A SUMMARY OF HYDRIC SOILS INDICATORS

For New England-wide use with Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: North Central & Northeast (Version 2.0) ERDC/EL-TR-12-1

User Notes & Definitions in Field Indicators for Identifying Hydric Soils in New England V4 offer significant additions to address some soil forming factors that may be unique to our formerly glaciated region — those notes & definitions are not presented in this summary.

IMPORTANT CONCEPTS

The Relevant Soil Surface** — for indicators A1 (Histosol), A2 (Histic Epipedon), & A3 (Black Histic), & S3 (5cm Mucky Peat or Peat) depths are measured from the top of the organic material (peat, mucky peat, or muck); for A11 & A12, depths measured top of muck, if present; otherwise, in LRR R depths are measured from the top of the mineral surface, & in LRR S depths are measured from the top of the muck, or mineral surface, when muck is absent. **Note -- this language attempts to capture the overriding concepts in NTCHS Indicators Version 8.1, Page 4 & ERDC/EL TR-12-1, Page 40.

Layer(s): A horizon, subhorizon, or combination of contiguous horizons or subhorizons sharing at least one property referred to in the indicators.

Mucky Modified Mineral Soil Material: (See Page 2 Figure entitled “Thresholds—Organic & Mineral Soil Material). Also note: where the organic component is peat (fibric material) or mucky peat (hemic material), mucky mineral soil material does not occur.

Organic Masking Requirement – the relevant sandy layer is value ≤3 & chroma ≤1, and has at least 70% of the visible soil particles masked with organic material, when viewed through a 10x or 15x hand lens. Observed without a hand lens, the particles appear to be close to 100% masked.

Redoximorphic Features – include masses, pore linings, nodules and concretions, iron depletions, clay depletions, reduced matrices.

Nodules & Concretions – Note: These are not considered to be redox concentrations in any of the indicators.

SYMBOLS USED IN THIS SUMMARY:

> Greater Than
\( \leq \) Equal To or Less Than
\( \geq \) Equal To or Greater Than

COMBINING INDICATORS: [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/) (see Hydric Soil Technical Note 4) It is permissible to combine certain hydric soil indicators if all requirements of the individual indicators are met except thickness. The most restrictive requirements for thickness of layers in any indicators used must be met.

CONTRAST -- DISTINCT OR PROMINENT: Any feature above the upper threshold for faint features would be considered either distinct or prominent. If an indicator requires distinct or prominent features, then those features at or below the faint threshold do not count.

<table>
<thead>
<tr>
<th>Upper Threshold for Faint</th>
<th>( \Delta ) Hue</th>
<th>and ( \Delta ) Value</th>
<th>and ( \Delta ) Chroma</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>≤2</td>
<td>≤1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>≤1</td>
<td>≤1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Any \( \Delta \) Hue if BOTH hues have values ≤3 and chromas ≤2

THRESHOLDS-- ORGANIC & MINERAL SOIL MATERIAL:

<table>
<thead>
<tr>
<th>Percent Organic Carbon</th>
<th>Percent Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>60+</td>
</tr>
</tbody>
</table>

ORGANIC SOIL MATERIAL

MUCKY MINERAL SOIL MATERIAL

MINERAL SOIL MATERIAL

See Exceptions in Certain MLRAs:

POTENTIAL INDICATORS FOR PROBLEMATIC SOILS (Continued)

F21. Red Parent Material. A layer derived from red parent materials that is ≥10cm(4in) thick, starting within 25cm(10in) of the soil surface with a hue of 7.5YR or redder. The matrix has a value & chroma ≥2 & ≤4. The layer must contain ≥10% depletions and/or distinct or prominent redox concentrations occurring as soft masses or pore linings. Redox depletions should differ in color by having:
  a. value one or more higher & chroma one or more lower than the matrix, or
  b. value ≥4 & chroma ≤2.

F22 Very Shallow Dark Surface. In depressions and concave landforms. One of following:
  a. If bedrock occurs between 15cm(6in) and 25cm(10in) of the soil surface, there’s a layer ≥15cm(6in) thick, starting ≤10cm(4in) from the soil surface with value ≤2 & chroma ≤1, remaining soil to bedrock must have that same color, or any other color with chroma ≤2.
  b. If bedrock occurs ≤15cm(6in) from the soil surface, >50% of soil thickness must have value≤2.5 & chroma ≤1, remaining soil to bedrock must have that same color, or any other color with chroma ≤2.

