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# WETLAND DELINEATION TECHNICAL MEMORANDUM

TO: Dan Ringstad, New Market Bank Sr. Vice President

FROM: Natalie White, SEH Biologist | Project Manager

DATE: May 31, 2016

RE: Wetland Delineation – Crystal Village Lot 3 Block 3  
SEH No. NEWMB 134676 14.00

This Technical Memorandum details the results of a site investigation for wetlands performed by Short Elliott Hendrickson Inc. (SEH®) at the Crystal Village housing development in Duluth, Minnesota on April 28, 2016. The parcel assessed was Lot 3, Block 3 of the Crystal Village housing development. The property is approximately 0.79 acres and borders Crystal Drive to the south and has forested uplands and residential property surrounding the remaining portion of the site (**Figure 1**). The site was investigated for areas meeting the technical criteria of a wetland following the 1987 U.S. Army Corps of Engineers *Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Northcentral and Northeast Region* (USACE 2012). The field investigation was completed by Kyle Hanson, CWD, SEH Biologist.

Topographic maps, the Natural Resources Conservation Service (NRCS) Web Soil Survey (**Figure 2**), the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (**Figure 3**), and the Minnesota Department of Natural Resources (MNDNR) Public Waters Inventory (PWI) (**Figure 4**) were reviewed prior to visiting the site to locate potential wetland habitats. One wetland was identified, mapped, and flagged in the field using pin flags and pink flagging tape within the area of investigation. **Table 1** summarizes the wetland characteristics and detailed field observations are also summarized below.

Table 1 Wetland Characteristics

Basin ID	Size <sup>1</sup>	Eggers & Reed Classification	Circular 39 Classification	Cowardin Classification
1	0.70	Hardwood Swamp	Type 7	PFO1B
<sup>1</sup> Size includes areas of wetland within the area of investigation only. Wetlands may extend beyond the limits of the area investigated and actual wetland size may be larger than indicated.				

The landscape of the site is relatively flat with wetland characteristics observed at the toe of slope to the adjacent upland areas on and outside of the property boundary. The area is approximately 89% wetland according to this assessment.

The NWI map indicates one wetland within the area of interest (**Figure 3**). The nearest PWI identified by the MNDNR is Chester Creek, located approximately 0.5 mile north of the area of interest. No PWI basins or watercourses are located on the site (**Figure 4**).

One wetland was identified on the site and is described below. The wetland extends out of the parcel to the east and west; only portions within the area of interest were delineated (**Figure 5**).

#### **Wetland 1: Hardwood Swamp**

Dominant vegetation observed in the Hardwood Swamp wetland consisted of black ash (*Fraxinus nigra* – FACW) and quaking aspen (*Populus tremuloides* – FAC) in the tree stratum, speckled alder (*Alnus incana* – FACW) and black ash (*Fraxinus nigra* – FACW) in the shrub/sapling stratum, and Canada bluejoint (*Calamagrotis canadensis* – OBL) in the herbaceous stratum.

Soils were comprised of 10 YR 2/1 mucky peat from 0-8 inches below ground surface. From 8-24 inches, soils consisted of 7.5 YR 4/2 very coarse sandy clay with 30% redoximorphic concentrations (5 YR 4/6) in the soil matrix. This soil description meets the criteria for hydric soil indicator A2 – Histic Epipedon and F3 – Depleted Matrix. Soils were saturated at the surface and a water table was present at eight (8) inches below the surface. Two primary indicators of wetland hydrology were observed: A2 – High Water Table and A3 - Saturation.

#### **Surrounding Upland Observations**

The surrounding upland areas were dominated by quaking aspen (*Populus tremuloides* – FAC) in the tree stratum, quaking aspen (*Populus tremuloides* – FAC) and paper birch (*Betula papyrifera* – FACU) in the shrub/sapling stratum and northern bracken fern (*Pteridium aquilinum* – FACU) in the herbaceous stratum. Upland soils are composed of 7.5 YR 2.5/3 fine sandy loam from 0-8 inches below the ground surface, and 7.5 YR 4/4 sandy clay loam from 8-18 inches below the ground surface. The hydrology indicator A3 – Saturation at eight (8) inches below the surface was observed. Despite the presence of soil saturation, this area did not meet hydrophytic vegetation or hydric soil indicators and is therefore classified as upland habitat.

#### **Supporting Maps, Data Sheets, and Representative Photographs**

Attached are maps (**Figures 1-5**) showing the delineated wetlands and resources reviewed prior to conducting the field delineation. Wetland Determination Data Forms, representative site photos of the area, and climate data are also attached.

This summary Technical Memorandum is provided to New Market Bank for your review and coordination with local, state, and federal wetland regulatory agencies as applicable.

If you have any questions regarding this wetland delineation please contact me directly at 218.279.3003 or [nwhite@sehinc.com](mailto:nwhite@sehinc.com).

