

Appendix B.2:
Wetland Determination Natural Resource Consulting

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Wetland Determination

Zavoral Mine Site
Washington County, Minnesota

NRC Project No. 0009-0138-01
June 2010

PREPARED FOR:

EDAW/AECOM
161 Cheshire Lane North, Suite 500
Minneapolis, MN 55441

PREPARED BY:

Natural Resources Consulting, Inc.
2300 Swan Lake Boulevard, Suite 200
Independence, Iowa 50644

WETLAND DETERMINATION

Zavoral Mine Site Washington County, Minnesota

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Prepared For:

EDAW/AECOM
161 Cheshire Lane North, Suite 500
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Prepared By:



2300 Swan Lake Blvd., Suite 200
Independence, Iowa 50644
Phone: (319) 334-3755
Fax: (319) 334-3780
www.nrc-inc.net

NRC Project # 009-0138-01

A handwritten signature in black ink that reads "Terry J. VanDeWalle". The signature is written in a cursive style with a long horizontal line extending to the left.

Terry J. VanDeWalle
Principal Scientist

A handwritten signature in black ink that reads "Stacey J. Carlson". The signature is written in a cursive style with a long horizontal line extending to the right.

Stacey J. Carlson
Environmental Scientist

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EXECUTIVE SUMMARY

A determination of wetland boundaries at the proposed Zavoral Mine Site in Washington County, Minnesota identified no wetland within the project study limits.

No other Waters of the U.S. (i.e. streams) were identified within the study limits.

INTRODUCTION

Project Description

Natural Resources Consulting, Incorporated (NRC) performed a wetland determination at the proposed Zavoral Mine in Washington County, Minnesota. The project site is approximately 114 acres in size and is located along State Trunk Highway 95 near the intersection of State Trunk Highway 97 within the town of Scandia, Minnesota (Sections 18 and 19, T32N, R19W)(Figure 1). The project boundary is shown in Figures 1-4.

Purpose of the Project

The purpose of this investigation was to determine if wetlands and other Waters of the U.S. are present within the proposed project site.

Discharges of dredged or fill material, excavation and mechanized land clearing in Waters of the U.S. will require authorization from the U.S. Army Corps of Engineers (USACE). Final determination and delineation of the limit of Waters of the U.S. for permitting purposes rests with the USACE. The determinations and delineations presented here may be used for planning and informational purposes. For final authorization for activities in U.S. waters, the USACE must approve this determination.

METHODS

Wetlands

The USACE and U.S. Environmental Protection Agency define wetland as:

“Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions.”

The initial steps in the wetland delineation process included a review of the following documents:

- Washington County Soil Survey (USDA, 2009)(Figure 2);
- NRCS list of hydric soil for Washington County (USDA, 2009);
- U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) Map (Figure 3)

These documents provide information on where wetlands have been previously identified or areas that possess a high likelihood of wetlands occurring.

Wetland determinations were conducted using the Routine On-Site Determination Method defined in the U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987), subsequent guidance documents (USACE, 1991, 1992) and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: North Central and Northeast Region (USACE, 2009). According to procedures described in this Manual, areas that under normal circumstances reflect a

predominance of hydrophytes (water-loving vegetation), hydric soils, and wetland hydrology (e.g., inundated or saturated soils) are considered wetlands.

At each observation point:

1. The presence or absence of normal circumstances was determined;
2. The plant community was characterized by identifying dominant plant species using the “50/20” rule and, in some cases, the FAC-neutral test. The 50/20 rule is conducted by placing plant species present (in each stratum) in a list. The plants are listed in decreasing order of abundance. The dominant plant species are identified as those plants constituting the first half of the total species present when the number of species is totaled from the most abundant to the least abundant. Any of the remaining species that exceed 20 percent of the total are also dominant species. A wetland indicator status is determined and recorded for each dominant species. Wetland indicator status is ranked by percent probability of the species occurrence in wetlands as follows:

OBL = Obligate Wetland, occurs with an estimated 99 percent probability of occurrence in wetlands

FACW = Facultative Wetland, estimated 67 to 99 percent probability of occurrence in wetlands

FAC = Facultative equally likely to occur in wetlands and non-wetlands (34 to 66 percent probability)

FACU = Facultative upland, 67 to 99 percent probability in non-wetlands, 1 to 33 percent in wetlands

UPL = Obligate Upland, greater than 99 percent probability in non-wetlands in this region

NI = No indicator, insufficient information available to determine an indicator status
3. Soil pits were dug to a depth of at least 24 inches, where possible, and the soil was evaluated for hydric soil characteristics; and
4. Hydrology was assessed by observing for primary (i.e., inundation, saturation within the root zone, water marks, etc.) and secondary (i.e., oxidized pore linings, water stained leaves, etc.) indicators of wetland hydrology.

An on-site wetland delineation was completed on May 20, 2010 by NRC staff. A minimum of one wetland and one non-wetland point were sampled at each location. Data forms were completed for each plant community present in each wetland and for representative non-wetland points and are included in Appendix A. Wetlands were classified using the Cowardin et al. (1979) system.

Waters of the U.S.

All “blue line” streams identified on USGS 1:24,000 Scale Topographic Maps were investigated in the field. A stream was considered to be Waters of the U.S. if it had a defined bed and bank, an ordinary high water mark and appeared to be actively sorting silt.

