

***Berthold Station Wetland Delineation
And Rare Plant Survey Report***

Berthold, North Dakota

***Prepared for
Enbridge Energy Company***

October 2009



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332 West Superior Street
Duluth, MN 55802
Phone: (218) 727-5218
Fax: (218) 727-6450

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1.0 Introduction

Berthold Station is an Enbridge Energy Company, Inc. facility along a transnational crude oil pipeline. The station is located northwest of Berthold, North Dakota, in NE/NE Section 20, T156N R86W Ward County (Figure 1) immediately adjacent to, and southwest of, the intersection of Highway 2 and 296th Street Northwest. The station is approximately 14 acres and includes a single tank facility and associated buildings and service roads. Barr Engineering Company was retained to conduct a wetland delineation and rare plant survey at the station in September 2009. This report documents results of the delineation and botanical survey.

2.0 Methods

The wetland delineation and botanical survey were conducted by Daniel DeJoode, Senior Scientist, Barr Engineering on September 23, 2009. Wetland delineation data sheets were reviewed by Cheryl Feigum, Senior Scientist, Barr Engineering, North Dakota Professional Soil Classifier #63.

2.1 Wetland Delineation

Background information for the project area was compiled in an ArcMap Geographic Information System (GIS). The location was superimposed on National Wetlands Inventory (NWI) maps, county soil survey maps, US Geological Survey (USGS) topographic quad maps, and aerial photographs. The aerial photographs used were 2008 Farm Service Agency photographs. County hydric soil lists were obtained from the Soil Data Mart of the Natural Resources Conservation Service (<http://soildatamart.nrcs.usda.gov/>).

The wetland delineation was conducted according to the Routine On-Site Determination Method specified in the 1987 Army Corps of Engineers Wetlands Delineation Manual (US Army Corps of Engineers 1987) and the interim regional wetland delineation manual for the Great Plains (US Army Corps of Engineers 2008). Sample sites were established in wetlands and uplands. Representative soil samples from each site were examined for hydric soil indicators. Soil colors were determined with the aid of a Munsell® soil color chart. Hydrologic conditions were evaluated at each soil boring. Plant species at each sample location were identified, and percent aerial cover was estimated in a 2 m diameter circle. Dominant species were determined by use of the 50/20 rule. The corresponding wetland indicator status of each plant species was recorded, and a determination of hydrophytic vegetation status was made using both the dominance test and prevalence index. Wetland boundaries were marked with pin flags and recorded with a Tremble GeoXT GPS unit with sub-meter accuracy.

Connection of wetlands in the project area to navigable waters was assessed through use of topographic maps, aerial photographs, and field reconnaissance. Wetlands were classified using both the U.S. Fish and Wildlife Service Cowardin System (Cowardin et al., 1979) and the U.S. Fish and Wildlife Service Circular 39 System (Shaw and Fredine, 1971).

2.1 Rare Plant Survey

Botanical survey of the project area followed a random-intuitive method were used to search for species likely to occur in the region and to evaluate the potential for listed species to occur in observed habitats (Nelson 1985). This type of search pattern is essentially a meandering traverse of

the study area, focusing on the specific habitats and plant associations of listed species. Target species for this botanical survey included federally-listed threatened species, as well as species of concern enumerated by the North Dakota Natural Heritage Program (Dirk 2006). Special attention was paid to search for species of concern known from Ward County, but the botanical search targets included all species on the state list.

Plant communities on the project area were documented, and an attempt was made to identify all vascular plant species present. Because the facility is mowed, some plants could not be identified. Plant species are reported using the nomenclature of the Flora of the Great Plains (Great Plains Flora Association 1986).

3.1 Wetlands

3.1.1 Background Information

3.1.1.1 Landform and Topography

The station is located northwest of Berthold, North Dakota, in NE/NE Section 20, T156N R86W Ward County (Figure 1) on soils derived from glacial till or alluvium from glacial till. Slopes are gentle, between 0 and 9 percent. The site is at approximately 2080 to 2090 feet elevation (Figure 2). Land use is currently industrial, and surrounding land is agricultural supporting grain and forage crops. It is likely that the station property was also cultivated prior to its current use.

3.1.1.2 Soils

Two soil series are mapped on the site (Figure 3). Bowbells loam is well to moderately well drained with moderate permeability in the upper profile and moderately slow to slow permeability below. This soil is found in upland locations. Colvin silty clay loam is poorly to very poorly drained with moderate to slow permeability. This soil is found in swales and depressions, and is considered to be a hydric soil series by the Natural Resources Conservation Service (<http://soildatamart.nrcs.usda.gov/>).

3.1.1.3 National Wetlands Inventory

The National Wetlands Inventory mapped three wetland polygons on or adjacent to the site (Figure 4). Two are shallow marsh wetlands, classified as PEMC (palustrine, emergent, seasonally flooded). The remaining wetland is an herbaceous wetland classified as PEMA (palustrine, emergent, temporarily flooded).

3.1.2 Wetland Delineation

Three wetlands were identified during the onsite wetland delineation (Figure 5).

3.1.2.1 Wetland A

Wetland A is a shallow marsh wetland (Type 3, PEMC) in an isolated, concave depression. Most of the wetland area is outside the project boundary, east of the project site. A county road (296th Street NW) bisects the wetland, and no culvert or surface water connections between the east and west portions of the wetland were found. The east side of the wetland is a farmed depression. No outlet was observed. High water can only apparently escape to the east through an upland saddle in an agricultural field. Wetland A is an isolated, closed depression, entirely surrounded by uplands, and with no direct connection to other wetlands or Waters of the US (Figures 2-7).

The west portion of wetland A has no apparent outlet because the road impounds water to the west. The wetland is dominated by cattails (*Typha* spp.) and common reed (*Phragmites australis*). It appears that both narrow leaf and hybrid cattails (*T. angustifolia* and *T. x glauca*) are present. The upper elevation of the wetland is dominated by quackgrass (*Agropyron repens*), and upland species are present (e.g., Canada thistle (*Cirsium arvense*) and prickly lettuce (*Lactuca serriola*)). Evidence of wetland hydrology included saturated soil, water stained leaves, inundation apparent on aerial photographs, drift deposits, cracked soil surface, a closed depressional geomorphic position, and the FAC-neutral test. A layer of light-colored soil was found on top the soil profile and is interpreted as sediment deposition from upland runoff, likely when surrounding uplands were cultivated. Beneath this layer of sediment, dark colors and redoximorphic features were observed, consistent with hydric soils. Three delineation sample points were documented here (A1-A3; Figure 5, Appendix). Only a small portion of the upper edge of the wetland is found within the project boundary (0.014 acres).