NW/EJ

Attachments

c: Kyle Hanson, CWD – SEH

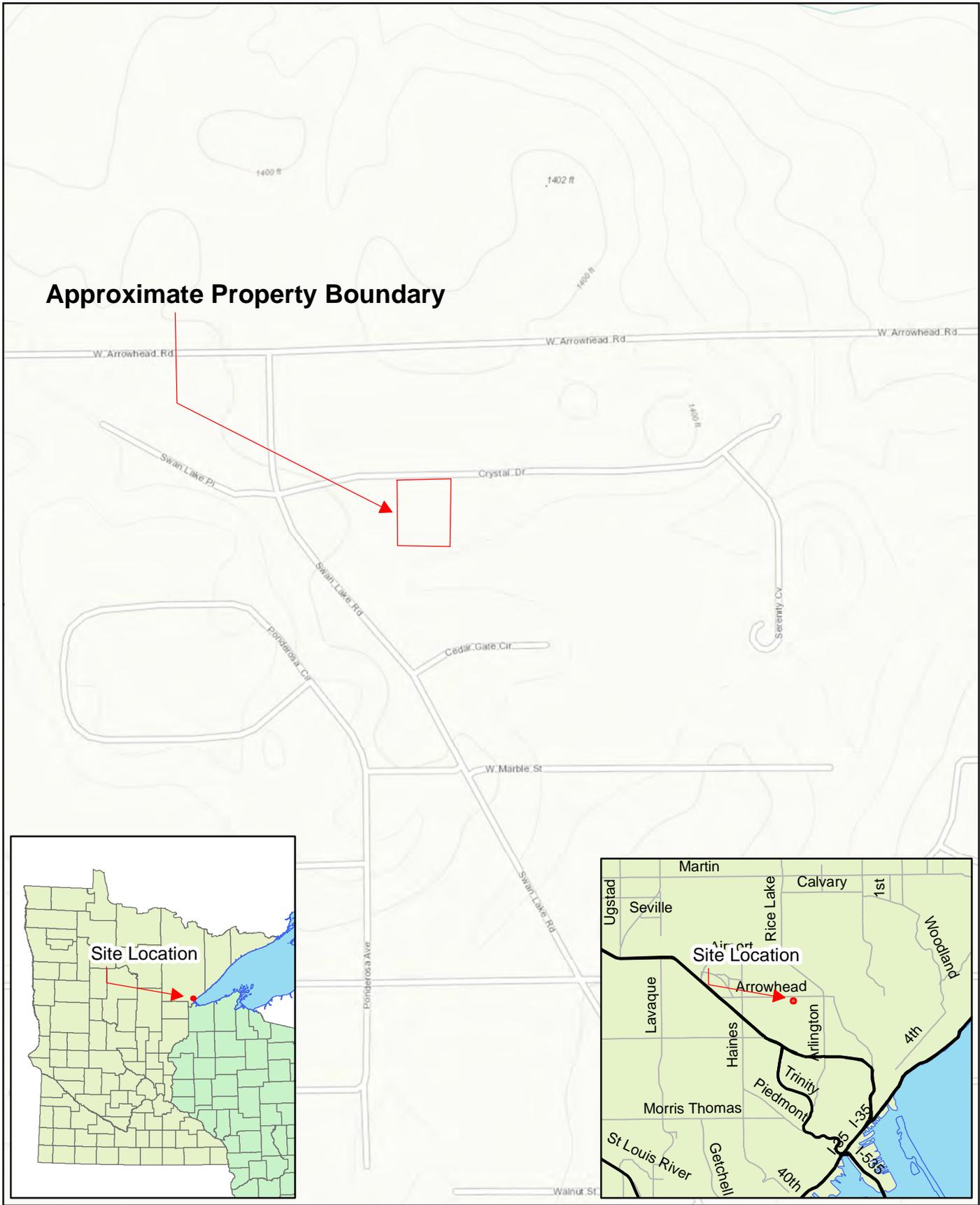
s:\ko\newmb\134676\3-env-stdy-regs\31-env-rpt\lot 3 block 3 south\draft crystal village south\_delineation memo.docx

Citations:

U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers: Wetlands Delineation Manual: Northcentral and Northeast Region. 152 pp. plus appendices.

