

MN Wetland Professional Certification Program Wetland Delineation Methods

#### BOARD OF WATER



1

		Agenda
Day 1 (9-5)	Day 2 (9-5)	Day 3 (9-5)
Introductions	Quiz	Wetland Vegetation
3 parameters of a Wetland	Web Resources for Wetland Professionals	Vegetation Sampling Plot Field Exercise
Wetland Delineation Methods	Antecedent Precipitation Exercise	Submitting Wetland Delineation Reports
Critical Definitions of Wetlands	Offsite Hydrology Methods	Wetland Delineation Field
Wetland Classification systems	Soil Concepts	Exercise & Class summary
Wetland Functions	Hydric Soil Indicators	
Wetland Hydrology Indicators	Web Soil Survey Exercise	
Top of Data Sheet & Hydrology Indicators Field Exercise	Soil Texture Lab & Field Exercise along Landform	

#### 2



Hydrophytic Vegetation Indicators and Determination

#### BOARD OF WATER AND SOIL RESOURCES

MWPCP | bwsr.state.mn

#### Outline

- Hydrophytic Vegetation 
   Hydrophytic Vegetation 
   Determining Hydrophytic Definition Indicators
  - Define Hydrophyte
  - · What makes a plant a
  - hydrophyte · Why it matters
- Indicator status Field indicators
- Dominance
- Plant Community Rapids Test • 50/20 Rule
- Prevalence Index
- Morphological Adaptations

4

#### Hydrophytic Vegetation Definition

Wetland definition includes the language: "...and that under normal circumstances do support, <u>a prevalence of vegetation typically adapted for life in saturated soil</u> conditions."

1987 Manual says in a wetland, "The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions."

Hydrophytic Vegetation: Hydrophytic vegetation is defined herein as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present.

#### Hydrophytic Vegetation Definition

What Is a Hydrophyte

Hydro	=	Water
Phyte	=	Plant

OR

Any plant that is adapted to grow in water or in wet habitats



#### Hydrophytic Vegetation Definition

What makes a plant a hydrophyte?.....ADAPTATIONS!

• Morphological adaptations ---  $\rightarrow$  visible changes/growth habits

- Physiological adaptations ----  $\rightarrow$  internal chemical process changes

Morphologic	al Adaptations
List of Examples	
Buttressed tree trunks	
Multiple trunks	
Pneumatophores	
Adventitious roots	
Shallow roots	
<ul> <li>Hypertrophied lenticels</li> </ul>	
• Aerenchyma	
<ul> <li>Polymorphic leaves</li> </ul>	
<ul> <li>Floating leaves</li> </ul>	



#### Morphological Adaptations



Buttressed bases







Aerenchyma Tissue for Oxygen Transpo

#### **Reproductive Adaptations**



Overcup oak seedlings tolerate shallow inundation

13

#### Why Hydrophytes Matter

- They have <u>adapted to life in saturated/ponded</u>/anaerobic conditions
- A prevalence of hydrophytes in a plant community indicates the area likely experiences a period of ponded or saturated soils such that they <u>out compete</u> <u>the non-hydrophytes</u>
- The vegetation component in wetland delineation requires each species be classified as a hydrophyte or non-hydrophyte, and then apply to the community as a whole

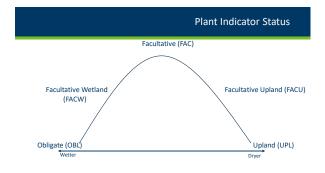


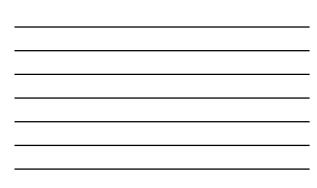
	What about bryophytes?
<ul> <li>Bryophytes are not vascular plants.</li> <li>Sphagnum is listed as bog plant community but does not have an indicator status</li> </ul>	

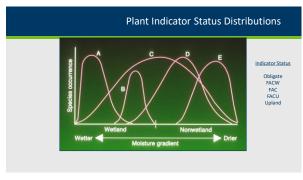


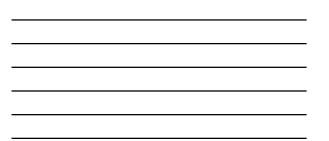
Plant Indicator Status

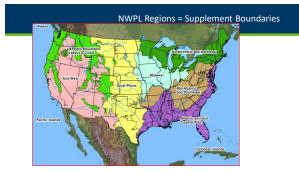
Wetland Indicator Status	Indicator Symbol	Definition
Obligate Wetland	OBL	Plants that almost always grow in wetlands. Estimated probability of >99% for growing in wetland.
Facultative Wetland	FACW	Plants that usually occur in wetlands. Estimated probability of 67% - 99% for growing in wetland (1%- 33% in upland)
Facultative	FAC	Plants with similar likelihood of occurring in both wetland and upland. Estimated 33%-67% for growing in wetland.
Facultative Upland	FACU	Plants that sometimes grow in wetland. Estimated 1% - <33% for growing in wetland.(>67% - 99% in upland).
Obligate Upland	UPL	Plants that rarely occur in wetland. Estimated probability of <1% for growing in wetland (>99% in upland).

