



# United States Department of the Interior

BUREAU OF INDIAN AFFAIRS  
Great Plains Regional Office  
115 Fourth Avenue S.E., Suite 400  
Aberdeen, South Dakota 57401



IN REPLY REFER TO:

DESCRM  
MC-208

SEP 28 2011

## MEMORANDUM

TO: Superintendent, Fort Berthold Agency

FROM: <sup>Acting</sup> Regional Director, Great Plains Region

SUBJECT: Environmental Assessment and Finding of No Significant Impact

In compliance with the regulations of the National Environmental Policy Act (NEPA) of 1969, as amended, an Environmental Assessment has been completed and a Finding of No Significant Impact (FONSI) has been issued. The environmental assessment authorizes land use for eight Bakken and Three Forks oil and gas wells atop four pads on the Fort Berthold Indian Reservation.

All the necessary requirements of the National Environmental Policy Act have been completed. Attached for your files are copies of the EA Addendum, FONSI and Notice of Availability. The Council on Environmental Quality (CEQ) regulations require that there be a public notice of availability of the FONSI (40 C.F.R. Part 1506.6(b)). Please post the attached notice of availability at the Agency and Tribal buildings for 30 days.

If you have any questions, please call Marilyn Bercier, Regional Environmental Scientist, Division of Environment, Safety and Cultural Resources Management, at (605) 226-7656.

Attachment

cc: Tex Hall, Chairman, Three Affiliated Tribes (with attachment)  
Elgin Crows Breast, Tribal Historic Preservation Officer (with attachment)  
Derek Enderud, BLM, Bureau of Land Management (with attachment)  
Joey Sheeley, SWCA (with attachment)  
Jonathon Shelman, Corps of Engineer  
Jeff Hunt, Fort Berthold Agency



# **ENVIRONMENTAL ASSESSMENT**

**United States Department of the Interior  
Bureau of Indian Affairs**

**Great Plains Regional Office  
Aberdeen, South Dakota**

**Cooperating Agency:  
Bureau of Land Management  
North Dakota Field Office  
Dickinson, North Dakota**



**Enerplus Resources (USA) Corporation**

**Eight Exploratory Bakken and Three Forks Oil Wells:**

**Morgan 149-93-29B-32H TF**

**Arabian 149-93-29B-32H**

**Pinto 149-93-29A-32H**

**Mustang 149-93-29A-32H TF**

**Wormwood 149-03-21C-22H**

**Bluestem 149-93-21C-22H TF**

**Arnica 149-93-21A-22H TF**

**Chokecherry 149-93-21A-22H**

**Fort Berthold Indian Reservation**

**September 2011**

For information contact:  
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Division of Environment, Safety and Cultural Resources Management  
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# Finding of No Significant Impact

## Enerplus Resources (USA) Corporation

### Environmental Assessment for Eight Bakken and Three Forks Oil Wells:

Morgan 149-93-29B-32H TF  
Pinto 149-93-29A-32H  
Wormwood 149-03-21C-22H  
Arnica 149-93-21A-22H TF

Arabian 149-93-29B-32H  
Mustang 149-93-29A-32H TF  
Bluestem 149-93-21C-22H TF  
Chokecherry 149-93-21A-22H


### Fort Berthold Indian Reservation Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal to drill up to eight oil and gas wells atop four pads, access roads and related infrastructure on the Fort Berthold Indian Reservation in Dunn County, North Dakota. Associated federal actions by BIA include determinations of effect regarding cultural resources, approvals of leases, rights-of-way and easements, and a positive recommendation to the Bureau of Land Management regarding the Applications for Permit to Drill.

Potential of the proposed actions to impact the human environment is analyzed in the attached addendum to an existing Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the recently completed addendum to the EA, I have determined that the proposed project will not significantly affect the quality of the human environment. No Environmental Impact Statement is required for any portion of the proposed activities.

This determination is based on the following factors:

1. Agency and public involvement was solicited and environmental issues related to the proposal were identified.
2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, public safety, water resources, and cultural resources. The remaining potential for impacts was disclosed for both the Proposed Action and the No Action Alternative.
3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species. This guidance includes the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) (MBTA), the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250) (BGEPA), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", and the Endangered Species Act (16 U.S.C. 1531 et seq.) (ESA).
4. The proposed actions are designed to avoid adverse effects to historic, archeological, cultural and traditional properties, sites and practices. The Tribal Historic Preservation Officer has concurred with BIA's determination that no historic properties will be affected.
5. Environmental justice was fully considered.
6. Cumulative effects to the environment are either mitigated or minimal.
7. No regulatory requirements have been waived or require compensatory mitigation measures.
8. The proposed projects will improve the socio-economic condition of the affected Indian community.

  
Regional Director

9/28/11  
Date



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**Appendix**

- A Threatened and Endangered Species in Dunn County

## **1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION**

### **1.1 INTRODUCTION**

Enerplus Resources (USA) Corporation (Enerplus) has acquired the leases and is proposing to drill eight horizontal oil and gas wells on four pad locations on the Fort Berthold Indian Reservation (Reservation) to evaluate, and possibly develop, the commercial potential of natural resources. Developments have been proposed on lands held in trust by the United States in Dunn County, North Dakota. The Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments. The BIA manages lands held in title by the tribe and tribal members to subsurface mineral rights. Development has been proposed for exploratory wells that target specific areas in the Bakken and Three Forks formations, known oil reserves. The four well pads are located on the Reservation such that the majority of the external boundaries are located above the Bakken and Three Forks formations, as shown in Figures 1.1 and 1.2.

One well pad site would be located within a 1,280-acre spacing unit in the N $\frac{1}{2}$  NW $\frac{1}{4}$  of Section 29, Township (T) 149 North (N), Range (R) 93 West (W), approximately 3.3 miles southeast of Mandaree, Dunn County, North Dakota (Figures 1.1 and 1.2). This site would contain the following wells:

- Morgan 149-93-29B-32H TF: NW $\frac{1}{4}$  NW $\frac{1}{4}$  of Section 29
- Arabian 149-93-29B-32H: NE $\frac{1}{4}$  NW $\frac{1}{4}$  of Section 29

A second well pad would be located approximately 3.5 miles southeast of Mandaree in the NE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 29, T149N, R93W, Dunn County, North Dakota, within a 1,280-acre spacing unit (Figures 1.1 and 1.2). This location would contain the following wells:

- Pinto 149-93-29A-32H: NE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 29
- Mustang 149-93-29A-32H TF: NE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 29

A third well pad would be located approximately 4.9 miles southeast of Mandaree in the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 21, T149N, R93W, Dunn County, North Dakota, within a 1,280-acre spacing unit (Figures 1.1 and 1.2). This location would contain the following wells:

- Wormwood 149-03-21C-22H: NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 21
- Bluestem 149-93-21C-22H TF: NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 21

A fourth well pad would be located approximately 4.7 miles southeast of Mandaree in the SE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 20, T149N, R93W, Dunn County, North Dakota, within a 1,280-acre spacing unit (Figures 1.1 and 1.2). This location would contain the following wells:

- Arnica 149-93-21A-22H TF: SE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 20
- Chokecherry 149-93-21A-22H: SE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 20

New access roads with underground utility corridors to each well pad, as shown in Figure 1.1, would be constructed to facilitate the construction and operation of each proposed well pad. Well pads would be constructed to accommodate drilling activities and well operations. Pits

constructed for drilled cuttings would be used during drilling operations and reclaimed once operations have ceased. Proposed well sites would also include support facilities; buried gathering oil, gas, and water pipelines; radio towers; and electrical utilities if the wells are completed for long-term commercial production. All components (i.e., roads, well pads, supporting facilities) would be reclaimed upon final abandonment unless formally transferred, with federal approval, to either the BIA or the landowner. The proposed wells are exploratory; should they prove productive, further exploration of surrounding areas is possible.

This environmental assessment (EA) addresses the potential impacts associated with the construction, and possible long-term operation, of the above-listed wells and directly related infrastructure and facilities. Further oil and gas exploration and development would require additional National Environmental Policy Act of 1969 (NEPA) analysis and federal action.



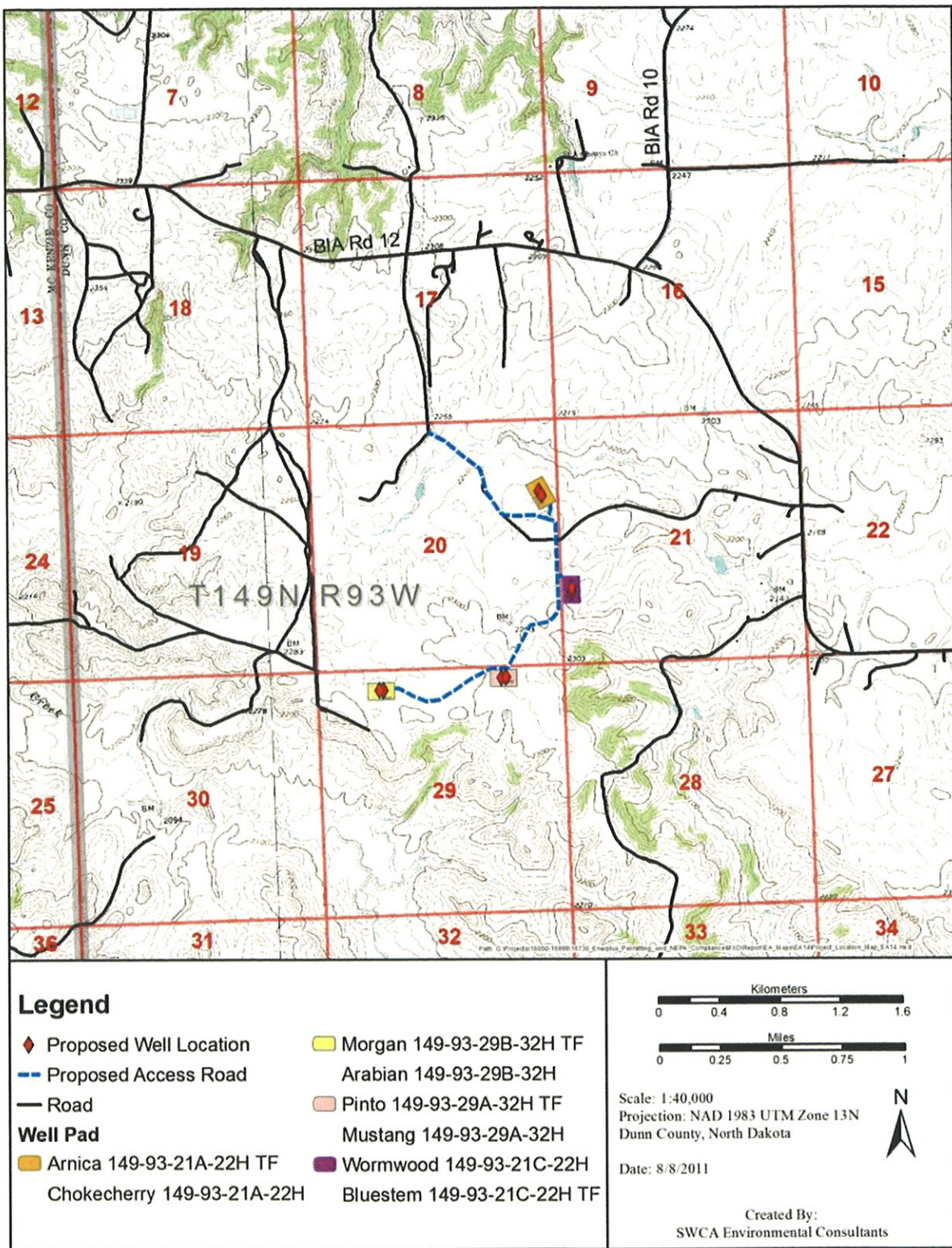


Figure 1.1. Project location for wells located in the N $\frac{1}{2}$  NW $\frac{1}{4}$  and NE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 29, NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 21, and SE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 20, T149N, R93W.



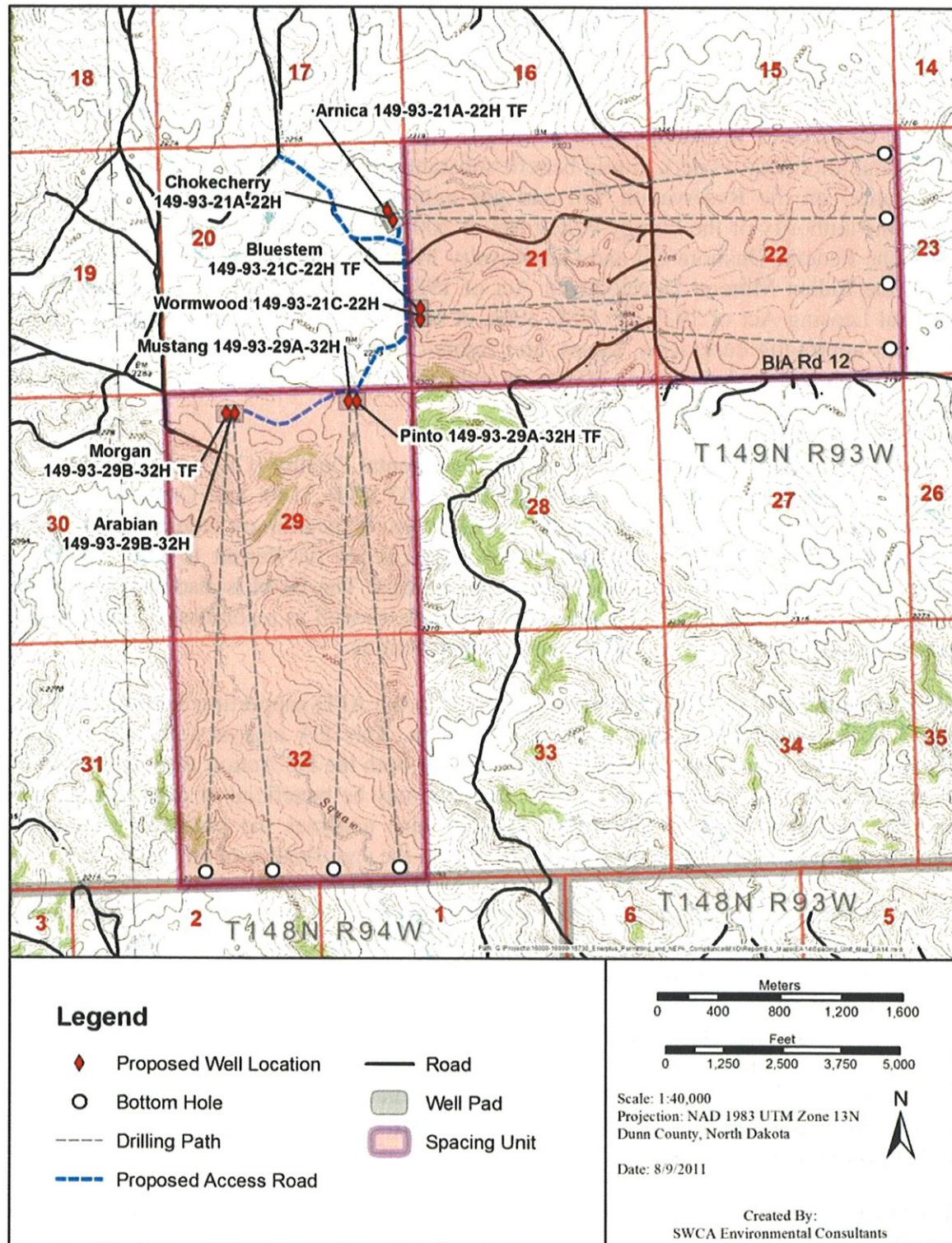


Figure 1.2. 1,280-acre spacing units in Sections 21, 22, 29, and 32, T149N, R94W and respective drilling targets of each well.

## **1.2 FEDERAL AND OTHER RELEVANT REGULATIONS AND AUTHORITIES**

The BIA's general mission is to represent the interests, including the trust resources, of members of the Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara (MHA) Nation, as well as those of individual tribal members. All members of the MHA Nation, including individual allotment owners, would benefit substantially from the development of oil and gas exploration on the Reservation. Oil and gas exploration and subsequent development are under the authority of the Energy Policy Act of 2005 (42 United States Code [USC] 15801, et seq.), the Federal Onshore Oil and Gas Royalty Management Act of 1982 (30 USC 1701, et seq.), the Indian Mineral Development Act of 1982 (25 USC 2101, et seq.), and the Indian Mineral Leasing Act of 1938 (25 USC 396a, et seq.). The BIA's role in the proposed project includes approving easements, leases, and rights-of-way (ROWs) for both access roads and gathering pipelines; determining effects on cultural resources; and making recommendations to the Bureau of Land Management (BLM).

Compliance with NEPA, the Council on Environmental Quality (CEQ) regulations (Title 40 Code of Federal Regulations [CFR] 1500–1508), 43 CFR 3100, and Onshore Oil and Gas Order Nos. 1, 2, 6, and 7 is required due to the project's location on federal lands. The BLM is responsible for the final approval of all Applications for Permit to Drill (APDs) after receiving recommendations for approval from the BIA. The BLM is also tasked with on-site monitoring of construction and production activities, as well as resolution of any dispute that may arise as a result of any of the aforementioned actions.

The procedures and technical practices described in the APD supporting documents and in the EA describe potential impacts to the project area. This EA analyzes potential impacts to elements in the natural and human environment for both the No Action Alternative (described in Section 2.1) and the Proposed Action. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. The EA also analyzes the potential for cumulative impacts and ultimately makes a determination as to the significance of any impacts.

In the absence of significant negative consequences, this EA would result in either a Finding of No Significant Impact. Should significant adverse impacts be identified as a result of the direct, indirect, or cumulative effects of the Proposed Action, then the NEPA requires the preparation of an environmental impact statement (EIS). It should be noted that a significant benefit from the project does not require preparation of an EIS. Commercial viability of the proposed wells could result in additional exploration in the area, and any future oil/gas exploration activities and associated federal actions that are proposed wholly or partly on trust land would require additional NEPA analysis and BIA consideration prior to implementation and/or production activities.

If a positive determination is made and a Notice to Proceed with the proposed project is issued, Enerplus would comply with all applicable federal, state, and tribal laws, rules, policies, regulations, and agreements. Enerplus also agrees to follow all best management practices (BMPs) and monitoring mitigations listed in this document. No disturbance of any kind can begin until all required clearances, consultations, determinations, easements, leases, permits, and surveys are in place.

## **2.0 PROPOSED ACTION AND THE NO ACTION ALTERNATIVE**

The BIA, as required by the NEPA, must “study, develop, and describe appropriate alternatives to the recommended course of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources” (NEPA Sec. 102[2][e]). Developing a range of alternatives allows for exploration of options designed to meet the purpose and need for the action. Along with the No Action Alternative, the BIA is considering the Proposed Action.

### **2.1 THE NO ACTION ALTERNATIVE**

Under the No Action Alternative, the proposed project, including well pads, wells, and access roads and gathering lines, would not be constructed, drilled, installed, or operated. The BIA would not approve easements, leases, or ROWs for the proposed locations and the BLM would not approve the APD. No impacts would occur as a result of this alternative to the following critical elements: air quality, public health and safety, water resources, wetland/riparian habitat, threatened and endangered species, soils, vegetation and invasive species, cultural resources, socioeconomic conditions, and environmental justice (EJ). There would be no project-related ground disturbance, use of hazardous materials, or trucking of product to collection areas. Surface disturbance, deposition of potentially harmful biological material, and traffic levels would not change from present levels. Under the No Action Alternative, the MHA Nation, tribal members, and allottees would not have the opportunity to realize potential financial gains resulting from the discovery of resources at these well locations.

### **2.2 THE PROPOSED ACTION**

In addition to the No Action Alternative, this document analyzes the potential impacts of eight exploratory oil and gas wells on four pad locations with varied surface and mineral estates located in the west-central portions of the Reservation in Dunn County. The proposed wells would test the commercial potential of the Bakken and Three Forks formations. Well bottom hole locations, shown in Figure 1.2, were chosen by Enerplus in consultation with tribal and BIA resource managers to provide information for future development.

#### **2.2.1 Well Pad and Infrastructure Locations and Disturbance**

Well pad and infrastructure locations, shown in Figures 1.1 and 1.2 and detailed in Table 2.1, were developed in consultation with tribal and BIA resource managers during a pre-clearance process that included surveys for cultural, archaeological, and natural (i.e., biological and physical) resources. Short-term construction disturbance at the well pad consists of all areas within the fenced perimeter around the well pad cut and fill area. Long-term disturbance consists of the un-reclaimed well pad area and access road.

Table 2.1. Proposed Well Pad and Infrastructure Locations, Disturbance, and Site-specific Owner-committed Measures.

Well Pad Location	Well Name	Short-term Disturbance	Long-term Disturbance (Acres)	Site-specific Owner-committed Measures
N½ NW¼ of Section 29, Township (T) 149 North (N), Range (R) 93 West (W), Dunn County, North Dakota	Morgan 149-93-29B-32H TF Arabian 149-93-29B-32H	Well pad construction area of 8.4 acres. See right-of-way (ROW) disturbance for Sections 20 and 29 shared road, below.	1.9 acres un-reclaimed well pad See long-term road disturbance for Sections 20 and 29 shared road, below.	Use semi-closed-loop. Install matting blankets on exposed slopes to inhibit erosion. Round corners of well pad as needed. Construct an 18-inch berm on the north, east, west sides and corners of well pad. Install straw bales between pad and drainage below fill.
NE¼ NE¼ of Section 29, T149N, R93W, Dunn County, North Dakota	Pinto 149-93-29A-32H Mustang 149-93-29A-32H TF	Well pad construction area of 9.2 acres. See ROW disturbance for Sections 20 and 29 shared road, below.	1.9 acres un-reclaimed well pad See long-term road disturbance for Sections 20 and 29 shared road, below.	Use semi-closed-loop system. Install lined freshwater cutting pit. Use blanket matting on exposed slopes. Use straw rolls at toe of slopes. Round southwest, northwest, and northeast corners of well pad. Construct an 18-inch berm on the northwest and southwest corners, and partial south side of well pad.



Well Pad Location	Well Name	Short-term Disturbance	Long-term Disturbance (Acres)	Site-specific Owner-committed Measures
NW¼ SW¼ of Section 21, T149N, R93W, Dunn County, North Dakota	Wormwood 149-03-21C-22H Bluestem 149-93-21C-22H TF	Well pad construction area of 8.4 acres. 66.0 feet (0.2 acre) access road and utility corridor.	1.9 acres un-reclaimed well pad 0.1 <sup>1</sup> -acre un-reclaimed access road	Well pad moved 200 feet to current location to avoid impacts to drainage. Use semi-closed-loop system. Install lined freshwater cutting pit. Install diversion ditch around location. Use blanket matting on cut slopes and straw rolls at toe of slopes. Round southwest, northwest, and northeast corners of well pad. Construct an 18-inch berm on the east, north, and northwest sides of the well pad.
SE¼ NE¼ of Section 20, T149N, R93W, Dunn County, North Dakota	Arnica 149-93-21A-22H TF Chokecherry 149-93-21A-22H	Well pad construction area of 10.8 acres. 3,686.4 feet (10.6 acres) access road and utility corridor.	1.9 acres after well pad interim reclamation. 6.3 <sup>1</sup> -acre un-reclaimed access road	Use semi-closed-loop system. Round corners of well pad. Construct an 18-inch berm on the north and northwest sides, and the southeast corner of pad.
Section 29 Well Pads	Shared Access Road from Sections 29 and 21 well pads to SE¼ NE¼ Section 20 access road.	5,945.90 feet (17.062 acres)	10.2 <sup>1</sup> -acre un-reclaimed access road	Install cattle guards at all fence lines. Monitor present during construction.
<b>Total Short-term and Long-term Disturbance</b>		Well pad construction area = 36.8 acres. Access roads/utility corridor = 27.8 acres Total = 64.6 acres	Well pads = 7.6 acres Access roads = 16.6 acres Total = 24.2 acres	

<sup>1</sup>Un-reclaimed access road acreage based on maximum of a 75-foot road base.

Interdisciplinary on-site meetings were conducted May 24 and July 14, 2011, to review well site locations and proposed access roads and underground utility corridors. The on-site meetings were attended by the surveyor, natural and cultural resource specialists, the Enerplus representative, the BIA representative, and the Tribal Historic Preservation Office (THPO) monitor. Surveys were conducted at that time to determine potential impacts to resources; topography, potential drainage issues, erosion control measures, associated with the well pad and road placement. Related facility locations (access roads, gathering pipelines, topsoil/subsoil stockpiles, reserve pits, tanks, etc.) were also discussed at the on-site meeting in order to minimize effects to natural and cultural resources.

After securing mineral leases, the ROW on-site meeting was conducted with the BLM on August 16, 2011. Copies of APDs submitted to the BLM North Dakota Field Office are sent to the BIA's office in New Town, North Dakota. Construction would begin only when the BIA completes the NEPA process and the APDs are subsequently approved by the BLM.

The combined short-term construction disturbance of the project is estimated to be approximately 64.6 acres, of which 36.8 acres would be needed to fence off and construct the well pads, and 27.8 acres would be required to construct access roads, as shown in Table 2.1. Other site-specific measures were identified during the interdisciplinary site assessment and required by BIA. These measures, also identified in Table 2.1, were then included in the project final designs.

### **2.2.2 Well Pads**

Four new well pads are proposed, with two wells per pad. The proposed well sites would include a perimeter fence surrounding a leveled area (pad) approximately 360 to 400 feet wide and 575 to 600 feet long, with a temporary lined freshwater cuttings pit. The pad would be used for the drilling rig and equipment and the pit would be excavated, lined, and used for drilling cuttings. The pads would be stripped of topsoil and vegetation and then graded. The topsoil would be stockpiled and stabilized with a cover crop until it could be used to reclaim and revegetate the disturbed area. The subsoils would be used in the construction of the pad and the finished pads would be graded to ensure that water drains away from the pad. Erosion-control BMPs would be implemented and could include surface drainage controls, soil surface protection methodologies, and sediment capture features.

Cut-and-fill slopes, stockpiled topsoil, and cuttings pit backfill placed on the edge of the pads would result in additional surface disturbance per pad. Total long-term surface disturbance from the un-reclaimed new well pad areas would total approximately 7.6 acres, as shown in Table 2.1. All proposed pads would have a 2:1 slope on cut ends. Details of pad construction and reclamation can be found in the APD.

### **2.2.3 Access Roads and Utility Corridors**

New access roads are proposed to improve an existing unimproved two-track road and connect the four well pads with an existing gravel road that links in to BIA Road 12. The shared access roads would minimize disturbance as much as possible (Figure 1.1). In total, 9,689.3 feet (1.8 miles) of new access road and utility corridor would be constructed. A maximum disturbed ROW width of 125 feet would be used for access roads and utility

corridors. Gathering lines and utilities would be buried within the utility corridor. Water pipelines would be Fiberspar and 6 inches or less in diameter; oil and gas pipelines would be steel and 12 inches or less in diameter. Approximately 27.8 acres of new short-term surface disturbance would result from the proposed roads, as shown in Table 2.1. Unused ROW would be reclaimed and long-term disturbance of approximately 16.6 acres would occur from the proposed 50 to 75-foot road. All proposed access roads would have cattle guards installed at the entrance to access spurs and pads. Signed agreements would be in place allowing road construction across affected private and allotted land surfaces, and any applicable approach permits and/or easements would be obtained prior to any construction activity.

Construction would follow road design standards outlined in the BLM Gold Book (BLM and U.S. Forest Service [USFS] 2007). At a minimum, 6 inches of topsoil would be removed from the access road corridors. This stockpiled topsoil would then be placed on the outside slopes of the ditches following road construction. The ditches would be reseeded as quickly as possible using a seed mixture determined by the BIA. Care would be taken during road construction to avoid disturbing or disrupting any buried utilities that may exist along BIA Road 12 or in the vicinity of new road construction. The access roads would be surfaced with a minimum of 4 inches of aggregate prior to commencement of drilling operations and would remain in use for the life of the wells. Details of road construction are addressed in the APD. A diagram of typical road cross sections is provided as Figure 2.1.

#### **2.2.4 Drilling**

Enerplus uses a semi-closed-loop drilling system. Rig transport and on-site assembly would take roughly seven days for each well; a typical drill rig is shown in Figure 2.2. Drilling would require approximately 30 days to reach target depth, using a rotary drilling rig rated for drilling to approximately 20,000 feet. For the first 2,000 feet drilled, a freshwater-based mud system (1.26 gallons per foot of hole drilled) with non-hazardous additives would be used to minimize contaminant concerns. Water would be obtained from a commercial source for this drilling stage.

After setting and cementing the near-surface casing, an oil-based mud system (80% to 85% diesel fuel and 15% to 20% water) would be used to drill to a 7-inch casing point at approximately 11,100 feet, depending on the formation targeted. Oil-based drilling fluids reduce the potential for hole sloughing while drilling through water-sensitive formations (shales/salts). Approximately 3,400 gallons of salt water and 13,400 gallons of diesel fuel per well would be used to complete vertical drilling. The lateral reach of the borehole would be drilled using approximately 63,000 gallons of salt water as mud and adding polymer sweeps as necessary to clean the hole.

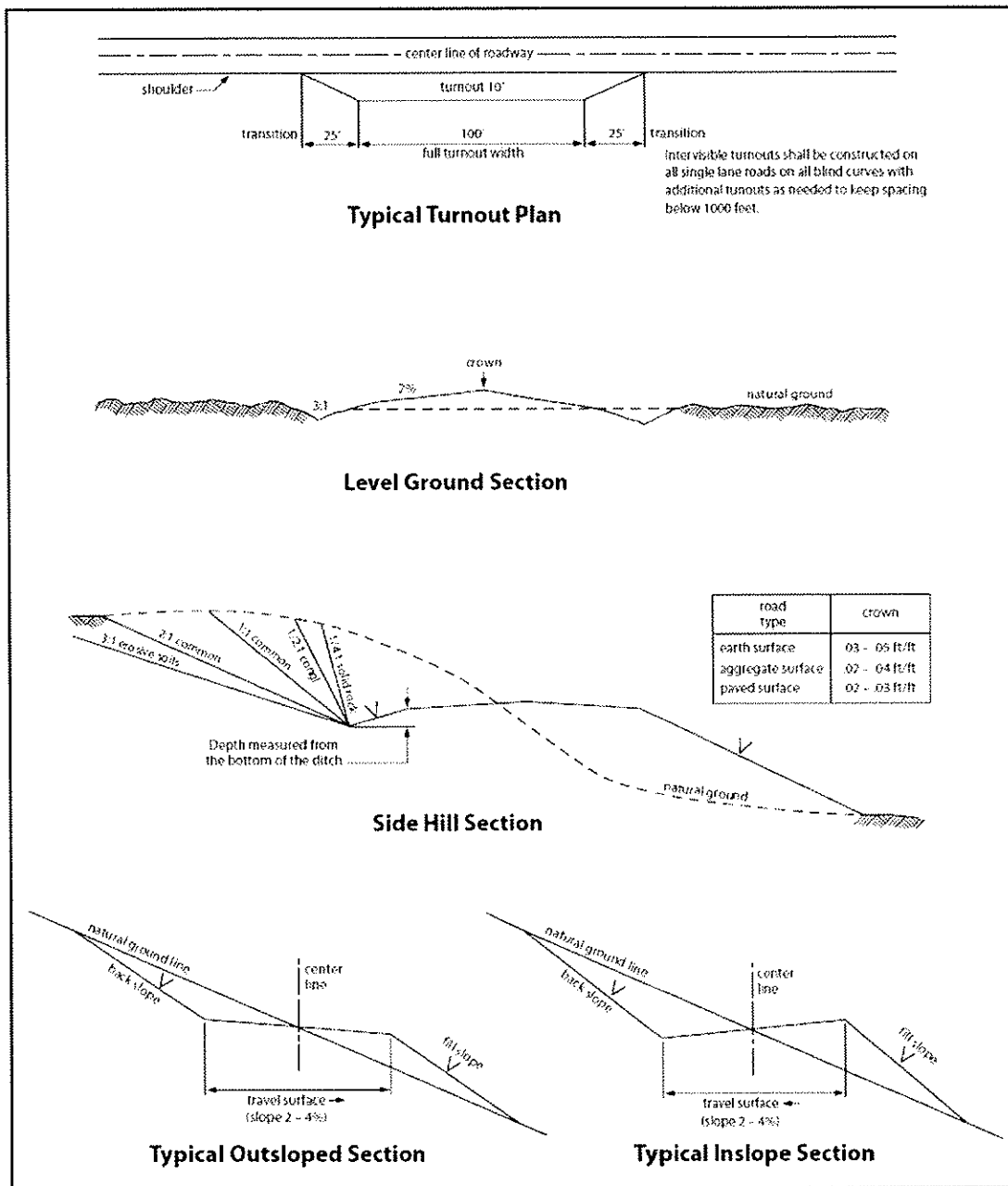


Figure 2.1. Typical road cross sections (BLM and U.S. Forest Service 2007).





**Figure 2.2. Typical drilling rig.**

### **2.2.5 Casing and Cementing**

Surface casing would be set at an approximate depth of 2,200 to 2,400 feet, depending on the targeted formation, and cemented back to the surface during drilling, isolating all near-surface freshwater aquifers in the project area. The Fox Hills Formation and Pierre Formation would be encountered at depths of approximately 1,600 to 2,200 feet. Intermediate casing would be cemented from approximately 11,100 feet (total measured depth [TMD]) deep to a depth of about 4,700 to 4,800 feet in order to isolate the hydrocarbon zone present in the Dakota Formation below at an average depth of 5,300 feet. Casing and cementing operations would be conducted in full compliance with Onshore Oil and Gas Order No. 2 (43 CFR 3160).

### **2.2.6 Completion and Evaluation**

A completion rig unit would be moved on site following the conclusion of drilling and casing activities. Approximately 30 days are usually required, at the proposed well depths, to clean out the well bore, pressure test the casing, perforate and fracture the horizontal portion of the hole, and run production tubing for commercial production. The typical procedure for fracturing a target formation to increase production includes pumping a mixture of sand and a carrier (e.g., water and/or nitrogen) downhole under extreme pressure. The resulting fractures are propped open by the sand, increasing the capture zone of the well and subsequently maximizing the efficient drainage of the field. After fracturing, the well is “flowed back” to the surface where fracture fluids are recovered and disposed of in accordance with North Dakota Industrial Commission (NDIC) rules and regulations.

### **2.2.7 Commercial Production and Gathering Lines**

If drilling, testing, and completion support commercial production from any of the eight proposed locations, additional equipment would be installed, including a pumping unit at the

well head, a vertical heater/treater, tanks (usually 400-barrel steel tanks), and a flare pit. A radio tower would be installed at each well pad location to allow for remote monitoring of facilities. Each radio tower would range in size from 20 to 50 feet high.

An impervious dike sized to hold 110% of the capacity of the largest tank plus one day's production would be constructed around the tank battery. Load out lines would be located inside the diked area and a heavy screen-covered drip barrel would be installed under the outlet. A metal access staircase would protect the dike and support flexible hoses used by tanker trucks. For all aboveground facilities not subject to safety requirements, the BIA would choose a paint color, recommended by the BLM or the Rocky Mountain Five-State Interagency Committee, which would blend with the natural color of the landscape. Commercial production would be discussed more fully in subsequent NEPA analyses.

Oil would be collected in tanks installed on location and periodically trucked to an existing oil terminal for sales. Any produced water would be captured in tanks and periodically trucked to an approved disposal site. The frequency of trucking activities for both oil and produced water would depend upon volumes and rates of production. The duration of production operations cannot be reliably predicted, but some oil wells have pumped for more than 100 years. The operator estimates that each well would yield approximately 180 barrels of oil per day and 40 barrels of water during the first year of production. After the first year, the operator estimates production would decrease to approximately 40 to 60 barrels of oil per day and 10 to 15 barrels of water. Produced water is mostly recovered frac fluids and is expected to become minimal after two years.

In the future, the operator may install a full utility corridor within the access road ROWs. The utility corridor is sized to accommodate the installation of buried oil, gas, and water gathering pipelines and buried electric and fiber optic lines.

Large volumes of gas are not expected from these locations. Small volumes would be flared in accordance with Notice to Lessees 4A and adopted NDIC regulations, which prohibit unrestricted flaring for more than the initial year of operation (North Dakota Century Code [NDCC] 38-08-06.4).

## **2.2.8 Construction Details at Individual Sites**

### **2.2.8.1 Well Pad at N½ SW¼ Section 29, T149N, R93W**

This proposed well location, illustrated in Figure 1.1, is located approximately 5.9 miles southeast of Mandaree, North Dakota, in the N½ SW¼ of Section 29, T149N, R93W in Dunn County, North Dakota. The proposed well pad would initially disturb approximately 8.4 acres. A shared access road would be used to access the well pad, as shown in Table 2.1. In addition to the BMPs and other protection measures identified in Section 3.13, Mitigation and Monitoring, the BIA would require and the owner has committed to use site-specific protection measures at this well pad site, identified in Table 2.1, which would reduce effects to various environmental resources. Two wells would be drilled on this well pad.

