4.0 Environmental Consequences

4.1 Air Quality

4.1.1 Proposed Action

Construction

Construction equipment would emit gaseous criteria pollutants and particulates as a result of tailpipe emissions. Construction equipment also would cause fugitive dust emissions from disturbed areas and along paved and unpaved roads. Construction would progress continuously through a given area, leading to negligible temporary and localized air quality impacts.

CO_2 emissions result from the combustion of diesel fuel in engines powering trucks, tractors, and other mobile equipment such as dozers, backhoes, and trenchers. CO_2 emissions are expected to be far below 25,000 tpy, which would be seen as a significant level of emissions. To reach this level of concern, the fuel usage would have to be on the order of 2,200,000 gallons of diesel fuel. The CO_2 emitted from construction equipment is expected to be only a small fraction of this amount and a minor contribution to national and statewide CO_2 emissions. Therefore, negligible impacts to air quality resulting from the operation of heavy construction equipment is expected.

Operation

Six receipt facilities that would occur along the Trunk line and laterals would be used for the delivery or receipt of crude oil during pipeline operation. Each of these facilities would have eighteen 400-barrel tanks and one 30,000-barrel storage tank. The 400-barrel tanks would be used for the unloading of customer trucks, which then pass through custody transfer into the 30,000-barrel storage tanks and into the pipeline.

Daily throughput for each of the six 30,000-barrel tanks is estimated to be 20,000 barrels per day. VOC emissions due to flashing and working/breathing losses were estimated using the USEPA TANKS 4.0.9 software and known tank characteristics. It is assumed the 30,000-barrel storage tanks would maintain a relatively constant liquid level and only be completely emptied for maintenance and inspection purposes. Therefore, the TANKS 4.0.9 default value of four turnovers per year was used when estimating turnover losses. In addition to the permanent external roof, the storage tanks also would contain an internal floating roof, which would limit maximum liquid height to 37 feet inside the 40-foot-high tank and an approximate maximum volume of 29,000 barrels. Results from TANKS 4.0.9 are provided in **Table 4.1-1**.

Table 4.1-1 Estimated VOC Emissions from Receipt Facility 30,000-barrel Storage Tanks

Losses per Tank (lbs/year)				
Rim Seal Losses	**Withdrawal Losses**	**Deck Fitting Losses**	**Deck Seam Losses**	**Total VOC Emissions**
147.77	62.38	265.10	141.06	616.30

Source: USEPA 2005.

As shown in **Table 4.1-1**, total VOC emissions would be 616.30 lbs/year, per tank, for a total of 1.85 tpy of VOC emissions from all six 30,000-barrel storage tanks.

VOC emissions also include emissions of HAPs, such as benzene, toluene, and formaldehyde, which are known to cause health problems and death at higher concentrations. The major source limit for any individual HAP is 10 tpy and 25 tpy for all HAPs combined. Given that all HAPs emitted would be only a small fraction of VOC emissions, the emissions would not approach major source limits; therefore, negligible significant impacts to air quality would be expected.

It is expected that operation of the Project would significantly reduce the distance traveled by up to 300 oil tanker trucks hauling oil each day. Using the conservative assumptions that each truck hauls 200 barrels, a pipeline capacity of 65,000 bpd, and an average roundtrip of 80 miles, approximately 24,000 truck miles per day would be eliminated from western North Dakota roads. This would be expected to provide positive benefits in terms of both traffic congestion and air quality. **Table 4.1-2** provides the estimated pollutant reductions expected on a per truck basis, daily basis, and annual basis.

Table 4.1-2 Total Combustion Emissions Reductions Expected from Diesel-fired Heavy Duty Haul Trucks Being Taken Off the Road

Pollutant	Emissions Reduction		
	(tons/truck-day)	(tons/day)	(tons/year)
NO_X	5.73E-04	1.72E-01	62.76
CO	1.74E-03	5.21E-01	190.22
SO_2	1.16E-06	3.49E-04	0.13
VOC	4.14E-04	1.24E-01	45.38
Benzene	8.43E-06	2.53E-03	0.92
Toluene	6.20E-06	1.86E-03	0.68
Ethylbenzene	1.28E-06	3.85E-04	0.14
Xylene	4.39E-06	1.32E-03	0.48
Formaldehyde	4.90E-05	1.47E-02	5.36
n-Hexane	6.60E-07	1.98E-04	0.07
CO_2	1.33E-01	3.99E+01	14,551.64
CH_4	5.47E-06	1.64E-03	0.60
N_2O	1.09E-06	3.28E-04	0.12
CO_2e	1.33E-01	4.00E+01	14,601.31

4.1.1.1 Climate Change

Existing climate change models can predict climate change impacts with a high degree of certainty over global or continental scales. However, these same models find it difficult to simulate climate change on a smaller scale. In the small scale environment, climate variations occur frequently, which make it difficult to distinguish if temperature changes are due to external forces (i.e., local construction, drilling, or production activities) or naturally occurring events.

While the effects of GHG emissions are well-documented on the global level, science does not yet have the ability have the ability to determine what effect GHG emissions from particular activities and projects might

have on the environment. Although it is not possible to predict the effects on climate change due to the Project, **Table 4.1-2** demonstrates that upon Project completion, yearly GHG emissions would be greatly reduced as a result of decreased truck traffic on the North Dakota arterial highway system.

4.1.2 No Action Alternative

Under the No Action Alternative, the Project would not be developed, and there would be no effect on current air quality in the area. The beneficial effects to traffic congestion and air quality by greatly reducing the miles driven by up to 300 trucks per day from western North Dakota roads would not occur.

4.1.3 Mitigation

No additional mitigation measures for air quality have been proposed.

4.1.4 Residual Impacts

Assuming applicable environmental protection measures are effectively implemented, and given the short duration and localized nature of the construction activities, the residual impacts of the Proposed Action on air quality are projected to be minimal and short-term in nature. Long-term impacts to air quality are not anticipated.

4.2 Geology and Minerals

4.2.1 Proposed Action

4.2.1.1 Geology

Construction

Construction activities would include disturbances to the topography along the Project route and at associated aboveground facilities due to grading and trenching that may result in slope instability. Since the Project route crosses landslide prone areas on either side of Lake Sakakawea and Little Missouri River crossings, construction activities could result in instability through undercutting of slopes or changes in drainage and surface flow.

Construction over undetected underground mining voids could pose dangers for construction workers, result in loss of equipment, and potentially pose a threat to shallow groundwater through spills of fuel and lubricants. Areas of potential subsidence from abandoned lignite mines were identified and are listed in **Table 3.2-3**.

The proposed protection measures listed in Section 4.2.3 would reduce the risk of impacts to construction from unstable slopes and underground mine subsidence.

Blasting is not anticipated for the Project. If hard bedrock is encountered it can be disaggregated by using rippers, trenchers, or other equipment.

Operation

As previously identified, landslide areas would be crossed by the Project route. Pre-construction geotechnical investigations would help to identify site-specific engineering design and monitoring that would lessen the risk and potential impact of landslide and ground instability concerns. Operation of the Project would not alter the geological and physiographic conditions.

Mine subsidence has the potential to create ground instability with a risk of damaging the proposed pipeline, disruption of service, and possible contamination from leaks. As with landslides, pre-construction investigations in areas of known or suspected historic mining, and avoidance of those identified, would lessen the risks associated with ground subsidence.

The proposed protection measures listed in Section 4.2.3 would reduce the risk of impacts to pipeline operation from unstable slopes and underground mine subsidence.

Because there are no identified active faults along the Project route, no impacts due to ground deformation due to fault movement are expected. The Project is in an area not likely to experience strong ground motion during a maximum credible earthquake, therefore impacts due to ground motion are not anticipated.

4.2.1.2 Minerals

Construction

As described in Section 3.2, the Project route crosses numerous oil and gas fields. In addition, the Project route may cross aggregate resources (e.g., gravel, sand) in alluvial valleys and river terraces. Nevertheless, construction would have very minor and short-term impacts on current mineral extraction activities due to the temporary and localized nature of pipeline construction activities. Construction of the Project is not expected to impact gravel mining operations.

It is possible that oil and gas wells may be close to the Project route and surface facilities. Construction activities potentially could damage wells, associated underground fluid lines and pipelines, and disrupt

normal operations and routine maintenance. Also, damage to oil and gas facilities, should it occur, could present severe health and safety and contamination hazards. Abandoned wells also could be impacted because construction potentially could remove existing abandoned well markers and damage near surface cement plugs. Because oil and gas are produced at depths considerably deeper than the excavation depth, construction of the Project would not be expected to affect the oil and natural gas producing formations. Rather, any construction-related impacts would be limited to surface or near-surface components of the wells and gathering systems, which would temporarily disrupt production until repairs are made.

Operation

The primary issues of concern regarding mineral resources and operation of the proposed pipeline are the potential for reduced access to underlying minerals and interference with future mineral extraction operations.

Long-term operation of a pipeline has the potential to preclude access to mineral resources. Overall, the Project does not pose a hindrance for accessing oil and gas resources. With the current propensity to drill horizontal laterals or directionally drill wells to access oil and gas resources, the proposed pipeline would not restrict access to those resources. Although the Project is within an area of coal and uranium resources, no current plans to mine such resources along the Project route were identified.

Additionally, impacts on future mineral development would not constitute a substantial loss of mineral resource or mineral availability because of the narrow, linear nature of the pipeline ROW relative to the expanse of areas with mineral resource potential. The pipeline trench would be backfilled with materials derived from the trench excavation, and it might be necessary to obtain some construction sand and gravel from local, existing commercial sources for use as pipe padding, road base, or surface facility pads. These demands for sand and gravel would not affect the long-term availability of construction materials in the area.

4.2.2 No Action Alternative

Impacts to geologic materials and minerals in the Project area would be avoided because the Project would not be implemented.

4.2.3 Mitigation

The following protection measures are proposed to reduce the risks ground instability poses by landslides and ground subsidence:

GM-1: Geotechnical investigations will be completed in landslide prone areas north and south of the Lake Sakakawea and Little Missouri River crossings in order to characterize areas of potential instability. HDD will be used for the Little Missouri crossing not only at the river crossing itself, but also HDD will be used to avoid landslide hazards and steep slopes along the bluffs on the north and south sides of the river crossing. It is recommended that final design of the HDDs under the landslides incorporate information concerning the bedrock-landslide interface so that the drill borings and eventually the pipe are placed in relatively competent bedrock and not in landslide material. Also, the distance of the entry/exit points from the edges of the bluffs should be adequate to accommodate erosion and large rotational slump blocks that could occur along the edges of the bluffs.

GM-2: Pre-construction investigations in areas of known or suspected historic lignite mining along the Project route will be completed prior to construction in order to identify potential subsidence areas. Avoidance of areas having underground voids is the best protection. If avoidance is not possible, then appropriate engineering design is recommended to protect the pipeline and facilities from risk of damage and rupture.

4.2.4 Residual Effects

A very small risk of facility damage would remain after implementation of geologic hazard avoidance or geotechnical engineering design protection measures for slope instability and underground mine subsidence.

4.3 Paleontological Resources

4.3.1 Proposed Action

Construction

The issue of concern with regard to paleontological resources is the potential damage and loss of scientifically important fossils from ROW clearing, grading, trench excavation, and construction of other pipeline facilities. Potential impacts to fossil localities during construction would be both direct and indirect. Direct impacts to or destruction of fossils would occur from trenching or facility construction activities conducted through significant fossil beds. Indirect impacts during construction would include erosion of fossil beds due to slope re-grading and vegetation clearing or the unauthorized collection of scientifically important fossils by construction workers or the public due to increased access to fossils along the ROW.

Protective measures should be implemented where specific paleontological resources have either been identified during field survey or where the geologic unit is rated as having a high level of sensitivity for paleontology. The protection measures vary in intensity depending on underlying geological unit anticipated to be disturbed by surface grading and trench excavation. Recommended protection measures that should be implemented are provided in Section 4.3.3.

Operation

The primary impact for paleontological resources during pipeline operation is potential damage and loss of scientifically important fossils from maintenance activities. Any potential effects to fossils from maintenance activities would be isolated due to the probable dispersed nature of those activities.

Normal operation of the Project is not expected to disturb important paleontological resources. If there are maintenance activities that would result in surface disturbance, it would occur within previously disturbed ROW and not likely to affect paleontological resources. Therefore, there would be no impacts to paleontological resources during operation of the Project.

4.3.2 No Action Alternative

Impacts to paleontological resources in the Project area would be avoided because the Project would not be implemented.

4.3.3 Mitigation

No mitigation measures are proposed. Protection measures for paleontological resources are included in the Unanticipated Discoveries Plan (POD, Appendix XVII).

4.3.4 Residual Effects

Even if construction monitoring is implemented, some scientifically valuable fossils may be disturbed and lost during excavation and grading over areas that are expected to be disturbed. As a consequence, there would be a small incremental loss of fossil material that would be offset by the material that is recovered and preserved for scientific study purposes.

4.4 Soils

4.4.1 Proposed Action

Potential impacts to soil resources were investigated by examining soil types, their extent, and their physical and chemical characteristics in relation to the Project area, which was completed using the Project description and the NRCS soil survey data as discussed in Section 3.4.

Construction

The Project construction would create surface disturbance to soils associated with:

- ROW clearing and grading;
- Construction of receipt facilities;
- Upgrading and maintenance of access roads; and
- Surface disturbance associated with ATWSs and pipe storage yards.

Land disturbance would result in:

- Vegetation removal;
- Compaction of soil by construction equipment;
- Accelerated runoff and erosion due to a reduction in pore space and infiltration associated with soil compaction;
- Alteration of the soil profile within the excavated trench area of the pipeline, on hillside cuts in steep-sloping areas, and in borrow areas for roads;
- A potential reduction in soil stability on steep side hill areas; and
- A temporary reduction in soil productivity and quality.

The Project would have surface disturbing activities that would result in short-term and long-term impacts. Short-term impacts are those impacts to soil resources that are related to initial construction and installation of the pipeline. Surface disturbance areas would be reclaimed and soils would be returned to a condition that currently exists within approximately 5 years following installation of the Project. Long-term impacts are those impacts associated with features used for operations and maintenance of the Project that would not be reclaimed until after the Project is decommissioned at the end of the Project's life. The acreage of sensitive soils impacted by the Project were estimated to assess the overall impacts to soil resources. The acreage of sensitive soils within disturbance areas is listed in **Table 4.4-1**.

A small percentage of prime farmland would be impacted during construction of the pipeline. With proper topsoil handling techniques, impacts to prime farmland are expected to be short term. No permanent facilities would be constructed on prime farmland. Two receipt facilities and a pipe storage yard would impact farmland of statewide importance. Soil quality and long-term productivity would be impacted permanently at these locations.

Table 4.4-1 Soil Characteristics within Disturbance Areas (Acres)

Disturbance Type	Droughty	Compaction Prone	Farmland of Statewide Importance	Prime Farmland	Hydric	Wind Erodible	Water Erodible	Shallow Depth to Bedrock
Trunk line and Laterals	273.5	520.7	336.9	1.6	279.9	47.6	169.4	61.7
Access Roads	1.9	8.1	2.4	0	2.1	0.1	1.4	0.3
ATWSs	12.0	10.3	12.3	1.5	4.1	0.8	3.6	0.4
MLVs	0.06	0.05	0.09	0	0.03	0	0	0
Lateral Interconnects	0	0.34	0	0	0	0	0	0
Pipe Storage Yards	0	44.0	17.6	0	0	0	0	0
Receipt Facilities	9.8	57.9	8.4	0	10.3	7.0	1.5	0
Total	297.2	641.0	377.6	3.1	296.6	55.2	175.9	62.3

Source: NRCS 2011.

Accelerated wind and water erosion would occur where land has been disturbed. Reclamation and erosion control would be difficult on soils that occur on steeper sloping areas (15 percent or more), particularly those steeper sloping areas over shallow soils (20 inches or less to bedrock). Soils with unfavorable properties, including thin topsoil layers, moderate to strong salinity and alkalinity, clayey or sandy surface and subsoils, and shallow depths over bedrock are common and would present problems for erosion control and revegetation. Badlands would present reclamation challenges due to the difficulty in stabilization of disturbances in these areas.

Soil compaction and rutting would likely result from the movement of heavy construction vehicles along the construction ROW, facilities, ATWS, receipt and delivery points, and on temporary access roads. The degree of compaction would depend on the moisture content and texture of the soil at the time of construction. Compaction would be most severe where heavy equipment operates on moist to wet soils with high clay contents. Detrimental compaction also can occur on soils of various textures and moisture contents if multiple passes are made by equipment. If soils are moist or wet where trenchline only topsoil removal has occurred, topsoil would likely adhere to tires and/or tracked vehicles and be carried away.

Typically soils that are compaction prone also are prone to rutting or displacement when saturated. Rutting occurs when the soil strength is not sufficient to support the applied load from vehicle traffic. Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs roots and reduces the aeration and infiltration of the soil, thereby degrading the rooting environment. Rutting also disrupts natural surface water hydrology by damming surface water flows, creating increased soil saturation upgradient from ruts, or by diverting and concentrating water flows thereby causing accelerated erosion and gullying. Rutting is most likely to occur on moist or wet fine-textured soils, but also may occur on dry sandy soils due to low soil strength.

BakkenLink plans to minimize or mitigate potential impacts to soils by implementing the soil protection measures identified in **Table 2-5**; the SWPPP; and the CMRP. The CMRP, SWPPP, and Summary of Protection Measures (POD, Appendices XV, XVIII, and XIX, respectively), would provide an effective program that would ensure successful erosion control and reclamation of all land disturbance. BakkenLink would follow the CMRP when operating on USFS and state lands, and would comply with soil protection and land use goals identified by the landowners on private lands.

Most of the impacts to soil resources would be short term, since all disturbed areas not needed for operations would be reclaimed within 1 year of construction. Most reclamation would be completed within a few months of disturbance. However, soil impacts may occur if revegetation is not successful or adverse weather conditions (mainly heavy rainstorms) occurred during construction or before reclamation and erosion control measures could be implemented.

Some unquantifiable soil loss resulting from accelerated wind and water erosion would occur until erosion measures were implemented (generally measures would be implemented within 20 days of backfilling the trench). In addition to the sensitive soils described in **Table 4.4-1**, a few small unquantifiable areas (mainly abrupt steep slopes and localized areas with soil containing unfavorable physical and chemical properties) would be subject to accelerated erosion and require intensive and continuing follow-up erosion control measures.

With effective use of erosion control/revegetation procedures, understory vegetation on sites without soil limitations is expected to return to near pre-construction conditions within 5 years after construction. Problem areas may require replanting and/or use of special revegetation techniques if revegetation does not respond in one to two growing seasons. In areas of limited precipitation or drought (less than 9 inches), and where there are shallow soils and/or low permeability soils, reclamation techniques that enhance permeability and conserve moisture would increase the potential for successful revegetation. Impacts to

overstory vegetation would be long term with shrubs and trees taking several years to become re-established (e.g., 10 to 20 years for shrubs and 50 to 75 years for tree species).

Potential effects of fuel spills on soils would include contamination at the spill site and possible removal of soils at discrete locations. Contaminates BMPs incorporated into the Spill Prevention, Control, and Countermeasure (SPCC) Plan (POD, Appendix XIII) would be implemented to minimize fuel spills.