3.1.2.2 Wetland B

Wetland A is a shallow marsh wetland (Type 3, PEMC) and wet meadow (Type 2, PEMB = palustrine, emergent, saturated) in an isolated, concave depression. The wetland has a culvert outlet under a service road at the east end of the wetland. The culvert discharges to a swale and ditch which, in turn, discharge to an upland agricultural field east of the site. Although sufficient flow has occurred to create a small ditch, flow must be uncommon and intermittent, because the ditch flattens and discharges to an upland field. The field drains via sheet flow towards Wetland A. However, the field is upland, and there is no discernible bed and bank draining to Wetland A. Wetland B is an isolated, closed depression, entirely surrounded by uplands, with no direct connection to other wetlands or Waters of the US (Figures 2-5, 8).

The shallow marsh portion of the wetland comprises approximately 2/3 of the wetland area. It is dominated by cattails (*Typha* spp.) and water knotweed (*Polygonum amphibium*). Portions of the wetland were unvegetated mud flats, indicating inundation for a significant portion of the growing season. Evidence of wetland hydrology included saturated soil, water stained leaves, inundation apparent on aerial photographs, thin muck on the soil surface, a sparsely vegetated concave surface, a closed depressional geomorphic position, and the FAC-neutral test. Soils were heavy and dark with a mucky surface layer and significant clay content.

The upper elevation of the wetland is an old field wet meadow dominated by quackgrass (*Agropyron repens*) with wetland species such as reed canarygrass (*Phalaris arundinacea*) and water knotweed. Upland species include Canada thistle, prickly lettuce, and white prairie aster (*Aster falcatus*). Three

delineation sample points were documented here (B1-B3; Figure 5, Appendix). The wetland is 1.42 acres.

3.1.2.3 Wetland C

Wetland C is a temporarily flooded basin (Type 1, PEMA) in an isolated, concave depression. The wetland is a small basin in a swale that has ephemeral inundation. Overflow discharges to the swale and into an upland. Wetland C is an isolated, closed depression, entirely surrounded by uplands, with no direct connection to other wetlands or Waters of the US (Figures 2-5, 9).

The entire wetland is mowed, and the lowest portion of the wetland is unvegetated. The short-mown vegetation made it difficult to identify species present, but reed canarygrass and kochia (*Kochia scoparia*) were present. Wetland hydrology was evident from cracked soil, a sparsely vegetated concave surface, and the geomorphic position as an enclosed depression. Soils were dark silty clay loam overlaying clay. Two delineation sample points were documented here (C1-C2; Figure 5, Appendix). The wetland is 0.024 acres.

3.2 Rare Plant Survey

3.2.1 Federal and State Listed Species

One federally protected plant species occurs in North Dakota, western prairie fringed orchid (*Platanthera praeclera*). This threatened species is known from native tallgrass prairies predominantly in the Sheyenne National Grasslands in two southeastern North Dakota counties.

Four plant species of concern, as designated by the North Dakota Natural Heritage Program, are known from Ward County (Dirk 2006). Chamomile grapefern (*Botrychium matricariifolium*) occurs in moist forests and woodlands. It is designated S1S2, to indicate that the species is imperiled to critically imperiled in the state. Sedge mousetail (*Myosurus aristatus*) occurs in moist habitats and vernal wetlands in mixed grass prairies. It is designated S1 to indicate that the species is critically imperiled in the state. White-stemmed pondweed (*Potamogeton praelongus*) is an aquatic plant found in cool, deep lakes. It is designated S1 to indicate that the species is critically imperiled in the state. Southern watermeal (*Wolffia columbiana*) is an aquatic plant found in quiet water. It is designated S2 to indicate that the species is imperiled in the state.

3.2.2 Field Survey Results

The entire site is highly altered relative to pre-settlement conditions. There is evidence that the site was used for cultivated agriculture prior to being a pipeline facility. Native plant communities are

largely absent, with the possible exception of some wetland vegetation (Figures 6, 8, 9). Even though native species are present in wetlands, many exotic species are also present, and the upper edges of the wetlands were likely historically tilled for agriculture. Uplands were likely cultivated, and are now industrial facilities or are seeded to turf grasses (Figure 10). Plant species found at the site are listed in Table 1.

Table 1 Plant Species Observed

Species	Common Name	Wetland Indicator Status
<i>Aster falcatus</i>	White prairie aster	FACU
<i>Agropyron repens</i>	Quackgrass	FAC
<i>Cirsium arvense</i>	Canada thistle	FACU
<i>Conyza canadensis</i>	Horseweed	FACU
<i>Hordeum jubatum</i>	Foxtail barley	FACW
<i>Kochia scoparia</i>	Kochia	FAC
<i>Lactuca serriola</i>	Prickly lettuce	FACU
<i>Panicum dichotomiflorum</i>	Fall panicum	FAC
<i>Phalaris arundinacea</i>	Reed canarygrass	FACW
<i>Phragmites australis</i>	Common reed	FACW
<i>Polygonum amphibium</i>	Water knotweed	OBL
<i>Scirpus validus</i>	Soft-stem bulrush	OBL
<i>Typha angustifolia</i>	Narrowleaf cattail	OBL
<i>Typha x glauca</i>	Hybrid cattail	OBL

Western prairie fringed orchid was not present at the site, nor was appropriate habitat found.

Chamomile grapefern not present at the site, nor was appropriate habitat found. Although September is past the optimum season to find this species, the herbaceous wetlands and mowed uplands do not provide habitat. Therefore, this species is considered to not be present.

Potentially appropriate habitat for sedge mousetail is present at the site in the wetlands with seasonal hydrology. Although this species would have flowered before the time of the survey, it was considered possible that it would be still be present in fruit or vegetatively. Nothing was found that resembled or could have been sedge mousetail. Again, consideration of past agriculture at this site suggests that appropriate habitat has been significantly altered. The least disturbed communities are the shallow marsh wetlands. Potential sedge mousetail habitat could exist in the upper portions of these wetlands, along the wetland edge or in moist uplands. These areas all show signs of past tillage,

and are currently dominated by species such as quackgrass, reed canarygrass, Canada thistle and prickly lettuce, all indicative of disturbance and an absence of native plant communities.