*2.2.8.1.1 Morgan 149-93-29B-32H TF*

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 32, T149N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,085 feet, at which point drilling would turn roughly horizontal to an approximate total vertical depth (TVD) of 10,835 feet. The drill string would total approximately 21,035 feet at TMD, including approximately 10,200 feet of lateral reach into the Three Forks member. The drilling target is approximately 250 feet from the south line and 550 feet from the west line, about 9,844 feet south and 775 feet west of the surface hole location. A setback of at least 200 feet would be maintained.

*2.2.8.1.2 Arabian 149-93-29B-32H*

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SE $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 32, T149N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,025 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 10,775 feet. The drill string would total approximately 20,975 feet at TMD, including approximately 10,200 feet of lateral reach into the Middle Bakken member. The drilling target is approximately 1,980 feet from the west line and 250 feet from the south line, about 9,844 feet south and 555 feet east of the surface hole location. A setback of at least 200 feet would be maintained.

2.2.8.2 Well Pad at NE $\frac{1}{4}$  NE $\frac{1}{4}$  Section 29, T149N, R93W

This proposed well location, illustrated in Figure 1.1, is located approximately 5.5 miles southeast of Mandaree, North Dakota, in the NE $\frac{1}{2}$  NE $\frac{1}{4}$  of Section 29, T149N, R93W in Dunn County, North Dakota. The proposed well pad would initially disturb approximately 9.227 acres at this well pad location. A shared access road would be used to access the well pad, as shown in Table 2.1. The BIA would require and the owner has committed to use site-specific protection measures at this well pad site, identified in Table 2.1, which would reduce effects to various environmental resources. Two wells would be drilled on this well pad.

*2.2.8.2.1 Pinto 149-93-29A-32H*

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SE $\frac{1}{4}$  SE $\frac{1}{4}$  of Section 32, T149N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,025 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 10,775 feet. The drill string would total approximately 20,975 feet at TMD, including approximately 10,200 feet of lateral reach into the Middle Bakken member. The drilling target is approximately 1,980 feet from the east line and 250 feet from the south line, about 10,038 feet south and 657 feet east of the surface hole location. A setback of at least 200 feet would be maintained.

*2.2.8.2.2 Mustang 149-93-29A-32H TF*

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SW $\frac{1}{4}$  SE $\frac{1}{4}$  of Section 32, T149N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,085 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 10,835 feet. The drill string would total approximately 21,035 feet at TMD, including approximately 10,200 feet of lateral reach into the Three Forks member. The drilling target is approximately 1,980 feet from the east line and 250 feet from the south

line, about 10,037 feet south and 673 feet west of the surface hole location. A setback of at least 200 feet would be maintained.

#### 2.2.8.3 Well Pad at NW¼ SW¼ Section 21, T149N, R93W

This proposed well location, illustrated in Figure 1.1, is located approximately 4.9 miles southeast of Mandaree, North Dakota, in the NW¼ SW¼ of Section 21, T149N, R93W in Dunn County, North Dakota. The proposed well pad would initially disturb approximately 8.4 acres. A new 65.5-foot access road with a 125.0-foot-wide ROW would link this well pad and any buried gathering pipelines and utilities with the shared access road identified below and in Table 2.1, bringing the total anticipated new construction disturbance of this site to 8.591 acres. The BIA would require and the owner has committed to use site-specific protection measures at this well pad site, identified in Table 2.1, which would reduce effects to various environmental resources. Two wells would be drilled on this well pad.

##### 2.2.8.3.1 *Wormwood 149-93-22A-21H*

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SE¼ SE¼ of Section 22, T149N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,025 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 10,775 feet. The drill string would total approximately 20,975 feet at TMD, including approximately 10,200 feet of lateral reach into the Middle Bakken member. The drilling target is approximately 550 feet from the south section line and 250 feet from the east line, about 10,032 feet east and 973 feet south of the wellhead location. A setback of at least 200 feet would be maintained.

##### 2.2.8.3.2 *Bluestem 149-93-21C-22H TF*

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the NE¼ SE¼ of Section 22, T148N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,085 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 10,835 feet. The drill string would total approximately 21,035 feet at TMD, including approximately 10,200 feet of lateral reach into the Three Forks member. The drilling target is approximately 1,940 feet from the south section line and 250 feet from the east line, about 10,032 feet east and 318 feet north of the wellhead location. A setback of at least 200 feet would be maintained.

#### 2.2.8.4 Well Pad at SE¼ NE¼ Section 20, T149N, R93W

This proposed well location, illustrated in Figure 1.1, is located approximately 5.9 miles southeast of Mandaree, North Dakota, in the SE¼ NE¼ of Section 20, T149N, R93W in Dunn County, North Dakota. The proposed well pad would initially disturb approximately 10.752 acres within the perimeter fence, and a new access road would be constructed to provide access from the well pad to the nearest established road, bringing the total anticipated new disturbance to 21.3 acres. The BIA would require and the owner has committed to use site-specific protection measures at this well pad site, identified in Table 2.1, which would reduce effects to various environmental resources. Two wells would be drilled on this well pad.

**2.2.8.4.1 Arnica 149-93-21A-22H TF**

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the NE¼ NE¼ of Section 22, T149N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,085 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 10,835 feet. The drill string would total approximately 21,035 feet at TMD, including approximately 10,200 feet of lateral reach into the Three Forks member. The drilling target is approximately 550 feet from the north section line and 250 feet from the east line, about 1,002 feet north and 10,651 feet east of the wellhead location. A setback of at least 200 feet would be maintained.

**2.2.8.4.2 Chokecherry 149-93-21A-22H**

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SE¼ NE¼ of Section 22, T149N, R93W (Figure 1.2). Vertical drilling to the kickoff point would be completed at approximately 10,025 feet, at which point drilling would turn roughly horizontal to an approximate TVD of 10,775 feet. The drill string would total approximately 20,975 feet at TMD, including approximately 10,200 feet of lateral reach into the Middle Bakken member. The drilling target is approximately 1,940 feet from the north section line and 250 feet from the east line, about 10,605 feet east and 300 feet south of the wellhead location. A setback of at least 200 feet would be maintained.

**2.2.8.5 Shared Access Road in Sections 20, 21, and 29 of T149N, R93W**

A shared access road would be constructed to connect the well pad and access road in the SE¼ NE¼ of Section 20, T149N, R93W (Figure 1.2) with all three other proposed well pads. The new access road/utility corridor would be approximately 5,945.9 feet long. The new road would have a ROW width of 125 feet and disturb approximately 17.1 acres to accommodate the construction of buried gathering pipelines and utilities with the well pads in Section 29 and Section 21.

In addition to the owner-committed measures identified in Table 2.1, see Section 3.13, Mitigation and Monitoring, for information regarding general BMPs and other protection measures that the BIA would require to reduce effects to various environmental resources.

**2.2.9 Reclamation**

**2.2.9.1 Interim Reclamation**

Interim reclamation would consist of reclaiming all areas not needed for production operations for the life of a well. Immediately after well completion, all equipment and materials unnecessary for production operations would be removed from a location and surrounding area. The cuttings pit contents would be treated, solidified, backfilled, and buried as soon as possible after well completion. Cuttings would be mixed with a non-toxic reagent resulting in an irreversible reaction to produce an inert, solid material. Any oil residue would be dispersed and captured, preventing coalescence and release to the environment at significant rates. The alkaline nature of the stabilized material also chemically stabilizes various metals that may be present, primarily by converting them into less soluble compounds. The treated material would then be buried in the cuttings pit, and overlain by at least 4 feet of overburden as required by adopted NDIC regulations. The surface above the



cuttings pit would be seeded to re-establish native/desired vegetation. Topsoil would be spread along the cut and fill slopes of a road.

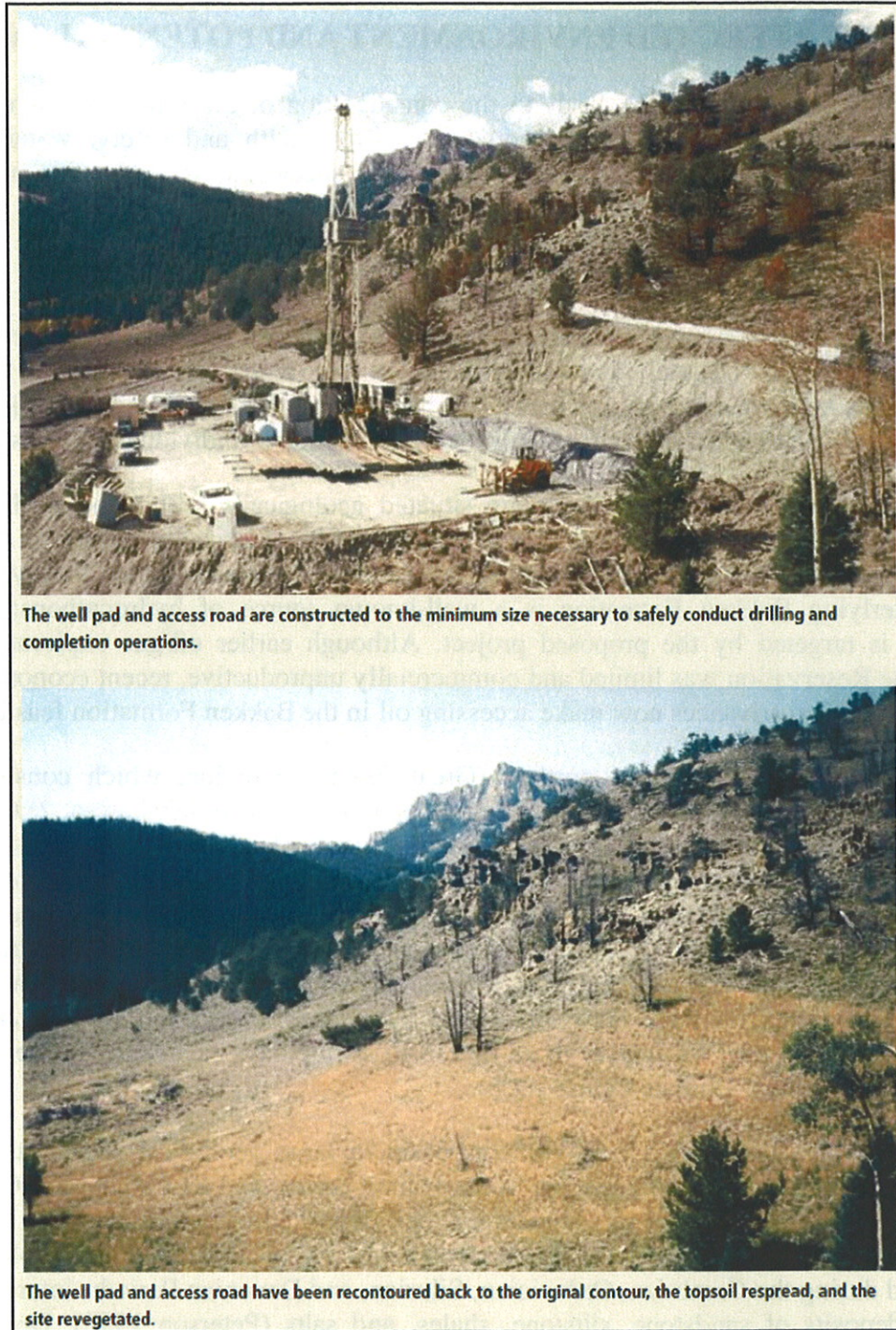
If commercial production equipment is installed, the well pads would be reduced in size by approximately 35%; the portion of the well pads not needed for production would be recontoured, covered with 6 inches of topsoil, and reseeded using methods and seed mixtures determined by the BIA.

The working area of each well pad and the running surface of access roads would be surfaced with scoria or crushed rock obtained from a previously approved location. The outslope portions of roads would be covered with stockpiled topsoil and reseeded with a seed mixture determined by the BIA, reducing the residual access-related disturbance to a width of approximately 28 feet. Enerplus would control noxious weeds within the ROW, well pads, or other applicable facilities by approved chemical or mechanical methods.

All topsoil material stockpiled after construction, and following interim reclamation, would be immediately placed in windrows no higher than 2 to 4 feet, seeded with a certified weed-free annual ryegrass (*Lolium multiflorum*) at a rate of 10 pounds per acre, and covered with fiber matting to prevent erosion and maintain soil fertility.

#### 2.2.9.2 Final Reclamation

Final reclamation would occur either in the very short term if a proposed well is commercially unproductive, or later upon final abandonment of commercial operations. All disturbed areas would be reclaimed, reflecting the BIA view of oil and gas exploration and production as temporary intrusions on the landscape. All facilities would be removed, well bores would be plugged with cement, and dry hole markers would be set. Access roads and work areas would be leveled or backfilled as necessary, scarified, recontoured, and reseeded. Exceptions to these reclamation measures might occur if the BIA approves assignment of an access road either to the BIA roads inventory or to concurring surface allottees. Figure 2.3 shows an example of reclamation (BLM and USFS 2007).



**Figure 2.3. Example of reclamation from the BLM Gold Book (BLM and USFS 2007).**

### **2.3 BIA-PREFERRED ALTERNATIVE**

The preferred alternative is to complete all administrative actions and approvals necessary to authorize or facilitate oil and gas developments at the four proposed well pad locations.

### **3.0 THE AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS**

The broad definition of NEPA leads to the consideration of the following elements of the human and natural environment: air quality, public health and safety, water resources, wetland/riparian habitat, threatened and endangered species, soils, vegetation and invasive species, cultural resources, socioeconomic conditions, and EJ.

#### **3.1 PHYSICAL AND GEOLOGICAL SETTING**

The proposed well sites and spacing units are in a rural area located on the Reservation in west-central North Dakota. The Reservation is the home of the MHA Nation and encompasses more than one million acres, of which almost half, including the project area, are held in trust by the United States for either the MHA Nation or individual allottees.

The proposed wells and access roads are situated geologically within the Williston Basin, where the shallow structure consists of sandstones, silts, and shales dating to the Tertiary period (65 to 2 million years ago), including the Sentinel Butte and Golden Valley formations. The underlying Bakken Formation is a well-known source of hydrocarbons; its middle member is targeted by the proposed project. Although earlier oil/gas exploration activity within the Reservation was limited and commercially unproductive, recent economic changes and technological advances now make accessing oil in the Bakken Formation feasible.

The Reservation is within the northern Great Plains ecoregion, which consists of four physiographic units: 1) the Missouri Coteau Slope north of Lake Sakakawea, 2) the Missouri River trench (not flooded), 3) the Little Missouri River badlands, and 4) the Missouri Plateau south and west of Lake Sakakawea (Williams and Bluemle 1978). Much of the Reservation is on the Missouri Coteau Slope. Elevations of the glaciated, gently rolling landscape range from a normal pool elevation of 1,838 feet at Lake Sakakawea to over 2,600 feet on Phaelan's Butte near Mandaree. Annual precipitation on the plateau averages between 15 and 17 inches. Mean temperatures fluctuate between -3 and 21 degrees Fahrenheit (°F) in January and between 55°F and 83°F in July, with 95 to 130 frost-free days each year (Bryce et al. 1998; High Plains Regional Climate Center 2008).

The project area lies within the Williston Basin, a large geological structural depression located in North Dakota and Montana in the United States, and Saskatchewan, Canada. The basin consists of deep layers of sedimentary rock deposited over time above a Precambrian geologic basement (Figure 3.1). Thick accumulations of limestone and dolomite were deposited during the Cambrian, Ordovician, Silurian, and Devonian Periods, interspersed with thinner deposits of sandstone, siltstone, shales, and salts (Peterson 1995). Deposition has continued in the basin through the current geological epoch, with the maximum depth of sedimentary deposits of approximately 16,000 feet in the area of Williston, North Dakota (Peterson 1995).



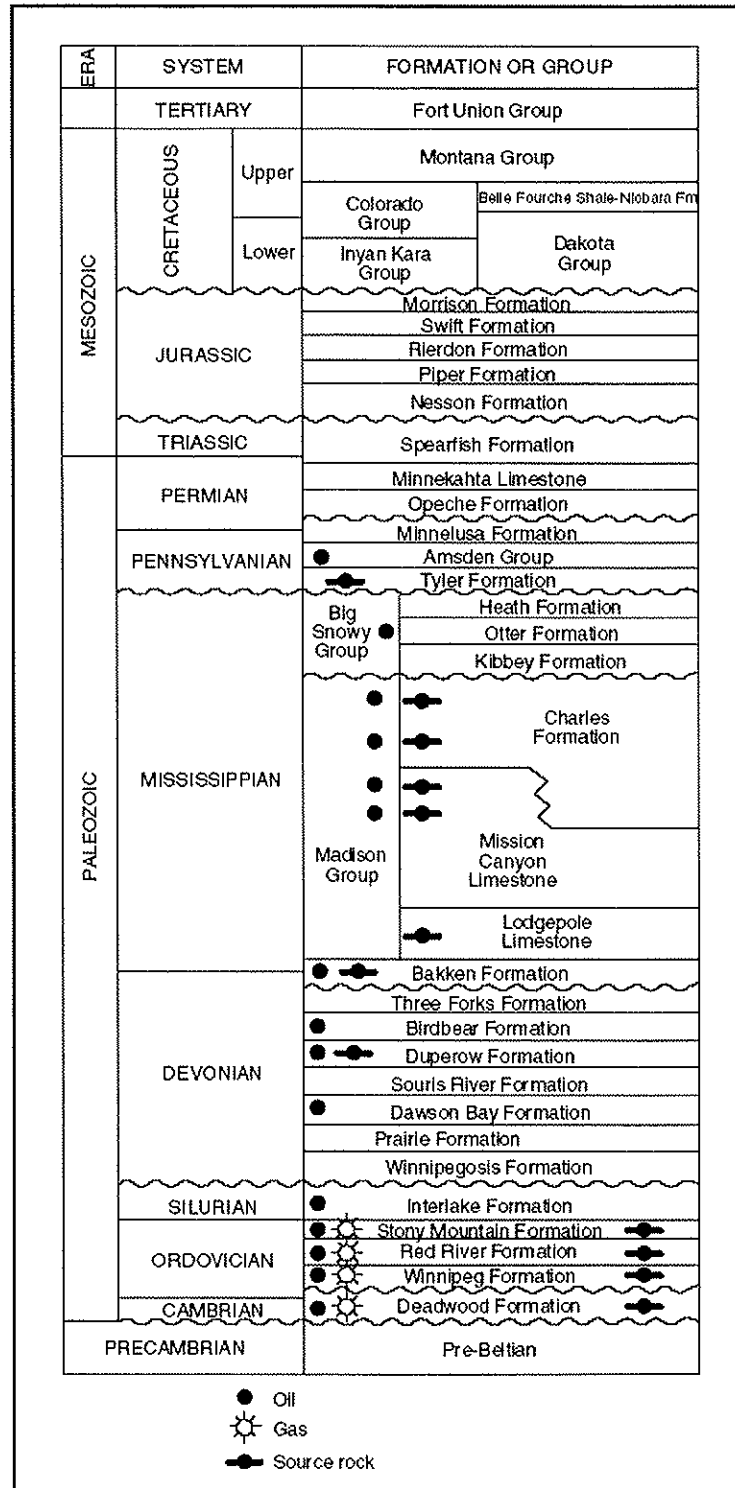


Figure 3.1. Typical stratigraphic column of the Williston Basin, with oil and gas bearing formations (Source: Peterson 1995).

The proposed new exploratory wells would target the Bakken and Three Forks formations. The Bakken Formation was deposited during the Upper Devonian and Lower Mississippian periods, ranging from 417 to 350 million years ago. It lies approximately 11,000 feet below the surface at its deepest location, and approximately 8,500 feet beneath the Reservation where the new wells are proposed. The formation is typically 158 feet thick, made up of an upper and lower member composed marine shales, with a middle member composed of thick interbedded layers of limestone, siltstone, dolomite, and sandstone. The Bakken Formation is located between thick and exceptionally tight formations of low-permeability carbonates: the Three Forks Limestone Formation lies below the Bakken Formation and is approximately 250 feet thick, while the Lodgepole Limestone lies above the Bakken Formation and is approximately 900 feet thick. These massive limestone formations have acted as seals to the Bakken Formation hydrocarbons and contributed to the trapping and development of mature crude oil deposits (Energy Information Administration 2006).

Regional subsidence of the Williston Basin during the Cretaceous Period and tectonic activity during the Laramide Orogeny produced geological anticlines that serve as traps for petroleum resources (Peterson 1995). Oil was first discovered in the Williston Basin at Cedar Creek Anticline in the 1920s, and subsequent discoveries in North Dakota of the extensive Bakken Formation and other oil and gas producing formations resulted in the development of major oil fields since the 1950s. However, efficient oil recovery continued to be limited by technical hurdles until 2004 (Energy Information Administration 2006).

The hydrocarbon resources of the Bakken Formation are considered to be “continuous” across the entire formation, with the Middle Member of the Bakken Formation having the greatest porosity and permeability. The limestone sealing formations of the Madison Group above the Bakken serve to maintain internal pressure and thermal conditions, while preventing the petroleum from escaping (Energy Information Administration 2006). Improved horizontal well stimulation methods using advanced hydraulic fracturing (HF) technology have greatly improved petroleum production rates and economic output of the formation’s substantial oil reserves since 2004 (Energy Information Administration 2006). Current drilling and HF technology used to release oil from the Bakken Formation includes deep vertical drilling to extend the well shaft to the target formation, followed by horizontal drilling of a lateral well shaft (parallel to the surface) within the target formation. A non-perforated well shaft is installed in the vertical section, while a perforated well shaft, ranging in length from 9,000 to nearly 11,000 feet, is installed in lateral sections of the well. If adequate hydrocarbon-bearing deposits are identified, the perforated lateral well shaft is used to deliver HF fluids and small compression-resistant particles called proppants into the target formation at high pressure, and to collect oil and other fluids from the well. Further discussion of HF technology and its potential effects on groundwater is included in Section 3.3.2.3.

## **3.2 AIR QUALITY**

### **3.2.1 Air Quality Standards and Criteria Pollutants**

The federal Clean Air Act (CAA) (USC 7401–7671, as amended in 1990) established National Ambient Air Quality Standards (NAAQS) for criteria pollutants to protect public health and welfare. It also set standards for other compounds that can cause cancer, regulated

emissions that cause acid rain, and required federal permits for large sources. NAAQS have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead (U.S. Environmental Protection Agency [EPA] 2010a). The primary NAAQS are set for pervasive compounds that are generally emitted by industry or motor vehicles. Standards for each pollutant meet specific public health and welfare criteria; thus, they are called the “criteria pollutants.”

The CAA mandates prevention of significant air quality deterioration in certain designated attainment areas and has designated more stringent air quality standards, known as Secondary Standards, for these areas. Class I attainment areas have national significance and include national parks greater than 6,000 acres, national monuments, national seashores, and federal wilderness areas larger than 5,000 acres that were designated prior to 1977 (Ross 1990). The Class I regulations (40 CFR 51.307) attempt to protect visibility through a review of major new and modified sources of pollutants, and requiring strict air quality emission standards if they would have an adverse impact on visibility within the Class I area (National Park Service 2010).

The nearest designated attainment area to the project area is the Theodore Roosevelt National Park (TRNP), a Class I area that covers about 110 square miles in three units within the Little Missouri National Grassland. The TRNP is located approximately 16 miles south of Watford City, North Dakota, and approximately 40 miles west of the proposed well sites. Two air quality monitoring stations are located within the TRNP, with the North Unit monitoring most criteria pollutants (National Park Service 2010; North Dakota Department of Health [NDDH] 2010). All other parts of the state, including the Reservation, are classified as Class II attainment areas, affording them protections through the Primary NAAQS (NDDH 2010).

Some states have adopted more stringent standards for criteria pollutants, or have chosen to adopt new standards for other pollutants. For instance, the NDDH has established a standard for hydrogen sulfide (H<sub>2</sub>S), which can be found in Table 3.1 (NDDH 2010).

Criteria pollutants and their health effects include the following.

- Sulfur dioxide (SO<sub>2</sub>) is a colorless gas with a strong, suffocating odor. SO<sub>2</sub> is produced by burning coal, fuel oil, and diesel fuel, and can trigger constriction of the airways, causing particular difficulties for asthmatics. Long-term exposure is associated with increased risk of mortality from respiratory or cardiovascular disease. SO<sub>2</sub> emissions are also a primary cause of acid rain and plant damage (EPA 2010a).
- Inhalable Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>) is a class of compounds that can lodge deep in the lungs, causing adverse health problems, depending on their size, concentration, and content. Based on extensive health studies, particulate matter is regulated under two classes. PM<sub>10</sub> is the fraction of total particulate matter 10 microns or smaller, and PM<sub>2.5</sub> is two and a half microns or smaller. Inhalable particulate matter can range from inorganic wind-blown soil to organic and toxic compounds found in diesel exhaust. Toxic compounds such as benzene often find a route into the body via inhalation of fine particulate matter (EPA 2010a).

- Nitrogen dioxide (NO<sub>2</sub>) is a reddish-brown gas with an irritating odor. Primary sources include motor vehicles, industrial facilities, and power plants. In the summer months, NO<sub>2</sub> is a major component of photochemical smog. NO<sub>2</sub> is an irritating gas that may constrict airways, especially of asthmatics, and increase the susceptibility to infection in the general population. NO<sub>2</sub> is also involved in ozone smog production (EPA 2010a).
- Ozone (O<sub>3</sub>) is a colorless gas with a pungent, irritating odor and creates a widespread air quality problem in most of the world's industrialized areas. Ozone smog is not emitted directly into the atmosphere but is primarily formed through the reaction of hydrocarbons and nitrogen oxides (NO<sub>x</sub>) in the presence of sunlight. Health effects related to O<sub>3</sub> can include reduced lung function, aggravated respiratory illness, and irritated eyes, nose, and throat. Chronic exposure can cause permanent damage to the alveoli of the lungs. O<sub>3</sub> can persist for many days after formation and travel several hundred miles (EPA 2010a).
- Carbon monoxide (CO) is a colorless, odorless gas that is a byproduct of incomplete combustion. CO concentrations typically peak nearest a source, such as roadways or areas with high fireplace use, and decrease rapidly as distance from the source increases. Ambient levels are typically found during periods of stagnant weather, such as on still winter evenings with a strong temperature inversion. CO is readily absorbed into the body from the air. It decreases the capacity of the blood to transport oxygen, leading to health risks for unborn children and people suffering from heart and lung disease. The symptoms of excessive exposure are headaches, fatigue, slow reflexes, and dizziness (EPA 2010a).

The Primary and Secondary NAAQS for criteria pollutants are shown in Table 3.1. NEPA assessments require analysis of both near-field and far-field as part of the cumulative effects of proposals on air quality. Therefore, the North Dakota Ambient Air Quality Standards (AAQS) are shown as well federal standards.

North Dakota has separate state standards for SO<sub>2</sub> and H<sub>2</sub>S that are different from the federal criteria standards. All other state criteria pollutant standards are the same as federal. North Dakota was one of 13 states that met standards for all federal criteria pollutants in 2008.

In addition, the EPA averages data from monitoring stations within each county to determine the Air Quality Index (AQI), a general measure of air quality for residents of the county. An AQI greater than 100 is indicative of unhealthy air quality conditions for the county residents, although residents may experience greater or lesser risks depending on their proximity to the sources of pollutants (EPA 2010b).

**Table 3.1. NAAQS and Other Air Quality Standards.**

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
SO <sub>2</sub> in parts per million of air (ppm)	3-hour	-	0.5	0.273 (1-hour)
	24-hour	0.14	-	0.099
	Annual mean	0.03	-	0.023
PM <sub>10</sub> in micrograms per cubic meter of air (µg/m <sup>3</sup> )	24-hour	150	-	150
	Expected annual mean	50	-	50
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	24-hour	35	35	35
	Weighted annual mean	15	15	15
NO <sub>2</sub> (ppm)	Annual mean	0.053	0.053	0.053
CO (ppm)	8-hour	9	-	9
	1-hour	35	-	35
O <sub>3</sub> (ppm)	8-hour	0.075	0.075	-
	1-hour	-	-	0.12
Lead (µg/m <sup>3</sup> )	3-month arithmetic mean within a 3-year period	0.15	0.15	1.5 (quarterly mean)
H <sub>2</sub> S (ppm)	Instantaneous	-	-	10
	1-hour	-	-	0.20
	24-hour	-	-	0.10
	3-month	-	-	0.02

Sources: EPA 2010a; NDDH 2010.

### 3.2.2 Greenhouse Gas Emissions and Climate Change

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). Some GHGs such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The EPA (2010c) identifies the principal GHGs that enter the atmosphere because of human activities as the following.

- **Carbon Dioxide (CO<sub>2</sub>):** CO<sub>2</sub> enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO<sub>2</sub> is also removed from the atmosphere (or “sequestered”) when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH<sub>4</sub>):** CH<sub>4</sub> is emitted during the production and transport of coal, natural gas, and oil. CH<sub>4</sub> emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

- Nitrous Oxide (N<sub>2</sub>O): N<sub>2</sub>O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- Fluorinated Gases: Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are typically emitted in small quantities, but are potent GHGs thought to contribute significantly to global warming processes (EPA 2010c).

CO<sub>2</sub> is the primary GHG, responsible for approximately 90% of radiative forcing (the rate of energy change as measured at the top of the atmosphere; can be positive [warmer] or negative [cooler]) (EPA 2010c). To simplify discussion of the various GHGs, the term “Equivalent CO<sub>2</sub> or CO<sub>2</sub>e” has been developed. CO<sub>2</sub>e is the amount of CO<sub>2</sub> that would cause the same level of radiative forcing as a unit of one of the other GHGs. For example, one ton of CH<sub>4</sub> has a CO<sub>2</sub>e of 22 tons; therefore, 22 tons of CO<sub>2</sub> would cause the same level of radiative forcing as one ton of CH<sub>4</sub>. N<sub>2</sub>O has a CO<sub>2</sub>e value of 310. Thus, control strategies often focus on the gases with the highest CO<sub>2</sub>e value.

According to the Pew Center, “Over the past 50 years, the (worldwide) data on extreme temperatures have shown similar trends of rising temperatures: cold days, cold nights, and frosts occurred less frequently over time, while hot days, hot nights, and heat waves occurred more frequently” (Pew Center 2009). Generally, the earth’s temperature has increased about one degree Celsius since 1850 but some areas have seen an increase of four degrees. Sea levels are also rising, mountain glaciers are disappearing, and ocean currents, such as the Gulf Stream, are slowing (Intergovernmental Panel on Climate Change [IPCC] 2007).

Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases. The IPCC Working Group I Fourth Assessment compiles and analyzes global data on climate change, and reports that warming of the climate system is evident from global observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level (IPCC 2007). Globally, 11 out of the 12 years between 1995 and 2007 ranked among the warmest years in the instrumental record of global surface temperature since 1850 (IPCC 2007). The National Oceanic and Atmospheric Agency monitored data indicates that 21 of the previous 30 years (1979–2009) have had above average temperatures in the contiguous United States, with departures from average temperatures occurring with increasing frequency, as shown in Figure 3.2 (National Oceanic and Atmospheric Agency 2010).

Many physical and biological effects have been observed to correlate with trends in global warming. Sea levels are rising worldwide and along much of the United States coast (EPA 2010c). Tide gauge measurements and satellite altimetry suggest that sea level has risen worldwide approximately 4.8 to 8.8 inches during the last century (IPCC 2007). A significant amount of sea level rise has likely resulted from the observed warming of the atmosphere and the oceans. Hydrological systems, ice pack, and permafrost are also affected by higher oceanic and atmospheric temperatures, affecting biological systems and agriculture (IPCC 2007).

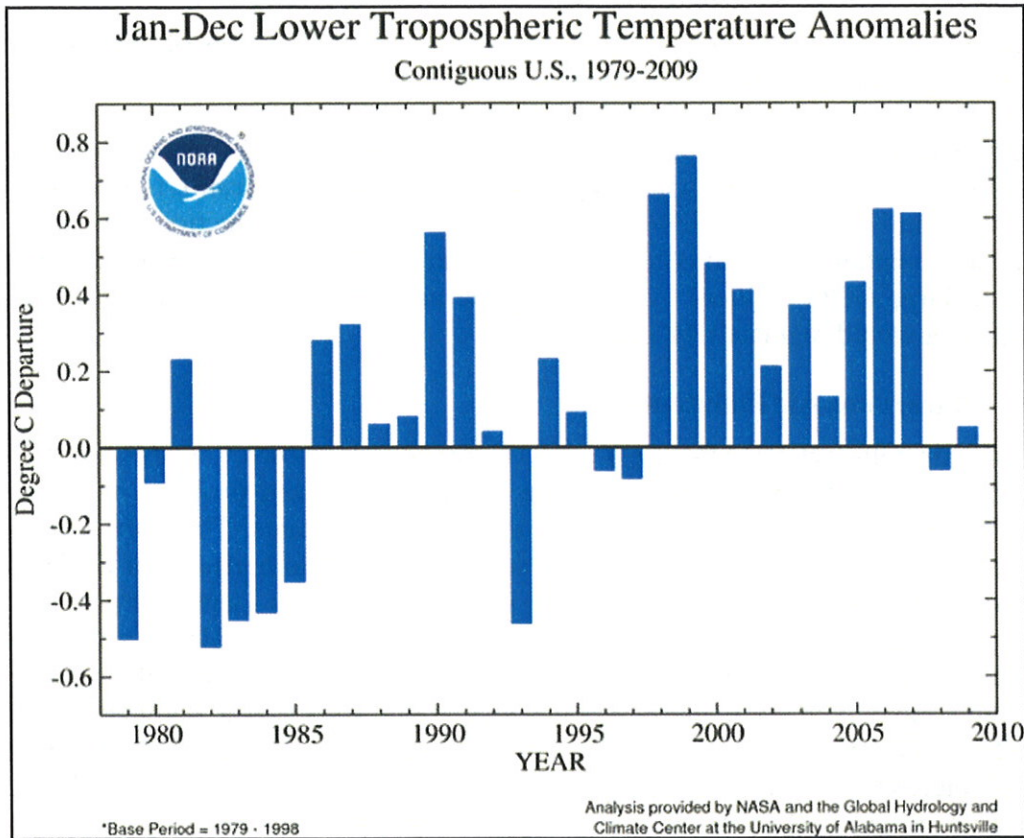


Figure 3.2. Temperature anomalies in the contiguous United States, 1979–2009.

IPCC experts concluded that most of the observed increase in globally averaged temperature since the mid-twentieth century is very likely due to the observed increase in anthropogenic GHG concentrations (IPCC 2007).

Therefore, the EPA collects data on and encourages limiting or reducing emissions of anthropogenic sources of GHGs to the earth's atmosphere (EPA 2010d). Many U.S. states have adopted goals and actions to reduce GHGs. The EPA and the National Highway Traffic Safety Administration have increased corporate fuel economy standards to promote national energy security and reduce GHGs. Standards would equal 35 miles per gallon by 2020, with an estimated savings to drivers of \$100 billion annually (EPA 2010d).

On May 13, 2010, the EPA issued a final rule that establishes thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration and title V Operating Permit programs are required for new and existing industrial facilities (EPA 2010d). This final rule "tailors" the requirements of these CAA permitting programs to limit which facilities would be required to obtain Prevention of Significant Deterioration and title V permits. Facilities responsible for nearly 70% of the national GHG emissions from stationary sources would be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities. Emissions from small farms, restaurants, and all but the very largest commercial facilities are not covered by these programs at this time; however, the



EPA recently initiated additional hearings to help determine the types of industries to be held to new standards under these federal permits (EPA 2010d).

Energy production and supply was estimated to emit up to 25.9% of GHGs world-wide in 2004 (Pew Center 2009). CH<sub>4</sub>, with a high radiative forcing CO<sub>2</sub>e ratio, is a common fugitive gas emission in oil and gas fields (EPA 2010c). Oil and gas production, however, is highly variable in potential GHG emissions. Oil and gas producers in the United States are not considered large GHG emitters by the EPA, and are not the subject of any current federal proposals that would regulate GHG emissions.

### **3.2.3 Hazardous Air Pollutants**

Hazardous air pollutants (HAPs) are a class of compounds known to cause cancer, mutation, or other serious health problems. HAPs are usually a localized problem near the emission source. HAPs are regulated separately from criteria air pollutants. There are several hundred HAPs recognized by the EPA and State of North Dakota. Health effects of HAPs may occur at exceptionally low levels; for many HAPs, it is not possible to identify exposure levels that do *not* produce adverse health effects. Major sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), wood smoke, and motor vehicle exhaust. Unlike regulations for criteria pollutants, there are no AAQS for HAPs. Examples of HAPs found in gases released by oil field development and operation include benzene, toluene, xylene, and formaldehyde (BLM 2009). HAP emissions receive evaluation based on the degree of exposure that can cause risk of premature mortality, usually from cancer.

