

ENVIRONMENTAL ASSESSMENT

United States Bureau of Indian Affairs

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



Spotted Hawk Development, LLC

One Bakken Formation Exploratory Well at One Location:

Simba #24-30H

Fort Berthold Indian Reservation

September 2009

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

September 2009.

Finding of No Significant Impact

Spotted Hawk Development, LLC

Simba 24-30H

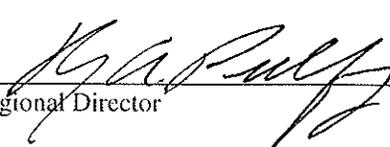
**Fort Berthold Indian Reservation
McLean County, North Dakota**

The U.S. Bureau of Indian Affairs (BIA) has received a proposal for one oil/gas well, access roads and related infrastructure on the Fort Berthold Indian Reservation to be located in Section 30 of Township 150 North—Range 90 West, in McLean County, North Dakota. Associated federal actions by BIA include determinations of effect regarding cultural resources, approvals of leases, rights-of-way and easements, and a positive recommendation to the Bureau of Land Management regarding the Application for Permit to Drill.

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

This determination is based on the following factors:

1. Agency and public involvement was solicited and environmental issues related to the proposal were identified.
2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, public safety, water resources, and cultural resources. The remaining potential for impacts was disclosed for both the proposed action and the No Action alternative.
3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species.
4. The proposed actions are designed to avoid adverse effects to historic, archeological, 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.


Regional Director

9/8/09
Date

TABLE OF CONTENTS

1.	Purpose and Need for the Proposed Action	1
2.	Proposed Action and Alternatives	3
2.1	Field Camps	3
2.2	Access Roads	3
2.3	Well Pads	4
2.4	Drilling	4
2.5	Casing and Cementing	5
2.6	Completion and Evaluation	5
2.7	Commercial Production	6
2.8	Reclamation	6
2.9	Construction Details at Individual Sites	9
2.10	Preferred Alternative	11
3.	The Affected Environment and Potential Impacts	12
3.1	No Action Alternative	13
3.2	Air Quality	13
3.3	Public Health and Safety	14
3.4	Water Resources	15
3.5	Wetland/Riparian Habitat and Threatened or Endangered Species	21
3.6	Soils	23
3.7	Vegetation and Invasive Species	26
3.8	Cultural Resources	29
3.9	Socio-Economics	29
3.10	Environmental Justice	31
3.11	Mitigation and Monitoring	32
3.12	Irreversible and Irrecoverable Commitment of Resources	32
3.13	Short-Term Use versus Long-Term Productivity	32
3.14	Cumulative Impacts	33
4.0	Consultation and Coordination	35
5.0	List of Preparers	38
6.0	References	39
7.0	Abbreviations and Acronyms	43

Tables

2.4	Mud Program	5
3.2	Air Quality Standards.....	13
3.4d	Existing Groundwater Wells	18
3.6a	Soil Samples.....	24
3.7a	Dominant Plant Species Summary	26
3.7b	McLean County Noxious Weed Distribution.....	28
3.9a	Population and Demographics	30
3.9b	Income and Unemployment	30
3.9c	Housing Units-2000 (U.S. Census Bureau 2007-2008)	31
3.14	Summary of Active and Proposed Wells	33

Figures

1	Project Location	2
2.4	Typical Drilling Rig	5
2.7	Typical Commercial Operations.....	6
2.8	Example of Reclamation from the Gold Book.....	8
2.9a	Aerial Photo Simba #24-30H, spacing units.....	9
2.9b	Simba #24-30H Access Road.....	9
2.9c	Simba #24-30H Well Pad.....	9
2.9d	Simba #24-30H Project Map.....	10
3.4a	Watershed Map	16
3.4b	Simba Drainage Patterns	16
3.4c	Drainage Path-Lake Sakakawea.....	17
3.6a	Soil Distributions	24
3.7a	Mixed Grass Prairie Community.....	27
3.7b	Green Ash Along Access Road.....	27
3.14	Approved or Proposed Oil and Gas Projects	34

1. Purpose and Need for the Proposed Action

Spotted Hawk Development, LLC is proposing to drill one horizontal oil/gas well from one location on the Fort Berthold Indian Reservation to evaluate and potentially develop the commercial potential of natural resources. The development has been proposed on land held in trust by the United States in Mclean County, North Dakota. The U.S. Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments. The BIA also holds title to the subsurface mineral rights. One well would be drilled from the surface location shown in Figure 1. Simba 24-30H would be drilled from a single well pad in the SE¹/₄SW¹/₄ of Section 30, T150N, R90W.

The economic development of available resources and associated BIA actions are consistent with BIA's general mission. Leasing and development of mineral resources offers substantial economic benefits to both the Three Affiliated Tribes of the Mandan, Hidatsa and Arikara Nation and to individual tribal members. Oil and gas exploration and development activities are conducted under authority of the Indian Mineral Leasing Act of 1938 (25 USC 396a, *et seq.*), the Indian Mineral Development Act of 1982 (25 USC 2101, *et seq.*), the Federal Onshore Oil and Gas Royalty Management Act of 1982 (30 USC 1701, *et seq.*), and the Energy Policy Act of 2005 (42 USC 15801, *et seq.*). BIA actions in connection with the proposed project are largely administrative and include approval of leases, easements and rights-of-way, determination regarding effects on cultural resources and recommendations to the Bureau of Land Management (BLM) regarding approval of Applications for Permit to Drill (APDs).

These proposed federal actions require compliance with the *National Environmental Policy Act* of 1969 (NEPA) and regulations of the Council on Environmental Quality (CEQ, 40 CFR 1500-1508). Analysis of the proposed project's potential to impact the human environment will be documented and will guide federal decision making. An APD submitted by Spotted Hawk Development, LLC, describes developmental, operational and reclamation procedures and practices that contribute to the technical basis of this Environmental Assessment (EA). The procedures and practices described in the application are critical elements in both the project proposal and BIA's decision regarding environmental impacts. This EA will result in either a Finding of No Significant Impact (FONSI) or a decision to prepare an Environmental Impact Statement (EIS).

There are several components to the proposed action. Improved roads are needed to access the proposed well site. A well pad would be constructed to accommodate drilling operations. Pits for drill cuttings would be constructed, used and reclaimed. Drilling and completion information could result in long-term commercial production at the site, in which case supporting facilities would be installed. The working portions of the well pad and the access road would remain in place during commercial production. All project components would eventually be abandoned and reclaimed, as specified in this document and the APD and according to any other federal conditions, unless formally transferred with federal approval to either the BIA or the landowner. The proposed well is exploratory, in that results could also support developmental decisions on other leases in the surrounding area, but this EA addresses only the installation and possible long-term operation of this well and directly associated infrastructure and facilities. Additional NEPA analysis, decisions and federal actions will be required prior to any other development.

Any authorized project will comply with all applicable federal, state and tribal laws, rules, policies, regulations and agreements. No construction, drilling or other ground-disturbing operations will begin until all necessary leases, easements, surveys, clearances, consultations, permissions, determinations and permits are in place.



Figure 1: Project location

2. Proposed Action and Alternatives

The **No Action Alternative** must be considered within an Environmental Assessment. If this alternative is selected, BIA would not approve leases, rights-of-way or other administrative proposals for the proposed project. The Application for Permit to Drill (APD) for this well location would not be approved. Current land use practices would continue at a No Action site. Development under other oil and gas leases would remain a possibility, but No Action is the only available or reasonable alternative to the specific proposals considered in this document.

This document analyzes the potential impacts of a specific proposed action – an exploratory oil/gas well on allotted surface and mineral estate within the boundaries of the Fort Berthold Indian Reservation in McLean County, North Dakota. The proposed well would test the commercial potential of the Middle Bakken Dolomite Member of the Bakken Formation. Site-specific actions would or might include several components, including an access road, construction of a well pad, drilling operations, installation of production facilities, tanker traffic and reclamation.

All construction activities would follow lease stipulations, practices and procedures outlined in this document, the APD, guidelines and standards in *Surface Operating Standards for Oil and Gas Exploration and Development* (BLM/US Forest Service, Fourth Edition, also known as the Gold Book), and any conditions added by either BIA or BLM. All lease operations would be conducted in full compliance with applicable laws and regulations, including 43 CFR 3100, *Onshore Oil and Gas Orders 1, 2, 6 and 7*, approved plans of operations and any applicable Notices to Lessees.

2.1 Field Camp

Self-contained trailers may house a few key personnel during drilling operations, but any such arrangements would be very short-term. No long-term residential camps are proposed. Construction and drilling personnel would commute to the project site, most likely from within or around the Reservation. Human waste would be collected in standard portable chemical toilets or service trailers located on-site, then transported off-site to a state-approved wastewater treatment facility. Other solid waste would be collected in enclosed containers and disposed of at a state-approved facility.

2.2 Access Road

A total of about 6,644 feet (1.26 miles) of existing two-track trail would be improved. Signed agreements are in place allowing road construction across affected surface allotments. A maximum disturbed right-of-way (ROW) width of 50 feet would result in a total of 7.62 acres of surface disturbance. One well is planned for the surface location.

Construction would follow road design standards outlined in the Gold Book. A minimum of six (6) inches of topsoil would be stripped from the access road corridors, with the stockpiled topsoil redistributed on the outslope areas of the borrow ditches following road construction. These borrow ditch areas would be reseeded as soon as practical with a seed mixture determined by the BIA. If commercial production is established from a proposed location, the access road would be graveled with a minimum of four (4) inches of gravel and the roadway would remain in place for the life of the well. Details of road construction are addressed in the Multi-Point Surface Use and Operations Plan in the APD.

2.3 Well Pad

The proposed well pad would consist mainly of 1) an area leveled for the drilling rig and related equipment; and 2) a pit excavated for drilling fluids, drill cuttings and fluids produced during drilling. The well pad area would be cleared of vegetation, stripped of topsoil and graded to the specifications in the approved APD. Topsoil would be stockpiled and stabilized until disturbed areas were reclaimed and re-vegetated. Excavated subsoil would be used in pad construction, with the finished well pad graded to ensure positive water drainage away from the drill site. Erosion control would be maintained through prompt re-vegetation and by constructing all necessary surface water drainage controls, including berms, diversion ditches and waterbars.

The level area of the well pad (including reserve pits for drill cuttings) would be about 400' x 400' (3.55 acres) to accommodate the well. Cut and fill on pad edges would result in a total disturbance of about 0.13 acres for the pad, in addition to the 7.62 acres for road construction. Details of pad construction and reclamation are described and diagrammed in the Surface Use Plan of the well's APD.

2.4 Drilling

After securing mineral leases, Spotted Hawk Development, LLC submitted the Notice of Staking (NOS) to BLM on June 29, 2009, proposing to drill one well.

- Simba 24-30H: SE¼SW¼ of Section 30, T150N, R90W

The BLM North Dakota Field Office forwarded copies of the NOS to BIA's Fort Berthold Agency in New Town, North Dakota, for review and concurrence. BLM will not approve an APD until BIA completes its NEPA process and recommends APD approval. No drilling will begin until an approved permit has been obtained from the BLM.

Initial drilling would be vertical to about 9,300 feet. The minimum setback of 500 feet (NDCC 43-02-03-18.2) from section lines would be maintained or achieved through directional drilling. Drilling would become roughly horizontal at a measured depth of about 10,065 feet, followed by the drilling of a lateral reach of about 11,100 feet in length at depths of about 10,065 feet within the Middle Bakken Dolomite Member.

Rig transport and on-site assembly would take about seven days. Drilling operations would require about 35 days to reach the target depth, using a rotary drilling rig rated for drilling to about 15,000 feet. A typical drilling rig is shown in Figure 2.4. For the first 1,900 feet of hole drilled, a fresh-water based mud system with non-hazardous additives such as bentonite would be used to minimize contaminant concerns. Water would be obtained from a commercial source for this drilling stage, using about 63 gallons of water per foot of hole drilled (a total of about 116,000 gallons).