Path: S:\KON\NE\WMB\134676\3-env-stdy-regs\31-env-rpt\Wetland Delineation\GIS\Site Location\_S.mxd



**Approximate Property Boundary**



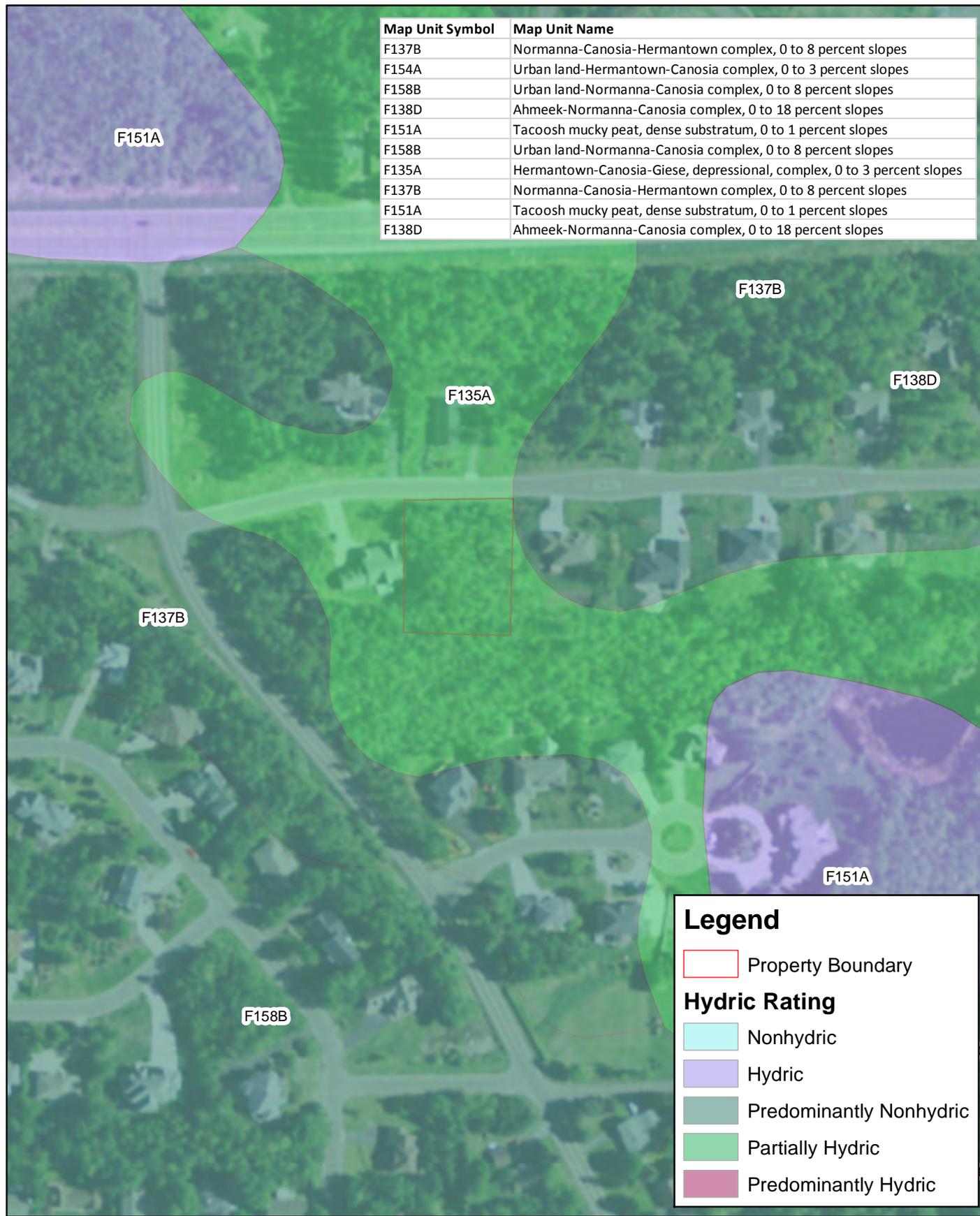
418 WEST SUPERIOR STREET, SUITE 200  
 DULUTH, MN 55802  
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 www.sehinc.com

Project: NEWMB 134676  
 Print Date: 4/29/2016  
 Map by: nwhite  
 Projection: NAD 83 UTM 15N  
 Source: SEH, USGS, MNDOT,  
 MNDNR, ESRI