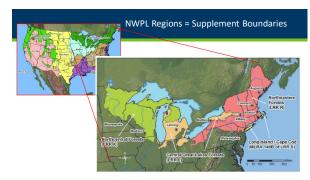


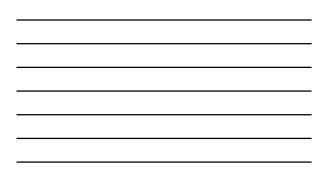


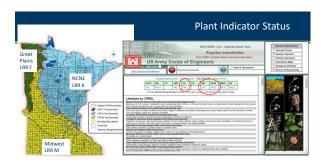










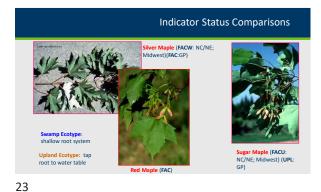


\_

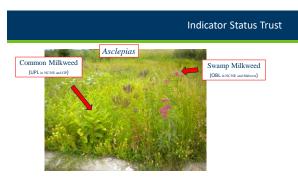
-

\_

\_















FACW Species Examples

Red-osier Dog

Showy Lady's-slipper

Contraction of the second



Giant Goldenrod









Smooth Brome





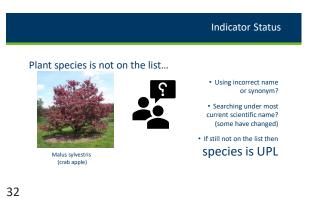
Butter and Egg

#### Reed Canary Grass - FACW



#### Is RCG a true hydrophyte because it occasionally occurs in uplands? RCG fits well within the concept of a FACW species as it usually occurs in wetlands, but may occur in non-wetlands

The fact that RCG occasionally occurs in uplands is why it wasn't assigned an OBL indicator status



#### From Individual to the Community

Vegetation Component Focus is on plant communities and not individual plants





#### From Individual to the Community



Delineation relies heavily on FIELD based INDICATORS applied to the whole veg community

Field Indicators for Hydrophytic Vegetation relies on the dominance or prevalence of hydrophytes in the community

\*\* Data collection/sampling is required to demonstrate/prove the veg community is dominated by hydrophytes for an indicator to be met.

54

34

#### Vegetation Strata (layers of vegetation)



35

#### Bryophyte?

- Show pic of club moss
- Doesn't need soil
- Relationship to hydrology
- What about sphagnum moss?Used in classification
- Shouldn't show up at data sheets
- N/I

#### Vegetation Strata

Trees: woody plants 3 inches or more DBH regardless of height

Shrubs/Saplings: woody plants less than 3 inches DBH and taller than 1 meter (3.28 feet) in height

Herbaceous: all non-woody plants regardless of size AND woody plants less than 1 meter (3.28 feet) in height

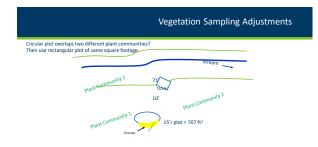


37





5 ft Herbaceous; 15 ft Shrub/Sapling; 30 ft Tree/Woody Vine





#### Determining Dominance- Sampling

Within plots relative abundance of a species is used as the metric for determining dominance



41

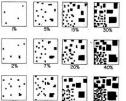
#### Determining Dominance- Sampling

#### ESTIMATES OF PERCENT COVER



Estimate can vary from person to person
 Almost <u>NEVER</u> adds up to 100%...sometimes

Is recommended method for determining

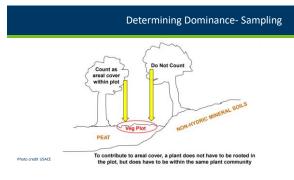


Used by 50/20 RuleUsed by Prevalence Index

more; sometimes less

cover

 Is different that Absolute Cover = Actual or Total cover



#### Determination of Hydrophytic Vegetation

Sequence of Field Indicators

- 1. Rapid Test
- 2. Dominance Test ("50/20 Rule")

3. Prevalence Index

4. Morphological Adaptations



44

#### Determining Hydrophytic Vegetation

The procedure for using hydrophytic vegetation indicators is as follows:

- 1. Apply Indicator 1 (<u>Rapid Test for Hydrophytic Vegetation</u>).
- 2. Apply Indicator 2 (Dominance Test).

 a) If the plant community fails the dominance test, but indicators of hydric soil and wetland hydrology are both present, proceed to step 3.

