Soils

MLRA Soil Survey Office

Bishopville, South Carolina

By Jackie Reed and Myra Jones

Natural Resources Conservation Service

What is Soil?

- Soil is the collection of natural bodies on the earth's surface, in places modified or even made by man of earthy materials, containing living matter and supporting or capable of supporting plants out-of-doors.

How Much Soil is There?

75% of the earth is covered by water; cut the apple into quarters and toss ¾ away; ¼ of dry land

50% of the dry land is desert, polar, or mountainous regions where it is too cold or too hot to be productive; toss ½ away, leaving 12.5% of the original apple

Of that 12.5%, 40% is too rocky, steep, shallow, infertile, or too wet to support food production; You are left with approximately 10% of the apple

Peel the skin from the tiny remaining sliver; this represents the world's food supply, but this land also competes with housing, landfills, etc.

Source: NASA GLOBE program

5 Ways of Viewing Soils

1 Medium for plant growth (Edaphologic View)

2 Regulator of water supplies (Hydrologic View)

3 Habitat for soil organisms (Biologic View)

4 Engineering medium (Geologic View)

5 Natural body on the Earth’s surface (Pedologic View)

Medium for plant growth

- Plants get carbon, hydrogen and oxygen from the air and water

- The macronutrients plants get from soils include nitrogen, phosphorus, potassium, calcium, magnesium and sulfur.

- The micronutrients plants get from soils include iron, manganese, molybdenum, copper, zinc, nickel, chlorine and cobalt.

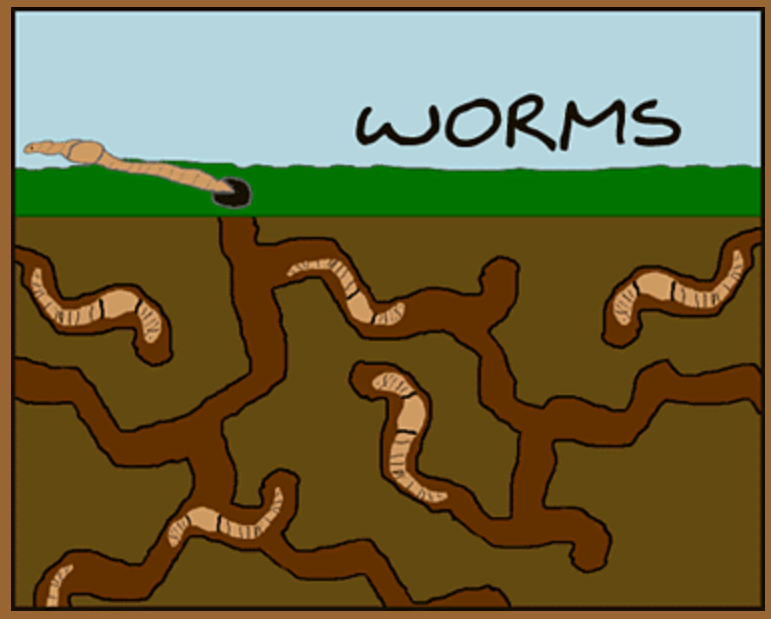
- Soil is a rooting medium that holds onto water and air for plant roots.

Regulator of Water Supplies

- Soils are important components of the hydrologic cycle
- Soils store water that can be used by plants
- Soils act as a filter for contaminated water to flow through before it reaches groundwater aquifers or surface water.

Habitat for Soil Organisms

- A handful of soil may contain billions of organisms
- Mostly, the organisms are various forms of bacteria and fungi
- The most important macro-organisms in soils are earthworms
- Soils are extremely biologically diverse
- Many important chemical reactions that occur in the soil are biologically mediated



Engineering Medium

- Soils are the foundation for roads and buildings

- Many soil physical characteristics affect the suitability of home, building, road, park and pond sites.

- Soils are the unconsolidated parts of the earth’s crust.

Natural body on the Earth's Surface

- Soils exist in nature as organized bodies, similar to deciduous forests, tropical forests and grassland prairies.

- This thought first originated in Russia by V.V. Dukochaev, 1880

- The idea gained acceptance in America in the 1920's, when promoted by C.F. Marabut, who was working for the USDA.