The aquatic species of concern, white-stemmed pondweed and southern watermeal were not found. Habitat for pondweed was not found. The wetlands at Berthold Station have ephemeral or seasonal hydrology, not the described cool, deep lake water habitat. Southern watermeal could potentially occur in the site's wetlands. No standing water was found in any of the wetlands, except a small area in Wetland A near a storm water discharge, and no aquatic vegetation was found there. The unvegetated mud flats in Wetland B were searched for possible stranded southern watermeal. However, no evidence of watermeal, or any related species of watermeal or duckweed in the Lemnaceae, was found.

No other species on the North Dakota list of plant species of concern were found at the site. No rare, threatened or endangered plant species were found at Berthold Station.

4.0 Discussion

4.1 Wetland Delineation

Three wetlands were found on, or partially on, the Berthold Station property. All wetlands are isolated pothole depressions, surrounded by uplands, with no apparent surface water or wetland connection to other wetlands or Waters of the US. Therefore, all three wetlands should be considered outside of the jurisdiction of Section 404 of the Clean Water Act and the US Army Corps Engineers.

4.2 Rare Plant Survey

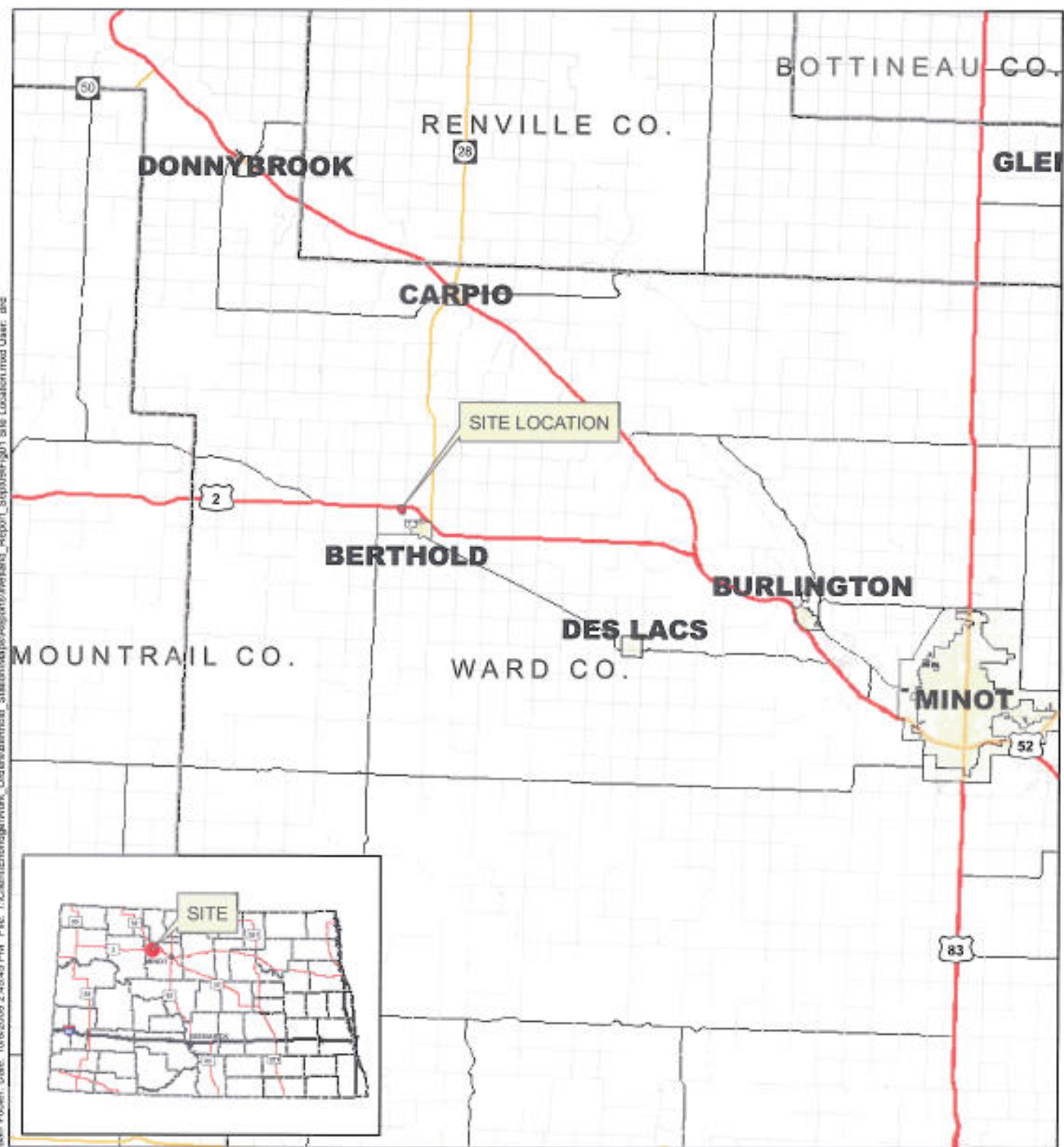
No rare or protected plant species were found. Land use history and alteration of plant communities has resulted in little habitat appropriate for rare species known to Ward County. No other species of concern were found.


5.0 References

- Cowardin, L.M., V. Carter, F.C. Golet, R.T. LaRoc. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS079/31. Department of the Interior. U.S. Fish and Wildlife Service. Washington, DC.
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- Nelson, J.R. 1985. Rare plant surveys: Techniques for impact assessment. *Natural Areas Journal* 5(3):18-30.
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Figures

Baron Footer: Date: 10/8/2009 2:45:45 PM File: I:\Client\Enbridge\Work_Oct08\Berthold_Station\Map\Reports\Welland_Report_Sep09\Fig01 Site Location.mxd User: dsl