- 3. Apply Indicator 3 (Prevalence Index).
- 4. Apply Indicator 4 (Morphological Adaptations).
  - a) If none of the indicators is satisfied, then hydrophytic vegetation is absent unless indicators of hydric soil and wetland hydrology are present and the site meets the requirements for a problematic wetland situation

#### Hydrophytic Plants – Rapid Test



All dominant species across all strata are rated OBL or FACW, or a combination of these two categories, based on a visual assessment

46

1. Rapid Test for Hydrophytic Vegetation



All dominant species are rated OBL or FACW, or a combination of the two, based on a visual assessment Example: 95% areal cover by reed canary grass (FACW)

47

#### Hydrophytic Plants – Dominance Test

#### • Dominance Test AKA 50/20 Rule

- Used to determine which species are dominant in each strata (layer of veg)
- Once dominate species are identified their percent cover does not matter; <u>all treated</u>
   <u>equally</u>
- Example: Tree Strata may have low number of species compared to Shrub Strata, but may still have a dominant component.
- IF greater than 50% of the dominant species across all strata are OBL, FACW, or FAC, THEN hydrophytic plant community exists
  - Example: 5 dominant species are identified. 3 dominant species are FACW and 2 dominants are FACU. MEETS CRITERIA FOR HYDROPHYTIC PLANT COMMUNITY; 3/5=.6 or 60% FACW dominants

#### Hydrophytic Vegetation – Dominance Test

#### 50/20 Rule How To:

- 1. Estimate absolute percent cover of each species in first stratum
- 2. Rank species from most to least abundant
- 3. Calculate the total percent cover of all species (usually not 100 percent) in that stratum
- 4. Calculate 50% of total cover
- 5. Calculate 20% of total cover
- 6. Begin at top of list and add percent covers together until 50% threshold is met
- 7. Continuing after last species in 50%, next identify species that ALONE meet or exceed 20% threshold
- 8. Repeat for each stratum

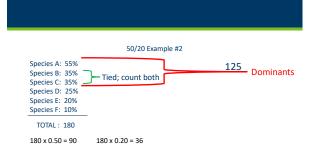
#### 49

#### Hydrophytic Vegetation – Dominance Test

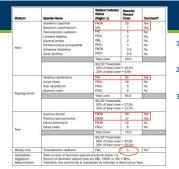
#### 50/20 Rule Example

Species Species a Species b	% Cover 45 30	120 x <u>50%</u> (0.50) = 60 120 x <u>20%</u> (.20) = 24
Species c	25	
Species d Species e	10 5	Species a + Species b = 75 <u>Together</u> exceed 50%
Species f	5	Species c = 25 <u>individually</u> meet/exceed 20%
Total Cover	120	Species a, b, and c are dominant

Note: if species percent cover is a tie, include both







#### Dominance Test

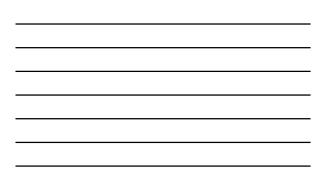
1. Tally number of dominants across all strata – 5

- 2. Tally number of dominants that are FAC, FACW, or OBL 4
- Calculate if FAC, FACW, OBL dominants comprise more than 50% of plant communities – 4/5 = 80%

			Class exercis	e
How many dominant species are there in the sample point data?	Species	Strata	% Coverage	1
1, 2, 3, or 4?	Species A	Herbaceous	30	1
	Species B	Herbaceous	30	1
	Species C	Herbaceous	20	1
	Species D	Herbaceous	20	1
	Species E	Herbaceous	15	1
	Species F	Shrub/sapling	5	l
	Species G	Tree	3	1

53

			Class exercise	
How many dominant species are there in the sample point data?	Species	Strata	% Coverage	
3	Species A	Herbaceous	30	
	Species B	Herbaceous	<mark>30</mark>	
	Species C	Herbaceous	20	
	Species D	Herbaceous	20	
	Species E	Herbaceous	15	
	Species F	Shrub/sapling	5	
	Species G	Tree	3	