WETLANDS FINDINGS

No wetlands were identified within the study limits (Figure 4). NWI maps indicate a palustrine, unconsolidated bottom, intermittently exposed, excavated wetland in the southern portion of the site (Figure 3). A field delineation conducted on November 11, 2003 by Earth Tech wetland biologists identified no wetland in the vicinity of the NWI-indicated wetland (Earth Tech, 2003). The current field delineation confirmed these findings (Sampling Point 3; Appendix A). No wetland hydrology indicators

were observed within the study limits and specifically, no indicators were present at any of the sampling points (Sampling Points 1-3; Appendix A).

Mapped soil units at the site are shown on Figure 2 (USDA, 2009) and include:

- 12C - Emmert gravelly, loamy, coarse sand, 3-12% slopes
- 12D - Emmert gravelly, loamy coarse sand, 15-25% slopes
- 49B - Antigo silt loam, 2-6% slopes
- 49C - Antigo silt loam, 6-12% slopes
- 153B - Santiago silt loam, 2-6% slopes
- 153C - Santiago silt loam, 6-12% slopes
- 177B - Gotham loamy sand, 1-6% slopes
- 302C - Rosholt sandy loam, 6-15% slopes
- 1029 - Pits, gravel
- 1820F - Mahtomedi variant – Rock outcrop complex, 25-60% slopes

Soils at the site generally consist of very dark grayish brown (10YR 3/2) to dark yellowish brown (10YR 4/6) silt loam to sand in some locations (Appendix A).

Vegetation consists primarily of upland and disturbance-adapted species. Herbaceous species present, but not necessarily dominant, at the site include red clover (*Trifolium pratense*), crown vetch (*Coronilla varia*), oldfield goldenrod (*Solidago canadensis*), Kentucky bluegrass (*Poa pratensis*) and spotted knapweed (*Centaurea maculosa*), dandelion (*Taraxacum officinale*), timothy (*Phleum pratense*), Virginia wild rye (*Elymus virginicus*) and reed canary grass (*Phalaris arundinacea*). Shrub and tree species present at various locations throughout the site include buckthorn (*Rhamnus cathartica*), red dogwood (*Cornus stolonifera*), white pine (*Pinus strobus*) and aspen (*Populus tremula*).

OTHER WATERS OF THE U.S.

No streams meeting Waters of the U.S. criteria are present within the project study limits.

REGULATORY REVIEW AND CONCURRENCE

Prior to beginning work at this site or disturbing or altering wetlands or waterways, NRC strongly recommends that the owner obtain the necessary permits or other agency regulatory review and concurrence with regard to the proposed work in order to comply with applicable regulations. NRC would be happy to assist with any additional resources inventory or identification work at your request, to the extent that the work is within our range of expertise.

The information provided regarding wetland boundaries is an estimate of the wetland boundary and the opinions presented are best estimates of the conditions at the time the wetlands were viewed. The ultimate decision on the boundaries defining regulatory jurisdiction over wetlands rests with the USACE. As a result, there may be adjustments to boundaries based upon review of a regulatory agency. An agency determination can vary from time to time depending on various factors including, but not limited to, precipitation and the season of the year. In addition, the physical characteristics of the site can change with time, depending on the weather, vegetation patterns, drainage, activities on adjacent parcels, or other events. Any of these factors can change the nature and extent of wetlands on the site. It is recommended the Client obtain an opinion and authority from regulating government agencies before proceeding with any development or utilization of the property. If the Client proceeds to change, modify or utilize the property in question without obtaining authorization from the regulating governmental agency, it will be done at the Client's own risk and Natural Resources Consulting, Inc. will not be responsible or liable for any resulting damages.

LITERATURE CITED

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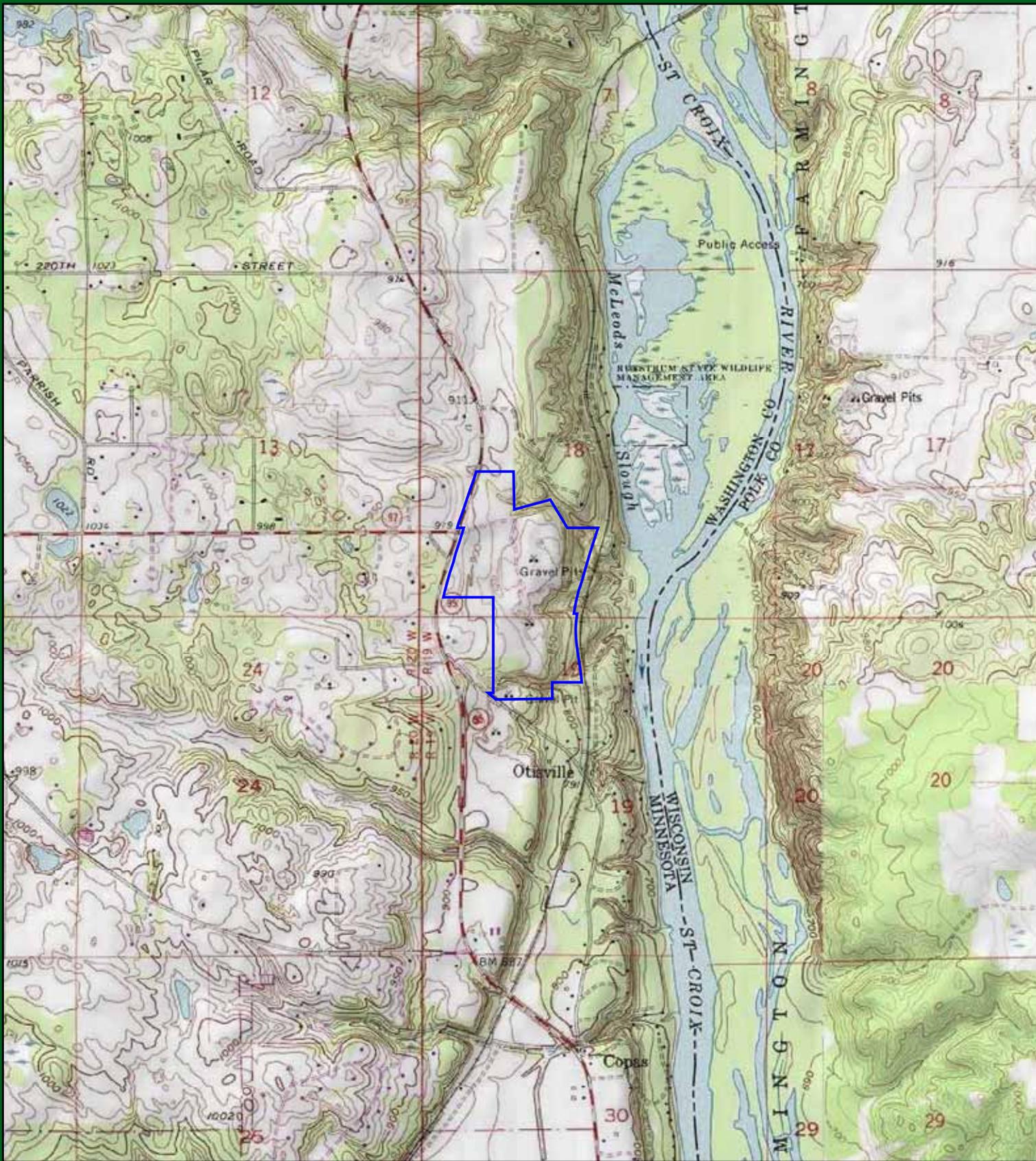
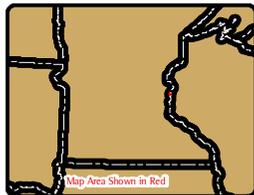