**SITE LOCATION MAP**  
 Crystal Village Lot 3 Block 3  
 Duluth, Minnesota

**Figure**  
**1**

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



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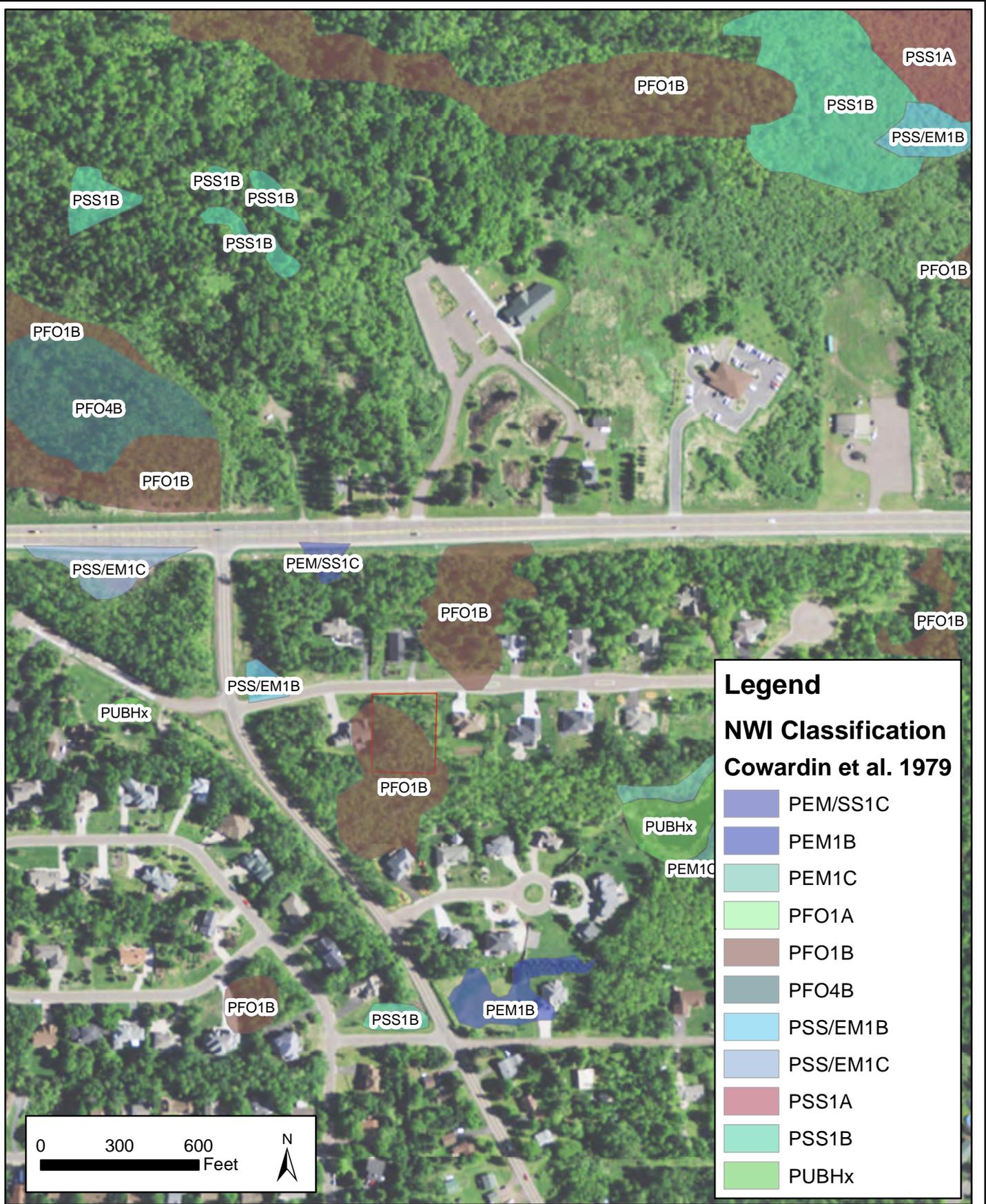
Project: NEWMB 134676  
 Print Date: 5/20/2016  
 Map by: nwhite  
 Projection: NAD 83 UTM 15N  
 Source: SEH, NRCS, ESRI

## NRCS SOILS MAP

Crystal Village Lot 3 Block 3  
 Duluth, St. Louis County, Minnesota

Figure  
2

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**NATIONAL WETLANDS INVENTORY**  
 Crystal Village Lot 3 Block 3  
 Duluth, St. Louis County, Minnesota

