New Hydric Soil Field Indicators for Michigan

Michigan Wetlands Association

2013 Winter Conference

February 11, 2013

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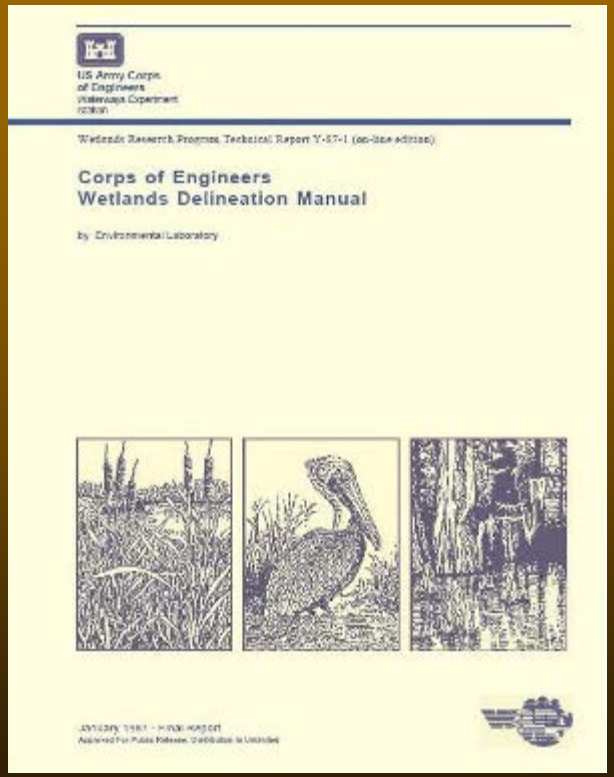