Operation

As previously described, some soil loss would result from wind and water erosion until erosion control measures begin to take effect. Very small scale, isolated surface disturbance impacts, resulting in accelerated erosion, soil compaction, spills, and related reductions in the productivity of desirable vegetation could result from pipeline maintenance traffic and incidental repairs. Impacts related to excavation and topsoil handling are not likely to occur. However, if they do occur, they would be limited to small areas where certain pipeline maintenance activities occur. During operation, these types of impacts would be addressed with the affected landowner or land management agency and a mutually agreeable resolution reached.

4.4.2 No Action Alternative

Implementation of this alternative would avoid impacts to soils since surface disturbance associated with the Project would not occur.

4.4.3 Mitigation

S-1: During reclamation, compacted areas (typically any area that received repeated traffic or three or more passes by heavy equipment) will be decompacted, to the depth of compaction, by subsoiling or ripping to the depth of compaction. This will help prepare the seed bed, encourage infiltration and help to prevent accelerated runoff and erosion. Where topsoil has been salvaged and segregated, decompaction will occur prior to respreading topsoil. Scarification will only be used on shallow soils.

S-2: Salvaged topsoil will be protected from wind and water erosion at all times. To ensure proper erosion control of topsoil piles, all sediment and erosion control measures will be inspected after large rain events and repairs will be performed as needed.

4.4.4 Residual Effects

Residual effects to soils would include the long-term loss of 80.2 acres of soils and soil productivity from the construction and operation of aboveground facilities (e.g., receipt facilities, MLVs).

4.5 Water Resources

4.5.1 Proposed Action

4.5.1.1 Surface Water

Construction

Potential construction impacts to surface water would depend on the construction techniques employed and the physical characteristics of the streams and watersheds crossed by the Project route. Construction of the Project could affect surface water in several ways. Clearing, grading, trenching and soil stockpiling activities could temporarily alter overland flow. Surface soil compaction caused by the operation of heavy equipment could reduce the soil's ability to absorb water, which could increase surface runoff and the potential for ponding. These impacts would be localized and temporary. Other temporary impacts, mainly in the form of erosion and sedimentation effects on surface water quality, would be generally expected from land disturbance during construction.

The potential for these impacts would be minimized by the implementation of BMPs, and by the implementation of the Project CMRP. In addition, the SPCC Plan would address preventive and mitigation measures that would be used to avoid or minimize the potential impact of hazardous material spills during construction. The Spill Risk Assessment evaluates the potential for contamination from an accidental oil release. The Project would be monitored through a SCADA system, which would alert operations personnel to any potential leaks. Additionally communications equipment would be installed allowing some valves to be operated remotely to minimize any potential impacts of a spill. BakkenLink would install remotely controlled valves on both sides of Lake Sakakawea, the Little Missouri River, the Green River, and the perimeter of USFS-administered lands.

MLVs would be installed in accordance with federal regulations as described in the POD and as reviewed by PHMSA. To address potential water resources impacts, MLVs would be installed:

- Along the Trunk line at locations appropriate for the terrain in open country or populated areas that would minimize damage or pollution from accidental discharge;
- At each side of a waterbody crossing more than 100 feet wide from high-water mark to high-water mark;
- On each side of a reservoir holding water for human consumption; and
- At other locations along trunk lines or at facilities.

As noted in Chapter 3.0 and on tables and maps in the POD, waterbodies more than 100 feet wide from their high-water marks include the Little Missouri River (approximately 440 feet wide at high water), Lake Sakakawea (approximately 12,300 feet wide), and several other streams. MLVs 1, 2, and 3 would be located at relatively short increments in the Lake Sakakawea vicinity, as described in **Table 2-4** and POD Table 5-1. MLV 5 is located at approximately MP 67, and MLVs 6 and 7 are located approximately at MPs 71 and 78 according to **Table 2-4** and POD Table 5-1. MLVs would be installed on either side of the Little Missouri River and Lake Sakakawea, as well as near other stream crossings. Proposed valve locations are depicted in **Figure 1-1**.

Areas of disturbance adjacent to and directly upslope of streams might contribute to temporary impacts of surface water through increased rates of erosion that contribute sediment to the streams during storm runoff events. **Table 2-5** summarizes environmental protection measures for the Proposed Action. In addition, BMPs contained in the SWPPP, typical construction practices indicated in the POD, Appendix III, and committed measures set forth in the CMRP (POD, Appendix XV) would be utilized during construction and reclamation to minimize impacts. Pipeline crossings would be scheduled at times when there is as little flow

and rainfall as possible. This would minimize the risks of debris, stockpiled soil, and other sources of sediment from being washed into waterbodies or wetlands. Temporary erosion and sediment control BMPs would be installed across the entire width of the construction ROW after clearing and before ground surface disturbance. No silty/turbid discharge water from the trench dewatering operations would be allowed to enter any waterbody or wetland.

The Project would be designed and constructed so it would not impede the flow of any waterway. The pipeline would be installed below the bed of the waterway, at a level so the channel bed gradient does not change. Where implemented at the Green River and Little Missouri River, HDD crossings would minimize the potential for impacts from stream crossing construction. Most streams would be crossed by open-cut methods. Temporary impacts would be most likely to occur during open-cut construction at flowing intermittent streams. Trench excavation at perennial streams or intermittent streams with streamflow at the time of construction would result in increases of sediment available for transport by the water. This would temporarily result in elevated levels of total suspended sediment (TSS) and increases in turbidity at and downstream from the stream crossing. TSS and turbidity levels would be expected to recover within several days after the completion of in-stream construction activities.

Similar impacts are anticipated to occur at the Lake Sakakawea crossing, where HDD is not currently proposed. Possible impacts to Lake Sakakawea include temporary increased turbidity during construction and disturbance of sediments containing certain potentially hazardous substances. BakkenLink is evaluating alternative crossing methods and is discussing these methods with the USACE. A pipeline-pull method is BakkenLink's proposed crossing method. Any construction method would have to be approved and permitted by the USACE prior to construction. The NDDH is a cooperating agency with the USACE through the Clean Water Act Section 401 Water Quality certification program as administered by the State. Sediment sampling of the lake sediments at the crossing location has been performed and analytical testing completed to determine the chemical composition of these sediments.

As described in POD, Appendix X, consultation with the NDDH and USACE resulted in sampling and analysis of lake sediments relative to maintaining water quality during lake crossing construction. Six soil boring sites and their spacing across the lake were determined in consultation with the NDDH. Composite samples were collected to represent two depth increments (0 to 4 feet, 6 to 10 feet). The total sampling depth of 10 feet represents typical pipeline installation depth. Laboratory results were reported as total constituent concentrations based on elutriate testing. Most numeric water quality standards are based on dissolved concentrations and default values use an assumed water hardness value of 100 mg/L (NDDH 2011). Because the dissolved fraction is less than or equal to the total concentrations, the site analyses are somewhat conservative. In addition, historical hardness values at NDDH sampling site 382050 on Lake Sakakawea upstream near the proposed crossing location range from 149 to 254 mg/L, with a geometric mean of approximately 193 mg/L. Under site-specific conditions, this may increase the concentrations of water quality standards for metals. For example, using the geometric mean hardness, the specific acute standard for lead would be 0.189 mg/L, for cadmium it would be 0.0042 mg/L, and the specific acute standard for zinc would be 0.209 mg/L. Of the 12 samples, four samples had total zinc concentrations above the default acute standard; one of these was a slight exceedence that is likely within statistical reporting error (POD, Appendix X). Two of the samples would exceed zinc concentrations for a calculated hardness-based standard value. Lead and cadmium concentrations exceeded default water quality standards in one of the same samples. Lead concentrations would all be within a calculated hardness-based standard value, but the one cadmium exceedence would remain.

In general, then, there may be minor zinc and cadmium exceedences within the lake floor sediments at the proposed crossing location. Due to the limited occurrence of these concentrations, they are not anticipated to create water quality impacts during or after construction. However, adverse turbidity and siltation effects would occur from proposed trenching. These impacts would occur as relatively short-term exceedences of narrative water quality standards. The Project would deploy turbidity monitoring instrumentation at

agreed-upon locations, with STOP authority in case the construction exceeds an agreed-upon turbidity threshold based on pre-construction measurement (POD, Appendix X). In addition, impacts from turbidity and siltation would be reduced by the use of turbidity curtains during crossing construction. These fabric barriers are suspended from floats and lines, and would control the extent of sediment suspension and contain the settlement of silts suspended during the crossing construction. Flexible concrete mats would be placed over the pipe to help protect it from physical abrasion, such as contact with boat anchors.

Water quality could be impacted if construction equipment and vehicles leaked or spilled petroleum products, lubricants, solvents, or other hazardous materials into or near waterbodies. Protective measures are presented in the Project SWPPP, SPCC Plan, and in the CMRP. These plans are in the POD, Appendices XIX, XVIII, and XV, respectively. Therefore, impacts to surface water resources due to construction of the pipeline are not anticipated.

Operation

During operations, impacts to surface water resources would occur if a pipeline leak or rupture released crude oil. The severity and duration of such an impact would depend on its location, the volume of oil released, and the spill response and countermeasures implemented. Pipeline safety provisions and monitoring procedures and equipment would minimize the potential for such impacts during operations. Because of the potential for adverse impacts to surface water quality from oil leaks or pipeline rupture during operations, additional mitigation is recommended. Remotely controlled MLVs on both sides of Lake Sakakawea, the Little Missouri River, the Green River, and on the perimeter of USFS-administered lands would help to lessen, but not eliminate, potential impacts to these resources in the event of a spill or rupture.

4.5.1.2 Groundwater

Construction

Construction and operation of the Project is not expected to adversely affect groundwater resources in the Project area or its vicinity. Blasting is not anticipated as a means for trench excavation. No measurable alteration of aquifer recharge should occur.

The trench excavated for pipe placement would be above the water table along the proposed ROW in most locations, with the exceptions of surficial alluvial aquifers along streams and shallow glacio-fluvial aquifer zones. These areas are described in Section 3.5, Groundwater. Portions of the route in the immediate vicinity of these features may encounter shallow groundwater during excavation. Following backfilling of the trench, these areas would be returned to their original condition, and groundwater impacts would not be expected. No unpermitted withdrawals of groundwater would occur. Therefore, impacts to groundwater resources due to construction of the Project are not anticipated.

Some dewatering of construction areas and the pipeline trench may occur; however, relatively small volumes are expected and effects on the overall groundwater system would be small and temporary. Potential impacts on the groundwater would include minor fluctuations in groundwater levels and/or increased turbidity with the aquifer adjacent to the activity. Because of the relatively small amount of water removed, the short duration of the activity, and the local discharge of the water, groundwater levels would quickly recover after pumping stops. If temporary dewatering of groundwater is required during construction activities, dewatering would be discharged in compliance with a NPDES permit.

Operation

The greatest risk for impacts to surficial or shallow groundwater would result from the accidental release of a hazardous substance during construction or from a release during pipeline operations. There is a risk for small spills of liquids during construction, but these would be contained to small, isolated areas centered along the construction ROW. Potential leaks or spills of petroleum products or other hazardous materials

from construction equipment and vehicles have the potential to adversely affect near-surface groundwater. In such an event, actions and reporting conducted according to an approved SPCC Plan would reduce the extent and severity of groundwater impacts.

The greatest risk for impacts to groundwater would result from an accidental oil release from the pipeline. As previously mentioned, BakkenLink developed a Spill Risk Assessment to address the potential for contamination from a pipeline release. The Project would be monitored through a SCADA system, which would alert operations personnel to any potential leaks. Additionally the communications equipment would be installed allowing valves to be operated remotely to minimize any potential impacts of a spill.

Water for hydrostatic testing, dust abatement, and other construction uses would temporarily impact surface water and/or groundwater resources, either through withdrawals from municipal or private wells. Water planned for construction would total approximately 4.5 million gallons (13.8 acre-feet). This would include 4,172,154 gallons (12.8 acre-feet) for hydrostatic testing, and 164,339 gallons (0.5 acre-feet) for HDD. Additional water would be used for dust abatement and drilling. Water would be obtained through Temporary Use Agreements with current water users, as applied for and pending approval by the State of North Dakota. Hydrostatic testing would occur in eight pipeline segments and nine HDD sections as they are completed during the construction period. Water for hydrostatic testing would be disposed of according to applicable federal, state, and local regulations. Test water would be discharged into a selected dispersion device as described in the Hydrostatic Testing Plan, so as to avoid erosion and sedimentation in upland settings, and to avoid channel or bank scour at streams. The Hydrostatic Test Plan and provisions in the CMRP, Section 8, provide guidance on the location of dewatering structures, which would be located and constructed to avoid deposition of sediments into waterbodies or shallow aquifers. The discharge of water from dewatering and hydrostatic testing operations would comply with relevant state discharge guidelines. Additional methods and provisions for water management during hydrostatic testing are presented in POD, Appendices III, XV, and XVI. Effects from dewatering would be localized and temporary.

At perennial stream crossings where HDD is employed, inadvertent releases of drilling fluids and lubricants through seepage may occur, which sometimes can reach surface water or shallow groundwater. Development and implementation of the SPCC Plan would reduce the potential for these impacts by necessarily including measures to address these types of occurrences and the nature of the materials potentially involved.

4.5.2 No Action Alternative

Implementation of this alternative would avoid impacts to surface water and groundwater because surface and subsurface disturbance associated with the Project would not occur.

4.5.3 Mitigation

Based on Project plans, drawings, and provisions, no additional mitigation measures are recommended.

4.5.4 Residual Effects

Assuming that successful site stabilization and revegetation are completed, residual impacts to surface water or ground water resources are expected to be negligible. Once established, controls on runoff, erosion, and sedimentation would reduce the long-term potential for impacts from disturbance. Implementation of the practices set forth in construction plans (such as the SWPPP, SPCC Plan, and Hydrostatic Testing Plan) would avoid or reduce impacts during Project construction. Burial depths at stream and river crossings would counteract the potential for pipeline rupture or leaks at those locations. Concrete coating at Lake Sakakawea, and rock covers and/or flexible concrete mats (placed as needed in areas having higher levels of marine traffic) would prevent pipeline damage and potential releases during operations. In addition, the SCADA system and periodic pipeline inspections would monitor conditions

during operations. If pipeline releases occurred, responses would be triggered to address impacts to water resources. All of these Project features would avoid residual impacts or reduce their potential to negligible levels.

4.6 Vegetation Resources

4.6.1 Proposed Action

The impact analysis area for vegetation resources encompasses the Project area. Construction impacts were calculated based on the inclusion of the construction ROWs temporary use areas associated with the Trunk line and laterals and their associated access roads; ATWSs; and pipe storage yards. A temporary construction ROW width of 100 feet would be employed in all areas, with the exception of USFS-administered lands, wooded areas, and wetland crossings, which would be limited to a 50-foot-wide construction ROW. Operation impacts were calculated based on the inclusion of long-term use areas associated with receipt facilities, MLV locations, launcher/receiver facilities, and interconnection facilities. The primary issues associated with vegetation resources include direct and/or indirect impacts to native vegetation communities, riparian/wetland habitats, and impacts associated with the potential introduction and/or spread of noxious weed species.

Construction

Direct impacts from Project-related activities would include the temporary loss of vegetation as a result of trampling/compaction, clearing/trenching/blading of surface cover, and direct removal of aboveground and belowground vegetation as a result of construction. Temporary disturbances would be limited to the agriculture, developed, grassland, and wetland/waterbody vegetation cover types within the construction ROW. Long-term impacts (greater than 20 years) would be limited to the shrubland and woodland vegetation cover types within the construction ROW. Increased fugitive dust emissions associated with vehicle and equipment travel along access roads during construction may result in a potential decrease in species and habitat productivity in the short term.

Operation

Permanent disturbances as a result of pipeline operation and maintenance activities would be limited to vegetation communities located within the permanent aboveground facilities. Woody species present within the shrubland and woodland vegetation cover type would be replaced pursuant to the *Tree and Shrub Mitigation Specifications* (POD, Appendix XXV). Tree and shrub replacement would be completed on 2:1 basis within the disturbed ROW; however, tree and shrub replacement would not be permitted within a 20- to 30-foot-wide path over the pipeline centerline to facilitate periodic visual inspections of the ROW. Although a loss of woody-dominated vegetative cover acreage would occur from Project construction, an increase of woody species individuals and herbaceous-dominated vegetative cover acreage would result with implementation of tree and shrub replacement plantings. **Table 4.6-1** summarizes temporary and permanent acreage disturbances to each vegetation cover type within the Project area.

Indirect impacts as a result of Project implementation may include the potential establishment of noxious weed species in areas of vegetation removal or soil disturbance, in areas where reclamation is unsuccessful or prolonged, or in areas of higher soil erosion or lower vegetative cover. Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive.

Table 4.6-1 Summary of Temporary and Permanent Disturbances per Vegetation Cover Type and Project Component Within the Project Area

Project Component	Vegetation Cover Types												Total	
	Grassland		Agriculture		Wetland/Waterbody		Developed		Woodland		Shrubland			
	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]	Temporary Disturbance (acres)[1]	Permanent Disturbance (acres)[1]
Trunk line	689.6	0.1	586.8	0.1	25.1	0.0	40.4	0.1	21.0	0.0	5.6	0.0	**1,368.6**	**0.2**
Laterals	30.1	0.0	26.6	0.0	0.0	0.0	2.2	0.0	0.2	0.0	0.0	0.0	**59.0**	**0.0**
Lateral Interconnects	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**0.3**
Receipt Facilities	0.0	7.6	0.0	67.8	0.0	0.0	4.6	4.6	0.0	0.1	0.0	0.0	**0.0**	**79.7**
Pipe Storage Yards	35.3	0.0	23.3	0.0	0.0	0.0	1.6	0.0	0.4	0.0	0.2	0.0	**60.7**	**0.0**
Total Surface Disturbance	**754.9**	**7.6**	**636.7**	**67.8**	**25.2**	**0.0**	**44.2**	**4.6**	**21.6**	**0.1**	**5.8**	**0.0**	**1,488.3**	**80.2**

[1] Totals discrepancy due to rounding.

Source: USGS 2004b.

To minimize environmental impacts and ensure site stabilization and revegetation, BakkenLink would implement the environmental protection measures and design features detailed in **Table 2-5**. The CMRP (POD, Appendix XV) outlines the procedures to be followed during construction and reclamation, and the subsequent mitigation necessary to return all vegetation cover types to pre-disturbance conditions. Timely stabilization of areas disturbed by construction and reseeding with an appropriate seed mixture would minimize the magnitude and duration of vegetation disturbance. Tree and shrub would be replaced in accordance with the Tree and Shrub Mitigation Specifications (POD, Appendix XXV). BakkenLink would coordinate with the appropriate agencies to identify efficient restoration and mitigation measures; and develop appropriate revegetation seed mixtures. In addition, ROW monitoring would be conducted to determine reclamation success. The Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix VI) outlines BMPs to be employed prior to construction, and during construction, reclamation, and monitoring timeframes.

To minimize fugitive dust emissions, BakkenLink would follow the measures detailed within the CMRP (POD, Appendix XV). The primary protection measure focuses on the use of water or chemical soil binders and BMPs to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements.

Direct spills of fuels, drilling fluids, or other hazardous materials would saturate soils and adversely affect vegetation resources. To minimize the potential for spills, BakkenLink would employ the spill prevention, contingency plans, and spill containment and countermeasures outlined within the CMRP (POD, Appendix XV).

4.6.2 No Action Alternative

Implementation of the No Action Alternative would avoid impacts to vegetation since surface disturbance associated with the Project would not occur.

