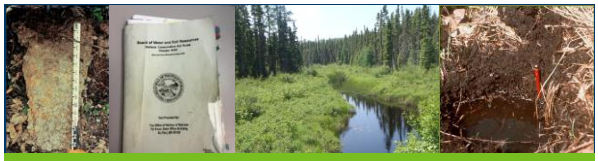

MN Wetland Professional Certification Program
Wetland Delineation Methods

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Professional Certification Program

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Agenda

Day 1 (9-5)
- Introductions
- Wetland Delineation Methods
- Critical Definitions of Wetlands
- Top of Data Sheet Field Exercise
- Wetland Hydrology Indicators
- Wetland Vegetation
- Vegetation Sampling Plot & Hydrology Indicators Field Exercise

Day 2 (9-5)
- Quiz
- Antecedent Precipitation Exercise
- Soil Concepts
- Hydric Soil Indicators
- Web Soil Survey Exercise
- Soil Texture Lab & Field Exercise along Landform

Day 3 (9-5)
- Quiz
- Wetland Delineation Field Practicum
- Group discussion of Field Practicum
- Submitting Wetland Delineation Reports & Course Summart

Prerequisite videos:
- 3 parameters of a Wetland
- Wetland Classification systems
- Wetland Functions
- Offsite Hydrology Methods

2

Quiz

1) Which of the following soil textures could use the "S" hydric soil group indicators?
a) Sandy clay loam
b) Loamy fine sand
c) Loam
d) Fine sandy loam

2) For the following description of a soil layer, what is the value of the matrix?
0– 10" 10YR 3/2 with 2% 7.5YR 4/6 concentrations
a) 6
b) 4
c) 3
d) 10

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3) Which of the following is true regarding hydric soil indicators?

a) The final version is located in the regional supplements
b) Their applicability varies by region
c) They all require the presence of iron in the soil
d) They can all be assessed within 2 feet of the soil surface

4) Circle the three processes that normally occur in a soil when it is saturated for an extended period?

a) It becomes aerobic
b) It becomes anaerobic
c) Iron becomes reduced
d) It becomes a wetland
e) Organic matter accumulates

4

5) The hydric soil indicators A, F, and S are used for what soil types. Use the table below.

Indicator	Soils
A	All Soils
F	Loamy and clay soils
S	Sandy soils (sand, loamy fine sand)

6) Which of the following is <u>not</u> used in identifying Hydric Soil Indicators:

- a) Land Resource Region
- b) Soil textures
- c) Soil colors
- d) Flood frequency >25%

5

7) Why is antecedent precipitation analysis important prior to a delineation?

To understand current climatic conditions

8) A delineator conducts a desktop review of air photos, soils map, topographic maps, and local wetland maps to identify and defines a wetland boundary without making a site visit. This is an example of what?

a) A comprehensive level 3 delineation
b) An unacceptable methodology under any circumstances
c) A quantitative delineation approach
d) A routine level 1 delineation

6

9) A Circular 39 Type 2 wetland, is most similar to what Cowardin Classification?

a) PEMB
b) PUBF
c) PSS1C
d) PFO1B

10) A seasonally flooded wetland on agricultural land is normally plowed and planted in most years. For delineation purposes, which of the following conclusions is most likely true?

a) This is not a jurisdictional wetland
b) Normal circumstances are not present
c) Normal circumstances exist
d) A level 2 delineation is required

7

11) A wetland good and services which provides monetary, or social welfare benefit is known as:

a) wetland value
b) Floristic Quality Assessment
c) wetland function
d) stormwater retention

12) What is the definition of depleted matrix? Describe what it looks like?

Value of 4 or more. Chroma of 2 or less. Redox (2%) required 5/2, 4/1, 4/2.

8

13) Which of the following is the least important when conducting hydrology monitoring with shallow wells for determining if the wetland hydrology technical standard is met for an area?

a) Growing season.
b) Depth to restrictive soil layer.
c) "A" horizon thickness.
d) Well installation methodology.

14) Which of the following tests is used for a wetland hydrology indicator?

a) 50/20 dominance
b) FAC Neutral
c) Prevalence Index
d) Bulk density

9

15) When should the Prevalence Index be calculated?

a) When dominant vegetation (as determined by the 50/20 rule) is determined to be hydrophytic.
b) When non-dominant vegetation (as determined by the 50/20 rule) is determined to be hydrophytic.
c) When hydric soils and wetland hydrology indicators are absent and the wetland determination is made by vegetation alone.
d) When wetland plant communities fail the dominance test, but have indicators of hydric soils and wetland hydrology

16) Based on the following vegetation sampling, how many dominant species are present?

