WETLAND DELINEATION PROCESS

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OVERVIEW

- Definitions
- Wetland Delineation Procedures
- Wetland Delineation Reports [Overview]
- Implementation

WETLAND DEFINITIONS - FEDERAL DEFINITIONS

Fish and Wildlife Service:
"Classification of Wetlands and Deepwater Habitats of the United States"
(Cowardin et al. 1979)

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

WETLAND DEFINITIONS continued

33 CFR Section 328.3(b) 1992:
40 CFR Sections 230.3(t) and 232.2(r):

"Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstance do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

WETLAND DEFINITIONS continued

Food Security Act of 1985:

Wetlands are defined as areas that have a predominance of hydric soils and that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions, except lands in Alaska identified as having a high potential for agricultural development and predominance of permafrost soils. *Source: National Food Security Act Manual, 1988*

WETLAND DEFINITIONS-continued

WISCONSIN DEFINITION

Section 23.32(1) Wisconsin Statures:

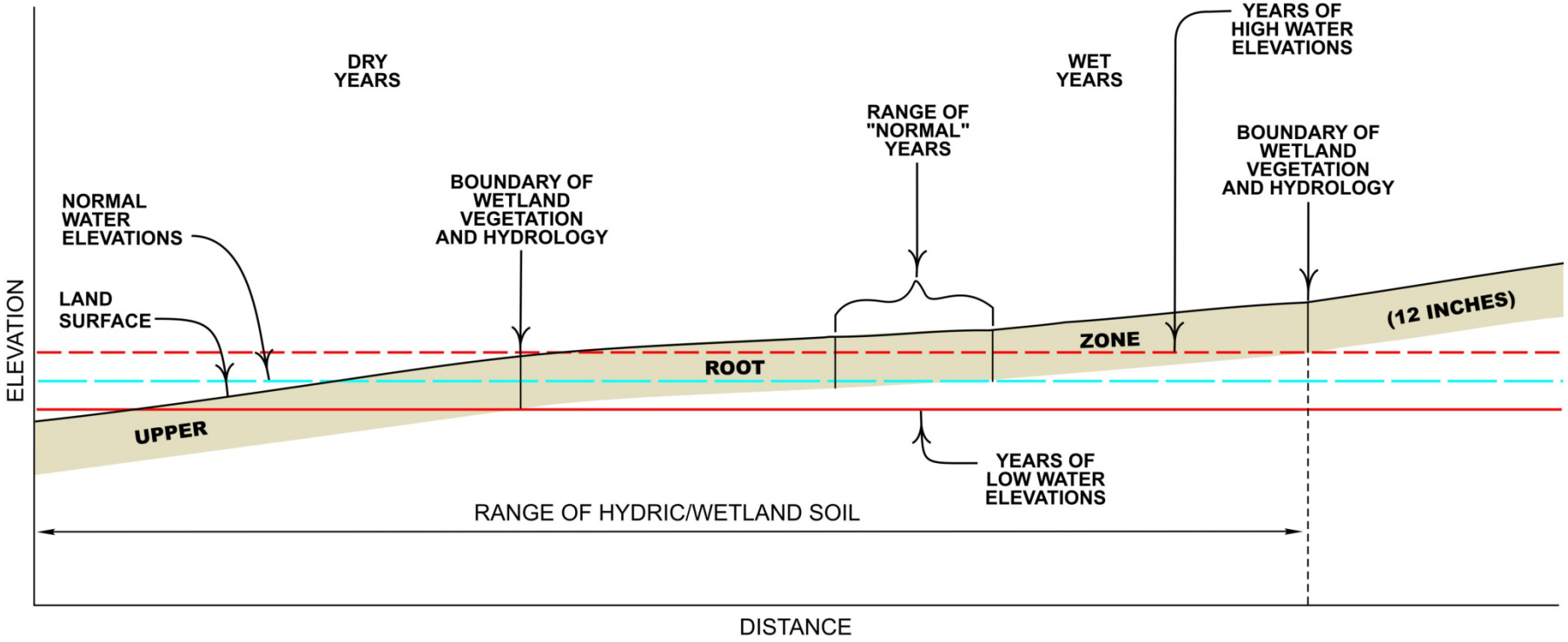
"Wetland" means an area where water is at, near, or above the surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.

FIELD DELINEATION METHODOLOGY

FIELD DELINEATION METHODOLOGY

Figure 1

WETLAND BOUNDARY DYNAMICS



Source: SEWRPC.

WETLAND DELINEATION MANUALS

- 1987 Corps of Engineers Wetlands Delineation Manual
  - Attached Memorandums
  - On-line version with updates: http://www.wes.army.mil/el/wetlands/pdfs/wlman87.pdf
- 1989 Federal Manual for Identifying and Delineation Jurisdictional Wetlands
- 1995 Basic Guide to Wisconsin's Wetlands and Their Boundaries. Wisconsin Department of Administration (WCMP)
- 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)
- 2009 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: North Central and Northeast Region