Figure  
 3

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**Legend**

- Property Boundary
- PWI Watercourses
- PWI Basins

0 0.375 0.75  
 Miles



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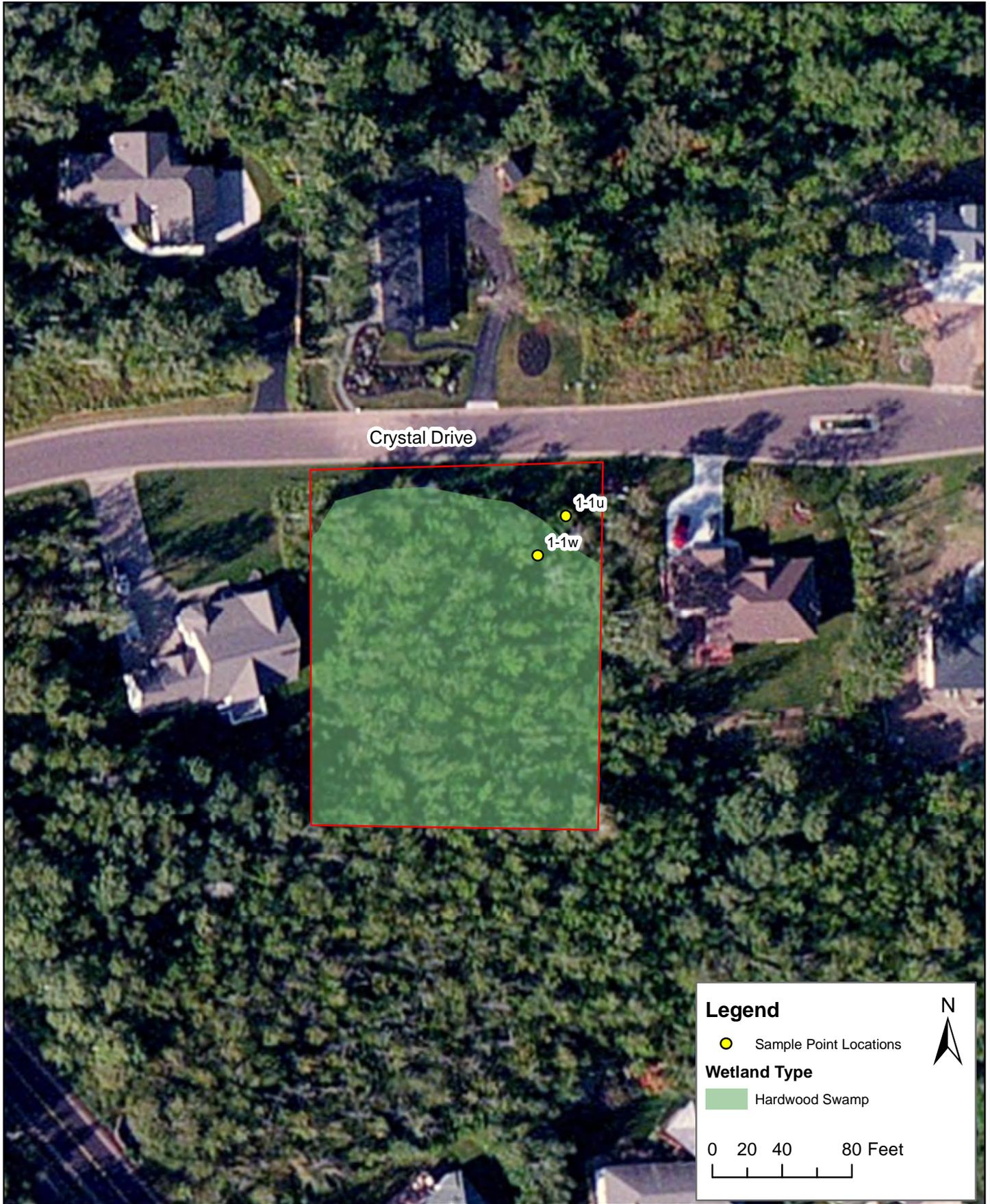
Project: NEWMB 134676  
 Print Date: 5/16/2016

Map by: nwhite  
 Projection: NAD 83 UTM 15N  
 Source: SEH, MNDNR, ESRI

**PUBLIC WATERS INVENTORY**  
 Crystal Village Lot 3 Block 3  
 Duluth, St. Louis County, Minnesota

**Figure 4**

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



**Legend**

● Sample Point Locations

**Wetland Type**

■ Hardwood Swamp

0 20 40 80 Feet



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Map by: nwhite  
Projection: NAD 83 UTM 15N  
Source: MNGeo, SEH, MNDOT

**Wetland Location Map**  
Crystal Village Lot 3 Block 3  
Duluth, St. Louis County, Minnesota

**Figure  
5**

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



**WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region**

Project/Site: Crystal Village South City/County: Duluth/St. Louis Sampling Date: 4-28-2016  
 Applicant/Owner: New Market Bank State: MN Sampling Point: 1-1U  
 Investigator(s): Kyle Hanson Section, Township, Range: S17, T50N, R14W  
 Landform (hillslope, terrace, etc.): footslope Local relief (concave, convex, none): none  
 Slope (%): 2 Lat.: 46.82082 Long.: -92.14777 Datum: NAD 83, UTM 15N  
 Soil Map Unit Name: Hermantown-Canosia-Giese, depressional, complex, 0-3% slopes NWI Classification: PFO1B  
 Are climatic/hydrologic conditions of the site typical for this time of the year? yes (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>    N    </u> Hydric soil present? <u>    N    </u> Indicators of wetland hydrology present? <u>    Y    </u>	<b>Is the sampled area within a wetland?</b> <u>    N    </u>  If yes, optional wetland site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.)  	

