

Hydric Soil Indicators - Remainder March 2014

David Hammonds

Environmental Consultant

Florida Department of Health

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

OBJECTIVES

- Define and describe seasonal high water table indicators for hydric soils
- Provide correct methodology for hydric soil indicator identification

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

NOTE

Additional information on certain slides will be found in the “NOTES” section and will only be visible in the “normal” view in PowerPoint

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

Remainder of the Field Indicators (Not on test)

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

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 indicator 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.
- Additional language used for clarification will be underlined

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

NOTE

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

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

S4. Sandy Gleyed Matrix

- For use in all of Florida
- A gleyed matrix which occupies 60% or more of a layer [starting within 15 cm (6 inches) of the soil surface]
- Gleyed matrix has already been defined in the previous presentation



Indicator S4
(Sandy Gleyed
Matrix). The
gleyed matrix
begins at the soil
surface. Scale is
inches (R) and cm
(L).

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

A1. Histosol

- *For use in all LRRs*
- Soil classifies as a Histosol (except Folist)
- Normally $\geq 16''$ (40 cm) of top 32'' (80 cm) is organic material such as muck, mucky peat and peat



- Indicator A1 (Histosols). Muck is >1 meter thick
- This soil has an organic carbon content of 17 percent in the upper 30 cm and 23 percent to a depth of 1 meter
- The field estimated percent organic carbon content (by experienced soil scientists) was 40 percent in the 2 layers

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

A2. Histic Epipedon

- *For use in all Florida LRRs*
- A histic epipedon (according to Soil Taxonomy) underlain by mineral soil material with a chroma of 2 or less
- User Notes: Most histic epipedons are surface horizons 20 cm (8 inches) or more thick of organic soil material
- Aquic conditions or artificial drainage are required, see Keys to Soil Taxonomy (2007) for complete definition



- Indicator A2 (Histic Epipedon)
- Proof of aquic conditions is required
- Generally, Histosols have more than 16 inches of organic soil material and Histic epipedons have 8 to 16 inches of organic materials

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

A3. Black Histic

- *For use in all LRRs*
- A layer of peat, mucky peat, or muck 20 cm (8 inches) or more thick [starting within the upper 15 cm (6 inches) of the soil surface] having hue 10YR or yellower, value 3 or less, and chroma 1 or less underlain by mineral soil material with a chroma of 2 or less
- Does not require proof of aquic conditions



- Indicator A3 (Black Histic)
- Proof of aquic conditions is not required
- Scale is inches (R) and cm (L)

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

A4. Hydrogen Sulfide

- *For use in all LRRs*
- A hydrogen sulfide odor [within 30 cm (12 inches) of the soil surface]
- Must be a “rotten egg” odor
- Other “unpleasant” odors exist such as mercaptans which contain sulfur compounds (e.g. smell placed in natural gas) but is not hydrogen sulfide



- **Indicator A4 (Hydrogen Sulfide) would most likely occur here**
- **Anaerobic conditions would probably occur in this salt marsh throughout the year**

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



A11 Depleted Below Dark Surface

- *For use in all of Florida*
- A layer with a depleted or gleyed matrix that has 60% or more chroma 2 or less [starting within 30 cm (12 inches) of the soil surface] that has a minimum thickness of either:
 - a. 15 cm (6 inches), or
 - b. 5 cm (2 inches) if the 5 cm (2 inches) consists of fragmental soil material

A11 Depleted Below Dark Surface

- Loamy/clayey layer(s) above the depleted or gleyed matrix must have value 3 or less and chroma 2 or less
- Any sandy material above the depleted or gleyed matrix must have value 3 or less, chroma 1 or less and meet 70% masked criterion



- Indicator A11
(Depleted Below
Dark Surface)
- This indicator is
similar to F3
(Depleted
Matrix)

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

A12 Thick Dark Surface

- *For use in all LRRs*
- A layer at least 15cm (6") thick with a depleted or gleyed matrix that has 60% or more chroma ≤ 2 [starting below 30cm (12") of the surface]
- The layer(s) above the depleted or gleyed matrix must have value ≤ 2.5 and chroma ≤ 1 to a depth of at least 30cm (12") and value ≤ 3 and chroma ≤ 1 in any remaining layers above the depleted or gleyed matrix

A12 Thick Dark Surface

- Any sandy material above the depleted or gleyed matrix must meet the 70 % masked criterion

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

A12 Thick Dark Surface



Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Indicator A12 (Thick Dark Surface)
Deep observation is often necessary

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.





Indicator A12 (Thick Dark Surface)

A depleted matrix
is below the mollic
epipedon

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F3. Depleted Matrix

- Term has been previously defined
- *For use in all of Florida*
- A layer with a depleted matrix that has 60% or more chroma 2 or less that has a minimum thickness of either:
 - a. 5 cm (2 inches) if 5 cm (2 inches) is entirely within the upper 15 cm (6 inches) of the soil, or
 - b. 15 cm (6 inches) [and starts within 25 cm (10 inches) of the soil surface] beginning at any depth

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.





