

Hydric Soils Indicators APRIL 2015

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OBJECTIVES

- Define and describe:
 1. Hydric soils indicator (HSI) usage, terminology and identification methodology *as used by FDOH*
 2. Methodology for determining SHWT when using hydric soil indicators
 3. Focus on the most common indicators used in Florida

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NOTE

Additional information on certain slides will be found in the “NOTES” section and will only be visible in the “normal” view in PowerPoint
Please watch for ## which indicates information in the notes section

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Much of the material used in this presentation is originally from Wade Hurt, Soil Scientist at the University of Florida

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Recognizing Features

Familiarity with redoximorphic processes and recognizing their morphological expressions in soils facilitates onsite determination of depth to soil saturation or the probability of inundation

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DOH and Hydric Soil Indicators (HSI)

- *DOH does not define hydric soils nor exert regulatory control because the soil may be hydric in nature*
- *DOH uses HSI solely for SHWT indicators*
- *To DOH, a hydric soil simply means that the soil has a SHWT closer to the ground surface or is possibly inundated*

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DOH and Hydric Soil Indicators

- “Hydric” only means the SHWT of the soil in question meets the criteria for the soil to be termed “hydric” by use of the indicators
- Must use HSI exactly as written in standards for SHWT determination (some of the standards are very exacting)
- Exception: Where an HSI indicates a specific feature must start with “X” inches of the surface (i.e. “depth to indicator”)

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DOH and Hydric Soil Indicators

- Use the current Field Indicators of Hydric Soils in the U.S. handbook for full descriptions, not just cheat sheet

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Hydric Soils and Other Agencies:

- For soils to be hydric: textures of LFS and coarser must have SHWT within 6”; LVFS and finer must have SHWT within 12”
- Hydric soil determinations have ramifications for other agencies, not DOH

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DOH and Hydric Soil Indicators

- Must use ONLY the HSI for the first 12" of soil, cannot use non-hydric indicators
- HSI can be used at any depth to determine the SHWT of the soil (because they are SHWT indicators); the only part of the HSI that will not be met is "depth to indicator" (doesn't matter) because DOH is not trying to identify a hydric soil, only determine the SHWT

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HSI and Fill Material

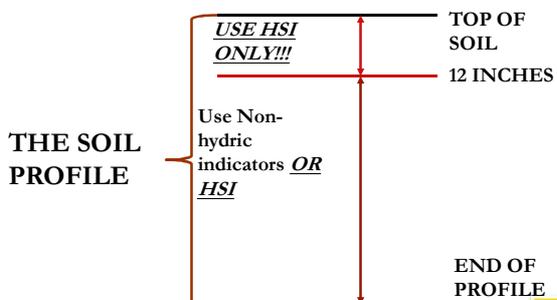
- When soil has been filled, the indicators must still be used
- Indicators can form in fill
- Underneath fill
- HSI must have formed in place, not been brought in with the fill
- Indicator formation takes time, if ever

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Which SHWT Indicators to Use?



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Three different textural groupings of HSI

- A indicators: used for All soil textures
- S indicators: used for Sandy soils only (LFS and more coarse)
- F indicators: used for Fine textured soils only (LVFS and finer, the loamy/clayey soils)

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DOH and Hydric Soil Indicators

- *Ensure all observations validate the conclusion*
- Thoroughly document all site conditions and soil profiles
- Take samples if necessary
- Take pictures

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Sample Observation

- Always look at samples that have a natural face by breaking the soil open
- When determining if a color is dark enough to meet standards (i.e., 70% masked criterion), do not touch the sample surface
- Several HSI used 70% masked criterion

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Sample Observation

- Break open and make observations on natural soil surface
- Touching the sample with objects (like your finger) can change the sample by moving the organic carbon

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LOOKING FOR HSI

- For DOH OSTDS purposes, we measure the depth to the indicator from where we begin the soil profile
- Whether the soil is actually hydric or not is unimportant to DOH because we only use HSI as indicators for SHWT, *not to determine hydric status of the soil*

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Hydric Soil Determination: Non-DOH HSI Measurement

- May be used by soil scientists
- Depths used in making hydric soil determinations are measured from the very top of the material upon which standing
 - nationwide when applying indicators A1, A2 (Soil Survey Staff. 1999), and A3

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Non-DOH HSI Measurement

- In the remaining LRRs for all soil materials:
- Depths used in making hydic soil determinations are measured from the muck or mineral surface (underneath any fibric and/or hemic material) except for application of A1, A2, and A3

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DOH USE

- In Florida, all indicators are measured from the soil surface, which includes all horizons that were made from the soil forming process, or fill material
- Remember that Peat (Fibric material) or Mucky Peat (Hemic material) at the surface or in a deeper layer is not an indicator unless it conforms to HSI A1, A2 or A3

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Depth from which to Measure

Hemic soil material (mucky peat) is about 9 cm thick directly underlain by sandy mineral soil material

For hydric soil indicator application in Florida, the depth from which to measure (*for HSI determination*) would be from the sandy mineral surface



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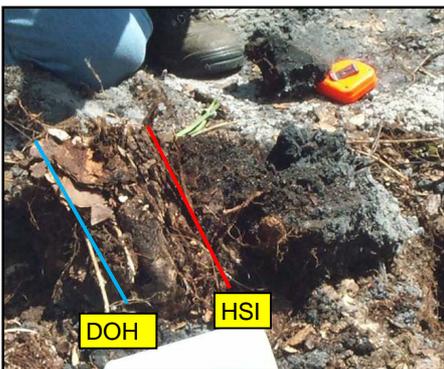
Where do you start looking for indicators?