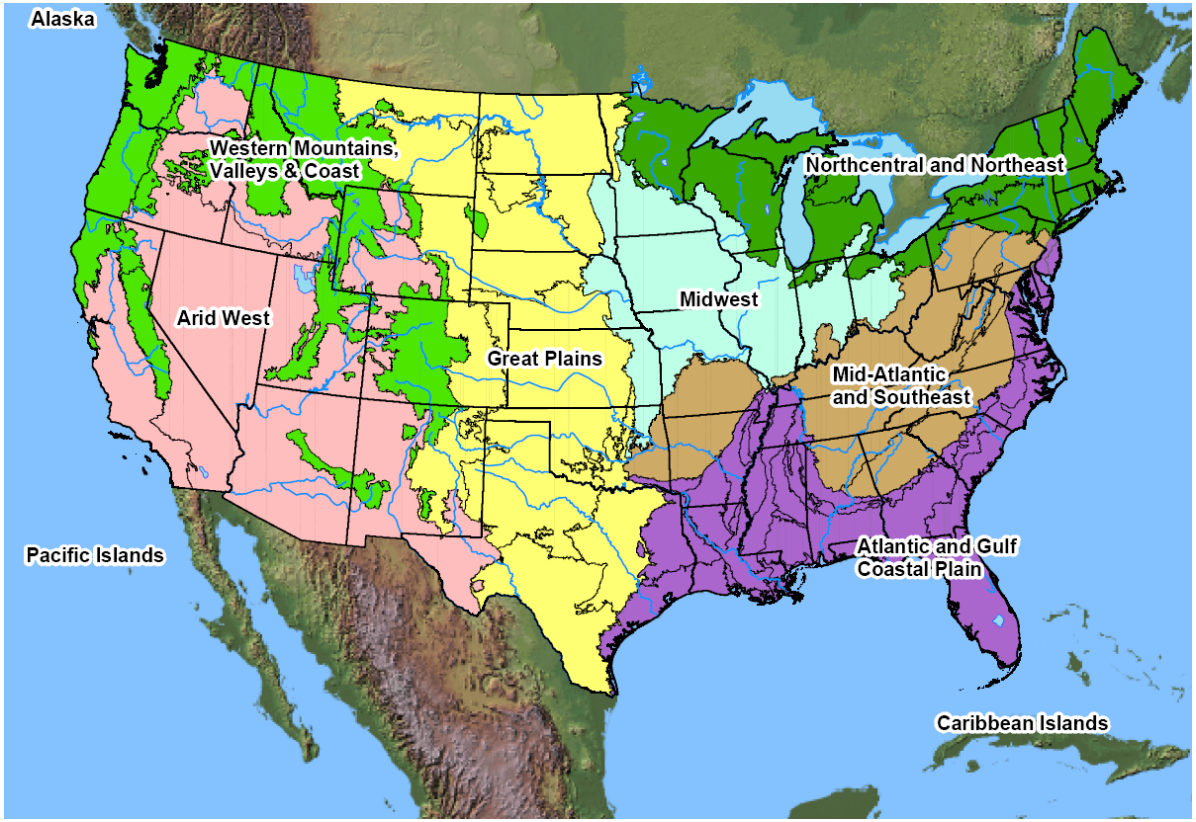
WETLAND DELINEATION MANUALS

- USDA Hydric Soils List
- USDA Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils
  - Most Recent Version
- F&WS National List of Plant Species that Occur in Wetlands
  - North Central (Region 3)
  - Use 1988 Wetland Plants of the State of Wisconsin

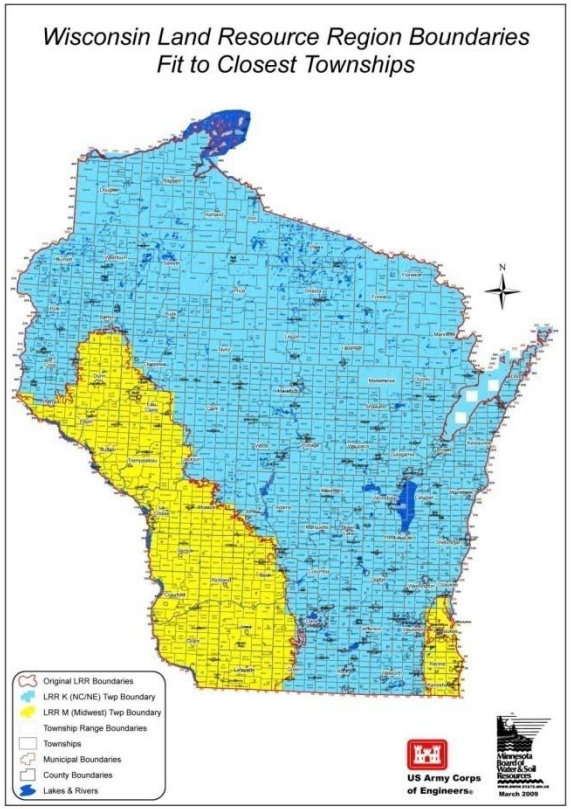
PURPOSE AND NEED FOR SUPPLEMENTS

- **Bring 1987 Manual up to the state-of-the-science in determining if an area meets technical criteria for wetlands**
- **Supplement use is mandatory for Corps regulatory program**
- **States: optional, each state makes decision on what manual is used for state wetland rules and programs**

REGIONAL SUPPLEMENTS (10)



