68.7	1.4	0.4
	October	28.8-54.5	0.8	2.3
	November	14.6-35.1	0.5	4.9
	Total Fall Average	28.0-52.8	2.7	7.7
Winter	December	1.6-21.8	0.5	6.2
	January	-4.1-16.4	0.5	6.3
	February	1.6-22.5	0.4	5.0
	Total Winter Average	-0.3-20.2	1.3	17.5
Total Annual Average		26.5-43.1	3.5	8.7

TABLE 2.12.1-2

Wind Direction Frequency Distribution for Williston, North Dakota

Parameter/Value	Percent of Occurrence
Wind Direction	
NE-NNW	26.2
NW-WSW	28.5
SW-SSE	26.8
SE-ENE	16.3
Wind Speed (MPH)	
0-4.0	5.3
4.0-19.0	86.5
Greater than 19.0	8.1
Stability Class	
A (Unstable)	0.16
B	2.50
C	10.64
D (Neutral)	53.92
E	14.99
F (Very stable)	17.79

Source: Williston, North Dakota meteorological data collected 1988-1992.

The EPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants, based on health effects studies, to protect human health (primary standards) and public welfare (secondary standards). The EPA set NAAQS for the following air contaminants designated "criteria pollutants": nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), sulfur dioxide (SO_2), lead (Pb), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$). The NDHD, Air Quality Division (NDDAQ) regulates air pollutant levels in the North Dakota pursuant to North Dakota Air Pollution Control Rules, Chapter 33-14-02. In addition to adopting the NAAQS, NDDAQ has set its own ambient air quality standards.

The Project area is designated attainment or unclassifiable for all criteria pollutants. Site-specific air quality monitoring data are not available for the Project area; however, ambient air pollutant monitoring has been conducted in northwestern North Dakota. A summary of the most representative monitoring data in the vicinity of the Project is listed in table 2.12.1-3.

TABLE 2.12.1-3

Monitored Concentrations of Air Pollutants in the Region

Pollutant [a]	Averaging Period	Regional Background Concentration (µg/m^3)	NDDAQ AAQS (µg/m^3)	NAAQS (µg/m^3)
SO_2	Annual	2.6	60	80
	24-hour	15.7	260	365
	3-hour	57.6	715	1,300
	1-hour	112.7	- -	196
NO_2	Annual	1.9	100	- -
	1-Hour	41.1	- -	188
PM_{10}	24-hour	30	150	150
$PM_{2.5}$	Annual	5.2	15	15
	24-hour	17.3	35	35
CO	8-hour	1.2	10,000	10,000
	1-hour	6.5	40,000	40,000
O_3	8-hour	115.6	147	147

[a] SO_2, NO_2, and PM_{10} concentrations from Burke County monitoring site, most recent available data year, 2008.
$PM_{2.5}$ concentrations from McKenzie County monitoring site, most recent available data year, 2006.
CO concentrations from only North Dakota CO monitoring site of record available on AIRS, located in Cass County, data year 2008.
O_3 concentration is fourth highest 8-hour concentration from Burke County monitoring site, 2008.

O_3 is not typically emitted directly to the atmosphere but instead is formed in atmospheric reactions between oxides of nitrogen and volatile organic compounds (VOCs) in the presence of sunlight. Similarly, not all $PM_{2.5}$ is emitted directly to atmosphere; it is also formed by oxides of nitrogen and sulfur reacting with chemicals in atmosphere to form sulfate and nitrate aerosols (e.g., ammonium sulfate or ammonium nitrate). As such, nitrogen oxide (NOx) and VOCs are regulated pre-cursors to O_3 and NO_x and SO_2 are regulated precursors to $PM_{2.5}$.

In addition to criteria pollutants, the EPA also regulates hazardous air pollutants (HAPs) and greenhouse gases (GHGs). HAPs are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects (EPA, 2009). The EPA regulates GHGs as the sum of CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. EPA has found that concentrations of these GHGs in the atmosphere threaten the public health and welfare of current and future generations.

Air pollutants would be generated by the Project during construction and operation of the proposed facilities. Additionally, operation of the heater at the Tioga Gas Plant, which has been identified as a connected action to the Project, would also produce air pollutants. Section 2.12.2 below discusses the impact of the connected action on air quality.

2.12.2 Construction and Operation Impacts and Mitigation

Proposed Action

Emissions associated with construction and installation of the pipeline would include fossil-fuel combustion emissions and fugitive dust. Emissions associated with construction activities generally include: 1) exhaust emissions from construction equipment, 2) fugitive dust emissions associated with construction vehicle movement, and 3) fugitive dust associated with trenching, backfilling, and other earth-moving activities. The exhaust emissions would depend on the equipment used and the hours of

operation. Tables 2.12.2-1 and 2.12.2-2 summarize the estimated construction emissions associated with the Project.

TABLE 2.12.2-1

Construction Air Emissions Associated with the Vantage Pipeline Project

Source Type	Pollutant	Emission Rate (tons per year)
On-Road Vehicles	CO	1.12
	SO_2	0.007
	NOx	1.55
	$PM_{10}/PM_{2.5}$	0.049 / 0.039
	CO_2e	388
Off-Road Vehicles and Equipment	CO	3.5
	SO_2	0.03
	NOx	8.28
	$PM_{10}/PM_{2.5}$	0.78 / 0.75
	CO_2e	1,617

Note: On-road criteria pollutant emissions and CO_2e emissions calculated based on emission factors from EPA MOBILE6C and Transport Canada. Off-road criteria pollutant and CO_2 emissions calculated based on emission factors from EPA Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition (EPA, 2009).

TABLE 2.12.2-2

Fugitive Dust Emissions from Construction of the Vantage Pipeline Project

Source Type	Pollutant	Emission Rate (tons per day)
Construction Activities	PM_{10}	0.045
	$PM_{2.5}$	0.025
Wind Erosion of Disturbed Areas	PM_{10}	7.16
	$PM_{2.5}$	1.07

Note: Emissions calculated using emission factors from EPA's Compilation of Air Pollutant Emission Factors (AP-42).

In addition to the emissions summarized above, emissions may result from small (22,000 British thermal units per hour) propane heaters used to warm personnel during construction activities.

Emissions from construction would be controlled to the extent required by state and local agencies (e.g., any special conditions of the NDPSC listed in the Certificate of Corridor Compatibility and Route Permit applicable to air quality), while tailpipe emission from gasoline and diesel powered construction equipment would be subject to federal mobile source regulations, such as 40 CFR 85 – Control of Air Pollution from Mobile Sources. Vantage has also committed to using sufficient measures to ensure that appropriate levels of air quality are maintained during construction and that emissions from construction-related activities do not significantly affect local or regional air quality.

Based on the proposed mitigation and the local and intermittent nature of the construction emissions, these emissions are not expected to impact local air quality attainment status.