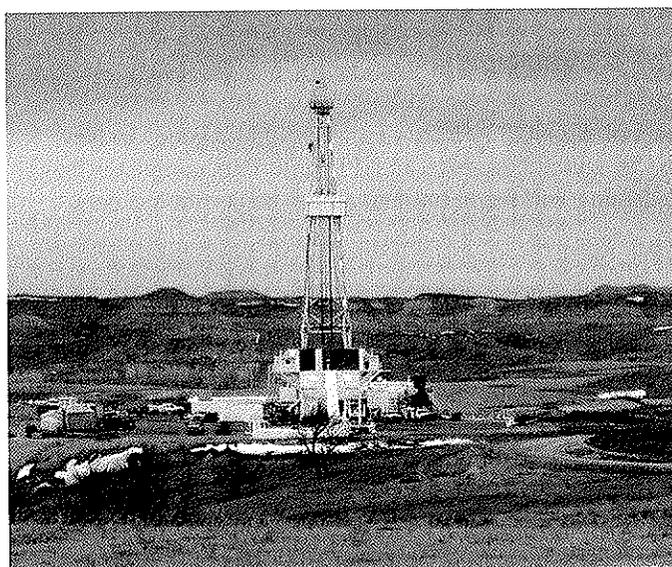
After setting and cementing the surface casing, an oil-based mud system (about 80% diesel fuel and 20% water) would be used to drill to the intermediate casing point. Oil-based drilling fluids can reduce the potential for hole sloughing while drilling through water-sensitive formations, such as shales. About 43,000 gallons of water and 30,000 gallons of diesel fuel would be used. Horizontal drilling would utilize saltwater-based mud drilling fluid. On the surface, toxic fluids would be contained in steel tanks placed on plastic/vinyl liners, then collected during drilling by centrifuging returns to separate the cuttings from fluids. Fluids would be recycled back into the steel tanks for re-use. Upon completion of drilling operations, oil-based fluids would be collected to the extent possible and recycled for use elsewhere. Any free fluids remaining in the reserve pits would be removed and disposed of in accordance with North Dakota Industrial Commission (NDIC) rules and regulations. Table 2.4 outlines the Mud Program.

September 2009.

Table 2.4 Mud Program

Depth	Mud Weight (MW)	Mud Type	Utilized Volume (gal/ft)	Funnel Viscosity (FV)	Fluid Loss (FL)
0' – 1,900'	8.5	Fresh Water Gel/Lime Sweeps (115,920 gallons fresh H ₂ O)	63	Hi Vis Sweeps	NC
1,900'-12,279' (casing point)	9.7 – 10	80/20 Invert (95% recovered) (42,200 gallons invert) (30,000 gallons diesel)	6	36-48	20-25 cc
12,279' (csg pt)- 21,238'± (TD)	9.8 – 10.2	Salt Water (200,302 gallons salt water)	9	26	NC

The volume of fresh water used in drilling is approximately 12,000 barrels, with a recovery rate of approximately 98%.

**Figure 2.4: Typical drilling rig**

Cuttings generated from drilling would be deposited in the reserve pit on the well pad. Reserve pits would be lined with an impervious (plastic/vinyl) liner to prevent drilling fluid seepage and contamination of the underlying soil. Liners would be installed over sufficient bedding (either straw or dirt) to cover any rocks, would overlap the pit walls, extend under the mud tanks, and would be covered with dirt and/or rocks to hold it in place. Prior to use, the entire location would be fenced completely with a cattle guard at the access road into location, in order to protect both wildlife and livestock. Fencing would be installed in accordance with Gold Book guidelines and maintained until the reserve pits are backfilled.

2.5 Casing and Cementing

Surface casing would be set to about 1,900 feet measured depth and cemented back to the surface during drilling, isolating all near-surface freshwater aquifers in the project area. The Dakota Formation is a potential hydrocarbon zone expected to be encountered at a depth of about 5,000 feet, so production casing would be set and cemented to about 12,300 feet measured depth. Casing and cementing operations would be conducted in full compliance with *Onshore Oil and Gas Order 2*.

2.6 Completion and Evaluation

After a well has been drilled and cased, a completion (work-over) unit would be moved onto the site. For wells of the depth proposed, about thirty (30) days are usually needed to clean out the well bore, pressure test the casing, perforate and fracture the horizontal portion of the hole, and run production tubing for commercial production. If the target formation is to be fractured to stimulate production, the typical procedure is to pump a mixture of sand and a carrier (e.g., water and/or nitrogen) under extreme pressure downhole. The resulting fractures are propped open by the sand, increasing the capture zone of the well and maximizing efficient

drainage of the field. After fracturing, the well is typically flowed back to the surface to recover fracture fluids and remove excess sand. Fluids utilized in the completion procedure would be captured either in the reserve pit or in tanks for disposal in strict accordance with NDIC rules and regulations.

2.7 Commercial Production

If drilling, testing and production support commercial production from the proposed location, additional equipment would be installed, including a pumping unit at the well head, a vertical heater/treater, tanks (usually four 400 barrel steel tanks), and a flare/production pit. An impervious dike sized to hold 100% of the capacity of the largest tank plus one full day's production would surround production tanks and the heater/treater. Load out lines would be located inside the diked area, with a heavy screen-covered drip barrel installed under the outlet. A metal access staircase would protect the dike and support flexible hoses used by tanker trucks. The BIA would choose an inconspicuous paint color for all permanent aboveground production facilities from colors recommended either by the BLM or the Rocky Mountain Five-State Interagency Committee. A typical producing rig is shown in Figure 2.7 and more detail is included in the APD.

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 product and 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 one hundred years.

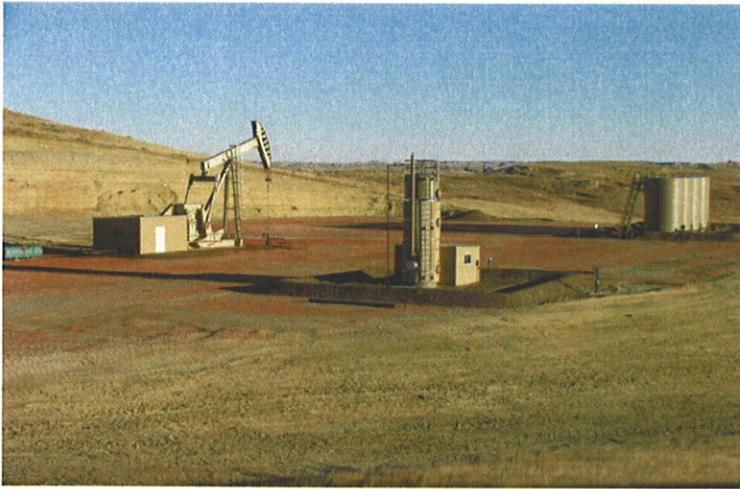


Figure 2.7: Typical commercial operation

Large volumes of gas are not expected from this location. Small volumes would be flared in accordance with Notice to Lessees (NTL) 4A and NDIC regulations, which prohibit unrestricted flaring for more than the initial year of operation (NDCC 38-08-06.4). Results could also encourage additional exploration on the Reservation. Should future oil/gas exploration activities be proposed by Spotted Hawk Development LLC on the Fort Berthold reservation, those proposals and associated federal actions would require additional NEPA analysis and BIA consideration prior to implementation.

2.8 Reclamation

The reserve pit and drill cuttings would be treated, solidified, backfilled and buried as soon as possible after well completion. Any oily residue is dispersed and captured, preventing coalescence and release to the environment at significant rates in the future. Controlled mixing of cuttings with a non-toxic reagent causes an irreversible reaction that quickly results in an inert, solid material. The alkaline nature of the stabilized material also chemically stabilizes various metals that may be present, primarily by transforming them into less soluble compounds. Treated material would then be buried in the reserve pit, overlain by at least four feet of overburden as required by NDIC regulations.

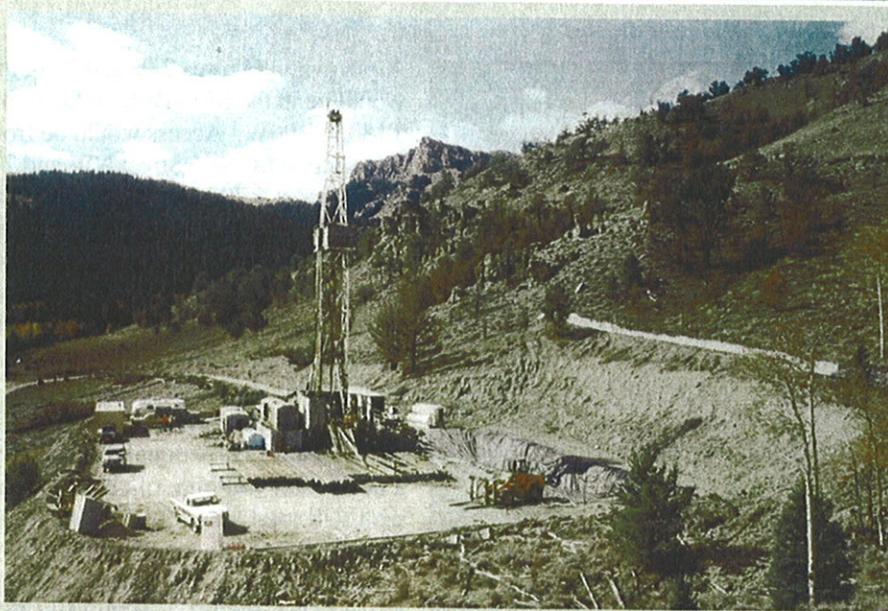
If commercial production equipment is installed, the well pad would be reduced in size to about 300' x 200', with the rest of the original pad reclaimed. The working area of each well pad and the running surface of access roads would be surfaced with scoria or crushed rock obtained from a previously approved location. The outslope

portions of roads would be covered with stockpiled topsoil and re-seeded with a seed mixture determined by the BIA, reducing the residual access-related disturbance to about 28' wide. Other interim reclamation measures to be accomplished within the first year include reduction of the cut and fill slopes, redistribution of stockpiled topsoil, installation of erosion control measures, and reseeded as recommended by the BIA.

Final reclamation would occur either in the very short term if the 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, re-contoured and re-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. The Surface Use Plan within the APD contains additional details regarding both interim and final reclamation measures. Figure 2.8 shows an example of reclamation from the Gold Book.

48

Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development



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 2.8: Example of reclamation from the Gold Book

2.9 Construction Details at This Site

One wellbore will be drilled from the surface location.

Simba #24-30H



As shown in Figures 2.9a and 2.9d, the well pad would be in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 30, T150N, R90W. Access would be from the intersection of 24 $\frac{1}{2}$ Street NW and 77 Avenue NW, almost 6,700 feet of upgraded two-track. Total disturbance would be 7.62 acres. Photographs of the proposed well location and access road are shown in Figures 2.9b and 2.9c. Directional drilling would achieve and maintain the minimum 500' setback from the section boundaries of spacing units. Initial drilling will be vertical to about 9,300 feet for the wellbore. Directional drilling will result in a horizontal wellbore of about 10,065 feet. The well will total about 21,238 feet, including a lateral reach of about 11,100 feet in the Middle Bakken Member. The lateral drilling target is about 550 feet FWL and 990 feet FSL of Section 26, T150N, R91W.

Figure 2.9a: Aerial photo of Simba #24-30H, showing spacing units



Figure 2.9b: Simba #24-30H access road



Figure 2.9c: Simba #24-30H well pad



Figure 2.9d: Simba #24-30H Project Map

2.10 Preferred Alternative

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

3. The Affected Environment and Potential Impacts

The Fort Berthold Indian Reservation is the home of the Three Affiliated Tribes of the MHA Nation. Located in west-central North Dakota, the Reservation encompasses more than one million acres, of which almost half are held in trust by the United States for either the MHA Nation or individual allottees. The remainder of the land is owned in fee simple title, sometimes by the MHA Nation or tribal members, but usually by non-Indians. The Reservation occupies portions of six counties, including Dunn, McKenzie, McLean, Mercer, Mountrail and Ward. In 1945, the Garrison Dam was completed, inundating much of the Reservation. The remaining land was divided into three sections by Lake Sakakawea, an impoundment of the Missouri River upstream of the Garrison Dam.

The proposed well site is located in the Lake Sakakawea Basin. This site is located in the Saddle Butte watershed and the Lucky Mound Creek Bay sub-watershed. Runoff is generally by sheetflow until collected by ephemeral and perennial streams draining to Lake Sakakawea. Surface runoff from the proposed site would flow 0.32 miles south/southeast to Lake Sakakawea.

The proposed project has been sited to avoid direct impacts to surface water and minimize disruption of drainages. Roadway engineering and erosion control measures would mitigate the potential migration of sediments downslope. No measurable increases in runoff or impacts to surface waters are expected.