SUPPLEMENT BOUNDARIES IN WISCONSIN



CORE OF 1987 MANUAL REMAINS

- Supplements are additional guidance for 1987 Manual
- Methods, sampling techniques, data sources, etc., essentially remain
- For Section 404, whether or not a wetland is jurisdictional is outside the scope of the 1987 Manual and supplements (no change, see ¶ 4. of the Manual)

All Supplements Use Same Format

- Chapter 1: Introduction
- Chapter 2: Hydrophytic Vegetation Indicators
- Chapter 3: Hydric Soil Indicators
- Chapter 4: Wetland Hydrology Indicators
- Chapter 5: Difficult Wetland Situations

DIAGNOSTIC WETLAND CHARACTERISTICS

- Hydrophytic Vegetation
  - Dominated by species that are tolerant of prolonged inundation or soil saturation
- Hydric Soils
  - Exhibit characteristics that develop under permanent or periodic soil saturation
- Wetland Hydrology
  - Evidence of ongoing wetland conditions

OVERVIEW

- **Plant Lists: Already regionalized (but boundaries will change). Nomenclature and indicator status will be updated. Drop (+) and (-).**
- **Soils: Hydric soil field indicators already regionalized, supplements adopt most current NRCS field indicators.**
- **Hydrology: Multiple new indicators added. One current indicator deleted (LSSD). New 14-day criterion proposed.**

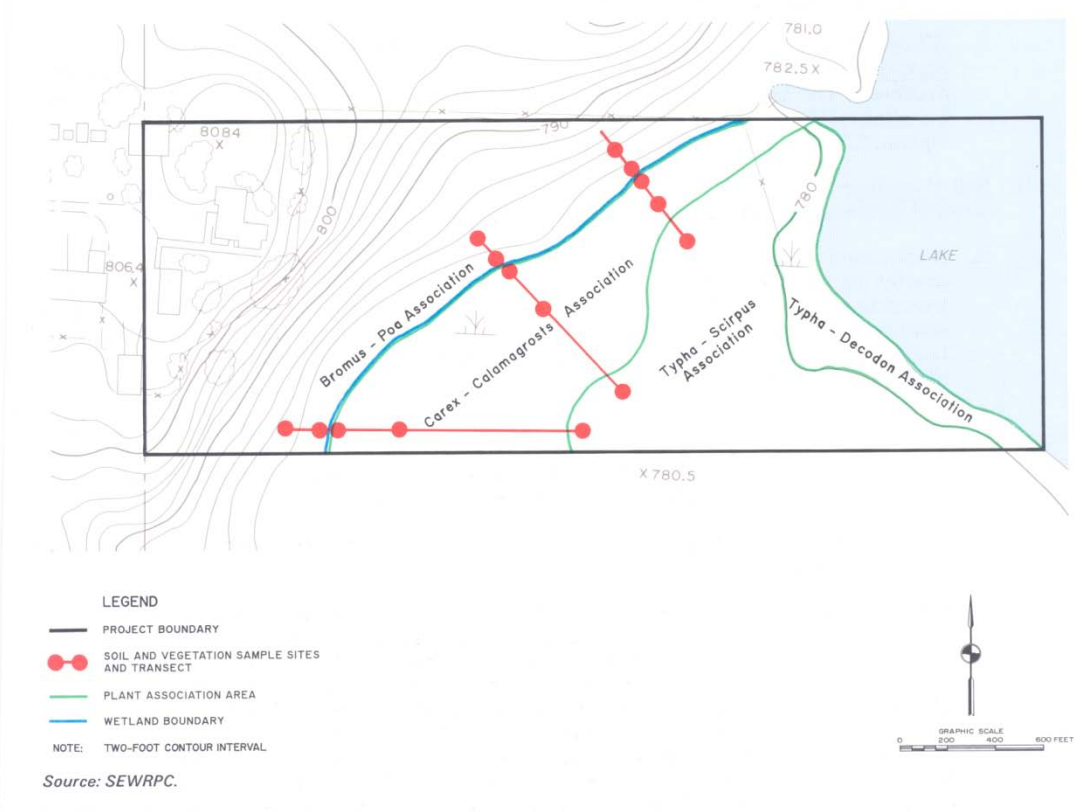
OVERVIEW [CON'T]

- **Difficult Wetland Situations: Formerly "problem areas" and "atypical situations" in 1987 Manual. Expanded discussion tailored to each supplement region.**
- **Growing Season: One new indicator added, another modified.**
- **Glossary: Update definitions, eliminate contradictions**

COLLECTING DATA

- Is it a difficult [problem or atypical] wetland situation?
- Dominant plant species;
- Hydrology [includes antecedent precipitation conditions];
- Soils; and
- Landscape [geomorphic] position.

TYPICAL LOCATIONS OF VEGETATION, HYDROLOGY, AND SOIL SAMPLE SITES ALONG TRANSECTS



Source: SEWRPC.

WETLAND VEGETATION

- Hydrophytes – Plants that grow in water or on a substrate that at least periodically is deficient in oxygen due to excessive water content.

