

Northeastern US Hydric Soil Indicators with Probable Application in Nova Scotia

(Adapted from: Regional Supplement to the Corps of Engineers Wetland Delineation Manual Northcentral and Northeast Region. Version 2.0, 2012)

Note: All mineral layers found above recognized hydric soil indicators (except indicators S6, F8, and F12) must have a dominant chroma of 2 or less, or the layer(s) with dominant chroma of more than 2 must be less than 15 cm thick.

All Soils (A - Indicators)

Refers to soils with any texture.

A1: Histosol.

Soils classified as Histosols (Organic) with a minimum thickness of 40 cm (also includes wetland organic soils of any thickness when found over bedrock or fragmental soil material that has interstices filled with organic material). **Note:** A1 does not include organic soils derived from upland vegetation.

A2: Histic Epipedon.

A histic epipedon (organic material 20-40 cm thick) underlain by mineral soil material with chroma of 2 or less. Proof of aquic conditions is required (i.e. presence of hydrophytic vegetation and wetland hydrology).

A4: Hydrogen Sulfide.

Hydrogen sulfide (rotten egg) odour within 30 cm of the soil surface.

A5: Stratified Layers.

Several stratified layers starting within 15 cm of the soil surface. One or more of the layers has value of 3 or less with chroma of 1 or less; or it is muck (Oh), mucky peat (Om), peat (Of), or mucky modified mineral texture. The remaining layers have chroma of 2 or less. For sandy materials that constitute the layer with value of 3

or less and chroma of 1 or less, at least 70% of the visible soil particles must be coated with organic material.

A11: Depleted Below Dark Surface.

A layer with a depleted or gleyed matrix that has 60% or more chroma of 2 or less, starting within 30 cm of the soil surface, and having a minimum thickness of either:

- 15 cm; or
- 5 cm if the 5 cm consists of fragmental soil material. Loamy/clayey layer(s) above the depleted or gleyed matrix must have value of 3 or less and chroma of 2 or less. Sandy material above the depleted or gleyed matrix must have value of 3 or less and chroma of 1 or less, and at least 70% of the visible soil particles must be coated with organic material.

A12: Thick Dark Surface.

A layer at least 15 cm thick with a depleted or gleyed matrix that has 60% or more chroma of 2 or less starting at least 30 cm below the surface. The layer(s) above the depleted or gleyed matrix must have value of 2.5 or less and chroma of 1 or less to a depth of at least 30 cm, and value of 3 or less and chroma of 1 or less in any remaining layers above the depleted or gleyed matrix. Any sandy material above the depleted or gleyed matrix must have at least 70% of the visible soil particles coated with organic material.

Sandy Soils (S - Indicators)

Refers to soil materials with texture of loamy fine sand and coarser (about 75% or more sand).

S1: Sandy Mucky Mineral.

A layer of mucky modified sandy soil material 5 cm or more thick starting within 15 cm of the soil surface. **Note:** Mucky = high organic matter content (about 10-15% for most sandy soils).

S4: Sandy Gleyed Matrix.

A gleyed matrix that occupies 60% or more of a layer starting within 15 cm of the soil surface.

S5: Sandy Redox.

A layer starting within 15 cm of the soil surface that is at least 10 cm thick and has a matrix with 60% or more chroma of 2 or less with 2% or more distinct or prominent redox concentrations occurring as soft masses or pore linings.

S6: Stripped Matrix.

A layer starting within 15 cm of the soil surface in which iron/manganese oxides and/or organic matter have been stripped from the matrix and the primary base colour of the soil material has been exposed. The stripped areas and translocated oxides and/or organic matter form a faint, diffuse splotchy pattern of two or more colours. The stripped zones are 10% or more of the volume; they are rounded and typically 1 to 3 cm in diameter. **Note:** There is no specific size criterion for the stripped areas, just % volume.

S7: Dark Surface.

A layer 10 cm thick starting within 15 cm of the soil surface with a matrix value of 3 or less and chroma of 1 or less. At least 70% of the visible soil particles must be coated with organic material. The matrix colour of the layer immediately below the dark layer must have the same colours as those described above or any colour that has a chroma of 2 or less.