#### Hydrophytic Vegetation – Prevalence Index

#### Prevalence Index

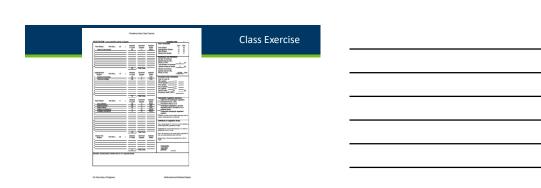
- A numerical calculation used to determine whether a hydrophytic plant community is present
- Uses a weighted average and uses all plant species in the plot, not just dominant
- Values range from 1 to 5
- Values less <u>than or equal to 3</u> indicate hydrophytic plant community

Prevalence Index works	heet:	
Total % Cover of:	Multiply by:	_
OBL species	x 1 =	_
FACW species	x 2 =	_
FAC species	x 3 =	_
FACU species	x 4 =	_
UPL species	x 5 =	_
Column Totals:	(A)	(8)

55

#### Hydrophytic Vegetation – Prevalence Index

Species	% Cover	Indicator	Prevalence Index	workshe	et:		
Tree Strata			Total % Cover	d.	Mul	tiply by:	
Species a	45	FACW					-
Species b	30	OBL	OBL species	85	_ x1=_	85	_
Species c	25	FAC	FACW species	115	x 2 =	230	
Species d	10	FAC	PACAA sheries -		_ *2		-
Species e	5	FACU	FAC species	60	x 3 =	180	
Species f	5	UPL	EAGU analian	25		100	-
			FACU species		_ x 4 = _		-
Herbaceous Strat	a		UPL species	15	x 5 =	75	-
Species A	55	OBL	Column Totals:	300	(A)	670	(B)
Species B	35	FACW			6.9		(0)
Species C	35	FACW				2.23	
Species D	25	FAC	Prevalence I	ndex = B	/A =	2.25	_
Species E	20	FACU					
Species F	10	UPL					



7.62 species	ass Exercis
Accord	
Nat (lipidat	
UR queres         20         12         102           Column halfs         100	
Problematic hydrophytic vegetation* (suplain)	ta in Remarks: or on a separate
Pavalence Index = BiA =	

#### Hydrophytic Vegetation – Morphological Adaptations

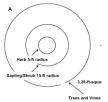
#### Morphological Adaptations

- Use when more than 50% of FACU plants exhibit morphological adaptations to saturated soil conditions AND criteria for hydric soils and hydrology is present
  - For each <u>FACU</u> species exhibiting adaptations, record percentage of individuals with morphological adaptations on data sheet so long as the adaptations are not also common in the same species within nearby uplands areas.
  - 2. If more than 50% have adaptations then re-assign indicator status for that species from FACU to FAC
  - 3. <u>Recalculate</u> dominance test and/or prevalence index

59

#### Vegetation Sampling





	Dominant Indicator	Dorsinance Test works/seet:
ee Stratum (Piot size:)	Species? Status	Number of Dominant Species That Are-OBL_EACW or EAC
		Ind Ale OBL, FACW, of FAC (excluding FAC+) (4)
		Total Number of Dominant Scedes Across Al Stata (B)
	= Total Cover	
oling/Shub Shream (Piol size:)		Parcent of Dominant Species That Are OBL , FACW, or FAC: (AN)
		Prevalence Index worksheet
		Total 16 Cover of: Multiply by
		OBL species x1 =
		FACW species x 2 =
	= Total Cover	FAC species x3 =
erb Stratum (Piot size)	 - 100 Cover	FACU species x.4 =
	 	UPL species x 5 =
		Column Totals (A) (B)
	 	Prevalence Index = B/A =
		Hydrophytic Wopelation indicators:
		Dominance Test is >50%
L	 	Prevalence Index is x3.0
		Mostological Adoptations' (Provide supporting data in Romarks or on a separate sheet)
		Problematic Histophylic Vecetation (Exclain)
		(cdraw)
inode Vine Bitstam (Pot size)	= Total Cover	<sup>1</sup> Indicators of hydric sail and wetland hydraiogy must be present, unless disturbed or problematic.
		Hydrophylic
	 = Tetal Courr	Vegetation
i Bare Ground in Herb Stratam	 - men code	Present? Yes No
enaks:		



BOARD OF WATER AND SOIL RESOURCES



#### Wetland Delineation Reports

- Field Notes
- Basic Report Components
- Report Contents
- Field Review
- Non-Routine Wetland Delineations

64

Delineation Method	Review of offsite mapping resources	Site Visit	Sampling App	roach	Complete Field Data Forms	Field Staking of Wetland Boundaries
Routine Level 1	Yes	Sometimes	Offsite	5	No	No
Routine Level 2	Yes	Yes	Onsite, qual	itative	Yes	Yes
Comprehensive	Yes	Yes	Onsite, quan	titative	Yes	Yes