WETLAND VEGETATION

Indicator categories:

- Obligate (OBL) - > 99%
- Facultative wet (FACW) – 67-99%
- Facultative (FAC) – 34-66%
- Facultative Upland (FACU) – 1-33%
- Upland (UPL) - > 1%

FIELD DELINEATION METHODOLOGY - VEGETATION SAMPLING

Preferred sampling methods:

- Quadrat Sampling
- Line-Intercept Sampling

SAMPLING METHODS

- VEGETATION:

1. 5-foot radius circular plots for herbaceous vegetation.
2. 15-foot radius for shrubs and saplings.
3. 30-foot radius from center of quadrat for trees and vines.

- SOILS:

1. 20 inch profile recommended.

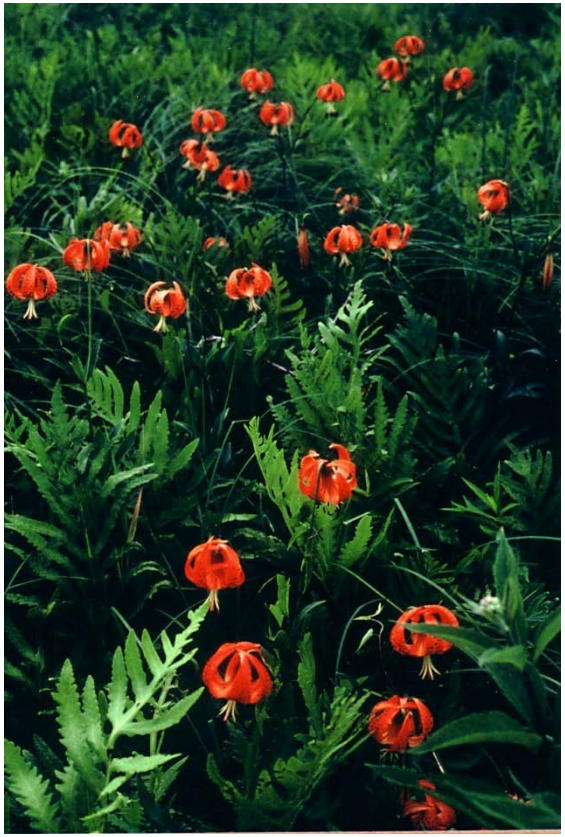
- HYDROLOGY

Strata (Layers of Vegetation)

- **Trees**: woody plants 3 inches or more DBH (regardless of height)
- **Saplings/Shrubs**: woody plants less than 3 in. DBH and taller than 3.28 feet (1 m)
- **Herbaceous**: all non-woody plants including herbaceous vines, regardless of size, and woody plants less than 3.28 feet (1 m) in height
- **Woody Vines**: all woody vines greater than 3.28 feet (1 m) in height

METHODS FOR DETERMINING MAJOR DOMINANCE

- The “50/20” Rule
- The Prevalence Index
- Morphological Adaptations



50/20 Rule

- See **Tables 4** (p.14) & **5** (p.15) of St. Paul District Corps of Engineers **Guidelines**: **Public Notice** issued 22 May 1996.

TABLE 4
THE "50/20" RULE
FOR DETERMINING DOMINANCE

1. In each stratum, rank plant species in descending order of abundance (most abundant first) and arrive at a total dominance measure (percent cover, basal area, etc.).

2. Dominant species are those that immediately exceed 50 percent of the total dominance measure.

3. Additionally, any species that comprises 20 percent or more of the total dominance measure is considered a dominant species.

Example:

	Dominance Measure
SPECIES A:	60
SPECIES B:	50
SPECIES C:	40
SPECIES D:	30
	180

Fifty percent of 180 is 90. Species A, with a dominance measure of 60, does not exceed this 50 percent threshold; therefore, the next most abundant species is added. Species A and B in combination (dominance measure of 110) exceed the 50 percent threshold of 90. Therefore, both are considered dominant species. Next, we need to determine if any other species comprises 20 percent or more of the total dominance measure. One-fifth, or 20 percent, of 180 is 36. Species C, with a dominance measure of 40, meets this criteria so it too is considered a dominant species. Species D is not a dominant.

TABLE 5
DETERMINING DOMINANCE
BY THE "50/20" RULE

SPECIES	STRATUM		
	I	II	III
A	45	20	20
B	5	25	10
C	--	10	25
D	20	10	10
E	--	15	5
F	5	10	10
G	20	5	10
H	5	5	10
	100	100	100

(50 percent threshold = 50,
20 percent threshold = 20)

NOTE: The numbers listed under "Stratum" represent a dominance measure (percent cover, basal area, etc.). For simplicity in this example, the total dominance measure adds up to 100. In actual cases, this may vary. For example, if percent cover is used as the dominance measure, it may be less than 100 percent if there are gaps within that stratum, or it may exceed 100 percent where there is overlap within the same stratum.

STRATUM I: Species A, with a dominance measure of 45, does not exceed the 50 percent threshold, so the next most abundant species is added. This is a tie between Species D and G, both with 20 percent of the dominance measure. In cases of a tie, both are included. The combination of dominance measure for these 3 species (85) exceeds the 50 percent threshold so all are considered dominants. No additional species exceeds the 20 percent threshold so no others are considered dominants.

STRATUM II: Species B (dominance measure of 25), does not exceed the 50 percent threshold. Neither does adding the dominance measure of 20 for Species A. So the next most abundant species is included, Species E with a dominance measure of 15. In combination the three exceed the 50 percent threshold and all are considered dominants. No additional species comprise 20 percent or more of the dominance measure.

