BASICS OF HYDRIC SOILS

Adam F. White

Regulatory Specialist Savannah District, Regulatory Division December 8, 2011



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Definition – Hydric Soil

 "A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part"



Prerequisite Knowledge

- Basic knowledge of soil-landscape relationships
 - Allows you read the landforms and predict where hydric soils would logically "live" on the landscape
- Basic knowledge of soil terminology and soil survey procedures
 - Allows you to know what information you can correctly infer from the county soil surveys
- Basic knowledge of soil texture and descriptions
 - Allows you to choose the correct Field Indicators to use
 - Accurately record what you saw



Soil Color and Oxidation / Reduction

- In subsoil horizons, Fe and Mn oxides give soils their characteristic brown, red, yellow colors
- When reduced, Fe and Mn are mobile and can be stripped from the soil particles
- Leaving the characteristic mineral grain color usually a "grayish" color



Biogeochemical Processes

That Create The Hydric Indicators



Manganese



- Manganese MassesNodules will
 - have a "halo"



Iron

- Many indicators are based on iron reduction, transformation, and differential accumulation.
- Reduced iron is soluble in water and may move through the soil profile
- Reduced iron present in a saturated soil may oxidize when exposed to air.





Sulfur

- Based on sulfur reduction: one of last elements to be reduced.
- Typically found in wettest sites but sulfur compounds must be present.





Carbon

- Many indicators are based on carbon accumulation and differential decomposition.
- OM decomposition slowed by anaerobic conditions.



Textural Triangle





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Texture of Materials High in Organic Carbon

Textures

- ► Organic
- Mucky mineral
- ► Mineral
- Determining Texture
 - Rub material between thumb and forefinger
 - ▶ 1st or 2nd rub feels gritty Mineral
 - ► 4th or 5th rub feels gritty Mucky Mineral
 - ► 4th or 5th rub feels greasy -- Organic



Making a Description

Key in on changes in color and texture

Changes in matrix color and redoximorphic features

Describe the soil, then identify indicators



Types of Redoximorphic Features

- Redox Concentrations
- Redox Depletions
- Reduced Matrix





Redox Depletions

> Fe Masses & Fe Depletions



Munsell Soil Color Charts



Dry soil is moistened until color is stable

Wet soil is allowed to dry until no longer glistens



Rate of Feature Formation

- A 2 mm thick Fe depletion around a root channel ranged from less than 1 to greater than 100 years depending upon how long reducing conditions occurred and how much Fe was in solution each day
- Recently constructed wetlands should have redox depletions evident within a couple of years if wetland hydrology is present during the "growing season"



Relict vs. Contemporary

Relict features are often firm and have abrupt boundaries within the soil matrix

Redox features do not always indicate current hydrologic condition - commonly found in drained/historic wetlands

Contemporary features have diffuse boundaries and are associated with ped faces or root channels



Local Hydric Soils List

Hydric Soils

Greene County, Georgia

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
ChA:					
Chewacla silt loam, 0 to 2 percent slopes, frequently flooded	Wehadkee, frequently flooded	5	Flood plains	Yes	2B3, 4
COA:					
Chewacla and Congaree soils, 0 to 2 percent slopes, frequently flooded	Wehadkee, frequently flooded	3	Flood plains	Yes	2B3, 4
WeA:					
Wehadkee loam, 0 to 2 percent slopes, frequently flooded	Wehadkee, frequently flooded	82	Flood plains	Yes	2B3, 4



Summary

- All hydric soils must meet the definition
- <u>Criteria</u> are used to generate lists that are used off-site to determine if an area is likely to contain hydric soils
- Indicators are used to identify hydric soils onsite



Field Indicators of Hydric Soils



NOTE: Any change to the Field Indicators of Hydric Soils in the United States represents a change to the Regional Supplement's subset of indicators.

Bottom line: Use the most recent guidebook

http://soils.usda.gov/use/hydric/