NE A1. Frigid Spodic. Starting ≤15cm(6in) of the soil surface there is a layer that has value of ≥4 & chroma ≤2 in which iron, manganese & other oxides have been stripped from the soil matrix, exposing the primary base color of the soil material, and/or there are ≥2% redox concentrations occurring as soft masses or pore linings. These stripped areas & the translocated oxides and/or organic matter form a faintly contrasting pattern of two or more colors with diffuse boundaries. The layer immediately below the stripped layer must have value ≤3 & chroma ≤2 & be ≥8cm(3in) thick.

NE F1 Glaciated Northeast Red Parent Material. A layer derived from red parent material ≥15cm(6in) thick, starting ≤25cm(10in) of the soil surface and having hue 7.5YR or redder, with matrix value & chroma ≥2 ≤4. Layer must contain ≥5% distinct or prominent depletions &/or redox concentrations occurring as soft masses or pore lining

NE S1. Three Chroma Sands. A layer ≥10cm (4in) thick & has matrix chroma ≤1 & value ≤3 & is directly underlain by a layer starting ≤30cm(12in) of the soil surface that has a matrix value ≥4 & chroma ≤3 with ≥2% prominent or distinct redox features.

Morphologies to Consider in Disturbed Soils.
The process for identifying human altered hydric soils requires an interpretive history of the site, plant analysis, recognition of earth moving and accompanying alterations to the landscape and hydrology, and finally assessment of the soil morphology for evidence of wetland hydrology. Much of this will require professional judgement. Even with strong evidence of hydric soil conditions, users may also want to consider monitoring to establish the extent of both saturated and reducing conditions.

HTM-A. Human Transported Material (All Textures) over Natural Soil. Starting ≤30cm(12in) of the soil surface there is
  a. a layer with chroma ≤2 and >2% redoximorphic features; or
  b. a layer with chroma ≤1.

HTM-S. Human Transported Material (Sandy) over Natural Soil. Starting ≤30cm(12in) of the soil surface there is
  a. a layer with chroma ≥3 and >2% redoximorphic features; or
  b. a layer with chroma ≥2

EX-1. Excavated with No Restrictive Layer. There is undisturbed mineral soil material ≤30cm(12in) of soil surface that extends ≥100cm(40in) below soil surface and,
  a. directly below an A-horizon there is ≥2% redoximorphic features, or
  b. if no A-horizon, there is ≥2% redoximorphic features ≤15cm(6in) of soil surface.

EX-2. Excavated with Restrictive Layer. A layer of undisturbed mineral soil material with ≥2% redoximorphic features ≤30cm(12in) of the soil surface, and a restrictive layer ≤30cm(12in) of the soil surface.
Loamy Clayey Soils (Continued)

F7. Depleted Dark Surface. Redox depletions with value ≥5 & chroma ≤2 in a layer that is at
≥10cm(4in) thick, is entirely within the upper 30cm(12in) of the mineral soil, & has:

a. matrix value ≤3 & chroma ≤1 & ≥10% redox depletions, or
b. matrix value ≤3 & chroma ≤2 & ≥20% redox depletions.

F8. Redox Depressions. In closed depressions subject to ponding, ≥5% distinct or prominent
redox concentrations occurring as soft masses or pore linings in a layer that is ≥5cm(2in) thick &
starting ≤10cm(4in) of the soil.

POTENTIAL INDICATORS
FOR PROBLEMATIC SOILS
New England

TA6. Mesic Spodic. (ONLY MLRA 144A, 145, & 149B). A layer ≥5cm(2in) thick starting within
15cm(6in) of the mineral soil surface that has value ≤3 & chroma ≤2 that is underlain by either:

a. a layer(s) ≥8cm(3in) thick occurring within 30cm(12in) of the mineral soil surface that has value &
chroma ≤3 that shows evidence of spodic development; or
b. a layer(s) ≥5cm(2in) thick occurring within 30cm(12in) of the mineral soil surface that has value
>4 & chroma ≤2 that is directly underlain by a layer(s) ≥8cm(3in) thick with value ≤3 & chroma ≤3 that
shows evidence of spodic development.

