
**Line 5 Wisconsin Segment Relocation Project
Wetland and Waterbody Delineation Report
2020 Supplement**



Prepared for:



Prepared by:

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July 2020

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ACRONYMS

Enbridge	Enbridge Energy Company
ERM	Environmental Resource Management, Inc.
MNR	Midwest Natural Resources
NHD	National Hydrography Dataset
NRCS	U.S. Department of Agriculture Natural Resources Conservation Services
NWI	National Wetland Inventory
OHWM	Ordinary High Water Mark
Project	Enbridge's Line 5 Wisconsin Segment Relocation Project
SSURGO	Soil Survey Geographic Database
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDNR	Wisconsin Department of Natural Resources
WHD	Wisconsin Hydrography Dataset
WOUS	Waters of the United States
WWI	Wisconsin Wetland Inventory

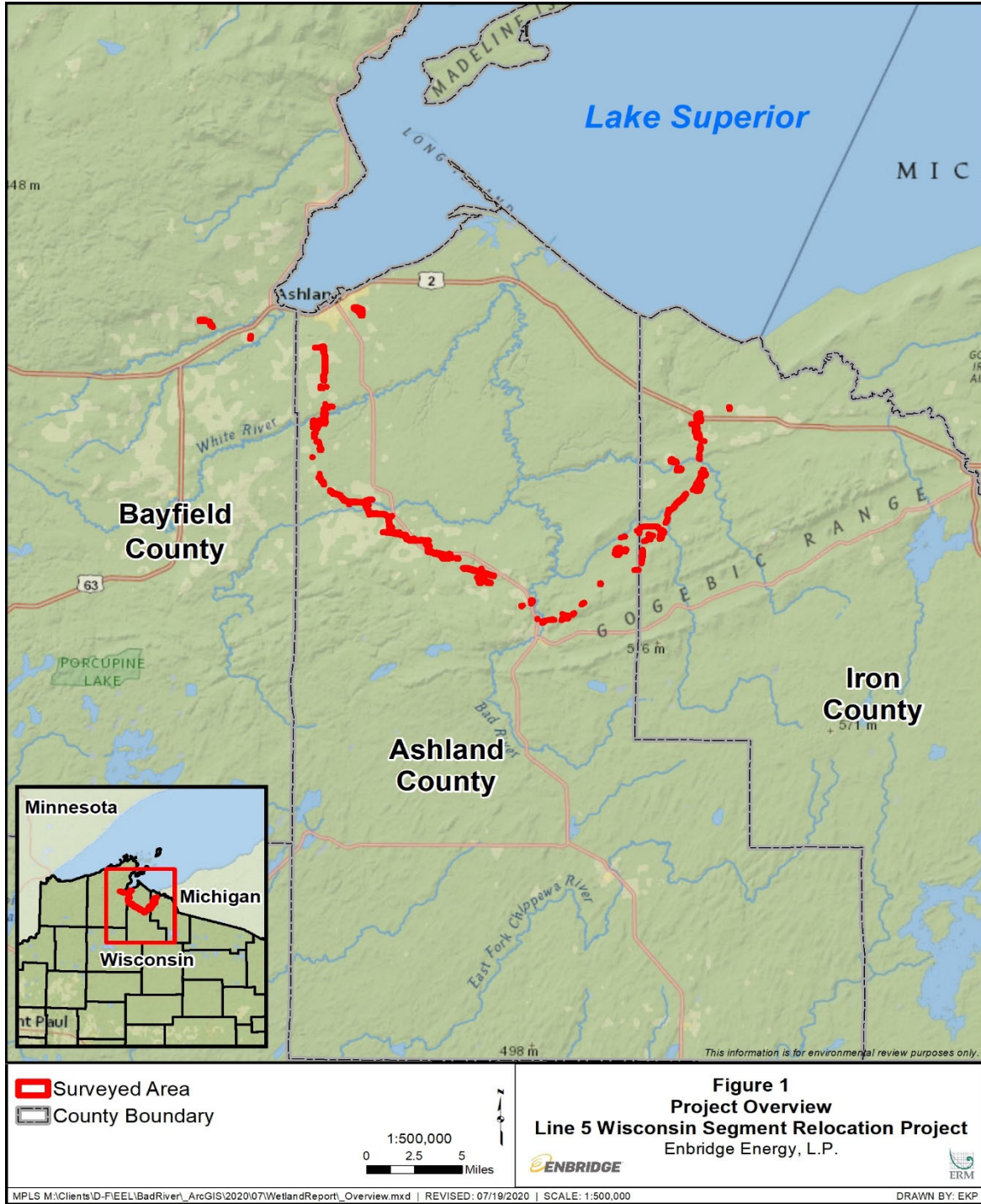
1.0 INTRODUCTION

Environmental Resource Management, Inc. (“ERM”), on behalf of Enbridge Energy, Limited Partnership (“Enbridge”), was contracted to oversee a comprehensive delineation and assessment of all wetlands and waterbodies as part of Enbridge’s Line 5 Wisconsin Segment Relocation Project (“Project”). Fieldwork for the wetland and waterbody delineation began during the 2019 field season, and the results of the 2019 fieldwork were documented in the initial wetland delineation report, dated February 2020. This supplement to the initial wetland delineation report documents additional wetland and waterbody surveys that were completed on tracts that were previously denied access during the 2019 field season, as well as additional areas of survey corridor that were added due to minor Project adjustments. The wetlands and waterbodies documented in this report include both new wetlands and waterbodies that were not previously identified in 2019, or extensions to wetlands and streams that were previously identified in 2019.

The fieldwork for the 2020 wetland/waterbody delineations was subcontracted to Midwest Natural Resources (“MNR”). The survey corridor is within the U.S. Army Corps of Engineers (“USACE”) St. Paul District. Wetland and waterbody surveys were conducted along accessible tracts located in Iron, Ashland, and Bayfield Counties, Wisconsin (Figure 1). Figure 1 represents the current survey corridor, which includes all the areas surveyed in 2020 and in 2019. The field surveys for this 2020 supplement to the Project were completed from late May 26, 2020 to July 10, 2020. The credentials of the lead delineators are included in Appendix A.

This report provides an initial assessment of all wetlands, ponds, and streams identified within the survey corridor, based on MNR’s best professional judgment and interpretation of the *USACE 1987 Wetland Delineation Manual* (Environmental Laboratory 1987) herein referred to as the *USACE 1987 Wetland Manual*; the *USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)* (USACE 2012); herein referred to as the Northcentral and Northeast Regional Supplement; the *USACE Regulatory Guidance Letter regarding Ordinary High Water Mark Identification* (December 7, 2005); the *Guidance for Submittal of Delineation Reports to the St. Paul District USACE and Wisconsin Department of Natural Resources* (WDNR) (USACE & WDNR 2015); herein referred to as USACE/WDNR Guidance; and other USACE and United States guidance documents and regulations.

The methodology for completing wetland/waterbody delineations and assessing no-points, follows the same general protocol used during the 2019 field delineations. This methodology is described in detail in the initial wetland report, dated February 2020, and is not repeated in this supplemental report.



2.0 BACKGROUND INFORMATION – SOURCES REVIEWED

The following sources of information were consulted to identify potential wetlands:

- U.S. Fish and Wildlife Service (“USFWS”) NWI Maps
- Wisconsin Department of Natural Resources (“WDNR”) Wetland Inventory Maps (“WWI”)
- U.S. Geological Survey (“USGS”) Topographic Maps
- USGS National Hydrography Dataset (“NHD”)
- Wisconsin Hydrography Dataset (“WHD”)
- U.S. Department of Agriculture Natural Resources Conservation Services (“NRCS”) Soil Survey Geographic Database (“SSURGO”)
- Google Earth Historical Imagery, Google Corp. accessed 2020
- Microsoft Aerial Imagery, Microsoft Corporation dated 2020
- NRCS Wetland Determination WETS Tables, accessed 2020

The information included above has been updated in this supplement as necessary. An updated soil list for the 2020 survey corridor is included in Appendix B. The precipitation conditions for the 2020 field delineations are summarized in Table 2.1-1 below.

TABLE 2.1-1			
Precipitation Conditions by Weather Station			
County/Weather Station	May 2020	June 2020	July 2020
Ashland/ Mellen NE, WI #475286	Normal	Normal	Dry
Iron/ Hurley, WI #473800	Normal	Normal	Dry
Bayfield/ Barnes, WI #55007	Normal	Normal	Dry

3.0 SITE DESCRIPTION AND RESULTS

3.1 Wetlands

A total of 451 wetlands were identified or extended in the 2020 survey corridor. These wetlands include new wetland polygons and significant extensions of wetlands previously identified in 2019. The wetland features delineated in 2020 are listed in table C-1 in Appendix C and include the county, wetland name, approximate latitude/longitude location, Cowardin classification, Eggers classification, and map page reference number. Data sheets and photographs for each wetland and upland sampling point are provided in Appendix D. Data

sheets are generally organized west to east along the corridor. Maps showing the location of all wetlands located in the survey corridor are located in Appendix I.

3.2 Waterbodies

A total of 134 waterbodies or waterbody extensions were identified in the 2020 survey corridor. Waterbodies including rivers, streams, lakes, ponds, and impoundments identified within the survey corridor are identified in table E-1 located in Appendix E. The table includes the county, waterbody ID, approximate latitude/longitude location, waterbody name, regime, and map page reference number. Data sheets and photographs for waterbody sampling points are located in Appendix F. Maps showing the location of all waterbodies located on the project area are located in Appendix I.

3.3 Non-Water Points

A total of 59 non-water points were identified in the 2020 survey corridor. An USACE data form was completed and a photo was collected at each location identified as a WWI or NWI wetland, but where no wetland was present. No-points were also collected in areas that were identified as a WWI or NWI wetland, but were determined to be a waterbody in the field

For areas that were identified as streams on the WHD and NHD layer or that had a signature on aerial photography, but no stream was identified, a photo was collected. A no-point was also collected if the waterbody currently met the criteria of a wetland rather than a waterbody with a defined bed and bank.

A table that includes the county, approximate latitude/longitude location, unique ID, reason the point was collected, and map page reference is located in Appendix G (table G-1). Non-water point data forms for non-wetland points are located in Appendix H.

4.0 SUMMARY AND CONCLUSIONS

MNR, under the direction of ERM, conducted a wetland and waterbody delineation and assessment of all wetlands and waterbodies that fell within the survey corridor where access was available from May 2020 to July 2020. This report supplements the data that was collected during the 2019 growing season, and was documented in the initial wetland delineation report, dated February 2020. Wetland and waterbody boundaries were identified and mapped based on the parameters outlined in the 1987 Wetland Manual and the Northcentral and Northeast Regional Supplement.

Table 4-1 presents the total number of features that were identified within the 2020 survey corridor.

TABLE 4-1	
Summary of Features Identified During 2020 Surveys	
Feature Category ^a	Number of Features
PEM Wetlands	251
PSS Wetlands	47
PFO Wetlands	153

Feature Category ^a	Number of Features
Perennial Streams	24
Intermittent Streams	26
Ephemeral Streams	80
Ponds	5
^a Wetland types according to Cowardin et al. (1979): PEM = palustrine emergent PSS = palustrine scrub-shrub PFO = palustrine forested	

5.0 REFERENCES

- Cowardin, L.M., V. Carter, F.C. Golet, E. T. LaRoe. 1979. *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center.
- Eggers, S.D. and D.M. Reed. 2011. *Wetland Plants and Plant Communities of Minnesota and Wisconsin, Third Edition*. U.S. Army Corps of Engineers, St. Paul District.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.
- Federal Register. 1993. *33 CFR Part 328;: Definition of Waters of the United States*. U.S. Government Printing Office, Washington, D.C. (51 FR 41250, Nov. 13, 1986, as amended at 58 FR 45036, Aug. 25, 1993).
- Federal Register. 2012. *Publication of the Final National Wetland Plant List*. Vol. 77, No. 90, May 9, 2012, pp. 27210-27214.
- Soil Survey Staff. 2013. Natural Resources Conservation Service, United States Department of Agriculture. Available online at: <http://websoilsurvey.nrcs.usda.gov/>. Accessed July 2020.
- U.S. Army Corps of Engineers. 2005. *Ordinary High Water Mark Identification*. Regulatory Guidance Letter No. 05-05.
- U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*. ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble, and J.F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture. Natural Resources Conservation Service. 2020. NRCS - Field Office Technical Guide County Locator. Available online at: http://efotg.sc.egov.usda.gov/efotg_locator.aspx. Accessed July 2020.

U.S. Geological Survey. 2020a. Hydrography, *National Hydrography Dataset*. Available online at: <http://nhd.usgs.gov/>. Accessed July 2020.

U.S. Geological Survey. 2020b. *National Hydrography Dataset Feature Directory*. Available online at: <http://nhd.usgs.gov/FeatureDirectory.pdf>. Accessed July 2020.

Wisconsin Department of Natural Resources. 2020. *Wetland mapping*. Available online at: <http://dnr.wi.gov/topic/wetlands/inventory.html>. Accessed July 2020.

APPENDIX A

Wetland Delineator Qualifications

EDUCATION

MS Biological Sciences
University of Mississippi
Oxford, Mississippi
December 1999

BS Botany
Iowa State University
Ames, Iowa
December 1996

CERTIFICATIONS

- Professional Wetland Scientist (1609) – Society of Wetland Scientists
 - Minnesota Certified Wetland Delineator (1214)
 - DNR list of qualified surveyors for vascular plant surveys
 - DNR list of qualified surveyors for *Botrychium* and *Sceptridium*
 - DNR list of qualified surveyors for the western prairie fringed orchid (*Platanthera praeclara*)
 - DNR list of qualified surveyors for the dwarf trout lily (*Erythronium propullans*)
 - DNR list of qualified surveyors for the prairie bush clover (*Lespedeza leptostachya*)
 - DNR Special Permit (22798) to collect and voucher rare plants
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PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2005-Current)

RARE PLANT SURVEYS

- Line 3 Replacement Project – (2016-2019) – Minnesota
- Bull-Moose 115 kV Transmission Line (2018-2019) – Cass County, MN
- Temperance River State Park (2019) – Cook County, MN
- Cass County Highway Department Ram's head survey (2019) – Cass County, MN
- Waite Park (Martin Marietta) (2019) – Stearns County, MN
- Medicine Quarry (Martin Marietta) (2019) – Yellow Medicine County, MN
- Lake Vermillion State Park (2019) – St. Louis County, MN
- Cass County Ram's-head Surveys (2019) – Cass County, MN
- Catchers Creek (2019) – Anoka County, MN
- Balfany South (2019) – Anoka County, MN
- Andover 35 (2019) – Anoka County, MN
- Andover Blvd. 5 (2019) – Anoka County, MN
- JSN Properties (2019) – Anoka County, MN
- Wilkinson Villas and Anderson Woods (2019) – Anoka County, MN
- Highway 610 – Coon Rapids (2019) – Anoka County, MN
- Entsminger (2018) – Ham Lake, Anoka County, MN
- Arbuckle II Pipeline Project *Abronia macrocarpa* Surveys (2018) – Texas
- Arbuckle II Pipeline Project *Spiranthes parksii* Surveys (2018) – Texas

- Demicks Lake Pipeline Project (2018) – North Dakota
- United Properties (2018) – Centerville, Anoka County, MN
- Amaris – Park Storage (2018) – Lino Lake, Anoka County, MN
- Hidden Forest South (2018) – Ham Lake, Anoka County, MN
- Andover Turkey Farm (2018) – Andover, Anoka County, MN
- Harstad Property (2018) – Mounds View, Ramsey County, MN
- Crosstown 2 South (2018) – Ham Lake, Anoka County, MN
- Hilla Property (2018) – Lakeville, Dakota County, MN
- McDonough-Xylite Street Property (2018) – Blaine, Anoka County, MN
- Bull Moose 115kV Rare Plant Survey (2018) – Aitkin County, MN
- Cuyuna Trail – (2018) – Crow Wing County, MN
- Hawkes Company Peatland Expansion (2017) – Marshall County, MN
- De Soto National Forest (2017) – Harrison County, MS
- Oakwood Realty 131st Street Property (2017) – Blaine, Anoka County, MN
- Paxmar Alpine Drive Project (2017) – Ramsey, Ramsey County, MN
- Asphalt Concrete Solutions (2017) – Blaine, Anoka County, MN
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
- Lutsen Ski Resort Expansion (2016) – Cook County, MN
- Hidden Forest East (2016) – Ham Lake, Anoka County, MN
- Sandpiper Pipeline Project (2013-2016) – Minnesota
- Chippewa National Forest (2007-2015, 2019) – Minnesota
- Superior National Forest (2006-2012, 2014-2015) – Minnesota
- Athens to Martin Lake (2012-2013) – Anoka/Isanti counties, MN
- Charcoal 6 (2012) – Stearns County, MN
- Red Lake Peatlands Survey (2011-2012, 2014) – Minnesota
- Border States Paving (2011) – Clay County, MN
- Lakewinds Windfarm Project (2011) – Clay County, MN
- Border Lakes (2009-2010) – BWCA – Cook County, MN
- UNIMIN Mine South (2009-2010) – Le Sueur County, MN
- Chequamegon National Forest (2007/2009) – Wisconsin
- Polymet Land Exchange (2008) – Lake County, MN
- Alberta Clipper/LSr Pipeline Project (2007-2009) – Minnesota/Wisconsin

NATIVE PLANT COMMUNITY CLASSIFICATION/MAPPING

- Iron Range OHV Project (2019) – St. Louis County, MN
- BitterRoot WindFarm Project – Calcareous Fen Survey (2016-2018) – Yellow Medicine County, MN
- Seavey Bog (Peatland) Project (2017) – NPC Mapping – Aitkin County, MN
- Sandpiper Pipeline Project – Calcareous Fen Surveys (2013-2015) - Minnesota
- Koochiching County Peatland Surveys (2014)
- MN River Regional Greenway – Calcareous Fen Surveys (2013-2014) – Dakota County, MN
- Polk and Norman Counties – Calcareous Fen Surveys (2012) – Minnesota
- Trail-Gully – Calcareous Fen Surveys (2010-2011) – Polk County, MN
- Yellow Birch/Cedar Community (MHn45b) Evaluation (2010) – Lake County, MN
- UNIMIN Mine South – Calcareous Fen Mapping (2009) – Le Sueur County, MN