Indicator F3
(Depleted Matrix)
The chroma is 1
Redox
concentrations are
present but not
required

Division of Disease Control and Health Protection

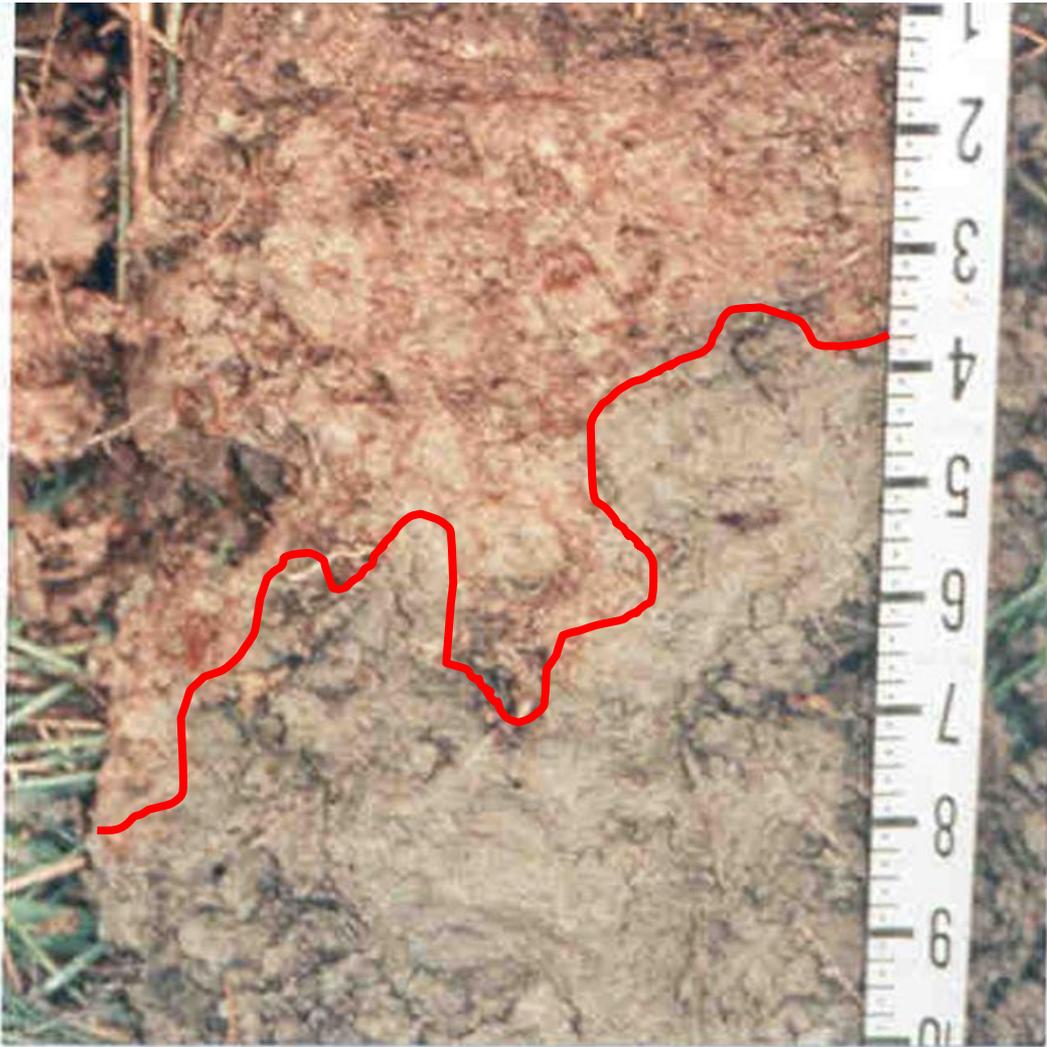
To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Indicator F3
(Depleted Matrix)
The chroma is 2
Redox
concentrations are
present as required

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Indicator F3 (Depleted Matrix)

The chroma is 1
within a depth of
about 10 to 15 cm

Redox
concentrations are
absent

Scale is inches

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Indicator F3 (Depleted Matrix)

The chroma is 2 below a depth of about 15 cm
Redox concentrations are present as required
Scale is inches

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F6. Redox Dark Surface

- *For use in all of Florida*
- A layer at least 10 cm (4") thick [entirely within the upper 30 cm (12") of the mineral soil] that has:
 - a. matrix value ≤ 3 and chroma ≤ 1 with $\geq 2\%$ distinct or prominent redox concentrations as soft masses or pore linings, or
 - b. matrix value ≤ 3 and chroma 2 with $\geq 5\%$ distinct or prominent redox concentrations as soft masses or pore linings

Redox Dark Surface User Notes:

- Very common indicator used to delineate wetlands in soils with dark-colored surface layers
- Redox concentrations in high organic-content mineral soils with dark surfaces are often small and difficult to see as it can mask some/all of the concentrations
- Careful examination is required to see what are often brownish redox concentrations in the darkened materials