A10. 2cm Muck. (ONLY in MLRA 149B, Long Island/Cape Cod subregion). A layer of muck ≥2cm.
(0.75in) thick with value ≤3 & chroma ≤1 & starting within 15cm. (6in) of the soil surface.

A16. Coast Prairie Redox. (NOT for use in MLRA 149B, Long Island/Cape Cod subregion) a layer
starting within 15cm(6in) of the soil surface that is ≥10cm. (4in) thick & has a matrix chroma ≤3 & ≥2% distinct or prominent redox concentrations occurring as soft masses and/or pore linings.

S3. 5cm Mucky Peat or Peat. (NOT for use in MLRA 149B, Long Island/Cape Cod subregion).
(Primarily in Interdunal Swales). A layer of mucky peat or peat 5cm(2in) or more thick with value ≤3 &
chroma ≤2, starting within 15cm(6in) of the soil surface, & underlain by sandy soil material.

F12. Iron-Manganese Masses. On floodplains, a layer ≥10cm(4in) thick with ≥40% chroma ≤2 & ≥2% distinct or prominent redox concentrations occurring as soft iron/manganese masses with diffuse
boundaries. The layer occurs entirely within 30cm(12in) of the soil surface. Iron-manganese masses
have value & chroma ≤3. Most commonly, they are black. The thickness requirement is waived if the
layer is the mineral surface layer.

floodplains, a mineral layer ≥15cm(6in) thick starting within 25cm(10in) of the soil surface with a matrix
(60% or more of the volume) chroma <4 & ≥20% distinct or prominent redox concentrations occurring
as soft masses or pore linings.
A layer sofl surface for Indicator S6, have a dominant chroma ≤2, or the layer(s) with a dominant chroma >2 is <15cm(6in) thick.

**A1. Histosol.** Classifies as a Histosol (except Folist).

**A2. Histic Epipedon.** A histic epipedon underlain by mineral soil material with chroma ≤2

**A3. Black Histic.** A layer of peat, mucky peat, or muck ≥20cm(8in) thick that starts within the upper 15cm(6in) of the soil surface; has hue of 10YR or yellower, value ≤3 & chroma ≤1; & is underlain by mineral soil material with chroma of ≤2.

**A4. Hydrogen Sulfide.** A hydrogen sulfide odor within 30cm(12in) of the soil surface.

**A5. Stratified Layers.** Several stratified layers starting within the upper 15cm(6in) of the soil surface. One or more of the layers has value of ≤3 & chroma ≤1, and/or it is muck, mucky peat, or peat or has a mucky modified mineral texture. The remaining layers have chroma ≤2. In sandy layer with value ≤3 see Organic Masking Requirement.

**A11. Depleted Below Dark Surface.** A layer with a depleted or gleyed matrix that has ≥60% chroma ≤2, starting within 30cm(12in) of the soil surface, & having a minimum thickness of either:

  a. 15cm(6in), or
  b. 5cm(2in) if the 5cm consists of fragmental soil material.

Sandy layers with value ≤3 & chroma ≤1 & Organic Masking Requirement; or, dark loamy or clayey layer(s) with value ≤3 & chroma ≤2 occur immediately above depleted matrix & within 15cm(6in) of soil surface.

**A12. Thick Dark Surface.** A layer at least 15cm(6in) thick with a depleted or gleyed matrix that has ≥60% chroma ≤2 & starting below 30cm(12in) of the surface. Layer(s) starting within 15cm(6in) & above depleted or gleyed matrix must have value ≤2.5 & chroma ≤1 & be ≥30cm(12in) thick & remaining layer(s) above depleted or gleyed matrix must have value ≤3 & chroma ≤1. Any dark sandy layers see Organic Masking Requirement.

**A11. Depleted Below Dark Surface.** A layer with a depleted or gleyed matrix that has ≥60% chroma ≤2, starting within 30cm(12in) of the soil surface, & having a minimum thickness of either:

a. 15cm(6in), or
b. 5cm(2in) if the 5cm consists of fragmental soil material.