STRATUM III: Species C (25) and Species A (20) do not surpass the 50 percent threshold. Therefore, the next most abundant species is added. This turns out to be a tie with 5 species all of which have a dominance measure of 10. Therefore, Species C, A, B, D, F, G and H are dominants.

Step 2: Apply Prevalence Index

(if needed)

Uses the same percent cover data as that for the 50/20 Rule !!

PI is a weighted average by indicator status:

$$\frac{(\%\text{ cover of all OBL spp.} \times 1) + (\%\text{ cover of all FACW spp.} \times 2) + (\%\text{ cover of all FAC spp.} \times 3) + (\%\text{ cover of all FACU spp.} \times 4) + (\%\text{ cover of all UPL spp.} \times 5)}{A} = \frac{B}{A} = PI$$

Divide sum of weighted cover value by sum of actual cover.
If PI $\leq$3.0 then veg is hydrophytic.

Step 2: Apply Prevalence Index
(if needed)

- At least 80 percent of total cover must be correctly identified to the species level
- Species used must have an assigned indicator status
- Advantage of PI vs. “50/20 Rule”: PI is more comprehensive as it uses the cover of all plant species vs. a few dominants
- Disadvantages of PI vs. “50/20 Rule”: (1) requires more time; and (2) requires greater plant identification skills

Prevalence Index Example

Indicator Status Group	Species name	Absolute Percent Cover by Species	Total Cover by Group	Multiply by:[1]	Product
OBL species	*Glyceria striata*	2	2	1	2
FACW specie		15			
		0.5			
		40			
		17			
		10	82.5	2	165
FAC species	*Toxicodendron radicans*[2]	6			
	Carpinus caroliniana	35	41	3	123
FACU species	*Lonicera tatarica*	2			
	Parthenocissus quinquefolia	1			
	Carex laxiflora	0.5			
	Carya ovata[2]	18			
	Acer saccharum	5			
	Quercus rubra	5	31.5	4	126
UPL species	*Geranium carolinianum*	7	7	5	35
Sum			164 (A)		451 (B)
Hydrophytic Vegetation Determination		Prevalence Index = B/A = 451/164 = 2.75 Therefore, this community is hydrophytic by Indicator 2 (Prevalence Index).			

A = 164 B = 451

B/A = 2.75

Veg is hydrophytic

[1] Where OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5.

[2] This species was recorded in two or more strata (see Table 2), so the cover estimates were summed across strata.

Vegetation Fails Dominance Test But Meets PI

- Not expected to be frequent occurrence
- Exception: when percent of dominants FAC or wetter is exactly 50%

  (the hydrophytic vegetation criterion is more than half of all dominants are FAC or wetter)
- Exception: Dominant(s) are FACU but numerous non-dominants are FACW or OBL

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
_____ = Total Cover			
Sapling/Shrub Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
_____ = Total Cover			
Herb Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
_____ = Total Cover			
Woody Vine Stratum (Plot size: _____)			
1. _____			
2. _____			
_____ = Total Cover			
% Bare Ground in Herb Stratum _____			

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** _____

Remarks:

HYDROPHYTIC VEGETATION SEQUENCE

1. Apply the Dominance Test ("50/20 Rule")
   - **a. If the 50/20 Rule is met, the vegetation is hydrophytic**
   - **b. If 50/20 Rule is not met but indicators of hydric soils and wetland hydrology are <u>BOTH</u> present, Proceed to Step 2.**