Figure 1. Project Location and Topography
Zavoral Mine Site



Location
S18 and 19, T32N, R19W
Washington County, MN

0 1,000 2,000 Feet

Project Information
Project Number : 009-0138-01
Modified June 2, 2010

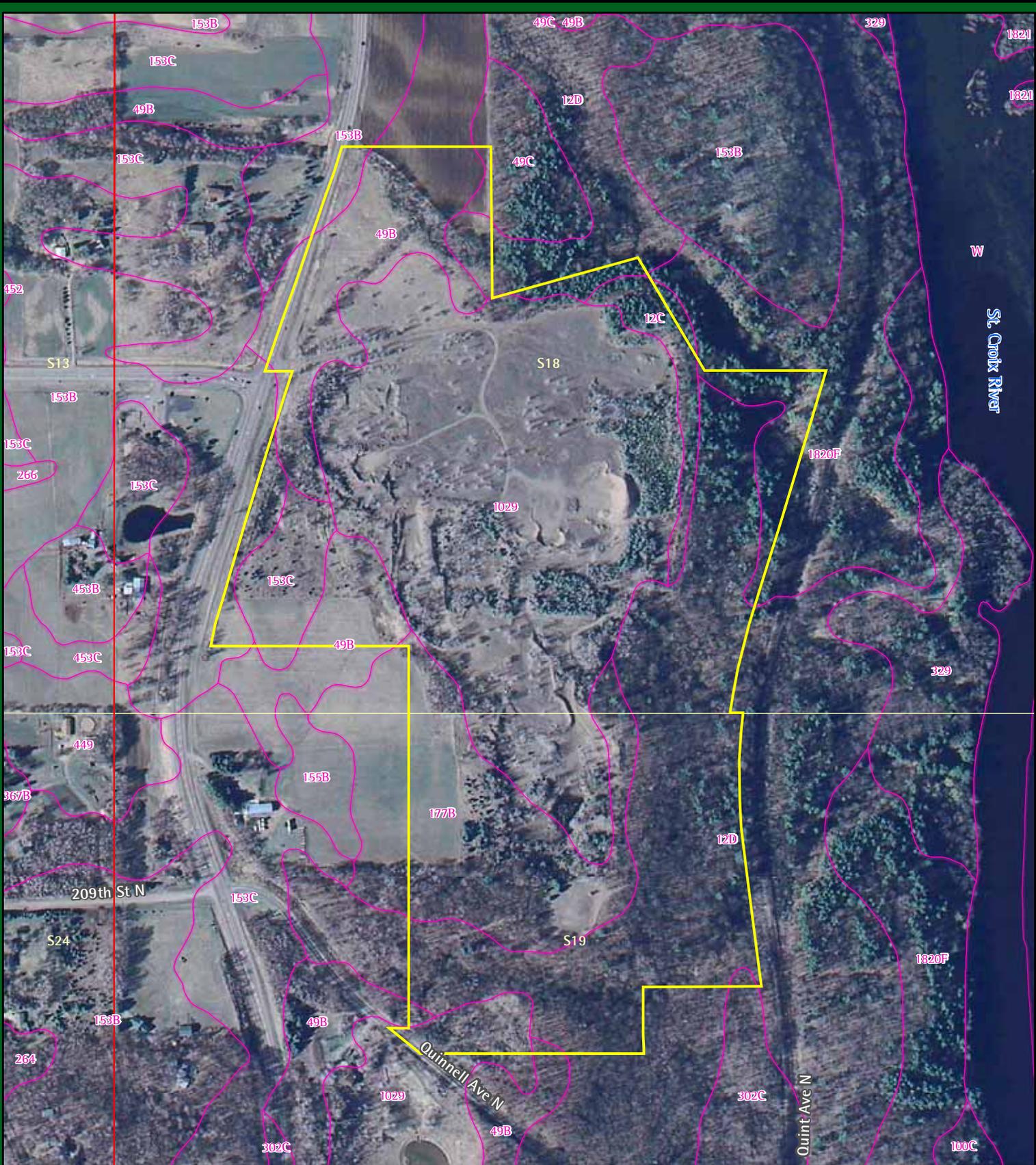
Legend

Project Location

Data Sources include USGS 7.5' Topographic Quadrangle

NRC
Natural Resources Consulting, Inc.

