

**Appendix A.5:
Zavoral Property Wetland Delineation Report**

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Zavoral Site

**Wetland Delineation Report
Scandia, Washington County, Minnesota
January 14, 2011**



Local Government Unit:

**Washington Conservation District
1380 West Frontage Road, Hwy 36
Stillwater, MN 55082**

Client:

**Tiller Corporation
PO Box 1480
Maple Grove, Minnesota 55311-6480**

Consultant:

**Critical Connections Ecological Services, Inc.
PO Box 184
Scandia, Minnesota 55073**



Zavoral Site Wetland Delineation Report Scandia, Washington County, Minnesota January 14, 2011

I. INTRODUCTION

Critical Connections Ecological Services, Inc. (CCES) was contracted by Tiller Corporation to provide wetland delineation services for the Zavoral site which is located off of State Highway 95 in Sections 18 & 19 of Township 32 North, Range 19 West, Washington County, Minnesota (**Figure 1**). On September 23rd, October 12th-14th, and November 11th, 2010, CCES delineated three wetland boundaries within the Zavoral site. The project area covers 114 acres.

II. OBJECTIVE

To determine and delineate jurisdictional wetland boundaries located within the project area. This information will be used in the planning process for a proposed reuse of a gravel mine.

III. METHODS

Prior to conducting the fieldwork, existing data were reviewed. These data include the U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) (**Figure 2**), the Minnesota Department of Natural Resources (MnDNR) Protected Waters Inventory (**Figure 3**), and the U.S. Department of Agriculture Soil Survey of Washington County (**Figure 4**).

Wetland delineation methods and criteria follow the U.S. Army Corps of Engineers (COE) Wetlands Delineation Manual (1987) and the Regional Supplement to the COE Wetland Delineation Manual: Northcentral and Northeast Region. The wetland boundaries were identified as the upper-most extent of areas that met the criteria required to be defined as a jurisdictional wetland: hydric soils, hydrophytic vegetation, and wetland hydrology. The delineated boundary was marked with pink pin flags with representative letters and numbers A1 to A83, B1 to B64, and C1 to C50 (**Figure 5**).

One transect was taken within each area of wetland investigation (3 total transect) where the wetland/upland transition occurs. These transects investigated the vegetation, soils, and hydrology at two positions in the landscape, one within the wetland and one in the upland. Vegetation, soils, and hydrology were then documented along each transect following the aforementioned delineation protocols. Soil pits were excavated to a minimum depth of 23 inches. The soil was characterized based on soil matrix/mottle colors and texture, as well as the presence/absence of hydric soil indicators. The dominant vascular plant species were identified and the cover was estimated visually. The indicator status of the dominant plant species was

taken from the *National List of Plant Species That Occur in Wetlands: 1988 Minnesota* (U.S. Fish and Wildlife Service, 1988). Hydrologic indicators (i.e. presence/absence of inundated and/or saturated soils, drift lines, drainage patterns, water marks, etc.) were evaluated to determine wetland hydrology. Finally, the wetland at the transect sample point was classified based on the Circular 39 and Cowardin wetland descriptions.

All collected field data were summarized in the Routine Wetland Determination Data Forms (1987 COE Wetland Delineation Manual) and are attached at the end of this Wetland Delineation Report.

IV. RESULTS

The land within the Zavoral Site is comprised of mixed hardwood and conifer woodland/forest, old gravel mining spoil areas with herbaceous vegetation and includes three delineated wetland areas. Wetland A would be classified as being part palustrine emergent saturated wetland (PEMB; Circular 39 Type 2) and part palustrine forested deciduous saturated wetland (PFO1B; Circular 39 Type 7). Wetland B would be classified as being part palustrine emergent saturated wetland (PEMB; Circular 39 Type 2) and part palustrine forested deciduous saturated wetland (PFO1B; Circular 39 Type 7). Wetland C would be classified as being part palustrine emergent saturated wetland (PEMB; Circular 39 Type 2) and part palustrine forested deciduous saturated wetland (PFO1B; Circular 39 Type 7). Areas bordering the delineated wetlands throughout the site consist of upland forests with white pine, sugar maple, red oak, and yellow birch trees.

Field hydrology observations of the wetland sample points at each transect indicated surface water present within Wetlands A, B, and C within the creek channel only with a depth ranging from two to six inches. Water table was present within Wetland A at a depth of 10" and in Wetland B at a depth of 6". Saturated soils were apparent at the surface for all three wetlands. Upland soil pits did not demonstrate saturated conditions at any transects for the wetlands delineated on the property.

The NWI characterizes one wetland within the subject property, an excavated palustrine unconsolidated bottom with an intermittently exposed water regime. No DNR Protected Waters are located within the subject property.

Wetland A

Wetland A is located in the southern part of the property, just west of the railroad tracks and consists of a ravine/creek system with several seeps located along its hillsides (**Figure 6**). Wetland A is dominated by Black ash (*Fraxinus nigra*), Cottonwood (*Populus deltoides*), Common scouring-rush (*Equisetum hyemale*), Jewel-weed (*Impatiens capensis*), Linear-leaf willow-herb (*Epilobium leptophyllum*), and Smooth goldenrod (*Solidago gigantea*). This wetland area is a ravine with steep slopes on both sides of the creek channel where several seeps are present that contribute to the flowing water in the creek. Areas within the creek bed that are upstream from where seeps daylight into the ravine are dry with upland plants occurring. There was no flowing water present in the creek bed above the seep discharge areas which can have water flowing in it after heavy rain events and during spring snowmelt. The general topography surrounding much of Wetland A rises up abruptly from the wetland edge to where upland occurs. Where seeps are located there is typically sloughing of the soil and a vertical cut in the side slope. Above the vertical cut soils are dry and sandy and below soils are saturated at the surface and consist of mucky sand.



Photo of Part of Wetland A, seep to the right

Wetland plant species documented at the wetland sample point along the Wetland A transect include: Black ash (*Fraxinus nigra*), Cottonwood (*Populus deltoides*), Common scouring-rush

(*Equisetum hyemale*), Jewel-weed (*Impatiens capensis*), Linear-leaf willow-herb (*Epilobium leptophyllum*), and Smooth goldenrod (*Solidago gigantea*). Upland plant species documented at the upland sample point along the Wetland A transect include: Sugar maple (*Acer saccharum*), White oak (*Quercus alba*), Blue beech (*Carpinus caroliniana*), Peduncled sedge (*Carex pedunculata*), Wild ginger (*Asarum canadense*), Zig-zag goldenrod (*Solidago flexicaulis*), and Maidenhair-fern (*Adiantum pedatum*).

The soil sample documented at the wetland sample point for Wetland A was comprised mainly of mucky sand from 0-4" with a color of 10YR 2/1 and sand from 5-23" with no redox concentrations. The soil in the upland pit was primarily sandy loam with a color of 10YR 2/2 from 0-8", sand with a color of 10YR 4/4 from 9-18", and sand with a color of 5YR 4/4 from 19-23".



Photo of Creek Bed within Wetland A

Wetland A had saturated soils present at the surface, standing water in the pit at a depth of 10", and surface water in the creek channel that ranged in depth from two to five inches deep. A strong hydrogen sulfide odor was also present in the upper soil horizon within the seep areas.