4.6.3 Mitigation

No additional mitigation measures for vegetation resources have been proposed.

4.6.4 Residual Effects

Residual effects to vegetation would include the long-term loss (greater than 20 years) of 80.2 acres of vegetation associated with the operation of aboveground facilities (e.g., receipt facilities, MLV locations, launcher/receiver facilities, and interconnection facilities).

4.7 Wetlands and Floodplains

The impact analysis area for wetland and floodplain resources encompasses the Project area. Construction impacts were calculated based on the inclusion of the construction ROWs associated with the Trunk line and laterals and their associated access roads; ATWSs; and pipe storage yards. A temporary construction ROW width of 100 feet would be employed in all areas, with the exception of USFS-administered lands, wooded areas, and wetland crossings, which would be limited to a 50-foot-wide construction ROW. Operation impacts were calculated based on the inclusion of long-term use areas associated with receipt facilities, MLV locations, launcher/receiver facilities, and lateral interconnect sites. The primary issues associated with wetland resources include direct and/or indirect impacts to wetlands and floodplains, and impacts associated with the potential introduction and/or spread of noxious weed species and potential for accidental oil spills.

4.7.1 Proposed Action

Construction

Direct impacts from Project-related activities would include the temporary loss of 3.3 acres of wetland vegetation, hydric soils, and potential hydrologic functionality as a result of trampling/compaction, clearing/trenching/blading of surface cover, and direct removal of aboveground and belowground vegetation and substrate. No permanent aboveground facilities would be located within a wetland; therefore, all impacts to wetland resources would be considered temporary in nature following the completion of successful reclamation. Impacts to surface waters are discussed in detail in Section 3.5, Water Resources.

Indirect impacts as a result of Project implementation may include the potential establishment of noxious weed species in areas of vegetation removal or soil disturbance, in areas where reclamation is unsuccessful or prolonged, or in areas of higher soil erosion or lower vegetative cover. Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive. In addition, increased fugitive dust emissions associated with vehicle and equipment travel along access roads for construction, operation, and maintenance activities may result in a potential decrease in species and habitat productivity.

To minimize environmental impacts and ensure site stabilization and revegetation, BakkenLink would implement the environmental protection measures and design features detailed in **Table 2-5**. Minimization measures include a reduction in construction ROW width to 50 feet within wetlands, the exclusion of permanent facilities within wetlands, and the implementation of BMPs (e.g., installation of erosion control devices to reduce sediment transport into wetlands). The CMRP (POD, Appendix XV) outlines the procedures to be followed during construction and reclamation, and the subsequent mitigation necessary to return all wetland and waterbodies to pre-disturbance conditions. Timely stabilization of areas disturbed by construction and reseeding with an appropriate seed mixture would minimize the magnitude and duration of vegetation disturbance. BakkenLink would coordinate with the appropriate agencies to identify efficient restoration and mitigation measures; and develop appropriate revegetation seed mixtures. In addition, ROW monitoring would be conducted to determine reclamation success. No refueling or lubricating would occur within 100 feet of wetlands and hazardous materials, chemicals, and fuels would not be stored within 100 feet of wetlands. The Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix VI) outlines BMPs to be implemented prior to construction, and during construction, reclamation, and monitoring timeframes. These BMPs would be implemented to minimize the potential for establishment or spread of noxious weeds and invasive species within wetlands.

To minimize fugitive dust emissions, BakkenLink would follow the measures detailed within the CMRP (POD, Appendix XV). The primary protection measure focuses on the use of water or chemical soil binders

and BMPs to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements.

Operation

No permanent facilities would be located within wetlands; therefore, no impacts are anticipated as a result of Project operation.

If an accidental spill were to occur within a wetland during operation, BakkenLink would employ the spill prevention, contingency plans, and spill containment and countermeasures outlined within the CMRP (POD, Appendix XV).

4.7.2 No Action Alternative

Implementation of the No Action Alternative would avoid impacts to wetlands and floodplains since surface disturbance associated with the Project would not occur.

4.7.3 Mitigation

No additional mitigation measures for wetlands and floodplains have been proposed.

4.7.4 Residual Effects

Residual impacts to wetlands and floodplains are not anticipated from the construction and operation of the Project.

4.8 Noxious Weeds and Invasive Species

4.8.1 Proposed Action

The impact analysis area for noxious weeds and invasive species encompasses the Project area. Construction impacts were calculated based on the construction ROWs associated with the Trunk line and laterals and their associated access roads; ATWSs; and pipe storage yards. A temporary construction ROW width of 100 feet would be employed in all areas, with the exception of USFS-administered lands, wooded areas, and wetland crossings which would be limited to a 50-foot-wide construction ROW. Operation impacts were calculated based on the inclusion of long-term use areas associated with receipt facilities, MLV locations, launcher/receiver facilities, and interconnection facilities. The primary issues associated with noxious weeds and invasive species include their potential introduction and/or spread into native vegetation communities and riparian/wetland habitats, and subsequent reduction of suitable vegetation species, overall habitats, or decreased land values.

Construction

Substantial increases in weed prevalence within the Project area are not anticipated; however, despite efforts to prevent the proliferation of noxious weed species, it is possible that construction activities could result in the spread or introduction of noxious weed species along the ROW or that weed species could be transported into areas that were relatively weed-free. Implementation of the Project's Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix VI) would minimize the introduction and spread of noxious weed species within the Project area. The Noxious Weed and Aquatic Nuisance Species Control Plan identifies pre-construction, construction, and post-construction measures including, but not limited to, the following: pre-construction biological monitors and weed control, use of weed-free erosion control devices, pressure washing all construction equipment, and post-reclamation monitoring and control.

Operation

Noxious weed species can be introduced to the Project area via weed-contaminated vehicles, equipment, and erosion control devices (e.g., straw bales) and, if not controlled, can displace native plant species, rendering infested areas unproductive. Impacts to vegetation as a result of noxious weed invasions are anticipated to be minimal during Project operation with the implementation of the Noxious Weed and Aquatic Nuisance Species Control Plan, which includes post-reclamation monitoring and noxious weed control measures.

4.8.2 No Action Alternative

Implementation of the No Action Alternative would avoid impacts to vegetation and the potential establishment and invasion of noxious weeds and invasive species since surface disturbance associated with the Project would not occur.

4.8.3 Mitigation

No additional mitigation measures for noxious weed control have been proposed.

4.8.4 Residual Effects

Residual effects to native vegetation as a result of invasion by noxious weeds and invasive species are not anticipated with the implementation of the Noxious Weed and Aquatic Nuisance Species Control Plan.

4.9 Wildlife and Fisheries

Wildlife species and related issues for this analysis were determined through consultation with the NDGFD, USFS, and USFWS. The primary issues related to wildlife species include the loss or alteration of native habitats, increased habitat fragmentation, animal displacement, and direct mortalities. Direct impacts to wildlife species include mortality and displacement related to pipeline construction and operation. Habitat loss, alteration, and fragmentation also would occur. Indirect impacts include disturbance from increased levels of noise and human activity. Impact levels depend upon timing and type of construction, sensitivity of the impacted species, and seasonal use patterns.

Potential impacts to wildlife species can be further classified as temporary and permanent. Temporary impacts consist of habitat removal, activities associated with Project construction, and changes in wildlife habitats until reclamation activities have been completed and vegetation is re-established. Permanent impacts consist of permanent changes to habitats and the wildlife populations that depend on these habitats, regardless of reclamation success. The extent of both temporary and permanent impacts depends on factors such as species sensitivity to human activity, seasonal use patterns, type and timing of construction activities, and physical parameters (e.g., topography, cover, forage).

Impacts to game and nongame wildlife species, which occur in the Project area and as referenced in **Appendix A**, are anticipated to be minimal because: 1) only a small portion of the potentially suitable, available habitat would be impacted by Project construction activities; 2) established topsoil handling techniques and subsequent reseeding of disturbed areas would aid in the re-establishment of habitats; 3) the temporary nature of Project construction would minimize the length of time that wildlife would potentially avoid habitats along the Project ROW; and 4) measures to avoid impacts to wetland and waterbody habitat would be implemented.

Electrical Transmission Lines

Power would be required to serve the receipt facilities listed in **Table 2-3**. Four 0.25-mile-long segments of new electrical transmission lines would be required, resulting in a total of less than 1.0 mile of new transmission lines. The Dunn and Watford City Receipt facilities would require overhead transmission lines. The Keene and Beaver Lodge Receipt facilities would require underground lines. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers. Protection measures that could be implemented by electrical service providers to minimize or prevent collision risk to migrating birds include the use of standard measures as outlined in *Mitigating Bird Collision with Power Lines* (Avian Power Line Interaction Committee [APLIC] 1994).

Hydrostatic Testing

Hydrostatic testing would be accomplished using municipal water sources therefore, impacts to waterbody habitat and associated species would not occur.

As presented in Section 4.6, Vegetation Resources, a total of five vegetation cover types occur in the Project area. Impacts from Project construction would include the temporary disturbance of 1,444.2 acres of potential wildlife habitat, including 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland. Permanent impacts would occur to 75.5 acres of wildlife habitat, including 67.8 acres of agricultural land, 7.6 acres of grassland, and 0.1 acre of woodland.

4.9.1 Proposed Action

4.9.1.1 Management Indicator Species

Construction

Three MIS have been identified for the Project: sharp-tailed grouse, greater sage-grouse, and black-tailed prairie dog. Impacts to sharp-tailed grouse are discussed under Section 4.9.1.3, Small Game Species. No greater sage-grouse leks occur within the Project area; therefore, impacts to the species are not anticipated (USFS 2011c). No black-tailed prairie dog colonies occur within the Project area; therefore, impacts to the species are not anticipated.

4.9.1.2 Big Game Species

Construction

Impacts to big game habitat (e.g., mule deer, white-tailed deer, elk, pronghorn, Rocky Mountain bighorn sheep, and mountain lion) include the temporary loss of potential forage and vegetative cover (native and reclaimed vegetation) and increased habitat fragmentation within the Project area. Impacts to the Rocky Mountain bighorn sheep and its habitat are discussed in Section 3.10, Special Status Species. No other big game critical ranges are identified within the Project area. A total of 1,444.2 acres of potential big game habitat would be temporarily impacted by Project construction. This includes 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland.

Operation

Project operation may result in direct and indirect impacts to big game species. Direct mortality to individuals may result from collisions with maintenance vehicles. In addition, big game species may experience increased hunting and poaching pressure due to increased public access (Cole et al. 1997). Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity.

Displacement of big game as a result of direct habitat loss and indirect reduction in habitat quality has been widely documented (Irwin and Peek 1983; Lyon 1983, 1979; Rost and Bailey 1979; Ward 1976). Big game species tend to move away from areas of human activity and roads, which reduces habitat utilization near disturbance areas (Cole et al. 1997; Sawyer et al. 2006; Ward 1976). Displacement distances are strongly influenced by the level and timing of human activity, topography, and vegetative cover (Cole et al. 1997; Lyon 1979), which affects noise attenuation and visual barriers. Mule deer and pronghorn appear to be more tolerant of human activity than elk. For mule deer, displacement distances ranged from 330 feet to 0.6 mile, depending on the presence of vegetative cover (Ward 1976). For evaluation purposes, 660 feet was the most common displacement distance used for mule deer, especially in areas with minimal vegetative cover. Mule Deer and pronghorn have been observed to habituate to vehicles. Displacement distances decreased when traffic was predictable; moved at a constant speed; and was not associated with out-of vehicle activities (Ward 1976).

Disturbances associated with construction activities would be temporary, and it is assumed that animals would return to the area following their completion. Based on the amount of available habitat within the Project area, impacts to big game species are anticipated to be minimal; limited primarily to displacement from areas of human activity and habitat alteration. In most instances, suitable habitat adjacent to disturbed areas would be available for big game species until herbaceous and woody vegetation were re-established within the disturbance areas.

Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial

inspections of the ROW. Permanent impacts would occur to 75.5 acres of potential big game habitat, including 67.8 acres of agricultural land, 7.6 acres of grassland, and 0.1 acre of woodland, as a result of the construction of aboveground facilities. The loss of available woody/shrubby vegetation would require more than 20 years to become re-established. However, herbaceous species may become established within 3 to 5 years, depending on reclamation success, weather conditions, and grazing management practices in the Project area.

4.9.1.3 Small Game Species

Construction

Direct impacts to small game would include mortality or displacement as a result of construction activities. Indirect impacts include habitat loss, alteration, and fragmentation. Disturbance from increased levels of noise and human activity also would indirectly impact small game species. Project construction would result in the temporary loss of 1,444.2 acres of potential small game habitat, including 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland until reclamation has been completed and vegetation is re-established within the disturbance areas. In addition, construction-related impacts to waterfowl would include the temporary loss of 25.2 acres of wetland/waterbody habitat within the Project area.

Habitat fragmentation impacts to some small game species have been demonstrated to negatively impact populations. In most instances, suitable habitat adjacent to disturbed areas would be available for small game species until herbaceous and woody vegetation become re-established. Temporary loss of habitat would reduce productivity for the current breeding season. However, due to the large amount of suitable habitat in the Project area, impacts to small game species are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to small game species. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Local populations may experience higher levels of hunting and poaching pressure due to improved public access (Holbrook and Vaughan 1985). Other potential indirect impacts would include displacement of individuals, and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 75.5 acres of potential small game habitat, including 67.8 acres of agricultural land, 7.6 acres of grassland, and 0.1 acre of woodland as a result of the construction of aboveground facilities.

Sharp-tailed Grouse

Construction

Four active sharp-tailed grouse leks occur along the Project route. Project construction during the breeding season may impact the sharp-tailed grouse by destroying nests, causing nest abandonment, or causing injury or direct mortality to the young. Impacts also may occur to sharp-tailed grouse breeding habitat, including the loss of lekking grounds and brood-rearing habitat. The species is particularly sensitive to disturbance while the birds gather on lekking grounds each morning and evening from March to June. Construction activities and associated noise, which may occur in the early morning or late evening near lekking grounds, may disrupt and displace individuals that have gathered for breeding activities. Once breeding activities have concluded, hens build their nests on the ground beneath vegetation near the lekking grounds. As presented in **Table 2-5**, no construction, operation, or maintenance activities would be allowed within 0.25 mile of the identified sharp-tailed grouse leks on USFS-administered land during the breeding season (February 1 through July 15). Therefore, impacts to breeding sharp-tailed grouse are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to sharp-tailed grouse. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Potential indirect impacts would include displacement of individuals and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 67.8 acres of agricultural land, and 7.6 acres of grassland as a result of the construction of aboveground facilities.

4.9.1.4 Nongame Species

Construction

Construction activities may result in mortalities of less mobile or burrowing nongame species (e.g., small mammals, and reptiles) within the ROW, as a result of crushing by construction vehicles and equipment. Indirect impacts include habitat loss, alteration, and fragmentation. Increased levels of noise and human activity also would indirectly impact nongame species. Project construction would result in the temporary loss of 1,444.2 acres of potential nongame habitat, including 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland. This impact would occur until herbaceous vegetation returns to pre-construction conditions (approximately 3 to 5 years). For those species that are dependent on shrubland habitat, displacement would occur until shrubs become re-established, which would require over 20 years. However, due to the large amount of suitable habitat in the Project area impacts to nongame species are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to nongame species. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals may result from collisions with maintenance vehicles. Other potential indirect impacts would include displacement of individuals, and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 75.5 acres of potential nongame habitat, including 67.8 acres of agricultural land, 7.6 acres of grassland, and 0.1 acre of woodland as a result of the construction of aboveground facilities.

Migratory Birds

Construction

Migratory birds that utilize various habitats in the Project area may be impacted by construction activities. Direct impacts to avian species include mortality, nest destruction, displacement, and disturbance from increased levels of noise and human activity. Indirect impacts to migratory birds include habitat loss, alteration, and fragmentation. Project construction would result in temporary impacts to 1,444.2 acres of potential migratory bird habitat, including 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland until reclamation has been completed and vegetation is re-established.

In addition to habitat loss, reductions in bird population densities in both open grasslands and woodlands may be attributed to a reduction in habitat quality caused by elevated noise levels (Reijnen et al. 1997, 1995). Although visual stimuli in open landscapes may add to density reduction at relatively short distances, the effect of noise appears to be the most critical factor. Breeding birds of open grasslands (threshold noise range of 43 to 60 dBA) and woodlands (threshold noise range of 36 to 58 dBA) respond very similarly to

disturbance by traffic volume (Reijnen et al. 1997). Reijnen et al. (1996) determined a threshold level for effects to bird species as 47 dBA. A New Mexico study in a pinyon-juniper community found that impacts of gas well compressor noise on bird populations was strongest in areas where noise levels were greater than 50 dBA. Moderate noise levels (40 to 50 dBA) also showed some effect on bird densities in this study (LaGory et al. 2001).

As discussed in **Table 2-5**, BakkenLink has committed to conduct pre-construction surveys for active migratory bird nests during the breeding season. To minimize impacts, migratory birds and their nests would be avoided during construction of the pipeline. Clearing and grubbing of the Project ROW would occur in the fall or winter to avoid potential impacts to bird nests. The typical migratory bird nesting season in North Dakota is February 1 through July 15 (USFWS 2011c). Consultation with the USFWS regarding migratory birds would be continued during construction activities. Therefore, impacts to migratory birds are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to migratory birds. Direct impacts may result if maintenance activities are conducted during the breeding season. Mortality to individuals or destruction of nests may result from being crushed by, or colliding with maintenance vehicles. Two 0.25-mile overhead transmission lines would incrementally increase collision and electrocution potential for raptors and other migratory birds. Potential indirect impacts would include displacement of individuals, and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 75.5 acres of potential migratory bird habitat, including 67.8 acres of agricultural land, 7.6 acres of grassland, and 0.1 acre of woodland as a result of the construction of aboveground facilities.

In addition, potential impacts to bird species may occur from a spill or leak of crude oil from the pipeline. Direct contact with crude oil would result in oiling of plumage; ingestion of crude oil from contaminated plumage and prey; and transfer of crude oil to eggs and young. The probability of adverse effects to bird species is unlikely, due to the low probability of a spill and the low probability of the spill directly impacting individuals (POD, Appendix XVIII, SPCC Plan). Minimal potential exists for a rupture of the pipeline to occur in Lake Sakakawea. Lake Sakakawea (i.e., the Missouri River) is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR 195). If a spill event of sufficient size were to occur, federal and state laws would require cleanup to prevent impacts to bird species.

Raptors

Construction

A number of raptor species (e.g., bald eagle, golden eagle, ferruginous hawk, red-tailed hawk, Swainson's hawk, prairie falcon, American kestrel, Cooper's hawk, sharp-shinned hawk, great-horned owl, long-eared owl, short-eared owl, burrowing owl, and northern harrier) utilize various habitats in the Project area. Direct impacts to raptor species may include mortality and displacement. Indirect impacts include the loss or alteration of habitat, reduction in prey base, and disturbance from increased levels of noise and human activity.

Project construction would result in temporary impacts to 1,444.2 acres of potential raptor habitat, including 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland until reclamation has been completed and vegetation is re-established.

The loss of native habitat to human development has resulted in declines of hawks and eagles throughout the West (Boeker and Ray 1971; Schmutz 1984). In some cases, habitat changes have not reduced numbers of raptors, but have caused shifts in species composition (Harlow and Bloom 1987). Impacts to small mammal populations due to habitat loss and fragmentation can cause a reduced prey base for raptors, resulting in lower raptor densities. Thompson et al. (1982) and Woffinden and Murphy (1989) found that golden eagles and ferruginous hawks had reduced nesting success where native vegetation had been lost because the habitat was no longer able to support jackrabbit (prey) populations.