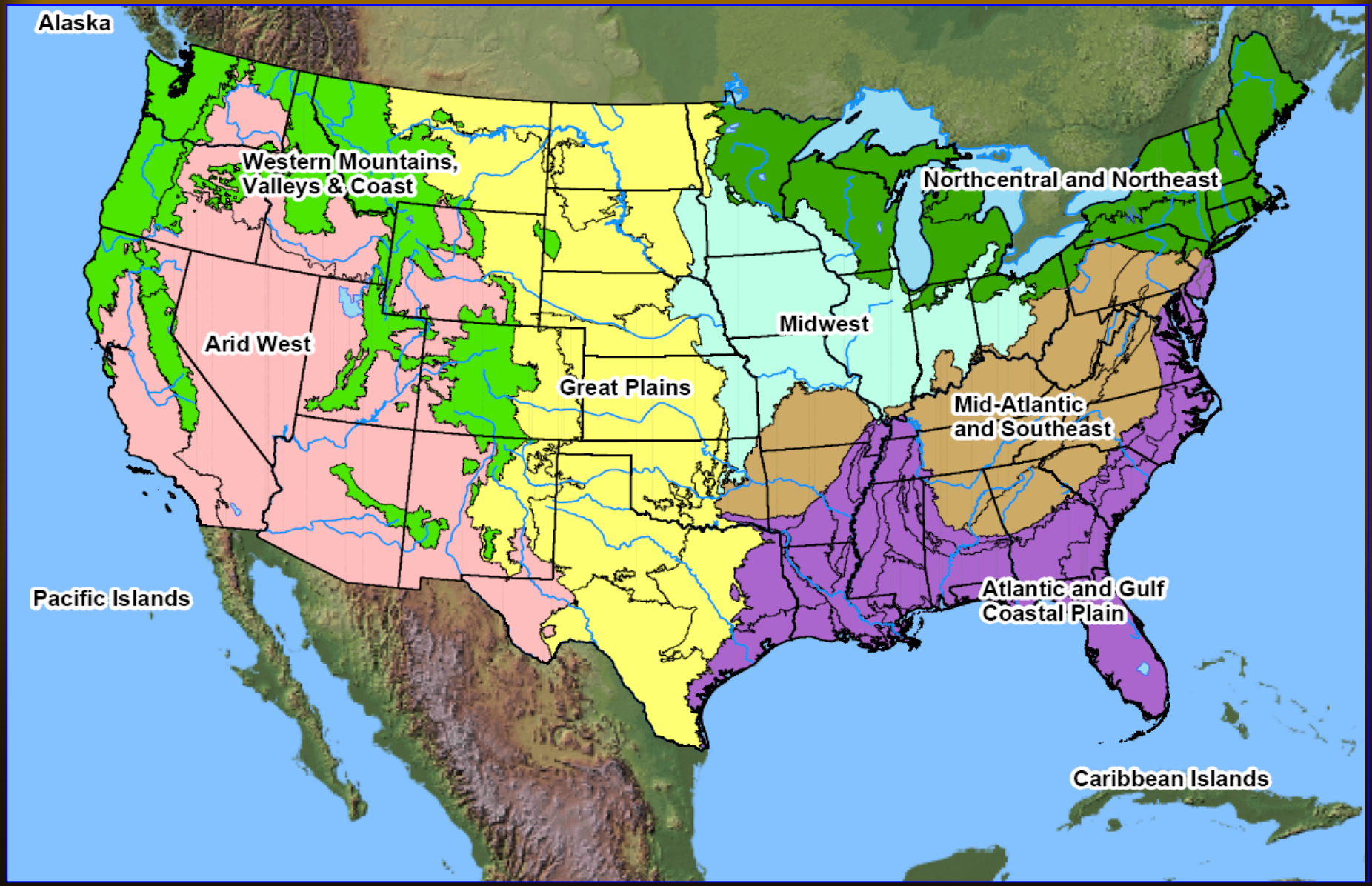
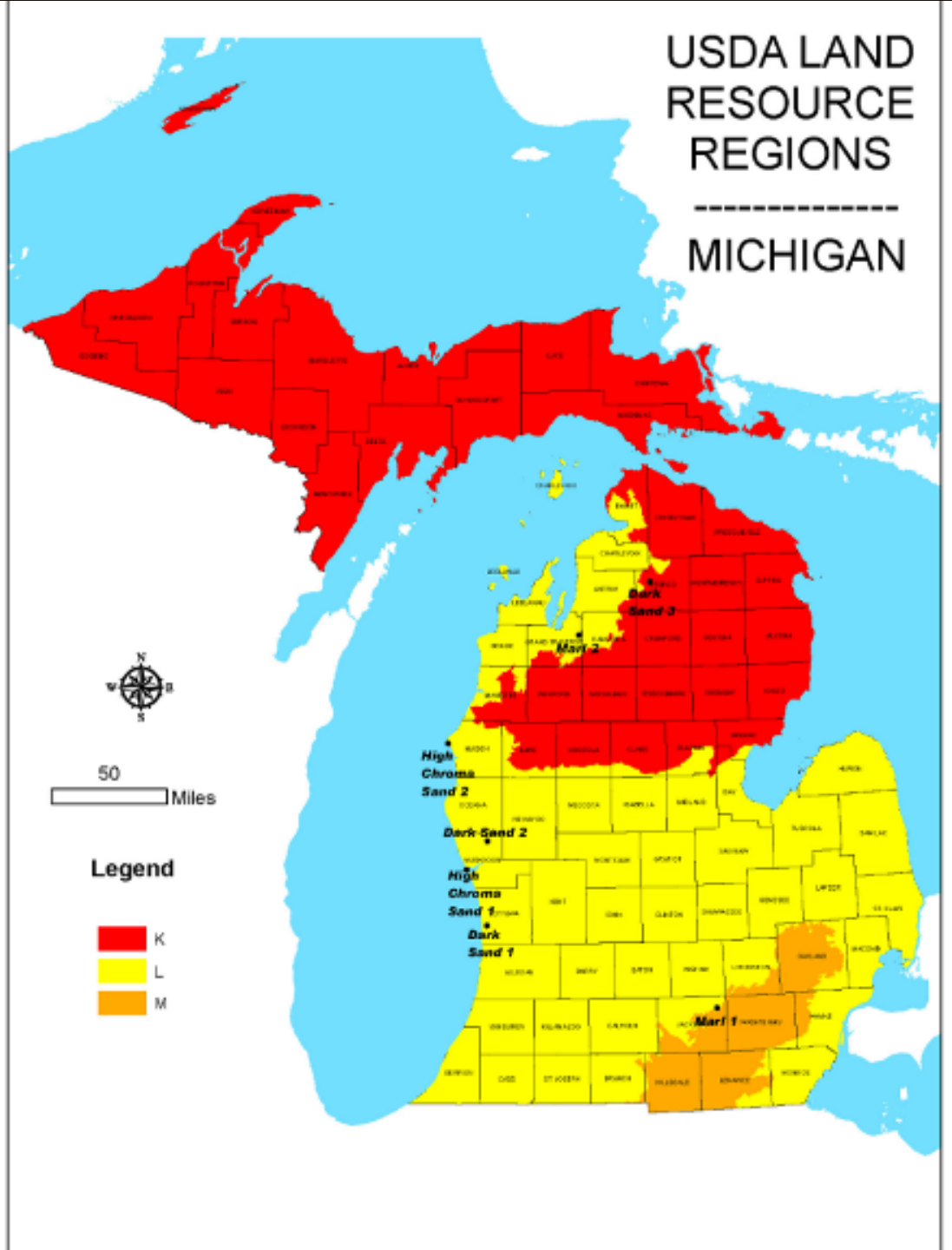
Regional Supplements Bring Wetland Delineation Up to the State-of-the-Science