Risk assessments express premature mortality in terms of the number of deaths expected per one million persons. The NDDH typically reviews projects and either requires an applicant to prepare a risk assessment or assign the state engineers to do the work. For new sources emitting HAPs with known negative health effects, an applicant must demonstrate that the combined impact of new HAP emission does not result in a maximum individual cancer risk greater than one in one hundred thousand.

### **3.2.4 Existing Air Quality in the Project Area**

Federal air quality standards apply in the project area, which is designated as a Class II attainment area. Although the State of North Dakota does not have jurisdiction over air quality matters on the Reservation and no air quality monitoring stations occur within the boundaries of the Reservation, monitoring efforts are being made by the state and industry in the area. The NDDH operates a network of monitoring stations around the state that continuously measure pollution levels. Industry also operates monitoring stations as required by the state. The data from all these stations are subject to quality assurance, and when approved, it is published on the Internet and available from EPA and NDDH (NDDH 2010).

Monitoring stations providing complete data near the project site include Theodore Roosevelt National Park North Unit (TRNP-NU) (Air Quality Station # 380530002) in McKenzie County, and Dunn Center (Air Quality Station # 38025003) in Dunn County. These stations are located west and southeast of the proposed well sites, respectively. Bear Paw Energy and



Amerada Hess operate site-specific monitoring stations in the region. However, these stations do not provide complete data that would be applicable to this analysis (NDDH 2010).

Criteria pollutants measured at the two monitoring stations include SO<sub>2</sub>, PM<sub>10</sub>, NO<sub>2</sub>, and O<sub>3</sub>. Lead and CO are not monitored by the two stations. Table 3.2 summarizes the NAAQS and the maximum levels of criteria pollutants. The highest value at either of the two monitoring locations is shown for each year from 2007 through 2009.

**Table 3.2. Maximum Levels of Monitored Pollutants, 2007–2009, as Measured at Dunn Center and Theodore Roosevelt National Park North Unit Monitoring Stations.**

Criteria Pollutant	Averaging Period	Primary Standard (NAAQS)	Maximum Reported Level from Dunn Center and TRNP-NU Monitoring Stations		
			2009	2008	2007
SO <sub>2</sub> in parts per million (ppm)	24-hour	0.14	0.006	0.004	0.004
	Annual mean	0.03	0.0005	0.0004	0.0011
PM <sub>10</sub> in micrograms per cubic meter or air (µg/m <sup>3</sup> )	24-hour	150	54	108	57.4
	Expected annual mean	50	11.3	14.2	13.2
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	24-hour	35	15	35.7	22.2
	Weighted annual mean	15	3.4	3.7	3.6
NO <sub>2</sub> (ppm)	Annual mean	0.053	0.0015	0.0018	0.0015
O <sub>3</sub> (ppm)	8-hour	0.08	0.057	0.0063	0.0071

Source: NDDH 2010.

All monitored criteria pollutants are well below federal and state standards measured at the monitoring stations for all years in the study period from 2007 through 2009. In addition to the low levels of monitored criteria pollutants, the EPA reports that Dunn County had zero days in which the AQI exceeded 100 in 2007 and 2008, indicating that general air quality does not pose an unhealthy condition for residents of this county (EPA 2010b). The AQI was not available for 2009, but is also likely to be zero for Dunn County.

### 3.2.5 Typical Project Emissions from Oilfield Development

According to EPA Emission Inventory Improvement documents (EPA 1999), oil field emissions encompass three primary areas: combustion, fugitive, and vented. Typical processes that occur during exploration and production include the following.

- Combustion emissions include SO<sub>2</sub>, ozone precursors called volatile organic compounds (VOCs), GHGs, and HAPs. Sources include engine exhaust, dehydrators, and flaring (EPA 1999).
- Fugitive emissions include criteria pollutants, H<sub>2</sub>S, VOCs, HAPs, and GHGs. Sources of fugitive emissions include mechanical leaks from well field equipment such as valves, flanges, and connectors that may occur in heater/treaters, separators, pipelines,

wellheads, and pump stations. Pneumatic devices such as gas actuated pumps and pressure/level controllers also result in fugitive emissions. Other sources of fugitive emissions include evaporation ponds and pits, condensate tanks, storage tanks, and wind-blown dust (from truck and construction activity) (EPA 1999).

- Vented emissions include GHGs, VOCs, and HAPs. Primary sources are emergency pressure relief valves and dehydrator vents (EPA 1999).

Pad and road construction, drilling activities, and tanker traffic would generate emissions of criteria pollutants and HAPs. Primary emissions sources during drilling are diesel exhaust, wind-blown dust from disturbed areas and travel on dirt roads, evaporation from pits and sumps, and gas venting. Diesel emissions are being progressively controlled by the EPA in a nationwide program (EPA 2010d). This program takes a two-pronged approach. First, fuels are improving to the ultra-low sulfur standard, and secondly manufacturers must produce progressively lower engine emissions.

### **3.2.6 Air Quality Best Management Practices**

Under the CAA, federal land management agencies have an affirmative responsibility to protect air quality. Tribes, federal land managers, and private entities can make emission controls part of a lease agreement. BMPs can be adopted for various portions of an oil/gas well's lifecycle. BMPs fall into the following six general categories.

- Transportation BMPs to reduce the amount of fugitive dust and vehicle emissions
  - Use directional drilling to drill multiple wells from a single well pad.
  - Use centralized water storage and delivery, well fracturing, gathering systems.
  - Use telemetry to remotely monitor and control production.
  - Use water or dust suppressants to control fugitive dust on roads.
  - Control road speeds.
  - Use van or carpooling.
- Drilling BMPs to reduce rig emissions
  - Use cleaner diesel (Tier 2, 3, and 4) engines.
  - Use natural gas-powered engines.
  - Use “green” completions to recapture product that otherwise would have been vented or flared.
- Unplanned or emergency releases
  - Use high-temperature flaring if gas is not recoverable.
- Vapor recovery
  - Use enclosed tanks instead of open pits to reduce fugitive VOC emissions.
  - Use vapor recovery units on storage tanks.

- Inspection and maintenance
  - Use and maintain proper hatches, seals, and valves.
  - Optimize glycol circulation and install a flash tank separator.
  - Use selective catalytic reduction.
  - Replace high-bleed with low-bleed devices on pneumatic pumps.
- Monitoring and repair
  - Use directed inspection and maintenance methods to identify and cost-effectively fix fugitive gas leaks.
  - Install an air quality monitoring station.

### **3.2.7 Potential Air Quality Impacts**

Based on the existing air quality of the region and the typical air emissions of similar oilfield projects, and implementation of BMPs identified in Section 3.2.6, the Proposed Action would not produce significant increases in criteria pollutants, GHGs, or HAPs.

## **3.3 WATER RESOURCES**

This section identifies the existing water resources within the project area and potential effects of the project. Specific subjects discussed in this section include surface water and surface water quality, groundwater resources, hydraulic fracturing, and the potential short-term and long-term impacts of the proposed project on these water resources.

### **3.3.1 Surface Water**

The surface water resources in the project area would be managed and protected according to existing federal law and policies regarding the use, storage, and disposal of the resource during the construction and operation of the project. Surface water resource use and protection is administered under the following federal laws:

- Clean Water Act of 1972 (CWA), as amended (33 USC 1251 et seq.)
- Federal Land Policy and Management Act of 1976 (43 USC 1711–1712)
- NEPA of 1972 (42 USC 4321)
- Safe Drinking Water Act of 1974, as amended (42 USC 300 et seq.)

Water quality is protected under the Federal Water Pollution Control Act (as amended), otherwise known as the CWA. The CWA has developed rules for regulating discharges of pollutants into waters of the U.S. and also regulates water quality standards for surface waters. The CWA has also made it unlawful to discharge any pollutant from a point source into any navigable waters of the U.S., unless a permit has been obtained from the National Pollution Discharge Elimination System (NPDES) program.

The Environmental Division of the MHA Nation has had an application pending with the EPA since 1996 for delegation of authority to set federally approved water quality standards on the Reservation. In the absence of tribal surface water quality authorities, enforcement of

federal environmental laws regarding surface water on the Reservation is accomplished through permitting, inspection, and monitoring activities of the NPDES, as administered by the EPA.

The project area is located within the Lower Little Missouri River/Squaw Creek Bay watershed (hydrologic unit code [HUC] 10110205), and the Waterchief Bay sub-watershed (HUC 1011020506) of the Lake Sakakawea basin. Surface water is abundant in the project area, as shown in Figure 3.3 (North Dakota Department of Health, Division of Water Quality 2010). Water would flow from the well pads and access roads into Upper Squaw Creek (HUC 1011020506070), then travel to the southeast until reaching Lower Squaw Creek and Lake Sakakawea, as shown in Figure 3.4. The nearest proposed well pad, located in the N $\frac{1}{2}$  NW $\frac{1}{4}$  of Section 29, T149N, R93W, is 0.5 mile of Upper Squaw Creek, and 18.5 river miles from Lake Sakakawea. The well pad located in the N $\frac{1}{2}$  NE $\frac{1}{4}$  of Section 29, T149N, R93W, is 0.8 mile from Upper Squaw Creek and 18.6 river miles from Lake Sakakawea. Upper Squaw Creek and Lake Sakakawea would also be the nearest perennial stream to the proposed well pad site in the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 21, and the N $\frac{1}{2}$  NE $\frac{1}{4}$  of Section 29, T149N, R93W, at a distance of 1.3 miles and 1.5 miles, respectively.

A query of the EPA Storage and Retrieval Water Quality Database for the Lake Sakakawea Drainage/Basin HUC showed that water quality data were not available from within the project area (EPA 2010e). Furthermore, standards for specific priority pollutants have not been developed for the project area or the Reservation. No ongoing discharge of water to surface waters of the U.S. would be required for this project. This project would comply with all the specific terms and conditions of the NPDES Construction Permit, in accordance with Section 402 of the CWA (EPA 2010e).

During the May and July 2011 site visits, the BIA made site-specific recommendations for design measures that would reduce or minimize surface runoff and potential surface water degradation from the construction of the new wells and access roads. Enerplus has adopted the site-specific erosion protection measures identified in Table 2.1 and further discussed in Section 3.4.2. These measures would reduce long-term erosion and runoff from the sites, protecting surface water resources.

As part of the NPDES Construction Permit, the proposed project would be engineered and constructed to minimize the suspended sediment (i.e., turbidity) concentration of surface runoff, avoid disruption of drainages, and avoid direct impacts to surface water. No surface water would be used for well drilling operations. Any chemicals or potentially hazardous materials would be handled in accordance with the operator's spill prevention, control, and countermeasure plan. Provisions established under this plan would minimize potential impacts to any surface waters associated with an accidental spill.



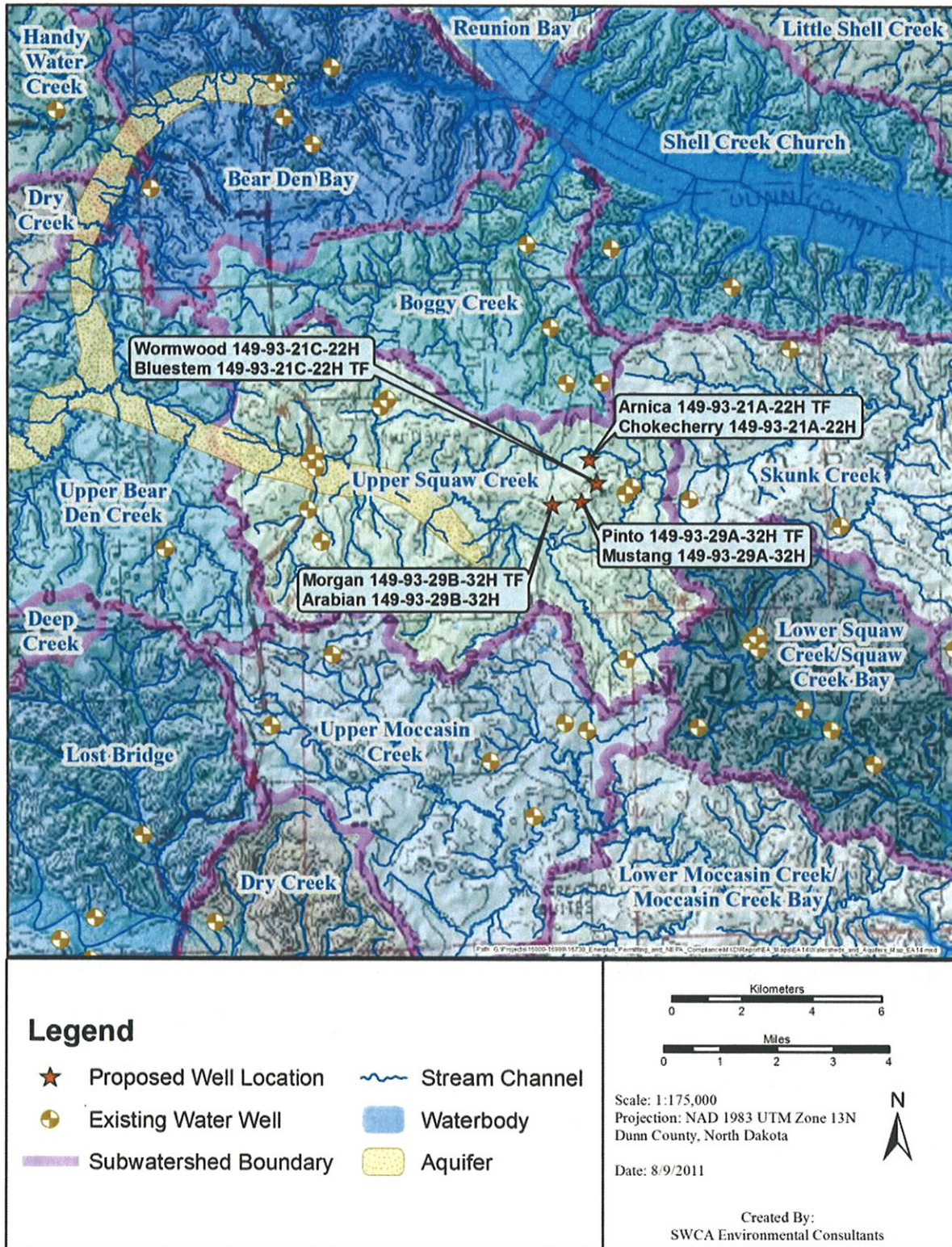


Figure 3.3. Watersheds and aquifers near the project area (North Dakota Department of Health, Division of Water Quality 2010).





Figure 3.4. Surface runoff and drainage direction from each of the proposed well pads (North Dakota Department of Health, Division of Water Quality 2010).



### 3.3.2 Groundwater

#### 3.3.2.1 Groundwater Aquifers and Typical Groundwater Quality

Aquifers in the project area and surrounding region include, from deepest to shallowest, the Cretaceous Fox Hills and Hell Creek formations and the Tertiary Ludlow, Tongue River, and Sentinel Butte formations (Table 3.3). The aquifers in question lie at depths from 670 to 1,900 feet below the surface. Shallow post-glacial outwash aquifers are located elsewhere in the Williston Basin, but do not occur within the proposed project areas. Shallow wells drilled to the upper member of the Fort Union and the Tongue River formations at depths ranging from 100 to 750 feet below the surface are often used for cattle watering. These wells typically contain total dissolved solid levels less than 3,000 parts per million (ppm). The shallow Sentinel Butte Formation is commonly used as a domestic water source in Dunn County and meets standards of the NDDH (Croft 1985). There are many wells drilled for domestic purposes throughout the Williston Basin in the basal Fox Hills Sand at depths ranging from 1,300 to 1,800 feet deep. The total dissolved solids level of the Fox Hills aquifer is normally 2,500 to 3,000 ppm, producing good drinking water. Detailed analyses are available from the North Dakota Geological Survey, Bulletin 68, Part III, 1976.

**Table 3.3. Common Aquifers in the Proposed Project Area and Surrounding Region.**

Period	Formation		Depth Range (feet)	Thickness (feet)	Lithology	Water-Yielding Characteristics
Quaternary	Alluvium		0-40	40	Silt, sand, and gravel	50 gal/min from sand and gravel deposits
Tertiary	Fort Union Group	Sentinel Butte	0-670	0-670	Silty, clay, sand and lignite	5 to 100 gal/min in sandstone. 1 to 200 gal/min in lignite
		Tongue River	140-750	350-490	Silty, clay, sand and lignite	Generally less than 100 gal/min in sandstone
		Cannonball/Ludlow	500-1,150	550-660	Fine- to medium-grained sandstone, siltstone, and lignite	Generally less than 50 gal/min in sandstone
Cretaceous	Hell Creek		1,000-1,750	200-300	Claystone, sandstone, and mudstone	5 to 100 gal/min in sandstone
	Fox Hills		1,100-2,000	200-300	Fine- to medium-grained sandstone and some shale	Generally less than 200 gal/min in sandstone; some up to 400 gal/min

Sources: Croft 1985; Klausning 1979.  
gal/min = gallons per minute

### 3.3.2.2 Existing Groundwater Wells

Data from the North Dakota State Water Commission shows that there is one existing groundwater well identified within 1 mile of the proposed well pad located in the NW¼ SW¼ of Section 21 (North Dakota State Water Commission 2011). This groundwater well targets the Sentinel Butte-Tongue River aquifer and is 0.62 mile from the well pad. The purpose and depth of this well is unknown, but it could range from 0 to 750 feet deep.

In addition, 14 existing groundwater wells are located within 5 miles of the well pad located in the SE½ NE¼ of Section 20, the well pad nearest to Mandaree, and three groundwater wells are located within 5 miles of the well pad located in the N½ NE¼ of Section 29 (North Dakota State Water Commission 2011).

### 3.3.2.3 Hydraulic Fracturing Process

HF is a well stimulation process used in North Dakota's Bakken and Three Forks formations to maximize the extraction of oil and gas. The process enhances subsurface fracture systems, allowing oil to move more freely through porous rock to production wells that bring the oil or gas to the surface (EPA 2010f). During fracturing, fluids, commonly made up of water and chemical additives, are pumped down the well bore into these target formations at high pressure. The HF process uses large volumes of water under high pressure to fracture rock within the target formation to increase formation porosity and allow the flow of petroleum from the rock. Depending upon the characteristics of the well and the rock being fractured, a few million gallons of water can be required to complete a job (Arthur et al. 2008).

Only specific sections of the well within the target formation receive the full force of pumping. As pressure builds up in this portion of the well, water opens fractures, and the driving pressure extends the fractures deep into the rock unit. When pumping stops, these fractures quickly snap closed and the water used to open them is pushed back into the borehole, back up the well and is collected at the surface. The water returned to the surface is a mixture of the water injected and pore water that has been trapped in the rock unit for millions of years. The pore water is usually a brine with significant amounts of dissolved solids (Arthur et al. 2008).

When the pressure exceeds the rock strength, the fluids open or enlarge fractures that can extend several hundred feet from the well shaft, which is oriented laterally within the target formation. After the fractures are created, a propping agent is pumped into the fractures to keep them from closing when the pumping pressure is released. After fracturing is completed, the internal pressure of the geologic formation causes the injected fracturing fluids to rise to the surface where they are stored in disposal tanks (EPA 2010f).

Proppants are small compression-resistant particles added to the HF fluids to assist in holding the fractures open and creating pore space through which petroleum can flow. Sand was the original proppant but now aluminum beads, ceramic beads, sintered bauxite, and other materials are being used in the wells. Over one million pounds of proppants can be used while fracturing a single well (Arthur et al. 2008).

In addition to proppants, a variety of chemical additives are included with the water used in HF. Some chemicals are used to thicken the water into a gel that is more effective at opening

fractures and carrying proppants deep into the rock unit. Other chemicals are added to reduce friction, keep rock debris suspended in the liquid, prevent corrosion of equipment, kill bacteria, control pH, and other functions (Arthur et al. 2008). Typical chemical additives used in the HF fluids are shown in Table 3.4.

**Table 3.4. Common Additives of Hydraulic Fracturing Fluid.**

<b>Additive Type</b>	<b>Main Compound</b>	<b>Common Use of Main Compound</b>
Acid	Hydrochloric acid or muriatic acid	Swimming pool chemical and cleaner
Biocide	Glutaraldehyde	Cold sterilant in health care industry
Breaker	Sodium chloride	Food preservative
Corrosion inhibitor	N,n-dimethyl formamide	Used as a crystallization medium in pharmaceutical industry
Friction reducer	Petroleum distillate	Cosmetics including hair, make-up, nail and skin products
Gel	Guar gum or hydroxyethyl cellulose	Thickener used in cosmetics, sauces, and salad dressings
Iron control	2-hydroxy-1,2,3-propanetricarboxylic acid	Citric acid is used to remove lime deposits; lemon juice ~7% citric acid
Oxygen scavenger	Ammonium bisulfite	Used in cosmetics
Proppant	Silica, quartz sand	Play sand
Scale inhibitor	Ethylene glycol	Automotive antifreeze and de-icing agent

Source: Arthur et al. 2008.

#### 3.3.2.4 Potential Impacts to Surface Water and Groundwater Resources

The majority of the identified groundwater wells may have minimal hydrologic connections due to their respective distances greater than 1 mile from the nearest project well and shallow depths. Water quality of future wells in the vicinity would be protected by drilling with freshwater to a point below the base of the Fox Hills Formation, implementing proper hazardous materials management, and using appropriate casing and cementing to permanently seal the well shaft from any surrounding aquifers. Surface casing would be employed to a depth of 2,500 feet below ground surface to isolate and protect all near surface aquifers from contamination during drilling, as described in Section 2.2.5 of this document, and to protect the potable water aquifers from any potential contamination during the drilling and operations phases.

Since the introduction of technological advances in HF, some environmental concerns have been published related to the use of chemical additives and their potential effect on groundwater resources. These concerns, reviewed in Arthur et al. (2008), include:

1. Fractures produced in the well might extend directly into shallow rock units that are used for drinking water supplies, or fractures produced in the well might communicate with natural fractures that extend into shallow rock units that are used for drinking water supplies.
2. The casing of a well might fail and allow fluids to escape into shallow rock units used for drinking water supplies.

3. Accidental spills of hydraulic fracturing fluids or fluids expelled during a fracturing job might seep into the ground or contaminate surface water.

The EPA recently studied the effects of coalbed methane well fracking, publishing the results in a report entitled *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs* (EPA 816-R-04-003) in 2004 (EPA 2010g). The report has received both internal and external peer review, and public comment on its research design and incident information. Based on its research, the EPA concluded that there was negligible risk of fracturing fluid contaminating underground sources of drinking water during hydraulic fracturing of coalbed methane production wells, which are significantly more shallow than the Bakken and Three Forks formations. However, the EPA continues to monitor the effects of fracking in coalbed methane well completion (EPA 2010g). The EPA is currently undertaking a study to evaluate of the effect of oilfield HF technology, processes, and fluids on potable water aquifers. The EPA study is not expected to be completed until 2012 (EPA 2010f).

Oil-bearing formations typically occur much deeper than potable water aquifers; approximately 8,700 feet of intervening rock formations occur between the Bakken Formation and the deepest groundwater wells within 1 mile of the proposed wells. In addition, the unique geological position of the Bakken Formation places it immediately beneath the Madison Group, as shown in Figure 3.1. The Madison group of Mississippian age includes three geological formations that have properties that greatly limit the possibility of HF fractures extending vertically into shallower geological formations containing potable water. The following characteristics of the three members of the Madison Group show extremely high resistance to fracturing or vertical transmission of fluids.

#### *3.3.2.4.1 Lodgepole Limestone Sequence*

This is a sequence of primarily Mississippian limestones, with scattered interbedded shales approximately 900 feet thick. It lies immediately above the Bakken Formation. This sequence of rocks is characterized as hard and very dense, requiring significant pressure to initiate fractures (Energy Information Administration 2006).

#### *3.3.2.4.2 Mission Canyon Limestone*

Like the Lodgepole Limestone, the Mission Canyon is a dense limestone formation with very low porosity that ranges from 500 to 800 feet thick (Figure 3.1). Any HF pressures within the Bakken Formation that might be sufficient to initiate fracturing of the Lodgepole Limestone are assumed to be greatly reduced before reaching the Mission Canyon Limestone Formation, and very unlikely to cause any fracturing or transmission of fluids.

#### *3.3.2.4.3 Charles Salt*

The Charles Salt is ubiquitous through a great portion of the Williston Basin in both Montana and North Dakota and lies immediately above the limestones described above. This salt formation is approximately 600 feet thick. At the depth below the surface and the associated pressures, this salt is ductile, and would flow slowly to fill any void created by drilling or other pressure. This “flow characteristic,” although very challenging to well drilling, would serve to seal any potential fracture that might be propagated artificially through HF. The salt would flow completely around the HF fluids or proppant, thereby eliminating any opportunity

for the artificially induced fracture to stay open. Further, the water from the Bakken is almost fully salt-saturated; even with water flow from the Bakken to the Charles Salt formation, there could be almost no dissolution to enhance any fracture, and the formation would form a barrier, or cap, for any potential HR fracture.

Above the Charles Salt lie greater than 6,000 feet of limestones, siltstones, interbedded salts, sandstones, and shales, many of which tend to be soft and incompetent, providing a serious impediment to any fracture height growth and redirecting and attenuating any fracture that is started. The multiple layers encountered would also serve to dissipate any energy from a fracture stimulation resulting in very limited fracture competency.

Potable water aquifers lie approximately 4,000 feet above the Bakken Formation. In general, almost any of the intervening rock packages appear to be able to independently act as an effective impediment to fracture growth in a vertical direction. Although large volumes of sand (proppant) are used in the modern, multi-stage fracture stimulations, relatively small amounts of proppant are used per stage and are specifically designed to limit fracture growth. This technology is highly unlikely to result in fractures that could expand through the Madison Group limestones or reach the Charles Salt Formation.

No direct or indirect impacts to surface water or groundwater resources would be anticipated from drilling of the proposed wells, HF completions, or operation of the proposed wells due to the following:

- The geological setting of the Bakken and Three Forks formations with extremely tight capping formations of the Madison Unit forming an impermeable barrier to upward fracturing or fluid movement.
- The use of semi-closed-loop drilling, construction BMPs, and spill prevention planning during the construction phase of the project.
- Implementation of site-specific measures to reduce long-term erosion and runoff into nearby streams and Lake Sakakawea.
- The use of protective casings on the well shafts to protect shallow water-bearing rock formations during drilling and operation of the oil wells.

### **3.4 SOILS**

#### **3.4.1 Natural Resources Conservation Service Soil Data**

The project area is located toward the center of the Williston Basin. The Greenhorn Formation, which consists of thin limestone and dark gray to black organic-rich shale, is found from the surface to a depth of approximately 4,000 feet. The Greenhorn is subdivided into lower and upper intervals of limestone and calcareous shale with a middle interval of shale. Near-surface sediment is of Recent, Pleistocene, or Tertiary age, and includes Sauk, Tippecanoe, Kaskaskia, Absaroka, Zuni, and Tejas Sequences. The Natural Resources Conservation Service (NRCS) soil data for soil series found in the project area are shown in Figure 3.5 and Table 3.5 (NRCS 2010).



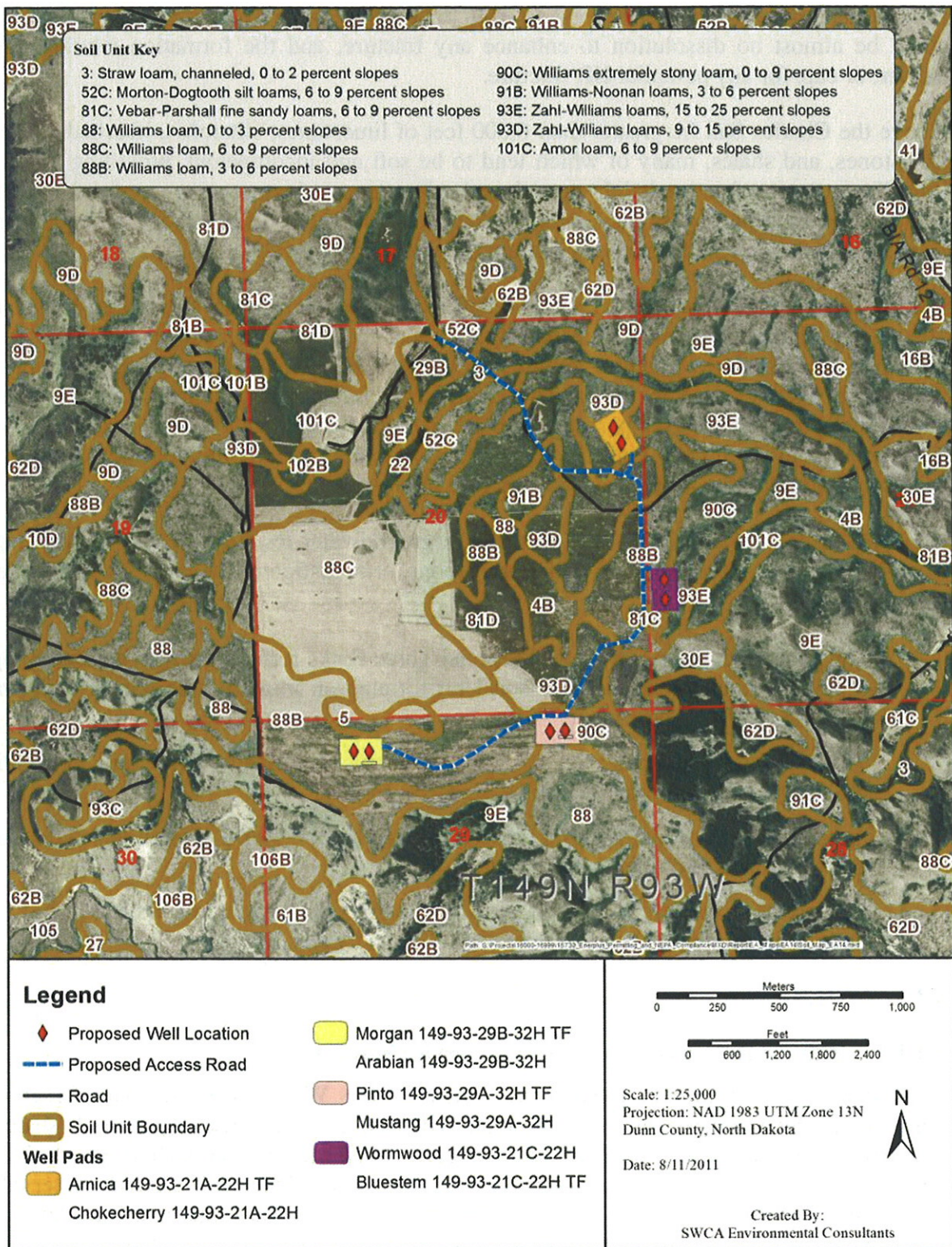


Figure 3.5. Approximate spatial extent of soil types within and around the well pads in the project area.



**Table 3.5. Percentage of the Overall Project Disturbance Comprised of Specific Soil Types.**

Feature	Soil Series	K-factor	Acres	% of Overall Project Disturbance
<b>N½ NW¼ of Section 29: Morgan-Arabian</b>				
Well Pad	Williams loam, 3 to 6 percent slopes	0.24	4.57	9.7
<b>N½ NE¼ of Section 29: Pinto-Mustang</b>				
Well Pad	Williams extremely stony loam, 0 to 9 percent slopes	0.28	2.01	4.11
	Williams loam, 0 to 3 percent slopes	0.24	2.08	4.25
	Williams loam, 3 to 6 percent slopes	0.24	0.65	1.33
<b>NW¼ SW¼ of Section 21: Wormwood-Bluestem</b>				
Well Pad	Vebar-Parshall fine sandy loams, 6 to 9 percent slopes	0.24	0.1	0.20
	Williams extremely stony loam, 0 to 9 percent slopes	0.28	1.07	2.19
	Williams loam, 3 to 6 percent slopes	0.24	3.1	6.33
	Zahl-Williams loams, 15 to 25 percent slopes	0.24	0.48	0.98
Access Road	Williams loam, 3 to 6 percent slopes	0.24	0.22	0.45
<b>SE¼ NE¼ of Section 20: Arnica-Chokecherry</b>				
Well Pad	Zahl-Williams loams, 9 to 15 percent slopes	0.24	0.76	1.55
	Williams loam, 3 to 6 percent slopes	0.24	4.74	9.68
Access Road: Arnica-Chokecherry	Amor loam, 6 to 9 percent slopes	0.24	0.41	0.84
	Morton-Dogtooth silt loams, 6 to 9 percent slopes	0.32	2.07	4.23
	Straw loam, channeled, 0 to 2 percent slopes	0.32	1.1	2.25
	Williams loam, 3 to 6 percent slopes	0.24	1.18	2.41
	Williams loam, 6 to 9 percent slopes	0.24	4.24	8.66
	Williams-Noonan loams, 3 to 6 percent slopes	0.24	0.96	1.96
	Zahl-Williams loams, 9 to 15 percent slopes	0.24	0.76	1.55
<b>Shared Access Road for N½ NW¼ of Section 29, N½ NW¼ of Section 29, and NW¼ SW¼ of Section 21</b>				
Access Road	Vebar-Parshall fine sandy loams, 6 to 9 percent slopes	0.24	0.84	1.72
	Williams extremely stony loam, 0 to 9 percent slopes	0.28	0.92	1.88
	Williams loam, 0 to 3 percent slopes	0.24	0.01	0.02
	Williams loam, 3 to 6 percent slopes	0.24	11.94	24.39
	Williams loam, 6 to 9 percent slopes	0.24	1.25	2.55
	Zahl-Williams loams, 9 to 15 percent slopes	0.24	3.3	6.74

The overall percentage of project disturbance by soil series is summarized in Table 3.5 and is based on the spatial extent of soil series combinations derived from NRCS data; therefore, the acreage is approximate and used as a best estimate of soil series distribution at each of the proposed project areas. The K-factor of each of the soil series is also included. K-factor indicates the vulnerability of material less than 2 millimeters in size to sheet and rill erosion by water. Values can range from 0.02 (i.e., lowest erosion potential) to 0.69 (i.e., greatest erosion potential) (NRCS 2010).

The following soil series descriptions represent individual soil series reported to exist within the proposed project area (NRCS 2010).

#### 3.4.1.1 Amor

The Amor series consists of moderately deep, well-drained, moderately permeable soils found on sandstone bedrock uplands with slopes ranging from approximately 0 to 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation of small grains, flax, and corn. Native vegetation species common to this soil type include needle and thread (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), and blue grama (*Bouteloua gracilis*) (NRCS 2010).

#### 3.4.1.2 Dogtooth

The Dogtooth series consists of moderately deep, well-drained, very slowly permeable soils found in uplands where the predominant slope is between 0 and 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. The most common vegetation species found on this soil type are range and pasture grasses including western wheatgrass and blue grama (NRCS 2010).

#### 3.4.1.3 Morton

The Morton series consists of moderately deep, well-drained, moderately permeable soils found in matter weathered from soft calcareous silty shales, siltstones, and fine-grained sandstones. These Morton soils are on uplands and have slopes of 0 to 15 percent. The mean annual precipitation found throughout the spatial extent of this soil type is 15 inches and the mean annual air temperature is 42°F. Cultivated areas are used for growing small grains, flax, corn, hay, and pasture. Native vegetation is mid- and short-prairie grasses such as western wheatgrass, green needlegrass (*Nasella viridula*), and blue grama (NRCS 2010).

#### 3.4.1.4 Noonan

The Noonan series consists of very deep, well-drained or moderately well-drained soils formed in till. Permeability is moderate on the surface and slow in the Btn horizons. These soils are on till plains and uplands and have slopes of 0 to 15 percent. The mean annual precipitation found throughout the spatial extent of this soil type is 14 inches and the mean annual air temperature is 39°F. This soil type is used for spring seeded small grains and pasture. Native vegetation includes western wheatgrass and blue grama (NRCS 2010).

#### 3.4.1.5 Parshall

The Parshall series consists of very deep, moderately rapidly permeable, well-drained soils found on uplands with slopes ranging from approximately 0 to 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation of small grains and other crops. Native vegetation species common to this soil type include needle and thread and other various medium and short prairie grasses (NRCS 2010).

#### 3.4.1.6 Straw

The Straw series consists of very deep, moderately well- and well-drained soils that formed in alluvium. These soils are on floodplains, stream terraces, and drainageways. Slopes are 0 to 8 percent. The mean annual precipitation found throughout the spatial extent of this soil type is about 16 inches, and mean annual air temperature is about 43°F. Straw soils are used mainly for dryland cropland, irrigated cropland, and range. Potential native vegetation is mainly plains rough fescue (*Festuca hallii*), western wheatgrass, needle and thread, little bluestem (*Schizachyrium scoparium*), bluebunch wheatgrass (*Pseudoroegneria spicata*), green needlegrass, forbs, and shrubs (NRCS 2010).