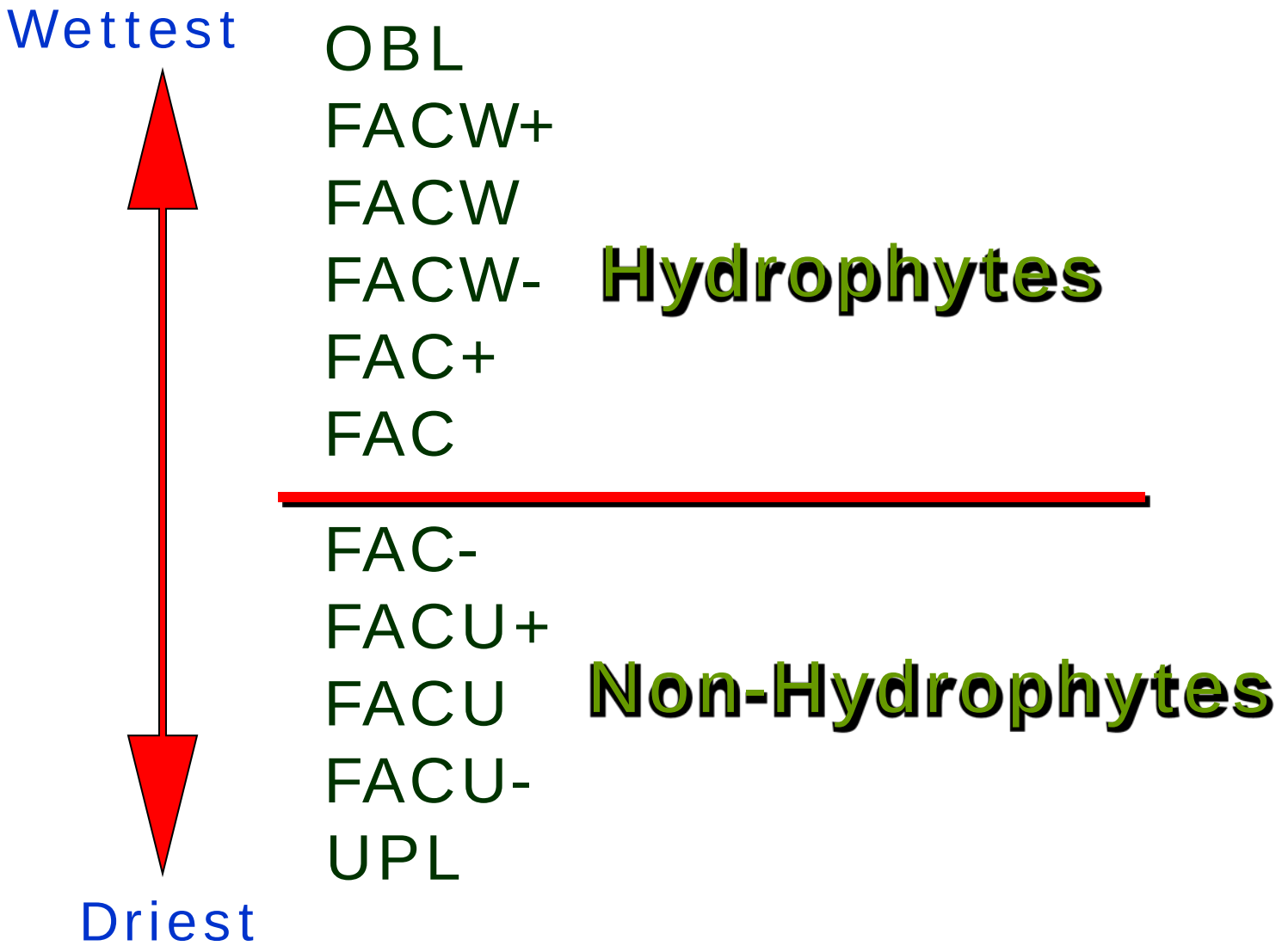
     (Be aware of problem areas and atypical situations – see Chapter 5)

2. Prevalence Index
   - **a. If the PI is <u>≤</u>3.0, the vegetation is hydrophytic**
   - **b. If this is not met, go to Step 3.**

HYDROPHYTIC VEGETATION SEQUENCE (con't)