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OSTDS USE
SHWT 14"



HSI MEASUREMENT

- STARTS @ 14" from top of grade
- Start depth to indicator from here
- SHWT is 14 inches below top of grade
- Soil is hydric

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DOH USE

- Still must use USDA NRCS methodology
- Must use Hydric Soil Criteria correctly to determine SHWT
- To not use correct methodology would mean that the SHWT may be misidentified
- Ramifications

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Indicator Presence

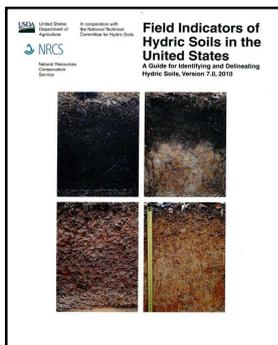
- Gather all information from site, including surface water bodies, swales, ditches, etc.
- Where hydrologic modifications have been made, make note of them
- Hydrologic modifications must be taken into account
- Fully document the soil observations and state which indicators are present and use to determine SHWT

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Field Indicators of Hydric Soils in the US



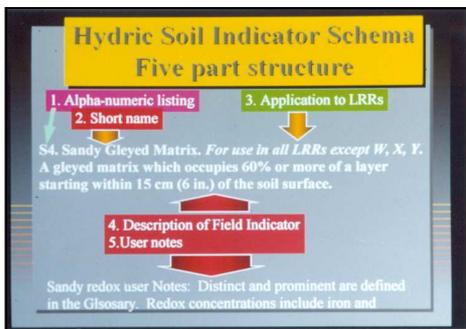
This lecture pertains to the publication *Field Indicators of Hydric Soils in the US, Version 7.0, 2010*

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Understanding HSI Information



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Regionalization of Hydric Soil Indicators

- The National Technical Committee for Hydric Soils (NTCHS) has approved each of the indicators for use in specific regions of the US (USDA, SCS. 1981)
- Most are based on Land Resource Regions (LRR)
- Some are based on the smaller Major Land Resource Areas (MLRAs)

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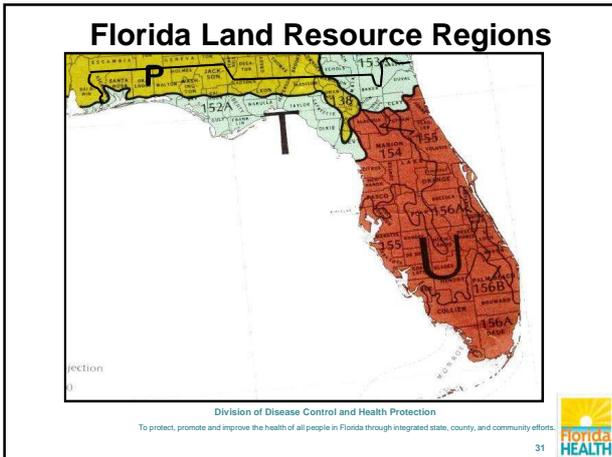




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Regionalization of HSI

- Not all HSI can be used in every LRR
- Make sure that the specific indicator is allowed for use in a particular LRR
- Example: Muck as an indicator:
- LRR U (most of peninsular FL): Only the “presence” of muck is required
- LRRs P and T: 1 cm thickness required

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Basic Terms of Importance

Several basic terms are used throughout the HSI and will be defined here because they are used in the definitions of many of the indicators

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Basic Terms of Importance

- Depleted Matrix – Used in Indicators A11, A12, F3 and F12
- Gleyed Matrix – Used in Indicators A11, A12, S4 and F2
- Reduced Matrix – Used in Indicators A11, A12, S4, F2, F3 and F12
- 70% masked by organic matter - Used in Indicators A5, A11, A12, S7, S8 and S9

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Depleted Matrix

- For loamy and clayey soil material (and sandy soil material for application of Indicators A11 and A12)
- The volume of a soil horizon or subhorizon from which iron has been removed or transformed by processes of reduction and translocation to create colors of low chroma and high value

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Depleted Matrix

- Depleted matrix may change color from a gray to reddish upon exposure to air (oxidation of Fe that was in solution), at which time it is termed a Reduced Matrix (more later on this)
- This phenomenon is included in the concept of depleted matrix

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Depleted Matrix

The following combinations of value and chroma identify a Depleted Matrix

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Depleted Matrix

1. Matrix value ≥ 5 and chroma 1 with or without redox concentrations as soft masses and/or pore linings; or
2. Matrix value ≥ 6 and chroma 1 or 2 with or without redox concentrations as soft masses and/or pore linings; or

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Depleted Matrix

3. Matrix value 4 or 5 and chroma 2 with 2 percent or more distinct or prominent redox concentrations as soft masses and/or pore linings; or
4. Matrix value 4 and chroma 1 with 2 percent or more distinct or prominent redox concentrations as soft masses and/or pore linings

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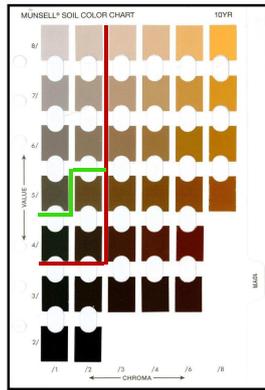


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Depleted Matrix

The range of colors for the depleted matrix is value 4 or more and chroma 1 or 2; HOWEVER, colors of value 4 and chroma 1 or 2 and value 5 and chroma 2 must have redox concentrations



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Depleted Matrix Note:

Any sandy material deemed a depleted matrix must have redox concentrations regardless of value and chroma

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Gleyed Matrix

Soils with a gleyed matrix have the following combinations of hue, value, and chroma and the soils are not glauconitic (no glauconite in Florida):