209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com



**Figure 2. NRCS Soil Survey Data
Zavoral Mine Site**



Location
S18 and 19, T32N, R19W
Washington County, MN

0 250 500 Feet

Project Information
Project Number : 009-0138-01
Modified June 2, 2010

Legend

- Project Location
- NRCS Soil Survey Data
- Hydric Soils
- Poss. Hydric Inclusion
- Non-Hydric Soils

Data Sources include NRCS, MNDNR, USGS, and 2005 Orthophotography.

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phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com

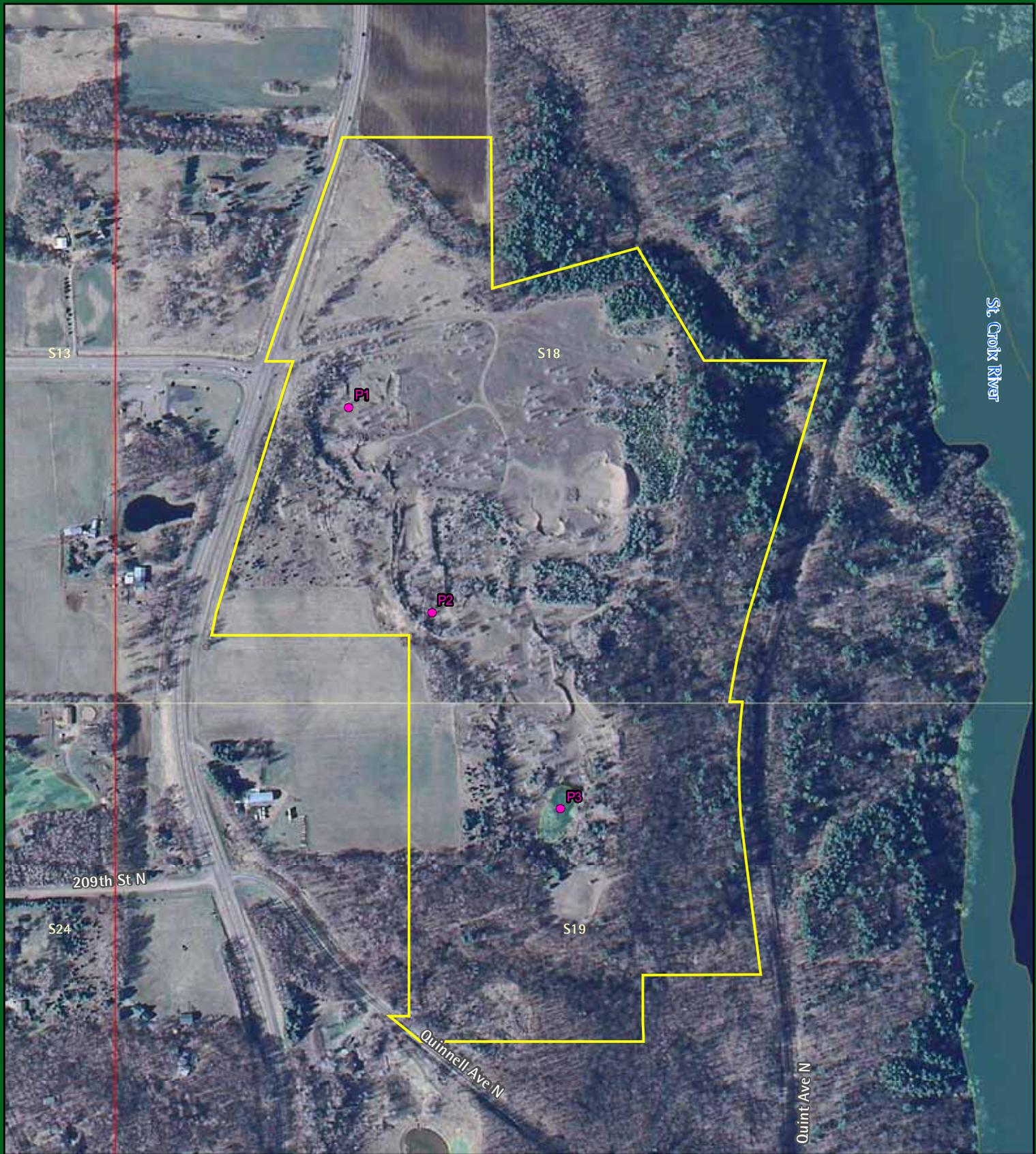


Figure 3. National Wetlands Inventory and Field Data
Zavoral Mine Site



Location
S18 and 19, T32N, R19W
Washington County, MN

0 250 500 Feet

Project Information
Project Number : 009-0138-01
Modified June 2, 2010

Legend

- Project Location
- Sample Point
- Nat'l Wetlands Inventory

Data Sources include NRCS, MNDNR, USGS, and 2005 Orthophotography.