Redox in Dark Colored Soils

- *Where the matrix has Value ≤ 3 and Chroma ≤ 1 , redox concentrations may have sharp (not diffuse) boundaries*
- *Caused by organic material masking the redox concentration*



Indicator F6 (Redox Dark Surface)

Prominent redox concentrations as soft masses and pore linings are present

Below the dark epipedon is indicator A11

(Depleted Below Dark Surface)

Scale is cm

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Indicator F6 (Redox Dark Surface)
Prominent redox concentrations as soft masses and pore linings are present
Often, as in this soil the redox concentrations are small (fine)

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F7. Depleted Dark Surface

- *For use in all of Florida*
- Redox depletions, with value ≥ 5 and chroma ≤ 2 , in a layer at least 10 cm (4") thick [entirely within the upper 30 cm (12") of the mineral soil] that has:
 - a. matrix value 3 or less and chroma 1 or less and $\geq 10\%$ redox depletions, or
 - b. matrix value ≤ 3 and chroma 2 and $\geq 20\%$ redox depletions

Indicator F7 (Depleted Dark Surface). Depletions as they occur within a dark surface layer.



Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F8. Redox Depressions

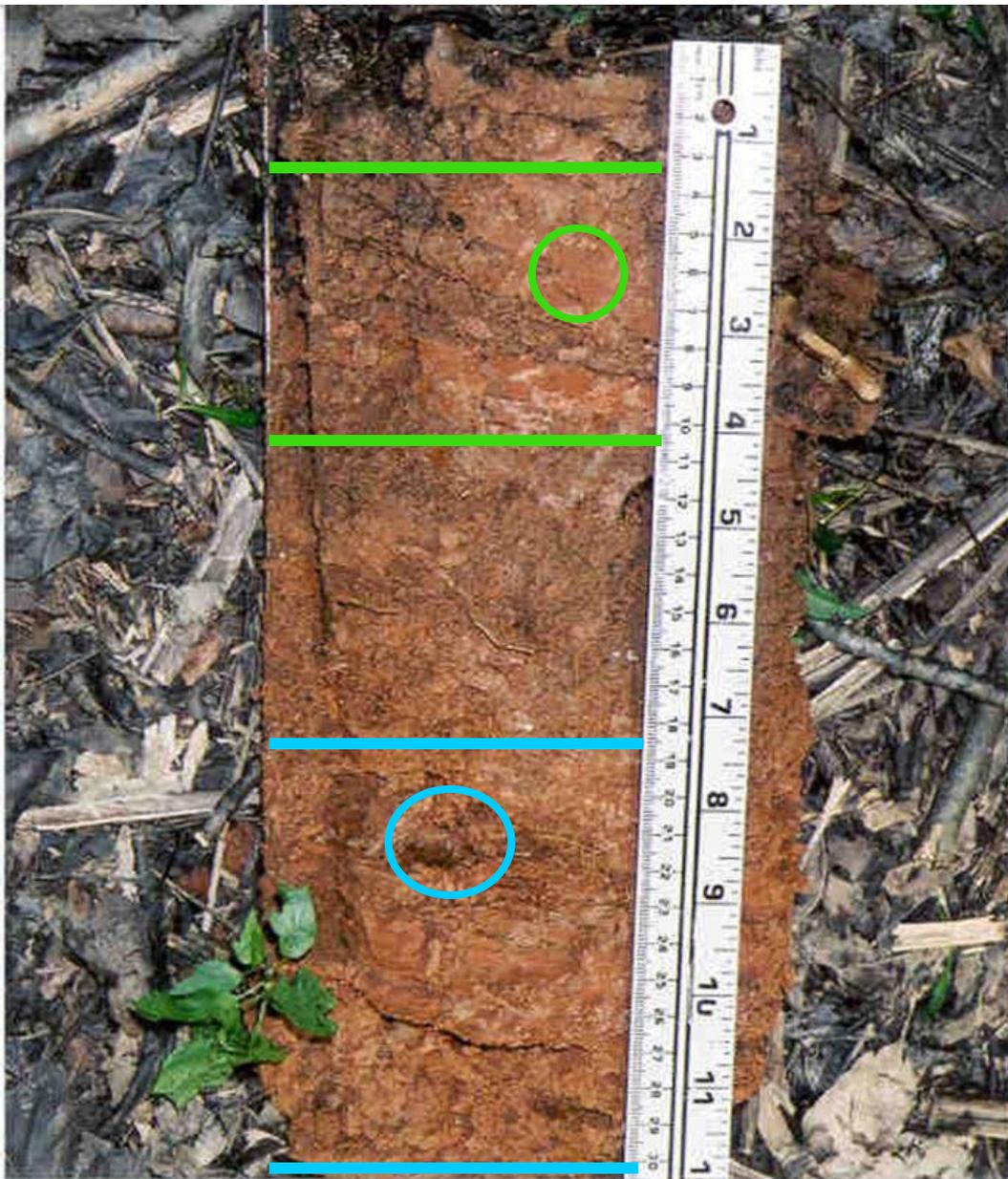
- *For use in all of Florida*
- In closed depressions subject to ponding, $\geq 5\%$ distinct or prominent redox concentrations as soft masses or pore linings in a layer 5 cm (2 inches) or more thick [entirely within the upper 15 cm (6") of the soil surface]
- This indicator is restricted to depressional landforms