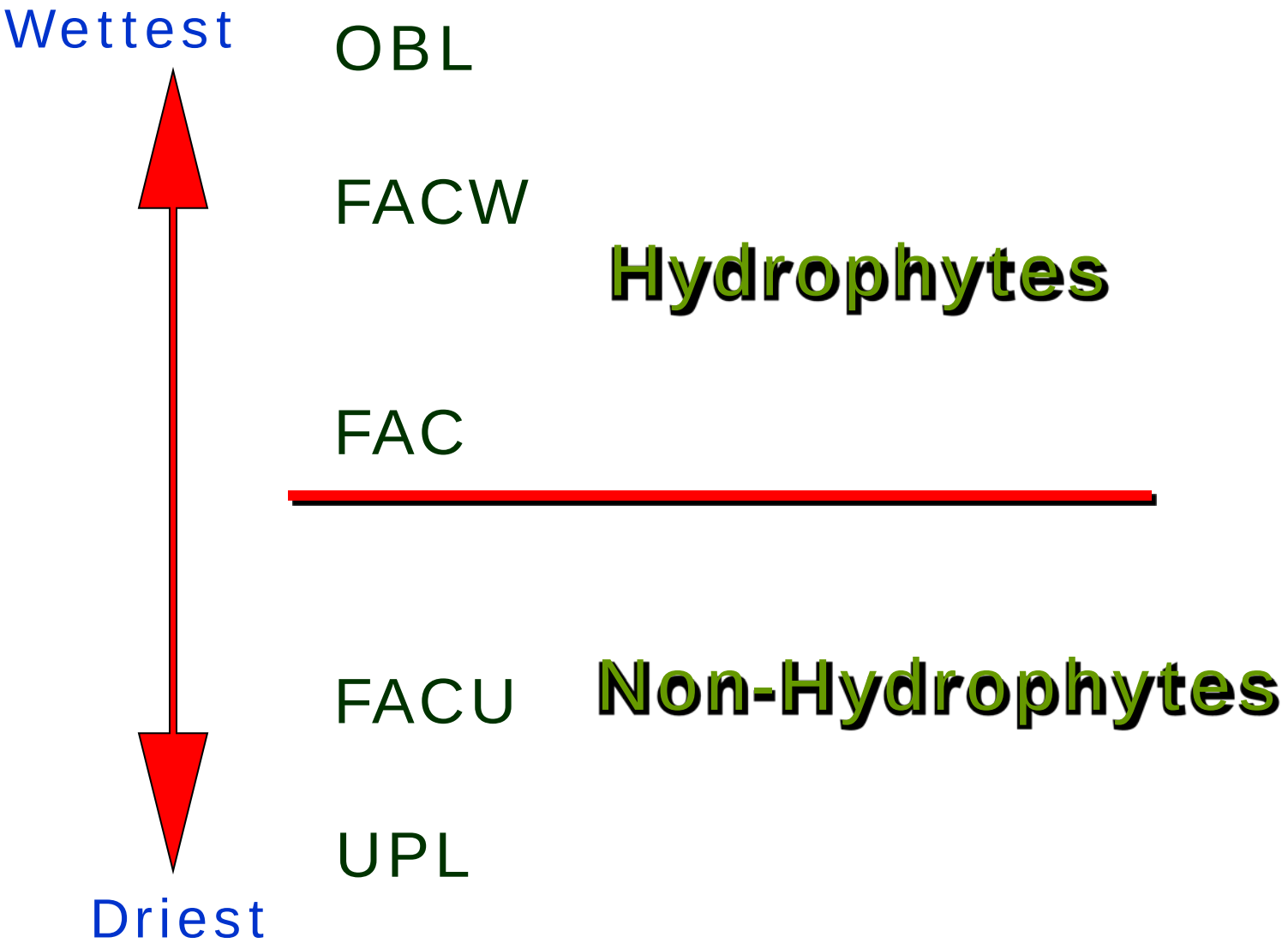
3. Morphological Adaptations

   a. If >50% of individuals of a FACU species exhibit morphological adaptations, assign FAC status and recalculate Steps 1 and 2 above.


Wettest
OBL
FACW+
FACW
FACW-
FAC+
FAC
Hydrophytes
FAC-
FACU+
FACU
FACU-
UPL
Non-Hydrophytes
Driest

Indicator Status: Drop (+) and (-)

- (+) and (-) are dropped for the facultative categories
- (+) and (-) were not based on ecological data; rather, used as tiebreakers
- FAC- species go to FAC for now
- Update to *National List of Wetland Plants* will also drop (+) and (-)
- *National List of Wetland Plants* will ultimately determine if FAC- species should be FAC or FACU


Wettest
OBL
FACW
Hydrophytes
FAC
FACU
Non-Hydrophytes
UPL
Driest

Notes on Indicator Status

- National List of Plant Species that Occur in Wetlands (1988)
  - a. If a species is not on the list, generally assume it is UPL
    (advisory: hundreds of nomenclature changes since 1988. Nomenclature rather than UPL could be a reason for absence on 1988 list)
  - b. NI = reviewed but given no indicator status
  - c. NO = no known occurrence in that region in 1988
  - d. For NI, NO --- apply indicator status of adjacent region
  - e. If NI or NO is not listed in adjacent region, consult 1996 national list of plant species that occur in wetlands (St. Paul District Guidance)

If your field observation is that individual FACU, NI or NO species are functioning as hydrophytes, then use Chapter 5 “Problematic Hydrophytic Vegetation”

HYDRIC SOILS

Defined:

- A soil that formed under conditions of saturation, flooding, or ponding of long enough duration, during the growing season, to develop anaerobic conditions in the upper part.

HYDRIC SOILS [CON'T]

- When anaerobic environments continue for long periods during the growing season, quite different biological and chemical reactions begin to dominate, compared with aerobic soils. In soils where saturation with water is prolonged and is repeated for many years, unique soil properties usually develop that can be recognized in the field

HYDRIC SOILS [CON'T]

HYDRIC SOILS [CON'T]

- Hydric soil indicators are presented in three groups:

1. Indicators for "All Soils" (A) are used in any soil regardless of texture.
2. Indicators for "Sandy Soils" (S) are used in soil layers with USDA textures of loamy fine sand or coarser.
3. Indicators for "Loamy and Clayey Soils" (F).

HYDRIC SOILS [CON'T]

EXAMPLES:

- Indicator A1: *Histosols*
- Indicator A12: *Thick Dark Surface* (Mollisols)
- Indicator A16: *Coast Prairie Redox* (problem soil)
- Indicator S5 *Sandy Redox*
- Indicator F3: *Depleted Matrix* (Most common)

WETLAND HYDROLOGY

A site meets the wetland hydrology criterion if it is inundated or saturated for a sufficient time during the growing season in most years to result in the development of hydric soils and dominance by hydrophytic vegetation

Hydrology Criterion

- Hydrology criterion "inundated or saturated to the surface for 5% or more of the growing season in most years"

- 5% ranges from about 7 to 18 days around the country
- 5% of the growing season doesn't work well in the south and coastal areas that essentially have a year-round growing season

- National Academy of Sciences recommended a uniform criterion for wetland hydrology –a minimum of 14 consecutive days in most years

WETLAND HYDROLOGY

- Lack of a hydrology indicator does not confirm the lack of wetland hydrology; many Midwest wetlands lack hydrology indicators during latter half of growing season and during drier than normal years□

Hydrology Field Indicators

Organized into four categories:

- Group A: Observations of Surface Water or Saturated Soils
- Group B: Evidence of Recent Inundation
- Group C: Evidence of Current or Recent Soil Saturation
- Group D: Evidence from Other Site Conditions or Data

Note: 29 hydrology field indicators total compared to 10 specifically listed in 1987 Manual/1992 data sheet

