

September 2019

Minnesota Public Utilities Commission

# Application for a Site Permit

## Appendix E - Elk Creek Wetland Delineation Report

PUC Docket No. IP7009/GS-19-495

### Elk Creek Solar Project

Rock County, Minnesota

Submitted by:

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## **Appendix E – Wetland Delineation Report**





# WETLAND DELINEATION REPORT

ELK CREEK SOLAR ROJECT

*Magnolia, Rock County, Minnesota*  
May 28, 2019

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# 1.0 Introduction

Elk Creek Solar LLC is proposing to develop a new solar energy production facility in Rock County, Minnesota. The 970 acre Project Area is located in Section 27, 26, and 35 of Township 103 Range 44 in Rock County, Minnesota (Figure 1). HDR completed a wetland delineation to identify wetlands and other Waters of the U.S. within the Project Area on May 6, 2019.

# 2.0 Methods

An initial desktop evaluation for the presence of wetlands and wetland hydrology within the Project Area was performed using protocols defined in the July 2016 Minnesota Board of Water and Soil Resources (BWSR) and U.S. Army Corps of Engineers (USACE) *Guidance for Offsite Hydrology/Wetland Determinations* (USACE 2016). Potential wetland areas were identified based on aerial photography interpretation and historical aerial photography review, National Wetland Inventory (NWI), hydric soil map units, 2 foot light detection and ranging (LiDAR) contours, and 2 foot digital elevation models (DEM). These areas were then visited in the field to confirm the presence or absence of wetland characteristics. Onsite wetland delineations were conducted in accordance with methods outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2)* (USACE 2010). The USACE defines areas as wetlands based on the following:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas [33 CFR 328 3.b].

Wetland delineations are based on the presence of the following three parameters:

- Indicators of wetland hydrology
- Predominance of hydrophytic vegetation
- Presence of hydric soils

“Atypical” or “problem areas” may be missing one or more of the three parameters, and still be classified as wetlands but must be justified using USACE criteria.

# 3.0 Site Description

The Project Area is located in eastern Rock County, approximately 1 mile northwest of Magnolia, Minnesota within the Prairie Parkland – Inner Coteau Subsection as defined by The Minnesota Department of Natural Resources (MNDNR) (MNDNR, 2005). This area is described as thick to thin loess deposits over glacial till. The Inner Coteau consists of highly dissected moraines of pre-Wisconsin drift, capped by thick wind-blown silt deposits. (MNDNR, 2005). Presettlement vegetation was tallgrass prairie (MNDNR 2005). The Project Area has been in crop production since at least 2003 based on historical aerial photography review.

### 3.1 Climate Data

The Minnesota Climatology Working Group (MNCWG, 2018) has an online calculator that provides a multi-month precipitation score for any date selected from a calendar. Scores of 6 to 9 are considered “dry”, 10 to 14 “normal”, and 15 to 18 “wet”. For the time of the on-site delineation, precipitation for the Project Area was considered “wet” with a score of 18 from MNCWG.

### 3.2 Historical Climate Data

A review of historical climate data for the Project Area was performed against the dates of historical aerial photos readily available through the Minnesota Historical Aerial Photographs Online (MHAPO) program and Farm Service Agency National Agriculture Imagery Program (NAIP) and Google Earth. USACE guidance states that historical photographs should be reviewed for indicators of wetland hydrology when normal precipitation conditions are present (USACE 2016). This review of historical aerial photography was used in identifying offsite wetland hydrology indicators. Of the publically available aerial photos; 2003, 2004, 2005, 2008, 2009, 2010, 2015, and 2017 had normal precipitation multi-month scores and therefore were selected for use in the historical aerial photography review. Additionally 2006 and 2013 which had a dry multi-month score were also included in the review (Table 1). All historic aerial photographs reviewed are included as Figure 2. MNCWG precipitation reports for the aerial photos reviewed are included as Appendix C.

**Table 1. Historical Aerial Photography Information**

Year of Photo	Date of Photo	Source of Photo	MNCWG Multi-Month Score
2003	August 15	NAIP	12 - Normal
2004	August 9	NAIP	14 - Normal
2005	September 12	NAIP	10- Normal
2006	August 11	NAIP	8 - Dry
2008	July 4	NAIP	14 - Normal
2009	September 17	NAIP	12 - Normal
2010	June 24	NAIP	11 - Normal
2013	September 25	NAIP	8 – Dry
2015	July 15	NAIP	13 - Normal
2017	September 1	NAIP	13 – Normal

### 3.3 Soils

A summary of the soil map units that occur onsite and their corresponding hydric ratings are listed in Table 2. Soil map units are included in Figures 2 and 3. USDA Web soil survey hydric rating map for the Project Area is included as Appendix D.



**Table 2. Mapped Soil Types within Project Area**

Map Unit Symbol	Map Unit name	Hydric Rating	Acres within Project Area
P48A	Allendorf silty clay loam, 0 to 2 percent slopes	0%	0.2
P12B	Everly silty clay loam, 2 to 6 percent slopes	0%	26.3
P14B	Flandreau silt loam, 2 to 6 percent slopes	0%	77.9
P15B	Galva silty clay loam, 2 to 5 percent slopes	0%	17.2
P55A	Kato silty clay loam, 0 to 2 percent slopes	90%	9.6
P21A	Marcus silty clay loam, 0 to 2 percent slopes	95%	49.2
P27A	Primghae silty clay loam, 1 to 3 percent slopes	8%	220.0
P28A	Ransom silty clay loam ,1 to 3 percent slopes	8%	29.9
P29A	Rushmore silty clay loam, 0 to 2 percent slopes	90%	54.7
P30B	Sac silty clay loam, loam substratum, 2 to 5 percent slopes	0%	330.2
P31A	Spicer silty clay loam, 0 to 2 percent slopes	100%	6.0
P38B	Thurman sandy loam, 2 to 6 percent slopes	0%	9.2
P42A	Whitewood silty clay loam, 0 to 2 percent slopes	80%	119.7
P43A	Wilmington silty clay loam, 1 to 3 percent slopes	5%	20.3

## 4.0 Results

Offsite review of historical aerial photography resulted in the identification of 21 locations of hydrology signatures (Table 3). In accordance with USACE guidance, of the 21 locations identified, *Signature 10*, tested positive for wetland hydrology and was verified as a wetland in the field. *Signature 1, 2, 11, 12, 13, 14, and 17* tested positive for wetland hydrology based on historical aerial photography review and required field verification. During field investigation none of these signatures were confirmed to be wetlands. *Signature 3, 16, 18, 19, 26, 27, 34, 35, 36, 44, 45, 46, 47, and 49* tested negative for wetland hydrology and did not require field verification.

**Table 3. Historical Aerial Photography Interpretation Results**

Signature ID	2003	2004	2005	2006 (Dry)	2008	2009	2010	2013 (Dry)	2015	2017	% Years Wetland Hydro Sig	Hydric Soil	NWI
Signature 1	SS	SS	-	-	SS	SS	-	-	-	SS	62.5%	Yes	Yes
Signature 2	SS	-	-	SS	SS	SS	SS	SS	-	-	50%	Yes	No
Signature 3	-	-	-	-	-	-	-	SS	SS	SS	25%	Yes	Yes
Signature 10	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	100%	Yes	Yes
Signature 11	-	SS	-	-	SS	-	SS	-	-	-	37.5%	Yes	Yes
Signature 12	-	-	-	SS	SS	-	-	-	-	-	12.5%	Yes	Yes
Signature 13	-	-	-	-	SS	-	-	SS	SS	SS	37.5%	Yes	No
Signature 14	-	-	-	-	-	-	SS	-	-	-	12.5%	Yes	Yes
Signature 16	-	-	-	-	SS	-	-	SS	-	-	12.5%	Yes	No
Signature 17	-	-	-	-	SS	-	-	SS	-	-	12.5%	Yes	Yes
Signature 18	-	-	-	-	SS	-	-	SS	-	-	12.5%	No	No
Signature 19	-	-	-	-	-	-	-	-	SS	-	12.5%	Yes	No
Signature 26	-	-	-	-	SS	-	-	-	-	-	12.5%	Yes	Yes
Signature 27	-	-	-	-	SS	-	-	-	-	-	12.5%	Yes	No
Signature 34	-	-	-	-	-	-	-	-	-	SS	12.5%	Yes	No
Signature 35	-	-	-	-	-	-	SS	-	-	-	12.5%	Yes	No
Signature 36	-	-	-	-	-	-	-	-	SS	-	12.5%	No	No
Signature 44	-	-	-	-	-	-	-	-	SS	-	12.5%	Yes	No

Signature ID	2003	2004	2005	2006 (Dry)	2008	2009	2010	2013 (Dry)	2015	2017	% Years Wetland Hydro Sig	Hydric Soil	NWI
Signature 45	-	-	-	SS	-	-	-	SS	-	-	0%	Yes	No
Signature 46	-	-	-	-	SS	-	-	-	-	-	12.5%	Yes	No
Signature 47	-	-	-	-	-	SS	-	-	-	-	12.5%	No	No
Signature 49	-	-	-	-	-	-	-	-	SS	SS	25%	No	No

*WS = Wetland Signature, SS = Soil Wetness Signature*



Areas of potential hydrology identified through historical aerial review were investigated in the field and the entire Project Area was reviewed for additional wetlands. 1 wetland area was delineated in the Project Area, Wetland 1. A total of 0.201 acres of wetland were field delineated in the Project Area. Table 4 summarizes wetland acreages and wetland types delineated in the Project Area. The delineated wetland boundaries are shown in Figure 3. USACE routine wetland data forms for the delineated wetlands are included as Appendix A. Ground level photography of the Project Area is included in Appendix B, with photo locations shown on Figure 3.

Wetland 1 consists of a palustrian emergent (PEM/Type 2) wetland. The boundary of Wetland 1 extends beyond the Project Area. The dominant vegetation of the PEM wetland is reed canary grass (*Phalaris arundinacea*). The adjacent upland vegetation is agricultural row crop. Wetland 1 includes the area identified as *Signature 10* from the offsite review. The boundary of the wetland area within agricultural row crop was identified by the extent of vegetation signature, topographic relief and the presence of hydric soil indicators.

Representative routine wetland delineation data forms were collected for wetland signatures identified during the offsite review. These data forms can be found in Appendix A.

**Table 4. Delineated Wetlands**

Wetland ID	NWI Wetland Type	Eggers and Reed Vegetative Community	Circular 39 Wetland Type	Area (acres)
<b>Wetland 1</b>	<b>PEM</b>	Fresh Wet Meadow	Type 2 Wet Meadow	0.201
Total				<b>0.201</b>

## 5.0 Conclusions

One wetland area was identified and delineated within the Project Area. The wetland boundaries were delineated in accordance with delineation methodologies as described in the July 2016 USACE and BWSR guidance and the *1987 Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2)* (USACE 2010) and are subject to review and approval by the USACE and Rock County (Local Governmental Unit (LGU) responsible for implementing the Minnesota Wetland Conservation Act (WCA)).