Wetland B

Wetland B is located in the central part of the property, just west of the railroad tracks and consists of a ravine/creek system with several seeps located along its hillsides (**Figure 7**). Wetland B is dominated by Black ash (*Fraxinus nigra*), Common elder (*Sambucus canadensis*), Jewel-weed (*Impatiens capensis*), and Clearweed (*Pilea pumila*). This wetland area is a ravine with steep slopes on both sides of the creek channel where several seeps are present that contribute to the flowing water in the creek. Areas within the creek bed upstream from where seeps daylight into the ravine are dry with upland plants occurring. No flowing water is present in the creek bed above the seep discharge areas which typically can have water flowing in it after heavy rain events and during spring snow melt. The general topography surrounding Wetland B rises up abruptly from the wetland edge to where upland occurs. Where seeps are located there is typically sloughing of the soil and a vertical cut in the side slope. Above the vertical cut soils are dry and sandy and below soils are saturated at the surface and sandy with distinct redox concentrations.



Photo of Part of Wetland B, seep in the mid-ground with vertical cut of side slope

Wetland plant species documented at the wetland sample point along the Wetland B transect include: Black ash (*Fraxinus nigra*), Common elder (*Sambucus canadensis*), Jewel-weed

(*Impatiens capensis*), and Clearweed (*Pilea pumila*). Upland plant species documented at the upland sample point along the Wetland B transect include: Basswood (*Tilia americana*), Sugar maple (*Acer saccharum*), Red oak (*Quercus rubra*), Prickly ash (*Zanthoxylum americanum*), Large leaved aster (*Eurybia macrophylla*), Penn's sedge (*Carex penslyvanica*), White snakeroot (*Eupatorium rugosum*), and Zig-zag goldenrod (*Solidago flexicaulis*).

The soil sample documented at the wetland sample point for Wetland B was comprised mainly of sand from 0-4" with a color of 10YR 2/1, sand from 5-16" with distinct redox concentrations with a color of 2.5YR 4/6, and fine sand from 17-26" with no redox concentrations. The soil in the upland pit was sand with a color of 10YR 2/2 from 0-20" and from 21-24" was sand with a color of 10YR 2/2 with distinct redox concentrations that had a color of 2.5YR 4/6.



Photo of Creek Bed within Wetland B

Wetland B had saturated soils present at the surface, standing water in the pit at a depth of 6", and surface water in the creek channel that ranged in depth from two to five inches deep. A strong hydrogen sulfide odor was also present in the upper soil horizon within the seep areas.

Wetland C

Wetland C is located in the northern part of the property, just west of the railroad tracks and consists of a ravine/creek system with several seeps located along its hillsides (**Figure 8**). Wetland C is dominated by Yellow birch (*Betula alleghaniensis*), Jewel-weed (*Impatiens capensis*), and True forget-me-not (*Myosotis scorpioides*). This wetland area is a ravine with steep slopes on both sides of a creek channel where several seeps are present that contribute to the flowing water in the creek. This ravine/creek system continues off-site to the north where the creek channel begins approximately 200-300' upstream. This creek begins off-site within a large gorge that consists of rock outcroppings which vary in height from approximately 10-30'. Above the off-site gorge area the creek channel is dry with no seeps located along the hillsides of the ravine. This ravine extends to the north and west where it occurs again within the Zavoral property. The northwestern limits of this ravine on the Zavoral property was not delineated as wetland due to a lack of hydrology, hydric soils and hydrophytic vegetation. The general topography surrounding Wetland C rises up abruptly from the wetland edge to where upland occurs.



Photo of Part of Wetland C, True Forget-Me-Not in the foreground within seep area

Wetland plant species documented at the wetland sample point along the Wetland C transect include: Yellow birch (*Betula alleghaniensis*), Jewel-weed (*Impatiens capensis*), and True forget-me-not (*Myosotis scorpioides*). Upland plant species documented at the upland sample point along the Wetland C transect include: White pine (*Pinus strobus*), Sugar maple (*Acer saccharum*), Yellow birch (*Betula alleghaniensis*), Maidenhair-fern (*Adiantum pedatum*), Wild ginger (*Asarum canadense*), Penn's sedge (*Carex penslyvanica*), Round-lobed hepatica (*Hepatica americana*), and Zig-zag goldenrod (*Solidago flexicaulis*).

The soil sample documented at the wetland sample point for Wetland C was comprised mainly of mucky sand with gravel from 0-3" with a color of 10YR 2/1 and mucky sand with gravel from 4-24" with prominent redox concentrations with a color of 10YR 5/4. The soil in the upland pit was sand with a color of 10YR 3/1 from 0-4", sand with a color of 10YR 2/2 from 5-12", and from 13-21" was sand with a color of 10YR 4/6.



Photo of Part of Wetland C, creek channel in center and rock outcropping in center background

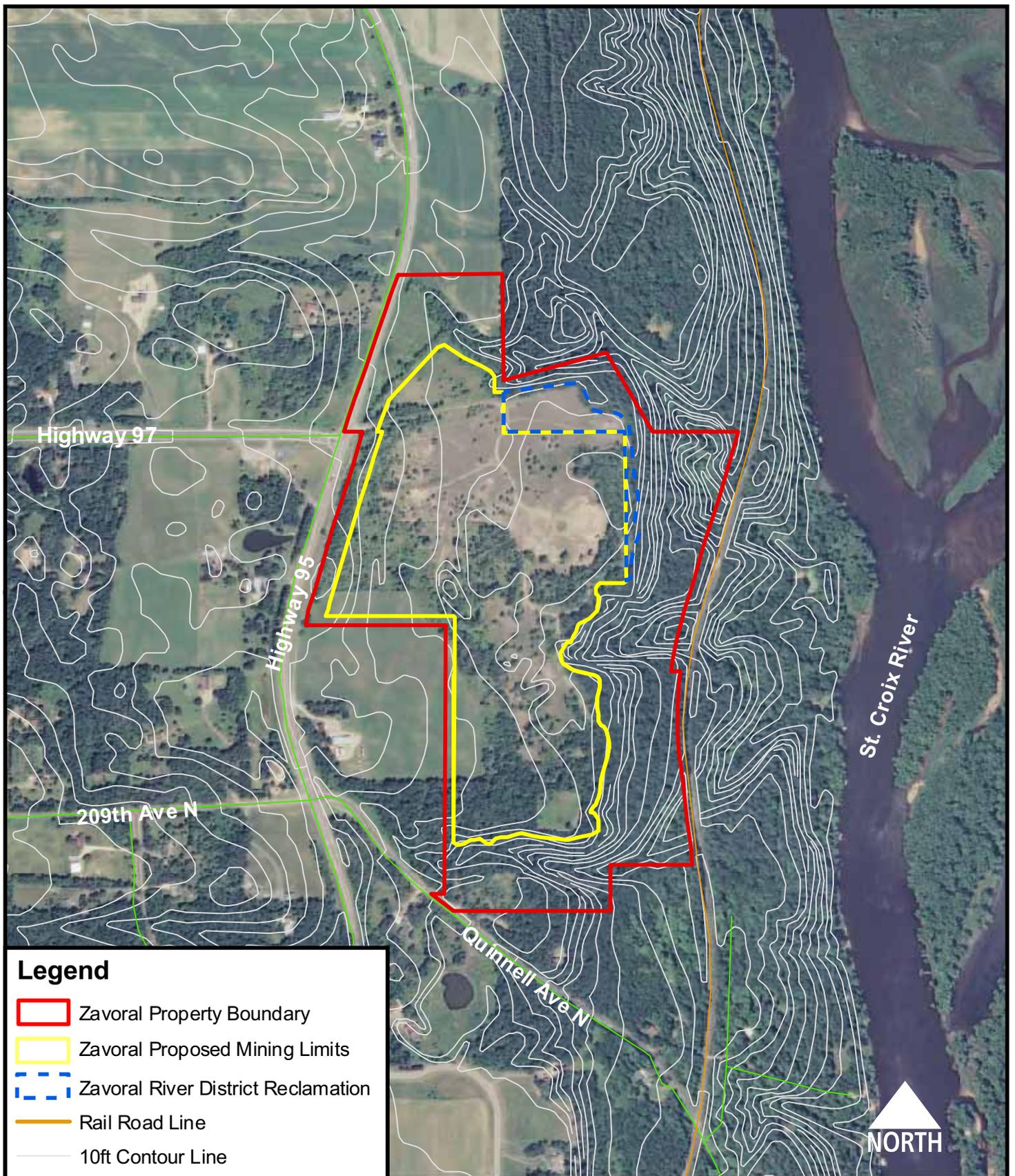
Wetland C had saturated soils present at the surface, no standing water in the pit, and surface water in the creek channel that ranged in depth from two to five inches deep. A strong hydrogen sulfide odor was also present in the upper soil horizon.

