

# Indicators for Problem Hydric Soils

Field Indicators for Identifying Hydric Soils in New England  
Version 4 – New England Hydric Soil Technical Committee

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## Why are some soils considered "problem hydric soils?"

- 1- Morphology – false positives.
- 2- Geology – morphologies are masked.
- 3- Human Altered Soils – morphologies weakly expressed.

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## Morphology – false positive

A 10.2 cm Muck – a layer of muck 0.75" or more thick less 6" from soil surface.



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Morphology – false positive

A16. Coast Prairie Redox – less than 6 " from soils surface, have a matrix color of chroma 3 or less with 2 percent redox features.



All hydric soils have a dominant chroma of 2 or less.

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Morphology – false positive.

NE – S1. – Three Chroma Sands (modified technical description).

Topsoil layer – Value 3 or less an chroma 1 or less.

Directly underlain by:

Matrix value 4 or more, chroma 3 or less, with 2 % distinct or prominent redox.

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Does this profile meet NE-S1 – Three Chroma Sands?  
 What is the texture? What is the matrix color directly underlying the topsoil? What is the topsoil color?

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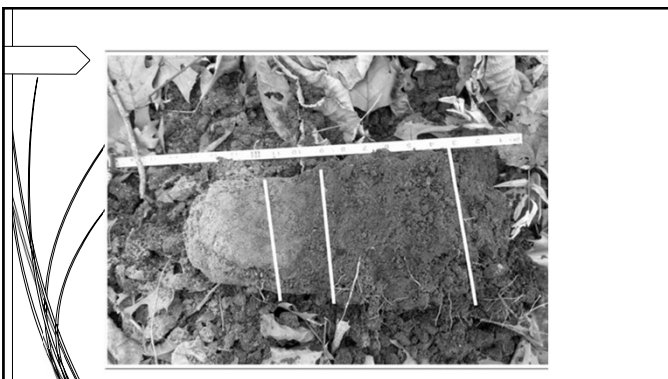
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What other indicators might identify this soil as hydric?

While this is the mottle profile for NE-S1 - Three Chroma Sands, there might be other indicators that could be used?

It is allowed to use more than one indicator to identify the soil as hydric.

Combining indicators: both sandy and loamy layers can occur in the same soil profile. A soil with a loamy surface layer over sand is hydric if the surface layer meets an indicator.



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What does a typical hydric soil look like?

A 11 - Depleted Below a Dark Surface. - Matrix of Chroma 2 less than 12 inches from the soil surface.



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Mottle concept of a hydric soil is A 11.

Topsail is dark - 10YR3/2  
Directly underlain with a grey subsoil 2.5Y 5/1  
Distinct of Prominent Redox Concentrations of 2% or more.



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Morphology – false positive.

S3. 5 cm Mucky Peat or Peat - (modified technical description) – a layer of mucky peat or peat 2 " or more thick with a value of 3 or less and chroma 2 or less.



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Geology – indicators are masked

NE-F1 – Glaciated Northeast Red Parent Material – (modified text) – a "B" horizon or a subsoil layer less than 10 inches from the soil surface with a hue of 7.5YR or redder, with value and chroma of 2, 3 or 4. Layer must have 5% or more redox concentrations.

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Red Parent Materials

Found in the Connecticut Valley that is the Triassic-Jurassic aged rift valley that spans Connecticut and Massachusetts.

Sedimentary rocks found in this valley are red in color.

These red rocks have a low propensity for color change.

Which means they typically do not have a depleted matrix of chroma 2 or less.



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F21 and NE - F1

Virtually none of the other indicators will work in identifying hydric soils formed in red parent materials.



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Soils that are mapped in Red Parent Materials:

Cheshire Ludlow Menlo Holyoke Yalesville Wethersfield  
Wilbraham

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Geology – masking indicators

Folists and Folistic Epipedons – not so much geology as it is topography.

These soils have thick surface layers of organic soil materials that are 6 inches or more thick, dominated by sphagnum, and are saturated less than 30 days cumulatively during a normal year.

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**Cold Rocky Mountains**

Found on the summit, shoulder, and backslope of these mountains and high elevation hills.

Under forests dominated by conifers.

The organic matter accumulates because it is too cold to decompose.



Map 1. Folists and Folistic Epipedons

Folists and Folistic epipedons

Legend

- Folists and Folistic epipedons
- Land Resource Regions

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**Folists**

Black sphagnum layer over bedrock.



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**Soils that are mapped as Folists:**

Knob Lock    Mahosuc    Ricker

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Geology – masks indicators.

Calcareous Parent Material – term for soils derived from calcium carbonate bearing rock like limestone, dolomite or marble.