**F8, slightly more than 2”
thick layer**

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



F8. REDOX DEPRESSIONS

The areas between the green (upper 2) bars and the blue (lower 2) bars meet the indicator by having more than 5% redox concentrations of iron and redox concentrations of iron/manganese, respectively

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F10. Marl (new info highlighted)

- *For use in LRR U*
- A layer of marl with a value ≥ 5 and chroma < 2 [starting within 10 cm (4 inches) of the soil surface]



Indicator F10 (Marl)

This indicator is
known to occur
only in south
Florida
Scale is cm

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F12. Iron/Manganese Masses

- *For use in LRRs P and T*
- On flood plains, a layer ≥ 10 cm (4") thick with $\geq 40\%$ chroma ≤ 2 , and $\geq 2\%$ distinct or prominent redox concentrations as soft iron/manganese masses with diffuse boundaries

F12. Iron/Manganese Masses

- [The layer occurs entirely within 30 cm (12 inches) of the soil surface]
- Most commonly Iron/manganese masses have value and chroma of 3; sometimes they are black
- The thickness requirement is waived if the layer is the mineral surface layer
- Note landform restriction (floodplains)

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



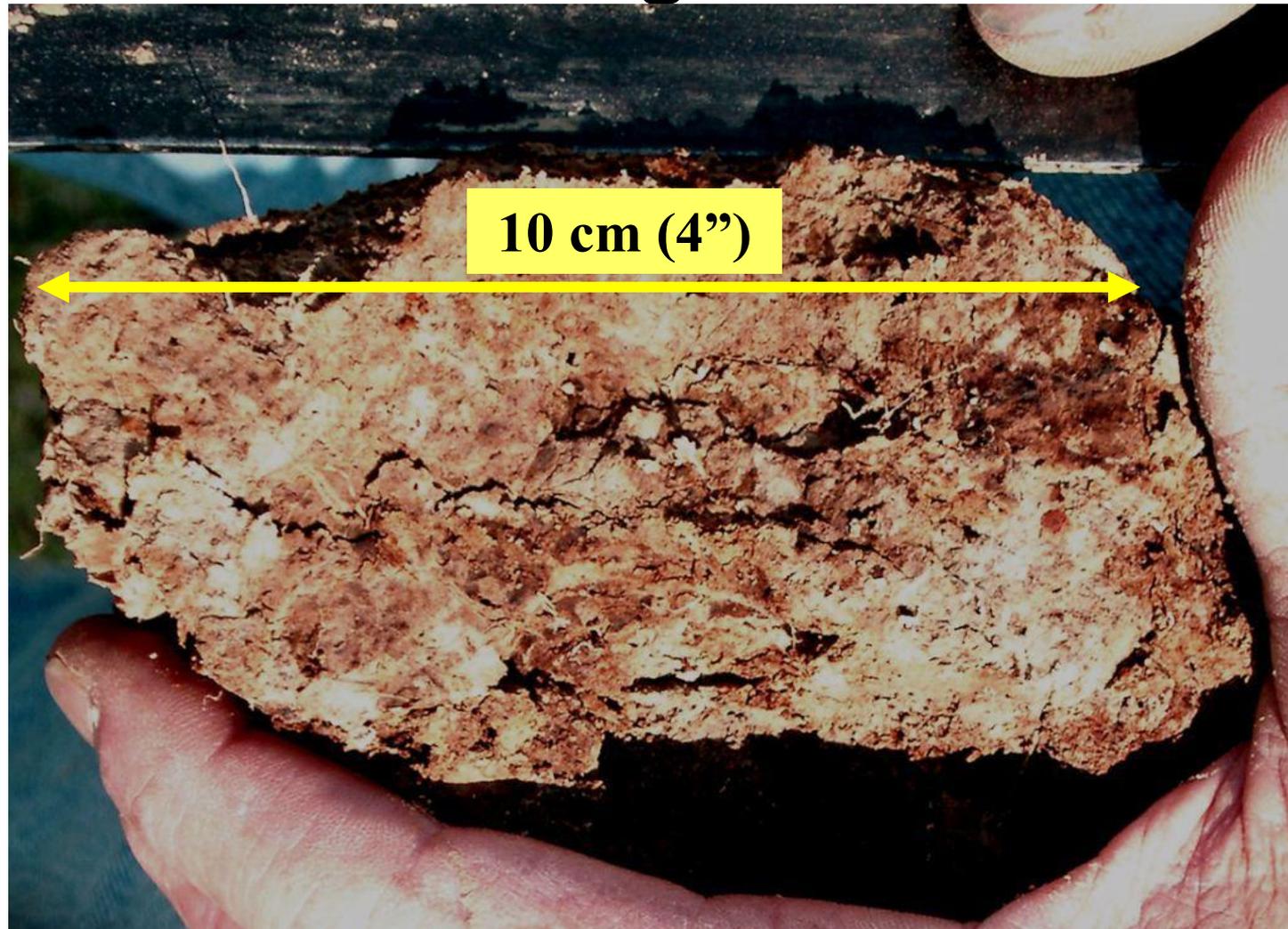
Indicator F12.
(Iron/Manganese
Masses) in a 40
percent depleted
(gray) matrix
Scale is inches