S8: Polyvalue Below Surface.

A layer with value of 3 or less and chroma of 1 or less starting within 15 cm of the soil surface. At least 70% of the visible soil particles in this layer must be coated with organic material. Directly below this layer, 5% or more of the soil volume has a value of 3 or less and chroma of 1 or less and the remainder of the soil volume has a value of 4 or more and chroma of 1 or less to a depth of 30 cm or to the spodic horizon, whichever is less.

S9: Thin Dark Surface.

A layer 5 cm or more thick starting within the upper 15 cm of the soil, with value of 3 or less and chroma of 1 or less. At least 70% of the visible soil particles in this layer must be coated

with organic material. This layer is underlain by a layer(s) with value of 4 or less and chroma of 1 or less to a depth of 30 cm or to the spodic horizon, whichever is less.

Loamy and Clayey Soils (F - Indicators)

Refers to soil materials with texture of loamy very fine sand and finer.

F2: Loamy Gleyed Matrix.

A gleyed matrix that occupies 60% or more of a layer starting within 30 cm of the soil surface.

F3: Depleted Matrix.

A layer that has a depleted matrix with 60% or more chroma of 2 or less and that has a minimum thickness of either:

- 5 cm if 5 cm is entirely within the upper 15 cm of the soil; or
- 15 cm starting within 25 cm of the soil surface.

F6: Redox Dark Surface.

A layer that is at least 10 cm thick, is entirely within the upper 30 cm of the mineral soil, and has a:

- Matrix value of 3 or less and chroma of 1 or less and 2% or more distinct or prominent redox concentrations occurring as soft masses or pore linings; or
- Matrix value of 3 or less and chroma of 2 or less and 5% or more distinct or prominent redox concentrations occurring as soft masses or pore linings.

F7: Depleted Dark Surface.

Redox depletions with value of 5 or more and chroma of 2 or less in a layer that is at least 10 cm thick, is entirely within the upper 30 cm of the mineral soil, and has a:

- Matrix value of 3 or less and chroma of 1 or less and 10% or more redox depletions; or
- Matrix value of 3 or less and chroma of 2 or less and 20% or more redox depletions.

F8: Redox Depressions.

In closed depressions subject to ponding (but not including micro-depressions), 5% or more distinct or prominent redox concentrations occurring as soft masses or pore linings in a layer that is 5 cm or more thick within the upper 15 cm of the soil.

Hydric Soil Indicators for Problem Soils with Probable Application in Nova Scotia

The following indicators are not currently recognized for general application by the US National Technical Committee for Hydric Soils (NTCHS), or they are not recognized for general use within the Northeast region. However, these indicators may be applicable in problem wetland situations where there is evidence of wetland hydrology and hydrophytic vegetation, and where the soil is believed to meet the definition of a hydric soil despite the lack of recognized indicators. Note: T means Test indicator.

F21: Red Parent Material.

A layer derived from red parent material at least 10 cm thick starting within 25 cm of the soil surface with a hue 7.5YR or redder. The matrix has a value and chroma greater than 2 and less than or equal to 4. The layer must contain 10% or more depletions and/or distinct to prominent redox concentrations occurring as soft masses or pore linings. Redox depletions should have a colour value one or more steps higher and chroma one or more steps lower than the matrix; or a value of 4 or more and chroma of 2 or less.

TF12. Very Shallow Dark Surface.

In depressions and other concave landforms, one of the following:

- If bedrock occurs between depths of 15 cm and 25 cm, a layer at least 15 cm thick starting within 10 cm of the soil surface and having value of 3 or less and chroma of 1 or less; the remaining soil to bedrock must have the same colours as above or any other colour that has chroma of 2 or less.

- If bedrock occurs within a depth of 15 cm, more than half of the soil thickness must have value of 3 or less and chroma of 1 or less and the remaining soil to bedrock must have the same colours as above or any other colour that has chroma of 2 or less.