**HYDROLOGY**

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Living Roots (C3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Recent Iron Reduction in Tilled <input type="checkbox"/> Inundation Visible on Aerial <input type="checkbox"/> Soils (C6) Imagery (B7) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Sparsely Vegetated Concave <input type="checkbox"/> Other (Explain in Remarks) Surface (B8)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)	Field Observations: Surface water present?    Yes <u>    </u> No <u>  X  </u> Depth (inches): _____ Water table present?     Yes <u>    </u> No <u>  X  </u> Depth (inches): _____ Saturation present?      Yes <u>  X  </u> No <u>    </u> Depth (inches): <u>    8    </u> (includes capillary fringe)
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  		<b>Indicators of wetland hydrology present?</b> <u>    Y    </u>
Remarks:		

**VEGETATION** - Use scientific names of plants

Sampling Point: 1-1U

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft )		Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1	<i>Populus tremuloides</i>	-- Quaking Aspen	50	Y	FAC	12	30	
2	<i>Acer rubrum</i>	-- Red Maple	10	N	FAC	7	17	
3		--				19	48	
4		--				0	0	
5		--						
6		--						
7		--						
8		--						
9		--						
10		--						
			60	= Total Cover				
Sapling/Shrub Stratum						Dominance Test Worksheet		
Plot Size (	15-ft )		Absolute % Cover	Dominant Species	Indicator Status	Number of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A)		
1	<i>Populus tremuloides</i>	-- Quaking Aspen	10	Y	FAC	Total Number of Dominant Species Across all Strata: <u>4</u> (B)		
2	<i>Betula papyrifera</i>	-- Paper Birch	10	Y	FACU	Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B)		
3	<i>Salix discolor</i>	-- Pussy Willow	5	N	FACW			
4	<i>Alnus incana</i>	-- Speckled Alder	5	N	FACW			
5	<i>Cornus alba (sericea)</i>	-- Red Osier	2	N	FACW			
6	<i>Larix laricina</i>	-- American Larch	2	N	FACW			
7		--						
8		--						
9		--						
10		--						
			34	= Total Cover				
Herb Stratum						Prevalence Index Worksheet		
Plot Size (	5-ft )		Absolute % Cover	Dominant Species	Indicator Status	Total % Cover of:		
1	<i>Pteridium aquilinum</i>	-- Northern Bracken Fern	90	Y	FACU	OBL species	<u>0</u> x 1 =	<u>0</u>
2	<i>Hieracium gronovii</i>	-- Queendevil	5	N	UPL	FACW species	<u>14</u> x 2 =	<u>28</u>
3		--				FAC species	<u>70</u> x 3 =	<u>210</u>
4		--				FACU species	<u>100</u> x 4 =	<u>400</u>
5		--				UPL species	<u>5</u> x 5 =	<u>25</u>
6		--				Column totals	<u>189</u> (A)	<u>663</u> (B)
7		--				Prevalence Index = B/A =	<u>3.51</u>	
8		--						
9		--						
10		--						
11		--						
12		--						
13		--						
14		--						
15		--						
			95	= Total Cover				
Woody Vine Stratum						Hydrophytic Vegetation Indicators:		
Plot Size (	30-ft )		Absolute % Cover	Dominant Species	Indicator Status	<input type="checkbox"/> Rapid test for hydrophytic vegetation <input type="checkbox"/> Dominance test is >50% <input type="checkbox"/> Prevalence index is ≤3.0* 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		
1		--				Definitions of Vegetation Strata:  <b>Tree</b> - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.  <b>Sapling/shrub</b> - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.  <b>Herb</b> - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.  <b>Woody vines</b> - All woody vines greater than 3.28 ft in height.		
2								
3								
4								
5								
			0	= Total Cover		Hydrophytic vegetation present? <u>N</u>		

Remarks: (Include photo numbers here or on a separate sheet)

**Note:** This data sheet has been adapted to use the 2016 National Wetland Plant List:

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings*. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X



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 Slope (%): 1 Lat.: 46.82075 Long.: -92.14784 Datum: NAD 83, UTM 15N  
 Soil Map Unit Name: Hermantown-Canosia-Giese, depressional, complex, 0-3% slopes NWI Classification: PFO1B  
 Are climatic/hydrologic conditions of the site typical for this time of the year? yes (If no, explain in remarks)  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ significantly disturbed? Are "normal  
 Are vegetation \_\_\_\_\_, soil \_\_\_\_\_, or hydrology \_\_\_\_\_ naturally problematic? circumstances" present? Yes  
 (If needed, explain any answers in remarks)

**SUMMARY OF FINDINGS**

Hydrophytic vegetation present? <u>Y</u> Hydric soil present? <u>Y</u> Indicators of wetland hydrology present? <u>Y</u>	<b>Is the sampled area within a wetland?</b> <u>Y</u>  If yes, optional wetland site ID: <u>Wetland 1</u>
Remarks: (Explain alternative procedures here or in a separate report.)  	

