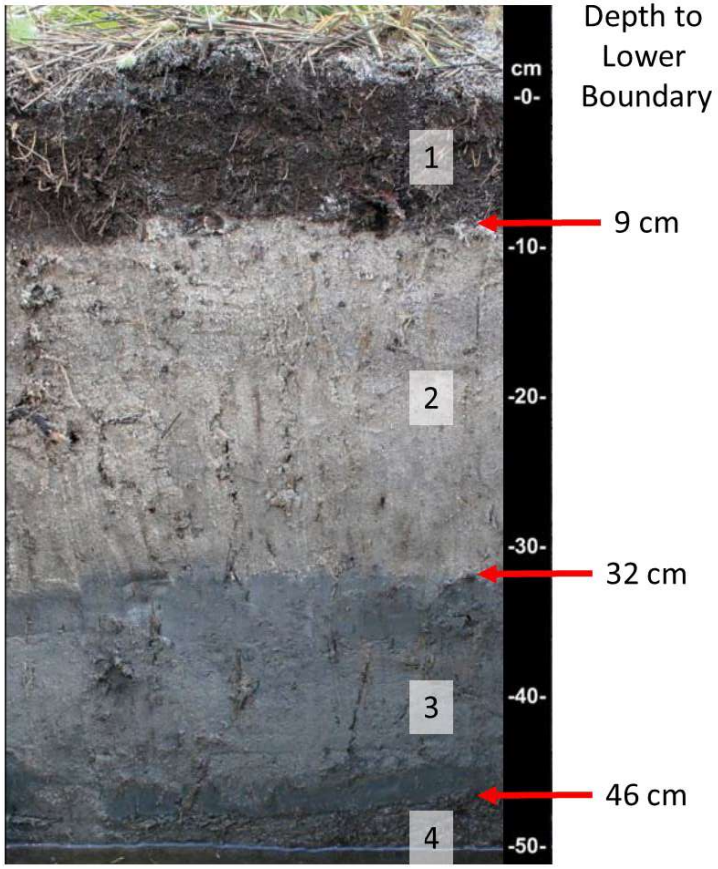
Reference Card S-2, Side A: Delineating Horizon Boundaries



Profile Photo: USDA NRCS (2010)

Distinguishing Soil Horizons

Soil horizons are delineated based on differences in:

- Texture
- Color
- Structure and Consistence
- Redoximorphic Features
- Other features, including mottles (colors/features not related to wetness), organic features, rocks or coarse fragments, roots

Identify each horizon from 0-125 cm and place markers (e.g., golf tee, nail) at the bottom of each horizon. Number horizons in order from the top of the profile to the bottom (125 cm).

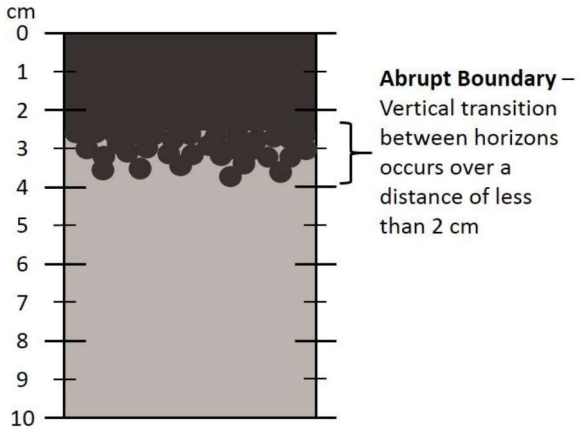
Measure the depth **from the soil surface to the lower boundary** of each horizon. Record the depths in the *Depth from surface to lower boundary (cm)* column in the Horizons section of the **Soil Data Form (S-1)**.

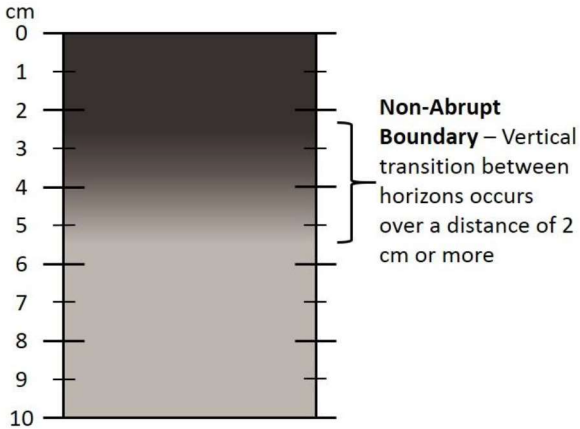
Using the example soil profile (left):

- **Horizon 1** is 9 cm thick with the upper boundary at 0 cm and the lower boundary at 9 cm. Depth from surface to lower boundary = 9 cm.
- **Horizon 2** is 23 cm thick with the upper boundary at 9 cm and the lower boundary at 32 cm. Depth from surface to lower boundary = 32 cm.
- **Horizon 3** is 14 cm thick with the upper boundary at 32 cm and the lower boundary at 46 cm. Depth from surface to lower boundary = 46 cm.
- **Horizon 4** continues beyond the bottom of the soil pit (lower boundary is not visible). The final depth of the soil pit is 50 cm. Depth from surface to lower boundary = 50+ cm. *NOTE: For NWCA, soil profiles should be described to 125 cm.*

Describing Horizon Boundaries

If the transition between two horizons occurs over a distance of less than 2 cm, fill in the bubble in the *Abrupt lower boundary present* column in the Horizons section of the **Soil Data Form (S-1)**.

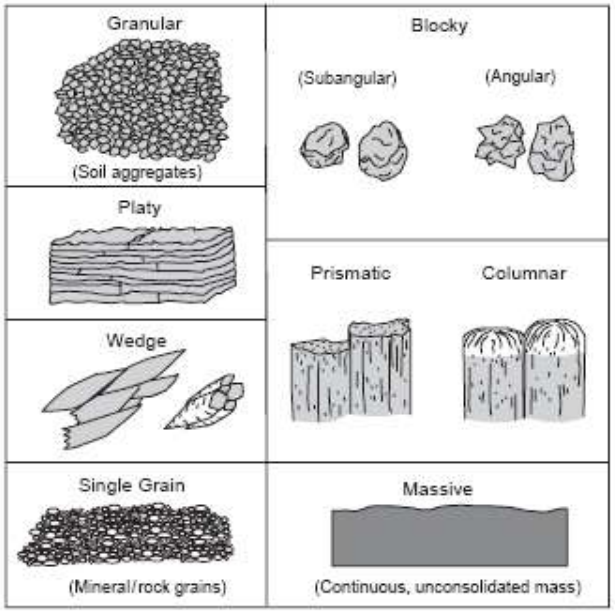




Reference Card S-2, Side B: Soil Structure, Consistence, and Estimating Surface Cover

Soil Structure describes the arrangement of mineral soil separates (sand, silt, and clay) in to secondary units or peds.