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Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com

Appendix A
Wetland Data Forms

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Project/Site: Zavoral Mine		NRC Project #: 009-0138-01		Date: 05/20/10
Applicant: Tiller Corporation		Investigator #2: L. Knapp, EDAW		County: Washington
Investigator #1: T. VanDeWalle, NRC		Soil Unit: 1029 - Pits, gravel		State: Minnesota
Landform:		Local Relief:		Wetland ID:
Slope (%):		Latitude:		Sample Point: 1
		Longitude:		Community ID: Upland
		Datum:		Section: 18&19
Are climatic/hydrologic conditions on the site typical for this time of year?(If no, explain in remarks) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				Township: 32N
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?		Are normal circumstances present?		Range: 19 Dir: W
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is This Sampling Point Within A Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present):

<p><u>Primary:</u></p> <input type="checkbox"/> A1 - Surface Water <input type="checkbox"/> A2 - High Water Table <input type="checkbox"/> A3 - Saturation <input type="checkbox"/> B1 - Water Marks <input type="checkbox"/> B2 - Sediment Deposits <input type="checkbox"/> B3 - Drift Deposits <input type="checkbox"/> B4 - Algal Mat or Crust <input type="checkbox"/> B5 - Iron Deposits <input type="checkbox"/> B7 - Inundation Visible on Aerial Imagery <input type="checkbox"/> B8 - Sparsely Vegetated Concave Surface	<input type="checkbox"/> B9 - Water-Stained Leaves <input type="checkbox"/> B13 - Aquatic Fauna <input type="checkbox"/> B15 - Marl Deposits <input type="checkbox"/> C1 - Hydrogen Sulfide Odor <input type="checkbox"/> C3 - Oxidized Rhizospheres on Living Roots <input type="checkbox"/> C4 - Presence of Reduced Iron <input type="checkbox"/> C6 - Recent Iron Reduction in Tilled Soils <input type="checkbox"/> C7 - Thin Muck Surface <input type="checkbox"/> Other (Explain)	<p><u>Secondary:</u></p> <input type="checkbox"/> B6 - Surface Soil Cracks <input type="checkbox"/> B10 - Drainage Patterns <input type="checkbox"/> B16 - Moss Trim Lines <input type="checkbox"/> C2 - Dry-Season Water Table <input type="checkbox"/> C8 - Crayfish Burrows <input type="checkbox"/> C9 - Saturation Visible on Aerial Imagery <input type="checkbox"/> D1 - Stunted or Stressed Plants <input type="checkbox"/> D2 - Geomorphic Position <input type="checkbox"/> D3 - Shallow Aquitard <input type="checkbox"/> D4 - Microtopographic Relief <input type="checkbox"/> D5 - FAC-Neutral Test
---	--	--

<p>Field Observations:</p> <p>Surface Water Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: 0 (in.)</p> <p>Water Table Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: >24 (in.)</p> <p>Saturation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: >24 (in.)</p>	<p>Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
--	--

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

Remarks:

SOILS

Map Unit Name: 1029 - Pits, gravel Series Drainage Class: #N/A

Taxonomy (Subgroup): #N/A Field Observations Confirm Mapped Type? Yes No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Localton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix			Mottles				Texture (e.g. clay, sand, loam)	
			Color (Moist)		%	Color (Moist)	%	Type	Location		
0	18	--	10YR	4/3	100	--	--	--	--	--	silt
18	24	--	10YR	4/4	100	--	--	--	--	--	sand
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

<p>NRCS Hydric Soil Field Indicators (check here if indicators are not present): <input checked="" type="checkbox"/></p> <input type="checkbox"/> A1 - Histosol <input type="checkbox"/> A2 - Histic Epipedon <input type="checkbox"/> A3 - Black Histic <input type="checkbox"/> A4 - Hydrogen Sulfide <input type="checkbox"/> A5 - Stratified Layers <input type="checkbox"/> A11 - Depleted Below Dark Surface <input type="checkbox"/> A12 - Thick Dark Surface <input type="checkbox"/> S1 - Sandy Muck Mineral <input type="checkbox"/> S4 - Sandy Gleyed Matrix <input type="checkbox"/> S5 - Sandy Redox <input type="checkbox"/> S6 - Stripped Matrix <input type="checkbox"/> S7 - Dark Surface (LRR R, MLRA 149B)	<input type="checkbox"/> S8 - Polyvalue Below Surface (LRR R, MLRA 149B) <input type="checkbox"/> S9 - Thin Dark Surface (LRR R, MLRA 149B) <input type="checkbox"/> F1 - Loamy Muck Mineral (LRR K, L) <input type="checkbox"/> F2 - Loamy Gleyed Matrix <input type="checkbox"/> F3 - Depleted Matrix <input type="checkbox"/> F6 - Redox Dark Surface <input type="checkbox"/> F7 - Depleted Dark Surface <input type="checkbox"/> F8 - Redox Depressions	<p>Indicators for Problematic Soils¹</p> <input type="checkbox"/> A10 - 2 cm Muck (LRR K, L, MLRA149B) <input type="checkbox"/> A16 - Coast Prairie Redox (LRR K, L, R) <input type="checkbox"/> S3 - 5cm Mucky Peat of Peat (LRR K, L, R) <input type="checkbox"/> S7 - Dark Surface (LRR K, L) <input type="checkbox"/> S8 - Polyvalue Below Surface (LRR K, L) <input type="checkbox"/> S9 - Thin Dark Surface (LRR K, L) <input type="checkbox"/> F12 - Iron-Manganese Masses (LRR K, L, R) <input type="checkbox"/> F19 - Piedmont Floodplain Soils (MLRA 149B) <input type="checkbox"/> TA6 - Mesic Spodic (MLRA 144A, 145, 149B) <input type="checkbox"/> TF2 - Red Parent Material <input type="checkbox"/> TF12 - Very Shallow Dark Surface <input type="checkbox"/> Other (Explain in Remarks)
---	---	---