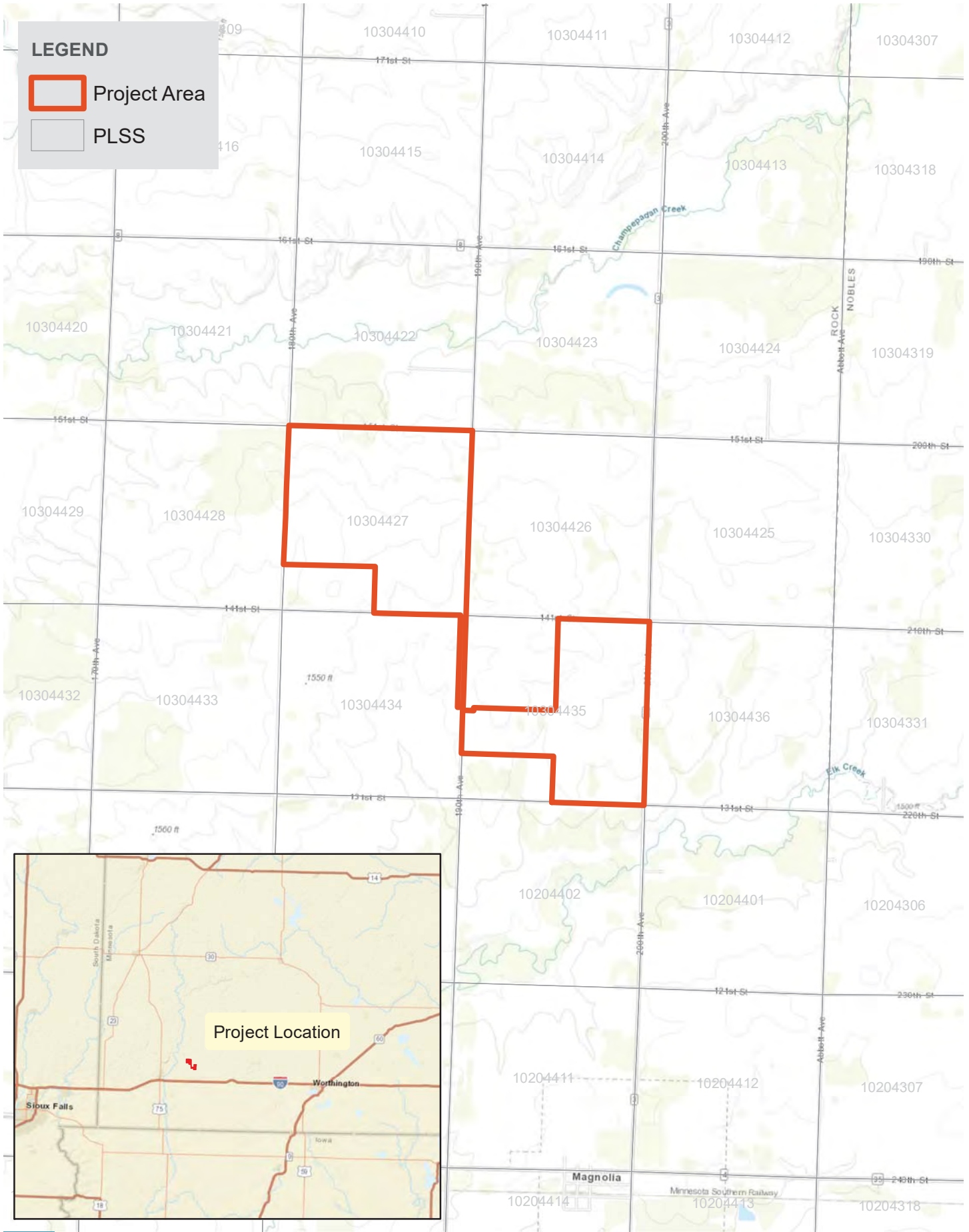
## 6.0 References

Minnesota Climatology Working Group. 2018. *Wetland Delineation Precipitation Data Retrieval from a Gridded Database for Vienna Township, MN*. [http://climate.umn.edu/gridded\\_data/precip/wetland/wetland.asp](http://climate.umn.edu/gridded_data/precip/wetland/wetland.asp).

- Minnesota Department of Natural Resources. 2005. *Field Guide to the Native Plant Communities of Minnesota: The Inner Coteau Subsection*. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program. MNDNR St. Paul, MN.
- U.S. Department of Agriculture, NRCS. 2018. Web Soil Survey for Rock County, Minnesota. <http://websoilsurvey.nrcs.usda.gov/app/>.
- U.S. Army Corps of Engineers. 1987. *Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1*, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS, 100 pp. and appendices.
- U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)*. ERDC/EL TR-10-16 Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- U.S. Army Corps of Engineers and Minnesota Board of Water and Soil Resources. 2016. Guidance for Offsite Hydrology/Wetland Determinations. [http://www.bwsr.state.mn.us/wetlands/delineation/Guidance for Offsite Hydrology and Wetland Determinations.pdf](http://www.bwsr.state.mn.us/wetlands/delineation/Guidance%20for%20Offsite%20Hydrology%20and%20Wetland%20Determinations.pdf)