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- 1. 10Y, 5GY, 10GY, 10G, 5BG, 10BG, 5B, 10B, or 5PB with value 4 or more and chroma is 1; or
- 2. 5G with value 4 or more and chroma is 1 or 2; or
- 3. N with value 4 or more; or
- In some places the gleyed matrix may change color (rust) upon exposure to air and is termed a *reduced matrix*, which is included in the concept of gleyed matrix

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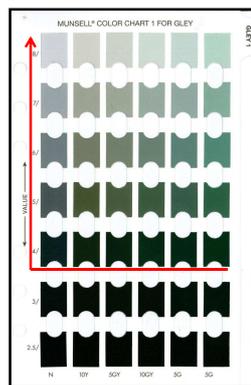
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Gleyed Matrix

The range of colors for the GLEYED MATRIX is value ≥ 4 on either of the two gley color charts



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Depleted Depleted Gleyed



4/1, 4/2, 5/2 with $\geq 2\%$ RC



$V \geq 5$ & $C = 1$, or $V \geq 6$ and $C \leq 2$ with or without RC



Value ≥ 4 on Gley Charts

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Reduced Matrix

- A matrix that upon initial exposure fits the color requirements of either a depleted matrix or a gleyed matrix but changes color (redder hue) when exposed to air for about 30 minutes (Vepraskas, 1994)

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Soil with
Gleyed Matrix

Soil oxidized
(rusted) on
exposure to air

Reduced Matrix
(occurred within 5
minutes)



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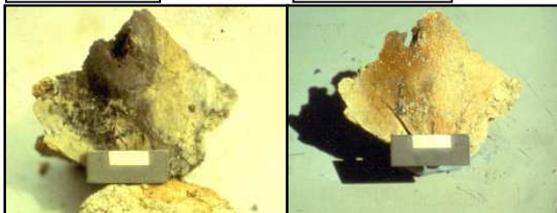
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Reduced Matrix

Initial Exposure

Air-dried 7 days



White bar is 1 cm

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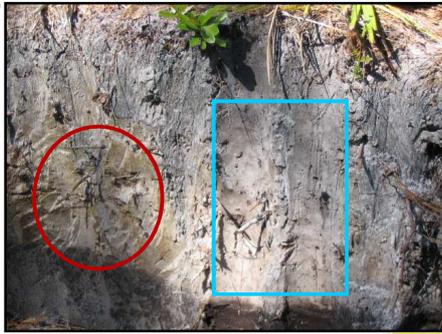
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Reduced matrix

- Note "rusted" areas on left where the soil was exposed to air
- Area to right has been scraped and oxidation is now gone
- Soil is dry



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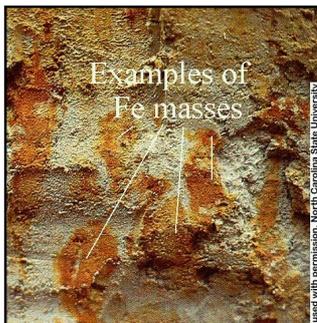
Additional Critical Terms/Issues

- Soft masses
- Redox depletion
- 70% masked with organic material criterion
- Moist Color (already defined)
- Colors between chips (already defined)

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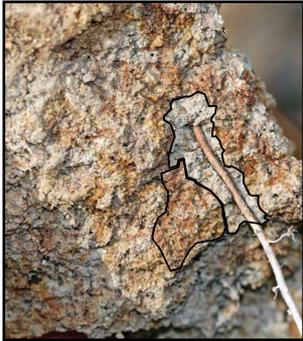
Soft Masses

- Noncemented redox concentrations, frequently within the soil matrix
- Has various shapes and cannot be removed as discrete units



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Soft masses (red areas) and Redox Depletion (gray area) along root channel



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70% Masked with Organic Material Criterion

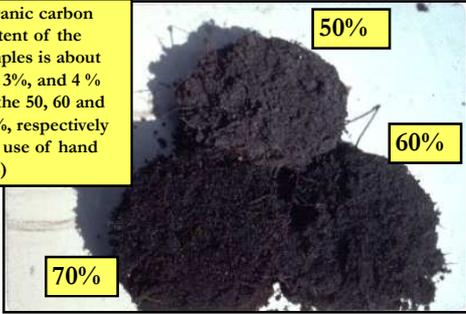
- Must observe natural (undisturbed) sample
- 70% masked criterion is for use with 10X or 15X hand lens only
- Viewed with naked eye, the soil must appear to be almost 100% masked (>98%)
- See next slide for example

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70% Masked with Organic Material

Organic carbon content of the samples is about 2%, 3%, and 4 % for the 50, 60 and 70 %, respectively (via use of hand lens)



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54 Florida HEALTH

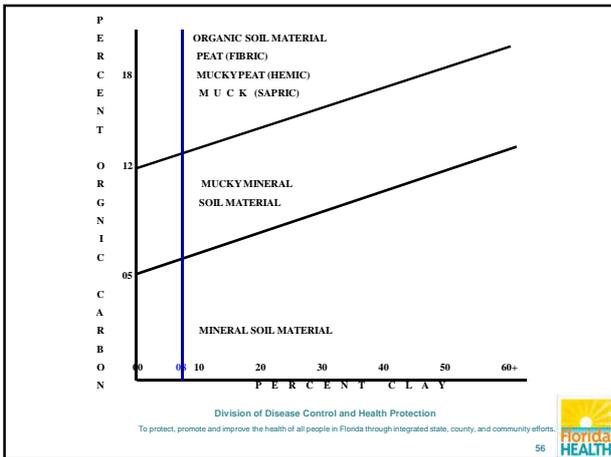
Soils and Organic Carbon Content

- HSI often require specific amounts of organic carbon
- Minimum for muck is 12 percent if soil has 0 percent clay
- Mucky mineral ranges from 5-12 percent depending on amount of clay in sample
- <5 percent organic carbon is mineral soil

