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

JUL 25 2012

IN REPLY REFER TO:
DESCRM
MC-208

MEMORANDUM

TO: Superintendent, Fort Berthold Agency

FROM: ACTING 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 EA authorizes land use for two Bakken and Three Forks oil wells located atop one well pad on the Fort Berthold Indian Reservation.

All the necessary requirements of the National Environmental Policy Act have been completed. Attached for your files is a copy of the EA, FONSI and Notice of Availability. The Council on Environmental Quality (CEQ) regulations require that there be a public notice of availability of the (40 C.F.R. Section 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)
Wade Epperson, SWCA (with attachment)
Eric Wortman, EPA (with attachment)
Carson Hood/Fred Fox, MHA Energy Dept. (with attachment)
Jonathon Shelman, Corps of Engineers
Jeff Hunt, Fort Berthold Agency

Finding of No Significant Impact

Enerplus Resources

Environmental Assessment
Two Exploratory Bakken and Three Forks Oil Wells Located on One Well Pad
Snow #149-93-7A-12H and Rain #149-93-7A-12H TF

Fort Berthold Indian Reservation
Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) has received a proposal to authorize land use for Two Bakken and Three Forks Oil Wells Located on One Well Pad on the Fort Berthold Reservation.

The well pad would be located approximately 3 miles east of Mandaree in the SE¼ NE¼ Section 7, Township 149 North, Range 93 West, Dunn County, North Dakota, within a 1,280-acre spacing unit. This location would contain the following wells:

- Snow #149-93-7A-12H
- Rain #149-93-7A-12H TF

Associated federal actions by BIA include determinations of impacts and effects regarding environmental resources for developments on tribal lands.

The potential of the proposed actions to impact the human environment is analyzed in the attached addendum to an existing 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 solicited for the preceding NEPA document was sufficient to ascertain potential environmental concerns associated with the currently proposed project.
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 actions 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.), the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", and the Endangered Species Act (16 U.S.C. 1531 et seq.).
4. The proposed actions are designed to avoid adverse effects to historic, archaeological, cultural and traditional properties, sites and practices. Compliance with the procedures of the National Historic Preservation Act is complete.
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.

Acting Regional Director

7/25/12
Date

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

Two Exploratory Bakken and Three Forks Oil Wells Located on One Well Pad:

Snow #149-93-7A-12H and Rain #149-93-7A-12H TF

Fort Berthold Indian Reservation

July 2012

For information contact:
Bureau of Indian Affairs, Great Plains Regional Office
Division of Environment, Safety and Cultural Resources Management
115 4th Avenue SE, Aberdeen, South Dakota 57401 (605) 226-7656

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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 two horizontal oil and gas wells on one pad location on the Fort Berthold Indian Reservation (Reservation) to evaluate, and possibly develop, the commercial potential of these 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 and subsurface mineral rights. Development has been proposed for two exploratory wells that target specific areas in the Bakken and Three Forks geological formations, which are known to contain hydrocarbon reserves. The well pad is located within the boundaries of the Reservation, as shown in Figures 1.1 and 1.2.

The well pad would be located approximately 3 miles east of Mandaree in the SE¼ NE¼ Section 7, Township (T) 149 North (N), Range (R) 93 West (W), Dunn County, North Dakota, within a 1,280-acre spacing unit (Figures 1.1 and 1.2). This location would contain the following wells:

- Snow #149-93-7A-12H
- Rain #149-93-7A-12H TF

The new access road with underground utility corridor to the well pad, located on allotted and tribal lands (Figures 1.1 and 1.2), would be constructed to facilitate the construction and operation of the proposed well pad. The well pad would be designed and constructed to accommodate drilling activities and well operations. All containment pits constructed for dry drill cuttings that are used during drilling operations would be reclaimed once drilling operations have ceased.

The proposed well site would also include support infrastructure or facilities; buried gathering oil, gas, and water pipelines; radio towers; and underground electrical and fiber optic utilities if the wells are economically feasible and completed for long-term commercial production. All surface disturbances and well site components (i.e., roads, well pad, 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 economically feasible for commercial production, 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 analysis and federal action under the National Environmental Policy Act of 1969 (NEPA), as amended.

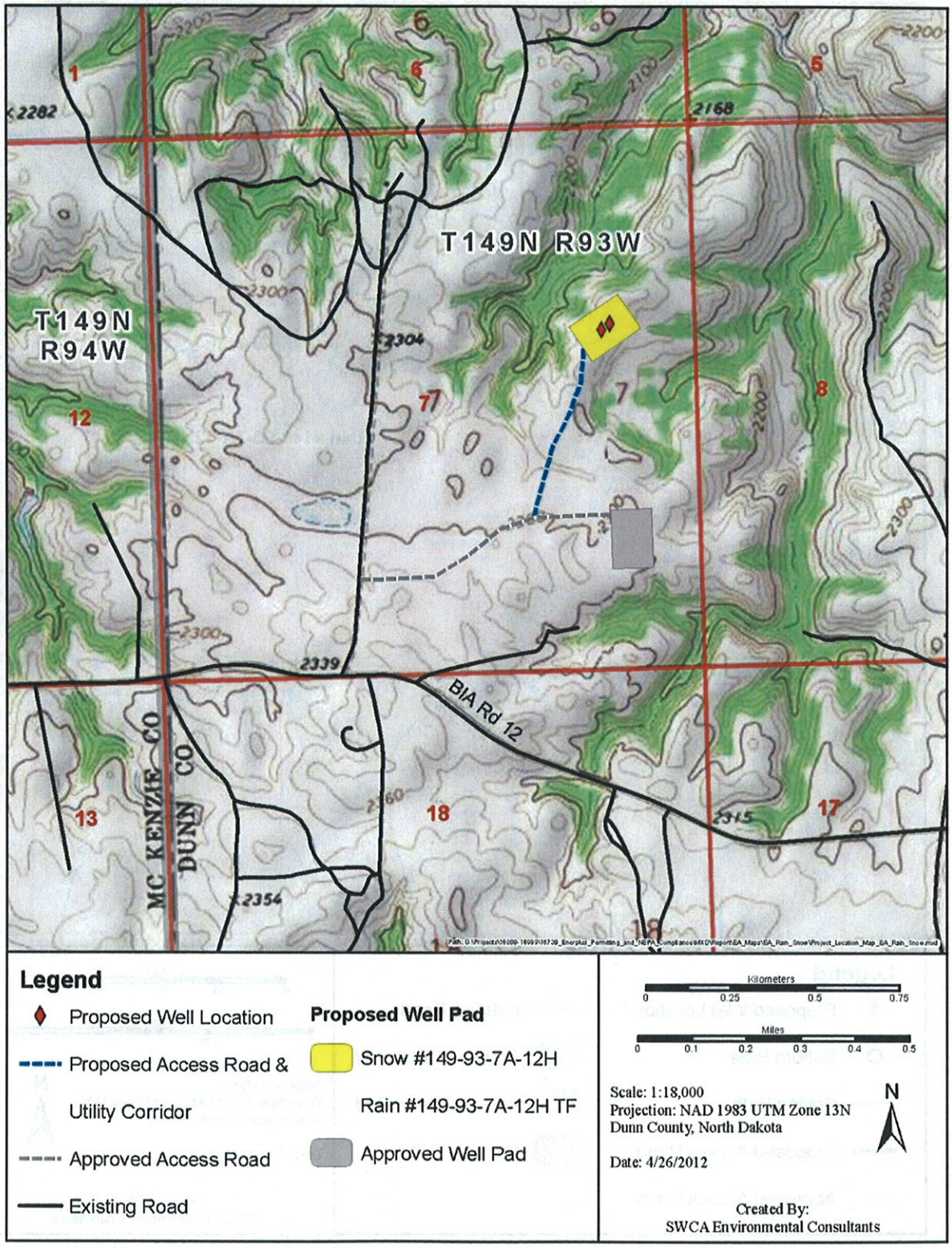


Figure 1.1. Project location for the proposed wells.

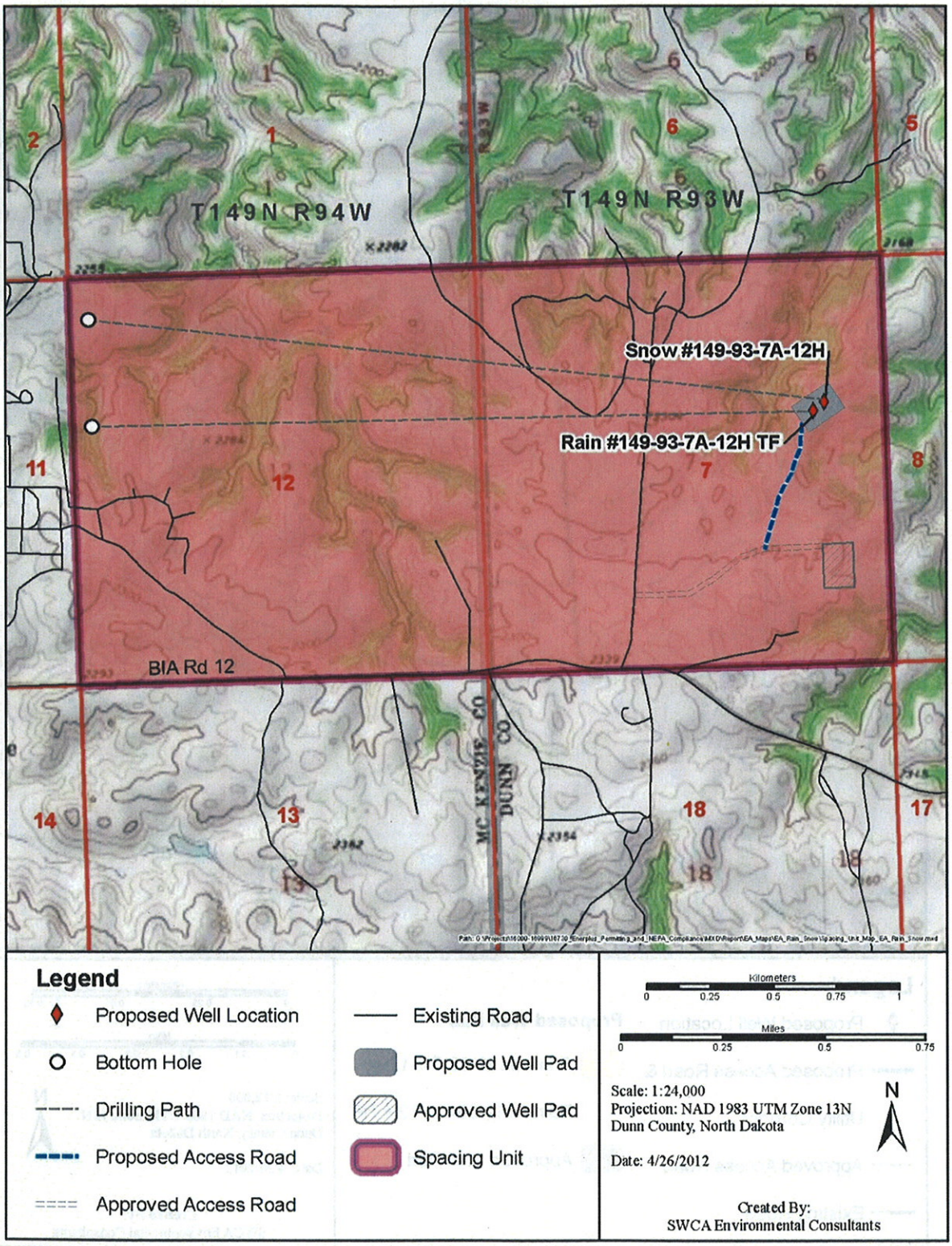


Figure 1.2. 1,280-acre spacing unit for the proposed wells and their respective drilling targets.

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 the well pad, access roads, and gathering pipelines; determining effects on cultural resources; and making recommendations to the Bureau of Land Management (BLM).

Compliance with the 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 tribal lands. The BLM is responsible for the final approval of all Applications for Permit to Drill (APDs) after receiving recommendations 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, the EA would result in 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. 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 lands 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 disturbances of any kind can begin until all required clearances, consultations, determinations, easements, leases, resource surveys, and applicable permits 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 pad, wells, and access road and underground utility 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 APDs. No adverse 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, transportation, and environmental justice (EJ). There would be no project-related ground disturbance, use of hazardous materials, or trucking of products 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 potential discovery of hydrocarbon resources at these well locations.

2.2 THE PROPOSED ACTION

In addition to the No Action Alternative, this document analyzes the potential impacts of two exploratory oil and gas wells on one pad location with varied surface and mineral estates located in the southwest portion of the Reservation in Dunn County. The proposed wells would test the commercial potential of the Bakken and Three Forks formations in these specific spacing units. Well bottom hole locations, shown in Figure 1.2, were chosen by Enerplus in consultation with tribal and BIA resource managers.

2.2.1 Well Pad and Infrastructure Locations and Disturbance

The well pad and infrastructure location, 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 includes surveys for cultural, archaeological, and natural (i.e., biological and physical) resources. Short-term construction disturbance at the well pad would consist of all areas within the fenced perimeter around the well pad cut and fill areas, and the access roads and utility corridors. Long-term disturbance would consist 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	Site-specific Owner-committed Measures
SE¼ NE¼ Section 7, Township 149 North, Range 93 West, Dunn County, North Dakota	Snow #149-93-7A-12H Rain #149-93-7A-12H TF	**Well pad construction** area of 15.5[1] acres. 1,964.0-foot-long (5.2[2]-acre) access road and utility corridor.	2.2-acre un-reclaimed well pad construction area. 3.4[3]-acre un-reclaimed access road.	Use semi-closed-loop drilling system. Construct a 24-inch-tall berm around the southeast corner of the well pad. Construct a diversion ditch around the north side of the well pad. Round corners of well pad as needed.
Total Disturbance		Total = 20.7 acres	Total = 5.6 acres	

[1] Well pad construction area acres of disturbance include the well pad, and access road and utility corridor within the fenced well pad perimeter.

[2] Access road disturbance acreage only includes the road located outside of the fenced well pad perimeter.

[3] Un-reclaimed access road acreage based on maximum of a 75-foot road base.

Natural and cultural resource surveys were performed by SWCA Environmental Consultants (SWCA) on July 13 and August 4, 2011, and April 2, 2012, at the proposed project areas to assess potential impacts to resources. Interdisciplinary on-site meetings were conducted on November 7, 2011, to review the results of the resource surveys of the well pad location, proposed access road, and underground utility corridor. The on-site meetings were attended by the civil surveyor, the SWCA representative, the Enerplus representative, and the BIA representative. Site topography, potential drainage issues, and erosion control measures associated with the well pad and road placement were discussed during the on-site meetings. Related facility locations (access roads, gathering pipelines, topsoil/subsoil stockpiles, tanks, etc.) were also discussed in order to minimize effects to natural and cultural resources.

After securing mineral leases, ROW on-site meetings were conducted with the BLM on February 2, 2012. Copies of APDs submitted to the BLM North Dakota Field Office were submitted 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 total approximately 20.7 acres. Approximately 15.5 acres, consisting of the constructed well pad and portions of the access road and utility corridor, would be located within a fenced perimeter. The remaining 5.2 acres would be required to construct the access road and underground utility corridor outside of the fenced perimeter. After well completion, all areas not needed for production operations would be reclaimed during interim reclamations. The un-reclaimed area is considered long-term surface disturbance and would total approximately 5.6 acres, with 2.2 acres associated with the well pad and 3.4 acres associated with the access road. Other site-specific measures were identified during the interdisciplinary site assessments and required by BIA. These measures are identified in Table 2.1 and incorporated into the project's final designs and operator-committed measures.

2.2.2 Well Pad

The proposed well site would include a single well pad (pad) with two wells. An approximately 700-foot-wide and 800-foot-long perimeter fence would be constructed surrounding the pad. The pad would be used to support the drilling rig and equipment and a temporary lined cuttings pit would be excavated and used for dry drilling cuttings. The pad would initially be stripped of topsoil and vegetation and then graded to form a level pad surface. The topsoil would be stockpiled immediately adjacent to the leveled pad and stabilized with a cover crop until it could be used in interim and final reclamations. The subsoils would be used in the construction of the pad and the finished pad 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 pad would result in some additional surface disturbance per pad. Total long-term surface disturbance not included in interim reclamation along the well pad and access road within the fenced perimeter would total approximately 2.2 acres (Table 2.1). The proposed pad would

have contoured slopes on both the cut and fill ends. Details of pad construction and reclamation can be found in the APDs.

2.2.3 Access Roads and Utility Corridors

The new access road for the well pad would extend east and then north from the approved access road for the Sun #149-94-12C-07H and Wind #149-94-12C-07H TF well pad for approximately 1,964 feet (0.4 mile) before ending at the well pad. A maximum disturbed ROW width of 125 feet would be used for the access road and utility corridor. Approximately 5.6 acres of new short-term surface disturbance would result from the proposed road and utility corridor, both within (0.4 acre) and outside of the fenced well pad location (5.2 acres). Unused ROW would be reclaimed and a maximum long-term disturbance of approximately 3.4 acres would result from the proposed road which would not exceed a maximum width of 75 feet. The proposed access road 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, 5 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 seeded 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 established roads, 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 APDs. A diagram of typical road cross sections is provided as Figure 2.1.

2.2.4 Drilling

Enerplus would use semi-closed-loop drilling systems with dry cuttings pits for the drilling of the wells. Cuttings would be contained and solidified with fly ash, placed in the pit, and buried in place following completion of drilling operations, as described in Section 2.2.10.1. In some cases, Enerplus would bury only surface cuttings (approximately 2,500 feet of the vertical hole) that are drilled using freshwater. The surface cuttings pit would be closed before drilling operations begin using invert mud. All other drilling fluids and cuttings following the drilling of the surface section would be contained in tanks and disposed of at approved locations.

Rig transport and on-site assembly would take approximately 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.

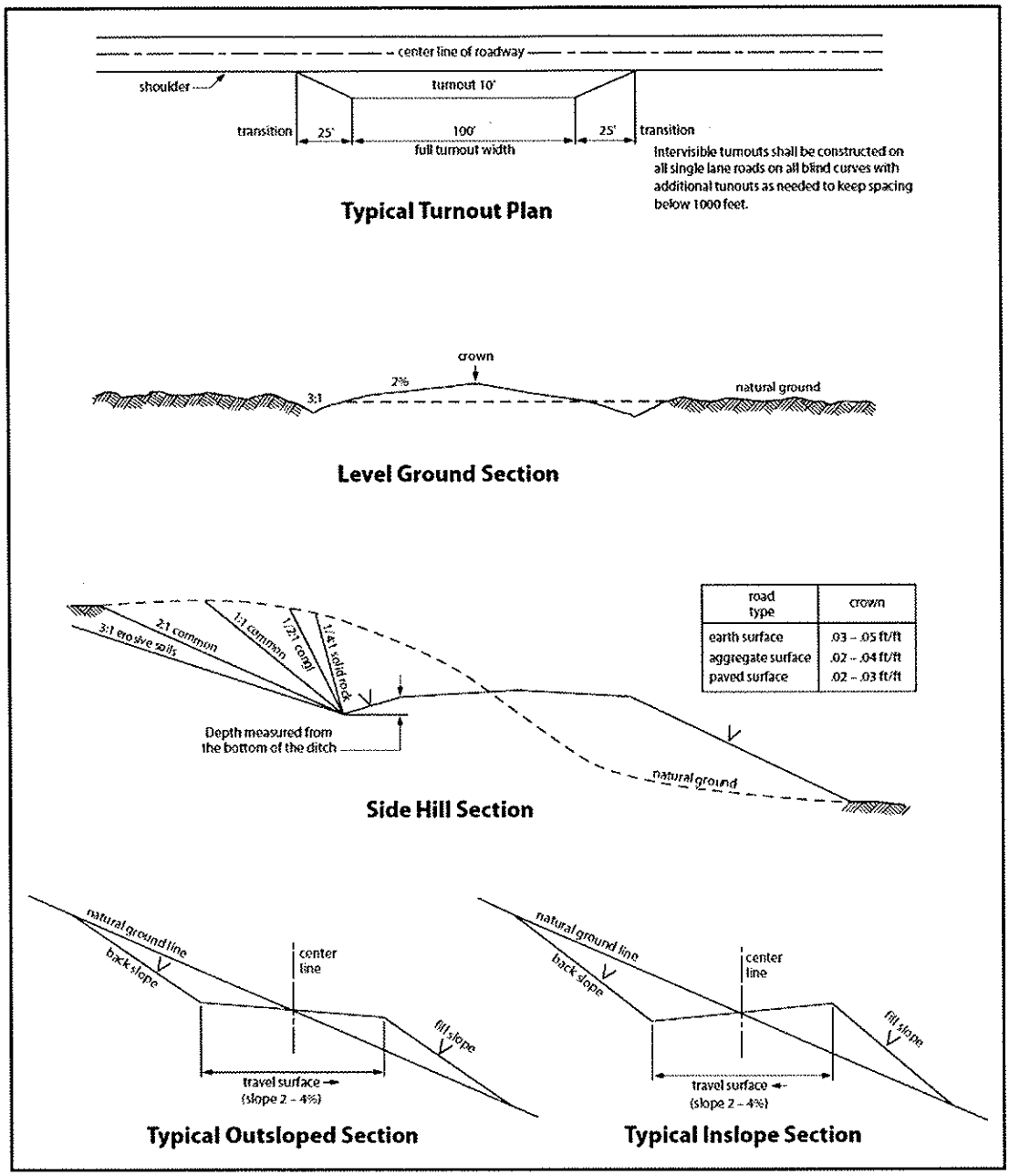


Figure 2.1. Typical road cross sections (BLM and USFS 2007).