FAUNA HABITAT SURVEYS

- Elk Creek Pipeline Project – Eastern Spotted Skunk Habitat Evaluation (2018) – Kansas
- Jayhawk Pipeline – Eastern Spotted Skunk Habitat Evaluation (2018) – Kansas

- Highland Partners – Dakota Skipper Habitat Mapping (2018) – North Dakota
- Demicks Lake Pipeline Project – Dakota Skipper Habitat Mapping (2018) – North Dakota
- Line 66 – Karner Blue Habitat Mapping (2014) – Wisconsin
- Flanagan South Pipeline – Indiana Bat Habitat Mapping (2012-2013) – Illinois
- Flanagan South Pipeline – Eastern Spotted Skunk Habitat Evaluation (2012) – Kansas

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland and Iron counties, WI
- Temperance River State Park (2019) – Cook County, MN
- Arbuckle II Pipeline Project (2018-2019) – Texas
- Split Rock Wild Trails State Trail – Lake County, MN
- Liberty Pipeline Project (2019) - Kansas
- Lake County Bike Trail Project (2018) – Lake County, MN
- Elk Creek Pipeline Project (2018-2019) – Kansas/Montana
- Northern Natural Gas – various O&M projects – (2015-2019) – Iowa, Nebraska, North Dakota, South Dakota, Wisconsin
- Jayhawk Pipeline (2018) – Kansas
- Line 84 (2018) – North Dakota
- Highland Partners (2018) – North Dakota
- TransCanada – various O&M projects – (2013, 2017-2018) – Michigan, Missouri, Wisconsin
- Seavey Bog (Peatland) Project (2017) – Aitkin County, Minnesota
- Mountaineer Xpress Pipeline (2017) – West Virginia
- George Property (2017) – Mille Lacs County, Minnesota
- 280 Mississippi Blvd (2017) – St. Paul, Ramsey County, Minnesota
- Exelon Handsome Lake Lateral (2016) – Pennsylvania
- Gulf Xpress Pipeline (2015-2016) – Kentucky, Mississippi, Tennessee
- Line 66 (2014) – Illinois/Wisconsin
- Sandpiper Pipeline Project (2013-2015) – Minnesota
- Flanagan South Pipeline (2012) – Illinois, Missouri, Kansas, Oklahoma
- Bakken Pipeline Project (2012) – Montana
- Nashwauk Esser Steel Corridor Project (2010) – Itasca County, MN
- MinnCan Pipeline Project 2007-2008 – Minnesota

WETLAND DATA REVIEW/DESKTOP ANALYSIS/DATA MANAGEMENT

- Arbuckle II Pipeline Project (2018-2019) – Texas
- Elk Creek Pipeline Project (2018-2019) – Kansas, Montana
- Scenic Transmission Line (2018) – Aitkin County, MN
- Demicks Lake Pipeline Project (2018) – North Dakota
- Line 3 Replacement Project – (2016-2018) – Minnesota
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
- Bay Area Pipeline Project (2016) – Michigan
- Mid-Michigan Pipeline Project (2016) – Michigan
- Dakota Access Pipeline (2014-2016) – North Dakota
- Sandpiper Pipeline Project (2013-2016) – Minnesota/Wisconsin

VEGETATION ASSESSMENT AND MONITORING

- Gully 30 Calcareous Fen Monitoring (2011-Current) – Polk County, MN
- DNR Prairie Monitoring (2008-2019) – Minnesota

- Alberta Clipper Post-Construction Wetland Monitoring (2011-2015) – Minnesota/Wisconsin
- *Botrychium* monitoring (2008-2014) – Cass County, MN

MANAGEMENT PLANS

- Pennington Bog Scientific and Natural Area (In-progress)
- Lake Bronson Scientific and Natural Area (In-progress)
- Split Rock Lighthouse State Park (2016-2017)
- Gooseberry Falls State Park (2016-2017)
- Gully Scientific and Natural Area (2015-2016)
- Sandpiper Prairie Scientific and Natural Area (2015-2016)
- Santee Prairie Scientific and Natural Area (2015-2016)

MANAGEMENT PLANS

- Pennington Bog Scientific and Natural Area (2018-2019)
- Lake Bronson Scientific and Natural Area (2018-2019)
- Split Rock Lighthouse State Park (2016-2017)
- Gooseberry Falls State Park (2016-2017)
- Gully Scientific and Natural Area (2015-2016)
- Sandpiper Prairie Scientific and Natural Area (2015-2016)
- Santee Prairie Scientific and Natural Area (2015-2016)

TECHNICAL DOCUMENTS

- Floristic Quality Assessment for Prairie Parkland and Tallgrass Aspen Parklands Provinces (2019) – Project Leader
 - Floristic Quality Assessment for Minnesota Wetlands (2017) – Primary Author
-

PROJECT RESULTS – RARE PLANT FINDS

- Line 3 Replacement Project – (2016-2019) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Carex sterilis* (T)
 - *Carex formosa* (E)
 - *Carex pallescens* (E)
 - *Cladium mariscoides* (SC)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Rhynchospora capillacea* (T)
 - *Scleria verticillata* (T)
- Temperance River State Park – Campground Expansion (2019) – Cook County, MN
 - *Carex flava* (SC)
 - *Carex media* (SC)
 - *Eleocharis nitida* (E)
 - *Euphrasia hudsoniana* var. *ramosior* (SC)
 - *Pinguicula vulgaris* (SC)
 - *Trisetum spicatum* (SC)
- JSN Properties (2019) – Anoka County, MN
 - *Rubus fulleri* (T)
 - *Viola lanceolata* (T)

- Medicine Quarry (Martin Marietta) (2019) – Yellow Medicine County, MN
 - *Oregon woodsia* (SC)
- Bull-Moose 115 kV Transmission Line (2019) – Cass County, MN
 - *Poa paludigena* (T)
- Swedish Immigrant Trail (2019) – Chisago County, MN
 - *Juglans cinerea* (E)
- Chippewa National Forest (2007-2015,2019) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Botrychium mormo* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* (SC)
 - *Calypso bulbosa* (RFSS)
 - *Cypripedium arietinum* (T)
 - *Dryopteris goldiana* (SC)
 - *Malaxis monophyllos* (SC)
 - *Malaxis paludosa* (E – First known population in the CNF)
 - *Ranunculus lapponicus* (SC)
 - *Sceptridium oneidense* (E)
 - *Sceptridium rugulosum* (T)
 - *Sparganium glomeratum* (RFSS)
 - *Utricularia geminiscapa* (T - First known population in the CNF)
- Demicks Lake Pipeline Project (2018) – North Dakota
 - *Escobaria missouriensis* (RFSS)
- Amaris – Park Storage (2018) – Lino Lake, Anoka County, MN
 - *Rubus semisetosus* (E)
- Cuyuna Trail – (2018) – Crow Wing County, MN
 - *Botrychium ascendens* (E)
 - *Botrychium campestre* var. *lineare* (E)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* (SC)
 - *Botrychium spathulatum* (E)
- Hawkes Company Peatland Expansion (2017) – Marshall County, MN
 - *Androsace septentrionalis* (SC)
 - *Carex obtusata* (SC)
 - *Salix maccalliana* (SC)
 - *Salix pseudomonticola* (SC).
- De Soto National Forest (2017) – Harrison County, MS
 - *Cirsium lecontei* (MS State Tracked)
 - *Lachnocaulon digitium* (RFSS)
 - *Pinguicula planifolia* (RFSS)
 - *Platanthera nivea* (ST)
 - *Polygala douglasii* (RFSS)
 - *Rhynchospora capitellata* (ST)
 - *Rhynchospora macra* (RFSS)
 - *Scleria baldwinii* (ST)
 - *Utricularia purpurea* (ST)
 - *Xyris drummondii* (RFSS)
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
 - *Botrychium lanceolatum* (T)
 - *Botrychium simplex* var. *tenebrosum* (SC)

- *Poa paludigena* (T)
- *Rubus stipulatus* (T)
- *Trichocolea tomentella* (T – State listed liverwort)
- Hidden Forest East (2016) – Ham Lake, Anoka County, MN
 - *Gaylussacia baccata* (T)
- Sandpiper Pipeline Project (2013-2016) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Botrychium simplex* var. *tenebrosum* (SC)
 - *Carex sterilis* (T)
 - *Carex formosa* (E)
 - *Cladium mariscoides* (SC)
 - *Drosera anglica* (SC)
 - *Eleocharis nitida* (WI E)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Juncus vaseyi* (WI SC)
 - *Petasites sagittatus* (WI T)
 - *Poa paludigena* (T)
 - *Ranunculus gmelinii* (WI E)
 - *Rhynchospora capillacea* (T)
 - *Salix planifolia* (WI T)
 - *Scleria verticillata* (T)
- Superior National Forest (2006-2012, 2014-2015) – Minnesota
 - *Asplenium trichomanes* (T)
 - *Botrychium mormo* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* (SC)
 - *Calypso bulbosa* (formerly RFSS)
 - *Carex flava* (SC)
 - *Carex michauxiana* (SC)
 - *Carex novae-angliae* (T)
 - *Claytonia caroliniana* (formerly SC)
 - *Eleocharis quinqueflora* (SC)
 - *Geocaulon lividum* (MN Watch-list)
 - *Platanthera clavellata* (SC)
 - *Pyrola minor* (SC)
 - *Ranunculus lapponicus* (SC)
 - *Rhynchospora fusca* (formerly SC)
 - *Rubus chamaemorus* (T)
- Athens to Martin Lake (2012-2013) – Anoka/Isanti counties, MN
 - *Gaylussacia baccata* (T)
 - *Juncus marginatus* (T)
 - *Rubus multiflorus* (SC)
 - *Viola lanceolata* (T)
- Charcoal 6 (2012) – Stearns County, MN
 - *Platanthera flava* var. *herbiola* (T)
- Red Lake Peatlands Survey (2011-2012, 2014) – Minnesota
 - *Carex exilis* (SC)
 - *Cladium mariscoides* (SC)
 - *Cypripedium arietinum* (T)

- *Drosera anglica* (SC)
- *Drosera linearis* (SC)
- *Eleocharis rostellata* (T)
- *Juncus stygius* (SC)
- *Rhynchospora capillacea* (T)
- *Xyris montana* (SC)
- Border States Paving (2011) – Clay County, MN
 - *Gaillardia aristata* (SC)
- Lakewinds Windfarm Project (2011) – Clay County, MN
 - *Cirsium hillii* (SC)
 - *Gaillardia aristata* (SC)
- Trail-Gully – Calcareous Fen Surveys (2010-2011) – Polk County, MN
 - *Carex sterilis* (T)
 - *Cladium mariscoides* (SC)
 - *Cypripedium arietinum* (T)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Rhynchospora capillacea* (T)
 - *Scleria verticillata* (T)
- Nashwalk Esser Steel Corridor Project (2010) – Itasca County, MN
 - *Carex pallescens* (E)
- Yellow Birch/Cedar Community (MHn45b) Evaluation (2010) – Lake County, MN
 - *Carex novae-angliae* (T)
- Border Lakes (2009-2010) – BWCA – Cook County, MN
 - *Botrychium simplex* (SC)
 - *Carex media* (SC)
 - *Carex michauxiana* (SC)
 - *Cladium mariscoides* (SC)
 - *Littorella uniflora* (SC)
 - *Muhlenbergia uniflora* (SC)
 - *Platanthera clavellata* (SC)
 - *Pyrola minor* (SC)
 - *Rhynchospora fusca* (formerly SC)
- UNIMIN Mine South (2009-2010) – Le Sueur County, MN
 - *Carex sterilis* (T)
- Polymet Land Exchange (2008) – Lake County, MN
 - *Juncus stygius* (SC)
 - *Platanthera clavellata* (SC)
 - *Pyrola minor* (SC)
- Alberta Clipper/LSr Pipeline Project (2007-2009) – Minnesota/Wisconsin
 - *Botrychium minganense* (SC)
 - *Botrychium simplex* (SC)
 - *Carex sterilis* (T)
 - *Cypripedium candidum* (SC)
 - *Cladium mariscoides* (SC)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Ranunculus lapponicus* (SC)
 - *Rhynchospora capillacea* (T)
 - *Salicornia rubra* (T)

- *Scleria verticillata* (T)
- *Utricularia geminiscapa* (T)
- *Waldsteinia fragarioides* (SC)

Status Reference

RFSS - Regional Forester Sensitive Species

E – Minnesota Threatened

SC – Minnesota Special Concern

T – Minnesota Threatened

Status of species for projects completed in other states is designated with state abbreviation.

PROFESSIONAL REFERENCES

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Robert H. Mohlenbrock, Ph.D.

Professor Emeritus Southern Illinois University
Author of the Flora of Illinois Series
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EDUCATION

BS Fisheries, Wildlife, and Conservation Biology
Plant Biology Minor
Forest Ecosystem Management and Conservation Minor
Environmental Sciences, Policy, and Management Minor
University of Minnesota-Twin Cities
St. Paul, Minnesota, 2017

CERTIFICATIONS

- Minnesota DNR list of qualified surveyors for vascular plant surveys
-

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2018-Current)

RARE PLANT SURVEYS

- Line 3 Replacement Project (2018-2019) – Minnesota
- Split Rock Wilds Trail (2019) – Lake County, MN
- Medicine Quarry (Martin Marietta) (2019) – Yellow Medicine County, MN
- L4870 Bridge Replacement (2019) – Fillmore County, MN
- Temperance River State Park (2019) – Cook County, MN
- Swedish Immigrant Trail (2019) – Chisago County, MN
- Huntley Wilmarth 345kV Transmission Line (2019) – Blue Earth County, MN
- Waite Park (Martin Marietta) (2019) – Stearns County, MN
- Lake Vermillion State Park (2019) – St. Louis County, MN
- Chippewa National Forest (2019) – Minnesota
- Cass County Highway Department Ram's head survey (2019) – Cass County, MN
- Catchers Creek (2019) – Anoka County, MN
- Balfany South (2019) – Anoka County, MN
- Andover 35 (2019) – Anoka County, MN
- Andover Blvd. 5 (2019) – Anoka County, MN
- Wilkinson Villas and Anderson Woods (2019) – Anoka County, MN
- Highway 610 – Coon Rapids (2019) – Anoka County, MN
- Arbuckle II Pipeline *Spiranthes parksii* Surveys (2018) – Texas
- Demicks Lake Pipeline Project (2018) – North Dakota
- Lexington Meadows (2018) – Blaine, Anoka County, MN
- Furrer Property (2018) – Forest Lake, Washington County, MN
- BL Holdings Property (2018) – Coon Rapids, Anoka County, MN
- Accent Homes (2018) – Blaine, Anoka County, MN

NATIVE PLANT COMMUNITY CLASSIFICATION/MAPPING

- Iron Range OHV Project (2019) – St. Louis County, MN

FAUNA SURVEYS

- Demicks Lake Pipeline Project – Avian Nest Surveys (2019) – North Dakota
- Demicks Lake Pipeline Project – Dakota Skipper Surveys (2018) – North Dakota
- Lexington Meadows – Wilson’s Phalarope Survey (2018) – Blaine, Anoka County, MN

FAUNA HABITAT SURVEYS

- Northern Natural Gas – Western Massasauga Crayfish Burrow Surveys (2019) – Nebraska
- Northern Natural Gas – Bald Eagle Nest Surveys (2019) – MN, Iowa, Wisconsin
- Bear Creek Pipeline Project – Dakota Skipper Habitat Mapping (2019) – North Dakota
- Elk Creek Pipeline Project – Eastern Spotted Skunk Habitat Evaluation (2018) – Kansas
- Demicks Lake Pipeline Project – Dakota Skipper Habitat Mapping (2018) – North Dakota

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland and Iron counties, WI
- Split Rock Wilds Trail (2019) – Lake County, MN
- Bear Creek Pipeline Project (2019) – North Dakota
- Tioga Lateral Pipeline Project (2019) – North Dakota
- Temperance River State Park (2019) – Cook County, MN
- Arbuckle II Pipeline (2018-2019) – Texas
- Elk Creek Pipeline Project (2018) – Kansas
- Northern Natural Gas – various O&M projects – (2018-2019) – Minnesota
- TransCanada – various O&M projects – (2018) – Missouri

VEGETATION ASSESSMENT AND MONITORING

- DNR Prairie Monitoring (2018-2019) – Minnesota
- Pelican River Habitat Management Plan (2019) – Otter Tail County, MN
- Caribou WMA Prairie Monitoring (2018) – Roseau County, MN
- Trail-Gully – Calcareous Fen Rare Species Counts (2018) – Polk County, MN

USFWS – Upper Mississippi River National Wildlife & Fish Refuge (2017)

RARE FAUNA SURVEYS

- Rusty Patched Bumble Bee Survey (2017) – Wabasha County, MN
- WI DNR Eastern Massasauga Survey (2017) – Wisconsin

USFWS – Minnesota Valley National Wildlife Refuge (2016)

RARE FAUNA SURVEYS

- Herpetofaunal Inventory/Rare Species Survey (2016) – Hennepin County, MN

PROJECT RESULTS – RARE VASCULAR PLANT FINDS

- Line 3 Replacement Project – (2018-2019) – Minnesota
 - *Botrychium lanceolatum* ssp. *angustisegmentum* (T)

- *Botrychium simplex* var. *simplex* (SC)
- *Botrychium simplex* var. *tenebrosum* (SC)
- *Botrychium rugulosum* (SC)
- *Carex obtusata* (SC)
- *Carex pallescens* (E)
- *Cirsium pumilum* var. *hillii* (SC)
- *Geum laciniatum* (MN Watch-list)
- *Torreyochloa pallida* (SC)
- *Trichophorum clintonii* (T)
- Iron Range OHV Project (2019) – St. Louis County, MN
 - *Botrychium lanceolatum* ssp. *angustisegmentum* (T)
 - *Platanthera clavellata* (SC)
- Split Rock Wilds Trail (2019) – Lake County, MN
 - *Carex ormostachya* (SC)
- Enbridge Line 5 Wetland Surveys (2019) – Ashland and Iron counties, WI
 - *Petasites frigidus* var. *sagittatus* (WI T)
- Medicine Quarry (Martin Marietta) (2019) – Yellow Medicine County, MN
 - *Woodsia oregana* (SC)
- L4870 Bridge Replacement (2019) – Fillmore County, MN
 - *Napaea dioica* (T)
- Temperance River State Park – Campground Expansion (2019) – Cook County, MN
 - *Carex flava* (SC)
 - *Carex media* (SC)
 - *Eleocharis nitida* (SC)
 - *Euphrasia hudsoniana* var. *ramosior* (SC)
 - *Pinguicula vulgaris* (SC)
 - *Trisetum spicatum* (SC)
- Swedish Immigrant Trail (2019) – Chisago County, MN
 - *Juglans cinerea* (E)
 - *Phemeranthus rugospermus* (T)
- Huntley Wilmarth 345kV Transmission Line (2019) – Blue Earth County, MN
 - *Agalinis auriculata* (E)
 - *Asclepias sullivantii* (T)
 - *Carex annectens* (SC)
 - *Cypripedium candidum* (SC)
 - *Eryngium yuccifolium* (SC)
- Chippewa National Forest (2019) – Minnesota
 - *Calypso bulbosa* (RFSS)
 - *Cypripedium arietinum* (T)
- Demicks Lake Pipeline Project (2018) – North Dakota
 - *Escobaria missouriensis* (RFSS)
 - *Townsendia exscapa* (RFSS)
 - *Townsendia hookeri* (RFSS)
- Lexington Meadows (2018) – Blaine, Anoka County, MN
 - *Viola lanceolata* (T)
- Furrer Property (2018) – Forest Lake, Washington County, MN
 - *Geum laciniatum* (MN Watch-list)

PROJECT RESULTS – RARE INSECT FINDS

- Demicks Lake Pipeline Project (2018) – North Dakota
 - *Hesperia dacotae* – Dakota skipper (Federally Threatened)
- Rusty Patched Bumble Bee Survey (2017) – Wabasha County, MN
 - *Bombus affinis* – Rusty Patched Bumble Bee (Federally Endangered)

PROJECT RESULTS – RARE VERTEBRATE FINDS

- Eastern Massasauga Survey – WI DNR (2017) – Wisconsin
 - *Sistrurus catenatus* – Eastern Massasauga (Federally Threatened)
- Herpetofaunal Inventory/Rare Species Survey (2016) – Hennepin County, MN
 - *Pituophis catenifer* – Gophersnake (SC)

Status Reference

RFSS - Regional Forester Sensitive Species

E – Minnesota Threatened

SC – Minnesota Special Concern

T – Minnesota Threatened

Status of species for projects completed in other states is designated with state abbreviation.

PROFESSIONAL REFERENCES

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Upper Mississippi River NWFR
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EDUCATION

BS Biology
Chemistry Minor
University of Minnesota, Duluth
Duluth, Minnesota, 2006

CERTIFICATIONS

- Professional Wetland Scientist (2774) – Society of Wetland Scientists
 - Minnesota Certified Wetland Delineator (1274)
 - Minnesota DNR list of qualified surveyors for vascular plant surveys
 - Minnesota DNR list of qualified surveyors *Botrychium* and *Sceptridium*
 - Minnesota DNR list of qualified surveyors for avian surveys
 - Wisconsin DNR Karner blue butterfly certified surveyor
-

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2007-Current)

RARE PLANT SURVEYS

- Line 3 Replacement Project (2015-2018) – Minnesota
- De Soto National Forest (2017) – Mississippi
- Seavey Bog (Peatland) Project (2017) – Minnesota
- Sandpiper Pipeline Project (2013-2016) – Minnesota
- Chippewa National Forest (2007-2012, 2014-2016) – Minnesota
- Chequamegon National Forest (2007, 2009, 2016-2017) – Wisconsin
- Line 66 (2014) – Wisconsin
- Superior National Forest (2007-2012) – Minnesota
- Twin Metals Mining (2011-2012) – Minnesota
- Franconia Minerals (2008) – Minnesota
- Mesabi Nugget Mining (2008) – Minnesota
- Alberta Clipper/LSr Pipeline Project (2007-2009) – Minnesota/Wisconsin
- Great Lakes Gas – Chequamegon National Forest (2007) – Wisconsin

NATIVE PLANT COMMUNITY CLASSIFICATION/MAPPING

- Paul Bunyan State Trail (2012) – Minnesota
- Southern Rich Conifer Swamp (FPs63a) Evaluation (2010) – Minnesota

FAUNA HABITAT SURVEYS

- Little Missouri Loop Pipeline – Avian Nesting Surveys – (2019) – North Dakota
- Demicks Lake Pipeline Project – Avian Nesting Surveys – (2019) – Montana/North Dakota

- Lexington Meadows – Avian Surveys (2018) - Minnesota
- Sandpiper Pipeline Project – Avian Surveys (2013-2015) – Minnesota/Wisconsin
- Line 66 – Karner Blue Habitat Mapping/Avian Surveys (2014) – Wisconsin
- Midwestern Gas Transmission Line – Indiana Bat Habitat Mapping/Avian Surveys (2012) – Indiana
- Flanagan South Pipeline – Indiana Bat Habitat Mapping (2012-2013) – Illinois/Missouri
- CapX2020 Powerline – Fauna Surveys (2009-2010) – Minnesota
- Chippewa National Forest Nelson Property – Avian Surveys (2008) – Minnesota

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Wisconsin
- Liberty Pipeline Project (2019) – Colorado
- Northern Natural Gas – various O&M projects – (2015-2019) – Iowa/Minnesota/Nebraska/North Dakota/South Dakota/Wisconsin
- Demicks Lake Pipeline Project (2019) – Montana/North Dakota
- TransCanada – various O&M projects (2011-2013, 2016-2019) – Michigan/Missouri/Wisconsin
- Arbuckle II Pipeline (2018) – Texas
- Elk Creek Pipeline Project (2018) – Kansas/Montana
- Rochester Expansion (2018) – Minnesota
- Cottonwood County CSAH 7 (2018) – Minnesota
- Medford to Prentice (2017) – Wisconsin
- Seavey Bog (Peatland) Project (2017) – Minnesota
- Mountaineer Xpress Pipeline (2017) – West Virginia
- Magellan Pipeline Project (2017) – Minnesota
- Bay Area Pipeline Project (2016) – Michigan
- Sandpiper Pipeline Project (2013-2016) – Minnesota
- Line 66 (2014-2015) – Illinois/Wisconsin
- Line 3 Replacement Project (2013-2015) Minnesota
- Blair Lateral Pipeline (2015) – Wisconsin
- Dakota Access Pipeline (2015-2016) – North Dakota
- Flanagan South Pipeline (2012-2013) – Illinois/Missouri
- Bakken Pipeline Project (2011-2012) – Montana
- MinnCan Pipeline Project (2007-2008) – Minnesota

VEGETATION ASSESSMENT AND MONITORING

- MinnCan Pipeline (2009-2012) – Minnesota
- Little Missouri National Grasslands (2010) - North Dakota/South Dakota
- DNR Prairie Monitoring (2009-2010) – Minnesota
- Alberta Clipper Post-Construction Wetland Monitoring (2011, 2013, 2014-2015) – Minnesota/Wisconsin
- *Botrychium* monitoring (2008) – Minnesota

ENVIRONMENTAL INSPECTOR

- Floodwood Maintenance Digs (2017) – Minnesota

PROJECT RESULTS – RARE VASCULAR PLANT FINDS

- Lexington Meadows (2018) – Minnesota
 - *Viola lanceolata* (T)

- Line 3 Replacement Project – (2016-2018) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Botrychium mormo* (T)
 - *Carex pallescens* (E)
 - *Carex sterilis* (T)
 - *Carex formosa* (E)
 - *Cladium mariscoides* (SC)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Rhynchospora capillacea* (T)
 - *Scleria verticillata* (T)
- De Soto National Forest (2017) – Mississippi
 - *Chasmanthium ornithorhynchum* (MS State Tracked)
 - *Cirsium lecontei* (ST)
 - *Lachnocaulon digitium* (RFSS)
 - *Pinguicula planifolia* (RFSS)
 - *Platanthera nivea* (ST)
 - *Polygala douglasii* (RFSS)
 - *Rhynchospora capitellata* (ST)
 - *Rhynchospora macra* (RFSS)
 - *Scleria baldwinii* (ST)
 - *Utricularia olivacea* (ST)
 - *Utricularia purpurea* (ST)
 - *Xyris drummondii* (RFSS)
- Sandpiper Pipeline Project (2013-2016) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* var. *tenebrosum* (SC)
 - *Carex sterilis* (T)
 - *Carex formosa* (E)
 - *Cirsium pumilum* (SC)
 - *Cladium mariscoides* (SC)
 - *Eleocharis nitida* (WI E)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Juglans cinerea* (E)
 - *Juncus vaseyi* (WI SC)
 - *Petasites sagittatus* (WI T)
 - *Poa paludigena* (T)
 - *Ranunculus gmelinii* (WI E)
 - *Ranunculus lapponicus* (SC)
 - *Salix maccalliana* (SC)
 - *Salix planifolia* (WI T)
 - *Salix pseudomonticola* (SC)
 - *Sceptridium rugulosum* (SC)
 - *Torreyochloa pallida* (SC)
 - *Utricularia purpurea* (E)
- Chippewa National Forest (2007-2015) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Botrychium mormo* (T)

- *Botrychium pallidum* (SC)
- *Botrychium simplex* (SC)
- *Calypso bulbosa* (formerly RFSS)
- *Cypripedium arietinum* (T)
- *Malaxis monophyllos* (SC)
- *Sceptridium oneidense* (E)
- *Sceptridium rugulosum* (T)
- *Sparganium glomeratum* (RFSS)
- Chequamegon National Forest (2007, 2009, 2016-2017) – Wisconsin
 - *Panax quinquefolius* (WI SC)
- Superior National Forest (2007-2012) – Minnesota
 - *Botrychium mormo* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* (SC)
 - *Carex michauxiana* (SC)
 - *Carex novae-angliae* (T)
 - *Claytonia caroliniana* (formerly SC)
 - *Crataegus douglasii* (T)
 - *Eleocharis nitida* (SC)
 - *Geocaulon lividum* (MN Watch-list)
 - *Luzula parviflora* (T)
 - *Platanthera clavellata* (SC)
 - *Polystichum braunii* (T)
 - *Pyrola minor* (SC)
 - *Ranunculus lapponicus* (SC)
 - *Rhynchospora fusca* (formerly SC)
 - *Rubus chamaemorus* (T)
 - *Torreyochloa pallida* (SC)
 - *Utricularia geminiscapa* (T)
 - *Waldsteinia fragarioides* (SC)
 - *Woodsia alpina* (T)
 - *Woodsia glabella* (T)
 - *Woodsia scopulina* (T)
 - *Xyris montana* (SC)
- Twin Metals (2011-2012) – Minnesota
 - *Botrychium simplex* (SC)
 - *Phacelia franklinii* (T)
 - *Rhynchospora fusca* (formerly SC)
 - *Xyris montana* (SC)
- Polymet Land Exchange (2008) – Minnesota
 - *Juncus stygius* (SC)
 - *Platanthera clavellata* (SC)
 - *Pyrola minor* (SC)
- Alberta Clipper/LSr Pipeline Project (2007-2009) – Minnesota/Wisconsin
 - *Botrychium simplex* (SC)
 - *Cladium mariscoides* (SC)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Rhynchospora capillacea* (T)
 - *Salicornia rubra* (T)

PROJECT RESULTS – RARE LICHEN FINDS

- Superior National Forest (2007-2012) – Minnesota
 - *Frullania selwyniana* (SC)
 - *Lobaria quercizans* (formerly SC)
 - *Usnea longissima* (SC)

PROJECT RESULTS – RARE FAUNA FINDS

- CapX2020 Avian Surveys - BGR 230kV Transmission Line (2009) – Minnesota
 - *Coturnicops noveboracensis* – Yellow rail – (SC)
 - *Cygnus buccinator* – Trumpeter swan – (SC)

Status Reference

RFSS - Regional Forester Sensitive Species

E -- Minnesota Threatened

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Status of species for projects completed in other states is designated with state abbreviation.

PROFESSIONAL REFERENCES

Robert H. Mohlenbrock, Ph.D.
Professor Emeritus Southern Illinois University
Author of the Flora of Illinois Series
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EDUCATION

BS Botany, Ecology & Vegetation Management
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St. Paul, Minnesota, 2007

CERTIFICATIONS

- DNR list of qualified surveyors for vascular plant surveys
-

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2016-Current)

RARE PLANT SURVEYS

- Line 3 Replacement Project (2016-2019) – Minnesota
- Gully Fen Plant Counts (2016-2018) – Polk County, MN
- De Soto National Forest (2017) – Harrison County, MS
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
- Lutsen Ski Resort Expansion (2017) – Cook County, MN
- West Farm (2017) – Blaine, Anoka County, MN
- Stalberger Property (2017) – Ham Lake, Anoka County, MN
- Sandpiper Pipeline Project (2016) – Minnesota
- Chequamegon-Nicolet National Forest (2016) – Wisconsin
- Chippewa National Forest (2016) – Minnesota

NATIVE PLANT COMMUNITY CLASSIFICATION/MAPPING

- Seavey Bog (Peatland) Project (2017) – NPC Mapping – Aitkin County, MN

FAUNA HABITAT SURVEYS

- Demicks Lake Pipeline Project – Avian Nest Surveys (2019) – North Dakota
- Little Missouri Loop Pipeline – Avian Nesting Surveys – (2019) – North Dakota
- Blazing Star 2 Wind Farm Project – *Lepidoptera* Habitat Assessment (2019) – Lincoln County, MN
- Demicks Lake Pipeline Project – Dakota Skipper Habitat Mapping (2018) – North Dakota

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland & Iron counties, WI
- Liberty Pipeline Project (2019) – Kansas
- Tioga Lateral Pipeline Project (2019) – North Dakota
- Arbuckle II Pipeline Project (2019) – Texas
- Demicks Lake Pipeline Project (2018-2019) – North Dakota/Montana
- Northern Natural Gas – various O&M projects – (2016-2019) – Iowa, Minnesota, Wisconsin, Nebraska

- Elk Creek Pipeline Mat Retrieval (2018) – Kansas
- Elk Creek Pipeline Project (2018) – Kansas/Montana
- TransCanada – various O&M projects – (2018) – Iowa, Missouri
- Fond du Lac Line 4 (2017) – Minnesota
- Fergus Falls - Great Plains Gas (2016) – Minnesota

VEGETATION ASSESSMENT AND MONITORING

- Blazing Star 2 Wind Farm Project – Grassland Habitat Sampling (2019) – Lincoln County, MN
- SAX Wetland Monitoring (2018-2019) – Illinois
- DNR Prairie Monitoring (2016-2019) – Minnesota
- Caribou WMA Prairie Monitoring (2018) – Roseau County, MN

NOXIOUS WEED SURVEYS

- Line 3 Replacement Project (2018-2019) – Minnesota
- Demicks Lake Pipeline Project (2018-2019) – North Dakota

TREE AND SHRUB SURVEYS

- Demicks Lake Pipeline Project (2018-2019) – North Dakota

MANAGEMENT PLANS

- DNR Prairie Stewardship Plans (2019) – Minnesota
- Cottonwood River Prairie Scientific and Natural Area (2017-2018) – Brown County, MN

PROFESSIONAL REFERENCES

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EDUCATION

BS Natural Sciences, Biology
University of Puget Sound
Tacoma, Washington, 2008

CERTIFICATIONS

- DNR list of qualified surveyors for vascular plant surveys
 - DNR list of qualified surveyors for *Botrychium* and *Sceptridium*
 - DNR list of qualified surveyors for the western prairie fringed orchid (*Platanthera praeclara*)
 - DNR list of qualified surveyors for the dwarf trout lily (*Erythronium propullans*)
 - DNR list of qualified surveyors for the prairie bush clover (*Lespedeza leptostachya*)
 - DNR list of qualified surveyors for bryophyte surveys
 - DNR list of qualified surveyors for avian surveys
 - DNR Special Permit (23226) to collect and voucher rare plants
 - USFWS Dakota Skipper Recovery Permit
 - WDNR Karner Blue Butterfly Certified Surveyor
-

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2006-Current)

RARE PLANT SURVEYS

- Line 3 Replacement Project (2016-2019) – Minnesota
- Minnesota Point (2019) – St. Louis County, MN
- Bull-Moose 115 kV Transmission Line (2019) – Cass County, MN
- Swedish Immigrant Trail (2019) – Chisago County, MN
- Minnesota Point (2019) – St. Louis County, MN
- Sagamore (Cuyuna Trail) (2019) – Crow Wing County, MN
- JSN Properties (2019) – Anoka County, MN
- Pheasant Ridge (2019) – Anoka County, MN
- Harpers Street (2019) – Anoka County, MN
- BL Holdings 20th Ave Property – Anoka County, MN
- Arbuckle II Pipeline *Spiranthes parksii* Surveys (2018) – Texas
- Demicks Lake Pipeline Project (2018) – North Dakota
- Amaris – Park Storage (2018) – Lino Lakes, Anoka County, MN
- Cuyuna Trail – (2018) – Crow Wing County, MN
- MJ Arndt Property (2018) – Blaine, Anoka County, MN
- Lexington Meadows (2018) – Blaine, Anoka County, MN
- Lorentz Bus Property (2018) – Blaine, Anoka County, MN

- Watermark Property (2018) – Blaine, Anoka County, MN
- BL Holdings Property (2018) – Coon Rapids, Anoka County, MN
- Crosstown 2 South (2018) – Ham Lake, Anoka County, MN
- Crosstown 2 North (2018) – Ham Lake, Anoka County, MN
- Anoka County Central Maint. Shop (2018) – Andover, Anoka County, MN
- Bunker Hills Regional Park (2018) – Andover, Anoka County, MN
- Park Construction (2017) – Blaine, Anoka County, MN
- Stalberger Property (2017) – Ham Lake, Anoka County, MN
- Asphalt Concrete Solutions (2017) – Blaine, Anoka County, MN
- Paxmar Alpine Drive Project (2017) – Ramsey, Ramsey County, Mn
- Hawkes Company Peatland Expansion (2017) – Marshall County, MN
- De Soto National Forest (2017) – Harrison County, MS
- Oakwood Realty 131st Street Property (2017) – Blaine, Anoka County, MN
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
- West Farm (2016-2017) – Blaine, Anoka County, MN
- Lutsen Ski Resort Expansion (2016-2017) – Cook County, MN
- Banning State Park Lichen Surveys – Carlton County, MN
- Hidden Forest East (2016) – Ham Lake, Anoka County, MN
- Mortenson Lovell Road Property (2016) – Blaine, Anoka County, MN
- Sandpiper Pipeline Project (2013-2016) – Minnesota
- Chippewa National Forest (2007-2016) – Minnesota
- Superior National Forest (2006-2012, 2014-2015) – Minnesota
- Great River Energy - Athens to Martin Lake (2012) – Anoka/Isanti counties, MN
- Charcoal 6 (2012) – Stearns County, MN
- Red Lake Peatlands Survey (2012) – Minnesota
- Twin Metals (2011-2012) – Lake and St. Louis counties, MN
- Border States Paving (2011) – Clay County, MN
- Lakewinds Windfarm Project (2011) – Clay County, MN
- Border Lakes (2010) – BWCA – Cook County, MN
- UNIMIN Mine South (2009-2010) – Le Sueur County, MN
- Chequamegon National Forest (2007/2009) – Wisconsin
- Polymet Land Exchange (2008) – Lake County, MN
- Alberta Clipper/LSr Pipeline Project (2007-2009) – Minnesota/Wisconsin

NATIVE PLANT COMMUNITY CLASSIFICATION/MAPPING

- Iron Range OHV Project (2019) – St. Louis County, MN
- North Shore Relevé Project (2019) – Lake County, MN
- Seavey Bog (Peatland) Project (2017) – NPC Mapping – Aitkin County, MN
- BitterRoot Wind Farm Project – Calcareous Fen Survey (2016) – Yellow Medicine County, MN
- Sandpiper Pipeline Project – Calcareous Fen Surveys (2013-2015) - Minnesota
- Koochiching County Peatland Surveys (2014)
- MN River Regional Greenway – Calcareous Fen Surveys (2013) – Dakota County, MN
- Polk and Norman Counties – Calcareous Fen Surveys (2012) – Minnesota
- Trail-Gully – Calcareous Fen Surveys (2010-2011) – Polk County, MN
- Yellow Birch/Cedar Community (MHN45b) Evaluation (2010) – Lake County, MN
- UNIMIN Mine South – NPC Mapping (2009-2010) – Le Sueur County, MN

FAUNA HABITAT SURVEYS

- Demicks Lake Pipeline Project – Avian Nest Surveys (2019) – North Dakota
- Demicks Lake Pipeline Project – Raptor Nest Surveys (2019) – North Dakota
- Northern Natural Gas – Bald Eagle Nest Surveys (2019) – MN, Iowa, Wisconsin
- Chippewa River Red Shouldered Hawk Surveys (2019) – Wisconsin
- Demicks Lake Pipeline Project – Dakota Skipper Habitat Mapping (2018-2019) – North Dakota
- Elk Creek Pipeline Project – Eastern Spotted Skunk Habitat Evaluation (2018) – Kansas
- Highland Partners – Dakota Skipper Habitat Mapping (2018) – North Dakota
- Demicks Lake Pipeline Project – Dakota Skipper Presence/Absence Surveys (2018) – North Dakota
- Line 66 – Karner Blue Habitat Mapping/Avian Surveys (2014) – Wisconsin
- Flanagan South Pipeline – Indiana Bat Habitat Mapping (2012-2013) – Illinois
- Flanagan South Pipeline – Eastern Spotted Skunk Habitat Evaluation (2012) – Kansas
- CapX2020 Avian Surveys - BGR 230kV Transmission Line (2009) – Minnesota

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland and Iron counties, WI
- Liberty Pipeline Project (2019) – Kansas
- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Arbuckle II Pipeline Project (2018-2019) – Texas
- Northern Natural Gas – various O&M projects – (2015-2019) – Iowa/Nebraska
- Lake County Bike Trail Project (2018) – Lake County, MN
- TransCanada – various O&M projects – (2018) – Michigan, Missouri
- Gulf Xpress Pipeline (2015-2016) – Kentucky, Mississippi, Tennessee
- Sandpiper Pipeline Project (2013-2015) – Minnesota
- Flanagan South Pipeline (2012) – Illinois, Missouri, Kansas, Oklahoma
- MinnCan Pipeline Project 2007-2008 – Minnesota

VEGETATION ASSESSMENT AND MONITORING

- Great Lakes Lichen Identification (2019)
- DNR Prairie Monitoring (2008-2019) – Minnesota
- Caribou WMA Prairie Monitoring (2015-2018) – Roseau County, MN
- Savage Fen Scientific and Natural Area (2016) – Scott County, MN
- Ram’s-head lady’s slipper (*Cypripedium arietinum*) Surveys (2012) – Minnesota
- Alberta Clipper Post-Construction Wetland Monitoring (2011) – Minnesota/Wisconsin
- *Botrychium* monitoring (2008-2014) – Cass County, MN

MANAGEMENT PLANS

- DNR Prairie Stewardship Plans (2019)
- Pennington Bog Scientific and Natural Area (2018-2019)
- Rushford Sand Barrens Scientific and Natural Area (2017-2018)
- Split Rock Lighthouse State Park (2016-2017)
- Gooseberry Falls State Park (2016-2017)

PROJECT RESULTS – RARE VASCULAR PLANT FINDS

- Minnesota Point (2019) – St. Louis County, MN
 - *Ammophila breviligulata* (T)

- *Hudsonia tomentosa* (T)
- *Botrychium michiganense* (MN Watch-list)
- *Botrychium pallidum* (SC)
- *Botrychium rugulosum* (SC)
- *Botrychium simplex* (SC)
- Line 3 Replacement Project (2016-2019) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Botrychium rugulosum* (SC)
 - *Carex formosa* (E)
 - *Carex lurida* (MN Watch-list)
 - *Carex obtusata* (SC)
 - *Carex sterilis* (T)
 - *Carex pallescens* (E)
 - *Cladium mariscoides* (SC)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Rhynchospora capillacea* (T)
 - *Scleria verticillata* (T)
 - *Trichophorum clintonii* (T)
- Bull-Moose 115 kV Transmission Line (2019) – Cass County, MN
 - *Poa paludigena* (T)
- Swedish Immigrant Trail (2019) – Chisago County, MN
 - *Juglans cinerea* (E)
- Cuyuna Trail – (2018-2019) – Crow Wing County, MN
 - *Botrychium ascendens* (E)
 - *Botrychium campestre* var. *lineare* (E)
 - *Botrychium oneidense* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium rugulosum* (SC)
 - *Botrychium simplex* (SC)
 - *Botrychium spathulatum* (E)
 - *Juglans cinerea* (E)
- Demicks Lake Pipeline Project (2018) – North Dakota
 - *Escobaria missouriensis* (RFSS)
 - *Townsendia exscapa* (RFSS)
 - *Townsendia hookeri* (RFSS)
- Amaris – Park Storage (2018) – Lino Lakes, Anoka County, MN
 - *Rubus semisetosus* (E)
- Lexington Meadows (2018) – Blaine, Anoka County, MN
 - *Viola lanceolata* (T)
- Hawkes Company Peatland Expansion (2017) – Marshall County, MN
 - *Androsace septentrionalis* (SC)
 - *Carex obtusata* (SC)
 - *Salix maccalliana* (SC)
 - *Salix pseudomonticola* (SC).
- De Soto National Forest (2017) – Harrison County, MS
 - *Chasmanthium ornithorhynchum* (MS State Tracked)
 - *Cirsium lecontei* (ST)
 - *Lachnocaulon digitium* (RFSS)
 - *Palhinhaea cernua* (ST)

- *Pinguicula planifolia* (RFSS)
- *Platanthera nivea* (ST)
- *Polygala douglasii* (RFSS)
- *Rhynchospora capitellata* (ST)
- *Rhynchospora macra* (RFSS)
- *Scleria baldwinii* (ST)
- *Utricularia olivacea* (ST)
- *Utricularia purpurea* (ST)
- *Xyris drummondii* (RFSS)
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
 - *Botrychium lanceolatum* (T)
 - *Botrychium simplex* var. *tenebrosum* (SC)
 - *Poa paludigena* (T)
 - *Trichocolea tomentella* (T – State listed liverwort)
- Banning State Park Lichen Surveys – Carlton County, MN
 - *Persicaria careyi* (SC)
- Hidden Forest East (2016) – Ham Lake, Anoka County, MN
 - *Gaylussacia baccata* (T)
- Sandpiper Pipeline Project (2013-2016) – Minnesota
 - *Botrychium lanceolatum* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* var. *tenebrosum* (SC)
 - *Caltha natans* (WI E)
 - *Carex hallii* (SC)
 - *Carex sterilis* (T)
 - *Carex formosa* (E)
 - *Cirsium pumilum* (SC)
 - *Cladium mariscoides* (SC)
 - *Eleocharis nitida* (WI E)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Gailardia aristata* (SC)
 - *Juglans cinerea* (E)
 - *Juncus vaseyi* (WI SC)
 - *Najas gracillima* (SC)
 - *Petasites sagittatus* (WI T)
 - *Packera cana* (E)
 - *Poa paludigena* (T)
 - *Ranunculus gmelinii* (WI E)
 - *Ranunculus lapponicus* (SC)
 - *Rhynchospora capillacea* (T)
 - *Salix maccalliana* (SC)
 - *Salix planifolia* (WI T)
 - *Salix pseudomonticola* (SC)
 - *Scleria verticillata* (T)
 - *Sceptridium rugulosum* (SC)
 - *Torreyochloa pallida* (SC)
 - *Trichocolea tomentella* (T – State listed liverwort)
 - *Trichophorum clintonii* (T)
 - *Utricularia purpurea* (E)

- Bull-Moose 115 kV Transmission Line (2019) – Cass County, MN
 - *Poa paludigena* (T)
- Chippewa National Forest (2007-2015, 2019) – Minnesota
 - *Botrychium ascendens* (E- First known population in the CNF)
 - *B. crenulatum* (RFSS - First known population in the CNF)
 - *Botrychium lanceolatum* (T)
 - *Botrychium mormo* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* (SC)
 - *Calypso bulbosa* (formerly RFSS)
 - *Cypripedium arietinum* (T)
 - *Malaxis monophyllos* (SC)
 - *Potamogeton bicupulatus* (T - First known population in the CNF)
 - *Ranunculus lapponicus* (SC)
 - *Sceptridium oneidense* (E)
 - *Sceptridium rugulosum* (T)
 - *Sparganium glomeratum* (RFSS)
- Superior National Forest (2006-2012, 2014-2015) – Minnesota
 - *Asplenium trichomanes* (T)
 - *Botrychium mormo* (T)
 - *Botrychium pallidum* (SC)
 - *Botrychium simplex* (SC)
 - *Calypso bulbosa* (formerly RFSS)
 - *Carex flava* (SC)
 - *Carex michauxiana* (SC)
 - *Carex novae-angliae* (T)
 - *Claytonia caroliniana* (formerly SC)
 - *Crataegus douglasii* (T)
 - *Eleocharis flavescens* (T)
 - *Eleocharis nitida* (SC)
 - *Eleocharis quinqueflora* (SC)
 - *Geocaulon lividum* (MN Watch-list)
 - *Luzula parviflora* (T)
 - *Muhlenbergia uniflora* (SC)
 - *Osmorhiza depauperata* (SC)
 - *Platanthera clavellata* (SC)
 - *Polystichum braunii* (T)
 - *Pyrola minor* (SC)
 - *Ranunculus lapponicus* (SC)
 - *Rhynchospora fusca* (formerly SC)
 - *Rubus chamaemorus* (T)
 - *Torreyochloa pallida* (SC)
 - *Utricularia geminiscapa* (T)
 - *Waldsteinia fragarioides* (SC)
 - *Woodsia alpina* (T)
 - *Woodsia glabella* (T)
 - *Woodsia scopulina* (T)
 - *Xyris montana* (SC)
- Great River Energy - Athens to Martin Lake (2012-2013) – Anoka/Isanti counties, MN
 - *Gaylussacia baccata* (T)

- *Juncus marginatus* (T)
- *Rubus multiflorus* (SC)
- *Viola lanceolata* (T)
- Ram's-head lady's slipper (*Cypripedium arietinum*) Surveys (2012) – Minnesota
 - *Cypripedium arietinum* (T)
 - *Malaxis paludosa* (E)
- Charcoal 6 (2012) – Stearns County, MN
 - *Platanthera flava* var. *herbiola* (T)
- Red Lake Peatlands Survey (2012) – Minnesota
 - *Cladium mariscoides* (SC)
 - *Drosera anglica* (SC)
 - *Drosera linearis* (SC)
 - *Nymphaea leibergii* (T)
 - *Rhynchospora capillacea* (T)
- Twin Metals (2011-2012) – Lake and St. Louis counties, MN
 - *Botrychium simplex* (SC)
 - *Phacelia franklinii* (T)
 - *Rhynchospora fusca* (formerly SC)
 - *Xyris montana* (SC)
- Border States Paving (2011) – Clay County, MN
 - *Gaillardia aristata* (SC)
- Lakewinds Windfarm Project (2011) – Clay County, MN
 - *Cirsium hillii* (SC)
 - *Gaillardia aristata* (SC)
- Trail-Gully – Calcareous Fen Surveys (2010-2011) – Polk County, MN
 - *Carex sterilis* (T)
 - *Cladium mariscoides* (SC)
 - *Cypripedium arietinum* (T)
 - *Eleocharis quinqueflora* (SC)
 - *Eleocharis rostellata* (T)
 - *Rhynchospora capillacea* (T)
 - *Scleria verticillata* (T)
- Border Lakes (2011) – BWCA – Cook County, MN
 - *Asplenium trichomanes* (T)
 - *Eleocharis flavescens* var. *olivacea* (T)
 - *Muhlenbergia uniflora* (SC)
 - *Platanthera clavellata* (SC)
 - *Subularia aquatica* (E)
 - *Xyris montana* (SC)
- Yellow Birch/Cedar Community (MHn45b) Evaluation (2010) – Lake County, MN
 - *Carex novae-angliae* (T)
- UNIMIN Mine South (2009-2010) – Le Sueur County, MN
 - *Arnoglossum plantagineum* (T)
 - *Carex sterilis* (T)
 - *Cypripedium candidum* (SC)
- Polymet Land Exchange (2008) – Lake County, MN
 - *Juncus stygius* (SC)
 - *Platanthera clavellata* (SC)
 - *Pyrola minor* (SC)
- Alberta Clipper/LSr Pipeline Project (2007-2009) – Minnesota/Wisconsin

- *Botrychium minganense* (SC)
- *Botrychium simplex* (SC)
- *Carex sterilis* (T)
- *Cyripedium candidum* (SC)
- *Cladium mariscoides* (SC)
- *Eleocharis quinqueflora* (SC)
- *Eleocharis rostellata* (T)
- *Ranunculus lapponicus* (SC)
- *Rhynchospora capillacea* (T)
- *Salicornia rubra* (T)
- *Scleria verticillata* (T)

PROJECT RESULTS – RARE LICHEN/BRYOPHYTE FINDS

- Lake County Bike Trail Project (2018) – Lake County, MN
 - *Bryoria fuscescens* (SC)
- Banning State Park Lichen Surveys – Carlton County, MN
 - *Usnea mutabilis* (T)
 - *Usnea rubicunda* (SC)
- Superior National Forest (2006-2012, 2014-2015) – Minnesota
 - *Ahtiana aurescens* (SC)
 - *Allocetraria oakesiana* (T)
 - *Amygdalaria panaeola* (SC)
 - *Anaptychia crinalis* (SC)
 - *Arctoparmelia centrifuga* (SC)
 - *Arctoparmelia subcentrifuga* (SC)
 - *Bryoria fuscescens* (SC)
 - *Frullania selwyniana* (SC)
 - *Lobaria quercizans* (formerly SC)
 - *Lobaria scrobiculata* (E)
 - *Menegazzia terebrata* (SC)
 - *Peltigera venosa* (SC)
 - *Protopannaria pezizoides* (T)
 - *Pseudocyphellaria crocata* (E)
 - *Ramalina thrausta* (SC)
 - *Sticta fuliginosa* (SC)
 - *Thelocarpon epibolum* (SC)
 - *Trichocolea tomentella* (T)
 - *Usnea longissima* (SC)
- Chippewa National Forest (2007-2015) – Minnesota
 - *Sticta beauvoisii* (RFSS)
 - *Sticta fuliginosa* (SC)
 - *Usnea angulata* (RFSS)
- Border Lakes (2011) – BWCA – Cook County, MN
 - *Bryoria fuscescens* (SC)
- Yellow Birch/Cedar Community (MHn45b) Evaluation (2010) – Lake County, MN
 - *Allocetraria oakesiana* (T)
 - *Bryoria fuscescens* (SC)
 - *Lobaria scrobiculata* (E)
 - *Menegazzia terebrata* (SC)
 - *Pseudocyphellaria crocata* (E)

- *Ramalina thrausta* (SC)
- *Usnea longissima* (SC)
- UNIMIN Mine South (2009-2010) – Le Sueur County, MN
 - *Buellia nigra* (SC)

PROJECT RESULTS – RARE FAUNA FINDS

- Demicks Lake Pipeline (2018-2019) – North Dakota
 - *Aquila chrysaetos* – Golden eagle
 - *Hesperia dacotae* – Dakota skipper (Federally Threatened)
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
 - *Somatochlora forcipata* – Forcipate emerald (SC)
- De Soto National Forest (2017) – Harrison County, MS
 - *Enallagma concisum* – Cherry bluet (MS State Tracked)
- Line 66 – (2014) – Wisconsin
 - *Glyptemys insculpta* – Wood turtle (T)
- Line 66 – Karner Blue Habitat Mapping (2014) – Wisconsin
 - *Plebejus melissa samuelis* – Karner blue (Federally Endangered)
- UNIMIN Mine South (2009-2010) – Le Sueur County, MN
 - *Bartramia longicauda* (Watch-list)
 - *Coluber constrictor* – Blue racer (SC)*
 - *Elaphe vulpine* - Western fox snake (Watch-list)
 - *Lanius ludovicianus* – Loggerhead shrike (E)
 - *Marpissa formosa* – species of jumping spider (SC)
 - *Schinia lucens* – Leadplant flower moth (SC)
 - *Speyeria idalia* – Regal fritillary (SC)

*observed outside of the project area
- Lakewinds Windfarm Project (2011) – Clay County, MN
 - *Hesperia leonardus* – Leonard's skipper (SC)
 - *Speyeria idalia* – Regal fritillary (SC)
- CapX2020 Avian Surveys - BGR 230kV Transmission Line (2009) – Minnesota
 - *Coturnicops noveboracensis* – Yellow rail – (SC)
 - *Cygnus buccinator* – Trumpeter swan – (SC)

Status Reference

RFSS - Regional Forester Sensitive Species

E – Minnesota Threatened

SC – Minnesota Special Concern

T – Minnesota Threatened

Status of species for projects completed in other states is designated with state abbreviation.

PROFESSIONAL REFERENCES

Welby Smith
State Botanist
DNR Div. of Ecological and Water Resources
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EDUCATION

BS Natural Resources Management
North Dakota State University
Fargo, North Dakota, 2017

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2018-Current)

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland and Iron counties, WI
- Liberty Pipeline Project (2019) – Kansas
- Tioga Lateral Pipeline Project (2019) – North Dakota
- Arbuckle II Pipeline Project (2018-2019) – Texas
- Northern Natural Gas – various O&M projects – (2018-2019) – Minnesota and Iowa
- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Elk Creek Pipeline Project (2018) – Montana
- Line 3 Replacement Project (2018) – Douglas County, Wisconsin
- Xcel Energy Powerline Replacement (2018) – Bayfield County, Wisconsin
- TransCanada (2018) – Minnesota

FAUNA SURVEYS

- Demicks Lake Pipeline Project – Avian Nesting Surveys – (2019) – North Dakota
- Little Missouri Loop Pipeline – Avian Nesting Surveys – (2019) – North Dakota
- Elk Creek Pipeline Project – Northern Long-Eared Bat Habitat Mapping (2018) – Montana
- Demicks Lake Pipeline Project – Dakota Skipper Habitat Mapping (2018) – North Dakota
- Northern Natural Gas – Northern Long-Eared Bat Habitat Mapping (2018) – Iowa

VEGETATION ASSESSMENT AND MONITORING

- Trail-Gully – Calcareous Fen Rare Species Counts (2018) – Polk County, MN

TREE INVENTORY/TAGGING

- Pioneer Engineering (2018-2019) – Blaine, Anoka County, MN

NOXIOUS WEED SURVEYS

- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Line 3 Replacement Project (2018) – Minnesota

RARE PLANT SURVEYS

- Line 3 Replacement Project (2018) – Minnesota

EDUCATION

BA Biology, Society, and Environment
Geographic Information Systems Minor
University of Minnesota – Twin Cities
Minneapolis, Minnesota, 2018

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2018-Current)

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland and Iron counties, WI
- Split Rock Wilds Trail (2019) – Lake County, MN
- Bear Creek Pipeline Project (2019) – North Dakota
- Tioga Lateral Pipeline Project (2019) – North Dakota
- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Northern Natural Gas – various O&M projects – (2018-2019) – Iowa, Minnesota, Nebraska, Wisconsin
- Arbuckle II Pipeline Project (2019) – Texas
- TransCanada – various O&M projects – (2018) – Iowa, Missouri, Wisconsin

RARE PLANT SURVEYS

- Line 3 Replacement Project (2018-2019) – Minnesota

NOXIOUS WEED SURVEYS

- Bear Creek Pipeline Project (2019) – North Dakota
- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Line 3 Replacement Project (2018) – Minnesota

VEGETATION ASSESSMENT AND MONITORING

- DNR Prairie Monitoring (2018) – Minnesota
- Trail-Gully – Calcareous Fen Rare Species Counts (2018) – Polk County, MN

TREE INVENTORY/TAGGING

- Pioneer Engineering, P.A. (2019) – Anoka County, MN
- Charles Cudd Co. (2019) – Dakota County, MN

FAUNA HABITAT SURVEYS

- Demicks Lake Pipeline Project – Avian Nest Surveys (2019) – North Dakota
- Little Missouri Loop Pipeline – Avian Nest Surveys (2019) – North Dakota
- Bear Creek Pipeline Project – Dakota Skipper Habitat Mapping (2019) – North Dakota
- Northern Natural Gas – Indiana Bat and Northern Long-Eared Bat Habitat Evaluation (2019) – Iowa

Kirsten D. Frahm, MS
Biologist



EDUCATION

MS Conservation Biology
Central Michigan University
Mount Pleasant, Michigan, 2019

BS Biology
University of St. Thomas
St. Paul, Minnesota, 2015

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2019-Current)

FAUNA HABITAT SURVEYS

- Liberty Pipeline Project – Northern Long-Eared Bat Habitat Mapping (2019) – Kansas
- Northern Natural Gas – Northern Long-Eared Bat Habitat Mapping (2019) – Iowa

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland and Iron counties, WI
- Liberty Pipeline Project (2019) – Kansas
- Northern Natural Gas – various O&M projects – (2019) – Minnesota, Wisconsin, Iowa, Nebraska

Nicolai T. Tourville, CWD
Field Technician



EDUCATION

BS Aquatic Biology
Geographic Information Systems Minor
Bemidji State University
Bemidji, Minnesota, 2011

CERTIFICATIONS

Minnesota Certified Wetland Delineator (1290)

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2014-2019)

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Wisconsin
- Liberty Pipeline Project (2019) – Colorado
- Arbuckle II Pipeline Project (2018-2019) – Texas
- Demicks Lake Pipeline Project (2018) – North Dakota
- Elk Creek Pipeline Project (2018) – Kansas/Montana
- Jayhawk Pipeline (2018) – Kansas
- Northern Natural Gas – various O&M projects – (2015-2018) – Minnesota, Iowa, South Dakota, Wisconsin
- TransCanada – various O&M projects – (2017-2018) – Iowa, Wisconsin, Missouri
- Rochester Expansion (2018) – Minnesota
- Magellan Ft. Snelling (2017) – Minnesota
- Xcel Energy – Medford to Prentice (2017) – Wisconsin
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN
- Driftwood Pipeline Project (2016) – Louisiana
- Bad River Easement Renewal (2016) – Ashland County, WI
- Mid-Michigan Pipeline (2016) – Michigan
- Saginaw Trail Pipeline (2016) – Michigan
- Sandpiper Pipeline (2014-2015) – Minnesota/Wisconsin
- Line 3 Replacement Project (2014-2015) Minnesota
- Blair Lateral Pipeline (2015) – Wisconsin
- Dakota Access Pipeline (2015-2016) – North Dakota

TREE & SHRUB SURVEYS

- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Dakota Access Pipeline (2015-2016) – North Dakota

NOXIOUS WEED SURVEYS

- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Magellan Ft. Snelling (2017) – Minnesota
- Line 3 Replacement Project (2014-2015, 2018) Minnesota
- Dakota Access Pipeline (2015-2016) – North Dakota

RARE PLANT SURVEYS

- Sandpiper Pipeline Project (2014-2018) – Minnesota
- Chequamegon-Armstrong Creek (2017) – Wisconsin
- Seavey Bog (Peatland) Project (2017) – Aitkin County, MN

FAUNA HABITAT SURVEYS

- Little Missouri Loop Pipeline – Avian Nesting Surveys – (2019) – North Dakota
- Demicks Lake Pipeline Project – Avian Nesting Surveys – (2019) – Montana/North Dakota
- Sandpiper Pipeline Project – Avian Surveys (2014) – Minnesota/Wisconsin

VEGETATION ASSESSMENT AND MONITORING

- DNR Prairie Monitoring (2017-2018) – Minnesota
- DNR Savage Fen Monitoring (2016) – Minnesota
- Alberta Clipper Post-Construction Wetland Monitoring (2015) – Minnesota/Wisconsin

Minnesota Department of Natural Resources (2013) – Seasonal Technician - Minnesota

Michael A. Lopez, MS
Field Technician



EDUCATION

MS Conservation Sciences
Ecological Restoration Minor
University of Minnesota- Twin Cities
Minneapolis, Minnesota
May 2019

BA Environmental Sciences
Geoscience Minor
University of Iowa
Iowa City, Iowa
May 2013

PROFESSIONAL EXPERIENCE

Midwest Natural Resources, Inc. (2019)

WETLAND SURVEYS/DELINEATIONS

- Line 5 Relocation Project (2019) – Ashland and Iron counties, WI

Green Iowa AmeriCorps (2015-2016) – Energy Efficiency Coordinator – Iowa

US Army Corps of Engineers (2014) – Park Ranger – Iowa

Sarah Rosche, MS

Field Biologist



EXPERTISE

- Avian Surveys
- T&E Habitat Assessments
- Wetland Delineation and Mapping
- Vegetation Monitoring
- Noxious Weed Inventories

EDUCATION

MS Fisheries, Wildlife, and Conservation Biology
North Carolina State University

Thesis: Effects of Growing-season Prescribed Fire on Northern Bobwhite Nesting Ecology and Habitat Selection

BS Wildlife Conservation
Virginia Polytechnic and State University

PUBLICATIONS

Rosche, S. B., C. E. Moorman, A.J. Kroeger, J. K. Pacifici, J. G. Jones, and C.S. DePerno. Effects of prescribed fire on northern bobwhite nesting ecology. *The Wildlife Society Bulletin*: in review.

Rosche, S. B., C. E. Moorman, J. K. Pacifici, J. G. Jones, and C.S. DePerno. Northern bobwhite breeding season habitat selection in fire-maintained pine woodland. *The Journal of Wildlife Management* 83: 1226-1236.

Rosche, S.B., C.M. Moorman, and C.S. DePerno. 2019. Less Is More: The importance of low tree density for northern bobwhite. *The Upland Gazette* 2019 Spring: 62-63.

WETLAND SURVEY/DELINEATION PROJECT EXPERIENCE (2020)

- Line 5 Relocation Project (2020) – Wisconsin
- Blue Earth County Highway Projects (2020) – Blue Earth County, MN
- Northern Natural Gas – various O&M projects (2020) – Iowa

FAUNA SURVEY PROJECT EXPERIENCE (2020)

- Line 5 Relocation Project –Loggerhead Shrike Surveys (2020) – Wisconsin

RARE PLANT SURVEY PROJECT EXPERIENCE (2020)

- Line 3 Replacement Project (2020) – Minnesota

PRIOR RELEVANT EXPERIENCE

AVIAN SURVEYS AND RESEARCH

- **Avian Field Biologist | 2018-2019 | WEST, Inc. | North Dakota**
Served as field avian biologist for multiple projects across North Dakota. Conducted small and large bird point-count surveys, and identified species by sight and sound. Also served as lead navigator for aerial lek surveys.
- **Graduate Research Assistant | 2015-2018 | NCSU | North Carolina**
Conducted graduate research studying the effects of growing-season prescribed fire on Northern Bobwhite (*Colinus virginianus*) nesting ecology and habitat selection. Trapped, captured, attached radio-collars to northern bobwhite. Used radio telemetry to track collared bobwhites.
- **Field Research Technician | 2015 | NCSU | North Carolina**
Field technician on project studying movement of north bobwhite in response to habitat management on working farms. Trapped, captured, attached radio-collars to northern bobwhite. Used radio telemetry to track collared bobwhites. Conducted vegetation surveys and habitat assessments.
- **Field Technician | 2014 | NCSU | Virginia**
Field technician for project studying Bachman's sparrow (*Peucaea aestivalis*). Set up mist nets, extracted birds, banded Bachman's Sparrows, Recorded/measured age class, sex, wing chord, fat, blood samples from brachial vein. Performed point counts, nest searches, vegetation surveys, territory observations

Eric J. Ogdahl, MS

Field Biologist



EXPERTISE

- Restoration Ecology
- Wetland Delineation and Mapping
- Vegetation Monitoring
- Noxious Weed Inventories

EDUCATION

MS Natural Resources Science and Management
University of Minnesota – Twin Cities

Thesis: Assessing the use of shrub-willows for living snow fences in Minnesota, USA

BS Ecology, Evolution, and Behavior
University of Minnesota – Twin Cities

Minor

- Plant Biology

PUBLICATIONS

Ogdahl, E.J., D.S. Zamora, G. Johnson, G. Wyatt. 2018. Comparison of woody species for use in living snow fences in the Midwestern United States. *Journal of Soil and Water Conservation*.

Ogdahl, E.J., D.S. Zamora, G. Johnson, G. Wyatt, D. Current, and D. Gullickson. 2016. Establishment and potential snow storage capacity of willow (*Salix* spp.) living snow fences in south-central Minnesota, USA. *Agroforestry Systems*.

Ogdahl, E.J. 2015. Financial assistance for living snow fences in Minnesota: programs to save lives, money, and time. *Inside Agroforestry, USDA National Agroforestry Center: Volume 24, Issue 1*.

Borer, E.T., E.M. Lind, **E.J. Ogdahl**, E.W. Seabloom, D. Tilman, R.A. Montgomery, and L.L. Kinkel. 2015. Food-web composition and plant diversity control foliar nutrient content and stoichiometry. *Journal of Ecology* 103:1432-1441.

WETLAND SURVEY/DELINEATION PROJECT EXPERIENCE (2020)

- Line 5 Relocation Project (2020) – Wisconsin
- SHN Project (2020) – North Dakota
- Northern Natural Gas – various O&M projects (2020) – Nebraska

RARE PLANT SURVEY PROJECT EXPERIENCE (2020)

- Superior National Forest (2020) – Minnesota
- Lake Vermilion State Park (2020) – St. Louis County, MN
- Twin Birch Reconstruction Project (2020) – Anoka County, MN

FAUNA HABITAT SURVEY PROJECT EXPERIENCE (2020)

- SHN Project – Dakota Skipper Habitat Mapping (2020) – North Dakota

PRIOR RELEVANT EXPERIENCE

CONSULTING AND RESEARCH

- **Ecologist | 2019-2020 | Great River Greening | Minnesota**
Managed restoration projects: developing work plans, preparing RFPs, selecting of contractors, negotiating contracts, and overseeing project budgets.

Regularly monitor and assess vegetation on restoration projects in a range of habitats, including prairies, oak savannas, woodlands, and forests.

Coordinated field crew work based on field conditions, phenology, and observed invasive species.

Planned and implemented 5 to 10 volunteer restoration events per year, with each event ranging from 5 to 200 volunteers.

Lead and trained volunteers in restoration techniques including plant identification, native seed collection, invasive species removal, and planting native plants and trees.

- **Environmental Scientist | 2016-2017 | Tetra Tech | Minnesota**
Performed wetland delineations using the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual and regional supplements. Activities included using a hand-held GPS, completing field data sheets, sampling vegetation and identifying plants, classifying wetland plant communities, and soil probing.
- **Graduate Research Assistant | 2013-2016 | UM Extension | Minnesota**
Managed and oversaw Minnesota Department of Transportation project to assess the potential of shrub-willows for living snow fences, biomass production, and soil conservation in southern Minnesota.

Conducted fieldwork ranging from installing and planting experiments, maintaining experiments, and collecting vegetation data, soil samples, and snow measurements from experiments.

Carefully tracked costs of project materials, installation, labor, and management activities for economic analyses.

David Paynotta

Field Biologist



EXPERIENCE

- Wetland Delineations
- Rare Species Habitat Surveys
- Rare Species Surveys
- Noxious Weed Surveys

EDUCATION

BS Conservation

Biology, Hydrogeology, GIS
University of Wisconsin-River Falls

WETLAND SURVEY/DELINEATION PROJECT EXPERIENCE (2018 | PRESENT)

- Line 5 Relocation Project (2020) – Wisconsin
- SHN Project (2020) – North Dakota
- Northern Natural Gas – various O&M projects (2018-2020) – IA, NE, SD
- Tioga Lateral Pipeline Project (2019) – North Dakota
- Liberty Pipeline Project (2019) – Kansas
- Bear Creek Pipeline Project (2019) – North Dakota
- Demicks Lake Pipeline Project (2018-2019) – North Dakota/Montana
- Arbuckle II Pipeline Project (2018-2019) – Texas
- Elk Creek Pipeline Project (2018) – Kansas/Montana
- TransCanada – various O&M projects – Missouri
- Cottonwood County CSAH 7 (2018) – Cottonwood County, MN

FAUNA HABITAT SURVEY PROJECT EXPERIENCE (2018 | PRESENT)

- SHN Project – Dakota Skipper Habitat Mapping (2020) – North Dakota
- Demicks Lake Pipeline Project – Avian Nest Surveys (2019) – North Dakota
- Little Missouri Loop Pipeline – Avian Nest Surveys (2019) – North Dakota
- Demicks Lake Pipeline Project – Dakota Skipper Habitat Mapping (2018-2019) – North Dakota
- Arbuckle II Pipeline Project – Golden-Cheeked Warbler Habitat Assessment (2018) – Texas

NOXIOUS WEED SURVEY PROJECT EXPERIENCE (2018 | PRESENT)

- Tioga Lateral Pipeline Project (2019) – North Dakota
- Bear Creek Pipeline Project (2019) – North Dakota
- Line 3 Replacement Project (2018-2019) – Minnesota
- Demicks Lake Pipeline Project (2018-2019) – North Dakota

TREE AND SHRUB SURVEY AND INVENTORY PROJECT EXPERIENCE (2018 | PRESENT)

- Tioga Lateral Pipeline Project (2019) – North Dakota
- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Pioneer Engineering, P.A. (2019) – Anoka County, MN
- Charles Cudd Co. (2019) – Dakota County, MN

RARE PLANT SURVEY PROJECT EXPERIENCE (2018 | PRESENT)

- Chippewa National Forest (2020) – Minnesota
- Demicks Lake Pipeline Project (2018-2019) – North Dakota
- Line 3 Replacement Project (2018-2019) – Minnesota

VEGETATION ASSESSMENT AND MONITORING PROJECT EXPERIENCE (2018 | PRESENT)

- DNR Prairie Monitoring (2018-2019) – Minnesota

SELECTED PROFESSIONAL REFERENCES

Joe Gathman, Ph.D.
University of Wisconsin-River Falls
414 Agricultural Science
611 S. 3rd Street
River Falls, WI 54022
715-425-4201

APPENDIX B

SOILS LOCATED IN THE SURVEY CORRIDOR

Table B**Environmental Survey
Soils Located in the Survey Corridor**

County	Soil Key	Soil Name	Hydric Status
Ashland	226A	Allendale loamy fine sand, 0 to 3 percent slopes	Partially Hydric
	319A	Tonkey sandy loam, 0 to 2 percent slopes	Partially Hydric
	3243A	Spear silt loam, lake terrace, 0 to 3 percent slopes	Partially Hydric
	375A	Robago fine sandy loam, lake terrace, 0 to 3 percent slopes	Partially Hydric
	3826B	Allendale-Wakeley-Kinross complex, 0 to 6 percent slopes	Partially Hydric
	388B	Pelkie, occasionally flooded-Dechamps, frequently flooded complex, 0 to 4 percent slopes	Partially Hydric
	388B	Pelkie, occasionally flooded-Dechamps, frequently flooded complex, 0 to 4 percent slopes	Partially Hydric
	405A	Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes	Hydric
	479A	Lerch-Herbster complex, 0 to 3 percent slopes	Partially Hydric
	480B	Portwing-Herbster complex, 0 to 6 percent slopes	Partially Hydric
	5141A	Lupton-Pleine-Cathro complex, 0 to 1 percent slopes	Hydric
	5170A	Minocqua-Pleine-Cathro complex, 0 to 2 percent slopes	Partially Hydric
	5171B	Tula-Wormet-Gogebic complex, 0 to 6 percent slopes, very stony	Partially Hydric
	5172B	Gogebic, very stony-Pence, very stony-Cathro complex, 0 to 6 percent slopes	Partially Hydric
	5172C	Gogebic, very stony-Pence, very stony-Cathro complex, 0 to 18 percent slopes	Partially Hydric
	526A	Flink sand, 0 to 3 percent slopes	Partially Hydric
	5353B	Tula-Gogebic complex, 0 to 6 percent slopes, stony	Partially Hydric
	5373A	Cathro muck, drainageway, 0 to 1 percent slopes	Hydric
	5374A	Bowstring-Arnheim complex, 0 to 1 percent slopes, frequently flooded	Hydric
	5425A	Foxpaw-Gay, stony complex, 0 to 2 percent slopes	Partially Hydric
	548A	Pickford-Badriver complex, 0 to 3 percent slopes	Partially Hydric
	5689B	Chabeneau-Channing-Gogebic complex, 0 to 6 percent slopes, stony	Partially Hydric
	580B	Sanborg-Badriver complex, 0 to 6 percent slopes	Partially Hydric
	5A	Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded	Partially Hydric
	6A	Moquah fine sandy loam, 0 to 3 percent slopes, frequently flooded	Partially Hydric
	713B	Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes	Partially Hydric
	713C	Kellogg-Allendale-Ashwabay complex, 0 to 15 percent slopes	Partially Hydric
	756B	Superior-Sedgwick complex, 0 to 6 percent slopes	Partially Hydric
	809C	Gogebic-Metonga-Rock outcrop complex, 6 to 18 percent slopes, very stony	Partially Hydric
	809D	Gogebic-Metonga-Rock outcrop complex, 10 to 35 percent slopes, very stony	Partially Hydric
	815A	Wormet sandy loam, 0 to 3 percent slopes	Partially Hydric
	W	Water	Non-Hydric
Bayfield	480B	Portwing-Herbster complex, 0 to 6 percent slopes	Partially Hydric
	713C	Kellogg-Allendale-Ashwabay complex, 6 to 15 percent slopes	Partially Hydric

Table B**Environmental Survey
Soils Located in the Survey Corridor**

County	Soil Key	Soil Name	Hydric Status
Bayfield (continued)	756B	Superior-Sedgwick complex, 0 to 6 percent slopes	Partially Hydric
Iron	193A	Minocqua muck, 0 to 2 percent slopes	Partially Hydric
	405A	Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes	Hydric
	5141A	Lupton-Pleine-Cathro complex, 0 to 1 percent slopes	Hydric
	5170A	Minocqua-Pleine-Cathro complex, 0 to 2 percent slopes	Partially Hydric
	5141A	Lupton-Pleine-Cathro complex, 0 to 1 percent slopes	Hydric
	5172B	Gogebic, very stony-Pence, very stony-Cathro complex, 0 to 6 percent slopes	Partially Hydric
	5689B	Chabeneau-Channing-Gogebic complex, 0 to 6 percent slopes, stony	Partially Hydric
	5353B	Tula-Gogebic complex, 0 to 6 percent slopes, stony	Partially Hydric
	5374A	Bowstring-Arnheim complex, 0 to 1 percent slopes, frequently flooded	Hydric
	5353B	Tula-Gogebic complex, 0 to 6 percent slopes, stony	Partially Hydric
	5172C	Gogebic, very stony-Pence, very stony-Cathro complex, 0 to 18 percent slopes	Partially Hydric
	5689B	Chabeneau-Channing-Gogebic complex, 0 to 6 percent slopes, stony	Partially Hydric
	5504A	Moquah-Arnheim complex, 0 to 3 percent slopes, frequently flooded	Partially Hydric
	5373A	Cathro muck, drainageway, 0 to 1 percent slopes	Hydric
	5374A	Bowstring-Arnheim complex, 0 to 1 percent slopes, frequently flooded	Hydric
	5504A	Moquah-Arnheim complex, 0 to 3 percent slopes, frequently flooded	Partially Hydric
	5A	Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded	Partially Hydric
	5689B	Chabeneau-Channing-Gogebic complex, 0 to 6 percent slopes, stony	Partially Hydric
	713C	Kellogg-Allendale-Ashwabay complex, 0 to 15 percent slopes	Partially Hydric
	713B	Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes	Partially Hydric
	756C	Superior-Sedgwick complex, 6 to 15 percent slopes	Partially Hydric
	815A	Wormet sandy loam, 0 to 3 percent slopes	Partially Hydric
	W	Water	Non-Hydric

APPENDIX C

WETLAND INVENTORY

Table C
**Environmental Survey
Wetlands Summary Table**

County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Bayfield	wbad1005e	PEM	Fresh (Wet) Meadow	46.571253	-91.019374	1
Bayfield	wbad1006e	PEM	Fresh (Wet) Meadow	46.572089	-91.020515	1
Bayfield	wbad1007e	PEM	Fresh (Wet) Meadow	46.572802	-91.021458	1
Bayfield	wbad1007s	PSS	Alder Thicket	46.574252	-91.021688	1
Bayfield	wbad1008e	PEM	Fresh (Wet) Meadow	46.573370	-91.021832	1
Bayfield	wbad1008s	PSS	Alder Thicket	46.574380	-91.022022	1
Bayfield	wbad1009e	PEM	Fresh (Wet) Meadow	46.572529	-91.021745	1
Bayfield	wbad1010s	PSS	Alder Thicket	46.574929	-91.022279	1
Bayfield	wbad1011e	PEM	Fresh (Wet) Meadow	46.575269	-91.022316	1
Bayfield	wbad1011f	PFO	Hardwood Swamp	46.574912	-91.021894	1
Bayfield	wbae1001e	PEM	Fresh (Wet) Meadow	46.563730	-90.976415	2
Bayfield	wbae1002e	PEM	Fresh (Wet) Meadow	46.563714	-90.976943	2
Bayfield	wbae1004e	PEM	Fresh (Wet) Meadow	46.561346	-90.976525	2
Bayfield	wbae1005e	PEM	Fresh (Wet) Meadow	46.562283	-90.976700	2
Bayfield	wbae1003e	PEM	Fresh (Wet) Meadow	46.561306	-90.977456	2
Bayfield	wbad1002e	PEM	Fresh (Wet) Meadow	46.575874	-91.030175	2
Bayfield	wbad1002f	PFO	Hardwood Swamp	46.575641	-91.029954	2
Bayfield	wbad1003e	PEM	Fresh (Wet) Meadow	46.575860	-91.029060	2
Bayfield	wbad1003f	PFO	Hardwood Swamp	46.575471	-91.028945	2
Bayfield	wbad1004e	PEM	Fresh (Wet) Meadow	46.574757	-91.032616	2
Bayfield	wbaa1001e	PEM	Fresh (Wet) Meadow	46.574807	-91.028591	2
Bayfield	wbaa1001f	PFO	Hardwood Swamp	46.574888	-91.031339	2
Bayfield	wbad1001e	PEM	Fresh (Wet) Meadow	46.574784	-91.032156	2
Ashland	wasc1058s	PSS	Shrub-Carr	46.587800	-90.862870	3
Ashland	wasc1058e	PEM	Fresh (Wet) Meadow	46.587608	-90.862771	3
Ashland	wasc1059e	PEM	Fresh (Wet) Meadow	46.587627	-90.863464	3
Ashland	wasc1060e	PEM	Fresh (Wet) Meadow	46.587859	-90.863858	3
Ashland	wasc1061e	PEM	Fresh (Wet) Meadow	46.587130	-90.862801	3
Ashland	wasc1062e	PEM	Fresh (Wet) Meadow	46.586073	-90.862015	3
Ashland	wasc1063e	PEM	Fresh (Wet) Meadow	46.585181	-90.861054	3
Ashland	wasc1064e	PEM	Fresh (Wet) Meadow	46.585282	-90.860635	3
Ashland	wasd1039e	PEM	Fresh (Wet) Meadow	46.586509	-90.861362	3
Ashland	wasd1039f	PFO	Hardwood Swamp	46.587043	-90.861839	3
Ashland	wasd1039s	PSS	Alder Thicket	46.587531	-90.861076	3
Ashland	wasd1040e	PEM	Fresh (Wet) Meadow	46.586930	-90.860943	3
Ashland	wasd1041e	PEM	Fresh (Wet) Meadow	46.587227	-90.859728	3
Ashland	wasd1042e	PEM	Fresh (Wet) Meadow	46.586924	-90.859184	3

Table C
**Environmental Survey
Wetlands Summary Table**

County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasc1065e	PEM	Fresh (Wet) Meadow	46.585928	-90.860937	3
Ashland	wasc1066e	PEM	Fresh (Wet) Meadow	46.585661	-90.859530	3
Ashland	wasc1067s	PSS	Shrub-Carr	46.583387	-90.858176	3
Ashland	wasc1068e	PEM	Fresh (Wet) Meadow	46.582961	-90.854569	3
Ashland	wasc1068f	PFO	Hardwood Swamp	46.581706	-90.854994	3
Ashland	wasd1043e	PEM	Fresh (Wet) Meadow	46.585580	-90.859085	3
Ashland	wasd1044f	PFO	Hardwood Swamp	46.582488	-90.857122	3
Ashland	wasd1044e	PEM	Shallow Marsh	46.582431	-90.857136	3
Ashland	wase1062f	PFO	Hardwood Swamp	46.584627	-90.857724	3
Ashland	wasc1070e	PEM	Fresh (Wet) Meadow	46.581279	-90.856264	3
Ashland	wase1061e	PEM	Fresh (Wet) Meadow	46.584724	-90.858528	3
Ashland	wase1061f	PFO	Hardwood Swamp	46.584732	-90.855605	3
Ashland	wase1061s	PSS	Shrub-Carr	46.583786	-90.857077	3
Ashland	wasa1002s	PSS	Shrub-Carr	46.556088	-90.896627	4
Ashland	wasa1003e	PEM	Fresh (Wet) Meadow	46.555662	-90.895942	4
Ashland	wasa1003s	PSS	Shrub-Carr	46.555593	-90.896224	4
Ashland	wase016e_x	PEM	Fresh (Wet) Meadow	46.553334	-90.896013	4
Ashland	wasa1007e	PEM	Fresh (Wet) Meadow	46.552807	-90.895948	4
Ashland	wasa1001e	PEM	Fresh (Wet) Meadow	46.554683	-90.906403	4
Ashland	wasa1008s	PSS	Shrub-Carr	46.551129	-90.896420	4, 5
Ashland	wase015e_x	PEM	Fresh (Wet) Meadow	46.548689	-90.894714	5
Ashland	wasa1009e	PEM	Fresh (Wet) Meadow	46.546892	-90.895125	5
Ashland	wasa1010e	PEM	Fresh (Wet) Meadow	46.545253	-90.895264	5
Ashland	wasa1010s	PSS	Shrub-Carr	46.544894	-90.895367	5
Ashland	wasa1011e	PEM	Fresh (Wet) Meadow	46.544099	-90.894908	5
Ashland	wasa1012e	PEM	Fresh (Wet) Meadow	46.543696	-90.895034	5
Ashland	wasa1013e	PEM	Fresh (Wet) Meadow	46.543547	-90.895078	5
Ashland	wasa1014e	PEM	Fresh (Wet) Meadow	46.543627	-90.894533	5
Ashland	wasa1018e	PEM	Fresh (Wet) Meadow	46.543344	-90.895862	5
Ashland	wasa1015e	PEM	Fresh (Wet) Meadow	46.543304	-90.895023	5
Ashland	wasa1016e	PEM	Fresh (Wet) Meadow	46.543195	-90.895493	5
Ashland	wasa1017e	PEM	Fresh (Wet) Meadow	46.543161	-90.895835	5
Ashland	wasa1021e	PEM	Fresh (Wet) Meadow	46.542946	-90.894663	5
Ashland	wasa1019e	PEM	Fresh (Wet) Meadow	46.542832	-90.895837	5
Ashland	wasa1022e	PEM	Fresh (Wet) Meadow	46.542770	-90.894555	5
Ashland	wasa1020e	PEM	Fresh (Wet) Meadow	46.542669	-90.895707	5
Ashland	wasa1023e	PEM	Fresh (Wet) Meadow	46.542485	-90.894844	5

Table C
**Environmental Survey
Wetlands Summary Table**

County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasa1024e	PEM	Fresh (Wet) Meadow	46.541973	-90.895141	5
Ashland	wasa1025e	PEM	Fresh (Wet) Meadow	46.541667	-90.895129	5
Ashland	wasa1026e	PEM	Fresh (Wet) Meadow	46.541111	-90.895069	5
Ashland	wasa1027e	PEM	Fresh (Wet) Meadow	46.540295	-90.895177	5, 6
Ashland	wasa1028e	PEM	Fresh (Wet) Meadow	46.539977	-90.894943	5, 6
Ashland	wasa1030e	PEM	Sedge Meadow	46.539787	-90.895760	5, 6
Ashland	wasa1031e	PEM	Sedge Meadow	46.539524	-90.895736	5, 6
Ashland	wasa1038e	PEM	Fresh (Wet) Meadow	46.539030	-90.895812	5, 6
Ashland	wasa1032e	PEM	Sedge Meadow	46.536731	-90.894565	6
Ashland	wasa1029e	PEM	Fresh (Wet) Meadow	46.538069	-90.895002	5, 6
Ashland	wasa1034e	PEM	Fresh (Wet) Meadow	46.536310	-90.895737	6
Ashland	wasa1033e	PEM	Fresh (Wet) Meadow	46.536030	-90.895526	6
Ashland	wasa1039e	PEM	Fresh (Wet) Meadow	46.535846	-90.894655	6
Ashland	wasa112e_x	PEM	Sedge Meadow	46.535627	-90.894611	6
Ashland	wasa112s_x	PSS	Shrub-Carr	46.535547	-90.894663	6
Ashland	wasa1035e	PEM	Fresh (Wet) Meadow	46.531932	-90.896650	6
Ashland	wasa1037e	PEM	Fresh (Wet) Meadow	46.531528	-90.896467	6
Ashland	wasa1036e	PEM	Sedge Meadow	46.531479	-90.896018	6
Ashland	wasa110e_x	PEM	Sedge Meadow	46.530742	-90.896357	6
Ashland	wasa106e_x	PEM	Fresh (Wet) Meadow	46.529610	-90.896046	6
Ashland	wasa1040e	PEM	Fresh (Wet) Meadow	46.528449	-90.896048	6, 7
Ashland	wasa1042e	PEM	Fresh (Wet) Meadow	46.523681	-90.899884	7
Ashland	wasa1041e	PEM	Fresh (Wet) Meadow	46.523679	-90.899527	7
Ashland	wasa039e_x	PEM	Fresh (Wet) Meadow	46.523458	-90.893135	7
Ashland	wasa1043e	PEM	Fresh (Wet) Meadow	46.523151	-90.899643	7
Ashland	wasa1044e	PEM	Fresh (Wet) Meadow	46.522737	-90.899657	7
Ashland	wasa1045e	PEM	Fresh (Wet) Meadow	46.522188	-90.899594	7
Ashland	wasa1046e	PEM	Fresh (Wet) Meadow	46.522005	-90.898479	7
Ashland	wasa1047e	PEM	Fresh (Wet) Meadow	46.507587	-90.885694	8
Ashland	wasa1049e	PEM	Fresh (Wet) Meadow	46.507561	-90.886615	8
Ashland	wasa1050e	PEM	Fresh (Wet) Meadow	46.507381	-90.887338	8
Ashland	wasa1050s	PSS	Shrub-Carr	46.507291	-90.887547	8
Ashland	wasa1048e	PEM	Fresh (Wet) Meadow	46.507406	-90.886168	8
Ashland	wasa1048s	PSS	Alder Thicket	46.507315	-90.885910	8
Ashland	wasa1051e	PEM	Fresh (Wet) Meadow	46.506954	-90.890441	8, 9
Ashland	wasa1051f	PFO	Hardwood Swamp	46.506974	-90.890651	8, 9
Ashland	wasa1051s	PSS	Alder Thicket	46.506421	-90.891024	8, 9

Table C
**Environmental Survey
Wetlands Summary Table**

County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasa1052e	PEM	Fresh (Wet) Meadow	46.506166	-90.893529	8, 9
Ashland	wasa1053e	PEM	Fresh (Wet) Meadow	46.505777	-90.893868	8, 9
Ashland	wasa1054f	PFO	Floodplain Forest	46.501123	-90.894846	9
Ashland	wasa1055f	PFO	Hardwood Swamp	46.500210	-90.893956	9
Ashland	wasa1057f	PFO	Hardwood Swamp	46.497619	-90.895412	9
Ashland	wasa1059f	PFO	Hardwood Swamp	46.497453	-90.894841	9
Ashland	wasa1058f	PFO	Hardwood Swamp	46.497385	-90.895234	9
Ashland	wasd021f_x	PFO	Hardwood Swamp	46.496926	-90.894174	9
Ashland	wasa1066e	PEM	Fresh (Wet) Meadow	46.496767	-90.898689	9
Ashland	wasa1065e	PEM	Fresh (Wet) Meadow	46.496338	-90.898071	9
Ashland	wasa1060f	PFO	Hardwood Swamp	46.495436	-90.893580	9, 10
Ashland	wasa1061f	PFO	Hardwood Swamp	46.495376	-90.894159	9, 10
Ashland	wase080f_x	PFO	Hardwood Swamp	46.494657	-90.894279	9m 10
Ashland	wase081f_x	PFO	Hardwood Swamp	46.494033	-90.894287	10
Ashland	wasa1063f	PFO	Hardwood Swamp	46.493599	-90.894109	10
Ashland	wasa1064e	PEM	Fresh (Wet) Meadow	46.493808	-90.896240	10
Ashland	wasa1067e	PEM	Fresh (Wet) Meadow	46.494160	-90.897724	10
Ashland	wasd1046e	PEM	Fresh (Wet) Meadow	46.494296	-90.898476	10
Ashland	wasd019e_x	PEM	Fresh (Wet) Meadow	46.494071	-90.898391	10
Ashland	wasa1068e	PEM	Fresh (Wet) Meadow	46.493720	-90.898673	10
Ashland	wasa1069e	PEM	Fresh (Wet) Meadow	46.493244	-90.902946	10
Ashland	wasd1038e	PEM	Fresh (Wet) Meadow	46.491335	-90.905293	10
Ashland	wasd1036e	PEM	Fresh (Wet) Meadow	46.490727	-90.903008	10
Ashland	wasd1037e	PEM	Fresh (Wet) Meadow	46.490426	-90.903736	10
Ashland	wasd1045e	PEM	Fresh (Wet) Meadow	46.486280	-90.904211	10
Ashland	wase1047f	PFO	Hardwood Swamp	46.479125	-90.903018	11
Ashland	wasc065e_x	PEM	Fresh (Wet) Meadow	46.479106	-90.901004	11
Ashland	wase073f_x	PFO	Hardwood Swamp	46.473786	-90.898463	11
Ashland	wasd1049f	PFO	Hardwood Swamp	46.473627	-90.898282	11
Ashland	wase074f_x	PFO	Hardwood Swamp	46.473292	-90.898050	11, 12
Ashland	wase1002e	PEM	Fresh (Wet) Meadow	46.466560	-90.907437	12
Ashland	wase1001e	PEM	Fresh (Wet) Meadow	46.466267	-90.907444	12
Ashland	wase1006e	PEM	Fresh (Wet) Meadow	46.447543	-90.897683	14
Ashland	wase1005e	PEM	Fresh (Wet) Meadow	46.447178	-90.895971	14
Ashland	wase1004e	PEM	Fresh (Wet) Meadow	46.447017	-90.895677	14
Ashland	wase1003e	PEM	Fresh (Wet) Meadow	46.446767	-90.895753	14
Ashland	wasa115e_x	PEM	Fresh (Wet) Meadow	46.437152	-90.882514	15

Table C
**Environmental Survey
Wetlands Summary Table**

County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasa114e_x	PEM	Fresh (Wet) Meadow	46.437694	-90.882516	15
Ashland	wase1008e	PEM	Fresh (Wet) Meadow	46.437045	-90.882293	15
Ashland	wase1009e	PEM	Fresh (Wet) Meadow	46.437469	-90.882168	15
Ashland	wase1010e	PEM	Fresh (Wet) Meadow	46.437508	-90.881448	15
Ashland	wase1010s	PSS	Shrub-Carr	46.437498	-90.881268	15
Ashland	wase1011e	PEM	Fresh (Wet) Meadow	46.436846	-90.880546	15
Ashland	wase1012s	PSS	Shrub-Carr	46.434009	-90.874728	15
Ashland	wase1012f	PFO	Hardwood Swamp	46.433348	-90.873415	15
Ashland	wase1046f	PFO	Hardwood Swamp	46.432331	-90.872465	15
Ashland	wase1013s	PSS	Shrub-Carr	46.431886	-90.871409	15, 16
Ashland	wase1013f	PFO	Hardwood Swamp	46.431506	-90.870118	15
Ashland	wase1013e	PEM	Fresh (Wet) Meadow	46.430825	-90.866740	15, 16
Ashland	wase1014s	PSS	Shrub-Carr	46.430828	-90.868774	15
Ashland	wase1015e	PEM	Fresh (Wet) Meadow	46.431292	-90.861627	16
Ashland	wase1017f	PFO	Hardwood Swamp	46.431019	-90.859881	16
Ashland	wase1022e	PEM	Fresh (Wet) Meadow	46.430817	-90.859659	16
Ashland	wase1016f	PFO	Hardwood Swamp	46.430558	-90.857811	16
Ashland	wase1016e	PEM	Fresh (Wet) Meadow	46.430336	-90.856164	16
Ashland	wase1036f	PFO	Hardwood Swamp	46.430931	-90.856765	16
Ashland	wase1020f	PFO	Hardwood Swamp	46.430711	-90.854443	16
Ashland	wase1021e	PEM	Fresh (Wet) Meadow	46.430602	-90.853640	16
Ashland	wase1021f	PFO	Hardwood Swamp	46.430880	-90.852423	16
Ashland	wase1021s	PSS	Shrub-Carr	46.430624	-90.851700	16
Ashland	wase1055e	PEM	Fresh (Wet) Meadow	46.431793	-90.848390	16
Ashland	wase1055f	PFO	Floodplain Forest	46.429368	-90.849147	16
Ashland	wase1023e	PEM	Fresh (Wet) Meadow	46.432781	-90.840882	16
Ashland	wase1042e	PEM	Fresh (Wet) Meadow	46.432551	-90.840872	16
Ashland	wase1056f	PFO	Hardwood Swamp (Vernal Subtype)	46.428143	-90.847938	16
Ashland	wase1038e	PEM	Fresh (Wet) Meadow	46.424606	-90.847041	16
Ashland	wase1039e	PEM	Fresh (Wet) Meadow	46.421123	-90.844274	17
Ashland	wase1039f	PFO	Hardwood Swamp	46.420914	-90.844100	17
Ashland	wase1040e	PEM	Fresh (Wet) Meadow	46.421123	-90.835751	17
Ashland	wase1041e	PEM	Fresh (Wet) Meadow	46.421069	-90.833498	17
Ashland	wase1043f	PFO	Hardwood Swamp	46.421004	-90.832149	17
Ashland	wase1044e	PEM	Fresh (Wet) Meadow	46.421118	-90.829962	17
Ashland	wase1045e	PEM	Fresh (Wet) Meadow	46.421039	-90.828481	17

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Wetlands Summary Table**

County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wase1050e	PEM	Fresh (Wet) Meadow	46.420915	-90.827513	17
Ashland	wase1052e	PEM	Fresh (Wet) Meadow	46.420437	-90.827298	17
Ashland	wase1053e	PEM	Fresh (Wet) Meadow	46.420863	-90.826798	17
Ashland	wase1049s	PSS	Shrub-Carr	46.420143	-90.826115	17
Ashland	wase1051e	PEM	Fresh (Wet) Meadow	46.420162	-90.819301	17
Ashland	wase1048e	PEM	Fresh (Wet) Meadow	46.419253	-90.820255	17
Ashland	wasd1047e	PEM	Fresh (Wet) Meadow	46.406700	-90.828617	18
Ashland	wase1058e	PEM	Fresh (Wet) Meadow	46.406819	-90.825628	18
Ashland	wasd1048e	PEM	Fresh (Wet) Meadow	46.406843	-90.824412	18
Ashland	wasd1050f	PFO	Floodplain Forest	46.406496	-90.826409	18
Ashland	wase1054s	PSS	Shrub-Carr	46.407016	-90.821439	18
Ashland	wase1060e	PEM	Fresh (Wet) Meadow	46.406893	-90.820937	18
Ashland	wase1060f	PFO	Hardwood Swamp	46.406369	-90.820779	18
Ashland	wase1059f	PFO	Hardwood Swamp	46.406373	-90.822948	18
Ashland	wasc1054e	PEM	Fresh (Wet) Meadow	46.405946	-90.818984	18
Ashland	wasc1053e	PEM	Fresh (Wet) Meadow	46.405761	-90.818140	18
Ashland	wasc1052e	PEM	Fresh (Wet) Meadow	46.405836	-90.816582	18
Ashland	wasc1052s	PSS	Shrub-Carr	46.405465	-90.816404	18
Ashland	wasc1057e	PEM	Fresh (Wet) Meadow	46.406857	-90.816020	18
Ashland	wasc1056f	PFO	Hardwood Swamp	46.406008	-90.815801	18
Ashland	wasc1055f	PFO	Hardwood Swamp (Vernal Subtype)	46.405782	-90.815488	18
Ashland	wasc1050f	PFO	Hardwood Swamp	46.405444	-90.812445	18
Ashland	wasc1051f	PFO	Floodplain Forest	46.404715	-90.812251	18
Ashland	wasa1005s	PSS	Shrub-Carr	46.405220	-90.812121	18
Ashland	wasa1004f	PFO	Floodplain Forest	46.406212	-90.811390	18
Ashland	wasa1006f	PFO	Hardwood Swamp	46.405010	-90.811033	18
Ashland	wasc1029f	PFO	Hardwood Swamp	46.404868	-90.808430	18
Ashland	wasc1030e	PEM	Fresh (Wet) Meadow	46.404525	-90.807555	18
Ashland	wasc1028e	PEM	Fresh (Wet) Meadow	46.404510	-90.806724	18, 19
Ashland	wasc1026e	PEM	Fresh (Wet) Meadow	46.404353	-90.803603	18, 19
Ashland	wasc1027e	PEM	Fresh (Wet) Meadow	46.404075	-90.803609	18, 19
Ashland	wasc1025s	PSS	Shrub-Carr	46.403500	-90.804287	18, 19
Ashland	wasc1024e	PEM	Fresh (Wet) Meadow	46.402416	-90.803597	18, 19
Ashland	wasc1031e	PEM	Fresh (Wet) Meadow	46.402230	-90.803415	18, 19
Ashland	wasc1032e	PEM	Fresh (Wet) Meadow	46.401185	-90.803143	18, 19
Ashland	wasc1033s	PSS	Shrub-Carr	46.401298	-90.801984	18, 19

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County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasc1033e	PEM	Fresh (Wet) Meadow	46.401700	-90.801622	18, 19
Ashland	wasa1072f	PFO	Hardwood Swamp	46.400275	-90.797644	19
Ashland	wasa1073e	PEM	Fresh (Wet) Meadow	46.399777	-90.797532	19
Ashland	wasa1071e	PEM	Fresh (Wet) Meadow	46.400380	-90.793612	19
Ashland	wasc1069e	PEM	Fresh (Wet) Meadow	46.400299	-90.792097	19
Ashland	wasc1036e	PEM	Fresh (Wet) Meadow	46.399959	-90.791633	19
Ashland	wasc1036s	PSS	Shrub-Carr	46.400109	-90.791108	19
Ashland	wasc1035e	PEM	Fresh (Wet) Meadow	46.400155	-90.789617	19
Ashland	wasc1034e	PEM	Fresh (Wet) Meadow	46.400180	-90.788317	19
Ashland	wasc1015e	PEM	Fresh (Wet) Meadow	46.400467	-90.788187	19
Ashland	wasc1016e	PEM	Fresh (Wet) Meadow	46.400276	-90.786758	19
Ashland	wasc1017e	PEM	Fresh (Wet) Meadow	46.399952	-90.782851	19
Ashland	wasc1018e	PEM	Fresh (Wet) Meadow	46.400331	-90.779860	19
Ashland	wasc1023e	PEM	Fresh (Wet) Meadow	46.399673	-90.782189	19
Ashland	wasc1022e	PEM	Fresh (Wet) Meadow	46.399383	-90.781992	19
Ashland	wasc1019e	PEM	Fresh (Wet) Meadow	46.399037	-90.782924	19
Ashland	wasc1020e	PEM	Fresh (Wet) Meadow	46.398600	-90.782889	19
Ashland	wasc1021e	PEM	Fresh (Wet) Meadow	46.398121	-90.782343	19
Ashland	wasc1014f	PFO	Floodplain Forest	46.397241	-90.781526	19
Ashland	wasc1013e	PEM	Fresh (Wet) Meadow	46.396827	-90.780646	19
Ashland	wasc1012e	PEM	Fresh (Wet) Meadow	46.397026	-90.779889	19
Ashland	wasc1011e	PEM	Fresh (Wet) Meadow	46.396865	-90.778863	19
Ashland	wasc1011s	PSS	Shrub-Carr	46.396266	-90.779148	19
Ashland	wasc1009e	PEM	Fresh (Wet) Meadow	46.395930	-90.778289	19
Ashland	wasc1008e	PEM	Fresh (Wet) Meadow	46.395863	-90.777956	19
Ashland	wasc1010s	PSS	Shrub-Carr	46.395518	-90.779890	19
Ashland	wasc1010e	PEM	Fresh (Wet) Meadow	46.395596	-90.779765	19, 20
Ashland	wasc1007e	PEM	Fresh (Wet) Meadow	46.395688	-90.778225	19
Ashland	wasc1047e	PEM	Fresh (Wet) Meadow	46.393546	-90.779874	19, 20
Ashland	wasc1006e	PEM	Fresh (Wet) Meadow	46.393116	-90.779516	19, 20
Ashland	wasc1005s	PSS	Shrub-Carr	46.392001	-90.779112	19, 20
Ashland	wasc1005e	PEM	Fresh (Wet) Meadow	46.391395	-90.779557	20
Ashland	wasc1002e	PEM	Fresh (Wet) Meadow	46.391168	-90.778334	20
Ashland	wasc1004e	PEM	Fresh (Wet) Meadow	46.391907	-90.777960	20
Ashland	wasc1003e	PEM	Fresh (Wet) Meadow	46.391750	-90.777962	20
Ashland	wasc1001e	PEM	Fresh (Wet) Meadow	46.390792	-90.777969	20
Ashland	wasc1038e	PEM	Fresh (Wet) Meadow	46.391280	-90.777788	20

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County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasc1037e	PEM	Fresh (Wet) Meadow	46.390871	-90.777773	20
Ashland	wasc1039e	PEM	Fresh (Wet) Meadow	46.390821	-90.777031	20
Ashland	wasc1040f	PFO	Hardwood Swamp	46.390483	-90.775652	20
Ashland	wasc1041f	PFO	Floodplain Forest	46.390614	-90.774591	20
Ashland	wasc1046f	PFO	Hardwood Swamp	46.389734	-90.771030	20
Ashland	wasc1046e	PEM	Fresh (Wet) Meadow	46.389880	-90.770962	20
Ashland	wasc1045f	PFO	Floodplain Forest	46.389748	-90.770500	20
Ashland	wasc1045e	PEM	Fresh (Wet) Meadow	46.389551	-90.770516	20
Ashland	wasc1044s	PSS	Shrub-Carr	46.389670	-90.769543	20
Ashland	wasc1042e	PEM	Fresh (Wet) Meadow	46.389705	-90.767729	20
Ashland	wasc1043e	PEM	Fresh (Wet) Meadow	46.389280	-90.767734	20
Ashland	wasc034e_x	PEM	Fresh (Wet) Meadow	46.389609	-90.766907	20
Ashland	wasb1001e	PEM	Fresh (Wet) Meadow	46.389273	-90.765382	20
Ashland	wasb1002e	PEM	Fresh (Wet) Meadow	46.388498	-90.764752	20
Ashland	wasc035e_x	PEM	Fresh (Wet) Meadow	46.389619	-90.764696	20
Ashland	wasc032e_x	PEM	Fresh (Wet) Meadow	46.388619	-90.763496	20
Ashland	wasb1005e	PEM	Fresh (Wet) Meadow	46.386807	-90.762970	20
Ashland	wasb1003s	PSS	Alder Thicket	46.386069	-90.763577	20
Ashland	wasb1004s	PSS	Alder Thicket	46.386486	-90.763120	20
Ashland	wasb1004e	PEM	Sedge Meadow	46.386245	-90.762926	20
Ashland	wasb1004f	PFO	Hardwood Swamp	46.386132	-90.761736	20, 21
Ashland	wasb1006s	PSS	Alder Thicket	46.385692	-90.763165	20
Ashland	wasb1007f	PFO	Hardwood Swamp	46.387537	-90.760978	20, 21
Ashland	wasb1008e	PEM	Fresh (Wet) Meadow	46.386811	-90.760630	20, 21
Ashland	wasb1009e	PEM	Fresh (Wet) Meadow	46.385860	-90.759988	20, 21
Ashland	wasb1009s	PSS	Shrub-Carr	46.386154	-90.759649	20, 21
Ashland	wasb1010e	PEM	Fresh (Wet) Meadow	46.385474	-90.759413	20, 21
Ashland	wasb1011e	PEM	Fresh (Wet) Meadow	46.385710	-90.758649	20, 21
Ashland	wasb1011f	PFO	Hardwood Swamp	46.386038	-90.757989	20, 21
Ashland	wasw034e_x	PEM	Fresh (Wet) Meadow	46.385513	-90.755413	20, 21
Ashland	wasw034f_x	PFO	Hardwood Swamp	46.385851	-90.754349	20, 21
Ashland	wasw034s_x	PSS	Shrub-Carr	46.386398	-90.753033	20, 21
Ashland	wasa1070f	PFO	Hardwood Swamp	46.386095	-90.755219	20, 21
Ashland	wasw033f_x	PFO	Hardwood Swamp	46.389089	-90.755244	20, 21
Ashland	wasb1012e	PEM	Fresh (Wet) Meadow	46.377778	-90.738229	22
Ashland	wasd1024f	PFO	Hardwood Swamp	46.377728	-90.735849	22
Ashland	wasd1024e	PEM	Fresh (Wet) Meadow	46.377603	-90.735665	22

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County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasd1024s	PSS	Open Bog	46.377603	-90.734027	22
Ashland	wasd1025f	PFO	Hardwood Swamp	46.376622	-90.731916	22
Ashland	wasd1027f	PFO	Hardwood Swamp	46.376146	-90.730376	22
Ashland	wasd1026f	PFO	Floodplain Forest	46.376556	-90.730119	22
Ashland	wasd1029s	PSS	Alder Thicket	46.376707	-90.729031	22
Ashland	wasd1028f	PFO	Hardwood Swamp	46.376067	-90.728360	22
Ashland	wase1024e	PEM	Fresh (Wet) Meadow	46.370859	-90.725847	22, 24
Ashland	wase1024f	PFO	Hardwood Swamp	46.370714	-90.725784	22, 24
Ashland	wase1025f	PFO	Hardwood Swamp	46.370413	-90.725629	22, 24
Ashland	wasd1030s	PSS	Shrub-Carr	46.375243	-90.722701	22
Ashland	wasd1031e	PEM	Fresh (Wet) Meadow	46.376217	-90.721607	22
Ashland	wasd1032e	PEM	Shallow Marsh	46.373600	-90.718240	22, 23
Ashland	wasd1035s	PSS	Alder Thicket	46.373601	-90.715005	22, 23
Ashland	wasa139s_x	PSS	Alder Thicket	46.373737	-90.712852	23
Ashland	wasa139f_x	PFO	Hardwood Swamp	46.373369	-90.712713	23
Ashland	wasa139e_x	PEM	Fresh (Wet) Meadow	46.373010	-90.712379	23
Ashland	wasd1033f	PFO	Hardwood Swamp	46.372368	-90.718586	22, 23
Ashland	wasd1033s	PSS	Alder Thicket	46.372173	-90.718510	22, 23
Ashland	wasd1034f	PFO	Hardwood Swamp	46.372077	-90.718106	22, 23
Ashland	wase1026e	PEM	Fresh (Wet) Meadow	46.370046	-90.725434	22, 24
Ashland	wase1027e	PEM	Sedge Meadow	46.369655	-90.724903	24
Ashland	wase1028f	PFO	Hardwood Swamp	46.367030	-90.723815	24
Ashland	wase1029f	PFO	Hardwood Swamp	46.366827	-90.723762	24
Ashland	wase1030e	PEM	Fresh (Wet) Meadow	46.366570	-90.723149	24
Ashland	wase1031f	PFO	Hardwood Swamp	46.366066	-90.722151	24
Ashland	wase1032f	PFO	Hardwood Swamp	46.367587	-90.718832	24
Ashland	wase1033f	PFO	Hardwood Swamp	46.367799	-90.717195	24
Ashland	wase1034f	PFO	Hardwood Swamp	46.367632	-90.716299	24
Ashland	wase1034e	PEM	Sedge Meadow	46.367489	-90.716095	24
Ashland	wase1035f	PFO	Hardwood Swamp	46.367282	-90.715170	24
Ashland	wasd1001e	PEM	Shallow Marsh	46.351838	-90.665530	25
Ashland	wasd1002e	PEM	Fresh (Wet) Meadow	46.351254	-90.666423	25
Ashland	wasd1005e	PEM	Seasonally Flooded Basin	46.351108	-90.665241	25
Ashland	wasd1004e	PEM	Seasonally Flooded Basin	46.351055	-90.665355	25
Ashland	wasd1003e	PEM	Fresh (Wet) Meadow	46.350681	-90.666092	25, 26
Ashland	wasd1006e	PEM	Fresh (Wet) Meadow	46.337947	-90.659366	27

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Wetlands Summary Table**

County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasd1007e	PEM	Fresh (Wet) Meadow	46.337727	-90.659265	27
Ashland	wasb1013f	PFO	Floodplain Forest	46.336119	-90.654780	27
Ashland	wasb1014f	PFO	Floodplain Forest	46.334401	-90.654274	27
Ashland	wasb1014e	PEM	Fresh (Wet) Meadow	46.334424	-90.654194	27
Ashland	wasb014f_x	PFO	Floodplain Forest	46.334937	-90.653076	27
Ashland	wasd1008f	PFO	Floodplain Forest	46.335935	-90.652257	27
Ashland	wasd1014e	PEM	Fresh (Wet) Meadow	46.337211	-90.646677	27
Ashland	wasd008f_x	PFO	Hardwood Swamp	46.337551	-90.632151	27, 28
Ashland	wase066f_x	PFO	Floodplain Forest	46.341805	-90.632109	27, 28
Ashland	wasd1013f	PFO	Hardwood Swamp	46.338449	-90.629694	28
Ashland	wasd1010f	PFO	Hardwood Swamp	46.338127	-90.627185	28
Ashland	wasd1012e	PEM	Fresh (Wet) Meadow	46.339093	-90.625709	28
Ashland	wasd1011e	PEM	Fresh (Wet) Meadow	46.340064	-90.625578	28
Ashland	wasd1009f	PFO	Hardwood Swamp	46.340524	-90.625925	28
Ashland	wase057f_x	PFO	Hardwood Swamp	46.342128	-90.619954	28
Ashland	wasv035f_x	PFO	Hardwood Swamp	46.349575	-90.611123	29
Ashland	wasv032f_x	PFO	Hardwood Swamp	46.351158	-90.608503	29
Ashland	wasd1018e	PEM	Fresh (Wet) Meadow	46.389846	-90.573603	33
Ashland	wasd1023e	PEM	Fresh (Wet) Meadow	46.391932	-90.573748	33
Ashland	wasd1019e	PEM	Fresh (Wet) Meadow	46.390725	-90.570070	33
Ashland	wasd1021e	PEM	Fresh (Wet) Meadow	46.393314	-90.570749	33
Ashland	wasd1015e	PEM	Fresh (Wet) Meadow	46.377730	-90.552864	31
Ashland	wasd1015s	PSS	Shrub-Carr	46.377727	-90.551571	31
Ashland	wasd1016e	PEM	Fresh (Wet) Meadow	46.377618	-90.551485	31
Ashland	wasd1017s	PSS	Shrub-Carr	46.377639	-90.549066	31
Iron	wirb1002f	PFO	Hardwood Swamp	46.383050	-90.547184	31
Iron	wirb1003f	PFO	Hardwood Swamp	46.383038	-90.546328	31
Iron	wirb1004f	PFO	Hardwood Swamp	46.383784	-90.546019	31
Iron	wirb1005f	PFO	Hardwood Swamp (Vernal Subtype)	46.383975	-90.546405	31
Iron	wirb1006f	PFO	Hardwood Swamp	46.384442	-90.545937	31, 32
Iron	wirb1007f	PFO	Hardwood Swamp	46.389466	-90.545331	32
Iron	wird1002f	PFO	Hardwood Swamp	46.391924	-90.545878	32
Iron	wird1001f	PFO	Hardwood Swamp	46.392228	-90.545445	32
Iron	wirb009f_x	PFO	Hardwood Swamp	46.392962	-90.545261	32
Iron	wirb009e_x	PEM	Fresh (Wet) Meadow	46.392921	-90.545970	32
Ashland	wasd1020e	PEM	Fresh (Wet) Meadow	46.393707	-90.570237	33

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County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Ashland	wasd1022e	PEM	Fresh (Wet) Meadow	46.394669	-90.573676	33
Iron	wirb051e_x	PEM	Fresh (Wet) Meadow	46.403006	-90.526790	35
Iron	wire1007f	PFO	Hardwood Swamp	46.403757	-90.524594	35
Iron	wire1008f	PFO	Hardwood Swamp	46.404318	-90.523864	35
Iron	wire1006f	PFO	Hardwood Swamp	46.405525	-90.525787	35
Iron	wira1002f	PFO	Hardwood Swamp	46.405523	-90.534294	35
Iron	wira1004f	PFO	Hardwood Swamp	46.405830	-90.537448	35
Iron	wira1003f	PFO	Hardwood Swamp	46.406285	-90.538175	35
Iron	wirc024f_x	PFO	Hardwood Swamp	46.426398	-90.515944	38
Iron	wire1001e	PEM	Fresh (Wet) Meadow	46.412326	-90.528348	37
Iron	wire1001f	PFO	Hardwood Swamp	46.412269	-90.528362	37
Iron	wire1005f	PFO	Hardwood Swamp	46.407174	-90.524674	35
Iron	wire1002f	PFO	Hardwood Swamp	46.410605	-90.525444	37
Iron	wire1004f	PFO	Hardwood Swamp	46.408156	-90.521877	35
Iron	wire1003f	PFO	Hardwood Swamp	46.409961	-90.524101	35
Iron	wirb040f_x	PFO	Hardwood Swamp	46.416706	-90.519399	37
Iron	wirb037s_x	PSS	Shrub-Carr	46.423163	-90.517766	38
Iron	wirb037f_x	PFO	Floodplain Forest	46.423323	-90.517584	38
Iron	wirc023f_x	PFO	Hardwood Swamp	46.423880	-90.517398	38
Iron	wirc022f_x	PFO	Hardwood Swamp	46.424487	-90.517083	38
Iron	wirc013f_x	PFO	Hardwood Swamp	46.428857	-90.510938	38, 39
Iron	wirc1022f	PFO	Hardwood Swamp (Vernal Subtype)	46.432161	-90.507775	39
Iron	wirc1021f	PFO	Hardwood Swamp	46.432200	-90.506931	38, 39
Iron	wirc1019f	PFO	Hardwood Swamp	46.433116	-90.505899	39
Iron	wirc1020f	PFO	Hardwood Swamp	46.432569	-90.506008	39
Iron	wirc1023f	PFO	Hardwood Swamp	46.433967	-90.505067	39
Iron	wirc1018f	PFO	Hardwood Swamp	46.433842	-90.504060	39
Iron	wirc014f_x	PFO	Hardwood Swamp	46.434714	-90.502723	39
Iron	wira017f_x	PFO	Hardwood Swamp	46.435211	-90.503035	39
Iron	wirc1016f	PFO	Hardwood Swamp	46.436948	-90.500291	39
Iron	wirc1017f	PFO	Hardwood Swamp	46.438632	-90.499484	39, 40
Iron	wirc006f_x	PFO	Hardwood Swamp	46.439389	-90.497871	39, 40
Iron	wira008e_x	PEM	Fresh (Wet) Meadow	46.442555	-90.490762	40
Iron	wira008f_x	PFO	Hardwood Swamp	46.443125	-90.490432	40
Iron	wirc1015e	PEM	Fresh (Wet) Meadow	46.441956	-90.486301	40
Iron	wirc1014f	PFO	Hardwood Swamp (Vernal Subtype)	46.441940	-90.483499	40

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County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Iron	wirc1013f	PFO	Hardwood Swamp	46.444807	-90.481844	40
Iron	wirc1013e	PEM	Fresh (Wet) Meadow	46.446233	-90.481492	40
Iron	wira006f_x	PFO	Hardwood Swamp	46.448535	-90.483865	40, 42
Iron	wira006e_x	PEM	Fresh (Wet) Meadow	46.448567	-90.483500	40, 42
Iron	wira001f_x	PFO	Hardwood Swamp	46.449445	-90.482710	40, 42
Iron	wirc1012e	PEM	Fresh (Wet) Meadow	46.449385	-90.482435	40, 42
Iron	wirc1011f	PFO	Hardwood Swamp	46.454315	-90.478816	42
Iron	wira002e_x	PEM	Fresh (Wet) Meadow	46.454401	-90.479806	42
Iron	wira010e_x	PEM	Fresh (Wet) Meadow	46.454462	-90.479810	42
Iron	wirc1009e	PEM	Fresh (Wet) Meadow	46.454364	-90.477478	42
Iron	wirc1008e	PEM	Fresh (Wet) Meadow	46.454399	-90.477072	42
Iron	wirc1008f	PFO	Hardwood Swamp	46.454574	-90.477139	42
Iron	wirc1010e	PEM	Fresh (Wet) Meadow	46.454474	-90.478079	42
Iron	wirc1010f	PFO	Hardwood Swamp (Vernal Subtype)	46.454560	-90.478384	42
Iron	wirc1007f	PFO	Hardwood Swamp	46.454872	-90.476492	42
Iron	wirc1006f	PFO	Hardwood Swamp	46.455471	-90.476745	42
Iron	wirc1005f	PFO	Hardwood Swamp	46.455633	-90.476394	42
Iron	wirc1004f	PFO	Hardwood Swamp	46.455901	-90.477388	42
Iron	wirc1003e	PEM	Fresh (Wet) Meadow	46.456423	-90.477726	42
Iron	wirc1003f	PFO	Hardwood Swamp (Vernal Subtype)	46.456467	-90.478009	42
Iron	wira012e_x	PEM	Fresh (Wet) Meadow	46.457591	-90.479746	42
Iron	wira013f_x	PFO	Hardwood Swamp	46.459438	-90.479993	42, 43
Iron	wird1005e	PEM	Fresh (Wet) Meadow	46.464857	-90.509071	41
Iron	wird1003e	PEM	Fresh (Wet) Meadow	46.465606	-90.514237	41
Iron	wird001f_x	PFO	Floodplain Forest	46.467781	-90.483254	43
Iron	wird1004e	PEM	Fresh (Wet) Meadow	46.466873	-90.514704	41
Iron	wirc1026e	PEM	Fresh (Wet) Meadow	46.469556	-90.483565	43
Iron	wirc1025f	PFO	Hardwood Swamp	46.470047	-90.483696	43, 44
Iron	wirc1024f	PFO	Hardwood Swamp	46.470698	-90.483212	43, 44
Iron	wird015f_x	PFO	Hardwood Swamp	46.481949	-90.480599	44, 45
Iron	wird015e_x	PEM	Fresh (Wet) Meadow	46.482077	-90.480327	44, 45
Iron	wirc1001e	PEM	Fresh (Wet) Meadow	46.482201	-90.477734	44, 45
Iron	wird1012e	PEM	Seasonally Flooded Basin	46.485602	-90.483683	45
Iron	wird1008f	PFO	Hardwood Swamp	46.484868	-90.485462	45
Iron	wird1009e	PEM	Seasonally Flooded Basin	46.485460	-90.485980	45

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County	Wetland ID	Cowardin Classification ^a	Eggers Classification	Latitude	Longitude	Map Page
Iron	wird021f_x	PFO	Hardwood Swamp	46.485160	-90.487278	45
Iron	wird016e_x	PEM	Seasonally Flooded Basin	46.485520	-90.487259	45
Iron	wird1010f	PFO	Hardwood Swamp	46.486062	-90.487017	45
Iron	wird1011f	PFO	Hardwood Swamp	46.488624	-90.486397	45
Iron	wird030f_x	PFO	Hardwood Swamp	46.489561	-90.486188	45
Iron	wira1009f	PFO	Hardwood Swamp	46.490537	-90.486045	45, 46
Iron	wira1008f	PFO	Hardwood Swamp	46.491131	-90.486118	45, 46
Iron	wirb1001e	PEM	Fresh (Wet) Meadow	46.491215	-90.487332	45, 46
Iron	wira1007s	PSS	Alder Thicket	46.492389	-90.486245	45, 46
Iron	wira1007f	PFO	Hardwood Swamp	46.492572	-90.486432	45, 46
Iron	wird1007f	PFO	Hardwood Swamp	46.492889	-90.487934	45, 46
Iron	wira1006f	PFO	Hardwood Swamp	46.492951	-90.486324	46
Iron	wira1005e	PEM	Fresh (Wet) Meadow	46.508048	-90.450754	48
Iron	wira1005s	PSS	Shrub-Carr	46.507991	-90.450657	48

^a Wetland types according to Cowardin et al. (1979):
PEM = palustrine emergent
PSS = palustrine scrub-shrub
PFO = palustrine forested
PAB = palustrine aquatic bed