Raptors have low tolerance of disturbance while nesting or roosting, which results in displacement and reduced nesting success (Holmes et al. 1993; Postovit and Postovit 1987; Stalmaster and Newman 1978). Thompson et al. (1982) and Woffinden and Murphy (1989) found that increased levels of noise and human activity also can preclude otherwise acceptable raptor habitat from use (USFWS 2002a). Vehicles that stop and go cause greater levels of disturbance to raptors than continuously moving vehicles (Holmes et al. 1993; White and Thurow 1985).

As described in **Table 2-5**, a preconstruction survey would be conducted to identify raptor nests in, and adjacent to, surface disturbance areas. To minimize impacts, raptors and their nests would be avoided during construction of the pipeline. Clearing and grubbing of the Project ROW would occur in the fall or winter to avoid potential impacts to raptor nests. The typical raptor nesting season in North Dakota is February 1 through July 15 (USFWS 2011c). Distance buffers for active raptor nests vary by species, ranging from 0.25 mile to 0.5 mile. Consultation with the USFWS regarding migratory birds, including raptors, would be ongoing during construction activities. Therefore, impacts to raptor species are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to raptors. Direct impacts may result from collision with maintenance vehicles. Two 0.25-mile overhead transmission lines would incrementally increase collision and electrocution potential for raptors and other migratory birds. Indirect impacts would include displacement of individuals, and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 75.5 acres of potential raptor habitat, including 67.8 acres of agricultural land, 7.6 acres of grassland, and 0.1 acre of woodland as a result of the construction of aboveground facilities.

Reptiles

Construction

Construction activities may result in direct and indirect impacts to less mobile species, such as reptiles. Direct mortality to individuals may result from crushing of individuals or burrows by vehicles and equipment. Indirect impacts may include habitat loss, alteration, and fragmentation; and disturbance from increased levels of noise and human activity. Project construction would result in temporary impacts to 1,444.2 acres of potential reptile habitat, including 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acre of shrubland until reclamation has been completed and vegetation is re-established. However, due to the presence of suitable habitat adjacent to the disturbed areas and the temporary nature of Project construction, impacts to reptiles are anticipated to be low.

Operation

Project operation may result in direct and indirect impacts to reptiles. Direct mortality to individuals may result from crushing of individuals or burrows by maintenance vehicles. Potential indirect impacts would

include displacement of individuals, and decreased breeding success due to increased levels of noise and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 7.5 acres of potential reptile habitat, including 67.8 acres of agricultural land, 7.6 acres of grassland, and 0.1 acre of woodland as a result of the construction of aboveground facilities.

4.9.1.5 Aquatic Resources

Construction

The primary issues related to aquatic species include the loss or alteration of native habitats; increased sedimentation; potential toxicity related to fuel or other hazardous material spills; and issues associated with water management during open cut stream crossing construction. **Table 4.9-1** summarizes perennial waterbody crossings. The Green and Little Missouri river crossings would be constructed using HDD methods. All other perennial and intermittent streams and wetland crossings would be constructed using open cut methods. The Lake Sakakawea crossing would be constructed with a trench/pull technique. Project construction would result in temporary impacts to 25.2 acres of wetland/waterbody habitat, until reclamation has been completed and vegetation is re-established.

Table 4.9-1 Perennial Waterbody Crossings

Waterbody	County	Milepost	Crossing Length (feet)	Crossing Method
Missouri River/Lake Sakakawea	McKenzie	14.3	12,321	Trench/Pull
Northfork Creek	McKenzie	48.7	118	Open Cut
Northfork Creek	McKenzie	48.8	126	Open Cut
Cherry Creek	McKenzie	49.5	72	Open Cut
Little Missouri River	McKenzie	69.7	928	HDD
Green River	Billings	109.4	26	HDD
South Fork Green River	Billings	114.7	47	Open Cut

Impacts to fish and other aquatic communities from Project construction would depend upon the physical characteristics of the streams (e.g., flow, substrate, channel configuration, and gradient), construction technique, and time of year. Direct impacts to aquatic communities and habitat would be minimized by implementation of environmental protection measures as described in **Table 2-5**.

Surface water quality may be impacted if construction equipment and vehicles leaked or spilled petroleum products or other hazardous materials into or near any streams or waterbodies. Direct spills of fuels or other hazardous materials would saturate soils and adversely affect wildlife habitat; less mobile species; and young, which are still dependent on the nest or burrow site. Environmental protection measures are presented in **Table 2-5** and the SWPPP. It is unlikely that a potential spill would affect terrestrial species, due to the low probability of a spill and the behavioral avoidance of a spill area by wildlife species. Hazardous materials, chemicals, fuels, etc., would not be stored within 100 feet of wetlands or perennial/intermittent waterbodies (**Table 2-5**). Other setbacks would include at least 50 feet for all equipment staging areas and 10 feet for temporary storage of spoil material. Therefore, impacts to aquatic resources from potential fuel or other petroleum product spills are not anticipated.

Water withdrawal from municipal water sources for hydrostatic testing would not affect aquatic resources. Hydrostatic test water would be discharged through straw bale dissipation structures, with final discharge occurring at locations identified in the Project POD (Appendix XVI). Discharge water quality would meet NPDES requirements.

Operation

Project operation may result in direct and indirect impacts to aquatic species. Direct mortality to individuals may result from maintenance activities conducted near waterbodies. Indirect impacts would include displacement of individuals, increased sedimentation, and degradation of habitat. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW.

In addition, potential impacts to aquatic species may occur from a spill or leak of crude oil from the pipeline. Direct contact with crude oil would result in oiling of individuals; ingestion of crude oil from contaminated prey; and transfer of crude oil to eggs and young. The probability of adverse effects to aquatic species is unlikely, due to the low probability of a spill and the low probability of the spill directly impacting individuals (POD, Appendix XVIII, SPCC Plan). Minimal potential exists for a rupture of the pipeline to occur in Lake Sakakawea. Lake Sakakawea (i.e., the Missouri River) is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR Part 195). If a spill event of sufficient size were to occur, federal and state laws would require cleanup to prevent impacts to aquatic species.

Maintenance activities near waterbodies would remove a small amount of riparian and wetland vegetation. The removal of grasses and small shrubs near stream crossings would represent a relatively small portion of streamside cover for aquatic species. Repairs in areas near waterbodies may result in temporarily increased erosion. Erosion control procedures, as part of the Project SWPPP and CMRP (POD, Appendices XIX and XV) would be implemented as part of the Project to minimize any erosion in disturbed areas.

4.9.2 No Action Alternative

The temporary disturbance of 1,444.2 acres of potential wildlife habitat and the permanent disturbance of 75.5 acres of potential wildlife habitat would not occur if the No Action Alternative were to be implemented. Impacts to fish and wildlife resources would not occur.

4.9.3 Mitigation

WF-1: BakkenLink will construct escape ramps every 0.5 mile to reduce the potential for livestock and wildlife becoming trapped in the pipeline trench.

WF-2: To the extent practicable, clearing and grubbing of the Project ROW will occur in the fall or winter (i.e., outside of nesting season) to minimize disturbance to nesting birds.

WF-3: If construction occurs during breeding season, BakkenLink will conduct pre-construction surveys for active nests, including raptor nests, to protect migratory birds. In North Dakota, the typical migratory bird nesting season (including raptors) is February 1 through July 15 (USFWS 2011c). To minimize impacts to migratory birds (including some game birds, waterfowl, and raptors), active nests will be avoided during construction and maintenance activities, in coordination with USFWS.

WF-4: Any open posts (1.5-inch-diameter or greater), which may be utilized in pipeline construction or operation (such as markers, signs, stacks, etc), will be permanently covered or filled with sand or gravel. This is necessary to prevent wildlife mortalities by entrapment.

Protection measures that will be implemented by electrical service providers to minimize or prevent collision and electrocution risk to raptors and other migratory birds in the Project area will include the use of standard measures as outlined in *Mitigating Bird Collision with Power Lines* (APLIC 1994) and *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006). The USFWS will consult further with the power provider regarding appropriate mitigation for potential impacts due to overhead transmission lines.

4.9.4 Residual Effects

Residual impacts to wildlife and aquatic resources as a result of surface disturbance would include the permanent reduction of approximately 75.5 acres of potential habitat associated with permanent facilities, such as receipt facilities, MLV, and lateral interconnect sites. In addition, a 20- to 50-foot-wide easement would be permanently maintained, including vegetation removal as necessary. Other residual impacts would include potential collision or electrocution mortalities to raptors and other migratory birds associated with approximately 0.5 mile of permanent overhead transmission lines. Habitat fragmentation and displacement of wildlife species could occur. Increased human presence during operations and maintenance activities would continue to affect the overall distribution of wildlife. The pipeline would remain submerged under Lake Sakakawea, on the lake bed. Residual impacts to aquatic species could occur as a result of the elevated temperature within the pipe and habitat disturbance and fragmentation as a result of the exposed pipe.

4.10 Special Status Species

The impact analysis area for special status species is defined by the Project area and relevant buffers for sensitive, mobile wildlife species. Construction impacts were calculated based on the inclusion of construction ROWs associated with the Trunk line and laterals and their associated access roads, ATWSs, and pipe storage yards. A 100-foot-wide temporary construction ROW would be allowed in all areas except USFS-administered lands, wooded areas, and wetland crossings, which typically would be limited to a nominal 50-foot-wide construction ROW. Operation impacts were calculated based primarily on the acreage that would be occupied by the permanent aboveground facilities (receipt facilities, MLV locations, launcher/receiver facilities, and interconnection facilities). The primary issues associated with special status species include loss of individuals and/or populations, and/or loss of suitable habitats.

The Project may result in both direct and indirect impacts to special status species. Direct impacts to special status plants could include the temporary loss of individual plants or local plant populations as a result of partial removal of vegetation as a result of trampling or crushing from construction vehicles and equipment, or permanent loss of individuals as a result of ROW clearing. Direct impacts to special status wildlife could include mortalities or displacement related to pipeline construction and operation, as well as habitat loss, alteration, and fragmentation.

Indirect impacts to special status plants could include temporary and long-term establishment of noxious weeds and invasive species, temporary accumulation of fugitive dust on plant species within suitable habitat as a result of construction and operation vehicle and equipment use, and potential loss of species as a result of adjacent noxious weed-related herbicide application. Indirect impacts to special status wildlife could include short-term displacement of mobile species (e.g., larger mammals, adult birds) caused by increased noise levels and human activity. Impact levels depend upon timing and type of construction, sensitivity of the impacted species, and seasonal use patterns.

Potential impacts to special status plant and wildlife species can be further classified as temporary and permanent. Temporary impacts consist of habitat and vegetation removal, disturbance as a result of Project construction, and changes in wildlife habitats and plant assemblages until reclamation activities have been completed and/or native vegetation populations are re-established. Permanent impacts consist of permanent changes to habitats and the plant and wildlife populations that depend on these habitats, regardless of reclamation success. The extent of both temporary and permanent impacts depends upon the sensitivity of the species, seasonal use patterns, type and timing of construction activities, and physical parameters (e.g., topography, cover, forage, precipitation).

Electrical Transmission Lines

Power would be required to serve the receipt facilities listed in **Table 2-3**. A maximum of four, 0.25-mile segments of new electrical transmission lines would be required, resulting in a total of less than 1.0 mile of new transmission lines. The Dunn and Watford City Receipt facilities would require overhead transmission lines. The Keene and Beaver Lodge Receipt facilities would require underground lines. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers, and would result in very minimal additional disturbance.

Hydrostatic Testing

Hydrostatic testing would be accomplished using municipal water sources; therefore, impacts to aquatic habitats and associated plant and animal species would not occur.

As presented in Section 3.6, Vegetation Resources, five vegetation cover types occur within the Project area. Impacts include the temporary disturbance of 1,444.2 acres of potential habitat for special status species, including 754.9 acres of grassland, 636.7 acres of agricultural land, 25.2 acres of wetland/ waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland. Permanent impacts would occur to

75.5 acres of potential special status species habitat as a result of the construction and operation of aboveground facilities.

4.10.1 Plant Species

Species-specific impact summaries and applicant-committed environmental protection measures for the 12 USFS sensitive plant species carried forward in detailed analysis are presented below. As summarized in Section 3.10.1, species-specific surveys were conducted to determine the presence of special status species individuals and populations within and adjacent to the Project area on USFS-administered lands.

4.10.1.1 Slimleaf Goosefoot (*Chenopodium pallescens*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species.

To minimize environmental impacts and ensure site stabilization and revegetation, BakkenLink would implement the environmental protection measures and design features detailed in **Table 2-5**. Implementation of the CMRP (POD, Appendix XV) and Noxious Weed and Aquatic Nuisance Species Control Plan (POD, Appendix VI) would minimize the magnitude and duration of suitable habitat disturbance. BakkenLink would coordinate with the appropriate agencies to identify efficient restoration and mitigation measures following construction; and develop appropriate revegetation seed mixtures. In addition, ROW monitoring would be conducted to determine reclamation success and identify post-reclamation noxious weed populations. To minimize fugitive dust emissions, BakkenLink would follow the environmental protection measures and design features detailed within the CMRP (POD, Appendix XV). The primary protection measure focuses on the use of water or chemical soil binders and BMPs to control dust along the ROW and access roads during construction in accordance with federal, state, and local requirements. Based on the implementation of the aforementioned environmental protection measures and design features, impacts to suitable habitat would be considered temporary in nature, pending successful reclamation.

Operation

Permanent facilities do not occur within suitable habitat for this species; therefore, no permanent loss of habitat is anticipated.

4.10.1.2 Blue Lips (*Collinsia parviflora*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Construction-related disturbances, occupying approximately 21.6 acres of suitable habitat, would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

Operational-related disturbances associated with the permanent placement of receipt facilities, would occupy approximately 0.1 acre of suitable habitat.

4.10.1.3 Torrey's Cryptantha (*Cryptantha torreyana*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Construction-related disturbances within suitable habitat would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

In areas where permanent facilities are located within suitable habitat, a permanent loss of habitat would be anticipated.

4.10.1.4 Nodding Wild Buckwheat (*Eriogonum cernuum*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Construction-related disturbances, occupying approximately 754.9 acres of suitable habitat, would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

Operational-related disturbances associated with the permanent placement of receipt facilities and MLVs, would occupy approximately 7.6 acres of suitable habitat.

4.10.1.5 Missouri Pincushion Cactus (*Escobaria missouriensis*)

Construction

Twenty-four populations (containing a total of 100 individuals) were identified within the survey area; however, only one population (containing one individual) is located within the Project area (**Figures 3.10-1**, **3.10-2**, and **3.10-3**). This population is located on the working side of the construction ROW and would be fenced off from direct construction disturbance. Populations located just outside of the construction ROW would be noted on construction alignment sheets and flagged/marked and/or fenced to avoid indirect impacts. In summary, no individuals or populations would be impacted as a result of construction or operational activities. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Construction-related impacts to suitable habitat would be considered temporary in nature, pending successful reclamation. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

In areas where permanent facilities are located within suitable habitat, a permanent loss of habitat would be anticipated.

4.10.1.6 Sand Lily (*Leucocrinum montanum*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Construction-related disturbances to suitable habitat would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

In areas where permanent facilities are located within suitable habitat, a permanent loss of habitat would be anticipated.

4.10.1.7 Golden Stickleaf (*Mentzelia pumila*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Construction-related disturbances, occupying approximately 27.4 acres of suitable habitat, would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

Operational-related disturbances associated with the permanent placement of receipt facilities, would occupy approximately 0.1 acre of suitable habitat.

4.10.1.8 Alyssum-leaved Phlox (*Phlox alyssifolia*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Construction-related disturbances to suitable habitat would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

In areas where permanent facilities are located within suitable habitat, a permanent loss of habitat would be anticipated.

4.10.1.9 Lance-leaf Cottonwood (*Populus acuminata*)

Construction

One lance-leaf cottonwood population was identified within the Project area; however, the population is located approximately 220 feet from the pipeline centerline (**Figure 3.10-1**). A required 50-foot buffer would be maintained from this species. In addition, the population would be noted on alignment sheets and flagged/marked in the field for avoidance. No impacts to this population are anticipated.

Suitable habitat for the species was identified within the Project area. Impacts to suitable habitat would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

Permanent facilities would not be constructed within suitable habitat for this species; therefore, no permanent loss of habitat is anticipated.

4.10.1.10 Alkali Sacaton (*Sporobolus airoides*)

Construction

Although suitable habitat was identified, no individuals or populations were identified within the Project area; therefore, no impacts to species are anticipated. Construction-related disturbances to suitable habitat would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

In areas where permanent facilities are located within suitable habitat, a permanent loss of habitat would be anticipated.

4.10.1.11 Stemless Townsend Daisy (*Townsendia exscapa*) and Hooker's Townsendia (*Townsendia hookeri*)

Construction

Four *Townsendia* sp. populations were identified within the Project area; however, the populations are located between 39 and 85 feet from the pipeline centerline (**Figure 3.10-2**). Each population is located outside of the construction and operation disturbance footprints. The populations would be noted on alignment sheets and flagged/marked in the field for avoidance. No impacts to these populations are anticipated.

Suitable habitat for the species was identified within the Project area. Construction-related disturbances to suitable habitat would be considered temporary in nature, pending successful reclamation. Due to avoidance of viable populations, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Impact minimization measures for the species would be the same as presented for the slimleaf goosefoot.

Operation

Permanent facilities would not be constructed within suitable habitat for this species; therefore, no permanent loss of habitat is anticipated.

4.10.2 Wildlife Species

4.10.2.1 Mammals

Rocky Mountain Bighorn Sheep

Construction

A Rocky Mountain bighorn sheep herd, known as the Long X herd, inhabits the Project area in central McKenzie County. Impacts to this herd would include the temporary loss of potential forage and cover (native vegetation and previously disturbed vegetation) and an increase in habitat fragmentation within the Project area. The loss of available woodland/shrubland vegetation would be long-term (greater than 20 years). However, herbaceous species may become established within 3 to 5 years, depending on reclamation success, weather conditions, and grazing management practices in the Project area. In most instances, suitable habitat adjacent to disturbed areas would be available for bighorn sheep until grasses and woody vegetation become re-established within the Project area.

