

READ FIRST: BASIC RULES TO FOLLOW IN ALL INDICATORS

1. All low Chroma (≤ 2) colors in "Depleted" layers below the dark surface (usually in B and C horizons) also require Values of ≥ 4 .

Rule describing "Depleted Matrix" colors in the diagnostic layer:

* Soil matrix colors having value/chroma of 4/1, 4/2 and 5/2 (or darker) must have $\geq 2\%$ distinct or prominent redox concentrations as soft masses and/or pore linings;

OR

* Soil matrix colors having value/chroma of 5/1, 6/1, 6/2, 7/1, 7/2, 8/1 and 8/2 (or Gleyed) do not require any redox concentrations.

2. "Gleyed Matrix" colors are found on the Munsell Color Book "Gley pages", but do not include the bottom two rows (those with Values < 4). (Gleyed color indicates Depleted matrix)

3. Reduced Matrix is included in the concept of Depleted or Gleyed Matrix; However, with a Reduced Matrix, initial low chroma (anaerobic) colors may change quickly (in seconds) to chromas > 2 when exposed to oxygen.

4. Soil Colors must always be taken on a fresh, un-smeared ped face when soils are "moist" – not when saturated (dripping) or dry.

5. Redox concentrations ARE soft masses or pore linings, and are NOT nodules and concretions, unless otherwise noted.

6. Except for Indicators A1, A2 and A3, you must remove the thin surface "duff" layer (i.e. < 8 inches peat [fibric material] or mucky peat [hemic material]) before measuring your soil depths – i.e., do not include a surface layer < 8 inches thick of relatively undecomposed grasses, needles, leaves and twigs on the surface in the soil depth measurements.

7. ALL mineral soil layers above any of the described indicator layers must have a dominant chroma of ≤ 2 (any value is OK), OR the layer with a dominant chroma of > 2 must be < 6 inches thick (unless otherwise noted -- For example, this rule does not apply to Indicators A11 and A12).

8. It is recommended to send all potential organic soils (peat, mucky peat, muck and mucky mineral) to a lab for verification. It is very easy to over-estimate organic content in the field. (See "organic soil material" definition in Field Indicators of Hydric Soils in the United States)

VERSION 9 (7-19-11)

LRRs A, B, and E

Indicators for All Soils

These indicators are to be used for ALL soils regardless of texture.

A.1 Histosol (Organic Soil).

Classified* as a Histosol, but excluding Folists. (**Soil Taxonomy*)

• Diagnostic* layer: More than a total of **16** inches of *organic* soil (peat, mucky peat or muck)...

• Depth: ...must occur in the **upper 32** inches of the soil profile.

Note: Peat is "fibric" organic material, mucky peat is hemic organic material, and muck is sapric organic material.

*"**Diagnostic layer**" is not be confused with "diagnostic horizons", as defined in *Soil Taxonomy*.

A.2. Histic Epipedon.(*Soil Taxonomy*)

• Diagnostic layer: ≥ 8 inches thick surface horizon of *organic* soil (peat, mucky peat or muck)

• Depth: Must be underlain by *mineral* soil with chroma $\leq 2^*$.

*You must prove aquatic conditions or must have current indicators of hydrophytic vegetation and wetland hydrology.

A.3. Black Histic.

• Diagnostic layer : ≥ 8 inches thick

• Starting at: ≤ 6 inches below the soil surface, and

• Composed of *organic* soil (peat, mucky peat, or muck)

AND

• With a hue 10YR or yellower, value ≤ 3 and chroma ≤ 1 .

A.4. Hydrogen Sulfide.

Must have a hydrogen sulfide odor (rotten egg smell) within 12 inches of the soil surface

A11. Depleted Below Dark Surface.

• Diagnostic layer: ≥ 6 inches thick*

• Starting at: ≤ 12 inches below the soil surface

AND

• With the diagnostic layer having a Depleted or Gleyed Matrix, with $\geq 60\%$ of the layer having a chroma $\leq 2^1$.

(*If fragmental soils, layer can be ≥ 2 inches thick)

NOTE:

• Loamy/clayey layer(s) above the diagnostic layer must have a color³ value of ≤ 3 and chroma ≤ 2 .