Have a high pH.

Located in valleys of the Litchfield Hills, Berkshire Mountains, Green Mountains. Western portion of NE.

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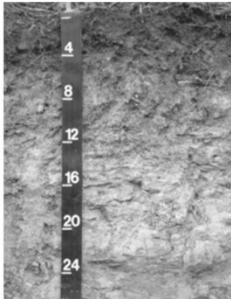
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Calcareous Soils

Don't have as much color as other soils.

Matrix is a lighter color.

More difficult to identify hydric soil indicators because the geology matrix color may already be two chroma.



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Calcareous Soils

These soils are much more extensive than the little blue area shown.

From Connecticut to Maine, pockets of calcareous soils can be found in the valleys of the mountain ranges.



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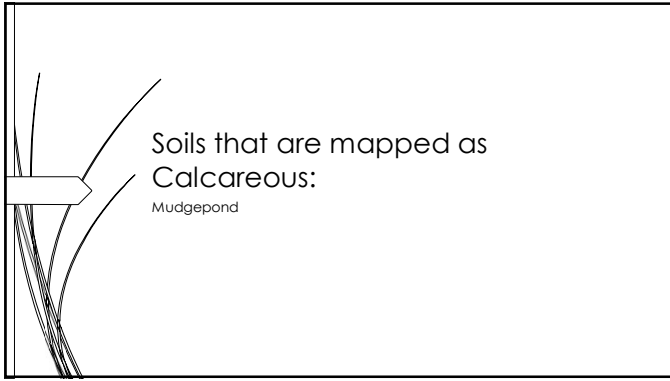
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Soils that are mapped as  
Calcareous:  
Mudgepond

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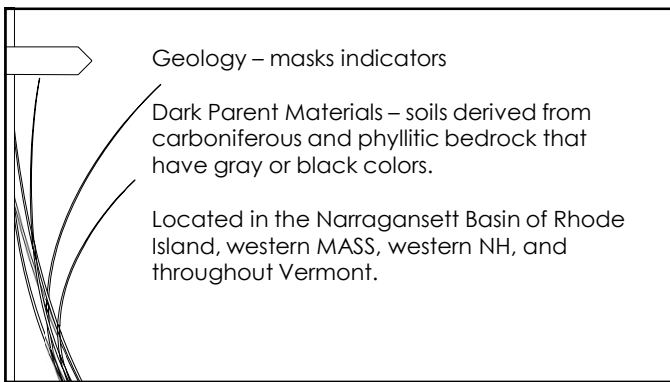
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Geology - masks indicators

Dark Parent Materials - soils derived from carboniferous and phyllitic bedrock that have gray or black colors.

Located in the Narragansett Basin of Rhode Island, western MASS, western NH, and throughout Vermont.

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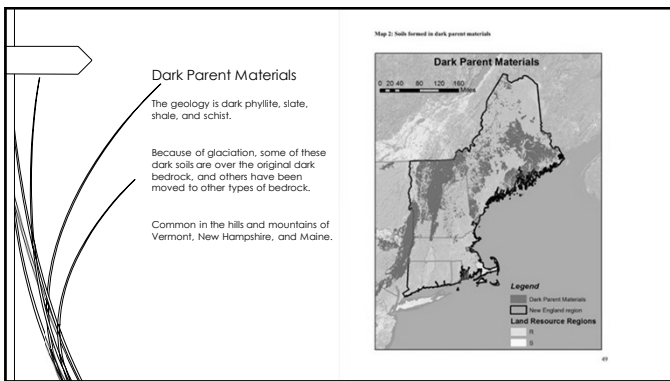
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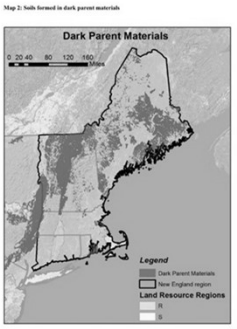


Dark Parent Materials

The geology is dark phyllite, slate, shale, and schist.

Because of glaciation, some of these dark soils are over the original dark bedrock, and others have been moved to other types of bedrock.

Common in the hills and mountains of Vermont, New Hampshire, and Maine.



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**Dark Parent Material**

The soil colors commonly have low chroma and value.

Difficult to assess wet soil morphology such as low chroma colors, depletions and depleted matrices.



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**Soils that are mapped as Dark Parent Materials:**

Mansfield, Newport, Pittstown, Stissing, Bernardston, Brayton, Buckland, Cabot, Dummerston, Dutchess, Fullam, Glover, Hubbardton, Kearsarge, Lanesboro, Macomber, Mansfield, Nassau, Peacham, Pennichuck, Pittstown, Shelburne, Taconic, Vershire.

