APPENDIX A Summary Table

Survey Date (s)	Site	Native Plant Community Code	Description	Calcareous Fen Point Summary
6/29/2016 and 8/15/2016	BR01	OPp93	Calc Fen - Prairie Extremely Rich Fen	80
7/1/2016	BR02	WMp73	Prairie Wet Meadow/Carr	0
7/1/2016	BR02	MRp93	Prairie Bulrush-Arrowhead Marsh	0
6/30/2016	BR03	WMp73	Prairie Wet Meadow/Carr	0
6/30/2016	BR04	WMs83	Southern Seepage Meadow/Carr	0
6/30/2016	BR05	None	Degraded Wet Meadow/Cattail Marsh	0
6/30/2016	BR06	None	Drainage swale dominated by reed canary grass	0
N/A	BR07	N/A	Not Evaluated	0
6/30/2016	BR08	WM	Wet Meadow Community - no type assigned	0
6/30/2016	BR09	None	Upland	0
6/30/2016	BR10	None	Upland	0
6/30/2016	BR11	None	Drainage Swale	0
6/30/2016	BR12	WMs83	Southern Seepage Meadow/Carr	25
6/30/2016	BR13	WMs83	Southern Seepage Meadow/Carr	25
6/30/2016 and 8/15/2016	BR14	WM or OP	Wet Meadow or Calc Fen	50
7/1/2016	BR15	None	Upland	0
7/1/2016	BR16	None	Upland	0
7/1/2016	BR17	WMp73	Prairie Wet Meadow/Carr	0
7/1/2016	BR18	WMp73	Prairie Wet Meadow/Carr	0
7/1/2016	BR19	WMs83	Southern Seepage Meadow/Carr	25
7/1/2016	BR20	WMs83	Southern Seepage Meadow/Carr	25
7/1/2016	BR21	WMp73	Prairie Wet Meadow/Carr	0
7/1/2016	BR22	OPp93	Calc Fen - Prairie Extremely Rich Fen	190
7/1/2016	BR23	OPp93	Calc Fen - Prairie Extremely Rich Fen	55
8/16/2016	BR24	None	Upland	0
8/16/2016	BR25	OPp93	Calc Fen - Prairie Extremely Rich Fen	75
8/16/2016	BR26	None	Upland	0
8/16/2016	BR27	WM	Degraded Wet Meadow	0
8/16/2016	BR28	None	Upland/Degraded Wetland	0
8/16/2016	BR29	None	Upland	0
8/16/2016	BR30	None	Upland	0
8/16/2016	BR31	None	Upland	0
8/16/2016	BR32	OPp93	Calc Fen - Prairie Extremely Rich Fen	110
8/16/2016	BR33	WM	Wet Meadow Complex	0

APPENDIX B

Summary of Scoring Results

Site	C. aquatilis	C. hystericina	C. prairea	C. sterilis	G. procera	L. kalmii	P. glauca	R. capillacea	S. verticillata	T. maritima	T. palustris	C. bulbosa	C. interior	E angustifolium	L. loeselli	S. boreale	Point Summary Native Plant Community
BR01	25	25									25	5					80 OPp93
BR02a																	0 WMp73
BR02b																	0 MRp73
BR03																	0 WMs83
BR04																	0 WMs83
BR05																	0 None
BR06																	0 None
BR07																	0 N/A
BR08																	0 WM
BR09																	0 None
BR10																	0 None
BR11																	0 None
BR12		25															25 WMs83
BR13		25															25 WMs83
BR14		25				25											50 WM or OP
BR15																	0 None
BR16																	0 None
BR17																	0 WMp73
BR18																	0 WMp73
BR19		25															25 WMs83
BR20		25															25 WMs83
BR21																	0 WMp73
BR22	25		25		25		25	25		25	25		5		5	5	190 OPp93
BR23			25								25		5				55 OPp93
BR24																	0 None
BR25	25	25									25						75 OPp93
BR26																	0 None
BR27																	0 WM
BR28																	0 None
BR29																	0 None
BR30							1										0 None
BR31																	0 None
BR32		25			25	25	25								5	5	110 OPp93
BR33																	0 WM

APPENDIX C Site Photos





BR03

Midwest Natural Resources, Inc. - Bitter Root Wind Project - Yellow Medicine County, MN









BR11







Midwest Natural Resources, Inc. - Bitter Root Wind Project - Yellow Medicine County, MN















Midwest Natural Resources, Inc. - Bitter Root Wind Project - Yellow Medicine County, MN



BR33

APPENDIX D Relevé Forms

Survey Date (s)	Site	Native Plant Community Code	Description	Relevé ID	MN DNR Fen ID	Within Project
						Footprint (8/12/2016)
6/29/2016 and 8/15/2016	BR01	OPp93	Calc Fen - Prairie Extremely Rich Fen	sam16-001	ID	Yes
7/1/2016	BR02	WMp73	Prairie Wet Meadow/Carr	sam16-004		Yes
7/1/2016	BR02	MRp93	Prairie Bulrush-Arrowhead Marsh	sam16-005		Yes
6/30/2016	BR03	WMp73	Prairie Wet Meadow/Carr	sam16-002		No
6/30/2016	BR04	WMs83	Southern Seepage Meadow/Carr	sam16-008		No
6/30/2016	BR05	None	Degraded Wet Meadow/Cattail Marsh	sam16-00a		Yes
6/30/2016	BR06	None	Drainage swale dominated by reed canary grass			Yes
N/A	BR07	N/A	Not Evaluated			No
6/30/2016	BR08	WM	Wet Meadow Community - no type assigned	sam16-00b		No
6/30/2016	BR09	None	Upland			Yes
6/30/2016	BR10	None	Upland			No
6/30/2016	BR11	None	Drainage Swale			No
6/30/2016	BR12	WMs83	Southern Seepage Meadow/Carr	sam16-00e		No
6/30/2016	BR13	WMs83	Southern Seepage Meadow/Carr	sam16-00c		No
6/30/2016 and 8/15/2016	BR14	WM or OP	Wet Meadow or Calc Fen	sam16-003		No
7/1/2016	BR15	None	Upland			No
7/1/2016	BR16	None	Upland			No
7/1/2016	BR17	WMp73	Prairie Wet Meadow/Carr	sam16-006		No
7/1/2016	BR18	WMp73	Prairie Wet Meadow/Carr			No
7/1/2016	BR19	WMs83	Southern Seepage Meadow/Carr	sam16-007		No
7/1/2016	BR20	WMs83	Southern Seepage Meadow/Carr	sam16-00d		No
7/1/2016	BR21	WMp73	Prairie Wet Meadow/Carr			Yes
7/1/2016	BR22	OPp93	Calc Fen - Prairie Extremely Rich Fen		Fortier 6	No
7/1/2016	BR23	OPp93	Calc Fen - Prairie Extremely Rich Fen			No
8/16/2016	BR24	None	Upland			Yes
8/16/2016	BR25	OPp93	Calc Fen - Prairie Extremely Rich Fen	sam16-015		Yes
8/16/2016	BR26	None	Upland			Yes
8/16/2016	BR27	WM	Degraded Wet Meadow			No
8/16/2016	BR28	None	Upland/Degraded Wetland			Yes
8/16/2016	BR29	None	Upland			Yes
8/16/2016	BR30	None	Upland			Yes
8/16/2016	BR31	None	Upland			Yes
8/16/2016	BR32	OPp93	Calc Fen - Prairie Extremely Rich Fen	sam16-014	Fortier 5	No
8/16/2016	BR33	WM	Wet Meadow Complex			No



0 0.75 1.5 Miles

Bitter Root Wind Project Calcareous Fen Evaluation Yellow Medicine County, MN **Relevé Locations**

*				
•				
mat Hinnesola		¥:	loitial Soon	· · ·
MINNESOTA DEPARTMENT OF NATURAL R	RESOURCES RELEVE FORM		Entered	-
MNDNR, Division of Ecological & Water Resources, statistical resources	500 Lafayette Road, Box 25, St. Paul,	MN 55155		
GENERAL INFORMATION	SITE DATA SH	EET	Final Scan	- 70 - 71
				Ē
Surveyor's Releve #: Sharthan Act Survey	or's Place Name: RDXI			- ^m
Institution: (M)BS (E)CS (N)HP (U)SFS (U) of I	M (O)the) MNC			TI #
Purpose of Releve: (C)lassification (R)are species	habitat (M)onitoring (O)ther			-
Date: 28 Month: JU & Year: 2016	; #: , (e.g. 09 JUL 2004) •			
MBS Site #: Ownership:	······		· · ·	1
VEGETATION INFORMATION	· · ////// · · · ·	1500		
NPC Code (Name): $\bigcirc P \land Q \land$	en upland (VV VV) wooded wetlar	nd (OW) open wetland		<u>۱</u>
NPC Ranking in Releve:)
Stand Typical of NPO: (Y)es (N)o (U)ncertain	anoo (H)uman disturbanco (X)ou	na stand (starm) (O)than		
Releve Typical of Stand: ((Y)es) (N)o			<u></u>	_
If No, identify appropriate modifier: (H)igher Quality	(L)ower Quality (C)anopy Gap (C	D)ther		_ ·
Plot Location in NPC: (F)ar from community boundar	ry (M)oderately far from boundary	(C)lose to boundary (E)cotona		
UTM: フム8んちろFÌ	/ Permanent Mark	er (N)o) (Y)es		
4955729N (record in NAD83, Zone 1	Marker Type / Pl	acement:		
UTM Accuracy: meters				
County: Verist Medic 100	Township: N R	ange: Section:	QQRT: of QRT:	
PLOT INFORMATION				-
Plot Size: $10 \text{ m} \times 10 \text{ m} = 100 \text{ m}^2$		7		
Levation:tt. Slope: A.5 (°) or Topographic Context: (C)rest (U)pper (M)iddle	r(%) Aspect: (L)ower (T)oe (E)lat (D)eores	e.g., N, NE, etc.; LV for level)		•
OIL INFORMATION				
Litter Thickness: cm		Denth of Laver	Coarse Fragments	
Litter Type: (L)eaves (N)eedles (G)rass (O))ther	Top Bottom	Texture ^A Type ^B Volume ^C	
HumusType: (M)or (M)oder (P)rairie mult (W	/)ormed mull	(1: <u>0</u> cm (>) c	m	
Earthworms Present: (Y)es (N)o	(1) (2) (2) (4) (5)	$\left \begin{array}{c} \varphi \\ \varphi \\ 2 \end{array} \right = \frac{2}{2} - \frac{cm}{2} \left(2 \right) - \frac{cm}{2} \left(2 $	m	
Depth to Semi-Permeable Layer: cm	(1) (2) (3) (4) (3)	1 0 3: cm (>) cl	m	
Depth to Gray Colors or Redox Features:	cm	5: cm (>) ci	m	
Drainage Class: (E)xcessively/Somewhat excessively (S)omewhat poorly (P)oorly (V)en	(W)ell (M)oderately well	6:cm (>)c	m	
Height of Moss Hummocks: cm	poony dramed	7:cm (>)ci	m	
Sphagnum Cover:%		A S = sand, LS = loamy sand, SL = sand	n dy loam, L=loam, SIL≕silt loam, SCL∓]
pH of Surface Water: (>) cm		sandy clay loam, CL = clay loam, SIC clay, C = clay, RO = rock, PE = peat,	L = silty clay loam, SC = sandy clay, SIC = silt MP = mucky peat, MU = muck	¥
Average Depth to Bedrock; cm		if origin of peat or mucky peat is know = sedge	/n, add suffix to two-letter code: -m = moss, -:	5
Exposed Rock:%		^B Gr = gravel, Co = cobbles, St = stones	, Bo = boulders	
Rock Group: (F)elsic (M)afic (C)alcareous (S)ands Rock Type:	tone (S)ioux quartzite (O)ther	^C 0 = <15%, 1 = 15-35%, 2 = 35-60%, 3	= 60-90%, 4 = >90%, ? = unknown	
General Soil Texture: (Cliay (Lloam (Slond (Slitt	(R)acte (M)uste (D)act			
Bomarkey Stille Alma Alma	INJUCK (IVI)UCK (I Jeal	in Alichance	here and O	
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Fulling and anne is deal				Contraction of the second
- I have the the hear of the card of the state of the sta	with an Mr.	. ralestone and	CARAGE_LEBL	
The well many . S. Awtus	with chefter - Luce	Lo palustine uno		
The water and a poole of	contraction and	L. palintane une		
Basal Area & Tree Diameters DBH List; 3pecies L/D BA-1 BA-2 Ave. DBH (cm)	Complete (P)artial	55: 4827/4832		
Basal Area & Tree Diameters DBH List: Species L/D BA-1 BA-2 Ave. DBH (cm)	Complete (P)artial	Les		
Basal Area & Tree Diameters DBH List: 3pecies U/D BA-1 BA-2 Ave. DBH (cm)	C)omplete (P)artial	255: 4.827/4832		
Basal Area & Tree Diameters DBH List:	Complete (P)artial	4827/4832		
Basal Area & Tree Diameters DBH List: Species L/D BA-1 BA-2 Ave. DBH (cm)	C)omplete (P)artial	4827/4832		- · ·
Basal Area & Tree Diameters DBH List: Species L/D BA-1 BA-2 Ave. DBH (cm)	C)omplete (P)artial	4.827/4832		

DNR RELEVE #

Surveyor's Releve #: SHM16-DOL Date: 6 28 16

Surveyor(s): <u>SBM</u> County: <u>VM</u>

Surveyor's Place Name: BP-Ø1

ID	C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS	D	c.s	SPECIES NAME	REMARKS
		DI-74		+	<u> </u>	K1-30		\vdash	<u> </u> .	CN-36	
	ŕ	A. Fairris Red			D.	E. PERFORIATUM			4	S. ALITUS	
	~	& INTERIAS	90		200- 200-	S. ADFAG-ANTOLYNE			3	S. PUNGENS	
					4.	S.GIGANTEA			2	C. HUSTERZICINA	
					de:	CMAURADA			2.	J. NOBOTUS	
					1.	L.ASPER			2.	A. CIGANTED	
		•			and and	E. MALULATUM		4	١.	E. PALUSSPEIS	
				A	2	Tivaluca		Ľ	<u>)</u> .	C. PPRECENCILLIS	
	•			Ľ	Are	T. SEFLUANALE			<u>[</u>].	G.STEINTA	• •
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					1.	B. Apricise			1	H. JUBATUMA	
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				L.		T. MUSTRIS			١.	J. DUDLEYI	
				Ĺ	8:250	P. AUREA			2	S. PALLIOUS	
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				L	1000	S. MEUTANSIS	· ·	R.	1	J. DUDLENI	
				Z	4	S. LANCEOLATUM			2	C. HOUATILIS	
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		•						L	1.		

Life Form

B = broadleaf evergreen D = broadleaf deciduous

<u>Height</u> 8 >35m 7 = 20-35m

6 = 10-20m

5 = 5-10m 4 = 2-5m

3 = 0.5-2m

1 = 0-0.1m

2 = 0.1- 0.5m

- E = needleleaf evergreen

G = graminoids H = forbs

- L = lichens
- M = mosses & liverworts

 $\mathbf{C} = \text{climbers}$ K = stem succulents

F = floating-leaved

S = submerged

X = epiphytes

Species 5 75-100% 4 50-75% 3 25-50%

Cover

2

Group

с

i

р

r

b

а

5 = extensive mat 4 = small colonies, broken mat 3 = large group, many plants 2 = small dense clumps

1.= growing singly

5-25% 1-5% <1%

- Abundance
- <5% cover, many individuals 1
- <5% cover, few (2-20) individuals

r <5% cover, single

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6-9p, Ca")

Selected Remark Codes Reliability Code 0 = varlety certain 1 = cf. var./subsp. 2 = species certain

- 5 = genus certain 6 = cf. genus 7 = unknown

4 = cf. species

3 = species complex

- ## = specimen collection #
- Selected Kemark Codes DD = dead DY = dying GE = germinating SD = seedling SP = sprout (coppice) FR = fuiling OP = outside plot (<2m)

Sociability

t Harresola	Initial Scan
MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM	Entered
	Edited
GENERAL INFORMATION SITE DATA SHEET	Final Scan
Surveyor(s): SAMUe-1502	
Surveyor's Releve #: Shttlle.002 Surveyor's Place Name: BRAS	
Institution: (M)BS (E)CS (N)HP (U)SFS (U) of M (O)ther M H /2	
Revisit: (Y)es ((N)o ² Original DNR Releve #:	
Date: 29 Month: JUN Year: 2016 (e.g. 09 JUL 2004).	
MBS Site #: Ownership:	
Vegetation Group: (WU) wooded upland (QU) open upland (WW) wooded wetland (QW) open upland	I
NPC Code (Name): 1.11583((<u>)</u>
NPC Ranking in Releve:	· · · · · · · · · · · · · · · · · · ·
If <u>No</u> , identify appropriate modifier: (N)atural disturbance (H)uman disturbance (Y)oung stand (<40 yrs) (O)ther	
Releve Typical of Stand: (Y)es (N)o	
It <u>No</u> , identify appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Gap (O)ther	
LOCATION INFORMATION	onał
UTM: $105162E$ (N)o (Y)es	
4955330 N (record in NAU83, Zone 15) Marker Type / Placement:	
Location Source: (G)PS (A)ic photo (T)ono man (L)iDAR (O)ther	
County: <u>County: Mental Mental Mental Englishing</u> Township: <u>N Range:</u> Section:	QQRT: of QRT:
PLOTINFORMATION	
Plot Size: $10 \text{ m} \times 10 \text{ m} = 100 \text{ m}^2$	
Topographic Context: (C)rest (U)pper (M)iddle (L)ower (T)oe (F)lat (D)epression (?)uncertain)
SOIL INFORMATION	
Litter Thickness: cm	Coarse Fragments
Litter Type: (L)eaves (N)eedles (G)rass (O)ther	om Texture ^A Type ^B Volume ^C
HumusType: (M)or (M)oder (P)rairie mull (W)ormed mull (1: 0 cm (>)	
Earthworms Present: (Y)es (N)o Earthworm Rapid Assessment Rank ($\omega \rightarrow beaux$): (1) (2) (3) (4) (5) $\left\{ \begin{array}{c} \varphi \\ \varphi \end{array} \right\}$	_cm
Depth to Semi-Permeable Layer: cm (1) (1) (2) (3) (1) (3) $\frac{1}{2}$	_cm
Depth to Gray Colors or Redox Features:cm (>)5:cm (>)	_cm
(S) onewhat poorly (P) oorly (V) ery poorly drained	_cm
Height of Moss Hummocks:cm	_cm
Sphagnum Cover: % Denth of Standing Water: % ^A S = sand, LS = loamy sand, SL = s	andy loam, L= loam, SIL= silt loam, SCL=
pH of Surface Water: ± till sandy clay loam, CL = clay loam, CL = clay loam, CL = clay loam, CL = clay, C = clay,	SICL≕silty clay loam, SC≕sandy clay, SIC≟silty ≥at, MP = mucky peat, MU = muck
Average Depth to Bedrock: cm	nown, add suffix to two-letter code: -m = moss, -s
Exposed Rock:% B Gr = gravel, Co = cobbles, St = stor	πes, Bo = boulders
Rock Group: (F)elsic (M)afic (C)alcareous (S)andstone (S)ioux quartzite (O)ther c 0 = <15%, 1 = 15-35%, 2 = 35-60%	5, 3 ≈ 60-90%, 4 = >90%, ? = unknown
General Soil Texture: (C)lay (L)gam (S)and (S)ilt (R)gock (M)uck (P)got	
Romarke: Wet when a love Guine (China Come (Nouch (Mouch () Jean	
calle und him had been ad an and provide	Lingh NG Strug
Comp pelliter : the try of citle cevanne	d-arminer - 2
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Basal Area & Tree Diameters DBH List: (C)omplete (P)artial Notes: 4830 Species L/D BA-1 BA-2 Ave. DBH (cm) 4830	
Releve-Wide DBH Statistics	
Prism Factor: Min: Max: Median: Photos Taken: (Y)es (N)o	Revised June 2013

DNR RELEVE #

Surveyor(s): <u>S.Milburn</u> County: Valour Municipie

Surveyor's Place Name: 🛛 🔀 🕵

Surveyor's Releve #: Strikille and Date: 6 29 11

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ID	C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS
		·				H1-36				61-30	<u> </u>
					١	E. PERFORMATUM			3.	Caramageostis stricto	×
					r.	L.LOCSALLA.			2.	S. PALLIOUS	
				L	+-	E.LEPTOPAYLLUM			1.	Jo BMSTICUS	
		1			<u>J.</u>	S. LURYCARPUM	· ·		<u>Å</u> .	C. PELITH	
	•				1.	E. MAGULATUM			١.	S. PECTIMATA	
					١.	L. ASPEVE			uite.	P. APUNDINSIACEN	
					de.	A. CANADONSIS		-	1.	C. STRINTA	
					+	S. CANSMIDLASSUS			1.	E. ENTRADOON	•
				Б	de .	TUDHA SP			1.	J. DUDLEYI	
					4	P. HUDROPIPKE			·		
					de	T. CHTOMOGOBIS			· -		
					ale.	A.INUNENSBITH			· _		
		•			e395	E. ARUGISIS			· -		· ·
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	Ι.					A.C. NNABINGM	OP		.		
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	1	A way but is they as a Re walk	6P		1.	1/ WEREN BA MASSIANCE	08		1.		