Factors affecting soil formation

1 Parent Material (the decomposition of)

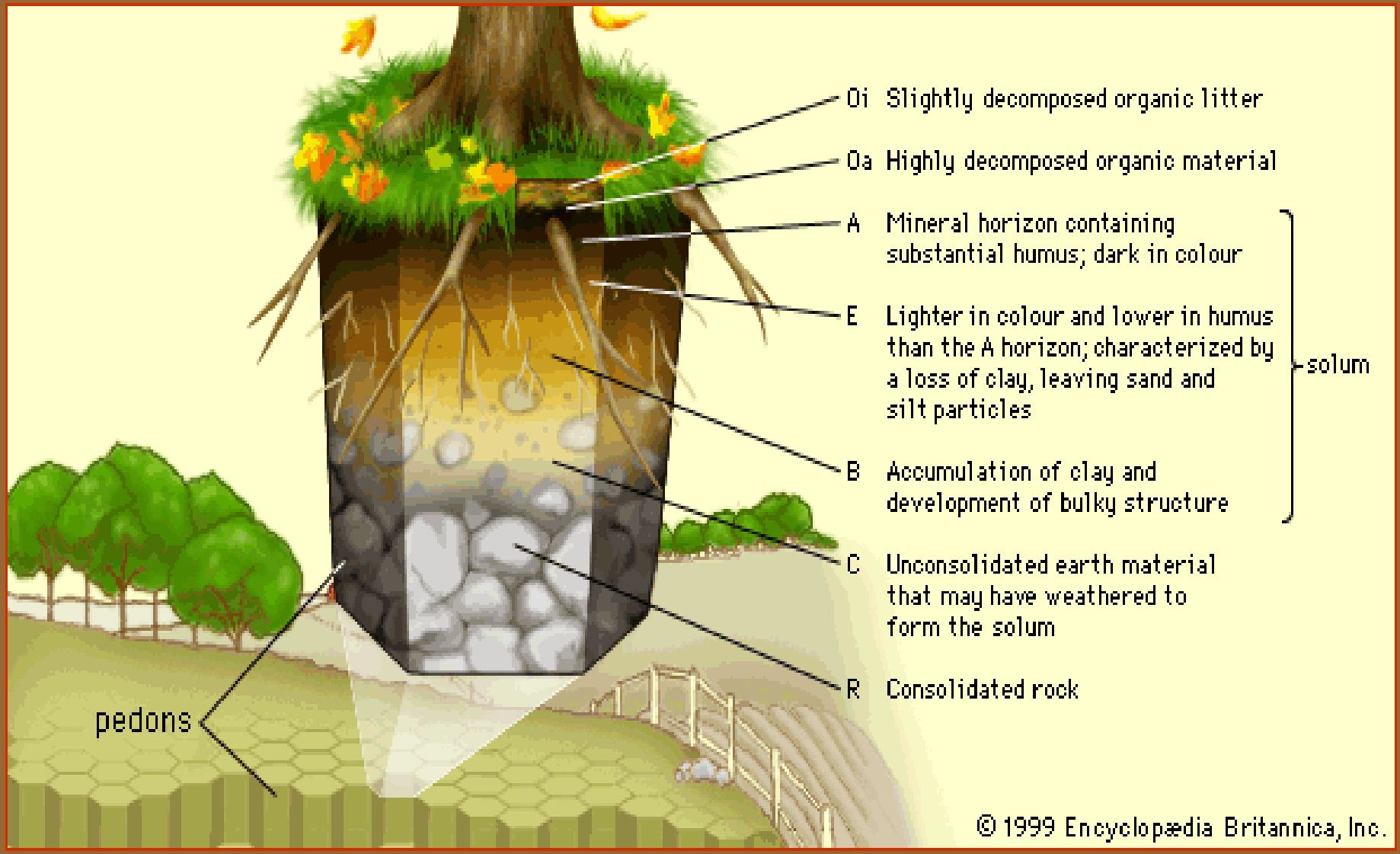
2 Climate (affects decomposition rates)