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**Geology – masking indicators**

Soils formed in marine sediments are found along the coasts of Maine, New Hampshire and Massachusetts. These are called glaciomarine parent materials because the land mass was depressed by the weight of the glacier below sea level.

The silts and clays were deposited under the sea water, then the land lifted.

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**Marine Silts and Clays**

As the glacier receded, the land mass lifted.

This process is known as isostatic rebound.

The marine silts and clays are low chroma, whether hydric or not.

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**Somewhat Poorly Drained Silty Clay Loam**

At first glance, this soil appears hydric due to the low chroma colors.

Close inspection of the "B" or subsoil horizon shows a layer that is chroma 3 or 4.

The higher chroma subsoil means that the chroma 2 layer is not directly underlying the dark topsoil.

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Soils that are mapped in marine sediments:

- Boxford
- Buxton
- Lamouine
- Scantic
- Scitico

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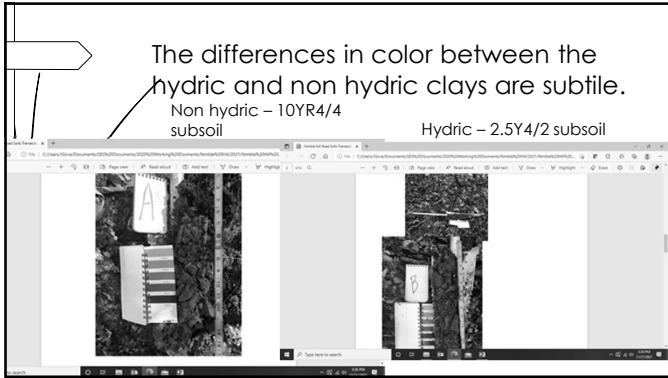
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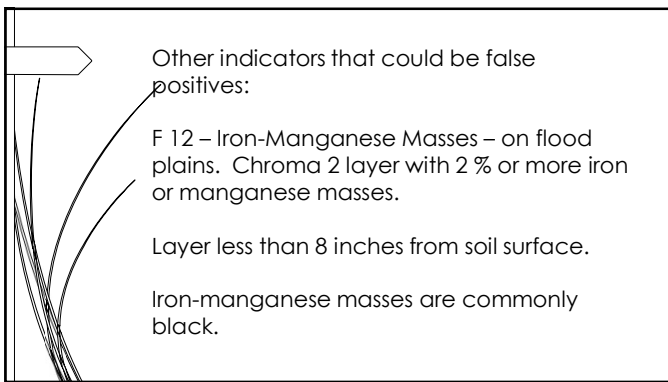
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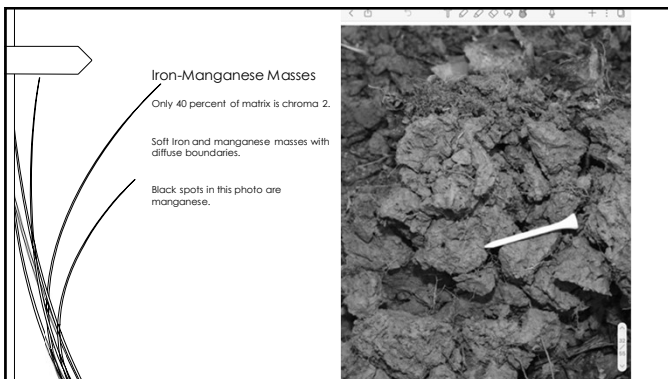
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**Manganese Masses**  
This was not on a flood plain but rather in marine silts and clays

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**F 19 Piedmont Floodplains** – on flood plains, matrix at 10 inches or less, matrix of chroma 4 or less, with 20% or more redox concentrations.

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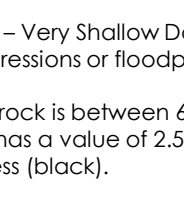
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**F 22 – Very Shallow Dark Surface** – in depressions or floodplains.

Bedrock is between 6" and 10 " and loamy soil has a value of 2.5 or less and chroma 1 or less (black).

Bedrock is less than 6" and similar soil colors above for 1/2 the thickness and the rest is chroma 2 or less.

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NE – A2 – Dark Muck or Mucky Peat

A surface layer of muck or mucky peat (sapric or hemic) 4" thick but less than 8" thick and underlain by mineral soil of chroma 2 or less.

Not difficult to apply the morphology and relatively common. This is the old concept of the very poorly drained soil for NH septic.

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NE – A1 – Frigid Spodic – less than 6" from the soil surface, a layer with a value of 4 or more and chroma 2 or less (albic) where oxides have been stripped from the matrix and the primary case color is exposed. With 2 % redox concentrations.