Figure 2.2. Typical drilling rig.

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 or horizontal reach of the borehole would be drilled using approximately 63,000 gallons of salt water as mud and adding polymer sweep as necessary to clean the bore hole. With the semi-closed-loop system the drilling fluids used following drilling of the surface section would be contained in tanks and disposed of at approved locations. Only dry cuttings will be buried on the pit as per North Dakota Industrial Commission (NDIC) regulations.

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, associated with localized aquifers, 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. 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 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 bore 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 hydraulic fracturing (HF) fluids are recovered and disposed of in accordance with NDIC rules and regulations.

2.2.7 Commercial Production

If drilling, testing, and completion support commercial production from any of the 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 the well pad location to allow for remote monitoring of facilities. The radio tower would be constructed to a height ranging between 20 to 50 feet.

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 to prevent hazardous runoff or spills. 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 HF fluids and is expected to become minimal after two years.

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 Gathering Pipelines

In the future, the operator may install a full utility corridor within the access road ROW. If the utility corridor is outside of the approved access road ROW, then additional NEPA analysis will be needed. The utility corridor is sized to accommodate the installation of buried oil, gas,

and water gathering pipelines and buried electric and fiber optic lines. Gathering pipelines would tie into main pipeline trunk lines.

Gathering pipelines consist of oil, gas, and water pipelines and are designed and sized to prevent erosion—which is an internal pipe condition caused by excessive abrasion of fine particles in the pipeline system or by excessive velocity of the transported product—by a safety factor of approximately two. Based on these criteria, the oil and gas pipelines would be steel and 12 inches or less in diameter and the water pipelines would be Fiberspar® and 6 inches or less in diameter. The gathering lines would be coated with between 14 and 16 millimeters of fusion bonded epoxy, which helps protect the pipelines against corrosive elements in the soil. Field joints are also protected by shrink sleeves. Specialty coatings are also used, as applicable, for underground fittings and bore crossings, to provide additional levels of protection from leakage or corrosion. The coating and shrink sleeves are inspected thoroughly at the time of installation, both visually and electronically. All pipelines are clearly marked following the U.S. Department of Transportation's rules and regulations, 49 CFR Parts 192 and 195. To prevent potential erosion or rupturing of the pipeline within critical areas near Lake Sakakawea or in drainages, the type, placement, and depth of gathering pipelines is designed based on soil types, localized topography, and the catchment size of drainages. Gathering pipelines would be placed a minimum of 8 feet below the substrate surface of drainages and pipes would be coated with specialty abrasion-resistant coating that provides additional protection from large scale erosion or flooding events. Pipelines are also equipped with check valves and manual valves between the trunk line and gathering pipeline, or lateral line, which provide connections to help limit the volume of potential spills.

After installation, the pipelines will be cleaned and inspected via internal tools (e.g., cleaning pigs and smart pigs), which help to identify integrity issues in the pipes. Hydrostatic testing is conducted to ensure that there is no leakage of the pipe. A cathodic survey using test stations, rectifier pads, and other means designed by cathodic protection specialists is also conducted. Any stress or damage issues identified in the pipelines can be quickly identified and remedied prior to backfill. Throughout the life of the gathering pipelines, an appropriate amount of cathodic active current is placed on pipeline segments and monitored in accordance with the strict pipeline safety requirements set forth in the U.S. Department of Transportation's rules and regulations. In order to assure the quality of the installation and the effectiveness of its corrosion control systems, pig launchers and receivers are also installed on the trunk lines and primary laterals to identify pipeline conditions both internally and externally, in order to maintain the integrity.

Saddle Butte Pipeline, LLC, (SBP) is one of two midstream companies currently building a pipeline infrastructure on the Reservation. SBP is the main pipeline trunk line that the proposed wells would tie into. SBP has developed a Spill Response Plan (Plan) for its pipeline construction and operation activities. The Plan includes spill preventative measures and monitoring protocols, notification procedures, spill detection and on-scene spill mitigation procedures, response activities, contacts, training and drill procedures, and response plan review and update procedures. SBP is committed to adhering to the Plan as well as the procedures and requirements set forth by federal law (49 CFR Part 194). SBP has also committed to providing the site-specific spill response plan to the BIA prior to the commencement of construction activities.

2.2.9 Construction Details at Individual Sites

This proposed well location, illustrated in Figure 1.1, is located approximately 3 miles east of Mandaree in the SE¼ NE¼ Section 7, T149N, R93W, Dunn County. A new access road/utility corridor, approximately 1,964 feet in length, would be constructed to connect the proposed Enerplus pad to an approved access road which connects with BIA Road 12 (Figure 1.1). The new access road would have a ROW width of 125 feet, and would disturb approximately 5.6 acres both within and outside of the perimeter fence. The proposed well pad construction area (which includes part of the access road/utility corridor) would initially disturb approximately 15.5 acres within the perimeter fence, bringing the total anticipated new disturbance to 20.7 acres. Two wells would be drilled on this well pad. Long-term disturbance associated with this project would be 5.6 acres, 2.2 acres of unreclaimed well pad and 3.4 acres of unreclaimed access road.

Please see Section 3.13, Mitigation and Monitoring, for information regarding general BMPs and other protection measures. In addition, the BIA would require, and the Enerplus has committed to use, the site-specific protection measures at this well pad site, identified in Table 2.1, which would reduce effects to various environmental resources.

2.2.9.1 Snow #149-93-7A-12H

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the NW¼ NW¼ Section 12, 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 total vertical depth (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 250 feet from the west section line and 550 feet from the north line, about 1,396 feet north and 9,463 feet west of the surface hole location. A setback of at least 200 feet would be maintained.

2.2.9.2 Rain #149-93-7A-12H TF

The spacing unit consists of 1,280 acres (+/-) with the bottom hole located in the SW¼ NW¼ Section 12, T149N, R94W (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 250 feet from the west section line and 1,940 feet from the north line, about 59 feet north and 9,380 feet west of the surface hole location. A setback of at least 200 feet would be maintained.

2.2.10 Reclamation

2.2.10.1 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. As applicable, the dry 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 pad would be reduced in size by approximately 35%; the portion of the well pad not needed for production would be recontoured, covered with 6 inches of topsoil, and seeded using methods and seed mixtures determined by the BIA.

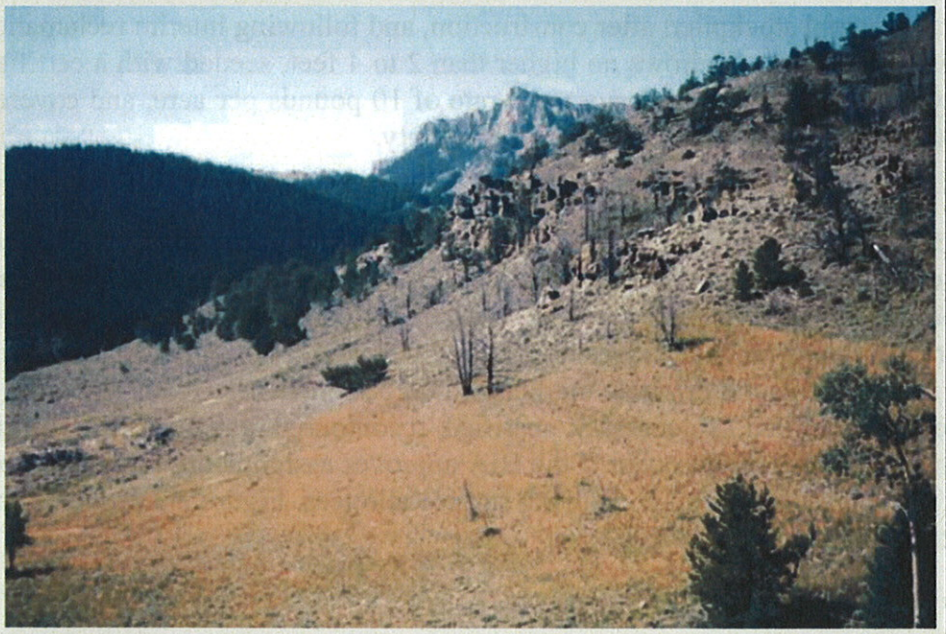
The working area of the well pad and the running surface of the access road would be surfaced with scoria or crushed rock obtained from a previously approved location. The outslope portions of the road would be covered with stockpiled topsoil and seeded with a seed mixture determined by the BIA, reducing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

2.2.10.2 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 seeded. 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 provides an example of reclamation (BLM and USFS 2007).

The well pad and access road are constructed to the minimum size necessary to safely conduct drilling and completion operations.



The well pad and access road have been recontoured back to the original contour, the topsoil respread, and the site revegetated.

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

2.3 BIA-PREFERRED ALTERNATIVE

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

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, transportation, and EJ.

3.1 PHYSICAL AND GEOLOGICAL SETTING

The proposed well pad 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 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 proposed well pad, access road, and utility corridor 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 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).

The underlying Bakken and Three Forks formations, targeted by the proposed project, are well-known sources of hydrocarbons within the Williston Basin. 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 these formations more feasible.

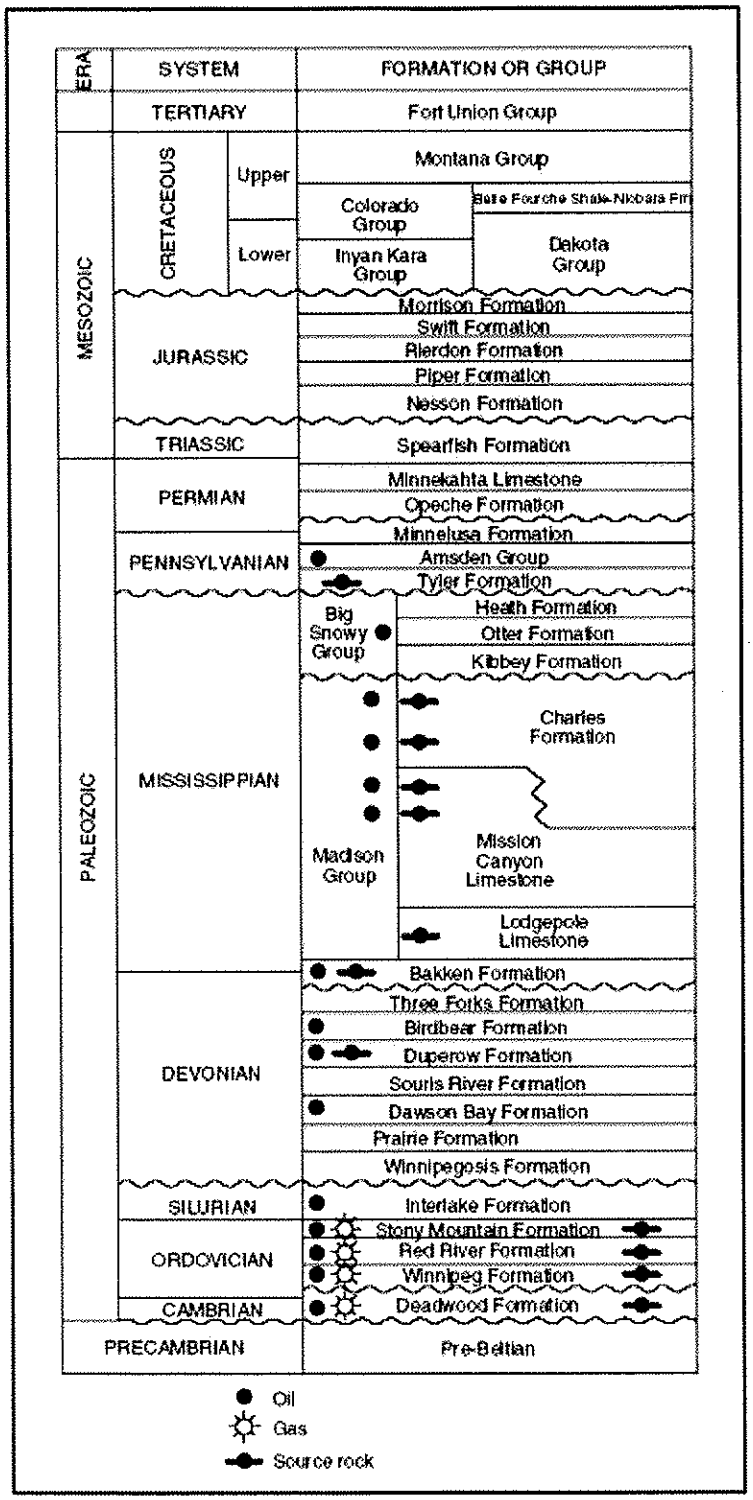


Figure 3.1. Typical stratigraphic column of the Williston Basin, with oil and gas bearing formations (Source: Peterson 1995).

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 of 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 the 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 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] 2011a). 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 30 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] 2011). All other parts of the state, including the Reservation, are classified as Class II attainment areas, affording them protections through the Primary NAAQS (NDDH 2012).

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_2S) (NDDH 2012).

Criteria pollutants and their health effects include the following.

- Sulfur dioxide (SO_2) is a colorless gas with a strong, suffocating odor. SO_2 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_2 emissions are also a primary cause of acid rain and plant damage (EPA 2011a).

- Inhalable Particulate Matter (PM_{10} and $PM_{2.5}$) 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_{10} is the fraction of total particulate matter 10 microns or smaller, and $PM_{2.5}$ 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 2011a).

- Nitrogen dioxide (NO_2) is a reddish-brown gas with an irritating odor. Primary sources include motor vehicles, industrial facilities, and power plants. In the summer months, NO_2 is a major component of photochemical smog. NO_2 is an irritating gas that may constrict airways, especially of asthmatics, and increase the susceptibility to infection in the general population. NO_2 is also involved in ozone smog production (EPA 2011a).

- Ozone (O_3) 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 in the presence of sunlight. Health effects related to O_3 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_3 can persist for many days after formation and travel several hundred miles (EPA 2011a).

- 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 2011a).

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 proposed projects on air quality. Therefore, the North Dakota Ambient Air Quality Standards (AAQS) are shown as well as federal standards.

North Dakota has separate state standards for SO_2 and H_2S 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 2011b).

Table 3.1. NAAQS and Other Air Quality Standards.

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
SO_2 in parts per billion (ppb)	1-hour	75	-	273
	3-hour	500	500	-
	24-hour[1]	140	-	99
	Annual (Arithmetic Average)	30	-	23
PM_{10} in micrograms per cubic meter of air ($\mu g/m^3$)	24-hour[2]	150	-	150
	Expected annual mean	50	-	50
$PM_{2.5}$ ($\mu g/m^3$)	24-hour[3]	35	35	35
	Annual (Arithmetic Average)[4]	15	15	15
NO_2 (ppb)	1-hour[3]	100	-	-
	Annual mean	53	53	53
CO parts per million (ppm)	1-hour[1]	35	-	35
	8-hour[1]	9	-	9
O_3 (ppb)	1-hour[5]	120	120	120
	8-hour[5]	75	75	-
Lead ($\mu g/m^3$)	Rolling 3-Month Average	0.15	0.15	1.5 (quarterly mean)
H_2S (ppm)	Instantaneous	-	-	10
	1-hour	-	-	0.20
	24-hour	-	-	0.10
	3-month	-	-	0.02

Sources: EPA 2011a; NDDH 2012.

[1] Not to be exceeded more than once per year.

[2] Not to be exceeded more than once per year on average over 3 years.

[3] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed standard.

[4] To attain this standard, the 3-year average of the weighted annual mean must not exceed the standard.

[5] To attain this standard, the 3-year average of the fourth-highest daily maximum must not exceed the standard.

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 (2011c) identifies the principal GHGs that enter the atmosphere because of human activities as the following.

- Carbon Dioxide (CO_2): CO_2 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_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- Methane (CH_4): CH_4 is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- Nitrous Oxide (N_2O): N_2O 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 2011b).

CO_2 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 2011b). To simplify discussion of the various GHGs, the term "Equivalent CO_2 or CO_2e" has been developed. CO_2e is the amount of CO_2 that would cause the same level of radiative forcing as a unit of one of the other GHGs. For example, one ton of CH_4 has a CO_2e of 22 tons; therefore, 22 tons of CO_2 would cause the same level of radiative forcing as one ton of CH_4. N_2O has a CO_2e value of 310. Thus, control strategies often focus on the gases with the highest CO_2e 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 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 indicate 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).

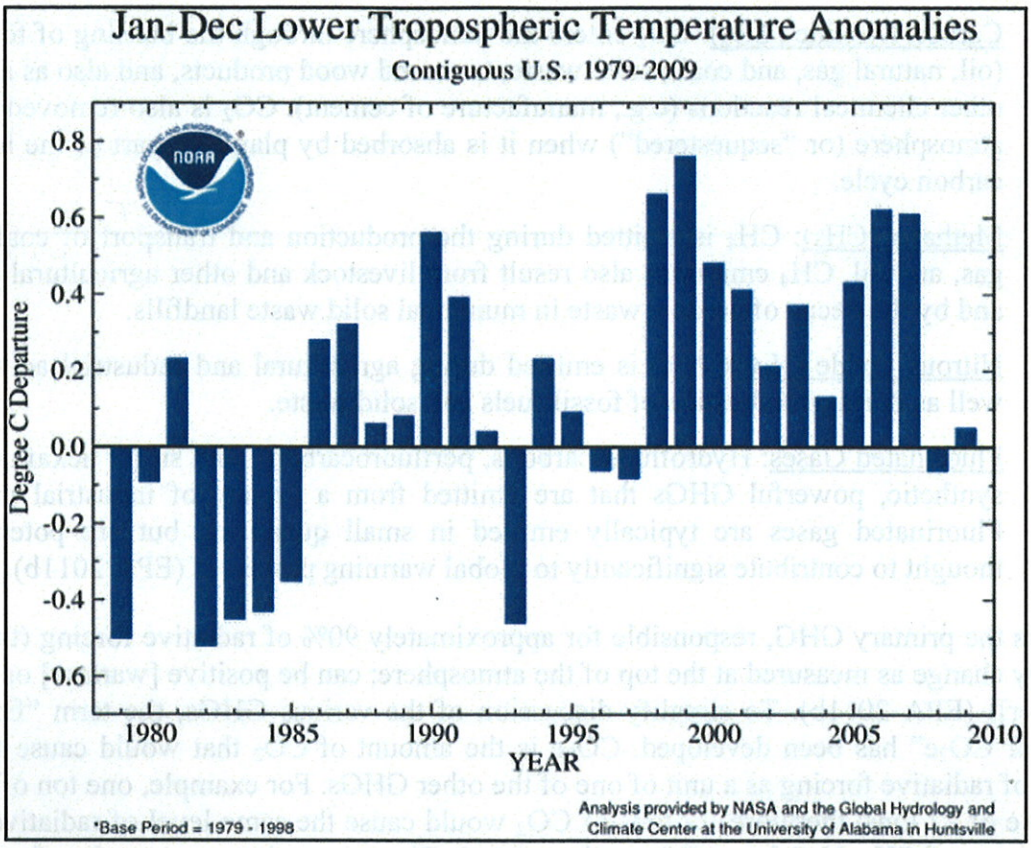


Figure 3.2. Temperature anomalies in the contiguous United States, 1979–2009.

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 2011b). 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).

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 2011c). 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 2011c).

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 2011c). 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 2011c).

Energy production and supply was estimated to emit up to 25.9% of GHGs world-wide in 2004 (Pew Center 2009). CH_4, with a high radiative forcing CO_2e ratio, is a common fugitive gas emission in oil and gas fields (EPA 2011b). 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 conduct the assessment. 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 2012).

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 2012).

Criteria pollutants measured at the two monitoring stations include SO_2, PM_{10}, NO_2, and O_3. 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 2010.

Table 3.2. Maximum Levels of Monitored Pollutants, 2007–2010, as Measured at Dunn Center and Theodore Roosevelt National Park North Unit Monitoring Stations.