 Project Boundary

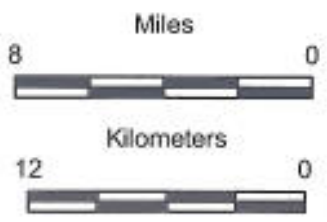
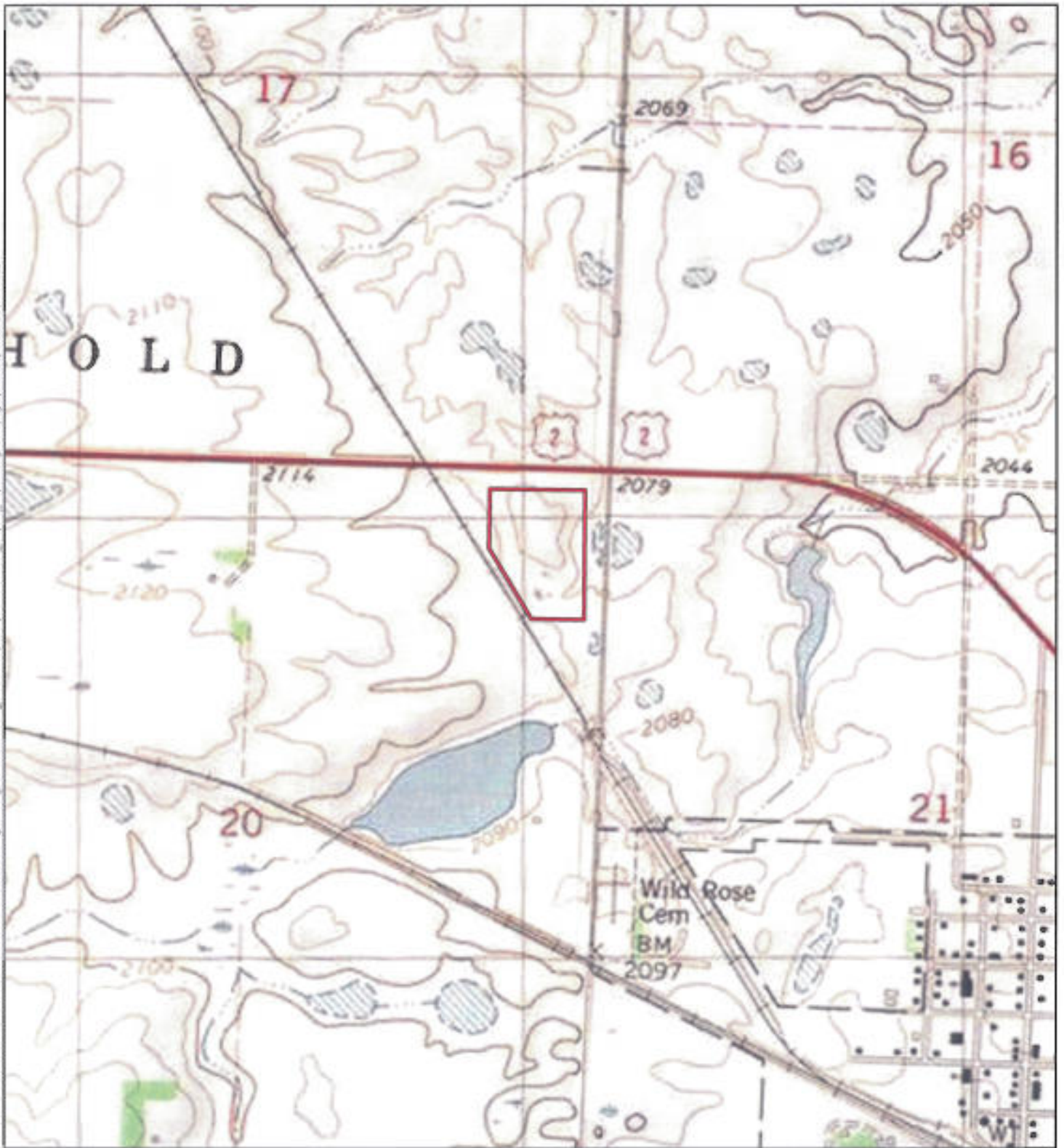



Figure 1

SITE LOCATION
Berthold Station
Enbridge Energy
Berthold, ND

Bar Fucker: Date: 10/6/2009 1:03:10 PM File: I:\Client\Energy\Work_Order\Berthold_Station\Map\Reports\Wetland_Report_Sep09\Fig02_Topographic_Map.mxd User: mbs2



 Project Boundary



Feet
1,000 0 1,000



Meters
300 0 300





Figure 2

TOPOGRAPHIC MAP
Berthold Station
Enbridge Energy
Berthold, ND

Bar Footer: Date: 10/6/2009 1:05:40 PM F46: I:\Client\Energy\Work_Order\Berthold_Station\Map\Reports\Wetland_Report_Sep09\Fig04 National Wetland Inventory.mxd User: mbs2



Data Source: USFWS NWI Database
Imagery Source: 2009 ESRI, i-cubed, GeoEye

-  Project Boundary
-  NWI Extent

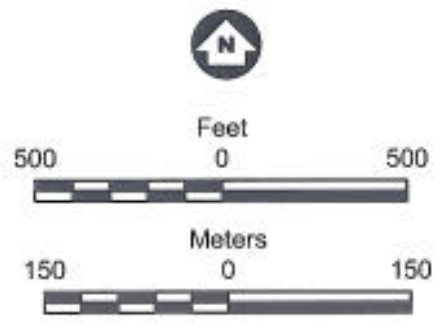





Figure 4
NATIONAL WETLANDS
INVENTORY MAP
Berthold Station
Enbridge Energy
Berthold, ND

Barr Foster: Date: 10/10/2009 1:28:54 PM File: I:\Client\Enbridge\Work_Orders\Berthold_Station\Maps\Reports\Wetland_Report_SectorF.gdb\Wetland Delineation.mxd User: mtc2



Imagery Source: 2009 ESRI, I-cubed, GeoEye

-  Survey Point
-  Delineated Wetland
-  Project Boundary

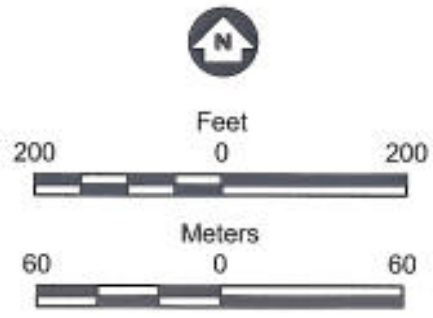


Figure 5
WETLAND DELINEATION
Berthold Station
Enbridge Energy
Berthold, ND



Wetland A, from road (296th Street NW) looking west towards Berthold Station. Wetland in foreground is outside project boundary (fence).



Wetland A, inside project boundary looking south.

Figure 6
SITE PHOTOGRAPHS
Berthold Station
Enbridge Energy Company, Inc.
Ward County, ND



Wetland A, from road (296th Street NW) looking east, outside of project area. Wetland in foreground is farmed wetland outside project boundary. This portion of the wetland is cut off from the west portion by a county road. The upland saddle in the center background is the only apparent outlet for high water flows from Wetland A. There are no direct connections to other wetlands or Waters of the US. Therefore, this wetland is considered to be isolated.