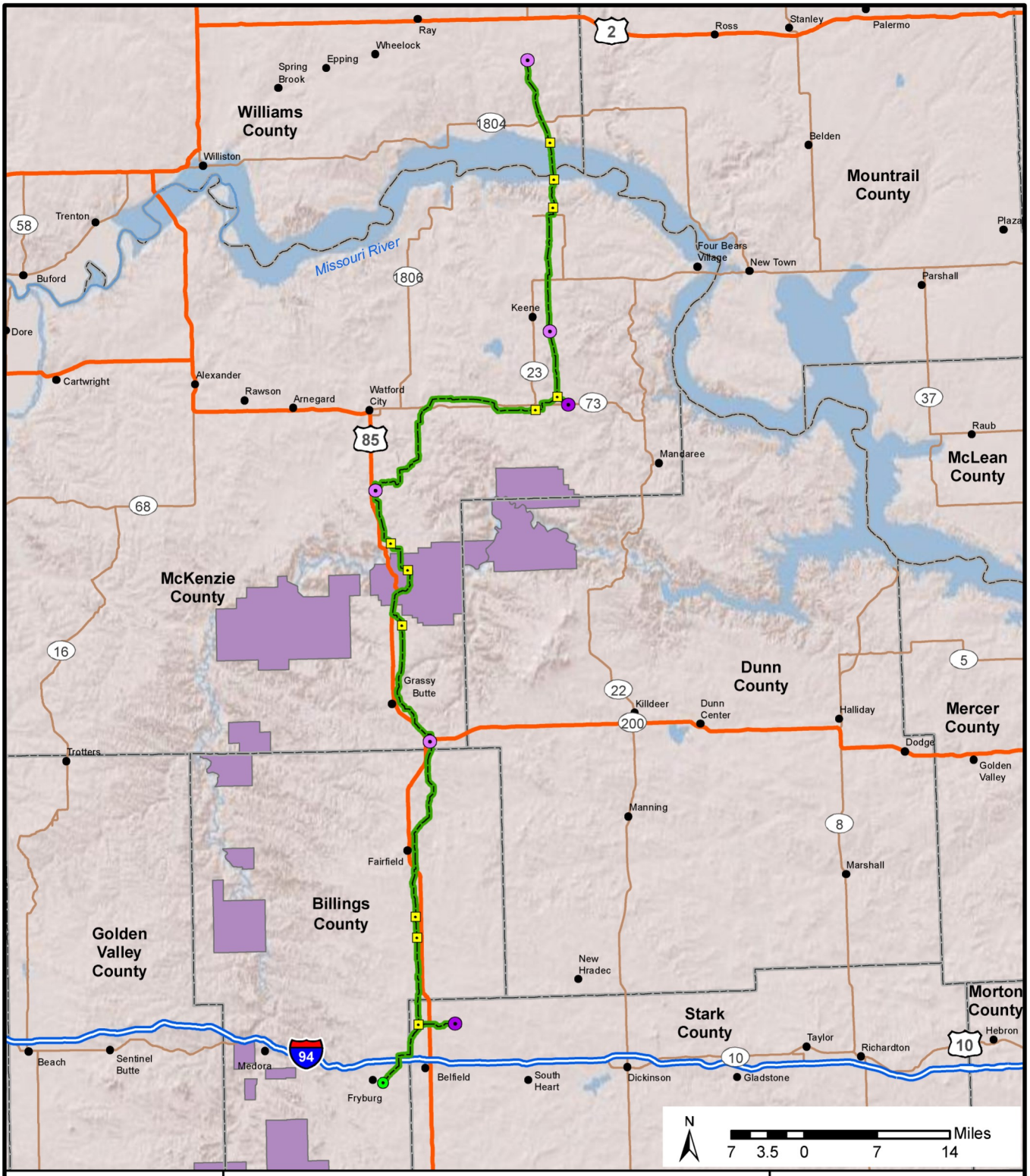
Additional impacts to bighorn sheep would result from increased noise levels and human activity during construction. Studies have shown that big game species tend to avoid areas of human activity and roads, which reduces habitat utilization near disturbed areas (Cole et al. 1997; Sawyer et al. 2006; Ward 1976). However, disturbance associated with construction activities would be temporary, and it is assumed that wildlife would return to the area following completion.

Project construction may result in impacts to bighorn sheep lambing areas, which are the most critical habitats for this species. The Project would directly impact approximately 24.6 acres of a bighorn sheep lambing area for the Long X herd on USFS lands between MP 65.5 and MP 76.7 (**Figure 4.10-1**). Indirect impacts, such as noise and human presence as described above may occur at a larger scale. Studies indicate that disturbance to lambing areas may cause ewes and lambs to flee up to 3 miles (Feist 1997 as cited in Dyke et al. 2011) to areas containing marginal habitat. As a result, lambs would be more susceptible to mortality (Dyke et al. 2011). Because suitable lambing habitat is very limited in North Dakota, these areas are the most susceptible to impacts by human activity, such as oil and gas development (Dyke et al. 2011).

To avoid impacts to bighorn sheep lambing areas, BakkenLink has committed to the following environmental protection measures (**Table 2-5**). Surface use would be prohibited from April 1 through June 15 within 1 mile (line-of-sight) of bighorn sheep lambing areas (NDGFD 2011; USFS 2001). New developments, including new facilities, roads, and concentrations of humans within 1 mile of bighorn sheep lambing areas may be moved or modified to be out-of-view of the lambing areas (USFS 2001). This stipulation applies to drilling, testing, and new construction projects, but does not apply to operation or maintenance of production facilities (USFS 2001). Based on these environmental protection measures, construction impacts to Rocky Mountain bighorn sheep are anticipated to be minimal.

Operation

Project operation may result in direct and indirect impacts to bighorn sheep. Direct mortality to individuals may result from collisions with maintenance vehicles. Indirect impacts include habitat reduction and fragmentation as a result of ROW maintenance activities. Indirect impacts would include displacement of individuals and decreased breeding success due to increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts within Rocky Mountain bighorn sheep habitat as a result of the construction of aboveground facilities are not anticipated.


Williams County
Mountrail County
McLean County
McKenzie County
Dunn County
Mercer County
Billings County
Golden Valley County
Stark County
Morton County
Missouri River
Ray
Wheelock
Epping
Spring Brook
Williston
Trenton
Buford
Dore
Cartwright
Alexander
Rawson
Arnegard
Watford City
Keene
Ross
Stanley
Palermo
Belden
Four Bears Village
New Town
Parshall
Plaza
Raub
Manderee
Killdeer
Dunn Center
Halliday
Dodge
Golden Valley
Grassy Butte
Trotters
Fairfield
Manning
Marshall
New Hradec
Beach
Sentinel Butte
Medora
Belfield
South Heart
Fryburg
Dickinson
Gladstone
Taylor
Richardton
Hebron
1804
1806
2
58
85
73
23
37
68
16
22
200
5
8
10
94
N
Miles
7 3.5 0 7 14
Project Route
Existing Receipt Facility
Proposed Receipt Facility
Rail Terminal Facility
MLV
City/Town
County Boundary
Interstate
Highway
Major Road
Rocky Mountain Bighorn Sheep Lambing Area
Source: Carlson-McCain 2011.
BakkenLink Pipeline Project
Figure 4.10-1
Rocky Mountain Bighorn Sheep Lambing Areas

Based on BakkenLink's current Project schedule to conduct construction activities outside the critical lambing period (April 1 through June 15) and the commitment to follow recommended mitigation measures of the USFS, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Black-tailed Prairie Dog

Construction

No black-tailed prairie dog colonies have been identified within the Project area (McCain and Associates 2011). However, suitable habitat exists within the Project area and the species is known to occur near the Project area, in the LMNG complex. Impacts to this species, if present, would include direct mortalities of individuals if burrows are crushed by construction vehicles or equipment. Indirect impacts would result from increased noise levels and human activity.

Operation

If black-tailed prairie dog colonies become established along the Project ROW in the future, direct and indirect impacts during Project operations may occur. Direct mortality to individuals may result from collisions with maintenance vehicles. Indirect impacts may include habitat fragmentation as a result of ROW maintenance activities. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW.

There would be no impacts to individual black-tailed prairie dogs as a result of the Project on USFS lands. However, the Project may impact suitable black-tailed prairie dog habitat. Therefore, direct impacts to this species would be limited to the incremental loss of potentially suitable habitat. Based on the implementation of the aforementioned environmental protection measures and design features, impacts to suitable habitat would be considered temporary in nature, pending successful reclamation.

4.10.2.2 Bird Species Associated with Wetland/Waterbody Habitat

Whooping Crane

Construction

Whooping cranes do not nest in North Dakota. However, the Project area lies within a 90-mile-wide corridor that includes approximately 75 percent of all reported sightings of migrating whooping cranes in North Dakota (USFWS 2011c). Although suitable roosting and /or foraging habitat occurs within the Project area, historic records for this species do not exist. Established communal roost sites have not been documented in, or adjacent to, the Project area.

Indirect impacts may result from individual migrants being flushed from the Project area during construction. Disturbance during roosting and foraging activities can stress the birds during critical times of the year. Since whooping cranes are highly mobile, it is anticipated that individuals would move to other suitable resting and foraging habitats within the Project region. Based on the rarity of the species and the lack of occurrence data for the Project area, potential impacts from encountering and flushing a migrating whooping crane from the Project area would be minimal.

Habitat loss from Project construction would include the temporary disturbance of 636.7 acres of agricultural land and 25.2 acres of wetland/waterbody habitat within the Project ROW. Crops and rangeland would return to their original state during the following growing season. In most instances suitable foraging habitat adjacent to disturbed areas would be available to whooping cranes. Minor impacts to stop-over habitat at Lake Sakakawea would occur from the pipeline-pull construction method that would be used for the crossing. Habitat loss from Project construction would be avoidable at other perennial waterbody crossings

(Section 4.5.1). Additionally, any surface disturbance adjacent to wetland/waterbody habitat would be allowed to completely re-vegetate following Project construction.

Operation

Project operation may result in indirect impacts to the whooping crane, including habitat reduction and fragmentation as a result of ROW maintenance activities. Other potential indirect impacts would include displacement and increased stress to individuals during migration by increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 283.3 acres of agricultural land as a result of the construction of aboveground facilities.

As discussed previously under Electrical Transmission Lines, power would be required to serve the receipt facilities listed in **Table 2-3**. Four 0.25-mile segments of new electrical lines would be required, resulting in a total of less than 1.0 mile of new transmission lines. The Dunn and Watford City Receipt facilities would require overhead transmission lines. The Keene and Beaver Lodge Receipt facilities would require underground lines.

The Watford City Receipt facility is located at MP 61.2 and the Dunn Receipt facility is located at MP 0 of the Dunn lateral off the Trunk line near MP 90.9. Suitable stop-over habitat is located within or adjacent to these locations. Therefore, the construction of new overhead electrical powerline segments would incrementally increase the collision potential for migrating whooping cranes in the Project area. The likelihood for migrating individuals to collide with a transmission line located in the Project area would be a possibility with the primary migration corridor for this species occurring within the Project area. Protection measures that could be implemented by electrical service providers to minimize or prevent collision risk to migrating whooping cranes in the Project area would include the use of standard measures as outlined in *Mitigating Bird Collision with Power Lines* (APLIC 1994).

These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers. The USFWS would consult further with the the power provider under Section 7 of the ESA when the analysis of suitable stop-over habitat and the routing and construction procedures for electrical transmission lines has been determined.

Interior least tern

Construction

The interior least tern is known to nest at Lake Sakakawea. Potential habitat for this species also exists at the Little Missouri River crossing. Direct impacts to breeding terns and their habitat may occur as a result of the pipeline-pull method, which would be utilized at the Lake Sakakawea crossing. This construction method would result in the incremental reduction of potentially suitable breeding and foraging habitat during construction activities. According to the Lake Sakakawea crossing schedule, construction activities would occur at the end of August, during the interior least tern breeding season (April 1 to August 31). If active nests are present, potential impacts may include individual mortalities and the loss of nests and/or eggs as a result of crushing by vehicles and equipment. Indirect impacts, such as displacement and decreased breeding success, may result from increased noise levels and human activity, if breeding terns are present or adjacent to the Project area. The Little Missouri River crossing would be constructed using the HDD method with a minimum setback of approximately 200 feet, therefore surface disturbance to potential habitat would not occur. If interior least terns are present in the vicinity, impacts from construction-related noise would occur.

Operation

Project operation may result in indirect impacts to the interior least tern. These include displacement and decreased breeding and foraging success caused by increased noise levels and human activity. BakkenLink would coordinate with the USFWS to establish authorized mitigation if maintenance activities are required during the nesting season, within or adjacent to suitable nesting habitat. In addition, as described below, a spill or leak of crude oil at Lake Sakakawea may directly impact the interior least tern and its habitat.

Piping Plover

Construction

Designated critical habitat for the piping plover is present along the Missouri River at the Lake Sakakawea crossing. Potential habitat for this species also exists at the Little Missouri River crossing. Direct impacts to breeding plovers, their habitat, and designated critical habitat are possible as a result of the pipeline-pull method that would be utilized at the Lake Sakakawea crossing. This construction method would result in the incremental reduction of potentially suitable breeding and foraging habitat within the Project area during construction. According to the Lake Sakakawea crossing schedule, construction would occur in mid-August, during the piping plover breeding season (April 1 to August 31). If occupied nests are present, potential impacts also would include individual mortalities and the loss of nests and /or eggs as a result of crushing by vehicles and equipment operating in the Project area. Indirect impacts may result from increased noise levels and human activity if breeding plovers are present within or adajent to the Project area. The Little Missouri River crossing would be constructed using the HDD method, with a minimum setback of approximately 200 feet. Therefore, surface disturbance to potential habitat would not occur. If piping plovers are present in the vicinity, impacts from construction-related noise would occur.

Operation

Project operation may result in indirect impacts to the piping plover. These include displacement and decreased breeding and foraging success caused by increased noise levels and human activity. BakkenLink would coordinate with the USFWS to establish authorized mitigation if maintenance activities are required during the nesting season, within or adjacent to suitable nesting habitat. In addition, as described below, a spill or leak of crude oil at Lake Sakakawea may directly impact the piping plover, its habitat, and its designated critical habitat.

Electrical Transmission Lines

Power would be required to serve the receipt facilities listed in **Table 2-3**. Four 0.25-mile segments of new electrical transmission lines would be required, resulting in a total of less than 1.0 mile of new transmission lines. The Dunn and Watford City Receipt facilities would require overhead lines. The Keene and Beaver Lodge Receipt facilities would require underground lines. These additional required electrical facilities would be permitted, constructed, and operated by local and/or regional electrical providers.

There would be no construction of new overhead electrical powerline segments across the Little Missouri River. The Project crosses the Little Missouri River between MP 48.7 and MP 48.9. The Watford City Receipt facility is located at MP 61.2 and the Dunn Receipt facility is located at MP 0 of the Dunn lateral off the Trunk line near MP 90.9, a distance of approximately 12 and 42 miles from the Little Missouri River crossing respectively. Therefore, impacts to piping plover and interior least tern from new overhead powerlines for the Project would be negligible.

Spill or Leak of Crude Oil

Potential impacts to the whooping crane, interior least tern, and piping plover may occur from a spill or leak of crude oil. In the event of a spill or leak, direct contact with crude oil would result in oiling of plumage;

ingestion of crude oil from contaminated plumage and prey; and transfer of crude oil to eggs and young. While these exposure routes have the potential to cause adverse effects to individuals, the probability of adverse effects to these species are unlikely, due to the low probability of a spill and the low probability of the spill directly impacting individuals of these species (POD, Appendix X, Spill Risk Assessment). In addition, Lake Sakakawea (i.e., the Missouri River) is subject to an intensive integrity management program stipulated by the USDOT (Integrity Management Rule, 49 CFR Part 195). If a spill event of sufficient size were to occur, federal and state laws would require cleanup to prevent impacts to the whooping crane, interior least tern, or piping plover.

Bald Eagle

Construction

The bald eagle typically occurs near large waterbodies that support suitable roosting and foraging habitat. Nest sites are usually located in large trees, close to open water. Winter habitat includes areas of open water, adequate food sources, and sufficient diurnal perches and night roosts (Hagen et al. 2005). Consultation with the USFS, and an analysis of suitable habitat on USFS-administered lands crossed by the Project, indicate that the Project would not cross suitable bald eagle habitat. In addition, results of the 2012 breeding raptor surveys (Carlson-McCain 2012) did not identify any bald eagle nests within 0.5 mile of the Project ROW. Therefore, there would be no impacts to bald eagles as a result of the Project construction.

Operation

Bald eagles are not known to occur within or near the Project area; therefore, there would be no impacts to bald eagles as a result of the Project operation.

4.10.2.3 Bird Species Associated with Grassland Habitat

Sprague's Pipit, Baird's Sparrow, and Long-billed Curlew

Construction

Direct and indirect impacts to the Sprague's pipit, Baird's sparrow, and long-billed curlew would include mortalities or displacement related to pipeline construction if construction occurs during the breeding season (February 1 through July 15); habitat loss, alteration, and fragmentation; and disturbance from increased noise levels and human activity. In addition to habitat loss, reductions in bird population densities also may be attributed to a reduction in habitat quality produced by elevated noise levels (Reijnen et al. 1997, 1995). Although visual stimuli in open landscapes may negatively affect densities at relatively short distances, the effects of noise appear to be the most critical factor, since breeding birds of open grasslands (threshold noise range of 43 to 60 dBA) and woodlands (threshold noise range of 36 to 58 dBA) respond similarly to disturbance by traffic volume. Reijnen et al. 1996 determined a threshold effect for bird species to be 47 dBA, while a New Mexico study in a pinyon-juniper community found that impacts of gas well compressor noise on bird populations were greatest in areas where noise levels were greater than 50 dBA. However, moderate noise levels (40 to 50 dBA) also showed some effect on bird densities in this study (LaGory et al. 2001). Project construction would result in temporary impacts to 1,416.8 acres of potential breeding and foraging habitat, including 754.9 acres of grassland, 636.7 acres of agricultural land, and 25.2 acres of wetland/waterbody habitat.

Operation

Project operation may result in direct and indirect impacts to the Sprague's pipit, Baird's sparrow, and long-billed curlew. Direct impacts may result if maintenance activities are conducted in suitable habitat during the breeding season. Direct mortality to individuals or nests may result from being crushed by, or colliding with maintenance vehicles. Indirect impacts may include habitat reduction and fragmentation as a result of ROW maintenance activities. Other potential indirect impacts include displacement of individuals, and decreased breeding success due to increased noise levels and human activity. Project operation would

allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 75.4 acres of potential breeding and foraging habitat, including 67.8 acres of agricultural land and 7.6 acres of grassland, as a result of the construction of aboveground facilities.

As described in **Table 2-5**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during the breeding season, pre-construction surveys would be conducted in suitable habitat for nests of these species. Appropriate avoidance measures would be implemented, if nests are identified. As a result, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species.

Burrowing Owl

Construction

No black-tailed prairie dog colonies occur within the Project area; therefore, the potential for burrowing owls to be present is minimal. However, burrowing owls are known to nest in other types of mammalian burrows that may be present in the Project area. Potential impacts to the burrowing owl, if present, would result from the incremental reduction of suitable habitat within the Project area during construction activities. Direct mortality to individuals or nests may result from being crushed by, or colliding with maintenance vehicles. As previously described, construction activities also would cause an increase in temporary, short-term noise levels and human activity, which may potentially displace individual owls from the Project area and decrease breeding success. Potential for construction-related impacts to the species are low due to the lack of primary nesting habitat (i.e., prairie dog colonies). Temporary impacts to 1,397.4 acres of potential burrowing owl habitat would occur, including 754.9 acres of grassland, 636.7 acres of agricultural land, and 5.8 acres of shrubland.

Operation

Project operation may result in direct and indirect impacts to the burrowing owl, if present. Direct impacts may result if maintenance activities are conducted during the breeding season (May 1 to September 15 [eBird 2012]). Direct mortality to individuals or nests may result from being crushed by, or colliding with maintenance vehicles. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Other potential indirect impacts would include displacement of individuals, and decreased breeding success due to increased noise levels and human activity. Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 75.4 acres of potential burrowing owl habitat, including 67.8 acres of agricultural land, and 7.6 acres of grassland as a result of the construction of aboveground facilities.