The site has over 20 acres of relatively flat buffer zone where runoff would be in sheetflow before being collected into the unnamed ephemeral streambed tributary to Lake Sakakawea. It is unlikely that a crude oil release would present a significant impact to area surface waters. The moderate infiltration rate of local soils and existing vegetation would act to slow and absorb any potential crude oil release. Of greater concern is a catastrophic release of salt water. The low viscosity of salt water may allow a significant quantity to reach the ephemeral stream. Proper secondary containment would greatly reduce this risk, by slowing the release.

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; 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 ranges 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° F in January and between 55° 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 site is in a rural area consisting of undisturbed mixed prairie grass that is currently either idle or used to graze livestock. The landscape has been previously disturbed by dirt trails and graveled and paved roadways. There are no residences within 1.6 miles of the proposed well site. Existing conditions within the proposed drilling unit are described below. The broad definition of the human and natural environment under NEPA leads to the consideration of the following elements: air quality, public health and safety, water resources, wetland/riparian habitat, threatened and endangered species, soils, vegetation and invasive species, cultural resources, socioeconomic conditions, and environmental justice. Potential impacts to these elements are analyzed for both the No Action Alternative and the Preferred Alternative. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. This 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, it should be noted that a significant benefit from the project does *not* in itself require preparation of an EIS.

3.1 The No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed, drilled, installed, or operated. Existing conditions would not be impacted for 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, and environmental justice. There would be no project-related ground disturbance, use of hazardous materials, or trucking of product to collection areas. Surface disturbance, deposition of potentially harmful biological material, trucking, and other traffic would not change from present levels. Under the No Action Alternative, the MHA Nation, Tribal members, and allottees would not have the opportunity to realize potential financial gains resulting from the discovery of resources at this well location.

3.2 Air Quality

The North Dakota Department of Health (NDDH) network of Ambient Air Quality Monitoring (AAQM) stations includes Watford City in McKenzie County, Dunn Center in Dunn County, and Beulah in Mercer County. These stations are located west, south and southeast of the proposed well site. Criteria pollutants tracked under National Ambient Air Quality Standards (NAAQS) of the Clean Air Act include sulfur dioxide (SO₂), particulate matter (PM₁₀), nitrogen dioxide (NO₂) and ozone (O₃). Two other criteria pollutants – lead (Pb) and carbon monoxide (CO) – are not monitored by any of three stations. Table 3.2 summarizes federal air quality standards and available air quality data from the three-county study area.

Table 3.2: Air quality standards and data for Dunn, McKenzie, and Mercer Counties, North Dakota

Pollutant	Averaging Period	NAAQS (µg/m ³)	NAAQS (ppm)	County		
				Dunn	McKenzie	Mercer
SO ₂	24-Hour	365	0.14	0.004 ppm	0.004 ppm	0.011 ppm
	Annual Mean	80	0.030	0.001 ppm	0.001 ppm	0.002 ppm
PM ₁₀	24-Hour	150	--	50 (µg/m ³)	35 (µg/m ³)	35 (µg/m ³)
	Annual Mean	50	--	--	--	--
PM _{2.5}	24-Hour	35	--	--	--	--
	Weighted Annual Mean	15	--	--	--	--
NO ₂	Annual Mean	100	0.053	0.002 ppm	0.001 ppm	0.003 ppm
CO	1-Hour	40,000	35	--	--	--
	8-Hour	10,000	9	--	--	--
Pb	3-Month	1.5	--	--	--	--

O ₃	1-Hour	240	0.12	0.071 ppm	0.072 ppm	0.076 ppm
	8-Hour	--	0.08	0.061 ppm	0.066 ppm	0.067 ppm

Source: U.S. Environmental Protection Agency (EPA) 2006. $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter. ppm = parts per million.

North Dakota was one of only nine states in 2006 that met standards for all criteria pollutants. The state also met standards for fine particulates and the eight-hour ozone standards established by the U.S. Environmental Protection Agency (EPA) (NDDH 2007). The three counties addressed in Table 3.2 are also in full attainment and usually far below established limits (American Lung Association 2006). The Clean Air Act mandates prevention of significant deterioration in designated attainment areas. Class I areas are of national significance and include national parks greater than 6,000 acres in size, national monuments, national seashores, and federal wilderness areas larger than 5,000 acres and designated prior to 1977. There is a Class I airshed at nearby Theodore Roosevelt National Park, which covers about 110 square miles in three units within the Little Missouri National Grassland between Medora and Watford City, 30-40 miles west of the proposed well site. The Reservation can be considered a Class II attainment airshed, which affords it a lower level of protection from significant deterioration.

The proposed project is similar to other projects installed nearby with the approval of state offices. Construction, drilling and tanker traffic would generate temporary, intermittent and nearly undetectable gaseous emissions of particulates, SO₂, NO₂, CO, and volatile organic compounds. Road dust would be controlled as necessary and other best management practices (BMPs) implemented as necessary to limit emissions to the immediate project area (BLM 2005). No detectable or long-term impacts to air quality or visibility are expected within the airsheds of the Reservation, state, or Theodore Roosevelt National Park. No laws, regulations or other requirements have been waived; no monitoring or compensatory measures are required.

3.3 Public Health and Safety

Health and safety concerns include naturally-occurring toxic gases, hazardous materials used or generated during installation or production, and hazards posed by heavy truck traffic associated with drilling, completion and production activities. No residences were identified within 1.6 miles of the proposed site.

Hydrogen sulfide gas (H₂S) is extremely toxic in concentrations above 500 parts per million, 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 H₂S. Release of H₂S at dangerous concentrations is very unlikely. Contingency plans submitted to BLM comply fully with relevant portions of *Onshore Oil and Gas Order 6* to minimize potential for gas leaks during drilling. Emergency response plans protect both the drilling crew and the general public within one mile of a well; precautions include automated sampling and alarm systems operating continuously at multiple locations on the well pad. No homes are within 1.6 miles of the proposed well pad. No direct impacts from H₂S are anticipated.

Negative impacts from construction would be largely temporary. Noise, fugitive dust, and traffic hazards would be present for about sixty days during construction, drilling and well completion, after which they would then diminish sharply during commercial operations. For the proposed well site, it is anticipated that about 50 trips over the course of several days, would be required to transport the drilling rig and associated equipment to the site, with the same traffic later needed to remove the rig and other temporary facilities.

If the well proves productive, one small truck would travel to the pad each day to check the pump. Gas would be flared initially, while oil and produced water would be hauled out by tankers, with tanker traffic depending directly on productivity. A successful Bakken well usually produces both oil and water at a high rate initially. In the vicinity of the proposed project, 500-1,000 barrels of oil per day might be expected at first, along with about 120 barrels of water. Over the next several months, daily production might drop to 200-400 barrels of oil and 30-70 barrels of water. An oil tanker can usually haul 140 barrels of oil per load, while water tankers usually hold 110 barrels. Production service might then start at 3-7 oil tankers and two water haulers in and out daily, before declining to 2-3 oil tankers and a single water load. Established load restrictions for state and BIA roadways would be followed and haul permits would be acquired as appropriate. All traffic must be confined to approved routes and conform to speed limits.

The U.S. EPA specifies chemical reporting requirements under Title III of the *Superfund Amendments and Reauthorization Act (SARA)* of 1986, as amended. No materials used or generated by this project for production, use, storage, transport, or disposal are on either the SARA list or on EPA's list of extremely hazardous substances in 40 CFR 355. Project design and operational precautions mitigate against impacts from toxic gases, hazardous materials or traffic. All operations, including flaring, would conform to instructions from BIA fire management staff. Impacts from the proposed project are considered minimal, unlikely and insignificant. No laws, regulations or other requirements have been waived; no compensatory mitigation measures are required.

3.4 Water Resources

Surface Water

The project would be located within the Lake Sakakawea basin, as shown in Figure 3.4a. The Simba #24-30H site is located within the saddle Butte watershed, Lucky Mound Creek Sub-watershed.

Runoff throughout the study area is by sheetflow until collected by ephemeral and perennial streams draining to Lake Sakakawea. Runoff within the study area would generally flow as noted in Figure 3.4b. Runoff from the well pad and access road would travel south/southwest 0.32 miles to Lake Sakakawea as shown in Figure 3.4c.

The proposed project has been sited to avoid direct impacts to surface water and minimize disruption of drainages. Roadway engineering and erosion control measures would limit migration of sediments downhill or downstream. No measurable increases in runoff or impacts to surface waters are expected as a result of project approval.

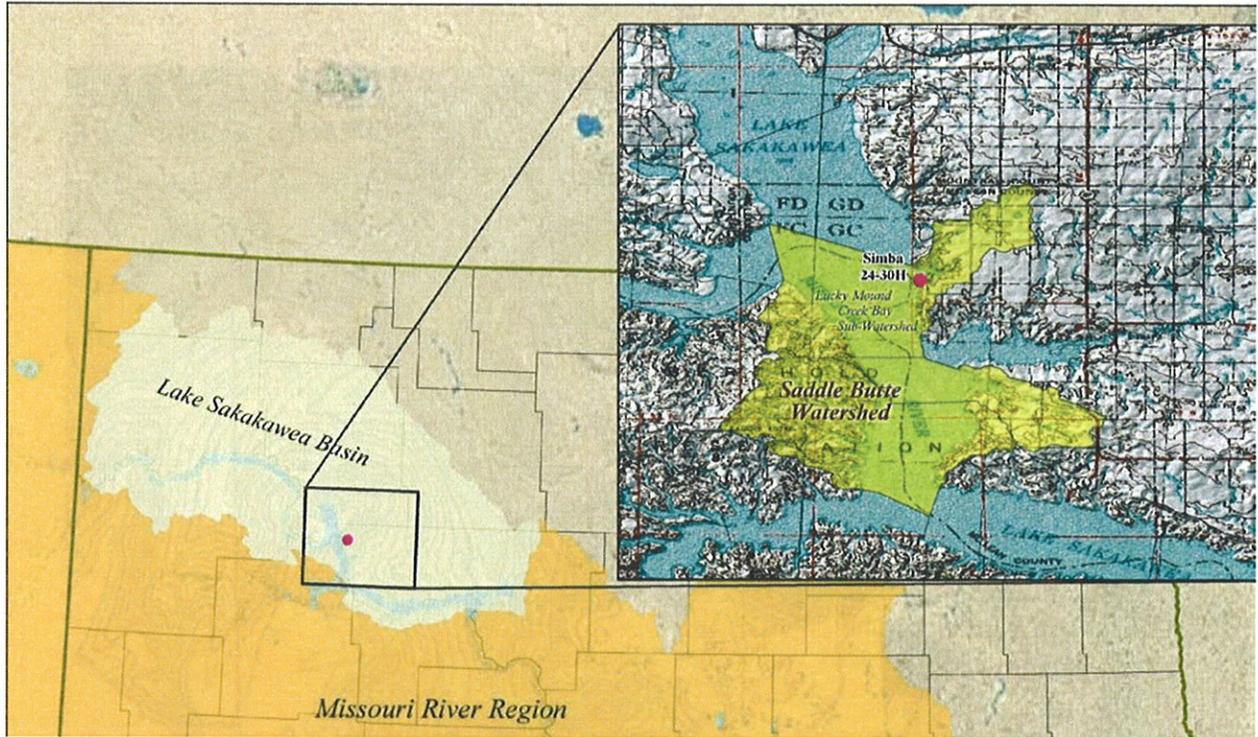


Figure 3.4a: Watershed map



Figure 3.4b: Simba Drainage Patterns



Figure 3.4c: Drainage Path-Lake Sakakawea

Groundwater

No groundwater wells were observed during the field survey. In this part of North Dakota, groundwater wells are typically drilled for domestic and livestock use. The North Dakota State Water Commission's electronic records reveal that there are no active or permitted water wells or groundwater-fed surface water impoundments immediately within the well pad or access road area. Information regarding water permits within five miles of the proposed Simba well site is summarized in Table 3.4d and Figure 3.4d. The White Shield aquifer is located north of the proposed Simba well site; however, no sole source aquifers have been identified within the state of North Dakota.

No impacts to groundwater resources are anticipated as a result of the proposed project, provided construction and reclamation techniques identified in the project's Application for Permit to Drill are implemented correctly.

Saltwater-based drilling fluids would be used to a point below the Fox Hills Formation. Produced water would be captured in tanks on-site and periodically trucked to an approved disposal site. BIA and BLM would monitor all operations and review site records at their discretion. Evidence of groundwater contamination related to the project would result in a stop work order until all appropriate measures were identified and implemented. These and other construction and reclamation techniques included in the APD would minimize potential for impacts to both surface water and groundwater. No significant impacts to surface water or groundwater are expected as a result of the proposed action. No applicable laws or regulations would be waived; no compensatory mitigation measures are required to protect surface water or groundwater.