Banking application: pre-application scoping	Routine Level 1
Banking application: full application	Routine Level 2
Road Program Wetland Impact Documentation-Road project	Routine Level 1
through a large continuous wetland	
Road Program Wetland Impact Documentation-Scattered	Routine Level 2
wetlands within construction corridor	
Replacement plan	Routine Level 2
Enforcement actions	Routine Level 2 or Comprehensive
Wetland boundary approval (no project application)	Routine Level 2
Agricultural exemption determination (8420.0420, Subpart 2A)	Routine Level 1



	What to Record
Plant communities	Vegetation
<ul> <li>Describe and sketch on aerial photograph</li> </ul>	<ul><li>Dominant veg</li><li>changes from wetland to upland</li></ul>
Landscape settings     Topographic changes from wetland to upland     Gradual, abrupt?	Soil     Changes from wetland to upland     Textures, Colors
- unauua,aurupu:	Hydrology indicators     Changes from wetland to upland



68

#### Notes on Field Notes (cont.)

- Note taking skills improve with experience as you figure out what is important and what is not
- Take time to organize, refine, and augment field notes immediately following your field visit.
- Label and organize photos so you know where you took them and what they are intended to show.

Project/Gite: 3500 131a1 Avenue NE	City/County: BiainerAnoka Sa	mpling Date: 9-1-2017
opicant/Owner: Oakwood Ready	COM: MN	Gamping Point SP2-web
weatgator(s): M. Barrell, A. Cameron	Dector, Township, Rul	nge: Dec 2, T51, F23
andform (hilatope, lensoe, etc.) depression, slopin		ex, none: conceve to fuel
tope (%): 0-1 Lat:U	S Dature	NAME PENIAL
re constonydrologic conditions of the sile borow for	the line of the year? Y (Frid, expla	an in senates)
		THOMAS
re vegelation . sol . or hydrology	raturally problematic? All	"Hormal Annalances" present? Ye
re vegelation . sol . or hydrology	raturally problematic? And	
re vegelation . sol . or hydrology	upstearty excited? An raturally problemate? (in	
re vegetation, sol, or hydrology f needed, explain any analesis (n minarka)	raturally problematic? An	
ve vegetation, kol, or hydrology If needed, explain any analyees in nerhaltic)	ugenearity exclusion An raturally problematic? sim	
ve vegetation, kol, or hydrody I needed, explain any analysis in remains; BUMMARY OF FINDINGS	railurally problematic* cen	unatarios" (resert? _ Ye
Ve vegetation col or hydroxy if needed, explain any ansaes in minarks; BUMMARY OF FINDINGS +hitrochikis vegetation (resent?	in the sampled area within a walland	unatarios" (resert? _ Ye
re septistion, col, or hydrosys freeded, explain any answer three takes UMMMARY OF FINDINGS hydroshydro vegetator present?	raincairy picturenaits? on	2 <u>Y</u>
re vegetation, col, or hydrosop f needed, explain any ansaeva th nemarks; UUMMARY OF FINDINGS hydroghydo vegetation present?	railurally problematic* cen	unatarios" (resert? _ Ye
e vegetation kol in hydrology (f needed, explain any anteeven in nertarka) LUMMARY OF FINDINGS hydrologik vegetation present?' Anterior of wetterd hydrology present?' distants of wetterd hydrology present?'	naionaly picturenaio? one	2 <u>Y</u>
n vegetation koi in hydrology needed, explain any antaleve in nertarba) UMMARY OF FINDINGS groupsyk vegetation precent? groupsyk vegetation precent? groupsyk vegetation present?  dication of wetand hydrology present?	naionaly picturenaio? one	2 <u>Y</u>
ve vegelation, kol, w hydrosogo f needad, explain any ansaves in metaleus BUMMARY OF FINDINGS hydrosynko vegelation present?	relately possenatic? on	2 <u>Y</u>

#### Marking Wetland Boundaries

• Mark with:

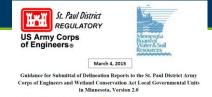
- · Flags, lath, whatever works.
- Will vary depending on situation.
- Locate via GPS or land survey methods (find out local requirements).
- Wetland boundaries must be usable for the regulatory purposes intended (grading plans, plat maps, etc.).