¹Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed)	Type:	Depth:	Hydric Soil Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks:			

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Project/Site: Zavoral Mine Wetland ID: 0 Sample Point 1

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)				
	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	<i>Pinus strobus</i>	20	Y	FACU
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		20		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Sapling/Shrub Stratum (Plot size: 5 meter radius)				
	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.				
2.				
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		0		

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	<u>0</u>	x 1 =	<u>0</u>
FACW spp.	<u>0</u>	x 2 =	<u>0</u>
FAC spp.	<u>15</u>	x 3 =	<u>45</u>
FACU spp.	<u>50</u>	x 4 =	<u>200</u>
UPL spp.	<u>55</u>	x 5 =	<u>275</u>
Total		<u>120</u> (A)	<u>520</u> (B)
Prevalence Index = B/A =		<u>4.333</u>	

Herb Stratum (Plot size: 2 meter radius)				
	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	<i>Trifolium pratense</i>	30	Y	FACU
2.	<i>Coronilla varia</i>	30	Y	UPL
3.	<i>Solidago canadensis</i>	25	Y	UPL
4.	<i>Poa pratensis</i>	15	N	FAC
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
Total Cover =		100		

Hydrophytic Vegetation Indicators:

Yes No Rapid Test for Hydrophytic Vegetation

Yes No Dominance Test is > 50%

Yes No Prevalence Index is ≤ 3.0 *

Yes No Morphological Adaptations (Explain) *

Yes No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: 10 meter radius)				
	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
Total Cover =		0		

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall

Woody Vines - All woody vines greater than 3.28 ft. in height.

Remarks:

Hydrophytic Vegetation Present Yes No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Project/Site: Zavoral Mine	NRC Project #: 009-0138-01	Date: 05/20/10
Applicant: Tiller Corporation		County: Washington
Investigator #1: T. VanDeWalle, NRC	Investigator #2: L. Knapp, EDAW	State: Minnesota
Soil Unit: 1029 - Pits, gravel	NWI/WWI Classification: N/A	Wetland ID:
Landform:	Local Relief:	Sample Point: 2
Slope (%):	Latitude:	Longitude:
		Datum:
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Community ID: Upland
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?	Are normal circumstances present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Section: 18&19
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?		Township: 32N
		Range: 19 Dir: W

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is This Sampling Point Within A Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present):

<p><u>Primary:</u></p> <input type="checkbox"/> A1 - Surface Water <input type="checkbox"/> A2 - High Water Table <input type="checkbox"/> A3 - Saturation <input type="checkbox"/> B1 - Water Marks <input type="checkbox"/> B2 - Sediment Deposits <input type="checkbox"/> B3 - Drift Deposits <input type="checkbox"/> B4 - Algal Mat or Crust <input type="checkbox"/> B5 - Iron Deposits <input type="checkbox"/> B7 - Inundation Visible on Aerial Imagery <input type="checkbox"/> B8 - Sparsely Vegetated Concave Surface	<input type="checkbox"/> B9 - Water-Stained Leaves <input type="checkbox"/> B13 - Aquatic Fauna <input type="checkbox"/> B15 - Marl Deposits <input type="checkbox"/> C1 - Hydrogen Sulfide Odor <input type="checkbox"/> C3 - Oxidized Rhizospheres on Living Roots <input type="checkbox"/> C4 - Presence of Reduced Iron <input type="checkbox"/> C6 - Recent Iron Reduction in Tilled Soils <input type="checkbox"/> C7 - Thin Muck Surface <input type="checkbox"/> Other (Explain)	<p><u>Secondary:</u></p> <input type="checkbox"/> B6 - Surface Soil Cracks <input type="checkbox"/> B10 - Drainage Patterns <input type="checkbox"/> B16 - Moss Trim Lines <input type="checkbox"/> C2 - Dry-Season Water Table <input type="checkbox"/> C8 - Crayfish Burrows <input type="checkbox"/> C9 - Saturation Visible on Aerial Imagery <input type="checkbox"/> D1 - Stunted or Stressed Plants <input type="checkbox"/> D2 - Geomorphic Position <input type="checkbox"/> D3 - Shallow Aquitard <input type="checkbox"/> D4 - Microtopographic Relief <input type="checkbox"/> D5 - FAC-Neutral Test
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Field Observations:	Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Surface Water Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: 0 (in.)	
Water Table Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: >24 (in.)	
Saturation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: >24 (in.)	

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

Remarks:

SOILS

Map Unit Name: 1029 - Pits, gravel Series Drainage Class: #N/A

Taxonomy (Subgroup): #N/A Field Observations Confirm Mapped Type? Yes No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Localton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix			Mottles				Texture (e.g. clay, sand, loam)	
			Color (Moist)		%	Color (Moist)	%	Type	Location		
0	15	--	10YR	3/2	100	--	--	--	--	--	silt loam
15	24	--	2.5YR	3/4	100	--	--	--	--	--	clay
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