Because the Project does not include combustion-driven compressor stations, the emissions from operating the Project would be minimal. The Project would emit regulated pollutants from maintenance activities (light duty tailpipe emissions and combustion emissions from small propane heaters used for personal warmth) and fugitive emissions from valves and flanges.

Emissions from pipeline maintenance would be primarily from on-highway mobile source travel to various locations along the pipeline route. There would also be emissions associated with aircraft use for aerial surveillance of the pipeline, which would occur one to two times per month. Internal combustion engine emissions would consist of emissions of CO, SO_2, NOx, $PM_{10}/PM_{2.5}$, and VOCs.

Localized, periodic, and temporary use of access roads during operations would result in infrequent and minor impacts on air quality associated with fugitive dust. GHGs, which include CO_2, CH_4, and N_2O, would also be produced from infrequent on-road mobile source travel, but would be subject to federal emissions standards.

A summary of the criteria air pollutants and GHGs emitted during operation of the pipeline is provided in table 2.12.2-3.

TABLE 2.12.2-3

Criteria Air Pollutants and Greenhouse Gas Emissions During Operation of the Vantage Pipeline Project

Source	CO (tons/year)	NO_x (tons/year)	SO_2 (tons/year)	CH_4 (tons/year)	N_2O (tons/year)	CO_2 (tons/year)	CO_2e (tons/year)
On-road vehicles	0.76	0.06	0.0004	0.04	0.002	-	25
Aerial Surveillance	0.00	0.04	-	0.01	0.001	7.43	8
Totals	0.76	0.10	0.0004	0.05	0.003	7.43	33

Note: On-road criteria pollutant emissions and CO_2 emissions calculated based on emission factors from MOBILE6C and Transport Canada. Aerial emission factors sourced from International Civil Aviation Organization on Aviation Environmental Protection and Environment Canada.

In a traditional natural gas pipeline, blowdown events or upset conditions may emit VOCs and the GHG CH_4. However, the Project would transport only ethane gas and, therefore, VOC or CH_4 emissions would not occur, and thus, no criteria pollutants would be released from the pipeline if a leak occurred. While ethane is a GHG with a 100-year Global-warming potential (GWP) of 5.5, this impact is considerably less than methane with a GWP of 25.

The emissions summarized above are well below major source permitting thresholds and are generally insignificant. As such, operation of the Project is not expected to impact the local area attainment status.

Also, as discussed in section 1.8.2.2, the EPA has the responsibility to review and comment in writing on the EA consistent with CEQ's Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 to 1508). The proposed Project would be located within EPA Region 8. Prior to issuance of the EA, DOS solicited comments on the EA from Region 8 of the EPA. The EPA's comments on issues related to wetlands (see section 2.4) and air quality have been incorporated into this EA. In addition, DOS consulted with the EPA's Office of NEPA Compliance in Washington D.C., which reviewed and approved the comments that were submitted by Region 8.

Connected Action

In order for any gas plant to produce ethane of a sufficient quality to be transported by a pipeline, additional processing equipment would need to be added to the plants' designs and operations. The Tioga Gas Plant is the origin of the Project and where the pipeline would initially obtain ethane to transport to Canada. As discussed in section 1.5, Hess is expanding its existing gas processing plant in Tioga, North Dakota. Following completion of the project, Hess would continue to combine ethane with the natural gas (i.e., ethane rejection) or would be able to separate the ethane from the gas stream (i.e., ethane

recover). One component of the Hess facility modification is specifically related to allowing for ethane recovery required for Vantage's Project: the operation of a heater. The heater is required to provide heat to the gas plant process to upgrade the ethane into specification ethane and would only be used during the ethane recovery process.

Vantage completed an analysis of the incremental emissions generated by operation of the heater at the Hess Gas Plant to upgrade the ethane in the natural gas stream into specification ethane that would be delivered to the Project, as listed in table 2.12.2-4.

TABLE 2.12.2-4

Criteria Air Pollutants and Greenhouse Gas Emissions from Operation of the Tioga Gas Plant Heater

Emissions Source	CO (tons/year)	NO_x (tons/year)	CH_4 (tons/year)	N_2O (tons/year)	CO_2 (tons/year)	CO_2e (tons/year)
Heater	20.45	34.09	0.56	0.16	29,220	29,280

Regarding the connected action, the total incremental emissions from the Tioga Gas Plant would equate to 29,280 tons per year (26,570 megagrams per year) of GHG emissions (in carbon dioxide equivalent units). This equates to a 26 percent increase in GHG emissions from the Tioga Gas Plant over 2010 emissions. The total incremental carbon dioxide emissions increase from the Tioga Gas Plant and Project would equate to 29,717 tons per year (26,966 megagrams per year), which is a 0.055 percent of the carbon dioxide emissions generated in North Dakota. The total incremental emissions increase for the Tioga Gas Plant and the Project would be well below major source permitting thresholds, which are 75,000 tons per year or 68,039 megagrams per year for modifications to existing sources. This is equivalent to the average annual GHG emissions from 5,186 U.S. passenger vehicles. As such, it is anticipated that operation of the connected action and the Project would not significantly impact the local area attainment status.

2.13 NOISE

2.13.1 Environmental Setting

The ambient sound level of a region is defined by the total noise generated within the specific environment and is usually comprised of natural and man-made sounds. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions and the effect of seasonal vegetative cover.

Two measurements used by some federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} takes into account the duration and time the noise is encountered. Late night and early morning (10 PM to 7 AM) noise exposures are penalized by adding 10 decibels when calculating the L_{dn} to account for people's greater sensitivity to sound during nighttime hours.

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA has indicated that an L_{dn} of 55 decibels on the A-weighted scale (dBA) protects the public from

indoor and outdoor activity interference. Generally this 55 dBA noise guideline is applied to operational noise sources (i.e., sources that operate continuously for long periods of time) in the form of an L_{dn} noise limit. For construction noise that is continuous for some time (e.g., horizontal directional drilling for several days straight), some federal agencies apply a 55 dBA limit to nighttime noise (L_n).

2.13.2 Construction and Operation Impacts and Mitigation

The construction activities associated with the Project would be temporary, intermittent, and vary over time. Construction noise would be limited to daylight hours and any horizontal bores for the Project are anticipated to be completed within one day between 7 AM and 10 PM. As such the construction activities would not exceed an L_n of 55 dBA, because the equipment would not operate between 10 PM and 7 AM.

During the daylight hours, construction noise would result in increased noise levels in close proximity of the construction activities but they may attenuate rapidly with distance depending on ground cover and geography of the area between the construction equipment and the closest noise-sensitive area (NSA). However, there are no permanent residences within 500 feet of the Project.

Table 2.13.2-1 summarizes the typical noise levels generated by construction equipment that may be used for the Project and demonstrates the rate of noise attenuation assuming no noise mitigation from ground cover.