Criteria Pollutant	Averaging Period	Primary Standard (NAAQS)	North Dakota AAQS	Maximum Reported Level from Dunn Center and TRNP-NU Monitoring Stations			
				2010	2009	2008	2007
SO_2 in parts per billion (ppb)	1-hour	75	273	25.8	20.3	20.9	22
	3-hour	500	-	16.3	13.0	13.0	10
	24-hour[1]	140	99	4.1	6.0	5.0	4
	Annual (Arithmetic Average)	30	23	0.7	0.6	0.5	1.1
PM_{10} in micrograms per cubic meter or air ($\mu g/m^3$)	24-hour[2]	150	150	32.0	54	108	57.4
	Expected annual mean	50	50	9.7	11.3	14.2	13.2
$PM_{2.5}$ ($\mu g/m^3$)	24-hour[3]	35	35	27.3	15.0	35.7	22.2
	Annual (Arithmetic Average)[4]	15	15	8.6	3.4	3.7	3.6
NO_2 (ppb)	1-hour[3]	100	-	24	15	24	26
	Annual mean	53	53	1.4	1.5	1.8	1.5
O_3 (ppb)	1-hour[5]	120	120	73	67	69	76
	8-hour[5]	75	-	70	58	63	71

Source: NDDH 2012.

[1] Not to be exceeded more than once per year.

[2] Not to be exceeded more than once per year on average over 3 years.

[3] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed standard.

[4] To attain this standard, the 3-year average of the weighted annual mean must not exceed the standard.

[5] To attain this standard, the 3-year average of the fourth-highest daily maximum must not exceed the standard.

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 2011. In addition to the low levels of monitored criteria pollutants, the EPA reports that Dunn and McKenzie Counties had zero days in which the AQI exceeded 100 in 2007 through 2011, indicating that general air quality does not pose an unhealthy condition for residents of these counties (EPA 2012).

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_2, 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_2S, 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 2011c). 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 HF, 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 oil field projects, and implementation of BMPs identified in Section 3.2.6, the Proposed Action would not lead to 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, HF, 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 this 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 1969, as amended (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 Pollutant 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.

Surface water is abundant in the project area, as shown in Figure 3.3 (North Dakota Department of Health, Division of Water Quality 2011). The project components would be located within the Lake Sakakawea subbasin (hydrologic unit code [HUC] 10110101), the Independence Point watershed (HUC 1011010121), and the Boggy Creek subwatershed (HUC 101101012101) Water would flow from the well pad and access road into the Boggy Creek subwatershed and travel north until reaching Lake Sakakawea, as shown in Figure 3.4. The proposed location is approximately 2.74 river miles from the nearest perennial stream (Missouri River) and Lake Sakakawea. The proposed location is 0.08 mile (422 feet) from the closest wooded draw.

A query of the EPA Storage and Retrieval Water Quality Database for the Lake Sakakawea and Independence Point watersheds showed that water quality data were not available from within the project area (EPA 2011d). 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 2011e).

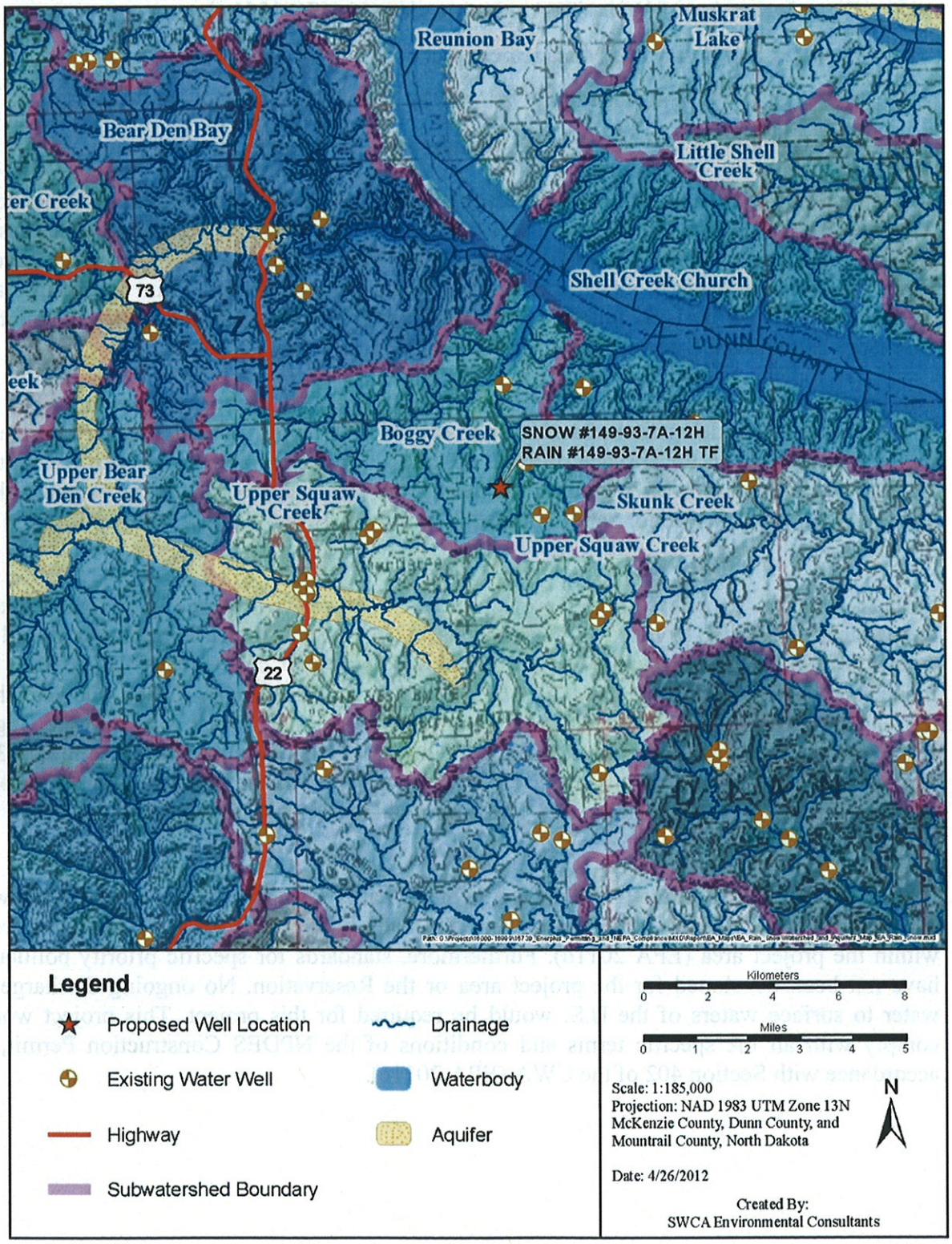


Figure 3.3. Watersheds, aquifers, and existing water wells near the project area (North Dakota Department of Health, Division of Water Quality 2011).

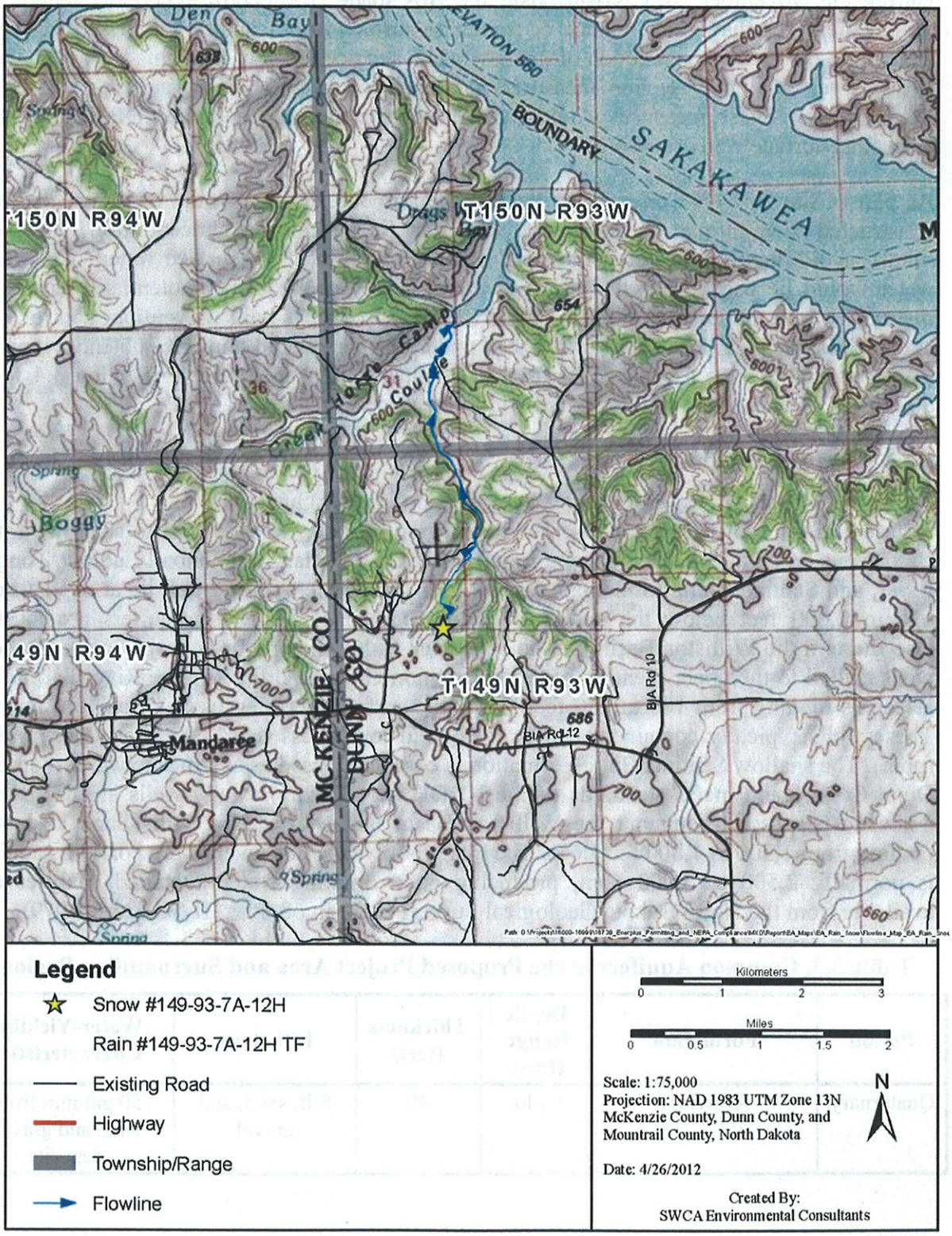


Figure 3.4. Surface runoff and drainage direction from the proposed well pad.

During the November 2011 on-site visit, 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 road. Enerplus has adopted the site-specific erosion protection measures identified in Table 2.1 and further discussed in Section 3.4.3. 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. Please refer to Section 3.4 for a discussion of the soil erodibility hazard within the project area.

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 Cannonball/Ludlow, Tongue River, and Sentinel Butte formations (Table 3.3). The aquifers in question lie at depths from 670 to 2,000 feet below the surface. Shallow post-glacial outwash aquifers are located elsewhere in the Williston Basin, but do not occur within the proposed project area. Shallow wells drilled to the upper member of the Fort Union Group and the Tongue River Formation 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). Many wells are 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 (Klausing 1979).

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

Period	Formation		Depth Range (feet)	Thickness (feet)	Lithology	Water-Yielding Characteristics
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; Klausing 1979.
gal/min = gallons per minute

3.3.2.2 Existing Groundwater Wells

Data from the North Dakota State Water Commission indicate that there are two existing groundwater wells identified within 1 mile and 10 within 5 miles of the proposed well pad location (Figure 3.3) (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 2011f). During HF, 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 hydrocarbons 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 one HF 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 HF is completed, the internal pressure of the geologic formation causes the injected HF fluids to rise to the surface where they are stored in disposal tanks (EPA 2011f).

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 aluminum (aka bauxite), and other materials are being used in the wells. Over one million pounds of proppants can be used while HF 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 listed in Table 3.4.

Table 3.4. Common Additives of Hydraulic Fracturing Fluid.

Additive Type	Main Compound	Common Use of Main Compound
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-propanetricaboxylic 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.

3.3.3 Potential Impacts to Surface Water and Groundwater Resources

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 the following.

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 HF fluids or fluids expelled during HF might seep into the ground or contaminate surface water.

The EPA recently studied the effects of coalbed methane well fracturing, 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 2004). 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 HF fluid contaminating underground sources of drinking water during HF 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 HFin coalbed methane well completion (EPA 2004). 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 2011f).

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 one groundwater well 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.

3.3.3.1 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).

3.3.3.2 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.

3.3.3.3 Charles Salt

The Charles Salt is ubiquitous throughout 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 two 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, as specified in Table 2.1, construction BMPs, and spill prevention planning during the construction phase of the project.
- Implementation of site-specific measures designed 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

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 project area consists of till plains and upland soils developed from a variety of landforms ranging from alluvial fans and flats (0 to 6 percent slopes), gentle sloping plains and rises (3 to 9 percent), and steeper rises, hill slopes, and ridges (6 to 45 percent). Textures vary from silt loams to fine sandy loams in soils derived from alluvium, residuum, and colluvium weathered from sedimentary rock and glacial deposits (Natural Resources Conservation Service [NRCS] 2012a). Mean annual precipitation found throughout the project area ranges from 13 to 18 inches and mean annual air temperature ranges from 39°F to 45°F. Vegetation common to these soils includes range and pasture grass species of the midgrass prairie and woodland vegetation on steeper, wetter slopes. Soils in and surrounding the project area are often cultivated for grain and/or hay and pasture, with frost free periods ranging from 120 to 135 days.

A vast number of soil series and components (see Appendix B) occur within the proposed project area as a result of weathering of several geomorphic features with differentiated geologic substrate, which have been categorized into two soil groups based on geomorphology: hills and ridges and plains and rises.

3.4.1 Hills and Ridges

The most predominant geomorphic soil group in the project area is hills and ridges. These soils cover approximately 8.6 acres (84.3 percent) of the project area (Table 3.5). These well-drained to somewhat excessively drained soils occur in diverse topographic terrain (6 to 45 percent slopes) on hills and ridges weathered from glacial till and loamy residuum derived from mixed sources (NRCS 2012a). Soils weathered on hills and ridges are generally deep but may also include more shallow soils with restrictive layers at 10 to 40 inches. The soil surface layer is typically 2 to 7 inches thick of loam. These soils are susceptible to sheetflow erosion (slope).

The hazard of water erosion increases on slopes greater than about 15 percent (NRCS 2012b). Some flow paths, rills, and pedestaled plants may be evident on these slopes. Reclamation potential of these soils is poor to fair and is limited by slope, depth to bedrock, and texture (NRCS 2012a).

Table 3.5. Soil Groups within the Project Area.

Soil Group	Soil Map Units	Erodibility Rating	Reclamation Potential	Ecological Site	Surface Disturbance (Acres)[1]	% of Surface Disturbance
Hills and ridges	9E 93D 93E	Moderate to severe	Poor to fair	Loamy (R054XY031ND) Shallow Loamy (R054XY030ND) Thin Loamy (R054XY038ND)	8.6	84.3
Plains and rises	88B	Moderate to severe	Fair to good	Loamy (R054XY031ND)	1.6	15.7
				TOTAL	**10.2**	**100.0**

[1] Surface disturbance acreage does not include all lands within the fenced perimeter of the well pad. These values only include actual surface disturbance involved in the construction of the project.

3.4.2 Plains and Rises

These soils cover approximately 1.6 acres (15.7 percent) of the project area (Table 3.5). This soil group is characterized by deep, well-drained loams typically found in gently rolling terrain (3 to 6 percent slopes). These soils formed in fine, loamy till (NRCS 2012a). The soil surface layer is often very shallow and characterized by clay loams and loams.

The soil surface of these soils is typically stable and intact, although these soils typically have an increased composition of stones and boulders. Areas of intact vegetation should exhibit slight to no evidence of rills, wind scoured areas, or pedestaled plants (NRCS 2012b). These soils have no to very few soil constraints; however, fine textures may limit reclamation.

3.4.3 Project-Specific Surface Disturbance

The overall percentage of surface disturbance for each soil series is summarized in Table 3.6 and is based on the spatial extent of soil series derived from NRCS data. The soil map units are approximations of the existing soils across the landscape acreage and, therefore, used as a best estimate to describe the soil distribution for each of the proposed project areas. A vast number of soil series occurs within the project area as a result of weathering of surfaces of several geomorphic features with differentiated geologic substrate (Figure 3.5). Soil component characteristics for each soil series are described in Appendix B (NRCS 2012a).

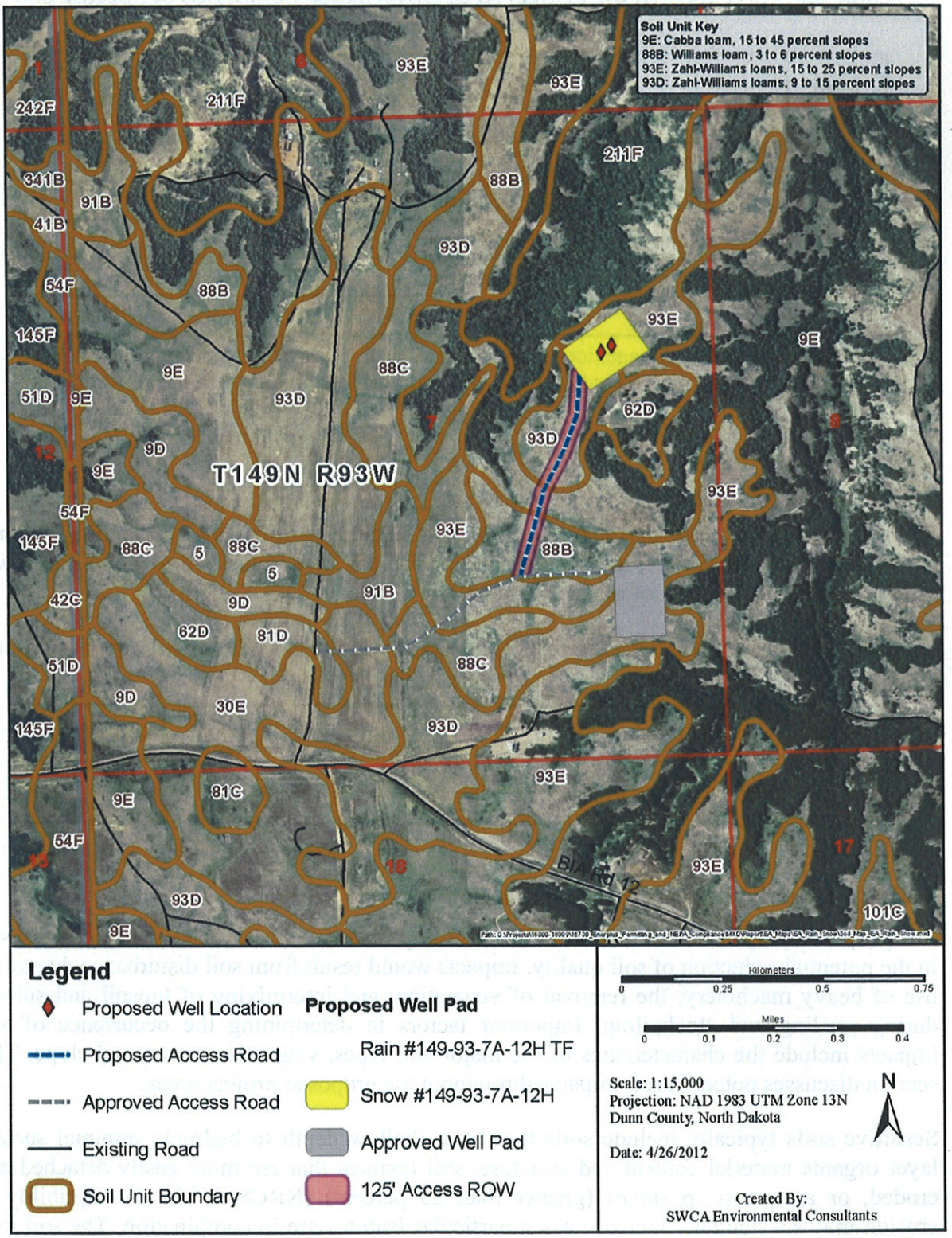


Figure 3.5. Approximate spatial extent of soil components within and around the project area.

Table 3.6. Percentage of the Project Area Disturbance Comprised of Specific Soil Component.