<p>NRCS Hydric Soil Field Indicators (check here if indicators are not present): <input checked="" type="checkbox"/></p> <input type="checkbox"/> A1 - Histosol <input type="checkbox"/> A2 - Histic Epipedon <input type="checkbox"/> A3 - Black Histic <input type="checkbox"/> A4 - Hydrogen Sulfide <input type="checkbox"/> A5 - Stratified Layers <input type="checkbox"/> A11 - Depleted Below Dark Surface <input type="checkbox"/> A12 - Thick Dark Surface <input type="checkbox"/> S1 - Sandy Muck Mineral <input type="checkbox"/> S4 - Sandy Gleyed Matrix <input type="checkbox"/> S5 - Sandy Redox <input type="checkbox"/> S6 - Stripped Matrix <input type="checkbox"/> S7 - Dark Surface (LRR R, MLRA 149B)	<input type="checkbox"/> S8 - Polyvalue Below Surface (LRR R, MLRA 149B) <input type="checkbox"/> S9 - Thin Dark Surface (LRR R, MLRA 149B) <input type="checkbox"/> F1 - Loamy Muck Mineral (LRR K, L) <input type="checkbox"/> F2 - Loamy Gleyed Matrix <input type="checkbox"/> F3 - Depleted Matrix <input type="checkbox"/> F6 - Redox Dark Surface <input type="checkbox"/> F7 - Depleted Dark Surface <input type="checkbox"/> F8 - Redox Depressions	<p>Indicators for Problematic Soils¹</p> <input type="checkbox"/> A10 - 2 cm Muck (LRR K, L, MLRA149B) <input type="checkbox"/> A16 - Coast Prairie Redox (LRR K, L, R) <input type="checkbox"/> S3 - 5cm Mucky Peat of Peat (LRR K, L, R) <input type="checkbox"/> S7 - Dark Surface (LRR K, L) <input type="checkbox"/> S8 - Polyvalue Below Surface (LRR K, L) <input type="checkbox"/> S9 - Thin Dark Surface (LRR K, L) <input type="checkbox"/> F12 - Iron-Manganese Masses (LRR K, L, R) <input type="checkbox"/> F19 - Piedmont Floodplain Soils (MLRA 149B) <input type="checkbox"/> TA6 - Mesic Spodic (MLRA 144A, 145, 149B) <input type="checkbox"/> TF2 - Red Parent Material <input type="checkbox"/> TF12 - Very Shallow Dark Surface <input type="checkbox"/> Other (Explain in Remarks)
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¹Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed)	Type:	Depth:	Hydric Soil Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks:			

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Project/Site: Zavoral Mine Wetland ID: 0 Sample Point 2

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	<i>Populus tremula</i>	10	Y	FAC
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		10		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Sapling/Shrub Stratum (Plot size: 5 meter radius)

	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	<i>Rhamnus cathartica</i>	20	Y	FACU
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		20		

Prevalence Index Worksheet

Total % Cover of:	Multiply by:	
OBL spp. <u>0</u>	x 1 =	<u>0</u>
FACW spp. <u>10</u>	x 2 =	<u>20</u>
FAC spp. <u>70</u>	x 3 =	<u>210</u>
FACU spp. <u>20</u>	x 4 =	<u>80</u>
UPL spp. <u>30</u>	x 5 =	<u>150</u>
Total <u>130</u> (A)		<u>460</u> (B)
Prevalence Index = B/A =		<u>3.538</u>

Herb Stratum (Plot size: 2 meter radius)

	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	<i>Poa pratensis</i>	60	Y	FAC
2.	<i>Solidago canadensis</i>	30	Y	UPL
3.	<i>Phalaris arundinacea</i>	10	N	FACW
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
Total Cover =		100		

Hydrophytic Vegetation Indicators:

Yes No Rapid Test for Hydrophytic Vegetation

Yes No Dominance Test is > 50%

Yes No Prevalence Index is ≤ 3.0 *

Yes No Morphological Adaptations (Explain) *

Yes No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Woody Vine Stratum (Plot size: 10 meter radius)

	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
Total Cover =		0		

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall

Woody Vines - All woody vines greater than 3.28 ft. in height.

Remarks:

Hydrophytic Vegetation Present Yes No

Additional Remarks:

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Project/Site: Zavoral Mine	NRC Project #: 009-0138-01	Date: 05/20/10
Applicant: Tiller Corporation		County: Washington
Investigator #1: T. VanDeWalle, NRC	Investigator #2: L. Knapp, EDAW	State: Minnesota
Soil Unit: 1029 - Pits, gravel	NWI/WWI Classification: PUBGx	Wetland ID:
Landform:	Local Relief:	Sample Point: 3
Slope (%):	Latitude:	Community ID: Upland
	Longitude:	Section: 18&19
	Datum:	Township: 32N
Are climatic/hydrologic conditions on the site typical for this time of year? (If no, explain in remarks) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Range: 19 Dir: W
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?	Are normal circumstances present?	
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is This Sampling Point Within A Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present):

<p><u>Primary:</u></p> <input type="checkbox"/> A1 - Surface Water <input type="checkbox"/> A2 - High Water Table <input type="checkbox"/> A3 - Saturation <input type="checkbox"/> B1 - Water Marks <input type="checkbox"/> B2 - Sediment Deposits <input type="checkbox"/> B3 - Drift Deposits <input type="checkbox"/> B4 - Algal Mat or Crust <input type="checkbox"/> B5 - Iron Deposits <input type="checkbox"/> B7 - Inundation Visible on Aerial Imagery <input type="checkbox"/> B8 - Sparsely Vegetated Concave Surface	<input type="checkbox"/> B9 - Water-Stained Leaves <input type="checkbox"/> B13 - Aquatic Fauna <input type="checkbox"/> B15 - Marl Deposits <input type="checkbox"/> C1 - Hydrogen Sulfide Odor <input type="checkbox"/> C3 - Oxidized Rhizospheres on Living Roots <input type="checkbox"/> C4 - Presence of Reduced Iron <input type="checkbox"/> C6 - Recent Iron Reduction in Tilled Soils <input type="checkbox"/> C7 - Thin Muck Surface <input type="checkbox"/> Other (Explain)	<p><u>Secondary:</u></p> <input type="checkbox"/> B6 - Surface Soil Cracks <input type="checkbox"/> B10 - Drainage Patterns <input type="checkbox"/> B16 - Moss Trim Lines <input type="checkbox"/> C2 - Dry-Season Water Table <input type="checkbox"/> C8 - Crayfish Burrows <input type="checkbox"/> C9 - Saturation Visible on Aerial Imagery <input type="checkbox"/> D1 - Stunted or Stressed Plants <input type="checkbox"/> D2 - Geomorphic Position <input type="checkbox"/> D3 - Shallow Aquitard <input type="checkbox"/> D4 - Microtopographic Relief <input type="checkbox"/> D5 - FAC-Neutral Test
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Field Observations:	Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Surface Water Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: 0 (in.)	
Water Table Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: >24 (in.)	
Saturation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Depth: >24 (in.)	