#### 3.4.1.7 Vebar

The Vebar series consists of moderately deep, moderately rapidly permeable, well-drained soils found on uplands with slopes ranging from approximately 0 to 65 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation of corn and small grains. Native vegetation species common to this soil type include needle and thread and prairie sandreed (*Calamovilfa longifolia*) (NRCS 2010).

#### 3.4.1.8 Williams

The Williams series consists of very deep, slowly permeable, well-drained soils found on glacial till plains and moraines with slopes at approximately 0 to 35 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation. Native vegetation species common to this soil type include western wheatgrass, needle and thread, blue grama, and green needlegrass (NRCS 2010).

#### 3.4.1.9 Zahl

The Zahl series consists of very deep, slowly permeable, well-drained soils found on glacial till plains, moraines, and valley side slopes at approximately 1 to 60 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 40°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, little bluestem, and needle and thread (NRCS 2010).

### 3.4.2 **Field-derived Soil Data and Erosion Protection Measures**

Soil data derived from on-site excavated soil pits, including the matrix value, hue, chroma, and color name, are summarized in Table 3.6. Additionally, redoximorphic features (i.e.,

reduced/oxidized iron or manganese deposits), and soil texture were noted at each soil pit. A Munsell Soil Color Chart was used to determine the color of moist soil samples.

**Table 3.6. Soil Data Obtained through the Excavation of Soil Pits within the Proposed Project Area.**

Well Pad Location/ Well Name and Component	Depth (inches)	% of Sample	Soil Matrix Color (color name)	Redoximorphic Feature Color	Texture	Topography Slope (°)
<b>N½ NW¼ of Section 29: Morgan-Arabian</b>						
Well pad	0-8	100	10YR 3/2	N/A	Silty clay loam	1-2
	8-20	100	10YR 4/3	N/A	Silty clay loam	
<b>N½ NE¼ of Section 29: Pinto-Mustang</b>						
Well pad	0-6	100	10YR 3/2	N/A	Silty clay loam	1-2
	6-20	100	10YR 4/3	N/A	Silty clay loam	
<b>NW¼ SW¼ of Section 21: Wormwood-Bluestem</b>						
Well pad	0-4	100	10YR 3/2	N/A	Silty clay loam	1-2
	4-20	100	10YR 4/3	N/A	Silty clay loam	
<b>SE¼ NE¼ of Section 20: Arnica-Chokecherry</b>						
Well pad	0-8	100	10YR 2/2	N/A	Silty clay loam	1-2

Enerplus has committed to the following specific protective measures that would prevent or reduce erosion potential at each site.

- All construction would include implementation of BMPs to prevent erosion, minimize runoff and loss of sediment, and ensure soil stabilization. Sites would be inspected during construction in accordance with NPDES requirements, and monitored after construction to ensure that erosion does not occur.
- Well pads are designed to be level with reclamation being completed on exposed cut and fill slopes shortly following construction.
- Roads would be constructed with crown and ditch to direct runoff away from gravel surfaces. Roads are designed with appropriately sized culverts at any intermittent stream crossings, in accordance with BLM Gold Book Standards. All disturbed areas except the road surface would be reseeded and stabilized as soon as practical following construction.
- Erosion and sedimentation control measures would be implemented in all project areas, such as installing culverts with energy dissipating devices at culvert outlets to

avoid sedimentation in ditches, constructing water bars alongside slopes, and planting cover crops to stabilize soil following construction and before permanent seeding takes place.

- Any disturbance from operational maintenance actions along gathering pipelines would be followed by reclamation.
- Other site-specific erosion control measures have been required by the BIA, and agreed to by Enerplus, as shown in Table 2.1.

### **3.4.3 Potential Impacts from Soil Erosion**

Some potential for erosion to occur may exist at sites, depending on surface disturbance, site-specific slope, soil type, K-factor, and construction technique and/or long-term maintenance.

Keeping in mind the general and site-specific measures identified in Table 2.1, the potential impacts from erosion are discussed in detail for each site.

#### **3.4.3.1 N½ NW¼ of Section 29: Morgan-Arabian**

- The proposed well pad would occur in an area dominated by Williams loam, which is very deep, slowly permeable, and well-drained (Figure 3.5, Tables 3.5 and 3.6). Reclamation of vegetative communities should be easily obtainable due to the affinity of native grassland species to this soil type (NRCS 2010).
- The K-factor of this soil type is 0.24, with very low erosion potential.
- 8.4 acres of surface disturbance would occur during construction. The topography in the project area is flat on and around the well pad (Table 3.6), but requires some site leveling with cut of 21,300 cubic yards of earth, and fill of 15,930 cubic yards. Excess soil after interim rehabilitation would be removed from the project area and disposed of in accordance with appropriate permits. With these measures, the potential for runoff is low during individual storm events. Potential erosion from around the well pad and the access road could also occur in small amounts over the life of the project.

#### **3.4.3.2 N½ NE¼ of Section 29: Pinto-Mustang**

- The well pad would occur in an area dominated by Williams loam and Williams extremely stony loam (Figure 3.5, Tables 3.5 and 3.6). As described previously, these soil types are very deep, slowly permeable, and well-drained (Figure 3.5, Tables 3.5 and 3.6). Reclamation of vegetative communities should be easily obtainable due to the affinity of native grassland species to this soil types (NRCS 2010).
- 9.2 acres of temporary surface disturbance would occur during construction. The topography in the project area is flat on and around the well pad (Table 3.6), requiring minimal site leveling with cut of 27,940 cubic yards of earth, and fill of 22,590 cubic yards. Excess soil after interim rehabilitation would be removed from the project area and disposed of in accordance with appropriate permits.
- The well pad location, access road, and gathering pipeline ROW have a K-factor ranging from 0.24 to 0.28 (Table 3.5), indicating low erosion potential.

3.4.3.3 NW¼ SW¼ of Section 21: Wormwood-Bluestem

- The well pad would occur in an area dominated by Williams loam, Zahl-Williams, and Vebar-Parshall soil types (Figure 3.5, Tables 3.5 and 3.6). As described previously, these soil types are deep to very deep, slowly permeable, and well-drained (Figure 3.5, Tables 3.5 and 3.6). Reclamation of vegetative communities should be easily obtainable due to the affinity of native grassland species to these soil types (NRCS 2010).
- 8.6 acres of temporary surface disturbance would occur during construction. The topography in the project area is flat on and around the well pad (Table 3.6), requiring minimal site leveling with cut of 18,820 cubic yards of earth, and fill of 13,420 cubic yards. Excess soil after interim rehabilitation would be removed from the project area and disposed of in accordance with appropriate permits.
- The well pad location, access road, and gathering pipeline ROW have a K-factor ranging from 0.24 to 0.28 (Table 3.5), indicating low erosion potential.

3.4.3.4 SE¼ NE¼ of Section 20: Arnica-Chokecherry

- The well pad would occur in an area dominated by Williams loam and Zahl-Williams loam (Figure 3.5, Tables 3.5 and 3.6). As described previously, these soil types are very deep, slowly permeable, and well-drained (Figure 3.5, Tables 3.5 and 3.6). Reclamation of vegetative communities should be easily obtainable due to the affinity of native grassland species to this soil types (NRCS 2010).
- 21.3 acres of temporary surface disturbance would occur during construction of the well pad and the access road. The topography in the project area is flat on and around the well pad (Table 3.6), requiring minimal site leveling with cut of 12,510 cubic yards of earth, and fill of 5,230 cubic yards. Excess soil after interim rehabilitation would be removed from the project area and disposed of in accordance with appropriate permits.
- The well pad location, access road, and gathering pipeline ROW have a K-factor of 0.24 (Table 3.5), indicating low- to moderate-erosion potential.

Site-specific measures identified in Table 2.1 would serve to reduce erosion from exposed soil surfaces, and the construction and reclamation measures indicated for the components at the site would be sufficient to reduce erosion to insignificant levels.

Most of the soils in the project area are known to support native grassland vegetation, which may substantially increase the probability for successful and permanent reclamation, provided care is taken in areas where the soils are less than ideal for vegetative growth (NRCS 2010). Proven construction BMPs are known to significantly reduce erosion of various types of soil, including those in the project area (BLM Instruction Memorandum 2004-124, [www.blm.gov/bmp](http://www.blm.gov/bmp); BLM and USFS 2007; Grah 1997).

The project is not expected to create unmanageable erosion issues or interfere with reclamation of the area. Topsoil stripped from areas of new construction would be retained for use during reclamation. Any areas stripped of vegetation during construction would be



reseeded once construction activities have ceased. All construction sites would be monitored during and after construction, and BMPs would be used to prevent erosion, minimize runoff and loss of sediment, and ensure soil stabilization. The implementation of BMPs by the operator would reduce project effects and maintain negligible levels of erosion; therefore, no significant adverse impacts to soil resources are anticipated.

### **3.5 WETLANDS, HABITAT, AND WILDLIFE**

#### **3.5.1 Wetlands**

##### **3.5.1.1 Wetland Data**

Wetlands, including riparian areas, perennial streams, and lakes, are considered to be transition zones between terrestrial and aquatic systems where soils are at least periodically saturated with water (Cowardin et al. 1979). Because of their proximity to available surface and subsurface water, plant species, soils, and topography of riparian and wetland areas differ considerably from those of adjacent uplands. These areas have highly productive soils that promote a lush and diverse vegetative community composition, which is important for wildlife, livestock, and agricultural production.

Under the federal definition of wetlands, areas must meet three criteria to be classified as a wetland: wetland hydrology, hydrophytic vegetation, and hydric soils. Wetlands that meet these three criteria are subject to regulation by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (33 CFR 1251 et seq.) and Executive Order 11990. The regulatory status of wetlands and other waters of the U.S. is determined by the USACE and EPA using this most recent guidance.

Wetlands are classified by the USACE, with general wetland surveys maintained in a National Wetland Inventory (NWI) maintained by the U.S. Fish and Wildlife Service (USFWS). Common wetland types found in the project area include the following.

##### **Palustrine Freshwater Emergent**

Palustrine freshwater emergent (PEM) wetlands are characterized by erect, rooted, herbaceous aquatic plants, excluding mosses and lichens (Cowardin et al. 1979). These wetlands are usually dominated by perennial plants, which are present for most of the growing season. Agricultural activities such as hay production and livestock grazing are common in these wetland types. Dominant species may include meadow foxtail (*Alopecurus pratensis*), obligate or facultative wet sedges, scratchgrass (*Muhlenbergia asperifolia*), cattails (*Typha* spp.), bluegrasses, reed canarygrass (*Phalaris arundinacea*), and bulrushes (*Scirpus* spp.).

##### **Palustrine Freshwater Forested**

The palustrine freshwater forested wetland class is characterized by woody vegetation that is at least 19 feet tall and is found along hydrologic features such as rivers and streams in mountainous areas that support distinct plant compositions that are dependent on saturated soils.

Palustrine Freshwater Scrub/Shrub

The palustrine freshwater scrub/shrub wetland class is typically dominated by woody vegetation less than 20 feet tall, such as shrubs, samplings, or small and stunted trees. Dominant trees and shrubs in this type of wetland habitat include cottonwoods, willows, tamarisk (*Tamarix* sp.), silver buffaloberry (*Shepherdia argentea*), black hawthorn (*Crataegus douglasii*), and boxelder (*Acer negundo*). Other herbaceous species include redtop (*Agrostis gigantea*), Baltic rush (*Juncus balticus*), and sedges.

Freshwater Pond

The freshwater pond wetland class contains both natural surface impoundments and anthropogenic areas (i.e., stock ponds and other excavated areas) that maintain surface water year-round except in times of drought. Even in times of drought, the water table may remain at or very near the surface.

3.5.1.2 Potential Impacts on Wetlands

According to the USFWS NWI database, 19 separate PEM wetlands and four freshwater ponds are located within 0.5 mile of the proposed project areas, as shown in Table 3.7 and Figure 3.6. No wetlands were observed along the proposed access roads or well pads during surveys conducted in May 2011, and none of the proposed new access roads or well pads would intersect any of the identified wetlands. NWI maps maintained by the USFWS do not identify any jurisdictional wetlands within the proposed well pads or access roads (USFWS 2011a), however, indirect effects could occur from erosion and sedimentation of nearby wetlands.

**Table 3.7. Wetland Types within 0.5 Mile of the Well Pad Sites.**

Well Pad Location	Nearest Wetland (miles) (NWI type)	Total Number of PEM Wetlands within 0.5 Mile	Other Wetlands within 0.5 Mile
N½ NW¼ of Section 29: Morgan-Arabian	0.03 (PEM)	11	1 freshwater pond
N½ NE¼ of Section 29: Pinto-Mustang	0.10 (PEM)	5	0
NW¼ SW¼ of Section 21: Wormwood-Bluestem	0.30 (PEM)	2	2 freshwater ponds
SE¼ NE¼ of Section 20: Arnica-Chokecherry	0.13 (PEM)	14	4 freshwater ponds

NWI = National Wetlands Inventory  
 PEM = palustrine freshwater emergent

The nearest wetland to any well pad would be a PEM wetland that is 0.03 mile from the proposed well site located in the N½ NW¼ of Section 29. The proposed well pad in the N½ NE¼ of Section 29 is located within 0.10 mile from the nearest wetland, which is classified as a PEM wetland. The proposed well pad in the NW¼ SW¼ of Section 21 is located within 0.30 mile from the nearest wetland, which is classified as a PEM wetland, and the well pad in the SE¼ NE¼ of Section 20 is 0.13 mile from the nearest PEM wetland.

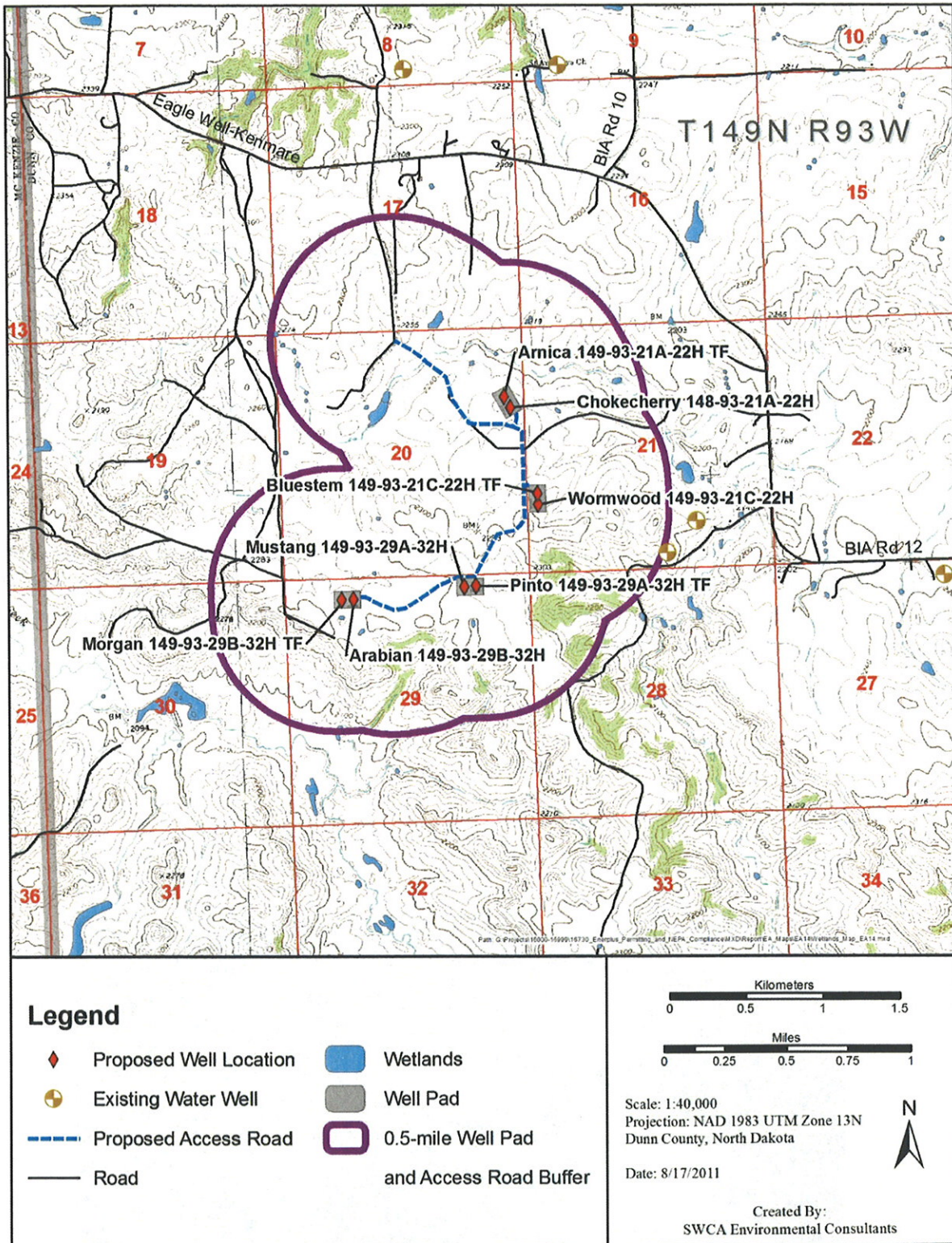


Figure 3.6. NWI-identified wetlands within 0.5 mile of proposed project areas.



In order to prevent any downstream impact to Lake Sakakawea, and to prevent any indirect effects to wetlands that could result from construction, drilling, or production activities, Enerplus would employ standard BMPs and other site-specific erosion control measures, as shown in Table 2.1.

### 3.6 VEGETATION AND INVASIVE SPECIES

#### 3.6.1 Vegetation Data

The proposed project areas occur in the Missouri Plateau ecoregion (Missouri Slope), which is a western mixed-grass and short-grass prairie ecosystem (Bryce et al. 1998). Native grasses include big bluestem (*Andropogon gerardii*), little bluestem, blue grama, side-oats grama (*Bouteloua curtipendula*), green needlegrass, and western wheatgrass. Common wetland vegetation includes various sedge species (*Carex* spp.), bulrush (*Scirpus* spp.), and cattails (*Typha* spp.). Common plant species found in woody draws, coulees, and drainages include chokecherry (*Prunus virginiana*), silver buffaloberry (*Shepherdia argentea*), and western snowberry (*Symphoricarpos occidentalis*).

##### 3.6.1.1 N½ NW¼ of Section 29: Morgan-Arabian

This well pad and access road would occur within an abandoned agricultural field and active pasture habitat. Vegetation noted at the N½ NW¼ of Section 29 well pad project area includes field brome (*Bromus arvensis*), little bluestem, Canada thistle (*Cirsium arvense*), and absinth wormwood (*Artemisia absinthium*) (Figure 3.7).



**Figure 3.7. Vegetation at the N½ NW¼ of Section 29 well pad area, facing southwest.  
Photo taken May 24, 2011.**



3.6.1.2 N½ NE¼ of Section 29: Pinto-Mustang

The project area would occur within abandoned agricultural field and active pasture habitat. Vegetation noted at the N½ NE¼ of Section 29 well pad includes western snowberry, little bluestem, field brome, Canada thistle, cocklebur (*Xanthium strumarium*), purple coneflower (*Echinacea purpurea*), and chokecherry (Figure 3.8).



**Figure 3.8. Vegetation at the N½ NE¼ of Section 29 well pad area, facing south. Photo taken May 24, 2011.**

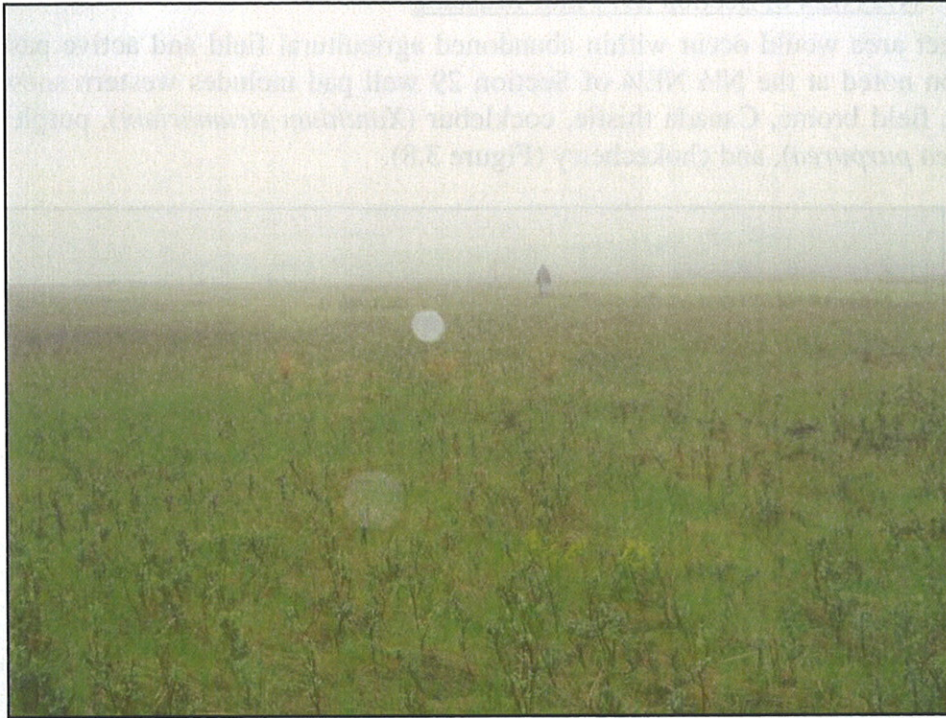
3.6.1.3 NW¼ SW¼ of Section 21: Wormwood-Bluestem

The project area would occur within native mixed-grass prairie habitat. Vegetation noted at the NW¼ SW¼ of Section 21 well pad includes western snowberry, hawthorn, purple coneflower, bluestem, green needlegrass, and chokecherry (Figure 3.9).

3.6.1.4 SE¼ NE¼ of Section 20: Arnica-Chokecherry

The project area would occur within native mixed grass prairie habitat. Vegetation noted at the well pad located in the SE¼ NE¼ of Section 20 well pad area includes needle and thread grass, green needlegrass, field brome, Kentucky bluegrass, western snowberry, purple coneflower, sweat clover, fringed sage, and yarrow (*Achillea* sp.) (Figure 3.10).





**Figure 3.9. Vegetation at NW¼ SW¼ of Section 21 well pad area, facing east. Photo taken May 24, 2011.**



**Figure 3.10. Vegetation at SE¼ NE¼ of Section 20 well pad area, facing west. Photo taken May 24, 2011.**



### 3.6.2 Noxious Weeds

“Noxious weeds” is a general term used to describe plant species that are not native to a given area, spread rapidly, and have adverse ecological and economic impacts. These species may have high reproduction rates and are usually adapted to occupy a diverse range of habitats otherwise occupied by native species. These species may subsequently out-compete native plant species for resources, causing a reduction in native plant populations.

Noxious weeds have the potential to detrimentally affect public health, ecological stability, and agricultural practices. NDCC (Chapter 63-01.1) and the North Dakota Department of Agriculture (NDDA) recognize 11 species as noxious, as shown in Table 3.8 (NDDA 2009). Each county has the authority to add additional species to their list of noxious weeds. In 2009, three state noxious weed species were found on 86,100 acres in Dunn County. Dunn County does not maintain a list of other noxious species. However, 3,000 acres of black henbane (*Hyoscyamus niger*) were shown to occur in Dunn County in 2009 (NDDA 2009, 2010).

**Table 3.8. Recognized Noxious Weed Occupied Area in Dunn County, North Dakota.**

Common Name	Scientific Name	Dunn County (acres)
<b>State Noxious Weeds</b>		
Absinth wormwood	<i>Artemisia absinthium</i>	42,000
Canada thistle	<i>Cirsium arvense</i>	38,000
Diffuse knapweed	<i>Centaurea diffusa</i>	0
Leafy spurge	<i>Euphorbia esula</i>	6,000
Musk thistle	<i>Carduus nutans</i>	0
Purple loosestrife	<i>Lythrum salicaria</i>	0
Russian knapweed	<i>Acroptilon repens</i>	0
Spotted knapweed	<i>Centaurea stoebe</i>	0
Yellow toadflax	<i>Linaria vulgaris</i>	0
Dalmatian toadflax	<i>Linaria dalmatica</i>	0
Saltcedar	<i>Tamarix ramosissima</i>	0
<b>Other Noxious Weeds</b>		
Black henbane	<i>Hyoscyamus niger</i>	0
Common burdock	<i>Arctium minus</i>	0
Houndstongue	<i>Cynoglossum officinale</i>	0
Halogeton	<i>Halogeton glomeratus</i>	0
Baby’s breath	<i>Gypsophila muralis</i>	0

Absinth wormwood was observed on the well pad in the N½ NW¼ of Section 29, and Canada thistle was observed at this well pad site and the well pad site in the N½ NE¼ of Section 29. Both sites occurred in an abandoned field. Efforts to reduce the spread of noxious weeds would be made during the project construction and maintenance processes. The following

guidelines would be followed during construction, reclamation, and maintenance stages of the project to control the spread of noxious weeds.

- Construction equipment, materials, and vehicles would be stored at construction sites or at specified construction yards.
- All personal vehicles, sanitary facilities, and staging areas would be confined to a limited number of specified locations to decrease chances of incidental disturbance and spread of weeds.
- In areas with existing noxious weed infestations, vegetation, soils, and trench spoil material would be stockpiled adjacent to the removal point and, following construction, would be returned to its original locations to prevent spreading.
- Prompt re-establishment of the desired vegetation in disturbed areas would be required. Seeding would occur during the frost-free periods after construction. Certified “noxious weed-free” seed would be used on all areas to be seeded.

### **3.6.3 Potential Impacts on Vegetation and Noxious Weeds**

The Proposed Action would result in minor loss of native grassland vegetation. The potential disturbance for each project component at each well pad is displayed in Table 2.1, and would total 64.6 acres of temporary disturbance and 24.2 acres of long-term loss of vegetation loss.

In addition to the removal of typical native grasslands, removal of existing vegetation may facilitate the spread of invasive species. The APD and this EA require the operator to control noxious weeds throughout project areas. If a noxious weed community is found, it would be eradicated unless the community is too large, in which case it would be controlled or contained to prevent further growth. The services of a qualified weed control contractor would be used.

Surface disturbance and vehicular traffic would not take place outside approved ROWs for the well pads. Areas that are stripped of topsoil must be reseeded and reclaimed at the earliest opportunity. Additionally, certified weed-free straw and seed must be used for all construction, seeding, and reclamation efforts. Prompt and appropriate construction, operation, and reclamation are expected to maintain minimal levels of adverse impacts to vegetation and would reduce the potential establishment of invasive vegetation species.

Rapid reclamation and the implementation of BMPs would minimize any long-term loss of soil and degradation of vegetation resources in the pipeline ROW. Construction of the three proposed well pads and their access roads would result in long-term disturbance of vegetation, since these facilities would only be partially reclaimed, and would be in continuous use for the life of the project. The loss of 24.2 acres would be dispersed in Sections 29, 21, and 20. With implementation of BMPs and noxious weed management guidelines, would result in negligible levels of vegetation disturbance and would not result in significant adverse impacts to vegetation resources.

### 3.7 WILDLIFE

#### 3.7.1 Threatened and Endangered Species Occurrence and Habitat

Several wildlife species that may exist in Dunn County (USFWS 2011b) are listed as threatened or endangered under the Endangered Species Act (ESA) (16 USC 1531 et seq.). According to the USFWS, listed species in Dunn County include the gray wolf (*Canis lupus*), black-footed ferret (*Mustela nigripes*), whooping crane (*Grus americana*), piping plover (*Charadrius melodus*) and its Designated Critical Habitat, interior least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirhynchus albus*), as well as two federal candidate species, the Dakota skipper (*Hesperia dacotae*) and the Sprague's pipit (*Anthus spragueii*). In addition to the ESA, the Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668–668d, 54 Sta. 250) and the Migratory Bird Treaty Act of 1918 (MBTA) (916 USC 703–711) protect nesting migratory bird species. The listed species and their federal status are provided in Table 3.9.

An SWCA Environmental Consultants (SWCA) biologist conducted surveys for threatened or endangered species or their habitats, as well as general wildlife surveys during site visits on May 24 and July 14, 2011. No threatened or endangered species or their habitats were observed within the project area. However, eagle nesting habitat was observed within 0.5 mile of both well pad sites. An aerial eagle nest survey was flown by the SWCA biologist on Friday March 25, 2011, for Enerplus to identify any eagle nests within 0.5 mile of the well pad and access road areas, per recommendations of the BIA. No nests or eagles were observed during the survey (SWCA 2011).

#### 3.7.2 General Wildlife Species Occurrence and Habitat

Several species common to the northern Great Plains are likely to be present in the project area including, but not limited to, mule deer (*Odocoileus hemionus*), American badger (*Taxidea taxus*), eastern spotted skunk (*Spilogale putoris*), and grassland songbirds such as western meadowlark (*Sturnella neglecta*) and loggerhead shrike (*Lanius ludovicianus*). Wildlife, including migratory birds, was observed during surveys on May 24 and July 14, 2011.

##### 3.7.2.1 N½ NW¼ of Section 29: Morgan-Arabian.

No threatened and endangered species habitat was observed. No raptors or nests were observed. Nesting habitat for eagles is present within 0.5 mile of the well pad. Migratory bird nesting habitat is also present and bobolink (*Dolichonyx oryzivorus*) were observed.

##### 3.7.2.2 N½ NE¼ of Section 29: Pinto-Mustang

Migratory bird nesting habitat was present and observations were made of red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), and gold finch (*Carduelis tristis*) in the project area. Coyote and rabbit scat was also observed. No raptor nests were observed. Nesting habitat for eagles is present within 0.5 mile of the well pad.

Table 3.9. Summary of Potential Effects to Threatened and Endangered Species.

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Black-footed Ferret ( <i>Mustela nigripes</i> )	Endangered	Species is presumed extirpated from North Dakota.	None	No Effect
Gray Wolf ( <i>Canis lupus</i> )	Endangered	Nearest known gray wolf populations exist in Minnesota, Canada, Montana, and Wyoming.	None	No Effect
Whooping Crane ( <i>Grus americana</i> )	Endangered	Birds may occasionally stopover during migration due to the presence of suitable foraging habitat near the project area.	If suitable whooping crane habitat exists within 1 mile of the project area, underground utility lines will be utilized. If underground power lines are deemed inappropriate, visual marking devices will be placed on new power lines plus an equal length of existing power line within 1 mile of suitable wetland roosting habitat. Drilling or construction activity will cease and the Bureau of Indian Affairs (BIA) and U.S. Fish and Wildlife Service (USFWS) will be notified if whooping cranes are sighted. In addition, see migratory bird protective measures below.	May Affect, Is Not Likely to Adversely Affect
Piping Plover ( <i>Charadrius melodus</i> )	Threatened	Birds are unlikely to be present due to lack of suitable foraging or nesting habitat.	See Designated Critical Habitat protective measures for piping plover.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Designated Critical Habitat for Piping Plover	Designated Critical Habitat	Critical Habitat occurs approximately 16.2 to 18.6 miles from the project area, on the shoreline and islands of Lake Sakakawea.	<p>Enerplus will implement all best management practices (BMPs), erosion control measures, and spill prevention practices required by the Clean Water Act.</p> <p>Enerplus will use a semi-closed-loop drilling system and an impervious dike sized to hold 110% of the capacity of the largest tank would be constructed around the tank battery to prevent hazardous runoff or spills.</p> <p>An 18-inch berm would be constructed around well pads located in the NW<math>\frac{1}{4}</math> NW<math>\frac{1}{4}</math> of Section 21, T151N, R94W; N<math>\frac{1}{2}</math> NW<math>\frac{1}{4}</math> of Section 29, T149N, R93W; N<math>\frac{1}{2}</math> NE<math>\frac{1}{4}</math> of Section 29, T149N, R93W; SE<math>\frac{1}{4}</math> NE<math>\frac{1}{4}</math> of Section 20, T149N, R93W.</p> <p>A diversion ditch would be constructed as needed at the well pad located in the NW<math>\frac{1}{4}</math> SW<math>\frac{1}{4}</math> of Section 21, T149N, R93W.</p>	May Affect, Is Not Likely to Adversely Affect
Interior Least Tern ( <i>Sterna antillarum</i> )	Endangered	The nearest suitable nesting and foraging habitat occurs on the shoreline and islands of Lake Sakakawea, approximately 16.2 to 18.6 river miles from proposed well pads and access roads. Migrating or foraging interior least terns may transition through the project area.	<p>See Designated Critical Habitat protective measures for piping plover.</p> <p>Interior floor of the drilling pad shall be sloped away from drainage ways. Cuttings pit liners will be a minimum of 20-millimeter thickness.</p>	May Affect, Is Not Likely to Adversely Affect
Sprague's Pipit ( <i>Anthus spragueii</i> )	Candidate	Habitat requirements include unfragmented native grasslands of intermediate height (4 to 12 inches) with a minimum patch size of 358 acres.	See migratory bird protective measures.	May Affect, Is Not Likely to Adversely Affect



Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Pallid Sturgeon ( <i>Scaphirhynchus albus</i> )	Threatened	Critical Habitat occurs in Lake Sakakawea (Missouri River) approximately 16.2 to 18.6 miles from the project area.	See Designated Critical Habitat protective measures for piping plover and interior least tern.	May Affect, Is Not Likely to Adversely Affect
Dakota Skipper ( <i>Hesperia dacotae</i> )	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	None.	May Affect, Is Not Likely to Adversely Affect
<b>Other Federally Protected Species</b>				
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Bald and Golden Eagle Protection Act (BGEPA)	No known nests occur within 0.5 mile of the project area. Raptor habitat survey was conducted. No raptor nests were observed within the project area. Eagle nesting habitat does occur within in the project area.	See migratory bird protective measures for whooping crane.  Maintain a minimum 0.5-mile buffer around all known or newly discovered active bald and golden eagle nests.  Conduct eagle nesting surveys between March 1 and May 15, before leaf-out at the well pads in Section 29, T149N, R93W. Results of surveys will be provided to the BIA and USFWS.	No Adverse Effects Anticipated

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Golden eagle ( <i>Aquila chrysaetos</i> )	BGEPA	No known nests occur within 0.5 mile of the project area. Raptor habitat survey was conducted. No raptor nests were observed within the project area. Eagle nesting habitat does occur within in the project area. Golden eagles may occasionally visit the project area.	See bald eagle protective measures.	No Adverse Effects Anticipated
Migratory Birds	Migratory Bird Treaty Act	Suitable habitat for nesting migratory grassland birds occurs in the project area.	<p>Schedule construction for late summer or fall/early winter so as not to disrupt waterfowl or other migratory birds during the breeding season (February 1 to July 15).</p> <p>If the construction window in item 1 above cannot be honored, degrade migratory bird habitat at the project site outside of the breeding season by mowing and/or clearing and grubbing to discourage nesting, and maintain the habitat in a degraded state until construction is completed.</p> <p>If construction will occur within the migratory bird nesting season of February 1–July 15, and habitat degradation has not been accomplished, conduct surveys at all well pads for migratory birds and their active nests (nests containing eggs or young) within five days of commencement of construction activities. If birds or their nests are found during surveys, contact the USFWS and BIA with a proposal for realigning the work or maintaining adequate buffers to prevent the take of migratory birds.</p> <p>Cuttings pits will include avian-safe coverings and be reclaimed immediately after wells are completed.</p>	No Adverse Effects Anticipated

3.7.2.3 NW¼ SW¼ of Section 21: Wormwood-Bluestem

Deer and coyote scat was observed. Migratory bird nesting habitat was present but no raptors or other migratory birds or their nests were observed. Nesting habitat for eagles is not present within 0.5 mile of the well pad.

3.7.2.4 SE¼ NE¼ of Section 20: Arnica-Chokecherry

Migratory bird nesting habitat is present and bobolink, sharp-tailed grouse (*Tympanuchus phasianellus*), and grasshopper sparrows (*Ammodramus savannarum*) were observed. No raptor nests were observed. Nesting habitat for eagles is not present within 0.5 mile of the well pad.

**3.7.3 Potential Impacts to Wetlands, Habitat, and Wildlife**

With the implementation of standard BMPs, no riparian or wetland habitats are anticipated to be directly or indirectly impacted by the proposed access roads or wells.

Indirect effects of the project on listed species could result from human disturbance and increases in vehicular traffic during drilling and commercial production, as well as indirectly from habitat degradation, sedimentation, or accidental release of drilling fluids or hazardous materials from the drilling, construction, or operation of the wells.

For additional information on general BMPs and other operator-committed measures, please see Section 2.2.8, Construction Details at Individual Sites, and Section 3.13, Mitigation and Monitoring.

Minor impacts to unlisted wildlife species and their habitats could result from the construction of four well pads and new access roads, increased vehicular traffic density, drilling activities, and long-term disturbances during commercial production. Ground clearing may impact habitat for small birds, small mammals, and other wildlife species. The proposed project may affect raptor and migratory bird species through direct mortality, habitat degradation, and/or displacement of individual birds. These impacts are regulated in part through the MBTA. Fragmentation of native prairie habitat can detrimentally affect grouse species; however, due to the ratio of each project area to the total landscape area, the overall disturbance would be negligible.