Guidance

#### 70



Introduction – Purpose and Background of 2015 Guidance

Introduction – Peripose and experiment of an experiment of the problem of the pro

71

	Typical Report Format
Introduction	Avenue NE Biano, Atoda Coany, Miwezata Werland Delineation Report
introduction	TABLE OF CONTENTS
Methods	TABLE OF CONTENTS Tole Page 1. WETLAND DELINEATION SUMMARY
Results	RESULTS     J     AL Review of NWL Soult, Public Water, and NHD Information     J     AL Weiked Determination and Delineations     4     S Other Area     S
Discussion (optional)	4.4 Request for Weland Boundary and Justichtmani Determination 6 5. CERTIFICATION OF DELINEATION 7 FIGURES
• Figures	Sine Location     Subing Conditions     Nutriant Wetlands Investory     A. Soil Survey
• Field Data Forms	5. DNR Public Waters Inventory 6. National Hydrography Datacet

• Field Data Forms

### Who did you do this for?

- Developer, public entity
- Where is the project
  - General location and size of project area
  - General description of plant communities: Wooded, meadow, urban etc...
- Why are you doing it?
  - · Identify wetlands on potential development site
  - Identify wetlands in road corridor
- When did you do it?

73

#### Methods

- Level 1 or 2?
- Off site aerial review?
- Monitoring data?
- Reference wetlands?
- Problem area or atypical procedures?

74

#### **RESULTS and Discussion**

#### **Describe wetlands AND uplands**

- •<u>Wetland Type</u> Circular 39, Cowardin, Eggers & Reed
- •<u>Dominant Vegetation</u> for each community/type

#### Text Examples

#### Wetland Type &Vegetation:

"Wetland 1 is a Type 3 (PEMC/F) with an interior shallow marsh community surrounded by a fringe of wet meadow.

Dominant vegetation in the shallow marsh includes broadleaf cattail, and water plantain.

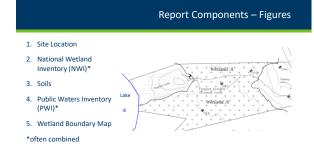
The wet meadow fringe include reed canary grass, with a few scattered willow shrubs."

#### Text Examples

#### Soils:

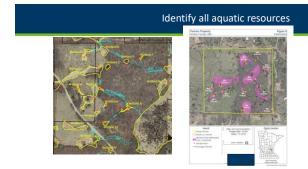
"Soils in the wetland consisted of a deep layer of organic sapric material overlying fine sand consistent with the mapped soil unit. Indicator A1 (histosol) was observed in the wetland.

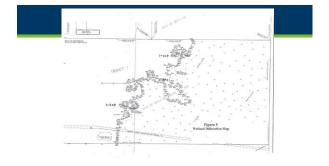
Adjacent upland soils lacked the organic surface layer and consisted of high chroma loamy fine sand over sand. No hydric soil indicators were observed in the upland."





















Completely filled out

- Correspond to sample locations indicated on a map
- Remember that sample locations should be representative
- Not needed if doing a Routine Level 1
- Do a complete job, but keep in mind that these are field assessments, not a scientific study, spend a reasonable amount of time.

	CICRBAN'S		- Midward Region
WHAT I AND		interests (180	
browning theop			Hat Mill Arctivity
surgery trends interest		en here b	
who they have a Till Parchet			Contract Lot of Contract
age the second second			MI AND DECK
Addition for these (200)			Contraction of the second seco
			Nerval Gradmann anner ( No. X ) an
An Hyperian Bul is hydrolege An Hyperian Bul is hydrolege			the state of the second
			locations, burnach, important factores, or
reparation (agenter frequent) (agenter)		a fu benefit	
VEOLITATION - Use accertific non-sea of at			
building for an in	thick .	Survey Spine	Romana hat assisted
		1 2563	The first of the second factors of the second secon
			Service or other 1
4			
*		Inches	Patrick March 1994 and 1995
Appartmentment property 18		2 (M)	Turnetore Index authorized
Concert Concert		1 10	here Gental
Populational skin			100 gene
			THU (\$100 - 171
Distant Parat		10 1000	Case Take
r Bárs nelssen			
	- (A)		
			an independent of the state of the second second
1			3. 4 demonstratives with a state
			_ freedown by the property in particular
			International and an other lands and
Bublishes Prov	Mil-	has been	Testington of Land, and and making high dags that it is a straight of the second secon
			Setteriote
			And ALL

86

#### **Field Review**

87

Who should conduct site review?

- At least 1 member of TEP
- LGU may request assistance from TEP (SWCD and BWSR) or other tech. prof.
- Corps invited/coordination
- Delineator invited (but does not need to be present)



#### Non-Routine Wetland Delineations

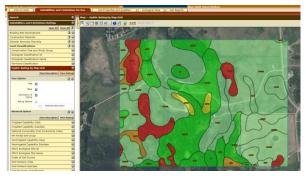
- Informal Delineations
- Landowner wanted to fill an area mapped as non-hydric soil
- Site visit to estimate and stake wetland boundary



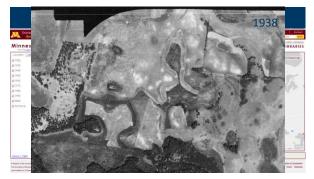
















What is a Wetland?