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Estimating Organic Carbon Content By Use Of The Near-Saturated Soil Rub Test

This is not the same procedure used in Mineral Texturing

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The Near-Saturated Soil Rub Test

- Near-saturated means that water can be squeezed from the sample, is not just "moist" as in mineral texturing
- Used when laboratory analysis has not been performed
- Rub sample with slightly firm pressure between thumb and forefinger (light, quick rubs)

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The Near-Saturated Soil Rub Test

- Looking for material that is non-mineral
- Samples feeling gritty will be dominated by sand
- Samples feeling slick or plastic will be dominated by silt or clay
- Samples not feeling gritty/slick/plastic will be organic (greasy) in nature
- See following slide for breakdown

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The Near-Saturated Soil Rub Test

- Make sure sample is near-saturated with water, rubs are "slightly firm"
- ≤ 2 light, quick rubs: if gritty/slick/plastic feel, is mineral soil
- 3-5 light, quick rubs: if gritty/slick/plastic feel, is mucky mineral soil
- ≥ 6 light, quick rubs: soil would be organic, usually muck (if greasy feel)

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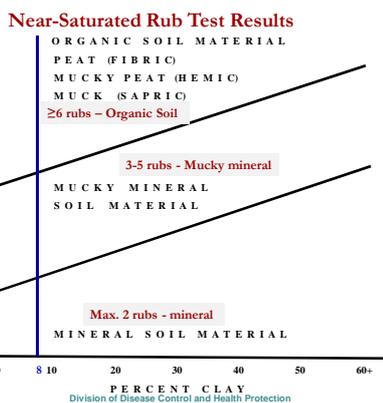
Water color in Organic Soil

- Water squeezed from different types of organic material have different colors
- Water from peat (fibric material-least decomposed) will be almost colorless
- Water from mucky peat (hemic material-intermediate decomposition) will be reddish in color
- Water from muck (sapric material-highest decomposition) is black

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Moist Color

All color requirements (hue, value, and chroma) are for moist color only.



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Summary of the Florida “A” indicators

- Many “A” indicators require specific amounts of organic carbon (OC), such as muck or 70% masked criterion
- Most evaluators over-estimate the amount of organic carbon
- May need to work with soil scientist in your area to become familiar with standard

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“S” Indicators

- All mineral layers above any of the layers meeting an S Indicator(s), except for Indicator S6 have dominant chroma 2 or less, OR
- The layer(s) with dominant chroma of more than 2 is less than 15 cm (6 inches) thick
- In addition, nodules and concretions are not redox concentrations

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Summary of the “S” indicators

- The entire soil does not have to be sandy, just the part of the soil as required by each specific indicator
- This material feels gritty
- S6 (Stripped Matrix) and S7 (Dark Surface) are not easily identified
- It may be best to work with a local soil scientist familiar with your region

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“F” Indicators

- These are soil materials with USDA textures of loamy very fine sand (LVFS) and finer
- All mineral layers above any of the layers meeting a Florida “F” Indicator(s), except for Indicators F8 and F12, have a dominant chroma of 2 or less, OR
- The layer(s) with a dominant chroma of more than 2 is less than 15 cm (6 inches) thick

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F Indicator Notes

- The entire soil profile does not have to be loamy or clayey, just the part of the soil as required by each specific indicator
- This material does not feel gritty
- F6, F7, F10 and F13 are not easily identified
- It may be best to work with a local wetland scientist familiar with your region

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Redox Concentrations in Hydric Soils

Different Requirements from
Non-Hydric Soils

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Redox Concentrations and HSI

- Redox colors still comes from Iron (Fe) and Manganese (Mn)
- Different criteria than non-hydric soils
- Must use the following redox concentration criteria whenever using HSI

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Redox Concentration Requirements

- | Mineral | Value/Chroma | | Hue |
|--------------|--------------|----|-------------|
| Mn: | ≤2 | ≤2 | 2.5YR to 5Y |
| Fe/Mn masses | 3 | 3 | 2.5YR to 5Y |
| Fe: | ≥4 | ≥4 | 2.5YR to 5Y |

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- Note: Redox concentrations having a hue of 10R or redder would indicate relict wetness and applies to hydric and non-hydric soils
- Note that gley colors are depletions, not concentrations so cannot be used to identify redoximorphic concentrations
- Note for Mn: except on flood plains of the Florida Panhandle, redoximorphic Mn is relatively unimportant

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SUMMARY OF REDOXIMORPHIC FEATURE USE IN HSI

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REDOXIMORPHIC FEATURES MUST:

- Have distinct or prominent contrast with the matrix
- Have diffuse boundaries EXCEPT where a specific indicator dictates otherwise

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NODULES AND CONCRETIONS:

- Nodules are cemented or hardened plinthite
- Concretions are similar except for the presence of visible, concentric layers around a point or line
- Both have sharp boundaries and except as noted in the HSI, do not count as a redoximorphic feature

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The 11 Dominant Hydric Soil Field Indicators used in Florida

We will focus on these indicators, but you need to know how to recognize all 25 HSI

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Florida's Dominant Indicators

- A5 Stratified Layers
- A6 Organic Bodies
- A7 5 cm Mucky Mineral
- A8 Muck Presence
- A9 1 cm muck

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Florida's Dominant Indicators

- S5 Sandy Redox
- S6 Stripped Matrix
- S7 Dark Surface
- S8 Polyvalue Below Surface
- S9 Thin Dark Surface
- F2 Loamy Gleyed Matrix

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*****NOTE*****

- While these are the “Hydric Soil Indicators” (HSI), the language that “makes” the soil hydric has been [bracketed]. Ignore this information to use the indicator for SHWT only. Example: [starting within the upper 15 cm (6 inches) of the soil surface.]
- This is to facilitate the idea that FDOH uses all HSI as SHWT indicators only.