Regional Supplements (10)



Michigan Land Resource Regions K, L, M



Version 7.0, 2010

Field Indicators of Hydric Soils in the United States

http://soils.usda.gov/use/hydric/

Most Recent Information on Changes to Field Indicators

http://soils.usda.gov/use/hydric/ntchs/minutes/minutes.html

Research Project Timeline

- 2008 – Study design and collaboration
- 2009 - 1st Year of Field Research
- 2009 – Interim Version of NC/NE Regional Supplement Published
- 2010 – 2nd Year of Field Research
- 2011 – Data Analysis and Publication of Research
- 2012 – Version 2.0 NC/NE Regional Supplement Published with change to Chapter 5
- 2012 – National Technical Committee site review and approval of new Field Indicators

Field Research

Field Research

Soil Science Society of America Journal
Volume 75: Number 6
November-December 2011

Investigating Problematic Hydric Soils using Hydrology, IRIS Tubes, Chemistry, and the Hydric Soils Technical Standard

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Resource professionals rely on soil morphology to make determinations of hydric soil status. Characteristic morphologies led to the development of field indicators for hydric soil identification and delineation. This study examined soils not meeting approved field indicators. These included high-chroma sandy soils, dark sandy soils, and marl soils located in Michigan. All soils displayed high water tables within 25 cm (10 in) of the surface for a minimum of 14 consecutive days. Indicator of reduction in soils (IRIS) tube data confirmed reducing conditions in wetland sites, with average Fe removal of 74%; only 4.8% removal was observed in uplands. Ten of 11 soils examined met the hydric soil technical standard (HSTS). Results indicate that two additional field indicators (S7–Dark surface and F10–Marl) should be approved in the region. Soil chemical data examined the development of hydric soil morphologies. Laboratory incubations monitored the formation of low-chroma colors with an artificial C substrate in high-chroma sands. This work expands the range of accepted field indicators and provides a case study for applying the HSTS to problematic soil situations.

Abbreviations: DAREM, direct antecedent rainfall evaluation method; HSTS, hydric soils technical standard; IRIS, indicator of reduction in soils; NTCHS, National Technical Committee for Hydric Soils; TC, total carbon; TOC, total organic carbon.