V. SUMMARY

CCES conducted a routine wetland delineation of the Zavoral site which is located off of State Highway 95 in Sections 18 & 19 of Township 32 North, Range 19 West, Scandia, Washington County, Minnesota. The site covers 114 acres.

The National Wetlands Inventory Map indicates one wetland within the subject property. The Soil Survey of Washington County, Minnesota indicates the area within and surrounding the delineated wetland boundaries as being comprised of Emmert gravelly loamy coarse sand, 15-25% slopes and Mahtomedi variant-rock outcrop complex, 25-65% slope which were typical from the upland soil pits taken in the ravine areas where the delineated wetlands were located. The DNR Protected Waters Map did not indicate any protected water under DNR jurisdiction within the subject property.

The boundaries of three wetlands were located within the subject property. These wetlands were delineated using methods and criteria that follow the U.S. Army Corps of Engineers (COE) Wetlands Delineation Manual (1987) and the Regional Supplement to the COE Wetland Delineation Manual: Northcentral and Northeast Region. The boundaries of the wetlands were flagged by CCES staff and were then located with one-meter accuracy GPS instrumentation.



0 287.5 575 1,150 1,725 2,300 Feet

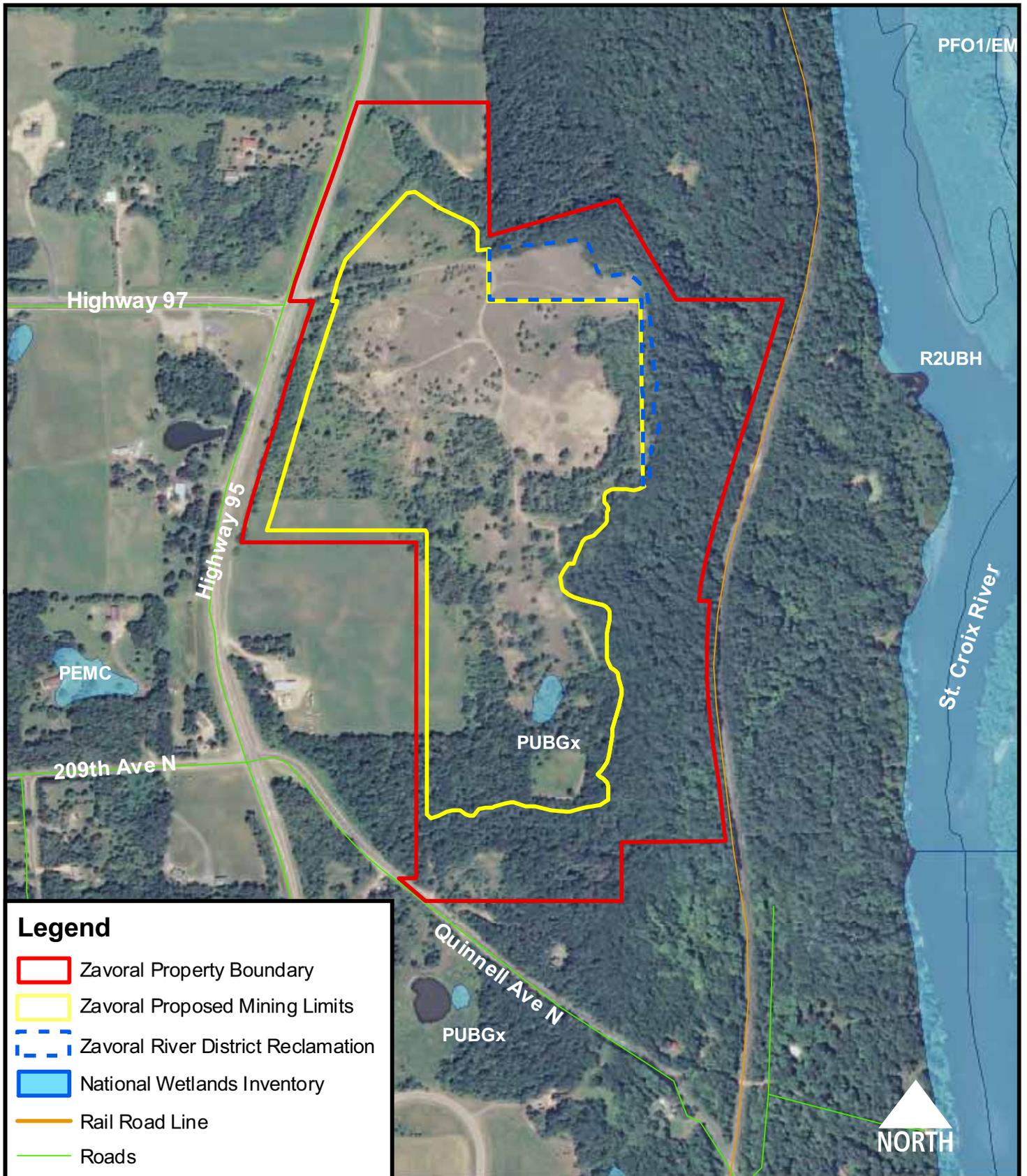
Aerial Photo Source: 2008 FSA Color Aerial Photograph