Based on the low potential for occurrence of nesting burrowing owls within the Project area and recommended mitigation measures of the USFS and USFWS (Section 4.10.4), it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species.

4.10.2.4 Bird Species Associated with Shrubland Habitat

Loggerhead Shrike

Construction

Potential direct and indirect impacts to the loggerhead shrike would include individual mortalities or displacement related to pipeline construction if construction occurs during the breeding season (February 1 through July 15); habitat loss, alteration, and fragmentation; and increased noise levels and human activity.

Potential impacts to the loggerhead shrike as a result of elevated noise levels are previously described. Project construction would result in temporary impacts to 5.8 acres of shrubland habitat.

Operation

Project operation may result in direct and indirect impacts to the loggerhead shrike. Direct impacts may result if maintenance activities are conducted in during the breeding season. Direct mortality to individuals or nests may result from being crushed by, or colliding with maintenance vehicles. Indirect impacts would include habitat reduction and fragmentation as a result of ROW maintenance activities. Other potential indirect impacts would include displacement of individuals, and decreased breeding success due to increased noise levels and human activity. Project operation would allow vegetation to become established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. No permanent disturbance would occur to shrubland habitat, as a result of the construction of aboveground facilities.

As described in **Table 2-5**, appropriate agency consultation and implementation of environmental protection measures would occur. If construction occurs during the breeding season, pre-construction surveys would be conducted in suitable habitat for loggerhead shrike nests. Appropriate avoidance measures would be implemented if nests are identified. As a result, it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species.

4.10.2.5 Butterfly Species

Construction

The USFS has documented two historic occurrences of the tawny crescent near the Project route between MP 14.4 and MP 14.5 (USFS 2011). Data provided by the USFS indicates observations of this species occurred both approximately 50 feet to the west of the centerline and over 1 mile to the east of the centerline in the southwest quarters of sections 10 and 11, T153N R95W on USFS lands. Vegetation removal would cause direct impacts to potential habitat as a result of vegetation removal for the following butterfly species would occur: Dakota skipper, Ottoe skipper, regal fritillary, and tawny crescent. Temporary impacts would occur to 807.5 acres of potential butterfly habitat, including 754.9 acres of grassland, 25.2 acres of wetland/waterbody habitat, 21.6 acres of woodland, and 5.8 acres of shrubland. Impacts to butterfly species are expected to be minimal.

Operation

Project operation would allow vegetation to become re-established. However, trees and shrubs over 15 feet in height, within 15 feet either side of the centerline would be removed as necessary to allow for aerial inspections of the ROW. Permanent impacts would occur to 7.7 acres of potential butterfly habitat, including 7.6 acres of grassland, and 0.1 acre of woodland as a result of the construction of aboveground facilities.

Based on recommended mitigation measures of the USFS and USFWS (Section 4.10.4), it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species. Additionally, impacts to suitable habitat would be considered temporary in nature, pending successful reclamation.

4.10.2.6 Fish Species

Pallid Sturgeon

Construction

The pallid sturgeon may be present at the Lake Sakakawea crossing location. The proposed methodology for this crossing is based on the pipeline-pull construction method. The crossing would occur early in the construction process, potentially during the pallid sturgeon spawning period. Potential impacts to the pallid

sturgeon, if present, include the loss or alteration of habitat and increased sedimentation. In addition, direct impacts may include individual mortalities from construction activities. Based on the presence of suitable habitat and the construction method proposed for crossing Lake Sakakawea, impacts to the pallid sturgeon would be high.

Operation

Routine pipeline operations would not likely impact the pallid sturgeon. In the improbable event of a spill or leak in Lake Sakakawea, exposure to crude oil may result in adverse toxicological effects to the species. However, the probability of adverse effects to the pallid sturgeon is unlikely due to the low probability of a spill or leak of a sufficient amount to cause toxic effects in Lake Sakakawea. Further, if a spill or leak event were to occur, federal and state laws would require cleanup of an event of sufficient size to potentially impact pallid sturgeon (POD, Appendix XVIII, SPCC Plan, for further information regarding impacts to wildlife from a potential spill event).

Northern Redbelly Dace

Construction

Potential impacts to the northern redbelly dace, if present, include the loss or alteration of habitat and increased sedimentation. In addition, direct impacts may include individual mortalities from construction activities, ground compaction, and vehicle traffic within suitable habitat.

Populations of the northern redbelly dace occur in several streams crossed by the Project. Historic occurrences from the 1970s have been documented near the Project area on private land at MPs 109.0 to 110.0 and 114.1 to 115.1 of the Project route (NDNHI 2011), but no occurrences are documented on USFS-administered lands. **Table 4.10-1** details the locations of the historic documented occurrences. The Project crosses one intermittent waterbody, an unnamed tributary to Lake Sakakawea located on USFS-administered lands at MP 14.63. According to the POD, Appendix IX, Waterbody Crossings, this stream crossing may provide suitable habitat for the northern redbelly dace. This determination is based on the waterbody characteristics documented at the time of the survey.

Table 4.10-1 Northern Redbelly Dace Historic Occurrences Documented Near the BakkenLink Pipeline Project

MP Range	Location	Waterbody	Land Ownership
109.0 - 110.0	T142N-R99W-S27	Green River	Private lands
114.1 - 115.1	T141N-R99W-S22	South Fork Green River	Private lands

Impacts from Project construction would depend upon the physical characteristics of the streams (e.g., flow, bottom substrate, channel configuration, and gradient) at the time of construction, construction technique, and time of year. Trenching (open-cut construction method) would occur at both stream crossing locations. Direct impacts resulting from trenching across waterbodies would include increased sedimentation, substrate removal or alteration, and removal of, or disturbance to, streamside vegetation. The effects of these changes on aquatic biota may include the following: reductions in the abundance and diversity of plant and macroinvertebrate species; displacement of fish; and alteration of habitat (Waters 1995). Trenching may cause direct mortalities to macroinvertebrates in these streams when substrate is removed or altered. Macroinvertebrate communities would likely re-colonize the disturbed area within 2 to 6 months (Robinson 1979). Stream flow would be maintained during construction by installing a flume pipe or by utilizing the dam and pump construction method. Most aquatic species would be tolerant of temporary increases in

sedimentation caused by trenching. If trench dewatering is required, the process would be conducted in a manner that would prevent silt-laden water from flowing into wetlands or waterbodies.

BakkenLink has committed to not constructing aboveground facilities and staging areas within wetlands, riparian areas, or other waters of the U.S. Therefore, no permanent disturbance or impacts are anticipated for the northern redbelly dace.

Operation

Maintenance activities near waterbodies would remove a small amount of wetland or riparian vegetation. The removal of grasses and small shrubs near the stream crossings would represent a relatively small portion of streamside cover for aquatic resources. Repairs in areas near waterbodies may result in temporarily increased erosion. Erosion control procedures, as part of the Project SWPPP and CMRP (POD, Appendices XII and XV) would be implemented as part of the Project to minimize any erosion in disturbed areas.

Spill or Leak of Crude Oil – As discussed in **Table 2-5**, hazardous materials, chemicals, fuels, etc., would not be stored within 100 feet of wetlands or WUS. Other setbacks would include at least 50 feet for all equipment staging areas and 10 feet for temporary storage of spoil material. Therefore, impacts to the northern redbelly dace from potential fuel or other petroleum product spills are not anticipated.

Based on the low potential for occurrence by this species within the Project area and BakkenLink's environmental protection measures developed for waterbody crossings (**Table 2-5**), it is not anticipated that implementation of the Project would contribute to a trend towards federal listing or cause a loss of viability to the population or species.

4.10.3 No Action Alternative

Implementation of the No Action Alternative would avoid direct impacts to all special status species and their associated habitats because surface disturbance associated with the Project would not occur.

4.10.4 Mitigation

SSS-1: The loss of special status plant species individuals or populations may occur as a result of adjacent noxious weed-related herbicide application treatments. To effectively mitigate this impact, consultation between the special status plant species jurisdictional agency and the weed control specialists will be completed prior to treatments. The location of known special status plant species and noxious weed species individuals and populations will be confirmed prior to treatments. In addition, techniques for special status plant species avoidance via direct and indirect applications will be developed.

SSS-2: To prevent the spread of aquatic nuisance species during construction and operation, BakkenLink will remove aquatic plants and animals from equipment before leaving any waterbody. Project staff will spray/wash equipment with high pressure hot water when leaving a wetland/waterbody, or will dry equipment for at least 5 days before use at a different wetland/waterbody.

SSS-3: The revegetation plan will include a commitment to reseed disturbed native prairie with a comparable native grass/forb seed mixture and planting a diverse mixture of native cool- and warm-season grasses and forbs; and

SSS-4: BakkenLink will obtain a seed source that is as local as possible to insure the particular cultivars are well adapted to the local climate.

SSS-5: Disturbance to native prairie will be reclaimed to its original condition using native seed mixes specified by applicable state and federal agencies. The objective is for no net loss of native prairie habitat to occur. Where avoidance of native tall-grass prairie is not feasible, appropriate surveys will be conducted to ensure that Dakota skipper and regal fritillary populations will not be affected. In addition, the following protection measures will be implemented to minimize impacts to the Dakota skipper, regal fritillary, Ottoe skipper, and tawny crescent:

- Restrict workspaces where the ROW crosses native prairie habitat;
- Salvage and segregate topsoil in native prairie to maintain the native seed sources for re-vegetation of the ROW in native prairie; and
- Restrict herbicide and pesticide use where Dakota skippers, regal fritillaries, Ottoe skippers, and tawny crescents are found.

SSS-6: If construction occurs during spring or fall migration, BakkenLink will provide whooping crane monitors in suitable habitat along the ROW. If a whooping crane is sighted within 1 mile of a pipeline or associated facilities during construction, all work will cease within 1 mile of the area and the USFWS will be contacted immediately. In coordination with the USFWS, work will resume after the bird(s) leave the area (USFWS 2011c). By implementing these mitigation measures, construction-related impacts to the whooping crane are anticipated to be low.

SSS-7: If construction were to occur during the interior least tern or piping plover breeding season (April 1 through August 31), BakkenLink will conduct surveys in suitable habitat within 0.25 mile of the Lake Sakakawea crossing location. A qualified biologist will survey no more than 2 weeks prior to construction-related activities to identify occupied breeding territories and/or active nest sites. If occupied breeding territories and/or active nest sites are identified, the USFWS will be notified. Appropriate protection measures, such as seasonal constraints and the establishment of a spatial buffer area, will be implemented on a site-specific basis, in coordination with the USFWS. Similar constraints and/or mitigation measures may apply to pipeline maintenance activities if conducted during the breeding season within 0.25 mile of the Project area.

SSS-8: All surface disturbing activities within suitable nesting habitat occur outside the burrowing owl breeding period (May 1 to September 15).

SSS-9: If work is proposed to take place during the migratory bird breeding season (February 1 to July 15), BakkenLink will implement appropriate protection measures, including clearing and grubbing the Project route prior to spring nesting, and having a qualified biologist survey the Project route for nesting migratory birds within 5 days of any ground disturbing activity.

SSS-10: If surveys or other available information indicate a potential for take of migratory birds, their eggs, or active nests, BakkenLink will suspend activities and contact the USFS, McKenzie Ranger District, and the USFWS for further coordination on the extent of the impact and the long-term implications of the intended use of the Project on migratory bird populations.

SSS-11: Any open posts (1.5-inch-diameter or greater), which may be utilized for pipeline construction or operation (e.g., markers, signs, stacks, fences, etc.) will be permanently covered or filled with sand or gravel to prevent wildlife mortalities by entrapment.

SSS-12: Surface use is prohibited from April 1 through June 15 within 1 mile (line-of-sight) of bighorn sheep lambing areas (USFS 2001; NDGFP 2011).

SSS-13: New developments, including new facilities, roads, and concentrations of humans, within 1 mile of bighorn sheep lambing areas may be moved or modified to be out of view of the lambing areas (USFS 2001). This stipulation applies to drilling and testing and new construction projects, not to operation or maintenance of production facilities (USFS 2001).

4.10.5 Residual Effects

Upon implementation of the Proposed Action, a residual loss of suitable habitat for eight special status plant species would occur as a result of permanent aboveground facility placement. Residual impacts to special status wildlife species as a result of surface disturbance would include the permanent reduction of approximately 75.5 acres of potential habitat associated with permanent aboveground facilities. In addition, a 20- to 50-foot-wide easement would be permanently maintained, including vegetation removal as necessary. Other residual impacts would include potential collision mortalities to the whooping crane associated with approximately 0.5 mile of permanent overhead transmission lines. Habitat fragmentation and displacement of special status species could occur. Increased human presence during operations and maintenance activities could continue to affect the overall distribution of special status species. The pipeline would remain submerged under Lake Sakakawea, under the lake bed. Residual impacts to the pallid sturgeon could occur as a result of the unlikely possibility of an oil leak or pipeline rupture.

4.11 Land Use

4.11.1 Proposed Action

Construction

The Project would require approximately 1,488 acres for construction. This acreage accounts for the pipeline as well as aboveground facilities, ATWSs/staging areas, pipe and contractor yards, and receipt facilities.

BakkenLink would use a 100-foot-wide construction ROW for the majority of the Project route. A 50-foot-wide construction ROW would be used on USFS-administered lands. BakkenLink also proposes ATWS at site-specific locations to accommodate rough terrain, side slope, topsoil segregation, road, and waterbody crossings. The standard width of the permanent ROW for operation would be 50 feet, except on USFS-administered lands where it would be 20 feet.

No residential lands would be traversed. Likewise, no residential lands are adjacent to aboveground facilities. Furthermore, there are no schools, churches, parks, or any other sensitive land use areas within 500 feet of the Project ROW.

The most common land cover types, based on USFWS Land Cover database information, include grassland (744 acres) and cultivated cropland (704 acres). The least common land cover types are open water (0.42 acre) and shrubland, steppe, and savanna systems (6 acres) (McCain and Associates 2011). Potential land use impacts associated with the Project would be temporary reductions in areas of rangeland and cropland/pasture. However, potential impacts to cultivated cropland would occur only if construction occurs on those lands during the appropriate growing season. Because the construction ROW can be used for crop production and grazing following construction, this loss would be a short-term impact. Construction is scheduled for autumn of 2012, resulting in not more than one growing season being impacted.

Agricultural lands would be restored to their former use after construction. Landowners would be compensated for crop loss during construction. In agricultural lands, crops could be planted on top of the new pipeline. Restoration would be guided by BakkenLink's CMRP. The Plan includes measures to ensure that soil productivity is not diminished in agricultural lands by using site-specific topsoiling measures and alleviating compaction if noted. Revegetation would be according to the landowner's preference in agricultural lands. In rangelands, the ROW would be seeded using the mixes selected in consultation with the NRCS or relevant land management agency.

Based on the Project plans, BMPs, and other conservation commitments, it is anticipated that impacts to general land use would be minor.

The majority of the construction ROW for the Project is located on private land. The Project route does not cross any formal public recreation lands, except for the Summit Campground near U.S. Highway 85. Construction activities would result in surface disturbance within the Summit Campground. No national parks, national landmarks, state or municipal parks, or wild and scenic rivers would be traversed by the Project route. The construction ROW would temporarily affect approximately 44 acres of national grassland managed by the USFS. Based on the Project plans, BMPs, and other conservation commitments, it is anticipated impacts to special land uses would be minor.

Operation

The land required for the operation of the Project is approximately 80 acres. This accounts for the permanent placement of pipeline facilities, such as interconnect facilities, valve sites, and receipt facilities.

4.11.2 No Action Alternative

Implementation of this alternative would avoid impacts to land use because surface disturbance associated with the Project would not occur.

4.11.3 Mitigation

No additional mitigation measures for land use have been proposed.

4.11.4 Residual Effects

Residual effects to land use would include the long-term loss of 80 acres of land and uses associated with this land as a result of construction and operation of aboveground facilities (e.g., receipt facilities, MLVs, interconnect facilities).

4.12 Recreation

4.12.1 Proposed Action

Construction

One of the primary concerns in crossing public lands is the impact construction would have on recreational activities. Disruption and noise during construction could be a nuisance to hikers, hunters, anglers, and campers; and could cause disturbance to wildlife. Construction during the summer months could affect hiking, fishing, and other summer activities when they are at their peak. Additionally, construction during the fall could affect hunting activities. Hunting is an important local recreational use in the Project area.

The duration of recreational impacts in any one area would usually be short term, lasting several days to several weeks. Wintertime activities would not be affected. The Project would not transect any WMAs, PLOTS, national parks, state or municipal parks, or developed recreational facilities (except the Summit Campground, briefly). Restoration of the Summit Campground would include the rebuilding of any affected trails, roads, parking spurs, or campsite pads. Tables and fire rings would possibly need to be reset as well. Mitigation measures for the Summit Campground are detailed in subsection 4.12.3. Scenic views would be temporarily affected during construction until revegetation blends the colors and textures of the ROW into the surrounding landscape. Areas of high visual sensitivity for the remainder of the Project area are further discussed in Section 4.14, Visual Resources.

Portions of the Project would cross hunting units managed by NDGFD. Some of the most commonly hunted species in these hunting units are white-tailed deer, mule deer, and pronghorn. The recreational enjoyment of wildlife (such as hunting during big game hunting seasons) may be temporarily affected by construction activities, depending on season and location. However, this effect would be short term.

Although the route would cross approximately 1,500 feet of IRA, impacts to the IRA would be avoided because the HDD construction method would be used to drill under it. Impacts to urban and dispersed recreation resources as a result of the construction work force are expected to be minimal due to the minor short-term population increase (200 workers) and the intensive nature of the construction schedule. After disturbed areas are reclaimed to pre-construction conditions, there would be no impacts to recreation resources.

BLM standard stipulations would be followed as part of the abandonment process. At Project termination, all surface facilities would be removed, and the disturbed areas would be reclaimed. Chapter 2.0 contains more details regarding Project abandonment.

Operation

The incremental work force size during operations (after construction) for the Project is estimated to be less than 10 pipeline personnel, resulting in a negligible long-term increase to recreational users in the region.

4.12.2 No Action Alternative

Implementation of this alternative would avoid impacts to recreation because surface disturbance associated with the Project would not occur.

4.12.3 Mitigation

RR-1: Construction activities within the Summit Campground will not take place between the established quiet hours of 10:00 pm to 7:00 am.

RR-2: Recreation facilities at the Summit Campground will not be used by project construction workers. Alternative facilities will be provided.

RR-3: Construction vehicles or equipment at the Summit Campground will not park in recreation campsites or parking areas by the restrooms.

RR-4: Camping at the Summit Campground by construction workers will not be permitted.

RR-5: Access to the Summit Campground will be maintained by keeping access open from at least one entrance.

4.12.4 Residual Effects

Residual effects to recreation areas are not anticipated as a result of Project construction and operation.

4.13 Wilderness

4.13.1 Proposed Action

Construction

Construction of the Project would not impact the characteristics of wilderness areas or lands suitable for wilderness west of the Project as none of the activity would occur within either of the respective boundaries (Theodore Roosevelt National Park and Potential Lands with Wilderness Characteristics). Congress' management guidelines for these lands suitable for wilderness areas would not be violated. Construction-related impacts, which would occur outside of the boundaries, would be temporary, and the disturbed areas would be reclaimed and revegetated in accordance with applicable regulations and permit requirements as discussed in Chapter 2.0.