Map Symbol	Soil Series	Acres[1]	% of Project Area Disturbance
93D	Zahl-Williams loams, 9 to 15 percent slopes	4.7	46.6
93E	Zahl-Williams loams, 15 to 25 percent slopes	3.2	31.4
88B	Williams loam, 3 to 6 percent slopes	1.6	15.4
9E	Cabba loam, 15 to 45 percent slopes	0.7	6.6
	TOTAL	**10.2**	**100.0**

[1]Surface disturbance acreage does not include all lands within the fenced perimeter of the well pad. These values only include actual surface disturbance involved in the construction of the project.

3.4.4 Field Descriptions

Soil data derived from on-site excavated soil pits, including the matrix value, hue, chroma, color name, and soil texture, are summarized in Table 3.7. A Munsell Soil Color Chart was used to determine the color of moist soil samples.

Table 3.7. Soil Data Obtained through the Excavation of Soil Pits within the Proposed Project Area.

Depth (inches)	% of Sample	Soil Matrix Color (color name)	Texture	Topsoil Depth (inches)	Topography Slope (%)
0–20	100	10YR 3/1	clay loam	6	5–15

3.4.5 Potential Impacts from Soil Erosion

The proposed project would involve short-term impacts on soil resources, which could result in the potential reduction of soil quality. Impacts would result from soil disturbance due to the use of heavy machinery, the removal of vegetation, and intermixing of topsoil and subsoil during grading and stockpiling. Important factors in determining the occurrence of soil impacts include the characteristics of the major soil types, vegetative cover, and slope. This section discusses potential soil impacts throughout the proposed project areas.

Sensitive soils typically include soils that have shallow depth to bedrock, minimal surface layer organic material content and structure, soil textures that are more easily detached and eroded, or are on steep slopes (greater than 25 percent) (NRCS 1998). Susceptibility to erosion may substantially increase when particular features are in combination. The soil map unit rates all soils on their susceptibility to water erosion. Wind erosion may also be a hazard, particularly when surface litter and vegetation are removed by surface disturbing activities.

As vegetative cover is removed and the structural stability of the soil is disrupted, the potential for erosion increases. This potential degree of erosion depends upon slope, runoff probability, soil texture, and soil structure. Finely textured soils with poor structure are generally more prone to water erosion than coarse, sandy soils. Silt loams and silty clay loams are particularly vulnerable to water erosion due to their fine particle size and decreased cohesiveness. However, elevated sandy textures make soils more sensitive to wind erosion. The project area includes soils that are susceptible to erosive forces, especially in the absence of vegetative cover following grading and compaction from heavy machinery. Steep slopes can be highly susceptible to erosion regardless of soil texture.

Some potential for erosion to occur may exist at the project area, depending on surface disturbance, site-specific slope, soil type, erosion risk, and construction technique and/or long-term maintenance. Soil erodibility ratings are determined by evaluating the erosion susceptibility (i.e., wind and water erosion factors) with terrain slope and content of rock fragments (NRCS 1998). Erosion risk is described as slight, moderate, or severe (Table 3.5). Slight ratings indicate that no erosion is likely, whereas a moderate rating indicates that erosion is likely but can be controlled with simple erosion control measures. However, a severe erodibility rating indicates that significant erosion is expected and that more costly and active erosion-control measures will be necessary. Keeping in mind the general and site-specific measures identified in Table 2.1, the potential impacts from erosion are discussed in detail for the site.

- The proposed well pad, access road, and utility corridor would occur in an area dominated Zahl and Williams loams (approximately 47 percent), soils with fair reclamation potential.
- Soils in the well pad, access road, and utility corridor locations have an erosion risk ranging from moderate to severe, primarily due to slope.
- 10.2 acres of temporary surface disturbance would occur during construction. The topography in the project area ranges from 5 to 15 percent on and around the well pad (Table 3.6), requiring site leveling with cut of 84,910 cubic yards of earth, and fill of 8,030 cubic yards.

3.4.6 Erosion Control Measures

During construction, some soils may become rutted and compacted under construction traffic. Factors that influence rutting and compaction include soil moisture, soil texture, grain size distribution, and porosity. For instance, heavily graded soils with some silt content that are not overly wet or dry tend to compact more than uniform sands. Some soils in the project area are more susceptible to compaction and it is anticipated that soil decompaction measures would be required on disturbed surfaces. To minimize the potential for rutting and compaction, the operator would avoid construction activity during periods of soil saturation in flood-prone areas, when practicable.

Soil properties that affect the growth of native grasses and shrubs include the topsoil thickness for the root zone, texture of the surface layer, available water capacity, wetness, salinity and

sodicity, flood hazard, soil temperature, and slope. With the existing conditions along the project alignment, reclamation and revegetation would be limited in a number of soil types.

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 2012a). Proven construction BMPs are known to significantly reduce erosion of various types of soil, including those in the project area (BLM and USFS 2007).

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 seeded 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 would be anticipated.

To minimize soil impacts during construction and operation activities, Enerplus would minimize disturbance areas and implement appropriate mitigation measures. To the extent possible, grading would be conducted in such a way as to limit soil disturbance and conserve existing vegetation. Grading and clearing of vegetation would be conducted to provide adequate construction and operational staging and access to the project areas.

Enerplus has committed to the following specific protective measures that would prevent or reduce erosion potential within the project area.

- All construction would include implementation of BMPs to prevent erosion, minimize runoff and loss of sediment, and ensure soil stabilization. The project location would be inspected during construction in accordance with NPDES requirements, and monitored after construction to ensure that erosion does not occur.
- The well pad is designed to be level with reclamation completed on exposed cut and fill slopes shortly following construction.
- Excess soil after interim rehabilitation would be removed from the project area and disposed of in accordance with appropriate permits.
- The access road would be constructed with crown and ditch to direct runoff away from gravel surfaces. If applicable, appropriately sized culverts would be installed at any intermittent stream crossings, in accordance with BLM Gold Book standards. All disturbed areas except the road surface would be seeded and stabilized as soon as practical following construction.
- Erosion and sedimentation control measures would be implemented in the project area, 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.

3.5 WETLANDS

Under the federal definition of wetlands, areas must contain at least one primary or two secondary indicators of three requisite criteria to be classified as a wetland including: a plant community dominated by hydrophytic vegetation, wetland hydrology, and hydric soils. Wetlands that meet these three criteria may be subject to regulation by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA (33 CFR 1251 et seq.). The regulatory status of wetlands and other potential waters of the U.S. under the CWA is determined by the USACE and EPA.

3.5.1 Potential Impacts on Wetlands

Wetlands types are classified by the U.S. Fish and Wildlife Service (USFWS) which maintains the National Wetland Inventory (NWI). The NWI is a general wetland database based primarily on aerial imagery interpretation. Common wetland types found in Dunn County are discussed in the following subsections.

3.5.1.1 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 (*Carex* spp.), scratchgrass (*Muhlenbergia asperifolia*), cattails (*Typha* spp.), bluegrasses (*Poa* spp.), reed canarygrass (*Phalaris arundinacea*), and bulrushes (*Scirpus* spp.).

3.5.1.2 Palustrine Freshwater Forested

The palustrine freshwater forested wetland class is characterized by woody vegetation that is at least 19 feet tall with a diameter at breast height (DBH) of greater than 3 inches 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 (Cowardin et al. 1979). However, the USACE considers the tree stratum to contain woody plants exhibiting a DBH of greater than or equal to 3 inches, regardless of height (USACE 2010).

3.5.1.3 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, saplings, or small and stunted trees. Dominant trees and shrubs in this type of wetland habitat include cottonwoods (*Populus* sp.), willows (*Salix* spp.), tamarisk (*Tamarix* sp.), western snowberry (*Symphoricarpos occidentalis*), black hawthorn (*Crataegus douglasii*), and boxelder (*Acer negundo*). Other herbaceous species include redtop (*Agrostis alba*), Baltic rush (*Juncus balticus*), and sedges (Cowardin et al.

1979). The USACE considers the sapling/shrub stratum to contain woody-stemmed plants with a DBH of less than 3 inches (USACE 2010).

3.5.1.4 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 (Cowardin et al. 1979).

According to the USFWS NWI database, three freshwater emergent wetlands and two additional wetlands are located within 0.5 mile of the proposed project areas, as illustrated in Figure 3.6. The closest NWI-identified wetland to the project area is a freshwater emergent wetland approximately 0.19 mile from the proposed well pad. NWI maps maintained by the USFWS do not identify any wetlands within the proposed well pad or access road areas (USFWS 2011a) that would be filled or disturbed by the proposed project.

3.5.1.5 Wetland Delineation

SWCA conducted wetland delineations based on the principles and guidelines provided in the 1987 *Corps of Engineers Wetland Delineation Manual* (Manual) (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region Version 2.0* (Supplement) (USACE 2010). According to the Manual and Supplement, an area is a wetland if three mandatory wetland indicators are present in a given area, with special exceptions. These criteria include the presence of a dominant hydrophytic plant community, one primary or two secondary indicators of wetland hydrology, and a recognized indicator of hydric soils.

Weather extremes affect the spatial and temporal dynamics of wetlands (Johnson et al. 2004.). Significantly wetter climatic conditions were recorded at both the Dickinson and Williston weather stations between January and August 2011 (Table 3.8). Further, the overall area was drier than normal between September 2011 and April 2012 (Table 3.9). Due to the abnormally wet conditions leading up to the initial survey on August 3, 2011, it is likely that surface water ponding occurred for a longer period of time than normal at the subject area. Additionally, drier than normal conditions between the two survey dates may indicate that surface water ponding was less likely to have occurred for extended periods of time.

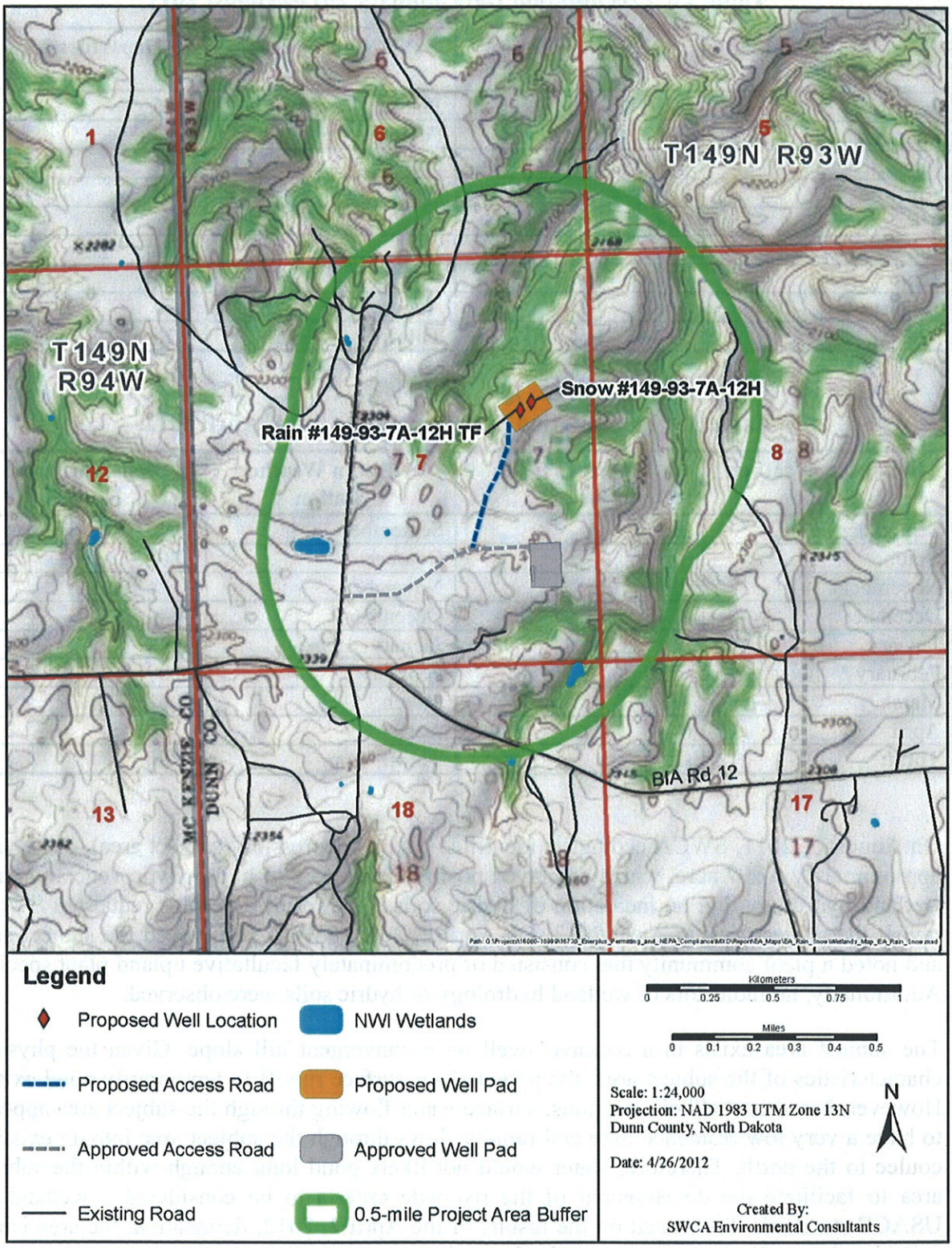


Figure 3.6. NWI-identified wetlands within 0.5 mile of the proposed well pad project area.

Table 3.8. Precipitation Data January 2011–August 2011.

Dickinson Weather Station	Departure from Normal	Williston Weather Station	Departure from Normal
January	0.10	January	0.76
February	-0.27	February	0.16
March	-0.08	March	0.24
April	0.41	April	1.94
May	2.56	May	3.40
June	0.25	June	-0.50
July	0.33	July	0.06
August	0.54	August	0.20
Total:	**3.84**	**Total:**	**6.26**

Table 3.9. Precipitation Data September 2011–April 2012.

Dickinson Weather Station	Departure from Normal	Williston Weather Station	Departure from Normal
September	-0.81	September	-0.20
October	-0.92	October	-0.07
November	-0.48	November	-0.26
December	-0.12	December	-0.44
January	-0.18	January	-0.49
February	-0.02	February	-0.09
March	-0.65	March	-0.61
April	0.18	April	0.20
Total:	**-3.00**	**Total:**	**-1.96**

On August 3, 2011, SWCA ecologists identified a small depression (subject area), occupying approximately 0.097 acre, which displayed positive indicators of hydrophytic vegetation and wetland hydrology, but no indication of hydric soils. As a result, Enerplus requested SWCA revisit the subject area in April 2012. On April 2, 2012, SWCA resurveyed the subject area and noted a plant community that consisted of predominately facultative upland plant species. Additionally, no indicators of wetland hydrology or hydric soils were observed.

The subject area exists in a concave swell on a convergent hill slope. Given the physical characteristics of the subject area, the potential for surface runoff to temporarily pond exists. However, based on field observations, surface water flowing through the subject area appears to have a very low residence time and rapidly flows through the subject area into an existing coulee to the north. Therefore, water would not likely pond long enough within the subject area to facilitate the development of the requisite criteria to be considered a wetland by USACE standards. Predicated on the results of the April 2, 2012, delineation, the area is not considered a wetland and consequently the project would not directly impact any wetlands as defined by USACE standards. However, indirect impacts to wetlands could occur by site erosion and subsequent sedimentation of nearby wetland areas.

In order to prevent any downstream impacts 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 common to the area include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), blue grama (*Bouteloua gracilis*), side-oats grama (*Bouteloua curtipendula*), green needlegrass (*Nassella virdula*), and western wheatgrass (*Pascopyrum smithii*). Common wetland vegetation in the region includes various sedge species, prairie cordgrass (*Spartina pectinata*), bulrush, and cattails. Common plant species found in woody draws, coulees, and drainages include chokecherry (*Prunus virginiana*), silver buffaloberry (*Shepherdia argentea*), and western snowberry (*Symphoricarpos occidentalis*).

The proposed well pad and access road would occur within mixed prairie grassland habitat. Vegetation noted at the immediate project area includes breadroot scurfpea (*Psoralea esculenta*), western snowberry, Kentucky bluegrass (*Poa pratensis*), common yarrow (*Achillea millefolium*), blue flax (*Linum lewisii*), purple coneflower (*Echinacea angustifolia*), western wheatgrass, bluebunch wheatgrass (*Pseudoroegneria spicata*), little bluestem, prairie junegrass (*Koeleria macrantha*), western sagewort (*Artemisia campestris*), white milkwort (*Polygala alba*), upright prairie coneflower (*Ratibida columnifera*), false gromwell (*Onosmodium molle*), wood lily (*Lilium philadelphicum*), and fringed sagewort (*Artemisia frigida*) (Figures 3.7 and 3.8).

Figure 3.7. Vegetation in the well pad area, facing north. Photo taken November 7, 2011.

Figure 3.8. Vegetation in the well pad area, facing south. Photo taken November 7, 2011.

3.6.2 Noxious Weeds

"Noxious weed" 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 3.10 (NDDA 2010). Each county has the authority to add additional species to their list of noxious weeds, but Dunn County does not maintain a list of other noxious species. In 2009, three state noxious weed species were found on 86,100 acres in Dunn County. Additionally, 3,000 acres of black henbane (*Hyoscyamus niger*) were shown to occur in Dunn County in 2009 (NDDA 2010).

Table 3.10. Recognized Noxious Weed Occupied Areas in Dunn County, North Dakota.

Common Name	Scientific Name	Dunn County (acres)
State Noxious Weeds		
absinth wormwood	*Artemisia absinthium*	39,300
Canada thistle	*Cirsium arvense*	28,500
diffuse knapweed	*Centaurea diffusa*	0
leafy spurge	*Euphorbia esula*	18,300
musk thistle	*Carduus nutans*	0
purple loosestrife	*Lythrum salicaria*	0
Russian knapweed	*Acroptilon repens*	0
spotted knapweed	*Centaurea stoebe*	0

Common Name	Scientific Name	Dunn County (acres)
yellow toadflax	*Linaria vulgaris*	0
dalmatian toadflax	*Linaria dalmatica*	0
salt cedar	*Tamarix ramosissima*	0
Additional Noxious Weeds		
black henbane	*Hyoscyamus niger*	3,000
common burdock	*Arctium minus*	0
houndstongue	*Cynoglossum officinale*	0
halogeton	*Halogeton glomeratus*	0
baby's breath	*Gypsophila muralis*	0

Source: NDDA 2010

3.6.3 Potential Impacts on Vegetation and Noxious Weeds

The Proposed Action would result in 20.7 acres of temporary disturbance and 5.6 acres of long-term loss of the native grassland vegetation and agricultural lands described above. The potential disturbance for each project component is summarized in Table 2.1.

In addition to the removal of 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 the project area. 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 pad. Areas that are stripped of topsoil must be seeded 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 proposed well pad and the access road 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 5.6 acres would be located in T149N, R93W. With implementation of BMPs and noxious weed management guidelines, the proposed project would result in negligible levels of vegetation disturbance and would not result in significant adverse impacts to vegetation resources.

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.

3.7 WILDLIFE AND HABITAT

SWCA biologists conducted general wildlife and eagle nest surveys, in addition to habitat assessments for threatened or endangered species, on July 13, 2011. Also, two aerial eagle nest surveys were flown by SWCA biologists on behalf of Enerplus to identify any eagle nests within 0.5 mile of the project area, per BIA recommendations. No nests or eagles were observed in flight or roosting within the 0.5-mile buffer area around the proposed project components during the aerial survey flown on March 25, 2011, and April 5, 2012, for the well pad and access road areas. No nests or eagles were observed during the aerial survey flown on April 5, 2012, for the well pad and access road area located in Section 35, T149N, R92W (SWCA 2011, *forthcoming*). Additionally, the North Dakota Game and Fish Department golden eagle nest database was checked for known nests within 0.5 mile of the project areas. No known golden eagle nests occur within 0.5 mile of the proposed project components (North Dakota Game and Fish Department 2010). The closest known golden eagle nest (nest ID GE269) occurs approximately 4.7 miles from the project area in Dunn County. This nest was classified as unoccupied in 2006.

3.7.1 General Wildlife Species Occurrence and Habitat

Several species common to the northern Great Plains include, 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*).

No threatened and endangered species habitat was observed during field surveys. Potential habitat for Dakota skipper (*Hesperia dacotae*) was observed. Raptor nesting habitat was not observed in the project area during the on-site survey, but nesting habitat for eagles is present within 0.5 mile of the well pad. Migratory bird nesting habitat is present in the project area. During the wildlife surveys, a bobolink (*Dolichonyx oryzivorus*) and an American goldfinch (*Carduelis tristis*) were observed.

3.7.2 Threatened and Endangered Species Occurrence and Habitat

Six 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 and the Sprague's pipit (*Anthus spragueii*). In addition to the ESA, the Bald and Golden Eagle Protection Act (16 USC 668–668d, 54 Sta. 250) and the Migratory Bird Treaty Act of 1918 (916 USC 703–711) protect nesting migratory bird species. The listed species and their federal status are provided in Table 3.11.