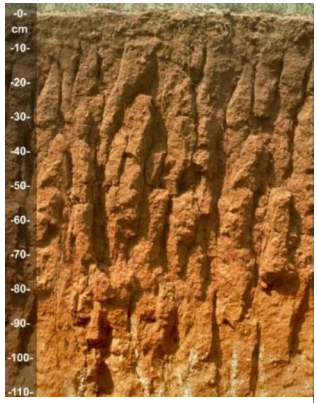
Horizons can be differentiated by changes in the dominant size, shape, or distinctness of peds.



Granular structure. Photo by John Kelley, USDA NRCS

Blocky structure. Photo by John Kelley, USDA NRCS

Platy structure. (Soil Survey Division Staff, 1993)



Prismatic structure. Photo by John Kelley, USDA NRCS

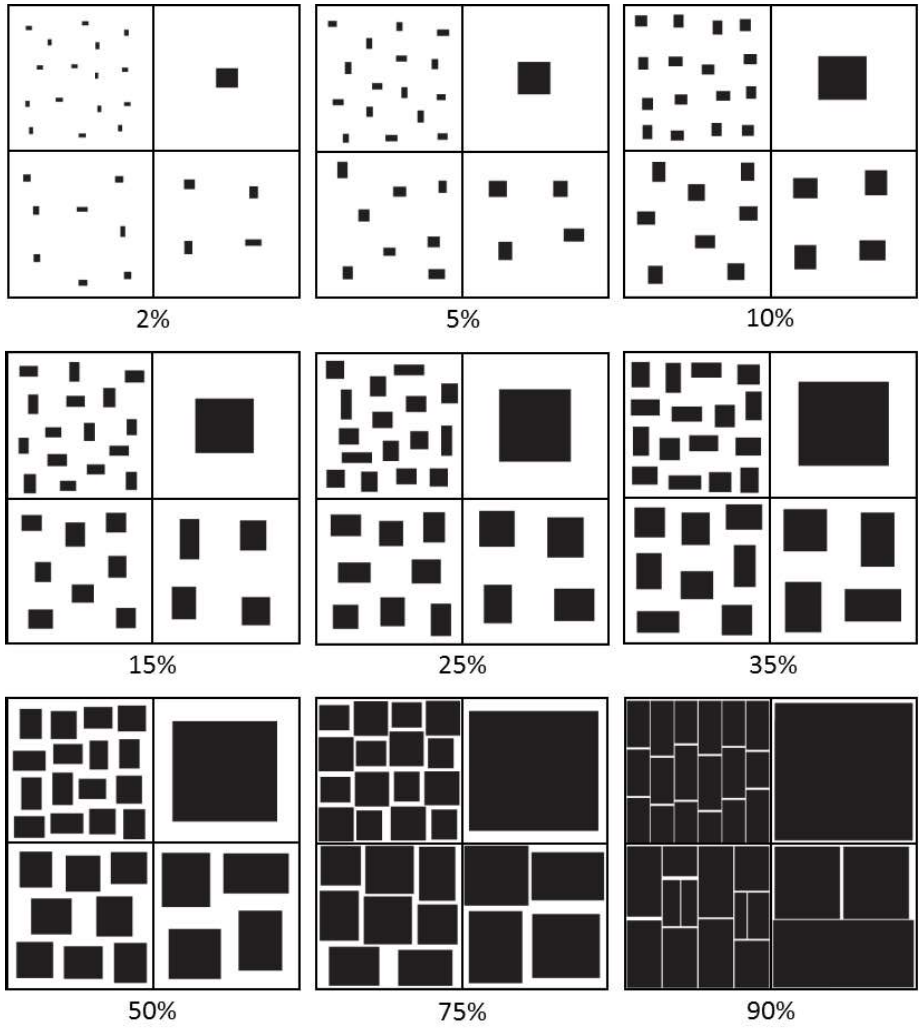
Consistence is the degree and kind of cohesion and adhesion the soil exhibits and/or the resistance of the soil to deformation or rupture under an applied stress.

Differences in consistence between horizons can be identified by changes in the ease of digging into the soil using a shovel, trowel, or soil knife, how easily a ped can be crushed, or the nature of peds as they are crushed (brittle or fluid).

Note: Soil structure and consistence do not need to be recorded on the **Soil Data Form (S-1)**. However, these properties may be useful in identifying horizon boundaries.

Estimation of Surface Area Cover

Use the reference charts to estimate percent surface area of the soil matrix occupied by other components (e.g., redoximorphic features, rocks, roots, or masked sand grains).



Reference Card S-3, Side A: Soil Texture

Step 1: Determine if the soil is Organic or Mineral.

Collect a golf ball sized chunk of moist soil and gently rub it between the forefingers and thumb several times.

- If the soil feels greasy, you can discern visible organic particles, it is very light (low bulk density) compared to equal amounts of mineral soil, and you can feel or see little to no mineral particles (grittiness of sand grains, silt coating on hands, stickiness of clay particles) the soil is an organic soil; **go to Step 2**.
- Otherwise, the soil is a mineral soil; go to **Step 3**.

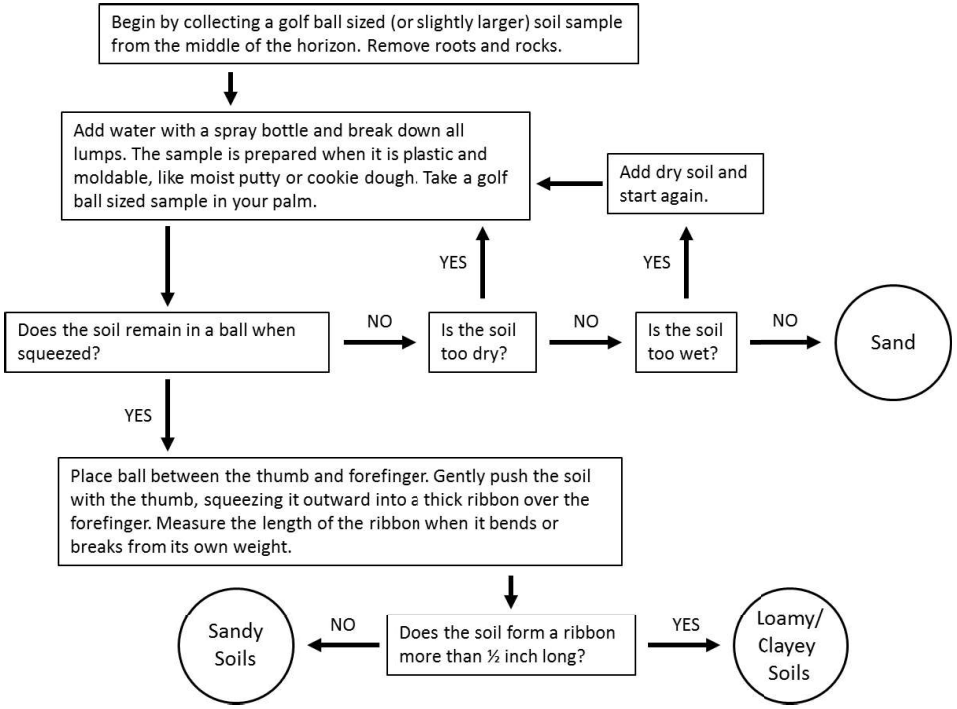
Step 2: Texturing Organic Soils

Distinguish the type of organic material. Take a fresh sample of moist soil and rub the sample between the thumb and fingers 10 times. Visually estimate the percent volume of plant fibers and dead roots. Use the chart below to determine the type of organic material.