Definition: Those areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions.





Hydrology + Vegetation + Soil = Wetland

#### 95

94

#### 3-Parameter/ Indicator Approach

- 1. Soils Historic conditions, may not reflect current condition.
- 2. Hydrology –Current condition, but heavily influenced by recent climate conditions
- 3. Vegetation Somewhere between

The 87 Manual requires 3 parameters because no one source typically gives the answer in all situations



#### Land Resource Regions

- Regions dictate which indicators are used and how they are used
- a) The indicator descriptions in this guide are abbreviated versions of the full descriptions found the Regional Supplements to the Corps of Engineers Wetland Delineaton Amaunal (Great Plains, North-Central/North-East, Midwest), Users are encouraged to reference the full descriptions and user notes found in those documents.
   b) An indicator is applicable statewide unless otherwise indicated below the indicator description.



97



98

#### Wetland Delineation Types

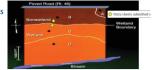


- Level 1 Onsite Inspection Unnecessary
- Level 2 Onsite Inspection Necessary
- Level 3 Combination of Levels 1 and 2



#### Sampling Location Should Be Representative

- Representative of <u>soil</u> changes (from upland to wetland)
- Representative of <u>vegetation</u> changes
- Representative of <u>hydrology</u> indicator changes
- Representative of landscape changes



100

#### **Critical Definitions**

- •Wetlands
- •Growing Season
- •Atypical Situations
- Problem Areas
- •Normal Circumstances



#### Research Data Sources

- Aerial Photos (current and historic)
- Soil map (Web Soil Survey)
- Topographic\LiDAR
- NWI Map (updated version in MN)
- DNR Protected Waters Map



#### 103

WETLAND OF TRANSPORTATION DATA FO	EN - Mitant Basia		
hostine (Monty	Interior Inte	$\sim$	
NUMBER	Tate Desits Fact	- m.	tente
manipolity		TURN NAVATIVE PROFESSION AND ADDRESS TO ADDRESS ADDRES	or confine the phonons of a distance.)
	10 Sector 11 Sector 1	their base is forecast to have	inf later for
Star Ter Ling	The second secon		
Are clearly "sub-legit conditions on the site basics" for the level of perif. The 1	ta		
An implaite	to None Droneton' years? No No		
	Presidet, angleitrary answer in Tamarta)		
EUMERATOR PROVIDE - Adult also may showing sampling per	et beatlone, transmis, important batures, etc.		
Television (Section Present) (Section Pr	and here	Tax. Origination. Delivation 7th Researching, Michigan David N	ana Lauder Portugung
Weight Schlage Present" Tex	test to to		
		Reter (F) Reter (R) mite Spanier (C) Senier (Reter (R)	- Casel Posts Tota (K.) Oats Ballan (K.)
( )			
VEDETWINDN - UN scientific names d'alerta.		Remote Safe (M) Lang Mark Mark (M)	Very lines and fact the present factor
Income Party of Street International Automatical Street International Automatical Street International Internation	or Instrume Tax autoine		
Later form hims land. As	A Serie d'Arrent Lenie III		hand the second se
	Landaurier & Summer	- Serie Multi Marce (P) Entry Representa (PR)	whethy thing must
	5004 004 0008		
	Technic Distance in Technic Internet	Tank Inclusion	ryon bet Preset? The
Antonia de la compañía de la compa	Resident halfs and find	Sector Sector	
	THE ROOM of March 10		
	IN galaxy 11 *	$\sim$	
	1411 gades +4.1	BADBOTOEA	
Sectors Price1	27. gania vi · H	Websellighting stress	house cannot be
	- Developed Males 2001 F	Scher Jahr J1. Relationed Leaves Mit	for the line of th
		- Registration (A) - Association (A) - Associati	
	<ul> <li>In Real Test Increasinghus register</li> <li>Diministration Testin-40%</li> </ul>		
		<ul> <li>Internet Papale 20</li> <li>Bit Depairs (0)</li> <li>Papare of Relation (0)</li> </ul>	
	- * Reputation relations' Produces the		
*		- Tarihar Solari - Tarihar Solari - Tarihar Solari - Tarihar Solari - Tarihar Solari	_ Feb Austra Tura (19)
*			
manual rear	Tratication of human set and welland bolishings must be present unlikes constraint or problematic	Test Recollect Later Rec Press" Inc. Inc. Instrument	
1	NAME OF TAXABLE PARTY O		
*	Parate in h	Education Pressent Vice Tel Eapth devices	Waterd Pyrtring Present Tex.
Tensile (bilded on collective of our specie ded)		Dearth factories (and under page, realising and area plotte process in	postore. I publicly
		hours.	
10 here lass of Badreen	Rosed Parks - Mexan 2.2		