3 Biota (vegetation or any type of living organism)

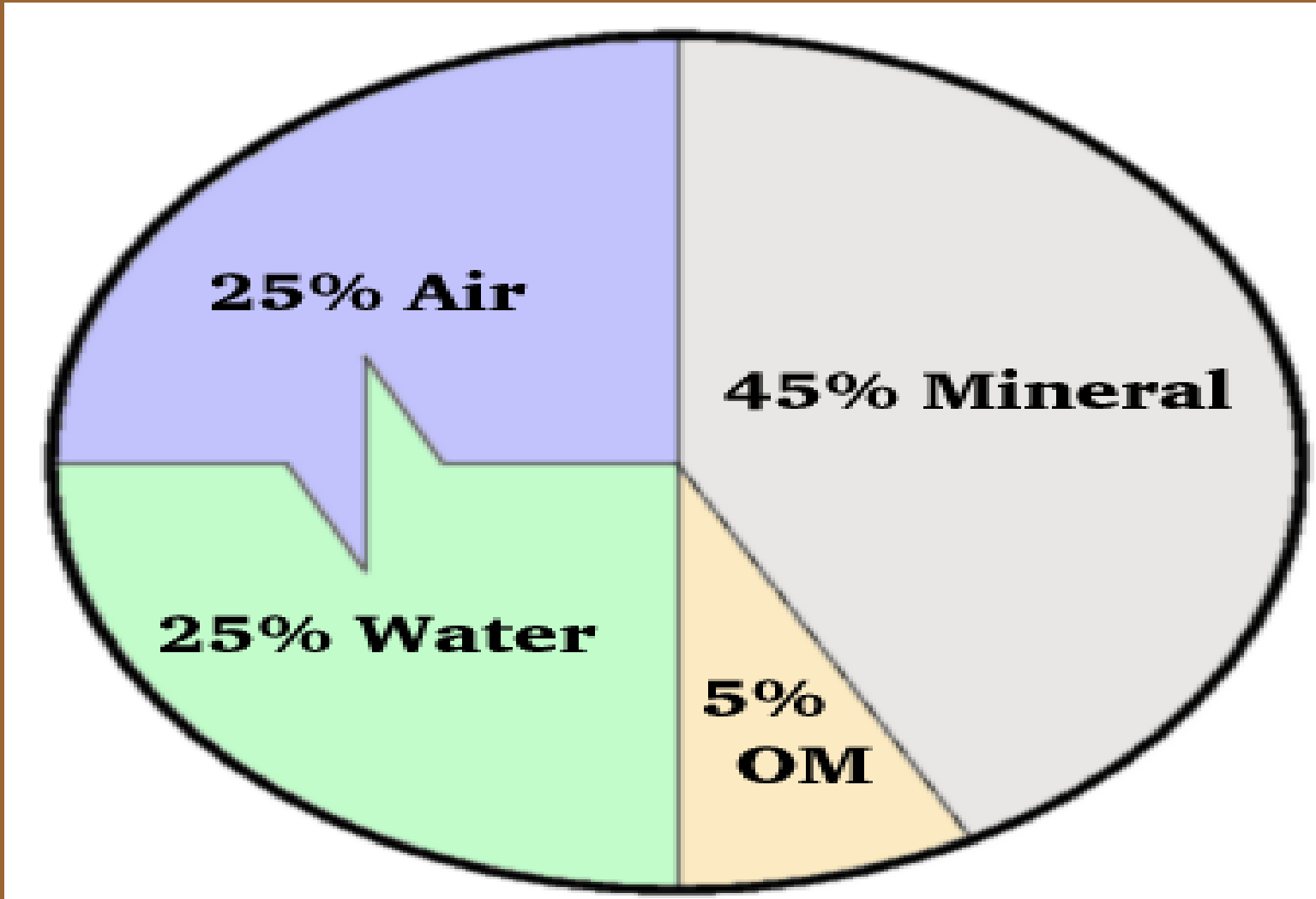
4 Topography (landscapes)