Organic Soil Material	Volume of Fibers Visible After Rubbing
Peat	> 75%
Mucky Peat	17% - 75%
Muck	< 17%

Step 3: Texturing Mineral Soils

a. Follow guide below to determine if the soil is Sandy or Loamy/Clayey.



Modified from Thien (1979).

b. If the soil is very dark, almost black in color, greasy or spongy feeling staining your fingers black, and feels lighter than equal amounts of mineral material containing less organic matter you would use a mucky modifier. Organic matter content will be between 5 and 18 percent organic carbon depending on texture.

- If the soil is sandy, select mucky sandy.
- If the soil is loamy/clayey, select mucky loamy/clayey.

Reference Card S-3, Side B: Soil Color

To Measure Soil Color:

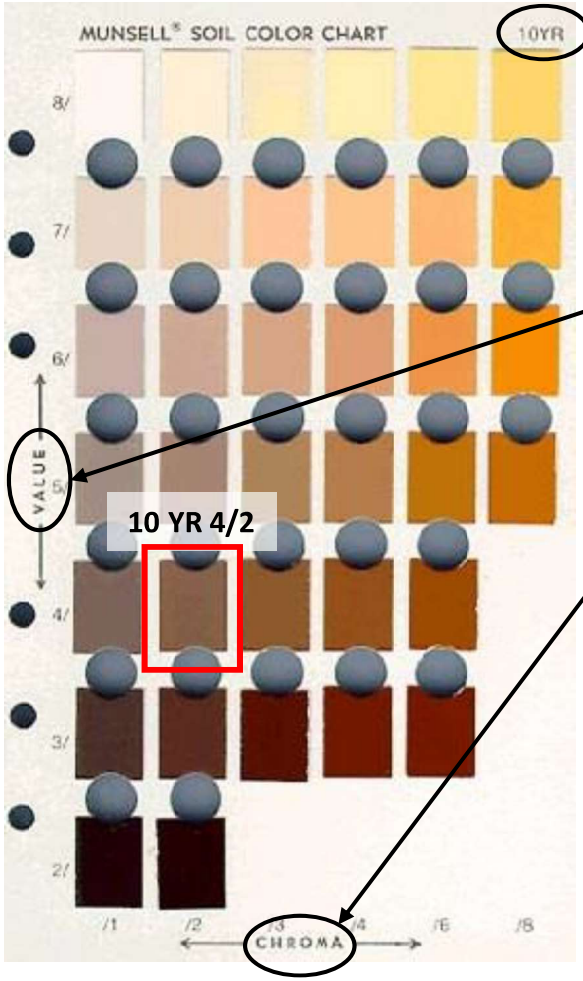
1) If the soil is dry, use a spray bottle to moisten the ped. Spray until moist, but not saturated.

2) Observe the soil color in direct sunlight with the sun over the shoulder (whenever possible). Match the color of the soil with the closest color chip in the Munsell Soil Color Book.
   - Start at the 10YR page. Hues will be progressively redder moving towards the front of the book, and will get yellower and greyer towards the back of the book

10R 2.5YR 5YR 7.5YR 10YR 2.5Y 5Y

   - The color chips in the Munsell Soil Color Book have holes so that the soil can be placed behind the page and viewed through the hole next to the chip of interest.
   - Take care to keep the color chips clean and dry. When not using the book, keep it closed and out of the sun, which will cause chips to fade.

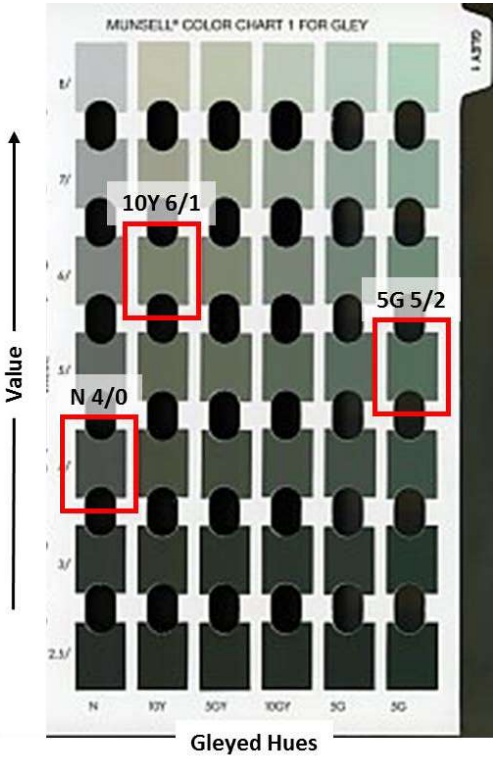
3) For each horizon, record the hue, value, and color for the soil matrix (dominant color in the horizon of interest) and the dominant concentration and depletion colors (if present).



Hue: Measure of chromatic composition – red, yellow, green, blue, purple

Value: Degree of lightness or darkness of color. Value decreases with darkness.

Chroma: Relative purity or strength of color (brightness). Low chroma colors are dull or gray, higher chroma colors are brighter.



   - For red and yellow hues, each hue is on a separate page. Value is shown on the left side of the page, and chroma is shown at the bottom. Color descriptions are given on the page opposite the color chips.

     Example: 10YR 4/2 = grayish yellow brown

   - On the gleyed pages, hues are organized in columns and listed at the bottom of the page. Gleyed hues include N (neutral), 10Y, 5GY, 10GY, 5G, 5BG, 10BG, 5B, 10B, and 5PB. Value is shown at the left side of the page. If the soil has a neutral hue (N), the chroma is 0. For all other gleyed hues, the chroma is 1 for the first column of the hue, and 2 for the second column of the hue. Color descriptions are given on the page opposite the color chips.

     Examples: N 4/0 = gray; 10Y 6/1 = greenish gray; 5G 5/2 = grayish green

Reference Card S-4, Side A: Soil Redoximorphic Features

Redox Concentrations

Accumulations of Fe or Mn oxides that form as the soil is oxidized (becomes aerobic).

Fe concentrations have redder hues and higher (brighter) chromas relative to the soil matrix.