As shown in table 2.13.2-1, the noise generated by the construction activities could exceed 55 dBA at more than 500 feet; however, the EPA 55 dBA noise level is a general guideline and not typically applied to construction activities that occur only during daylight hours. Further, the noise impacts would be temporary, intermittent, and short term. Therefore, no significant impact resulting from construction-related noise is anticipated.

TABLE 2.13.2-1

Construction Noise from Typical Pipeline Construction Equipment Activities [a]

Equipment	Reference dBA at 50 feet	Number of devices	Usage (percent)	Estimated Noise Level (dba) at the Specified Distance from the Source (feet)					
				50	100	250	500	1,000	2,500
3-Ton truck	84	1	40	80	74	66	60	54	46
Dump truck	84	1	40	80	74	66	60	54	46
Concrete truck	85	1	40	81	75	67	61	55	47
Fuel truck	84	1	40	80	74	66	60	54	46
Backhoe	80	1	40	76	70	62	56	50	42
Trenching machine	85	1	40	81	75	67	61	55	47
Crane	85	1	16	77	71	63	57	51	43
Front end loader	80	1	40	76	70	62	56	50	42
Bulldozer	85	1	40	81	75	67	61	55	47
Sideboom	85	1	16	77	71	63	57	51	43
Boring machine	85	1	20	78	72	64	58	52	44
Padding machine	85	1	40	81	75	67	61	55	47
Farm tractor	84	1	40	87	74	66	60	54	46
Mulching machine	86	1	40	82	76	68	62	56	48
Air compressor	80	1	40	76	70	62	56	50	42
Generator/ light plant	82	1	50	79	73	65	59	53	45
Water pump	77	1	50	74	68	60	54	48	40
Water truck	84	1	40	80	74	66	60	54	46

TABLE 2.13.2-1

Construction Noise from Typical Pipeline Construction Equipment Activities [a]

Equipment	Reference dBA at 50 feet	Number of devices	Usage (percent)	Estimated Noise Level (dba) at the Specified Distance from the Source (feet)					
				50	100	250	500	1,000	2,500
Welding machine	73	1	40	69	63	55	49	43	35
Welding truck	55	1	40	51	45	37	31	25	17
X-ray truck	55	1	40	51	45	37	31	25	17

[a] Derived by adding the individual equipment noise levels logarithmically using the following formula: Leq total =10log(Σ(10Leq/10)).

The Project does not include the installation of pump stations or other significant above-ground noise generating facilities. The Project does, however, include MLBVs that would be located above ground. The MLBVs are expected to generate approximately 52 dBA of noise at the fenceline of the valve sites. A review of aerial imagery around the MLBV sites indicates the closest NSA to be about 1,500 feet from a site. Therefore, the noise attributable to MLBV valve sites at the closest NSAs would be about 0 dBA based on natural hemispheric attenuation. Therefore, the noise attributable to the MLBV sites would be below 55 dBA L_{dn}.

2.14 RELIABILITY AND SAFETY

Transportation of liquid ethane by pipeline involves some risk to the public and the environment in the event of an accident or release. Ethane is a colorless, odorless, flammable gas with a vapor pressure of 540 pounds per square inch gauge at 70 degrees Fahrenheit (°F) and boiling point of minus 128°F. Contact with the liquid may cause frostbite. Vaporized ethane is slightly heavier than air and typically dissipates rapidly into air, but still could form pockets of oxygen deficient atmosphere in low-lying areas. In high vapor concentrations, it can act as a simple asphyxiant, possessing a slight inhalation hazard. If inhaled in high concentration, oxygen deficiency can result in serious injury or death.

2.14.1 Pipeline Compliance and Safety Standards

The main causes of pipeline incidents in the United States are corrosion, excavation damage, pipe or weld failure, incorrect operations, or natural causes (e.g., floods). To avoid pipeline incidents, the federal government has established minimum pipeline safety standards under the 49 CFR 190–199. The OPS, PHMSA, within the DOT, is the primary federal enforcement agency that regulates the safety of hazardous liquid and gas pipelines within the United States. The North Dakota Pipeline Authority (NDPA), within the Industrial Commission of North Dakota, is the jurisdictional state agency responsible for assisting operators with the development of pipeline facilities to support the production, transportation, and utilization of North Dakota energy-related commodities.

The DOT is mandated to regulate pipeline safety under 49 U.S.C. Chapter 601. PHMSA is responsible for protecting the American public and the environment by ensuring the safe and secure movement of hazardous materials to industry and consumers by all transportation modes, including the nation‘s pipelines. Through PHMSA, the DOT develops and enforces regulations for the safe, reliable, and environmentally sound operation of the nation‘s 2.3-million-mile pipeline transportation system and the nearly 1 million daily shipments of hazardous materials by land, sea, and air. PHMSA administers the national regulatory program to ensure the safe transportation of hazardous liquids by pipeline. PHMSA develops regulations that address safety in the design, construction, testing, operation, maintenance, and emergency response for hazardous liquid pipelines and related facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operators

to use various technologies to achieve the required level of safety. PHMSA is responsible for regulations that require safe operations of hazardous liquid pipelines to protect human health and the environment from unplanned pipeline incidents.

The regulations governing pipeline safety are included in 49 CFR 190 through 199. Of those, Parts 190, 194, 195, 198, and 199 are relevant to hazardous liquid pipelines. Highlights of the key PHMSA regulations that apply to the Project include:

- Part 190 describes the procedures for carrying out regulatory duties, including inspection of pipelines and enforcement of the regulations.
- Part 194 contains requirements for spill response plans and emergency response plans intended to reduce the environmental impact of liquid hydrocarbons discharged from onshore pipelines.
- Part 195 prescribes the safety standards and reporting requirements for hazardous liquid pipelines, including detailed requirements on a broad spectrum of areas related to the safety and environmental protection of hazardous liquid pipelines.
- Part 198 prescribe regulations for grants to aid state pipeline safety compliance programs.
- Part 199 requires operators of gas and hazardous liquid pipelines to establish programs for preventing alcohol misuse and to test employees for the presence of alcohol and prohibited drugs.

PHMSA policies also address pipeline safety standards near high consequence areas (HCAs). Agriculture is the predominant land use along the pipeline corridor, comprising about 99 percent of land affected by the Project. The only HCA in the vicinity of the Project is the City of Tioga, North Dakota (population 1,128). The Tioga city limits extend approximately 0.5 mile from the pipeline route at about MP 0.8.

For a new hazardous liquid pipeline, the regulations at 49 CFR 195.452 require that HCAs be identified prior to operation and that a written Integrity Management Plan be in place within 1 year of the start of operation. The HCA regulation also requires that operators of new hazardous liquid pipelines complete baseline assessments by the start date for pipeline operation. Depending on the findings of the assessment, the operator must take preventive and mitigating measures to protect the HCA from the consequences of a pipeline failure. These measures include conducting a risk analysis of the pipeline segment to identify additional actions to enhance public safety or for environmental protection. The ethane proposed to be transported by Vantage is also considered by PHMSA to be a hazardous material and, therefore, would need to comply with all regulatory requirements applicable to such materials.