Herb Strata	Shrub Strata	Tree Strata
Species A- 45%	Species A- 4%	Species A- 10%
Species B- 35%		Species B- 5%
Species C- 20%		
Species D- 30%		

a) 2
b) 6
c) 7
d) 8

10

17. When using the "Guidance for Offsite Hydrology", Area A shows what wetland signature?

a)Altered Pattern (AP)

b) Upland (UP)

c) Normal vegetative cover (NSS)

d) Drowned out (DO)

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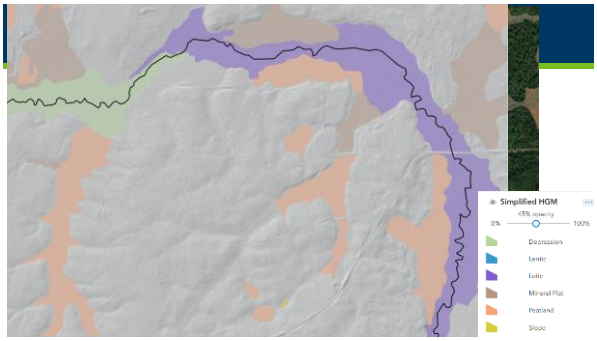

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Carlton County, Minnesota (MN017)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
21	Ahmeek loam, 0 to 2 percent slopes	0.2	0.0%
21C	Ahmeek-Normanna-Canosia complex, 0 to 18 percent slopes	20.5	3.2%
186	Nemadji fine sand	3.0	0.5%
188	Omega loamy sand, 0 to 2 percent slopes	231.4	36.6%
188C	Omega loamy sand, 2 to 12 percent slopes	166.9	26.4%
268	Cromwell sandy loam, 0 to 2 percent slopes	1.8	0.3%
530	Greenwood mucky peat	13.1	2.1%
533	Loxley muck	125.1	19.8%
536	Dawson muck	24.9	3.9%
549	Greenwood peat	0.2	0.0%
1005	Fluvaquents	41.5	6.6%
V166	Mora fine sandy loam, wet	4.0	0.6%

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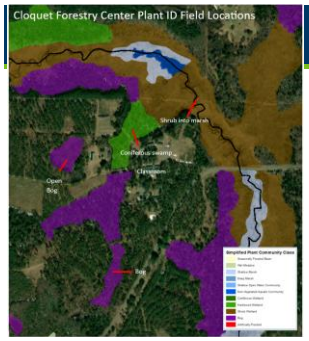

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Submitting Wetland Delineation Reports

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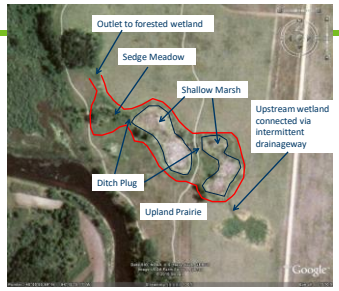

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Wetland Delineation Reports

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

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Guidance

Delineation Method	Review of offsite mapping resources	Site Visit	Sampling Approach	Complete Field Data Forms	Field Staking of Wetland Boundaries
Routine Level 1	Yes	Sometimes	Offsite	No	No
Routine Level 2	Yes	Yes	Onsite, qualitative	Yes	Yes
Comprehensive	Yes	Yes	Onsite, quantitative	Yes	Yes

WCA Application Type Examples	*Commonly Used* Delineation Method
Temporary impact under No-Loss	Routine Level 1
Banking application: pre-application scoping	Routine Level 1
Banking application: full application	Routine Level 2
Road Program Wetland Impact Documentation—Road project through a large continuous wetland	Routine Level 1
Road Program Wetland Impact Documentation—Scattered wetlands within construction corridor	Routine Level 2
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

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Take Good Field Notes

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What to Record

- Plant communities
  - Describe and sketch on aerial photograph
- Landscape settings
  - Topographic changes from wetland to upland
    - Gradual, abrupt?
- Vegetation
  - Dominant veg
  - changes from wetland to upland
- Soil
  - Changes from wetland to upland
  - Textures, Colors
- Hydrology indicators
  - Changes from wetland to upland

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What to Record

- Wetland type
  (Circular 39, Cowardin, Eggers & Reed)
- General site description
  - Buildings, ditches, culverts, etc…
- Field conditions
  - Raining, temperature, drought, etc.

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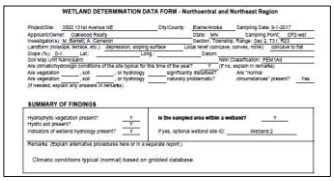
Notes on Field Notes (cont.)

- 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.



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SUMMARY OF FINDINGS

Is the sampled area within a wetland?

Remarks: (Explain alternative procedures here or in a separate report.)

Climatic conditions typical (normal) based on gridded database.

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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.).