• Sandy layers above the diagnostic layer must have a color value ≤ 3 and chroma ≤ 1 , and $\geq 70\%$ of visible particles in that surface layer must be coated with organic material (must use hand lens).

A12. Thick Dark Surface.

• Diagnostic layer: ≥ 6 inches thick;

• Starting at: ≥ 12 inches below the soil surface and

• With the diagnostic layer having a Depleted or Gleyed Matrix, with $\geq 60\%$ of the layer having a chroma ≤ 2 .

NOTE:

• The surface layer(s) above the Depleted Matrix must have value ≤ 2.5 and chroma ≤ 1 to ≥ 12 inches depth, and/or value ≤ 3 and chroma ≤ 1 in the remainder of the dark surface layer below the dark surface.

• If the dark surface is sandy, then $\geq 70\%$ of the visible soil particles in that surface layer must be coated with organic material (must use hand lens).

Indicators for Sandy Soils

These indicators are to be used for soils with texture of loamy fine sand or coarser.

S1. Sandy Mucky Mineral

• Diagnostic layer: ≥ 2 inches thick;

• Starting at: ≤ 6 inches below the soil surface,

AND

• With a mucky modified sandy soil texture.

NOTE: The soils must meet formal definition of "mucky modified" texture.

S4. Sandy Gleyed Matrix.

• Diagnostic layer: A gleyed matrix in a layer of any thickness;

• Starting at: ≤ 6 inches below the soil surface,

AND

• With $\geq 60\%$ of the diagnostic layer being Gleyed.

S5. Sandy Redox.

• Diagnostic layer: ≥ 4 inches thick;

• Starting at: ≤ 6 inches below the soil surface, and

• With $\geq 60\%$ of that layer having a chroma ≤ 2 ,

AND

• With $\geq 2\%$ distinct or prominent redox concentrations. (see notes)

S.5 is common in swales associated with coastal sand dunes

NOTE: There is no color value requirement for this sandy soil indicator.

S6. Stripped Matrix.

• Diagnostic layer: A layer of any thickness,

• Starting at: ≤ 6 inches below the soil surface,

AND

• In which iron/manganese oxides and/or organic matter have been stripped from the matrix, exposing the primary base color of soil materials.

(S6 Stripped Matrix cont.) The stripped areas and translocated oxides and/or organic matter form a diffuse splotchy pattern of two or more colors. The stripped zones are $\geq 10\%$ of the volume; they are rounded and approximately 0.5 to 1 inch in diameter.

NOTE: S.6 is common at the wetland/non-wetland boundary in dune/swale complexes in western Oregon and in depressional areas in sandy outwash.

S7. Dark Surface (Not official for this LRR, but sometimes works. Use only if nothing else works, and you are confident that these characteristics are indicative of the hydric soil definition.)

- **Diagnostic layer:** ≥ 4 inches thick;
- **Starting at:** ≤ 6 inches below the soil surface,

AND

- With a matrix value ≤ 3 and chroma ≤ 1 .

NOTE:

- $\geq 70\%$ of the visible soil particles in the layer must be covered, coated, or similarly masked with organic material.

- The matrix color of the layer immediately below the diagnostic layer must have chroma ≤ 2

Indicators for Fine Soils

(These indicators are to be used for soils with texture of soil texture of loamy very fine sand or finer)

F1. Loamy Mucky Mineral.

- **Diagnostic layer:** ≥ 4 inches thick;
- **Starting at:** ≤ 6 inches below the surface,

AND

- With a mucky modified clayey or loamy soil texture.

NOTE: Must meet formal definition of "mucky modified" texture.

F2. Loamy Gleyed Matrix

- **Diagnostic layer:** A gleyed matrix in a layer of any thickness

- **Starting at:** ≤ 12 inches,

AND

- With $\geq 60\%$ of the diagnostic layer being Gleyed

Soils with gleyed matrices are assumed to be saturated for significant periods; therefore, no minimum thickness of the gleyed layer is required.

F3. Depleted [Gray] Matrix.

- **Diagnostic layer:** ≥ 6 inches thick*;

- **Starting at:** ≤ 10 inches below the mineral soil surface,

AND

- With a depleted matrix, with $\geq 60\%$ of the diagnostic layer having a chroma ≤ 2 .