Life Form

B = broadleaf evergreen

<u>Height</u>

8 >35m

7 = 20-35m

6 = 10-20m5 = 5-10m4 = 2-5m

3 = 0.5-2m 2 = 0.1- 0.5m 1 = 0-0.1m

D = broadleaf deciduous

E = needleleaf evergreen

G = graminoids H = forbs

- L = lichens
- M = mosses & liverworts

C = climbers K = stem succulents

F = floating-leaved

S = submerged X = epiphytes

Species 5 75-100% 4 50-75% 3 25-50%

Cover

Group

С

р г

b

а

i.





- 1 <5% cover, many individuals + <5% cover, few (2-20) individuals r <5% cover, single

Selected Remark Codes DD = dead DY = dying

0 = variety certain 1 = cf. var./subsp.

Reliability Code

2 = species certain

4 = cf. species 5 = genus certain

6 = cf. genus

7 = unknown

3 = species complex

- GE = germinating SD = seedling SP = sprout (coppice)
 - FR = fruiting

OP = outside plot (<2m) ## = specimen collection #

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

Sociability

5 = extensive mat 4 = small colonies, broken mat 3 = large group, many plants

1.= growing singly

2 = small dense clumps

			·		Initial Scan	
	MINNESOTA DEPARTMEN	NT OF NATURAL RESOURCES RELEV	VE FORM	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Entered	[
STFANINENT OF KITUPAL AJSCURATES	MNDNR, Division of Ecological	31 & Water Resources, 500 Lafayette Road, E	lox 25, St. Paul, MN 55155		QC'd Edited	· · · ·
GENERA	L INFORMATION	SITE	DATA SHEET		Final Scan	
DNR F	ELEVE #	· · · ·		•		
Survey	or(s): S.M. LAURA	<u></u>			·	
Survey	or's Releve #: Show No.	Surveyor's Place Name	" <u>BEN4</u>			
Purpos	e of Releve: (C)lassificatio	ion (R)are species habitat (M)onitorin	q (O)ther			
Revisit	(Y)es (N)o Origi	inal DNR Releve #:	_	2		
Date: <u>1</u>	<u>So</u> Month: $\underline{\mu} \underline{\psi} \underline{\xi}$	Year: 2 0 (e.g. 09 JUL 2004)				
WEGETA		nip:			1 - V.1	
Vegeta	ion Group: (WU) wooded	d upland (OU) open upland (WW)	wooded wetland (TOW)	open wetland		
NPC C	ode (Name):	(SEE NOTE	3 Wino	vor)
NPC R	nking in Releve:					
Stand	o, identify appropriate modifier	(N)o (U)ncertain er: (N)atural disturbance (H)uman distu	rbance (Y)oung stand (<	40 yrs) (O)ther		
Releve	Typical of Stand: (Y)es	3)(N)o				
lf <u>h</u>	o, identify appropriate modifie	er: (H)lgher Quality (L)ower Quality (C	anopy Gap (O)ther	National Action of the Astron		
Plot Lo	cation in NPC: (F)ar from	n community boundary (M)oderately far	from boundary (C)lose	to boundary (E)cotonal	· .	
LOCATIO	N INFORMATION	-	annant Marta Can			
UTM: /	10101414 E	(record in NAD83, Zone 16) Pern Marl	ranent Warker: (N)o ker Type / Placement	л(т)es ::		
UTM A	curacy: mete	ers/ 4 main				
Locatio	n Source: (G)PS (A)ir pr	hoto (T)opo map (L)iDAR (O)ther				
County	· TEFFOR WEDI	CING Township: _	N Range:	Section:	QQRT: of Q	RT:
PLOT IN	ORMATION	······································				
Flevati	e: <u>10</u> mx <u>10</u> m= m: ft Sic	= 100 m	spect: NW (en N	NF etc : V for level)		
Topogr	aphic Context: (C)rest ((U)pper (M)lddle (L)ower (T)oe (F)lat (D)epression (?)u	ncertain		
SOIL INF	ORMATION		, , , , , , , , , , , , , , , , , , , ,			
Litter T	hickness: cm			Denth of Laver	Coarso I	Fragmonte
Lit	er Type: (L)eaves (N)ee	edies (G)rass (O)ther	·	Top Bottom		Volume
Humus Hu	Inickness: cm nusTvpe: (M)or (M)oder	r (P)rairie mull (W)ormed mull	(1:	0 cm (>) cm		
Earthw	orms Present: (Y)es (N	N)o	φ ² :	cm (>) cm	<u> </u>	
Earthw Depth f	orm Rapid Assessment	$\operatorname{Rank}(\operatorname{low} \to \operatorname{heavy}); (1) (2) (3)$		cm (>)cm	۱ <u> </u>	
Depth t	o Gray Colors or Redox	k Features: cm		cm (>)cm	1 <u> </u>	
Draina	e Class: (E)xcessively/So	omewhat excessively (W)ell (M)oderat	ely well 0 6:	Cm (>)Cm	!	
	(S)omewhat poor	orly (P)oorly (V)ery poorly drained	رم ۲:	om (>)om		
		cm	8:	cm (>)cm	· · · · · · · · · · · · · · · · · · ·	
Height	of Moss Hummocks:					
Height Sphagr Depth o	of Moss Hummocks:% um Cover:% f Standing Water: (>)	cm	A S = sand	, LS = loamy sand, SL = sandy av loam _ CL = clav loam _ SICL	/ Ioam, L = Ioam, SIL = silt Ioa =.silty clay loam, SC = sandy cl	m, SUL =
Height Sphagr Depth o pH of S	of Moss Hummocks: um Cover: % f Standing Water: (>) urface Water: ±	cm	A S = sand sandy cla clay, C =	, LS ≈ loamy sand, SL ≈ sandy ay loam, CL ≈ clay loam, SICL ≈ clay, RO ≈ rock, PE ≈ peat,	rioam, L ≠ Ioam, SIL ≠ silt Ioa ≕silty clay loam, SC = sandy cl MP = mucky peat, MU = mucl	m, SCL≒ lay, SIC ⇔silty k
Height Sphagr Depth o pH of S Averag	of Moss Hummocks:% um Cover:% f Standing Water: (>) urface Water: ± e Depth to Bedrock:	cm cm	A S = sand sandy cla clay, C = lf origin = sedge	, LS = loamy sand, SL = sandy ay loam, CL = clay loam, SICL = clay, RO = rock, PE = peat, of peat or mucky peat is known	/ Ioam, L = Ioam, SL = silt Ioa ≕silty clay loam, SC = sandy cl MP = mucky peat, MU = much n, add suffix to two-letter code:	m, SCL = lay, SIC = silty k -m = moss, -s
Height Sphagr Depth o pH of S Averag Expose	of Moss Hummocks: um Cover:% f Standing Water: (>) urface Water: ± e Depth to Bedrock: d Rock:%	cm cm	A S = sand sandy cla clay, C = If origin = sedge B Gr = gra	, LS = loamy sand, SL = sandy ay loam, CL = clay loam, SICL = clay, RO = rock, PE = peat, of peat or mucky peat is known vel, Co = cobbles, St = stones,	r loam, L= loam, SL= silt loa =silty clay loam, SC= sandy cl MP = mucky peat, MU = mucl n, add suffix to two-letter code: Bo = boulders	m, sct = lay, slC = silty k -m = moss, -s
Height Sphagr Depth of PH of S Averag Expose Rock G	of Moss Hummocks: um Cover:% f Standing Water: (>) urface Water: ± e Depth to Bedrock: d Rock:% roup: (F)elsic (M)afic (C)	cm cm)alcareous (S)andstone (S)ioux quartz	A S = sand sandy ck clay, C = If origin = sedge B Gr = gra zite (O)ther c 0 = <15%	, LS = loamy sand, SL = sand) y loam, CL = clay loam, SICL clay, RO = rock, PE = peat, of peat'or mucky peat is knowr vel, Co = cobbles, St = stones, 4, 1 = 15-35%, 2 = 35-60%, 3 =	<pre>/ loam, L = loam, SL = sit loa = sitty cay loam, SC = sandy ci MP = mucky peat, MU = muck n, add suffix to two-letter code: Bo = boulders = 60-90%, 4 = >90%, 7 = unkno</pre>	m, SCL = lay, SIC + silty k -m = moss, -s
Height Sphagr Depth of PH of S Averag Expose Rock G Rock T	of Moss Hummocks:% um Cover:% f Standing Water: (>) urface Water: a Depth to Bedrock: d Rock:% roup: (F)elsic (M)afic (C) ype:	cm cm)alcareous (S)andstone (S)ioux quartz	A S = sand sandy ck clay, C = If origin = sedge B Gr = grav zite (O)ther $c_0 = <15\%$, LS = loamy sand, SL = sand) sy loam, CL = clay loam, SICL = clay, RO = rock, PE = peat, of peat or mucky peat is knowr vel, Co = cobbles, St = stones, 6, 1 = 15-35%, 2 = 35-60%, 3 =	rioam, L= Ioam, SLL= sitt (oa = sitty cay loam, SC= sandy ci MP = mucky peat, MU = mucl , add suffix to two-letter code: Bo = boulders = 60-90%, 4 = >90%, ? = unkno	m, SOL = lay, SIC = silty k - m = moss, -s wn
Height Sphagr Depth of PH of S Averag Expose Rock G Rock T Genera	of Moss Hummocks:	cm cm)alcareous (S)andstone (S)ioux quartz)oam (S)and (S)ilt (R)ock (M)uck (A S = sand sandy th clay, C: If origin = sedge B Gr = grav Zite (O)ther C 0 = <159	, LS = loamy sand, SL = sand) sy loam, CL = clay loam, SiCL clay, RO = rock, PE = peat, of peat or mucky peat is known vel, Co = cobbles, St = stones, 4, 1 = 15-35%, 2 = 35-60%, 3 =	r loam, L = Ioam, SL = sit (oa MP = mucky peat, MU = mucky n, add suffix to two-letter code: Bo = boulders = 60-90%, 4 =>90%, ? = unkno	m, scu = lay, sIC = silty k -m = moss, -s
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Height Sphagr Depth of PH of S Averag Expose Rock G Rock T Genera Remark	of Moss Hummocks: um Cover:% f Standing Water: (>) urface Water: ± e Depth to Bedrock: d Rock:% roup: (F)elsic (M)afic (C) /pe: Soil Texture: (C)lay (L) s: ftereform (C) (C) (C)	cm cm :)alcareous (S)andstone (S)ioux quart)oam (S)and (S)ilt (R)ock (M)uck (A S = sand sandy ck clay, C: If origin = sedge B Gr = grav zite (O)ther $c_0 = <15$? (P)eat	, LS = loamy sand, SL = sand) I loam, CL = clay loam, SICL clay, RO = rock, PE = peat, of peat or mucky peat is known vel, Co = cobbles, St = stones, 6, 1 = 15-35%, 2 = 35-60%, 3 = Alegel by gyl alegel by gyl	<pre>/ loam, L = loam, SL = sit loa = sitty cay loam, SC = sandy ci MP = mucky peat, MU = muck , add suffix to two-letter code: Bo = boulders = 60-90%, 4 = >90%, ? = unkno </pre>	m, suct = all y, sic = silty k -m = moss, -s
Height Sphagr Depth of PH of S Averag Expose Rock G Rock T Genera Remark	of Moss Hummocks: um Cover:% f Standing Water: (>) urface Water: ± o Depth to Bedrock:% roup: (F)elsic (M)afic (C) /pe: Soil Texture: (C)lay (L) s: S.p. Landor L. S.p.	cm cm :)alcareous (S)andstone (S)ioux quart:)oam (S)and (S)ilt (R)ock (M)uck (charter (S)and (S	A S = sand sandy ch clay, C: If origin = sedge B Gr = gra- zite (O)ther $c_0 = <159$ (P)eat (P)eat (P)eat	, LS = loamy sand, SL = sand) sy loam, CL = clay loam, SICL clay, RO = rock, PE = peat, of peat or mucky peat is known vel, Co = cobbles, St = stones, 6, 1 = 15-35%, 2 = 35-60%, 3 = ALC LL, QVA COLLAR, DVA (SOC)	<pre>/ loam, L = loam, SL = sit loa Sitty call your, SC = sandy ci MP = mucky peat, MU = muck , add suffix to two-letter code: Bo = boulders = 60-90%, 4 = >90%, ? = unkno MMMOULL AMAL AVENAL AMAL AVENAL AMAL AVENAL AMAL AVENAL AMAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL AVENAL</pre>	m, suct ₁ au, sict ₁ silty k -m = moss, -s
Height Sphag Depth of PH of S Averag Expose Rock G Rock T Genera Remark <u>PUT</u>	of Moss Hummocks:% I Standing Water: (>) urface Water: ± Depth to Bedrock: d Rock:% roup: (F)elsic (M)afic (C) /pe: Soil Texture: (C)lay (L) s: textor roup: (L) S, pi textor roup: (L) S, pi tex	cm cm :)alcareous (S)andstone (S)ioux quart)oam (S)and (S)ilt (R)ock (M)uck (children (M)uck ()))))))))))))))))))))))))))))))))	A S = sand sandy the clay, C: If origin = sedge B $Gr = gravely gravely the constraints (P)eat Gravely the constraints Gravely the constraintsGravely the constraints Gravely the constraintsGravely the constraints Gravely the constraintsGravely the constra$, LS = loamy sand, SL = sand) sy loam, CL = clay loam, SiCL clay, RO = rock, PE = peat, of peat or mucky peat is known vel, Co = cobbles, St = stones, 6, 1 = 15-35%, 2 = 35-60%, 3 =	<pre>/ loam, L = loam, SL = sit loa </pre>	m, suct = arg, sict = silty k -m = moss, -s wn
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DNR RELEVE #

Surveyor's Releve #: Smalb-003 Date: June 30, 2016

Surveyor(s): S.M. Iburn

County: Verene Merricius

ID C.S SPECIES

2.

p.

Surveyor's Place Name: Rola

								•	
SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS
DIST				HI-3r				G1-36	
COONTRA STOLOWIFEREM			1.	S. CATHOR PLANELS			3.	S. PUNGENS	· .
Amenoha Fruiticases			4-	T. DUSNEWAR PULL			2	S. PALLIDUS	
			4.	A. INKYTETSWAM			4.	CALIAMALESTI & STALLT	à
CI-Za			١.	S. Collopadation			١.	J. HODDEUS	
P. VITACED			1.	E. MALULARM			1.	E.EPAMAROPOON	
			١.	V. NEPROPHYLLA		L	١.	P. ARUMMINALIA	
۰.			١.	LASPUR			١.	G. STANTA	
			1.	S. LYNCEDERTUM			1.	J. DUDLEYI	•
			Ϊ.	ZAUREA			1.	C. PELLITA	
			1.	1. CAPENSIS			4.	C. GRANNLARDS	
			1.	V. HUSTATA				G. GRANNIS	OP
			1.	S. HARVERSIS			.	S. PECTINATIA	
			١.	ELEPTOPHYLUM			3	CAREY STRICTA	
			1.	TILMAMOSIE	•		3.	C. HUISTERFICINSA	
			*:	A ARTEMISUFOLIA			+:	C. YULPINGUNHA	
			4.	LIMMORICANNUS			.		
			1.	FUPHOREIA ESCULAVIUS					
			apr.	T. REPENS					
			V.	E: PURFOLIMILAN				· .	
			de.	POTENTILLA ANSCHING					
		·	١.	LOBELID GALMIL					
			4	HELENIUM ANTOMISM	C				
			1	Agalinis tenutolia					
			1.	J .					
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Life Form

B = broadleaf evergreen

Height

8 >35m

7 = 20-35m 6 = 10-20m 5 = 5-10m

4 = 2-5m

3 = 0.5-2m 2 = 0.1-0.5m 1 = 0-0.1m

D = broadleaf deciduous

E = needleleaf evergreen

G = graminoids H = forbs

L = lichens

M = mosses & liverworts C = climbers

K = stem succulents

F = floating-leaved

S = submerged X = epiphytes

Group Species 5 75-100% 4 50-75% 3 25-50% C i

Cover

p 2 5-25% r 1-5% <1% b а

- Abundance
- <5% cover, many individuals 1
- + <5% cover, few (2-20) individuals r <5% cover, single

Reliability Code

0 = variety certain

1 = cf. var./subsp. 2 = species certain

3 = species complex 4 = cf. species 5 = genus certain<math>6 = cf. genus

7 = unknown

SD = seedling

DD = deąd DY = dying GE = germinating

SP = sprout (coppice) FR = fruiting OP = outside plot (<2m)

= specimen collection

Selected Remark Codes

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

Sociability

5 = extensive mat

1.= growing singly

4 = small colonies, broken mat 3 = large group, many plants 2 = small dense clumps

Hinnesota		Initial Scan	1
	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM	Entered	_
OFFAILURE FESO, SCES	MNUNK, Division of Ecological & Water Resources, 500 Lafayette Road, Box 25, St. Paul, MN 55155	QC'd	N
GENER	AL INFORMATION SITE DATA SHEET	Final Scan	RR
DNR	RELEVE #		Ĩ
Survey	VOTS POLANE # SAMUE DBA SURVIVOTO PLACE Name: POMO		Ш
Institu	tion: (M)BS (E)CS-(N)HP (U)SFS (U) of M (O)thar M ANA		Ē
Purpo	se of Releve: (C)lassification (R)are species habitat (M)onitoring (O)ther	······	- +-
Revisi	t: (Y)es (N)>> Original DNR Releve #:	.—	I
Date: MBS S	<u>Se</u> Month: <u>JUN</u> Year: <u>25 ILo</u> (e.g. 09 JUL 2004)·		
VEGETA			
Vegeta NPC C	tion Group: (WU) wooded upland (OU) open upland (WW) wooded wetland (OW) open wetland ode (Name): WM w 7.3	,	I
NPC R	anking in Releve:		
Stand If I	Typical of NPC: (Y)es (N)o (U)ncertain No identify appropriate modifier: (N)atural disturbance (H)uman disturbance (Y)oung stand (<40 yrs) (O)ther		
Releve	Typical of Stand: (Y)es (N)o	· · · · · · · · · · · · · · · · · · ·	
Plot Lo	cation in NPC: (F)ar from community boundary (M)oderately far from boundary (C)lose to boundary (E)cotona		
LOCATI		'	
UTM:	135964E (record in NAD83, Zone 35) Permanent Marker: (N) (Y)es 4955748 N		
UTM A	ccuracy:meters		
Locatio	on Source: (G)PS (A)ir photo (T)opo map (L)iDAR (O)ther	0007.	
	FORMATION	_ QQRI: of QRI:	
PLOT IN Plot Si	$\frac{1}{2} \frac{1}{2} \frac{1}$		
Elevati	on:ft. Slope:(°) orO(%) Aspect: └─V (e.g., N, NE, etc.; LV for level)		
Topog	raphic Context: (C)rest (U)pper (M)iddle (L)ower (T)oe (F)lat (D)epression (?)uncertain		
SOIL INF	ORMATION		
Litter T	hickness: cm	Coarse Fragments	1
Lit Humus	ter Type: (L)eaves (N)eedles (G)rass (O)ther	Texture ^A Type ^B Volume ^C	
Hu	musType: (M)or (M)oder (P)rairie muli (W)ormed muli (1: 0 cm (>) cm	m	
Earthw	orms Present: (Y)es (N)o 2:cm (>)ci	m	
Earthw	$\begin{array}{c} \text{rorm Rapid Assessment Rank}_{\text{(low} \rightarrow \text{heavy)}} & (1) & (2) & (3) & (4) & (5) & 0 \\ \hline \textbf{0} & \textbf{0} & \textbf{3} & \dots & (\textbf{a}) \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} & \textbf{0} \\ \hline \textbf{0} & \textbf{0} & \textbf{0} \\$	m	
Depth 1	to Stemi-Permeable Layer: cm cm to Grav Colors or Redox Features: cm (>) ci	m	
Draina	ge Class: (E)xcessively/Somewhat excessively (W)ell (M)oderately well	m	
	(S)omewhat poorly (P)oorly (V)ery poorly drained	n	
Height	of Moss Hummocks: cm	m	
Sphagi	num Cover: % A S = sand, LS = loamy sand, SL = sand	dy loam, L=loam, SIL=silt loam, SCL=	J
pH of S	Surface Water: (2) Cffi sandy clay loam, CL=clay loam, SIC Surface Water: ± clay, C=clay, RO=rock, PE=peat,	L=silty clay loam, SC = sandy clay, SIC = silty , MP = mucky peat, MU = muck	
Averaq	e Depth to Bedrock: cm If origin of peat or mucky peat is know	vn, add suffix to two-letter code: -m = moss, -s	
Expose	ed Rock:% B Gr = gravel. Co = cobbles. St = stones	s. 8o ⇒ boulders	
Rock G	roup: (F)elsic (M)afic (C)alcareous (S)andstone (S)ioux quartzite (O)ther c 0 = <15%, 1 = 15-35%, 2 = 35-60%, 3	; = 60-90%, 4 = >90%, ? = unknown	
Genera	I Soil Texture: (C)lav (L)oam (S)and (S)ilt (R)ock (M)uck (P)eat	· · · · · · · · · · · · · · · · · · ·	
Remark	15: Grangering Longens land with meanland within the	biores .	
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Basal Ar	ea & Tree Diameters DBH List: (C)omplete (P)artial Notes:		
Species	L/D BA-I BA-2 Ave. DBH (cm)		
	Releve-Wide DBH Statistics		
Prism Fa	ctor: Min: Max: Madian: Photos Taken (Y)es (N)o	Revised J	lune 2013

DNR RELEVE #

Date: 4

16 301

Surveyor(s): S.Milburn

County: Vellows MEDICINE

Surveyor's Place Name: B2\$2

Surveyor's Releve #:১೫৬৬--∞4

D	C.S	SPECIES NAME	REMARKS	10	5	C.S	SPECIES NAME	REMARKS	5 1	D	C.S	SPECIES NAME	REMARKS
		01-25	1.		┫		#1-3r] [G1-36	
	7	C. STOLONIFERA				Д.	ZIAVILLA		٦ [1.	J. BALTICUS	
	<u> </u>					1.	A: CANNUSIDUM		٦ [Ą.	C. PELLITA	-
						+.	P. CRISPUS] [2.	C BLAMBERSONS STRICTA	
						1.	T. CANROFUSIS		7 Г		2	S. PHILIDUS	
						١.	P. AWELLIA		٦ ٦		3.	A. GIGHNATEN	
						· 1.	A. CHAMBIDGMESIS	:	7 [1.	P. PPATENESS	
						2	G. LEPIPATA		1 [1.	A. HIRTUM	
	· ·			1	1	1.	CIMACULASA		7 Г		١.	C. PRASCONCILIS	
	•			1		Ì.	S. LANK HA BOTINGS		1 [١.	G. STRIMA	
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			-	1		1.	T. DASYCHEOUM		1 [].	H. JUBATUM	
				1		. <u>1</u>	7. APTERS	OP			١.	J. BUNLEY 1	
	<u> </u>	·····		1							ulie	G, VUEPINGIDEN	
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Lif B = D =	e For = broa	m Height idleaf evergreen 8 >35m idleaf deciduous 7 = 20-35m idleaf 0.000000000 6 = 40.200000000000000000000000000000000000	Group	u L over	Spe 5	cies 75-1	Sociability 5 = extensive mat 00% 4 = small colonies, broke 5% 3 = large group many pla	- n mat	<u>Re</u> 0 == 1 == 2 =	lia va cf	bility ariety . var.i	Code Selected Remark Co- certain DD = dead /subsp. DY = dying GE = germinating	des_

E = needleleaf evergreen G = graminoids H = forbs

L = lichens

M = mosses & liverworts C = climbers

K = stem succulents

F = floating-leaved

S = submerged X = epiphytes

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6-9p, Ca")

3 = large group, many plants 2 = small dense clumps 1 = growing singly

4 50-75% 3 25-50% 2 5-25% 1-5% <1% Abundance

p r b a

5 = 5-10m

3 = 0.5-2m 2 = 0.1- 0.5m 1 = 0-0.1m

4 = 2-5m

1 <5% cover, many individuals + <5% cover, few (2-20) individuals r <5% cover, single

2 = species certain 3 = species complex

4 = cf. species

6 = cf. genus

7 = unknown

5 = genus certain

DD = dead DY = dying GE = germinating SD = seedling SP = sprout (coppice)

FR = fruiting OP = outside plot (<2m)

= specimen collection

Hinnesota		Initial Scan		
	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM	Entered		Ū
OFFAALINENT OF NITURAL AFSOLUCES		Edited		ŽR
GENERAL	LINFORMATION SITE DATA SHEET	Final Scan		R
Surveyo	ELEVE#			Ë
Surveyo	pr's Releve #: SAMIU-005 Surveyor's Place Name: BP42 Part 2		,	Ř
Instituti	on: (M)BS (E)CS (N)HP (U)SFS (U) of M (O)the MNR			#
Revisit:	(Y)es ((N)o ₃ Original DNR Releve #:		· · · · · ·	
Date: 🐧	3 Month: JUN Year: 2016 (0.g. 09 JUL 2004)			
MBS Sit	e #: Ownership:			
VEGETAT	ion Group: (WU) wooded upland (OU) open upland (WW) wooded wetland (OW) open wetland			l
NPC Co	de (Name): $\underline{MEP 9.3}$ ()	
NPC Ra	nking in Releve:			
If <u>No</u>	2, identify appropriate modifier: (N)atural disturbance (H)uman disturbance (Y)oung stand (<40 yrs) (O)ther			
Releve 7	Typical of Stand: (Y)es (N)o			
If <u>N</u>	2, identity appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Gap (O)ther			
UTM	10.5991 E (Y)es Permanent Marker: (N)e (Y)es			
	<u>ASS ABL</u> N J Marker Type / Placement:			
Location	n Soμrce: (C)PS (A)ir photo (T)opo map (L)iDAR (O)ther			
County:	N Range: Section:	_ QQRT:	of QRT:	
PLOT INF	ORMATION 2			
Elevatio	e: <u>\D_m x \D_</u> m = <u>\DD_</u> m n: ft. Slope: (°) or (%) Aspect: (e.g., N. NE, etc.; t.V for level)			
Topogra	aphic Context: (C)rest (U)pper (M)iddle (L)ower (T)oe (F)lat (D)epression) (?)uncertain			
SOIL INFO	DRMATION			
Litter Th	nickness:cm Depth of Layer Depth of Layer		Coarse Fragments]
Humus	Thickness: cm	Texture ^A	Type ^B Volume ^C	
Hun Farthwo	nusType: (M)or (M)oder (P)rairie mull (W)ormed mull (1:cm (>)cm) mms Present: (X)os (N)o	n		
Earthwo	$\frac{9}{0} = \frac{2}{3} = \frac{9}{3} = \frac{2}{3} = \frac{1}{3} = \frac{1}$	n	·	
Depth to	o Semi-Permeable Layer: cm	n		
Deptinte	e Class: (E)xcessively/Somewhat excessively (W)ell (M)oderately well	ņ	·	
	(S)omewhat poorly (P)oorly (V)ery poorly drained	n .	·	
Height o Sphagn	of Moss Hummocks:cm {3:cm (>)cm	n		
Depth of	f Standing Water: (>) Cm	y loam, L = loam, ⇒silty clay loam.	SIL = silt loam, SCL = SC = sandy clay, SIC = silty	
pH of St	Irface Water: ± terms to be a clay, C= clay, RO= rock, PE = peat,	MP ≍ mucky pea	t, MU ≕ muck	
Average	Depth to Bedrock: cm = sedge	n, add suffix to tw	o-letter code: -m = moss, -s	
Exposed Rock Gr	B Gr = gravel, Co = cobbles, St = stones, oup: (F)elsic (M)afic (C)alcareous (S)andstone (S)ioux quartzite (O)ther country to cryster a spectral	, Bo = boulders		
Rock Ty	pe:	= 60-90%, 4 = 290	J%, r = unknown	
General	Soil Texture: (C)lay (L)oam (S)and (S)ilt (R)ock (M)uck (P)eat			
Remarks	: Sessonally inundated system in a demonstrand)	basen	and	
wh	rent to (), a WMp 73 commundy. Dominabed by	ujant.	hur-read	
-min	h. bulrusher (sugers) dustributer in clasters. No surves to	WWW 4	1 the time	
-4fs	Shed had			
	······································			
Basal Area	a & Tree Diameters DBH List: (C)omplete (P)artial Notes: 4888			-
Species	L/D BA-1 BA-2 Ave. DBH (cm)	·	in le trose	
	Unawaawaawaa	ama	CI. U.	
L				
Prism Fac	tor: Min; Max: Median: Photos Taken: Mes (N)o		Barde-1	lune 2013
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DNR RELEVE #

GE = germinating SD = seedling SP = sprout (coppice) FR = fruiting OP = outside plot (<2m)

= specimen collection

5 = genus certain 6 = cf. genus 7 = unknown

Surveyor(s): S.Milburn County: Villow Medicine

Surveyor's Releve #: SAMIG-DOS Date: 63016 Surveyor's Place Name: BEB2 prt 2

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D	C.S	SPECIES NAME	REMARKS		וי	C.S	SPECIES NAME	REMARKS	Ш	$ ^{c}$.5	SPECIES NAME	REMARKS
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						K	& LANGELLINGTHE HAA			5		C. IRANSTONE	
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	· ·		1		_	<u>+ .</u>	KOMICA BELLANNICA			12	-	J. TASKE MONTAPIL	
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Life	e Forn	n Height	<u> </u>	over			Sociability	-	<u>Relia</u>	bili	ty (Code Selected Remark Co	des
В= п-	: broad	deat evergreen $8 > 35m$	Group	S	spe 5	cies 75-1	5 = extensive mat 4 = small colonies, broker	n mat	υ=ν 1=c	ine va	iy c ir./s	ubsp. DY = dead	
E =	need	leleaf evergreen 6 = 10-20m	i		ă	50-7	5% 3 = large group, many pla	nts	2 = s	peci	es	certain GE = germinating	
G =	gram	inoids 5 = 5-10m	р		3	25-5	0% 2 = small dense clumps		3 = s	peci	es	complex SD = seedling	
н =	TOLDS	4 = 2-5m	г		2	0-20	70 L – growing strigty		4-C	. sp	eu	ea or ~ sprout (coppice)	

3 = 0.5-2m 2 = 0.1- 0.5m 1 = 0-0.1m

b

а

1-5% <1%

r <5% cover, single

Abundance

- G = graminoids H = forbs
- L = lichens
- M = mosses & liverworts C = climbers K = stem succulents
- F = floating-leaved
- S = submerged X = epiphytes

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

1 <5% cover, many individuals + <5% cover, few (2-20) individuals

Hine-esofs				·	Initial Scan	
	MINNESOTA DEPART	MENT OF NATURAL RESOURCES	RELEVE FORM	11 MN 66166	Entered	— <u> </u>
DEFAILNENT OF NUTRALL RESOURCES		gida a water Nesources, 500 carayetter			QC'd	— Ň
GENER.	AL INFORMATION		SIIE DAIA S	HEEI	Final Scan	7
DNR	RELEVE #					臣
Surve	yor's Releve #: SAMI	6-50 Surveyor's Place	Name: 821-	7		∰
Institu	tion: (M)BS (E)CS (N)HP (U)SFS (U) of M (O)ther	MNR			III #
Purpo Revisi	se of Releve:((C)lassifié t: (Y)es (N)o Oi	ation (R)are species habitat (M) riginal DNR Releve #:	onitoring (O)ther			
Date:	\underline{O} Month: \underline{J} \underline{U}	L Year: <u>2014</u> (e.g. 09 JU	L 2004) ·			
MBSS	Site #: Owne	rship:		· · · · · · · · · · · · · · · · · · ·	·	
VEGETA	ATION INFORMATION			for the second second second		l
NPC C	ode (Name): 1 M	b 2 3 (00) open upland ((VV VV) wooded wel	land (OW) open wetland)
NPC R	anking in Releve:				· · · · · · · · · · · · · · · · · · ·	/
Stand	Typical of NPC: (Y)es	; (N)o (U)ncertain Nifier: (N)atural disturbanco (H)um	an diaturbanea (V)	ound stand (see) (O)there		
Releve	• Typical of Stand: (Y))es (N)o	an disturbance (1)			
lf	No, identify appropriate mod	lifier: (H)igher Quality (L)ower Qua	ality (C)anopy Gap	(O)ther	·	
Plot Lo	ocation in NPC: (F)ar fr	rom community boundary (M)odera	itely far from bound	ary (C)lose to boundary (E)coton	al	
LOCATI	ON INFORMATION ゴカウ (みんめ F)	Down on out Ma			
UTW.	4955787N	(record in NAD83, Zone 15)	Marker Type /	Placement:		
UTM A	ccuracy:m	eters				
Locati	on Source: (G)BS (A)i	ir photo (T)opo map (L)iDAR (C)ther		0007	
	EDEMATION	<u>Luss</u> Iowns	nip:N	Range: Section:	_ QQR1: of QRT:	
Plot Si	ze:\ô_m x \ ô` n	n = いひつm²				
Elevati	on:ft.	Slope:(°) orO_(%)) Aspect:	\underline{V} (e.g., N, NE, etc.; LV for level)		
Тород	raphic Context: (C)rest	t (U)pper (M)iddle (L)ower (T)oe (F)lat ((D)epi	ression (?)uncertain		
SOIL INF	ORMATION					
Litt	ter Type: (L)eaves (N))eedles (G)rass (O)ther		Depth of Layer	Coarse Fragme	nts
Humus	Thickness: cm	· · · · · · · · · · · · · · · · · · ·		Top Bottor	n <u>Texture</u> ^A <u>Type^B Volum</u>	<u>e</u> c
Earthw	rormsPresent: (Y)es	<pre>(P)rairie mull (W)ormed mull (N)o</pre>	. ·	(1: 0 cm (>))	.m	-
Earthw	orm Rapid Assessme	nt Rank (low \rightarrow heavy): (1) (2)	(3) (4) (5)	S 3: cm (>)		_
Depth : Depth :	to Semi-Permeable La	yer: cm		4: cm (>) c	.m	
Draina	ge Class: (E)xcessively/	/Somewhat excessively (W)ell (M)	oderately well	$\left(\frac{1}{10}\right)^{5}$;cm (>)c	;m	
	(S)omewhat p	poorly (P)oorly (V)ery poorly draine	ed	0 0:cm (>)0	.m	-
Height	of Moss Hummocks:	cm		(1: - cm(r)) = 0 8; cm(r) cm(r)		-
Depth (of Standing Water; (>)	°		A S = sand, LS = loamy sand, SL = sar	idy loam, L = loam, SIL = silt loam, SCL =	=J
pH of S	Surface Water: ±			sandy clay loam, CL = clay loam, Si clay, C = clay, RO = rock, PE ≈ pea	JL= silty clay loam, SC = sandy clay, SIC = t, MP = mucky peat, MU = muck	silty
Averag	e Depth to Bedrock: _	cm		lf origin of peat or mucky peat is kno = sedge	wn, add suffix to two-letter code: -m = mos	ss, -s
Expose	ed Rock:%			^B Gr = gravel, Co = cobbles, St = stone	≥s, Bo = boulders	
Rock G	roup: (F)elsic (M)afic (vpe:	C)alcareous (S)andstone (S)loux	quartzite (O)ther	^C 0 = <15%, 1 = 15-35%, 2 = 35-60%,	3 ≈ 60-90%, 4 = >90%, ? ≈ unknown	
Genera	Soil Texture: (C)lay ((L)oam (S)and (S)ill (R)ock (N	l)uck (P)ost			
Bomari	on A free Mart	Adam (C)and (C)nt (11)OCK (M		Lever Others en	14 x 0 1 4 1 . 4 6 x . 4	
Nemar Vast	N LIMITUA EM	2 PORT LEDVINION VI	1 - 12 - 12 - 12 - 12 - 12 - 12 - 12 -	TOTAL TOTAR	NO OHMR COVED	francis
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Basal Ar	ea & Tree Diameters	DBH List: (C)omplete	(P)artial N	otes: 49.07)		
				A + _ em.		
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Prism Fa	ctor:	Releve-Wide DBH Statistics Min: Max: Median:	Р	hotos Taken: (Y)es (N)o		Inited her- 0040
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DNR RELEVE #

Surveyor(s): S Milleron 1 County: y. 1 and Medicine

Surveyor's Place Name: BR17

Surveyor's Releve #:<u>\$ AMIL-006</u> Date:

ID C.	.s	SPECIES NAME	REMARKS	11	D	c.s	SPECIES NAME	REMARKS		D	c.s	SPECIES NAME	REMARKS
Π.	. 1						H1-36					<u>Cil-3c</u>	
						۱.	S. EJENCATIONM				3	S. PERTINATA	
						þ.	MADUARSIS				<u>Q.</u>	C. PELLITA	
<u> </u>											۱	C. PRAECORPEILIS	
											<u>A</u> .	CARLAY STRUCTA	
											<u>).</u>	A. GIGANITEA	
	.										۱	S. PALLIBUS	
											١.	Commacevens STRACTON	
				Γ		•].	GIGRANDIS	•
				Γ						4	4.	E. DEVENS	
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Life Form

B = broadleaf evergreen

<u>Height</u>

8 >35m

7 = 20-35m

6 = 10-20m

3 = 0.5-2m 2 = 0.1- 0.5m 1 = 0-0.1m

5 = 5-10m

4 = 2-5m

- D = broadleaf deciduous
- E = needleleaf evergreen

G = graminoids H = forbs

- L = lichens
- M = mosses & liverworts

C = climbers

- K = stem succulents F = floating-leaved
- S = submerged X = epiphytes

Species 5 75-100% 4 50-75% 3 25-50%

2

Cover

Group

С

1

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r

b

а

- Sociability 5 = extensive mat
 - 4 = small colonies, broken mat 3 = large group, many plants
 - 2 = small dense clumps
 - 1.= growing singly
- 5-25% 1-5% <1% Abundance
- 1 <5% cover, many individuals + <5% cover, few (2-20) individuals r <5% cover, single

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

Selected Remark Codes DD = dead DY = dying

- - GE = germinating SD = seedling SP = sprout (coppice)
 - FR = fruiting
 - OP = outside plot (<2m)
 - ## = specimen collection #

Reliability Code

0 = variety certain 1 = cf. var./subsp.

2 = species certain

4 = cf. species 5 = genus certain

6 = cf. genus

7 = unknown

3 = species complex

Hinnesola			Initial Scan		ľ
	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM		Entered		
DEFASINENT OF NITURUL RESOLUCIES	MNDNR, Division of Ecological & Water Resources, 500 Lafayette Road, Box 25, St. Paul,	MN 55155	QC'd _		ž
GENER	AL INFORMATION SITE DATA SH	EET	Final Scan		
DNR	RELEVE #				Ē
Surve	VOR(S): DiH.M. HEBUTH	·			. 'n
Institu	tion: (M)BS (E)CS (N)HP (U)SFS (U) of M (O)ther MARC			· · · · · · · · · · · · · · · · · · ·	· m
Purpo	se of Releve: (C)lassification (R)are species habitat (M)onitoring (O)ther	· · · · · · · · · · · · · · · · · · ·			.
Revisi	t: (Y)es (N) Original DNR Releve #:				1
MBS S	$\underline{\mathscr{O}}$ [Wonth: \underline{J} \underline{O} \underline{L} Year: \underline{O} \underline{I} \underline{O} (e.g. 09 JUL 2004).				1
VEGET	TION INFORMATION				1
Vegeta	ation Group: (WU) wooded upland (OU) open upland (WW) wooded wetlar	d (OW) open wetland			1
NPC C	ode (Name): <u>W M s 8 3 (</u>)	
NPC R Stand	anking in Releve:				
lf	No, identify appropriate modifier: (N)atural disturbance (H)uman disturbance (Y)ou	ng stand (<40 vrs) (O)ther			
Releve	Typical of Stand: (Y)es (N)o				
lf .	No, identify appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Gap (C))ther			
Plot Le	ocation in NPC: (F)ar from community boundary (M)oderately far from boundary	(C)lose to boundary (E)cotonal			
LOCATI UTM·	ON INFORMATION			· .	
011.	A 9.56037 N (record in NAD83, Zone 16) Permanent Marker Type / Pl	acement:			
UTM A	ccuracy: meters				
Locati	on Source: ((G)P\$ (A)ir photo (T)opo map (L)iDAR (O)ther				
Count	/: <u></u>	ange: Section:	_ QQRT:	of QRT:	
PLOT IN Plot Si	FORMATION				
Elevati	on:ft. Slope:(2) or 4.5 (%) Aspect: \ /	(e.g., N, NE, etc.; LV for level)	1		
Topog	raphic Context: (C)rest (U)pper (M)iddle) (L)ower (T)oe (F)lat (D)epres	sion (?)uncertain	÷		
SOIL INF	ORMATION				
Litter 1	hickness: cm	Depth of Layer		Coarse Fragments	7
Humus	Thickness: cm	Bottom	Texture ^A	Type ^B Volume ^C	
Hu	musType: (M)or (M)oder (P)rairie mull (W)ormed mull	(1: <u>0</u> cm (>) cm	n		
Earthw	orms Present: (Y)es (N)o	ν 2:cm (>)cn	ו <u></u>		
Depth	to Semi-Permeable Layer: cm	$\begin{bmatrix} \overline{0} & 3 \end{bmatrix} = \begin{bmatrix} 0 & \mathbf{c} \\ 2 & \mathbf{d} \end{bmatrix} = \begin{bmatrix} \mathbf{c} \\ \mathbf{c} \\ \mathbf{c} \end{bmatrix} \begin{bmatrix} \mathbf{c} \\ \mathbf{c} \\ \mathbf{c} \end{bmatrix} = \begin{bmatrix} \mathbf{c} \\ \mathbf{c} \\ \mathbf{c} \end{bmatrix} = \begin{bmatrix} \mathbf{c} \\ \mathbf{c} \\ \mathbf{c} \end{bmatrix}$	ו <u></u>		
Depth	o Gray Colors or Redox Features: cm	[cm (²) - cm (²) cm	י <u></u> ו	<u></u>	
Draina	ge Class: (E)xcessively/Somewhat excessively (W)ell (M)oderately well	6:cm (>)cm	·		
Heiaht	of Moss Hummocks: cm	7:cm (>)cm	<u>،</u> ۱		
Sphag	num Cover:%	(8:cm (>)cm	<u> </u>		
Depth	of Standing Water: (>) cm	A S = sand, LS = loamy sand, SL = sandy sandy clay loam, CL = clay loam, SICL	/ loam, L = loam, =,silty clay loam,	SIL = silt loam, SCL = SC = sandy clay, SIC = silty	
pH of S	urface Water: ±	clay, C = clay, RO = rock, PE ≈ peat,	MP = mucky peat	, MU = muck	
Averag	e Depth to Bedrock: cm	= sedge	, add sumx to two	s-letter code: -m = moss, -s	
Expose Rock G	ROCK:% roup: (F)elsic (M)afic (C)alcareous (S)andstope (S)ioux quartzite (O)ther	^B Gr = gravel, Co = cobbles, St = stones,	Bo≈boulders		
Rock T	ype:	^C 0 = <15%, 1 ≈ 15-35%, 2 = 35-60%, 3 ÷	= 60-90%, 4 = >90	%, ?≖unknown	
Genera	I Soil Texture: (C)lay (L)oam (S)and (S)ilt (R)ock (M)uck (P)eat				
Remarl	Secondary factories but the	it close with a	il.		
6.85	NON '	THE SAME MULTER	MUTUCE	<u>101</u>	
- गोल्टी हरू	*****				
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Basal Ar	ea & Tree Diameters DBH List: (C)omplete (P)artial Note	es:			-
Species	L/D BA-1 BA-2 Ave. DBH (cm)				-
				x	
	· · · · · · · · · · · · · · · · · · ·				
	Releve-Wide DBH Statistics				
Prism Fa	ctor: Max: Median: Phot	tos Takeh: (Y)es) (N)o		Revised J	June 2013

DNR RELEVE #

2016

Surveyor's Releve #: 81016-009 Date:

Surveyor(s): S.MILBURN

County: Un Mariente

Surveyor's Place Name: BRAG

D	c.s	SPECIES NAME	REMARKS		c.s	SPECIES NAME	REMARKS	ID	0	c.s	SPECIES NAME	REMARKS
		DI-20	- <u> </u>	-	1.	H1-3L			Τ		G1-31	
_	· M	Franking henry henry		$ \vdash$	X	E ARAILATEIC			r	1	S. PHILIPUT	
	<u>\.</u>	A HALLMAN A	1		1	C. C.I.C.B. 107-16			Ĭ		F. E BUTHUNKABA	
	T	U.V. HEOTINT PATYON		╡┝		PWW			1		C. HUISTMOICHUD	
	<u> </u>			┥┝	- <u>T</u>	7 0119/10			1		T: KO. WORLAN	
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	<u> </u>	· · · ·			<u> 1.</u>	T Dua Good and			1		Nº A LOWSTON	
	<u> </u>	·····		┥┝	<u><u> </u></u>	E. PORTOLIHIUM_		$ $ \vdash	+	<u> </u>	MICIGNEISE	
				┥┝	<u> </u>	G. BORSENE			+	•		
	· .			┥┝	<u>-+</u> .	M. ALBA		-	_	•		-
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	<u> </u>				<u> </u>	LI CAPENSIS				÷		
					4.	V. NEPROPHYLLA			4	•		
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					+-	H. K-UTUMINALE				·	· · · · · · · · · · · · · · · · · · ·	· · ·
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Life Form

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<u>Height</u>

8 >35m

7 = 20-35m 6 = 10-20m

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- F = floating-leaved
- S = submerged X = epiphytes

Species 5 75-100% 4 50-75%

3 25-50%

2

Cover

Group

С

1

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b

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- 5 = extensive mat 4 = small colonies, broken mat
 - 3 = large group, many plants
 - 2 = small dense clumps 1 = growing singly

Sociability

- Abundance
- 1 <5% cover, many individuals + <5% cover, few (2-20) individuals r <5% cover, single

Note: Indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

Reliability Code

0 = variety certain 1 = cf. var./subsp.

- 2 = species certain
- 3 = species complex 4 = cf. species 5 = genus certain
- GE = germinating SD = seedling SP = sprout (coppice)

DD = dead

DY = dying

Selected Remark Codes

- FR = fruiting OP = outside plot (<2m) ## = specimen collection #
- 6 = cf. genus 7 = unknown

5-25% 1-5% <1%

Himesola				Initial Scan	
MINNESOTA DEF	ARTMENT OF NATURAL RESOURCES	RELEVE FORM		Entered	
MNDNR, Division of	Ecological & Water Resources, 500 Lafayette	Road, Box 25, St. Paul, M	N 55155	QC'd	— ž
GENERAL INFORMATION	1	SITE DATA SHE	ET	Final Scan	
DNR RELEVE #					円
Surveyor(s): <u>S: Min</u>	BURN COR Sumawaria Place	Name: PR 2/1			— E
Institution: (M)BS (E)C	M = 008 Surveyors Place	MNR MNR			ш ——
Purpose of Releve: (C)	assification (R)are species habitat (M)	onitoring (O)ther			
Revisit: (Y)es ((N)o)	Original DNR Releve #:				
Date: (30) Month: $_{\sim}$	$\underline{20}$ $\underline{1}$ Year: $\underline{20}$ $\underline{10}$ (e.g. 09 JU	JL 2004) ·			
					1
Vegetation Group: (WU	J) wooded upland (OU) open upland	(WW) wooded wetland	(OW) open wetland)		ı
NPC Code (Name): 🔟	Ms 83_(· · ·)
NPC Ranking in Releve	:				
Stand Typical of NPC:	(Y)es (N)o (U)ncertain te modifier: (N)atural disturbance (H)ur	an disturbance. (Y)oun	stand (<d0 (o)ther<="" td="" vrs)=""><td></td><td></td></d0>		
Releve Typical of Stand	I: (Y)es (N)o				
If <u>No</u> , identify appropriat	e modifier: (H)igher Quality (L)ower Qu	ality (C)anopy Gap (O	ther		
Plot Location in NPC:(F)ar from community boundary (M)oder	ately far from boundary	(C)lose to boundary (E)cotonal	1	
LOCATION INFORMATIO	N		Can beau		
UTM: <u>10338</u>	(record in NAD83, Zone 16)	Permanent Marke	er: (N)o (Y)es		
445001 UTM Accuracy:	meters f4	Marker Type / Fla			
Location Source: ((G)PS	(A)ir photo (T)opo map (L)iDAR (D)ther	·	•	
County: 4.116	Midicine Town	ship:N Ra	inge: Section:	_ QQRT: of QRT: _	·
PLOT INFORMATION					
Plot Size: <u>10</u> m x <u>1</u>	$\underline{b} m = \underline{b} \underline{b} m^2$	() Appendi			
Topographic Context:	(C)rest (U)pper (M)iddle (1)ower (7	b) Aspect:	lon (?)uncertain		
Litter Thickness:	cm	•	Donth of Lover	Coorco Eroam	
Litter Type: (L)eave	s (N)eedles (G)rass (O)ther	·	Top Bottom	Toxturo ^A Tupo ^B Volu	mo
Humus Thickness:	_ cm (M)adar (P)raida mult (M/)armad mu	.11	(1: 0 cm (>) ci	m <u>Texture Type void</u>	
Earthworms Present:	(Y)es (N)o		2: cm (>) ci	m	
Earthworm Rapid Asse	ssment Rank (low \rightarrow heavy): (1) (2) (3) (4) (5)	3:cm (>)c	m	_
Depth to Semi-Permeak	ple Layer: cm		4: cm (>)c	m	
Depth to Gray Colors o	r Redox Features: cm ssively/Somewhat excessively. (W)ell. (N	Anderately well	1] 5 ;cm (>)c	m	-
Some	what poorly (P)oorly (V)erv poorly drai	ned	0 6:cm (>)c	m	-
Height of Moss Hummo	cks: cm		(12) (2) (2) (2) (2) (2) (2) (2) (2) (2) (m	
Sphagnum Cover:	%		A S = sand, LS = loamy sand, SL = sand	dy loam, L=loam, SIL=silt loam, SC	l
Depth of Standing Water	•r: (>) cm		sandy clay loam, CL = clay loam, SIC clay, C = clay, RO = rock, PE = peat	L = silty clay loam, SC = sandy clay, SI MP = mucky peat, MU = muck	C = silty
ph of Surface Water: _			If origin of peat or mucky peat is know	vn, add suffix to two-letter code: -m = n	noss, -s
Average Depth to Bedro	ock: cm		= sedge	Na e havidara	
Rock Group: (F)elsic (M		ux quartzite (O)ther	$^{\circ}$ Gr = graver, Cd = copples, St = stone	3 = 60-90% $4 = >90%$ $2 = unknown$	
Rock Type:	· · · · · · · · · · · · · · · · · · ·		0 - (1970) 1 - 19 9970, 2 - 39 8870, 1	5 - 56 5676, 1 × 5676, 1 × 411416171	
General Soil Texture: (C)lay (L)oam (S)and (S)ilt (R)ock (M)uck (P)eat	t i		
Remarks: A wet W	readout commenty don	unabed h	1 commonder, D	mimunity Covers	
Stricta, Avu	Serrounding feature is	Naugal FU	Sure is demin	inal and inclu	eler
In one wat	er consistend with	Non-Mative	whill Tussa	to present. Soil's	
Withhankover	une lensent uter	Aux with	muchy mineral	Dilow	
	<u>}</u>		· · · · · · · · · · · · · · · · · · ·		
-					
Basal Area & Tree Diameter	s DBH List: (C)omplet	e (P)artial Note	s: Lais Lait		
Species L/D BA-1	BA-2 Ave. DBH (cm)		4843-4344		
	······································				
		<u>``</u>			
J Instant Instant	Releve-Wide DBH Statistic	s			
Prism Factor:	Min: Max: Media	n: Pho	tos Taken (Y)es (N)o		Revised June 2013

DNR RELEVE #

2016

(2A)

Surveyor's Releve #: 83M/ 608 Date: 4

Surveyor(s): S.M. Hourn

County: Juller Medicine

Surveyor's Place Name: _ BPØ4

ID	C.S	SPECIES NAME	REMARKS	п	D	c.s	SPECIES NAME	REMARKS	1 [ID	C.S	SPECIES NAME	REMARKS
		121-2-A					HI-3r		11			61-30	
	r.	A. HEGUNDO				١.	M. ARVENEIC	1	11		5.	C. PULLTA	
					ŀ	ŧ.	A. INCARLANABA		11		2.	CALAMAGNOGALS STRADA	
				Γ	1	١.	V. MA-SOMATH		1 [1.	M. JUBATUM	
				Γ		1.	S. CAMARAMUS		11		2	SIPALIAUS	
		·····		Γ		Ì.	L. ASPER		11		١.	S. PELTINIATA	
				Γ		1.	P. HUNDRADIEHO		11		١.	CARLAU STURIERA	
		× .		Γ		١.	V. NEPODEMULLA		11			· · · · · · · · · · · · ·	
		·		Γ		1.	M. PINGENS		1 [,
						<u> </u>	T, CANFARENSIS	of	1 [
							A. SURIBLA	AP	11				
						١.	8.1 CPMPHYLLUM		11				
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							P. PELLISHLVANAU	DP	1				
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Life Form

B = broadleaf evergreen D = broadleaf deciduous E = needleleaf evergreen G = graminoids

<u>Height</u>

8 >35m

7 = 20-35m 6 = 10-20m

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- H = forbsL = lichens
- M = mosses & liverworts C = climbers K = stem succulents
- F = floating-leaved S = submerged
- X = epiphytes

Group Species p r 2

Cover

c

i

b

а

5 75-100% 4 50-75% 3 25-50%

- 5-25% 1-5% <1%
- Abundance
- <5% cover, many individuals 1
- + <5% cover, few (2-20) individuals r <5% cover, single

Reliability Code

0 = variety certain 1 = cf. var./subsp.

2 = species certain 3 = species complex

- 4 = cf. species

GE = germinating SD = seedling SP = sprout (coppice)

DD = dead

DY = dying

- 5 = genus certain 6 = cf. genus

7 = unknown

FR = fruiting OP = outside plot (<2m) ## = specimen collection #

Selected Remark Codes

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

Sociability

5 = extensive mat

1 = growing singly

4 = small colonies, broken mat

3 = large group, many plants 2 = small dense clumps

Himasola		Initial Scan	
	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM	Entered	
ACTANINENT OF KITURAL RESOURCES		Edited	
GENER	AL INFORMATION SITE DATA SHEET	Final Scan	
DNR	RELEVE #		Ë
Survey	/or/s):	· · · ·	
Institu	tion: (M)BS (E)CS (N)HP (U)SFS (U) of M (O)Der MNR		#
Purpo	se of Releve: (C)lassification (R)are species habitat (M)onitoring (O)ther	<u>, , , , , , , , , , , , , , , , , , , </u>	
Revisi	t: (Y)es ((N)o / Original DNR Releve #:		ĺ
MBS S	ite #: Ownership:	· .	ĺ
VEGETA	ATION INFORMATION		
Vegeta	ation Group: (WU) wooded upland (OU) open upland (WW) wooded wetland "(OW) open wetland)	
NPC C	ode (Name): <u>▷ /² p 9 3 (</u>)
Stand	anking in Releve:		
lf.	No, identify appropriate modifier: (N)atural disturbance (H)uman disturbance (Y)oung stand (<40 yrs) (O)ther		
Releve	Typical of Stand: (Y)es (N)o	•	
lf.	No, identify appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Gap (O)ther	C)- + /	<u> </u>
Plot Lo	Cation in NPC: (F)ar from community boundary (M)oderately far from boundary (C)lose to boundary (L jcotonai	
LUCATI UTM·	763683E] / Permanent Markek: (N)d (Y)es		
	4953310 N (record in NAD83, Zone 16) (A Marker Type / Placement:		
UTM A	accuracy:meters		
Locati	on Source; (G)PS) (A)ir photo (T)opo map (L)iDAR (O)ther	tion: OORT: of ORI	r٠
DIOTIN			•
Plot Si	$ze: 10 \text{ m} \times 10 \text{ m} = 100 \text{ m}^2$		
Elevat	ion:ftSlope:(°) or(%) Aspect: (e.g., N, NE, etc.; LV fi	or level)	· · · · ·
Topog	raphic Context: (C)rest) (U)pper (M)iddle (L)ower (T)oe (F)lat (D)epression (?)uncertain		
SOIL IN	FORMATION		
Litter	Thickness:cm Depth of De	Layer Coarse Fra	igments
Humus	s Thickness: cm	Bottom Texture ^A Type ^B V	<u>/olume</u> c
Hu	ImusType: (M)or (M)oder (P)raine mull (W)ormed mull	>) cm	
Earthy	vorms Present: (Y)es (N)o vorm Rapid Assessment Rapk (receiver the second (1) (2) (3) (4) (5) $\begin{pmatrix} y \\ z \end{pmatrix}$	>)cm	
Depth	to Semi-Permeable Laver: $cm = cm$	>) cm	
Depth	to Gray Colors or Redox Features: cm	>)cm [·]	
Draina	ge Class: (E)xcessively/Somewhat excessively (W)ell (M)oderately well	>)cm	
Hoight	(S)omewhat poorly (P)oorly (V)ery poorly drained 7:cm (>)`cm	
Sphag	num Cover: %	>) cm	
Depth	of Standing Water: (>) cm	d, SL=sandy loam, L=loam, SIL=silt loam, / loam, SICL=,silty clay loam, SC≃sandy clay,	SCL ≓ , SIC = silty
pH of \$	Surface Water: ± tree terms of the state of	PE = peat, MP = mucky peat, MU = muck	
Averag	ge Depth to Bedrock: cm = sedge	deat is known, add suffix to two-letter code; -n	1 = 11055, -5
Expos	ed Rock:% Gr = gravel, Co = cobbles	St = stones, Bo = boulders	
Rock (Group: (F)elsic (M)atric (C)alcareous (S)andstone (S)roux quartitie (C)ther $c_{0=<15\%, 1=15\cdot35\%, 2}$	= 35-60%, 3 = 60-90%, 4 = >90%, ? = unknowr	١
Gonor	al Soil Toxture: (C)lay (L)aam (S)and (S)ilt (R)aak (M)uck (P)aat	а	
Genera	Why had a character of a character of the former of the second of the se	ischurge und ne	inter and
Remar くつ	Ks: Intorvineer the future ' dominanted by most active	1. T. T. O.	• — — — ·
_22	Continuen of the tear of the commence and rum nath	AC COVILIANS P	· `
Basal A	rea & Tree Diameters DBH List: (C)omplete (P)artial Notes: 특강영역		
Species	L/D BA-1 BA-2 Ave. DBH (cm)		
	· · · · · · · · · · · · · · · · · · ·		
L	Releve-Wide DBH Statistics		
Prism F	actor: Min: Max: Median: Photos Taken ((Y)es) (N)	0	Revised June 2013

DNR RELEVE #

Surveyor's Releve #: Som 16-014 Date: Aug 16.2016

Surveyor(s): S.Milburn

County: Gillow Medicine

Surveyor's Place Name: BR32

C.S SPECIES NAME C.S SPECIES NAME חו REMARKS In REMARKS ID C.S SPECIES NAME REMARKS H1-3P DI-24 G1-20 C. STOLOHIPGOM HIGIGANABUS S. PUNGEN S. ALUTUS -G. PROCLERY ł +---PICLANCA MRICHWARDSONII L. 2 L. LOESELLI ۴. MICLOMERATA 1 LIKALMII E. TRADUNY CAULIS 4-. l VINHOPOPANILIA CIAGUATIUS 1 1 ł: S. PHUELLI PARUNDINACLA 4: S. BOLOME C. PULITA A 1 4. B. LEPTOPYLLUM E.MACULATUM H. GROSSEPSEPERTUS 1 LIASPER A.CHNANBIDUM ŵ A. INCROMMEN 3 TYPHAANYUITIEOUM J

Life Form

B = broadleaf evergreen

<u>Height</u>

8 >35m

7 = 20-35m

6 = 10-20m

5 = 5-10m

3 = 0.5-2m 2 = 0.1- 0.5m

1 = 0-0.1m

4 = 2-5m

- D = broadleaf deciduous E = needleleaf evergreen
- G = graminoids
- H = forbs
- L = lichens
- M = mosses & liverworts C = climbers
- K = stem succulents
- F = floating-leaved S = submerged
- X = epiphytes

Group Species 5 75-100% 4 50-75%

2

Cover

С

i

р

b

а

- 3 25-50% 5-25%
- 2 = small dense clumps
- 1 = growing singly

Sociability

5 = extensive mat

4 = small colonies, broken mat

3 = large group, many plants

- 1-5% <1% Abundance
- 1 <5% cover, many individuals

+ <5% cover, few (2-20) individuals

r <5% cover, single

Reliability Code 0 = variety certain

1 = cf. var./subsp.

2 = species certain 4 = cf. species

3 = species complex

DY = dying GE = germinating SD = seedling SP = sprout (coppice)

DD = dead

Selected Remark Codes

- FR = fruiting OP = outside plot (<2m)
- 5 = genus certain 6 = cf. aenus7 = unknown
 - ## = specimen collection #

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6-9p, Ca")

Hinnesola			Initial Scan	
MAN NOT OF	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM MNDNR, Division of Ecological & Water Resources, 500 Lafayette Road, Box 25, St. Paul,	MN 55155	Entered QC'd Edited	
GENER	AL INFORMATION SITE DATA SH	EET	Final Scan	~ R
DNR				EL
Surve	yor(s): 5, MILBORN SURVEYOR'S Place Name: 845	LS		<u> </u>
Institu	tion: (M)BS (E)CS (N)HP (U)SFS (U) of MC (Other M NE	·····		III #
Purpo	se of Releve: (C)lassification (R)are species habitat (M)onitoring (O)ther		· · · · ·	
Revisi	t: (Y)es (N) Original DNR Releve #:			
MBS S	Site #: Ownership:		· ·	
VEGET	ATION INFORMATION			
Veget	ation Group: (WU) wooded upland (OU) open upland (WW) wooded wetland	nd (OW) open wetland		•
NPC C	:ode (Name): <u>ਨੋ P_p ੀ ਤੋ</u> (and the second se)
NPC F	Ranking in Releve:			
Stand	No, identify appropriate modifier: (N)atural disturbance (H)uman disturbance (Y)ou	ng stand (<40 yrs) (O)ther		
Releve If	Typical of Stand (Y)es (N)o No, identify appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Gap (I	Dither Impactus By (intle	
Plot L	ocation in NPC: (F)ar from community boundary (M)oderately far from boundar	(C)lose to boundary (E)cotonal		
LOCAT	ON INFORMATION	A D A A	i -	
UTM:	7 0 0 0 2 E (record in NAD83, Zone 19)	(er: (N)o (Y)es Iacomont:		
UTM A	Accuracy: meters			
Locat	on Source: (G)PS (A)ir photo (T)opo map (L)iDAR (O)ther	ı		
Count	y: YELLOW MUNICINE Township:N F	Range: Section:	_ QQRT: of Q	RT:
PLOT IN	IFORMATION			
Plot S	ize: $10 \text{ m x} 10 \text{ m} = 100 \text{ m}^2$	(a.g. N. NE atau I.V. far loval)		
Topod	raphic Context: (C)rest (U)pper (M)iddle (L)ower (T)oe (F)lat (D)epre	ssion (?)uncertain		
SOU IN		,		
Litter	Thickness: cm	Dopth of Lavor	Coorco	Fragmonte
Li	tter Type: (L)eaves (N)eedles (G)rass (O)ther	Top Bottom	Texture ^A Type ^B	Volume ^C
Humu H	s Thickness: cm umusTyne: (M)or (M)oder (P)rairie mult (W)ormed mult	(1: 0 cm (>) ci	m	
Earth	worms Present: (Y)es (N)o	2: cm (>) ci	m	
Earthy	worm Rapid Assessment Rank (low \rightarrow heavy): (1) (2) (3) (4) (5)	3: cm (>) ci	m	
Depth	to Semi-Permeable Layer: cm	4:cm (>)c	m	
Deptin	age Class: (E)xcessively/Somewhat excessively (W)ell (M)oderately well	$[\frac{1}{10}]$ 5: cm (>) ci	mi	
2.4.1.1	(S)omewhat poorly (P)oorly (V)ery poorly drained	0 0 ; cm (2) cl	m [.]	
Heigh	t of Moss Hummocks: cm	$\binom{7.}{8}$ cm (>) cl	m	
Sphag	inum Cover:%	A S = sand, LS = loamy sand, SL = sand	dy loam, L = loam, SIL = silt lo	am, SCL≓
Depth nH of	or Standing Water: (>)Cn	sandy clay loam, CL = clay loam, SIC clay, C = clay, RO = rock, PE = peat,	L = silty clay loam, SC = sandy o , MP = mucky peat, MU = mu	:lay, SIC ≈ silty :k
Avera	a Doubt to Podrock	If origin of peat or mucky peat is know	vn, add suffix to two-letter code	:: -m = moss, -s
Expos	ed Rock: %	^B Gr = gravel. Co = cobbles. St = stone:	s. Bo = boulders	
Rock	Group: (F)elsic (M)afic (C)alcareous (S)andstone (S)ioux quartzite (O)ther	^C 0 = <15%, 1 = 15-35%, 2 = 35-60%, 3	3 = 60-90%, 4 = >90%, 7 = unkn	own
Rock	Туре:			
Gener	al Soil Texture: (C)lay (L)oam (S)and (S)ilt (R)ock (M)uck (P)eat		e	
Rema	rks: Siele Clerre fenfentiere: un practe	- On cutte gra	min i domin	<u>alo</u>
ba.	avortunica with very ful for be und liv	il la Breblower	Jesterno	
ÓÌ	Wour discharge with upposed much			
	l			
Basal A	Area & Tree Diameters DBH List; (C)omplete (P)artial No	tes: 5112		
-200100		-		
	Releve-Wide DBH Statistics			
Prism F	Factor: Min: Max: Median: Ph	otos Taken: (Y)ès (N)o		Revised June 2013

DNR RELEVE #

Surveyor's Releve #: Stam 16-015 Date: Aug 16,2011

Surveyor(s): S.Milborn County: <u>Yellow Medicine</u>

Surveyor's Place Name: BE25

ID	C.S	SPECIES NAME	REMARKS	DI	C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS
						41-34			1.	61-20	
					-{	T. PHEIREBAL			2	CHURTHRAUMA	
].	VINERRORMULIA			Д.	J. BALTILUL	
	•				١.	B. MHULATH			1.	SiALUTUTS	
					•				1.	S. PALLINA	
	·								۱.	INDADAUR	
	•	·			•				١.	MUNICESBERGINA SUD	
									Э.	CHLAMAGUSTALS SMILL	
						······································			١.	A. GIGHMATTAN	-
					•			Δ	1.	CAMEN ABUNTILIS	
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Life Form

B = broadleaf evergreen D = broadleaf deciduous

<u>Height</u>

8 >35m 7 = 20-35m 6 = 10-20m

5 = 5-10m

4 = 2-5m 3 = 0.5-2m 2 = 0.1- 0.5m 1 = 0-0.1m

- E = needleleaf evergreen
- G = graminoids H = forbs L = lichens

M = mosses & liverworts

C = climbers

K = stem succulents F = floating-leaved S = submerged

X = epiphytes

1 <5% cover, many individuals + <5% cover, few (2-20) individuals r <5% cover, single

Cover

Species

3 25-50%

5 75-100% 4 50-75%

5-25% 1-5% <1% 2

Abundance

Group

с

i

р

r b

а

Reliability Code

0 = variety certain 1 = cf. var./subsp. 2 = species certain

3 = species complex

4 = cf. species

5 = genus certain

6 = cf. genus 7 = unknown

 $\begin{array}{l} \text{Spectral Vertical Ver$ FR = fruiting OP = outside plot (<2m) ## = specimen collection #

Selected Remark Codes

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

Sociability

5 = extensive mat

1 = growing singly

4 = small colonies, broken mat 3 = large group, many plants 2 = small dense clumps

Hinnesota				Initial Scan	1
M	MINNESOTA DEPARTMENT OF MNDNR, Division of Ecolonical & Wat	NATURAL RESOURCES RELEVE FC	DRM St. Paul. MN 55155	Entered	——
REFAMINENT OF KETURAL RESOURCES	······································	Box 25,	, OL FAUL, MIN 30100	QC'd	— <u> </u>
GENER.	AL INFORMATION	SITE DAT	TA SHEET	Final Scan	
DNR				······	Ĩ
Survey	Vor(s): S.1 VILBURN	Surveyor's Place Names T	DAF	· · · · · · · · · · · · · · · · · · ·	'n
Institu	tion: (M)BS (E)CS (N)HP (U)	SFS (U) of M((O)ther) M NR	<u>xps</u>		—— <u> </u>
Purpo	se of Releve: (C)lassification (R	are species habitat (M)onitoring (O)ther DOCUMENTATIO	h	#*
Revisi	t: (Y)es (N)o Original D	NR Releve #:			
MBS S	\underline{SO} Wonth: \underline{SO} \underline{N} Year:	<u>O (</u> e.g. 09 JUL 2004)·			·
VEGETA	TION INFORMATION			•	
Vegeta	tion Group: (WU) wooded uplan	d (OU) open upland (WW) wood	ed wetland (OW) open wetland		I
NPC C	ode (Name):	- (NONE -> Degras	decl feasure)
Stand	Typical of NPC: (Y)es (N)o	(L1)poertain			
lf	No, identify appropriate modifier: (N)	tural disturbance (H)uman disturbanc	e (Y)oung stand (<40 yrs) (O)ther		
Releve	Typical of Stand: (Y)es (N)o		· · ·		
Plot L	vo, identify appropriate modifier: (H)	ther Quality (L)ower Quality (C)anop	y Gap (O)ther		
LOCATI		unity boundary (ivi)oderately far from i	boundary (C)lose to boundary (E)c	otonal	
UTM:	102309E1		nt Marker: (N)o (Y)es		
é	1955027N (record in	NAD83, Zone 16) Marker Ty	ype / Placement:		
	ccuracy: meters				
County	" U. Mar Mediano	Jopo map (L)IDAR (U)ther	N Range: Section		
PLOT IN	FORMATION				
Ó Plot Si	ze: <u> 0</u> m x <u> 0</u> m = <u> </u>	<u>ô</u> ☆ m²	· · · ·		
Elevati	on:ft. Slope: _	(°) orO (%) Aspect	t: LV (e.g., N, NE, etc.; LV for lev	vel)	
	aphic Context: (C)rest (U)pper	(M)iddle (L)ower (1)oe (F)iat (D)epression (?)uncertain	,	
SOIL INF	ORMATION hickness: cm	· · · ·			
Lit	ter Type: (L)eaves (N)eedles (G)rass (O)ther	Depth of Lay	er Coarse Fragm	ients
Humus	Thickness: cm			ottom <u>Texture</u> ^A <u>Type^B Volu</u>	me ^c
Earthw	orms Present: (Y)es (N)o	ine muli (VV)ormed muli	(1: 0 cm (>))		
Earthw	orm Rapid Assessment Rank	low \rightarrow heavy): (1) (2) (3) (4)	(5) (5) (5) (5) (5) (5) (5) (5) (5) (5)	cm	
Depth t	o Semi-Permeable Layer: o Gray Colors or Pedex Featu	cm	4:cm (>)	<u></u> cm	
Drainag	e Class: (E)xcessively/Somewhat	excessively (W)ell (M)oderately well	[] [] [] [] [] [] [] [] [] [] [] [] [] [cm	<u> </u>
	(S)omewhat poorly (P)	porty (V)ery poorty drained	" σ ⁶ ;cm (>)	cm	
Height	of Moss Hummocks:	cm	8: cm (>)		
Depth o	of Standing Water: (>)	cm	A S = sand, LS = loamy sand, SL	= sandy loam, L = loam, SIL = silt loam, SCI]
pH of S	urface Water: ±		sandy clay loam, CL = clay loam clay, C = clay, RO = rock, PE =	n, SICL=,silty clay loam, SC = sandy clay, Si = peat, MP = mucky peat, MU = muck	C = silty
Average	e Depth to Bedrock: c	m	If origin of peat or mucky peat i: = sedge	s known, add suffix to two-letter code: -m = m	1055, -S
Expose	d Rock:%	(=)	^B Gr = gravel, Co = cobbles, St =	stones, Bo = boulders	
Rock G	roup: (F)elsic (M)afic (C)alcareo /pe:	us (S)andstone (S)ioux quartzite (C))ther	50%, 3 = 60-90%, 4 ≈ >90%, ? = unknown	
Genera	Soil Texture: (C)lay (L)com (S	Sland (S)# (D)ack (M)t. (D)act			κ.
Bomark	Shill - () By () ball	Sjand (Sjiit (Rjock (Wi)uck (Pjeat	· · · · ·	01 11.0	
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- Long	ustan al lin u	- 1- Country phil	DiaWertills- 1144	und gard j he.	
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<u>.</u>			· · · · · · · · · · · · · · · · · · ·		
Basal Are	a & Tree Diameters	DBH List: (C)omplete (P)artial	Notes:		
Species	L/D BA-1 BA-2 AVE	DBH (cm)	Ver 1		
			4846		
Driam E	Relev	/e-Wide DBH Statistics			
rnsm Fac	Min:	Max: Median:	Photos Taken: ((Y)es) (N)o		Revised June 2013

**DNR RELEVE #** 

Surveyor(s): S.Milburn County: Ullow Medicin

Surveyor's Place Name: ______________

Surveyor's Releve #: Stmib-dan Date: 6 30 2016

D	c.s	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS	
-					Ϊ.	H1-30				G1-3p		
					4.	Typolin x alaven			1.	C. LACUSTRAS		
		······			4.	S. LANCESLATUM			١.	B. FLUVIMTILIS		
-					ų.	A. INCARNYATIA			3.	P. APUNNINACEM		
					1.	P. PHASULVANILLA						
					4.	V. HASTATA						
		,				T. CHNPHOLOSE	OP		<u>  .</u>			
						SIEURICHERM	68		<u>  .</u>	·		
					<u>  .</u>	L.ASPitz	95		ļ		· · · · · · · · · · · · · · · · · · ·	
					<u> </u>	HICEOSSEPHIUS	68		Ļ.			
					<u>  .</u>	U. DIOCA	09		ι.	·		
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	<u>  · -</u>			┨┝	<u> </u>			┥┝	┼∸			
	.	]			Ŀ			1 L	·	1	J	
Lii B	fe Form         Height         Cover         Sociability         Reliability Code         Selected Remark Codes           = broadleaf evergreen         8 >35m         Group         Species         5 = extensive mat         0 = variety certain         DD = dead											

7 = 20-35m

6 = 10-20m

5 = 5-10m 4 = 2-5m

3 = 0.5-2m

1 = 0-0.1m

2 = 0.1- 0.5m

D = broadleaf deciduous E = needleleaf evergreen

G = graminoids

- H = forbs L = lichens M = mosses & liverworts

 $\mathbf{C} = climbers$ 

- K = stem succulents F = floating-leaved S = submerged
- X = epiphytes

Group Species 5 75-100%

С

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- 4 50-75% 3 25-50% 2 5-25%
- 4 = small colonies, broken mat 3 = large group, many plants 2 = small dense clumps
  - 1 = growing singly
  - 1-5% <1%
  - Abundance
  - + <5% cover, few (2-20) individuals r <5% cover, single

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6-9p, Ca")

#### DD = dead

- DY = dying
- GE = germinating SD = seedling SP = sprout (coppice)
- FR = fruiting
- OP = outside plot (<2m) ## = specimen collection #

2 = species certain

4 = cf. species 5 = genus certain

6 = cf. genus

7 = unknown

3 = species complex

- 1 <5% cover, many individuals

Hinnesola			`		Initial Scan	Ĭ	
	MINNESOTA DEPARTME	NT OF NATURAL RESOURCES RELEVE	FORM		Entered _		
DEFAILINENT OF NUTURUL RESOURCES	MNDNR, Division of Ecologica	I & Water Resources, 500 Lafayette Road, Box	25, St. Paul, MN 5515	55	QC'd		Z
GENER	AL INFORMATION	SITE D	ATA SHEET		Edited		ਸ
DNR I	RELEVE #						RE
Survey	vor(s): S.MILBURL	- · ·					F
Survey	or's Releve #: <u>SAMIL</u>	Surveyor's Place Name:	BRØB_				ŝ
Purpo	CION: (M)BS (E)CS (N)HF	(U)SFS (U) of M (O)the MNJ-C	0				#
Revisi	: (Y)es (N)o Origi	inal DNR Releve #	(U)ther) Dorr	IMG MANNI			Í
Date:	30 Month: J J N	Year: 2 0 \ (a (e.g. 09 JUL 2004)			4 m		
MBS S	ite #: Ownersh	nip:		4	1997 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	,	
VEGETA	TION INFORMATION					- 1	
Vegeta	tion Group: (WU) wooded	l upland (OU) open upland (WW) we	oded wetland '(Q	N) open wetland		I	
	ode (Name): <u>w 11</u>	( Let Meader		- <u>-</u>		)	
Stand	Typical of NPC: (Y)es (	- No (U)ncertain					
lf <u>I</u>	lo, identify appropriate modifie	r: (N)atural disturbance (H)uman disturba	ance (Y)oung stand	(<40 yrs) (O)ther			
Releve	Typical of Stand: (Y)es	(N)o			•		
lf <u>I</u>	lo, identify appropriate modifier	r: (H)igher Quality (L)ower Quality (C)ar	hopy Gap (O)ther				
Plot Lo	cation in NPC: (F)ar from	community boundary (M)oderately far fro	m boundary (C)lo	se to boundary (E)cotona	1		
LOCATIC		-	and the second				
	157627 E	(record in NAD83, Zone 15)	nent Marké <u>r; (N</u>	)o ⁾ (Y)es			
UTM А	curacy: mete	rs Warker	Type / Placeme	ent:			
Locatio	on Source: (G)PS (A)ir ph	noto (T)opo map (L)iDAR (O)ther				•	
County	: yellow Michici	Township:	N Range:	Section:	_ QQRT:	of QRT:	
PLOT INI	ORMATION	~					
Plot Siz	xe: <u>10_</u> m x <u>10</u> _m =	= <u>160</u> m ²	1.7				
Elevatio	on:ft. Sio	pe:(°) or(%) Asp	ect: <u>LV</u> (e.g.,	N, NE, etc., LV for level)			
ropogr	apric context: (C)rest (	U)pper (M)iddle (L)ower (1)oe (F)la	(D)epression (7	')uncertain			
SOIL INF	ORMATION						
Litter	nickness: cm	diag (G)ragg (O)lbar		Depth of Layer		Coarse Fragments	
Humus	Thickness: cm			Top Bottom		Type ^B Volume ^C	
Hu	musType: (M)or (M)oder	(P)rairie mull (W)ormed mull		1:0 cm (>) cr	n		
Earthw	orms Present: (Y)es (N	$\sqrt{1}$	s (s) (s)	2:cm (>)cr	n		
Depth t	o Semi-Permeable Laver	$\operatorname{Contraction}_{\operatorname{Contraction}} \operatorname{Contraction}_{\operatorname{Contraction}} (1) (2) (3) (2) (3) (2) (3) (2) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3$	^{+) (5)}   <b>-</b>	3:cm (>)cr	n		
Depth t	o Gray Colors or Redox	Features: cm	La La	4:cm (>)cr	n		
Drainag	e Class: (E)xcessively/Sor	newhat excessively (W)ell (M)oderately	well io	6:Cm (>)Cr	·!		
	(S)omewhat poor	ly (P)oorly (V)ery poorly drained	S	7:Cm (>)Cr	· ·		
Height (	of Moss Hummocks:	cm		R:C(n) (>)C(n) R:C(n) (>)C(n)	n		
Denth o	f Standing Water: (>)	om	A S = sa	ind, LS = loamy sand, SL = sand	yloam, L≈łoam, l	SIL = silt loam. SCL =	
pH of S	urface Water: ±		sandy clay,	clay loam, $CL = clay loam$ , SICL C = clay, $RO = rock$ , $PE = peat$ .	=.silty clay loam, S	C = sandy clay, SIC ≈ silty	
Average	Depth to Bedrock		lf orig	in of peat or mucky peat is know	n, add suffix to two-	letter code: -m = moss, -s	
Expose	d Rock: %		= sedg	ge			
Rock G	oup: (F)elsic (M)afic (C)a	alcareous (S)andstone (S)ioux quartzite	(O)ther contract	(ravel, Co = cobbles, St = stones)	Bo = boulders		
Rock Ty	vpe:			.5%, 1 - 15°55%, 2 - 55°60%, 5	= 60-90%, 4 = >90%	, r≃unknown	
General	Soil Texture: (C)lay (L)c	pam (S)and (S)ilt (R)ock (M)uck (P)r	∋at,		· 1		
Remark	s: Wit mendoi	1 ummunil an	ne en bul	in in a we	en a de co		
Su	item Comprime	of in here & is	di vice i		st-Ling.	<u>s cras</u>	
- Lei	ber peole. Le des	1 MARINA MALINA	Mule Fr	pero trans			
- b-1	1 Natural O ben	- me har and instrum , that i to	Carlos - Car	and re think	<u> Le un Vellage _                                   </u>	Ktoner-	
		KJ					
					<b>-</b>		
Basal Are	a & Tree Diameters	DBH List: (C)omplete (P)artial	Notes: A d	DED IBEI			
Species	L/D BA-1 BA-2	Ave. DBH (cm)		1006 7004	1	· · · · · · · · · · · · · · · · · · ·	
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		+	1 dint	entersen enterstation Courtestation	4 · · ·		5)
L	<u> </u>	1	]				
Prism Fac	for	Releve-Wide DBH Statistics					
	· · · · ·	wwwwwwwww.	# Photos lake	IN ATTES \(N)O		Besteral Long M	149

DNR RELEVE #

30/2011

Surveyor(s): S.M. Burn

County:

Surveyor's Releve #: SAMIL-Ob Date:

Surveyor's Place Name:

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D C	.s	SPECIES NAME	REMARKS	D	C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS
					<u> </u>	H1-31				G1-32	
	. 1	, <u>, , , , , , , , , , , , , , , , , , </u>			1.	D. TRIVALE			1.	S. PUNGENS	
	. †				r.	R. SULERWINS			Q.	H. JUBATUM.	
				Γ	١.	Spraganium Sis.			١.	E. REPENS	
					4.	Pimania			2.	E. BRYTHROPODA	
	-				17-				١.	B. SUZICACHNE	
	-								2	P. ARIHOWACHA	
	-				<u> </u>				m	CARLASTOICTA	
	·				<u> </u>			-	2	S. PECTINIATIA	,
_	·				÷			-	Ň	Q FULLISFILL	
	÷				<u> </u>				de ser	B. QUITUS	
	·			-	+ ·-			-	1.	C APPAIRIE	
	·			╎┝	· ·			-	67	O PULLING	
	·			-	<u> </u>			-	2	E AR TOUL	<u> </u>
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Life F B = b D = b E = n G = g H = fc L = lic M = n	roa roa eed ram orbs cher	nHeightdleaf evergreen $8 > 35m$ dleaf deciduous $7 = 20 - 35m$ dleaf devergreen $6 = 10 - 20m$ ninoids $5 = 5 - 10m$ $6 = 4 - 25m$ $3 = 0.5 - 2m$ ns $3 = 0.5 - 2m$ ses & liverworts $2 = 0.1 - 0.5m$ arr $1 = 0.0 - 1m$	Group C C I P r b a		pecies 5 75- 4 50- 3 25- 2 5-2 1-5 <19	Sociability 5 = extensive mat 5 = extensive mat	en mat lants	Relia 0 = v 1 = c 2 = s 3 = s 4 = c 5 = g 6 = c 7 = u	bility ariety f. var. pecies pecies f. spe enus f. gen nknov	Code         Selected Remain           certain         DD = dead           subsp.         DY = dying           a certain         GE = germination           complex         SD = seedling           cises         SP = sprout (cop           subsp.         OP = outside plo           us         OP = outside plo	g popice) ot (<2m) sollection #

- C = climbers K = stem succulents
- F = floating-leaved S = submerged
- X = epiphytes

- 2

  - Nr

     Anndance

     1
     <5% cover, many individuals</td>

     '+
     <5% cover, few (2-20) individuals</td>

     r
     <5% cover, single</td>

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6-9p, Ca")

- FR = fruiting OP = outside plot (<2m) ## = specimen collection #

- 5-25% 1-5% <1%
- b а

1 Ninnesola			Initial Scan	l
	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM		Entered	
OKFANINEST OF KUTURAL AFROMMEN	MNDNR, Division of Ecological & Water Resources, 500 Lafayette Road, Box 25, St. F	2aul, MN 55155	QC'd	Ž
GENER	AL INFORMATION SITE DATA	SHEET	Final Scan	R
DNR	RELEVE #			Ē
Survey	vor(s): <u>S.M. ILB. real</u>	1910	· · · · · · · · · · · · · · · · · · ·	Ē
Institu	tion: (M)BS (E)CS (N)HP (U)SFS (U) of M (O)ther M NB-	1.2	, , , , , , , , , , , , , , , , ,	inn . #t
Purpo	se of Releve: (C)lassification (R)are species habitat (M)onitoring (O)the	Docum KATTATION		.
Revisi	:: (Y)es (N)b Original DNR Releve #:			
Date: MBS S	<u>ろし</u> Month: <u>」 いい</u> Year: <u>2 ち い</u> (e.g. 09 JUL 2004)・ ite #・ Ownership:			ł
VEGETA	TION INFORMATION		· · ·	1
Vegeta	tion Group: (WU) wooded upland (OU) open upland (WW) wooded w	retland (OW) open wetland		1
NPC C	ode (Name): W M <u>2</u> 8 <u>3</u> (		)	
NPC R	anking in Releve:		. (	
Stanu If	No. identify appropriate modifier: (N)atural disturbance (H)uman disturbance (	Y)oung stand (<40 yrs) (O)ther	ζ	
Releve	Typical of Stand: (Y)es (N)o		· · · · · · · · · · · · · · · · · · ·	
lf.	No, identify appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Ga	ap (O)ther		
Plot Lo	ocation in NPC: (F) ar from community boundary (M) oderately far from bour	ndary (C)lose to boundary (E)coton	al	
LOCA II		Aarker (N)o (Y)es		
01111.	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	/ Placement:		
UTM A	ccuracy: meters			
Locati	on Source: (G)PS, (A)ir photo (T)opo map (L)iDAR (O)ther	N Range: Section:		
	ECOMATION			
Plot Si	$ze: 20 \text{ m x BS m} = 100 \text{ m}^2$			
Elevat	on:ft. Slope:(°) or(%) Aspect: _	(e.g., N, NE, etc.; LV for level)		
Topog	raphic Context: (C)rest (U)pper (M)iddle (L)ower (T)oe (F)lat (D)e	epression (?)uncertain		
SOIL INF	ORMATION			
Litter	hickness: cm ter Tyne: (L)eaves (N)eedles (G)rass (O)ther	Depth of Layer	Coarse Fragments	]
Humus	s Thickness: cm	Top Botton	<u>m Texture^A Type^B Volume^c</u>	
Hu Farthu	musType: (M)or (M)oder (P)rairie mull (W)ormed mull	$(1: \U cm (>) \0)$	cm	
Earthw	vorm Rapid Assessment Rank (low $\rightarrow$ heavy): (1) (2) (3) (4) (5)	5) $\left  \begin{array}{c} \varphi \\ \varphi \\ z \\$	cm	
Depth	to Semi-Permeable Layer: cm	4: cm (>)	cm	
Depth	to Gray Colors or Redox Features:cm	[]]5:cm (>)	cm	
Draina	ge Class: (E)xcessively/Somewhat excessively (VV)ell (IVI)oderately well (S)omewhat poorly (P)oorly (V)ep poorly drained	S 6:cm (>)(	cm	
Height	of Moss Hummocks: cm	7:cm (>)		
Sphag	num Cover:%	A S = sand. LS = loamy sand. SL = sa	ndy loam. L= loam. SiL= silt loam. SCL=	
Depth	of Standing Water: (>) cm	sandy clay loam, CL = clay loam, SI clay, C = clay, RO = rock, PE = pea	CL =, slity clay loam, SC = sandy clay, SIC = slity it. MP = mucky peat. MU = muck	
		If origin of peat or mucky peat is kno	wn, add suffix to two-letter code: -m = moss, -s	
Expos	e Depth to Bedrock: cm	= sedge	Ro – bouldars	
Rock C	Group: (F)elsic (M)afic (C)alcareous (S)andstone (S)ioux quartzite (O)th	$10^{\circ} = 15\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 1 = 15-35\%, 2 = 35-60\%, 2 = 35-60\%, 2 = 35\%, 2 = 35\%, 2 = 35-60\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 35\%, 2 = 3$	3 = 60-90%, 4 = >90%, ? = unknown	
Rock T	уре:	-		
Genera	al Soil Texture: (C)lay (L)oam (S)and (S)ilt (R)ock (M)uck (P)eat			
Remar	ks: Drainuce surele positioned betwee	en two steent	ullstones und	
_ <u>_</u> £_	afere drains surface water pulled	S_mindeny w	Alize Wey Corey	
_ke	esterrance is abundling in patcher	but lang thank so	5/ courd brogil	
	Culle			
	DDLL List (C)emplete (D)erticl	Notori MI A	()	-
Species	L/D BA-1 BA-2 Ave. DBH (cm)	Notes: Muchar Miner	us nour.	
		4862-4865		
		1 m . w. switch		
L				
Prism Fa	Releve-vylde DBH Statistics actor: Min: Max: Median:	Photos Taken: ((Y)es (N)o	Revised	d June 2013
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DNR RELEVE #

SAL

Surveyor's Releve #: Shimle - chic Date: 6

Surveyor(s): <u>S.M. Iburn</u>

County: yollow Medicine

Surveyor's Place Name: BRIZ

ID	C.S	SPECIES NAME	REMARKS	[	ID	C.S	SPECIES NAME	REMARKS	ID	С	S SPECIES NAME	REMARKS
		DI-3C					H1-3h				61-36	
	9	Amorphy fruitiese				١.	E. MARISLAM INA			3	C. HYSTERICINK	
	4.	R. CATHARTICA				der.	RICRISPUS.			3	S. ATROVIERS	
	÷.	PUNCLANNAAM				۱.	S. CHARMOLASEIC			2	A. yyunter	
						a.	E. ESCULA			2	CANKY STRUCTY	
		•				20009	V. HINSTATIA			2	S. RETINATA	
						1	E. ADUKNSIC			1	BINTERMIC	
						1	V. NERRAPHULLA			1	J. DUROLINI	
						des-	LICILIANCE			1	Pipperteased	,
_						V.	B. MULLIAME			1000	C Saterianta	
						i	S. EUDI WARDUM			4	C. C. PRASULANELS	-
		· · · · · · · · · · · · · · · · · · ·			_	-	SCUCONTINA			4	· C. PHILITS	
	· · · ·					1	H. CODSECTOR RATIK			1	K. CRAITHREPONA	
						+	C. MARINIASIA					
	<u>.</u>					<u>`</u>	Sulex CALMAN	158				
		· · ·					PAURLANE	840	·  -			
		· · · · · · · · · · · · · · · · · · ·				<u> </u>	D. AMALDIL HALLS	NO				
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Life Form

B = broadleaf evergreen D = broadleaf deciduous E = needleleaf evergreen

<u>Height</u>

8 >35m 7 = 20-35m

6 = 10-20m

5 = 5-10m

4 = 2-5m 3 = 0.5-2m 2 = 0.1- 0.5m

1 = 0-0.1m

G = graminoids

H = forbs L = lichens

M = mosses & liverworts

C = climbers

K = stem succulents

F = floating-leaved S = submerged

X = epiphytes

#### Species 5 75-100% 4 50-75% Group

Cover

С

i

р

# 5 75-100% 4 50-75% 3 25-50% 2 5-25% 1-5%

- Abundance
- 1 <5% cover, many individuals + <5% cover, few (2-20) individuals r <5% cover, single

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6-9p, Ca")

Sociability

5 = extensive mat 4 = small colonies, broken mat

3 = large group, many plants

2 = small dense clumps

1 = growing singly

## <u>Selected Remark Codes</u> DD = dead

DY = dying

Reliability Code

0 = variety certain 1 = cf. var./subsp.

2 = species certain

3 = species complex 4 = cf. species

5 = genus certain

6 = cf. genus

7 = unknown

- GE = germinating
- SD = seedling SP = sprout (coppice)

- FR = fruiting OP = outside plot (<2m)
- ## = specimen collection #

r b <1% а

Elozenniki		Initial Scan	
	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM	Entered	
DEFAILNENT OF NUTURAL RESOLUTION	MINDINK, DIVISION OF Ecological & Water Resources, 500 Larayette Road, Box 25, St. Paul, MN 55155		ž
GENERAL	LINFORMATION SITE DATA SHEET	Final Scan	קק
DNR R	ELEVE #	1	Ĩ
Surveyo	pr(s): Similyon		Ţ.
Institutio	on: (M)BS (F)CS (N)HP (U)SES (U) of M (O)ther M NO.		m
Purpose	e of Releve: (C)lassification (R)are species habitat (M)onitoring (O)ther (Dist U)	NTIM .	#
Revisit:	(Y)es (N)o Original DNR Releve #:	· · · · · · · · · · · · · · · · · · ·	i I
Date: 🧲	$\frac{2}{1} \text{ Month: } \frac{J}{J} \frac{J}{L} \text{ Year: } \frac{2}{2} \frac{J}{L} \frac{J}{L} (e.g. 09 \text{ JUL } 2004)}$		
VECETAT			
Vegetati	on Group: (WII) wooded unland (OII) open unland (WW) wooded wotland (OW) open up	Hord	
NPC Co	de (Name): WMS83(	)	
NPC Rar	nking in Releve:		
Stand Ty	ypical of NPC: (Y)es (N)o (U)ncertain	William .	
Releve T	Typical of Stand: (Y)es (N)o	Juler	
lf <u>No</u>	2, identify appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Gap (O)ther		
Plot Loc	ation in NPC: (F)ar from community boundary (M)oderately far from boundary (C)lose to boundary	ary (E)cotonal	
LOCATION	N INFORMATION		
UTM:	$\frac{1}{9} \underbrace{\bigcirc}_{4} \underbrace{\bigcirc}_{4} \underbrace{\bigcirc}_{5} \underbrace{\bigcirc}_{7} \underbrace{\frown}_{6} \underbrace{\bigcirc}_{1} \underbrace{\odot}_{1} $		
UTM Acc	curacy: meters	-	
Location	Source: (G)PS (A)ir photo (T)opo map (L)iDAR (O)ther	· · ·	
County:	Township:N Range:	Section: QQRT: of QRT:	
	ORMATION		
Elevation	n: ft. Slope: (°) or (%) Aspect: (o.e. N.NE sto:	LV for lovel)	
Topogra	phic Context: (C)rest (U)pper (M)iddle (L)ower (T)oe (F)lat (D)epression (?)uncertain		
SOIL INFO	PRMATION		
Litter Thi	ickness: cm	th of Laver Coarse Fragmonts	
Litter Humus T	r Type: (L)eaves (N)eedles (G)rass (O)ther	Bottom Texture ^A Type ^B Volume ^C	
Hum	usType: (M)or (M)oder (P)rairie mull (W)ormed mull	n (>)cm	
Earthwor	rms Present: (Y)es (N)o	n (>) cm	
Depth to	Semi-Permeable Layer: $cm$ $cm$ $(low \rightarrow heavy)$ ; (1) (2) (3) (4) (5) $[5]$ $[3]$ $[3]$ $[3]$	n (>) cm	
Depth to	Gray Colors or Redox Features: cm	n (>)cm	
Drainage	Class: (E)xcessively/Somewhat excessively (W)ell (M)oderately well	n (>) cm	
Hoight of	(S)omewhat poorly (P)oorly (V)ery poorly drained	n (>)cm	
Sphagnu	Im Cover: %	n (>) cm	
Depth of	Standing Water: (>) cm	y sand, SL = sandy loam, L = loam, SIL = silt loam, SCL =	
pH of Sur	rface Water: ± clay, C= clay, RO=	rock, PE = peat, MP = mucky peat, MU = muck	
Average I	Depth to Bedrock: cm	ucky peat is known, add suffix to two-letter code: -m = moss, -s	
Exposed	Rock:% Gr = gravel, Co = co	bbles, St = stones, Bo = boulders	
Rock Tvn	<b>Sup:</b> (F Jeisic (IVI)and (C Jaicareous (S) and stone (S) ioux quartzite (C) ther $c_{0=<15\%, 1=15\cdot35}$	%, 2=35-60%, 3=60-90%, 4=>90%, ?=unknown	
General S	Soil Texture: (C)low (1) com (S)and (S)it (D)cok (Mi)uck (D)cot		
Demontra	Structure. (Oliay (L)oant (Oliant (Oliant (C)) (C) (N) (Ock (P)) (C) (C) (C) (C) (C) (C) (C) (C) (C) (	1 - the A	
Remarks:	: - Hendel without fauture, feature MP a Marin of	- Chellardy ; Energy	
Basal Area	& Tree Diameters DBH List: (C)omplete (P)artial Notes:		
Species	L/D BA-1 BA-2 Ave. DBH (cm)		
			,
	Releve-Wide DBH Statistics		
Prism Facto	pr: Min: Max: Median: Photos Taken: (Y)es	(N)O Revised Juno 2	<b>313</b>

**DNR RELEVE #** 

2010

SP = sprout (coppice) FR = fruiting OP = outside plot (<2m)

## = specimen collection #

5 = genus certain 6 = cf. genus 7 = unknown

Surveyor's Releve #: 8mm and Date: 1/01

Surveyor(s): S.Milburn County: Unloud Medicine

Surveyor's Place Name: ________

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D	C.S	SPECIES NAME	REMARKS	IC	) (	c.s	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS
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	en e	C.S.TOLOHIFELSA				۱.	PIAGUILONGE			3.	P. y.yawteh	
	,				r E	2.	S. Anutrisic.			3.	Cipellita	
					)		2. AURINA			9	CMAN HERBETIC STRICTH	
					6	2.	H. GROSSERRATUS			1.	BINERMIS	
						١.	F. VIRGINIANA			<u> </u>	C. POBLGAMENUS	
					6	2	EMALISLAMIN			der.	S. MICROCANDUS	
				Γ	4	984	SILANCEAMIM			-	C. STRINTIA	
				Γ	1		Siciannea			<u> </u>		·
				Г		١.	E: "LANICATUM			<u> </u>		
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<u>Lif</u> B = D = E = G = H = L =	e Forr = broa = broa = neec = gran = forbs = liche	nHeightdleaf evergreen $8 > 35m$ dleaf deciduous $7 = 20.35m$ lleleaf evergreen $6 = 10.20m$ sinoids $5 = 5.10m$ s $4 = 2.5m$ ns $3 = 0.5.2m$	Group c i p r b	over S	Spei 5 4 3 2		Sociability         5 = extensive mat         00%       4 = small colonies, broke         5%       3 = large group, many pla         0%       2 = small dense clumps         %       1 = growing singly	n mat ants	$\frac{\text{Relia}}{0 = v}$ $1 = c$ $2 = s$ $3 = s$ $4 = c$ $5 = g$	bility ariety f. var., pecies f. spec enus	Code         Selected Remark Co-           certain         DD = dead           /subsp.         DY = dying           s certain         GE = germinating           s complex         SD = seedling           cies         SP = sprout (coppice)           certain         FR = fruiting	<u>des</u>

4 = 2-5m 3 = 0.5-2m 2 = 0.1- 0.5m

1 = 0-0.1m

- G = graminoids
- H = forbs
- L = lichens M = mosses & liverworts C = climbers
- K = stem succulents
- F = floating-leaved S = submerged
- X = epiphytes

p r b a

### 3 = large group, many plants 2 = small dense clumps

- 1 = growing singly
- <1%
- Abundance 1 <5% cover, many individuals
- + <5% cover, few (2-20) individuals
- r <5% cover, single

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6-9p, Ca")

Hinnesola	,		Initial Scan
	MINNESOTA DEPARTMENT OF NATURAL RESOURCES RELEVE FORM	N 55155	Entered
MEANINENT OF MIDRULATEOURCES	MNDNR, Division of Ecological & Water Resources, 500 Latayette Road, Box 25, St. Paul, M		Edited
GENER	AL INFORMATION SITE DATA SHE	ET	Final Scan
DNR	RELEVE #		
Survey	yor(s): <u>SMIRABAN</u>		
Institu	tion: (M)BS (E)CS (N)HP (U)SFS (U) of M (O)ther M N/		
Purpo	se of Releve: (C)lassification (R)are species habitat (M)onitoring ((O)ther	Beim en striktion	
Revisi	t: (Y)es (N)o Original DNR Releve #:		
Date:	<u>1 S</u> Month: <u>H U 6</u> Year: <u>∞ D ∖ (a</u> (e.g. 09 JUL 2004) Site #: Ownershin:		
VEGETA	ATION INFORMATION	and the second	
Vegeta	ation Group: (WU) wooded upland (OU) open upland (WW) wooded wetland	(OW) open wetland	
NPC C	:ode (Name): WMS & 3 (	A compared with the second sec	)
NPC R	anking in Releve:		
If	No, identify appropriate modifier: (N)atural disturbance (H)uman disturbance (Y)oun	g stand (<40 yrs) (O)ther	
Releve	e Typical of Stand: (Y)es (N)o		
lf	No, identify appropriate modifier: (H)igher Quality (L)ower Quality (C)anopy Gap (O	ther	
Plot L	ocation in NPC: (F)ar from community boundary (M)oderately far from boundary,	(C)lose to boundary (E)cotonal	
LOCATI	ON INFORMATION フムコネノフェ) Permanent Marke	r (No XY)es	
01WI.	4940644 N (record in NAD83, Zone 15) Marker Type / Pla	cement:	
UTM A	Accuracy: meters		
Locati	on Source; (G)PS) (A)ir photo (T)opo map (L)iDAR (O)ther	Section:	OORT: of ORT:
Count	ISODMATION	inge Section	
PLOT IN Plot S	$i_{\text{rec}} = 10^{\circ} \text{m}^2$		
Elevat	ion:ft. Slope:(°) or(%) Aspect:	(e.g., N, NE, etc.; LV for level)	
Тород	graphic Context: (C)rest (U)pper (M)iddle (L)ower (T)oe (F)lat (D)epress	ion (?)uncertain	
SOIL IN	FORMATION	•	·
Litter	Thickness: cm	Depth of Layer	Coarse Fragments
⊔ Humu	s Thickness: cm	Top Bottom	Texture ^A Type ^B Volume ^C
H	umusType: (M)or (M)oder (P)rairie mull (W)ormed mull	(1: 0 cm (>) cn (>)	n
Earthy	vorms Present: (Y)es (N)o vorm Ranid Assessment Rank (low $\rightarrow$ heave): (1) (2) (3) (4) (5)	ຍຸ 2:cm (>)cn	
Depth	to Semi-Permeable Layer: cm	0 3:cm (*)cm	n
Depth	to Gray Colors or Redox Features: cm		n
Draina	age Class: (E)xcessively/Somewhat excessively (W)ell (M)oderately well	cm (≥)cn	n <u>.</u>
Heigh	(S)omewhat poorly (P)oorly (V)ery poorly drained	7:cm (>)cn	n
Sphag	jnum Cover:%	(8:cm (>)cm	n
Depth	of Standing Water: (>) cm	sandy clay loam, CL = clay loam, SICL	= silty clay loam, SC = sandy clay, SIC = silty
pH of	Surface Water: ±	lf origin of peat or mucky peat is know	mp = mucky peat, mu = muck n, add suffix to two-letter code: -m ≈ moss, -s
Avera	ge Depth to Bedrock: cm	= sedge	
Expos Rock	ed Rock:% Group: (E)elsic (M)atic (C)alcareous (S)andstone (S)ioux quartzite (O)ther	^B Gr = gravel, Co = cobbies, St = stones, G = cobbies, St = stones,	Bo = boulders
Rock	Type:	° 0 = <15%, 1 = 15-35%, 2 = 35-60%, 3	= 60-90%, 4 = >90%, r = unknown
Gener	al Soil Texture: (C)lay (L)oam (S)and (S)ilt (R)ock (M)uck (P)eat		
Rema	rks. Syla, along & segurare the lined	I discharge : A	montha truituosa
1 \n	andern t for the downshing and the roward	lev is growings	2 dominulal
<i>\$</i>			
			·
<u>.</u>	If		
Basal A	Area & Tree Diameters DBH List: (C)omplete (P)artial Note	es:	
Species		·	
	Releve-Wide DBH Statistics		
Prism F	-actor: Min: Max: Median: Pho	tos laken: (Y)es (N)o	Revised June

**DNR RELEVE #** 

Surveyor's Releve #: SAMIL-ADE Date: 215 2016

Surveyor(s): S (1) (1) NW County: Yellow Medie

Surveyor's Place Name: B212

ID	C.S	SPECIES NAME	REMARKS	10	) C.S	SPECIES NAME	REMARKS	ID	C.S	SPECIES NAME	REMARKS
		D3-4P			].	41-3r				G1-31	
	3.	A. fruithuses			1.	SIGIGANTIGA			١.	J. DUDLENI	
		•			1	E. MANUMAN			2	C. NUTBONCION	· ·
		D1-24			1.	V.MASTATA			بعهد	S. PMILLIOUS	
	ŕ	CI STOLONIRIRA			- in	P. LANKEDHARUS			2	A. Cennorm	
,					4.	F. VIRGIMIANA			2.	ALGIGAMMENA	
	•				de	E. ARUSUSUS			2.	C. PRILITTA	
	•				<u> </u>	V. NEPROPHYLLIA			١.	G STRIKTA	
		·····			1.	PAURER			4	S. PRETIMANA	
					1.	R. LEPTSPHYLUM			<u> </u>	· •	
					1	LISIANILITICA					
					alas	S. ETALLOWER			<u> </u>		
	•				1.	SICHWANDERSIS				,	
	•				-	H. AUTUMUALE			<u> </u>		
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Life Form

B = broadleaf evergreen

D = broadleaf deciduous

E = needleleaf evergreen G = graminoids H = forbs

L = lichens

M = mosses & liverworts C = climbers K = stem succulents

F = floating-leaved

- S = submerged
- X = epiphytes

#### Group Species 5 75-1 4 50-7 С i р r

Cover

5 75-100% 4 50-75% 3 25-50% 2 5-25% 1-5% <1%

75-100%

- Abundance
- 1 <5% cover, many individuals + <5% cover, few (2-20) individuals r <5% cover, single

Note: indicate tree canopy by recording "Ca" to right of canopy layer life form/height code (ex: "D6 - 9p, Ca")

**Sociability** 

5 = extensive mat 4 = small colonies, broken mat

3 = large group, many plants

2 = small dense clumps

1 = growing singly

#### Reliability Code

0 = variety certain 1 = cf. var./subsp.

2 = species certain

3 = species complex

DD = dead DY = dying GE = germinating SD = seedling

4 = cf. species 5 = genus certain 6 = cf. genus

7 = unknown

- SP = sprout (coppice) FR = fruiting OP = outside plot (<2m) ## = specimen collection #

Selected Remark Codes

b а

<u>Height</u> 8 >35m 7 = 20-35m

6 = 10-20m

5 = 5-10m 4 = 2-5m

3 = 0.5-2m 2 = 0.1- 0.5m 1 = 0-0.1m

#### **Anne-Marie Griger**

From:	Mixon, Kevin (DNR) <kevin.mixon@state.mn.us></kevin.mixon@state.mn.us>
Sent:	Friday, December 02, 2016 10:45 AM
То:	Joe Sedarski
Cc:	Steinhauer, Suzanne (COMM); Davis, Richard (COMM); Sean Flannery; Anne-Marie
	Griger; Peter Rood; John Seaberg; Todd Mattson; Warzecha, Cynthia (DNR)
Subject:	RE: Bitter Root Wind Project - Calcareous Fen Matters

Thanks Joe,

MNDNR staff is in the process of reviewing the report and we will provide a response in the near future. We appreciate the work that went into the report and your efforts to identify and avoid calcareous fens.

Thanks,

Kevin

From: Joe Sedarski [mailto:jsedarski@merjent.com]
Sent: Wednesday, November 30, 2016 8:17 AM
To: Mixon, Kevin (DNR) <kevin.mixon@state.mn.us>
Cc: Steinhauer, Suzanne (COMM) <suzanne.steinhauer@state.mn.us>; Davis, Richard (COMM)
<Richard.Davis@state.mn.us>; Sean Flannery <Sean.Flannery@res-group.com>; Anne-Marie Griger <Anne-Marie.Griger@res-group.com>; Peter Rood <Peter.Rood@res-americas.com>; John Seaberg <jseaberg@merjent.com>;
Todd Mattson <tmattson@west-inc.com>
Subject: RE: Bitter Root Wind Project - Calcareous Fen Matters

... and here is the second with the last 37 pages of said report. Thanks, Joe

### merjent

Joe Sedarski
612.746.3660 main

612.924.3981 direct 612.214.6658 cell 612.746.3679 fax

TractorWorks Building
800 Washington Avenue N.
Suite 315
Minneapolis, MN 55401

www.merjent.com

jsedarski@merjent.com

From: Joe Sedarski
Sent: Wednesday, November 30, 2016 8:13 AM
To: 'Mixon, Kevin (DNR)' <<u>kevin.mixon@state.mn.us</u>>
Cc: 'Steinhauer, Suzanne (COMM)' <<u>suzanne.steinhauer@state.mn.us</u>>; 'Davis, Richard (COMM)'

<<u>Richard.Davis@state.mn.us</u>>; 'Sean Flannery' <<u>Sean.Flannery@res-group.com</u>>; 'Anne-Marie Griger' <<u>Anne-Marie.Griger@res-group.com</u>>; 'Peter Rood' <<u>Peter.Rood@res-americas.com</u>>; John Seaberg <<u>iseaberg@merjent.com</u>>; 'Todd Mattson' <<u>tmattson@west-inc.com</u>> **Subject:** RE: Bitter Root Wind Project - Calcareous Fen Matters

Good morning Kevin and all – apologies for multiple emails on this matter. We tried emailing the referenced report yesterday (about 23 MB), but it did not get through to you, Suzanne and Richard (limit appears to be around 25 MB and notice said the message was 30 MB).

Attached is the first 20 pages and I'll send the second 20 pages right after this email.

Please let us know if you have any questions or problems with the attached document.

Best, Joe

### merjent

	Joe Sedarski
TractorWorks Building	612.746.3660 main
800 Washington Avenue N.	612.924.3981 direct
Suite 315	612.214.6658 cell
Minneapolis, MN 55401	612.746.3679 fax
www.merjent.com	jsedarski@merjent.com

From: Joe Sedarski
Sent: Tuesday, November 29, 2016 3:45 PM
To: 'Mixon, Kevin (DNR)' <<u>kevin.mixon@state.mn.us</u>>
Cc: 'Steinhauer, Suzanne (COMM)' <<u>suzanne.steinhauer@state.mn.us</u>>; 'Davis, Richard (COMM)'
<<u>Richard.Davis@state.mn.us</u>>; 'Sean Flannery' <<u>Sean.Flannery@res-group.com</u>>; 'Anne-Marie Griger' <<u>Anne-Marie.Griger@res-group.com</u>>; Peter Rood <<u>Peter.Rood@res-americas.com</u>>; John Seaberg <<u>iseaberg@merjent.com</u>>; 'Todd Mattson' <<u>tmattson@west-inc.com</u>>
Subject: RE: Bitter Root Wind Project - Calcareous Fen Matters

Dear Kevin,

This e-mail is follow-up to the August 11, 2016 e-mail that I sent you regarding the early season phase of the calcareous fen field survey for the Bitter Root Wind Project (Project). Subsequent to the early season survey work, we have completed the late season survey as required by MN DNR. The attached Calcareous Fen Survey Report includes the results of both the early and late season surveys. The late season field survey was conducted for sites that were determined to be potential calcareous fens in the early season field survey, as well as new potential calcareous fen sites that were not previously surveyed based upon the results of the early season field survey and updated site layout revisions of the Project. Please let us know if you have any questions or comments on the attached Calcareous Fen Survey Report.

Also, please note that we also conducted wetland/waterbody surveys for the project this fall, and are currently summarizing the results in a report that we anticipate submitting to you for review in the near future. We would like to

schedule a meeting with the MN DNR shortly thereafter to review both the calcareous fen and wetland/waterbody data.

If you have any questions or comments, please contact me. We appreciate your assistance and involvement with the Project.

Best, Joe

## merjent

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jsedarski@merjent.com

From: Joe Sedarski
Sent: Thursday, August 11, 2016 11:41 AM
To: Mixon, Kevin (DNR) <<u>kevin.mixon@state.mn.us</u>>
Cc: Steinhauer, Suzanne (COMM) <<u>suzanne.steinhauer@state.mn.us</u>>; Davis, Richard (COMM)
<<u>Richard.Davis@state.mn.us</u>>; Sean Flannery <<u>Sean.Flannery@res-group.com</u>>; Anne-Marie Griger <<u>Anne-Marie.Griger@res-group.com</u>>; Jeff Jackson <<u>Jeff.Jackson@res-group.com</u>>; John Seaberg <<u>iseaberg@merjent.com</u>>;
Todd Mattson <<u>tmattson@west-inc.com</u>>
Subject: Bitter Root Wind Project - Calcareous Fen Matters

#### Dear Kevin,

Please find attached the preliminary Calcareous Fen (CF) Survey Report for the Bitter Root Wind Project (Project) for your review. Note this work was conducted on a preliminary site layout and that follow up CF desktop and field review is being conducted on a revised site layout.

We are planning to conduct the 2nd round/late season CF plant surveys this coming week on Aug. 15-16, 2016, and are completing the desktop work on the revised Project layout at this time. For the late season field review, we are not planning to revisit sites evaluated during the early season field review that were determined not to be potential CFs. We do plan to revisit sites that were determined to be potential CFs in the early season field review, as well as field review any new potential CF sites based upon the revised site layout of the Project that were not evaluated in the early season effort. We request MN DNR review and concurrence with this approach, to be applied to the late season field work to be done Aug. 15-16 and other subsequent fen evaluation that may be necessary.

Upon completion of the 2nd season field review, a report will be prepared (similar to the attached report) and submitted to the MN DNR. Wetland/Waterbody surveys are being scheduled for this month. Once that work is completed, we would like to schedule a meeting with the MN DNR in early September to review CF and wetland/waterbody data and provide updates to the MN DNR on those matters. We would appreciate it if you could let us know some dates/times you are available for a meeting in early September.

If you have any questions or comments, please contact me or respond to all on this email. We appreciate your assistance and involvement with the Project.

Best, Joe

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From:	Joe Sedarski
To:	Mixon, Kevin (DNR)
Cc:	"Anne-Marie Griger"; Sean Flannery; Michelle Matthews; Jim Arndt
Bcc:	Brie Anderson; Dean Sather; Kevin Mueller; Scott A. Milburn
Subject:	RES Bitter Root Wind Project - Calcareous Fen Follow Up
Date:	Thursday, August 17, 2017 2:51:00 PM
Attachments:	image002.jpg

Good afternoon Kevin,

On behalf of RES Americas, we are following up with you on the calcareous fen review for the Bitter Root Wind Project following the meeting on July 26th, 2017.

First of all, thanks for your email on July 31, 2017, indicating that the MnDNR has further reviewed the existing calcareous fen across 210th Avenue from the proposed Project access road, and that the MnDNR agrees that the access road in this location should not impact the fen, and avoidance of potential impacts to the fen has been achieved.

Also, please see attached kmz regarding culvert locations to address question during the July  $26^{th}$  meeting – RES America confirms there are two culverts on 201th Avenue in this area.

Secondly, as discussed during the July 26, 2017, meeting, RES/Merjent conducted a desktop review of potential calcareous fens in areas associated with the current Project site layout which were not reviewed in 2016. Jim Arndt with Merjent conducted a desktop review the same protocols used in 2016. We request your review of the attached information and summary of the desktop data and response to our recommendations for conducting late season calcareous fen field review by the end of August.

A brief summary of the desktop review follows:

- 50 wetland areas were examined within the 500 foot buffer areas of the current 2017 Project site layout construction corridors.
- No areas were double counted with the exception of "Site 13 FenCheck++ 0817" which, though portions of which are outside of the 2016 footprint, was checked by MNR during the 2016 field survey (referred to as BR32 in 2016 report). Because this was reviewed in 2016, no further review of Site 13 is recommended.
- Merjent looked at everything except for obvious farmed wetland. All wetland areas were examined for offsite fen indicator features, including topographic anomalies (based on 2' contour interval LiDAR Data) indicative of the presence of sloping peatland, peat domes, and groundwater spring heads and spring runs, national wetlands inventory (NWI) data, and air photo interpretation of a number of photo years from 1991 to 2015 to assess land use and surface water hydrology. If an area had any indicators of potential calcareous fen regardless of how subtle the expression, it was included as an area requiring field assessment.
- A total of 10 areas were identified as new areas within the 2017 footprint requiring a field survey; however, only two sites (15 FenCheck 0817 and 50 FenCheck 0817) are anticipated to have significant potential for calcareous fen. These ten areas include Sites 7, 10, 12, 15 (three

locations), 17, 18, 22, and 50, as indicated in the attached kmz and shapefiles.

• The remainder do not have any offsite evidence of calcareous fen, e.g. sloping peatland, peat domes or topographic anomalies, spring head spring run discharge, etc.

Based upon this information, we recommend that ten identified locations be field reviewed for calcareous fens. Field survey protocols for this effort will be the same as we used in 2016. After the field survey is completed, we will prepare a report with the findings and provide to the MnDNR. This information will also be used, as necessary, for possible changes to the site layout.

Because the late season survey window for calcareous fens is closing at the end of August, we appreciate your review and response to this email so that we can get this done if you are in agreement with this recommendation.

Best Regards, Joe



### Joe Sedarski

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From:	<u>Mixon, Kevin (DNR)</u>
To:	Joe Sedarski
Cc:	Anne-Marie Griger; Sean Flannery; Michelle Matthews; Jim Arndt; Benage, Megan (DNR); Scott A. Milburn; Warzecha, Cynthia (DNR)
Subject:	RE: RES Bitter Root Wind Project - Calcareous Fen Follow Up
Date:	Wednesday, September 6, 2017 2:17:17 PM
Attachments:	image002.jpg

Joe:

Thanks for the update and coordination on this issue. We have no comments or concerns at this time and we look forward to receiving the combined report.

Kevin

From: Joe Sedarski [mailto:jsedarski@merjent.com]
Sent: Wednesday, August 30, 2017 10:44 AM
To: Mixon, Kevin (DNR) <kevin.mixon@state.mn.us>
Cc: Anne-Marie Griger <Anne-Marie.Griger@res-group.com>; Sean Flannery <Sean.Flannery@res-group.com>; Michelle Matthews <Michelle.Matthews@res-group.com>; Jim Arndt
<jarndt@merjent.com>; Benage, Megan (DNR) <megan.benage@state.mn.us>; Scott A. Milburn
<scott.milburn@mnrinc.us>
Subject: RE: RES Bitter Root Wind Project - Calcareous Fen Follow Up

Good morning Kevin, and all:

Quick update – on this past Monday (Aug 28, 2017) Scott with MNR conducted field review of the potential sites flagged by Jim Arndt in current site layout areas that are new/updated for the Bitter Root Wind Project. None of the sites had indication of calcareous fens.

Note that we did not field review 7 FenCheck (it is located in South Dakota and Project is no longer in SD), nor 15 FenCheck sites located at USFWS lands (Project will not impact these lands), or 17 FenCheck site (landowner has not signed up for the Project and Project will not impact this parcel).

We are preparing a report that will compile applicable 2016 and 2017 desktop and field review information relative to the current site layout which will correspond to the site layout to be included in the Site Permit Application.

Please let us know if any questions or comments regarding this update.

We appreciate your assistance with these matters.

Best Regards, Joe

### merjent

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From: Mixon, Kevin (DNR) [mailto:kevin.mixon@state.mn.us]
Sent: Tuesday, August 22, 2017 8:52 AM
To: Joe Sedarski <jsedarski@merjent.com>
Cc: Anne-Marie Griger <<u>Anne-Marie.Griger@res-group.com</u>>; Sean Flannery <<u>Sean.Flannery@res-group.com</u>>; Michelle Matthews <<u>Michelle.Matthews@res-group.com</u>>; Jim Arndt
<jarndt@merjent.com>; Benage, Megan (DNR) <<u>megan.benage@state.mn.us</u>>
Subject: RE: RES Bitter Root Wind Project - Calcareous Fen Follow Up

Joe:

The MNDNR is in agreement with your methods and desktop review for calcareous fens in the areas that were not reviewed in 2016. Please proceed to review the 10 potential calcareous fens in the field. We appreciate the high level of coordination that has occurred on this issue.

Thanks,

Kevin

From: Joe Sedarski [mailto:jsedarski@merjent.com]
Sent: Thursday, August 17, 2017 2:52 PM
To: Mixon, Kevin (DNR) <kevin.mixon@state.mn.us>
Cc: Anne-Marie Griger <Anne-Marie.Griger@res-group.com>; Sean Flannery <Sean.Flannery@resgroup.com>; Michelle Matthews <Michelle.Matthews@res-group.com>; Jim Arndt
<jarndt@merjent.com>
Subject: RES Bitter Root Wind Project - Calcareous Fen Follow Up

Good afternoon Kevin,

On behalf of RES Americas, we are following up with you on the calcareous fen review for the Bitter Root Wind Project following the meeting on July 26th, 2017.

First of all, thanks for your email on July 31, 2017, indicating that the MnDNR has further reviewed the existing calcareous fen across 210th Avenue from the proposed Project access road, and that the MnDNR agrees that the access road in this location should not impact the fen, and avoidance of potential impacts to the fen has been achieved.

Also, please see attached kmz regarding culvert locations to address question during the July  $26^{th}$  meeting – RES America confirms there are two culverts on 201th Avenue in this area.

Secondly, as discussed during the July 26, 2017, meeting, RES/Merjent conducted a desktop review of potential calcareous fens in areas associated with the current Project site layout which were not reviewed in 2016. Jim Arndt with Merjent conducted a desktop review the same protocols used in 2016. We request your review of the attached information and summary of the desktop data and response to our recommendations for conducting late season calcareous fen field review by the end of August.

A brief summary of the desktop review follows:

- 50 wetland areas were examined within the 500 foot buffer areas of the current 2017 Project site layout construction corridors.
- No areas were double counted with the exception of "Site 13 FenCheck++ 0817" which, though portions of which are outside of the 2016 footprint, was checked by MNR during the 2016 field survey (referred to as BR32 in 2016 report). Because this was reviewed in 2016, no further review of Site 13 is recommended.
- Merjent looked at everything except for obvious farmed wetland. All wetland areas were examined for offsite fen indicator features, including topographic anomalies (based on 2' contour interval LiDAR Data) indicative of the presence of sloping peatland, peat domes, and groundwater spring heads and spring runs, national wetlands inventory (NWI) data, and air photo interpretation of a number of photo years from 1991 to 2015 to assess land use and surface water hydrology. If an area had any indicators of potential calcareous fen regardless of how subtle the expression, it was included as an area requiring field assessment.
- A total of 10 areas were identified as new areas within the 2017 footprint requiring a field survey; however, only two sites (15 FenCheck 0817 and 50 FenCheck 0817) are anticipated to have significant potential for calcareous fen. These ten areas include Sites 7, 10, 12, 15 (three locations), 17, 18, 22, and 50, as indicated in the attached kmz and shapefiles.
- The remainder do not have any offsite evidence of calcareous fen, e.g. sloping peatland, peat domes or topographic anomalies, spring head spring run discharge, etc.

Based upon this information, we recommend that ten identified locations be field reviewed for calcareous fens. Field survey protocols for this effort will be the same as we used in 2016. After the field survey is completed, we will prepare a report with the findings and provide to the MnDNR. This information will also be used, as necessary, for possible changes to the site layout.

Because the late season survey window for calcareous fens is closing at the end of August, we appreciate your review and response to this email so that we can get this done if you are in agreement with this recommendation.

Best Regards, Joe



#### Joe Sedarski

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From:	Mixon, Kevin (DNR)
To:	Joe Sedarski
Cc:	Anne-Marie Griger; Michelle Matthews; Sean Flannery; Scott A. Milburn; Jim Arndt; Warzecha, Cynthia (DNR)
Subject:	RE: Bitter Root Wind Project - Follow up Calcareous Fen Question and Review
Date:	Friday, September 29, 2017 9:18:12 AM
Attachments:	image001.gif

Joe:

The MNDNR agrees that locating a collection line on the south side of 180th Avenue would not be considered an impact to the fen located approximately 218 feet north of 180th Avenue.

Thanks

From: Joe Sedarski [mailto:jsedarski@merjent.com]
Sent: Thursday, September 28, 2017 1:14 PM
To: Mixon, Kevin (DNR) <kevin.mixon@state.mn.us>
Cc: Anne-Marie Griger <Anne-Marie.Griger@res-group.com>; Michelle Matthews
<Michelle.Matthews@res-group.com>; Sean Flannery <Sean.Flannery@res-group.com>; Scott A.
Milburn <scott.milburn@mnrinc.us>; Jim Arndt <jarndt@merjent.com>
Subject: Bitter Root Wind Project - Follow up Calcareous Fen Question and Review

Good afternoon Kevin,

While putting together the compiled calcareous fen report for the Bitter Root Wind Project, we identified a second fen (BR25) located within the 500 foot buffered survey corridor (see attached jpg). As shown in the figure, a proposed collection line would be installed within about 218 feet of fen BR25, which is located on the north side of 180th Avenue. Please note the proposed collection line would be trenched in along the south side of 180th Avenue.

Similar to your earlier previous review of MN DNR fen Fortier 5 (BR32), which is located about 120 from the construction corridor for a proposed access road that would be installed south of 210th Avenue (see attached jpg), could you also review BR25 and let us know if concerns or if potential impacts to this fen has been achieved as well?

Once we have this determination, we'll finalize the fen report and submit to you.

Please contact us with any questions or comments regarding this matter and thanks in advance for your review.

Best, Joe



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From:	Joe Sedarski
To:	<u>"Mixon, Kevin (DNR)"; Warzecha, Cynthia (DNR)</u>
Cc:	<u>"Sean Flannery"</u> ; <u>"Anne-Marie Griger"</u> ; <u>"Michelle Matthews"</u> ; <u>Jim Arndt</u> ; <u>"Scott Milburn"</u>
Subject:	Bitter Root Wind Project - Combined Calcareous Fen Survey Report
Date:	Thursday, October 5, 2017 1:25:00 PM
Attachments:	image001.gif

Good morning Kevin and Cynthia,

Please find attached the above referenced report concerning the Bitter Root Wind Project. We will include this in the Site Permit Application (SPA) for the Project as well, but we'd like to review that with you in terms of showing fen locations.

If you have any questions or comments, please contact me or any of the parties cc'd on this email.

We appreciate your continued assistance with this Project!

Best,

Joe



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October 4, 2017



Mr. Sean Flannery Permitting Director Renewable Energy Systems Americas, Inc. 330 2nd Avenue South, Suite 820 Minneapolis, MN 55401

#### Re: Combined Calcareous Fen Survey Report Bitter Root Wind Project

Dear Mr. Flannery:

Midwest Natural Resources, Inc. (MNR) and Merjent Inc. (Merjent) are pleased to provide the following 2016–2017 Field Seasons combined Calcareous Fen Survey Report (Report) for the proposed Bitter Root Wind Project (Project). Flying Cow Wind, LLC (Flying Cow Wind), a subsidiary of Renewable Energy Systems Americas Inc., is the Project proposer. The boundary of the Project and 2016-2017 Survey Corridors are indicated in the attached Figure 1.

#### **Project Regulatory Summary and Coordination Updates**

The calcareous fen survey work was conducted to address Minnesota Department of Natural Resources (MN DNR) initial comments on the Project provided in the MN DNR Preliminary Review letter dated May 3, 2016, and subsequent MN DNR review and coordination with Flying Cow Wind on calcareous fen matters. The MN DNR required that early and late season field surveys be conducted for the Project to assess the potential impacts to calcareous fens in 2016 and associated follow-up fen surveys in August 2017¹. This Report provides a summary of all desktop and field survey results completed in 2016 and 2017 as of this date for the Project.

On August 11, 2016, Merjent submitted to the MN DNR the Preliminary Calcareous Fen Survey Report (Preliminary Report, dated July 18, 2016), which provided the results of a desktop assessment of potential calcareous fen sites and results of the early season field survey conducted for the then current site layout of the Project. On November 28, 2016, Merjent submitted the Calcareous Fens Early and Late Season Survey Report to the MN DNR, which provide the results of desktop assessment and early and late season field survey work conducted for the updated site layout of the Project. Flying Cow Wind used the results of the 2016 calcareous fen work to further revise the site layout of the proposed Project to avoid and/or minimize potential impacts to fens and associated sensitive environmental features within the Project construction corridors.

On July 26, 2017, representatives of the Minnesota Department of Commerce (DOC), MN DNR, and Flying Cow Wind met to discuss, among other things, the status of the Project and review updated environmental field survey and related information, including site layout updates and calcareous fens. During the meeting, Flying Cow Wind informed the MN DNR that, except for one location, all Project turbines, access roads,

¹ The suite of calcareous fen indicator plant species that are observed during spring survey are different from those that can be identified during fall survey.

collections lines, and other Project facilities were outside of the 500-foot buffer² from identified calcareous fens (Figure 2).

One planned Project access road (which consists of an existing field access road) to a turbine site near 210th Avenue is located within the 500-foot buffer near MN DNR fen Fortier 5/BR32 (Figures 2 and 5). The access road is proposed because it follows an existing field access road and is the most direct route to the turbine site which minimizes impacts to land use and other environmental features in this area. On July 31, 2017, the MN DNR informed Flying Cow Wind via email that it reviewed the planned access road relative to the fen, and determined that the planned access road should not impact this fen and avoidance of potential impacts to the fen has been achieved (see Agency Correspondence in the Attachments).

Upon subsequent design and review, Flying Cow Wind has determined that a proposed collection line disturbance corridor would be within approximately 218 feet of another fen, BR25 (Table 1; Figure 2). This fen is located on the north side of 180th Avenue, whereas the proposed collection line would be trenched along the south side of 180th Avenue. On September 29, 2017, MN DNR informed Flying Cow Wind via email that it reviewed the planned collection line relative to the fen, and determined that locating the planned collection line on the south side of 180th Avenue would not be considered an impact to this fen (see Agency Correspondence in the Attachments).

On August 17, 2017, Flying Cow Wind provided follow-up information regarding the completed desktop work and planned methodology for conducting field survey work for the August 2017 calcareous fen review (see Agency Correspondence in the Attachments). On August 22, 2017, MN DNR approved the proposed field methodology and desktop review for fen field review. Based upon this approval, MNR conducted field review of the additional potential calcareous fen sites for the current Project site layout in late August 2017.

This Report includes a compilation of the early season work and results of the late season desktop and field survey efforts completed in August 2016 and the desktop/field survey efforts completed in 2017 on the updated Project site layout. This information is being used to appropriately site Project facilities and to avoid potential Project impacts to calcareous fens and other natural resources.

#### Background

Flying Cow Wind is proposing the Project located in southwestern Minnesota in Yellow Medicine County and Deuel County, South Dakota, approximately 1.5 miles west of the City of Canby and 5 miles to the northwest of the City of Porter (Figure 1). The Project is a wind conversion facility with a planned capacity up to 152 megawatts, with 37 planned turbines and 3 alternate turbines planned in Minnesota.

The Project also includes an approximately 10-mile long 345 kilovolt overhead transmission line, which will be entirely located in South Dakota. The Project Substation will be located near the Minnesota/South Dakota border in Deuel County, South Dakota, and will continue southwest in Deuel County until the point of interconnection located at Otter Tail Power's planned Astoria Substation in southeastern Deuel County. The transmission line and Project substation will be permitted separately by the South Dakota Public Utilities Commission and Deuel County. The layout for the Project may continue to be updated slightly as additional constraint information and agency feedback is incorporated in to the Project development.

The 2016 calcareous early season fen survey was based on a preliminary turbine layout that included up to 42 turbine locations, including alternate sites. The 2016 late season fen survey was based upon a revised preliminary turbine layout that had 46 turbine locations, including alternate sites. The 2017 late season fen

² By agreement between the MN DNR and Flying Cow Wind, calcareous fens with a closest approach beyond 500 feet from the boundary of the Project footprint are automatically considered avoided.

survey was based upon a subsequent revised turbine layout that has 40 turbine locations (37 proposed and 3 alternate sites). Figure 3 illustrates the 2016 early season and late season and 2017 late season Project layouts and buffer areas used for fen Survey Corridors 1 and 2, as well as the August 2017 Survey Corridor 3. With each desktop and field review data, the design of the Project layout has been refined, particularly to avoid known and suspected environmental impacts and minimize to the extent practicable unavoidable impacts, and will continue to be slightly revised to further meet these objectives, if possible.

In addition to the turbines, facilities necessary for construction and operation of the Project in Minnesota that are included in the Project footprint (and the calcareous fen assessment based on the footprint) include access roads, electrical collection lines, fiber optic communication cabling, an operations and maintenance facility, and temporary crane paths and laydown/staging areas. Construction in Minnesota is expected to begin in first quarter 2019.

According to the MN DNR, there are seven previously documented calcareous fen features in the Project Area (see Agency Correspondence [MN DNR Preliminary Review letter dated May 3, 2016], and Figure 3). As a result, Flying Cow Wind retained MNR and Merjent to investigate other potential calcareous fen locations.

Calcareous fens are wetland plant communities regulated by both the MN DNR and the Minnesota Pollution Control Agency. These features are groundwater-fed discharge systems rich in calcium carbonate (CaCO₃) and/or magnesium carbonates (Bergland 1995; Leete et al. 2005, Arndt et al. 2015). Calcareous fens remain saturated year-round due to continuous groundwater discharge maintaining anaerobic conditions at and near the soil surface, resulting in the accumulation of organic matter (peat) in the wetland soil.

Calcareous fens typically classify into Prairie Extremely Rich Fen communities (OPp93) in the Minnesota Native Plant Community Classification system (MN DNR 2005), and host a number of unusual plants that are adapted to the calcareous fen environment. A number of these plants are state-listed species and are further protected under Minnesota's endangered species law.

#### Methods

#### Desktop Review and Selection of Potential Calcareous Fen Sites

The objective of the field surveys was to identify potential calcareous fens in or near the Project Area in Minnesota. Merjent staff, in collaboration with MNR, targeted survey locations of possible calcareous fen sites based on desktop review conducted just prior to field surveys in 2016 and 2017.

Desktop review involved the examination of the following geospatial resources obtained for the study area and interpreted in a Geographic Information System (Google Earth Professional):

- 1. Recent high-resolution aerial imagery, dated 9/1/2015;
- 2. A 2-foot topographic contour map created from high resolution light detection and ranging data available for the State of Minnesota³;
- 3. National Wetlands Inventory (NWI) polygons and associated attribute data;
- 4. Supplemental information from the Minnesota Geospatial Commons included MN DNR native plant community polygons and attribute data⁴ for areas inventoried for potential biological significance by the MN County Biological Survey⁵ and the calcareous fen source feature points datasets; and

³ <u>http://arcgis.dnr.state.mn.us/maps/mntopo/</u>

⁴ <u>http://www.dnr.state.mn.us/eco/mcbs/maps.html</u>

⁵ <u>http://www.dnr.state.mn.us/eco/mcbs/maps.html</u>

5. A polygon created by buffering planned infrastructure associated with the Project by 500 feet to represent the area to be investigated, the "Survey Corridor" (see Figures 3 to 5).

On unrelated projects, Dr. James Arndt of Merjent previously reviewed several listed calcareous fens in the field in Yellow Medicine County near the proposed Project. That work was conducted to support an informational document prepared for the Environmental Protection Agency (Arndt 1995, 1999), and to characterize a state-listed calcareous fen potentially affected by a proposed road realignment in nearby Lincoln County (Arndt and DeJoode 2009). Calcareous fens in southwest Minnesota are associated with unique landscape positions and present unique landform features that can be used as a scoping tool to identify locations that may have calcareous fens (Arndt, J.L. 1995, 1999; Almendinger and Leete, 1998a, 1998b; Arndt and DeJoode, 2005). These features include:

- 1. The presence of wetlands and wetland signatures on sloping ground in areas that are inconsistent with typical depression-type palustrine wetlands, and are not characteristic of the topography associated with riparian wetlands adjacent to area streams. The accretion of peat in these areas presents a signature of a doubly convex, sloping apron of saturated ground in sideslope and toeslope positions typically located above the floodplain of incised drainageways within the surrounding till plain. These areas typically represent sidehill seeps of calcareous water from exposures of confined aquifers on the valley walls of incised drainageways; and
- 2. Breaks in the confining aquitard⁶ that allow confined aquifers to discharge as spring-heads in nearly level till areas, resulting in an accumulation of peat forming a classic "dome" feature. Such features are typically 10 to 12 feet or more in height, and readily appear on contour maps as approximate circular concentric contours indicative of a mounding effect.

All data were incorporated into Google Earth Pro GIS. Within the Survey Corridor, all NWI wetland areas and all NWI-designated upland areas that presented anomalous topographic signatures of peat accretion were identified as sites requiring subsequent field identification for potential calcareous fen. These desktop reviews preceded both early and late field surveys to account for ongoing alterations in the Project footprint.

#### Field Survey Methods

Using the desktop review data, Merjent engaged MNR personnel to field review each of the potential calcareous fen areas identified in the desktop review. In the event that MNR determined any of the potential calcareous fens did not meet the criteria to be a calcareous fen, Merjent's wetland personnel would then delineate it as a wetland.

MNR made a determination of potential fen status in the field and documented with basic site notes and representative photographs. The approach included collecting detailed plot data at those locations having possible calcareous fen conditions observed in the field. Sites having wetlands with no observed calcareous fen features were documented either by collecting thorough species lists or with relevés.

Relevés are used as tools to document and classify native plant communities. This sampling involves the collection of species richness and abundance within a standardized plot. This method also incorporates the documentation of plant life form (e.g., forbs, graminoids, broadleaf evergreens etc.), and height class. Sampling by means of relevés was reserved for those sites dominated by intact native plant communities. Field-determined native plant community classifications are based on Minnesota's Native Plant Community Classification (Version 2.0). Possible calcareous fen locations were further evaluated by means of the vegetation technical criterion as described in the "Test of the Technical Criteria for Identifying and Delineating Calcareous Fens in Minnesota" document (Leete et al. 2005).

⁶ Aquitard: a relatively low permeability layer that impedes groundwater flow.

#### Results

#### 2016 Early Season Desktop Screening Analysis and Field Surveys

Early season site evaluations were conducted June 29 - July 1, 2016 within Survey Corridor 1 based on the most current Project footprint at the time (Survey Corridor 1, Figures 3 and 5). Initial site selection based on the above information resulted in the selection of 23 potential areas to survey early in the growing season.

MNR evaluated all but one of the 23 predetermined sites, with one additional site added based on the field reconnaissance (Figures 3 and 5). The site that was not evaluated (BR07) is located on federal land. Because MNR did not have access permission for that parcel and Flying Cow Wind redesigned the Project to avoid this area, no survey was completed. No Project infrastructure will be placed on federal land. Appendix A summarizes the field survey results, and Appendix B presents the scoring results used in the classification of calcareous fens. Representative photos are provided in Appendix C, and relevé data are provided in Appendix D.

Preliminary surveys resulted in the location of three areas exhibiting calcareous fen characteristics, one of which (BR22-Fortier 6) had been previously documented by MN DNR. This particular feature, along with the associated fen (BR23), were both outside of Survey Corridor 1, while the third fen location (BR01) was located within it. Site BR14 was also identified as a possible fen location so it was surveyed again during the late season survey. All other remaining survey areas were classified as either wet meadow communities (Prairie Wet Meadow/Carr and Southern Seepage Meadow/Carr), marsh (Prairie Bulrush-Arrowhead Marsh), upland, or drainage swale.

#### 2016 Late Season Desktop Screening Analysis and Field Surveys

The late season surveys were conducted August 15 - 16, 2016 using the same protocols described for the early season survey. However, Survey Corridor 1 was revised based on the early season survey results and other Project constraints to avoid impacts to known sensitive resources, resulting in a Survey Corridor 2 that was used during the late season survey (see Figures 3 and 5).

Application of the desktop screening procedures identified 10 additional areas to be surveyed within Survey Corridor 2 for the late season survey. Sites discounted as potential fens during the early season survey were not included in the late season survey. Two potential calcareous fens were subjected to both early and late season plant surveys. In total, 33 areas were assessed during the two surveys for diagnostic calciphile plants (Figure 5)⁷.

The 2016 late season survey identified two potential calcareous fens within Survey Corridor 2, in addition to fen BR01, which was resurveyed. Features identified as potential fens in the early and late season surveys are summarized in Table 1 below. Feature BR14 was also revisited during the August field review. This site would fall into the classification of a seepage wet meadow community, but meets the vegetative criterion of a calcareous fen strictly related to the point value of the feature. However, it is located outside of Survey Corridor 2. All other remaining survey areas were classified as either wet meadow communities (Prairie Wet Meadow/Carr and Southern Seepage Meadow/Carr), marsh (Prairie Bulrush-Arrowhead Marsh), upland, or drainage swale that lacked calciphiles or did not have sufficient calciphiles to be considered calcareous fen by plant criteria. In summary, the 2016 early and late season surveys identified three fen features within Survey Corridor 2—BR01, BR25, and BR32 (Figure 5).

⁷ Several potential fen areas are outside of the Project Survey Corridor 2 as a result of interim adjustments to Survey Corridor, which was based on previous Project configurations designed by Flying Cow Wind to avoid impacts to potentially environmentally sensitive resources, including potential fen areas.

#### 2017 Late Season Desktop Screening Analysis and Field Surveys

From late 2016 to early August 2017, Flying Cow Wind refined the Project site layout to meet a number of objectives, including avoiding calcareous fens and other environmentally sensitive resources (see Figures 3 and 4). Merjent conducted desktop screening for the 2017 late season assessment on Survey Corridor 3, the current Project site layout, after receiving MN DNR approval of proposed protocols on August 22, 2017.

Merjent's desktop review included all area within Survey Corridor 3. A brief summary of the 2017 desktop review follows:

- 50 wetland areas were examined within the 500-foot buffer areas of the current 2017 Project site layout construction corridors (Survey Corridor 3), including areas that overlapped with the 2016 Project site layout buffered areas (Survey Corridors 1 and 2);
- No areas assessed during 2016 were included in the 2017 target locations, with the exception of "Site 13 FenCheck++ 0817" which, though portions of which are outside of the 2016 footprint, was checked by MNR during the 2016 field survey (referred to as BR32 in 2016 report). Because this was reviewed in 2016, no further review of Site 13 was recommended;
- Merjent looked at all vegetated areas with wetland signatures except for obvious farmed wetlands. All remaining wetland areas were examined for offsite fen indicator features that are discussed in the Methods section above. To ensure all potential fen areas were considered, if an area had any indicators of potential calcareous fen regardless of how subtle the expression, it was included as an area requiring field assessment;
- A total of 10 areas were identified as new areas within the 2017 Survey Corridor 3 requiring a field survey; however, only two sites (15 FenCheck 0817 and 50 FenCheck 0817) were anticipated to have significant potential for calcareous fen. These ten areas include Sites 7, 10, 12, 15 (three locations), 17, 18, 22, and 50, were provided to the MN DNR along with a summary of the desktop review on August 17, 2017 (see Agency Correspondence in the Attachments);
- Of these 10 areas, six of the sites were either surveyed in 2016, were located in South Dakota (none of the Project turbines will be located in South Dakota), were located on federal lands (no Project facilities will be located on federal lands), were located on non-participating land (no Project facilities will be located on non-participating land), or were where Project collection lines were rerouted to avoid potential fen locations. For this reason, the only remaining four sites were surveyed by MNR (BR34, BR35, BR36, and BR37) in August 2017; and
- The remainder wetland areas do not have any offsite evidence of calcareous fen (e.g. sloping peatland, peat domes or topographic anomalies, spring head spring run discharge, etc.).

Based upon this information, Merjent recommended that four identified locations be field reviewed for calcareous fens (see Figure 4). Field survey protocols for this effort were similar to those used in 2016. On August 28, 2017, Scott Milburn of MNR conducted the field review of the four sites.

The first site, BR34, is a small watercourse through a grazed pasture with no signs of seepage and no calciphiles were observed. The second site, BR35, is a large degraded marsh complex with a wet meadow fringe. This site is surrounded by row crop agriculture and subject to agricultural runoff. This particular area lacked obvious signs of discharge and no calciphiles were observed. The third site, BR36, is a small depressional drainage way that is primarily dominated by non-native graminoid species. This particular feature lacked both discharge hydrology and calciphiles. The final of the four sites, BR 37, is a degraded wet meadow associated with a waterway that is also dominated by non-native graminoids. As with the other sites, this feature lacked discharge and the presence of calciphiles.

A summary of the survey date (s), calcareous fen point summary, site locations, and general characterization of the previously documented calcareous fen features and the four additional sites are provided in Table 1.

Additionally, the overall Project summary table (Appendix A) has been updated along with the calcareous fen scoring points summary table (Appendix B), and site photos (Appendix C). Relevés were not collected during the 2017 survey efforts since none of the four sites were deemed intact native plant communities.

Table 1           Potential Calcareous Fens Identified in 2016-2017 Field Surveys						
Site	Survey Date	Calcareous Fen Point Summary	Within Survey Corridor 1 (June/July 2016)	Location Within Survey Corridor 2 (August 2016)	Within Survey Corridor 3 (August 2017)	Comments
BR01	6/29/2016 and 8/15/2016	80	Yes	Yes	No	Calcareous Fen—Prairie Extremely Rich Fen
BR14	6/30/2016 and 8/15/2016	50	Yes	No	No	Wet Meadow or Calcareous Fen
BR22	7/1/2016	190	No	No	No	Calcareous Fen—Prairie Extremely Rich Fen
BR23	7/1/2016	55	No	No	No	Calcareous Fen—Prairie Extremely Rich Fen
BR25	8/16/2016	75	No	Yes	Yes	Calcareous Fen—Prairie Extremely Rich Fen
BR32	8/16/2016	110	No	Yes	Yes	Calcareous Fen—Prairie Extremely Rich Fen
BR34	8/28/2017	0	No	No	Yes	Drainage Swale
BR35	8/28/2017	0	No	No	Yes	Degraded Marsh
BR36	8/28/2017	0	No	No	Yes	Drainage Swale/Degraded Wetland
BR37	8/28/2017	0	No	No	Yes	Degraded Wet Meadow

All five documented calcareous fen features (2016 survey efforts) are outside of the of the current construction corridor. However, as discussed above, the MN DNR calcareous fen Fortier 5 at site BR32 and fen BR25 are both within the 500-foot buffer area, approximately 120 feet and 218 feet, respectively, away from the proposed construction corridor (Figure 5). MN DNR reviewed the proposed access road relative to fen Fortier 5/BR32 and the proposed collection line relative to fen BR25 and determined that the planned access road and collection line should not impact these fens and avoidance of potential impacts to the fen has been achieved (see Agency Correspondence in the Attachments).

Calcareous fen surveys as described in this Report will be conducted on any new areas subsequently identified as potentially part of future updated Project footprints, as they are developed. The information provided in this Report has been used to refine the Project footprint.

Flying Cow Wind anticipates that all impacts to identified calcareous fens can be avoided, and will request MN DNR concurrence for any previously unsurveyed areas if there are future changes to the Project layout.

Please feel free to contact either of us if you have any questions regarding the findings of the calcareous fen studies for the Project. Scott can be reached at 612.310.6260 or <u>scott.milburn@mnrinc.us</u>, and Jim can be reached at 612.924.3987 or <u>jarndt@merjent.com</u>.

Respectfully submitted,

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Attachments Agency Correspondence Figure 1 Project Location and Survey Corridor Overview Figure 2 Closeup of Calcareous Fens Within Survey Corridors Figure 3 Project Survey Corridors and MN DNR Calcareous Fen Locations Figure 4 Calcareous Fen Evaluation Locations August 2017 Figure 5 Potential Calcareous Fen Areas Within or Near Survey Corridor 3 Appendix A Summary Table Appendix B Summary of Scoring Results Appendix C Site Photos Appendix D Relevé Forms

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