5 Time (geologic time)

Soil Horizons



Soil Composition



Soil Morphology

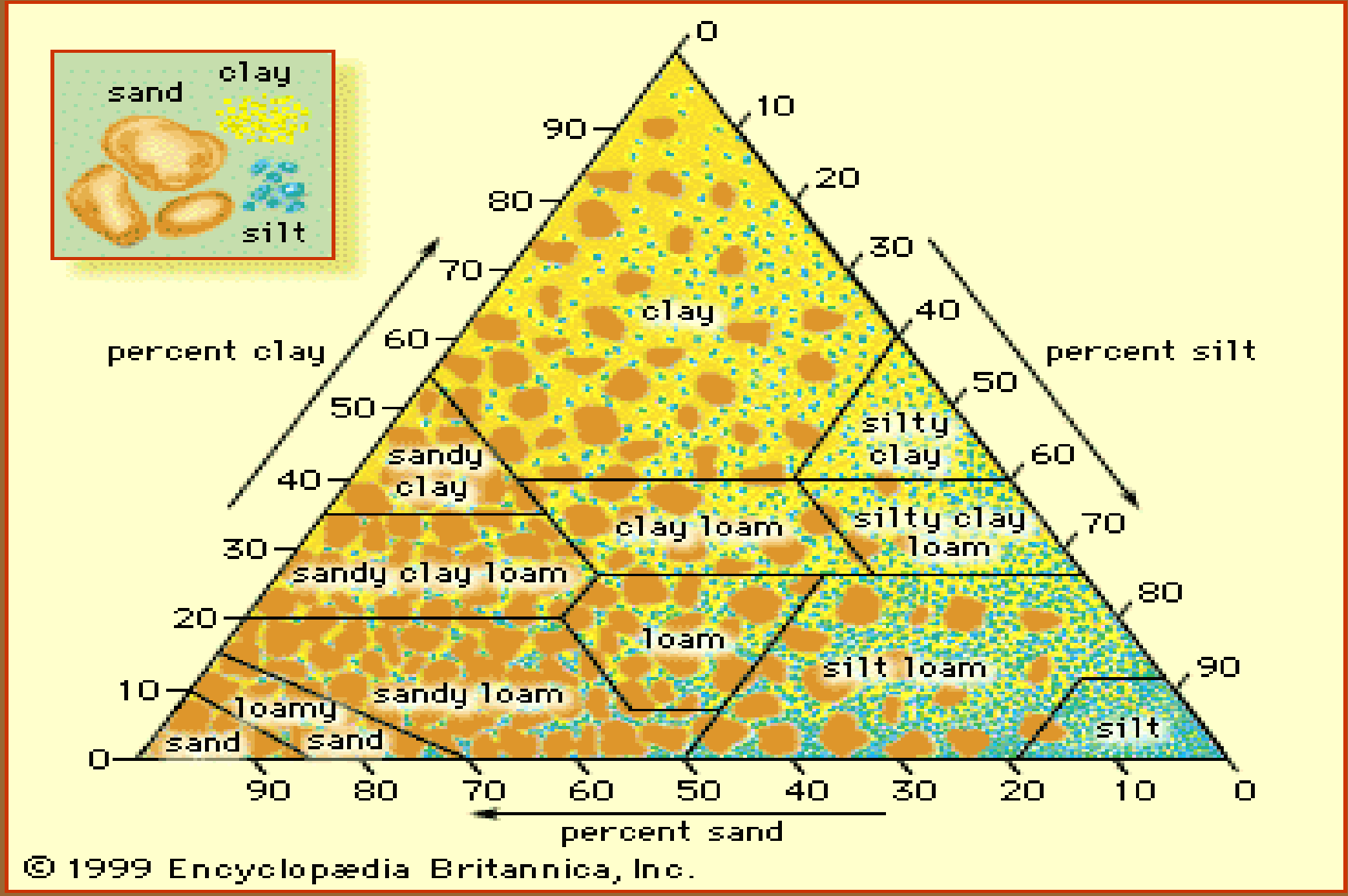
- Color
- Texture
- Structure
- Redoximorphic Features
- Consistence

Color

- Munsell color notation
- Hue (5Y, 2.5Y, 10YR, 7.5YR, 5YR, 2.5YR)
- value (read from top to bottom)
- Chroma (read from left to right)
- Chance of getting an exact match. . . . . .

