Field Indicators of Hydric Soils in the United States, Version 7.0 (2010) with Errata
Indicators for use in LRR R

Wetland Interior Indicators

All Soils
"All soils" refers to soils with any USDA soil texture. All mineral layers above any of the A Indicators, have a dominant chroma of $\leq$ 2, or the layer(s) with a dominant chroma of more than 2 is less than 15 cm (6 in) thick.

A1. Histosol
Classifies as a Histosol (except Folist) or as a Histel (except Folistel).

A2. Histic Epipedon.
A histic epipedon underlain by mineral soil material with chroma of 2 or less.

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

A4. Hydrogen Sulfide.
A hydrogen sulfide odor within 30 cm (12 in) of the soil surface. ("rotten egg" smell)

A12. Thick Dark Surface.
A layer at least 15 cm (6 in) thick w/a depleted or gleyed matrix that has $\geq$ 60% chroma of 2 or less and starting below 30 cm (12 in) of 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 (12 in) 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 covered, coated, or similarly masked w/organic material.

Sandy Soils
Sandy soils have a USDA texture of loamy fine sand and coarser. All mineral layers above any of the layers meeting the requirements of any S indicator(s), except for indicator S6, have a dominant chroma of 2 or less, or the thickness of the layer(s) with a dominant chroma of more than 2 is less than 15 cm (6 in). In addition, nodules and concretions are not considered to be redox concentrations.

S1. Sandy Mucky Mineral.
A layer of mucky modified sandy soil material 5 cm (2 in) or more thick starting w/in 15 cm (6 in) of the soil surface.

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

S8. Polyvalue Below Surface.
A layer with value of 3 or less and chroma of 1 or less starting w/in 15 cm (6 in) of the soil surface. At least 70 % of the visible soil particles must be masked w/organic material, viewed through a 10x or 15x hand lens. Observed w/out a hand lens, the particles appear to be close to 100% masked. Directly below this layer, 5% or more of the soil volume has value of 3 or less and chroma of 1 or less, and the remainder of the soil has value of 4 or more and chroma of 1 or less to a depth of 30 cm (12 in) or to the spodic horizon, whichever is less.

Loamy and Clayey Soils
These soils have USDA textures of loamy very fine sand and finer. All mineral layers above any of the F Indicators, except for Indicators F8, have a dominant chroma of 2 or less, or the layer(s) with a dominant chroma of more than 2 is less than 15cm (6 in) thick.

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

Procedure

Where to begin looking. Begin observations at the top of the mineral surface (underneath any and all fibric, hemic, and/or sapric material) except for application of indicators A1, A2, A3 and S3 (for Testing in LRR R).

Important Definitions

Hydric soil definition (1994). 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.

***Gleyed matrix.** Soils with a gleyed matrix have the following combinations of hue, value, and chroma (the soils are not glauconitic):

1. 10Y, 5GY, 10GY, 10G, 5BG, 10BG, 5B, 10B, or 5PB with value of 4 or more and chroma of 1; or
2. 5G with value 4 or more and chroma of 1 or 2; or
3. N with value of 4 or more; or

In some places the gleyed matrix may change color upon exposure to air. (See Reduced matrix). This phenomenon is included in the concept of gleyed matrix.

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

***Depleted matrix.** For loamy and clayey material, (and sandy material for the application of Indicators A11 and A12), a depleted matrix refers to the volume of a soil horizon or subhorizon in which the processes of reduction and translocation have removed or transformed iron, creating colors of low chroma and high value. A and E horizons may have low chromas and high values and may therefore be mistaken for a depleted matrix; however, they are excluded from the concept of depleted matrix unless the soil has common or many distinct or prominent redox concentrations occurring as soft masses or pore linings. In some areas the depleted matrix may change color upon exposure to air (See Reduced matrix); this phenomenon is included in the concept of depleted matrix. The following combinations of value and chroma identify a depleted matrix:

1. Matrix value of 5 or more and chroma of 1 or less with or without redox concentrations occurring as soft masses and/or pore linings; or
2. Matrix value of 6 or more and chroma of 2 or less with or without redox concentrations occurring as soft masses and/or pore linings; or
3. Matrix value of 4 or 5 and chroma of 2 and 2% or more distinct or prominent redox concentrations occurring as soft masses and/or pore linings; or
4. Matrix value of 4 and chroma of 1 and 2% or more distinct or prominent redox concentrations occurring as soft masses and/or pore linings.

***Mucky modified mineral soil material.** A USDA soil texture modifier, e.g., mucky sand. Mucky modified mineral soil material that has 0 percent clay has between 5 and 12 percent organic carbon. Mucky modified mineral soil material that has 60 percent clay has between 12 and 18 percent organic carbon. Soils with an intermediate amount of clay have intermediate amounts of organic carbon. Where the organic component is peat (fibric material) or mucky peat (hemic material), mucky mineral soil material does not occur.

Reduced matrix. A soil matrix that has low chroma and high value, but in which the color changes in hue or chroma when the soil is exposed to air. See Vepraskas (1994) for a complete discussion.