Table 3.4d Existing Groundwater Wells

LEGAL LOCATION		DISTANCE TO WELL PAD (MILES)	PERMIT TYPE	PERMIT INFORMATION		
LOCATION	SUBDIVISION			AQUIFER	DEPTH (FEET)	DATE
T149N R90W Sec.4	SW¼SW¼	2.8	Domestic Well	Unknown	130	1999
T149N R90W Sec.4	SW¼NE¼	2.8	Domestic Well	Unknown	175	1983
T149N R90W Sec.4	NE¼NE¼	2.9	Domestic Well	Unknown	100	2004
T149N R90W Sec.4	NE¼NE¼	2.9	Domestic Well	Unknown	125	2004
T149N R90W Sec.4	NE¼NE¼	2.8	Domestic Well	Unknown	101	2004
T149N R90W Sec.4	NE¼NE¼	2.8	Domestic Well	Unknown	180	2002
T149N R90W Sec.4	NE¼NE¼	2.8	Irrigation Well	Unknown	185	2002
T149N R90W Sec.4	NE¼NE¼	2.8	Domestic Well	Unknown	145	2002
T149N R90W Sec.4	SE¼SE¼	3.4	Domestic Well	Unknown	108	2008
T149N R90W Sec.5	NW¼SE¼	2.1	Domestic Well	Unknown	100	1985

T149N R90W Sec.5	SW¼SW¼	2.2	Domestic Well	Unknown	320	1985
T149N R90W Sec.9	NW¼NE¼	3.3	Domestic Well	Unknown	159	1992
T149N R90W Sec.9	NW¼NE¼	3.2	Domestic Well	Unknown	215	2002
T149N R90W Sec.9	NW¼NE¼	3.3	Domestic Well	Unknown	105	2008
T149N R90W Sec.10	SE¼NE¼	4.4	Domestic Well	Unknown	225	2002
T150N R90W Sec.22	SW¼SW¼	2.9	Domestic Well	White Shield	330	1952
T150N R90W Sec.19	SE¼NE¼	1.6	Domestic Well	White Shield	77	1981

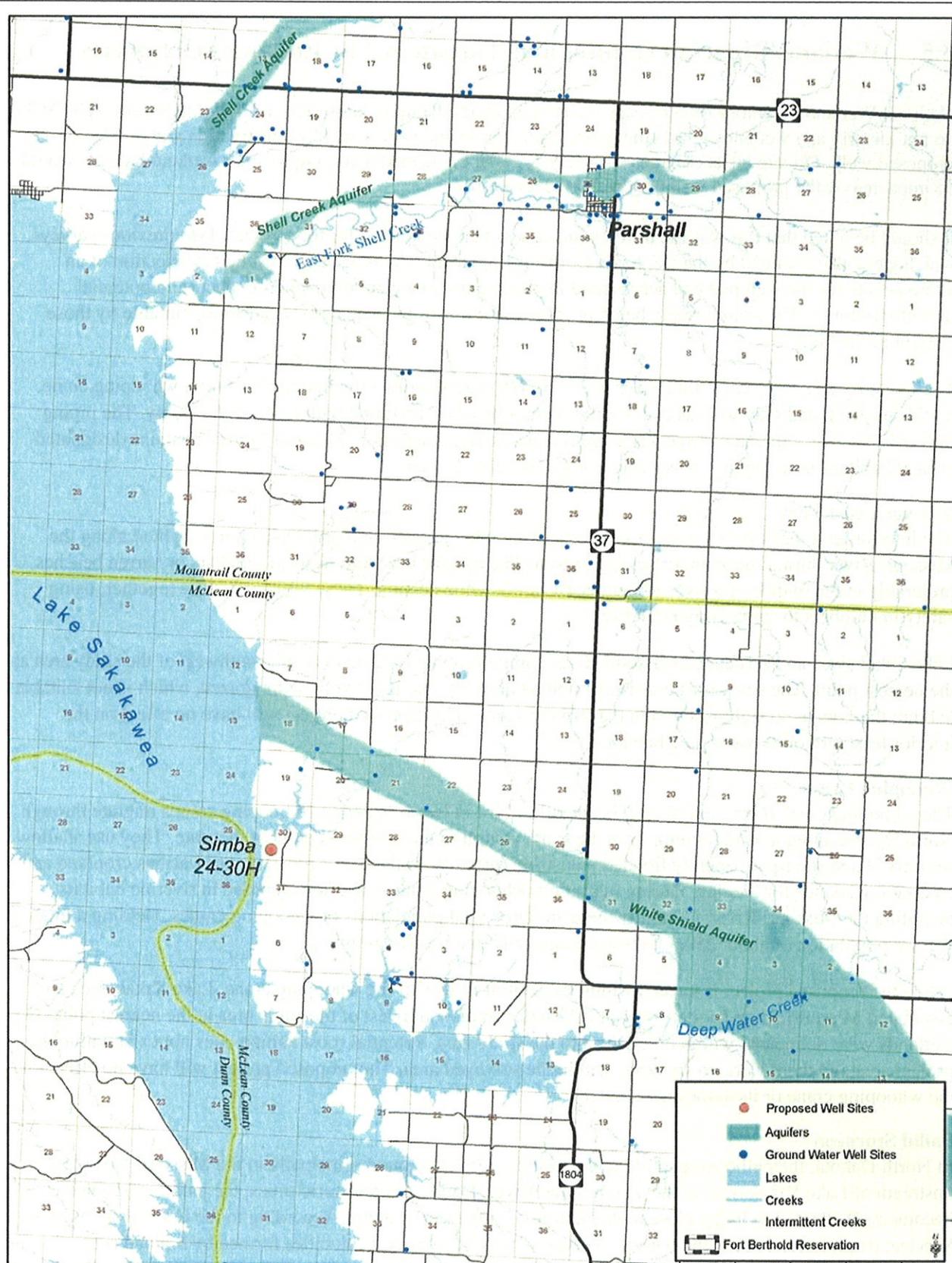


Figure 3.4d: Water resources

3.5 Wetland/Riparian Habitat and Threatened or Endangered Species

National Wetland Inventory (NWI) maps maintained by the United States Fish and Wildlife Service (USFWS) do not identify any wetlands within the project area that would be affected by construction and drilling of the proposed well. On-site visits conducted on July 1, 2009, confirmed that no riparian or wetland habitats would be impacted by the proposed well or access road location.

It should be noted that this was the third on-site assessment conducted for this project. Two previous surveys, which were also attended by the US Army Corps of Engineers (USACE), each resulted in selection of an alternate site for the well pad and access road in order to minimize environmental impacts and potential permitting issues. The site currently being proposed (the third site evaluated) was deemed suitable by those present in the field.

The United States Fish and Wildlife Service (USFWS) has identified the interior least tern, whooping crane, pallid sturgeon, and gray wolf as endangered species that may be found within McLean County. The piping plover is listed as a threatened species for McLean County. In addition, McLean County contains designated critical habitat for the piping plover adjacent to Lake Sakakawea.

Interior Least Tern

The interior least tern (*Sterna antillarum*) nests along inland rivers. In North Dakota, it is sighted along the Missouri River during the summer nesting season. The interior least tern nests in sandbars or barren beaches, preferably in the middle of a river for increased safety while nesting. These birds nest close together, using safety in numbers to scare away predators.

Lake Sakakawea and associated Missouri River habitat is about 0.32 miles south/southwest of the study area at the nearest point. The study area consists of upland property that is actively being grazed, which is not suitable habitat; there were no sightings within the surveyed area. The proposed project will have no effect on the interior least tern or its associated habitat.

Whooping Crane

The whooping crane (*Grus americana*) is the tallest bird in North America. Whooping cranes migrate through North Dakota along a band running from the south central to the northwest parts of the state. They use shallow, seasonally and semi-permanently flooded palustrine (marshy) wetlands for roosting, and various cropland and emergent wetlands for feeding. During migration, whooping cranes are often recorded in riverine habitats, including the Missouri River. Currently there are three wild populations of whooping cranes, yielding a total species population of about 250. Of these groups, only one is self-sustaining.

While the proposed project is located within the central flyway of the whooping crane, Lake Sakakawea and associated Missouri River habitat is about 0.32 miles south/southwest of the study area at the nearest point. No wetlands were delineated within or adjacent to the study area. Potential roost habitat does not exist within the project area and there were no sightings within the surveyed area. The proposed project will have no effect on the whooping crane or its associated habitat.

Pallid Sturgeon

In North Dakota, the pallid sturgeon (*Scaphirhynchus albus*) is found principally in the Missouri River and upstream of Lake Sakakawea in the Yellowstone River. Dating to prehistoric times, the pallid sturgeon has become well adapted to living close to the bottom of silty river systems. According to the US Fish & Wildlife Service, its preferred habitat includes a diversity of water depths and velocities formed by braided river channels, sand bars, sand flats, and gravel bars. Weighing up to 80 pounds, pallid sturgeons are long lived, with individuals possibly reaching 50 years of age.

Lake Sakakawea and associated Missouri River habitat is about 0.32 miles south/southwest of the study area at the nearest point. There is no existing or potential habitat within or near the project area and there were no sightings within the surveyed area. The proposed project will have no effect on the pallid sturgeon or its associated habitat.

Gray Wolf

The gray wolf (*Canis lupus*) is the largest wild canine species in North America. While the gray wolf is not common in North Dakota, occasionally individual wolves do pass through the state. Historically, its preferred habitat includes biomes such as boreal forest, temperate deciduous forest, and temperate grassland. Gray wolves live in packs of up to 21 members, although some individuals will roam alone.

It is unlikely that gray wolves would inhabit the project area as it does not contain preferred habitat for suitable prey to sustain a population and is far from other known wolf populations. There were no sightings within the surveyed area. The proposed project will have no effect on the gray wolf or its associated habitat.

Piping Plover

The piping plover (*Charadrius meoldus*) is a small migratory shorebird. In North Dakota, breeding and nesting sites can be found along the Missouri River. Preferred habitat for the piping plover includes riverine sandbars, gravel beaches, alkali areas of wetlands, and flat, sandy beaches with little vegetation. The USFWS has identified critical habitat for the piping plover on the Missouri River system. Critical habitat includes reservoir reaches composed of sparsely vegetated shoreline beaches, peninsulas, islands composed of sand, gravel, or shale, and their interface with water bodies.

Potential habitat for the piping plover does not occur within the project area and there were no sightings within the surveyed area. The proposed project will have no effect on the piping plover or its associated critical habitat.

Big Game Species

The proposed project area contains suitable breeding area and food sources for mule deer (*Odocoileus hemionus*); however, mule deer were not observed during the on-site visit. Mule deer are abundant across western North Dakota. Mule deer may use the area for feeding; however, mule deer frequenting the project area are generally expected to adapt to changing conditions and continue to thrive. The proposed project will have no effect on big game wildlife species.

Small Game Species

The proposed project area contains suitable breeding area for sharptail grouse (*Tympanuchus phasianellus*) and mourning dove (*Zenaida macroura*). Mourning doves were observed during the site visit. No grouse leks were observed during the field survey. The project area is located within waterfowl migratory routes, but no waterfowl species were observed during the field survey. In addition, the study area did not contain wetlands or other suitable habitat for waterfowl. Sharptail grouse and mourning dove may use the project area for nesting and/or feeding; however, small game species frequenting the project area are generally expected to adapt to changing conditions and continue to thrive. The proposed project will have no effect on small game wildlife species.

Raptor Species

The Bald and Golden Eagle Protection Act of 1940, 16 USC 668-668d, as amended, was written with the intent to protect and preserve bald and golden eagles, both of which are treated as species of concern within the Department of the Interior.

The bald eagle (*Haliaeetus leucocephalus*) is the only eagle unique to North America. There are approximately

15 breeding pairs of bald eagles in North Dakota, most of which nest along the Missouri River. Its preferred habitat includes open areas, forests, rivers, and large lakes. Bald eagles tend to use the same nest year after year, building atop the previous year's nest. No bald eagles or nests were identified during the on-site surveys. The project area does not contain suitable roosting/perching habitat, concentrated feeding areas, or other special habitat. The proposed project will have no effect on bald eagles.