Operation

Operation of the Project would not impair characteristics of the wilderness area or lands suitable for wilderness west of the Project area. Vehicular traffic along the permanent ROW would be limited to workers performing periodic pipeline and valve maintenance and emergency repairs to the pipeline or corrosion protection devices. The aboveground facilities would be located within the permanent ROW. These facilities would not impair lands suitable for preservation as wilderness.

4.13.2 No Action Alternative

All impacts to wilderness would be avoided because the Project would not be constructed.

4.13.3 Mitigation

Additional mitigation measures for wilderness have not been proposed.

4.13.4 Residual Effects

Residual effects to potential lands with wilderness characteristics on Theodore Roosevelt National Park are not anticipated as a result of Project construction or operations.

4.14 Visual Resources

The assessment of the Project's impacts to visual resources is based on an evaluation of the changes to the existing visual environment that would result from Project construction and operation.

In determining the extent and implications of the visual changes, a number of factors were considered:

- The specific changes in the affected environment's composition, character, and any outstanding valued qualities;
- The context of the affected visual environment;
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration; and
- The numbers of viewers, their activities, and the extent to which these activities are related to the visual qualities affected by proposed changes.

The USFS scenic management system was used for determination of potential impact significance. If impacts meet applicable scenic integrity objectives, they are considered less than adverse. If they do not meet the scenic integrity objectives, they are considered potentially significant.

4.14.1 Proposed Action

Construction

Immediate foreground views of the Project would occur from the entry area of Theodore Roosevelt National Park (**Figure 3.14-2**), Lake Sakakawea (**Figure 3.14-3**), I-94, U.S. Highway 85, and SHs 23, 73, 200, and 1804. These locations are defined as sensitive due to scenery-related concerns of viewers and high numbers of viewers. Construction activities, ground disturbance, pipeline materials, equipment, and vehicles would be visible from these public viewing locations. Construction activities would disturb the ground surface by removing low-growing vegetation, shifting soil, and altering drainage patterns. Surface disturbances would affect scenery by creating exposed soil across the construction area with a different texture and color and by creating land barren of vegetation and topsoil. A visually strong edge of vegetation would appear along the construction ROW. The construction ROW would visually divide the landscape due to absence of vegetation and the altered lines of topography.

Construction activities would affect scenery due to dust originating from the movement of vehicles, from excavation work, and from wind blowing across exposed soil. Construction activities would use lights for safety and illumination of work areas.

Glare and glint from reflective surfaces of construction equipment and vehicles would be seen by casual viewers. The intensity and amount of glare would vary throughout the day and also would depend on atmospheric conditions and the presence of construction equipment and vehicles. The construction activities would affect visual resources by adding a noticeable level of activity to an area with little present land use activity. The color of construction equipment and vehicles would not resemble the muted tans, browns, greys, and greens of the terrain and vegetation. For all immediate foreground viewing situations, the degree of visual impact would be temporarily moderate to strong, involving changes to vegetation patterns and the lack of screening elements to block direct views of the Project.

The continuous line of ROW disturbance would reduce the openness of the landscape by visually dividing views. Although the homogenous texture of vegetation would mimic the texture of other pipeline corridors, it would not resemble the texture of any other landscape element. Although views of the Project originate in the immediate foreground distance, visible extents of the Project vary by location and relationship with terrain.

Operation

The Project would be visible from 4,294 acres of SIO high landscapes, 3,802 acres of SIO moderate landscapes, and 8,902 acres of SIO low landscapes (**Figure 4.14-1**).Visual impacts would be weak to moderate for changes in the color of vegetation and none to moderate for changes in form, line, and texture of landform and structures. As reclamation progresses, moderate impacts for changes in colors of vegetation eventually would become weak. These weak impacts would meet the objectives for SIO high, medium, low, and very low landscapes.

The Project's overall effects on visual conditions during hours of both daylight and darkness would be low. Some nighttime lighting would be required for operational safety and security at the receipt facilities. However, because of other minimal manmade sources of light in these remote areas, when viewed from nearby offsite locations, the overall change in ambient lighting conditions at the Project site may be moderate to substantial.

The Project likely would create a weak to moderate visual impact in SIO high, medium, low, and very low categories of rangeland and riparian landscapes and a weak visual impact in cultivated cropland landscapes. This impact would be more apparent in visually sensitive areas such as the Theodore Roosevelt National Park viewshed, Little Missouri River corridor, and Lake Sakakawea viewshed. The Project would be visible from 693 acres of the areas classified as Scenic Areas, Vista, or Travel Corridors and 2,956 acres classified as Rangelands with Diverse Natural-appearing Landscapes in the McKenzie Special Management Area, which are recognized and valued for their scenic surroundings. However, it is not anticipated that long-term impacts would be considered adverse. With application of reclamation measures suitable for the soils and climate of the Project area, croplands would achieve visual compatibility in the first or second season, while rangeland and riparian landscape would require 3 to 5 years during the operations phase for the ROW disturbance to blend with the surrounding grassland landscape and a longer time to blend with sagebrush landscapes.

Decommissioning of the Project would have temporary impacts similar to construction phase impacts.

4.14.2 No Action Alternative

Implementation of this alternative would avoid impacts to visual resources because surface disturbance associated with the Project would not occur.

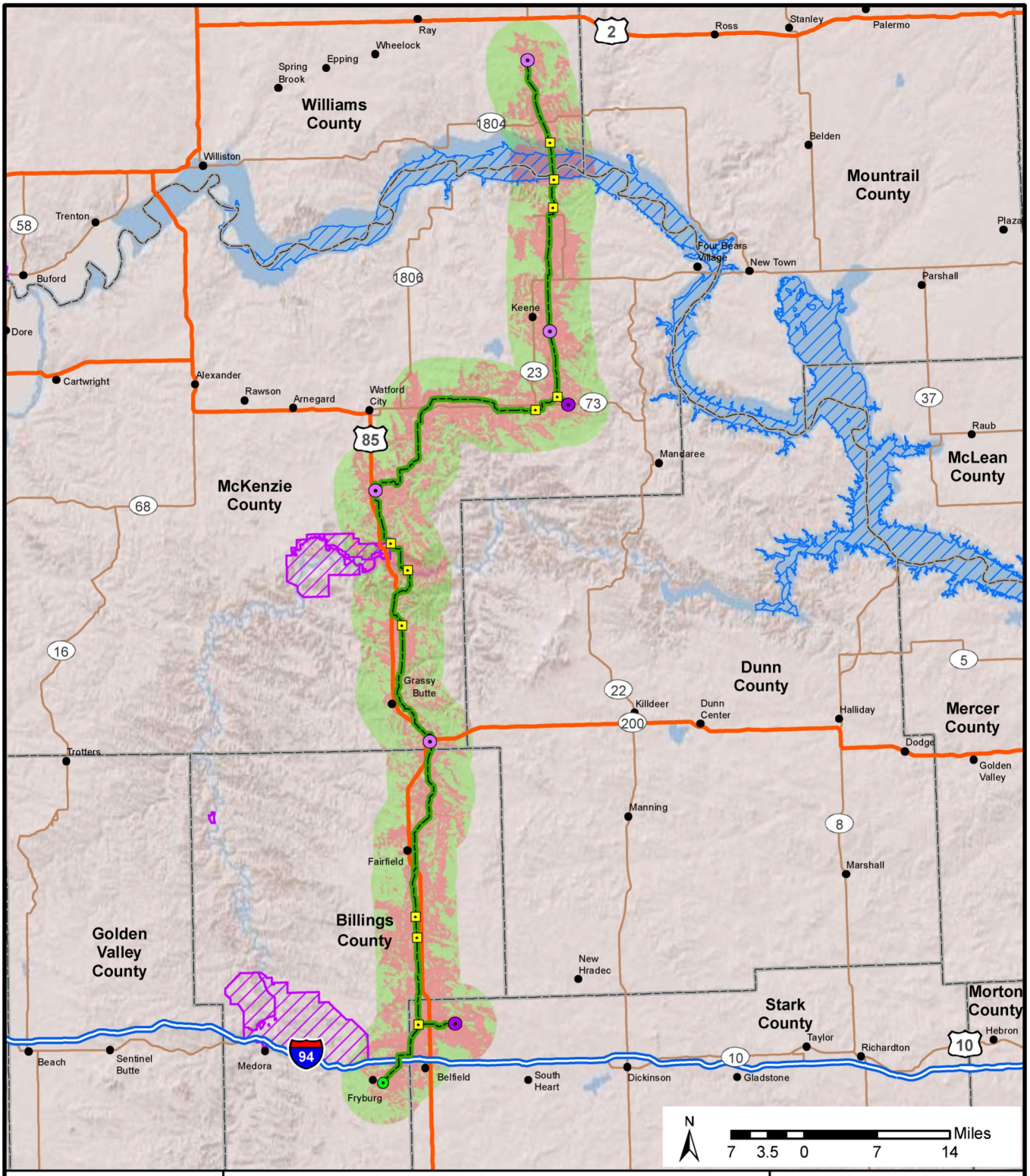
4.14.3 Mitigation

Additional mitigation measures for visual resources have not been proposed.

VR-1: Aboveground structures will be painted with BLM-approved environmental colors to minimize contrasts with surrounding landscapes.

4.14.4 Residual Effects

Residual effects to visual resources would include the construction and operation of aboveground facilities (e.g., receipt facilities, MLVs), which would remain in the landscape in the long term. These facilities would result in moderate impacts to the surrounding landscapes.



BakkenLink Pipeline Project

Figure 4.14-1

Viewshed of Project

4.15 Noise

4.15.1 Proposed Action

Construction

The nearest noise receptor (private residence) is at least 500 feet from the construction ROW and aboveground facilities. Noise resulting from construction activities would be short-term (2 to 3 weeks in any given area) in duration and limited to daylight hours. Based on construction noise analyses conducted for other pipeline projects (USEPA 1974), noise levels of 60 dBA or above could extend perpendicularly up to 12,000 feet (2.5 miles). These levels could occur sporadically over the construction period, and the zone of impact would be limited to the local area of construction activities as construction activities progress along the construction ROW. The terrain along portions of the Project route is more diverse and occasionally would pass through areas where the terrain enhances the noise levels during construction. As a result of the short duration of construction (approximately 4 months), the daylight-only construction period, and generally rural alignment of the construction ROW, noise levels should not be overly disruptive.

Operation

Operation-related noise would be limited to the six receipt facilities where tanker trucks would be periodically unloading crude oil at storage tanks and support vehicles and equipment would be used by maintenance personnel. Residences are located more than 500 feet from the receipt facilities; therefore, impacts to these residences are not anticipated as a result of operational activities.

4.15.2 No Action Alternative

Implementation of this alternative would avoid noise-related impacts associated with the Project.

4.15.3 Mitigation

No additional mitigation measures for noise have been proposed.

4.15.4 Residual Effects

Residual effects to soundscapes adjacent to the receipt facilities from noise generated during operations would be localized to the immediate vicinity of the receipt facilities. No sensitive noise receptors (e.g., residences) are known to occur within 500 feet of the receipt facilities.

4.16 Socioeconomics

This section evaluates the beneficial and adverse effects of the Project within the context of social and economic changes in the Project area. Calculations of impacts were based on known characteristics of the Project area.

4.16.1 Proposed Action

4.16.1.1 Population and Communities

Construction

The Project construction spreads would require an average of 100 workers per spread to construct the Project, with approximately 200 workers total, working simultaneously. Local and non-local labor forces have been estimated based on skilled and unskilled labor availability, primarily from the areas that surround Williston and Dickinson. Work force availability in Williston and Dickinson may contribute to the percentage of local workers. A local worker is identified as a worker who is able to commute to and from his permanent place of residence on a daily basis. A non-local worker is identified as a worker who has moved into the construction area for the duration of the Project. Unemployment rates near or under 2 percent in the affected counties are indicative of the extremely tight local labor market; however, BakkenLink would attempt to hire 25 percent of its construction work force from local labor. Local employment opportunities initiated by the Project construction would be considered beneficial to the local area economies.

As a result of the short duration of construction, it is assumed that only a small percentage of the non-local work force would bring their families. Based on information from the 1979 Pipeline Construction Workers and Community Impact Surveys Reports, only 0.3 dependents per worker are estimated (Mountain West, Inc. 1979). Using these criteria, the 150 non-local workers would bring an estimated 45 dependents, for an estimated total temporary increase in population of approximately 195 people. Adverse social, economic, and community infrastructure impacts of construction personnel are considered minimal because of the quick pace and short duration of the construction schedule. The number of workers would be very small relative to the regional population. Assuming half of the work force lodges in the Williston area and the other half in the Dickinson area, the largest population increase that could occur would be no greater than 0.7 percent in the Williston area and 0.6 percent in the Dickinson area.

Operation

Adverse social, economic, and community infrastructure impacts from operation personnel would be considered minimal as a result of the small permanent work force.

4.16.1.2 Community Services and Temporary Housing

Construction

Because construction would be short in duration, housing demand would be temporary. It is generally accepted that pipeline workers prefer to stay in accommodations closest to the pipeline that offer adequate housing and amenities. Based on typical pipeline construction, it is assumed that housing for the non-local pipeline work force would be divided among rental units, hotels/motels, recreational vehicles, and other accommodations; however, the current western North Dakota boom in oil and gas development has stretched existing housing resources in the Project vicinity. The scarcity of accommodations has resulted in the presence of over 9,000 man camp beds in Williams County and an increase in residential buildings permits of over 350 percent from 2005 to 2010. Many of the other affected counties have had a similar increase in residential building permits over the same timeframe. In this housing environment, accommodations for the construction work force would not be easily obtained. The lack of local availability for housing may require lengthy commutes to the Project area. BakkenLink anticipates that workers would be able to find accommodations at existing man camps as workers depart and beds becomes available.

A potential effect of the construction work force on housing would be competition with travelers, recreationists, and more notably, industry workers for temporary accommodations. Peak construction would occur during the summer tourist and fall hunting seasons; however, accommodations in the Project area are already so limited that the Project construction work force would only have an incremental impact on an already strained housing environment.

Correspondence with local fire and law enforcement agencies in Williston and Dickinson have confirmed that Project area government services are stressed as a result of current oil and gas development in the region. Impacts to government services would be added incrementally by the Project, but due to the short pipeline construction schedule, these impacts would be temporary and would end once construction is completed. As a result of the short-term and transient nature of pipeline construction, many workers do not bring along school aged children, therefore, schools are not anticipated to be impacted by new enrollment.

Operation

The Project permanent work force would be small and would place a negligible demand on local services such as police, medical facilities, fire or educational services; and would not cause any detrimental effects to community social well-being.

4.16.1.3 Tax Revenues and Finance

Construction

The estimated labor cost for construction in 2011 dollars is $21.3 million. This cost would be spread over the construction period and includes salaries for contract supervisors' wages, benefits and overtime for skilled and unskilled labor, and rental on labor force trade equipment. A portion of this total labor cost would be spent in the area and would result in increased sales tax receipts. Local spending is estimated to total $5.3 million during construction, or approximately 25 percent of total labor costs.

Increased spending in the local areas would result in increased retail sales to merchants, as well as increased sales tax to local taxing jurisdictions. The overall impact of this local spending and tax generation would be positive. In addition to construction worker local expenditures, other income generated by construction would include local material purchases paid by contractor(s) and other support personnel. It is assumed that the contractor would locally purchase as many materials as possible. These expenditures would include tools, fuel, oil, parts, and repairs. Smaller communities would benefit from fuel sales and repair expenditures.

Operation

The permanent work force for operation would be a slight increase of the current population full time positions, probably stationed at Dickinson and Williston. Maintenance would be done with local contractors specializing in this type of work.

The estimated Project-related assessed valuation for the first year of operations is compared with 2010 county-wide assessed valuation in **Table 4.16-1**. Each county and school district would benefit from the increased tax base. Tax revenues for the first year are estimated in **Table 4.16-1**, based on 2010 average county-wide tax rates. The largest increases in the tax base attributed to the Project would occur in McKenzie and Williams counties.

Abandonment of the Project would decrease the tax bases of those counties through which it passes. At the time of abandonment, tax receipts in each county would be reduced from the pipeline's in-service date due to depreciation. Total decreases in tax receipts cannot be quantified at this time.

Table 4.16-1 Estimated Contribution to Tax Base from the BakkenLink Project

County	Miles of Pipeline	2010 Average Tax Rate[1,2] (mills)	Estimated Taxable Value of Pipeline and Facilities[3] ($)	Estimated Property Tax Receipts From Pipeline and Facilities[4] ($)
Billings	29.9	129.67	285,500	37,021
McKenzie	81.6	172.64	834,000	143,981
Stark	9.2	315.28	92,500	29,163
Williams	11.4	272.69	195,500	53,310
Total	**132.1**	**NA**	**1,407,500**	**263,475**

[1] Estimated average county-wide tax rates may not reflect actual tax rate applied to pipeline.

[2] Due to the nature of the analysis, data are not totaled.

[3] Estimated values of pipe and facilities were multiplied by 0.50 to determine the assessed value and 0.10 to determine the estimated taxable value. Typically this value is calculated by the North Dakota Office of State Tax Commissioner.

[4] Estimated annual taxes based on first year valuation and 2010 average mill rates.

NA – Not Applicable.

Source: Davis 2012.

4.16.2 No Action Alternative

Impacts to tax revenues, populations, communities, community services, and temporary housing would not be affected since the Project would not be constructed.

4.16.3 Mitigation

Mitigation measures for socioeconomics have not been proposed.

4.16.4 Residual Effects

Residual effects would include an increase in the local and state tax revenue base during construction and operation, as well as stressed local government services and housing during the construction phase of the Project.

4.17 Environmental Justice

4.17.1 Proposed Action

Construction

The estimates on minority population percentages and median household income for the five counties affected by the Project indicate there are no minority and/or low-income populations living within the "affected area," with the exception of Dunn and McKenzie counties. The Fort Berthold Indian Reservation lies within Dunn and McKenzie counties, contributing to a Native American population that is substantially higher than the state average; however, the Project is not located within the boundary of the Reservation. Billings and Dunn counties have median household incomes that are 4.5 and 6.7 percent below the North Dakota state average, respectively; however, median household income for these counties is well above the poverty threshold as defined for a 3-person household. Ultimately, the Project would generate income within the affected counties, potentially benefiting minority communities. Moreover, because the Project is not located in large communities or urban areas, there is no evidence the Project would have a disproportionately high adverse human health or environmental effect on minority and low-income populations. Therefore, it is anticipated no environmental justice issues concerning minority and/or low-income populations are expected to occur as a result of the Project.

Operation

Impacts to minority and/or low-income populations would not occur as a result of Project operation.

4.17.2 No Action Alternative

Implementation of this alternative would avoid impacts to minority and/or low-income populations similar to the Proposed Action.

4.17.3 Mitigation

No additional mitigation measures for environmental justice have been proposed.

4.17.4 Residual Effects

Residual effects to minority and/or low-income populations are not anticipated to occur as a result of the construction and operation of the Project.

4.18 Transportation

4.18.1 Proposed Action

Construction

Construction of the Project would generate short-term traffic increases from truck transport of pipe and construction materials, and from commuting by construction workers. Load limit restrictions on roads, bridges, and highways would be observed at all times to prevent surface and structural damage. Oversize loads would comply with special permit requirements of the North Dakota Department of Transportation and county highway departments.