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*****NOTE*****

- The laminated HSI sheets have not been bracketed in order to provide consistency with all other HSI information from other sources

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A5. Stratified Layers ##

- *For use in all of Florida*
- Several (≥ 3) stratified layers [starting within the upper 15 cm (6 inches) of the soil surface]
- At least one of the layers has value 3 or less with chroma 1 or less or it is muck, mucky peat, peat, or mucky modified mineral texture
- The remaining layers have chroma 2 or less

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A5. Stratified Layers

- Individual strata are dominantly less than 2.5 cm (1 inch) thick
- Any sandy material that constitutes the value 3 or less and chroma 1 or less layer must meet 70% masked criterion

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A5. Stratified Layers-User notes

- Hand lens aids in the identification of this indicator
- Many alluvial soils (formed by flowing water deposition) have stratified layers at greater depths and do not meet this indicator
- Many alluvial soils have stratified layers at the required depths but lack chroma 2 or less which will not meet the requirements of this indicator

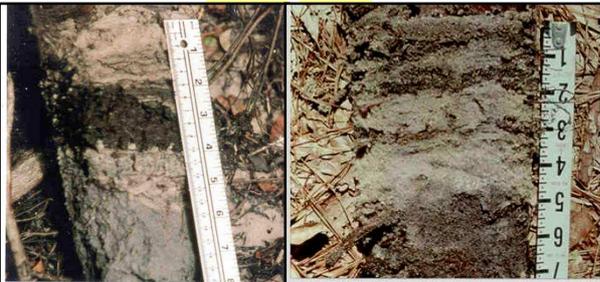
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Indicator A5 (Stratified Layers) in loamy and sandy materials. Scale is inches (R) and cm (L)

Loamy Sandy

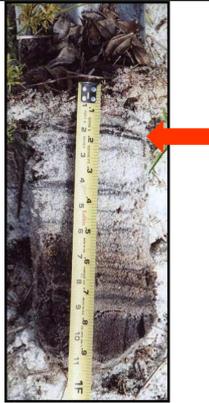


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Indicator A5 -
The required
70% masked
layer (near
100% by naked
eye) is between
1 and 2 inches



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MASKED LAYER



Indicator A5 -
Stratified Layers:
the required masked
layer is the near
surface
The layer with redox
concentrations is too
thin to meet the
requirements of S5
(Sandy Redox)

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A5 Stratified
Layers
The required
masked layer is
near the surface

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A6. Organic Bodies

- For use in all of Florida
- Presence of 2% or more organic bodies of muck or a mucky modified mineral texture, approximately 1 to 3 cm (0.4 to 1.2 inches) in diameter
- [Starting within 15 cm (6 inches) of the soil surface]
- See multiple user notes in “notes” section of slide”

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A6. Organic Bodies User Notes

- Organic bodies are typically found at the tips of fine roots
- The content of organic carbon in organic bodies is the same as in the Muck or Mucky Texture Indicators
- The Organic Bodies indicator includes the indicator previously named “accretions” (Florida Soil Survey Staff, 1992)

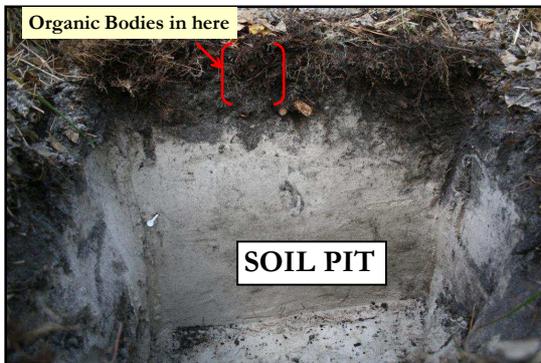
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Organic Bodies in here



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Organic bodies adhering to small feeder roots



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A6. Organic Bodies. The mucky organic bodies layer occurs between 0 and 10 cm (left). Indicator S7 (Dark Surface) is also present. The individual organic bodies are 1 -3 cm in size (right) from the soil on the left. Scale is inches (top) and cm (bottom)



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- Indicator A6 states that the size of organic bodies are about 1-3 cm. Sometimes they are smaller. Scale is inches. This indicator is easy to identify
- Bodies that adhere to roots and qualify for A6 feel greasy and will float in water; bodies that adhere to roots and fail to qualify for A6 feel gritty

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A7. 5 cm Mucky Mineral

- For use in all of Florida
- A mucky modified mineral surface layer 5 cm (2 inches) or more thick [starting within 15 cm (6 inches) of the soil surface]
- When soils with this indicator are saturated or nearly saturated individual soil particles are not visible nor can they be felt, however, after 2 rubs with slightly firm pressure and within 5 rubs individual soil particles can be felt

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A7 5cm Mucky Mineral Begins at the surface and ends about 2.5 inches

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Indicator A7 (5 cm Mucky Mineral) about 10 cm thick. Indicator S7 (Dark Surface) is also present. Scale is inches (R) and cm (L).