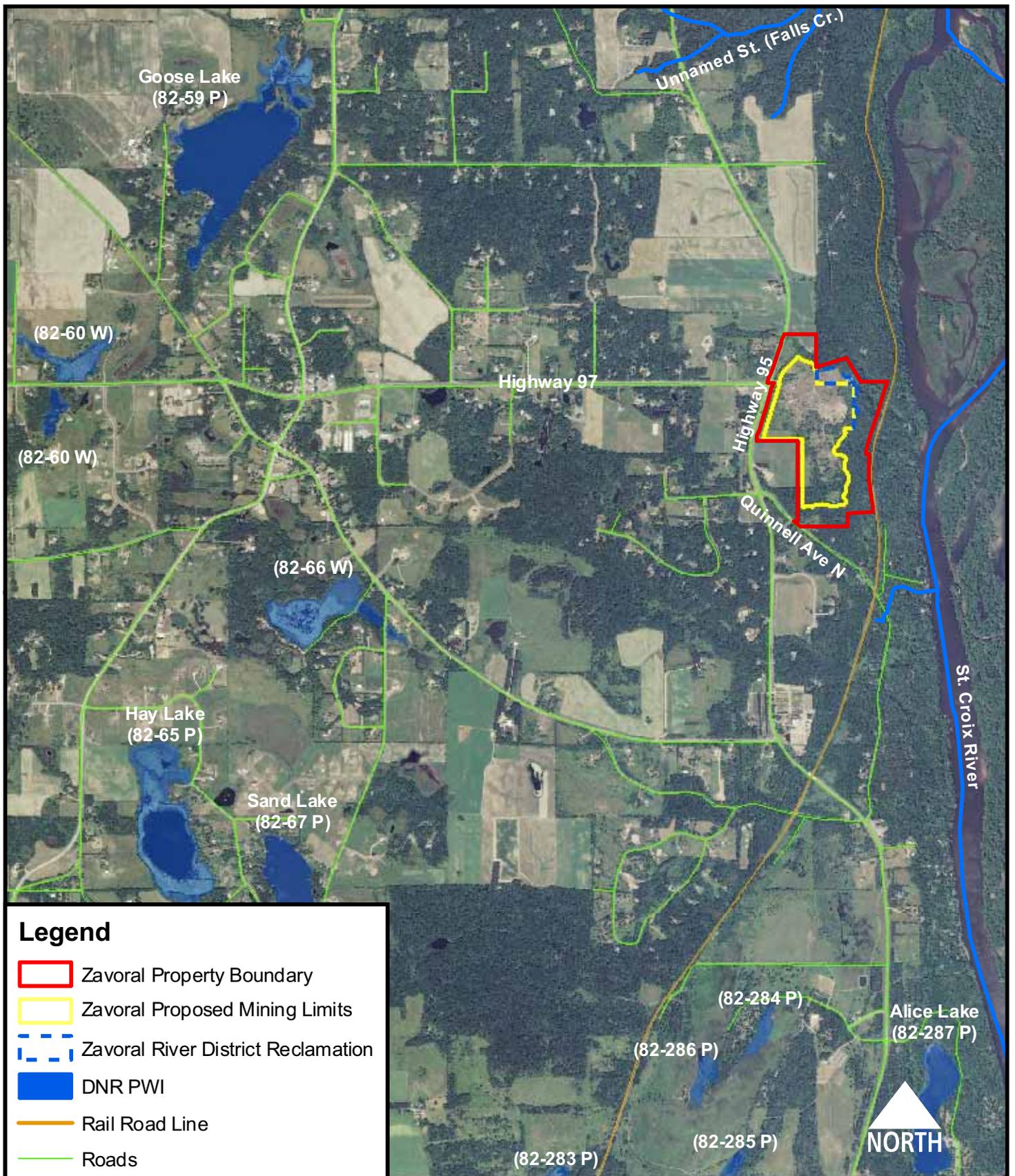


Critical Connections
Ecological Services, Inc.

Zavoral Property Site Location Map

Figure 1





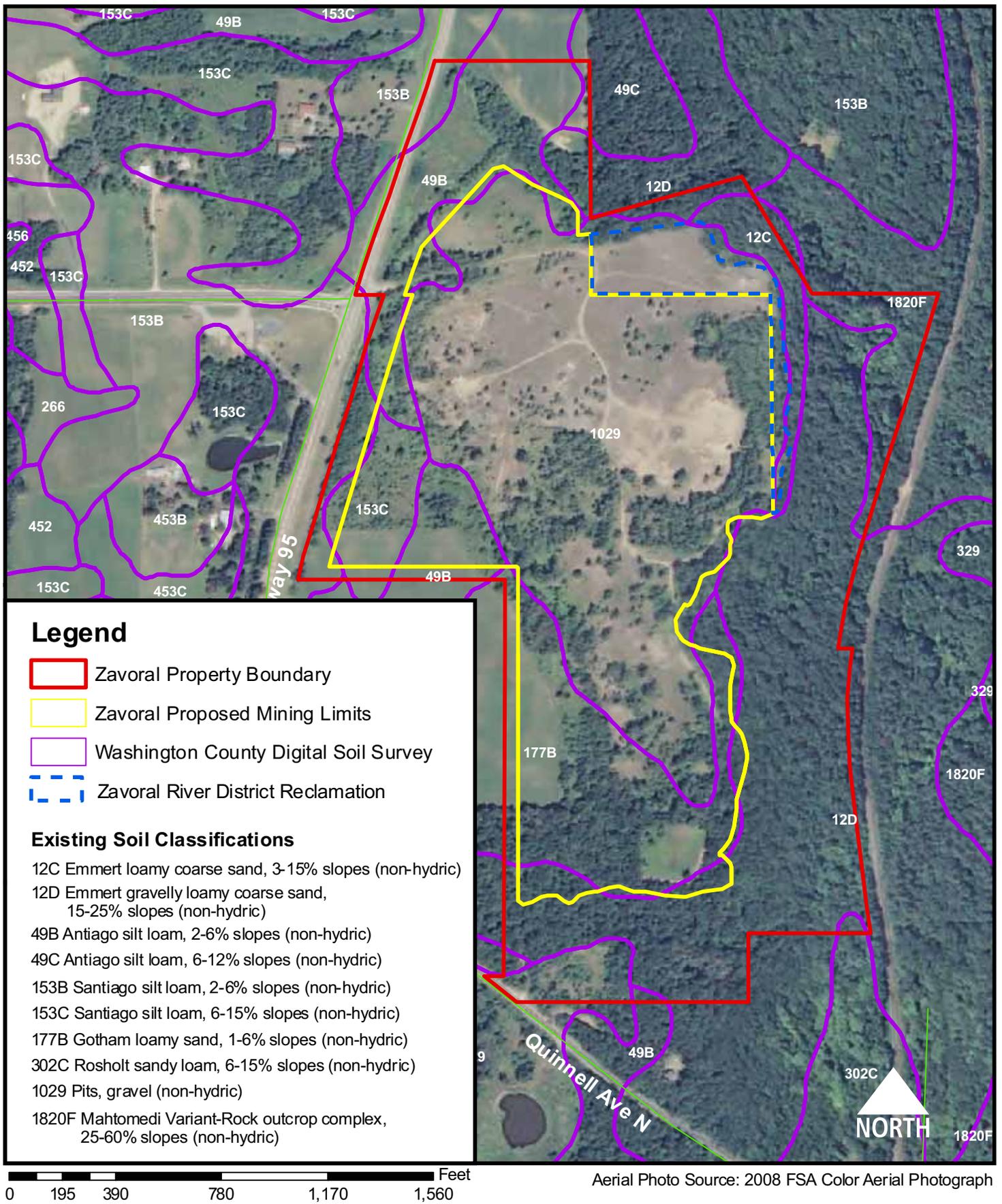
Aerial Photo Source: 2008 FSA Color Aerial Photograph