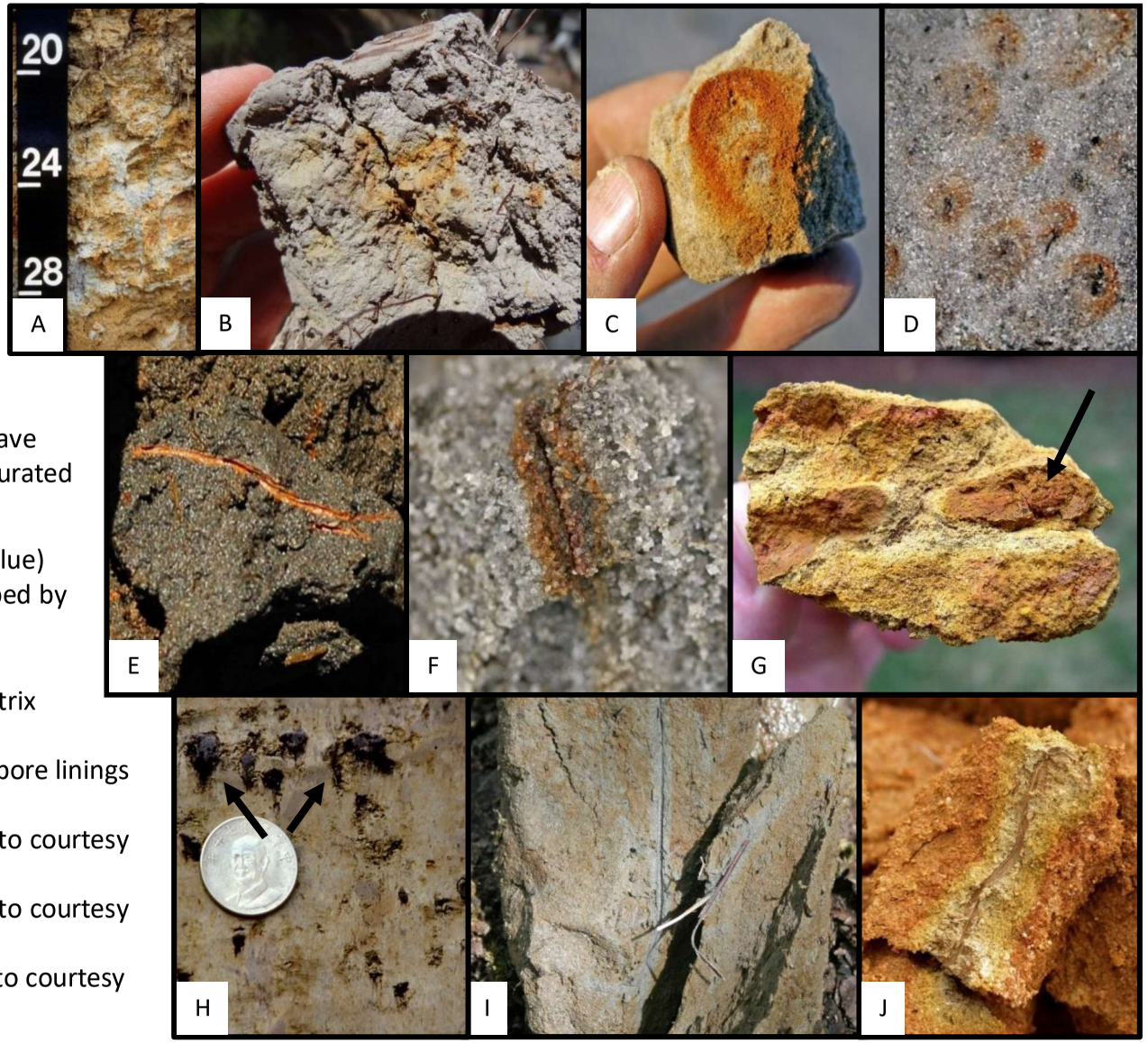
Mn concentrations tend to be black in color.

Redox concentrations are described by the type (soft masses, pore linings, nodules/concretions), color, and percent surface area cover.

Redox Depletions

Localized zones where Fe or Mn oxide minerals have been reduced, solubilized, and leached under saturated soil conditions.

Depletions are greyer and lighter in color (high value) than the soil matrix. Redox depletions are described by the color and percent surface area cover.

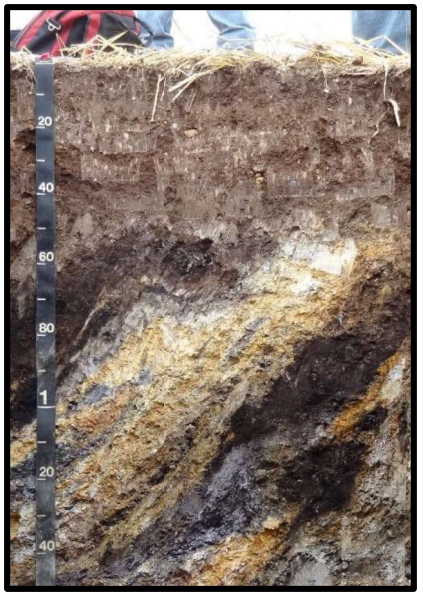


A. Depletions (grey zones) in an oxidized soil matrix (red areas) (Photo courtesy of USDA NRCS)
B. Concentrations occurring as soft masses and pore linings (Photo by Ann Rossi)
C. Concentrations occurring as soft masses (Photo courtesy of USDA NRCS)
D. Concentrations occurring as soft masses (Photo courtesy of USDA NRCS)
E. Concentration occurring as a pore lining (Photo courtesy of USDA NRCS)
F. Concentration occurring as a pore lining (Photo courtesy of USDA NRCS)
G. Iron nodules (Photo by John Kelley, USDA NRCS)
H. Manganese concretions (Photo courtesy of USDA NRCS)
I. Depletion along root channel (Photo courtesy of USDA NRCS)
J. Depletion along root channel (Photo by John Kelley, USDA NRCS)

Reference Card S-4, Side B: Organic Features, Masked Sand Grains, and Mottles

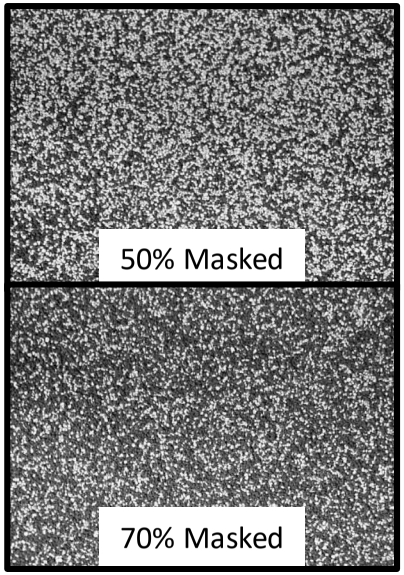
Organic Bodies – Aggregates of organic matter with mineral or mucky mineral textures. They typically occur at the tips of roots and are commonly 1 to 3 cm in diameter. The presence of organic bodies is a Hydric Soil Field Indicator in some regions (A6. Organic Bodies). Photos courtesy of USDA NRCS.