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A8. Muck Presence

- For use in LRR U
- A layer of muck with value 3 or less and chroma 1 or less [starting within 15 cm (6 inches) of the soil surface]
- This is for presence only, there is no thickness depth
- Normally occurs at soil surface, but can be deeper
- Look for in natural setting, not tire tracks, etc.

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A9. 1 cm Muck

- For use in LRRs P and T
- A layer of muck 1 cm (0.4 inches) or more thick with value 3 or less and chroma 1 or less [starting within 15 cm (6 inches) of the soil surface]
- This indicator has a minimum thickness requirement (hence the indicator name)
- Look for in natural setting

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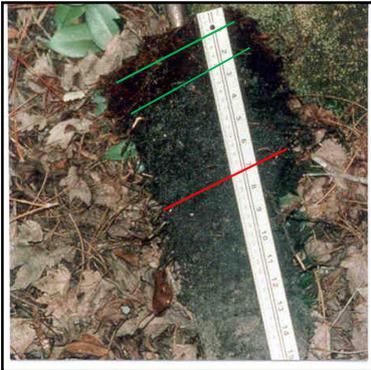
Muck begins at 5 inches in the profile



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- This could be Indicator A8 or A9; also has Indicator S7 (Dark Surface)
- Muck is about 3 cm thick and the dark surface is 18 cm thick
- Scale is inches (R) and cm (L)

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S5. Sandy Redox

- For use in all of Florida
- A layer [starting within 15 cm (6 inches) of the soil surface] that is at least 10 cm (4 inches) thick, and has a matrix with 60% or more chroma 2 or less with 2% or more distinct or prominent redox concentrations as soft masses and/or pore linings
- This is a very common indicator

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Sandy Redox



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Redox
spotches
start
within 6
inches
on both
(color
altered)



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- Indicator S5 (Sandy Redox)
- The redox concentrations are reddest in the center (near a pore) and diffuse into the matrix

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S5 (Sandy Redox):
redox
concentrations
may exist in any
value matrix from
gray (shown here)
to black

6"

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Redox Concentration Boundaries: Exception

- Where the matrix has $V \leq 3$ and $C \leq 1$, redox concentrations may have sharp (not diffuse) boundaries
- This is due to masking by the organic material obscuring the diffused areas

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Sandy Redox
(note how difficult the redox concentrations are to see)

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Sandy Redox Dark Soil Enlarged



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Sandy redox in dark sands



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Sandy redox in dark sands



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SANDY REDOX

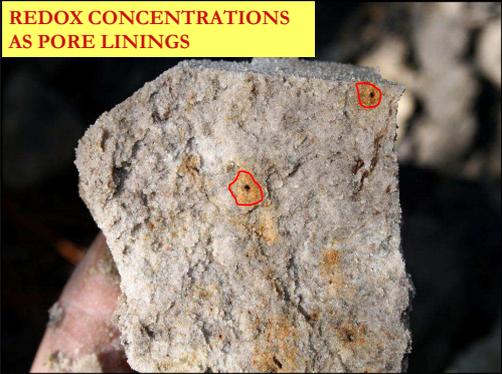


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REDOX CONCENTRATIONS AS PORE LININGS



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S6. Stripped Matrix##

- For use in all of Florida
- A layer [starting within 15 cm (6 inches) of the soil surface] in which iron-manganese oxides and/or organic matter have been stripped (removed) from the matrix
- The primary base color of the soil material has been exposed

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S6. Stripped Matrix

- The stripped areas and translocated oxides and/or organic matter form a faintly contrasting pattern of 2 or more colors with diffuse boundaries
- The stripped zones are ≥10 percent of the volume and are rounded
- Includes the indicator previously named “polychromatic matrix” or “streaking”

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S6. Stripped Matrix notes:

- Stripped areas are typically 1 to 3 cm (0.5 to 1 inch) in size, but may be larger or smaller
- The stripped areas commonly have value of 5 or more and have chroma of 1 and/or 2 and unstripped areas have chroma of 3 and/or 4
- The matrix *may not have* the material with 3 and/or 4 chroma

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S6. Stripped Matrix notes:

- The mobilization and translocation of oxides and/or organic matter is the important process and should result in plotchy coated and uncoated soil areas
- Pattern may be difficult to recognize, is more evident when observing a horizontal slice

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Indicator S6 (Stripped Matrix). The knife blade is pointing to a perfect example of a stripped splotch##



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S6 (Stripped Matrix). Knife blade is six inches long.

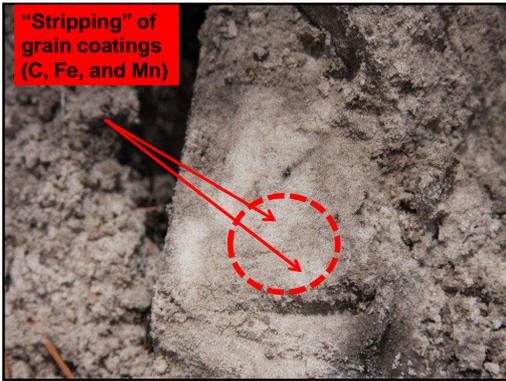


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**“Stripping” of
grain coatings
(C, Fe, and Mn)**



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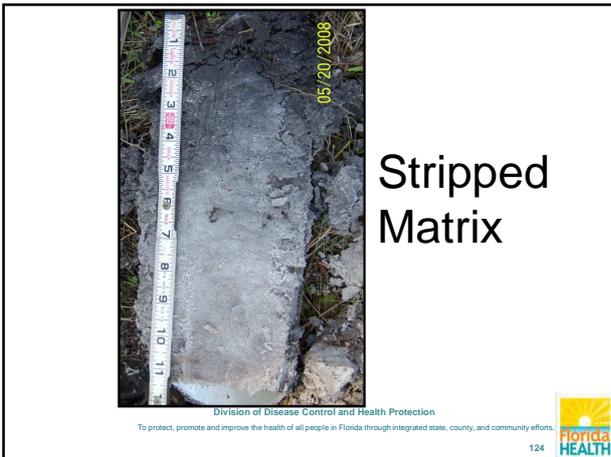