Several precautions that may limit or reduce the possible impact to all wildlife species include:

- locating well pads over areas with existing disturbances;
- netting the cuttings pit between drilling and reclamation;
- removing any oil found in pits and ponds;
- installing covers under drip buckets and spigots; and
- conducting interim reclamation of at least half the disturbed area.

Reclamation would begin without delay if a well is determined to be unproductive, or upon completion of commercial production. Any wildlife species inhabiting the project area are likely to adapt to changing conditions and continue to persist without adverse impacts.

### **3.8 CULTURAL RESOURCES**

Historic properties, or cultural resources, on federal or tribal lands are protected by many laws, regulations, and agreements. Section 106 of the National Historic Preservation Act of 1966 (16 USC 470 et seq.) requires, for any federal, federally assisted, or federally licensed undertaking, that the federal agency take into account the effect of that undertaking on any district, site, building, structure, or object that is included in the National Register of Historic Places (National Register) before the expenditure of any federal funds or the issuance of any federal license. Cultural resources is a broad term encompassing sites, objects, or practices of archaeological, historical, cultural, and religious significance. Eligibility criteria (36 CFR 60.6) include association with important events or people in our history, distinctive construction or artistic characteristics, and either a record of yielding or a potential to yield information important in prehistory or history. In practice, properties are generally not eligible for listing on the National Register if they lack diagnostic artifacts, subsurface remains, or structural features, but those considered eligible are treated as though they were listed on the National Register, even when no formal nomination has been filed. This process of taking into account an undertaking's effect on historic properties is known as "Section 106 review," or more commonly as a cultural resource inventory.

The area of potential effect of any federal undertaking must also be evaluated for significance to Native Americans from a cultural and religious standpoint. Sites and practices may be eligible for protection under the American Indian Religious Freedom Act of 1978 (42 USC 1996). Sacred sites may be identified by a tribe or an authoritative individual (Executive Order 13007). Special protections are afforded to human remains, funerary objects, and objects of cultural patrimony under the Native American Graves Protection and Repatriation Act (25 USC 3001 et seq.).

Whatever the nature of the cultural resource addressed by a particular statute or tradition, implementing procedures invariably include consultation requirements at various stages of a federal undertaking. The MHA Nation has designated a THPO by Tribal Council resolution, whose office and functions are certified by the National Park Service. The THPO operates with the same authority exercised in most of the rest of North Dakota by the State Historic Preservation Officer. Thus, BIA consults and corresponds with the THPO regarding cultural resources on all projects proposed within the exterior boundaries of the Reservation.

#### **3.8.1 Cultural Resource Inventories**

Cultural resource inventories of these well pads and access roads were conducted by personnel of SWCA, using an intensive pedestrian methodology, on May 24 and July 14, 2011. The Class III inventory, located in Sections 20, 21, and 29 of Township 149 North, Range 93 West, included four block inventories of the parcels surrounding the proposed wells and a 200-foot-wide, 10,567-foot-long survey corridor buffering the proposed access road that will connect the well pads. Disturbance associated with the well pads and access road

construction will include mechanical excavation, grading, and gravelling. The block survey area for the Arnica/Chokecherry well pad was 17.6 acres, the Morgan/Arabian well pad was 24.8 acres, the Pinto/Mustang well pad was 23.6 acres, and the Wormwood/Bluestem well pad was 16.2 acres. The total acreage surveyed for the project includes 82.2 acres for the four proposed well pads and 48.5 non-overlapping acres for the proposed access road. In total, 130.7 acres were inventoried for the project.

During the inventory, SWCA newly identified and recorded one prehistoric site and one historic isolated find. The prehistoric site is a lithic scatter site and was left unevaluated for listing on the National Register of Historic Places (NRHP), pending further testing under Criterion D. The isolated find is a piece of historic farm equipment and is considered not eligible for the NRHP. Given the distance of the site from the proposed ground disturbance, the prehistoric site has been adequately avoided and will not be adversely affected. The BIA recommends that a determination of *No Historic Properties Affected* be granted for the project to proceed as planned (Johnson 2011). This determination was communicated to the THPO on August 25, 2011; however, the THPO did not respond within the allotted 30 day comment period

### **3.8.2 Potential Impacts to Cultural Resources**

No historic properties were located that appear to possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, BIA reached a determination of no historic properties affected for these undertakings. This determination was communicated to the THPO on August 25, 2011.

If cultural resources are discovered during construction or operation, the operator shall immediately stop work, secure the affected site, and notify the BIA and the THPO. Unexpected or inadvertent discoveries of cultural resources or human remains trigger mandatory federal procedures that include work stoppage and BIA consultation with all appropriate parties. Following any such discovery, operations would not resume without written authorization from the BIA. Project personnel are prohibited from collecting any artifacts or disturbing cultural resources in the area under any circumstance. Individuals outside the ROW are trespassing. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required. The presence of qualified cultural resource monitors during construction activities is encouraged.

## **3.9 TRANSPORTATION**

### **3.9.1 Federal and North Dakota State Transportation Links**

Transportation in the project area is predominantly by automobiles and trucks on roads. The transportation study area includes all highways and roads that traverse the Reservation, as well as those providing access to tribal lands. Major federal highways surrounding the project area include U.S. Highway 2, which is an east/west route to the north of the Reservation; U.S. Highway 83, a north/south route to the east of the Reservation; and U.S. Highway 85, a north/south route to the west of the project area. Interstate highways south of the project area provide access to Bismarck and other interstate transportation links. Federal highways outside



of the Reservation boundaries are built and maintained through the Federal Highway Administration (FHWA) and North Dakota Department of Transportation (NDDOT) funding and guidelines.

The Reservation is bisected by North Dakota state and county roads, which link the area with the goods, services, and markets in North Dakota and beyond, as shown in Figure 3.11. State Highway 22 traverses the Reservation from north to south, passing west of Mandaree. State Highway 23 is an east/west route passing through New Town, North Dakota. State Highway 200 is an east/west route traversing the area south of the Little Missouri River. And State Highway 73 provides access to the Reservation from the west, in the area south of Lake Sakakawea, while State Highway 1804 intersects with Highway 23 near New Town, providing access from the north. County Roads 1, 4, 6, 8, and 53 also occur within the Reservation boundaries.

State Highway 22 provides the primary transportation link to the project area, which lies approximately 20 miles east of the intersection of Highway 22 and BIA Road 12, west of Mandaree. In addition to providing access to the town of Mandaree, Highway 22 is designated by North Dakota Parks and Recreation as part of the Kildeer Mountain-Four Bears Scenic Byway, known for its scenic, cultural, and historical importance to North Dakota (North Dakota Parks and Recreation 2011a). The North Dakota Scenic Byways and Backways Program encourages all development projects within the immediate and distant viewshed of Highway 22 to conserve the visual and aesthetic quality of the area (North Dakota Parks and Recreation 2011b).

### **3.9.2 Indian Reservation Roads Program**

Approximately 2,733.5 miles of roads within the Reservation are under the jurisdiction of the BIA Indian Reservation Roads (IRR) Program (IRR 2009, 2011). These Reservation IRR roads provide access to all areas of the Reservation with paved all-weather roads, as well as numerous non-paved improved roads that serve as access to energy exploration and development and other activities surrounding the project area (IRR 2011). Figure 3.11 provides an overview of these primary and secondary BIA roads, but does not attempt to show the many primitive roads or well pad and pipeline access roads that occur on the Reservation.

The BIA and the MHA Nation retain planning and maintenance responsibility over this roadway system on the Reservation through the IRR Program of the Federal Lands Highway Office of the FHWA. The IRR Program addresses transportation needs of tribes by providing funds for planning, design, construction, and maintenance activities. The program is jointly administered by the Federal Lands Highway Office and the BIA. The IRRs are all public roads which provide access to and within Indian reservations, Indian trust land, restricted Indian land, and Alaska native villages. IRR funds can be used for any type Title 23 transportation project providing access to or within federal or Indian lands and may be used for the state/local matching share for apportioned Federal-aid Highway Funds (FHWA 2010).

The most recent IRR inventory for the Reservation roads was conducted in 2006. A summary of the available data is included in Table 3.10. The 2006 inventory shows that the Reservation

is bisected by approximately 6,600 road segments ranging in length from 0.01 mile to 15.00 miles. Approximately 284.63 miles of BIA roads consist of paved surface types, and 671 miles consist of improved gravel roads. The remaining roads are primitive or other unimproved road types.

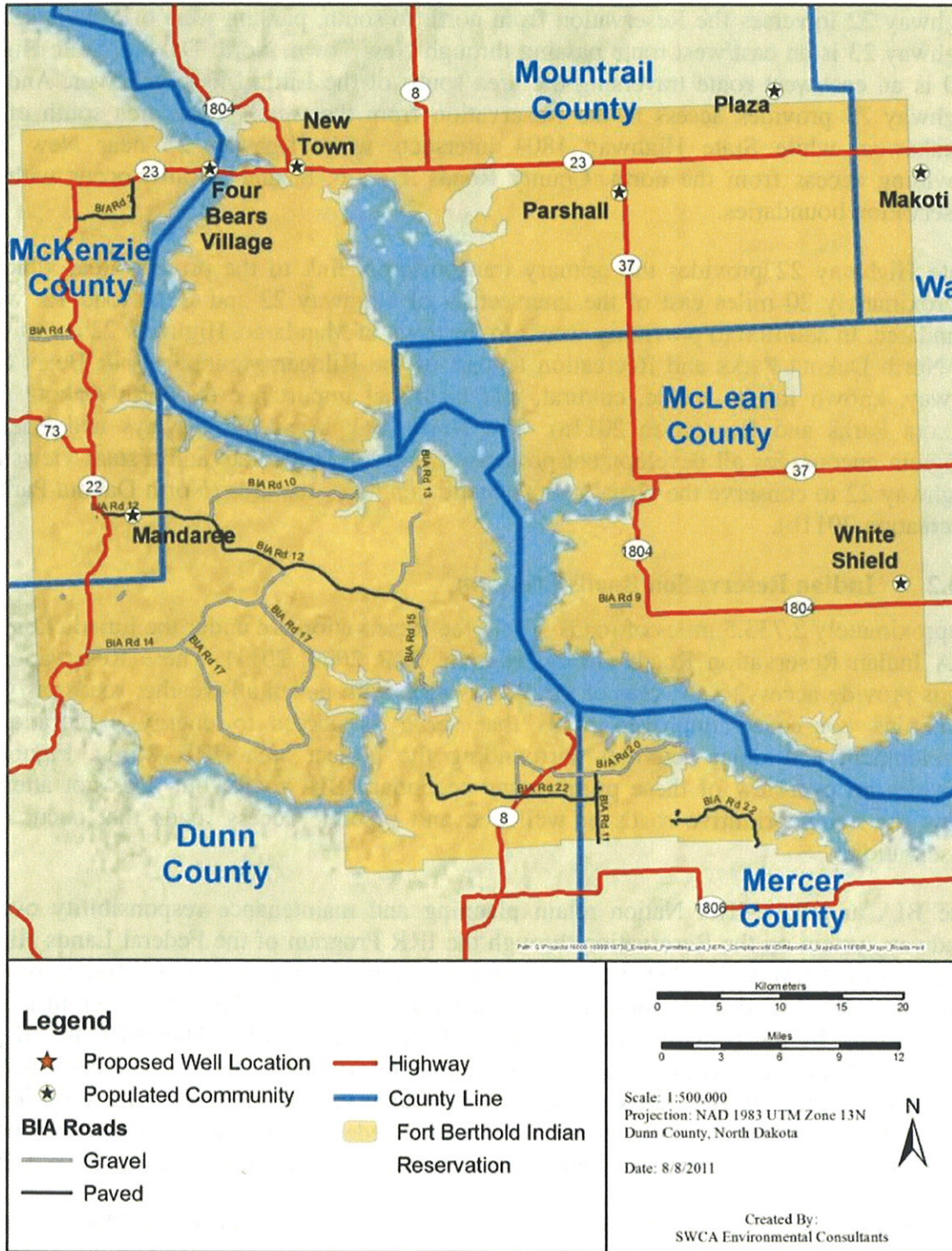


Figure 3.11. Fort Berthold Indian Reservation major roads and highways.

### 3.9.3 Trends in Reservation Vehicular Traffic Volume

Table 3.10 provides summary information for 15 BIA road segments for which average daily traffic (ADT) measurements have been recorded since 1990. Some additional road segments had ADT data prior to 1990, but most likely would not reflect current conditions. Since the IRR data only provide the most recent ADT, it is not possible to determine if ADT is increasing on BIA roads.

**Table 3.10. Summary of BIA Roads with ADT Data since 1990.**

Road Name	IRR Class	Surface Type	Section Length (miles)	Road Width (feet)	ADT	% Trucks	ADT Year
BIA 1	Rural, local traffic	Gravel	3.8	25 & 26	150	15	1994
BIA 1	Rural, local traffic	Paved >2 inches thick	6.1	24	839	2	2006
BIA 1	Rural, major collector	Paved >2 inches thick	1.0	24 & 30	839	2	2006
BIA 2	Rural, major collector	Paved >2 inches thick	4.9	20	656	2	2006
BIA 6	Rural, local traffic	Paved >2 inches thick	11.2	24	139	2	2006
BIA 10	Rural, local traffic	Gravel	5.7	20	102	2	2006
BIA 12	Rural, major collector	Paved >2 inches thick	1.2	24	944	2	2006
BIA 12	Rural, major collector	Paved >2 inches thick	18.4	24	398	2	2006
BIA Route 1	Rural, local traffic	Gravel	6.5	24	100	5	2000
BIA 14	Rural, major collector	Gravel	12.3	22	198	2	2006
BIA 18	Rural, major collector	Paved <2 inches thick	8.8	30	114	2	2006
BIA 18	Rural, major collector	Paved >2 inches thick	3.0	28	114	2	2006
BIA 22	Rural, major collector	Paved >2 inches thick	2.8	28	757	2	2006
BIA 22	Rural, major collector	Paved >2 inches thick	0.2	27	504	2	2006
BIA 27	Rural, local traffic	Gravel	3.7	20	137	2	2006

Source: Indian Reservation Roads 2011.

ADT = average daily traffic

BIA = Bureau of Indian Affairs

IRR = Indian Reservation Road

Table 3.11 provides ADT recorded at traffic counter stations along eight NDDOT highway segments within the Reservation for years in which such data were recorded between 2005 through 2010. No data were recorded within the Reservation by NDDOT during 2007. Traffic volumes vary greatly along the various NDDOT highways that pass through the Reservation. Some primary highways show consistent increases each year and have experienced significant increases in ADT and in truck ADT since 2005, as shown in Table 3.11. Significant increases ranging from more than 73% to 700% in passenger vehicle traffic volume were experienced on State Highways 22, 23, 73, and 8. The same highways experienced significant increases in truck traffic volumes ranging from 344% to 2,500% over the same period, indicating that industrial activity, most likely the increased activity of oil and gas drilling, has had a significant effect on traffic within the Reservation. Some NDDOT highways, however, had limited data available and failed to show clear trends for traffic increase, or even showed a decrease in ADT for the period.

### **3.9.4 Trends in Traffic Safety on the Reservation**

Traffic accident data were not available for BIA roads. Accident data were obtained for seven NDDOT highway sections on the Reservation from January 2008 through May 2011, as shown in Table 3.12. NDDOT statistics suggest that traffic accidents have increased on the approximately 141.6 miles of state roads within the boundaries of the Reservation over the past 41 months since the beginning of 2008. In addition to trends in overall accidents and accidents involving fatalities or injuries on state highways, the incidence of accidents or injuries involving truck-tractors and 2- or 3-axle trucks were evaluated as indicators of safety issues from increased oil and gas activity within the Reservation.

The monthly average was determined for each measure and the percentage departure from the monthly average was calculated to assess the overall yearly relationship to the 41-month average. In general, 2008 and 2009 showed below average accident rates, injuries and fatalities, truck accidents, and truck accidents involving injuries compared with the 41-month average, while 2010 and the five-month period of 2011 showed above average accident and injury rates, as summarized in Table 3.12. State Highways 23, 73, and 8 each experienced increased ADT and truck ADT, and also experienced above average crashes and truck-involved traffic accidents. State Highway 22 was an exception, since traffic volumes increased significantly but no corresponding increase in crashes occurred. State Highway 37 was also an exception to increased traffic contributing to increased crashes, since this highway segment saw a decrease in ADT and truck ADT, but experienced above average crashes and truck-involved crashes during 2010 and 2011.

The data suggest that a combination of overall increased passenger traffic and increased truck traffic may be contributing to above average accidents in recent years; however, it will take several additional years of data collection to establish a clear connection, and poor road repair condition, weather, and driver error may contribute to accidents as much as traffic volume.

Table 3.11. Changes in Average Daily Traffic along NDDOT Highways within the Reservation, 2005–2010.

NDDOT Highway	Segment	2005		2006		2008		2009		2010		% Change in Traffic	
		ADT	Truck ADT	ADT	Truck ADT	ADT	Truck ADT	ADT	Truck ADT	ADT	Truck ADT	ADT	Truck ADT
ND 22	RP 126.5-156.05	NA	NA	635	60	NA	NA	1330	305	2130	680	235.4	1033.3
	South Reservation boundary north to ND 23 (29.55 miles)												traffic increases
ND 23	RP 35.6-80.6	2200	180	NA	NA	2450	375	2970	560	3810	800	73.2	344.4
	Reservation west boundary to east boundary (45.0 miles)												traffic increases
ND 37	RP 0.0-30.0	715	175	NA	NA	631	85	NA	NA	NA	NA	-11.7	-51.4
	ND 23 south and Reservation east boundary (30.0 miles)												Decreased traffic based on 2008 data
ND 73	RP 7.3-11.32	NA	NA	200	30	NA	NA	680	140	1605	780	702.5	2500.0
	Reservation boundary to ND 22 (4.02 miles)												traffic increases
ND 1804	RP 247.145-248.6	1625	205	NA	NA	1355	300	NA	NA	NA	NA	-16.6	46.3
	Reservation west and north boundaries to ND 37 (1.455 miles)												Mixed result based on 2008 data
ND 1804	RP 192.1-213.688	NA	NA	235	70	NA	NA	245	35	NA	NA	4.3	-50.0
	ND 23 (New Town) to Reservation north boundary (21.588 miles)												Mixed result based on 2009 data
ND 8	RP 123.7-132.12	NA	NA	125	15	NA	NA	170	20	NA	NA	36.0	33.3
	Reservation boundary north to Lake Sakakawea (8.42 miles)												traffic increases
ND 8	RP 132.121-133.7	640	110	NA	NA	1440	490	1870	700	2245	1000	250.8	809.1
	ND 23 north to Reservation boundary (1.58 miles)												traffic increases

Source: North Dakota Department of Transportation 2011.

ADT = average daily traffic

NA = not applicable





Table 3.12. 41-month Safety Trends on NDDOT Roads within the Reservation.

State Highway No. and Segments		41-month Totals		2008		2009		2010		2011 (Jan-May)	
		Crashes	Average	Crashes	Change from Average (%)	Crashes	Change from Average (%)	Crashes	Change from Average (%)	Crashes	Change from Average (%)
<b>ND 22</b>	Total	34	0.83	8	-19.61	6	-39.71	16	60.78	4	-3.53
RP 126.5 to 156.05 (29.55 miles)	Truck involved	9	0.22	2	-24.07	1	-62.04	5	89.81	1	-8.89
	Fatality or Injury	13	0.32	4	5.13	4	5.13	4	5.13	1	-36.92
	Truck & injury	4	0.10	1	-14.58	1	-14.58	2	70.83	0	-100.00
Year Performance				Below Average		Below Average		Above Average		Below Average	
<b>ND 23</b>	Total	117	2.85	32	-6.55	27	-21.15	37	8.05	21	47.18
RP 35.6to 80.6 (45 miles)	Truck involved	28	0.68	5	-38.99	3	-63.39	15	83.04	5	46.43
	Fatality or Injury	41	1.00	13	8.33	13	8.33	12	0.00	3	-40.00
	Truck & injury	11	0.27	2	-37.88	3	-6.82	4	24.24	2	49.09
Year Performance				Below Average		Below Average		Above Average		Above Average	
<b>ND 37</b>	Total	22	0.54	4	-37.88	6	-6.82	8	24.24	4	49.09
RP 0.0 to 30.0 (30 miles)	Truck involved	12	0.29	1	-71.53	2	-43.06	5	42.36	4	173.33
	Fatality or Injury	8	0.20	1	-57.29	2	-14.58	0	-100.00	4	310.00
	Truck & injury	7	0.17	1	-51.19	1	-51.19	2	-2.38	3	251.43
Year Performance				Below Average		Below Average		Below Average		Above Average	
<b>ND 73</b>	Total	6	0.15	0	-100.00	2	13.89	3	70.83	1	36.67
RP 7.3 to 11.32	Truck involved	1	0.02	0	-100.00	1	241.67	0	-100.00	0	-100.00
	Fatality or Injury	2	0.05	0	-100.00	1	70.83	0	-100.00	1	310.00
	Truck & injury	0	na	0	na	0	na	0	na	0	na
Year Performance				Below Average		Above Average		Below Average		Above Average	
<b>ND 1804</b>	Total	13	0.32	6	57.69	2	-47.44	3	-21.15	2	26.15
2 segments (RP 247.145 to 248.6; and 192.1 to 213.688)	Truck involved	1	0.02	0	-100.00	0	-100.00	1	241.67	0	-100.00
	Fatality or Injury	7	0.17	4	95.24	2	-2.38	1	-51.19	0	-100.00
	Truck & injury	1	0.02	0	-100.00	0	-100.00	1	241.67	0	-100.00
Year Performance				Below Average		Below Average		Above Average		Below Average	
<b>ND 8</b>	Total	10	0.24	0	-100.00	3	2.50	4	36.67	3	146.00
2 segments (RP 123.7 to 132.120; 132.121 to 133.7 )	Truck involved	5	0.12	0	-100.00	0	-100.00	2	36.67	2	228.00
	Fatality or Injury	2	0.05	0	-100.00	0	-100.00	2	241.67	0	-100.00
	Truck & injury	1	0.02	0	-100.00	0	-100.00	0	-100.00	1	720.00
Year Performance				Below Average		Below Average		Above Average		Above Average	
<b>All Reservation NDDOT Roads</b>	All Crashes	202	4.93	50	-15.43	46	-22.19	71	20.09	35	42.08
	Truck involved	56	1.37	8	-51.19	7	-57.29	28	70.83	12	75.71
	Fatality or Injury	73	1.78	22	2.97	22	2.97	19	-11.07	9	1.10
	Truck & injury	19	0.46	4	-28.07	5	-10.09	9	61.84	6	158.95
All NDDOT Roads Year Compared to Average				Below Average		Below Average		Above Average		Above Average	

Source: North Dakota Department of Transportation 2011.

### **3.9.5 Potential Impacts to Transportation**

Transportation impacts could include any adverse visual changes to the near and distant viewshed of Kildeer Mountain-Four Bear Scenic Byway (State Highway 22), increased traffic volumes on primary and secondary highways, and resource and collector roads; an increased need for maintenance of existing roadways; or an increase in two-track and off-road vehicle travel. The NDDOT vehicle crash data for the Reservation does not indicate that there would necessarily be an increase in vehicle accidents and livestock/wildlife-vehicle collisions correlated with a temporary increase in ADT due to project activities. However, road surface condition and construction need could be greatly affected by the addition of many heavy loads associated with well drilling, dirt moving, and fracing activities.

Neither of the four proposed well pads nor the radio towers on the pads would be visible from State Highway 22. Therefore these facilities would not result in any long-term adverse effects on the viewshed of the Kildeer Mountain-Four Bear Scenic Byway.

Potential short-term impacts from added traffic could occur. Overall, approximately five months of continuous construction is anticipated to complete all components of the Proposed Action. Drilling and construction of many of the components and facilities would take place concurrently. As many as 35 construction workers may be accessing the sites during certain periods of intensive construction. Following construction, wells and pipelines would receive regularly scheduled inspection and maintenance, but would not require a regular workforce. The Project could, therefore, result in minimal increases in traffic on State Highway 22 at the intersection with BIA Road 12. These increases would be temporary and would not affect the visual quality of the scenic byway or the functionality of either State Highway 22 or the intersection.

Traffic increases from development of eight proposed new wells in the area would cause a short-term increase in traffic and movement of heavy equipment converging on BIA roads in Section 20 for a short duration of time, resulting in direct and indirect impacts to BIA roads, especially to gravel roads or any unpaved roads in the form of additional new wear and tear and inconvenience to local rural residents, and possible roadbed deterioration and repairs.

The proposed project would add new traffic volume to the town of Mandaree and to BIA Road 12 (paved), and thence onto new access roads constructed by Enerplus. Additional traffic on BIA Road 12 through Mandaree would include approximately 2,000 heavy truckloads over the five-month construction period to transport drill rigs, pipe, steel, equipment, building materials, and other miscellaneous construction materials on federal, state, and BIA roads. This would result in an average of 13 heavy truck round trips per day. It would also require approximately 15 to 20 round trips per day over the five-month construction period. This impact to transportation would be short term, local, and moderate on the two gravel roads (BIA Roads 14 and 17) that would be used to access the well pads. Impacts to roads are being minimized by the development and implementation of management and maintenance agreements between operators, agencies, and the TAT (see section 3.13.2.5). These efforts will address past activities and continue to minimize and mitigate potential future activities.

### 3.10 PUBLIC HEALTH AND SAFETY

The Proposed Action would occur in a rural area with a total of 13 residences located within 1 mile of the proposed well pad located in the SE¼ NE¼ of Section 20, but only two residences located within 1 mile of the well pad in the N½ NW¼ of Section 29 (Table 3.13). The nearest home would be 0.52 mile from any proposed well.

**Table 3.13. Distance and Direction from Proposed Multi-well Pads to Nearest Home.**

<b>Proposed Well Pad, and Nearest Well</b>	<b>Distance to Nearest Home (miles)</b>	<b>Direction to Nearest Home</b>
N½ NW¼ of Section 29: Morgan-Arabian	0.76	North
N½ NE¼ of Section 29: Pinto-Mustang	0.72	Southeast
NW¼ SW¼ of Section 21: Wormwood-Bluestem	0.66	Southeast
SE¼ NE¼ of Section 20: Arnica-Chokecherry	0.52	West

Health and safety concerns include sour gas that could be released as a result of drilling activities; hazards introduced by heavy truck traffic; and hazardous materials used or generated during construction, drilling, and/or production activities.

H<sub>2</sub>S is extremely toxic in concentrations above 500 ppm, but it has not been found in measurable quantities in the Bakken Formation. Before reaching the Bakken, however, drilling would penetrate the Mission Canyon Formation, which is known to contain varying concentrations of H<sub>2</sub>S. Contingency plans submitted to the BLM comply fully with relevant portions of Onshore Oil and Gas Order No. 6 to minimize potential for gas leaks during drilling. Emergency response plans protect both the drilling crew and the general public within 1 mile of a well; precautions include automated sampling and monitoring by drilling personnel stationed at each well site.

Standard mitigation measures would be applied, and because release of H<sub>2</sub>S at dangerous concentration levels is very unlikely, no direct impacts from H<sub>2</sub>S are anticipated with implementation of the project.

Tanker trips would depend on production, but Enerplus estimates approximately two trucks per day during the initial production period. Trucks for normal production operations would use the existing and proposed access roads. Produced water would be transported to an approved disposal site. All traffic would be confined to approved routes and conform to established load restrictions and speed limits for state and BIA roadways and haul permits would be acquired as appropriate.

The EPA specifies chemical reporting requirements under Title III of the Superfund Amendments and Reauthorization Act (SARA), as amended. No chemicals subject to reporting under SARA Title III (hazardous materials) in an amount greater than 10,000

pounds would be used, produced, stored, transported, or disposed of annually in association with the Proposed Action. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities would be used, produced, stored, transported, or disposed of in association with the Proposed Action. All operations, including flaring, would conform to instructions from BIA fire management staff.

A temporary, lined cuttings pit would be constructed within the disturbed area of each well pad and constructed so as not to leak, break, or allow discharge and in a way that minimizes the accumulation of precipitation runoff into the pit.

Spills of oil, produced water, or other produced fluids would be cleaned up and disposed of in accordance with appropriate regulations. Sewage would be contained in a portable chemical toilet during drilling. All trash would be stored in a trash cage and hauled to an appropriate landfill during and after drilling and completion operations.

### **3.10.1 Potential Impacts to Public Health and Safety**

With the implementation of the described reporting and management of hazardous materials, no adverse impacts to public health and safety are anticipated as a result of the proposed new wells. Other potential adverse impacts to any nearby residents from construction would be largely temporary. Noise, fugitive dust, and traffic hazards would be present for about 150 days during construction, drilling, and well completion as equipment and vehicles move on and off the site, and then diminish sharply during production operations. If a well proved productive, one small pumper truck would visit the well once a day to check the pump. Bakken wells typically produce both oil and water at a high rate initially. Gas would be flared initially and intermittently, while oil and produced water would be stored on the well pad in tanks and then hauled out by tankers until the well could be connected to gathering pipelines. Up to four 400-barrel oil tanks and one 400-barrel water tank would be located on the pad inside a berm of impervious compacted subsoil. The berm would be designed to hold 110% of the capacity of the largest tank plus one day's production.

## **3.11 SOCIOECONOMICS**

This section discusses community characteristics such as population, housing, demographics, employment, and economic trends within the Analysis Area. Also included are data relating to the State of North Dakota and the United States, which provide a comparative discussion when compared to the Analysis Area. Information in this section was obtained from various sources including, but not limited to, the U.S. Census Bureau, the U.S. Bureau of Economics, and the North Dakota State Government.

### **3.11.1 Socioeconomic Analysis Area**

The scope of analysis for social and economic resources includes a discussion of current social and economic data relevant to the project area and surrounding communities of the Reservation and McKenzie, Dunn, McLean, and Mountrail counties, North Dakota. These counties were chosen for analysis because their proximity to the proposed well locations and overlap with the Reservation could result in socioeconomic impacts. These communities are collectively referred to as the Analysis Area.

### 3.11.2 Population and Demographic Trends

Historic and current population counts for the Analysis Area, compared to the state, are provided below in Table 3.14. The state population showed little change between the previous two census counts (1990–2000), however in 2010 the state population increased by 4.7% to 672,594 (U.S. Census Bureau 2011a). Populations in McKenzie and Mountrail counties have increased slightly from 2000 to 2009 while McLean and Dunn counties had a rate of decline of -10.8% and -6.5%, respectively (U.S. Census Bureau 2011b). These declines can be attributed to more people moving to metropolitan areas, which are perceived as offering more opportunities for growth. However, population on or near the Reservation has increased approximately 13.3% from 2000 to 2005 (BIA 2005). While Native Americans are the predominant group on the Reservation, they are considered the minority in all other areas of North Dakota.

As presented in Table 3.14, population growth on the Reservation (13.3%) exceeds the overall growth in the state of North Dakota (4.7%) and four counties in the Analysis Area. This trend in population growth for the Reservation is expected to continue in the next few years (Fort Berthold Housing Authority 2008).

**Table 3.14. Population and Demographics.**

County or Reservation	Population in 2009	% of State Population	% Change Between 1990–2000	% Change Between 2000–2009	Predominant Group in 2009 (%)	Predominant Minority in 2009 (Percent of Total Minority Population)
Dunn	3,365	0.5	-10.1	-6.5	Caucasian (85.3%)	American Indian (13.6%)
McKenzie	5,799	0.9	-10.1	1.1	Caucasian (76.7%)	American Indian (21.5%)
McLean	8,310	1.3	-11.0	-10.8	Caucasian (91.2%)	American Indian (7.1%)
Mountrail	6,791	1.0	-5.6	2.4	Caucasian (62.7%)	American Indian (35.1%)
On or near Fort Berthold Indian Reservation <sup>1</sup>	11,897	1.8	178.0 <sup>2</sup>	+13.3 <sup>3</sup>	American Indian	Caucasian (~27%)
Statewide	672,594 <sup>4</sup>	100	0.5	4.7 <sup>4</sup>	Caucasian (91.1)	American Indian (5.6%)

Source: U.S. Census Bureau 2011b.

<sup>1</sup> Population shown reflects the total enrollment in the tribe in 2005. 2008 data unavailable. All information related to the Reservation reflects 2005 data, including state population. 11,897 reflects tribal enrollment on or near the Reservation. According to the BIA, near the Reservation includes those areas or communities adjacent or contiguous to the Reservation (BIA 2005).

<sup>2</sup> Reflects percent change between 1991 and 2001 (BIA 2001).

<sup>3</sup> Reflects percent change between 2001 and 2005.

<sup>4</sup> Reflects population levels in 2010 (U.S. Census Bureau 2011a).



### 3.11.3 Employment

The economy in the state of North Dakota, including the Reservation and four counties in the Analysis Area, has historically depended on agriculture, including grazing and farming. However, 2010 economic data indicate that the major employers in North Dakota include government and government enterprises, which employed 16.6%; health care and social assistance, which employed 11.9%; and retail trade, which employed at 10.8% of the state's labor force (U.S. Bureau of Economic Analysis 2011a). Energy development and extraction, power generation, and services related to these activities have become increasingly important over the last several years and many service sector jobs are directly and indirectly associated with oil and gas development.

In 2010, total employment in the state of North Dakota was approximately 355,000 (Table 3.15). The average weekly wage for all employees on private nonfarm payrolls was \$697 in North Dakota. All counties in the Analysis Area, and the entire state of North Dakota, showed average weekly wages that were higher than the state and national average in 2010 (Table 3.15).

In 2010, the statewide unemployment rate was 3.8% of the workforce (Table 3.15). This is the lowest unemployment rate in the nation (Bureau of Labor Statistics 2011a). While some counties in the Analysis Area experienced a slight increase in unemployment, others were unchanged or experienced a decreased unemployment since 2005 (Table 3.15).

**Table 3.15. 2010 Total Employment, Average Weekly Wages, and Unemployment Rates.**

Location	Total Employment	Average Weekly Wage	Unemployment Rate	Change in Unemployment Rate (2005–2010)
United States	139,909,000	\$781	9.4%	+4.3%
North Dakota	355,000	\$697	3.8%	+0.4%
Dunn County	1,684	\$829	3.3%	-0.1%
McKenzie County	2,625	\$1,006	2.6%	-1.1%
McLean County	2,674	\$820	3.8%	-1.2%
Mountrail County	4,713	\$947	2.4%	-3.6%
On or near Fort Berthold Indian Reservation*	1,287	N/A	71%	N/A

Sources: Bureau of Labor Statistics 2011a, 2011b; U.S. Department of Agriculture 2011; BIA 2005.

\* Represents 2005 data only.

According to the 2005 American Indian Population and Labor Force Report, of the 8,773 tribal members that were eligible for BIA-funded services, 4,381 constituted the total available workforce. Approximately 29%, or 1,287 members, were employed in 2005, indicating a 71% unemployment rate (as a percent of the labor force) for members living on or near the Reservation; 55% of the employed members were living below poverty guidelines. Compared to the 2001 report, 2005 statistics reflect a 6.2% increase in the number of tribal members employed living on or near the Reservation, but unemployment (as a percent of the

labor force) has stayed steady at 71% and the percentage of employed people living below the poverty guidelines has increased to 55% (BIA 2005).

Although detailed employment information for the Reservation is not provided by the U.S. Bureau of Economics or the State of North Dakota, residents of the Reservation are employed in similar ventures as those outside the Reservation. Typical employment includes ranching, farming, tribal government, tribal enterprises, schools, federal agencies, and recently, employment related to conventional energy development. The MHA Nation's Four Bears Casino and Lodge, located 4 miles west of New Town, employs approximately 320 people, of which 90% are tribal members (Fort Berthold Housing Authority 2008).

The Fort Berthold Community College, which is tribally chartered to meet the higher education needs of the people of the MHA Nation, had 11 full-time members and 25 adjunct members in academic year 2006–2007. Approximately 73% of the full-time faculty members are of American Indian/Alaska Native descent, approximately 88% of which are enrolled members of the MHA Nation. Additionally, 65% of the part-time faculty members are of American Indian/Alaska Native descent and all (100%) are tribal members.

#### **3.11.4 Income**

Per capita income is often used as a measure of economic performance, but it should be used with changes in earnings for a realistic picture of economic health. Since total personal income includes income from 401(k) plans and other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise even if the average wage per job declines over time. The North American Industry Classification System is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. Per capita income, median household income, and poverty rates for the Analysis Area and North Dakota are presented in Table 3.16.