Stripped Matrix – Zone where iron and manganese oxides are stripped from the matrix and the primary base color of the soil material is exposed. A stripped matrix in a sandy soil is a Hydric Soil Field Indicator in some regions (S6. Stripped Matrix). Photo courtesy of USDA NRCS.



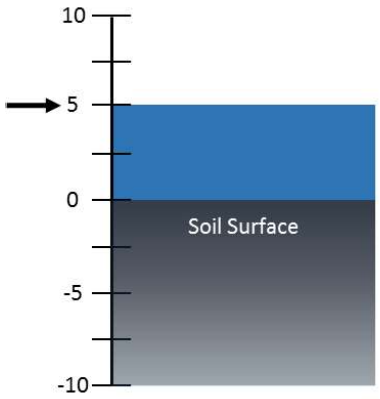
Mottles – Mottles are areas or splotches of color that differ from the soil matrix color. Mottles are unrelated to saturated or reducing conditions, and typically have a geologic origin (reflect the soil parent material). Photo by Ann Rossi.

Organic Infillings – Accumulations of organic matter in pores, root channels, or soil cracks. This can occur when dead roots decompose in a root channel, or when organic material from the soil surface fills in an animal burrow. Photos courtesy of USDA NRCS.

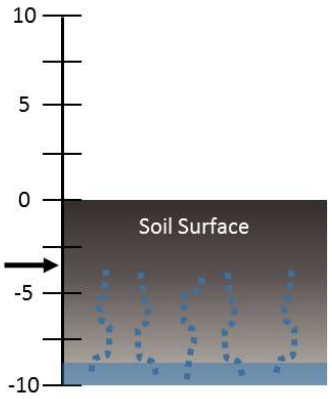


Masked Sand Grains – In sandy soils, organic material can coat or mask mineral grains. Depending on the degree of masking soils can have a salt and pepper appearance to looking almost completely black. The degree of masking is a criteria for many Hydric Soil Field Indicators when the soil is sandy. Degree of masking is reported as the percentage of sand grains that are coated by organic matter (dark in color). Photos by Martin Rabenhorst.

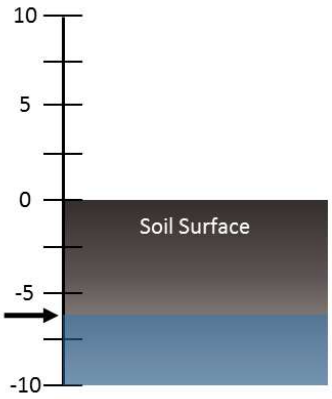
Reference Card S-5: Measuring Water Table Depth



Surface Water
Water level is 5 cm above the soil surface.
Record Water Level as +5 cm



Evidence of Saturation in Soil Pit – Water Seepage
Water seepage starts 4 cm below the soil surface.
Record Water Level as -4 cm

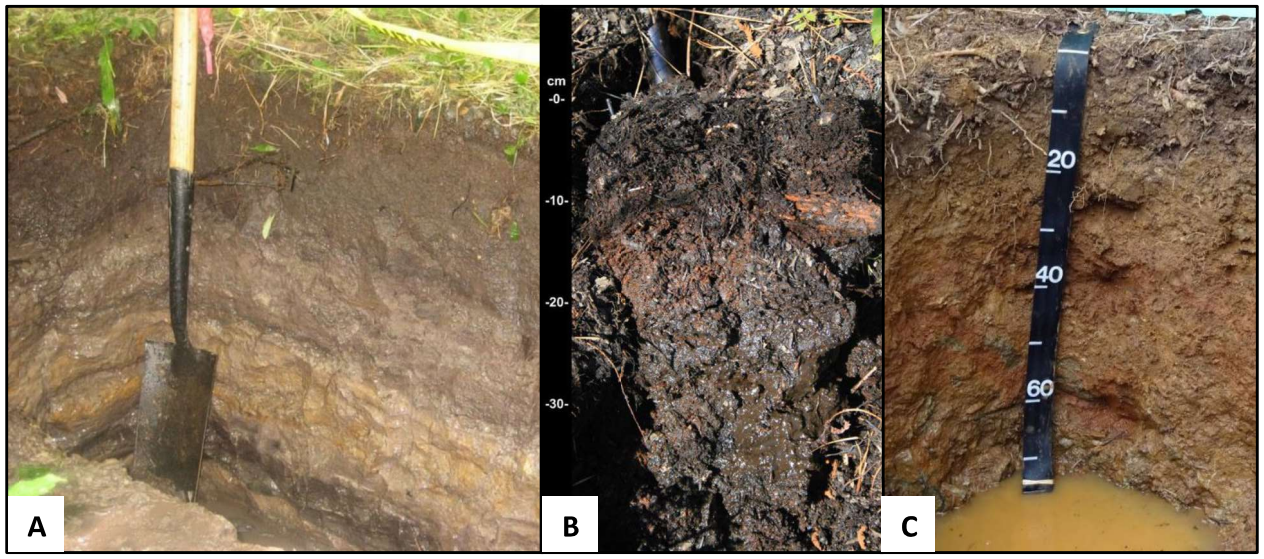


Standing Water in Soil Pit
Water level is 6 cm below the soil surface.
Record Water Level as -6 cm

Estimate the depth of the water table based on surface water at the Soil Pit, evidence of saturation in the Soil Pit, or standing water in the Soil Pit. Allow the water table to equilibrate before estimation.

If surface water is present: Measure the height of the water above the soil surface. Record as a positive (+) value.

Absence of surface water: Measure the depth of saturation as the distance from the soil surface to the saturated zone in the Soil Pit. Record depth as a negative (-) value.



Soil Saturation can be indicated by:

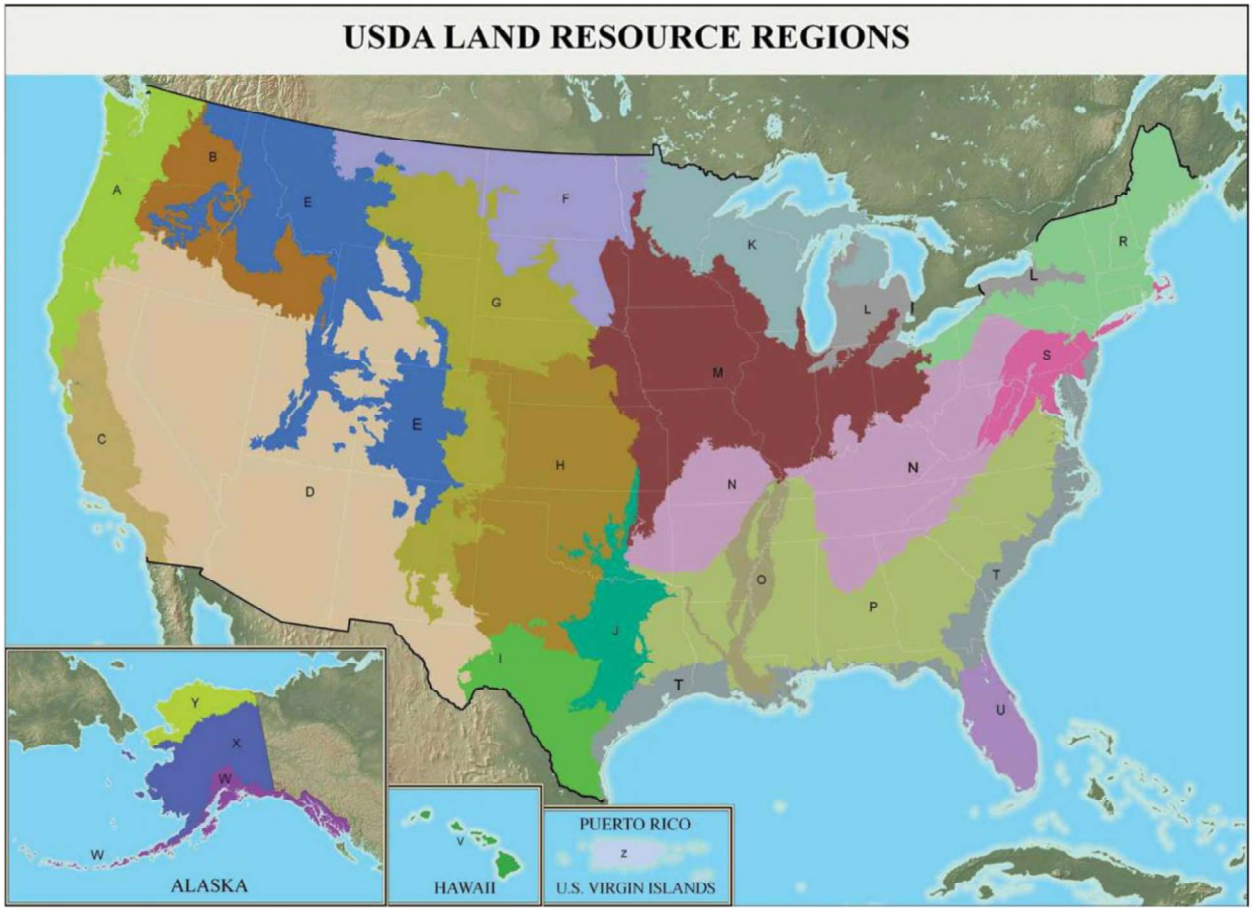
(A) Pit surfaces with a sheen of moisture or appear to be glistening. Photo by Ann Rossi.
(B) Water seepage from the pit walls. This includes water running down the Soil Profile Face, along ped faces, or oozing from macropores. Photo courtesy of USDA NRCS.
(C) Standing water in the Soil Pit. Photo by Ann Rossi.

Applicability of Land Resource Regions (LRR) by State

State	LRRs
AL	N, P, T
AR	N, O, P
AZ	D
CA	A, C, D
CO	D, E, G, H
CT	R
DE	S, T
FL	P, T, U
GA	N, P, T
IA	M
ID	B, D, E
IL	K, L, M, N, O, P
IN	L, M, N
KS	G, H, J, M, N
KY	M, N, O, P
LA	O, P, T

State	LRRs
MA	R, S
MD	N, S, T
ME	R
MI	K, L, M
MN	F, K, M
MO	M, N, O, P
MS	O, P, T
MT	D, E, F, G
NC	N, P, T
ND	F, G, M
NE	G, H, M
NH	R
NJ	R, S, T
NM	D, E, G, H
NV	D
NY	L, N, R, S

State	LRRs
OH	L, M, N, R
OK	G, H, J, M, N, P
OR	A, B, D, E
PA	L, N, R, S
RI	R, S
SC	N, P, T
SD	F, G, M
TN	N, O, P
TX	D, G, H, I, J, P, T
UT	B, D, E
VA	N, P, S, T
VT	R
WA	A, B, E
WI	K, M
WV	N, S
WY	D, E, G, H



Reference Card S-6: Hydric Soil Field Indicators Approved For Use In LRR N (Front)

General Guidance:

Hydric Soil Field Indicators occur in 3 groups.

- A Indicators – for "All Soils" regardless of texture
- S Indicators – for "Sandy Soils", layers that have textures of loamy fine sand or coarser
- F Indicators – for "Loamy and Clayey Soils", layers that have textures of loamy very fine sand or finer.

For indicators A1, A2, and A3 observations begin at the actual soil surface. For all other indicators, depths are measured from the top of the muck or mineral soil surface (below any peat or mucky peat layers).

Depleted Matrix – Identified by the following combinations of value and chroma:

1) Matrix value ≥5, chroma ≤1, with or without redox concentrations; or
2) Matrix value ≥6, chroma ≤2, with or without redox concentrations; or
3) Matrix value 4 or 5, chroma 2, and 2% or more redox concentrations occurring as soft masses or pore linings; or
4) Matrix value 4, chroma 1, and 2% or more redox concentrations occurring as soft masses or pore linings.

Gleyed Matrix – Identified by the following combinations of hue, value, and chroma:

1) Hue 10Y, 5GY, 10GY, 10G, 5BG, 10BG, 5B, 10B, or 5PB, value ≥4, and chroma 1; or
2) Hue 5G, value ≥4, chroma 1 or 2; or
3) Hue N and value ≥4.

All Indicators:

A1. Histosol – Greater than 40 cm of organic soil material (muck, mucky peat, or peat) in the upper 80 cm of the soil.

A2. Histic Epipedon – Surface layer of organic soil material (muck, mucky peat, or peat) at least 20 cm thick. The mineral horizon below the organic surface horizon has a chroma ≤2.

A3. Black Histic – Organic soil layer (muck, mucky peat, or peat) at least 20 cm thick starting within 15 cm of the soil surface. Organic soil has a hue of 10YR or yellower, value ≤3, and chroma ≤1. The mineral horizon below the organic horizon has a chroma ≤2.

A4. Hydrogen Sulfide – A hydrogen sulfide odor ("rotten egg smell") within 30 cm of the soil surface. Occurs only when the soil is saturated an anaerobic.

A5. Stratified Layers – Several stratified layers starting within 15 cm of the soil surface. At least one layer has either:

1) Value ≤3 and chroma ≤1, or
2) Muck, mucky peat, peat, or mucky mineral texture.

If the layer is sandy, at least 70% of visible soil particles must be masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens. The remaining layers have chroma ≤2. Strata are often less than 2.5 cm thick, but this is not a requirement.

A10. 2 cm Muck – A layer of muck at least 2 cm thick with value ≤3 and chroma ≤1, starting within 15 cm of the soil surface.