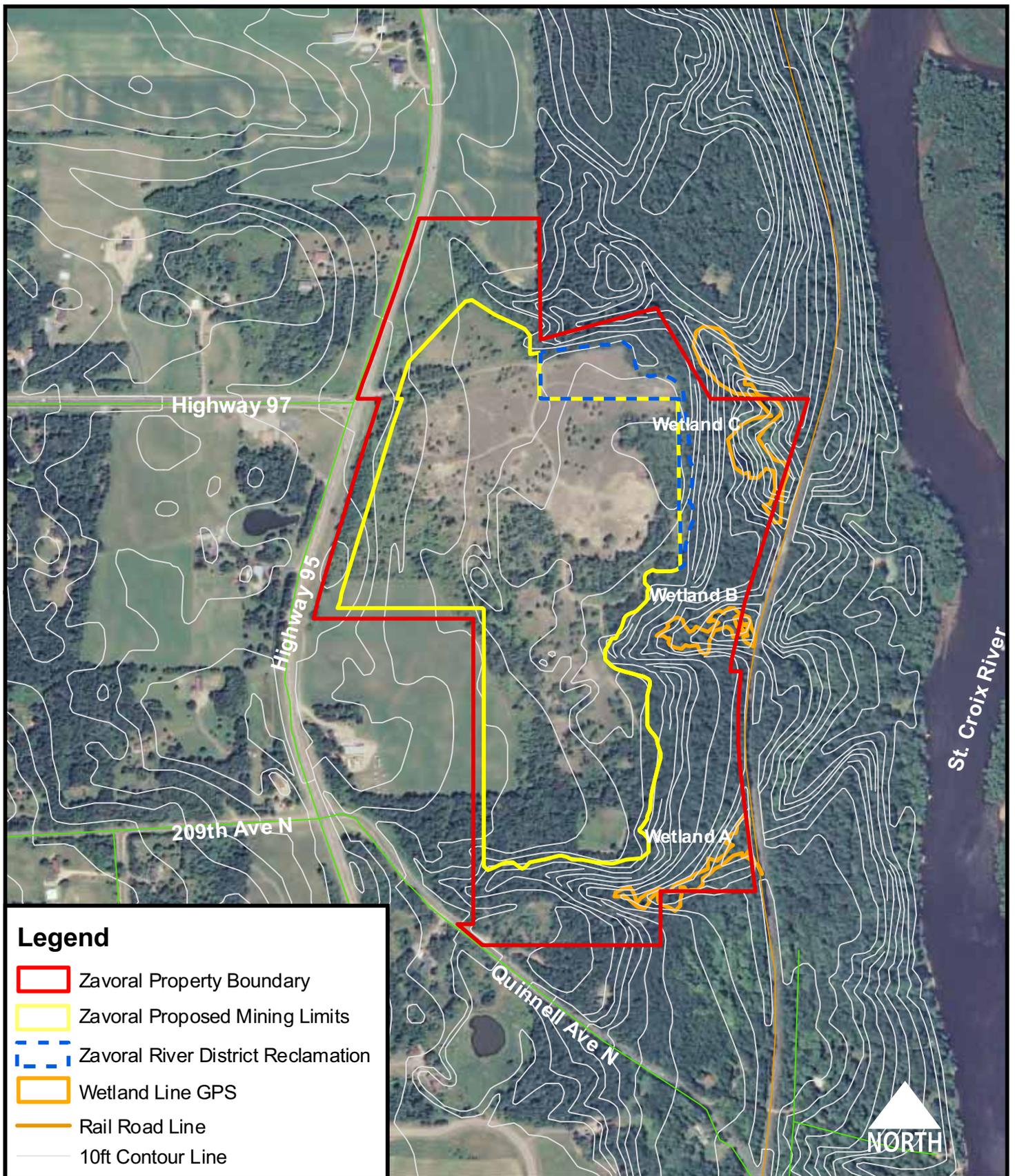


Critical Connections
Ecological Services, Inc.

Zavoral Property DNR PWI Map

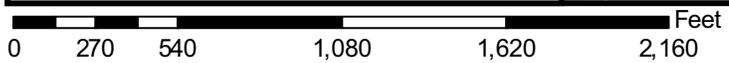
Figure 3





Legend

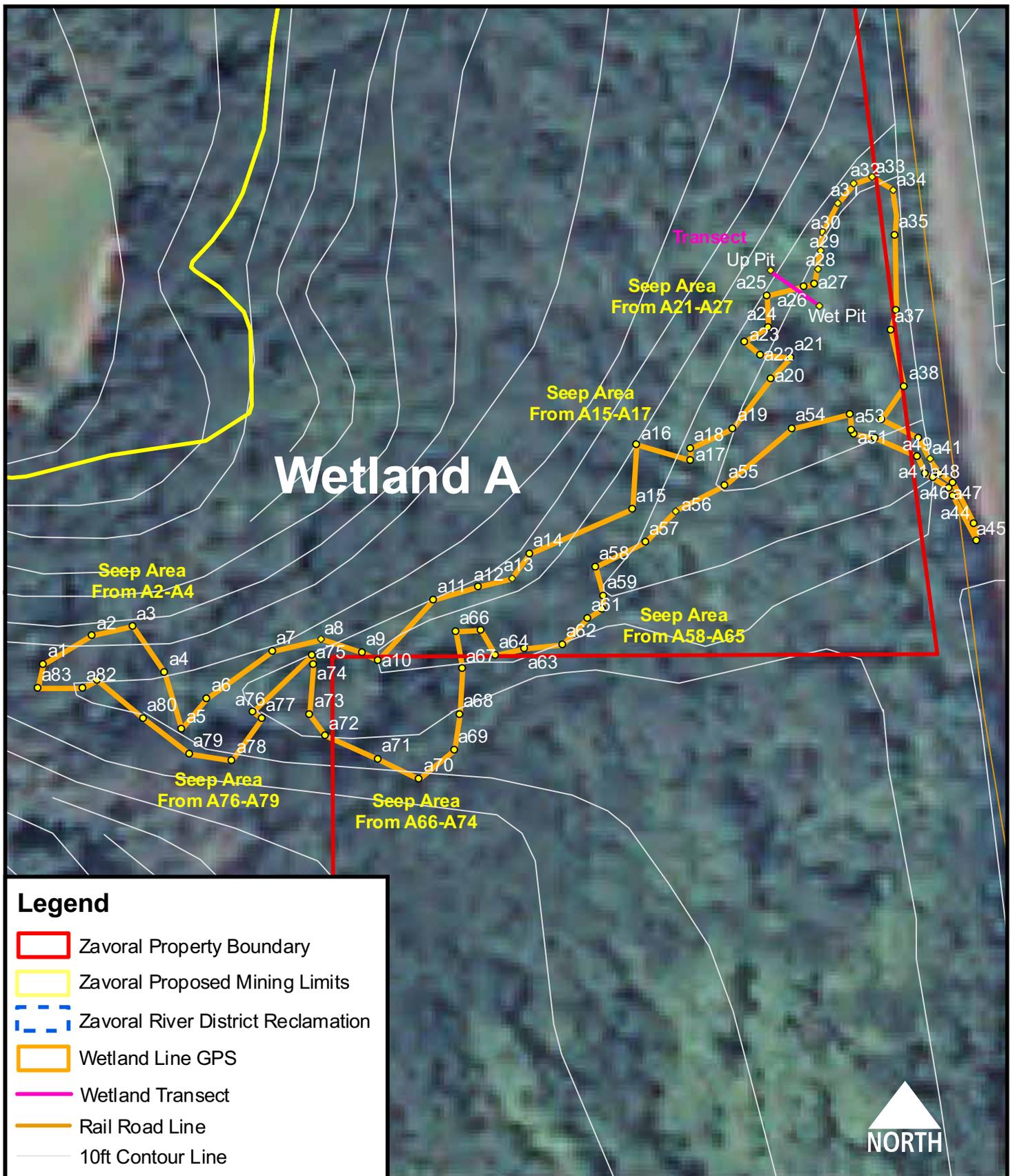
- Zavoral Property Boundary
- Zavoral Proposed Mining Limits
- Zavoral River District Reclamation
- Wetland Line GPS
- Rail Road Line
- 10ft Contour Line