No Unusually Sensitive Areas, as defined in 49 CFR 195.6, are located adjacent to the Project.

The EPA requires facilities covered by the Emergency Planning and Community Right-to-Know Act to submit an Emergency and Hazardous Chemical Inventory Form to the Local Emergency Planning Committee, the State Emergency Response Commission, and the local fire department annually. Facilities provide either a Tier I or Tier II form. North Dakota requires the Tier II form. Tier II reporting must be performed annually using the appropriate on-line North Dakota emergency and hazardous chemical inventory form(s) for all applicable pipeline chemicals. This information is distributed to the local emergency response services and fire departments. Tier II forms provide the following information for each substance transported through a pipeline:

- the chemical name or the common name as indicated on the Materials Safety Data Sheets;
- an estimate (in ranges) of the maximum amount of the chemical present at any time during the preceding calendar year and the average daily amount;
- a brief description of the hazards and manner of storage of the chemical;
- the location of the chemical at the facility; and
- an indication of whether the owner elects to withhold location information from disclosure to the public.

The PHMSA regulates, inspects, and enforces both intrastate and interstate liquid pipeline safety requirements in North Dakota. Through certification by PHMSA, the State of North Dakota regulates, inspects, and enforces intrastate gas pipeline safety requirements. This work is performed by the Testing and Safety Division of the NDPA.

To ensure safe pipeline construction, operation, and maintenance, the Project would be constructed and maintained to meet or exceed requirements and standards established by the DOT, the PHMSA, and the NDPA, as well as applicable industry standards, including those issued by the American Society of Mechanical Engineers, National Association for Corrosion Engineers, and American Petroleum Institute.

Prior to being placed into operation, Vantage would hydrostatically test all pipeline sections with water to at least 125 percent of the pipeline's maximum allowable operating pressure to ensure the integrity and operational safety of the pipeline. After the welds have passed inspection, a corrosion-resistant protective coating would be applied to the outside of the pipe.

2.14.2 Release Response and Reporting

Most construction-related spills would likely release minor quantities of refined products (e.g., gasoline, diesel, and lubricating and hydraulic fluids). These releases would be subject to the reporting requirements of 40 CFR 110, and would typically result from vehicle and construction equipment fueling and maintenance. Potential spills from construction activities would be addressed by specific preventive and mitigating measures included in the SPCC Plan.

The root cause of pipeline releases is usually from excavation damage, corrosion, or natural forces (e.g., soil settlement or washouts). Although pipeline leak-detection technology could identify a leak and shut down flow quickly, actual response is often delayed due to the remoteness of the release location.

When a release of ethane occurs, the resulting environmental impact(s) depend on a number of factors, including weather conditions. Windy conditions results in dissipation of the volatile ethane to the atmosphere. Conversely, calm days could potentially result in isolated pockets of ethane gas near the ground surface due to its characteristic specific gravity.

Based on modeling work by Hanna and Drivas (1993), the majority of VOCs, including ethane from pipeline releases, would evaporate almost completely within a few hours. In addition, the vapors are usually dissipated below risk levels within a short distance of the source.

If a pipeline release were to occur, emergency response contractors or health and safety personnel would follow their emergency response plans, including wearing the proper personal protective

equipment and performance of air monitoring of the ethane vapors. Public access to areas exceeding specified risk levels would be restricted and authorized personnel within the restricted areas would be equipped with and use appropriate personal protective equipment.

Any impacts on air quality related to releases would likely be localized and short term resulting in little or no impact on ecological and physical resources. An estimate of the volume of the release and air emissions would be reported to PHMSA using standard forms, consistent with 49 CFR 195.50.

In addition, consistent with North Dakota law, hazardous materials exceeding reportable quantities must be reported to the North Dakota Emergency Services through the Division of State Radio by calling 800-472-2121. The initial notification requires follow-up reporting using the Hazardous Materials Spill Report Form. Once a release has been mitigated, the owner or operator must provide a spill or release report describing the details of the incident. These procedures would also be implemented by Vantage to reduce the potential for any health and/or safety risks.

To minimize the threat of leaks, the proposed Project would be monitored and controlled 24 hours per day, 365 days per year, from a central control facility (CCF) located in Joffre, Alberta using a state-of-the-art supervisory control and data acquisition (SCADA) system. A leak detection system would continuously monitor the pipeline. This system would report through the SCADA system to the CCF and would provide the CCF operator with enhanced capabilities related to the early detection and location of leaks. Response to a leak indication would be coordinated from the CCF, with resources being supplied from the nearest pipeline maintenance location. In the event any anomaly is detected, MLBVs would automatically shut to isolate that portion of the pipeline. These automated MLBVs would be located approximately every 15 miles along the pipeline (see table 1.4.2-1). A cathodic protection system, including anode beds, rectifiers, and associated facilities would be installed for the pipeline.

Vantage's public awareness program would include annual contact with all residents living within 2,800 feet of either side of the centerline of the pipeline; regular contact and meetings with all the emergency response personnel that could be responding to a Vantage pipeline emergency; and annual mailings to all landowners, tenants, and lessees located on the Vantage pipeline route.

In addition, Vantage would incorporate regular preventative maintenance programs into the design and operation of the pipeline, such as aerial patrols, internal inspections, and cathodic protection monitoring, along with pipeline markers at roads and pipeline watercourse crossings.

2.15 CUMULATIVE IMPACTS

2.15.1 Introduction

The cumulative impacts assessment for the Vantage pipeline focuses on potential changes to the environment and socio-economic conditions caused by the Project, in combination with other projects or activities in the past, present, and/or reasonably foreseeable future. This assessment examines a larger geographic study area and a longer time frame than the environmental effects assessment, and includes the assessment of effects from adjacent and unrelated activities.

Indirect effects are defined as effects "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8).

Cumulative impacts are "… [t]he impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions

regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR § 1508.7). Cumulative impacts consider not only the localized effect of the construction and operation of the proposed Vantage pipeline, but also past actions.

Cumulative environmental and socio-economic effects were assessed if all three of the following conditions were met:

- the Project results in a residual environmental or socio-economic effect on a component of the biophysical or human environment that can be measured, or can be expected to occur;
- the Project's residual environmental or socio-economic effect on that component does, or is likely to, act in a cumulative fashion with the effects of other past or future projects and activities that are likely to occur; and
- the Project's contribution to cumulative effects can be reasonably expected to affect the viability or sustainability of the resource or a value such as a regulatory 'threshold' or standard.

The assessments were generally based on the known effects from past and recent pipeline construction practices and the adoption of industry-recognized standards.