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



F12. Iron/Manganese Masses



Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F13. Umbric Surface

- *For use in all Florida*
- In depressions and other concave landforms
- A layer ≥ 25 cm (10") thick [starting within 15 cm (6") of the soil surface]
- Upper 15 cm (6") must have value ≤ 3 and chroma ≤ 1 , and the lower 10 cm (4") of the layer must have the same colors as above or any other color that has a chroma ≤ 2

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Indicator F13 (Umbric Surface)

This umbric surface is about 30 cm. thick (green bar)

Scale is inches

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

F22. Very Shallow Dark Surface

For use in MLRA 138 of LRR P, MLRA 154 of LRR U, and West Florida portion of MLRA 152A in LRR T

SEE NEXT 4 SLIDES

Note: MLRA means Major Land Resource Area

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

In depressions and flood plains subject to frequent ponding and/or flooding, one of the following

a) if bedrock occurs between 15 cm (6 inches) and 25 cm (10 inches), a layer at least 15 cm (6 inches) thick [starting within 10 cm (4 inches) of the soil surface] with value 2.5 or less and chroma 1 or less,

Continued next slide

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

and the remaining soil to bedrock must have the same colors as above or any other color that has a chroma 2 or less, or

b) if bedrock occurs within 15 cm (6 inches), more than half of the soil thickness must value 2.5 or less and chroma 1 or less, and the remaining soil to bedrock must have the same colors as above or any other color that has a chroma 2 or less.