No listed threatened or endangered species or their designated critical habitats were observed within the project area. Potentially suitable habitat for Dakota skipper does occur within the project area. Eagle nesting habitat occurs within 0.5 mile of the project area.

3.7.3 Potential Impacts to Wildlife

SWCA wildlife biologists have evaluated the status, life history, and potential effects of the Proposed Action on each of the listed species. The potential effects of the project on these species is described in detail in Appendix A, and summarized in Table 3.11.

Minor impacts to wildlife species and their habitats could result from the construction of the well pad and new access road, 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. 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. The proposed project may affect raptor and migratory bird species through direct mortality, habitat degradation, and/or displacement of individual birds.

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.

Table 3.11. 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 (*Mustela nigripes*)	Endangered	Species is presumed extirpated from North Dakota.	None.	No Effect
Gray Wolf (*Canis lupus*)	Endangered	Nearest known gray wolf populations exist in Minnesota, Canada, Montana, and Wyoming.	None.	No Effect
Whooping Crane (*Grus americana*)	Endangered	Birds may occasionally stopover during migration due to the presence of suitable foraging habitat near the project area. However, suitable foraging and roosting habitat does not occur within the project area. The nearest small grain crop field is >2 kilometers from the project area and the nearest suitable wetland habitat (>0.04 hectare [Armbruster 1990]) is approximately 0.7 kilometer from the project area.	Underground utility lines would be utilized at all proposed project areas. If whooping cranes are sighted within 1 mile of the project area, drilling or construction activity would cease and the Bureau of Indian Affairs (BIA) and U.S. Fish and Wildlife Service (USFWS) will be notified. Cuttings pits would include avian-safe coverings and be reclaimed immediately after wells are completed. Enerplus would construct the well pad and access road outside of the spring and fall migration periods (March 25 through May 1 and September 15 through November 15 [USFWS 2007]).	No Effect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Piping Plover (*Charadrius melodus*)	Threatened	Birds are unlikely to be present due to lack of suitable foraging or nesting habitat.	Enerplus would implement all best management practices (BMPs), erosion control measures, and spill prevention practices required by the Clean Water Act. Enerplus would use a semi-closed-loop drilling system with a dry cuttings pit on the pad. At all locations, 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. A 24-inch berm would be constructed as needed at all well pad location, as shown in Table 2.1. A diversion ditch would be constructed, as needed, at the well pad location to reduce sediment loss and transportation from the well pad, as shown in Table 2.1. Sediment control devices would be implemented as needed to prevent or reduce sediment transport off the well pad location. All locations would comply with BIA's conditions of approval. Cuttings pits would include avian-safe coverings and be reclaimed immediately after wells are completed. Interior floors of the drilling pad would be sloped away from drainage ways. Cuttings pit liners would be a minimum of 20 millimeters thick.	May Affect, Is Not Likely to Adversely Affect
Designated Critical Habitat for Piping Plover	Designated Critical Habitat	Critical Habitat occurs approximately 2.7 river miles from the project area, on the shoreline and islands of Lake Sakakawea.	See piping plover protective measures.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Interior Least Tern (*Sterna antillarum*)	Endangered	The nearest suitable nesting and foraging habitat occurs on the shoreline and islands of Lake Sakakawea, approximately 2.7 river miles from the proposed well pad and access road. Migrating or foraging interior least terns may transition through the project area.	See piping plover protective measures.	May Affect, Is Not Likely to Adversely Affect
Pallid Sturgeon (*Scaphirhynchus albus*)	Endangered	Suitable habitat occurs in Lake Sakakawea (Missouri River) approximately 2.7 river miles from the project area.	See piping plover protective measures.	May Affect, Is Not Likely to Adversely Affect
Sprague's Pipit (*Anthus spragueii*)	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 below.	May Affect, Is Not Likely to Adversely Affect
Dakota Skipper (*Hesperia dacotae*)	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

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Other Federally Protected Species				
Bald Eagle (*Haliaeetus leucocephalus*)	Bald and Golden Eagle Protection Act (BGEPA) and Migratory Bird Treaty Act (MBTA)	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 occurs within 0.5 mile of the project area.	Maintain a minimum 0.5-mile buffer around all known or newly discovered active bald and golden eagle nests. Two aerial eagle nest surveys were flown by SWCA biologists for Enerplus to identify any eagle nests within 0.5 mile of the project areas, per BIA recommendations. No nests or eagles were observed during the aerial survey flown on March 25, 2011 (SWCA 2011) or on April 5, 2012 (SWCA *forthcoming*).	No Adverse Effects Anticipated
Golden Eagle (*Aquila chrysaetos)*	BGEPA and MBTA	No known nests occur within 0.5 mile of the project area. The closest known nest is 4.7 miles northeast of well location. Raptor habitat survey was conducted. No raptor nests were observed within the project area. Eagle nesting habitat occurs within 0.5 mile of the project area. Golden eagles may occasionally visit the project area.	See bald eagle protective measures.	No Adverse Effects Anticipated

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Migratory Birds	MBTA	Suitable habitat for nesting migratory grassland birds occurs in the project area.	At all project locations, migratory bird protective measures would be implemented, as follows. 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 the above item cannot be honored, degrade migratory bird habitat at the project site outside of the breeding season (July 16 to January 31) 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 and habitat degradation has not been accomplished, conduct surveys at the well pad and access road areas 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. Cuttings pits would include avian-safe coverings and be reclaimed immediately after wells are completed.	No Adverse Effects Anticipated

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

- locating well pads over areas with existing disturbances, where possible;
- using avian-safe coverings on the cuttings pits and reclaiming the pits immediately after wells are completed;
- 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.

With implementation of the protective measures identified above, in Table 3.11, in Section 2.2.9, Construction Details at Individual Sites, and in Section 3.13, Mitigation and Monitoring, the proposed project is unlikely to adversely affect wildlife species.

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 (NRHP) 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 NRHP if they lack diagnostic artifacts, subsurface remains, or structural features, but those considered eligible are treated as though they were listed on the NRHP 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 Tribal Historic Preservation Officer (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

A cultural resource inventory of this well pad and access road was conducted by personnel of SWCA Environmental Consultants, using an intensive pedestrian methodology. Approximately 44.2 acres were inventoried between June 23, 2011 and March 21, 2012 (Baer 2012). 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 this undertaking. This determination was communicated to the THPO on April 11, 2012; however, the THPO did not respond within the allotted 30 day comment period.

3.8.2 Potential Impacts to Cultural Resources

As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, the BIA reached a determination of **no historic properties affected** for these undertakings. This determination was communicated to the THPO on April 11, 2012. 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.

3.9 TRANSPORTATION

3.9.1 Federal and North Dakota State Transportation Links

Transportation in the project area is predominantly by private automobiles and commercial trucks on established 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 3.9. 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 State Highway 23 near New Town, providing access from the north.

State Highway 22 provides the primary transportation link to the project area, which lies approximately 10 to 15 miles southeast of the intersection of State Highway 22 and State Highway 73, east and south of Mandaree. In addition to providing access to the town of Mandaree, State Highway 22 is designated by North Dakota Parks and Recreation as part of the Killdeer 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 State 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 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 3.9 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.

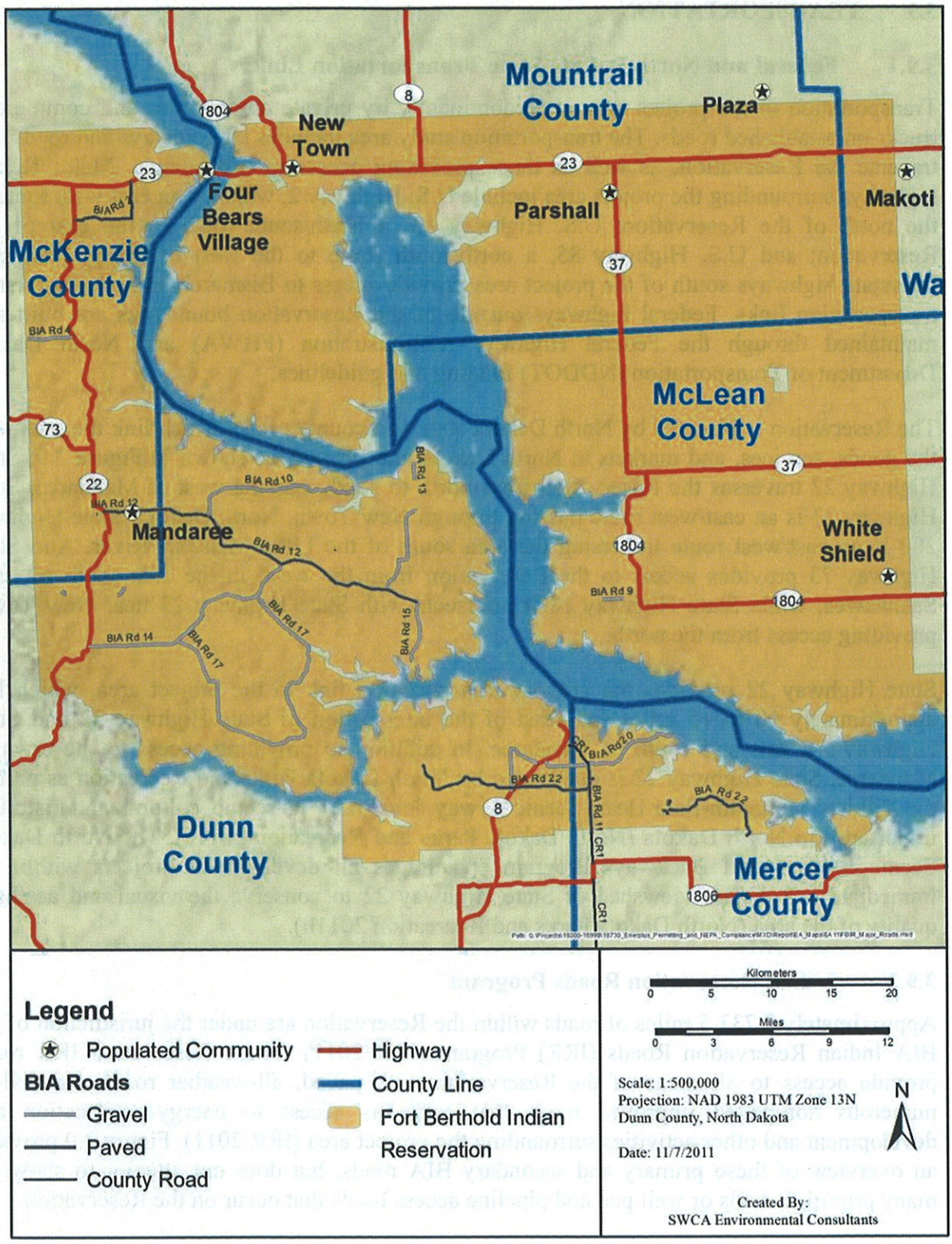


Figure 3.9. Fort Berthold Indian Reservation major roads and highways.

The BIA and the MHA Nation retain planning and maintenance responsibility over this roadway system on the Reservation through the IRR Program 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 FHWA 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. 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 671.00 miles consist of improved gravel roads. The remaining roads are primitive or other unimproved road types.

3.9.3 Trends in Reservation Vehicular Traffic Volume

Table 3.12 provides summary information for 15 BIA road segments for which average daily traffic (ADT) measurements have been recorded since 1994. Some additional road segments had ADT data prior to 1994, 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 3.12. Summary of BIA Roads with ADT Data since 1994.

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 and 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 and 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

Road Name	IRR Class	Surface Type	Section Length (miles)	Road Width (feet)	ADT	% Trucks	ADT Year
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: IRR 2011.
ADT = average daily traffic
BIA = Bureau of Indian Affairs
IRR = Indian Reservation Road

Table 3.13 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 increases in ADT and in truck ADT since 2005, as shown in Table 3.13. Increases ranging from more than 73% to 700% in passenger vehicle traffic volume were experienced on State Highways 22, 23, and 73, and County Road 8. The same highways experienced 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 an 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 3.14. NDDOT statistics suggest that traffic accidents have increased on the approximately 141.6 miles of state roads within the boundaries of the Reservation from January 2008 to May 2011. 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.

Table 3.13. Changes in ADT 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: NDDOT 2011.
ADT = average daily traffic
NA = not applicable

Table 3.14. 41-month Safety Trends on NDDOT Roads within the Reservation.

State Highway Number and Accident Breakdown	41-month Totals		2008		2009		2010		2011 (Jan–May)	
	Accidents	Average	Accidents	Change from Average (%)	Accidents	Change from Average (%)	Accidents	Change from Average (%)	Accidents	Change from Average (%)
ND 22: RP 126.5 to 156.05 (29.55 miles)										
Total	34	0.83	8	-19.61	6	-39.71	16	60.78	4	-3.53
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	
ND 23: RP 35.6 to 80.6 (45 miles)										
Total	117	2.85	32	-6.55	27	-21.15	37	8.05	21	47.18
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	
ND 37: RP 0.0 to 30.0 (30 miles)										
Total	22	0.54	4	-37.88	6	-6.82	8	24.24	4	49.09
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	
ND 73: RP 7.3 to 11.32 (4.02 miles)										
Total	6	0.15	0	-100.00	2	13.89	3	70.83	1	36.67
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	
ND 1804: 2 segments (RP 247.145 to 248.6 [1.45 miles]; and 192.1 to 213.688 [21.59 miles])										
Total	13	0.32	6	57.69	2	-47.44	3	-21.15	2	26.15
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

State Highway Number and Accident Breakdown	41-month Totals		2008		2009		2010		2011 (Jan–May)	
	Accidents	Average	Accidents	Change from Average (%)	Accidents	Change from Average (%)	Accidents	Change from Average (%)	Accidents	Change from Average (%)
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	
ND 8: 2 segments (RP 123.7 to 132.120 [8.42 miles]; 132.121 to 133.7 [1.58 miles])										
Total	10	0.24	0	-100.00	3	2.50	4	36.67	3	146.00
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	
All Reservation NDDOT Roads										
All Accidents	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.

NA = not applicable

NDDOT = North Dakota Department of Transportation

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 3.14 State Highways 23, 73, and 8 each experienced increased ADT and truck ADT, and also experienced above average accidents, including truck-involved traffic accidents. State Highway 22 was an exception, since traffic volumes increased but no corresponding increase in accidents occurred. State Highway 37 was also an exception to increased traffic contributing to increased accidents, since this highway segment saw a decrease in ADT and truck ADT, but experienced above average accidents, including truck-involved accidents 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.

3.9.5 Potential Impacts to Transportation

Transportation impacts could include any adverse visual changes to the near and distant viewshed of Killdeer 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 accident data for the Reservation do not necessarily indicate that there would 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 could be affected by the addition of many heavy loads associated with well drilling, dirt moving, and HF activities.

The proposed well pad and/or the radio tower location would not be visible at a distance from State Highway 22. As an administrative BMP for visual resources, Enerplus has designed roads and facility sites to minimize visual impacts. Because the project area is not visible from State Highway 22, these facilities would not result in any long-term adverse effects on the viewshed of the Killdeer Mountain-Four Bear Scenic Byway.

Potential short-term impacts from added traffic could occur. Overall, approximately seven 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 proposed project would add new traffic volume to State Highway 22, as well as BIA Road 12 (paved), before entering the access roads that Enerplus proposes to construct, improve, and maintain. Additional traffic 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. The proposed project would increase traffic by an average of 25 to 40 heavy trucks per day, and 25 to 65 pick-up trucks per day over the seven-month construction period. This impact to transportation would be short term and local on BIA Road 12 and State Highway 22.

3.10 PUBLIC HEALTH AND SAFETY

The Proposed Action would occur in a rural area with seven residences located within 1 mile of the proposed well pad project areas. The nearest home would be 0.43 mile west of the proposed wells.

Health and safety concerns include sour gas, natural gas or any gas containing hydrogen sulfide gas (H_2S), 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_2S 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_2S. 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_2S at dangerous concentration levels is very unlikely, no direct impacts from H_2S 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 dry cuttings pit would be constructed within the disturbed area for the 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 210 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 and Three Forks 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 three 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 3.15. 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 employment opportunities. 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.

Table 3.15. Population and Demographic Trends in the Analysis Area.

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[1]	11,897	1.8	178.0[2]	+13.3[3]	American Indian (~73%)	Caucasian (~27%)
Statewide	672,594[4]	100	0.5	4.7[4]	Caucasian (91.1%)	American Indian (5.6%)

Source: U.S. Census Bureau 2011b.

[1] Population shown reflects the total enrollment in the tribe in 2005. 2008 data were 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).

[2] Reflects percent change between 1991 and 2001 (BIA 2001).

[3] Reflects percent change between 2001 and 2005.

[4] Reflects population levels in 2010 (U.S. Census Bureau 2011a).

As presented in Table 3.15, 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).

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 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 3.16). The average weekly wage for all employees on private nonfarm payrolls was $697 in North Dakota. The four counties in the analysis area showed average weekly wages that were higher than the state and national average in 2010 (Table 3.16).

In 2010, the statewide unemployment rate was 3.8% of the workforce (Table 3.16). This is the lowest unemployment rate in the nation (Bureau of Labor Statistics 2011a). All counties in the analysis area experienced a decreased unemployment since 2005 (Table 3.16).

Table 3.16. 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 3.17.

Table 3.17. Income and Poverty in Analysis Area, 2008.

Unit of Analysis	Per Capita Income[1] (2000)	Per Capita Income[1] (2008)	Median Household Income[2] (2009)	Percent of all People in Poverty[2] (2009)
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[3]	$8,855	$10,291[3]	$26,977[3]	N/A
North Dakota	$25,624	$39,874	$47,898	11.7%

[1] U.S. Bureau of Economic Analysis 2011a, 2011b.
[2] U.S. Census Bureau 2009a.
[3] Population shown reflects the total enrollment in the tribe in 2005. 2008 data were unavailable. All information related to the Reservation reflects 2005 data (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 of $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 3.17, 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 3.18 provides housing unit supply estimates for the analysis area and the Reservation.

Table 3.18. 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 3.19.

Table 3.19. 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 Socioeconomics

Impacts to socioeconomic resources of the analysis area would be incremental 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 3.20, implementation of the proposed wells is anticipated to employ approximately 10 to 35 workers per well during the seven 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 result in a short-term increase in population in the project area required for short-term operations and would create an incremental increase in demand for services or infrastructure on the Reservation or the communities near the project area.

Table 3.20. 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 3.15), the population on the Reservation itself has increased. This has not led to housing shortages. The historic housing vacancy rate (Table 3.18) 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 that federal 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. Due to the population numbers, tribal members on the Great Plains qualify for EJ consideration as both a minority and low-income population. Table 3.21 summarizes relevant data regarding minority populations for the analysis area.

Table 3.21. 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[1]	27	35	58	103	81	111	87	202	7,786	14,718
Races										
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%	

[1] 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 3.21) (U.S. Census Bureau 2010). The four counties of the analysis area showed a range of increase from 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 3.22. 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 3.22. 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 3.22. 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 seeded 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 green) 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. These include:

- 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.

Enerplus would implement these and/or other BMPs to the extent that they are technically feasible and would add strategic and measurable protection to the project area.

3.13.2 Mitigation and Safety Measures Committed to by Enerplus

3.13.2.1 Air Quality

- 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 telemetry to remotely monitor and control production.
    - Use water or dust suppressants to control fugitive dust on roads.
    - During construction, a watering truck may be kept on site and access roads would be watered as necessary, especially during periods of high winds and/or low precipitation.
    - Control road speeds.
- Vapor recovery
    - Use enclosed tanks instead of open pits to reduce fugitive VOC emissions.

3.13.2.2 Utility Lines

All utility lines, including electric lines and other lines essential to oil well operations, would be installed underground.

3.13.2.3 Wildlife

As mentioned in Section 3.7.3, Potential Impacts to Wildlife, Enerplus has committed to using a semi-closed-loop drilling system with a dry cuttings pit, 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 would 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 the above item cannot be honored, Enerplus would 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 is to occur within the migratory bird nesting season of February 1 to July 15, and habitat degradation has not been accomplished, Enerplus would conduct surveys at the well pad 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 would be presented with a proposal for realigning the work or maintaining adequate buffers to prevent the take of migratory birds.
- Two aerial eagle nest surveys were flown by SWCA biologists for Enerplus to identify any eagle nests within 0.5 mile of the project area, per BIA recommendations. No nests or eagles were observed during the aerial surveys flown on March 25, 2011 (SWCA 2011) or April 5, 2012 (SWCA *forthcoming*).
- 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.
    - Enerplus would use a semi-closed-loop drilling system with a dry cuttings pit, as specified above and in Table 2.1.
    - 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. 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 would implement all BMPs, erosion control measures, and spill prevention practices required by the CWA.
    - A 24-inch berm would be constructed around the well pad, as indicated in Table 2.1.
    - A diversion ditch would be constructed, as needed, around the well pad, as indicated in Table 2.1.
    - The corners of the well pad would be rounded, as indicated in Table 2.1.
    - Cuttings pits would include avian-safe coverings and be reclaimed immediately after wells are completed.
    - Interior floor of the drilling pads would be sloped away from drainage ways. Cuttings pit liners would be a minimum of 20 millimeters thick.