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Guidance

St. Paul District REGULATORY
US Army Corps of Engineers®

Minnesota Board of Water & Soil Resources

March 4, 2015

Guidance for Submittal of Delineation Reports to the St. Paul District Army Corps of Engineers and Wetland Conservation Act Local Governmental Units in Minnesota, Version 2.0

Introduction – Purpose and Background of 2015 Guidance

This guidance provides specific standards and expectations for conducting wetland delineations and submitting wetland delineation reports for regulatory purposes in Minnesota. It supplements and emphasizes information in the 1987 *Corps of Engineers Wetland Delineation Manual* (Manual) and applicable regional supplements. In 1996, the Corps of Engineers (the Corps), St. Paul District Regulatory Branch issued *Guidelines for Submitting Wetland Delineations to the St. Paul District Corps of Engineers and Local Units of Government in the State of Minnesota* jointly with the Minnesota Board of Water and Soil Resources (BWSR). Significant improvements to the application of the science behind wetland and

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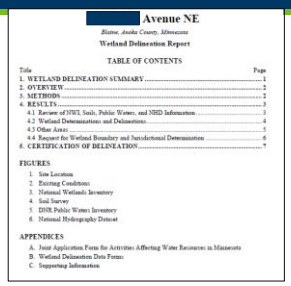
Typical Report Format

- Introduction
- Methods
- Results
- Discussion (optional)
- Figures
- Field Data Forms



[redacted] Avenue NE

Blaine, Anoka County, Minnesota

Wetland Delineation Report

TABLE OF CONTENTS

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Introduction

- 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?

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Methods

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

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RESULTS and Discussion

Describe wetlands AND uplands

- Wetland Type – Circular 39, Cowardin, Eggers & Reed
- Dominant Vegetation for each community/type

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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."

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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."

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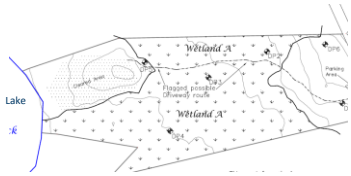
Report Components – Figures

1. Site Location
2. National Wetland Inventory (NWI)*
3. Soils
4. Public Waters Inventory (PWI)*
5. Wetland Boundary Map

*often combined



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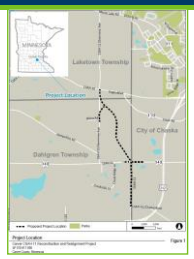
Report Components – Maps | Site Location



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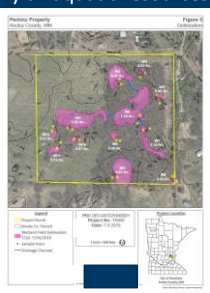
Identify all aquatic resources



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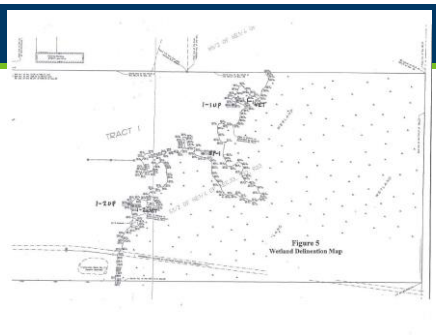

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Reports

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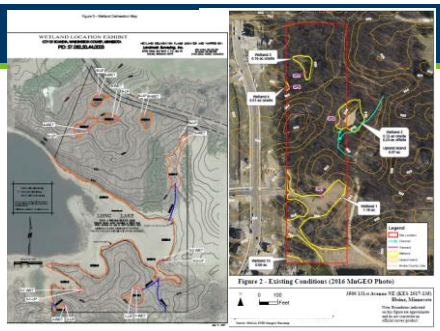

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Data Forms

- 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.

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Field Review

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)

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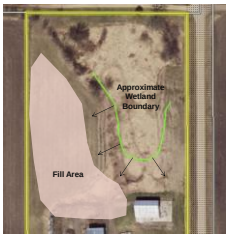
Non-Routine Wetland Delineations

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



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Delineation Class Summary

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MINNESOTA WETLAND PROFESSIONAL CERTIFICATION PROGRAM
CORE CURRICULUM

- **Critical Definitions**
- **Classification Systems & Functions**
- **Wetland Delineation**
  - **Vegetation – hydrophyte, Dominance**
  - **Soil – hydric indicators**
  - **Hydrology- inputs/outputs, indicators, monitoring**

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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

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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

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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 Delineation Manual (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.