Hydrology Field Indicators

	Primary	Secondary
Group A – Observation of Surface Water or Saturated Soils		
A1 – Surface water	X	
A2 – High water table	X	
A3 – Saturation	X	
Group B – Evidence of Recent Inundation		
B1 – Water marks	X	
B2 – Sediment deposits	X	
B3 – Drift deposits	X	
B4 – Algal mat or crust	X	
B5 – Iron deposits	X	
B7 – Inundation visible of aerial imagery	X	
B8 – Sparsely vegetated concave surface	X	
B9 – Water-stained leaves	X	
B13 – Aquatic fauna	X	
B15 – Marl deposits	X	
B6 – Surface soil cracks		X
B10 – Drainage patterns		X
B16 – Moss trim lines		X
Group C – Evidence of Current or Recent Soil Saturation		
C1 – Hydrogen sulfide odor	X	
C3 – Oxidized rhizospheres along living roots	X	
C4 – Presence of reduced iron	X	
C6 – Recent iron reduction in tilled soils	X	
C7 – Thin muck surface	X	
C2 – Dry-season water table		X
C8 – Crayfish burrows		X
C9 – Saturation visible on aerial imagery		X
Group D – Evidence from Other Site Conditions or Data		
D1 – Stunted or stressed plants		X
D2 – Geomorphic position		X
D3 – Shallow aquitard		X
D4 – Microtopographic relief		X
D5 – FAC-neutral test		X

GROWING SEASON

- Growing season dates are needed to:

1. Evaluate and interpret some wetland hydrology indicators.
2. Analyze recorded hydrologic data to determine if the Corps Technical Standard for wetland hydrology is met.

GROWING SEASON

- Technical Definition: The portion of the year when soil temperatures at 19.7 in. below the soil surface are higher than biologic zero (41oF.)

- Approximated by: The number of frost-free days (last frost in spring and first frost in autumn of 28 degrees F., 5 years in 10, using WETS table).

- Represents safe planting period for agricultural crops but natural vegetation is much more frost hardy

GROWING SEASON

- Start of growing season:

1. "Green-Up" indicator (new indicator based on observing actual plant growth)
2. Soil temperature at 12 inches is 41 degrees F. or higher.
3. In the absence of site-specific information, use the 28-degree F., 5 years in 10, per WETS tables

GROWING SEASON

- The end of the growing season indicated:

1. When woody deciduous species lose their leaves and/or
2. The last herbaceous plants cease flowering and their leaves die back

The Three Parameter Approach:

1. **Hydrology**
2. **Soils**
3. **Vegetation**

- **But also**

4. **Topography**
5. **Professional Judgment**

"Wetland determinations on difficult or problematic sites must be based on the best information available to the field inspector, interpreted in light of his or professional experience and knowledge of the ecology of wetlands in the region"

(p. 95 COE Midwest Supplement)

DIFFICULT WETLAND SITUATIONS

- Agricultural Lands:
  1. Considered Atypical
  2. Drainage Systems
- Problematic Hydrophytic Vegetation:
  1. Temporal Shifts in Vegetation
  2. Riparian Areas
  3. Areas Affected by Grazing
  4. Managed Plant Communities
  5. Areas Affected by Fires, Floods, and Other Natural Disturbances
- Problematic Hydric Soils:
  1. Shallow Soils over Limestone
  2. Fluvial Sediments within Floodplains
  3. Seasonally Ponded Soils
  4. Soils with High-Chroma Subsoils

DIFFICULT WETLAND SITUATIONS (CON'T.)

- Wetlands that Periodically Lack Indicators of Wetland Hydrology:
  1. Ephemeral ponds, dune swales, wet prairies, sedge meadows, etc.
- Wetland/Non-wetland Mosaics:
  1. Ridge and Swale Complexes

FINDING THE WETLAND BOUNDARY

Process

- Preparation
- Field Work
- Report Writing
- Cautions

Preparation

- Locate Site on Map
- Aerial Photographs
- Hydric Soil List
- County Soil Survey
- USGS Quad Map

Preparation *(con't)*

- Topographic Features
- Wisconsin Wetland Inventory Maps
- Previous Wetland Delineations

Field Investigation

- Reconnaissance Survey
- Set up transects
- Collect Data

Wetland delineation should result in three things:

1. A wetland boundary clearly marked in the field.
2. A map that clearly identifies data collection points and the boundaries of the delineated wetland. (Topographic and aerial site maps are very helpful.)
3. A report that explains how the boundary was determined. It should include:

- A description of how, when, and where the delineation was done.
- Data forms used to delineate the wetland area.
- The map described in #2 above.
- Discussion of antecedent precipitation conditions
- FSA Slide Review and Site PHOTOGRAPHS.

FEDERAL REGULATORY AUTYHORITY

- Section 404 of Clean Water Act of 1972 (1977)
- Section 10 of Rivers and Harbors Act of 1899

STATE REGULATORY AUTYHORITY

- Chapter NR1.95
- Chapter NR102
- Chapter NR103
- Chapter NR151
- Chapter NR299
- Chapter NR350
- Chapter NR351
- Chapter NR352
- Chapter NR353
- Chapters 23, 30 and 31, STATS.
- Chapter 281.36 STATS. (Act 6)
- Chapter 281.37 STATS. (Act 147)
- CZMA Federal Consistency

LOCAL REGULATORY AUTYHORITY

- Shoreland-Wetland Zoning: Villages, Cities & Counties: Chapters NR115 & NR117
- General Zoning Law