The golden eagle (*Aquila chrysaetos*) is one of North America's largest birds of prey. Within North Dakota, golden eagles can be spotted throughout the badlands and along the upper reaches of the Missouri River in the western part of the state. Golden eagle pairs maintain territories that can be as large as 60 square miles and nest in high places including cliffs, trees, and human-made structures. They perch on ledges and rocky outcrops and use soaring to search for prey. Their preferred habitat includes open prairie, plains, and forested areas. No golden eagles or nests were identified during the on-site surveys. The project area does not contain suitable roosting/perching habitat, concentrated feeding areas, or other special habitat. The proposed project will have no effect on golden eagles.

Additional raptor species, including red tail hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*) may be found in the surrounding area. However, no indicators of either species were observed during the on-site visits. No raptor nests were observed during the field survey. Raptor species frequenting the project area are transitory in nature and are generally expected to adapt to changing conditions and continue to thrive. The proposed project will have no effect on raptor species.

Non-Game Wildlife

A variety of non-game wildlife species, including songbirds, coyote (*Canis latrans*), red fox (*Vulpes vulpes*), North American badger (*Taxidea taxus*), and white-tailed jackrabbit (*Lepus townsendii*) may traverse the project area. Songbirds observed during the on-site survey include the yellow-headed blackbird (*Xanthocephalus xanthocephalus*) and bobolink (*Dolichonyx oryzivorus*). The project area is situated within potential songbird migratory routes. The European cabbage butterfly (*Pieris rapae*) was also sighted, and an American white pelican (*Pelecanus erythrorhynchos*) was observed in flight outside of the study area near the Lake. Wildlife species observed at the proposed Simba #24-30H well site are typical in this portion of North Dakota. These species are transitory in nature and non-game species frequenting the project area are generally expected to adapt to changing conditions and continue to thrive. The proposed project will have no effect on non-game wildlife species.

3.6 Soils

Soils were evaluated on-site through soil sampling using a soil auger or tile spade to achieve a soil profile. Profiles were analyzed for color according to Munsell Soil Color Charts and texture within the various layers of the profile. Sample locations were chosen based on the topography of the study area. Where abrupt topographical changes occurred, samples were taken in both geomorphic positions.

According to soil data obtained from the Natural Resources Conservation Service (NRCS), soils within the study area consist of Mandan silt loams (map unit MdB) and Zahl-Cabba loams (map unit ZoE). These soil types have different properties. Mandan is formed on loess mantled uplands and terraces and Zahl-Cabba is formed in loamy till located on till plains. Mandan soils have slow run-off potential and slight susceptibility to erosion. Zahl-Cabba has a rapid runoff potential, high hazard of sheet and rill erosion by water, and high hazard of wind erosion. Both Mandan silt loams and Zahl-Cabba loams are formed nearly equally of sand, silt, and clay (Figure 3.6a).

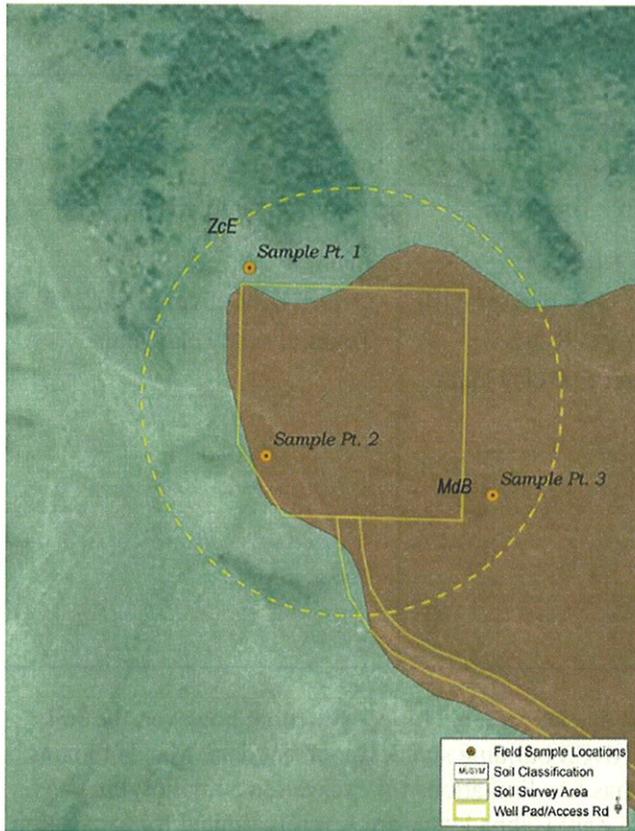


Figure 3.6a Soil Distribution

Three soil samples were taken within the study area to an approximate depth of 20 inches. Based on NRCS maps, samples 2 and 3 were located atop Mandan silt, and sample 1 was located on Zahl-Cabba loam. The profiles of these samples were compared with the Mandan and Zahl-Cabba soil profiles identified in the NRCS Soil Survey of McLean County, North Dakota. The NRCS soil profiles are defined and compared with the study area soil samples in the following Table 3.6a.

The soil profiles in this area could be influenced by the high upland nature of the area. It should be noted that slight variance in color determination is common and dependent upon the person using the Munsell soil color chart and quality of natural lighting.

Table 3.6a Soil Samples

NRCS ZAHL-CABBA LOAM SOIL PROFILE		SOIL SAMPLE 1
From 0-6 inches	Color: dark grayish brown 10YR 4/2 (very dark brown 10YR 2/2 when moist) Texture: loam	From 0-8" Color: brown 7.5YR 4/3 Texture: sandy loam
From 6-15 inches	Color: light brownish gray 2.5Y 6/2 (olive brown 2.5Y 4/3 when moist) Texture: heavy loam	From 8-20" Color: light olive brown 2.5Y 5/4 Texture: sandy clay loam
From 15-26 inches	Color: light brownish gray 2.5Y 6/2 (light olive brown 2.5Y 5/3 when moist when moist) Texture: light clay loam	

September 2009.

NRCS MANDAN SILT LOAM PROFILE		SOIL SAMPLE 2	SOIL SAMPLE 3
From 0-6 inches	Color: dark grayish brown 10YR 4/2 (very dark brown 10YR 2/2 when moist) Texture: silt loam	From 0-10" Color: brown 7.5YR 4/3 Texture: fine loam	From 0-8" Color: light olive brown 2.5Y 5/3 Texture: sandy loam
From 6-10 inches	Color: dark grayish brown 10YR 4/2 (very dark brown 10YR 2/2 when moist) Texture: silt loam	From 10-20" Color: very dark grayish brown 10YR 3/2 Texture: fine clay loam	From 8-20" Color: light olive brown 2.5Y 5/3 Texture: sandy clay loam
From 10-26 inches	Color: grayish brown 2.5Y 5/2 (dark grayish brown 2.5Y 3/2 when moist) Texture: silt loam		

Based on erosion and infiltration rates, soils at the Simba site are suitable for construction; however, the soil bearing capacities have not been verified. According to NRCS building site development data, Mandan loams are typically well-suited for construction. This soil type has few limitations for excavation activities, but can be limited in terms of road construction due to low strength. Zahl-Cabba loams are severely limited for excavation activities and road construction due to slope. Though Zahl-Cabba loams may pose challenges for construction, the majority of the construction would be located atop Mandan loams that are better suited to such activities. The topography upon which the well site and access road would be located is relatively flat, with slopes ranging from 1 to 3% though the topography to the west is severely sloping. No evidence of erosion or erosion concerns were witnessed in the field. Therefore, few construction limitations are anticipated. Given the topography of the immediate construction area, the suitability of Mandan loams for construction, and its low to moderate potential for wind and water erosion, the soil at this site is generally anticipated to be suitable for well site and access road construction.

Topsoil quantities for this location were calculated using an assumed 6-inches existing topsoil. A minimum of 2,970 cubic yards of topsoil will be stockpiled on-site. In addition, 5,265 cubic yards of material will be stockpiled on-site for future site reclamation. Based on field samples, topsoil exists in excess of 10 inches at the well pad site, yielding sufficient quantity of topsoil for reclamation activities. Topsoil and embankment stockpiles are proposed to be located on the eastern edge of the pad. The eastern half of the pad is higher in elevation and should assist in diverting runoff away from the disturbed area and thus minimizing erosion.

The existing contours shown in the figure will aid in the reclamation process. According to discussions at the field on-site assessment and standard industry practices, Best Management Practices identified in the BLM Gold Book will be utilized to minimize site erosion.

3.7 Vegetation and Invasive Species

Vegetation Inventory

The well pad area consisted of mixed-grass prairie: a variety of tall and short grasses interspersed with forb species. The eastern third of the pad site was predominantly tall grass species, and short grasses were more prevalent in the northwest corner of the pad site. The access road corridor also consisted of a mix of species, including woody plants, grasses, and forbs (Table 3.7a; Figures 3.7a and 3.7b).

Table 3.7a Dominant Plant Species Summary

LOCATION	SCIENTIFIC NAME	COMMON NAME	VEGETATION TYPE
Access Road	<i>Taraxacum officinale</i>	Dandelion	Forb
Access Road	<i>Agropyron caninum</i>	Crested Wheatgrass	Grass
Access Road	<i>Poa pratensis</i>	Kentucky Bluegrass	Grass
Access Road	<i>Agropyron smithii</i>	Western Wheatgrass	Grass
Access Road	<i>Fraxinus pennsylvanica</i>	Green Ash	Woody
Access Road	<i>Rosa arkansa</i>	Prairie Rose	Woody
Access Road	<i>Shepherdia argentea</i>	Silver Buffaloberry	Woody
Access Road	<i>Symphoricarpos occidentalis</i>	Western Snowberry	Woody
Well Pad	<i>Vicia americana</i>	American vetch	Forb
Well Pad	<i>Pediometelum esculentum</i>	Breadroot scurfpea	Forb
Well Pad	<i>Achillea millefolium</i>	Common yarrow	Forb
Well Pad	<i>Taraxacum officinale</i>	Dandelion	Forb
Well Pad	<i>Castilleja sessiliflora</i>	Downy Paint Brush	Forb
Well Pad	<i>Antennaria neglecta</i>	Field Pussytoes	Forb
Well Pad	<i>Tragopogon dubius</i>	Goat's beard	Forb

Well Pad	<i>Aster ericoides</i>	Many flowered aster	Forb
Well Pad	<i>Opuntia polyacantha</i>	Plains prickly pear cactus	Forb
Well Pad	<i>Sphaeraicea coccinea</i>	Scarlet globemallow	Forb
Well Pad	<i>Carex filifolia</i>	Threadleaf sedge	Forb
Well Pad	<i>Aster ericoides</i>	White prairie aster	Forb
Well Pad	<i>Linum perenne</i>	Wild Blue Flax	Forb
Well Pad	<i>Agropyron caninum</i>	Crested Wheatgrass	Grass
Well Pad	<i>Poa pratensis</i>	Kentucky Bluegrass	Grass
Well Pad	<i>Schizachryrium scoparium</i>	Little Bluestem	Grass
Well Pad	<i>Stipa comata</i>	Needle and Thread	Grass
Well Pad	<i>Koeleria pyramidata</i>	Prairie Junegrass	Grass
Well Pad	<i>Calamovilfa longifolia</i>	Prairie sandreed	Grass
Well Pad	<i>Shepherdia argentea</i>	Silver Buffaloberry	Woody



Figure 3.7a Mixed Grass Prairie Community at well pad



Figure 3.7b Green Ash along Access Road

Noxious Weeds

The study area was also evaluated for the presence of noxious weeds. The North Dakota Department of Agriculture has identified 12 noxious weed species that are included on the State's noxious weed list. In addition, counties and cities have the option to add noxious weeds to the list to be regulated within their jurisdiction. Of the 12 noxious weed species managed by the State, nine are known to occur in McLean County (Table 3.7b). McLean County has not added additional species to its control list. A small quantity of leafy spurge (several plants) was observed in an approximate 20-square-foot area along the access road of the study area. None of the other noxious weeds listed below were identified within the study area.