Three types of past, present, and reasonably foreseeable future projects were identified that would potentially result in a cumulative impact when considered with the Project. These are: 1) facilities associated with construction of the Project but that are not under the jurisdiction of DOS; 2) other ethane, oil, and/or gas projects; and 3) other projects that are either in place, are under construction in the vicinity of the Project, or are proposed (see table 2.15.1-1). These projects were identified through information provided by the applicant and independent research into the local energy and other development projects in the Project area (e.g., review of NDPSC website, energy developer project plans). Although solicited, no scoping comments related to cumulative impacts were received on the Project (see section 1.3). The potential effects most likely to have a cumulative impact pertain to soils, surface waters, wetlands, fish and fish habitat, vegetation, wildlife and wildlife habitat, and socioeconomics. Not all actions identified in this section would have cumulative impacts in all resource areas.

TABLE 2.15.1-1

Past, Present, and Reasonably Foreseeable Projects or Activities Evaluated for Cumulative Impacts

Project/Activity	Description	Estimated Construction Dates	Location Relative to the Vantage Pipeline Project
North Dakota Oil and Natural Gas Production	Ongoing activities associated with oil and gas drilling and development, and subsequent petroleum production.	Potential 10 to 20 years of drilling and development; additional time for petroleum production.	Majority of nearby development is in the southern half of Williams County, not in the vicinity of the Project.
Ethane Production in Canada	Processing and marketing of the additional ethane that is transported to Red Deer, Alberta, Canada.	Ongoing.	Outside the U.S. Project area, but connected to the larger Vantage Pipeline Project.
Tioga Plant Expansion, Hess Corporation	Expansion to double the current plant capacity to exceed 250 million cubic feet per day (mmcfd) of natural gas; construction of a 120,000 barrel per day oil and natural gas liquid rail loading terminal.	Scheduled in-service at end of 2012.	Tioga, North Dakota near MP 0.0.
ONEOK Stateline Gas Plant	Processing plant designed for 100 mmcfd of natural gas.	Scheduled completion in mid-2012.	Approximately 35 miles south of the southern end of the pipeline route.

TABLE 2.15.1-1

Past, Present, and Reasonably Foreseeable Projects or Activities Evaluated for Cumulative Impacts

Project/Activity	Description	Estimated Construction Dates	Location Relative to the Vantage Pipeline Project
ONEOK Garden Creek Plant	Processing plant designed for 100 mmcfd of natural gas.	Construction recently completed.	Approximately 42 miles south of the southern end of the pipeline route.
Hiland Partners Watford City Plant (PU-10-554)	Processing plant designed for 50 mmcfd of natural gas.	Construction recently completed.	Approximately 55 miles southwest of the southern end of the pipeline route.
Plains Bakken North Pipeline	Proposed oil pipeline.	Construction scheduled to occur in 2012.	Approximately 8 miles south of the northern end of the pipeline route.
Enbridge Portal Reversal (Phase 7 Expansion)	Proposed oil pipeline.	Construction recently completed.	Approximately 7 miles from the proposed route.
Bridger Pipeline Four Bears Pipeline Expansion	Proposed oil pipeline.	Construction recently completed.	Approximately 30 miles from the proposed route.
Quintanna Bakken Link Pipeline	Proposed oil pipeline.	Construction schedule undetermined.	Approximately 36 miles from the proposed route.
Rangeland Energy COLT Hub	Proposed oil pipeline.	Scheduled completion in early 2012.	Approximately 8 miles from the proposed route.
Annabelle Homes	Proposed commercial/residential development.	No construction schedule has been established.	Within 0.25 mile of the south end of the pipeline route.

[a] Cumulative impacts associated with the electric transmission lines and interconnections connected action are discussed in section 1.5.2.

2.15.2 Potential Cumulative Impacts of the Proposed Action

Geology

As discussed in section 2.1.1, the proposed Project would cross deposits of petroleum, coal, lignite, trace metal, clay, sand, gravel, scoria, and salt bearing formations. Existing and planned oil and natural gas rights-of-way associated with the projects listed in table 2.15.1-1 would limit the area available for extraction of mineral resources. In areas where existing and planned projects are present within the proposed Project area, there would be a minor cumulative decrease in the access to mineral resources because the proposed Project would limit the extraction of mineral resources in the permanent Project right-of-way. Extraction of oil and gas resources would not be affected by operation of the proposed Project because they are typically found at a depth far below the pipeline trench and installation depth. Overall, the proposed Project would not significantly affect the existing development of mineral resources in the Project area, as described in section 2.1.2. Therefore, construction and operation of the proposed Project, in addition to the other proposed and planned projects listed in table 2.15.1-1, is not anticipated to result in significant cumulative impacts on mineral extraction in the proposed Project cumulative impact corridor.

As discussed in section 2.1.2, the Project right-of-way would be returned to the approximate original topographic contour during restoration activities, as would the pipeline rights-of-way associated with the planned pipeline projects listed in table 2.15.1-1. In addition, Project impacts on bedrock are expected to be nonexistent and, thus, blasting is not anticipated during Project construction and pipeline installation activities. Therefore, construction of the proposed Project, in addition to the other proposed and planned projects listed in table 2.15.1-1, is not anticipated to result in significant cumulative impacts on regional topography in the proposed Project cumulative impact corridor.

During construction of the Project and the projects listed in table 2.15.1-1, damage to or destruction of paleontological resources from excavation and grading activities, or from unauthorized collection of fossils by construction personnel or the public, may occur. Research conducted of the Project area, as discussed in section 2.1.1, has minimized the potential for the proposed Project to impact known scientifically significant paleontological resources. Additionally, Vantage would notify agency personnel if fossils are uncovered. Therefore, construction and operation of the proposed Project, in addition to the other proposed and planned projects listed in table 2.15.1-1, is not anticipated to result in significant cumulative impacts on paleontological resources within the proposed Project cumulative impact corridor.

Soils

Soils along approximately 80 percent of the Vantage pipeline alignment have previously been and are currently being impacted by agricultural activities. The majority of the land area impacted during construction of the Project would be reclaimed as grassland, pasture, or returned to agricultural production. Vantage would implement its EPP (see Appendix C for the Draft EPP) as well as other Project-specific plans (e.g., Soil Conditions Contingency Plan) to reduce the impacts of construction on soils. Construction of the projects listed in table 2.15.1-1 would result in impacts on agricultural activities within the Project cumulative impact corridor; however, DOS expects that the pipeline rights-of-way associated with the planned pipeline projects listed in table 2.15.1-1 would be reclaimed as grassland, pasture, or returned to agricultural product similar to the right-of-way associated with the Vantage pipeline. In addition, DOS expects that these projects would also be required to implement BMPs to minimize impacts on agricultural activities and, therefore, impacts from construction of the Project, in addition to the other projects in the area, would not result in significant cumulative impacts.