Figure 7

**SITE PHOTOGRAPHS
Berthold Station
Enbridge Energy Company, Inc.
Ward County, ND**



Wetland B, looking north showing seasonally flooded, shallow marsh in center of wetland. The wetland is an isolated basin surrounded by upland.



Wetland B, looking northwest, showing transition from shallow marsh to old field, wet meadow..

Figure 8
SITE PHOTOGRAPHS
Berthold Station
Enbridge Energy Company, Inc.
Ward County, ND



Wetland C, looking south. Wetland is isolated basin in a swale draining south into an upland.

Figure 9

**SITE PHOTOGRAPHS
Berthold Station
Enbridge Energy Company, Inc.
Ward County, ND**



The culvert outlet from Wetland B can be seen left of center. It drains to the right (east/northeast) into the upland forage field (foreground).



Upland photos showing land use at Berthold Station. Aside from the wetlands, the entire property is industrial or mowed upland grasses.

Figure 10
SITE PHOTOGRAPHS
Berthold Station
Enbridge Energy Company, Inc.
Ward County, ND

Appendix

Wetland Delineation Data Sheets

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Berthold Station Applicant/Owner: Enbridge Energy Co City/County: Ward County State: ND Sampling Date: 09/23/09

Sampling Point: A1 Section: 20 Township: 155N Range: 66W Investigator(s): DRD

Land Form: Local Relief: Concave Slope %: 0-1 Soil Map Unit Name: Colvin

Subregion (LRR): E Latitude: 48.3255388 Longitude: -101.75056 Datum: NAD83

NW/Cowardin Classification: PENC Circular 39 Classification: Type 3

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil Yes Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic? Eggers & Reed (primary): Shallow Marsh

Eggers & Reed (secondary):
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

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

Hydrophytic vegetation present?	<u>Yes</u>	Remarks (explain any answers if needed): Sample point is within a closed depression wetland.
Hydric soil present?	<u>Yes</u>	
Wetland hydrology present?	<u>Yes</u>	
Is the sampled area within a wetland?	<u>Yes</u>	

VEGETATION

Tree Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *																																	
1.		0			Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW or FAC: <u>50.00%</u> (A/B)																																
2.		0																																			
3.		0																																			
4.		0																																			
Total Cover:		0																																			
Sapling/Shrub Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *																																	
1.		0			Prevalence Index Worksheet: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Total % Cover of:</th> <th colspan="2" style="text-align: left;">Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL Species</td> <td style="text-align: center;">70</td> <td style="text-align: center;">X 1</td> <td style="text-align: center;">70</td> </tr> <tr> <td>FACW Species</td> <td style="text-align: center;">10</td> <td style="text-align: center;">X 2</td> <td style="text-align: center;">20</td> </tr> <tr> <td>FAC Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 3</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FACU Species</td> <td style="text-align: center;">60</td> <td style="text-align: center;">X 4</td> <td style="text-align: center;">240</td> </tr> <tr> <td>UPL Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 5</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Column Totals:</td> <td style="text-align: center;">140</td> <td style="text-align: center;">(A)</td> <td style="text-align: center;">330</td> </tr> <tr> <td colspan="3" style="text-align: right;">Prevalence Index = B/A =</td> <td style="text-align: center;">2.4</td> </tr> </tbody> </table>	Total % Cover of:		Multiply by:		OBL Species	70	X 1	70	FACW Species	10	X 2	20	FAC Species	0	X 3	0	FACU Species	60	X 4	240	UPL Species	0	X 5	0	Column Totals:	140	(A)	330	Prevalence Index = B/A =			2.4
Total % Cover of:		Multiply by:																																			
OBL Species	70	X 1	70																																		
FACW Species	10	X 2	20																																		
FAC Species	0	X 3	0																																		
FACU Species	60	X 4	240																																		
UPL Species	0	X 5	0																																		
Column Totals:	140	(A)	330																																		
Prevalence Index = B/A =			2.4																																		
2.		0																																			
3.		0																																			
4.		0																																			
5.		0																																			
Total Cover:		0																																			
Herb Stratum	(Plot Size: <u>2 m diameter circle</u>)	Absolute % Cover	Dominant Species?	Indicator Status *																																	
1.	<u>Typha angustifolia</u>	40	Yes	OBL	Hydrophytic Vegetation Indicators: No <u> </u> Dominance Test is >50% Yes <u> </u> Prevalence Index ≤ 3.0 [1] No <u> </u> Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet) No <u> </u> Problematic Hydrophytic Vegetation [1] (Explain) [1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.																																
2.	<u>Polygonum amphibium</u>	25	No	OBL																																	
3.	<u>Lactuca scariola</u>	50	Yes	FACU																																	
4.	<u>Scirpus validus</u>	5	No	OBL																																	
5.	<u>Cirsium arvense</u>	10	No	FACU																																	
6.	<u>PPhragmites australis</u>	5	No	FACW																																	
7.	<u>Hordeum jubatum</u>	5	No	FACW																																	
8.		0																																			
Total Cover:		140																																			
Woody Vine Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *																																	
1.		0			* In USFWS Region 4 Hydrophytic vegetation present? <u>Yes</u>																																
2.		0																																			
Total Cover:		0																																			
% Bare Ground in Herb Stratum: <u>0</u>																																					
Remarks: <u>Shallow marsh with significant presence of upland species, likely due to seasonal hydrology.</u> (Include photo numbers here or on a separate sheet)																																					

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: A1

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

	Depth (inches)	Matrix		Redox Features			Loc [2]	Texture	Remarks
		Color (moist)	%	Color (moist)	%	Type [1]			
1.	0 - 6	10YR4/2	80	2.5YR4/4	20	D	PL	Silty clay	Sediment from upland
2.	6 - 18	10YR2/1	100					silty clay	
3.	-								
4.	-								
5.	-								
6.	-								

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- Histic (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)

- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F5)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils [3]:

- 1 cm Muck (A9) (LRR I, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside MLRA 72 & 73)
- Reduced Vertic (F18)
- Rod Parent Material (TF2)
- Other (explain in soil remarks)

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

Restrictive Layer (if present):	Type: _____	Depth (inches): _____	Hydric soil present? <u>Yes</u>
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Remarks: Upper layer appears to be deposition from upland. Redox depressions in closed depression in prairie pothole region = F8.

HYDROLOGY

Wetland Hydrology Indicators:

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

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (where not tiled) (C3)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (explain in remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

- Surface water present? Surface Water Depth (inches): _____
- Water table present? Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) Saturation Depth (inches): 12

Wetland hydrology present? Yes

Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe:

Hydrology Remarks: In closed depression wetland.