Table 3.7b McLean County Noxious Weed Distribution

COMMON NAME	SCIENTIFIC NAME	MCLEAN COUNTY ACRES	PRESENT AT SITE?
Absinth wormwood	<i>Artemisia absinthium L.</i>	1,500	No
Canada thistle	<i>Cirsium arvense (L.) Scop</i>	4,800	No
Dalmation toadflax	<i>Linaria genistifolia ssp. Dalmatica</i>	—	No
Diffuse knapweed	<i>Centaurea diffusa Lam</i>	—	No
Field bindweed	<i>Convolvulus arvensis L.</i>	1,100	No
Leafy spurge	<i>Euphorbia esula L.</i>	1,300	Yes—access road
Musk thistle	<i>Carduus nutans L.</i>	200	No
Purple loosestrife	<i>Lythrum salicaria</i>	—	No
Russian knapweed	<i>Acroptilon repens (L) DC.</i>	9	No
Salt cedar (tamarisk)	<i>Tamarix ramosissima</i>	21	No
Spotted knapweed	<i>Centaurea maculosa Lam.</i>	6	No
Yellow starthistle	<i>Centaurea solstitialis L.</i>	1	No

Threatened, Endangered, or Unique Vegetation

No threatened or endangered plant species are listed for McLean County. Plant communities observed at the proposed Simba #24-30H well site are typical to this portion of North Dakota. No unique plant communities were observed within or adjacent to the study area.

3.8 Cultural Resources

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

The area of potential effect (APE) 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* (NAGPRA, 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 (SHPO). As a result, BIA consults and corresponds with the THPO on all projects proposed within the exterior boundaries of the Fort Berthold Reservation. The SHPO may have useful information, but has no official role regarding proposed federal actions on trust land. The MHA Nation has also designated responsible parties for consultations and actions under NAGPRA and cultural resources generally.

A cultural resource inventory of this well pad and access road was conducted by personnel of Kadrmas, Lee & Jackson, Inc., using a pedestrian methodology. Approximately 34 acres were intensively inventoried on July 1, 2009 (Harty 2009). 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 July 28, 2009, and the THPO concurred on August 17, 2009 (see Part 4).

3.9 Socioeconomics

Socioeconomic conditions include population, demographics, income, employment, and housing. These conditions can be analyzed and compared at various scales. This analysis focuses on the reservation, the four counties that overlap most of the Reservation and the state of North Dakota. The state population showed little change between the last two censuses (1990–2000), but there were notable changes locally, as shown in Table 3.9a. Populations in Dunn, McKenzie, McLean, and Mountrail counties declined 5 to 11%, while population on the Fort Berthold Reservation increased by almost 10%. These trends are expected to continue (Rathge *et al.* 2002). While American Indians are the predominant group on the reservation, they are a minority everywhere else in the state. More than two-thirds (3,986) of the Reservation population are tribal members.

Table 3.9a: Population and Demographics

County or Reservation	Population in 2000	% of State Population	% Change 1990-2000	Predominant Group	Predominant Minority
Dunn County	3,600	0.56%	- 10.1%	White	American Indian (12%)
McKenzie County	5,737	0.89%	- 10.1%	White	American Indian (21%)
McLean County	9,311	1.45%	- 11.0%	White	American Indian (6%)
Mountrail County	6,631	1.03%	- 5.6%	White	American Indian (30%)
Fort Berthold Reservation	5,915	0.92%	+ 9.8%	American Indian	White (27%)
Statewide	642,200	100%	+ 0.005%	White	American Indian (5%)

Source: U.S. Census Bureau 2007.

In addition to the ranching and farming that are employment mainstays in western North Dakota, employment on the reservation largely consists of ranching, farming, tribal government, tribal enterprises, schools, and federal agencies. The MHA Nation's Four Bears Casino and Lodge, near New Town, employs over 320 people, 90% of which are tribal members (Three Affiliated Tribes 2008).

As shown in Table 3.9b, counties overlapping the Reservation tend to have per capita incomes, median household incomes, and employment rates that are lower than North Dakota statewide averages. Reservation residents have lower average incomes and higher unemployment rates compared to the encompassing counties. MHA Nation members are in turn disadvantaged relative to overall Reservation incomes and unemployment rates that average in non-Indian data. The most recent census found that per capita income for residents of the Reservation is \$10,291 (less than 1/3 the state average). Overcrowded housing skews the median reservation household income upward to \$26,274 (about 1/3 the state average). A BIA report in 2003 found that 33% of employed MHA Nation members were living below federal poverty levels. The unemployment rate for tribal members is 22 %, compared to 11.1% for the reservation as a whole and 4.6% statewide.

Table 3.9b: Income and Unemployment

Unit of Analysis	Per Capita Income	Median Household Income	Unemployment Rate (2007)	Employed but Below Poverty Level	Percent of All People in Poverty
MHA Nation members	--	--	22 %	33 %	Unknown
Fort Berthold Reservation	\$ 10,291	\$ 26,274	11.1 %	--	Unknown
Mountrail County	\$ 29,071	\$ 34,541	5.8 %	--	15.4%
Dunn County	\$ 27,528	\$ 35,107	3.4 %	--	13%
McKenzie County	\$ 27,477	\$ 35,348	3.1 %	--	15.8 %
McLean County	\$ 32,387	\$ 37,652	4.7 %	--	12.8%
North Dakota	\$ 31,871	\$ 40,818	3.2 %	--	11.2 %

Source: U.S. Department of Agriculture Economic Research Data 2008 and BIA 2003.

Availability and affordability of housing could impact oil and gas development and operations. Housing information is summarized in Table 3.9c. The tribal 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. 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.

Table 3.9c: Housing Units – 2000 (U.S. Census Bureau 2007 and 2008).

Housing Development	Fort Berthold Reservation	Dunn County	McKenzie County	McLean County	Mountrail County
Existing Housing					
Owner-Occupied Units	1,122	1,570	2,009	4,332	2,495
Renter-Occupied Units	786	395	710	932	941
Total	1,908	1,965	2,719	5,264	3,436
New Private Housing Building Permits 2000-2005	--	18	4	135	113
Housing Development Statistics					
State rank in housing starts	--	51 of 53	15 of 53	21 of 53	17 of 53
National rank in housing starts	--	3112 / 3141	2498 / 3141	2691 / 3141	2559 / 3141

The proposed project is not expected to have measurable impacts on population trends, local unemployment rates or housing starts. Relatively high-paying construction jobs would result from exploration and development of oil and gas reserves on the reservation, but most of these opportunities are expected to be short-term. The proposed action would require temporary employees during the well construction cycle and one to two full-time employees for the long-term production cycle. Short-term construction employment would provide some economic benefit. Long-term commercial operations would provide significant royalty income and indirect economic benefits.

3.10 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, was signed by President Clinton in 1994. The Order requires agencies to advance environmental justice (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 U.S. Environmental Protection Agency (EPA) headed the interagency workgroup established by the 1994 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 Order.

Environmental Justice is an evolving concept with potential for disagreement over the scope of analysis and the implications for federal responsiveness. It is nevertheless clear that tribal members on the Great Plains qualify for EJ consideration as both a minority and low-income population. The population of the Dakotas is predominantly Caucasian. While some 70% of Reservation residents are tribal members, Indians comprise only 5% of North Dakota residents and 12% of the population of Dunn County. Even in a state with relatively low per capita and household income, Indian individuals and households are distinctly disadvantaged.

There are, however, some unusual EJ considerations when proposed federal actions are meant to benefit tribal members. Determination of fair treatment necessarily considers the distribution of both benefits and negative impacts, due to variation in the interests of various tribal groups and individuals. There is also potential for major differences in impacts to resident tribal members and those enrolled or living elsewhere. A general benefit to MHA Nation government and infrastructure has already resulted from tribal leasing, fees and taxes. Oil and gas leasing has already brought much-needed income to MHA Nation members who hold mineral interests, some of whom might eventually benefit further from royalties on commercial production. Profitable production rates at proposed locations might lead to exploration and development on additional tracts owned by currently non-benefitting allottees. The absence of lease and royalty income does not, moreover, preclude

other benefits. Exploration and development would provide many relatively high-paying jobs, with oversight from the Tribal Employment Rights Office.

The owners of allotted surface within the project areas may not 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 compensatory for productive acreage lost to road and well pad construction. Tribal members without either surface or mineral rights would not receive any direct benefits whatsoever. Indirect benefits of employment and general tribal gains would be the only potential offsets to negative impacts.

Potential impacts to tribes and tribal members include disturbance of cultural resources. There is potential for disproportionate impacts, especially if the impacted tribes and members do not reside within the Reservation and therefore do not share in direct or indirect benefits. This potential is significantly reduced following the survey of the proposed well location and access road route and determination by the BIA that there will be no effect to historic properties. Nothing is known to be present, furthermore, that qualifies for protection under the *American Indian Religious Freedom Act*. Potential for disproportionate impacts is further mitigated by requirements for immediate work stoppage following an unexpected discovery of cultural resources of any type. Mandatory consultations will 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 has not been found to pose significant impacts to any other critical element—air, public health and safety, water, wetlands, wildlife, soils or vegetation—within the human environment. Avoiding or minimizing such impacts also makes unlikely disproportionate impacts to low-income or minority populations. The proposed action offers many positive consequences for tribal members, while recognizing Environmental Justice 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.

3.11 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.

3.12 Irreversible and Irretrievable Commitment of Resources

Removal and consumption of oil and/or gas from the Bakken Formation would be an irreversible and irretrievable commitment of resources. Other potential resource commitments include acreage devoted to disposal of cuttings, soil lost through wind and water erosion, cultural resources inadvertently destroyed, wildlife killed during earthmoving or in collisions with vehicles, and energy expended during construction and operation.

3.13 Short-Term Use Versus Long-Term Productivity

Short-term activities would not detract significantly from long-term productivity of the project area. The small areas dedicated to the access road and well pad would be unavailable for livestock grazing, wildlife habitat and other uses. Allottees with surface rights would be compensated for loss of productive acreage and the project footprint would shrink considerably once the well were drilled and non-working areas were reclaimed and reseeded. Successful and ongoing reclamation of the landscape would quickly support wildlife and livestock grazing, stabilize the soil, and reduce the potential for erosion and sedimentation. The major long-term resource loss corresponds with the project purpose: extraction of hydrocarbons from the Bakken Formation.

3.14 Cumulative Impacts

Environmental impacts may accumulate either over time or in combination with similar activities in the area. Unrelated activities may also have negative impacts on critical elements, thereby contributing to cumulative degradation of the environment. Past and current disturbances in the vicinity of the proposed project include farming, grazing, roads, and other oil/gas wells. Current land uses are expected to continue with little change, since undivided interests in the land surface are often held by tribal members other than those holding mineral rights. Virtually all available acreage is already organized into agricultural leases or range units to utilize surface resources for economic benefit; oil and gas development is not expected to have more than a minor effect on surface use patterns.

The major activity with potential to impact critical elements of the human environment is oil field development. Over the past several years, exploration has accelerated over the Bakken Formation. Most of this exploration has taken place outside the reservation boundary on fee land, but for purposes of cumulative impact analyses, land ownership and the reservation boundary are immaterial. Perimeters of 1, 5, 10, and 20 miles around the proposed well site were therefore evaluated to determine the level of oil and gas activity in the surrounding area, as shown in Figure 3.14. There are no wells currently proposed within one mile of the site considered in this document. Only one active and three proposed wells are within five miles of the site. There are 13 active and 7 additional proposed wells within a 10-mile radius of the proposed well. It is not until the perimeter is expanded to 20 miles that 101 active and 36 proposed wells are found. Distances from the proposed site to the nearest proposed or installed oil/gas well are provided in Table 3.14.

Within the reservation and near the proposed site, installations remain few and dispersed. The project analyzed in this EA would not share roads with any other installation. Commercial success at any new well might result in additional oil/gas exploration proposals, but such developments are speculative at this time and until APDs are submitted to BLM or BIA. Approved oil/gas leases may lead to additional exploration and development, but additional analysis and BIA approval are required before the surface is disturbed at any other location. Potential impacts from possible future development cannot be meaningfully analyzed at this time. Not only is the level of development highly sensitive to volatile commodities prices, but additional development may increase interest in pipelines, thereby *reducing* impacts to certain critical elements of the human environment, such as public safety and air quality.

The proposed action has been planned to avoid impacts to wetlands, floodplains, surface water, cultural resources, and threatened and endangered species. Unavoidable impacts to these or other resources would be minimized and/or mitigated as described in this document. The operator of any facility would be required to complete interim reclamation of the road and well pad immediately following construction and completion. Implementation of other precautionary and protective measures detailed in this EA, the APD, and applicable regulations are expected to minimize impacts to all critical elements of the human environment. Impacts from the proposed project are expected to generally be minor, temporary, manageable, and/or insignificant. No cumulative impacts are reasonably foreseen from existing and proposed activities, other than increasingly positive impacts to the reservation economy.