**HYDROLOGY**

Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4)
Field Observations: Surface water present? Yes <u>      </u> No <u>X</u> Depth (inches): <u>      </u> Water table present? Yes <u>X</u> No <u>      </u> Depth (inches): <u>8</u> Saturation present? Yes <u>X</u> No <u>      </u> Depth (inches): <u>0</u> (includes capillary fringe)		<b>Indicators of wetland hydrology present?</b> <u>Y</u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  		
Remarks:		

**VEGETATION** - Use scientific names of plants

Sampling Point: 1-1W

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1	<i>Fraxinus nigra</i>	--	Black Ash	60	Y	FACW	18	45
2	<i>Populus tremuloides</i>	--	Quaking Aspen	20	Y	FAC	5	14
3	<i>Abies balsamea</i>	--	Balsam Fir	10	N	FAC	14	36
4		--					0	0
5		--						
6		--						
7		--						
8		--						
9		--						
10		--						
			90	=	Total Cover			
Woody Vine Stratum								
Plot Size (	30-ft	)	Absolute % Cover	Dominant Species	Indicator Status			
1		--						
2		--						
3		--						
4		--						
5		--						
			0	=	Total Cover			

Tree Stratum						50/20 Thresholds		
Plot Size (	15-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1	<i>Fraxinus nigra</i>	--	Black Ash	10	Y	FACW	18	45
2	<i>Alnus incana</i>	--	Speckled Alder	10	Y	FACW	5	14
3	<i>Abies balsamea</i>	--	Balsam Fir	5	N	FAC	14	36
4	<i>Cornus alba (sericea)</i>	--	Red Osier	2	N	FACW	0	0
5		--						
6		--						
7		--						
8		--						
9		--						
10		--						
			27	=	Total Cover			

Tree Stratum						50/20 Thresholds		
Plot Size (	5-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1	<i>Calamagrostis canadensis</i>	--	Bluejoint	60	Y	OBL	18	45
2	<i>Rubus idaeus</i>	--	Common Red Raspberry	10	N	FAC	5	14
3	<i>Abies balsamea</i>	--	Balsam Fir	1	N	FAC	14	36
4	<i>Thuja occidentalis</i>	--	Eastern Arborvitae	1	N	FACW	0	0
5		--						
6		--						
7		--						
8		--						
9		--						
10		--						
11		--						
12		--						
13		--						
14		--						
15		--						
			72	=	Total Cover			

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1		--						
2		--						
3		--						
4		--						
5		--						
			0	=	Total Cover			

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1		--						
2		--						
3		--						
4		--						
5		--						
			0	=	Total Cover			

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1		--						
2		--						
3		--						
4		--						
5		--						
			0	=	Total Cover			

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1		--						
2		--						
3		--						
4		--						
5		--						
			0	=	Total Cover			

Tree Stratum						50/20 Thresholds		
Plot Size (	30-ft	)	Absolute % Cover	Dominant Species	Indicator Status	20%	50%	
1		--						
2		--						
3		--						
4		--						
5		--						
			0	=	Total Cover			

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1		--						
2		--						
3		--						



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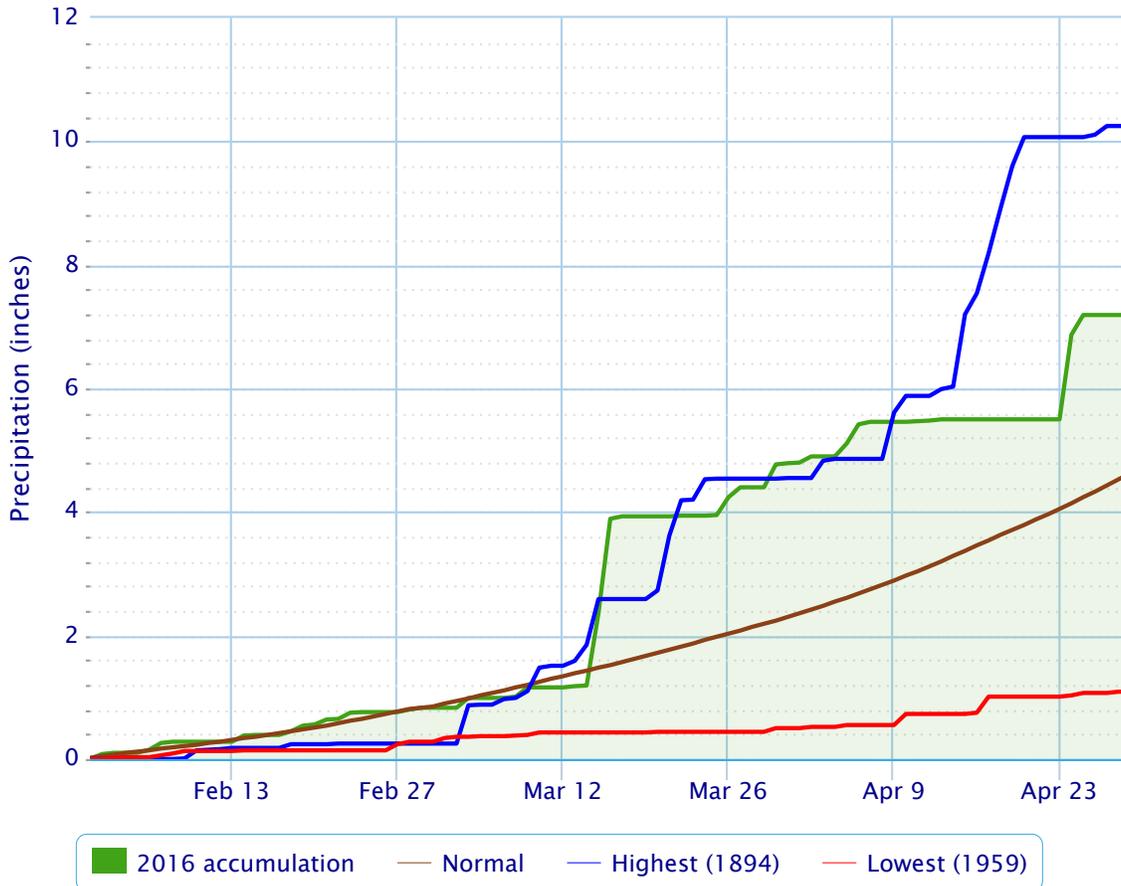