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: A2

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

	Depth (inches)	Matrix		Redox Features		Type [1]	Loc [2]	Texture	Remarks
		Color (moist)	%	Color (moist)	%				
1.	0 - 12	10YR4/2	100					Sandy clay loam	Sediment from upland
2.	12 - 20	10YR2/1	95	2.5YR4/4	5	D	M	Silty clay loam	
3.	20 - 30	10YR2/1	90					Silty clay loam	
4.	20 - 30	10YR5/2	10					Silty clay loam	
5.	30 - 36	10YR2/1	50					Sandy clay	
6.	30 - 36	10YR5/1	50					Sandy clay	

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) (LRR F) <input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> Sandy Gleyed Matrix (S4) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)	Indicators for Problematic Hydric Soils [3]: <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) <input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H) <input type="checkbox"/> Dark Surface (S7) (LRR G) <input type="checkbox"/> High Plains Depressions (F16) (LRR H outside MLRA 72 & 73) <input type="checkbox"/> Reduced Vertic (F18) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Other (explain in soil remarks)
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric soil present? <u>Yes</u>
Remarks: Upper layer likely upland runoff sediment. Indicators lacking but soil hydric based on best professional judgement.	

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required) <input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (where killed) (C3) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Field Observations: Surface water present? <input type="checkbox"/> Surface Water Depth (inches): _____ Water table present? <input type="checkbox"/> Water Table Depth (inches): _____ Saturation present? (includes capillary fringe) <input type="checkbox"/> Saturation Depth (inches): _____	Wetland hydrology present? <u>Yes</u>
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Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe: _____

Hydrology Remarks: In upper portion of wetland. Wetland is concave surface. Soil cracks and debris flow indicates hydrology.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Berthold Station Applicant/Owner: Enbridge Energy Co City/County: Ward County State: ND Sampling Date: 09/23/09

Sampling Point: A3 Section: 20 Township: 156N Range: 86W Investigator(s): DRD

Land Form: Local Relief: Conver Slope %: 0-5 Soil Map Unit Name: Bowbells

Subregion (LRR): E Latitude: 48.3254730 Longitude: -101.75076 Datum: NAD83

NW/Cowardin Classification: U Circular 39 Classification: Upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation Yes Soil No Hydrology No significantly disturbed? Are "normal circumstances" Yes present?

Are vegetation Yes Soil No Hydrology No naturally problematic? present?

Eggers & Reed (primary): Upland
 Eggers & Reed (secondary):
 Eggers & Reed (tertiary):
 Eggers & Reed (quaternary):

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

Hydrophytic vegetation present?	No	Remarks (explain any answers if needed):
Hydric soil present?	No	Sample point is upland above a closed depression wetland.
Wetland hydrology present?	No	
Is the sampled area within a wetland?	No	

VEGETATION

Tree Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *	Dominance Test Worksheet:																																
1.		0			Number of Dominant Species That Are OBL, FACW or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW or FAC: _____ (A/B)																																
2.		0																																			
3.		0																																			
4.		0																																			
Total Cover:		0																																			
Sapling/Shrub Stratum (Plot Size:)																																					
1.		0			Prevalence Index Worksheet: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Total % Cover of:</th> <th style="width: 20%;"></th> <th style="width: 20%;">Multiply by:</th> <th style="width: 20%;"></th> </tr> </thead> <tbody> <tr> <td>OBL Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 1</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FACW Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 2</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FAC Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 3</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FACU Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 4</td> <td style="text-align: center;">0</td> </tr> <tr> <td>UPL Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 5</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Column Totals:</td> <td style="text-align: center;">0</td> <td style="text-align: center;">(A)</td> <td style="text-align: center;">0 (B)</td> </tr> <tr> <td colspan="3" style="text-align: right;">Prevalence Index = B/A =</td> <td style="text-align: center;">#Num!</td> </tr> </tbody> </table>	Total % Cover of:		Multiply by:		OBL Species	0	X 1	0	FACW Species	0	X 2	0	FAC Species	0	X 3	0	FACU Species	0	X 4	0	UPL Species	0	X 5	0	Column Totals:	0	(A)	0 (B)	Prevalence Index = B/A =			#Num!
Total % Cover of:		Multiply by:																																			
OBL Species	0	X 1	0																																		
FACW Species	0	X 2	0																																		
FAC Species	0	X 3	0																																		
FACU Species	0	X 4	0																																		
UPL Species	0	X 5	0																																		
Column Totals:	0	(A)	0 (B)																																		
Prevalence Index = B/A =			#Num!																																		
2.		0																																			
3.		0																																			
4.		0																																			
5.		0																																			
Total Cover:		0																																			
Herb Stratum (Plot Size: <u>2 m diameter circle</u>)																																					
1.		0			Hydrophytic Vegetation Indicators: No <u> </u> Dominance Test is >50% #Error <u> </u> Prevalence Index ≤ 3.0 (f) No <u> </u> Morphological Adaptations (f) (provide supporting data in vegetation remarks or on a separate sheet) No <u> </u> Problematic Hydrophytic Vegetation (f) (Explain) (f) Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic. Hydrophytic vegetation present? <u>No</u>																																
2.		0																																			
3.		0																																			
4.		0																																			
5.		0																																			
6.		0																																			
7.		0																																			
8.		0																																			
Total Cover:		0																																			
Woody Vine Stratum (Plot Size:)																																					
1.		0																																			
2.		0																																			
Total Cover:		0																																			
* in USFWS Region 4																																					
% Bare Ground in Herb Stratum: <u> </u>																																					
Remarks: (include photo numbers here or on a separate sheet) Vegetation consists of unidentifiable mowed grasses. Likely Agropyron repens and Hordeum jubatum.																																					

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: A3

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]		
1. 0 - 24	10YR3/1						Silty clay loam	
2. 24 - 30	2.5Y6/3						Silty clay loam	
3. -								
4. -								
5. -								
6. -								

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)

- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Shipped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils [3]:

- 1 cm Muck (A9) (LRR I, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside MLRA 72 & 73)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (explain in soil remarks)

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

Restrictive Layer (if present):	Type: _____	Depth (inches): _____	Hydric soil present?	<u>No</u>
Remarks: Not hydric soil.				