Ongoing development of oil wells, access roads, and pipelines in the area would act cumulatively with effects from the Project. As discussed in section 2.2.2, the majority of the Vantage pipeline right-of-way would be allowed to revert to its previous use; therefore, the long-term area impacted by the Project would be much less than the area impacted by oil well development and access roads, which would result in permanent impacts on soils. The soil stabilization and revegetation requirements in Vantage's EPP (see Appendix C for the Draft EPP) would prevent or minimize any indirect impacts. Revegetation of the right-of-way consistent with the EPP (see Appendix C for the Draft EPP) would ensure that the disturbed areas are stabilized to prevent erosion. Similarly, DOS expects that the oil and gas development projects listed in table 2.15.1-1 would also have associated soil stabilization requirements as part of their permit approvals. Construction and restoration activities, as well as operation and maintenance activities, would be monitored through the process to ensure compliance. Consequently, it is anticipated that the proposed Project, in addition to the other projects in the area, would not result in significant cumulative impacts on soils.

Groundwater, Surface Waters, and Wetlands

Project construction could have a minor, temporary, and localized effect on groundwater, surface waters, and wetlands. Groundwater impacts could include increased turbidity, reduced water levels, and contamination, and nearby water wells could also be damaged by construction. The greatest potential impacts of pipeline construction on waterbodies/wetlands would likely result from an increase in sediment loading to waterbodies/wetlands either during active construction within a feature or due to runoff from construction near waterbodies/wetlands.

The level of impact of the Project on waterbodies/wetlands would depend on precipitation events, sediment loads, stream area/velocity, channel integrity, and bed material. As discussed in section 2.4.2, construction and operation of the proposed Project would result in temporary impacts on intermittent and

ephemeral drainages classified as wetlands. As discussed in section 2.4.1, the wetlands that were identified during Vantage's field surveys have already been directly impacted by agricultural activities, and approximately 5 percent of the potentially traversed wetlands are within areas already impacted by construction, drilling, and production activities related to oil well development, primarily in Williams County. Potential impacts on wetlands as a result of construction activities associated with the proposed Project would, therefore, overlap with effects from other activities in Divide and Williams Counties (e.g., agriculture, well pad construction and drilling, pipelines, road use and construction).

Vantage would avoid direct and permanent impacts on waterbodies/wetlands by using the horizontal bore method at each crossing. Impacts on waterbodies/wetlands expected from the other proposed pipeline projects in the area, as listed in table 2.15.1-1, would vary and be dependent on the crossing method adopted at each feature. Also, while the proposed Project is not anticipated to act cumulatively with these other proposed construction projects because of Vantage's commitment to avoid direct impacts, the other projects may result in an incremental change in localized natural flow patterns and change of surface water or wetland quality. These residual effects include potential alteration of natural flow patterns and increase in suspended solids during isolated crossings. Construction and operation of the proposed projects listed in table 2.15.1-1 would be subject to review and approval by applicable local, state, and federal agencies. It is anticipated that these approvals would include BMPs to avoid, minimize, or mitigate for impacts on water resources and wetlands; thus, the Project and other projects in the area are not expected to contribute significantly to cumulative impacts on water resources or wetlands.

Fish and Fish Habitat

When projects are constructed in the same general location and time frame, they could have a cumulative impact on local fish and fish habitat communities. As described above, the Project would cross intermittent and ephemeral drainages, which are predominately dry and not fish-bearing. Construction impacts from the proposed Project and the projects listed in table 2.15.1-1 would vary and be dependent on the crossing method adopted at each feature. Impacts could include potentially impacting downstream fish and fish habitat through increased suspended sediment concentrations.

Vantage has committed to using the horizontal bore method at each crossing. The mitigation measures included in Vantage's EPP (see Appendix C for the Draft EPP) that are proposed to control erosion and sediment discharge are, based on past and recent pipeline construction projects, effective methods to minimize potential long-term impacts on fish and fish habitat. Vantage would reduce indirect effects on riparian habitat caused by Project construction by revegetating the right-of-way following construction, thus avoiding long-term or significant impacts.

Construction and operation of the proposed projects listed in table 2.15.1-1 would be subject to review and approval by applicable local, state, and federal agencies. It is anticipated that these approvals would include BMPs to avoid, minimize, or mitigate for impacts on water resources and any supporting fisheries; thus, the Project and other projects in the area are not expected to contribute significantly to cumulative impacts on fish and fish habitats.

Vegetation

Right-of-way clearing and grading and other construction activities associated with the Project would result in the removal of vegetation and other potential secondary effects such as the establishment of invasive plant species. Construction of the Project would temporarily impact about 735 acres of vegetated land, of which about 291 acres would be retained for permanent operation for maintenance.

The Project would result in the permanent loss of approximately 0.6 acre of vegetation required for MLBVs and access roads.

When projects are constructed in the same general location and time frame, they could have a cumulative impact on local vegetation. Impacts on vegetation resulting from the proposed Project and other projects identified in table 2.15.1-1 would range from direct, temporary, and short term as a result of construction, to permanent impacts associated with well pads and road installation in vegetated areas. The effects from construction of the proposed pipeline are expected to be primarily temporary and short term as the construction right-of-way would be restored and allowed to return to preconstruction conditions. As indicated in section 2.6, approximately 80 percent of the lands affected by the Project are used for agricultural purposes including the production of cultivated crops, pasture land, and hay production. The remaining 20 percent includes native grasslands and less than 1 percent is wetlands. Vantage would implement construction and restoration measures listed in its EPP (see Appendix C for the Draft EPP) to mitigate for direct and indirect impacts on vegetated areas. Vantage would reclaim grasslands with native species and agricultural lands would be returned to production in the growing season following construction. DOS expects that the other pipeline projects listed in table 2.15.1-1 would also adopt similar construction and right-of-way restoration measures to minimize significant cumulative impacts on vegetated areas.

The Project would result in 0.6 acre of vegetated land permanently removed from use as a result of MLBVs and access roads required for the Project. Aboveground facilities associated with the other projects listed in table 2.15.1-1, as well as oil and gas development activities in the region, would add cumulatively to the loss of available agricultural and native grasslands. Fragmentation of native prairie habitat may also result from the installation of new well sites and related facilities. However, it is estimated that the 0.6-acre loss associated with the Project represents less than 0.0001 percent of the total grassland available in Divide and Williams Counties. As a result, it is anticipated that the Project would not result in a significant cumulative impact on vegetative resources.

Additionally, construction and operation of the proposed projects listed in table 2.15.1-1 would be subject to review and approval by applicable local, state, and federal agencies. It is anticipated that these approvals would include BMPs to avoid, minimize, or mitigate for impacts on vegetation; thus, the Project and other projects in the area are not expected to contribute significantly to cumulative impacts on vegetative resources.