**Stripped
Matrix
Horizontal
Slice**

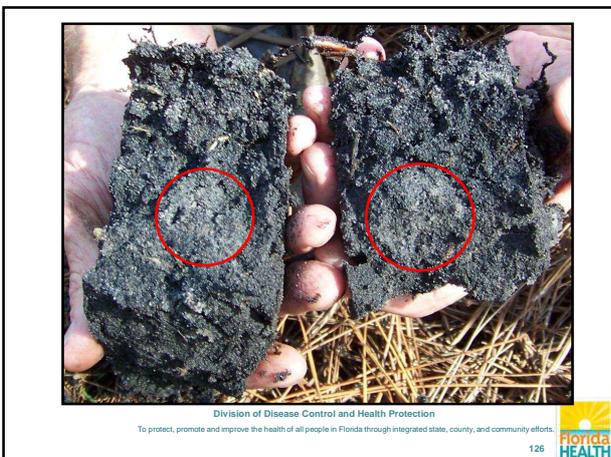
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- The following slide shows Stripped Matrix in a dark horizon
 - Note lighter colors in the center of the stripped areas progressively darkening as you move away from the center
 - Do not document only the dark matrix and gray color
 - Must document all the subtle grays (faint contrast) in the sample as this is the stripped area
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- 125



S6. Stripped Matrix

- Be careful when looking for this
- *Stripped Matrix (a.k.a. stripping) is often missed when using a bucket auger, so use of a Sharpshooter-type shovel is needed*
- Soil pit would be better, or dig a trench or pit (maybe with available backhoe)

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S6. Stripped Matrix - Caution

- Do not focus on just Stripped Matrix
- *Other indicators may be present higher in the profile*
- *If other SHWT indicators are higher in the profile, must use them*
- *Area closest to ground surface where any SHWT indicator is met is the SHWT*

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STRIPPED MATRIX



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Stripped Matrix
Note vertical plane of sample



SPLOTCHES

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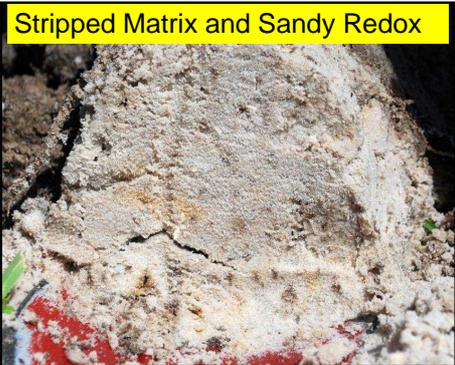
Stripped Matrix (and a little Fe)



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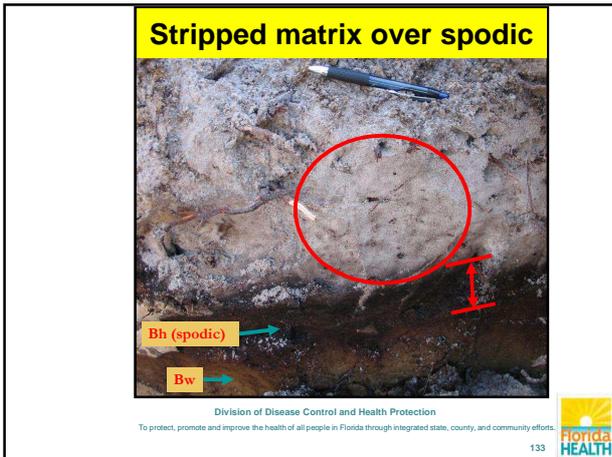
131 

Stripped Matrix and Sandy Redox



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S7. Dark Surface##

- *For use in all of Florida*
- A layer 10 cm (4 inches) thick [starting within the upper 15 cm (6 inches) of the soil surface] with matrix value 3 or less and chroma of 1 or less with 70% masked criterion required
- The layer immediately below the dark layer must have matrix color as those described above or any color that has chroma of 2 or less

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Indicator S7 (Dark Surface). The dark surface is 17 cm thick. Scale is inches (R) and cm (L)

A 10X or 15X hand lens is a tool to help make this decision

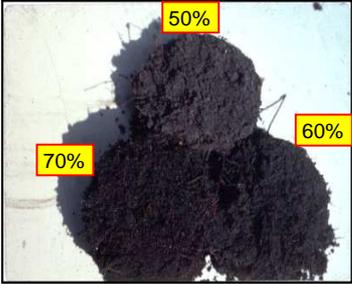


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Remember 70% Masked Criterion

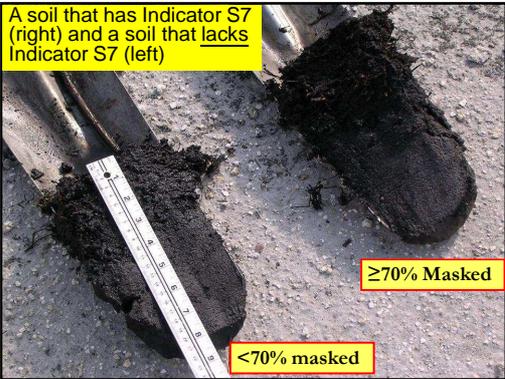
- Sandy soil material with (clockwise from top) 50, 60, and 70% masked with organic material
- Organic carbon content of the samples are about 2, 3, and 4 % respectively
- Must view undisturbed sample