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Land Resource Regions

- **Regions dictate which indicators are used and how they are used**

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Wetland Delineation Types

ROUTINE

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

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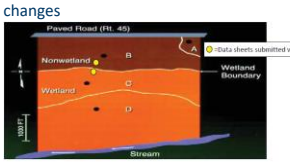
Sampling Location Should Be Representative

- Representative of soil changes (from upland to wetland)
- Representative of vegetation changes
- Representative of hydrology indicator changes
- Representative of landscape changes



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Critical Definitions

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

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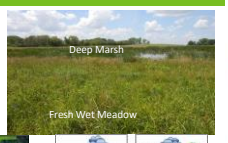
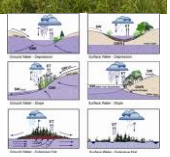
Wetland Classification Systems in MN

- Circular 39
- Cowardin et al.
- Eggers & Reed
- Hydrogeomorphic Method





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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

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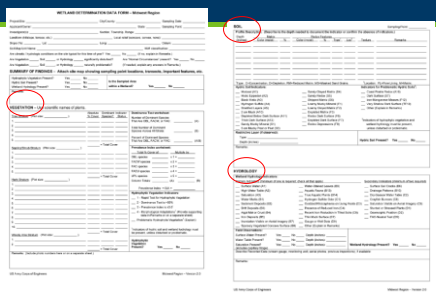
It's all about the documentation!



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Soil

- Basics of Soil
  - Soil formation
  - Landscape positior
- Soil Properties
  - Texture
  - Color
- Hydric soil develop
- Web Soil Survey
  - Interpreting soil reports
- Hydric soil indicators
  - All
  - Fine
  - Sandy
- Common soil indicators

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Field Indicators of Hydric Soils

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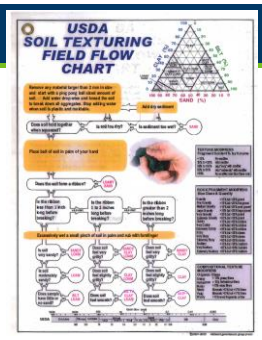

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Web Soil Survey

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
OSB	Bashville loamy sand, Rarny till phase, 0 to 3 percent slopes	31.6	25.3%
C152B	Blakeland sandy loam, 1 to 4 percent slopes	13.0	10.3%
C154B	Blakeland-Flak complex, 4 to 8 percent slopes	13.3	10.6%
C155A	Nokay-Pinhook complex, 0 to 2 percent slopes	56.3	44.8%
W	Water	11.5	9.0%
Totals for Area of Interest		125.7	100.0%

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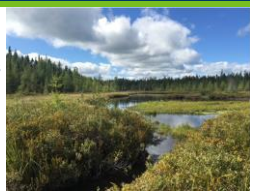
Hydrology

…"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;



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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:

Primary – provide stand-alone evidence of a current or recent hydrologic event; and
Secondary – provide evidence of recent hydrology when supported by one or more other hydrology indicators.

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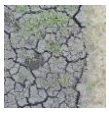
Hydrology Indicator Groups

Group A – direct observation of *water*



Group B – evidence of *flooding/ponding*

Group C – evidence of *current or recent saturation*.

Group D – *Landscape and veg. characteristics* that indicate contemporary wetland conditions.

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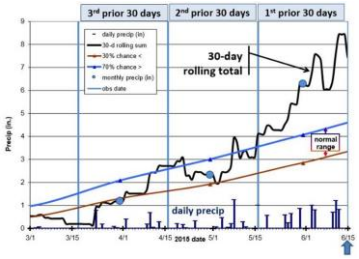
Antecedent Precipitation

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



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Overview of Wetland Vegetation

- Hydrophytic Vegetation Definition
  - Define Hydrophyte
  - What makes a plant a hydrophyte
  - Determine why matters
- Hydrophytic Vegetation Indicators
  - Field indicators
  - Indicator status
  - Dominance
- Determining Hydrophytic Plant Community
  - Rapid Test
  - 50/20 Rule
  - Prevalence Index
  - Morphological Adaptations

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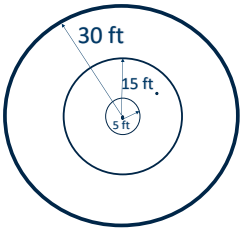
Vegetation Sampling



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

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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).
3. 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).

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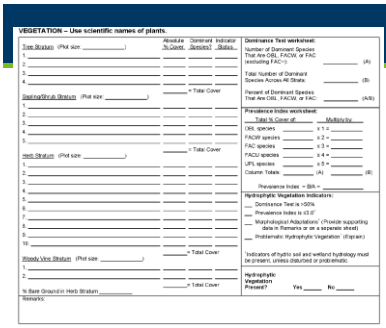
Hydrophytic Veg.


VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size _____)

Sapling/Shrub Stratum (Plot size _____)

Herb Stratum (Plot size _____)

Woody Vine Stratum (Plot size _____)

% Bare Ground in Herb Stratum _____

Remarks:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

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) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No _____

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Wetland Delineation Reports

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

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Final Thoughts?

- Questions (last chance!)

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