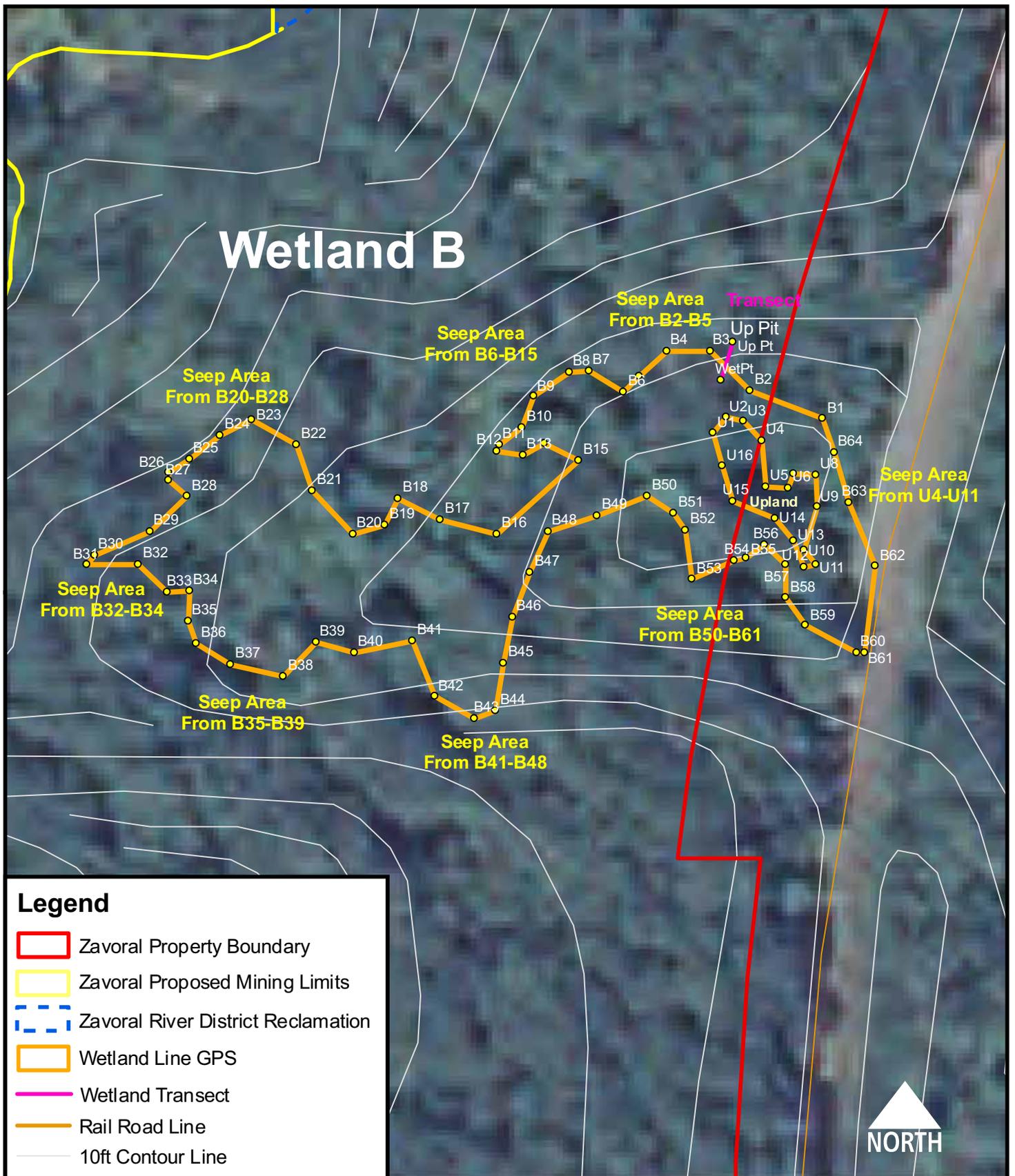


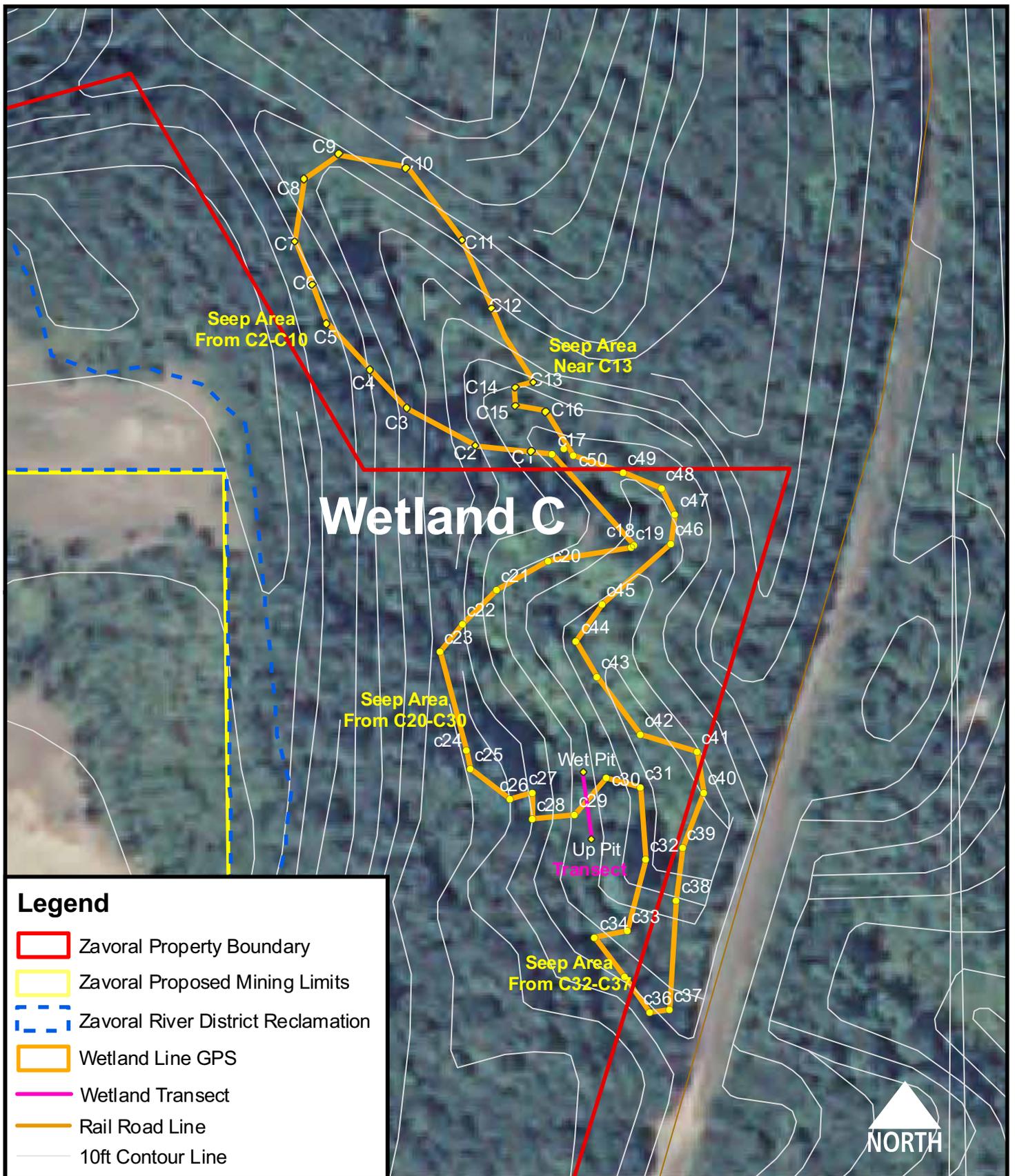
Aerial Photo Source: 2008 FSA Color Aerial Photograph