## Figures



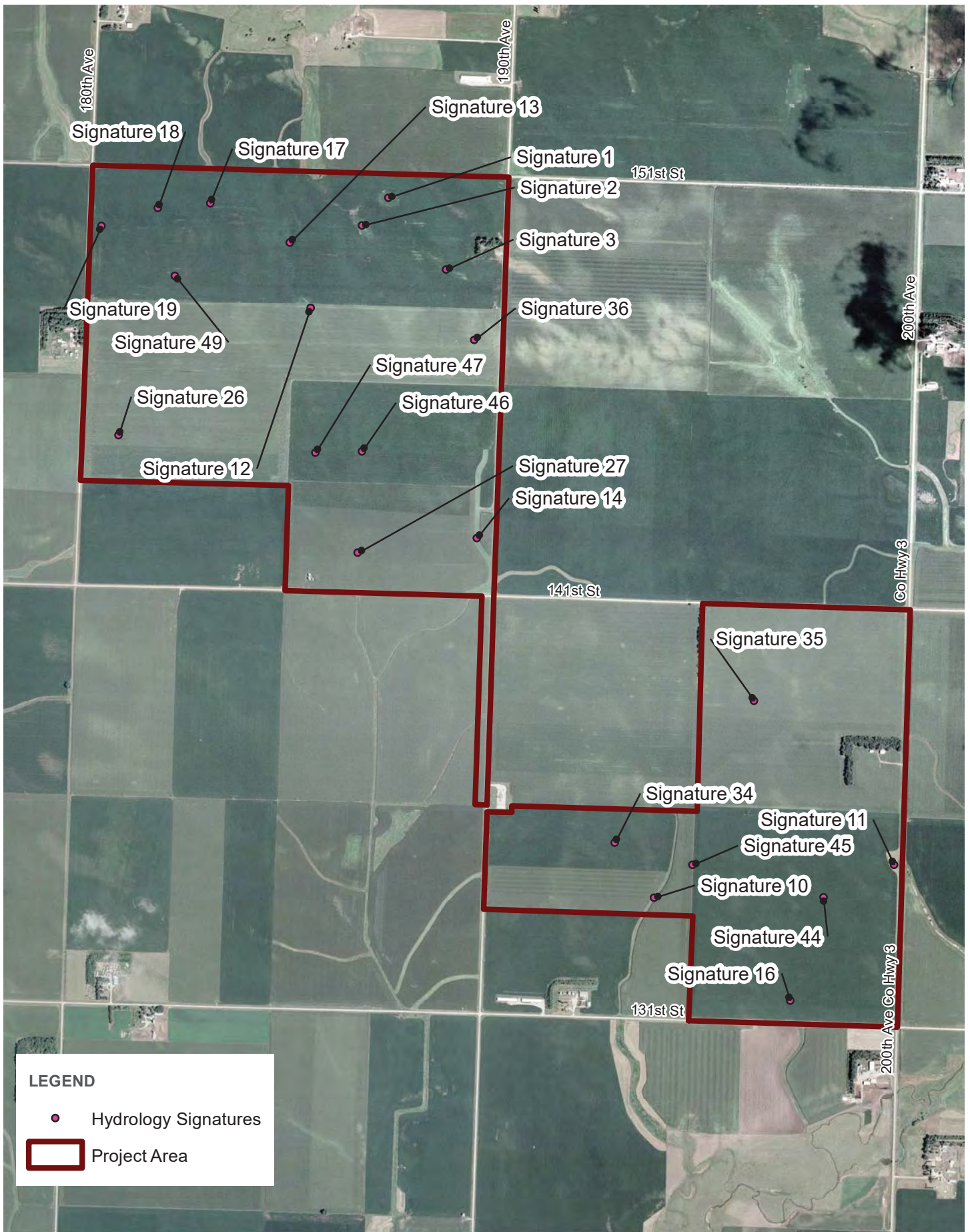


**LEGEND**

- Project Area
- PLSS

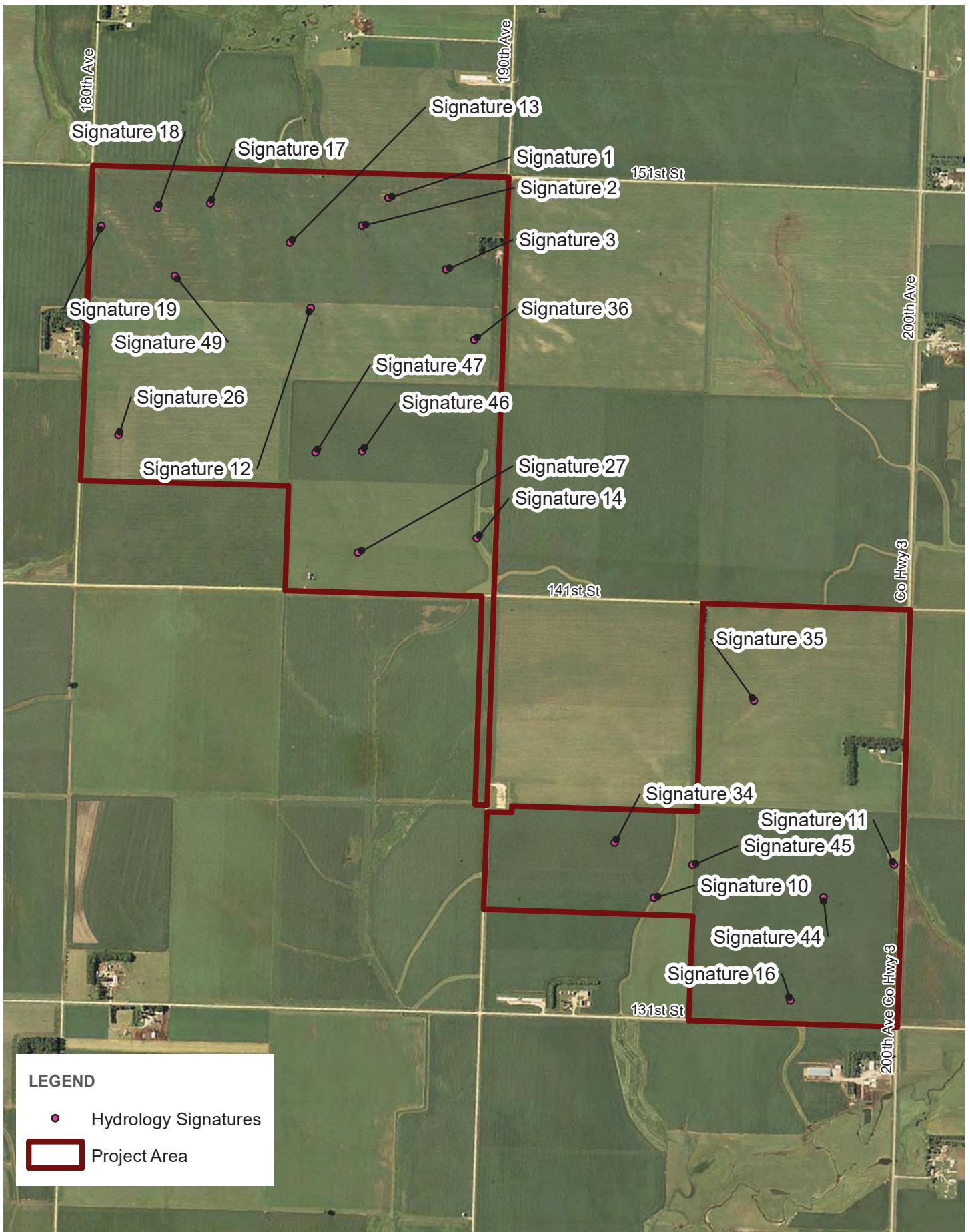


**FIGURE 1**  
**PROJECT LOCATION**  
**MAGNOLIA, MINNESOTA**  
 ELK CREEK SOLAR LLC



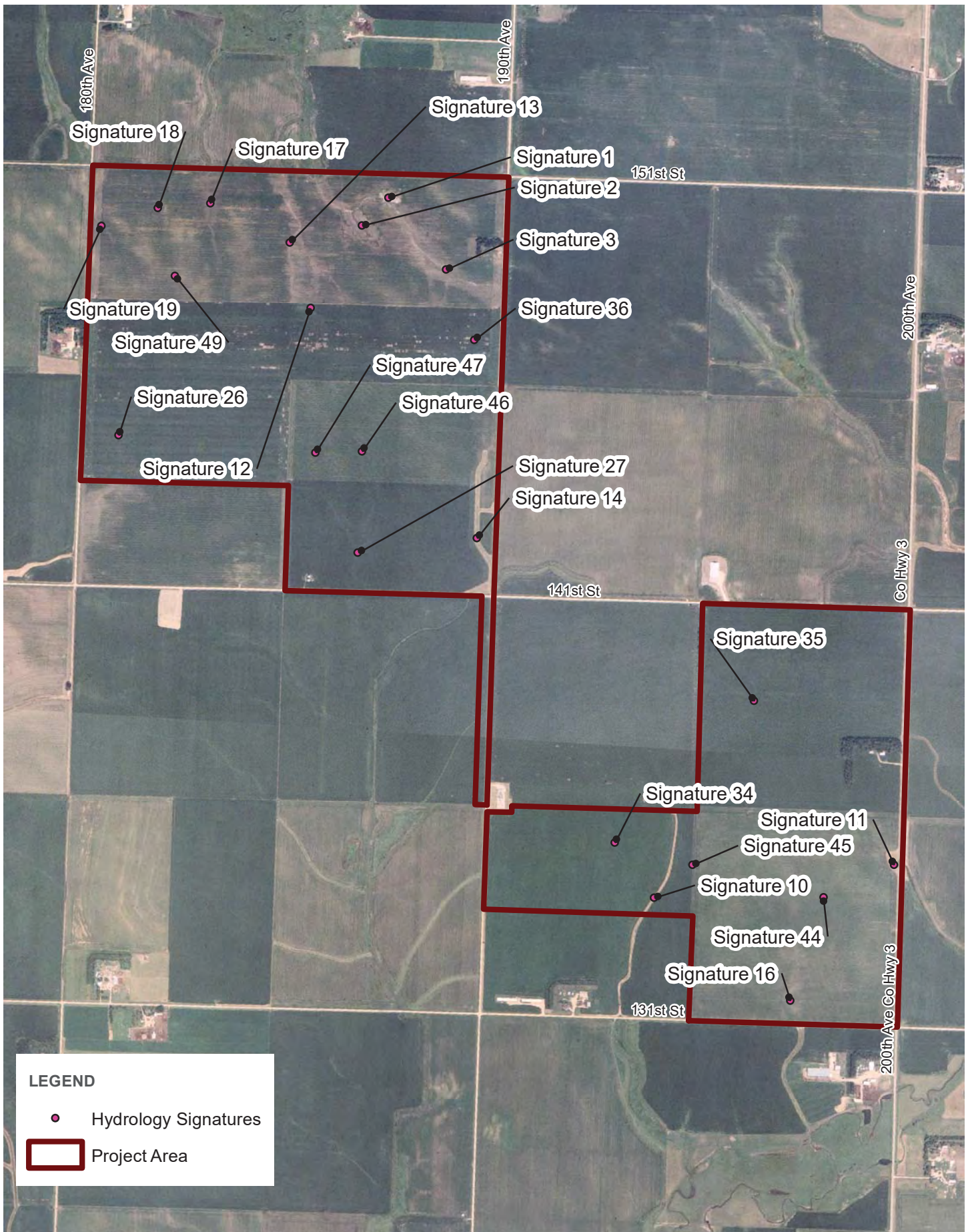
**FIGURE 2**  
**HISTORICAL AERIAL PHOTOGRAPHY REVIEW**  
**2003**



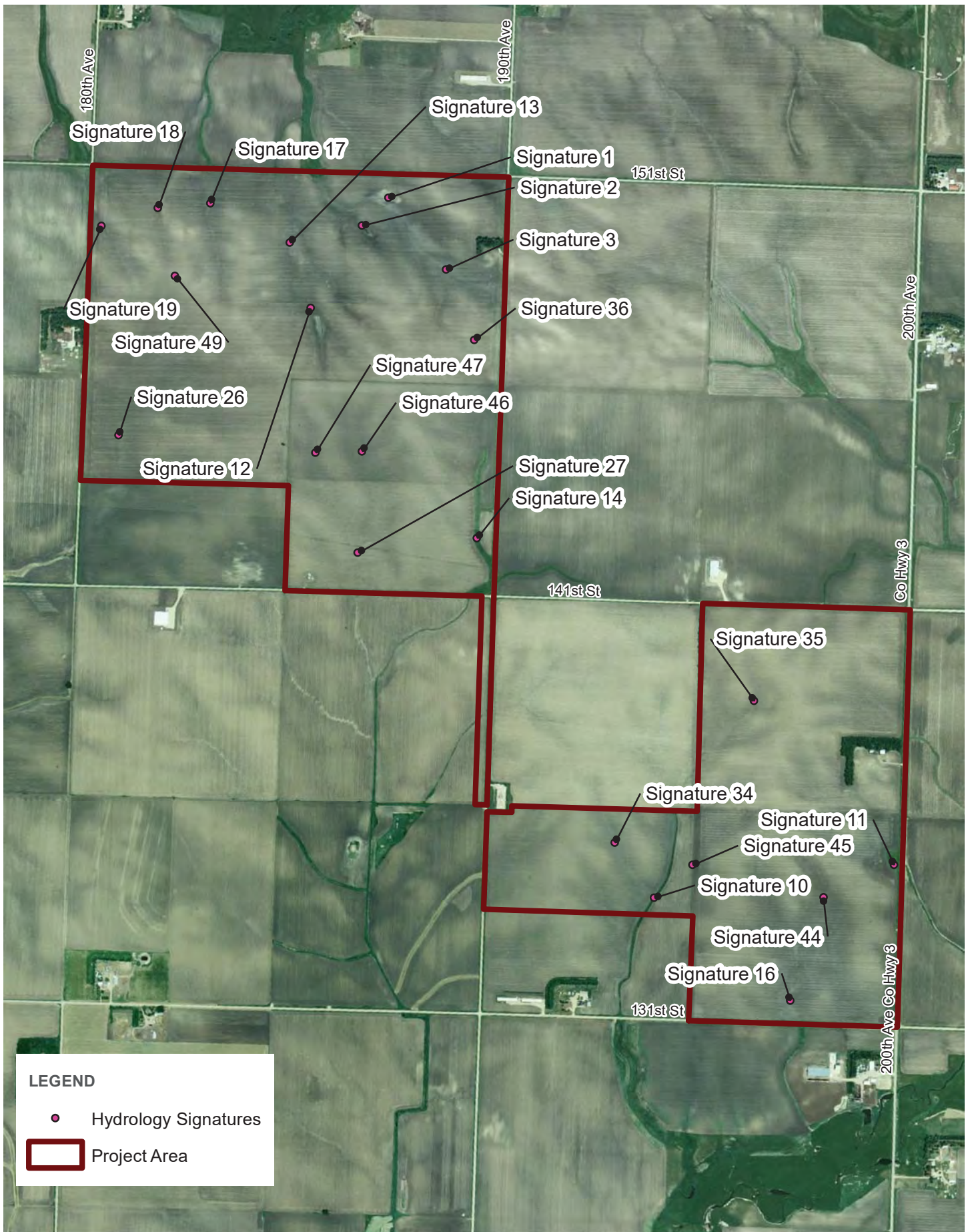


**FIGURE 2**  
**HISTORICAL AERIAL PHOTOGRAPHY REVIEW**  
**2004**

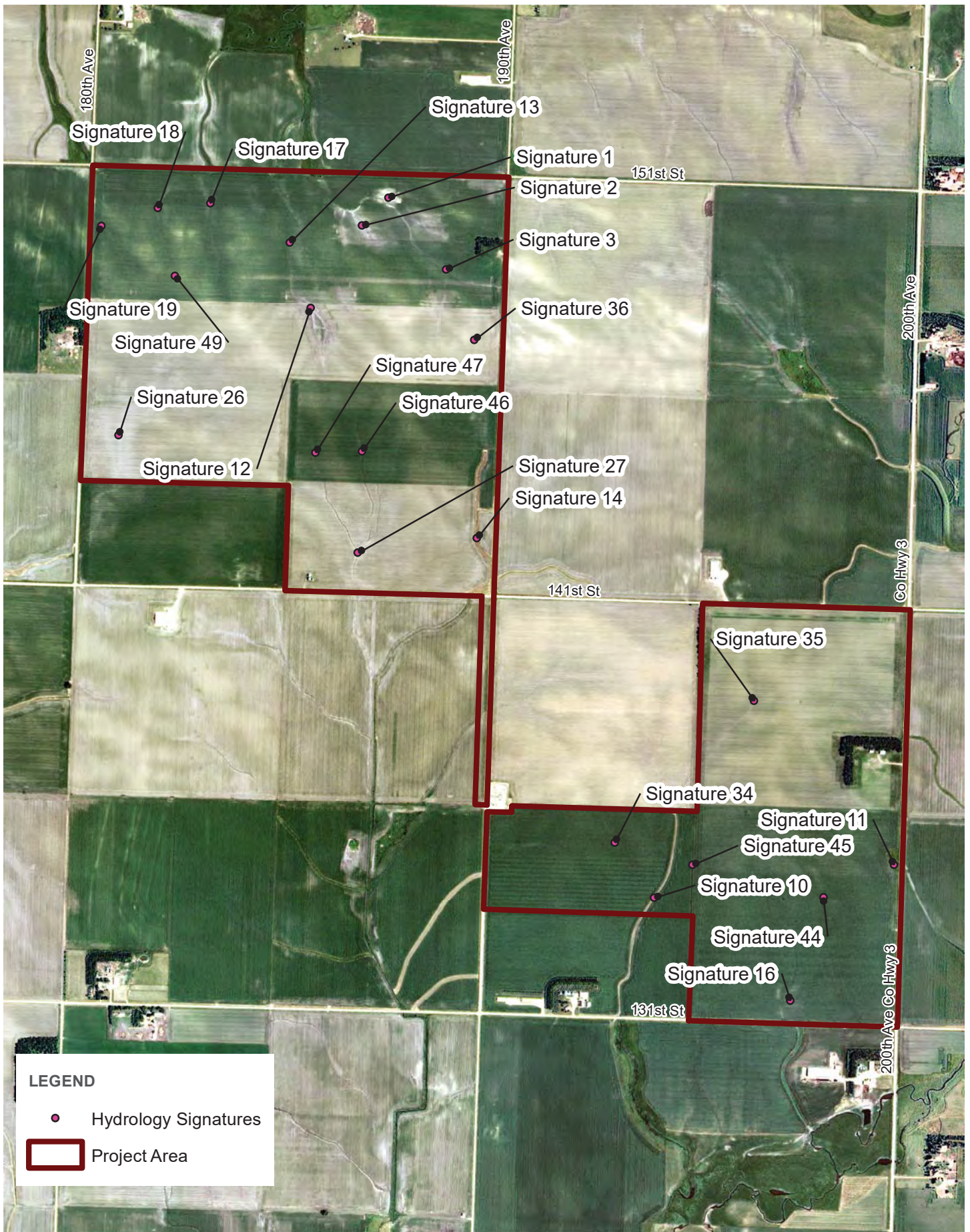






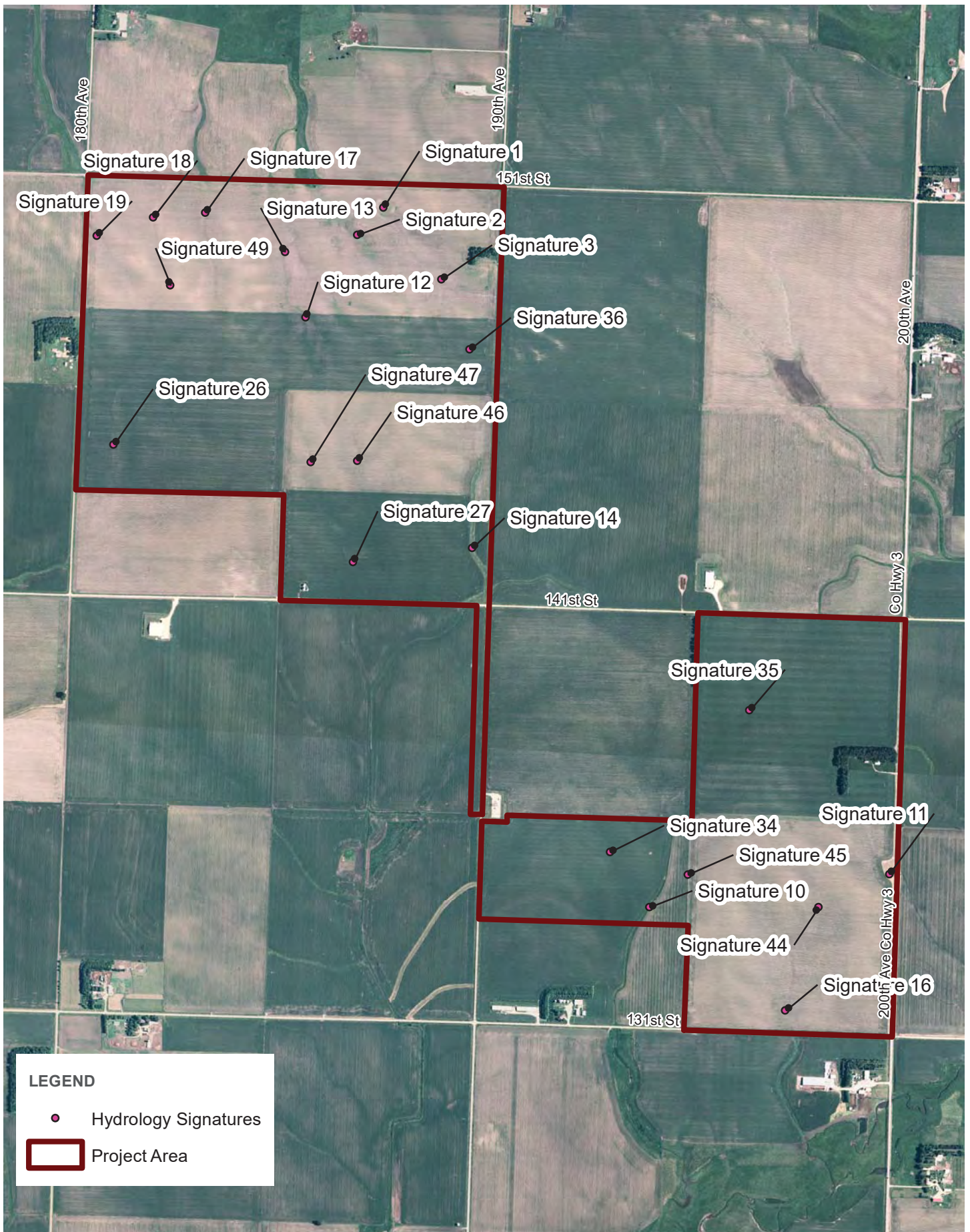




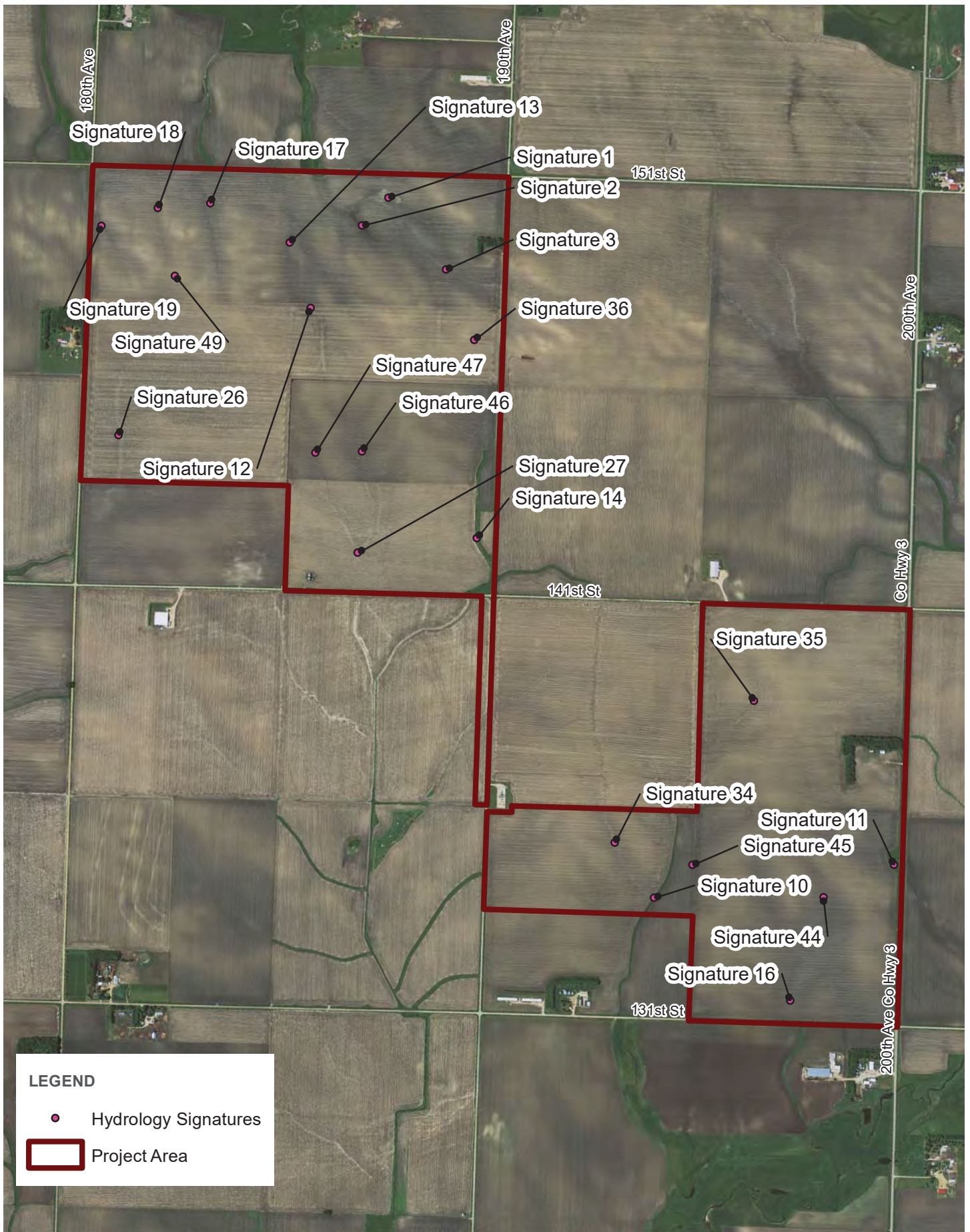


**FIGURE 2**  
**HISTORICAL AERIAL PHOTOGRAPHY REVIEW**  
**2008**







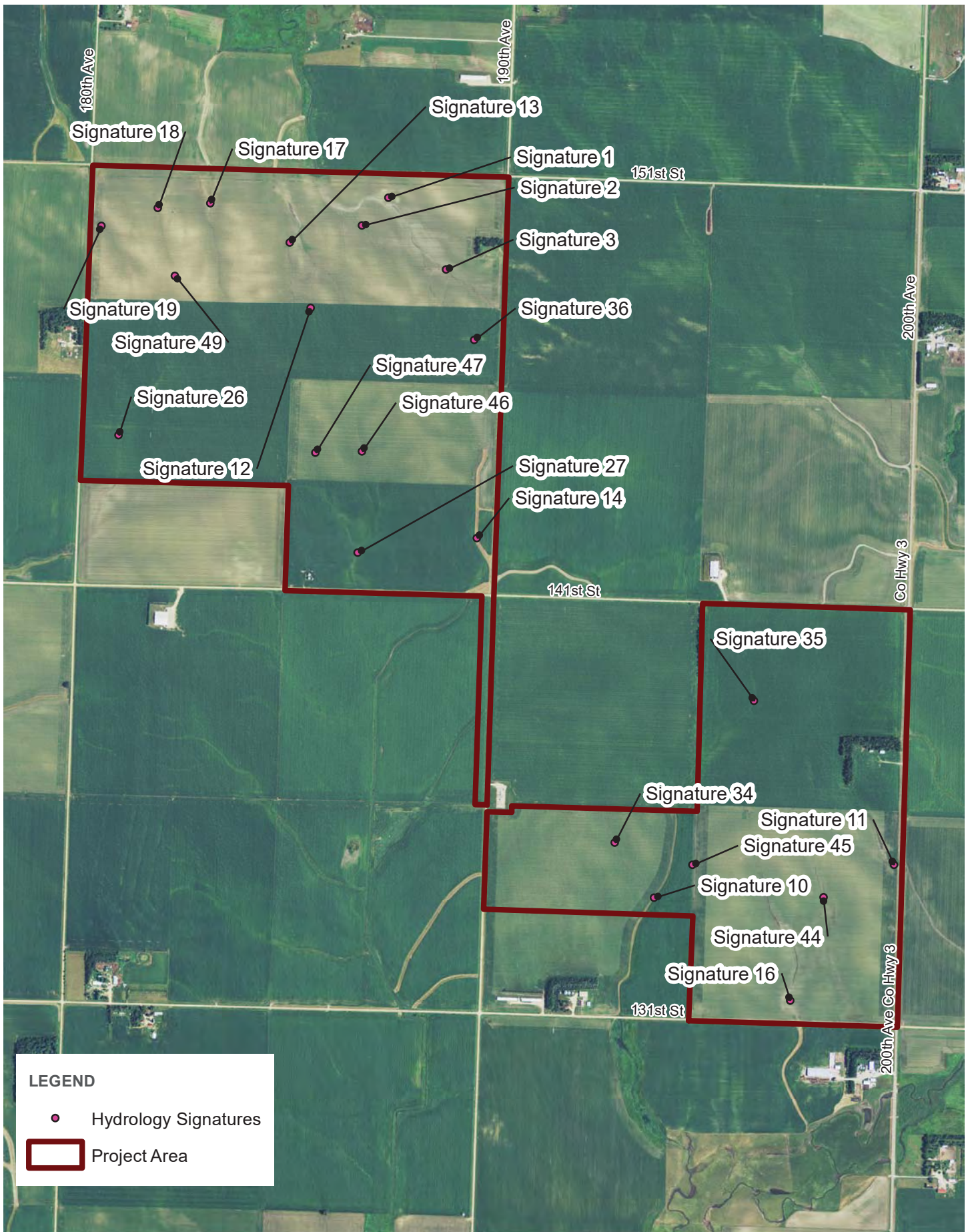


**FIGURE 2**  
**HISTORICAL AERIAL PHOTOGRAPHY REVIEW**  
**2010**

MAGNOLIA, MINNESOTA  
 ELK CREEK SOLAR LLC







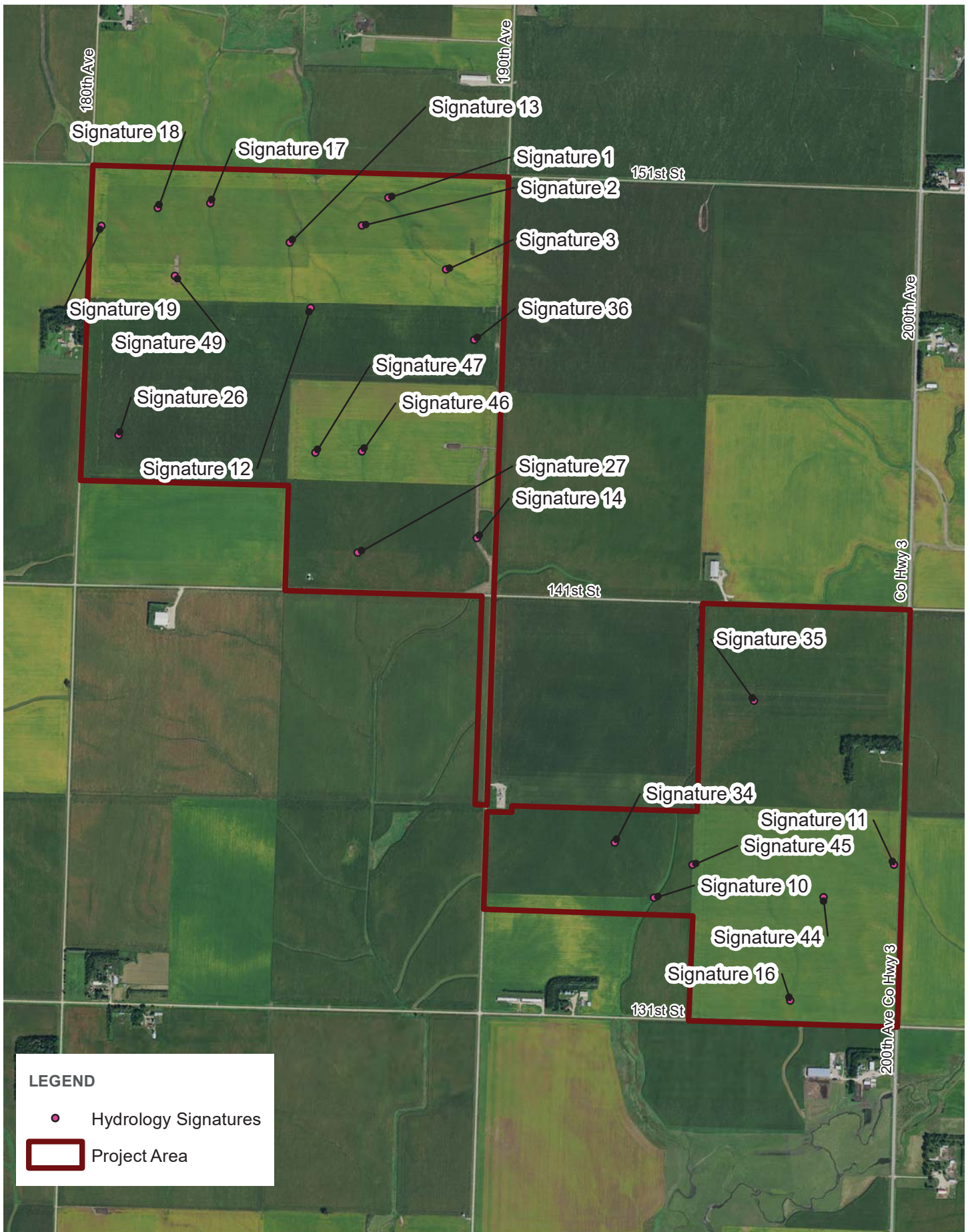
**LEGEND**

- Hydrology Signatures
- ▭ Project Area

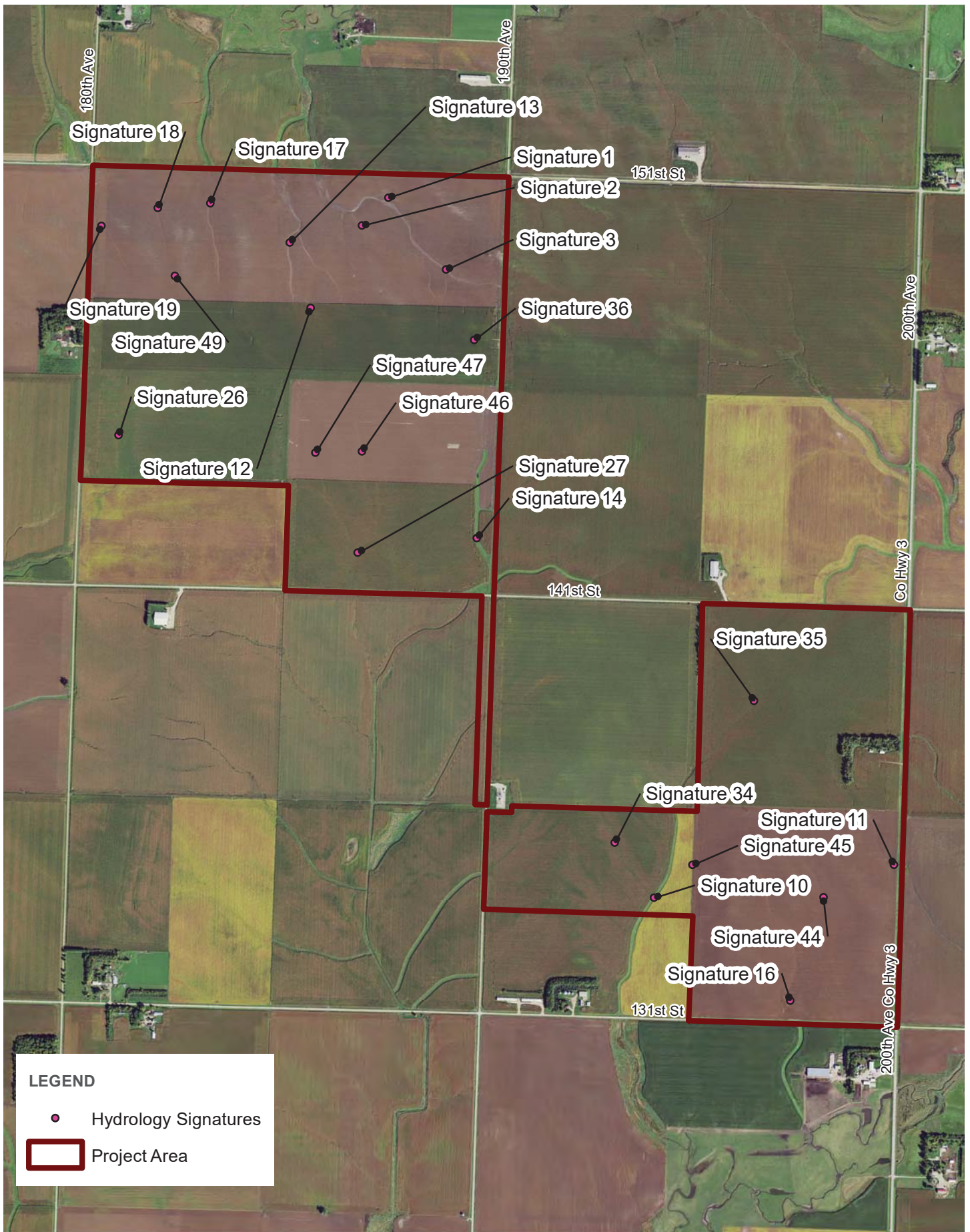


**FIGURE 2**  
**HISTORICAL AERIAL PHOTOGRAPHY REVIEW**  
**2013**

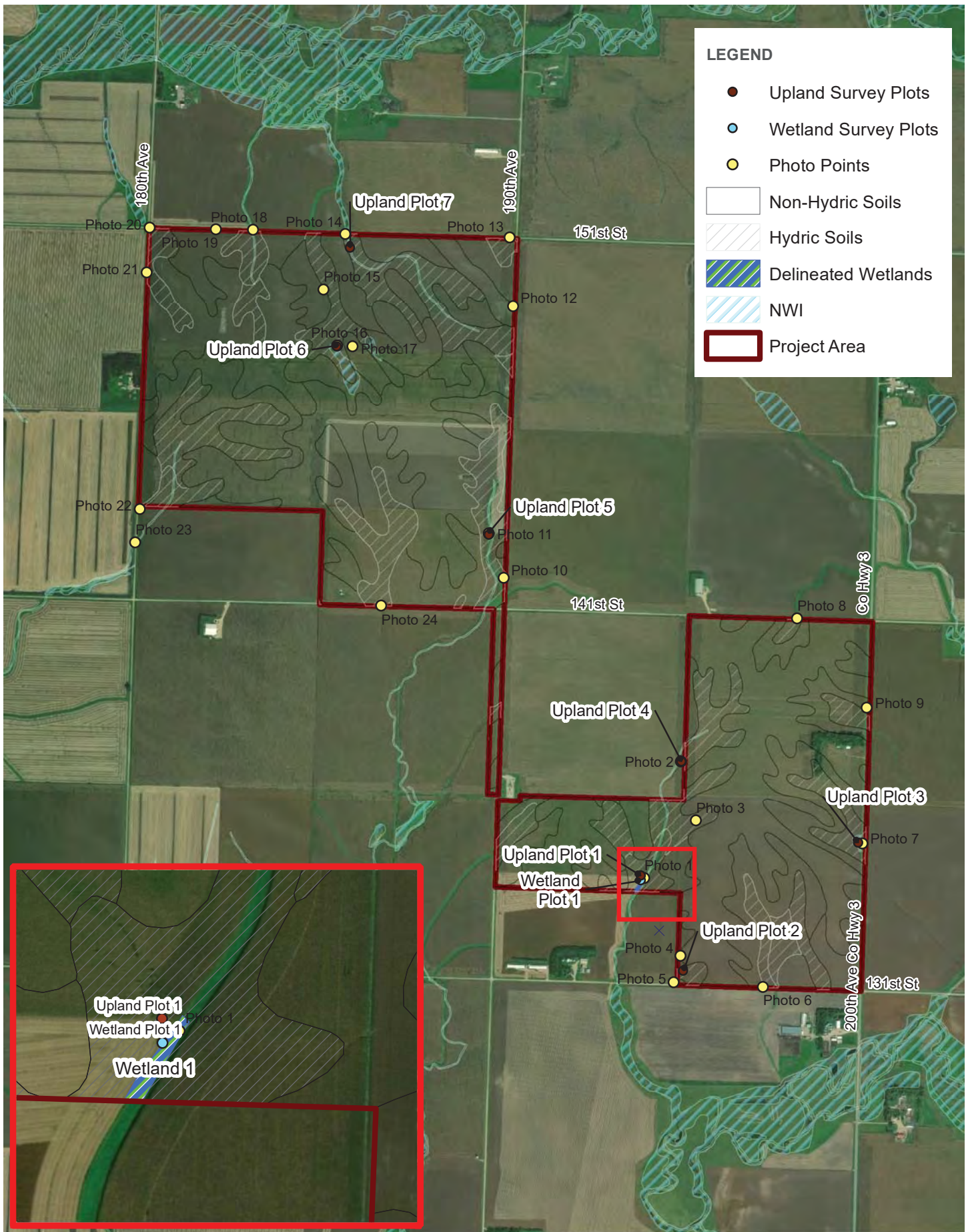












# Appendix A

USACE Routine Wetland Delineation Data Forms

## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Wetland Plot 1  
 Investigators: Kendall Vandercamp Section, Township, Range: Section 35 Township 103 Range 44  
 Landform (hillslope, terrace, etc.): Floodplain Local Relief (concave, convex, none): Concave Slope(%): 1  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.680000 Long: -96.080000 Datum: WGS84  
 Soil Map Unit Name: Whitewood silty clay loam, 0 to 2 percent slopes NWI Classification: PEM

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

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

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u>    </u>	<b>Is the Sampled Area within a Wetland?</b>	Yes <u>X</u>	No <u>    </u>
Hydric Soil Present?	Yes <u>X</u>	No <u>    </u>			
Wetland Hydrology Present?	Yes <u>X</u>	No <u>    </u>			

Remarks:  
 Area is a hayed drainage/ floodplain area. This data form is representative for field verification of Signature 10.

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
= Total Cover				
Sapling/Shrub Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: OBL species <u>    </u> x1= <u>    </u>
2. _____	_____	_____	_____	FACW species <u>100</u> x2= <u>200</u>
3. _____	_____	_____	_____	FAC species <u>    </u> x3= <u>0</u>
4. _____	_____	_____	_____	FACU species <u>    </u> x4= <u>0</u>
5. _____	_____	_____	_____	UPL species <u>    </u> x5= <u>0</u>
= Total Cover				Column Totals: <u>100</u> (A) <u>200</u> (B)
				<i>Prevalence Index = B/A = 2.00</i>
Herb Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Phalaris arundinacea</u>	<u>100</u>	<u>Yes</u>	<u>FACW</u>	<u>X</u> Dominance Test is >50%
2. _____	_____	_____	_____	<u>X</u> Prevalence Index is ≤3.01
3. _____	_____	_____	_____	____ Morphological Adaptations1 (Provide data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	____ Problematic Hydrophytic Vegetation1 (Explain)
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
= Total Cover				
Woody Vine Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
= Total Cover				
% Bare Ground in Herb Stratum _____	% Cover of Biotic Crust _____			<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No <u>    </u>

Remarks:

**SOIL**

Sampling Point: Wetland Plot 1

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-24	10 YR 2/1	100					Silty Clay	
24-36	10 YR 2/1	100					Silty Clay	

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

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 5 cm Mucky Peat or Peat (S3)
- 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 Depression (F8)

**Indicators for Problematic Hydric Soils:**

- Coast Prairie Redox (A16)
- Dark Surface (S7)
- Iron-Manganese Masses (F12)
- 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 present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks:

Likely depleted below dark surface.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

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

- Surface Water (A1)
- High Water Tables (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 Invertebrates (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Gauge or Well Data (D9)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- 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

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

Remarks:

## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Upland Plot 1  
 Investigators: Kendall Vandecamp Section, Township, Range: Section 35 Township 103 Range 44  
 Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): Concave Slope(%): 2  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.680000 Long: -96.080000 Datum: WGS84  
 Soil Map Unit Name: Whitewood silty clay loam, 0 to 2 percent slopes NWI Classification: NA

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

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

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u>    </u>	<b>Is the Sampled Area within a Wetland?</b>		
Hydric Soil Present?	Yes <u>    </u>	No <u>X</u>		Yes <u>    </u>	No <u>X</u>
Wetland Hydrology Present?	Yes <u>    </u>	No <u>X</u>			

Remarks:  
 This area consists of the edge of a cultivated field and grassy swale.  
 This data form is representative for field verification of signatures 34 and 35

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
= Total Cover				
Sapling/Shrub Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: OBL species <u>    </u> Multiply by: x1= <u>    </u>
2. _____	_____	_____	_____	FACW species <u>100</u> x2= <u>200</u>
3. _____	_____	_____	_____	FAC species <u>    </u> x3= <u>0</u>
4. _____	_____	_____	_____	FACU species <u>    </u> x4= <u>0</u>
5. _____	_____	_____	_____	UPL species <u>    </u> x5= <u>0</u>
= Total Cover				Column Totals: <u>100</u> (A) <u>200</u> (B)
<i>Prevalence Index = B/A =</i> <u>2.00</u>				
Herb Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Phalaris arundinacea</u>	<u>100</u>	<u>Yes</u>	<u>FACW</u>	<u>X</u> Dominance Test is >50%
2. _____	_____	_____	_____	<u>X</u> Prevalence Index is ≤3.01
3. _____	_____	_____	_____	<u>    </u> Morphological Adaptations1 (Provide data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	<u>    </u> Problematic Hydrophytic Vegetation1 (Explain)
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
= Total Cover				
Woody Vine Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
= Total Cover				
% Bare Ground in Herb Stratum <u>    </u>	% Cover of Biotic Crust <u>    </u>			<b>Hydrophytic Vegetation Present?</b> Yes <u>X</u> No <u>    </u>

Remarks:



**SOIL**

Sampling Point: Upland Plot 1

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-10	10 YR 3/1	100					Silt	
10-14	10 YR 3/2	100					Silty Clay	
14-18	10 YR 4/3	100					Silty Clay	

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

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

**Indicators for Problematic Hydric Soils:**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depression (F8)	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)		

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

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No  X

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water Stained Leaves (B9)
<input type="checkbox"/> High Water Tables (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)
	<input type="checkbox"/> Surface Soil Cracks (B6)
	<input type="checkbox"/> Drainage Patterns (B10)
	<input type="checkbox"/> Dry-Season Water Table (C2)
	<input type="checkbox"/> Crayfish Burrows (C8)
	<input checked="" 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"/> FAC-Neutral Test (D5)

**Field Observations:**

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

**Wetland Hydrology Present?** Yes  No  X

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

Remarks:

## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Upland Plot 2  
 Investigators: Kendall Vandercamp Section, Township, Range: Section 35 Township 103 Range 44  
 Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.670000 Long: -96.080000 Datum: WGS84  
 Soil Map Unit Name: Marcus silty clay loam, 0 to 2 percent slopes NWI Classification: NA

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

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

Hydrophytic Vegetation Present?	Yes <u>    </u>	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>		
Hydric Soil Present?	Yes <u>    </u>	No <u>X</u>		Yes <u>    </u>	No <u>X</u>
Wetland Hydrology Present?	Yes <u>    </u>	No <u>X</u>			

Remarks:  
 This area consists of a tilled cultivated field. This data form is representative of field verification for Signature 16

### VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1.	_____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)
2.	_____	_____	_____	_____	Total Number of Dominant Species Across All Strata: _____ (B)
3.	_____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
			= Total Cover		
Sapling/Shrub Stratum	(Plot size: )				Prevalence Index worksheet:
1.	_____	_____	_____	_____	Total % Cover of: _____ Multiply by: _____
2.	_____	_____	_____	_____	OBL species _____ x1= _____
3.	_____	_____	_____	_____	FACW species _____ x2= 0
4.	_____	_____	_____	_____	FAC species _____ x3= 0
5.	_____	_____	_____	_____	FACU species _____ x4= 0
			= Total Cover		UPL species _____ x5= 0
					Column Totals: 0 (A) 0 (B)
					<i>Prevalence Index = B/A=</i> NaN
Herb Stratum	(Plot size: )				Hydrophytic Vegetation Indicators:
1.	_____	_____	_____	_____	_____ Dominance Test is >50%
2.	_____	_____	_____	_____	<u>X</u> Prevalence Index is ≤3.01
3.	_____	_____	_____	_____	_____ Morphological Adaptations1 (Provide data in Remarks or on a separate sheet)
4.	_____	_____	_____	_____	_____ Problematic Hydrophytic Vegetation1 (Explain)
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
			= Total Cover		
Woody Vine Stratum	(Plot size: )				Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
			= Total Cover		
% Bare Ground in Herb Stratum _____		% Cover of Biotic Crust _____			<b>Hydrophytic Vegetation Present?</b> Yes <u>    </u> No <u>X</u>

Remarks:  
 This area consists of a tilled corn field and there was no vegetation at the time of the survey.

**SOIL**

Sampling Point: Upland Plot 2

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-24	10 YR 2/1	100					Silt	
24-36	10 YR 3/1	100					Silty Clay	
36-42	10 YR 4/3	100					Silty Clay	

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

<b>Hydic Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b>		<b>Indicators for Problematic Hydic Soils:</b>
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depression (F8)	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)		

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

<b>Restrictive Layer (if present):</b> Type: _____ Depth (inches): _____	<b>Hydic Soil Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X
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Remarks:

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b>		<i>Secondary Indicators (2 or more required)</i>
Primary Indicators (minimum of one required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Tables (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)	

<b>Field Observations:</b> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X Depth (inches): _____ (includes capillary fringe)	<b>Wetland Hydrology Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Upland Plot 3  
 Investigators: Kendall Vandercamp Section, Township, Range: Section 35 Township 103 Range 44  
 Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): None Slope(%): 0  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.680000 Long: -96.070000 Datum: WGS84  
 Soil Map Unit Name: Whitewood silty clay loam, 0 to 2 percent slopes NWI Classification: NA

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

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

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	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"/>			

Remarks:  
 This area is within a tilled corn field. This data form is representative of field verification for Signature 11 and 44.

### VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1.	_____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)
2.	_____	_____	_____	_____	Total Number of Dominant Species Across All Strata: _____ (B)
3.	_____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
			= Total Cover		
Sapling/Shrub Stratum	(Plot size: )				Prevalence Index worksheet:
1.	_____	_____	_____	_____	Total % Cover of: OBL species _____ Multiply by: x1= _____
2.	_____	_____	_____	_____	FACW species _____ x2= 0
3.	_____	_____	_____	_____	FAC species _____ x3= 0
4.	_____	_____	_____	_____	FACU species _____ x4= 0
5.	_____	_____	_____	_____	UPL species _____ x5= 0
			= Total Cover		Column Totals: 0 (A) 0 (B)
					<i>Prevalence Index = B/A=</i> NaN
Herb Stratum	(Plot size: )				Hydrophytic Vegetation Indicators:
1.	_____	_____	_____	_____	<input type="checkbox"/> Dominance Test is >50%
2.	_____	_____	_____	_____	<input checked="" type="checkbox"/> Prevalence Index is ≤3.01
3.	_____	_____	_____	_____	<input type="checkbox"/> Morphological Adaptations1 (Provide data in Remarks or on a separate sheet)
4.	_____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation1 (Explain)
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
			= Total Cover		Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum	(Plot size: )				Hydrophytic Vegetation Present?
1.	_____	_____	_____	_____	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2.	_____	_____	_____	_____	
			= Total Cover		
% Bare Ground in Herb Stratum _____		% Cover of Biotic Crust _____			

Remarks:  
 This area consists of a tilled corn field. No vegetation was present at the time of the survey.

**SOIL**

Sampling Point: Upland Plot 3

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-24	10 YR 2/1	100					Silt	
24-36	10 YR 3/1	100					Silty Clay	
36-42	10 YR 4/3	100					Silty Clay	

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

Hydic Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydic Soils:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depression (F8)		
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)			

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

<p><b>Restrictive Layer (if present):</b></p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p><b>Hydic Soil Present?</b>    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    X <input type="checkbox"/></p>
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Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Tables (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)	

<p><b>Field Observations:</b></p> <p>Surface Water Present?    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    X <input type="checkbox"/>    Depth (inches): _____</p> <p>Water Table Present?    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    X <input type="checkbox"/>    Depth (inches): _____</p> <p>Saturation Present?    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    X <input type="checkbox"/>    Depth (inches): _____ (includes capillary fringe)</p>	<p><b>Wetland Hydrology Present?</b>    Yes <input type="checkbox"/>    No <input type="checkbox"/>    X <input checked="" type="checkbox"/></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Upland Plot 4  
 Investigators: Kendall Vandercamp Section, Township, Range: Section 35 Township 103 Range 44  
 Landform (hillslope, terrace, etc.): Shoulder Local Relief (concave, convex, none): Concave Slope(%): 1  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.680000 Long: -96.080000 Datum: WGS84  
 Soil Map Unit Name: Marcus silty clay loams, 0 to 2 percent slopes NWI Classification: NA

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

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

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	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"/>			

Remarks:  
 This area is within a cultivated corn field. This data form is representative of field verification for Signature 35.

### VEGETATION – Use scientific names of plants.

Tree Stratum	(Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1.	_____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)
2.	_____	_____	_____	_____	Total Number of Dominant Species Across All Strata: _____ (B)
3.	_____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
			= Total Cover		
Sapling/Shrub Stratum	(Plot size: )				Prevalence Index worksheet:
1.	_____	_____	_____	_____	Total % Cover of: OBL species _____ Multiply by: x1= _____
2.	_____	_____	_____	_____	FACW species _____ x2= 0
3.	_____	_____	_____	_____	FAC species _____ x3= 0
4.	_____	_____	_____	_____	FACU species _____ x4= 0
5.	_____	_____	_____	_____	UPL species _____ x5= 0
			= Total Cover		Column Totals: 0 (A) 0 (B)
					<i>Prevalence Index = B/A=</i> NaN
Herb Stratum	(Plot size: )				Hydrophytic Vegetation Indicators:
1.	_____	_____	_____	_____	<input type="checkbox"/> Dominance Test is >50%
2.	_____	_____	_____	_____	<input checked="" type="checkbox"/> Prevalence Index is ≤3.01
3.	_____	_____	_____	_____	<input type="checkbox"/> Morphological Adaptations1 (Provide data in Remarks or on a separate sheet)
4.	_____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation1 (Explain)
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
			= Total Cover		Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum	(Plot size: )				Hydrophytic Vegetation Present?
1.	_____	_____	_____	_____	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2.	_____	_____	_____	_____	
			= Total Cover		
% Bare Ground in Herb Stratum _____		% Cover of Biotic Crust _____			

Remarks:  
 This area is within a tilled corn field. No vegetation was present at the time of the survey.

**SOIL**

Sampling Point: Upland Plot 4

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-18	10 YR 2/1	50	10 YR 3/1	50			Silty Clay	Two matrix colors, no redox.
18-24	10 YR 4/3	100					Clay	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depression (F8)		
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)			

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

<p><b>Restrictive Layer (if present):</b></p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p><b>Hydric Soil Present?</b>    Yes <input type="checkbox"/>    No <input type="checkbox"/>    X <input checked="" type="checkbox"/></p>
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Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (2 or more required)
Primary Indicators (minimum of one required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Tables (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)	

<p><b>Field Observations:</b></p> <p>Surface Water Present?    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    X <input type="checkbox"/>    Depth (inches): _____</p> <p>Water Table Present?    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    X <input type="checkbox"/>    Depth (inches): _____</p> <p>Saturation Present?    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    X <input type="checkbox"/>    Depth (inches): _____ (includes capillary fringe)</p>	<p><b>Wetland Hydrology Present?</b>    Yes <input type="checkbox"/>    No <input type="checkbox"/>    X <input checked="" type="checkbox"/></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Upland Plot 6  
 Investigators: Kendall Vandercamp Section, Township, Range: Section 27 Yownship 103 Range 44  
 Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): Concave Slope(%): 2  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.700000 Long: -96.100000 Datum: WGS84  
 Soil Map Unit Name: Whitewood silty clay loam, 0 to 2 percent slopes NWI Classification: NA

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

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

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	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"/>			

Remarks:  
 This area is within a tilled corn field. This data form is representative of field verification for Signatures 12, 13, 17, 18, 19, 36, and 49.

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A) Total Number of Dominant Species Across All Strata: _____ (B) Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
= Total Cover				
Sapling/Shrub Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of:                      Multiply by: OBL species                              x1= _____ FACW species                            x2= 0 FAC species                                x3= 0 FACU species                            x4= 0 UPL species                                x5= 0 Column Totals:                          0 (A)                      0 (B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
= Total Cover				
Herb Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. _____	_____	_____	_____	Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.01 Morphological Adaptations1 (Provide data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation1 (Explain)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
= Total Cover				
Woody Vine Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____	_____	_____	_____	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. _____	_____	_____	_____	
= Total Cover				
% Bare Ground in Herb Stratum _____	%	Cover of Biotic Crust _____	%	

Remarks:  
 This area is within a tilled corn field. No vegetation was present at the time of the survey.

**SOIL**

Sampling Point: Upland Plot 6

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-18	10 YR 2/1	100					Silty Clay	
18-20	10 YR 4/3	100					Silty Clay	

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

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 5 cm Mucky Peat or Peat (S3)
- 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 Depression (F8)

**Indicators for Problematic Hydric Soils:**

- Coast Prairie Redox (A16)
- Dark Surface (S7)
- Iron-Manganese Masses (F12)
- 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 present):**

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No  X

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

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

- Surface Water (A1)
- High Water Tables (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 Invertebrates (B13)
- True Aquatic Plants (B14)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Gauge or Well Data (D9)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)

**Field Observations:**

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

**Wetland Hydrology Present?** Yes  No  X

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

Remarks:

## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Upland Plot 7  
 Investigators: Kendall Vandercamp Section, Township, Range: Section 27 Township 103 Range 44  
 Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): Concave Slope(%): 2  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.700000 Long: -96.100000 Datum: WGS84  
 Soil Map Unit Name: Rushmore silty clay loam, 0 to 2 percent slopes NWI Classification: NA

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

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

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	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"/>			

Remarks:  
 This area is within a tilled corn field. This data form is representative of field verification for Signature 1, 2, and 3.

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: _____ (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
		= Total Cover		
Sapling/Shrub Stratum (Plot size: )				Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: OBL species _____ Multiply by: x1= _____
2. _____	_____	_____	_____	FACW species _____ x2= 0
3. _____	_____	_____	_____	FAC species _____ x3= 0
4. _____	_____	_____	_____	FACU species _____ x4= 0
5. _____	_____	_____	_____	UPL species _____ x5= 0
		= Total Cover		Column Totals: 0 (A) 0 (B)
				<i>Prevalence Index = B/A=</i> NaN
Herb Stratum (Plot size: )				Hydrophytic Vegetation Indicators:
1. _____	_____	_____	_____	<input type="checkbox"/> Dominance Test is >50%
2. _____	_____	_____	_____	<input checked="" type="checkbox"/> Prevalence Index is ≤3.01
3. _____	_____	_____	_____	<input type="checkbox"/> Morphological Adaptations1 (Provide data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation1 (Explain)
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
		= Total Cover		
Woody Vine Stratum (Plot size: )				Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
		= Total Cover		
% Bare Ground in Herb Stratum _____		% Cover of Biotic Crust _____		<b>Hydrophytic Vegetation Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Remarks:  
 This area is within a tilled corn field. No vegetation was present at the time of the survey.

**SOIL**

Sampling Point: Upland Plot 7

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-8	10 YR 2/1	100					Silt	
8-18	10 YR 3/1	100					Silty Clay	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Dark Surface (S7)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Iron-Manganese Masses (F12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depression (F8)		
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)			

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

<p><b>Restrictive Layer (if present):</b></p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p><b>Hydric Soil Present?</b>    Yes _____ No _____ <b>X</b></p>
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Remarks:

**HYDROLOGY**

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Tables (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)	

<p><b>Field Observations:</b></p> <p>Surface Water Present?    Yes _____ No <b>X</b>    Depth (inches): _____</p> <p>Water Table Present?    Yes _____ No <b>X</b>    Depth (inches): _____</p> <p>Saturation Present?    Yes _____ No <b>X</b>    Depth (inches): _____ (includes capillary fringe)</p>	<p><b>Wetland Hydrology Present?</b>    Yes _____ No <b>X</b></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:



## WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Elk Creek City/County: Rock Sampling Date: 5/6/2019  
 Applicant/Owner: Geronimo State: Minnesota Sampling Point: Upland Plot 5  
 Investigators: Kendall Vandercamp Section, Township, Range: Section 27 Township 103 Range 44  
 Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): Concave Slope(%): 2  
 Subregion (LRR): 103 - Central Iowa and Lat: 43.690000 Long: -96.090000 Datum: WGS84  
 Soil Map Unit Name: Whitewood silty clay loam, 0 to 2 percent NWI Classification: NA

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

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

Hydrophytic Vegetation Present?	Yes <u>    </u>	No <u>X</u>	<b>Is the Sampled Area within a Wetland?</b>	Yes <u>    </u>	No <u>X</u>
Hydric Soil Present?	Yes <u>    </u>	No <u>X</u>			
Wetland Hydrology Present?	Yes <u>    </u>	No <u>X</u>			

Remarks:  
 This plot is within a grassy drainage. This data form is representative of field verification for Signatures 14, 26, 27, 46, and 47.

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
= Total Cover				
Sapling/Shrub Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____	_____	_____	_____	Total % Cover of: OBL species <u>    </u> x1= <u>    </u>
2. _____	_____	_____	_____	FACW species <u>    </u> x2= <u>0</u>
3. _____	_____	_____	_____	FAC species <u>    </u> x3= <u>0</u>
4. _____	_____	_____	_____	FACU species <u>100</u> x4= <u>400</u>
5. _____	_____	_____	_____	UPL species <u>    </u> x5= <u>0</u>
= Total Cover				Column Totals: <u>100</u> (A) <u>400</u> (B)
				<i>Prevalence Index = B/A= 4.00</i>
Herb Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Bromus inermis</u>	<u>100</u>	<u>Yes</u>	<u>FACU</u>	<u>    </u> Dominance Test is >50%
2. _____	_____	_____	_____	<u>    </u> Prevalence Index is ≤3.01
3. _____	_____	_____	_____	<u>    </u> Morphological Adaptations1 (Provide data in Remarks or on a separate sheet)
4. _____	_____	_____	_____	<u>    </u> Problematic Hydrophytic Vegetation1 (Explain)
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
= Total Cover				
Woody Vine Stratum (Plot size: )	Absolute % Cover	Dominant Species?	Indicator Status	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
= Total Cover				
% Bare Ground in Herb Stratum <u>    </u>		% Cover of Biotic Crust <u>    </u>		<b>Hydrophytic Vegetation Present?</b> Yes <u>    </u> No <u>X</u>

Remarks:

**SOIL**

Sampling Point: Upland Plot 5

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type	Loc		
0-18	10 YR 2/1	100					Silt	
18-36	10 YR 3/1	100					Silt	
36-42	10 YR 4/2	96	10 YR 4/4	4	C	M	Clay	

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

<b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b>		<b>Indicators for Problematic Hydric Soils:</b>
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2 cm Muck (A10)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depression (F8)	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)		

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

<p><b>Restrictive Layer (if present):</b></p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p><b>Hydric Soil Present?</b>    Yes _____ No _____ <b>X</b></p>
---	---

Remarks:

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b>		<i>Secondary Indicators (2 or more required)</i>
Primary Indicators (minimum of one required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Tables (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C)	<input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)	

<p><b>Field Observations:</b></p> <p>Surface Water Present?    Yes _____ No <b>X</b>    Depth (inches): _____</p> <p>Water Table Present?    Yes _____ No <b>X</b>    Depth (inches): _____</p> <p>Saturation Present?    Yes _____ No <b>X</b>    Depth (inches): _____ (includes capillary fringe)</p>	<p><b>Wetland Hydrology Present?</b>    Yes _____ No <b>X</b></p>
--	---

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

Remarks:

# Appendix B

Ground Level Photography



Photo 1. Facing Southwest



Photo 2. Facing North





Photo 3. Facing South



Photo 4. Facing South





Photo 5. Facing West



Photo 6. Facing North



Photo 7. Facing West



Photo 8. Facing South





Photo 9. Facing West



Photo 10. Facing Northwest



Photo 11. Facing East



Photo 12. Facing West



Photo 13. Facing South



Photo 14. Facing South





Photo 15. Facing South



Photo 16. Facing South



Photo 17. Facing East



Photo 18. Facing South





Photo 19. Facing South



Photo 20. Facing South



Photo 21. Facing Southeast



Photo 22. Facing East





Photo 23. Facing North



Photo 24. Facing North




# Appendix C

Minnesota Climatology Working Group Antecedent Precipitation Data

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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Friday, August 15, 2003**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>July 2003</b>	second prior month: <b>June 2003</b>	third prior month: <b>May 2003</b>
estimated precipitation total for this location:	<b>2.41</b>	<b>4.98</b>	<b>3.28</b>
there is a 30% chance this location will have less than:	2.22	3.42	1.92
there is a 30% chance this location will have more than:	3.96	5.60	4.11
type of month: <b>dry normal wet</b>	<b>normal</b>	<b>normal</b>	<b>normal</b>
monthly score	<b>3 * 2 = 6</b>	<b>2 * 2 = 4</b>	<b>1 * 2 = 2</b>
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	<b>12 (Normal)</b>		

### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions \(BWSR\)](#)

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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Monday, August 9, 2004**

### Score using 1981-2010 normal period


values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>July 2004</b>	second prior month: <b>June 2004</b>	third prior month: <b>May 2004</b>
estimated precipitation total for this location:	<b>5.47</b>	<b>2.24</b>	<b>7.03</b>
there is a 30% chance this location will have less than:	2.22	3.42	1.92
there is a 30% chance this location will have more than:	3.96	5.60	4.11
type of month: <b>dry</b> normal <b>wet</b>	<b>wet</b>	<b>dry</b>	<b>wet</b>
monthly score	<b>3 * 3 = 9</b>	<b>2 * 1 = 2</b>	<b>1 * 3 = 3</b>
multi-month score: 6 to 9 ( <b>dry</b> ) 10 to 14 (normal) 15 to 18 ( <b>wet</b> )	<b>14 (Normal)</b>		

### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions \(BWSR\)](#)

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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Monday, September 12, 2005**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>August 2005</b>	second prior month: <b>July 2005</b>	third prior month: <b>June 2005</b>
estimated precipitation total for this location:	<b>2.47</b>	<b>3.60</b>	<b>5.82</b>
there is a 30% chance this location will have less than:	2.55	2.22	3.42
there is a 30% chance this location will have more than:	4.19	3.96	5.60
type of month: <b>dry</b> normal wet	<b>dry</b>	<b>normal</b>	<b>wet</b>
monthly score	<b>3 * 1 = 3</b>	<b>2 * 2 = 4</b>	<b>1 * 3 = 3</b>
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	<b>10 (Normal)</b>		


### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions](#) (BWSR)