**Table 3.16. Income and Poverty in Analysis Area, 2008.**

<b>Unit of Analysis</b>	<b>Per Capita Income (2000)</b>	<b>Per Capita Income<sup>1</sup> (2008)</b>	<b>Median Household Income<sup>3</sup> (2009)</b>	<b>Percent of all People in Poverty<sup>3</sup> (2009)</b>
Dunn County	\$21,031	\$29,558	\$44,681	11.2%
McKenzie County	\$22,269	\$36,862	\$49,465	12.8%
McLean County	\$23,125	\$42,466	\$49,212	10.3%
Mountrail County	\$23,045	\$34,590	\$49,884	12.4%
Fort Berthold Indian Reservation <sup>4</sup>	\$8,855	\$10,291 <sup>4</sup>	\$26,977 <sup>4</sup>	N/A
North Dakota	\$25,624	\$39,874	\$47,898	11.7%

<sup>1</sup> U.S. Bureau of Economic Analysis 2011a, 2011b.

<sup>2</sup> U.S. Department of Agriculture 2011.

<sup>3</sup> U.S. Census Bureau 2009a.

<sup>4</sup> Population shown reflects the total enrollment in the tribe in 2005. 2008 data unavailable. All information related to the Reservation reflects 2005 data, including state population (BIA 2005).

From 2000 to 2008, per capita income increased by 28.8% for Dunn County, 39.6% for McKenzie County, 45.5% for McLean County, and 33.4% for Mountrail County. These figures compare to a 35.7% increase for the State of North Dakota per capita personal income (U.S. Bureau of Economic Analysis 2009).

According to a 2008 report published by the Fort Berthold Housing Authority, the average per capita income for the Reservation was \$8,855 in 1999, compared to \$25,624 for the state and the national average of \$21,587 at that time (Fort Berthold Housing Authority 2008). The median household income on the Reservation was \$26,977, compared to the national median \$41,994.

With the exception of McLean County, counties that overlap the Reservation tend to have per capita incomes below the North Dakota state average. In addition, Dunn County and the Reservation have median household incomes below the North Dakota state average. As presented in Table 3.15, Dunn, McKenzie, and Mountrail counties have unemployment levels below the state average of 3.8%. Subsequently, Reservation residents and MHA Nation members tend to have per capita incomes and median household incomes below the averages of the encompassing counties, as well as statewide and higher unemployment.

### 3.11.5 Housing

Workforce-related housing can be a key issue associated with development. Historical information on housing in the four counties in the Analysis Area was obtained from the U.S. Census Bureau, 2000 Census, with 2009 updates (U.S. Census Bureau 2011c). Because the status of the housing market and housing availability changes often, current housing situations can be difficult to characterize quantitatively. Therefore, this section discusses the historical housing market. Table 3.17 provides housing unit supply estimates in the Analysis Area, including the Reservation and four overlapping counties.

**Table 3.17. Housing Development Data for the Reservation and Encompassing Counties.**

Region	Total Housing Units						% Change 2000–2009
	Occupied	Owner Occupied	Renter Occupied	Vacant	Total	Total	
	2000	2000	2000	2000	2000	2009	
Dunn	1,378	1,102	276	587	1,965	1,985	+1.0
McKenzie	2,151	1,589	562	568	2,719	2,801	+2.9
McLean	3,815	3,135	680	1,449	5,264	5,461	+3.6
Mountrail	2,560	1,859	701	878	3,438	3,607	+4.7
Reservation	1,908	1,122	786	973	2,881	N/A	N/A
North Dakota	257,152	171,299	85,853	32,525	289,677	316,435	+8.5

Source: U.S. Census Bureau 2011c.

The Fort Berthold Housing Authority manages a majority of the housing units within the Reservation. Housing typically consists of mutual-help homes built through various government programs, low-rent housing units, and scattered-site homes. Housing for government employees is limited, with a few quarters in Mandaree and White Shield

available to Indian Health Service employees in the Four Bears Community and to BIA employees. Private purchase and rental housing are available in New Town. New housing construction has recently increased within much of the Analysis Area, but availability remains low.

Availability and affordability of housing could impact oil and gas development and operations. The number of owner-occupied housing units (1,122) within the Reservation is approximately 58% lower than the average number of owner-occupied housing units found in the four overlapping counties (1,921).

In addition to the relatively low percent change of the total housing units compared to the state average, these four counties are ranked extremely low for both the state and national housing starts and have minimal new housing building permits, as presented in Table 3.18.

**Table 3.18. Housing Development Data for the Encompassing Counties, 2000–2008.**

Housing Development	North Dakota County			
	Dunn	McKenzie	McLean	Mountrail
New private housing building permits 2003–2008	14	14	182	110
Housing starts / state rank	51 / 53	15 / 53	21 / 53	17 / 53
Housing starts / national rank	3,112 / 3,141	2,498 / 3,141	2,691 / 3,141	2,559 / 3,141

Source: U.S. Census Bureau 2009b, 2009c.

### **3.11.6 Potential Impacts to Area Socioeconomics**

Impacts to socioeconomic resources of the Analysis Area would be minimal and therefore would not adversely impact the local area. Short-term impacts to socioeconomic resources would generally occur during the construction/drilling and completion phase of the proposed wells. Long-term effects would occur during the production phase, should the wells prove successful.

As presented in Table 3.19, implementation of the proposed wells is anticipated to employ approximately 11 to 28 workers per well during the five month construction and completion phase. If the wells prove successful, Enerplus would install production facilities and begin long-term production. To ensure successful operations, production activities require between one and four full-time employees to staff operations. It is anticipated that a mixture of local and Enerplus employees would work in the project area. Therefore, any increase in workers would constitute a minor increase in population in the project area required for short-term operations and would not create a noticeable increase in demand for services or infrastructure on the Reservation or the communities near the project area.

**Table 3.19. Duration of Employment during Proposed Project Implementation.**

Activity	Duration of Activity (average days per well)	Daily Personnel (average number per well)
Construction (access road and well pad)	5–8 days	3–5
Drilling	30–35 days	8–15
Completion/Installation of facilities	Approx. 10 days	3–8
Production	Ongoing – life of well	1–4

Although some counties within the Analysis Area have experienced a recent decline in population between 2000 and 2009 (as shown in Table 3.14), the population on the Reservation itself has increased. This has not led to significant housing shortages. The historic housing vacancy rate (Table 3.17) indicates that housing has remained available despite the growth of the population on the Reservation. The levels of available housing are therefore anticipated to be able to absorb the projected slight increase in population related to this proposed project. As such, the proposed project would not have measurable impacts on housing availability or community infrastructure in the area. The proposed project also would not result in any identifiable impacts to social conditions and structures within the communities in the project area.

Implementation of the proposed project would likely result in direct and indirect economic benefits associated with industrial and commercial activities in the area, including the Reservation, State of North Dakota, and potentially local communities near the Reservation. Direct impacts would include increased spending by contractors and workers for materials, supplies, food, and lodging in Dunn County and the surrounding areas, which would be subject to sales and lodging taxes. Other state, local, and Reservation tax payments and fees would be incurred as a result of the implementation of the proposed project, with a small percentage of these revenues distributed back to the local economies. Wages due to employment would also impact per capita income for those that were previously unemployed or underemployed. Indirect benefits would include increased spending from increased oil and gas production, as well as a slight increase in generated taxes from the short-term operations. Mineral severance and royalty taxes, as well as other relevant county and Reservation taxes on production would also grow directly and indirectly as a result of increased industrial activity in the oil and gas industry.

### **3.12 ENVIRONMENTAL JUSTICE**

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, signed in 1994 by President Clinton, requires agencies advance EJ by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means such groups should not bear a disproportionately high share of negative environmental consequences from federal programs, policies, decisions, or operations. Meaningful involvement means federal officials actively promote opportunities for public participation and federal decisions can be materially affected by participating groups and individuals.



The EPA headed the interagency workgroup established by the 1994 Executive Order and is responsible for related legal action. Working criteria for designation of targeted populations are provided in *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (EPA 1998). This guidance uses a statistical approach to consider various geographic areas and scales of analysis to define a particular population's status under the Executive Order.

EJ is an evolving concept with potential for disagreement over the scope of analysis and the implications for federal responsiveness. Nevertheless, due to the population numbers, tribal members on the Great Plains qualify for EJ consideration as both a minority and low-income population. Table 3.20 summarizes relevant data regarding minority populations for the Analysis Area.

**Table 3.20. Minority Population Breakdown by North Dakota County and Race, 2000–2009.**

Race	Dunn		McKenzie		McLean		Mountrail		North Dakota	
	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009
Total Population	3,600	3,365	5,737	5,799	9,311	8,310	6,629	6,791	642,204	646,844
Non-Hispanic	3,573	3,330	5,679	5,696	9,230	8,199	6,542	6,589	634,418	632,126
Hispanic or Latino <sup>1</sup>	27	35	58	103	81	111	87	202	7,786	14,718
<b>Races</b>										
Caucasian	3,123	2,827	4,457	4,450	8,632	7,577	4,546	4,259	596,722	589,112
African American	1	4	4	12	2	15	7	31	4,157	7,813
American Indians and Alaska Natives	448	459	1,216	1,249	568	587	1,988	2,385	31,440	36,258
Asian / Pacific Islanders	8	3	4	8	12	19	17	17	3,912	5,646
Two or more races	25	30	39	80	97	112	71	99	5,973	8,015
All minorities	477	538	1,280	1,349	679	733	2,083	2,532	45,482	57,732
% minority population	13.2	15.9	22.3	23.2	7.3	8.8	31.4	37.2	7.1	8.9
Change in minority population (2000–2009)	+12.8%		+5.3%		+7.9%		+21.5%		+26.9%	

<sup>1</sup> Hispanic or Latino may be of any race.

Sources: U.S. Census Bureau 2011d.

In July 2009, the U.S. Census Bureau estimated that North Dakota's total minority population comprised approximately 57,732 persons, or 8.9% of the state's total population (i.e., 646,844 residents). This represents an increase of 26.9% over the 2000 minority population of the state. Within the Analysis Area, the number of Caucasian residents decreased, while minorities in nearly all categories increased, producing a strong increase in the percentage of minority population in each of the counties in the Analysis Area during the period from 2000 until 2009 (Table 3.20) (U.S. Census Bureau 2010). The four counties of the Analysis Area showed an increase of 5.3% to 21.5% in minority population, compared with the statewide increase of 26.9%.

In 2009, the counties in the Analysis Area had a higher percentage of American Indian and Alaska Natives, ranging from 7.1% in McLean County to nearly 35.1% in Mountrail County, compared with the state as a whole which had approximately 5.6% in this category (U.S. Census Bureau 2011d). The North Dakota Indian Affairs Commission (NDIAC) reports that American Indian population (race alone or in combination) in North Dakota has increased 12% from 35,228 in 2000 to 35,666 in 2008 (NDIAC 2011), with estimates for the future American Indian population (one race only) would be 47,000 in 2015 and 59,000 in 2025 in North Dakota (NDIAC 2011). The Reservation has a total population of 5,915 in the 2000 census, with 67.4% American Indian, mostly with tribal affiliations with MHA Nation (NDIAC 2011).

Poverty rate data for the counties in the Analysis Area are summarized in Table 3.21. The data show that poverty rates have decreased in the Analysis Area during the period from 2000 to 2009 (U.S. Department of Agriculture 2011). McKenzie and Mountrail counties continue to have poverty rates that exceed the statewide poverty rate of 11.7%. With the exception of Dunn County, all counties within the Analysis Area have higher median household incomes than the statewide household income of \$47,898.

**Table 3.21. Poverty Rates and Median Household Income for the Analysis Area.**

Location	2000	2009	2009 Median Household Income
Dunn County	13.3%	11.2%	\$44,681
McKenzie County	15.7%	12.8%	\$49,465
McLean County	12.3%	10.3%	\$49,212
Mountrail County	15.7%	12.4%	\$49,884
North Dakota	10.4%	11.7%	\$47,898

Source: U.S. Department of Agriculture 2011.

### **3.12.1 Potential Impacts to Environmental Justice**

The Analysis Area, having larger and increasing minority populations, compared with statewide numbers, could result in disproportionately beneficial impacts from the proposed oilfield development. These would derive from direct and indirect economic opportunities for tribal members. Generally, existing oil and gas leasing has already benefited the MHA Nation government and infrastructure from tribal leasing, fees, and taxes. Current oil and gas leasing

on the Reservation has also already generated revenue to MHA Nation members who hold surface and/or mineral interests. However, owners of allotted surface within the Analysis Area may not necessarily hold mineral rights. In such cases, surface owners do not receive oil and gas lease or royalty income, and their only related income would be compensation for productive acreage lost to road and well pad construction. Those with mineral interests also may benefit from royalties on commercial production if the wells prove successful. Profitable production rates at proposed locations might lead to exploration and development of additional tracts owned by currently non-benefitting allottees. In addition to increased revenue for land and mineral holders, exploration and development would increase employment on the Reservation with oversight from the Tribal Employment Rights Office, which would help alleviate some of the poverty prevalent on or near the Reservation. Tribal members without either surface or mineral rights would not receive any direct benefits, except through potential employment, should they be hired. Indirect benefits of employment and general tribal gains would be the only potential offsets to negative impacts. Poverty rates in the Analysis Area have already begun to decrease since oil and gas development began after 2000, as shown in Table 3.21. There is potential for adverse economic impacts to tribal members who do not reside within the Reservation and therefore do not share in direct or indirect benefits.

Potential adverse impacts could occur to tribes and tribal members, as well, such as the potential disturbance of any traditional cultural properties and cultural resources. These potential impacts are reduced through surveys of proposed well locations and access road routes, mitigation measures required by the BIA, and thorough reviews and determinations by the BIA that there would be no effect to historic properties. The possibility of disproportionate impacts to tribes or tribal members is further reduced by the requirement for immediate work stoppage following an unexpected discovery of cultural resources of any type. Mandatory consultation would take place during any such work stoppage, affording an opportunity for all affected parties to assert their interests and contribute to an appropriate resolution, regardless of their home location or tribal affiliation.

The proposed project would not result in significant impact to any other critical element, including air quality, public health and safety, transportation, water quality, wetlands, wildlife, soils, or vegetation. Through the avoidance of such impacts, no disproportionate impact is expected to low-income or minority populations. The Proposed Action offers many positive consequences for tribal members, while recognizing EJ concerns. Procedures summarized in this document and in the APD are binding and sufficient. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required.

### **3.13 MITIGATION AND MONITORING**

Many protective measures and procedures are described in this document and in the APD. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required. Monitoring of cultural resource impacts by qualified personnel is recommended during all ground-disturbing activities, as determined by the BIA. Each phase of construction and development through production could be monitored by the BLM, the BIA, and representatives of the MHA Nation to ensure the protection of cultural, archaeological, and natural resources. In conjunction with 43 CFR 46.30, 46.145, 46.310, and

46.415, a report would be developed by the BLM and the BIA that documents the results of monitoring in order to adapt the projects to eliminate any adverse impact on the environment.

Mitigation opportunities can be found in general and operator-committed BMPs and mitigation measures. BMPs are loosely defined as techniques used to lessen the visual and physical impacts of development. The BLM has created a catalog of BMPs that, when properly implemented, can assist industry in a project's design, scheduling, and construction techniques. Enerplus would implement, to the extent possible, the use of BMPs in an effort to mitigate environmental concerns in the planning phase allowing for smoother analysis, and possibly faster project approval. Many of these are required by the BLM when drilling federal or tribal leaseholds and can be found in the surface use plan in the APD.

### **3.13.1 General BMPs**

Although largely project-specific, there are a number of BMPs that can, and should, be considered on development projects in general. The following are examples of general BMPs.

- Planning roads and facility sites to minimize visual impacts.
- Using existing roads to the extent possible, upgrading as needed.
- Reducing the size of facility sites and types of roads to minimize surface disturbance.
- Minimizing topsoil removal.
- Stockpiling stripped topsoil and protecting it from erosion until reclamation activities commence. At that time, the soil would be redistributed and reseeded on the disturbed areas. The reclaimed areas would be protected and maintained until the sites are fully stabilized.
- Avoiding removal of, and damage to, trees, shrubs, and groundcover where possible. Trees near construction areas would be marked clearly to ensure that they are not removed.
- Mowing, instead of clearing, a facility or well site to accommodate vehicles or equipment.
- Maintaining buffer strips or using other sediment control measures to avoid sediment migration to stream channels as a result of construction activities.
- Planning for erosion control.
- Storing chemicals in a proper manner (including secondary containment).
- Keeping sites clean, including containing trash in a portable trash cage. The trash cage would be emptied at a state-approved sanitary landfill.
- Conducting snow removal activities in a manner that does not adversely impact reclaimed areas and areas adjacent to reclaimed areas.
- Avoiding or minimizing topographic alterations, activities on steep slopes, and disturbances within stream channels and floodplains to the extent possible.

- Maintaining buffers around work areas where there is a risk of fire as a result of construction activities.
- Keeping fire extinguishers in all vehicles.
- Planning transportation to reduce vehicle density.
- Posting speed limits on roads.
- Avoiding traveling during wet conditions that could result in excessive rutting.
- Painting facilities a color (Shale) that would blend with the environment.
- Practicing dust abatement on roads.
- Recontouring disturbed areas to approximate the original contours of the landscape.
- Developing a final reclamation plan that allows disturbed areas to be quickly absorbed into the natural landscape.

Enerplus recognizes that there are several BMPs that can be used to mitigate environmental concerns specific to projects associated with below-ground linear alignments, such as those included in the proposed utility corridor. Enerplus would implement these and/or other BMPs to the extent that they are required by the BIA, are technically feasible, and would add strategic and measurable protection to the project area:

- following the contour (form and line) of the landscape;
- avoiding locating ROWs on steep slopes;
- sharing common ROWs;
- co-locating multiple lines in the same trench; and
- using natural (topography, vegetation) or artificial (berms) features to help screen facilities such as valves and metering stations.

### **3.13.2 Mitigation and Safety Measures Committed to by Enerplus**

#### **3.13.2.1 Dust Control**

During construction, a watering truck may be kept on site and the access roads would be watered as necessary, especially during periods of high winds and/or low precipitation.

#### **3.13.2.2 Wildlife**

As mentioned in Section 3.7.3, Potential Impacts to Wetlands, Habitat, and Wildlife, Enerplus has committed to using a semi-closed-loop drilling system, ensuring that the cuttings pit would 1) be smaller than a typical pit, and 2) contain only dry cuttings, which would be solidified with fly ash and buried in place following completion of drilling operations. Additional protections committed to by Enerplus are described below.



*Bald and Golden Eagle and Migratory Bird Protective Measures*

- Enerplus will schedule construction for late summer or fall/early winter so as not to disrupt waterfowl or other migratory birds during the breeding season (February 1 to July 15).
- If the construction window in item 1 above cannot be honored, Enerplus will degrade migratory bird habitat at the project site outside of the breeding season by mowing and/or clearing and grubbing to discourage nesting, and maintain the habitat in a degraded state until construction is completed.
- If construction will occur within the migratory bird nesting season of February 1–July 15, and habitat degradation has not been accomplished, Enerplus will conduct surveys at all well pads for migratory birds and their active nests (nests containing eggs or young) within five days of commencement of construction activities. If birds or their nests are found during surveys, the USFWS and BIA will be presented with a proposal for realigning the work or maintaining adequate buffers to prevent the take of migratory birds.
- Conduct eagle nesting surveys between March 1 and May 15, before leaf-out at the well pads in Section 29, T149N, R93W. Results of surveys will be provided to the BIA and USFWS
- Maintain a minimum 0.5-mile buffer around all known or newly discovered active bald and golden eagle nests

*ESA Protective Measures*

- Piping Plover and its Designated Critical Habitat, Interior Least Tern, and Pallid Sturgeon: The following measures are designed to prevent any accidental release of drilling fluids or hazardous materials into the watersheds of Lake Sakakawea:
  - An impervious dike sized to hold 110% of the capacity of the largest tank would be constructed around the tank battery. Load out lines would be located inside the diked area and a heavy screen-covered drip barrel would be installed under the outlet. A metal access staircase would protect the dike and support flexible hoses used by tanker trucks.
  - Enerplus will implement all BMPs, erosion control measures, and spill prevention practices required by the Clean Water Act.
  - Enerplus will use a semi-closed-loop drilling system and an impervious dike sized to hold 110% of the capacity of the largest tank would be constructed around the tank battery to prevent hazardous runoff or spills.
  - An 18-inch berm would be constructed around well pads located in the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 21, T151N, R94W; N $\frac{1}{2}$  NW $\frac{1}{4}$  of Section 29, T149N, R93W; N $\frac{1}{2}$  NE $\frac{1}{4}$  Section of 29, T149N, R93W; and SE $\frac{1}{4}$  NE $\frac{1}{4}$  of Section 20, T149N, R93W/
  - A diversion ditch would be constructed as needed at the well pad located in the NW $\frac{1}{4}$  SW $\frac{1}{4}$  of Section 21, T149N, R93W.
  - The corners of the well pads will be rounded, as indicated in Table 2.1.

- Interior floor of the drilling pad shall be sloped away from drainage ways. Cuttings pit liners will be a minimum of 20-millimeter (ml) thickness.
- Whooping Crane:
  - If suitable whooping crane habitat exists within 1 mile of the project area, underground utility lines will be utilized. If underground power lines are deemed inappropriate, visual marking devices will be placed on new power lines plus an equal length of existing power line within 1 mile of suitable wetland roosting habitat.
  - If a whooping crane is sighted within 1 mile of the proposed project area, work will be stopped and the USFWS and BIA will be notified. In coordination with the USFWS and BIA, work may resume after the bird(s) leaves the area.
- Consolidating well locations by designing multi-well pads to minimize disturbance and habitat fragmentation.
- Fencing all pits.

#### 3.13.2.3 Erosion Controls and Spill Prevention

- As described in Section 2.2.7, Commercial Production, an impervious dike sized to hold 110% of the capacity of the largest tank plus one day's production would be constructed around the tank battery. Load out lines would be located inside the diked area and a heavy screen-covered drip barrel would be installed under the outlet. A metal access staircase would protect the dike and support flexible hoses used by tanker trucks.
- Topsoil would be placed to divert flow away from well pad locations to limit the possibility of surface contamination.
- See Section 3.13.2.2 for site-specific measures to reduce erosion.
- As described in Section 2.2.9.1, Interim Reclamation, all disturbed areas that are not needed for operations after construction and drilling are complete would be revegetated.

#### 3.13.2.4 Fire Control

Enerplus would implement fire prevention and control measures including, but not limited to, the following.

- Requiring construction crews to carry fire extinguishers in their vehicles and/or equipment.
- Training construction crews in the proper use of fire extinguishers.
- Contracting with the local fire district to provide fire protection.

### 3.13.2.5 Traffic and Roads

Cooperative efforts by operators, agencies, and the tribe are currently being developed and implemented across FBIR. These measures include the following.

- Requiring construction personnel to stay within the ROW or follow designated access roads.
- Increasing the pipeline infrastructure, centralizing water depots, and developing salt water disposal wells to reduce overall truck traffic and road degradation.
- Utilizing Tribal TERO fees for oil and gas activities, TAT Tribal funds, and IRR funds to increase the pace of maintenance and repair of roads impacted by increased truck traffic and unusually adverse weather conditions.

### 3.13.2.6 Cultural Resources

The following protocol would be adhered to by all construction personnel during construction and maintenance of the well pad or access road.

- All project workers are prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.
- A monitor would be present during construction of the shared access road from Sections 29 and 21 well pads to SE $\frac{1}{4}$  NE $\frac{1}{4}$  Section 20 access road.

If cultural resources are discovered during construction or operation, work shall immediately be stopped, the affected site be secured, and the BIA and the THPO notified. In the event of a discovery, work shall not resume until written authorization to proceed has been received from the BIA.

## **3.14 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

Removal and consumption of oil and/or gas from the Bakken and Three Forks Formation would be an irreversible and irretrievable commitment of resources. Other potential resource commitments include land area devoted to the disposal of cutting, soil lost to erosion (i.e., wind and water), unintentionally destroyed or damaged cultural resources, wildlife killed as a result of collision with vehicles (i.e., construction machinery and work trucks), and energy expended during construction and operation.

## **3.15 SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY**

Short-term development activities would not detract significantly from long-term productivity, and use, of the project areas. The construction of access roads and well pad areas would eliminate any forage or habitat use by wildlife and/or livestock. Any allottees to which compensation for land disturbance is owed would be properly compensated for the loss of land use. The initial disturbance area would decrease considerably once the wells are drilled and non-necessary areas have been reclaimed. Rapid reclamation of the project area would facilitate revived wildlife and livestock usage, stabilize the soil, and reduce the potential for erosion and sedimentation.

### 3.16 CUMULATIVE IMPACTS

Environmental impacts may accumulate either over time or in combination with similar events in the area. Unrelated and dissimilar activities may also have negative impacts on critical elements, thereby contributing to the cumulative degradation of the environment. Past and current disturbances in the vicinity of the project area include farming, grazing, roads, and other oil and gas wells. Over the past several years, exploration has accelerated over the Bakken and Three Forks Formation. Most of this exploration has taken place outside the Reservation boundary on fee land, but for purposes of cumulative impact analyses, land ownership and the Reservation boundary are immaterial. The cumulative impact area (CIA) may vary depending on the particular resource under consideration, but effects may be felt as far as 20 miles from the proposed project.

Within the Reservation and near the proposed project areas, development projects remain few and widely dispersed, but off-reservation well density is much higher, as shown in Table 3.22 and Figure 3.12. No active wells occur within 1 mile of the project area, as shown in Table 3.22. A cumulative total of 90 active and confidential wells occurs within a 5-mile CIA, a cumulative total of 211 active and confidential wells occurs within a 10-mile CIA, and a cumulative total of 809 active and confidential wells occurs within a 20-mile CIA, with the number of wells on the Reservation being slightly greater than those that occur off the Reservation.

**Table 3.22. Active, Confidential, Active, and Permitted Wells within the Cumulative Impact Area.**

Well Type	Arnica- Chokecherry SE¼ NE¼ Section 20, T149N, R93W		Wormwood- Bluestem NW¼ SW¼ Section 21, T149N, R93W		Pinto-Mustang N½ NE¼ Section 29, T149N, R93W		Morgan- Arabian N½ NW¼ Section 29, T149N, R93W	
<b>1-mile CIA</b>								
Reservation (on/off)	On	Off	On	Off	On	Off	On	Off
Active wells	2	0	2	0	0	0	2	0
Confidential wells	2	0	1	0	0	0	1	0
Permitted wells	0	0	0	0	0	0	0	0
Cumulative total active and confidential wells within 1-mile CIA:							4*	
<b>5-mile CIA</b>								
Reservation (on/off)	On	Off	On	Off	On	Off	On	Off
Active wells	21	0	19	0	24	0	26	0
Confidential wells	54	0	53	0	57	0	63	0
Permitted wells	5	0	6	0	6	0	6	0
Cumulative total active and confidential wells within 5-mile CIA:							90*	
<b>10-mile CIA</b>								
Reservation (on/off)	On	Off	On	Off	On	Off	On	Off
Active wells	84	4	83	2	80	2	84	4
Confidential wells	117	4	113	1	109	3	113	4
Permitted wells	21	0	21	0	21	0	21	0
Cumulative total active and confidential wells within 10-mile CIA:							211*	

*Environmental Assessment: Enerplus Resources (USA) Corporation: Eight Exploratory Bakken and Three Forks Oil Wells*

Well Type	Arnica- Chokecherry SE¼ NE¼ Section 20, T149N, R93W		Wormwood- Bluestem NW¼ SW¼ Section 21, T149N, R93W		Pinto-Mustang N½ NE¼ Section 29, T149N, R93W		Morgan- Arabian N½ NW¼ Section 29, T149N, R93W	
	<b>20-mile CIA</b>							
Reservation (on/off)	On	Off	On	Off	On	Off	On	Off
Active wells	206	266	205	262	200	275	206	288
Confidential wells	217	76	213	76	212	77	213	80
Permitted wells	54	12	54	12	51	12	54	12
Cumulative total active and confidential wells within 20-mile CIA:							809*	

\*Duplicate wells have been eliminated from cumulative totals



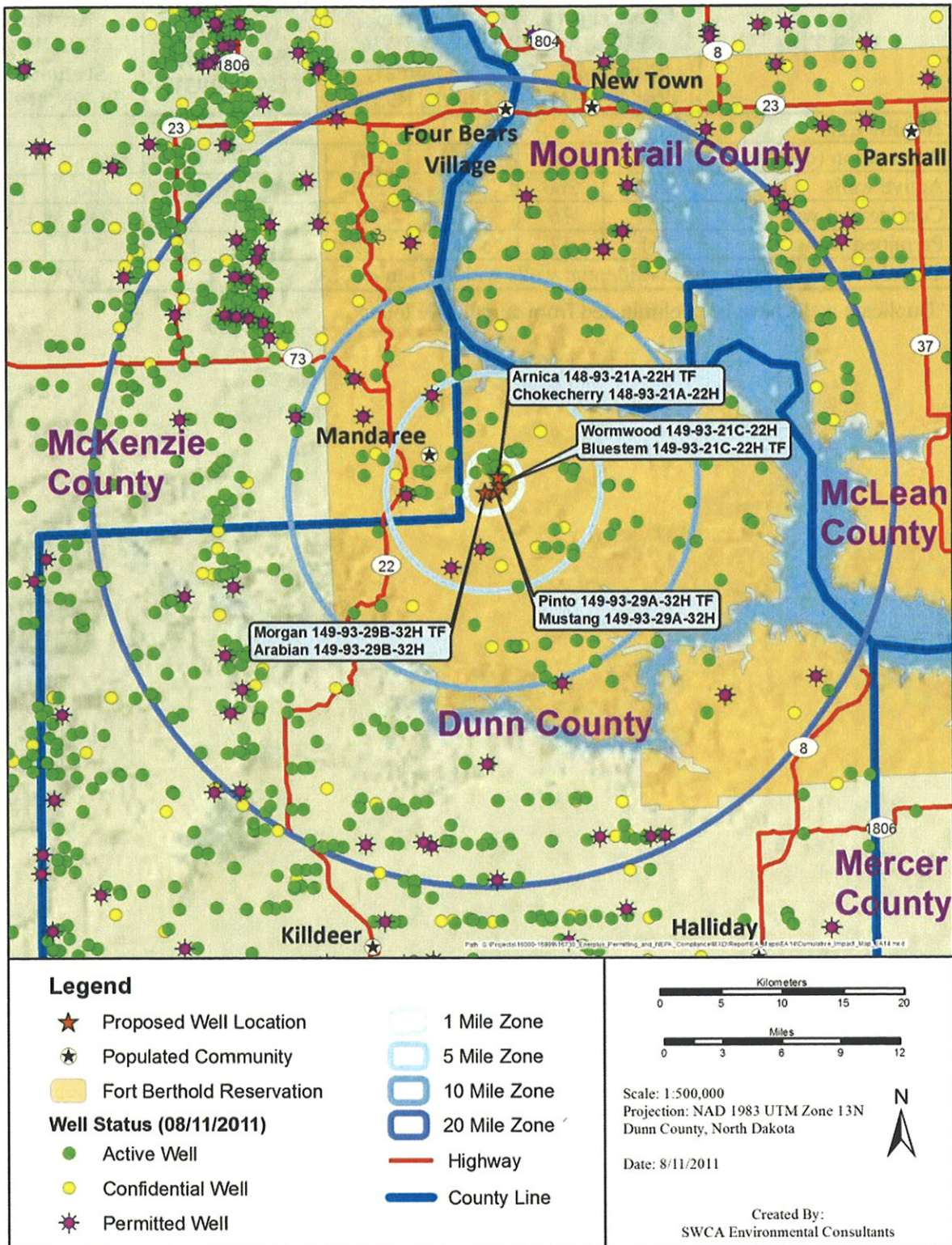


Figure 3.12. Active, confidential, and permitted wells within a 1-, 5-, 10-, and 20-mile radius of the proposed project locations.



Reasonably foreseeable future cumulative impacts must also be considered. If the proposed new wells prove productive, it is likely that Enerplus or other operators would pursue additional development in the area. In addition to the cumulative total of 66 wells that have already been permitted for future drilling within a 20-mile radius of the current proposal (Table 3.22), Enerplus has suggested, but not yet formally proposed, that potentially 74 more wells may eventually be drilled in the same general area as the proposed project. Enerplus has also submitted or will soon submit additional proposals for 20-25 future new wells within 5 miles of the proposed action. These future foreseeable new wells would occur in T148N, R93W and T149N, R93W.

### **3.16.1 Cumulative Effects on Land Use**

Although it is the dominant activity currently taking place in the area, oil and gas development is not expected to have more than a minor cumulative effect on land use patterns. Current farming and ranching activities are expected to continue with little change because virtually all available acreage is already organized into range units to use surface resources for economic benefit. Undivided interests in the land surface, range permits, and agricultural leases are often held by different tribal members than those holding mineral rights.

### **3.16.2 Cumulative Effects on Human Health and Safety**

The main effect of the proposed wells and other foreseeable future well-field development on human health and safety is related to the possibility of accidental release of petroleum, drilling or fracking fluids, or H<sub>2</sub>S into the environment. A cumulative total of four active and confidential oil and gas wells currently occurs within 1 mile of the proposed multi-well pads, and the nearest home is within 0.52 mile of the nearest well. In addition, the proposed wells would add eight new wells to the cumulative total of 809 existing wells located within 20 miles of the proposed well pads. Maintaining adequate setbacks from residences, along with adequate spill prevention measures and other emergency plans, would generally prevent hazardous materials from coming into direct contact with drinking water, surface water, and groundwater, or residential populations. However, the risk of accidental release of toxic or hazardous substances is never completely eliminated. Therefore, the proposed project would incrementally contribute to a low level of cumulative impact on human health and safety in the CIA.

### **3.16.3 Cumulative Effects on Air Quality**

It is anticipated that the pace and level of oil and gas development within this region of the state would continue at the current rate over the next few years and contribute to cumulative air quality impacts. The Proposed Action would incrementally contribute to emissions occurring within the region. In general, however, the increase in emissions associated with the Proposed Action would occur predominantly during construction and drilling operations and would therefore be localized, largely temporary, and limited in comparison with regional emissions.

### **3.16.4 Cumulative Effects on Wetlands, Habitats, and Wildlife**

Wetlands in the CIAA could be affected primarily by erosion and spills or other indirect effects on surface water quality. Past, present, and reasonably foreseeable future oil and gas

drilling activities within the area would likely lead to increased sediment loads being deposited in PEM wetlands and streams. Adherence to BMPs and site-specific erosion control measures identified for this project (Table 2.1) would prevent long-term erosion and sedimentation from the proposed project. The use of similar site-specific measures for all future permitted and proposed well drilling would provide strong protections that would keep erosion at very low levels and keep future development from adversely affect wetland functions or quality.

Vegetation resources across the project area could be affected by various activities, including additional energy development and surface disturbance of quality native prairie areas that have been largely undisturbed by development activities, grazing, and agriculture. Indirect impacts to native vegetation may be possible due to soil loss, compaction, and increased encroachment of unmanaged invasive weed species. Continued oil and gas development within the Reservation could result in the loss, and further fragmentation, of native mixed-grass prairie habitat.

Past, present, and reasonably foreseeable future activities within the general area have reduced, and would likely continue to reduce, the amount of available habitat for listed species as well as unique wildlife, such as migratory grassland birds. Potential cumulative impacts of the proposal plus other foreseeable future oil and gas development on the Reservation could include habitat fragmentation from construction of other well pads and roads, with potential effects on migratory grassland birds. The project would generate new long-term disturbance of approximately 24.2 acres of grassland habitat for the well pads and access roads, out of a total 845,125 acres within a 20-mile radius of the project. Similar levels of disturbance have occurred at 809 existing wells within the 20-mile radius, and another 66 permitted wells, as indicated in Table 3.20. Existing and future foreseeable oil and gas development is estimated to result in long-term disturbance to approximately 8,750 acres (10 acres per well), or approximately 1.03% of the available surface area within the 20-mile radius. The project would result in an estimated relative incremental increase of 0.002% long-term disturbance when added to the existing surface disturbance. The proposed project would add only a minor cumulative effect from additional habitat fragmentation.

### **3.16.5 Cumulative Effects on Surface Water and Groundwater Resources**

No surface discharge of water would occur under the Proposed Action, nor would any surface water or groundwater be used during project development. The Proposed Action, when combined with other actions (cattle grazing, other oil and gas development, and agriculture) that are likely to occur in and near the project area in the future, would increase sedimentation and runoff rates. Sediment yield from active roadways could occur at higher rates than background rates and continue indefinitely. Thus, the Proposed Action could incrementally add to existing and future sources of water quality degradation in the Lower Squaw Creek/Squaw Creek Bay sub-watershed, but increases in degradation would be reduced by Enerplus's commitment to minimizing disturbance, using erosion control measures as necessary, and implementing BMPs designed to reduce impacts.