As one of the three factors associated with the delineation of wetlands, the identification of hydric soils affects resource management and land-use development (Environmental Laboratory, 1987; Moorhead, 1990). In most cases, wetland delineations and management decisions require on-site determinations of hydric soils based on direct observations in the field (Hurt and Brown, 1995; National Research Council, 1995). As a result, wetland professionals developed hydric soil indicators (field indicators) (Hurt et al., 1998; Vasilas et al., 2010). Field indicators based on morphological features reflect conditions associated with prolonged and repeated occurrences of reduced soil conditions within the upper portion of the soil profile (Mausbach, 1994; Mausbach and Parker, 2001). Common hydric soil morphologies include organic matter accumulation, redoximorphic features, and development of low-chroma colors through the reduction and translocation of solid-phase Fe and Mn species (Vepraskas, 1992).

Northcentral and Northeast Regional Supplement, (Version 2.0) Chapter 5, Difficult Wetland Situations in the Northcentral and Northeast Region, Page 130 (January 2012)

In addition, along the shorelines of the Great Lakes within LRRs L and K, some wetlands lack hydric soil indicators due to the presence of high-chroma sands (often a chroma of 3 or more). These high-chroma, sandy soils occur at the landward edge of coastal marshes, in interdunal wetlands, and in dune-and-swale complexes. They do not meet a hydric soil indicator due to matrix chromas greater than 2. These soils often exhibit redox concentrations as pore linings and/or soft masses within 12 in. (30 cm) of the surface. In adjacent upland areas, redox concentrations are absent or are only observed at depth. It may be helpful to involve a soil scientist or wetland scientist familiar with these problem soils.

New Hydric Soil Field Indicators for Michigan

- S7. Dark Surface (test indicator)
- F10. Marl (only Florida)
- S11. High Chroma Sands (brand new)

S7. Dark Surface. For use in LRRs K, L, M, N, P, S, T, U, V, and Z. A layer 10 cm (4inches) thick, starting within the upper 15 cm (6 inches) of the soil surface, with a matrix value of 3 or less and chroma of 1 or less. At least 70 percent of the soil particles must be masked with organic material, viewed through a 10x or 15x hand lens. Observed without a hand lens, the particles appear to be close to 100 percent masked. The matrix color of the layer directly below the dark layer must have the same colors of those described above or any color that has chroma of 2 or less.

F.10. Marl. For use in LRRs K, L, and U. A layer of marl with value of 5 or more and starting within 10 cm (4 inches) of the soil surface.

S11. High Chroma Sands. For use along shorelines and near shore regions of the Great Lakes in LRRs K and L. In coastal zones and dune-and-swale complexes, a layer 2 inches (5 cm) or more thick starting within 4 inches (10 cm) of the surface with chroma 4 or less and 2 percent or more distinct or prominent redox concentrations.