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

Remarks:

SOILS

Map Unit Name: 1029 - Pits, gravel Series Drainage Class: #N/A

Taxonomy (Subgroup): #N/A Field Observations Confirm Mapped Type? Yes No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Localton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix			Mottles				Texture (e.g. clay, sand, loam)	
			Color (Moist)	%	Color (Moist)	%	Type	Location			
0	4	--	10YR	3/2	100	--	--	--	--	--	silt loam
4	24	--	10YR	4/3	100	--	--	--	--	--	sand
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--	--

<p>NRCS Hydric Soil Field Indicators (check here if indicators are not present): <input checked="" type="checkbox"/></p> <input type="checkbox"/> A1 - Histosol <input type="checkbox"/> A2 - Histic Epipedon <input type="checkbox"/> A3 - Black Histic <input type="checkbox"/> A4 - Hydrogen Sulfide <input type="checkbox"/> A5 - Stratified Layers <input type="checkbox"/> A11 - Depleted Below Dark Surface <input type="checkbox"/> A12 - Thick Dark Surface <input type="checkbox"/> S1 - Sandy Muck Mineral <input type="checkbox"/> S4 - Sandy Gleyed Matrix <input type="checkbox"/> S5 - Sandy Redox <input type="checkbox"/> S6 - Stripped Matrix <input type="checkbox"/> S7 - Dark Surface (LRR R, MLRA 149B)	<input type="checkbox"/> S8 - Polyvalue Below Surface (LRR R, MLRA 149B) <input type="checkbox"/> S9 - Thin Dark Surface (LRR R, MLRA 149B) <input type="checkbox"/> F1 - Loamy Muck Mineral (LRR K, L) <input type="checkbox"/> F2 - Loamy Gleyed Matrix <input type="checkbox"/> F3 - Depleted Matrix <input type="checkbox"/> F6 - Redox Dark Surface <input type="checkbox"/> F7 - Depleted Dark Surface <input type="checkbox"/> F8 - Redox Depressions	<p>Indicators for Problematic Soils¹</p> <input type="checkbox"/> A10 - 2 cm Muck (LRR K, L, MLRA149B) <input type="checkbox"/> A16 - Coast Prairie Redox (LRR K, L, R) <input type="checkbox"/> S3 - 5cm Mucky Peat of Peat (LRR K, L, R) <input type="checkbox"/> S7 - Dark Surface (LRR K, L) <input type="checkbox"/> S8 - Polyvalue Below Surface (LRR K, L) <input type="checkbox"/> S9 - Thin Dark Surface (LRR K, L) <input type="checkbox"/> F12 - Iron-Manganese Masses (LRR K, L, R) <input type="checkbox"/> F19 - Piedmont Floodplain Soils (MLRA 149B) <input type="checkbox"/> TA6 - Mesic Spodic (MLRA 144A, 145, 149B) <input type="checkbox"/> TF2 - Red Parent Material <input type="checkbox"/> TF12 - Very Shallow Dark Surface <input type="checkbox"/> Other (Explain in Remarks)
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¹Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If Observed)	Type:	Depth:	Hydric Soil Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks:			

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Project/Site: Zavoral Mine

Wetland ID: 0

Sample Point 3

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)				
	<u>Species Name</u>	<u>% Cover</u>	<u>Dominant</u>	<u>Ind. Status</u>
1.	<i>Populus tremula</i>	40	Y	FAC
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		40		
Sapling/Shrub Stratum (Plot size: 5 meter radius)				
1.	<i>Rhamnus cathartica</i>	10	N	FACU
2.	<i>Cornus stolonifera</i>	10	N	FACW
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
Total Cover =		20		
Herb Stratum (Plot size: 2 meter radius)				
1.	<i>Taraxacum officinale</i>	60	Y	UPL
2.	<i>Elymus virginicus</i>	30	Y	FACW
3.	<i>Phleum pratense</i>	10	N	FACU
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
Total Cover =		100		
Woody Vine Stratum (Plot size: 10 meter radius)				
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
Total Cover =		0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index Worksheet

Total % Cover of:	Multiply by:
OBL spp. <u>0</u>	x 1 = <u>0</u>
FACW spp. <u>40</u>	x 2 = <u>80</u>
FAC spp. <u>40</u>	x 3 = <u>120</u>
FACU spp. <u>20</u>	x 4 = <u>80</u>
UPL spp. <u>60</u>	x 5 = <u>300</u>
Total <u>160</u> (A)	<u>580</u> (B)
Prevalence Index = B/A = <u>3.625</u>	

Hydrophytic Vegetation Indicators:

Yes No Rapid Test for Hydrophytic Vegetation

Yes No Dominance Test is > 50%

Yes No Prevalence Index is ≤ 3.0 *

Yes No Morphological Adaptations (Explain) *

Yes No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present Yes No

Remarks:

Additional Remarks:

