Supplements adopt NTCHS Indicators.

‘87 Manual soil indicators are no longer ‘valid’
Field Indicators originated as

- Refinements of 1987 Indicators
  - Low Chroma Colors, Mottles
  - Gleyed Colors
  - “High” Organic Matter Content
  - Organic Streaking
  - Histosol, Histic epipedon
  - Sulfidic Material

- Address problem soils
Field Indicators only

- Corps 1987 Manual list of Indicators for hydric soil are no longer valid. They are addressed in specific Field Indicators.
  - Low Chroma Colors, Redox (F3, F6, F7, A11)
  - Gleyed Colors (A11, A12, F2)
  - “High” Organic Matter Content (A10, F1, S1)
  - Organic Streaking (A5, S6)
  - Histosol, Histic epipedon (A1, A2)
  - Sulfidic Material (A4)
Field Indicators of Hydric Soils in the U. S.

- Available on-line at
  www.soils.usda.gov/use/hydric/

- Scroll down to “Links”
- Click on Field Indicators of Hydric Soils v 7.0

✓ Also check “Errata” for changes & updates
Control Sections or Zones

1) Layers with:
   - high value, low chroma or;
   - redoximorphic features or;
   - organic matter accumulations
2) at a depth
3) of certain thickness
Depleted / Gleyed Matrix

4/1, 4/2, 5/2, 5/1 or 6/2 with 2% redox concentrations
5/1 or 6/2 with or without redox features
Value >=4 Gley pages
10YR Hue
Depleted Matrix
**Gleyed Matrix**

**Gley Pages**

**Value 4 or more**

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**Figure A2.** For hydric soil determinations, a gleyed matrix has the hues and chroma identified in this illustration with a value of 4 or more. *Due to inaccurate color reproduction, do not use this page to determine soil colors in the field.* Background image from the Munsell Soil Color Charts reprinted courtesy of Munsell Color Services Lab, a part of X-Rite, Inc.
<table>
<thead>
<tr>
<th>Hydric Soil Indicators for the MW &amp; NC Regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>- A1, Histosol</td>
</tr>
<tr>
<td>- A2, Histic Epipedon</td>
</tr>
<tr>
<td>- A3, Black Histic</td>
</tr>
<tr>
<td>- A4, Hydrogen Sulfide</td>
</tr>
<tr>
<td>- A5, Stratified Layers</td>
</tr>
<tr>
<td>- A10, 2 cm muck*</td>
</tr>
<tr>
<td>- A11, Depleted Below Dark Surface</td>
</tr>
<tr>
<td>- A12, Thick Dark Surface</td>
</tr>
<tr>
<td>- A16, Coast Prairie Redox **</td>
</tr>
<tr>
<td>- S1, Sandy Mucky Mineral</td>
</tr>
<tr>
<td>- S3, 5 cm Mucky Peat or Peat *</td>
</tr>
<tr>
<td>- S4 Sandy Gleyed Matrix</td>
</tr>
<tr>
<td>- S5, Sandy Redox</td>
</tr>
<tr>
<td>- S6, Stripped Matrix</td>
</tr>
</tbody>
</table>

* MW, test in NC

**Test indicator in MW & NC
# Hydric Soil Indicators for the MW & NC Regions

- **S7**, Dark Surface **
- **S8**, Polyvalue Below Surface*
- **S9**, Thin Dark Surface*
- **F1**, Loamy Mucky Mineral
- **F2**, Loamy Gleyed Matrix
- **F3**, Depleted Matrix
- **F6**, Redox Dark Surface
- **F7**, Depleted Dark Surface
- **F8**, Redox Depresssions
- **F12**, Iron-Manganese Masses **
- **F21**, Red Parent Material *
- **TF12**, V. Dark Shallow Surface **

*Test indicator NC only  ** Test indicator MW & NC
All - Depleted below Dark Surface

- A layer at least 6” thick with a depleted matrix starting <12” from the surface. The layer(s) above the depleted matrix have value ≤3 and chroma ≤2 (chroma ≤1 if sandy).
- Generally Mollisols
- MW & NC Regions
A12, Thick Dark Surface

A layer at least 6” thick with a depleted or gleyed matrix starting 12” or more from the surface. The layer(s) above have value $<2.5$ and chroma $\leq 1$ in upper 12” and value $\leq 3$ and chroma $\leq 1$ in the remainder of the epipedon (think Mollisols!)
Sandy Soils with High OM surface layers

S1, Sandy Mucky Mineral

Lab testing or professional soil scientist recommended

MW & NC Regions
Sandy Soils
with Redox Colors

- **S5, Sandy Redox**

  A 4” layer starting w/in 6” of the surface, matrix >60% chroma ≤2 and ≥2% “distinct or prominent” redox concentrations.

MW & NC Regions
Tabular key for contrast determination using Munsell® notation

Note: If both colors have values of ≤ 3 and chromas of ≤ 2, the color contrast is Faint (regardless of the difference in hue).

### Key for determining Contrast

#### Hues are the same ($\Delta h = 0$)

<table>
<thead>
<tr>
<th>$\Delta$ Value</th>
<th>$\Delta$ Chroma</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>≤ 1</td>
<td>Faint</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>Distinct</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td>Distinct</td>
</tr>
<tr>
<td>0</td>
<td>≥ 4</td>
<td>Prominent</td>
</tr>
<tr>
<td>1</td>
<td>≤ 1</td>
<td>Faint</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Distinct</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>Distinct</td>
</tr>
<tr>
<td>1</td>
<td>≥ 4</td>
<td>Prominent</td>
</tr>
<tr>
<td>≤ 2</td>
<td>≤ 1</td>
<td>Faint</td>
</tr>
<tr>
<td>≤ 2</td>
<td>2</td>
<td>Distinct</td>
</tr>
<tr>
<td>≤ 2</td>
<td>≥ 3</td>
<td>Distinct</td>
</tr>
<tr>
<td>≤ 2</td>
<td>≥ 4</td>
<td>Prominent</td>
</tr>
</tbody>
</table>

#### Hues differ by 1 ($\Delta h = 1$)

<table>
<thead>
<tr>
<th>$\Delta$ Value</th>
<th>$\Delta$ Chroma</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>≤ 1</td>
<td>Faint</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>Distinct</td>
</tr>
<tr>
<td>0</td>
<td>≥ 3</td>
<td>Prominent</td>
</tr>
<tr>
<td>1</td>
<td>≤ 1</td>
<td>Faint</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>Distinct</td>
</tr>
<tr>
<td>1</td>
<td>≥ 3</td>
<td>Prominent</td>
</tr>
<tr>
<td>≤ 2</td>
<td>≤ 1</td>
<td>Faint</td>
</tr>
<tr>
<td>≤ 2</td>
<td>2</td>
<td>Distinct</td>
</tr>
<tr>
<td>≤ 2</td>
<td>≥ 3</td>
<td>Prominent</td>
</tr>
</tbody>
</table>

#### Hues differ by 2 ($\Delta h = 2$)

<table>
<thead>
<tr>
<th>$\Delta$ Value</th>
<th>$\Delta$ Chroma</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Faint</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>Distinct</td>
</tr>
<tr>
<td>0</td>
<td>≥ 2</td>
<td>Prominent</td>
</tr>
<tr>
<td>1</td>
<td>≤ 1</td>
<td>Distinct</td>
</tr>
<tr>
<td>1</td>
<td>≥ 2</td>
<td>Prominent</td>
</tr>
<tr>
<td>≥ 2</td>
<td>---</td>
<td>Prominent</td>
</tr>
</tbody>
</table>

#### Hues differ by 3 or more ($\Delta h ≥ 3$)

<table>
<thead>
<tr>
<th>$\Delta$ Value</th>
<th>$\Delta$ Chroma</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color contrast is prominent, except for low chroma and value.</td>
<td>Prominent</td>
<td></td>
</tr>
</tbody>
</table>
Loamy Soils

F1, Loamy Mucky mineral

- A layer of mucky modified loamy or clayey soil material ≥4” thick starting within 6” of the surface.

Even expert soil scientists cannot consistently apply this indicator without lab data (MW & NC Regions)
F3, Depleted Matrix

A layer at least 6” thick with a depleted matrix that has 60% or more chroma 2 or less starting within 10” of the surface.
Loamy Soils

**F6, Redox Dark Surface**

- A layer at least 4” thick entirely within the upper 12” that has:
  
  a. matrix value \( \leq 3 \) and chroma 1 or less and \( >2\% \) redox concentrations, or

  b. matrix value \( \leq 3 \) and chroma \( <2 \) and \( >5\% \) redox concentrations.

**MW & NC Regions**
Universal Indicators

• A11 Depleted Below Dark Surface
• A12 Thick Dark Surface
• S5 Sandy Redox
• F3 Depleted Matrix
• F6 Redox Dark Surface
• F21 Red Parent Material

GET TO KNOW THESE!
Identifying “Problematic” Hydric Soils
MW Problematic Soils

Soils with Faint or No Indicators

• Shallow soils over dolomite (high pH inhibits redox features from developing)

• Fluvial Sediments within Floodplains (active deposition, low Fe or Mn, low OM)

• Recently Developed Wetlands (mitigation sites, WRP, etc.)

• Seasonally Ponded Soils (restrictive layer near surface, limited saturation depth)
NC Problematic Hydric Soils

• *Soils with Faint or No Indicators*
  – Sandy Soils
  – Red Parent Materials
  – Fluvial Deposits within Floodplains
  – Recently Developed Wetlands
  – Seasonally Ponded Soils
  – Discharge Areas for Iron-Enriched Groundwater

• *Non-Hydric Soils that May Be Misinterpreted as Hydric*
  – Spodosols
Problem Soil Indicators

Are not recognized by the NTCHS, (test indicators)

or

May not applicable to LRR K & M
Indicators for Problematic Soils

MIDWEST

A16 – Coastal Prairie Redox
S7 – Dark Surface
F12 – Iron/Manganese Masses
TF12 – Very Shallow Dark Surface
## Indicators for Problematic Soils

### NORTHCENTRAL

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A10</td>
<td>2 cm Muck</td>
</tr>
<tr>
<td>S3</td>
<td>2” Mucky Peat or Peat</td>
</tr>
<tr>
<td>S8</td>
<td>Polyvalue Below Surface</td>
</tr>
<tr>
<td>F12</td>
<td>Iron/Manganese Masses</td>
</tr>
<tr>
<td>TF12</td>
<td>Very Shallow Dark Surface</td>
</tr>
<tr>
<td>A16</td>
<td>Coast Prairie Redox</td>
</tr>
<tr>
<td>S7</td>
<td>Dark Surface</td>
</tr>
<tr>
<td>S9</td>
<td>Thin Dark Surface</td>
</tr>
<tr>
<td>F21</td>
<td>Red Parent Material</td>
</tr>
</tbody>
</table>
MW & NC Procedure for Problematic Soils

1. Is hydrophytic vegetation present? If Yes, go to 2.

2. Is 1 primary or 2 secondary hydrology indicators present? If Yes, go to 3.

3. Will landscape position collect or concentrate water? If Yes, go to 4.

4. In the Remarks Section, put why no Indicators were met and determine whether the soil is hydric by:
MW Problematic soil Procedures

4a. meeting Problem Indicators A16, S7, F12, or TF12.

4b. meeting Problematic Soil Situations
- Shallow Soils over Dolomite
- Fluvial deposits within floodplains
- Recently developed wetlands
- Seasonally ponded soils
NC Problematic soil Procedures

4a. meeting Problem Indicators A10, A16, S3, S7, S8, S9, F12, F21, or TF12.

4b. meeting Problematic Soil Situations
   - Sandy soils
   - Red parent material
   - Fluvial deposits within floodplains
   - Recently developed wetlands
   - Seasonally ponded soils
   - Discharge areas for iron-enriched groundwater
MW & NC Problematic
Soil Procedures

4c. having a 4” layer starting w/in 12” that oxidizes when exposed to air. (must change color w/in 30 minutes and does NOT dry out)

4d. having a 4” layer w/in 12” that is reduced, indicating ferrous iron is present. (soil must be saturated in order to test a freshly broken ped face with alpha, alpha-dipyridyl dye)

4e. having stream gauge data, water-table monitoring data or repeated observation that show soil is flooded, ponded, or saturated to the surface for ≥14 consecutive days during the growing season.

If Yes to any above, soil is Hydric, put in remarks section.
Hydric Soils Tech Note 4

Both Supplements permit combining Indicators if all requirements are met except thickness.

- S5 – Sandy Redox
- S7 – Dark Surface
- F1 – Loamy Mucky Mineral
- F3 - Depleted Matrix
- F6 – Redox Dark Surface
- F7 – Depleted Dark Surface
0-3, 10YR 2/1, Loam
3-6, 10YR 3/1, cmp 7.5YR redox, Loam
6-10, 10YR 5/2, cmp 7.5YR redox, Loam
10-20, 2.5Y 4/2, Loam

• F6 needs 4 inches w/in upper 12 inches
• F3 needs 6 inches starting w/in 10 inches

• Combine layer 2 & 3 to meet the more restrictive 6 inch requirement of F3
The ‘Professional Judgment’ Clause

• The indicators are used to help identify the hydric soil component of wetlands; however, some hydric soils do not have any of the currently listed indicators. The absence of any listed indicator does not preclude the soil from being hydric.
  – Some “wet” sites will not meet an indicator. What do we do if we believe a soil is hydric?

• Guidance for identifying hydric soils that lack indicators can be found in Chapter 3 (see the sections on documenting the site and its soils) and in Chapter 5 (Difficult Wetland Situations in the Region).