- Whooping Crane:
    - Enerplus would construct the well pad and access road outside of the spring and fall migration periods (March 25 through May 1 and September 15 through November 15 [USFWS 2007]).
    - Install underground utility lines at the project location.
    - If a whooping crane is sighted within 1 mile of the proposed project area, work would be stopped and the USFWS and BIA would be notified. In coordination with the USFWS and BIA, work may resume after the bird(s) leaves the area.

- Consolidating well locations by designing multiple-well pads to minimize disturbance and habitat fragmentation.

- Fencing the dry cuttings pit.

3.13.2.4 Erosion Controls and Spill Prevention

- As described in detail in Section 2.2.7, spill prevention would be conducted. During 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 to prevent hazardous runoff or spills. 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 the well pad location to limit the possibility of surface contamination.

- See Table 2.1 for site-specific measures to reduce erosion.

- As described in Section 2.2.10.1, Interim Reclamation, all disturbed areas that are not needed for operations after construction and drilling are complete would be revegetated.

- As described in Section 2.2.8, Gathering Pipelines, design and safety measures would be implemented to maintain the integrity of the gathering pipelines and prevent pipeline failures or erosion. Check and manual shut-off valves would be installed at the connection between the trunk and gathering lines. Additionally, SBP's spill prevention plan would be strictly adhered to and a spill prevention, control, and countermeasure plan would be implemented.

- Enerplus has committed to the erosion control measures detailed in Section 3.4.3.

3.13.2.5 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.

3.13.2.6 Traffic and Roads

Cooperative efforts by operators, agencies, and the tribe are currently being developed and implemented across the Reservation. 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.
- Using Tribal Employment Rights Office fees for oil and gas activities, MHA Nation funds, and IRR funds to increase the pace of maintenance and repair of roads impacted by increased truck traffic and unusually adverse weather conditions.

3.13.2.7 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 would be prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.

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 formations would be an irreversible and irretrievable commitment of resources. Other potential resource commitments include land area devoted to the disposal of cuttings, 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 formations. 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 analysis area (CIAA) 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 3.23 and Figure 3.10. There are six active and confidential wells within a 1-mile CIAA, as shown in Table 3.23. A cumulative total of 82 active and confidential wells occurs within a 5-mile CIAA, a cumulative total of 306 active and confidential wells occurs within a 10-mile CIAA, and a cumulative total of 1,038 active and confidential wells occurs within a 20-mile CIAA, with the number of wells on the Reservation being slightly more than those that occur off the Reservation.

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 55 wells that have already been permitted for future drilling within a 20-mile radius of the current proposal (Table 3.23), Enerplus has suggested, but not yet formally proposed, that potentially greater than 100 more wells may eventually be drilled within a 20-mile radius of the proposed project. Enerplus has also submitted or will soon submit additional proposals for 40 to 45 future new wells within 5 miles of the Proposed Action. These future foreseeable new wells would occur in T148N, R93W, T149N, R94W, and T150N, R94W.

Table 3.23. Active, Confidential, and Permitted Wells within the Cumulative Impact Analysis Area.

Well Type	Rain-Snow	
1-mile CIAA		
Reservation (on/off)	On	Off
Active wells	4	0
Confidential wells	2	0
Permitted wells	0	0
Cumulative total active and confidential wells within 1-mile CIAA: 6		
5-mile CIAA		
Reservation (on/off)	On	Off
Active wells	41	0
Confidential wells	41	0
Permitted wells	4	0
Cumulative total active and confidential wells within 5-mile CIAA: 82		
10-mile CIAA		
Reservation (on/off)	On	Off
Active wells	141	12
Confidential wells	148	5
Permitted wells	12	2
Cumulative total active and confidential wells within 10-mile CIAA: 306		
20-mile CIAA		
Reservation (on/off)	On	Off
Active wells	359	306
Confidential wells	284	89
Permitted wells	46	9
Cumulative total active and confidential wells within 20-mile CIAA: 1,038		
Cumulative total permitted wells within 20-mile CIAA: 55		

*Duplicate wells have been eliminated from cumulative totals
CIAA = cumulative impact analysis area

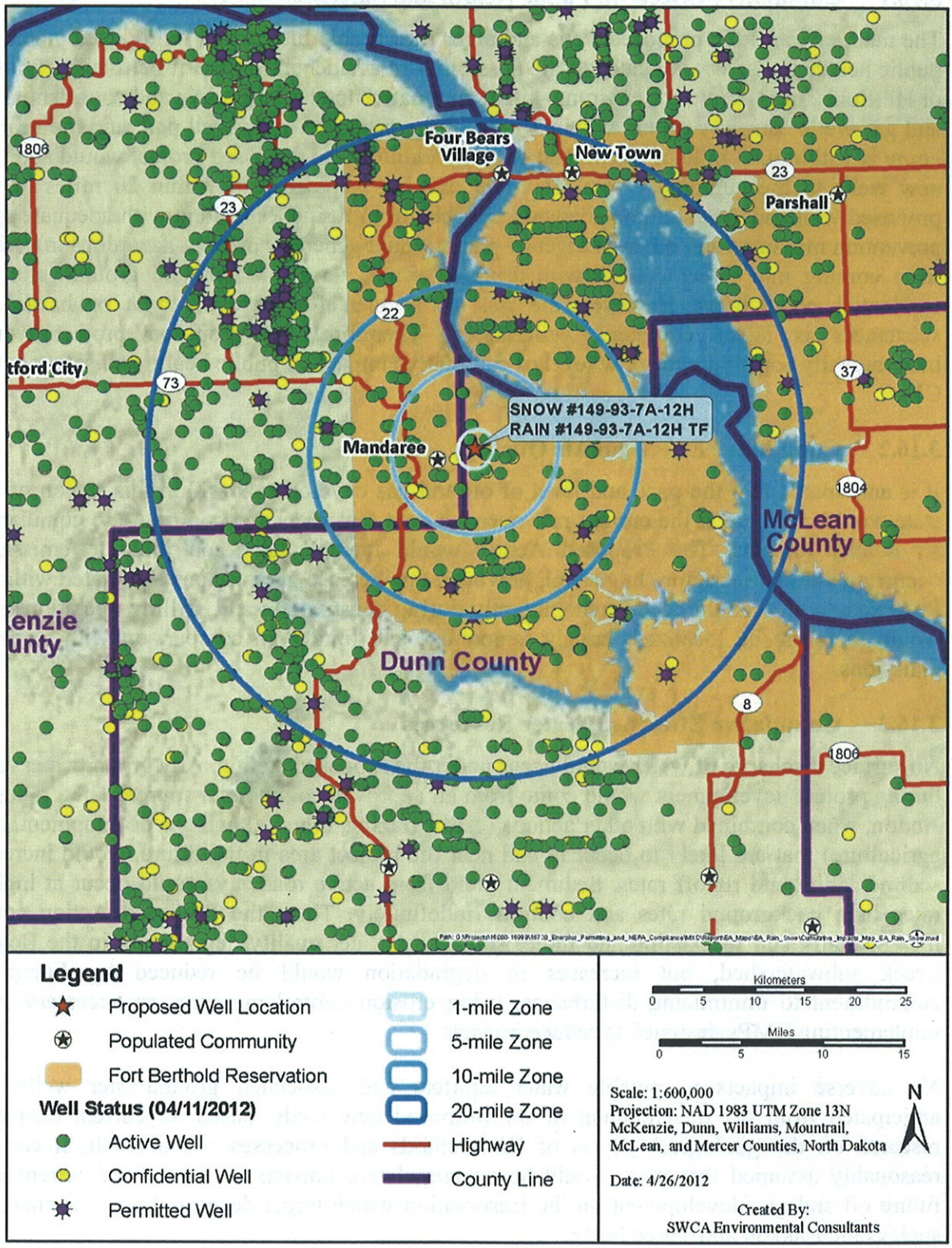


Figure 3.10. Active, confidential, and permitted wells within a 1-, 5-, 10-, and 20-mile radius of the proposed project locations.

3.16.1 Cumulative Effects on Public Health and Safety

The main effect of the proposed wells and other foreseeable future well-field development on public health and safety is related to the possibility of accidental release of petroleum, drilling or HF fluids, or H_2S into the environment. A cumulative total of six active and confidential oil and gas wells currently occurs within 1 mile of the proposed multi-well pad, and the nearest home is within 0.43 mile of the nearest well. In addition, the proposed project would add two new wells to the cumulative total of 1,093 existing wells located within 20 miles of the proposed well pad. 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 public health and safety in the CIAA.

3.16.2 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.

3.16.3 Cumulative Effects on Water Resources

No surface discharge of water would occur under the Proposed Action. Any groundwater used during project development would come from an approved commercial source. 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 Boggy Creek subwatershed, but increases in degradation would be reduced by Enerplus' commitment to minimizing disturbance, using erosion control measures as necessary, and implementing BMPs designed to reduce impacts.

No adverse impacts to 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.

3.16.4 Cumulative Effects on Soils

Soils across the project area could be affected as a result of soil loss, compaction, and disturbance of quality topsoil that has been largely undisturbed by development activities, grazing, and agriculture. The Proposed Action would result in a total of 5.65 acres of long-term disturbance associated with the well pad and access road (Table 2.1), out of a total of 816,737 acres of land within a 20-mile radius of the project. Similar levels of soil disturbance have occurred at 1,038 existing wells within the 20-mile radius, and another 55 permitted wells, as indicated in Table 3.23. Existing and future foreseeable oil and gas development is estimated to result in long-term disturbance to approximately 10,930 acres (10 acres per well), or approximately 1.34% of the available surface area within the 20-mile radius. The project would result in an estimated relative incremental increase of 0.007% long-term disturbance when added to the existing surface disturbance.

The proposed project also includes the creation of 0.37 mile of additional lengths of unpaved roadway. 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. 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.

3.16.5 Cumulative Effects on Wetlands

Wetlands in the CIAA could be affected primarily by erosion, sedimentation 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 affecting wetland functions or quality.

3.16.6 Cumulative Effects on Vegetation and Invasive Species

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 and noxious weed species. Continued oil and gas development within the Reservation could result in the loss, and further fragmentation, of native mixed-grass prairie habitat. As described above in the Cumulative Effects on Soils (Section 3.16.4), the project would result in an estimated relative incremental increase of less than 0.001% long-term disturbance when added to the existing surface disturbance.

3.16.7 Cumulative Effects on Wildlife and 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. As described above in the Cumulative Effects on Soils (Section 3.16.4), the project would result in an estimated relative incremental increase of less than 0.001%long-term disturbance when added to the existing surface disturbance. The proposed project would add only a minor cumulative effect from additional habitat fragmentation.

3.16.8 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.

3.16.9 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 (Tables 3.13 and 3.14), when this is combined with projected heavy truck traffic from hundreds of new wells previously authorized by BIA for 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 MHA Nation are developing and implementing cooperative efforts to address this issue (see Section 3.13.2.6); 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 Roads 12 (paved), before entering the access roads that Enerplus proposes to construct, improve, and maintain. The proposed project would increase traffic by an average of 25 to 40 heavy trucks per day, and 25 to 65 pick-up trucks per day over the five-month construction period. If authorized by BIA, other current proposals from Enerplus would include, approximately, an additional 60 to 75 new wells being drilled nearby and using portions of BIA Roads 12, 14, 17, and 30. The combined future foreseeable traffic and heavy loads would therefore increase by an estimated 30 heavy truck round-trips, and 30 to 60 pick-up trips spread out over a seven-month construction period. BIA Road 12 through Mandaree would potentially be affected by the cumulative increase in construction traffic. The IRR report indicates that BIA Road 12 was in good construction condition in 2006 (IRR 2011). No other drilling permit is known to have been authorized within 1 mile of the proposed well pad

(Table 3.23). 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.

3.16.10 Cumulative Effects on Socioeconomics

The Proposed Action would incrementally add to existing and future socioeconomic impacts in the general area. The Proposed Action includes nine 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.

Although oil and gas development is the dominant commercial activity in the CIAA, current impacts to the natural environment from oil and gas-related activities are still fairly dispersed, and the required and operator-committed BMPs would limit potential impacts. Current farming and ranching activities are expected to continue with little change because virtually all available acreage is already organized into range units. Undivided interests in the land surface, range permits, and agricultural leases are often held by different tribal members than those holding mineral rights. 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 proposed action 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 Action that could be affected by it.

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	Kadrmas, 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 Federal Aviation Regulations, Part 77, Objects Affecting Navigable Airspace, Paragraph 77.9. Notice may be filed on-line at https://oeaaa.faa.gov.	Notifications will be made as appropriate.
Federal Emergency Management Agency	Kyner, Dave	Recommends that Enerplus contacts the local Floodplain Manager for the Fort Berthold Reservation to receive further guidelines regarding the impact that the project might have to the regulations of the National Flood Insurance Program.	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	

Organization	Name	Comment	Response to Comment
Killdeer, Weydahl Field Airport	Hoffman, Warren	No Comment	
McKenzie County	Cayko, Richard	No Comment	
McKenzie County	Olson, Frances	No Comment	
McKenzie Electric Cooperative	Thorson, Gary	No 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	Podoll, Mary E.	Michael Ulmer: The Farmland Protection Policy Act does not apply, no further action is needed. We recommend that impacts to wetlands be avoided.	Thank you for your comment. See Section 3.5, Wetlands.
New Town Municipal Airport	Johnson, Harley	No Comment	
NoDak Electric Cooperative, Inc.	Berg, George	No Comment	

Organization	Name	Comment	Response to Comment
North Dakota Department of Health	Glatt, David	Impacts minor and can be controlled by using proper construction methods.	See Site-specific Owner-committed Measures in Table 2.1, and Sections 2.2.9, 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	
North Dakota Game and Fish Department	McKenna, Mike	Greg Link: 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 Sections 3.5, Wetlands, 3.6, Vegetation and Invasive Species, and 3.7, Wildlife and Habitat.
North Dakota Parks and Recreation	Prchal, Doug	Jesse Hanson: The proposed project is located along the Killdeer Mountain Four Bears Scenic Byways. We recommend any project development be completed with the least amount of or no visual impact to the immediate and distant views from the byway. Table of historic plant or animal species are known to occur within one mile was provided. During reclamation, we recommend that the area be revegetated with native species.	See Sections 2.2.10, Reclamation, 3.6, Vegetation and Invasive Species, 3.7, Wildlife and Habitat, 3.9, Transportation, and 3.13, Mitigation and Monitoring, for more information.
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	

Organization	Name	Comment	Response to Comment
Standing Rock Sioux Tribe	Murphy, Charles	No Comment	
State Historical Society of North Dakota	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 submitted 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	
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	No Comment	
U.S. Army Corps of Engineers	Laux, Eric	No Comment	

Organization	Name	Comment	Response to Comment
U.S. Army Corps of Engineers	Sorenson, Charles	Due to the close proximity to the Missouri River/Lake Sakakawea, please consider construction of an impervious lined trench located on the down sloping side of the well pad to hold any surface run off from the well. We recommend that the entire well pad have an impervious type liner placed on the well pad prior to construction. Also recommend a closed-loop drilling system. 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 0.5 mile of any known threatened and endangered species critical habitat. Construction time frame recommendations made. Cumulative impacts should be adequately addressed.	See Section 2.2.7, Commercial Production, for information regarding berms. Enerplus will use a semi-closed-loop system with a dry cuttings pit. No additional fill material is required. See Site-specific Owner-committed Measures in Table 2.1, and Sections 2.2.9, Construction Details at Individual Sites, and 3.13, Mitigation and Monitoring, for site-specific details and BMPs. 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.
U.S. Army Corps of Engineers	Sellers, Randal	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.	See Section 2.2.4, Drilling. Enerplus will use a semi-closed-loop system with a dry cuttings pit. No additional fill material is required.
U.S. Bureau of Reclamation	Nelson, Richard	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.	See Section 2.2.3, Access Roads and Utility Corridors. Enerplus would consult with the Rural Water Director if the project components might come into contact with any Bureau of Reclamation rural water lines.
U.S. Department of Agriculture	Sweeney, Paul	No Comment	

Organization	Name	Comment	Response to Comment
U.S. Department of Agriculture	Hecker, Ron	No Comment	
U.S. Environmental Protection Agency	Dhieux, Joyce	No Comment	
U.S. Environmental Protection Agency	Hefferman, Dan	No Comment	
U.S. Environmental Protection Agency	Svoboda, Larry	No Comment	
U.S. Environmental Protection Agency	Truskowski, Brent	No Comment	
U.S. Fish and Wildlife Service	Towner, Jeffrey	Comments given during USFWS scoping.	Please see Sections 3.7, Wildlife and Habitat, and 3.13, Mitigation and Monitoring.
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	
WPX Energy Williston, LLC.	Head, Jennifer	No Comment	
WPX Energy Williston, LLC.	Klitzka, Nelson	No Comment	
Xcel Energy	Manager	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 under the direction of the BIA. Information was compiled from various sources within SWCA .

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- Pete Christensen and Mike Cook, Biologists
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- David Myers and Kimberly Ip, Biologists
  Conducted natural resource surveys for well pas and access roads

- Alan Hutchinson, Andrew Lantz, and Chandler Herson, Archaeologists
  Conducted cultural resource surveys.

- Sarah Baer and Michael Retter, Archaeologists
  Prepared cultural resource reports for well pad and access road.

- 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
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_4	methane
CIAA	cumulative impact analysis area
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
DBH	diameter at breast height
EA	environmental assessment
EJ	Environmental Justice
Enerplus	Enerplus Resources (USA) Corporation
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FHWA	Federal Highway Administration
GHG	greenhouse gas
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HF	hydraulic fracturing
HUC	hydrologic unit code
IPCC	Intergovernmental Panel on Climate Change
IRR	Indian Reservation Roads
MHA Nation	Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation
N_2O	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_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

NWI	National Wetlands Inventory
O_3	ozone
PEM	palustrine freshwater emergent
PM	particulate matter
ppm	parts per million
Reservation	Fort Berthold Indian Reservation
ROW	right-of-way
SBP	Saddle Butte Pipeline, LLC
SO_2	sulfur dioxide
SWCA	SWCA Environmental Consultants
THPO	Tribal Historic Preservation Officer
TMD	total measured depth
TRNP	Theodore Roosevelt National Park
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*)
Effects 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 within the Fort Berthold Indian Reservation. The proposed project would have **no effect** on this species.

Gray Wolf (*Canis lupus*)
Effects 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*)
Effects Determination: No effect

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).

Whooping crane individuals may traverse over the project area during migration, but suitable stop-over habitat does not exist within the project area. The nearest small grain cropfield is greater than 2 km (1.24 miles) from the project area while the nearest potentially suitable wetland area (i.e., area >0.04 hectare) is approximately 0.7 km (0.43 mile) from the project area. Enerplus has committed to constructing the proposed project outside of the whooping crane migration period established as March 25 through May 1 (Spring Migration) and September 15 through November 15 (Fall Migration). Additionally, Enerplus would construct all utility lines underground to further reduce the potential for impact. Finally, 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 outside of the listed migration periods. As a result, the proposed project would have **no effect** on the endangered whooping crane.

Piping Plover (*Charadrius melodus*)
Effects 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 the Missouri River lakes 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 2.74 river miles from the proposed well pad and access road. Piping plover may stop-over within the project area during migration, however it is unlikely due to the limited availability of alkali wetlands in or surrounding the project area.

Potential pollution and sedimentation occurring within the project area are concerns for piping plover and their forage base. If minor tributaries and/or wooded draws are within 300 feet of proposed project components, secondary containment measures are applied by the BIA to prevent spills. Activities associated with the construction, production, or reclamation of the proposed project area are not anticipated to adversely affect water quality and subsequently the piping plover. Additionally, a semi-closed-loop drilling system with a dry cuttings pit will be used at the well pad locations. All locations will comply with BIA Conditions of Approval (COAs) and spill prevention standards; the interior floor of the drilling pads will be sloped away from drainage ways; and cuttings pit liners will be a minimum of 20 millimeters thick. Therefore, the proposed project **may affect, but is not likely to adversely affect** piping plovers.

Designated Critical Habitat of Piping Plover
Effects Determination: May Affect, Is Not Likely to Adversely Affect

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 Dunn County, North Dakota (USFWS 2002).