#### 104

# Soil • Basics of Soil • Hydric soil indicators • Soil formation • All • Landscape positior • Fine • Soil Properties • Sandy • Texture • Common soil indicators • Color • Hydric soil develop • Web Soil Survey • Web Soil Survey

Interpreting soil reports



\_\_\_\_

106



107

#### Web Soil Survey

	-/	Map Linit Byr	Vibel
		CXXB	Dashs
100		C1638	Baane
The Designation of the local division of the		C1648	Graine per
	14.74	CIMA	Notay
		- I W	Water
		Totals for Area of In	derest
Manufactures	Peri lar laren Referen fragmenter ber brenn	Page 1 and	

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI	
0608	Bushelie loamy sand, Raity till phase, 0 to 3 percent slopes	51.8	25.2%	
C1638	Branent sandy loam, 1 to 4 percent slopes	13.0	10.3%	
C1648	Brainent-Flak complex, 4 to 8 percent slopes	13.3	10.6%	
C166A	Nokas-Pretish congres, 0 to 2 percent slopes	98.3	44.05	
n	Water	11.5	9.0%	
Totals for Area of Interest		125.7	189.85	

#### Hydrology

... "inundated or saturated by surface or ground water at a frequency and duration"

 Technical standard of 14 or more consecutive days of flooding or ponding;

• Water table 12 in. or less below soil surface;





109

#### Hydrology Indicators

Evidence that there is continuing hydrology and confirms that an episode of inundation/saturation occurred recently.

Wetland hydrology indicators are divided into two categories: <u>Primary</u> – provide <u>stand-alone</u> evidence of a

current or recent hydrologic event; and Secondary - provide evidence of recent hydrology when supported by one or more <u>other</u> hydrology indicators.



110

#### Hydrology Indicator Groups



<u>Group A</u> – direct

observation of water







saturation.



#### Antecedent Precipitation

To better interpret the data collected or observation made in the proper context.



112

#### Overview of Wetland Vegetation

- Hydrophytic Vegetation 
   Hydrophytic Vegetation 
   Determining Hydrophytic Definition
  - Define Hydrophyte
  - What makes a plant a
  - hydrophyte Determine why matters
- Indicator status Dominance

Indicators

Field indicators

- Prevalence Index
  - Morphological Adaptations

Plant Community

Rapid Test

• 50/20 Rule

113

113



5 ft Herbaceous; 15 ft Shrub/Sapling; 30 ft Tree

#### Determining Hydrophytic Vegetation

The procedure for using hydrophytic vegetation indicators is as follows:

- 1. Apply Indicator 1 (Rapid Test for Hydrophytic Vegetation).
- 2. Apply Indicator 2 (Dominance Test).
- Apply Indicator 3 (Prevalence Index). This and the following step assume that at least one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present.
- 4. Apply Indicator 4 (Morphological Adaptations).

#### 115

Time ditatam (Pol size:) 1	5 Cover		Deretnance Test worksheet: Number of Dominant Species That Are OBI, FACH, or FAC wendwing FACH. (4)	Hydrophytic Veg
5 4 <u>Stating Strub Stratum</u> (Plot size:)	-=	= Total Cover	Total Number of Dominant Sondes Actions All State:(B) Percent of Dominant Species That Are OIB., FACH, or FAC:(AB)	
12 22 4 5(Potsee)			Prevalence Index worksheet:         Markely/sc           Total % Cover at:         Markely/sc           08L species         x1 =           FACW species         x2 =           FACW species         x3 =           FACU species         x3 =	
12			UPs species 15 = (8) Column Table: (A) (8) Prevalence Index = BA = (8) Mythophytic Wegetallos Indicators: Onmison Text is 2014.	
55555555	==	$\equiv \equiv$	Prevalence Index is 33 0 <sup>'</sup> Voget-diagraf Adaptions' (Provide supporting data in Remarks or on a separate sheet)      data in Remarks or on a separate sheet)      Problemate Hydrophyte Vegetation' (Explane)	
Woody Vine Stratum (Pot size) 1 2 % Bare Ground in Help Stratum		Total Cover	Thdoators of hydric soil and welland bydraisigy must be present, unless disturbed or problematic. Hydroghytelic Vegetation Present? Yes <u>No</u>	

#### 116

#### Wetland Delineation Reports

- Field Notes
- Basic Report Components
- Report Contents
- Field Review
- Non-Routine Wetland Delineations

## • Questions (last chance!)