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A soil that has Indicator S7 (right) and a soil that lacks Indicator S7 (left)



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138 



S7 Dark Surface
The required masked material starts at the mineral surface and extends to a depth of about 7 inches

S8. Polyvalue Below Surface

- For use in LRRs T and U
- A layer with value 3 or less and chroma 1 or less [starting within 15 cm (6 inches) of the soil surface] with 70% masked criterion required
- Immediately below the masked layer, 5%-100% of the soil volume has value ≤ 3 and chroma ≤ 1
- Continued next slide

S8. Polyvalue Below Surface

- The remainder of the soil volume (if any) has value ≥ 4 and chroma ≤ 1 to a depth of 30 cm (12 inches) or to the spodic horizon, whichever is less

S8 User Notes

- This indicator describes soils with a very dark gray or black layer <10 cm (4 inches) thick underlain by a layer where organic matter has been differentially distributed within the soil by water movement
- The mobilization and translocation of organic matter results in splotchy coated and uncoated soil

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Required
 masked layer
 starts about 4"

Splotchy
 coated/uncoated
 soil

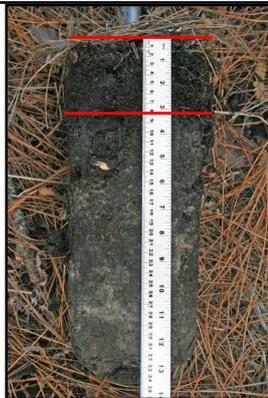


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S8 Polyvalue
 Below Surface
 70% masked layer
 begins at surface
 to about 3"
 Splotchy
 Underneath, meets
 color requirements
 (Note S5 begins
 below 5")



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S8 Polyvalue
Below Surface
70% masked area
is between 2-3
inches and all
other requirements
met

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145 Florida HEALTH

Pit from which plug was taken



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146 Florida HEALTH

S9. Thin Dark Surface

- For use in LRRs T and U
- A layer 5 cm (2 inches) or more thick [within the upper 15 cm (6 inches) of the surface,] with value 3 or less and chroma 1 or less with 70% masked criterion met
- This layer is underlain by a layer(s) with value ≤ 4 and chroma ≤ 1 (dark gray or blacker) to a depth of 30 cm (12 inches) or to the spodic horizon, whichever is less
- See user notes next two slides.

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147 Florida HEALTH

S9. User Notes

- This indicator describes soils with a very dark gray or black soil layer at least 5 cm (2 inches) thick underlain by a layer where organic matter has been carried downward by flowing water
- The mobilization and translocation of organic matter results in an even distribution of organic matter in the eluvial (E) horizon

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S9. User Notes

- The chroma 1 or less is critical because it limits application of this indicator to only those soils which are depleted of iron
- This indicator commonly occurs in hydric Spodosols; however, a spodic horizon is not required

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S9 Thin Dark Surface
 The dark layer is between 0.5 and 3 inches; a spodic occurs at about 7 inches

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150

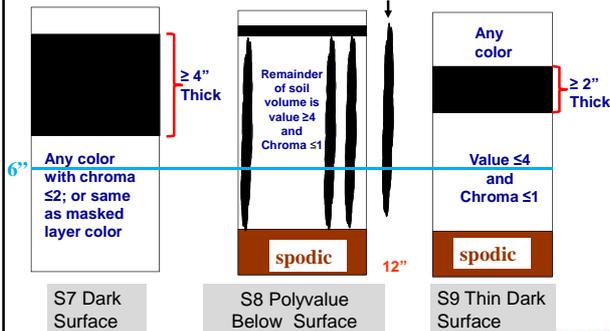
Differentiation Between Indicators S7, S8 and S9

The black squares on the next slide indicates a value ≤ 3 and chroma ≤ 1 and the 70% masked criterion is met

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Value 3 or less and chroma 1 or less (5-100%);
70% masked not required



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Sample Observation

- Always look at samples that have a natural face
- When determining if a color is dark enough to meet 70% masked criterion do not touch the sample as it can translocate material, altering the natural condition
- Break open and make observations on natural surface by picking the surface

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F2. Loamy Gleyed Matrix

- For use in all of Florida
- A gleyed matrix that occupies 60% or more of a layer [starting within 30 cm (12 inches) of the soil surface]
- Any color on the Gley Charts with value ≥ 4 meets the indicator
- Included reduced matrix (color change)
- See user notes next two slides

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F2. User Notes

- Gley colors *are not* synonymous with gray colors
- Gley colors are those colors that are found on the gley pages (Gretag/Macbeth. 2000)
- Soils with gleyed matrices are saturated for a significant duration, this is why no thickness of the layer is required

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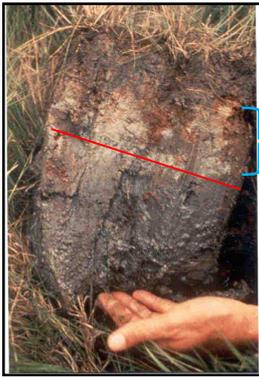


Indicator F2 (Loamy Gleyed Matrix) starts at the soil surface. Scale is inches

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- Indicator F2 (Loamy Gleyed Matrix). The gleyed matrix begins at a depth of about 18 cm
- Indicator F3 (Depleted Matrix-bracketed area) also occurs between the gleyed matrix and the surface layer

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F2 Loamy Gleyed Matrix
Requires gleyed matrix must occupy $\geq 60\%$ of the soil layer. Colors must appear on Gley Charts and have Value ≥ 4 .

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THE END



QUESTIONS?

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