Photo 1 Wetland 1, Hardwood Swamp

# Accumulated Precipitation – Duluth Area, MN (ThreadEx)



Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



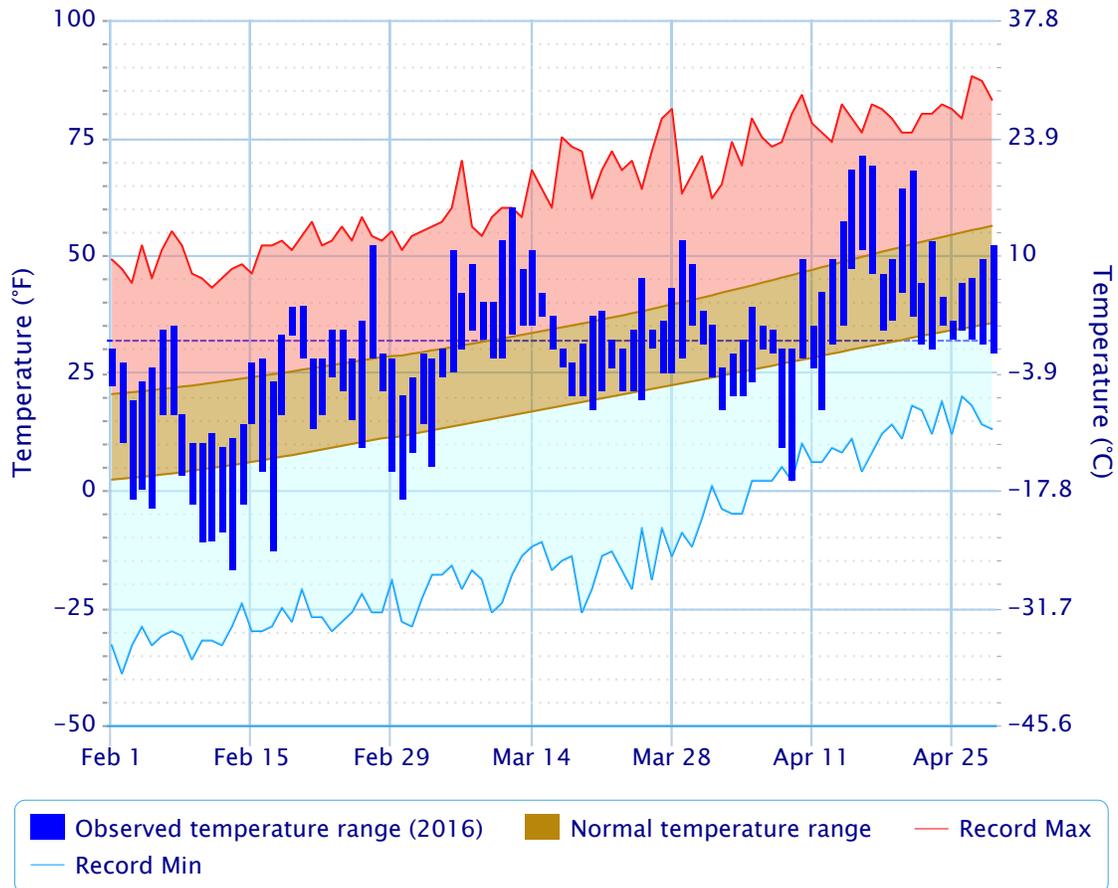
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Note regarding subsequent/missing values

# Daily Temperature Data – Duluth Area, MN (ThreadEx)



Period of Record – 1874-05-13 to 2016-05-19. Normals period: 1981-2010. Click and drag to zoom chart.



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