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on Living Roots (where tiled) (C3)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- FAC-Neutral Test (D6)
- Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

- Surface water present? Surface Water Depth (inches): _____
- Water table present? Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) Saturation Depth (inches): _____

Wetland hydrology present? No

Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe:

Hydrology Remarks: No positive indications of wetland hydrology. Sample point is on mowed slope above wetland.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Berthold Station Applicant/Owner: Enbridge Energy Co City/County: Ward County State: ND Sampling Date: 09/23/09

Sampling Point: B1 Section: 20 Township: 156N Range: 66W Investigator(s): DRD

Land Form: Local Relief: Concave Slope %: 0 Soil Map Unit Name: Bowbells

Subregion (LRR): E Latitude: 46.3249711 Longitude: -101.75245 Datum: NAD83

NW/Cowardin Classification: PEMC Circular 39 Classification: Type 3

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Shallow Marsh

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Eggers & Reed (secondary):

Are vegetation No Soil No Hydrology Yes naturally problematic? present?

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

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

Hydrophytic vegetation present?	<u>Yes</u>	Remarks (explain any answers if needed): Sample point is in a closed depression wetland.
Hydric soil present?	<u>Yes</u>	
Wetland hydrology present?	<u>Yes</u>	
Is the sampled area within a wetland?	<u>Yes</u>	

VEGETATION

Tree Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *																																	
1.		0			Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW or FAC: <u>100.00%</u> (A/B)																																
2.		0																																			
3.		0																																			
4.		0																																			
Total Cover:		0																																			
Sapling/Shrub Stratum (Plot Size:)																																					
1.		0			Prevalence Index Worksheet: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Total % Cover of:</th> <th colspan="2">Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL Species</td> <td style="text-align: center;">100</td> <td style="text-align: center;">X 1</td> <td style="text-align: center;">100</td> </tr> <tr> <td>FACW Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 2</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FAC Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 3</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FACU Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 4</td> <td style="text-align: center;">0</td> </tr> <tr> <td>UPL Species</td> <td style="text-align: center;">0</td> <td style="text-align: center;">X 5</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Column Totals:</td> <td style="text-align: center;">100</td> <td style="text-align: center;">(A)</td> <td style="text-align: center;">100 (B)</td> </tr> <tr> <td colspan="2" style="text-align: right;">Prevalence Index = B/A =</td> <td colspan="2" style="text-align: center;"><u>1.0</u></td> </tr> </tbody> </table>	Total % Cover of:		Multiply by:		OBL Species	100	X 1	100	FACW Species	0	X 2	0	FAC Species	0	X 3	0	FACU Species	0	X 4	0	UPL Species	0	X 5	0	Column Totals:	100	(A)	100 (B)	Prevalence Index = B/A =		<u>1.0</u>	
Total % Cover of:		Multiply by:																																			
OBL Species	100	X 1	100																																		
FACW Species	0	X 2	0																																		
FAC Species	0	X 3	0																																		
FACU Species	0	X 4	0																																		
UPL Species	0	X 5	0																																		
Column Totals:	100	(A)	100 (B)																																		
Prevalence Index = B/A =		<u>1.0</u>																																			
2.		0																																			
3.		0																																			
4.		0																																			
5.		0																																			
Total Cover:		0																																			
Herb Stratum (Plot Size: <u>2 m diameter circle</u>)																																					
1.	Polygonum amphibium	100	Yes	OBL	Hydrophytic Vegetation Indicators: Yes <u> </u> Dominance Test is >50% Yes <u> </u> Prevalence Index ≤ 3.0 [1] No <u> </u> Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet) No <u> </u> Problematic Hydrophytic Vegetation [1] (Explain) [1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic. Hydrophytic vegetation present? <u>Yes</u>																																
2.		0																																			
3.		0																																			
4.		0																																			
5.		0																																			
6.		0																																			
7.		0																																			
8.		0																																			
Total Cover:		100																																			
Woody Vine Stratum (Plot Size:)																																					
1.		0			* in USFWS Region 4																																
2.		0																																			
Total Cover:		0																																			
% Bare Ground in Herb Stratum: <u>0</u>																																					
Remarks: (include photo numbers here or on a separate sheet) Monotype of Polygonum. Nearby are cattails and unvegetated mud flats.																																					

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: B1

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

	Depth (inches)	Matrix		Redox Features				Texture	Remarks
		Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]		
1.	0 - 2	10YR2/1						Fibric-sapric muck	Organic
2.	2 - 30	10YR2/1						Clay loam	
3.	30 - 48	10YR2/1						Clay	
4.	-								
5.	-								
6.	-								

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)

- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils [3]:

- 1 cm Muck (A9) (LRR I, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside MLRA 72 & 73)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (explain in soil remarks)

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

Restrictive Layer (if present):	Type: <u>Clay</u>	Depth (inches): <u>30 - 48</u>	Hydric soil present?	<u>Yes</u>
Remarks: <u>Organic layer indicates hydric soil.</u>				

HYDROLOGY

Wetland Hydrology Indicators:

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

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B8)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (where not tiled) (C3)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (explain in remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

- Surface water present? Surface Water Depth (inches): _____
- Water table present? Water Table Depth (inches): 40
- Saturation present? (includes capillary fringe) Saturation Depth (inches): >40

Wetland hydrology present? Yes

Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe:

Hydrology Remarks: Wetland inundated earlier in growing season.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Barthold Station Applicant/Owner: Enbridge Energy Co City/County: Ward County State: ND Sampling Date: 09/23/09

Sampling Point: B2 Section: 20 Township: 156N Range: 86W Investigator(s): DRD

Land Form: Local Relief: Concave Slope %: 0-1 Soil Map Unit Name: Bowbells

Subregion (LRR): E Latitude: 48.3250548 Longitude: -101.75258 Datum: NAD83

NW/Cowardin Classification: PEMB Circular 39 Classification: Type 2

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (if no, explain in remarks)

Eggers & Reed (primary): Fresh (Wet) Meadow

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology Yes naturally problematic?