For complete Indicators and User Notes go to
http://soils.usda.gov/use/hydric/

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Indicators for use in LRR R

Wetland Border Indicators

All Soils

"All soils" refers to soils with any USDA soil texture. All mineral layers above any of the layers meeting the requirements of any A indicator(s), or the thickness of the layer(s) with a dominant chroma of more than 2 is less than 15 cm (6 in). In addition, nodules and concretions are not considered to be redox concentrations. Use the following indicators regardless of texture.

A5. Stratified Layers.
Several stratified layers starting w/in the upper 15 cm (6 in) of the soil surface. At least one of the layers has value of 3 or less and chroma of 1 or less, or it is muck, mucky peat, peat, or a mucky modified mineral texture. The remaining layers have chroma of 2 or less. For any sandy material that constitutes the layer w/value of 3 or less and chroma of 1 or less, at least 70% of the visible soil particles must be masked w/organic material, viewed through a 10x or 15x hand lens. Observed w/out a hand lens, particles appear to be close to 100% masked.

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 (12 in) of the soil surface, and having a minimum thickness of either:
a. 15 cm (6 in), or
b. 5 cm (2 in) if the 5 cm consists of fragmental soil material.
Loamy or clayey layer(s) above the depleted or gleyed matrix must have value of ≤ 3 and chroma of ≤ 2. Any sandy material above the depleted or gleyed matrix must have value of ≤ 3 and chroma of ≤ 1, and, viewed through a10x or 15x hand lens, at least 70 % of the visible soil particles must be masked with organic material. Observed w/out a hand lens, the particles appear to be close to 100 % masked.

Sandy Soils

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

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

S7. Dark Surface.
A layer 10 cm (4 in) thick, starting within the upper 15 cm (6 in) of the soil surface, with a matrix value 3 of or less and chroma of 1 or less. At least 70 % of the visible 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 % masked. The matrix color of the layer directly below the dark layer must have the same colors as those described above or any color that has chroma of 2 or less.

S9. Thin Dark Surface.
A layer 5 cm (2 in) or more thick within the upper 15 cm (6 in) of the soil, with value of 3 or less and chroma of 1 or less. At least 70% of the visible soil particles must be masked with organic material, viewed through a 10x or 15x hand lens. Observed without a hand lens, particles appear to be close to 100% masked. This layer is underlain by a layer or layers with value of 4 or less and chroma of 1 or less to a depth of 30 cm (12 in) or to the spodic horizon, whichever is less.

Loamy and Clayey Soils

F3. Depleted Matrix.
A layer that has a depleted matrix with 60% or more chroma of 2 or less with a minimum thickness of either:
a. 5 cm (2 in) if the 5 cm is entirely within the upper 15 cm (6 inches) of the soil, or
b. 15 cm (6 in), starting within 25 cm (10 in) of the soil surface.

F6. Redox Dark Surface.
A layer that is at least 10 cm (4 in) thick, is entirely within the upper 30 cm (12 in) 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
b. 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 (4 in) thick, is entirely within the upper 30 cm (12 in) of the mineral soil, and has:
a. Matrix value of 3 or < and chroma 1 or less and 10 % or more redox depletions, or
b. 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, 5% or more distinct or prominent redox concentrations occurring as soft masses or pore linings in a layer that is 5 cm (2 in) or more thick and is entirely within the upper 15 cm (6 in) of the soil.

Test Indicators of Hydric Soils in LRR "R"

S3. 5 cm Mucky Peat or Peat.
A layer of mucky peat or peat 5 cm (2 in) or more thick with value ≤ 3 and chroma of ≤ 2, starting within 15 cm (6 in) of the soil surface, and underlain by sandy material.

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

F21. Red Parent Material.
A layer derived from red parent materials at least 10 cm (4 in) thick, starting w/in 25 cm (10 in) of the soil surface with a hue of 7.5YR or redder. The matrix has a value and chroma > 2 and ≤ to 4. The layer must contain 10 % or more 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 and chroma one or more lower than the matrix, or
b. Value of ≥ 4 and chroma of ≤ 2.

TF12. Very Shallow Dark Surface. In depressions and other concave landforms, one of the following:
a. If bedrock occurs between 15cm (6 in) and 25cm (10 in), a layer at least 15cm (6 in) thick starting w/in 10cm (4 in) of the soil surface and having value of ≤ 3 and chroma of ≤ 1; the remaining soil to bedrock must have the same colors as above or any other color that has chroma of ≤ 2.
b. If bedrock occurs w/in a depth of 15cm (6 in), more than half of the soil thickness must have value ≤ 3 and chroma ≤ 1 and the remaining soil to bedrock must have the same colors as above or any other color with chroma ≤ 2.

TA6. Mesic Spodic. *For testing in MLRAs 144A and 145.*
A layer ≥ 5cm (2in) thick, starting w/in 15cm (6 in) of the mineral soil surface, that has value of ≤ 3 and chroma of ≤ 2 and is underlain by either:
a. A layer(s) ≥ 8 cm thick w/in 30 cm of the mineral soil surface, w/value and chroma ≤ 3, w/ spodic development; or
b. A layer(s) ≥ 5 cm thick occurring w/in 30 cm of the mineral soil surface, having value of ≥ 4 and chroma of ≤ 2, and directly underlain by a layer(s) ≥ 8 cm thick having value and chroma of ≤ 3 w/evidence of spodic development.