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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Friday, August 11, 2006**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>July 2006</b>	second prior month: <b>June 2006</b>	third prior month: <b>May 2006</b>
estimated precipitation total for this location:	<b>0.10</b>	<b>4.00</b>	<b>1.18</b>
there is a 30% chance this location will have less than:	2.22	3.42	1.92
there is a 30% chance this location will have more than:	3.96	5.60	4.11
type of month: <b>dry</b> normal wet	<b>dry</b>	<b>normal</b>	<b>dry</b>
monthly score	<b>3 * 1 = 3</b>	<b>2 * 2 = 4</b>	<b>1 * 1 = 1</b>
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	<b>8 (Dry)</b>		

### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions](#) (BWSR)



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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Friday, July 4, 2008**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>June 2008</b>	second prior month: <b>May 2008</b>	third prior month: <b>April 2008</b>
estimated precipitation total for this location:	<b>5.29</b>	<b>4.98</b>	<b>2.33</b>
there is a 30% chance this location will have less than:	3.42	1.92	2.21
there is a 30% chance this location will have more than:	5.60	4.11	3.49
type of month: <b>dry</b> normal wet	<b>normal</b>	<b>wet</b>	<b>normal</b>
monthly score	<b>3 * 2 = 6</b>	<b>2 * 3 = 6</b>	<b>1 * 2 = 2</b>
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	<b>14 (Normal)</b>		

### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions \(BWSR\)](#)

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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Thursday, September 17, 2009**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>August 2009</b>	second prior month: <b>July 2009</b>	third prior month: <b>June 2009</b>
estimated precipitation total for this location:	<b>2.69</b>	<b>3.27</b>	<b>4.66</b>
there is a 30% chance this location will have less than:	2.55	2.22	3.42
there is a 30% chance this location will have more than:	4.19	3.96	5.60
type of month: <b>dry</b> normal wet	<b>normal</b>	<b>normal</b>	<b>normal</b>
monthly score	<b>3 * 2 = 6</b>	<b>2 * 2 = 4</b>	<b>1 * 2 = 2</b>
multi-month score: <b>6 to 9 (dry)</b> 10 to 14 (normal) 15 to 18 (wet)	<b>12 (Normal)</b>		

### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions](#) (BWSR)

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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Thursday, June 24, 2010**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>May 2010</b>	second prior month: <b>April 2010</b>	third prior month: <b>March 2010</b>
estimated precipitation total for this location:	<b>2.32</b>	<b>2.51</b>	<b>0.89</b>
there is a 30% chance this location will have less than:	1.92	2.21	1.00
there is a 30% chance this location will have more than:	4.11	3.49	1.80
type of month: <b>dry normal wet</b>	<b>normal</b>	<b>normal</b>	<b>dry</b>
monthly score	<b>3 * 2 = 6</b>	<b>2 * 2 = 4</b>	<b>1 * 1 = 1</b>
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	<b>11 (Normal)</b>		


### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions \(BWSR\)](#)



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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Wednesday, September 25, 2013**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>August 2013</b>	second prior month: <b>July 2013</b>	third prior month: <b>June 2013</b>
estimated precipitation total for this location:	<b>1.76</b>	<b>0.35</b>	<b>5.91</b>
there is a 30% chance this location will have less than:	2.55	2.22	3.42
there is a 30% chance this location will have more than:	4.19	3.96	5.60
type of month: <b>dry</b> normal <b>wet</b>	<b>dry</b>	<b>dry</b>	<b>wet</b>
monthly score	<b>3 * 1 = 3</b>	<b>2 * 1 = 2</b>	<b>1 * 3 = 3</b>
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	<b>8 (Dry)</b>		

### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
- [Evaluating Antecedent Precipitation Conditions](#) (BWSR)

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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Wednesday, July 15, 2015**

### Score using 1981-2010 normal period


values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>June 2015</b>	second prior month: <b>May 2015</b>	third prior month: <b>April 2015</b>
estimated precipitation total for this location:	<b>3.48</b>	<b>4.83</b>	<b>1.17</b>
there is a 30% chance this location will have less than:	3.42	1.92	2.21
there is a 30% chance this location will have more than:	5.60	4.11	3.49
type of month: <b>dry</b> normal wet	<b>normal</b>	<b>wet</b>	<b>dry</b>
monthly score	<b>3 * 2 = 6</b>	<b>2 * 3 = 6</b>	<b>1 * 1 = 1</b>
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	<b>13 (Normal)</b>		

### Other Resources:

- [retrieve daily precipitation data](#)
- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
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## Precipitation Worksheet Using Gridded Database

### Precipitation data for target wetland location:

county: **Rock** township number: **103N**  
township name: **Vienna** range number: **44W**  
nearest community: **Magnolia** section number: **27**

### Aerial photograph or site visit date:

**Friday, September 1, 2017**

### Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: <b>August 2017</b>	second prior month: <b>July 2017</b>	third prior month: <b>June 2017</b>
estimated precipitation total for this location:	<b>5.29</b>	<b>0.99</b>	<b>3.99</b>
there is a 30% chance this location will have less than:	2.55	2.22	3.42
there is a 30% chance this location will have more than:	4.19	3.96	5.60
type of month: <b>dry normal wet</b>	<b>wet</b>	<b>dry</b>	<b>normal</b>
monthly score	<b>3 * 3 = 9</b>	<b>2 * 1 = 2</b>	<b>1 * 2 = 2</b>
multi-month score: <b>6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)</b>	<b>13 (Normal)</b>		

### Other Resources:

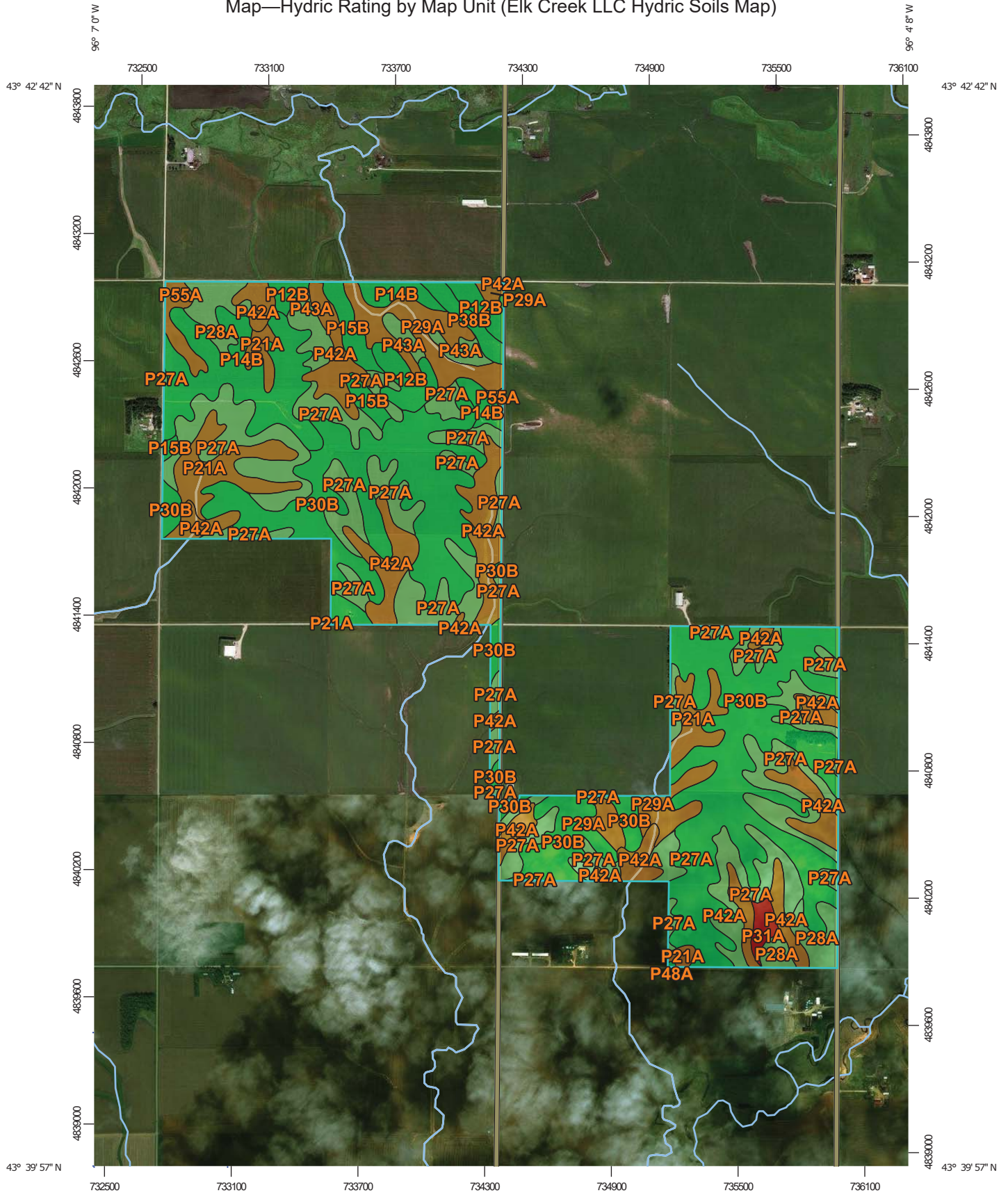
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- [view radar-based precipitation estimates](#)
- [view weekly precipitation maps](#)
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# Appendix D

USDA Web Soil Survey Hydric Rating by Map Unit

Custom Soil Resource Report  
 Map—Hydric Rating by Map Unit (Elk Creek LLC Hydric Soils Map)




Map Scale: 1:24,800 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84







### MAP LEGEND

**Area of Interest (AOI)**







 Area of Interest (AOI)

**Soils**







**Soil Rating Polygons**

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available


**Soil Rating Lines**

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available






**Soil Rating Points**

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available


**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rock County, Minnesota  
 Survey Area Data: Version 16, Oct 9, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 27, 2012—Mar 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



**Table—Hydric Rating by Map Unit (Elk Creek LLC Hydric Soils Map)**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
P12B	Everly silty clay loam, 2 to 6 percent slopes	0	26.3	2.7%
P14B	Flandreau silt loam, 2 to 6 percent slopes	0	77.9	8.0%
P15B	Galva silty clay loam, 2 to 5 percent slopes	0	17.2	1.8%
P21A	Marcus silty clay loam, 0 to 2 percent slopes	95	49.2	5.1%
P27A	Primghar silty clay loam, 1 to 3 percent slopes	8	220.0	22.7%
P28A	Ransom silty clay loam, 1 to 3 percent slopes	8	29.9	3.1%
P29A	Rushmore silty clay loam, 0 to 2 percent slopes	90	54.7	5.6%
P30B	Sac silty clay loam, loam substratum, 2 to 5 percent slopes	0	330.2	34.0%
P31A	Spicer silty clay loam, 0 to 2 percent slopes	100	6.0	0.6%
P38B	Thurman sandy loam, 2 to 6 percent slopes	0	9.2	1.0%
P42A	Whitewood silty clay loam, 0 to 2 percent slopes	80	119.7	12.3%
P43A	Wilmington silty clay loam, 1 to 3 percent slopes	5	20.3	2.1%
P48A	Allendorf silty clay loam, 0 to 2 percent slopes	0	0.2	0.0%
P55A	Kato silty clay loam, 0 to 2 percent slopes	90	9.6	1.0%
<b>Totals for Area of Interest</b>			<b>970.3</b>	<b>100.0%</b>

**Rating Options—Hydric Rating by Map Unit (Elk Creek LLC Hydric Soils Map)**

*Aggregation Method:* Percent Present

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute

value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Percent Present" returns the cumulative percent composition of all components of a map unit for which a certain condition is true. For example, attribute "Hydric Rating by Map Unit" returns the cumulative percent composition of all components of a map unit where the corresponding hydric rating is "Yes". Conditions may be simple or complex. At runtime, the user may be able to specify all, some or none of the conditions in question.

*Component Percent Cutoff: None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

*Tie-break Rule: Lower*

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

## **Hydric Rating by Map Unit (Elk Creek LLC Hydric Soils Map)**

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

## Custom Soil Resource Report

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

### References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

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