Zavoral Property Site Wetlands Map
Figure 5







WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: **Zavoral Site** City/County: **Washington** Sampling Date: **10-12-10**
 Applicant/Owner: **Tiller Corporation** State: **MN** Sampling Point: **Wetland A Wetland Pit**
 Investigator(s): **Ken Arndt** Section, Township, Range: **19; 32; 19**
 Landform (hillslope, terrace, etc.): **steep slopes** Local relief (concave, convex, none): **concave**
 Slope (%): **15-25%** Northing: **518460.304** Easting: **5010843.480** Datum: **UTMNAD 83 Zone 15N**
 Soil Map Unit Name: **Emmert gravelly loamy coarse sand** NWI classification: **(Not Mapped) classified as PFOB**
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain)
 Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? **No** Are "Normal Circumstances" present? **Yes**
 Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? **No** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, optional Wetland Site ID: Wetland A
Remarks:	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30')				
<i>Fraxinus nigra</i>	50	Y	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u> 4 </u> (A) Total Number of Dominant Species Across All Strata: <u> 4 </u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u> 100% </u> (A/B)
<i>Populus deltoides</i>	15	Y	FAC	
				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
65% = Total Cover				
Sapling/Shrub Stratum (Plot size: 15')				
				Hydrophytic Vegetation Indicators: ___ Rapid Test for Hydrophytic Vegetation <u> x </u> Dominance Test is >50% ___ Prevalence Index is ≤ 3.0* ___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation* (Explain)
0% = Total Cover				
Herb Stratum (Plot size: 5')				
<i>Impatiens capensis</i>	40	Y	FACW	*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<i>Equisetum hyemale</i>	25	Y	FACW	
<i>Epilobium leptophyllum</i>	15	N	OBL	
<i>Solidago gigantea</i>	15	N	FACW	
<i>Eupatorium maculatum</i>	5	N	OBL	
100% = Total Cover				
Woody Vine Stratum (Plot size: 30')				
= Total Cover				

SOIL

Sampling Point: **Wetland A Wetland Pit**

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

Depth	Matrix Color		Redox Concentrations				Soil Texture
	Color	%	Color	%	Contrast	Type* / Loc**	
0-4	10YR 2/1	100					Mucky sand
5-23+	5YR 4/6	100					Sand

Remarks:

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

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 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)

Indicators for Problematic Hydric Soils*:

- 2 cm Muck (A10)
- Coast Prairie Redox (A16)
- 5 cm Mucky Peat or Peat (S3)
- Dark Surface (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Iron-Manganese Masses (F12)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: **Bedrock**
Depth (inches):

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators

(minimum of two required)

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)
- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches): **2-5"**
 Water Table Present? Yes No Depth (inches): **10"**
 Saturation Present? Yes No Depth (inches): **at surface**
(includes capillary fringe)

Wetland Hydrology Present?

Yes No

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

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: **Zavoral Site** City/County: **Washington** Sampling Date: **10-12-10**
 Applicant/Owner: **Tiller Corporation** State: **MN** Sampling Point: **Wetland A Upland Pit**
 Investigator(s): **Ken Arndt** Section, Township, Range: **19; 32; 19**
 Landform (hillslope, terrace, etc.): **steep slopes** Local relief (concave, convex, none): **concave**
 Slope (%): **15-25%** Northing: **518457.806** Easting: **5010840.700** Datum: **UTMNAD 83 Zone 15N**
 Soil Map Unit Name: **Emmert gravelly loamy coarse sand** NWI classification: **(Not Mapped)**

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain)
 Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? **No** Are "Normal Circumstances" present? **Yes**
 Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? **No** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ___ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes ___ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes ___ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes ___ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID:
Remarks:	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30')				
15% = Total Cover				
65% = Total Cover				
60% = Total Cover				
= Total Cover				

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 7 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 28.5% (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column Totals: _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 ___ Rapid Test for Hydrophytic Vegetation
 ___ Dominance Test is >50%
 ___ Prevalence Index is ≤ 3.0*
 ___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation* (Explain)

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

Hydrophytic Vegetation Present? Yes ___ No

Hydrophytic Vegetation Present? Yes ___ No

SOIL

Sampling Point: **Wetland A Upland Pit**

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

Depth	Matrix Color		Redox Concentrations				Soil Texture
	Color	%	Color	%	Contrast	Type* / Loc**	
0-8	10YR 2/2	100					Sandy loam
9-18	10YR 4/4	100					Sand
19-23+	5YR 4/4	100					Sand

Remarks:

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

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 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)

Indicators for Problematic Hydric Soils*:

- 2 cm Muck (A10)
- Coast Prairie Redox (A16)
- 5 cm Mucky Peat or Peat (S3)
- Dark Surface (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Iron-Manganese Masses (F12)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: **Bedrock**
Depth (inches):

Hydric Soil Present? Yes ___ No **x**___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators

(minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches):
 Water Table Present? Yes ___ No ___ Depth (inches):
 Saturation Present? Yes ___ No ___ Depth (inches):
 (includes capillary fringe)

Wetland Hydrology Present?

Yes ___ No **x**___

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

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: **Zavoral Site** City/County: **Washington** Sampling Date: **10-13-10**
 Applicant/Owner: **Tiller Corporation** State: **MN** Sampling Point: **Wetland B Wetland Pit**
 Investigator(s): **Ken Arndt** Section, Township, Range: **19; 32; 19**
 Landform (hillslope, terrace, etc.): **steep slopes** Local relief (concave, convex, none): **concave**
 Slope (%): **15-25%** Northing: **518459.751** Easting: **5011166.050** Datum: **UTMNAD 83 Zone 15N**
 Soil Map Unit Name: **Emmert gravelly loamy coarse sand** NWI classification: **(Not Mapped) classified as PFOB**
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain)
 Are Vegetation , Soil , or Hydrology significantly disturbed? **No** Are "Normal Circumstances" present? **Yes**
 Are Vegetation , Soil , or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, optional Wetland Site ID: Wetland B
Remarks:	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30')				
<i>Fraxinus nigra</i>	30	Y	FACW	
30% = Total Cover				
Sapling/Shrub Stratum (Plot size: 15')				
<i>Sambucus canadensis</i>	10	Y	FACW	
10% = Total Cover				
Herb Stratum (Plot size: 5')				
<i>Impatiens capensis</i>	60	Y	FACW	
<i>Pilea pumila</i>	30	Y	FACW	
90% = Total Cover				
Woody Vine Stratum (Plot size: 30')				
= Total Cover				

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column Totals: _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 Rapid Test for Hydrophytic Vegetation
 Dominance Test is >50%
 Prevalence Index is ≤ 3.0*
 Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation* (Explain)

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

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: **Wetland B Wetland Pit**

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

Depth	Matrix Color		Redox Concentrations				Soil Texture
	Color	%	Color	%	Contrast	Type* / Loc**	
0-4	10YR 2/1	100					Sand
5-16	10YR 4/1	90	2.5YR 4/6	10	distinct	C/M	Sand
17-26+	10YR 4/3	100					Fine sand

Remarks:

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

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 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)

Indicators for Problematic Hydric Soils*:

- 2 cm Muck (A10)
- Coast Prairie Redox (A16)
- 5 cm Mucky Peat or Peat (S3)
- Dark Surface (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Iron-Manganese Masses (F12)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: **Bedrock**
Depth (inches):

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches): **2-5"**
 Water Table Present? Yes No Depth (inches): **6"**
 Saturation Present? Yes No Depth (inches): **at surface**
(includes capillary fringe)

Wetland Hydrology Present?