**If at least 2 inches of the layer is within 6 inches of the surface, the minimum thickness is 2 inches.*

NOTE: If A or E horizons are used as part of the "Depleted Matrix", then these horizons must always have common to many ($\geq 2\%$), distinct or prominent redox concentrations. (see Table A1 in Supplement)

F6. Redox Dark Surface.

- **Diagnostic layer:** ≥ 4 inches thick;

- **Entirely within:** ≤ 12 inches of the mineral soil surface, **AND**

- With a matrix value ≤ 3 , chroma ≤ 1 , and with $\geq 2\%$ distinct or prominent redox concentrations⁴,

OR

- With a matrix value ≤ 3 , chroma ≤ 2 and $\geq 5\%$ distinct or prominent redox concentrations.

NOTE: *If the soil is saturated at the time of sampling, it may be necessary to let it dry at least to a moist condition for redox features to become visible.*

NOTE: This morphology has been observed in soils that have been compacted by tillage and other means. For that reason, it is *recommended* that delineators evaluate the hydrologic source

and examine and describe the layer below the dark-colored epipedon when applying this indicator.

F7. Depleted Dark Surface.

- **Diagnostic layer:** ≥ 4 inches thick

- **Starting at:** ≤ 12 inches of the mineral soil surface,

AND

- With redox depletions, having value ≥ 5 and chroma ≤ 2 .

NOTE:

- If the matrix value is ≤ 3 and chroma ≤ 1 , then there must be $\geq 10\%$ coverage of redox depletions,

OR

- If the matrix value ≤ 3 and chroma ≤ 2 (not as dark as above), then there must be $\geq 20\%$ redox depletions.

NOTE: Mixing of surface layers can be caused by burrowing animals or cultivation. Pieces of deeper layers that become incorporated into the surface layer through mixing **are not** redox depletions.

F8. Redox Depressions.

- Must be located in a closed depression subject to ponding (like vernal pools and potholes), **and have**

- **Diagnostic layer:** ≥ 2 inches thick;

- **Entirely within:** **Upper 6** inches of the soil profile,

AND

- With $\geq 5\%$ distinct or prominent redox concentrations.

NOTE: This indicator occurs on depressional landforms, such as vernal pools, playa lakes, rainwater basins, "Grady" ponds and potholes. It does not occur in microdepressions on convex or plane landscapes.

Test Indicators

TEST indicator: *For problem areas where nothing else works*

A10. 2 cm Muck

- **Diagnostic layer:** Muck ≥ 0.75 inches thick;

- **Starting at:** ≤ 6 inches below the soil surface, that has a value ≤ 3 and chroma ≤ 1 .

NOTE: This indicator may be used **ONLY** in problem wetland situations where there is clear evidence of wetland hydrology and hydrophytic vegetation, and the soil is believed to meet the definition of a hydric soil *despite the lack of other indicators of a hydric soil*.

TF2. Red Parent Material. *For testing in LRRs with red parent material.*

In parent material with a hue of ≥ 7.5 YR:

- **Diagnostic layer:** ≥ 4 inches thick*;

- **Starting at:** ≤ 12 inches of the mineral soil surface,

AND

- with a matrix value and chroma ≤ 4 , and with $\geq 2\%$ redox depletions and/or redox concentrations.

NOTE: If the diagnostic layer is directly at the mineral soil surface, the layer can be thinner -- ≥ 2 inches thick.

TF12. Very Shallow Dark Surface.

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

a. If bedrock occurs between 6 and 10 inches below the soil surface, then:

Diagnostic layer: ≥ 6 inches thick

Starting at: ≤ 4 inches below the soil surface

AND

With Munsell color value ≤ 3 and chroma ≤ 1

NOTE: The remaining soil to bedrock must be any color with a chroma ≤ 2 (no value requirement).

b. if bedrock occurs at ≤ 6 inches depth, then:

Diagnostic layer: $> 50\%$ of the entire soil thickness must have Munsell value ≤ 3 and chroma ≤ 1 , and the remaining soil to bedrock must be any color with a chroma ≤ 2 (no value requirement).