Immediately below the stripped layer is a layer of accumulation of illuvial organic carbon, aluminum or iron at least 3" thick.

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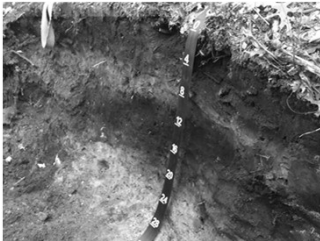
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NE-A1 Frigid Spodic

Spodosols are always difficult to interpret.  
The intent is that not all spodosols, especially in the frigid soil areas, are hydric.  
The color of the layer of accumulation is the critical element.



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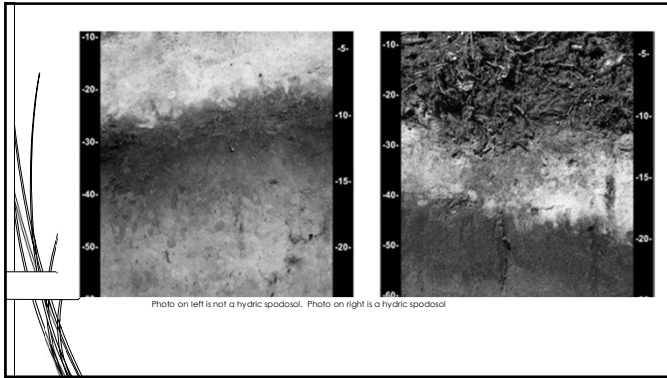
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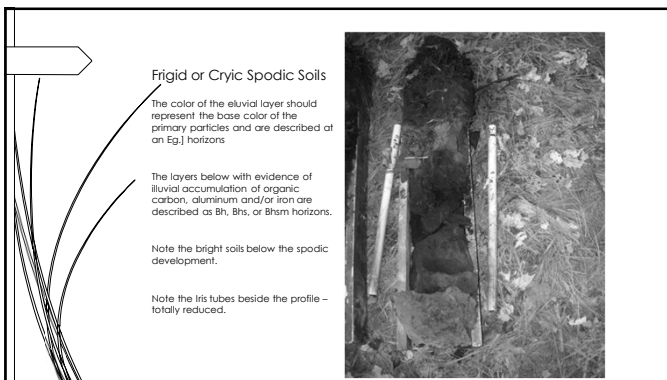
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**Human Altered Hydric Soils**

Where human transported material (HTM) (fill) overlies a natural soil.

HTM – A (all textures)  
Within 12" of the surface, chroma 2 or less with 2% redox features.

HTM-S (sandy)  
Within 12" of the surface, chroma 3 or less and 2% redox features within 8".

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**Fill was placed over a hydric soil.**

- The fill has developed hydric soil
- HTM-A
- 2% Redox Features
- Matrix is chroma 2 or less.



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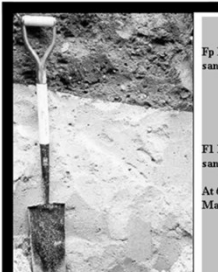
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**New England Soil Profiles**

**Psammments**

Filled  
Does not meet HTM –S

The hydric soil – Massasoit – was filled  
Currently the fill is



Fp Horizon, loamy sand fill material.

F1 Horizon, coarse sand fill material  
At 63" is a buried Massasoit Soil.

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Human-Altered Soils where natural soil has been removed.

EX – 1  
Less than 6" there is 2% redox features and there is no restrictive layer within 40" of the soil surface.

EX – 2  
Less than 12" there is 2% redox features and there is a restrictive layer within 12 inches of soil surface.

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Meets EX-1

While there is the chroma 2 colors the major features are the redox manganese and iron concentrations.



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A 17 Mesic Spodic

Has been removed from the problem soil section – was TA 6.

While it is no longer a problem hydric soil, it is still difficult to apply.

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A 17 a.

A dark topsoil.

No observed albic horizon.

Under the dark topsoil, have spodic materials that are value and chroma of 3 or less.



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A 17 b.

Have a dark topsoil

Have an albic horizon

Underlain by spodic layer that have value and chroma of 3 or less.



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A 17 a or NE-S1

Could be a wet spodic

Could be a wet three chroma sands

Okay to be both

Combine indicators or have match more than one



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Conclusion

- 1- make sure you read the user notes.
- 2- note where the you should have strong supporting evidence of wetland hydrology and plant community dominated with wetland plants.
- 3- note what geology and geography the indicator is to be applied.

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For publications that might be of assistance contact SSSNNE.  
Comparison to the field indicators is very helpful.

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