Suitable shoreline habitat for breeding and nesting plovers does not occur in the project area, and Lake Sakakawea is a minimum of 2.74 river miles from the proposed well pad and access road. Activities associated with the construction, production, or reclamation of the proposed project area are not anticipated to adversely affect water quality and subsequently any Designated Critical Habitat for piping plover

All locations will comply with BIA COAs and spill prevention standards; the interior floor of the drilling pad will be sloped away from drainage ways; and cuttings pit liners will be a minimum of 20 millimeters thick. Therefore, the proposed project **may affect, but is not likely to adversely affect** Designated Critical Habitat of the piping plover.

Interior Least Tern (*Sterna antillarum*)
Effects 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 terns does not occur in the project area, and Lake Sakakawea is a minimum of 2.74 river miles from the proposed well pad and access road. Terns can forage up to 40 miles from colony sites located near the Missouri River and Lake Sakakawea. Interior least terns may visit perennial streams and wetlands near the project area for foraging; however, it is unlikely that terns would visit the upland habitats present in the project area.

Potential pollution and sedimentation occurring within the project area are concerns for interior least terns and their forage base. If minor tributaries and/or wooded draws are within 300 feet of proposed project components, secondary containment measures are applied by the

BIA to prevent spills. Activities associated with the construction, production, or reclamation of the proposed project area are not anticipated to adversely affect water quality and subsequently the least tern. Additionally, a semi-closed-loop drilling system with a dry cuttings pit will be used at the well pad locations. All locations will comply with BIA COAs and spill prevention standards; the interior floor of the drilling pad will be sloped away from drainage ways; and cutting pit liners will be a minimum of 20 millimeters thick. Therefore, the proposed project **may affect, but is not likely to adversely affect** endangered least terns.

Sprague's Pipit (*Anthus spragueii*)
Effects 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 tracks of native prairie habitats, unplowed, throughout their life cycle. Because native grasslands are disturbance dependent, Sprague's pipit prefers grassland habitats 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 to 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 on-site surveys. 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*)
Effects 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, USFWS, to Mike Cook, Aquatic Ecologist, SWCA Environmental Consultants, September 3, 2010).

Potential pollution and sedimentation occurring within the project area are concerns for downstream populations of endangered pallid sturgeon. Suitable habitat for pallid sturgeon does not occur in the project area, and Lake Sakakawea is a minimum of 2.74 river miles from the proposed well pad and access road. If minor tributaries and/or wooded draws are within 300 feet of proposed project components, secondary containment measures are applied by the BIA to prevent spills. 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, a semi-closed-loop drilling system with a dry cuttings pit will be used at the well pad location. All locations will comply with BIA COAs and spill prevention standards; the interior floor of the drilling pads will be sloped away from drainage ways; and cutting pit liners will be a minimum of 20 millimeters thick. Therefore, the proposed project **may affect, but is not likely to adversely affect** pallid sturgeon.

Dakota Skipper (*Hesperia dacotae*)
Effects 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 proposed well pad is 2.92 miles from Lake Sakakawea and 1.84 miles from the Little Missouri River. Two aerial eagle nest surveys were flown by SWCA biologists for Enerplus to identify any eagle nests within 0.5 mile of the project areas, per BIA recommendations. No nests or eagles were observed in flight or roosting within the 0.5-mile buffer area around the proposed project components during the aerial survey flown on March 25, 2011 (SWCA 2011) or April 5, 2012 (SWCA *forthcoming*). 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 4.69 miles from the proposed wells pad. However, no primary or secondary indication of golden eagle presence, including nests, was observed within or near the project areas during the field survey. Two aerial eagle nest surveys were flown by SWCA biologists for Enerplus to identify any eagle nests within 0.5 mile of the project areas, per BIA recommendations. No nests or eagles were observed in flight or roosting within the 0.5-mile buffer area around the proposed project components during the aerial survey flown on March 25, 2011 (SWCA 2011) or April 5, 2012 (SWCA *forthcoming*). Therefore, no adverse effects are anticipated.

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APPENDIX B

Natural Resources Soil Descriptions and Attributes

Part I. NRCS Map Unit Descriptions (Source: NRCS 2012[1])

Map unit: 9E – Cabba loam, 15 to 45 percent slopes

Component: Cabba (80%)

The Cabba component comprises 80 percent of the map unit. Slopes are 3 to 70 percent. This component is on ridges on uplands. The parent material consists of fine-loamy residuum weathered from sedimentary rock. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded and it is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R054XY030ND Shallow Loamy ecological site. Non-irrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 8 percent. The soil has a slightly sodic horizon within 30 inches of the soil surface.

Map unit: 88B – Williams loam, 3 to 6 percent slopes

Component: Williams (85%)

The Williams component comprises 85 percent of the map unit. Slopes are 3 to 6 percent. This component is on rises on till plains. The parent material consists of fine-loamy till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded and it is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the R054XY031ND Loamy ecological site. Non-irrigated land capability classification is 2e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Map unit: 93D – Zahl-Williams loams, 9 to 15 percent slopes

Component: Williams (40%)

The Williams component comprises 40 percent of the map unit. Slopes are 9 to 15 percent. This component is on hills on till plains. The parent material consists of fine-loamy till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded and it is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the R054XY031ND Loamy ecological site. Non-irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

---

[1] Natural Resources Conservation Service (NRCS). 2012. Soil Data Mart. U.S. Department of Agriculture, Natural Resources Conservation Service. Soil Survey Geographic (SSURGO) Database for Dunn and McKenzie Counties, North Dakota. Available online at http://soildatamart.nrcs.usda.gov. Accessed March 5, 2012.

Component: Zahl (40%)

The Zahl component comprises 40 percent of the map unit. Slopes are 9 to 15 percent. This component is on hills on till plains. The parent material consists of fine-loamy till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded and it is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R054XY038ND Thin Loamy ecological site. Non-irrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Map unit: 93E – Zahl-Williams loams, 15 to 25 percent slopes

Component: Zahl (50%)

The Zahl component comprises 50 percent of the map unit. Slopes are 15 to 25 percent. This component is on ridges on till plains. The parent material consists of fine-loamy till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded and it is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R054XY038ND Thin Loamy ecological site. Non-irrigated land capability classification is 7e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Component: Williams (30%)

The Williams component comprises 30 percent of the map unit. Slopes are 15 to 25 percent. This component is on ridges on till plains. The parent material consists of fine-loamy till. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded and it is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the R054XY031ND Loamy ecological site. Non-irrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 15 percent.

Part II. Soil Series within the Project Area

Map Unit	Soil Series	Landform	Slope	Drainage	Depth (cm)	Restrictive Layer	Carbonate (%)	Organic Matter (%)	Sodium Adsorption Ratio	K Factor	Erodibility Rating	Reclamation Potential	Limitation	Ecological Site	Surface Disturbance (Acres)	% of Surface Disturbance
9E	Cabba loam, 15 to 45 percent slopes	Hills and ridges	38	Well drained	20–40	Paralithic bedrock	15	3	2	0.32	Moderate to severe	Poor	Bedrock, slope	Shallow Loamy (R054XY030ND)	0.7	6.6
88B	Williams loam, 3 to 6 percent slopes	Plains and rises	5	Well drained	> 60	<Null>	20	5	<Null>	0.28	Moderate	Good	<Null>	Loamy (R054XY031ND)	1.6	15.4
93D	Zahl-Williams loams, 9 to 15 percent slopes	Hills and ridges	12	Well drained	> 60	<Null>	15	5	<Null>	0.28	Moderate	Fair	Clay, slope	Loamy (R054XY031ND)	4.7	46.6
93E	Zahl-Williams loams, 15 to 25 percent slopes	Hills and ridges	20	Well drained	> 60	<Null>	15	4	<Null>	0.28	Moderate	Poor	Clay, slope	Thin Loamy (R054XY038ND)	3.2	31.4
														TOTAL	**10.2**	**100.0**

APPENDIX C

Scoping and Concurrence Information

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

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
DESCRM
MC-208

APR 1 1 2012

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 two oil well pads and a gathering line in Dunn and McKenzie Counties, North Dakota. Approximately 70.96 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the areas depicted in the enclosed reports. No historic properties were located that appear to 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. Catalogued as **BIA Case Number AAO-2074/FB/12**, the proposed undertakings, locations, and project dimensions are described in the following reports:

Baer, Sarah
(2012) A Class I and Class III Cultural Resource Inventory of the Snow #149-93-07A-12H and Rain #149-93-07A-12H TF Well Pad and Access Road/Utility Corridor, Fort Berthold Indian Reservation, Dunn County, North Dakota. SWCA Environmental Consultants for Enerplus Resources, Denver.

Baer, Sarah, and Alan Hutchinson
(2012) A Class I and Class III Cultural Resource Inventory of the Enerplus Resources Houston #148-94-34CH, Memphis #148-94-34CH TF and Phoenix #148-94-34CH TF Well Pad and Access Road/Utility Corridor, Fort Berthold Indian Reservation, McKenzie County, North Dakota. SWCA Environmental Consultants for Enerplus Resources, Denver.

Nagra, Jenny, and Alan Hutchinson
(2012) A Class I and Class III Cultural Resource Inventory of Enerplus Resources Proposed Extension of the Pipeline/Utility Corridor for the Grassy Knoll #2-11H and Banjo #149-94-02B-01H TF Well Pad, Fort Berthold Indian Reservation, McKenzie 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,

ACTING Regional Director

Enclosures

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

From: Wade Epperson <wepperson@swca.com>
Sent: Thursday, July 19, 2012 12:48 PM
To: Herman, Mark; Bercier, Marilyn
Cc: David J. Myers; Laura Leslie Burckhardt
Subject: FW: Enerplus Resouces Rain/Snow JD (UNCLASSIFIED)

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Red Category

Hello Mark and Marilyn,

We finally got the determination from the USACE, see below. They determined that the area evaluated at the Rain and Snow well pad location is not a wetland.

Let me know if you require any more information.

Cheers!

Wade Epperson
NR Project Manager/GIS Specialist

SWCA Environmental Consultants
1892 South Sheridan Avenue
Sheridan, WY 82801
P 307.673.4303 | F 307.673.4505
C 307.752.4138

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See us on LinkedIn:
http://www.linkedin.com/company/swca-environmental-consultants

"... Behold the rain which descends from heaven upon our vineyards; there it enters the roots of the vines, to be changed into wine; a constant proof that God loves us, and loves to see us happy."
~ Benjamin Franklin

-----Original Message-----
From: Erhardt, Toni R NWO [mailto:Toni.R.Erhardt@usace.army.mil]
Sent: Thursday, July 19, 2012 10:27 AM
To: Mike Cook; David J. Myers; Wade Epperson
Subject: Enerplus Resouces Rain/Snow JD (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Mike, David and Wade, Two guys from our office made a trip out to the Enerplus site yesterday. They determined the area does not meet the parameters necessary to be considered a wetland; therefore, the area is not jurisdictional and no permits are required.

They did indicate; however, that the data points evaluated by SWCA in April were located outside of areas most likely to be wetlands and on the upslope away from the area of most interest to the Corps. They did observe areas containing carex sp. as indicated on the original handwritten data sheet; however, there was no evidence of hydrology or hydric soils. If the area had been determined to be a wetland, the next step in the evaluation process would be to determine whether or not it is an isolated, intrastate and non-navigable basin. Especially in sloped situations, the most important area to evaluate is on the downslope to determine the wetland boundary at a location between the wetland itself and the closest potentially or known jurisdictional water.

Toni

Classification: UNCLASSIFIED
Caveats: NONE

SWCA
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.

Bismarck Office
116 N. 4th Street, Suite 200
Bismarck, ND 58501
701.258.6622
www.swca.com

April 11, 2012

Mr. Josh Ruffo, Environmental Compliance Coordinator
Enerplus Resources
110 Second Avenue West
Turtle Lake, North Dakota, 58575

SWCA Project Number: 16730

RE: Results of SWCA's Wetland Delineation of a Possible Wetland Area on the Rain and Snow 149-93-7A-12H Well Pad Conducted on April 2, 2012

Dear Mr. Ruffo,

On April 2, 2012, SWCA Environmental Consultants (SWCA) conducted a wetland delineation of an area that had been previously recorded as a palustrine emergent (PEM) wetland in order to collect additional data and make appropriate regulatory recommendations.

The area in question was previously determined, by SWCA, to be a PEM wetland on August 3, 2011. However, during a subsequent review, SWCA determined that the area did not contain characteristics associated with conditions that would indicate long-term ponding, ground water intrusion, and subsequently the development of hydric soils. Therefore, in order to supplement data acquired during the August 3, 2011, delineation, SWCA revisited the location on April 2, 2012. The following letter report describes the methodology used by SWCA ecologists to conduct the delineation as well as the results of SWCA's April 2, 2012, visit to the subject area. Finally, the report provides Enerplus Resources (Enerplus) with additional documentation regarding the potential for U.S. Army Corps of Engineers (USACE) jurisdiction under Section 404 of the Clean Water Act.

The subject area is located in Section 7, Township 149 North, Range 93 West, Dunn County, North Dakota. The subject area exists in a concave swell on a convergent hill slope. Given the physical characteristics of the subject area, the potential for surface runoff to temporarily pond exists. However, based on field observations, surface water flowing through the subject area appears to have a very low residence time and rapidly flows through the subject area into an existing coulee to the north of the subject area. Therefore, in a year with normal precipitation, the surface runoff is unlikely to pond long enough to facilitate the development of hydric soils and subsequently support a dominant hydrophytic vegetation community.

WETLAND DELINEATION METHODS

SWCA conducted the delineation based on the principles and guidelines provided in the 1987 *Corps of Engineers Wetland Delineation Manual* (Manual) (Environmental Laboratory 1987[1]) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region Version 2.0* (Supplement) (USACE 2010[2]). According to the Manual and Supplement, an area is a wetland if three mandatory wetland indicators are present in a given area, with special exceptions. These criteria include the presence of a dominant hydrophytic plant community, one primary or two secondary indicators of wetland hydrology, and a recognized indicator of hydric soils.

Hydrophytic Vegetation

Ecologists recorded all plants within the vegetative community based on the respective stratum in which each species occurred. A tree is defined by the Supplement to be a woody-stemmed plant with a trunk diameter at breast height (DBH) of equal to or greater than 3 inches, regardless of height. The sapling and shrub stratum is defined by the Supplement to be composed of woody-stemmed plants with a trunk DBH of less than 3 inches, regardless of height. The herbaceous stratum includes all non-woody-stemmed plants regardless of height. Finally, the woody vine stratum includes all woody-stemmed vines, regardless of diameter.

SWCA recorded the binomial scientific name and percent cover of all plants within a 30-foot radius for the tree stratum, a 15-foot radius for the sapling/shrub stratum, a 5-foot radius for the herbaceous stratum, and a 30-foot radius for the woody vine stratum. SWCA noted each plant species' respective U.S. Fish and Wildlife Service's indicator status (i.e., upland [UPL], facultative upland [FACU], facultative [FAC], facultative wetland [FACW], and obligate [OBL]).

Wetland Hydrology

An area was determined to contain wetland hydrology if at least one primary indicator or at least two secondary indicators of wetland hydrology were present, as defined by the Manual and Supplement. Common hydrologic indicators that may be observed in the Land Resource Region F: Northern Great Plains (LRRF) include the presence of surface water (A1), high water table (A2), soil saturation (A3), sediment deposits (B2), water-stained leaves (B9), and oxidized rhizospheres on living roots (C3).

Hydric Soil

A hydric soil is a soil that is saturated for a sufficient amount of time to develop anaerobic conditions that favor the growth of hydrophytic vegetation. The presence of hydric soil indicators can confirm that an area has been inundated or saturated for periods during the growing season that would facilitate oxygen depletion regardless of whether inundation and/or saturation was noted during the field visit. Ecologists recorded detailed notes regarding soil profiles including

[1] Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station.

[2] U.S. Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0). Edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-12. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

the hue, value, and chroma (i.e., color) of the soil (using Munsell Soil Color Charts); the depth and extent of that soil color within the entire soil profile; the concentration of any redoximorphic concentrations or depletions; and the texture of the soil at each depth where a color change was observed. Soil pits were excavated to a depth of 20 inches at each data point. Common hydric soil indicators of the LRRF subregion include the presence of hydrogen sulfide gas within the soil pit (A4), redox depressions (F8), and depleted matrix (F3).

RESULTS

As proposed, the Rain and Snow 149-93-7A-12H well pad project would not impact any areas that meet the criteria for consideration as a wetland by the USACE. In total, SWCA recorded three datapoints within and adjacent to the boundary of the subject area identified during the August 3, 2011, survey, as shown on the attached map. A brief explanation of SWCA's findings at each datapoint is provided below.

DP1

DP1 is located within an ephemeral drainage surrounded by 1% to 5% slopes. The datapoint exists within an herbaceous upland community (see Figure 1 below), dominated by buffalograss (*Bouteloua dactyloides*; 60% of absolute coverage) and western wheatgrass (*Pascopyrum smithii*; 35% of absolute coverage). Bare ground comprised approximately 5% of the herbaceous plot. No primary indicators of wetland hydrology (surface water, saturation, algal crust, etc.) were recorded. Soil data derived from a pit excavated to a depth of 20 inches contained no redoximorphic concentrations, as shown on the attached USACE wetland delineation datasheets.

Figure 1. View from DP1, facing north.

Overall, this datapoint does not contain a positive indicator of a dominant hydrophytic vegetation community or hydric soil indicators as defined by the Manual and Supplement. Further, no primary indicators of recent inundation or saturation were observed. Therefore, datapoint DP1 exists within an upland area.

DP2

DP2 is located within an ephemeral drainage, surrounded by slopes ranging from 1% to 5%. The vegetative community was classified as herbaceous upland (see Figure 2 below) and is dominated by western wheatgrass (70% absolute coverage). The herb stratum also contained sweetclover (*Melilotus* sp.; 15% absolute coverage), buffalograss (5% absolute coverage), white sagebrush (*Artemisia ludoviciana*; 5% absolute coverage), and bare ground (5% absolute coverage). The sapling/shrub stratum contained redosier dogwood (*Cornus sericea*; 5% absolute coverage). No primary indicators of wetland hydrology (surface water, saturation, algal crust, etc.) were recorded. Soil data derived from a pit excavated to a depth of 20 inches contained no redoximorphic concentrations.

Figure 2. View from DP2, facing south.

Overall, this datapoint does not contain a positive indicator of a dominant hydrophytic vegetation community or hydric soil indicators as defined by the Manual and Supplement. Further, no primary indicators of recent inundation or saturation were observed. Therefore, datapoint DP2 exists within an upland area.

DP3

DP3 is located within an ephemeral drainage, surrounded by slopes ranging from 1% to 5%. The vegetative community was classified as herbaceous upland (see Figure 3 below) and is composed of smooth brome (*Bromus inermis*; 90% absolute coverage), buffalograss (5% absolute coverage), and prairie rose (*Rosa arkansana*; 5% absolute coverage). No primary indicators of wetland hydrology (surface water, saturation, algal crust, etc.) were recorded. Soil data derived from a pit excavated to a depth of 20 inches contained no redoximorphic concentrations.

Figure 3. View from DP3, facing east.

Overall, this datapoint does not contain a positive indicator of a dominant hydrophytic vegetation community or hydric soil indicators as defined by the Manual and Supplement. Further, no primary indicators of recent inundation or saturation were observed. Therefore, datapoint DP3 exists within an upland area.

CONCLUSION

Based on data collected during the April 2, 2012, delineation, SWCA has determined that the subject area, identified as a wetland during the August 3, 2011, delineation, does not exhibit the requisite criteria to be considered a wetland by USACE standards. Therefore, as currently proposed, the Rain and Snow 149-93-7A-12H well pad project will not impact any wetland areas. This assertion is predicated on the results of SWCA's delineation.

Please contact me at 701.258.6622 or pchristensen@swca.com should you require additional clarification regarding SWCA's wetland delineation of the proposed project.

Regards,

Pete Christensen
Wildlife Biologist-Bismarck

Attachments: 4

Legend

- Data Point
- Previously Recorded Wetland
- Proposed Rain & Snow #149-93-7A-12H Well Pad

SWCA ENVIRONMENTAL CONSULTANTS

116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

Kilometers
0 0.03 0.06

Miles
0 0.02 0.04

Base Map: Aerial Imagery
Source: esri ArcGIS service
Quadrangle: Mandaree (1973)
T. 149N, R. 93W
Dunn County, North Dakota

N

Scale: 1:1,500 NAD 1983 UTM Zone 13N

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rain & Snow 149-93-7A-12H County: Dunn Sampling Date: April 2, 2012
Applicant/Owner: Enerplus State: ND Sampling Point: DP1
Investigator(s): A. Persinger and P. Christensen Section, Township, Range: Section 7, Township 149N, Range 93W
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%
Subregion (LRR): Northwestern Great Plains Lat: 47.74088 Long: -102.62570 Datum: NAD 83
Soil Map Unit Name: Zahl-Williams loams, 9-15% Slopes NWI Classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? (Yes / No) No (if no, explain in Remarks.)
Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation NO, Soil NO, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:

This point was determined not to be within a wetland due to the lack of all three wetland criteria.