The introduction of invasive species within the Project area could result in a cumulative impact when combined with agricultural activities and future development of oil and gas. More specifically, based on past and recent pipeline construction projects, construction-related disturbances could promote the spread of invasive weed species from disturbed croplands onto native prairie sites. As discussed in section 2.6.1, North Dakota law (North Dakota Century Code § 4.1-47-02) requires every person to do all things necessary and proper to control the spread of noxious weeds and makes it illegal for any person to distribute, sell, or offer for sale within the state a noxious weed. Vantage would implement the measures included in its EPP (see Appendix C for the Draft EPP)) to control the spread of invasive weed species. DOS expects that the other projects identified in table 2.15.1-1 would abide by North Dakota's law regarding noxious weeds and would, as necessary, develop weed management plans, as necessary.

Wildlife and Wildlife Habitat

Right-of-way clearing and grading and other construction activities associated with the Project would result in the removal of vegetation; alteration of wildlife habitat; displacement of wildlife; and other potential secondary effects such as increased population stress and predation. The development of the Project and other projects in the area could also result in habitat fragmentation. Cumulative impacts

on wildlife and wildlife habitat, including federally and state-listed species, would be similar to those described above for vegetation. Impacts resulting from the proposed Project would primarily be direct and temporary to short term. Vantage would implement construction and restoration measures listed in its EPP (see Appendix C for the Draft EPP) to mitigate for direct and indirect impacts on areas supporting wildlife and its habitat. The potential for wildlife habitat fragmentation resulting from the Project would be further reduced because the majority of the disturbed areas would be allowed to return to pre-existing conditions. DOS expects that the other pipeline projects listed in table 2.15.1-1 would also adopt similar right-of-way restoration measures and/or implement BMPs to minimize significant cumulative impacts on wildlife and its available habitat.

As previously discussed, the Project would permanently impact 0.6 acre of land. While aboveground facilities associated with the other projects listed in table 2.15.1-1 may also result in permanent impacts on land available to wildlife, the proposed Project's impact in combination with these projects would not result in a significant cumulative impact on wildlife and its available habitat. Additionally, construction and operation of the proposed projects listed in table 2.15.1-1 would be subject to review and approval by applicable local, state, and federal agencies. DOS expects that these approvals would include BMPs to avoid, minimize, or mitigate for impacts on wildlife; thus, the Project and other projects in the area are not expected to contribute significantly to cumulative impacts on wildlife and its habitat.

Land Use and Visual Resources

Construction of the proposed Project could contribute to cumulative impacts in the area of the proposed Project through disruption of agricultural and open land production, which includes cultivated croplands, grasslands, and pasture/hay fields. Short-term contributions could include potential damage to agricultural infrastructure (e.g., drain tiles or irrigation systems) that would diminish agricultural productivity, and construction-related noise and dust that could temporarily impair other land uses. Most acreage disturbed during construction of the proposed Project would be returned to preconstruction uses after right-of-way restoration and, therefore, would not contribute to long-term alterations in land uses. Generally, based on past and recent pipeline construction projects, disturbed agricultural and open land would become productive within several planting seasons. However, disturbed pastures could require revegetation taking 1 to 5 years to recover to preconstruction levels. Aboveground facilities (i.e., MLBVs) required for operations would convert the land associated with these facilities to an industrial use for the life of the proposed Project. As discussed previously, the contribution of lands committed to industrial uses during the life of the proposed Project would be small in relation to the number of acres available for these land uses. Easement restrictions associated with the proposed Project would contribute to land use restrictions within the proposed Project cumulative impact corridor.

Cumulative impacts on visual resources could occur in areas where past and reasonably foreseeable future projects in addition to the proposed Project remove large swaths of vegetation and where permanent aboveground facilities are installed. Along most of the proposed Project route, the contribution to cumulative visual impacts due to proposed Project construction activities would be limited to the removal of existing vegetation, exposure of bare soils, earthwork and grading scars, and minor landform alterations. Temporary visual impacts would be evident during Project construction due to clearing, grading, and construction activities. After construction, restoration consistent with Vantage's EPP (see Appendix C for the Draft EPP) and other permitting agency requirements would promote revegetation of the construction work areas, thereby limiting permanent visual impacts on those areas.

If any of the projects identified in table 2.15.1-1 were to occur concurrently with the proposed Project, cumulative impacts could include temporary contributions to degradation in visual quality as a result of the presence of construction crews, equipment, and dust.

The aboveground components (i.e., MLBVs) associated with the Project would contribute to an intensified industrial character in the region. Other aboveground facilities associated with the projects listed in table 2.15.1-1 would also result in a cumulative impact that could adversely affect the visual quality of the area. DOS notes that this permanent cumulative impact on the visual character of the landscape would occur; however, the potential impact would be localized in a rural and sparsely populated area, and given the small footprint of the MLBV facilities associated with the proposed Project, the majority of the surrounding landscape would retain its visual character.

Socioeconomics

Overall, construction and operation of the Project would likely have no significant impact on the socioeconomic character of the region in which it lies. The impacts on housing, the local population, employment, and public services resulting from the presence of temporary construction workers would likely be the primary contribution of the proposed Project. Due to the number of temporary worker and the relatively short time frame in which construction would occur, however, the impact on socioeconomic resources would likely be temporary and minor.

More localized, cumulative impacts may be felt in the vicinity of Tioga, North Dakota, where Project construction may coincide with the ongoing construction activities at the Tioga Gas Plant. Construction of the Tioga Gas Plant in Tioga is scheduled to experience peak manpower of around 700 by late 2012. Vantage estimates that, if the Project is approved, its manpower would peak at around 70 in late 2012. To reduce cumulative impacts on the local population, including potential impacts on recreation, food and food services, and accommodations, Vantage would begin construction of the proposed pipeline at the north end of the line near the Canada/U.S. border and move south towards the Tioga Gas Plant. It is anticipated that this would provide the greatest amount of distance between the construction crews at the busiest time during the construction schedule for both Hess' Tioga Gas Plant and Vantage pipeline. As the pipeline construction crews move south towards Hess' Tioga Gas Plant, the number of construction workers at the Tioga Gas Plant is anticipated to be decreasing. In the event the cumulative impact of the Vantage pipeline construction crews on the local population is unmanageable, Vantage has proposed to use buses to move the Vantage pipeline construction crews from the jobsite to accommodations that are further away from Tioga and surrounding area. It is anticipated that the use of buses to transport construction crews would assist in reducing the cumulative impacts on recreation, food and food services, and accommodations resulting from the Project when combined with other projects in the area.

As discussed in section 2.10.2, the proposed Project is not expected to result in adverse impacts that would fall disproportionately on minority or low-income populations within the Project area. Cumulative impacts on minority and low-income populations related to past and reasonably foreseeable future projects could occur; however, the contribution of the proposed Project to these cumulative impacts would likely be minor given that no significant environmental justice populations are located within the Project area.