Yes No

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

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: **Zavoral Site** City/County: **Washington** Sampling Date: **10-13-10**
 Applicant/Owner: **Tiller Corporation** State: **MN** Sampling Point: **Wetland B Upland Pit**
 Investigator(s): **Ken Arndt** Section, Township, Range: **19; 32; 19**
 Landform (hillslope, terrace, etc.): **steep slopes** Local relief (concave, convex, none): **concave**
 Slope (%): **15-25%** Northing: **518462.052** Easting: **5011173.035** Datum: **UTMNAD 83 Zone 15N**
 Soil Map Unit Name: **Emmert gravelly loamy coarse sand** NWI classification: **(Not Mapped)**
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain)
 Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? **No** Are "Normal Circumstances" present? **Yes**
 Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? **No** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ___ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes ___ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes ___ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes ___ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID:
Remarks:	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30')				
<i>Tilia americana</i>	30	Y	FACU	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u> 0 </u> (A) Total Number of Dominant Species Across All Strata: <u> 5 </u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u> 0% </u> (A/B)
<i>Acer saccharum</i>	20	Y	FACU	
<i>Quercus rubra</i>	10	N	FACU	
60% = Total Cover				
Sapling/Shrub Stratum (Plot size: 15')				
<i>Zanthoxylum americanum</i>	15	Y	UPL	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
15% = Total Cover				
Herb Stratum (Plot size: 5')				
<i>Eurybia macrophylla</i>	30	Y	UPL	Hydrophytic Vegetation Indicators: ___ Rapid Test for Hydrophytic Vegetation ___ Dominance Test is >50% ___ Prevalence Index is ≤ 3.0* ___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation* (Explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<i>Carex pensylvanica</i>	25	Y	UPL	
<i>Eupatorium rugosum</i>	15	N	UPL	
<i>Solidago flexicaulis</i>	15	N	FACU	
85% = Total Cover				
Woody Vine Stratum (Plot size: 30')				
				Hydrophytic Vegetation Present? Yes ___ No <input checked="" type="checkbox"/>
= Total Cover				

SOIL

Sampling Point: **Wetland B Upland Pit**

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

Depth	Matrix Color		Redox Concentrations				Soil Texture
	Color	%	Color	%	Contrast	Type* / Loc**	
0-20	10YR 2/2	100					Sand
21-24+	10YR 2/2	95	2.5YR 4/6	5	Distinct	C/M	Sand

Remarks:

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

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 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)

Indicators for Problematic Hydric Soils*:

- 2 cm Muck (A10)
- Coast Prairie Redox (A16)
- 5 cm Mucky Peat or Peat (S3)
- Dark Surface (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Iron-Manganese Masses (F12)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: **Bedrock**
Depth (inches):

Hydric Soil Present? Yes ___ No **x**___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators

(minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches):
Water Table Present? Yes ___ No ___ Depth (inches):
Saturation Present? Yes ___ No ___ Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present?

Yes ___ No **x**___

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

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: **Zavoral Site** City/County: **Washington** Sampling Date: **10-14-10**
 Applicant/Owner: **Tiller Corporation** State: **MN** Sampling Point: **Wetland C Wetland Pit**
 Investigator(s): **Ken Arndt** Section, Township, Range: **18; 32; 19**
 Landform (hillslope, terrace, etc.): **steep slopes** Local relief (concave, convex, none): **concave**
 Slope (%): **15-25%** Northing: **518504.019** Easting: **5011371.263** Datum: **UTMNAD 83 Zone 15N**
 Soil Map Unit Name: **Mahtomedi Variant-rock outcrop comp, 25-65% slopes** NWI classification: **(Not Mapped) classified as PEMB**

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain)
 Are Vegetation , Soil , or Hydrology significantly disturbed? **No** Are "Normal Circumstances" present? **Yes**
 Are Vegetation , Soil , or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, optional Wetland Site ID: Wetland C
Remarks:	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: 30')					
<i>Betula alleghaniensis</i>	10	Y	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u> 3 </u> (A) Total Number of Dominant Species Across All Strata: <u> 3 </u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u> 100% </u> (A/B)	
10% = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____	
Sapling/Shrub Stratum (Plot size: 15')					
10% = Total Cover					
Herb Stratum (Plot size: 5')					
<i>Impatiens capensis</i>	60	Y	FACW	Hydrophytic Vegetation Indicators: ___ Rapid Test for Hydrophytic Vegetation <u> x </u> Dominance Test is >50% ___ Prevalence Index is ≤ 3.0* ___ Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation* (Explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
<i>Myosotis scorpioides</i>	40	Y	OBL		
100% = Total Cover					
Woody Vine Stratum (Plot size: 30')					
= Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

SOIL

Sampling Point: **Wetland C Wetland Pit**

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

Depth	Matrix Color		Redox Concentrations				Soil Texture
	Color	%	Color	%	Contrast	Type* / Loc**	
0-3	10YR 2/1	100					Mucky sand w/gravel
4-24+	10YR 5/2	90	10YR 5/4	10	prominent	C/M	Mucky sand w/gravel

Remarks:

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

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 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)

Indicators for Problematic Hydric Soils*:

- 2 cm Muck (A10)
- Coast Prairie Redox (A16)
- 5 cm Mucky Peat or Peat (S3)
- Dark Surface (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Iron-Manganese Masses (F12)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: **Bedrock**
Depth (inches):

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators

(minimum of two required)

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)
- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches): **2-5"**
 Water Table Present? Yes No Depth (inches):
 Saturation Present? Yes No Depth (inches): **at surface**
 (includes capillary fringe)

Wetland Hydrology Present?

Yes No

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

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: **Zavoral Site** City/County: **Washington** Sampling Date: **10-14-10**
 Applicant/Owner: **Tiller Corporation** State: **MN** Sampling Point: **Wetland C Upland Pit**
 Investigator(s): **Ken Arndt** Section, Township, Range: **18; 32; 19**
 Landform (hillslope, terrace, etc.): **steep slopes** Local relief (concave, convex, none): **concave**
 Slope (%): **25-65%** Northing: **518516.918** Easting: **5011354.810** Datum: **UTMNAD 83 Zone 15N**
 Soil Map Unit Name: **Mahtomedi Variant-rock outcrop comp, 25-65% slopes** NWI classification: **(Not Mapped)**
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain)
 Are Vegetation , Soil , or Hydrology significantly disturbed? **No** Are "Normal Circumstances" present? **Yes**
 Are Vegetation , Soil , or Hydrology naturally problematic? **No** (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID:
Remarks:	

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30')				
<i>Pinus strobus</i>	40	Y	FACU	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> 4 </u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u> 25% </u> (A/B)
<i>Acer saccharum</i>	25	Y	FACU	
<i>Betula alleghaniensis</i>	15	N	FAC	
80% = Total Cover				
Sapling/Shrub Stratum (Plot size: 15')				
				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
0% = Total Cover				
Herb Stratum (Plot size: 5')				
<i>Adiantum pedatum</i>	30	Y	FAC	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤ 3.0* <input type="checkbox"/> Morphological Adaptations* (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation* (Explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<i>Asarum canadense</i>	15	Y	UPL	
<i>Solidago flexicaulis</i>	10	N	FACU	
<i>Carex pensylvanica</i>	10	N	UPL	
<i>Hepatica americana</i>	5	N	UPL	
70% = Total Cover				
Woody Vine Stratum (Plot size: 30')				
				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
= Total Cover				

SOIL

Sampling Point: **Wetland C Upland Pit**

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

Depth	Matrix Color		Redox Concentrations				Soil Texture
	Color	%	Color	%	Contrast	Type* / Loc**	
0-4	10YR 3/1	100					Sand
5-12	10YR 2/2	100					Sand
13-23+	10YR 4/6	100					Sand

Remarks:

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

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 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)

Indicators for Problematic Hydric Soils*:

- 2 cm Muck (A10)
- Coast Prairie Redox (A16)
- 5 cm Mucky Peat or Peat (S3)
- Dark Surface (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Iron-Manganese Masses (F12)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: **Bedrock**
Depth (inches):

Hydric Soil Present? Yes ___ No **x**___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators

(minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches):
 Water Table Present? Yes ___ No ___ Depth (inches):
 Saturation Present? Yes ___ No ___ Depth (inches):
 (includes capillary fringe)

Wetland Hydrology Present?

Yes ___ No **x**___

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