A portion of the access road ROW would be reclaimed on either side of the active roadway. Unlike well pads, however, active gravel roadways are not typically reclaimed, thus sediment

yield from roads can continue indefinitely at rates two to three times the background rate. The Proposed Action would create additional lengths of unpaved roadway in the project area. Thus, the Proposed Action would incrementally add to existing and future impacts to soil resources in the general area. However, Enerplus is committed to using BMPs to mitigate these effects. BMPs would include implementing erosion and sedimentation control measures, such as installing culverts with energy dissipating devices at culvert outlets to avoid sedimentation in ditches, constructing water bars alongside slopes, planting cover crops to stabilize soil following construction and before permanent seeding takes place. Additional information regarding BMPs can be found in Section 3.13, Mitigation and Monitoring.

No adverse impacts potable water aquifers and associated groundwater wells are anticipated from the development of the proposed new wells, based on current data and research on the geological effects of HF methods and processes. As a result, it can be reasonably assumed that there would be no cumulative impacts as a result of current and future oil and gas development on the Reservation which target deep geological formations such as the Bakken and Three Forks.

#### **3.16.6 Cumulative Effects on Cultural Resources**

Significant archaeological resources are irreplaceable and often unique; any destruction or damage of such resources can be expected to diminish the archaeological record as a whole. However, no such damage or destruction of significant archaeological resources is anticipated as a result of the Proposed Action, as these resources would be avoided, negating the cumulative impacts to the archaeological record.

#### **3.16.7 Cumulative Effects on Transportation**

The BIA IRR Inventory reports that there are approximately 671 miles of rural gravel roads on the Reservation, compared with only 285 miles of paved BIA roads serving local residents. While the existing major highways and paved BIA roads may be adequate to handle anticipated increases in passenger traffic volume and size, when this is combined with projected heavy truck traffic from hundreds of new wells previously authorized by BIA for the Reservation (Table 3.20) and foreseeable future activities on the Reservation, there is a potential for short-term adverse impacts to gravel roads. Without additional funding for road repair and improvement projects, these cumulative impacts could become prolonged for many of the state highways and BIA roads; such projects are outside the direct control of the operators or the local BIA officials, since the roads planning authorities and traditional funding sources would lie with state and federal agencies. However, operators, agencies, and the TAT are developing and implementing cooperative efforts to address this issue (see 3.13.2.5); these efforts will address past activities and continue to minimize and mitigate potential future activities.

The proposed project would add new traffic volume to State Highway 22, as well as BIA Road 12 (paved), before entering the shared access roads that Enerplus proposes to improve and maintain. The IRR report indicates that BIA Road 12 was in good construction condition in 2006 (IRR 2011). The proposed project would increase traffic by an average of 13 to 20 heavy trucks per day, and 15 to 37 pick-ups per day over the five to seven-month construction period. If authorized by BIA, other current proposals from Enerplus would include an

additional 20-25 new wells being drilled nearby and using portions of BIA Road 12. The combined future foreseeable traffic and heavy loads would therefore increase by an estimated 30 truck round-trips, and 30 to 60 pick-ups trips spread out over a seven-month construction period. BIA Road 12 through Mandaree and east for approximately 3.3 miles would potentially be affected by the cumulative increase in construction traffic. No other drilling permits that are known to have been authorized within 1 mile of the proposed well pads (Table 3.20). Given the recent condition of BIA Road 12, this expected level of added road use may be inconvenient to the residents living in or near Mandaree along BIA Road 12, but would be unlikely to result in serious road degradation or other adverse cumulative impacts on traffic.

### **3.16.8 Cumulative Effects on Socioeconomics**

The Proposed Action would incrementally add to existing and future socioeconomic impacts in the general area. The Proposed Action includes eight wells, which would be an additional source of revenue for some residents of the Reservation. Increases in employment would be temporary during the construction, drilling, and completion phases of the proposed project. Therefore, little change in employment would be expected over the long term.

Current impacts to the natural environment from oil and gas-related activities are still fairly dispersed, and the required operator-committed BMPs would limit potential impacts. No significant negative impacts are expected to affect any critical element of the human environment; impacts would generally be low and mostly temporary.

## **4.0 CONSULTATION AND COORDINATION**

The BIA must continue to make efforts to solicit the opinions and concerns of all stakeholders (Table 4.1). For the purpose of this EA, a stakeholder is considered any agency, municipality, or individual person to which the proposed action may affect either directly or indirectly in the form of public health, environmental, or socioeconomic issues. A scoping letter declaring the location of the proposed project areas and explaining the actions proposed at each site was sent in advance of this EA to allow stakeholders ample time to submit comments or requests for additional information. Additionally, a copy of this EA would be submitted to all cooperating federal agencies and also to those agencies with interests in or near the proposed actions that could be affected by those actions.

Table 4.1. Scoping Comments.

Organization	Name	Comment	Response to Comment
Barnes County Municipal Airport	Lindemann, Larry	No Comment	
Bureau of Indian Affairs	Bercier, Marilyn	No Comment	
Bureau of Land Management	Bagley, Lonny	No Comment	
Bureau of Land Management	Nash, Mike	No Comment	
Dunn County	Hauck, Reinhard	No Comment	
Dunn County	Kadmas, Ray	No Comment	
Enerplus Resources Corp	Overbey, Rachel	No Comment	
EOG Resources, Inc	Smith, Heather	No Comment	
Federal Aviation Administration	Dressler, Patricia	No objection provided the Federal Aviation Administration is notified of construction or alterations as required by the Federal Aviation Regulations, Part 77, Objects Affecting Navigable Airspace, and Paragraph 77.9.	Notifications will be made as appropriate.
Federal Emergency Management Agency	Kyner, Dave	No Comment	Project area is not in a flood hazard area. Please see Section 3.3, Water Resources.
Fort Berthold Agency	Turcotte, Daryl	No Comment	
Fort Berthold Rural Water Director	Danks, Marvin	No Comment	
Garrison Project Office	U.S. Army Corps of Engineers, Omaha District	No Comment	
Indian Affairs Commission	Davis, Scott	No Comment	
Killdeer, Weydahl Field	Hoffman, Warren	No Comment	
McKenzie County	Cayko, Richard	No Comment	
McKenzie County	Olson, Frances	No Comment	
McKenzie Electric Cooperative	Thorson, Gary	No Comment	

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Organization	Name	Comment	Response to Comment
McLean County Board of Commissioners	Hudson-Schenfisch, Julie	No Comment	
McLean Electric Cooperative, Inc.	Rudolph, Reginald	No Comment	
Mercer County Board of Commissioners	Mercer County	No Comment	
Midcontinent Cable Company	Boyd, Bill	No Comment	
Minot Air Force Base	Missile Engineer, Chief	No Comment	
Montana Dakota Utilities	Dixon, Doug	No Comment	
Mountrail Board of County Commissioners	Hynek, David	No Comment	
National Park Service, Midwest Region	Chevance, Nick	No Comment	
Natural Resources Conservation Service	Sweeney, Paul	Jerome Schaar: The Federal Protection Policy Act does not apply, no further action is needed. We recommend that impact to wetlands be avoided.	Thank you for your comment. See Section 3.5, Wetlands, Habitat, and Wildlife.
New Town Municipal Airport	Johnson, Harley	No Comment	
NoDak Electric Cooperative, Inc.	Berg, George	No Comment	
North Dakota Department of Health	Glatt, David	Impacts minor and can be controlled by using proper construction methods.	See Sections 2.2.8, Construction Details at Individual Sites, and 3.13, Mitigation and Monitoring, for site-specific details and BMPs.
North Dakota Department of Transportation	Peterson, Walter	No Comment	



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Organization	Name	Comment	Response to Comment
North Dakota Game and Fish Department	McKenna, Mike	Paul Schadewald: Avoid construction to the extent possible within native prairie, wooded draws, riparian corridors, and wetland areas. Conduct botanical surveys and aerial surveys for raptor nests before construction	See Affected Environment, Section 3.5, Wetlands, Habitat, and Wildlife. Also see Section 3.13, Mitigation and Monitoring, for additional site-specific monitoring.
North Dakota Parks and Recreation	Prchal, Doug	No Comment	
Northern Border Pipeline Company	Land Department	No Comment	
Parshall-Hankins Field Airport	Kuehn, John	No Comment	
Petro-Hunt, LLC	Nordquist, Don	No Comment	
Reservation Telephone Cooperative	Jarski, Tim	No Comment	
Sisseton-Wahpeton Sioux Tribe	Selvage, Michael	No Comment	
Southwest Water Authority	Massad, Mary	No Comment	
Spirit Lake Sioux Tribe	Pearson, Myra	No Comment	
Standing Rock Sioux Tribe	Murphy, Charles	No Comment	
State Historical Society	Paaverud, Merl	Requests that a copy of cultural resource site forms and reports be sent to the State Historical Society office to keep archives current.	Reports will be sent to the required agencies. See Section 3.8, Cultural Resources.
THPO, Three Affiliated Tribes	Elgin Crows Breast	No Comment	
Three Affiliated Tribes	Brugh, V. Judy	No Comment	
Three Affiliated Tribes	Fox, Fred	No Comment	
Three Affiliated Tribes	Hall, Tex	No Comment	
Three Affiliated Tribes	NAGPRA Office	No Comment	
Three Affiliated Tribes	Natural Resources Department	No Comment	
Three Affiliated Tribes	Packineau, Mervin	No Comment	
Three Affiliated Tribes	Poitra, Fred	No Comment	

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Organization	Name	Comment	Response to Comment
Three Affiliated Tribes	Strahs, Arnold	No Comment	
Three Affiliated Tribes	Whitcalf, Frank	No Comment	
Three Affiliated Tribes	Williams, Damon	No Comment	
Three Affiliated Tribes	Wolf, Malcolm	No Comment	
Turtle Mountain Band of Chippewa	Ferris, Kade	No Comment	
U.S. Army Corps of Engineers	Cimarosti, Dan	Submit a Section 10 and/or Section 404 permit application if needed.	Section 10 and/or Section 404 permit not needed.
U.S. Army Corps of Engineers	Laux, Eric	Brad Thompson: A closed loop drilling system is recommended due to proximity to Lake Sakakawea. Coordinate with the EPA, USFWS, North Dakota Game and Fish Department, SHPO. Consult the floodplain management office. Submit Section 404 permit application if necessary.	Enerplus uses the semi-closed-loop system with a pit for cuttings only as a matter of practice. Necessary consultations have been, or will be, made. Section 404 permit not needed.

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Organization	Name	Comment	Response to Comment
U.S. Army Corps of Engineers	Sorenson, Charles	<p>Due to the close proximity to the Missouri River/Lake Sakakawea, please consider the use of a catch trench located on the down sloping side of the well pad. Accumulated fluids should be pumped out and disposed of properly. USACE also recommends that the well pad have an impervious type liner placed on the well pad prior to build up of the pad. USACE strongly recommends that a closed loop drilling method be used. If applicable, all sewage collection systems be of a closed design and all holding tanks are to be either double walled or contained in a secondary containment system. All sewage waste removed from the well site location should be disposed of properly. Additional weed-free fill material should be obtained from a supplier. Equipment should be cleaned off Tribal lands to prevent transportation of weeds onto Tribal or U.S. Army Corps of Engineers lands. Do not allow surface occupancy within 1/2 mile of any known threatened and endangered species critical habitat. Construction time frame recommendations made. Cumulative impacts should be adequately addressed.</p>	<p>See Section 2.2.8, Construction Details, for information regarding berms, trenches, and liners. Enerplus uses the semi-closed-loop system with a pit for cuttings only as a matter of practice. No additional fill material is required. Enerplus will treat any noxious weeds within the project area. No surface occupancy would be allowed within 0.5 mile of any known threatened and endangered habitat. See Section 3.16, Cumulative Impacts, for cumulative impacts analysis.</p>
U.S. Bureau of Reclamation	Nelson, Richard	<p>Kelly McPhillips: Project components would affect Bureau of Reclamation facilities (rural water pipelines). Please review enclosed map for potential adverse effects and proper pipeline crossing, should that be necessary. Coordinate with the Reclamation Rural Water Director.</p>	<p>See Section 2.2.3, Access Roads and Utility Corridors. Enerplus would consult with the Rural Water Director if the project components should come into contact with any Bureau of Reclamation rural water lines.</p>
U.S. Department of Agriculture	Sweeney, Paul	No Comment	
U.S. Environmental Protection Agency	Dhieux, Joyce	No Comment	

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<b>Organization</b>	<b>Name</b>	<b>Comment</b>	<b>Response to Comment</b>
U.S. Environmental Protection Agency	Hefferman, Dan	No Comment	
U.S. Environmental Protection Agency	Svoboda, Larry	No Comment	
U.S. Fish and Wildlife Service	Towner, Jeffrey	Comments given during USFWS scoping	Please see Sections 3.7 and 3.13.
United States Environmental Protection Agency	Truskowski, Brent	No Comment	
Ward County Board of Commissioners	Erickson, Carroll	No Comment	
West Plains Electric Cooperative, Inc.	Schelkoph, David	No Comment	
Western Area Power Administration	Paulson, Gerald	No Comment	
Williams Production RMT CO.	Head, Jennifer	No Comment	
Xcel Energy	Manager	No Comment	
Zenergy Operating Company	Bryan, Kelley	No Comment	

## **5.0 LIST OF PREPARERS**

An interdisciplinary team contributed to this document according to guidance provided in Part 1502.6 of CEQ regulations. This document was drafted by SWCA Environmental Consultants under the direction of the BIA. Information was compiled from various sources within SWCA Environmental Consultants.

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- Rachael Overbey, Engineering Technician

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*Prepared the EA.*
- Joey Sheeley, Project Manager/Planning Specialist  
*Reviewed and edited the EA.*
- Laura Burckhard, Ecologist, and Chris Kirol, Wildlife Biologist  
*Conducted natural resource surveys for well pads and access roads.*
- Alan Hutchinson, Natalie Fewings, and Andrew Lantz, Archaeologists  
*Conducted cultural resource surveys.*
- Mike Retter and Sarah Bear, Archaeologists  
*Conducted prepared cultural resource reports for well pads and access roads.*
- Wade Epperson, GIS Specialist, and Kimberly Ip, Biologist  
*Created maps and spatially derived data.*

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## **7.0 ACRONYMS AND ABBREVIATIONS**

°F	degrees Fahrenheit
AAQS	ambient air quality standards
ADT	average daily traffic
APD	Application for Permit to Drill
AQI	air quality index
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH <sub>4</sub>	methane
CIA	cumulative impact area
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CWA	Clean Water Act
EA	environmental assessment
EIS	environmental impact statement
EJ	Environmental Justice
Enerplus	Enerplus Resources (USA) Corporation
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FHWA	Federal Highway Administration
GHG	greenhouse gas
H <sub>2</sub> S	hydrogen sulfide
HAP	hazardous air pollutant
HF	hydraulic fracturing
HUC	hydrologic unit code
IPCC	Intergovernmental Panel on Climate Change
IRR	Indian Reservation Roads
MBTA	Migratory Bird Treaty Act
MHA Nation	Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation
N <sub>2</sub> O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NDCC	North Dakota Century Code
NDDA	North Dakota Department of Agriculture
NDDH	North Dakota Department of Health
NDDOT	North Dakota Department of Transportation
NDIAC	North Dakota Indian Affairs Commission
NDIC	North Dakota Industrial Commission
NEPA	National Environmental Policy Act
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxide



NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
O <sub>3</sub>	ozone
PEM	palustrine emergent
PM	particulate matter
ppm	parts per million
Reservation	Fort Berthold Indian Reservation
ROW	right-of-way
SO <sub>2</sub>	sulfur dioxide
THPO	Tribal Historic Preservation Officer
TMD	total measured depth
TRNP	Theodore Roosevelt National Park
TRNP-NU	Theodore Roosevelt National Park North Unit
TVD	total vertical depth
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

**APPENDIX A**  
**Threatened and Endangered Species in Dunn County**

## SPECIES ACCOUNTS AND EFFECTS DETERMINATIONS

### ENDANGERED SPECIES ACT

#### **Black-footed Ferret (*Mustela nigripes*)**

**Affects Determination:** No Effect

Black-footed ferrets are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys* sp.) ecosystem (Kotliar et al. 1999). They have been listed by the U.S. Fish and Wildlife Service (USFWS) as endangered since 1967, and have been the object of extensive re-introduction programs (USFWS 2010a). Ferrets inhabit extensive prairie dog complexes of the Great Plains, typically composed of several smaller colonies in proximity to one another that provide a sustainable prey base. The *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) states that ferrets require black-tailed prairie dog (*Cynomys ludovicianus*) towns or complexes greater than 80 acres in size, and towns of this dimension may be important for ferret recovery efforts (USFWS 1988a). Prairie dog towns of this size are not found in the project area. In addition, this species has not been observed in the wild for more than 20 years. The proposed project would have **no effect** on this species.

#### **Gray Wolf (*Canis lupus*)**

**Affects Determination:** No Effect

The gray wolf, listed as endangered in the United States in 1978, was believed extirpated from North Dakota in the 1920s and 1930s with only sporadic reports from the 1930s to present (Licht and Huffman 1996). The presence of wolves in most of North Dakota consists of occasional dispersing animals from Minnesota and Manitoba (Licht and Fritts 1994; Licht and Huffman 1996). Most documented gray wolf sightings that have occurred within North Dakota are believed to be young males seeking to establish territory (Hagen et al. 2005). The Turtle Mountains region in north-central North Dakota provides marginal habitat that may be able to support a very small population of wolves. The closest known pack of wolves is the Minnesota population located approximately 28 kilometers (km) from the northeast corner of North Dakota.

The gray wolf uses a variety of habitats that support a large prey base, including montane and low-elevation forests, grasslands, and desert scrub (USFWS 2010b). Due to a lack of forested habitat and distance from Minnesota and Manitoba populations, as well as the troubled relationship between humans and wolves and their vulnerability to being shot in open habitats (Licht and Huffman 1996), the re-establishment of gray wolf populations in North Dakota is unlikely. Additionally, habitat fragmentation, in particular road construction as a result of oil and gas development, may further act as a barrier against wolf recolonization in western North Dakota. Therefore, the proposed project would have **no effect** on the gray wolf.

#### **Whooping Crane (*Grus americana*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The whooping crane was listed as endangered in 1970 in the United States by the USFWS, and in 1978 in Canada. Historically, population declines were caused by shooting and

destruction of nesting habitat in the prairies from agricultural development. Current threats to the species includes habitat destruction, especially suitable wetland habitats that support breeding and nesting, as well as feeding and roosting during their fall and spring migration (Canadian Wildlife Service and USFWS 2007).

The July 2010 total wild population was estimated at 383 (USFWS 2010c). There is only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, which nests in Wood Buffalo National Park and adjacent areas in Canada, where approximately 83% of the wild nesting sites occur (Canadian Wildlife Service and USFWS 2007; USFWS 2010c). Dunn County, including the project area, is within the primary migratory flyway of whooping cranes.

Whooping cranes probe the soil subsurface with their bills for foods on the soil or vegetation substrate (Canadian Wildlife Service and USFWS 2007). Whooping cranes are omnivores and foods typically include agricultural grains, as well as insects, frogs, rodents, small birds, minnows, berries, and plant tubers. The largest amount of time during migration is spent feeding in harvested grain fields (Canadian Wildlife Service and USFWS 2007). Studies indicate that whooping cranes use a variety of habitats during migration, in addition to cultivated croplands, and generally roost in small palustrine (marshy) wetlands within 1 km of suitable feeding areas (Howe 1987, 1989). Whooping cranes have been recorded in riverine habitats during their migration, with eight sightings along the Missouri River in North Dakota (Canadian Wildlife Service and USFWS 2007:18). In these cases, they roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Suitable whooping crane foraging habitat (i.e., cultivated cropland) was observed near the project area. If suitable whooping crane habitat exists within 1 mile of the project area, underground utility lines will be utilized. If underground power lines are deemed inappropriate, visual marking devices will be placed on new power lines plus an equal length of existing power line within 1 mile of suitable wetland roosting habitat. Additionally, project precautionary measures would be implemented if a whooping crane is sighted in or near the project area. Enerplus would cease all drilling and construction activities and notify the USFWS and Bureau of Indian Affairs (BIA) of the sighting, should a crane be spotted within 1 mile of the project area. As a result, the proposed project **may affect, but is not likely to adversely affect** the endangered whooping crane.

#### **Piping Plover (*Charadrius melodus*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The piping plover is a small shorebird which breeds only in three geographic regions of North America: the Atlantic Coast, the Northern Great Plains, and the Great Lakes. Piping plover populations were federally listed as threatened and endangered in 1985, with the Northern Great Plains and Atlantic Coast populations listed as threatened, and the Great Lakes population listed as endangered (USFWS 1985a).

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2010d). The shorelines of lakes of the Missouri River

constitute significant nesting areas for the bird. Piping plovers nest on the ground, making shallow scrapes in the sand, which they line with small pebbles or rocks (USFWS 1988b). Anthropogenic alterations of the landscape along rivers and lakes where piping plover nest have increased the number and type of predators, subsequently decreasing nest success and chick survival (USFWS 2002, 2010d). The birds fly south by mid to late August to areas along the Texas coast and Mexico (USFWS 2002). The Northern Great Plains population has continued to decline despite federal listing, with population estimates of 1,500 breeding pairs in 1985 reduced to fewer than 1,100 in 1990. Low survival of adult birds has been identified as a factor (Root et al. 1992). Current conservation strategies include identification and preservation of known nesting sites, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 1988b, 2010d).

Suitable shoreline habitat for breeding and nesting plovers does not occur in the project area, and Lake Sakakawea is a minimum of 16.2 river miles from the proposed well pads and access roads. It is unlikely that migrating plovers would visit the project during their migration. Additionally, semi-closed-loop drilling systems will be used, all locations will comply with BIA Conditions of Approval (COAs), the interior floor of the drilling pad will be sloped away from drainage ways, and cutting pit liners will be a minimum of 20-millimeter (mm) thickness. Therefore, the proposed project **may affect, but is not likely to adversely affect** piping plovers.

#### **Designated Critical Habitat of Piping Plover**

**Affect Determination:** No Effect

The USFWS has Designated Critical Habitat for the Great Lakes and Northern Great Plains populations of piping plover (USFWS 2002). Designated Critical Habitat for the piping plover includes 183,422 acres and 1,207.5 river miles of habitat, including areas near the proposed project, along the shoreline of Lake Sakakawea in McKenzie County, North Dakota (USFWS 2002).

Since the project would not modify, alter, disturb, or affect the shoreline of Lake Sakakawea or any of its tributary streams in any way, **no effect** to Designated Critical Habitat of the piping plover would occur.

#### **Interior Least Tern (*Sterna antillarum*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The interior population of the least tern is listed as endangered by the USFWS (1985b). This bird is the smallest member of the gull and tern family, measuring approximately 9 inches in length. Terns remain near flowing water, where they feed by hovering over and diving into standing or flowing water to catch small fish (USFWS 2010e).

The interior population of least terns breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults continue to care for chicks after they hatch. Least terns in North Dakota are often found sharing sandbars with the piping plover, a threatened species (USFWS 2010e).

Census data indicate over 8,000 least terns in the interior population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone rivers upstream of Lake Sakakawea (USFWS 1990a, 2010e). Approximately 100 pairs breed in North Dakota (USFWS 2010e). Details of their migration are not known, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2010e).

Loss of suitable breeding and nesting habitat for terns has resulted from dam construction and river channelization on major rivers throughout the Mississippi, Missouri, and Rio Grande River systems. River and reservoir changes have led to reduced sandbar formation and other shoreline habitats for breeding, resulting in population declines. In addition, other human shoreline disturbances affect the species (USFWS 1990a). Critical Habitat has not been designated for the species (USFWS 2010e).

Current conservation strategies include identification and avoidance of known nesting areas, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 2010e).

Suitable shoreline habitat for breeding and nesting plovers does not occur in the project area, and Lake Sakakawea is a minimum of 16.2 river miles from the proposed well pads and access roads. It is unlikely that terns would visit the upland habitats present in the project area. Additionally, semi-closed-loop drilling systems will be used, all locations will comply with BIA COAs, the interior floor of the drilling pad will be sloped away from drainage ways, and cutting pit liners will be a minimum of 20-ml thickness. Therefore, the proposed project **may affect, but is not likely to adversely affect** endangered least terns.

### **Sprague's Pipit (*Anthus spragueii*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The Sprague's pipit is a small passerine, 10 to 15 centimeters in length, endemic to the Northern Great Plains (USFWS 2010f). The Sprague's pipit requires large tracts of native prairie habitats, unplowed, throughout their life cycle. Because native grasslands are disturbance dependent, Sprague's pipit prefers grassland habitat that are regularly disturbed. The frequency of disturbance required for habitat maintenance depends on how quickly grasses grow to an intermediate height (4 to 12 inches) following a disturbance event.

In North Dakota, Sprague's pipit has been found in areas of moderate grazing. Sprague's pipits are sensitive to patch size and avoid edges between grasslands and other habitat features (USFWS 2010f). They may avoid non-grassland features including roads, trails, oil wells, croplands, woody vegetation, and wetlands. The Sprague's pipit is reported to stay up to 350 meters (m) away from anthropogenic features such as roads, oil wells, and wind turbines (USFWS 2010f). The USFWS has estimated that each new oil well and associated road in North Dakota results in potential impacts approximately 51 acres of pipit habitat due to avoidance and habitat fragmentation (USFWS 2010f). Due to increasing habitat fragmentation, especially by energy development, throughout the Sprague's pipit range and the loss of native prairie habitat, the Sprague's pipit was listed as a Candidate Species under the ESA in 2010 (USFWS 2010f).



In North Dakota, Sprague's pipit breeds throughout the state except for the easternmost counties. During the breeding season they prefer large patches of well drained, open native grassland with a minimum size of 358.3 acres (range = 170 to 776 acres). They have not been observed in areas smaller than 71.6 acres on their breeding grounds (USFWS 2010f).

Sprague's pipits were not observed within the project area during surveys in May and July 2011. Native prairie habitat with grasses of intermediate height does occur within the project area. However, the habitat within and surrounding the project area has been previously disturbed by agriculture, roads, and oil and gas development. The proposed project is unlikely to directly affect habitat due to lack of adequate patch sizes required by the Sprague's pipit for breeding grounds in the immediate project area, but may indirectly contribute to reduced use of any nearby suitable grassland habitat patches within 350 m of the proposed new facilities. Therefore, the proposed project **may affect, but is not likely to adversely affect** Sprague's pipit.

**Pallid Sturgeon (*Scaphirhynchus albus*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The pallid sturgeon was listed as Endangered in 1990 in the United States by the USFWS (1990b). The primary factor leading to the decline of this species is the alteration of habitat through river channelization, creation of impoundments, and alteration of flow regimes (USFWS 1990b). These alterations within the Missouri River have blocked movements to spawning, feeding, and rearing areas, destroyed spawning habitat, altered flow conditions which can delay spawning cues, and reduced food sources by lowering productivity (USFWS 2007a). The fundamental elements of pallid sturgeon habitat are defined as the bottom of swift waters of large, turbid, free-flowing rivers with braided channels, dynamic flow patterns, flooding of terrestrial habitats, and extensive microhabitat diversity (USFWS 1990b).

The pallid sturgeon population which is found near the project area occurs from the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up the confluence of the Tongue River, Montana (USFWS 2007a). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007a). Hatchery reared sturgeon have also been stocked since 1998. The pallid sturgeon has been found to utilize the 25 km of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996 per USFWS 2007a). Larval pallid sturgeons have also been found to drift into Lake Sakakawea. While the majority of pallid sturgeons are found in the headwaters of Lake Sakakawea, North Dakota Game and Fish have caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook area. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, U.S. Fish and Wildlife Service, to Mike Cook, Aquatic Ecologist, SWCA Environmental Consultants, September 3, 2010).

Suitable habitat for pallid sturgeon does not occur in the project area, and Lake Sakakawea is a minimum of 16.2 river miles from the proposed well pads and access roads. However, Upper Squaw Creek, which drains the project area, is a perennial tributary to the Missouri

River in Lake Sakakawea. Potential pollution and sedimentation occurring within the project area are concerns for downstream populations of endangered pallid sturgeon. Activities associated with the construction, production, or reclamation of the proposed project area are not anticipated to adversely affect water quality and subsequently the pallid sturgeon. Additionally, semi-closed-loop drilling systems will be used, all locations will comply with BIA COAs, the interior floor of the drilling pad will be sloped away from drainage ways, and cutting pit liners will be a minimum of 20-in thickness. Therefore, the proposed project **may affect, but is not likely to adversely affect** pallid sturgeon.

**Dakota Skipper (*Hesperia dacotae*)**

**Affect Determination:** May Affect, Is Not Likely to Adversely Affect

The Dakota skipper is a small butterfly with a 1-inch wingspan and is found primarily in undisturbed native tall grass and upland dry mixed grass prairie areas with a high diversity of wildflowers and grasses (Committee on the Status of Endangered Wildlife in Canada 2003). The Dakota skipper appears to require a range of precipitation-evaporation ratios between 60 and 105 and a soil pH between 7.2 and 7.9 (McCabe 1981). Larvae feed on grasses, favoring little bluestem. Adults commonly feed on nectar of flowering native forbs such as harebell (*Campanula rotundifolia*), wood lily (*Lilium philadelphicum*), and purple coneflower (*Echinacea purpurea*). The species is threatened by conversion of native prairie to cultivated agriculture or shrublands, over-grazing, invasive species, gravel mining, and inbreeding (USFWS 2005). Dakota skippers are not known to occur within the project area; however, suitable habitat does occur. The proposed project **may affect, but is not likely to adversely affect** this species. The use of best management practices and conservation guidelines (USFWS 2007b) during construction and operation and immediate reclamation of short-term disturbance should decrease direct, indirect, and cumulative impacts to this species.

**MIGRATORY BIRD TREATY ACT / THE BALD AND GOLDEN EAGLE PROTECTION ACT**

**Bald Eagle (*Haliaeetus leucocephalus*)**

**Status:** Delisted in 2007; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

**Effects of Project:** No adverse effects anticipated

Suitable nesting or foraging habitat for bald eagles includes old growth trees relatively close (usually less than 1.24 miles [Hagen et al. 2005]) to perennial waterbodies. The project area does not contain old growth trees and the closest well pad is 16.2 miles from Lake Sakakawea and 10.2 miles from the Little Missouri River. Eagle nesting surveys will be conducted between March 1 and May 15, before leaf-out at the well pads in Section 29, T149N, R93W. Therefore, no adverse effects are anticipated.

**Golden Eagle (*Aquila chrysaetos*)**

**Status:** Not Listed; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

**Effects of Project:** No adverse effects anticipated

No golden eagles or nests were observed during the field surveys, however, golden eagles may occur within or near the project area. The golden eagle prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. The closest known golden eagle nest (Nest ID GE269) is located a minimum of 3.8 miles from the proposed wells pads. However, no primary or secondary indication of golden eagle presence, including nests, was observed within or near the project area during the field survey. Nesting habitat was not observed. Therefore, the project is unlikely to cause any adverse effects to golden eagles.

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# United States Department of the Interior

BUREAU OF INDIAN AFFAIRS  
Great Plains Regional Office  
115 Fourth Avenue S.E. Suite 400  
Aberdeen, South Dakota 57401



IN REPLY REFER TO:  
DESCRM  
MC-208

AUG 25 2011

Elgin Crows Breast, THPO  
Mandan, Hidatsa and Arikara Nation  
404 Frontage Road  
New Town, North Dakota 58763

Dear Mr. Crows Breast:

We have considered the potential effects on cultural resources of a proposed quadruple oil well pad and access road in Dunn County, North Dakota. Approximately 236.88 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the areas depicted in the enclosed reports. Three archaeological sites (32DU1643, 32DU1644, 32DU1645) were located which may possess the quality of integrity and meet at least one of the criteria (36 CFR 60.4) for inclusion on the National Register of Historic Places. No properties were located that appear to qualify for protection under the American Indian Religious Freedom Act (42 USC 1996).

As the surface management agency, and as provided for in 36 CFR 800.5, we have therefore reached a determination of **no historic properties affected** for these undertakings, as the archaeological sites will be avoided. Catalogued as **BIA Case Number AAO-1981/FB/11**, the proposed undertakings, locations, and project dimensions are described in the following reports:

Boyer, Noelle, and Sarah Johnson

(2011) A Class I and Class III Cultural Resources Inventory of the Round House #148-93-22D-21H, Log House #148-93-22D-21HTF, Schwinn #148-93-23D-21HTF and Huffy #148-93-23C-21HTF Well Pad and Access Road, Fort Berthold Indian Reservation, Dunn County, North Dakota. SWCA Environmental Consultants for Enerplus Resources, Denver.

Boyer, Noelle, and Todd Kohler

(2011) A Class I and Class III Cultural Resources Inventory of the Earth Lodge #148-93-22A-21HTF, Tipi #148-93-22A-21H, BMX #148-93-23B-24HTF and Huffy #148-93-23B-21H Well Pad and Access Road, Fort Berthold Indian Reservation, Dunn County, North Dakota. SWCA Environmental Consultants for Enerplus Resources, Denver.

Johnson, Sarah

(2011) A Class I and Class III Cultural Resources Inventory of the Arnica #149-93-21A-22HTF and Chokecherry #149-93-21A-22H; Morgan #149-93-29B-32HTF and Arabian #148-93-29B-32H; Pinto #149-93-29A-32HTF and Mustang #149-93-29A-32H; and Wormwood #149-93-21C-22H and Bluestem #149-93-21C-22HTF Well Pads and Access Road, Fort Berthold Indian Reservation, Dunn County, North Dakota. SWCA Environmental Consultants for Enerplus Resources, Denver.

If your office concurs with this determination, consultation will be completed under the National Historic Preservation Act and its implementing regulations. We will adhere to the Standard Conditions of Compliance.



If you have any questions, please contact Dr. Carson N. Murdy, Regional Archaeologist,  
at (605) 226-7656.

Sincerely,

A handwritten signature in black ink, appearing to read 'C. N. Murdy', written in a cursive style.

Regional Director

Enclosures

cc: Chairman, Three Affiliated Tribes  
Superintendent, Fort Berthold Agency





United States Department of the Interior  
BUREAU OF RECLAMATION



Dakotas Area Office  
P.O. Box 1017  
Bismarck, North Dakota 58502

JUN 16 2011

DK-5000  
ENV-6.00

Joey Sheeley  
Planning Specialist  
SWCA Environmental Consultants  
1892 South Sheridan Avenue  
Sheridan, WY 82801

Subject: Solicitation for an Environmental Assessment for the Proposed Construction of Twelve Exploratory Oil and Gas Wells on six 2-Well Pads on the Fort Berthold Indian Reservation in Dunn County, North Dakota

This letter is written to inform you that we received your letter on June 7, 2011, and the information and map of your proposed 12 wells at six well pads have been reviewed by Bureau of Reclamation staff.

The proposed well pads and short connecting access road located in Dunn County appear to be in the immediate vicinity of Reclamation facilities, in this case the rural water pipelines of the Fort Berthold Rural Water System. Your map does not include your design for access roads. Please note that municipal, rural, and industrial water lines commonly follow roads. Therefore, we have provided a map of the general area and associated federal pipelines in the vicinity of your proposed project:

The Bass and Trout Well Pad: NE $\frac{1}{4}$ NW $\frac{1}{4}$ , Section 25, T149N, R94W, PM 5 Dunn

The Hyena and Cheetah Well Pad: SE $\frac{1}{4}$ SE $\frac{1}{4}$ , Section 31, T149N, R93W, PM 5 Dunn

The Morgan and Arabian Well Pad: SW $\frac{1}{4}$ SW $\frac{1}{4}$ , Section 32, T149N, R93W, PM 5 Dunn

The Mustang and Pinto Well Pad: SW $\frac{1}{4}$ SE $\frac{1}{4}$ , Section 32, T149N, R94W, PM 5 Dunn

The Armica and Chokecherry Well Pad: SE $\frac{1}{4}$ NE $\frac{1}{4}$ , Section 20, T149N, R93W, PM 5 Dunn

The Bluestem and Wormwood Well Pad: NW $\frac{1}{4}$ SW $\frac{1}{4}$ , Section 21, T149N, R93W, PM 5 Dunn

The map is provided to aid you in identification of potential for adverse effect to or crossings of federal facilities. Should you have need to cross a Fort Berthold Rural Water System pipeline





while accessing your proposed project, please refer to the enclosures for pipeline crossing specifications and contact our engineer Colin Nygaard, as below. Since Reclamation is the lead federal agency for the Fort Berthold Rural Water System, we request that any work planned on the reservation be coordinated with Mr. Lester Crows Heart, Fort Berthold Rural Water Director, Three Affiliated Tribes, 308 4 Bears Complex, New Town, North Dakota 58763.

Thank you for providing the information and opportunity to comment. If you have any further environmental questions, please contact me at 701-221-1287 or for engineering questions Colin Nygaard, Civil Engineer, at 701-221-1260.