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

Hydrophytic vegetation present?	<u>Yes</u>	Remarks (explain any answers if needed):
Hydric soil present?	<u>Yes</u>	Sample point is in a closed depression wetland.
Wetland hydrology present?	<u>Yes</u>	
Is the sampled area within a wetland?	<u>Yes</u>	

VEGETATION

Tree Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *	
1.		0			
2.		0			
3.		0			
4.		0			
Total Cover:		0			
Sapling/Shrub Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *	
1.		0			
2.		0			
3.		0			
4.		0			
5.		0			
Total Cover:		0			
Herb Stratum	(Plot Size: <u>2 m diameter circle</u>)	Absolute % Cover	Dominant Species?	Indicator Status *	
1.	<u>Agropyron repens</u>	95	Yes	FAC	
2.	<u>Polygonum amphibium</u>	5	No	OBL	
3.	<u>Phalaris arundinacea</u>	10	No	FACW	
4.	<u>Cirsium arvense</u>	10	No	FACU	
5.	<u>Lactuca scariola</u>	5	No	FACU	
6.	<u>Aster falcatus</u>	10	No	FACU	
7.		0			
8.		0			
Total Cover:		135			
Woody Vine Stratum	(Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *	
1.		0			
2.		0			
Total Cover:		0			
* In USFWS Region 4					
% Bare Ground in Herb Stratum:		0			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	X 1	5
FACW Species	10	X 2	20
FAC Species	95	X 3	285
FACU Species	25	X 4	100
UPL Species	0	X 5	0
Column Totals:	135 (A)		410 (B)
Prevalence Index = B/A =			<u>3.0</u>

Hydrophytic Vegetation Indicators:

Yes Dominance Test is >50%

Yes Prevalence Index ≤ 3.0 [1]

No Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)

No Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks: (include photo numbers here or on a separate sheet) Old field? Likely cultivated before current landuse.

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: B2

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]		
1. 0 - 6	10YR2/1	95	10YR 4/6	5	D	PL	Silty clay loam	
2. 6 - 24	10YR2/1	100					Silty clay loam	
3. 24 - 36	10YR2/1	90	5YR4/6	10	D	M	Silty clay loam	
4. 36 - 40	10YR4/2	75	5YR4/6	25	D	M	Clay	
5. -								
6. -								

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)

- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils [3]:

- 1 cm Muck (A9) (LRR L, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside MLRA 72 & 73)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (explain in soil remarks)

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

Restrictive Layer (if present):	Type: _____	Depth (inches): _____		Hydric soil present? <u>Yes</u>
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Remarks: Redox depressions in closed depression in prairie pothole region = F8.

HYDROLOGY

Wetland Hydrology Indicators:

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

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (where not tiled) (C3)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (explain in remarks)

Secondary Indicators (minimum of two required)

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

Field Observations:

- Surface water present? Surface Water Depth (inches): _____
- Water table present? Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) Saturation Depth (inches): _____

Wetland hydrology present? Yes

Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe:

Hydrology Remarks: No unambiguous indicators of hydrology, but wetland veg and elevation suggest this point is in upper portion of wetland.

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: B3

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

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]		
1. 0 - 8	10YR2/1	75					Silty clay loam	Flow layer?
2. 8 - 24	10YR2/1	99	5YR4/6	1	D	M	Silty clay loam	
3. 24 - 30	2.5YR6/3	75					Clay	
4. -								
5. -								
6. -								

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)

- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils [3]:

- 1 cm Muck (A9) (LRR I, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside MLRA 72 & 73)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (explain in soil remarks)

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

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric soil present? <u>No</u>
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Remarks: 25% 10YR7/3 in matrix at 0-8" possibly from carbonates; 25% 10YR2/1 in matrix at 24-30"

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

- Surface water present? Surface Water Depth (inches): _____
- Water table present? Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) Saturation Depth (inches): _____

Wetland hydrology present? No

Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe: _____

Hydrology Remarks: No indicators of wetland hydrology.

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: C1

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

	Depth (inches)	Matrix		Redox Features				Texture	Remarks
		Color (moist)	%	Color (moist)	%	Type [1]	Loc [2]		
1.	0 - 20	10YR2/1	90	10YR5/1	10	D	PL	Silty clay loam	
2.	20 - 24	10YR6/1	50	7.5YR5/8	50			Clay	
3.	-								
4.	-								
5.	-								
6.	-								

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)

- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils [3]:

- 1 cm Muck (A9) (LRR I, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside MLRA 72 & 73)
- Reduced Vertic (F18)
- Rod Parent Material (TF2)
- Other (explain in soil remarks)

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

Restrictive Layer (if present):	Type: <u>Clay</u>	Depth (inches): <u>20 - 24</u>	Hydric soil present?	<u>Yes</u>
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Remarks: Redox depressions in closed depression in prairie pothole region = F8. Upper layer includes 10YR6/8 in matrix.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

- Surface water present? Surface Water Depth (inches): _____
- Water table present? Water Table Depth (inches): _____
- Saturation present? (includes capillary fringe) Saturation Depth (inches): _____

Wetland hydrology present? Yes

Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe:

Hydrology Remarks: Shallow depression and small area of cracked and bare soil suggest ephemeral wetland hydrology.

WETLAND DETERMINATION DATA FORM - Great Plains Region

SOIL

Sampling Point: G2

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

	Depth (Inches)	Matrix		Redox Features			Texture	Remarks
		Color (moist)	%	Color (moist)	%	Type [1]		
1.	0 - 24	10YR3/1					Silty clay loam	
2.	24 - 36	2.5Y6/3					Silty clay	
3.	-							
4.	-							
5.	-							
6.	-							

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

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

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

Indicators for Problematic Hydric Soils [3]:

- 1 cm Muck (A9) (LRR I, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside MLRA 72 & 73)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (explain in soil remarks)

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

Restrictive Layer (if present):	Type: _____	Depth (Inches): _____	Hydric soil present?	<u>No</u>
Remarks: Not hydric soil.				

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Surface Water (A1)
<input type="checkbox"/> High Water Table (A2)
<input type="checkbox"/> Saturation (A3)
<input type="checkbox"/> Water Marks (B1)
<input type="checkbox"/> Sediment Deposits (B2)
<input type="checkbox"/> Drift Deposits (B3)
<input type="checkbox"/> Algal Mat or Crust (B4)
<input type="checkbox"/> Iron Deposits (B5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)
<input type="checkbox"/> Water-Stained Leaves (B9) | <input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (where not tiled) (C3)
<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Thin Muck Surface (C7)
<input type="checkbox"/> Other (explain in remarks) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Secondary Indicators (minimum of two required)

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

Field Observations:

- | | | | |
|-------------------------------------------------|--------------------------|-------------------------------------|--|
| Surface water present? | <input type="checkbox"/> | Surface Water Depth (inches): _____ | |
| Water table present? | <input type="checkbox"/> | Water Table Depth (inches): _____ | |
| Saturation present? (includes capillary fringe) | <input type="checkbox"/> | Saturation Depth (inches): _____ | |

Wetland hydrology present? No

Recorded Data: Aerial Photo Monitoring Well Stream Gauge Previous Inspections Describe:

Hydrology Remarks: On slope above wetland; no hydrology.