Additional short-term contributions to cumulative socioeconomic impacts would result from increased employment opportunities and related labor income benefits, and increased government revenues associated with sales and payroll taxes. Operation of the proposed Project would require relatively few permanent employees; thus, there would be little contribution to long-term cumulative impacts on population, housing, municipal services, or traffic in the proposed Project area. It is anticipated that the other projects listed in table 2.15.1-1 would contribute similarly to the local economy; thus, the Project and other projects in the area would likely result in a minor beneficial, long-term cumulative economic impact.

Cultural Resources

Contribution to cumulative impacts on cultural resources from the proposed Project would include disturbance to aboveground and belowground resources within the designated Project APE. The proposed Project would be constructed consistent with the requirements under Section 106 NHPA and other relevant federal, state, and local regulations. Disturbance to these resources from construction of the proposed Project would be limited primarily through avoidance, and through mitigation when avoidance is not achievable.

The contribution to cumulative impacts on cultural resources that could occur from construction and operation of the proposed Project include damage or destruction of historic properties that cannot be avoided; introduction of visual or audible elements that would diminish the integrity of a historic property's significant historic features; changes to the character of the historic property's use; or changes to physical features within the historic property's setting that contribute to its significance. The proposed Project's contribution to cumulative impacts on cultural resources would be primarily limited through avoidance of adverse effects to historic properties that have been found eligible for listing in the NRHP or that are currently unevaluated. Cultural resource avoidance could be achieved through pipeline route variations to avoid NRHP-eligible properties, or through boring underneath the cultural deposits using the horizontal bore construction method. DOS executed a PA that would address the identification, evaluation and mitigation of adverse effects to historic properties throughout the course of the Project (see Appendix D).

Contribution to cumulative impacts on cultural resources could result from future linear projects or other future developments within the proposed Project cumulative impact corridor that disturb known or currently unidentified archaeological sites and historic properties or degrade in-place mitigation for previously disturbed historical properties. It is anticipated that other project proponents listed in table 2.15.1-1 would be required to conduct cultural resources surveys, consult with the appropriate agency(ies), and/or adopt mitigation to avoid cultural resources of significance to the extent possible. Known sites identified during proposed Project studies or in past or future cultural resource studies would be avoided or mitigated to the degree practicable as required by Section 106 NHPA during future project implementation.

Air Quality

The Project, the ongoing drilling activities in the Bakken area, and other projects in the area would involve the use of heavy equipment that would generate emissions of air contaminants, fugitive dust, and noise during construction. Because pipeline construction moves through an area quickly, air emissions associated with the pipeline would be intermittent and short term. The majority of these impacts would be minimized further because the construction activities would occur over a large geographical area and, in many cases, construction schedules would not directly overlap. Although these projects would result in short-term construction air emissions, they are not likely to significantly affect long-term air quality in the region.

Operation of the Project, oil and gas drilling activities, and other projects would also contribute cumulatively to existing air emissions. The Project's associated operating emissions would be mitigated by federal, state, and local permits and approvals. It is anticipated that each of the projects would also need to comply with federal, state, and local air regulations, which may require controls to limit the emission of certain criteria pollutants or hazardous air pollutants. Thus, the Project in combination with the other projects listed in table 2.15.1-1 is not anticipated to contribute significantly to the cumulative impact on regional air quality as a result of operation.

Noise

The Project, oil and gas drilling activities, and other projects identified in table 2.15.1-1 would all produce noise during construction; however, this noise would be temporary annoyances to noise receptors in the vicinity of the projects, particularly given the sparsely populated area of the Project. Noise impacts during the construction phase would be localized and would attenuate quickly as the distance from the noise source increases. However, because construction proceeds as a moving assembly line along the proposed pipeline loops, the duration of construction activities, and therefore noise impacts, at any one location would be limited and short term. As discussed in section 2.13.2, the noise attributable to the MLBV sites at the closest NSAs would be about 0 dBA L_{dn}, well below 55 dBA L_{dn} the EPA attributes to public activity interference. Because the impact of noise is highly localized and attenuates quickly as the distance from the noise source increases, it is anticipated that impacts associated with the Project would not result in significant cumulative impacts.

Conclusion

DOS identified recently completed, ongoing, and planned projects in the Project area that meet the criteria for inclusion in the cumulative impact analysis study. Due to the implementation of specialized construction techniques, the relatively short construction timeframe in any one location, and resource protection and mitigation plans designed to minimize and control environmental impacts for the Project as a whole (e.g., the EPP, the BA, the PA), only small cumulative effects are anticipated when the impacts of Vantage's Project are added to the identified ongoing projects in the immediate area.

2.15.3 Canadian Effects

The Canadian government has conducted its own environmental review of the portion of the Project in Canada. In accordance with EO 12114, DOS is not preparing any environmental assessment of the impacts of the pipeline in Canada. Nevertheless, as a matter of policy, in addition to its environmental assessment of the Project in the United States, DOS endeavors to monitor and obtain information, as appropriate, regarding the Project in Canada.

The Canadian process began on September 23, 2010 when Vantage submitted a Project Description to Canada's NEB. On February 8, 2011, Vantage submitted an application to the NEB for a Certificate of Public Convenience and Necessity for the proposed Project pursuant to Section 52 of the National Energy Board Act. On January 19, 2012, the NEB issued its Reasons for Decision and approved the Project.[7]

2.16 SUMMARY OF ASSUMPTIONS

Our preliminary analyses of potential impacts associated with construction and normal operation of the proposed Project on most resources along the proposed Project corridor assume the following:

- Vantage would comply with all applicable laws and regulations;
- Vantage would incorporate the mitigation measures required in permits issued by environmental permitting agencies listed in table 1.10-1 into the construction, operation, and maintenance of the proposed Project;

[7] The NEB's Reasons for Decision for the Vantage Pipeline Project is available online at: http://publications.gc.ca/collections/collection_2012/one-neb/NE22-1-2012-2-eng.pdf.

- Vantage would adopt the timing restrictions and/or adopt the mitigation measures recommended by the FWS to avoid adversely affecting federally listed species or their habitat;

- Vantage would adopt the timing restrictions and/or adopt the mitigation measures recommended by the FWS to avoid adversely affecting species protected by the MBTA and BGEPA, and implement the Conservation Plan developed in consultation with the FWS;

- Vantage would complete cultural resources surveys and surveys for historic properties of religious and cultural significance to an Indian tribe, adhere to the measures outlined in the PA, and assist DOS in review consistent with Section 106 of the NHPA;

- Vantage would construct, operate, and maintain the proposed Project as described in the EA; and

- Vantage would implement the measures designed to avoid or reduce impacts described in its application for a Presidential Permit and supplemental filings with DOS and the EPP (see Appendix C for the Draft EPP) and its attachments.