Sandy layers with value ≤3 & chroma ≤1 & Organic Masking Requirement; or, dark loamy or clayey layer(s) with value ≤3 & chroma ≤2 occur immediately above depleted matrix & within 15cm(6in) of soil surface.

**S1. Sandy Mucky Mineral.** A layer of mucky modified sandy soil material ≥5cm(2in) thick starting within 15cm(6in) of the soil surface.

**S4. Sandy Gleyed Matrix.** A gleyed matrix that occupies ≥60% of a layer starting within 15cm(6in) of the soil surface.

**S5. Sandy Redox.** A layer starting within 15cm(6in) of the soil surface that is ≥10cm(4in) thick & has a matrix with ≥60% chroma ≤2 with ≥2% distinct or prominent redox concentrations occurring as soft masses and/or pore linings.

**S6. Stripped Matrix.** A layer starting within 15cm(6in) of the soil surface in which iron-manganese oxides and/or organic matter have been stripped from the matrix & the primary base color of the soil material has been exposed. The stripped areas & translocated oxides and/or organic matter form a faintly contrasting pattern of two or more colors with diffuse boundaries. The stripped zones are ≥10% of the volume & are rounded.

**S7. Dark Surface.** A layer ≥10cm(4in) thick starting within the upper 15cm(6in) of the soil surface & with a matrix value ≤3 & chroma ≤1, & Organic Masking Requirement.

**S8. Polyvalue Below Surface.** A layer with value ≤3 & chroma ≤1, starting within 15cm(6in) of the soil surface, & Organic Masking Requirement. Directly below this layer, ≥5% of the soil has value ≤3 & chroma ≤1, & the remainder of the soil volume has value ≥4 & chroma ≤1 to a depth of 30cm(12in) or to the spodic horizon, whichever is less.

**S9. Thin Dark Surface.** A layer ≥5cm(2in) thick within the upper 15cm(6in) of the soil, with value ≤3 & chroma ≤1, & Organic Masking Requirement. This layer is underlain by a layer(s) with a value ≤4 & chroma ≤1 to a depth of 12in. (30cm) or to the spodic horizon, whichever is less.

**S2. Mucky Modified Matrix.** A layer with a depleted or gleyed matrix that has ≥60% chroma ≤2, or the layer(s) with a dominant chroma >2 is <15cm(6in) thick.

**S3. Depleted Matrix.** A layer that has a depleted matrix with ≥60% chroma ≤2 & that has a minimum thickness of either:

a. 5cm(2in) if the 5cm is starts ≤10cm(4in) from the soil surface, or
b. 15cm(6in), starting ≤25cm(10in) from the soil surface.

**S6. Redox Dark Surface.** A layer ≥10cm(4in) thick, starting ≥20cm(8in) from the mineral soil surface, & has:

a. matrix value ≤3 & chroma ≤1 & ≥2% distinct or prominent redox concentrations occurring as soft masses or pore linings, or
b. matrix value ≤3 & chroma ≤2 & ≥5% distinct or prominent redox concentrations occurring as soft masses or pore linings.

**LOAMY & CLAYEY SOILS**

These soils have USDA textures of loamy very fine sand & finer. All mineral layers above any of the F Indicators, except for Indicators F8, F12, F19 & F21 have a dominant chroma ≤2, or the layer(s) with a dominant chroma >2 is ≤15cm(6in) thick.

**F2. Loamy Gleyed Matrix.** A gleyed matrix that occupies ≥60% of a layer starting within 30cm(12in) of the soil surface.

**F3. Depleted Matrix.** A layer that has a depleted matrix with ≥60% chroma ≤2 & that has a minimum thickness of either:

a. 5cm(2in) if the 5cm is starts ≤10cm(4in) from the soil surface, or
b. 15cm(6in), starting ≤25cm(10in) from the soil surface.

**F6. Redox Dark Surface.** A layer ≥10cm(4in) thick, starting ≥20cm(8in) from the mineral soil surface, & has:

a. matrix value ≤3 & chroma ≤1 & ≥2% distinct or prominent redox concentrations occurring as soft masses or pore linings, or
b. matrix value ≤3 & chroma ≤2 & ≥5% distinct or prominent redox concentrations occurring as soft masses or pore linings.