LRR MAP with MLRAs for use with F22 Very Shallow Dark Surface

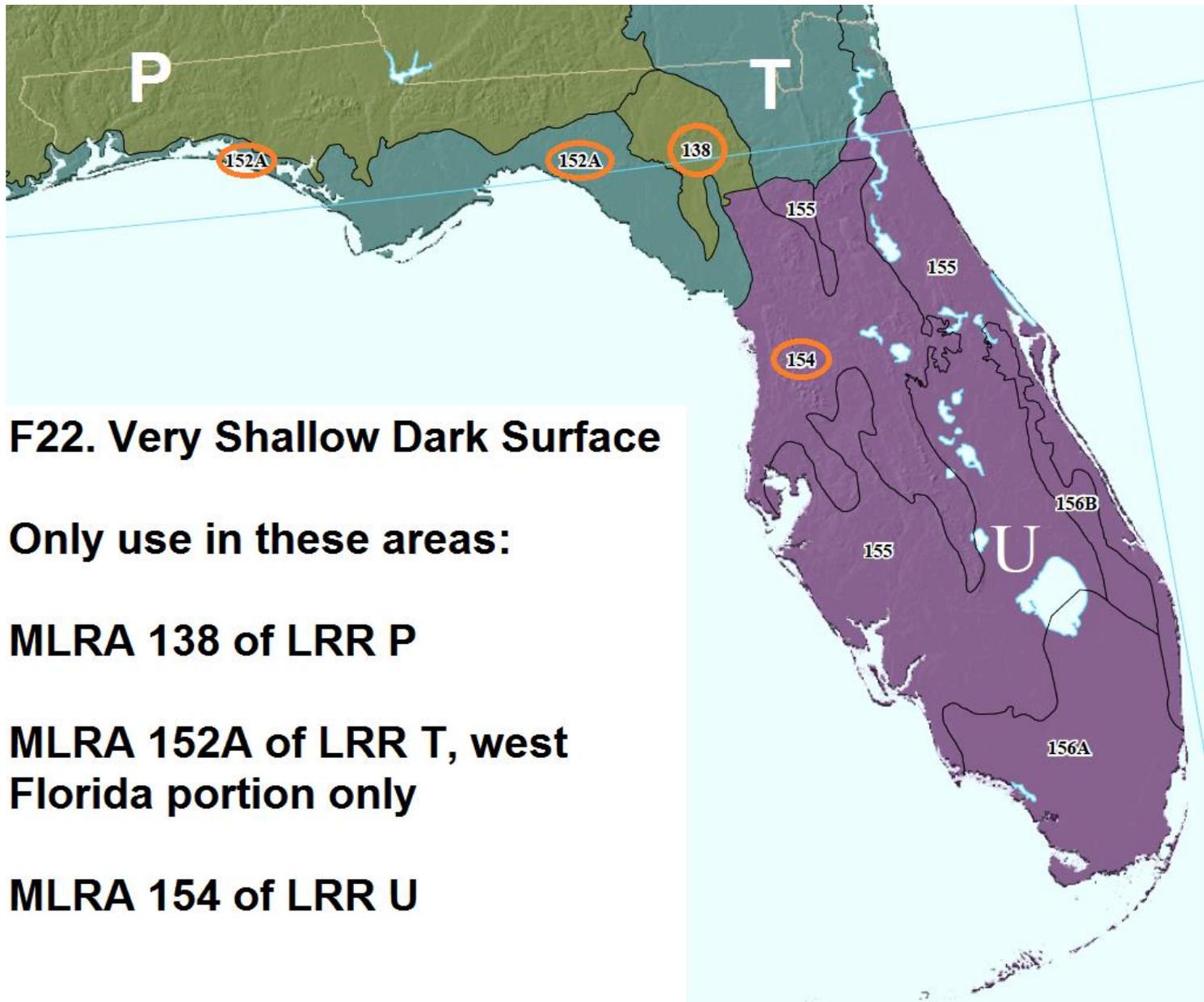
LRR P- See MLRA 138

LRR T- See MLRA 152A

LRR U- See MLRA 154

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



F22. Very Shallow Dark Surface

Only use in these areas:

MLRA 138 of LRR P

**MLRA 152A of LRR T, west
Florida portion only**

MLRA 154 of LRR U

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

Problem Hydric Soil?##

Has Umbric Surface and Redox Dark Surface

Glistening/sheen shows reduced iron oxidizing as it is exposed to air on the surface of the water in the pit



Combining HSI

- It is permissible to combine certain hydric soil indicators
- All requirements of the indicators are met except for thickness
- The most restrictive requirements for thickness of layers in any indicators used must be met

Combining HSI

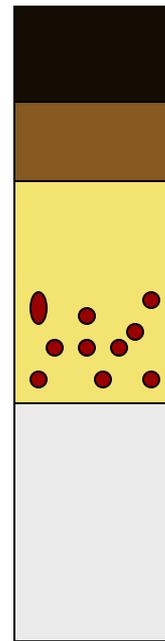
- Not all indicators are possible candidates for combination
- For example, indicator F2 (Loamy Gleyed Matrix) has no thickness requirement and is not a candidate for combination

WHERE THE NATURAL SOIL SURFACE HAS BEEN ALTERED BY THE ACTION OF MAN VIA SOIL ADDITION OR REMOVAL, THE INDICATORS MUST BE JUDGED USING NATURAL SOIL SURFACE CRITERIA, ACCOUNTING FOR WHAT WAS ADDED OR REMOVED

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

NATURAL SOIL SERIES



0-4" 10YR 2/1 FS

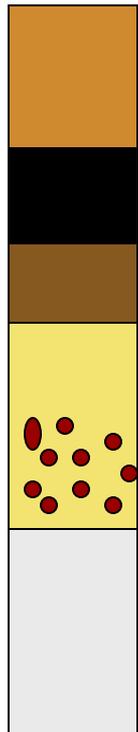
4-13" 10YR 4/6 FS

13-25 " 2.5Y 4/6 FS

7.5YR 6/8 many/prm RF @ 19"

25-72" 2.5Y 8/1 FSL

9" FILL ADDED OVER SOIL



0-9" 10YR 6/8 FS FILL

9-13" 10YR 2/1 FS

13-22" 10YR 4/6 FS

22-34" 2.5Y 4/6 FS

7.5YR 6/8 many/prm RF @ 28"