Table 3.14

Summary of Active and Proposed Wells		
Distance from Site	Number of Active Wells	Number of Proposed Wells
1 mile radius	0	0
5 mile radius	1	3
10 mile radius	13	7
20 mile radius	101	36

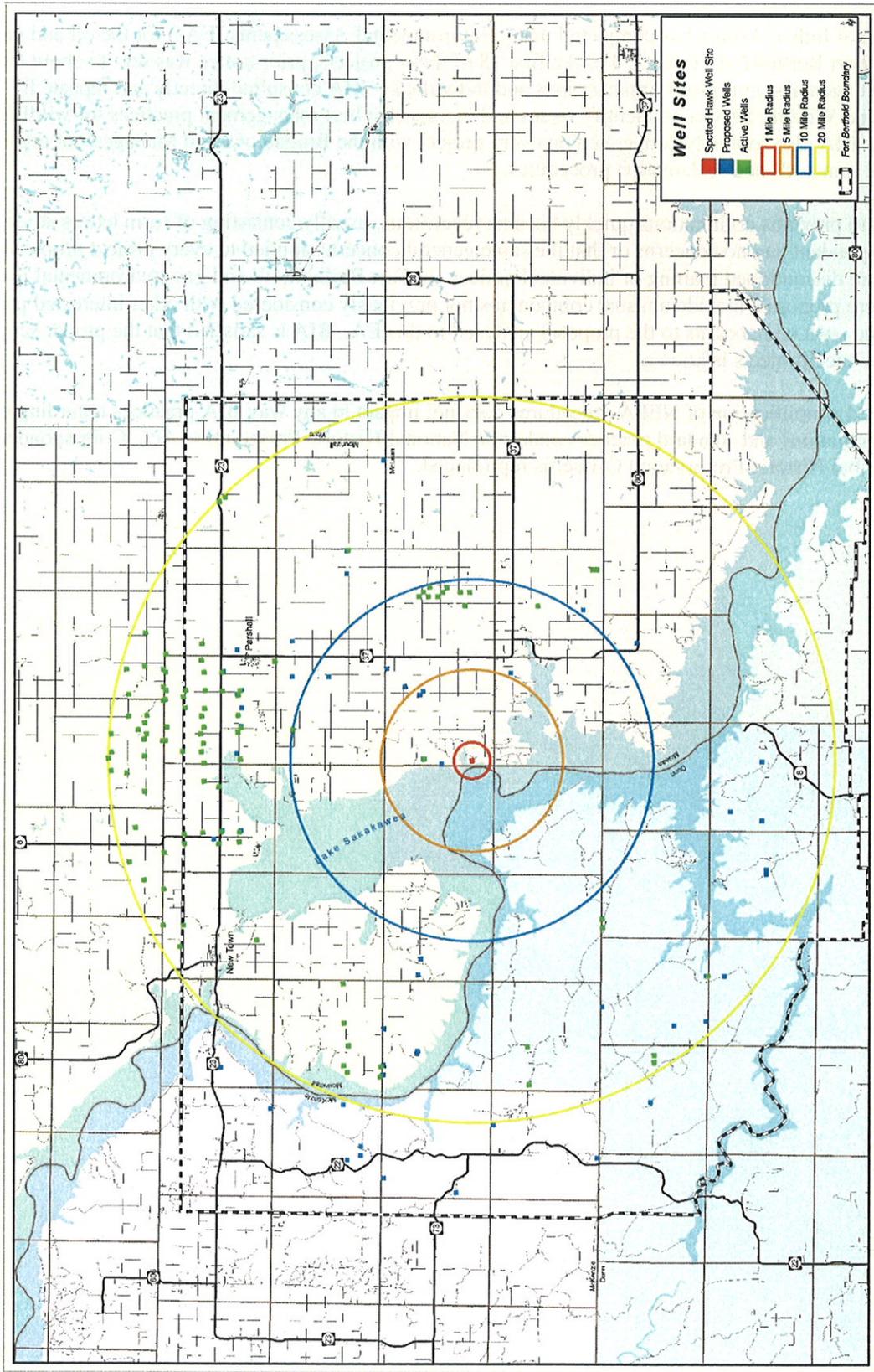


Figure 3.14: Approved or proposed oil and gas projects

4. Consultation and Coordination

The Bureau of Indian Affairs has completed many Environmental Assessments (EAs) for the oil and gas projects at Fort Berthold since 2007. For the first 18 of these projects, prior notice was sent to about 60 tribes, government agencies, non-profit organizations and individuals. BIA consulted directly and repeatedly with the U.S. Fish and Wildlife Service to identify issues and incorporate best management practices for wildlife protection. BIA also routinely cooperated on every project with the Bureau of Land Management regarding operational standards and reclamation procedures.

Responses to previous notifications quickly became repetitious, usually consisting of form letters advising BIA that the respondent had no concerns or that the same general concerns applied to every project proposal. BIA has therefore discontinued mailing of individual notices for Fort Berthold oil and gas environmental review, except where proposals include unusual components not previously considered with other interested parties. There are no such components to the proposal analyzed in this EA. BIA is satisfied that the proper scope of analysis for such projects is known.

This justified simplification of NEPA procedures does not impact in any way BIA practices regarding cultural resource regulations and standard practices under the National Historic Preservation Act. Correspondence with the Tribal Historic Preservation Officer is reproduced.

September 2009.



United States Department of the Interior

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



IN REPLY REFER TO:
DESCRM
MC-208

JUL 27 2009

Perry 'No Tears' Brady, THPO
Mandan, Hidatsa and Arikara Nation
404 Frontage Road
New Town, North Dakota 58763

Dear Mr. Brady:

We have considered the potential effects on cultural resources of an oil well pad and access road in McLean County, North Dakota. Approximately 34 acres were intensively inventoried using a pedestrian methodology. Potential surface disturbances are not expected to exceed the area depicted in the enclosed report. 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 (16 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 this undertaking. Catalogued as **BIA Case Number AAO-1636/FB/09**, the proposed undertaking, location, and project dimensions are described in the following report:

Harty, Jennifer L.
(2009) Simba 13-30H: A Class III Cultural Resource Inventory, McLean County, North Dakota.
KLJ Cultural Resources for Spotted Hawk Development, McLean, VA.

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

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

Sincerely,

Regional Director

Enclosure

cc: Chairman, Three Affiliated Tribes
Superintendent, Fort Berthold Agency
Chief, Division of Energy and Environment

September 2009.



TRIBAL HISTORIC PRESERVATION

Mandan Hidatsa Arikara

Perry 'No Tears' Brady, Director.
404 Frontage Road,
New Town, North Dakota 58763
Ph/701-862-2474 fax/701-862-2490

pbrady@mhanation.com

August 17, 2009

Carson Murdy
Regional Archeologist
Bureau of Indian Affairs
Great Plains Regional Office
115 Fourth Avenue SE
Aberdeen, SD, 57401

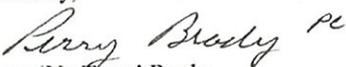
RE: Project # AAO-1636/FB/09
Simba 13-30H well pad and access road

Dr. Murdy:

After review of the documentation provided, the Mandan Hidatsa Arikara Nations Tribal Historic Preservation Office concurs with the determination of 'No Adverse Affect'/No Historic Properties Affected' to any pre and post-historic relics, artifacts or sacred and cultural resources in the revised proposed Project area.

We respectfully request to be notified should any NAGPRA issue or others arise as the Project progresses.

Sincerely,


Perry 'No Tears' Brady,
Tribal Historic Preservation Officer,
Mandan Hidatsa Arikara Nations.

THPO Concurrence letters

5. List of Preparers

An interdisciplinary team contributed to this document, following guidance in Part 1502.6 of CEQ regulations. Portions of the documents were drafted by Kadrmas, Lee and Jackson under contract to Spotted Hawk Development, LLC and Gas under the direction of BIA. Preparers, reviewers, consultants and federal officials include the following:

- Division of Environment, Safety and Cultural Resources BIA-GPRO.
- Shanna Braun Environmental Specialist- Kadrmas, Lee, and Jackson.
- Charlotte Brett Environmental Specialist- Kadrmas, Lee, and Jackson.
- Jerry Krieg Engineer- Kadrmas, Lee, and Jackson.
- Jerry Reinisch Environmental Scientist- Kadrmas, Lee, and Jackson.
- Skip Skattum Geographic Information- Kadrmas, Lee, and Jackson.

6. References and Acronyms

- American Lung Association. 2006. State of the Air 2006. Available online at http://lungaction.org/reports/sota06_analyses5.html#region8. Accessed 4/22/08.
- “Bald Eagle Fact Sheet: Natural History, Ecology, and History of Recovery.” U.S. Fish & Wildlife Service. 9 December 2008. U.S. Department of Interior, U.S. Fish & Wildlife Service, Midwest Region. 3 April 2009. <<http://www.fws.gov/midwest/eagle/recovery/biologie.html>>.
- “Bald Eagle Population Size.” U.S. Fish & Wildlife Service. 12 November 2008. U.S. Department of Interior, U.S. Fish & Wildlife Service, Midwest Region. 3 April 2009. <<http://www.fws.gov/midwest/eagle/population/index.html>>.
- Bryce, S., J.M. Omernik, D.E. Pater, M. Ulmer, J.Schaar, J. Freeouf, R. Johnson, P. Kuck, and S.H. Azevedo. 1998. Ecoregions of North Dakota and South Dakota. Jamestown, North Dakota: Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/index.htm>. Accessed June 2008.
- Bureau of Indian Affairs (BIA). 2003. American Indian Population and Labor Force Report. U.S. Department of the Interior, Bureau of Indian Affairs, Office of Tribal Affairs. Washington, D.C. 34pp.
- Bureau of Land Management (BLM). 1997. Draft Environmental Impact Statement of the Cave Gulch-Bullfrog-Waltman Natural Gas Development Project, Natrona County, Wyoming. DEIS 97-4. Prepared by the Casper District Office, Bureau of Land Management. Casper, Wyoming. 251 pp. Available online at www.blm.gov/wy/st/en/info/NEPA/cfodocs/cavegulch.htm.
- _____. 2003. Environmental Assessment of Bill Barrett Corporation’s Proposed Wallace Creek Raderville Formation Field Development Project, Natrona County, Wyoming. EA Number WY-060-03-108. Prepared by the Casper Field Office, Bureau of Land Management. Casper, Wyoming. 50 pp. Available online at www.blm.gov/wy/st/en/info/NEPA/cfodocs/wallace.htm.
- _____. 2005. Environmental Assessment for the Cave Gulch Infill Development Project, Natrona County, Wyoming. U.S. Department of the Interior, Bureau of Land Management, Casper Field Office. Casper, Wyoming. EA Number WY-060-EA05-17. 143 pp. + appendices. Available online at www.blm.gov/wy/st/en/info/NEPA/cfodocs/cavegulch.htm.
- Bureau of Land Management and U.S. Forest Service. 2006. *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. The Gold Book*. BLM/WO/ST-06/021+3071. Denver, CO.
- “County Occurrence of Endangered, Threatened, and Candidate Species and Designated Critical Habitat in North Dakota.” U.S. Fish & Wildlife Service. 15 May 2009. U.S. Department of Interior, U.S. Fish & Wildlife Service, Mountain-Prairie Region, North Dakota Field Office. 16 May 2009. <http://www.fws.gov/northdakotafieldoffice/county_list.htm>.
- “The Cranes Status Survey and Conservation Action Plan Whooping Crane (*Grus americana*).” U.S. Geological Survey Northern Prairie Wildlife Research Center. 3 August 2006. U.S. Department of Interior, U.S. Geological Survey, Northern Prairie Wildlife Research Center. 2 April 2009. <<http://www.npwrc.usgs.gov/resource/birds/cranes/grusamer.htm>>.
- Environmental Protection Agency (EPA). 1998. Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses. Office of Federal Activities, U.S. Environmental Protection Agency. Washington, D.C. 70 pp + appendices.
-

"Fact Sheet: Pallid Sturgeon (*Scaphirhynchus albus*)." U.S. Fish & Wildlife Service. 14 July 2008. U.S. Department of Interior, U.S. Fish & Wildlife Service, Midwest Region. 3 April 2009. <http://www.fws.gov/midwest/endangered/fishes/palld_fc.html>.

Fagerstone, K.A. 1987. Black-footed ferret, long-tailed weasel, and least weasel. Pages 548-573. In: Wild Furbearer Management and Conservation in North America edited by M. Novak, J.A. Baker, M.E. Obbard, and B. Malloch. Ministry of Natural Resources. Ontario, Canada.