A11. Depleted Below Dark Surface – A layer with a depleted or gleyed matrix (60% or more of the volume) with chroma ≤2, starting within 30 cm of the soil surface. The layer has a minimum thickness of either:

1) 15 cm, or
2) 5 cm if the layer has ≥90% rock fragments.

Immediately above the depleted matrix and within 15 cm of the soil surface there must be either:

1) Sandy layer(s) with value ≤3, chroma ≤1, and at least 70% of visible soil particles masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens, or
2) Loamy/clayey layer(s) with value ≤3 and chroma ≤2.

A12. Thick Dark Surface – A layer at least 15 cm thick with a depleted or gleyed matrix (60% or more of the volume) with chroma ≤2, starting below 30 cm. The layer(s) starting within 15 cm of the soil surface and above the depleted or gleyed matrix must have a value ≤2.5, chroma ≤1, and be at least 30 cm thick. Any remaining layers above the depleted or gleyed matrix must have value ≤3 and chroma ≤1. Dark sandy layers above the depleted or gleyed matrix must appear close to 100% masked when observed without a hand lens.

Sandy Indicators:

S1. Sandy Muck Mineral – A layer of mucky sand at least 5 cm thick and starting within 15 cm of the soil surface. Mucky sand is an example of a mucky mineral texture.

Reference Card S-6: Hydric Soil Field Indicators Approved For Use In LRR N (Back)

S4. Sandy Gleyed Matrix – A layer with a gleyed matrix (60% or more of the volume) 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 (60% or more of the volume) chroma ≤2 and 2% or more redox concentrations occurring as soft masses or pore linings.

S6. Stripped Matrix – A layer starting within 15 cm of the soil surface in which Fe-Mn 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 rounded.

S7. Dark Surface – A layer 10 cm thick starting within 15 cm of the soil surface, with a matrix value ≤3 and chroma ≤1. At least 70% of visible soil particles must be masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens. The layer directly below the dark layer must have the same colors as those described above or any color that has a chroma ≤2.

Loamy/Clayey Indicators:

F2. Loamy Gleyed Matrix – A layer with a gleyed matrix (60% or more of the volume) starting within 30 cm of the soil surface.

F3. Depleted Matrix – A layer with a depleted matrix (60% or more of the volume) with chroma ≤2, and a minimum thickness of either:

1) 5 cm if the 5 cm occurs entirely within the upper 15 cm of the soil, or
2) 15 cm if the layer starts within 25 cm of the soil surface.

F6. Redox Dark Surface – A layer at least 10 cm thick entirely within the upper 30 cm of mineral soil and has:

1) Matrix value ≤3, chroma ≤1, and 2% or more redox concentrations occurring as soft masses or pore linings, or
2) Matrix value ≤3, chroma ≤2, and 5% or more redox concentrations occurring as soft masses or pore linings.

F7. Depleted Dark Surface – A layer at least 10 cm thick entirely within the upper 30 cm of mineral soil that has:

1) Matrix value ≤3, chroma ≤1, and 10% or more redox depletions, or
2) Matrix value ≤3, chroma ≤2, and 20% or more redox depletions. Redox depletions have value ≥5 and chroma ≤2.

F8. Redox Depressions – In closed depressions (e.g., vernal pools, playa lakes, rainwater basins, "Grady" ponds, and potholes) subject to ponding, 5% or more redox concentrations occurring as soft masses or pore linings in a layer at least 5 cm thick and entirely within 15 cm of the soil surface.

F12. Iron-Manganese Masses – On flood plains, a layer at least 10 cm thick, with 40% or more chroma ≤2, and 2% or more 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 ≤3 and chroma ≤3 (most commonly black). There is no layer thickness requirement if the layer occurs at the mineral soil surface.

F13. Umbric Surface – In depressions and other concave landforms, a layer at least 25 cm thick, starting within 15 cm of the soil surface, in which the upper 15 cm has value ≤3 and chroma ≤1 and the lower 10 cm has the same colors as described above or any other color with chroma ≤2.
ONLY for use in MLRA 122.

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

1) Value one or more higher and chroma one or more lower than the matrix, or
2) Value ≥4 and chroma ≤2.

This indicator was developed for use in areas of red parent material, such as residuum in the Piedmont Province Triassic lowlands section or the Paleozoic "red beds" of the Appalachian Mountains, and in alluvium or colluvium derived from these materials. In glaciated areas, the indicator may form in glacial till, outwash, deltaic sediments, or glaciolacustrine sediments derived from similar red lithologies.
ONLY for use in MLRA 127.

Reference Card S-6: Hydric Soil Field Indicators Approved For Use In LRR S (Front)

General Guidance:

Hydric Soil Field Indicators occur in 3 groups.

- A Indicators – for "All Soils" regardless of texture
- S Indicators – for "Sandy Soils", layers that have textures of loamy fine sand or coarser
- F Indicators – for "Loamy and Clayey Soils", layers that have textures of loamy very fine sand or finer.

For indicators A1, A2, and A3 observations begin at the actual soil surface. For all other indicators, depths are measured from the top of the muck or mineral soil surface (below any peat or mucky peat layers).

Depleted Matrix – Identified by the following combinations of value and chroma:

1) Matrix value ≥5, chroma ≤1, with or without redox concentrations; or
2) Matrix value ≥6, chroma ≤2, with or without redox concentrations; or
3) Matrix value 4 or 5, chroma 2, and 2% or more redox concentrations occurring as soft masses or pore linings; or
4) Matrix value 4, chroma 1, and 2% or more redox concentrations occurring as soft masses or pore linings.

Gleyed Matrix – Identified by the following combinations of hue, value, and chroma:

1) Hue 10Y, 5GY, 10GY, 10G, 5BG, 10BG, 5B, 10B, or 5PB, value ≥4, and chroma 1; or
2) Hue 5G, value ≥4, chroma 1 or 2; or
3) Hue N and value ≥4.

All Indicators:

A1. Histosol – Greater than 40 cm of organic soil material (muck, mucky peat, or peat) in the upper 80 cm of the soil.

A2. Histic Epipedon – Surface layer of organic soil material (muck, mucky peat, or peat) at least 20 cm thick. The mineral horizon below the organic surface horizon has a chroma ≤2.

A3. Black Histic – Organic soil layer (muck, mucky peat, or peat) at least 20 cm thick starting within 15 cm of the soil surface. Organic soil has a hue of 10YR or yellower, value ≤3, and chroma ≤1. The mineral horizon below the organic horizon has a chroma ≤2.

A4. Hydrogen Sulfide – A hydrogen sulfide odor ("rotten egg smell") within 30 cm of the soil surface. Occurs only when the soil is saturated an anaerobic.

A5. Stratified Layers – Several stratified layers starting within 15 cm of the soil surface. At least one layer has either:

1) Value ≤3 and chroma ≤1, or
2) Muck, mucky peat, peat, or mucky mineral texture.