34-72" 2.5Y 8/1 FSL

16" NATURAL SOIL REMOVED



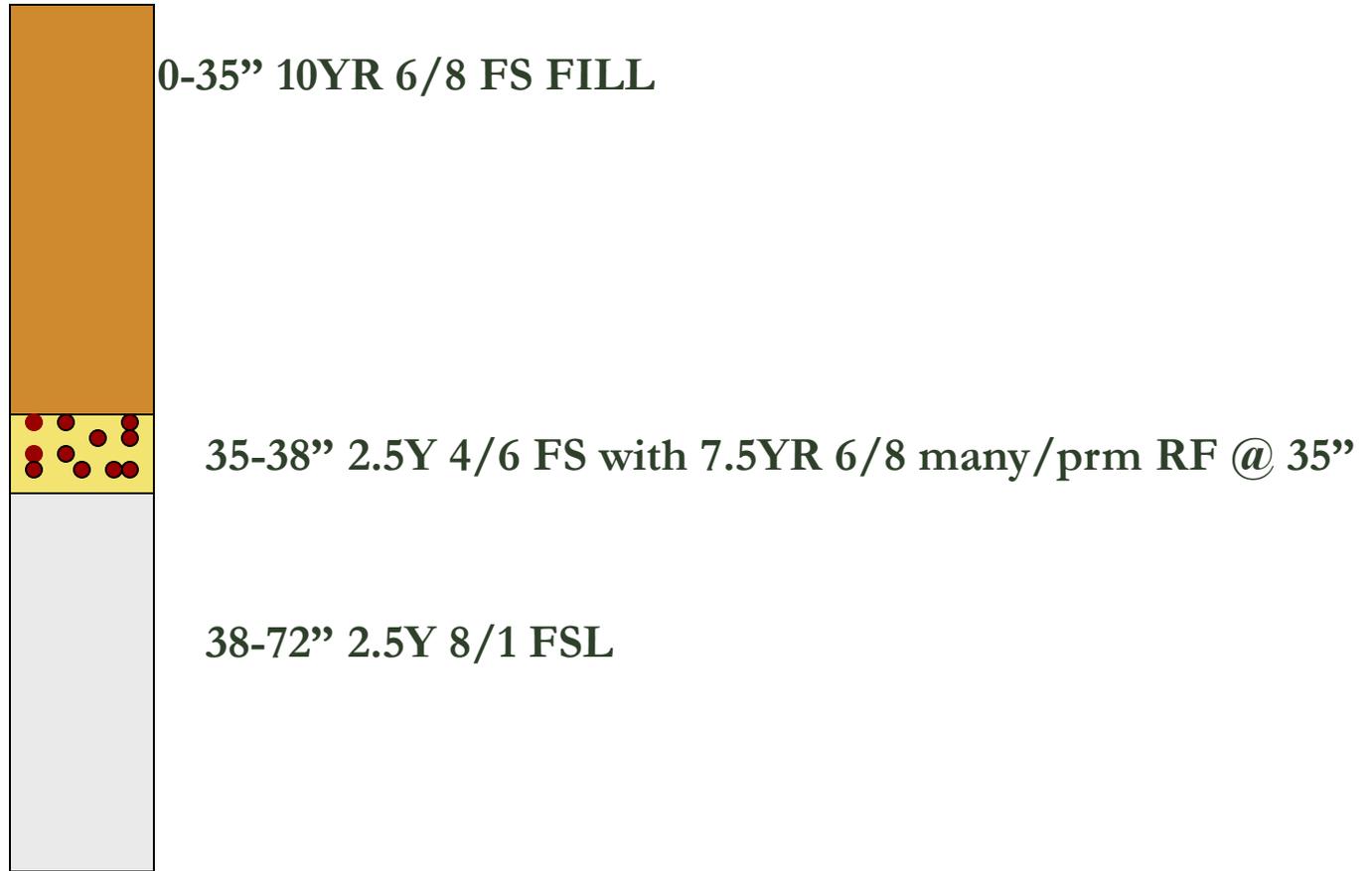
0-9 " 2.5Y 4/6 FS

7.5YR 6/8 many/prm RF @ 3"

9-72" 2.5Y 8/1 FSL

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



NATURAL SOIL REMOVED AND FILL MATERIAL PUT IN PLACE

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



REDOX FEATURES MAY FORM IN FILL MATERIAL AND EXTRA CARE MUST BE TAKEN DURING THEIR EVALUATION

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

Soil Pits

Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.





Division of Disease Control and Health Protection

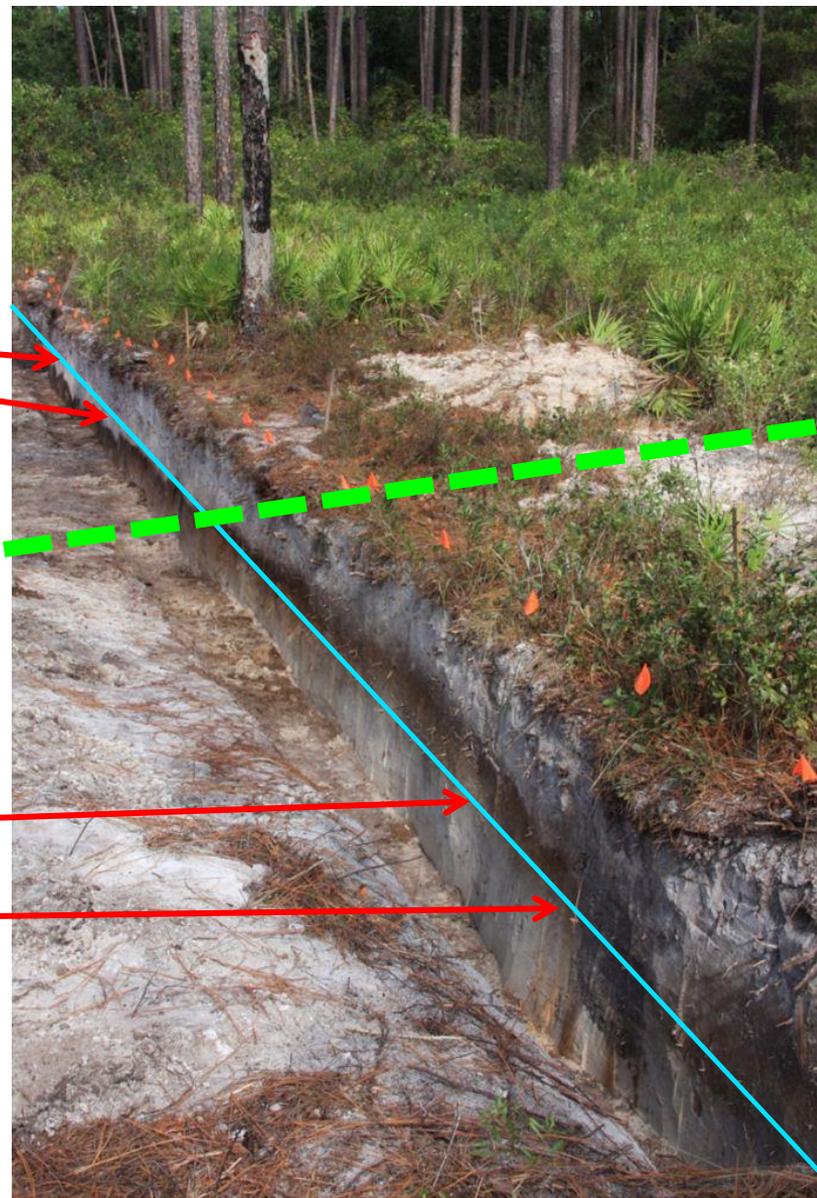
To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