Sincerely,



Kelly B. McPhillips  
Environmental Specialist

Enclosures - 2

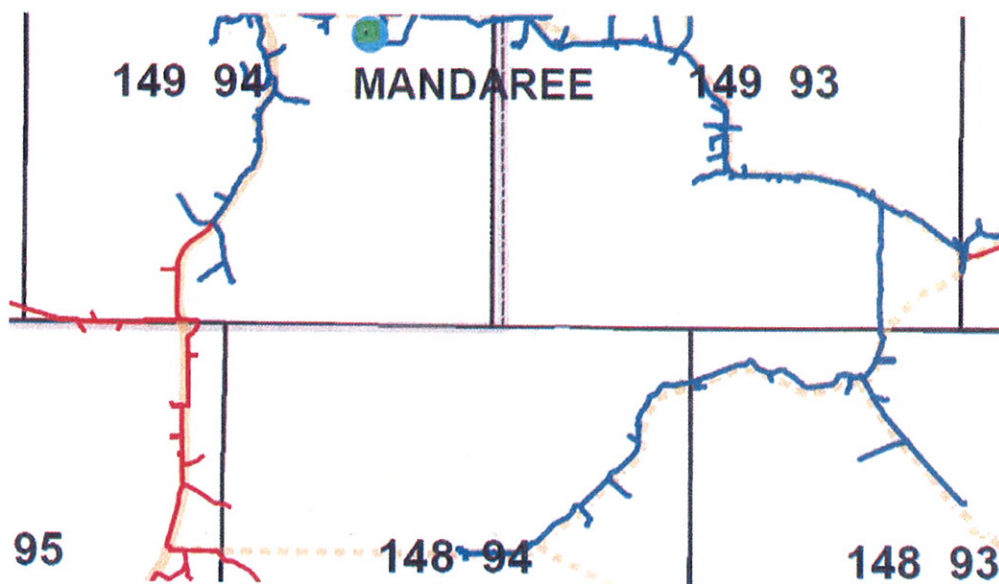
cc: Bureau of Indian Affairs  
Great Plains Regional Office  
Attention: Ms. Marilyn Bercier  
Regional Environmental Scientist  
115 Fourth Avenue S.E.  
Aberdeen, SD 57401

Mr. Lester Crows Heart  
Fort Berthold Rural Water Director  
Three Affiliated Tribes  
308 4 Bears Complex  
New Town, ND 58763  
(w/encl)



Subject: Solicitation for an Environmental Assessment for the Proposed Construction of Twelve Exploratory Oil and Gas Wells on six 2-Well Pads on the Fort Berthold Indian Reservation in Dunn County, North Dakota

Orange and blue solid lines represent rural water lines.



Bass and Trout Well Pad: NE ¼ NW ¼, Section 25, T149N, R94W, PM 5 Dunn - Hyena and Cheetah Well Pad: SE ¼ SE ¼, Section 31, T149N, R93W, PM 5 Dunn  
Morgan and Arabian Well Pad: SW ¼ SW ¼, Section 32, T149N, R93W, PM 5 Dunn - Mustang and Pinto Well Pad: SW ¼ SE ¼, Section 32, T149N, R94W, PM 5 Dunn  
Arnica and Chokecherry Well Pad: SE ¼ NE ¼, Section 20, T149N, R93W, PM 5 Dunn - Bluestem and Wormwood Well Pad: NW ¼ SW ¼, Section 21, T149N, R93W, PM 5 Dunn









Sound Science. Creative Solutions.

Sheridan Office  
1892 South Sheridan Avenue  
Sheridan, WY 82801  
307.673.4303  
www.swca.com

June 3, 2011

Dear Interested Party:

The Bureau of Indian Affairs (BIA) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA), in cooperation with the Bureau of Land Management (BLM). The proposed action includes approval by the BIA and BLM for the construction, drilling, completion and production of twelve exploratory oil and gas wells on the Fort Berthold Reservation by Enerplus Resources Corporation (Enerplus). The surface positions for six well pads, designed for accommodate 2 wells each, are proposed in the following locations and shown on the enclosed project location map:

Wells located within 1,280-acre spacing:

- The Bass 149-94-25B-36H TF and Trout 149-94-25B-36H, located in the NE $\frac{1}{4}$  NW $\frac{1}{4}$ , Section 25, T149N, R94W, Dunn County, North Dakota, is a single well pad with two wells.
- The Hyena 149-93-19D-31H TF and Cheetah 149-93-19D-31H wells, located in the SE $\frac{1}{4}$  SE $\frac{1}{4}$ , Section 31, T149N, R93W, Dunn County, North Dakota, is a single well pad with two wells.
- The Morgan 149-93-29B-32H TF and Arabian 149-93-29B-32H wells, located in SW $\frac{1}{4}$  SW $\frac{1}{4}$ , Section 32, T149N, R93W, Dunn County, North Dakota, is a single well pad with two wells.
- The Mustang 149-93-29A-32H TF and Pinto 149-93-29A-32H wells, located in the SW $\frac{1}{4}$  SE $\frac{1}{4}$ , Section 32, T149N, R94W, Dunn County, North Dakota, is a single well pad with two wells.
- The Arnica 149-93-21A-22H TF and Chokecherry 149-93-21A-22H wells, located in the SE $\frac{1}{4}$  NE $\frac{1}{4}$ , Section 20, T149N, R93W, Dunn County, North Dakota, is a single well pad with two wells.
- The Bluestem 149-93-21C-22H TF and Wormwood 149-93-21C-22H wells, located in the NW $\frac{1}{4}$  SW $\frac{1}{4}$ , Section 21, T149N, R93W, Dunn County, North Dakota, is a single well pad with two wells.

Each well pad would include wells that would be drilled to the Bakken and to the Three Forks formations. The wells would be positioned to utilize existing roadways for access to the greatest extent possible. The drilling of these well sites is proposed to begin as early as November 1, 2011.

The associated facilities required by the project would include roads, utility lines, pipeline and production facilities, and equipment storage facilities. Enerplus also proposes to construct and install oil, gas, and water gathering pipelines along the proposed access roads from the well pad to the existing improved roads that provide access, including BIA 12 and 17. A buried electric line would be installed in the future. The utility corridor would be part of the proposed ROW and no additional disturbance is anticipated.





Enerplus would use existing roads and previous disturbances to the greatest extent practicable. Surface disturbance from the Project would result from the construction 3.68 miles of new or upgraded/improved roads with co-located utility corridors to access the six well pads, plus approximately 24 acres of disturbance for the well pads.

To ensure that any affect on social, economic, and environmental issues are analyzed accurately, we solicit your views and comments on the proposed action, pursuant to Section 102(2) (D) (IV) of NEPA, as amended. We are interested in developments proposed or underway that should be considered in connection with the proposed project. We also ask your assistance in identifying any property or resources that you own, manage, oversee or otherwise value that might be adversely impacted. Please send your replies and requests for additional project information to:

SWCA Environmental Consultants  
Joey Sheeley, Planning Specialist  
1892 South Sheridan Avenue  
Sheridan, WY 82801  
(307) 673-4303  
[jsheeley@swca.com](mailto:jsheeley@swca.com)

Comments should be submitted before July 1, 2011 so that they may be addressed in the final document. Questions for the BIA can be directed to Marilyn Bercier, Regional Environmental Scientist, or Mark Herman, Environmental Engineer, at (605) 226-7656.

Sincerely,




Joey Sheeley



US Department  
of Transportation  
Federal Aviation  
Administration

Date 6/21/11

No objection provided the Federal Aviation Administration is notified of construction or alterations as required by Federal Aviation Regulations, Part 77, Objects Affecting Navigable Airspace, Paragraph 77.9. Notice may be filed on-line at <https://oeaaa.faa.gov>.



Patricia L. Dressler, Environmental Protection Specialist  
FAA/Bismarck Airports District Office  
2301 University Drive, Building 23B  
Bismarck, ND 58504



United States Department of Agriculture



Natural Resources Conservation Service  
P.O. Box 1458  
Bismarck, ND 58502-1458

---

June 28, 2011

Joey Sheeley  
SWCA Environmental Consultants  
Sheridan Office  
1892 South Sheridan Avenue  
Sheridan, WY 82801

RE: Six well pads, designed for accommodating 2 wells each.  
Bass, Hyena, Morgan, Mustang, Arnica, and Bluestem  
Fort Berthold Reservation

Dear Mr. Sheeley:

The Natural Resources Conservation Service (NRCS) has reviewed your letter dated June 3, 2011, regarding wells and pads on the Fort Berthold Reservation.

*Important Farmlands* - NRCS has a major responsibility with Farmland Policy Protection Act (FPPA) in documenting conversion of farmland (i.e., prime, statewide, and local importance) to non-agricultural use. It appears your proposed project is not supported by Federal funding or actions; therefore, no further action is required.

*Wetlands* - The Wetland Conservation Provisions of the 1985 Food Security Act, as amended, provide that if a USDA participant converts a wetland for the purpose of, or to have the effect of, making agricultural production possible, loss of USDA benefits could occur. NRCS has developed the following guidelines for the installation of buried utilities. If these guidelines are followed, the impacts to the wetland(s) will be considered minimal allowing USDA participants to continue to receive USDA benefits. Following are the requirements: 1) Disturbance to the wetland(s) must be temporary, 2) no drainage of the wetland(s) is allowed (temporary or permanent), 3) mechanized landscaping necessary for installation is kept to a minimum and preconstruction contours are maintained, 4) temporary side cast material must be placed in such a manner not to be dispersed in the wetland, and 5) all trenches must be backfilled to the original wetland bottom elevation.

*Helping People Help the Land*

An Equal Opportunity Provider and Employer

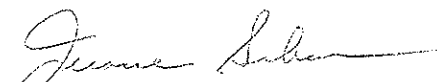


Mr. Sheeley  
Page 2

NRCS would recommend that impacts to wetlands be avoided. If the project requires passage through or disturbance of a wetland, NRCS can complete a certified wetland determination, if requested by the landowner/operator.

If you have additional questions pertaining to FPPA, please contact Steve Sieler, State Soil Liaison, at (701) 530-2019.

Sincerely,

  
JEROME SCHAAR  
State Soil Scientist/MO Leader







REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
CORPS OF ENGINEERS, OMAHA DISTRICT  
NORTH DAKOTA REGULATORY OFFICE  
1513 SOUTH 12<sup>TH</sup> STREET  
BISMARCK ND 58504-6640

June 8, 2011

North Dakota Regulatory Office

SWCA Environmental Consultants  
Attn: Joey Sheeley, Planning Specialist  
1892 South Sheridan Avenue  
Sheridan, Wyoming 82801

Dear Mr. Sheeley:

This is in response to your solicitation letter on behalf of Enerplus Resources Corporation received on June 06, 2011 requesting Department of the Army (DA), United States Army Corps of Engineers (Corps) comments for twelve proposed oil and gas exploratory wells from six well pads within the Fort Berthold Reservation. The proposed wells: **The Bass 149-94-25B-36H TF, Trout 149-94-25B-36H, Hyena 149-93-19D-31H TF and Cheetah 149-93-19D-3H, Morgan 149-93-29-32H TF, Arabian 149-93-29B-32H, Mustang 149-93-29A-32H TF, Pinto 149-93-29A-32H, Arnica 149-93-21A-22H TF, Chokeycherry 149-93-21A-22H, Bluesem 149-93-21C-22H TF and Wormwood 149-93-21C-22H located in Dunn County, North Dakota.**

Corps Regulatory Offices administer Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act regulates work in or affecting navigable waters. This would include work over, through, or under Section 10 water. Section 10 waters in North Dakota are the Missouri River (including Lake Sakakawea and Lake Oahe), Yellowstone River, James River south of Jamestown, North Dakota, Bois de Sioux River, Red River of the North, and the Upper Des Lacs Lake. Section 404 of the Clean Water Act regulates the discharge of dredge or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in waters of the United States.

For any proposed well where the well line and/or bottom hole is under or crosses under Lake Sakakawea, regardless of depth, we require that project proponent provide a DA permit application (ENG Form 4345) to the Corps.

Enclosed for your information is the fact sheet for Nationwide Permit 12, Utility Line Activities. Pipeline projects are already authorized by Nationwide Permit 12 **provided the utility line can be placed without any change to pre-construction contours and all other proposed construction activities and facilities are in compliance with the Nationwide's permit conditions and 401 Water Quality Certification is obtained**. Please note the pre-construction notification requirements on page 2 of the fact sheet. **If a project involves any one of the seven notification requirements, the project proponent must submit a DA application**. Furthermore, a project must also be in compliance with the "Regional Conditions for Nationwide Permits within the State of North Dakota", found on pages 12 and 13 of the fact sheet. [The following info is for activities on a reservation] Please be advised that the United States Environmental Protection Agency (EPA), Region 8 has denied 401 Water Quality Certification for activities in perennial drainages and wetlands. Furthermore, EPA has placed conditions on activities in ephemeral and intermittent drainages. It is recommended you contact the U.S. Environmental Protection



Agency, Region 8, Attn: Brent Truskowski, 1595 Wynkoop Street, Denver, Colorado 80202-1129 to review the conditions pursuant to Section 401 of the Clean Water Act prior to any construction.

Also enclosed for your information is the fact sheet for Nationwide Permit 14, Linear Transportation Projects. Road crossings are already authorized by Nationwide Permit 14 **provided the discharge does not cause the loss of greater than ½ acre of waters of the United States per crossing and all other proposed construction activities are in compliance with the Nationwide's permit conditions**. Please note the pre-construction notification requirements on the front page of the fact sheet. **If a project involves (1) the loss of waters of the United States exceeding 1/10 acre per crossing; or (2) there is a discharge in a special aquatic site, including wetlands, the project proponent must submit a DA application prior to the start of construction.** Please reference General Condition 27, Pre Construction Notification on page 8 of the fact sheet. Furthermore, a project must also be in compliance with the "Regional Conditions for Nationwide Permits within the State of North Dakota", found on pages 11 and 12 of the fact sheet. [The following is included for activities on a reservation] Enclosed is a copy of the United States Environmental Protection Agency, Region 8's; General Conditions for all Nationwide Permits and specific conditions for Nationwide Permit 14.

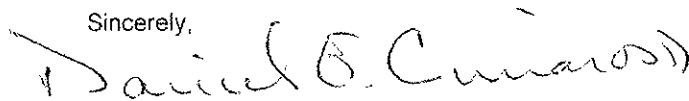
In the event your project requires approval from the U.S. Army Corps of Engineers and cannot be authorized by Nationwide Permit(s), a Standard or Individual Permit will be required. A project that requires a Standard or Individual Permit is intensely reviewed and will require the issuance of a public notice. A Standard or Individual Permit generally requires a minimum of 120 days for processing but based on the project impacts and comments received through the public notice may extend beyond 120 days.

**This correspondence letter is neither authorization for the proposed construction nor confirmation that the proposed project complies with the Nationwide Permit(s).**

If any of these projects require a Section 10 and/or Section 404 permit, please complete and submit the enclosed Department of the Army permit application (ENG Form 4345) to the U.S. Army Corps of Engineers, North Dakota Regulatory Office, 1513 South 12<sup>th</sup> Street, Bismarck, North Dakota 58504. If you are unsure if a permit is required, you may submit an application; include a project location map, description of work, and construction methodology.

If we can be of further assistance or should you have any questions regarding our program, please do not hesitate to contact this office by letter or phone at (701) 255-0015.

Sincerely,



Daniel E. Cimarosti  
Regulatory Program Manager  
North Dakota

Enclosure  
ENG Form 4345  
Fact Sheet NWP 12 and 14  
EPA 401 Conditions for Nationwide Permits

CF w/o encl  
EPA Denver (Brent Truskowski)





**NORTH DAKOTA**  
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION  
Gold Seal Center, 918 E. Divide Ave.  
Bismarck, ND 58501-1947  
701.328.5200 (fax)  
[www.ndhealth.gov](http://www.ndhealth.gov)



June 10, 2011

Joey Sheeley, Planning Specialist  
SWCA Environmental Consultants  
1892 South Sheridan Avenue  
Sheridan, WY 82801

Re: 12 Exploratory Oil & Gas Wells on 6 Well Pads  
by Enerplus Resources Corporation on the Fort Berthold Reservation  
in Dunn County, North Dakota

Dear Mr. Sheeley:

This department has reviewed the information concerning the above-referenced project submitted under date of June 3, 2011, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. Development of the production facilities and any access roads, well pads or pipelines should have a minimal effect on air quality provided measures are taken to minimize fugitive dust. However, operation of the wells has the potential to release air contaminants capable of causing or contributing to air pollution. We encourage the development and operation of the wells in a manner that is consistent with good air pollution control practices for minimizing emissions. Detailed information on the required air pollution control equipment and registration process can be found at [www.ndhealth.gov/AQ/OilAndGasWells.htm](http://www.ndhealth.gov/AQ/OilAndGasWells.htm).

Any questions about air pollution control or permitting requirements should be addressed to Ms. Kathleen Paser at the U.S. Environmental Protection Agency, Region 8. She may be reached at (303) 312-6526 or [Paser.Kathleen@epa.gov](mailto:Paser.Kathleen@epa.gov).

2. Aggregate to be used for road construction should not contain any erionite. Aggregate sources should be tested for erionite following guidelines found at [www.ndhealth.gov/EHS/Erionite](http://www.ndhealth.gov/EHS/Erionite). For questions regarding erionite testing, please call Mark Dihle at 701-328-5188.
3. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area

Environmental Health  
Section Chief's Office  
701.328.5150

Division of  
Air Quality  
701.328.5188

Division of  
Municipal Facilities  
701.328.5211

Division of  
Waste Management  
701.328.5166

Division of  
Water Quality  
701.328.5210



as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

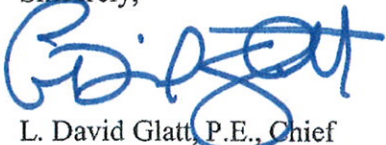
3. Oil and gas related construction activities located within tribal boundaries in North Dakota may be required to obtain a permit to discharge storm water runoff from the U.S. Environmental Protection Agency. Further information may be obtained from the U.S. EPA's website or by calling the U.S. EPA - Region 8 at (303) 312-6312. Also, cities or counties may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local storm water management considerations are addressed.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

These comments are based on the information provided about the project in the above-referenced submittal. The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,



L. David Glatt, P.E., Chief  
Environmental Health Section

LDG:cc

Attach.

cc: Mark Dihle, Division of Air Quality







## Construction and Environmental Disturbance Requirements

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

### **Soils**

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

### **Surface Waters**

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

### **Fill Material**

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.





REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
CORPS OF ENGINEERS, OMAHA DISTRICT  
1616 CAPITOL AVENUE  
OMAHA NE 68102-4901

June 22, 2011

Planning, Programs, and Project Management Division

SWCA

Attention: Joey Sheeley  
1892 South Sheridan Avenue  
Sheridan, Wyoming 82801

Dear Ms. Sheeley:

The U.S. Army Corps of Engineers, Omaha District (Corps) has reviewed your letter dated June 3, 2011, regarding the proposed development, drilling and completion of twelve wells on six well pads on the Fort Berthold Reservation in Dunn County, North Dakota. The Corps offers the following comments:

The Corps is aware of recent reports that describe environmental impacts associated with the use of oil waste pits in North Dakota. Oil waste pits may be susceptible to flooding, which may threaten drinking water supplies, wildlife, soil and other water resources. Due to the proximity of the proposed wells to Lake Sakakawea, a significant drinking water resource, the Corps requests the applicant consider using a closed loop drilling system. A closed loop drilling system may reduce or eliminate the discharge of toxic drilling wastes and their potential negative impacts to the environment.

Since the proposed project does not appear to be located within Corps owned or operated lands, we are providing no floodplain or flood risk information. To determine if the proposed project may impact areas designated as a Federal Emergency Management Agency special flood hazard area, please consult the following floodplain management office:

North Dakota State Water Commission  
Attention: Jeff Klein  
900 East Boulevard Avenue  
Bismarck, North Dakota 58505-0850  
jjkein@nd.gov  
T-701-328-4898  
F-701-328-3747

Your plans should be coordinated with the U.S. Environmental Protection Agency, which is currently involved in a program to protect groundwater resources. If you have not already done so, it is recommended you consult with the U.S. Fish and Wildlife Service and the North Dakota Game and Fish Department regarding fish and wildlife resources. In addition, the North Dakota State Historic Preservation Office should be contacted for information and recommendations on potential cultural resources in the project area.




Any proposed placement of dredged or fill material into waters of the United States (including jurisdictional wetlands) requires Department of the Army authorization under Section 404 of the Clean Water Act. You can visit the Omaha District's Regulatory website for permit applications and related information. Please review the information on the provided website (<https://www.nwo.usace.army.mil/html/od-r/district.htm>) to determine if this project requires a 404 permit. For a detailed review of permit requirements, preliminary and final project plans should be sent to:

U.S. Army Corps of Engineers  
Bismarck Regulatory Office  
Attention: CENWO-OD-R-ND/Cimarosti  
1513 South 12th Street  
Bismarck, North Dakota 58504

If you have any questions, please contact Mr. John Shelman of my staff at (402) 995-2708.

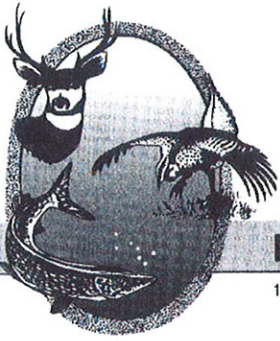
Sincerely,

A handwritten signature in black ink, appearing to read "Brad Thompson". The signature is fluid and cursive, with a large initial "B" and "T".

 Brad Thompson  
Chief, Environmental Resources and Missouri  
River Recovery Program Plan Formulation Section







"VARIETY IN HUNTING AND FISHING"

**NORTH DAKOTA GAME AND FISH DEPARTMENT**

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

June 28, 2011

Joey Sheeley  
Planning Specialist  
SWCA Environmental Consultants  
1892 South Sheridan Avenue  
Sheridan, WY 82801

Dear Ms. Sheeley:

RE: Bass 149-94-25B-36H TF & Trout 149-94-25B-36H  
Hyena 149-93-19D-31H TF & Cheetah 149-93-19D-31H  
Morgan 149-93-29B-32H TF & Arabian 149-93-29B-32H  
Mustang 149-93-29A-32H TF & Pinto 149-93-29A-32H  
Arnica 149-93-21A-22H TF & Chokecherry 149-93-21A-22H  
Bluestem 149-93-21C-22H TF & Wormwood 149-93-21C-22H

Enerplus Resources Corporation is proposing twelve exploratory oil and gas wells on six well pads on the Fort Berthold Reservation in Dunn & McKenzie Counties, North Dakota.

Our primary concern with oil and gas development is the fragmentation and loss of wildlife habitat associated with construction of the well pads and access roads. We recommend that construction be avoided to the extent possible within native prairie, wooded draws, riparian corridors, and wetland areas.

We also suggest that botanical surveys be completed during the appropriate season and aerial surveys be conducted for raptor nests before construction begins.

Sincerely,

Paul Schadewald  
Chief  
Conservation & Communication Division

js





**STATE  
HISTORICAL  
SOCIETY**  
OF NORTH DAKOTA

Jack Dalrymple  
*Governor of North Dakota*

North Dakota  
State Historical Board

Chester E. Nelson, Jr.  
*Bismarck - President*

Gerold Gerntholz  
*Valley City - Vice President*

Richard Kloubec  
*Fargo - Secretary*

Albert I. Berger  
*Grand Forks*

Calvin Grinnell  
*New Town*

Diane K. Larson  
*Bismarck*

A. Ruric Todd III  
*Jamestown*

Sara Otte Coleman  
*Director  
Tourism Division*

Kelly Schmidt  
*State Treasurer*

Alvin A. Jaeger  
*Secretary of State*

Mark A. Zimmerman  
*Director  
Parks and Recreation Department*

Francis Ziegler  
*Director  
Department of Transportation*

Merlan E. Paaverud, Jr.  
*Director*

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June 8, 2011

Mr. Joey Sheeley  
SWCA  
1892 South Sheridan Avenue  
Sheridan WY 82801

NDSHPO REF. 11-1617 BIA/Mandan Hidatsa Arikara Nation  
Environmental Assessment of Enerplus six dual well pads  
Bass & Trout [T149N R94W Section 25, NE NW] Dunn County  
Hyena and Cheetah [T149N R93W Section 31 SE SE] Dunn County  
Morgan and Arabian [T149N R93W Section 32 SW SW] Dunn County  
Mustang and Pinto [T149N R94W Section 32 SE] Dunn County  
Arnica and Chokeycherry [T149N R93W Section 20] Dunn County  
Bluestem and Wormwood [T149N R93W Section 21 NW SW] Dunn County,  
North Dakota

Dear Mr. Baker,

We received your correspondence regarding NDSHPO REF. 11-1617  
BIA/Mandan Hidatsa Arikara Nation Environmental Assessment of Enerplus  
six dual well pads in Dunn County, North Dakota. We request that a copy of  
cultural resource site forms and reports be sent to this office so that the cultural  
resources archives can be kept current for researchers.

Thank you for your consideration. Consultation is with MHAN THPO. If you  
have any questions please contact Susan Quinnell, Review & Compliance  
Coordinator at (701)328-3576 or [squinnell@nd.gov](mailto:squinnell@nd.gov)

Sincerely,

Merlan E. Paaverud, Jr.  
State Historic Preservation Officer (North Dakota)  
and Director, State Historical Society of North Dakota

c: Elgin Crows Breast, THPO MHAN  
c: Brenda Shierts, BLM, Belle Fourche, SD





# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Ecological Services  
3425 Miriam Avenue  
Bismarck, North Dakota 58501



AUG 31 2011

Ms. Joey Sheeley, Project Manager  
SWCA Environmental Consultants  
1892 South Sheridan Avenue  
Sheridan, Wyoming 82801

Re: Enerplus 34-Well, 11-Pad Proposal,  
Fort Berthold Reservation, McKenzie  
and Dunn Counties, North Dakota

Dear Ms. Sheeley:

This is in response to your August 1, 2011, scoping letter and request for concurrence regarding 34 proposed exploratory oil and gas wells on 11 pads proposed to be drilled and completed by Enerplus Resources (USA) Corporation (Enerplus) on the Fort Berthold Reservation, Dunn and McKenzie Counties, North Dakota.

Specific locations for the proposed pads are:

**BMX, Tandem, Tipi, Earth Lodge:** T. 148 N., R. 93 W., Section 23, Dunn County

**Huffy, Schwinn, Round House, Log House:** T. 148 N., R. 93 W., Section 23,  
Dunn County

**Scissors, Serger, Needle, Thimble:** T. 149 N., R. 93 W., Section 5, Dunn County

**Carbon, Air, Earth, Sky:** T. 151 N., R. 94 W., Section 21, McKenzie County

**Corn, Beans, Pike, Carp:** T. 148 N., R. 93 W., Section 14, Dunn County

**Tobacco, Pumpkin, Bullhead, Catfish:** T. 148 N., R. 93 W., Section 14, Dunn  
County

**Morgan, Arabian:** T. 149 N., R. 93 W., Section 19, Dunn County

**Pinto, Mustang:** T. 149 N., R. 93 W., Section 29, Dunn County



**Wormwood, Bluestem:** T. 149 N., R. 93 W., Section 21, Dunn County

**Arnica, Chokecherry:** T. 149 N., R. 93 W., Section 20, Dunn County

We offer the following comments under the authority of and in accordance with the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*) (NEPA), the Endangered Species Act, as amended (16 U.S.C. 1531 *et seq.*) (ESA), Migratory Bird Treaty Act (16 U.S.C. 703 *et seq.*) (MBTA), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250) (BGEPA), and Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds."

### **Threatened and Endangered Species**

In an e-mail dated October 13, 2009, the Bureau of Indian Affairs (BIA) designated SWCA Environmental Consultants (SWCA) to represent the BIA for informal Section 7 consultation under the ESA. Therefore, the U.S. Fish and Wildlife Service (Service) is responding to you as the designated non-Federal representative for the purposes of ESA, and under our other authorities as the entity preparing the NEPA document for adoption by the BIA.

Your letter states that the 11 proposed pads are located from 1.34 to 18.60 river miles from Lake Sakakawea, and from potential habitat for interior least tern, piping plover and pallid sturgeon. A setback distance of 1.0 stream-mile is believed to be adequate to contain most spills before product can reach the lake through draws and drainages. Therefore, the Service concurs with your "may affect, is not likely to adversely affect" determination for interior least tern, piping plover, pallid sturgeon and designated critical habitat for piping plover.

Your letter states that Enerplus has committed to ceasing work on the proposed site if a whooping crane(s) is sighted within 1.0 mile of the project area and immediately contacting the Service. Work may resume in coordination with the Service after the bird(s) leaves. Therefore, the Service concurs with your "may affect, is not likely to adversely affect" determination for whooping cranes.

The Service acknowledges your no effect determinations for black-footed ferret and gray wolf.

No effects determinations are required for candidate species and there is no legal requirement under the ESA to protect candidate species. However, it is within the spirit of the ESA to consider these species as intrinsically valuable and worth protecting. Section 7(a)(4) of the ESA provides a mechanism for identifying and resolving potential conflicts whereby a Federal action agency may request a conference on any proposed action that may adversely affect proposed species or proposed critical habitat at an early planning stage. During the conference, the Service may assist the action agency in determining effects and may advise the action agency on ways to avoid or minimize adverse effects to proposed species (or candidate species if present, and voluntarily





considered by the action agency and/or the applicant) or proposed critical habitat. Conferences may involve informal discussions among the Service, the action agency, and the applicant.

### **Migratory Birds**

The letter states that Enerplus will implement the following measures to avoid/minimize take of migratory birds:

- Construction will be completed outside of the migratory bird nesting season (Feb. 1-July 15). If construction cannot be completed outside of the migratory bird nesting season, Enerplus will either:
  - Mow, maintain, or completely remove vegetation within the project area prior to and during the breeding season to deter migratory birds from nesting in the project area until construction is underway;
  - If the project areas are not mowed and maintained as indicated above, pre-construction surveys for migratory birds and their nests will be conducted within 5 days prior to the initiation of construction activities. If birds or nests are discovered, the Service will be contacted for additional information on how to proceed.

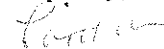
### **Bald and Golden Eagles**

The letter states that a ground survey for cliff, tree and ground raptor nests was conducted within line-of-sight of the proposed project on May 23 and 24, June 15, and July 14, 2011. An aerial nest survey for bald and golden eagles was also conducted on March 25, 2011. No eagles or nests were discovered within 0.5-mile of the project area. The eagle nest database maintained by North Dakota Game and Fish Department does not indicate any recorded eagle nests within 0.5-mile of the project area.

The Service reminds Enerplus that commitment to implement the aforementioned measures does demonstrate compliance with the MBTA and the BGEPA.

Thank you for the opportunity to comment on this project proposal. If you require further information or the project plans change, please contact me or Heidi Riddle of my staff at (701) 250-4481 or at the letterhead address.

Sincerely,



for

Jeffrey K. Towner  
Field Supervisor  
North Dakota Field Office



cc: Bureau of Indian Affairs, Aberdeen  
(Attn: Marilyn Bercier)  
Bureau of Land Management, Dickinson  
ND Game & Fish Department, Bismarck



# **Notice of Availability and Appeal Rights**

Enerplus: Morgan 149-93-29B-32H TF, Arabian 149-93-29B-32H, Pinto 149-93-29A-32H  
Mustang 149-93-29A-32H TF, Wormwood 149-03-21C-22H, Bluestem 149-93-21C-22H TF  
Arnica 149-93-21A-22H TF, Chokecherry 149-93-21A-22H

**The Bureau of Indian Affairs (BIA) is planning to issue administrative approvals related to installation of eight oil and gas Bakken and Three Forks Oil Wells atop four pads as shown on the attached map. Construction by Enerplus is expected to begin in 2011.**

**An environmental assessment (EA) determined that proposed activities will not cause significant impacts to the human environment. An environmental impact statement is not required. Contact Earl Silk, Superintendent at 701-627-4707 for more information and/or copies of the EA and the Finding of No Significant Impact (FONSI).**

**The FONSI is only a finding on environmental impacts – it is not a decision to proceed with an action and *cannot* be appealed. BIA's decision to proceed with administrative actions *can* be appealed until October 28, 2011, by contacting:**

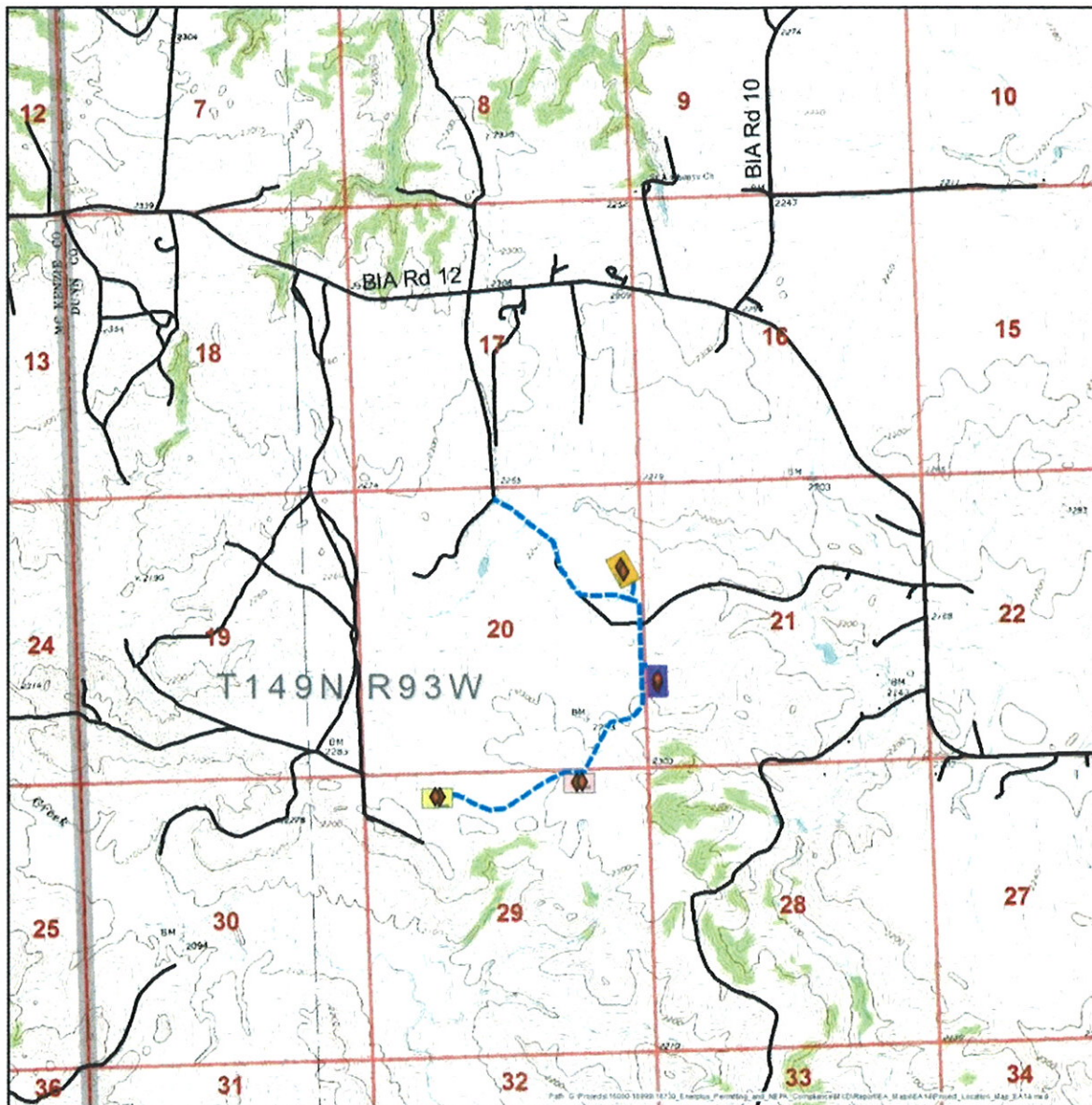
**United States Department of the Interior  
Office of Hearings and Appeals  
Interior Board of Indian Appeals  
801 N. Quincy Street, Suite 300, Arlington, Va 22203.**

**Procedural details are available from the BIA Fort Berthold Agency at 701-627-4707.**



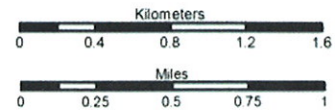


**Project locations**



**Legend**

- ◆ Proposed Well Location
- Proposed Access Road
- Road
- Well Pad**
- Arnica 149-93-21A-22H TF
- Chokecherry 149-93-21A-22H
- Morgan 149-93-29B-32H TF
- Arabian 149-93-29B-32H
- Pinto 149-93-29A-32H TF
- Mustang 149-93-29A-32H
- Wormwood 149-93-21C-22H
- Bluestem 149-93-21C-22H TF



Scale: 1:40,000  
 Projection: NAD 1983 UTM Zone 13N  
 Dunn County, North Dakota

Date: 8/8/2011



Created By:  
 SWCA Environmental Consultants