If the layer is sandy, at least 70% of visible soil particles must be masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens. The remaining layers have chroma ≤2. Strata are often less than 2.5 cm thick, but this is not a requirement.

A11. Depleted Below Dark Surface – A layer with a depleted or gleyed matrix (60% or more of the volume) with chroma ≤2, starting within 30 cm of the soil surface. The layer has a minimum thickness of either:

1) 15 cm, or
2) 5 cm if the layer has ≥90% rock fragments.

Immediately above the depleted matrix and within 15 cm of the soil surface there must be either:

1) Sandy layer(s) with value ≤3, chroma ≤1, and at least 70% of visible soil particles masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens, or
2) Loamy/clayey layer(s) with value ≤3 and chroma ≤2.

A12. Thick Dark Surface – A layer at least 15 cm thick with a depleted or gleyed matrix (60% or more of the volume) with chroma ≤2, starting below 30 cm. The layer(s) starting within 15 cm of the soil surface and above the depleted or gleyed matrix must have a value ≤2.5, chroma ≤1, and be at least 30 cm thick. Any remaining layers above the depleted or gleyed matrix must have value ≤3 and chroma ≤1. Dark sandy layers above the depleted or gleyed matrix must appear close to 100% masked when observed without a hand lens.

A17. Mesic Spodic – A layer that is ≥5 cm thick, that starts at a depth 15 cm from the mineral soil surface, that has value of 3 or less and chroma of 2 or less, and that is directly underlain by either:

1) One or more layers of spodic materials that have a combined thickness of ≥8 cm, that start at a depth ≤30 cm from the mineral soil surface, and that have a value and chroma of 3 or less; or
2) One or more layers that have a combined thickness of ≥5 cm, that start at a depth ≤30 cm from the mineral soil surface, that have a value of 4 or more and chroma of 2 or less, and that are directly underlain by one or more layers that have a combined thickness of ≥8 cm, that are spodic materials, and that have a value and chroma of 3 or less.

ONLY for use in MLRA 149B.

Sandy Indicators:

S1. Sandy Muck Mineral – A layer of mucky sand at least 5 cm thick and starting within 15 cm of the soil surface. Mucky sand is an example of a mucky mineral texture.

S4. Sandy Gleyed Matrix – A layer with a gleyed matrix (60% or more of the volume) starting within 15 cm of the soil surface.

Reference Card S-6: Hydric Soil Field Indicators Approved For Use In LRR S (Back)

S5. Sandy Redox – A layer starting within 15 cm of the soil surface that is at least 10 cm thick and has a matrix (60% or more of the volume) chroma ≤2 and 2% or more redox concentrations occurring as soft masses or pore linings.

S6. Stripped Matrix – A layer starting within 15 cm of the soil surface in which Fe-Mn 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 rounded.

S7. Dark Surface – A layer 10 cm thick starting within 15 cm of the soil surface, with a matrix value ≤3 and chroma ≤1. At least 70% of visible soil particles must be masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens. The layer directly below the dark layer must have the same colors as those described above or any color that has a chroma ≤2.

S8. Polyvalue Below Surface – A layer with value ≤3, chroma ≤1, and starting within 15 cm of the soil surface. At least 70% of visible soil particles must be masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens. Directly below this layer, 5% or more of the soil volume has a value ≤3 and chroma ≤1, and the remainder of the soil volume has value ≥4 and chroma ≤1 to a depth of 30 cm or to a spodic horizon, whichever is less.

S9. Thin Dark Surface – A layer at least 5 cm thick, within the upper 15 cm of the soil, with value ≤3 and chroma ≤1. At least 70% of visible soil particles must be masked with organic material when viewed with a 10x or 15x hand lens, or appear close to 100% masked when viewed without a hand lens. The layer(s) below have a value ≤4 and chroma ≤1 to a depth of 30 cm or to a spodic horizon, whichever is less.

Loamy/Clayey Indicators:

F2. Loamy Gleyed Matrix – A layer with a gleyed matrix (60% or more of the volume) starting within 30 cm of the soil surface.

F3. Depleted Matrix – A layer with a depleted matrix (60% or more of the volume) with chroma ≤2, and a minimum thickness of either:

1) 5 cm if the 5 cm occurs entirely within the upper 15 cm of the soil, or
2) 15 cm if the layer starts within 25 cm of the soil surface.

F6. Redox Dark Surface – A layer at least 10 cm thick entirely within the upper 30 cm of mineral soil and has:

1) Matrix value ≤3, chroma ≤1, and 2% or more redox concentrations occurring as soft masses or pore linings, or
2) Matrix value ≤3, chroma ≤2, and 5% or more redox concentrations occurring as soft masses or pore linings.

F7. Depleted Dark Surface – A layer at least 10 cm thick entirely within the upper 30 cm of mineral soil that has:

1) Matrix value ≤3, chroma ≤1, and 10% or more redox depletions, or
2) Matrix value ≤3, chroma ≤2, and 20% or more redox depletions. Redox depletions have value ≥5 and chroma ≤2.

F8. Redox Depressions – In closed depressions (e.g., vernal pools, playa lakes, rainwater basins, "Grady" ponds, and potholes) subject to ponding, 5% or more redox concentrations occurring as soft masses or pore linings in a layer at least 5 cm thick and entirely within 15 cm of the soil surface.

F19. Piedmont Flood Plain Soils – On flood plains, a mineral layer at least 15 cm thick, starting within 25 cm of the soil surface, with a matrix (60% or more of the volume) chroma <4 and 20% or more redox concentrations occurring as soft masses or pore linings. This indicator is for use on flood plains in the Mid-Atlantic and Southern Piedmont Provinces where sediments derived from the Piedmont are being deposited on flood plains on the Coastal Plain. This indicator does not apply to stream terraces, which are associated with a previous stream level represent an abandoned flood plain.
ONLY for use in MLRAs 148 and 149A.

F20. Anomalous Bright Loamy Soils – Within 200 m of estuarine marshes or water and within 1 m of mean high water, a mineral layer at least 10 cm thick, starting within 20 cm of the soil surface, with a matrix (60% or more of the volume) chroma of <5 and 10% or more distinct or prominent redox concentrations occurring as soft masses or pore linings, and/or redox depletions.
ONLY for use in MLRA 149A.

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

1) Value one or more higher and chroma one or more lower than the matrix, or
2) Value ≥4 and chroma ≤2.

This indicator was developed for use in areas of red parent material, such as residuum in the Piedmont Province Triassic lowlands section or the Paleozoic "red beds" of the Appalachian Mountains, and in alluvium or colluvium derived from these materials. In glaciated areas, the indicator may form in glacial till, outwash, deltaic sediments, or glaciolacustrine sediments derived from similar red lithologies.
ONLY for use in MLRAs 147 and 148.