The pipe and most construction material would be shipped by truck to areas near Williston and Dickinson where the construction headquarters and a material staging yard would be established for the Project. Temporary increased traffic would occur on I-94, U.S. Highway 85, and SRs 200, 23, 73, 1804, and 1806, as well as on heavy-duty access roads due to the transport of pipe and materials to the ROW during the construction period.

The routes used would change as construction progressed along the Project route. The increase in heavy and light truck traffic generated during peak construction would be incremental in light of current heavy truck traffic in the Project area, resulting in little to no appreciable effect on levels of service or travel times on area highways. Effects on traffic flows would be minor and short term, although the increase in heavy trucks could create some queuing delays on road segments where passing is restricted. Effects of traffic increases on county roads would be minor. An individual motorist using one of these roads regularly may experience delays, but individual effects would be short-term, lasting no more than a few weeks on any particular road.

Project-related effects on traffic accidents would be expected to be minor. The total number of accidents in the Project area could increase approximately in proportion to the increase in travel. There is no reason to believe, however, that the vehicle accident probability, commonly expressed as the number of accidents per million vehicle miles, would increase beyond state average levels (Planning Information Corporation [PIC] 1988). Increased local traffic congestion during the construction period would tend to increase accident probability above the current low levels, but an increase in the proportion of professional bus and truck drivers in overall traffic flow would tend to counter this effect (PIC 1988).

Increased heavy truck traffic would tend to accelerate deterioration of road surfaces. This effect would be minimal on state and U.S. highways built to accommodate such traffic. Road maintenance requirements on unpaved county roads may be notably increased during the brief periods of heavy usage for access to particular segments of the Project route during construction activities. The degree of increase in maintenance needed would depend on weather conditions and the quality of the existing roadway. Traffic delays on roads and highways intersecting the Project route would be minimal. All paved highway crossings would be bored; therefore, traffic interruptions would be limited to equipment and personnel crossing the road (see Chapter 2.0). Unpaved roads would be open-cut and completed within a few days, limiting potential impacts.

Operation

Operation of the Project would have a positive measurable effect on transportation in the Project vicinity. The length and duration of the approximately 300 daily truck trips would decrease as a result of crude oil transportation occurring by pipeline instead of tanker truck. Occasional maintenance or repair requirements would cause activity similar to construction but only for very brief periods and generally on a much smaller scale than those that would be experienced during the construction period. Localized truck traffic in the vicinity of the six receipt facilities would increase relative to existing levels.

4.18.2 No Action Alternative

Implementation of this alternative would avoid both beneficial and negative impacts to transportation because construction and operational activities associated with the Project would not occur. Without the construction of the Project, additional truck traffic would continue to occur on existing highways and county roads within the Project vicinity. The beneficial effects to both traffic congestion and air quality would not be realized.

4.18.3 Mitigation

No additional mitigation measures for transportation are proposed.

4.18.4 Residual Effects

Truck traffic in the Project vicinity would decrease with the operation of the Project but local truck traffic in the immediate vicinity of the receipt facilities is expected to increase relative to existing levels.

4.19 Public Safety

4.19.1 Proposed Action

Construction

Construction of the Project would generate the possibility of elevated risks to public safety through increased traffic, local population, and hazardous chemical and fire related risks. To address potential impacts during construction, workers would be housed in temporary accommodations and would utilize temporary transportation measures to minimize public safety impacts on local citizens. Additionally, emergency response procedures for all incidents would be developed involving hazardous materials and possible fire emergencies.

Traffic along the Project route would temporarily increase during construction; however, this increase is expected to be negligible when considered in the scope of the increased traffic as a result of recent oil and gas development. The Project is expected to help reduce overall truck traffic after it is in service, as crude would be shipped by pipeline and not tanker trucks.

Operation

The transportation of crude oil by pipeline involves some risk to the public in the event of an accident and subsequent release of oil. The PHMSA is the primary federal regulatory agency responsible for ensuring that pipelines are safe and reliable. The PHMSA works cooperatively with other agencies that regulate pipelines. The safety regulations implement the laws found in 49 CFR Part 195.

To address potential impacts during operation, an ERP would be developed, in conjunction with local authorities and first responders, to build site-specific response plans, detail emergency equipment availability and location, and emergency contacts. Additionally, water trucks, portable water pumps, chemical fire extinguishers, hand tools, and heavy equipment would be available to address effects from fire during operation.

A spill of crude oil during Project operation as a result of a pipeline leak could contaminate soil and groundwater if the leak is not properly contained and remediated. The pipeline would be monitored by an electronic system that would sense pressure and flow rates 24 hours a day, as well as by aerial patrols. Consistent monitoring would allow concerns to be immediately identified and addressed. A Pipeline Integrity Management Plan would be developed, which, in conjunction with the ERP, would outline pipeline integrity management procedures to be implemented during operation.

4.19.2 No Action Alternative

Implementation of this alternative would avoid impacts to public safety because construction and operational activities associated with the Project would not occur.

4.19.3 Mitigation

No additional mitigation measures for public safety have been proposed.

4.19.4 Residual Effects

Truck traffic in the Project vicinity would decrease with the operation of the Project but local truck traffic in the immediate vicinity of the receipt facilities is expected to increase relative to existing levels.

4.20 Hazardous Materials and Solid Waste

Issues related to the presence of hazardous materials are the potential impacts to the environment from an accidental release of hazardous materials during transportation, and materials use during construction and operation of the Project. Also, the crude oil to be transported in the pipeline is considered a hazardous material that, if leaked or spilled, has the potential to contaminate soil and water resources and pose a threat to public health and safety.

Improper handling or storage of hazardous materials or pipeline leaks can result in contamination of soil and water resources as well as pose a threat to worker and public health and safety. The environmental effects of a release would depend on the material released, the quantity released, and the location of the release. Potential releases could include a small amount of fuel spilled during transfer operations in the Project ROW to the loss of several thousand gallons of fuel into a riparian drainage. The release of a hazardous material or solid waste into a sensitive area (such as stream, wetland, or populated area) is judged to be very unlikely. Depending on the material released, the amount released, and the location of the release, an accident resulting in a release could affect soils, water, biological resources, and human health.

4.20.1 Proposed Action

Construction

Contamination of soil and water may occur due to spills during transportation, storage, and handling of hazardous materials and solid waste. Also, unknown subsurface contaminants could be encountered during excavation.

Hazardous Materials

Soil and water contamination along the ROW may result from spills during construction and trench excavation. Impacts from spills would typically be minor because of the low frequency of spill occurrence and relatively low volume of materials being handled, and potentially spilled. The Project SPCC Plan would address procedures to ensure the proper handling and storage of these materials and procedures for the containment and cleanup of spills at aboveground facilities. In addition, POD, Appendix XX provides additional protection measures for the handling of hazardous materials with respect to sensitive receptors.

Solid Waste

BakkenLink would dispose of construction waste in accordance with applicable rules. Construction debris would not be placed in or adjacent to waterways and construction trash would be removed from the ROW. BakkenLink would comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations.

Contaminated Sites

It is possible that contaminated soil and groundwater (e.g., hydrocarbon contamination) could be encountered during trench excavation operations. In case contaminated soil is encountered, BakkenLink would suspend work in the area of the suspected contamination until the type and extent of the contamination was determined. The specific procedures for handing the discovery of potentially contaminated soils are described in Section 5.0 of the SPCC Plan (POD, Appendix XVIII). The type and extent of contamination, the responsible party, and local, state, and federal regulations would determine the appropriate cleanup method for contaminated soil and groundwater.

Operation

Hazardous Materials

Table 3.20-1 lists various hazardous materials that would be used in the operation of the pipeline. The procedures for safe handling of these materials are outlined in the regulatory programs described in Section 3.20.

The USDOT classifies crude oil as a hazardous liquid. Accordingly, the pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards in 49 CFR Part 195. The regulations are intended to ensure adequate protection for the public and to prevent pipeline and facility accidents and failures. Part 195 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

BakkenLink would design, construct, and operate the pipeline in accordance with federal regulations. Important features to ensure the safe operation of the pipeline include:

- Hydrostatic testing to verify the pipeline's integrity prior to operations;
- Corrosion protection by using high integrity fusion bonded epoxy coating and cathodic protection;
- Internal inspection of the pipe using "smart pigs" designed to detect irregularities on the internal and external surfaces of the pipe;
- SCADA system to continuously monitor the pipeline and the pressure of its contents;
- Participation in state "one call" programs; and
- Use of remotely activated valves at key locations.

Solid Waste

As described in Section 3.20, the waste generated during operations would be similar to waste generated during construction, except for certain waste that may be generated from pipeline maintenance operations. Such waste materials may be considered hazardous and would have to be accumulated, stored, and disposed of in accordance with applicable rules and regulations.

4.20.2 No Action Alternative

Under the No Action Alternative, the Project would not be constructed and the potential effects associated with the transportation, storage, or use of hazardous materials or the disposal of solid waste would not occur. Unknown contaminated sites that may exist along the Project ROW would not be discovered and impacts would continue undetected until discovery sometime in the future by other parties.

4.20.3 Mitigation

As described in Section 3.2, the Project route crosses an area of potential naturally occurring radioactive materials within the pipeline trench excavation depth. For worker health and safety, the following protective measure is recommended:

HM-1: It is recommended that ground disturbing activities be monitored in the area of uranium deposits shown on **Figure 3.2-3**. Spoil piles and airborne dust will be monitored by qualified persons to ensure that radiation is below government recommended action levels. If action levels are exceeded, BakkenLink will provide for appropriate personal protective equipment to be provided to construction workers and length of potential exposure monitored to limit time of exposure to comply with government recommended levels. In

addition, soils that exhibit elevated levels of radioactivity will be dealt with according to the provisions for handling contaminated soil in the SPCC Plan.

4.20.4 Residual Effects

Residual adverse effects from the use of hazardous materials under the Proposed Action would depend on the substance, quantity, timing, location, and response involved in the event of an accidental spill or release. Operation in compliance with applicable regulations and in accordance with the facility's SPCC Plan, as well as the prompt cleanup of potential spills and releases would minimize the potential of residual adverse effects due to accidental spills or releases of hazardous materials.

4.21 Cultural Resources/Native American Concerns

4.21.1 Proposed Action

4.21.1.1 Cultural Resources

Construction

Potential impacts to historic properties are assessed by applying the "criteria of adverse effect" (36 CFR 800.5[a][1]). "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." The analysis of impacts using the criteria is limited to those resources that are either listed in the NRHP or have been recommended as eligible for inclusion in the NRHP.

Potential direct impacts to known and unknown cultural resources include physical disturbance associated with Project-related construction activities. Indirect impacts could include soil erosion and the potential for illegal artifact collecting and vandalism due to the presence of increased numbers of people during construction and increased public access. Visual impacts could result from the introduction of visual intrusions (e.g., aboveground ancillary facilities) resulting in changes in the setting surrounding such resources.

Cultural resources inventories conducted for the Project identified a total of four NRHP-eligible sites within the APE, including two prehistoric cultural material scatters (32MZ1484 and 32MZ1647) and two segments of the abandoned historic US 85 roadbed (32MZ1560 and 32WI1560). The remaining 25 prehistoric sites and one historic site (a wagon trail) are located within or adjacent to the APE and currently are of undetermined NRHP-eligibility. Additional investigations such as subsurface evaluative testing or archival research would be required to determine if any of these unevaluated sites qualify for inclusion in the NRHP. Management recommendations for all of the sites are presented in **Table 4.21-1**.

Table 4.21-1 Management Recommendations for NRHP-eligible and Unevaluated Sites Located within or Adjacent to the APE

Site Number	Site Type	NRHP-Eligibility	Management Recommendations
32MZ1560	Old U.S. Highway 85 roadbed (segment)	Eligible	Avoid via HDD or boring, or restore grade/recontour after construction
32WI1560	Old U.S. Highway 85 roadbed (segment)	Eligible	
32MZ1647	Prehistoric – cultural material scatter	Eligible	Avoid; fence/stay off landform on which site is located
32MZ2311	Prehistoric – cultural material scatter	Undetermined	Avoid; fence/neck down
MAC-BLAK75[1]	Prehistoric – cultural material scatter	Undetermined	
32WI132	Prehistoric – stone circle, cultural material scatter	Undetermined	
32MZ1484	Prehistoric – cultural material scatter	Eligible	
MAC-BLAK49[1]	Prehistoric – stone circles	Undetermined	Avoid; fence/neck down-or reroute C/L South into previously surveyed ROW
MAC-BLAK59[1]	Prehistoric – cultural material scatter	Undetermined	Avoid; fence/stay at least 70 meters from edge of valley
32WI338	Prehistoric – stone circle	Undetermined	Avoid; method unspecified

Table 4.21-1 Management Recommendations for NRHP-eligible and Unevaluated Sites Located within or Adjacent to the APE

Site Number	Site Type	NRHP-Eligibility	Management Recommendations
32MZ1473	Prehistoric – cultural material scatter	Undetermined	Avoid via HDD or boring
32WI1246	Prehistoric – stone circle	Undetermined	Avoid; fence
MAC-BLAK54[1]	Prehistoric – cairn	Undetermined	
MAC-BLAK90[1]	Prehistoric – eagle trapping pits	Undetermined	
MAC-BLAK73[1]	Prehistoric – cultural material scatter	Undetermined	
MAC-BLAK74[1]	Prehistoric – cultural material scatter	Undetermined	
32WI1238	Prehistoric – stone circle	Undetermined	Avoid; neck down, fence features
32WI1243	Prehistoric – stone circles	Undetermined	Avoided by reroute; fence
32WI1245	Prehistoric – stone circles	Undetermined	
32WI1242	Prehistoric – stone features	Undetermined	
32WI1237	Prehistoric – stone features	Undetermined	Avoided by reroute
32MZ1314	Historic – wagon trail	Undetermined	
32MZ1312	Prehistoric – cultural material scatter	Undetermined	
32MZ1311	Prehistoric – cultural material scatter	Undetermined	
MAC-BLAK45[1]	Prehistoric – cultural material scatter	Undetermined	
32WI1241	Prehistoric – stone circle	Undetermined	
32MZ2313	Prehistoric – cultural material scatter	Undetermined	
32MZ2307	Prehistoric – cultural material scatter	Undetermined	
MAC-BLAK63[1]	Prehistoric – cairn	Undetermined	
32BI453	Prehistoric – cultural material scatter	Undetermined	

[1] Temporary field number.

Source: Metcalf 2012b.

Of the 30 NRHP-eligible and unevaluated cultural resources, 10 are located outside of the APE; no further work is recommended for these resources. Avoidance by HDD or boring is recommended for two NRHP-eligible segments of the historic US 85 road bed (32MZ1560 and 32WI1560) and an unevaluated prehistoric cultural material scatter (32MZ1473). The remaining sites, including the two other NRHP-eligible sites, would be avoided by erecting protective fencing between the site and construction activities and/or by a narrowing of the pipeline ROW in the area of the site. Final determination of eligibility is pending evaluative testing and BLM and North Dakota SHPO review.

Resolution of Effects

Avoidance by fencing, narrowing of the construction ROW, HDD, or bore is recommended for historic properties located within the APE. If avoidance by these measures is feasible, then no adverse effects to these sites as a result of the Project would be anticipated. However, if avoidance is not feasible, a treatment plan would be developed by the BLM in consultation with the North Dakota SHPO and interested tribes. The treatment plan would include measures to minimize or mitigate unavoidable direct effects which could include, but would not be limited to, data recovery (archaeological excavation) or Historic American

Buildings Survey/Historic American Engineering Record or other agreed upon historic recordation process. At this time, not all of the sites have been evaluated for eligibility for inclusion on the NRHP.

Potential indirect effects to historic properties located adjacent to the APE as a result of drainage or soil erosion would be minimized through implementation of procedures described in the BMPs, SWPPP, and the CMRP (Section 2.2.2, Environmental Protection Measures). Other indirect effects, such as illegal collecting of artifacts and inadvertent damage to archaeological sites, could occur in the area of the Project due to an increase in the number of workers during construction and increased public access. In accordance with the environmental protection measures (**Table 2-5**), Project-related personnel would be educated as to the sensitive nature of the resources; a strict policy of prohibiting collecting of these resources would be implemented. To prevent unauthorized use of the ROW, access would be blocked at locations specified by agencies and/or private landowners (**Table 2-5**).

To reduce potential visual effects to a historic property in which site setting contributes to its NRHP eligibility, measures would be implemented to minimize the visual effects of construction on historic road/trail crossings as identified by the BLM, USFS, or USACE (**Table 2-5**).

Per the environmental protection measures and as described in the Unanticipated Discoveries Plan (POD, Appendix XVII), if any previously unknown archaeological sites are discovered during Project construction, all construction activities would cease in the area of the discovery and the BLM, North Dakota SHPO, and/or applicable land management agency would be notified of the find. Steps would be taken to protect the site from vandalism or further damage until the BLM and North Dakota SHPO could evaluate the nature of the discovery. If the site qualifies as a historic property, a mitigation plan would be developed and executed before construction can resume in the vicinity of the discovery. If the site does not qualify as a historic property, construction can resume in the vicinity of the discovery.

If construction or other Project personnel discover what may be human remains, funerary objects, or items of cultural patrimony, construction would cease within the vicinity of the discovery, and the BLM, North Dakota SHPO, and or applicable land-managing agency would be notified of the find. Any discovered Native American human remains, funerary objects, or items of cultural patrimony found on federal land would be handled in accordance with the Native American Graves Protection and Repatriation Act. Non-Native American human remains found on federal, state, or private lands would be handled in accordance with the North Dakota Century Code §23-06-27 and the administrative rules in the North Dakota Administrative Code Chapter 40-02-03.

Operation

No impacts to cultural resources associated with operation of the Project are anticipated.

4.21.1.2 Native American Concerns

Construction

Section 106 of the NHPA requires that federally recognized Native American tribes be consulted regarding potential impacts to properties of traditional, religious, and cultural importance to the tribes. In general, properties of Native American concern include, but are not limited to, stone cairns and stone circles. The assessment of impacts to properties of tribal concern identified through the consultation effort utilizes the same process used for cultural resources, involving determinations of NRHP-eligibility and application of the criteria of adverse effect. Potential direct, indirect, and visual impacts to properties of Native American concern are similar to those that may affect cultural resources.

Tribal consultations are ongoing, and would afford Native American groups the opportunity to review all cultural resources inventory documentation for the Project, and to express concerns about potential impacts

to properties of traditional religious and cultural importance to such groups. If any issues are raised by Native American groups prior to construction, the issue would be addressed through further consultation with the BLM.

Operation

No impacts to sites of Native American concern associated with operation of the Project are anticipated.

4.21.2 No Action Alternative

Under the No Action Alternative, the Project would not be developed, and therefore no impacts to cultural resources or Native American resources would occur.

4.21.3 Mitigation

Additional mitigation has not been proposed for cultural resources and Native American concerns. Protection measures for unknown cultural resources are described in the Unanticipated Discoveries Plan (POD, Appendix XVII).

4.21.4 Residual Effects

The Proposed Action would result in the loss of cultural resources that are not eligible for the NRHP. Although these sites would be recorded to BLM and SHPO standards and the information integrated into local and statewide databases, the sites ultimately would be destroyed by Project construction. Historic properties identified within the Project APE would be avoided, or if avoidance is not feasible, mitigated in accordance with a BLM and SHPO-approved treatment plan. Although historic properties sites would be mitigated through implementation of data recovery or other forms of mitigation, some of the cultural values associated with these sites cannot be fully mitigated; therefore, it is anticipated that residual impacts to these resources would occur.