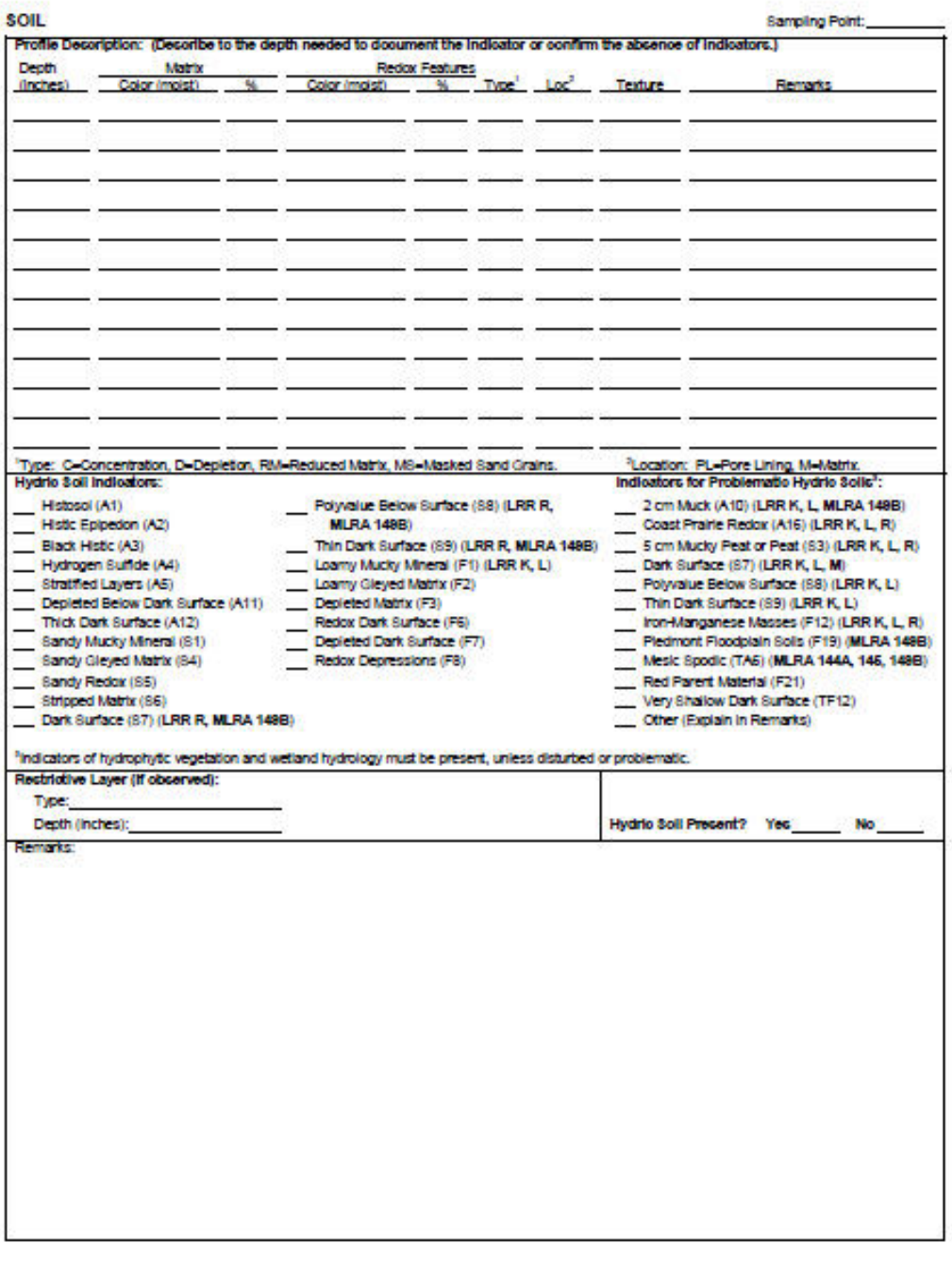
User Notes: Along the shorelines of the Great Lakes within LRRs L and K, some wetlands exhibit the presence of high chroma sands (often a chroma of 3 or more). These high-chroma, sandy soils occur at the landward edge of coastal marshes, in interdunal landscape positions, and dune-and-swale complexes. These soils exhibit redox concentrations as pore linings and/or soft masses starting within 4 in. (10 cm) of the surface. In adjacent upland areas, redox concentrations are absent or are only observed below 6 in. (15cm). It may be helpful to involve a soil scientist or wetland scientist familiar with these soils.

Data Sheet – Page 3, Soil

S7. Dark Surface – listed as indicator for problematic hydric soils

F10. Marl – not listed as indicator

S11. High Chroma Sands – not listed as indicator



SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 148B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 148B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 148B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 148B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 148B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

US Army Corps of Engineers

Northcentral and Northeast Region – Version 2.0

Summary

- Three new hydric soil indicators are approved for use in Michigan
- Indicators are not on official forms yet but will be when forms are updated
- New indicators improve the accuracy of hydric soil identification and wetland delineation in Michigan’s diverse wetlands


Hosts with Members of National
Technical Committee for Hydric Soils
MISSION
ACCOMPLISHED!
09/20/20