Stripping

Flatwoods

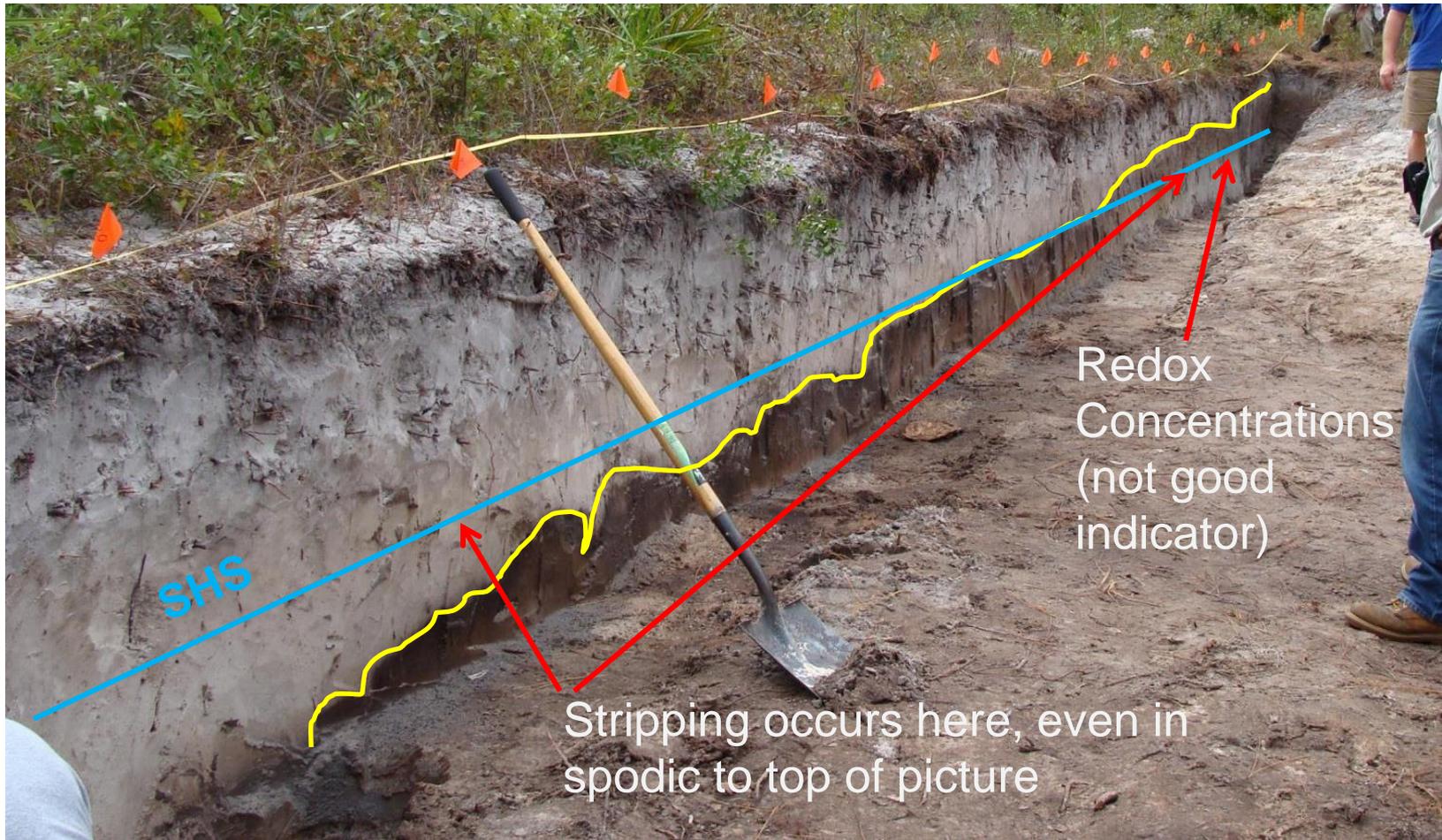
Sandhill

Stripped matrix and
“redox concentrations”
(RC not good indicator
in spodic)



Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.



Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

THE END

QUESTIONS?



Division of Disease Control and Health

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.