S3. 5 cm Mucky Peat or Peat.

A layer of mucky peat (Om) or peat (Of) 5 cm or more thick with a value of 3 or less and chroma 2 or less, starting within 15 cm of the soil surface, and underlain by sandy soil material.

F12: Iron / Manganese Masses.

On floodplains, a layer 10 cm or more thick with 40% or more chroma of 2 or less and 2% or more distinct or prominent redox concentrations occurring as soft iron/manganese masses with diffuse boundaries. The layer occurs entirely within 30 cm of the soil surface. Iron/manganese masses have value and chroma of 3 or less (most commonly they are black). The thickness requirement is waived if the layer is the mineral surface layer.

Indicator Notes:

- Indicator depth criteria: For indicators A1, A2, and S3, start at the top of the organic layer (excluding live material). For all other indicators, start at the top of the mineral soil.

- It is permissible to combine indicators if all other requirements of each indicator are met except thickness. The most restrictive requirement for thickness for the indicators used must be met.

- Indicator A3 (Black Histic) is not listed in this summary because any soil that qualifies as hydric under A3 will also qualify under A2 (assuming aquatic conditions or artificial drainage).

- Fragmental soil contains at least 90% coarse fragments (i.e. rock).

- Spodic = Podzolic = Bf, Bhf, and/or Bh horizons.

- The 70% coated sand particle criterion is based on viewing with a 10- or 15-power hand lens. Without a hand lens, the material looks to be almost 100% coated.

Important Definitions:

Hydric Soil.

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

Depleted Matrix.

A depleted matrix refers to the volume of a soil horizon in which the processes of reduction and translocation have removed or transformed iron creating colours of low chroma and high value.

Leached (Ae) horizons may also have low chromas and high values and may sometimes be mistaken for a depleted matrix; however, they are excluded from the concept of depleted matrix unless the soil has common or many (i.e. more than 2%) distinct or prominent redox concentrations occurring as soft masses or pore linings.

The following combinations of value and chroma identify a depleted matrix:

- Matrix value of 5 or more and chroma of 1 or less with or without redox concentrations occurring as soft masses or pore linings

- Matrix value of 6 or more and chroma of 2 or less with or without redox concentrations occurring as soft masses or pore linings

- Matrix value of 4 or 5 and chroma of 2 and 2% or more distinct or prominent redox concentrations occurring as soft masses or pore linings

- Matrix value of 4 and chroma of 1 and 2% or more distinct or prominent redox concentrations occurring as soft masses or pore linings.

Reduced matrix.

A soil matrix that has low chroma and high value, but in which the colour changes in hue or chroma when the soil is exposed to air; or which shows a positive reaction to alpha-alpha-Dipyridyl solution.

Gleyed Matrix.

A gleyed matrix has one of the following combinations of hue and value found on Munsell Gley charts:

N, 10Y, 5GY, 10GY, 5G, 10G, 5BG, 10BG, 5B, 10B, or 5PB with value of 4 or more.

Note: Colours found on Munsell Gley charts with a value of 3 or less do not qualify for gleyed matrix indicators.

Distinct and Prominent Contrast.

The following differences in hue, value, and chroma denote distinct to prominent contrast between redox concentration and soil matrix colours (Δ = change in).

Δ Hue = 0; Δ Value = 0; Δ Chroma \geq 2
 Δ Hue = 0; Δ Value = 1; Δ Chroma \geq 2
 Δ Hue = 0; Δ Value = 2; Δ Chroma \geq 2
 Δ Hue = 0; Δ Value \geq 3
 Δ Hue = 1; Δ Value = 0; Δ Chroma \geq 2
 Δ Hue = 1; Δ Value = 1; Δ Chroma \geq 2
 Δ Hue = 1; Δ Value \geq 2
 Δ Hue = 2; Δ Value = 0; Δ Chroma \geq 1
 Δ Hue = 2; Δ Value \geq 1
 Δ Hue \geq 3

Note: if both colours have value of 3 or less and chroma of 2 or less, the contrast is faint regardless of the difference in hue.

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June, 2012