Preliminary climate data indicates precipitation values were 0.61 inches below normal for March 2012.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % cover	Dominant Species?	Indicator Status
1. *None Observed*	N/A	N/A	N/A
2.			
3.			
4.			
	N/A = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *None Observed*	N/A	N/A	N/A
2.			
3.			
4.			
5.			
	N/A = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Bouteloua dactyloides*	60	Yes	FACU
2. *Pascopyrum smithii*	35	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
1. *None Observed*	N/A	N/A	N/A
2.			
	N/A = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	95	x 4 =	380
UPL species	0	x 5 =	0
Column Totals:	95 (A)		380 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤ 3.0[1]
___ 4 - Morphological Adaptations[1] (Explain)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Provide supporting data in Remarks.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (if observed, list morphological adaptations below).

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC- or drier).

Sampling Point: DP1

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/1	100	NONE N/A	0	N/A	N/A	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soils Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR F)
- ___ 1 cm Muck (A9) (LRR F, G, H)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR I, J)
- ___ Coast Prairie Redox (A16) (LRR F, G, H)
- ___ Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches) None

Hydric Soil Present? Yes ___ No X

Remarks:

No positive indication of hydric soils was observed.

HYDROLOGY

Wetland hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): N/A

Water Table Present? Yes ___ No X Depth (inches): N/A

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): N/A

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No positive indication of wetland hydrology was observed.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rain & Snow 149-93-7A-12H County: Dunn Sampling Date: April 2, 2012
Applicant/Owner: Enerplus State: ND Sampling Point: DP2
Investigator(s): A. Persinger and P. Christensen Section, Township, Range: Section 7, Township 149N, Range 93W
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%
Subregion (LRR): Northwestern Great Plains Lat: 47.74085 Long: -102.62565 Datum: NAD83
Soil Map Unit Name: Zahl-Williams loams, 9-15% Slopes NWI Classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? (Yes / No) No (if no, explain in Remarks.)
Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation NO, Soil NO, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:

This point was determined not to be within a wetland due to the lack of all three wetland criteria.

Preliminary climate data indicates precipitation values were 0.61 inches below normal for March 2012.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % cover	Dominant Species?	Indicator Status
1. *None Observed*	N/A	N/A	N/A
2.			
3.			
4.			
	N/A = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *None Observed*	N/A	N/A	N/A
2.			
3.			
4.			
5.			
	N/A = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Pascopyrum smithii*	70	Yes	FACU
2. *Melilotus officinalis*	15	No	FACU
3. *Bouteloua dactyloides*	5	No	FACU
4. *Artemisia ludoviciana*	5	No	FACU
5. *Cornus sericea*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
1. *None Observed*	N/A	N/A	N/A
2.			
	N/A = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x1 =	0
FACW species	5	x2 =	10
FAC species	0	x3 =	0
FACU species	95	x4 =	380
UPL species	0	x5 =	0
Column Totals:	100 (A)		390 (B)

Prevalence Index = B/A = 3.90

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤ 3.0[1]
___ 4 - Morphological Adaptations[1] (Explain)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Provide supporting data in Remarks.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (if observed, list morphological adaptations below).

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC- or drier).

US Army Corps of Engineers Great Plains - Version 2.0

Sampling Point: DP2

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/1	100	NONE N/A	0	N/A	N/A	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soils Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5) **(LRR F)**
- ____ 1 cm Muck (A9) **(LRR F, G, H)**
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ____ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) **(LRR I, J)**
- ____ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ____ Dark Surface (S7) **(LRR G)**
- ____ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ____ Reduced Vertic (F18)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): None

Hydric Soil Present? Yes ____ No X

Remarks:

No positive indication of hydric soils was observed.

HYDROLOGY

Wetland hydrology indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ____ Presence of Reduced Iron (C4)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ FAC-Neutral Test (D5)
- ____ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): N/A

Water Table Present? Yes ____ No X Depth (inches): N/A

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): N/A

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No positive indication of wetland hydrology was observed.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rain & Snow 149-93-7A-12H County: Dunn Sampling Date: April 2, 2012
Applicant/Owner: Enerplus State: ND Sampling Point: DP3
Investigator(s): A. Persinger and P. Christensen Section, Township, Range: Section 7, Township 149N, Range 93W
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%
Subregion (LRR): Northwestern Great Plains Lat: 47.74080 Long: -102.62536 Datum: NAD83
Soil Map Unit Name: Zahl-Williams loams, 9-15% Slopes NWI Classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? (Yes / No) No (if no, explain in Remarks.)
Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation NO, Soil NO, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

This point was determined not to be within a wetland due to the lack of all three wetland criteria.

Preliminary climate data indicates precipitation values were 0.61 inches below normal for March 2012.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % cover	Dominant Species?	Indicator Status
1. *None Observed*	N/A	N/A	N/A
2.			
3.			
4.			
	N/A = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *None Observed*	N/A	N/A	N/A
2.			
3.			
4.			
5.			
	N/A = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Bromus inermis*	90	Yes	UPL
2. *Bouteloua dactyloides*	5	No	FACU
3. *Rosa arkansana*	5	No	NI
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
1. *None Observed*	N/A	N/A	N/A
2.			
	N/A = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x1 =	0
FACW species	0	x2 =	0
FAC species	0	x3 =	0
FACU species	5	x4 =	20
UPL species	90	x5 =	450
Column Totals:	95 (A)		470 (B)

Prevalence Index = B/A = 4.95

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤ 3.0[1]
___ 4 - Morphological Adaptations[1] (Explain)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Provide supporting data in Remarks.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (if observed, list morphological adaptations below).

No positive indication of hydrophytic vegetation was observed (≥50% of dominant species indexed as FAC- or drier).

Sampling Point: DP3

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/1	100	NONE N/A	0	N/A	N/A	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soils Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5) **(LRR F)**
- ____ 1 cm Muck (A9) **(LRR F, G, H)**
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ____ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Loamy Mucky Mineral (F1)
- ____ Loamy Gleyed Matrix (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)
- ____ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ____ 1 cm Muck (A9) **(LRR I, J)**
- ____ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ____ Dark Surface (S7) **(LRR G)**
- ____ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ____ Reduced Vertic (F18)
- ____ Red Parent Material (TF2)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): None

Hydric Soil Present? Yes ____ No X

Remarks:

No positive indication of hydric soils was observed.

HYDROLOGY

Wetland hydrology indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Salt Crust (B11)
- ____ Aquatic Invertebrates (B13)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Dry-Season Water Table (C2)
- ____ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ____ Presence of Reduced Iron (C4)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ FAC-Neutral Test (D5)
- ____ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): N/A

Water Table Present? Yes ____ No X Depth (inches): N/A

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): N/A

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No positive indication of wetland hydrology was observed.

SWCA
ENVIRONMENTAL CONSULTANTS
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U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
ND FIELD OFFICE

Project as described will have no significant impact on fish and wildlife resources. No endangered or threatened species are known to occupy the project area and/or are not likely to be adversely affected. IF PROJECT DESIGN CHANGES ARE MADE, PLEASE SUBMIT PLANS FOR REVIEW.

3-30-12 Jeffrey K. Towner
Date Jeffrey K. Towner
Field Supervisor

March 29, 2012

Jeffrey K. Towner
U.S. Fish and Wildlife Service
3425 Miriam Avenue
Bismarck, ND 58501

RE: Tails #2012-CPA-0239, Enerplus 30 Proposed Wells on 13 Pads, Fort Berthold Reservation, McKenzie & Dunn Counties, ND

Dear Mr. Towner,

This is in response to your March 23, 2012, letter of no-concurrence regarding thirty proposed oil and gas wells on thirteen well pads to be drilled by Enerplus Resources (USA) Corporation on the Fort Berthold Reservation, McKenzie and Dunn Counties, North Dakota.

An error was made in the scoping letter we sent February 7, 2012. It stated that the well pad with wells Sun #149-93-07D-12H and Wind #149-93-07D-12H TF located in SE¼ SE¼ Section 7, T149N, R93W, contained a wetland on the pad and that construction would directly impact that wetland. This is a mistake; no wetlands were found on the project area and no wetlands will be impacted by this proposed well pad and access road.

To address USFWS' concerns about the wetland found on the well pad containing wells Snow #149-93-07A-12H and Rain #149-93-07A-12H TF located in SE¼ NE¼ Section 7, T149N, R93W, this pad will be removed from consideration for this review and resubmitted at a later date after further investigation and discussion. This action resolves the wetland and threatened and endangered species issues detailed in the no-concurrence letter sent by U.S. Fish and Wildlife Service. All other project descriptions and commitments from the February 7th scoping letter remain unchanged.

The proposed action now includes approval by the BIA and BLM for the construction, drilling, completion, and production of 28 exploratory oil and gas wells, located on 12 well pads, on the Fort Berthold Indian Reservation by Enerplus. The updated list of well pads is:

Badger, Muskrat, Mink, Raccoon: NE¼ NW¼ Section 4, T150N, R94W
Sun, Wind: SE¼ SE¼ Section 7, T149N, R93W
TAT, Arikara: SW¼ SE¼ Section 32, T150N, R94W
Hidatsa, Mandan: SE¼ SW¼ Section 32, T150N, R94W
Joey, Boomer: SE¼ SW¼ Section 23, T152N, R94W
Arctic, Pacific, Atlantic: NW¼ NW¼ Section 36, T150N, R94W

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Sheridan, WY 82801
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www.swca.com

Painted, Snapper: SE¼ NE¼ Section 28, T152N, R94W
Map, Softshell: NE¼ SE¼ Section 28, T152N, R94W
Everest, Denali: SW¼ SE¼ Section 12, T148N, R95W
Rebutia, Cactus: SE¼ SW¼ Section 35, T149N, R92W
Zeus, Homer: SW¼ SE¼ Section 33, T149N, R93W
Houston, Memphis, Phoenix: SW¼ SW¼ Section 34, T148N, R94W

We are requesting an updated concurrence letter be sent before April 4, 2012, so that it may be addressed in the final EA. Please send the concurrence letter to the address below.

SWCA Environmental Consultants
Kimberly Ip
1892 South Sheridan Avenue
Sheridan, Wyoming 82801
(307) 673-4303
kip@swca.com

Sincerely,

Kimberly Ip
Biologist
kip@swca.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

MAR 23 2012

Ms. Laura Leslie Burckhardt,
Ecologist
SWCA Environmental Consultants
1892 South Sheridan Ave.
Sheridan, Wyoming 82801

Re: Enerplus 30 Proposed Wells on 13 Pads, Fort Berthold Reservation, McKenzie & Dunn Counties, ND
In response, please reference Tails # 2012-CPA-0239

Dear Ms. Burckhardt:

This is in response to your February 7, 2012, scoping letter and request for concurrence regarding thirty proposed oil and gas wells on thirteen pads to be drilled and completed by Enerplus Resources (USA) Corporation (Enerplus) on the Fort Berthold Reservation, McKenzie and Dunn Counties, North Dakota.

Specific locations for the proposed pads are:

Badger, Muskrat, Mink, Raccoon: T. 150 N., R. 94 W., N.E. ¼ NW ¼ Section 4
Sun, Wind: T. 149 N., R. 93 W., S.E. ¼ S.E. ¼ Section 7
TAT, Arikara: T. 150 N., R. 94 W., S.W. ¼ S.E. ¼ Section 32
Hidatsa, Mandan: T. 150 N., R. 94 W., S.E. 1/4 S.W. ¼ Section 32
Joey, Boomer: T. 152 N., R. 94 W., S.E. ¼ S.W. ¼ Section 23
Snow, Rain: T. 149 N., R. 93 W., S.E. ¼ N.E. ¼ Section 7
Arctic, Pacific, Atlantic: T. 150 N., R. 94 W., N.W. ¼ N.W. ¼ Section 36
Painted, Snapper: T. 152 N., R. 94 W., S.E. ¼ N.E. ¼ Section 28
Map, Softshell: T. 152 N., R. 94 W., N.E. ¼ S.E. ¼ Section 28
Everest, Denali: T. 148 N., R. 95 W., S.W. ¼ S.E. ¼ Section 12
Rebutia, Cactus: T. 149 N., R. 92 W., S.E. ¼ S.W. ¼ Section 35
Zeus, Homer: T. 149 N., R. 93 W., S.W. ¼ S.E. ¼ Section 33
Houston, Memphis, Phoenix: T. 148 N., R. 94 W., S.W. ¼ S.W. ¼ Section 34

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 Kadrmas Lee & Jackson (KLJ) 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.

A March 6, 2012, email from Kimberly Ip of SWCA to Heidi Riddle of my staff confirms that two wetlands will be impacted by the Sun/Wind and Snow/Rain well pads. The email also states that BIA determined that the wetlands are "non-jurisdictional". Corps of Engineers' jurisdiction to require a Department of Army permit may be determined only by the Corps of Engineers pursuant to Section 404 of the Clean Water Act. The Service recommends that BIA coordinate with the Corps to determine if a 404 permit is required. Contact Mr. Dan Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504; Phone (701) 255-0015, to determine their permit requirements. If a 404 permit is required, the Service will also provide recommendations on this project to the Corps.

In the event that the subject wetlands are not under Corps' jurisdiction, all federal agencies must assess the impacts of their actions under Executive Order 11990, which directs all federal agencies to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance the natural beneficial values of wetlands. Although not required, we also recommend that if the wetland is to be impacted, that wetland mitigation be provided to offset this loss.

Temporary wetlands are important to a variety of wildlife species, including whooping cranes. The Service recommends avoiding impacts to these wetlands. As proposed, the Service does not concur with your determination of "may affect, not likely to adversely affect ", based on the potential for adverse effects to whooping cranes due to harm from habitat modification. We recommend avoiding direct impacts to these wetlands, and maintaining a buffer which eliminates or reduces potential effects to whooping cranes from disturbance. Barring this project modification, a biological assessment based on anticipated adverse effect should be submitted.

Your letter states that the Badger/Muskrat/Mink/Raccoon, Sun/Wind, TAT/Arikara, Hidatsa/Mandan, Joey/Boomer, Snow/Rain, Houston/Memphis/Phoenix, Painted/Snapper, Map/Softshell, Everest/Denali, Rebutia/Cactus, Zeus/Homer, Arctic/Pacific/Atlantic proposed pads are located approximately 3.62, 3.69, 2.69, 2.60, 8.73, 2.74, 2.81, 9.70, 3.82, 28.17, 5.09, 12.01, 20.30 stream-miles, respectively, from potential habitat for interior least tern, piping plover and pallid sturgeon. KLJ believes that 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. The topographic features of the area and the distances from the shoreline should also assist in providing sight and sound buffers for plovers and terns. 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.

The Service acknowledges your no effect determination for gray wolf.

The Dakota skipper and Sprague's pipit are candidate species for listing under the ESA; therefore, an effects determination is not necessary for these species. No legal requirement exists to protect candidate species; however, it is within the spirit of the ESA to consider these species as having significant value and worth protecting. Although not required, Federal action agencies such as the BIA have the option of requesting a conference on any proposed action that may affect candidate species such as the Dakota skipper and Sprague's pipit.

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:
  - Conduct pre-construction surveys for migratory birds and their nests within five 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. 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 believes the commitment to implement the aforementioned measures will assist in complying 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,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

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

Notice of Availability and Appeal Rights

Enerplus: Two Exploratory Bakken and Three Forks Oil Wells Located on One Well Pad-
Snow #149-93-7A-12H and Rain #149-93-7A-12H TF

The Bureau of Indian Affairs (BIA) is planning to issue administrative approvals related to Two Bakken and Three Forks Oil Wells atop one well pads on the Berthold Reservation as shown on the attached map. Construction by Enerplus Resources is expected to begin in 2012.

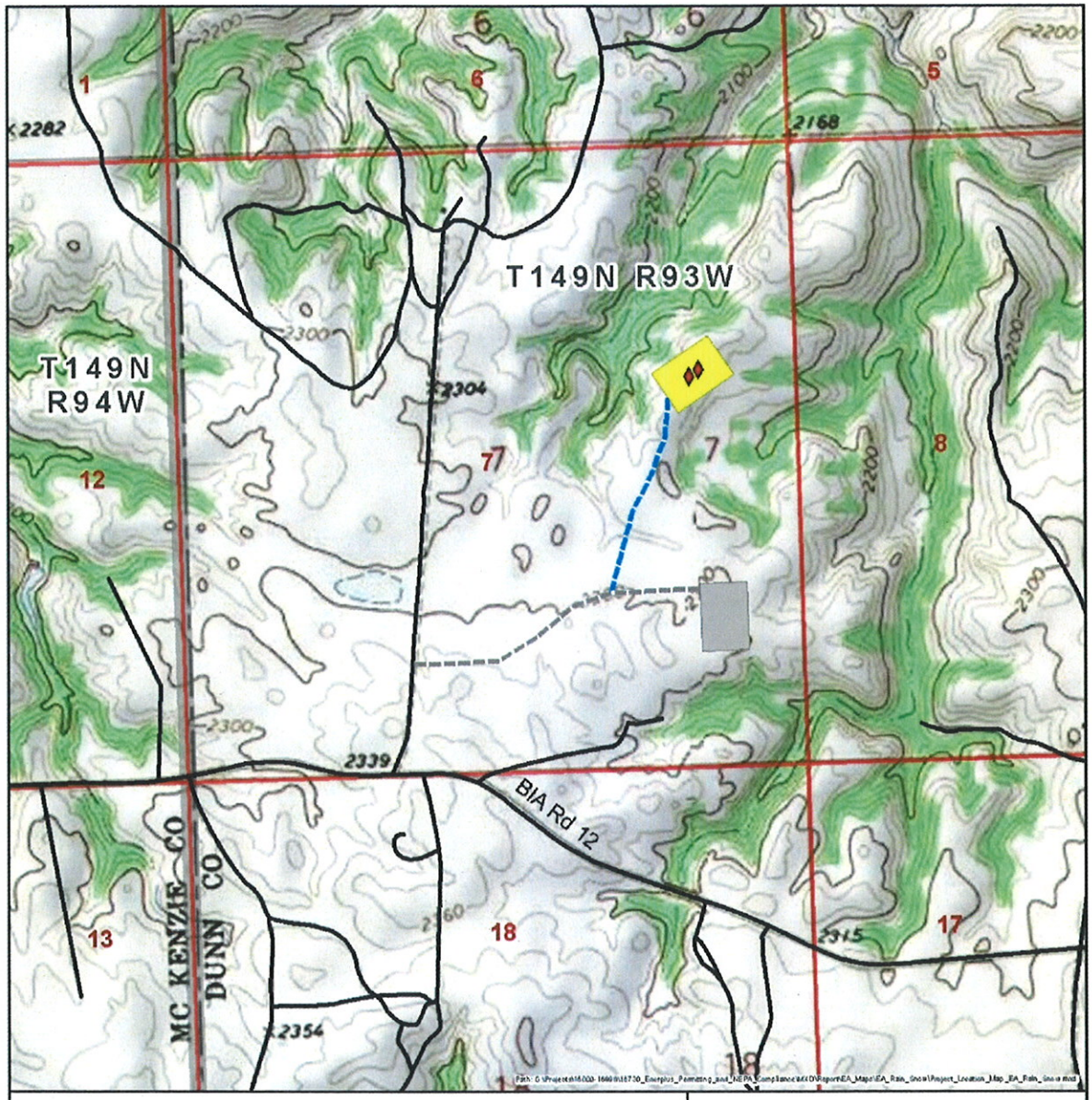
An environmental assessment (EA) determined that proposed activities will not cause significant impacts to the human environment. An environmental impact statement is not required. Contact Earl Silk, Superintendent at 701-627-6570 for more information and/or copies of the EA and the Finding of No Significant 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 August 23, 2012, 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 701-627-6570.

Project locations.



Legend

- Proposed Well Location
- Proposed Access Road & Utility Corridor
- Approved Access Road
- Existing Road

Proposed Well Pad

- Snow #149-93-7A-12H
- Rain #149-93-7A-12H TF
- Approved Well Pad

Kilometers: 0 0.25 0.5 0.75

Miles: 0 0.1 0.2 0.3 0.4 0.5

Scale: 1:18,000
Projection: NAD 1983 UTM Zone 13N
Dunn County, North Dakota

Date: 4/26/2012

N

Created By:
SWCA Environmental Consultants