Geological Survey Staff. 2 April 2009. USGS Digital Elevation Models for North Dakota. U.S. Department of Interior, U.S. Geological Survey. Available URL: <<http://www.nd.gov/gis/>>. 2 April 2009. USGS Hydrography Dataset for North Dakota. U.S. Department of Interior, U.S. Geological Survey. Available URL: <<http://nhd.usgs.gov/>>.

"Golden Eagle." National Geographic. 3 April 2009. <<http://animals.nationalgeographic.com/animals/birds/golden-eagle.html>>.

Grah, O.J. 1997. Soils, Water, and Vegetation Resources Technical Report. Report prepared for the Cave Gulch-Bullfrog-Waltman Natural Gas Development Project Environmental Impact Statement. Prepared for the Casper District Office, Bureau of Land Management and Gary Holsan Environmental Planning, Thayne, Wyoming by ECOTONE Environmental Consulting, Inc. Logan, Utah. 101 pp.

"Gray Wolves in the Northern Rocky Mountains." U.S. Fish & Wildlife Service. 4 June 2009. U.S. Department of Interior, U.S. Fish & Wildlife Service, Mountain-Prairie Region. 3 April 2009. <<http://www.fws.gov/mountain-prairie/species/mammals/wolf/>>.

Grondahl, C., and K. Martin. n.d. North Dakota's endangered and threatened species. North Dakota State Game and Fish Department's Nongame Program, Bismarck, North Dakota. Jamestown, North Dakota: Northern Prairie Wildlife Research Center Online. Available at: <http://www.npwrc.usgs.gov/resource/wildlife/endanger/index.htm> (Version 16JUL97). Accessed August 27, 2008.

Harty, Jennifer L. 2009. Simba 13-30H: A Class III Cultural Resource Inventory, McLean County, North Dakota. KLJ Cultural Resources for Spotted Hawk Development, McLean, VA.

"Hawks, Eagles, and Falcons of North Dakota." U.S. Geological Survey Northern Prairie Wildlife Research Center. 3 August 2006. U.S. Department of Interior, U.S. Geological Survey, Northern Prairie Wildlife Research Center. 3 April 2009. <<http://www.npwrc.usgs.gov/resource/birds/hawks/intro.htm>>.

High Plains Regional Climate Center (HPRCC). 2008. Historical Climate Data Summaries. Available online at <http://www.hprcc.unl.edu/data/historical/>. Accessed May 2008.

Hillman, C.N. and T.W. Clark. 1980. *Mustela nigripes*. Mammalian Species, Number 126. 3 pp.

"Identification and Control of Invasive and Troublesome Weeds in North Dakota." NDSU Extension Service. June 2009.

"Interior Least Tern (*Sterna antillarum athalassos*)." Texas Parks and Wildlife. 2 June 2009. Texas Parks and Wildlife. 2 April 2009. <<http://www.tpwd.state.tx.us/huntwild/wild/species/leasttern/>>.

- Kotliar, N.B., B.W. Baker, A.D. Whicker, and G. Plumb. 1999. A critical review of assumptions about the prairie dog as a keystone species. *Environmental Management* 24(2):177–192.
- “Least Tern (Interior Population).” U.S. Fish & Wildlife Service. 16 April 2008. U.S. Department of Interior, U.S. Fish & Wildlife Service, Midwest Region. 2 April 2009.
<<http://www.fws.gov/midwest/Endangered/birds/tern.html>>.
- “Least Tern (*Sterna antillarum*).” U.S. Fish & Wildlife Service. 18 December 2008. U.S. Department of Interior, U.S. Fish & Wildlife Service, North Dakota Field Office. 2 April 2009.
<http://www.fws.gov/northdakotafieldoffice/endspecies/species/least_tern.htm>.
- Leuchtman, Amy. 2008. Charging Eagle 15-14H Well Pad and Access Road: A Class III Cultural Resource Inventory, Dunn County, North Dakota. Earthworks for Kodiak Oil and Gas.
- “Major Research Gives Insight into the Needs of Whooping Cranes.” GBRA. 29 April 2009. Guadalupe-Blanco River Authority. 2 April 2009. <<http://www.gbra.org/News/2009042901.aspx>>.
- McCabe, T.L. 1981. The Dakota skipper, *Hesperis dacotae* (Skinner): range and biology, with special reference to North Dakota. *Journal of the Lepidopterist Society* 35(3):179-193.
- Metcalf Archeological Consultants. 2008. Moccasin Creek 16-3H/16-3-11H: A Class III Cultural Resource Inventory for a Proposed Dual Wellhead on the Fort Berthold Indian Reservation in Dunn County, North Dakota.
- Munsell Color Company. Munsell Soil Color Chart. 1954. New Windsor, New York: gretagmacheth, 2000.
- Natural Resources Conservation Service (NRCS). 2008. Web Soil Survey. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soils data for portions of Sections 21, 22, and 27, Township 147 North, Range 91 West were downloaded from the NRCS websoil survey site in May 2008. Available online at <http://websoilsurvey.nrcs.usda.gov> and <http://soildatamart.nrcs.usda>.
- North Dakota Department of Agriculture (NDDA). 2007. 2006 Noxious Weed List Survey - Reported Acres. North Dakota Department of Agriculture. Bismarck, North Dakota. 2 pp. Available online at agdepartment.com/Programs/Plant/noxiousweeds.html.
- _____. 2008. North Dakota Noxious Weed Law. Available online at <http://www.agdepartment.com/Programs/Plant/NoxiousWeeds.html>.
- North Dakota Agricultural Experiment Station. 1979. Soil Survey for McLean County, North Dakota. U.S. Department of Agriculture, Soil Conservation Service. U.S. Government Printing Office.
- North Dakota Department of Health (NDDH). 2007. Annual Report: North Dakota Air Quality Monitoring Data Summary 2006. North Dakota Department of Health. Bismarck, North Dakota. 70 pp. Report downloaded 5/2008 and available at www.health.state.nd.us/AQ/AmbientMonitoring.htm.
- North Dakota Industrial Commission (NDIC). 2008. Data on previous oil/gas exploration activity in Township 147 North, Range 91 West downloaded from the NDIC, Oil and Gas Division website 5/2008 and available online at www.dmr.nd.gov/oilgas.
- North Dakota Natural Heritage Biological Conservation Database (NDNH). 2007. Email reporting negative results received from the NDNH on December 13, 2007. Natural Resource Division, North Dakota Parks & Recreation Department. Bismarck, North Dakota.
-

North Dakota State Water Commission Staff. 2 April 2009. Ground and Survey Water Data Query. State of North Dakota, State Water Commission. Available URL: <<http://www.swc.state.nd.us/4dlink2/4dcgi/wellsearchform/Map%20and%20Data%20Resources>>.

North Dakota State Water Commission (NDWC). 2008a. Watershed data downloaded from the NDWC Mapservice website 6/2008 and available online at <http://mapservice.swc.state.nd.us>.

_____. 2008b. Data on existing/approved (surface and ground) water permits in Township 147 North, Range 91 West downloaded from the NDWC website 1/2008 and available online at www.swc.state.nd.us.

Northern Plains Agroecosystems Laboratory (NPAL). 2008. Vegetation of the Northern Great Plains by William T. Barker and Warren C. Whitman. Animal & Range Sciences, College of Agriculture, North Dakota State University. Fargo, North Dakota. 19 pp. Report downloaded 1/2008 and available online at www.npal.ndsu.nodak.edu/vegetation.htm.

“Noxious Weeds Team.” North Dakota Department of Agriculture. North Dakota Department of Agriculture. 2 April 2009. <<http://www.agdepartment.com/Programs/Plant/NoxiousWeeds.html>>.

“Piping Plover.” U.S. Fish & Wildlife Service. U.S. Department of Interior, U.S. Fish & Wildlife Service, Mountain-Prairie Region. 2 April 2009. <<http://www.fws.gov/mountain-prairie/species/birds/pipingplover/>>.

Rathge, R., M. Clemson, and R. Danielson. 2002. North Dakota Population Projections 2005–2020. North Dakota State Data Center at North Dakota State University. Fargo, North Dakota. September.

Sedivec, Kevil K. and Barker, William T. Selected North Dakota and Minnesota Range Plants. NDSU Extension Service at North Dakota State University. Fargo, North Dakota.

Soil Survey Staff. 2 April 2009. Spatial and Tabular Data of the Soil Survey for McLean County, North Dakota. U.S. Department of Agriculture, Natural Resources Conservation Service. Available URL: <<http://soildatamartnrcs.usda.gov/>>.

Three Affiliated Tribes. 2008. Mandan, Hidatsa, Arikara Website. Available online at http://www.mhanation.com/main/history/history_economic_social.html. Accessed April 2008.

United States Census Bureau. 2008. Selected Demographic Data for both North Dakota and the Fort Berthold Indian Reservation from Census 2000. U.S. Census Bureau, Census 2000. Information downloaded 5/2008 and available online at <http://factfinder.census.gov>.

United States Fish and Wildlife Service (USFWS). 2006. Gray Wolf Populations in the United States, 2006. Available online at http://www.fws.gov/home/feature/2007/gray_wolf_factsheet_populations.pdf. Accessed August 27, 2008.

_____. 2007. Federal Threatened and Endangered Species and Designated Critical Habitat Found in Dunn County, North Dakota. North Dakota Field Office, U.S. Fish and Wildlife Service. Bismarck, North Dakota.

_____. 2008a. National Wetlands Inventory: Wetlands Online Mapper. Available online at <http://wetlandsfws.er.usgs.gov/wtlnds/launch.html>. Accessed July 2008.

_____. 2008b. Dakota Skipper. Available online at http://www.fws.gov/northdakotafieldoffice/endspecies/species/dakota_skipper.htm.

United States Geological Survey. 2008. Ecoregions of North and South Dakota. North Dakota Ecoregion Map. Ecoregion 43A: Missouri Plateau. Northern Prairie Wildlife Research Center, USGS. Available online at www.npwrc.usgs.gov/resource/habitat/ndsdeco/43a.htm.

United States. "Whooping Crane Recovery Plan Revised." U.S. Fish & Wildlife Service. 29 May 2007. <http://www.fws.gov/mountain-prairie/pressrel/WO_717_Whooping_crane_recoveryplanpr.pdf>.

Van Bruggen, Theodore. Wildflowers, Grasses & Other Plants of the Northern Plains and Black Hills. Fourth Edition. Interior, South Dakota: Badlands Natural History Association, 1992.

Vance, F.R., et. al. Wildflowers of the Northern Great Plains. Third Edition. University of Minnesota Press. Minneapolis, Minnesota, 1999.

Whitson, Tom D., et. al. 1996. Weeds of the West. Fifth Edition. 1996.

Williams, B. B., and M. E. Bluemle. 1978. Status of Mineral Resource Information for the Fort Berthold Indian Reservation, North Dakota. Administrative report BIA-40. 35 pp.

Acronyms

AAQM	Ambient Air Quality Monitoring (site)	NDNH	North Dakota Natural Heritage
AIRFA	American Indian Religious Freedom Act	ND SWC	North Dakota State Water Commission
APD	Application for Permit to Drill	NEPA	National Environmental Policy Act
APE	Area of Potential Affect	NHPA	National Historic Preservation Act
BIA	Bureau of Indian Affairs	NPAL	Northern Plains Agroecosystems Laboratory
BLM	Bureau of Land Management	NRCS	Natural Resources Conservation Service
CFR	Code of Federal Regulations	NRHP	National Register of Historic Places
EA	Environmental Assessment	NTL	Notice to Lessees
EIS	Environmental Impact Statement	SHPO	State Historic Preservation Officer
EPA	Environmental Protection Agency	TCP	Traditional Cultural Property
FONSI	Finding of No Significant Impact	TERO	Tribal Employment Rights Office
GPRO	Great Plains Regional Office	THPO	Tribal Historic Preservation Officer
MHA Nation	Three Affiliated Tribes of the Mandan, Hidatsa and Arikara Nation	TVD	Total Vertical Depth
NAGPRA	Native American Graves Protection and Repatriation Act	USC	United States Code
NDCC	North Dakota Century Code	USFS	U.S. Forest Service
NDDH	North Dakota Department of Health	USFWS	U.S. Fish and Wildlife Service
NDIC	North Dakota Industrial Commission	USGS	U.S. Geological Survey