1 in 100

Texture


sand
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silt
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percent sand
clay
silty clay
sandy clay
clay loam
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loam
silt loam
sandy loam
loamy sand
sand
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90
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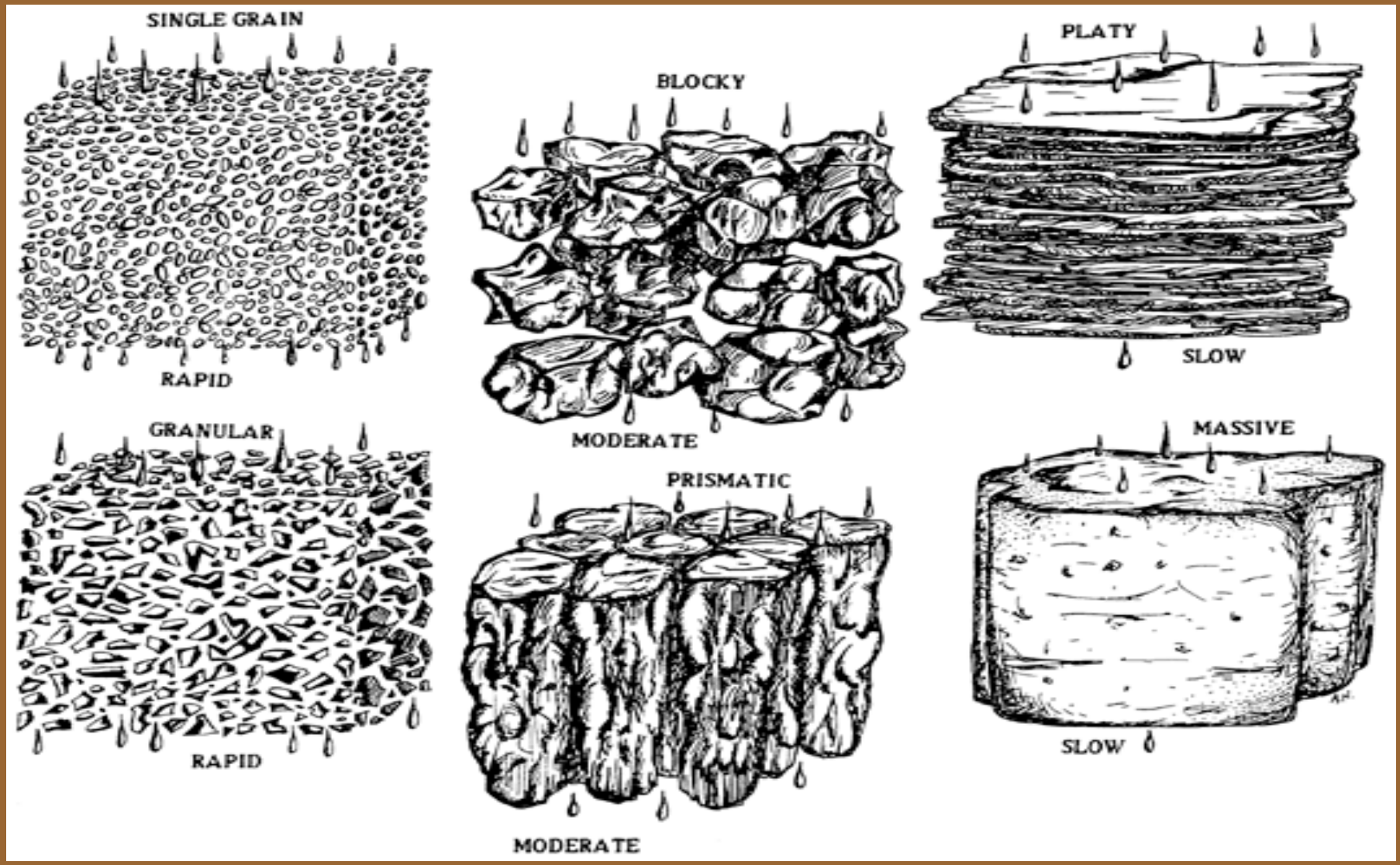
Structure


SINGLE GRAIN
RAPID
BLOCKY
MODERATE
PLATY
SLOW
GRANULAR
RAPID
PRISMATIC
MODERATE
MASSIVE
SLOW

Redoximorphic features

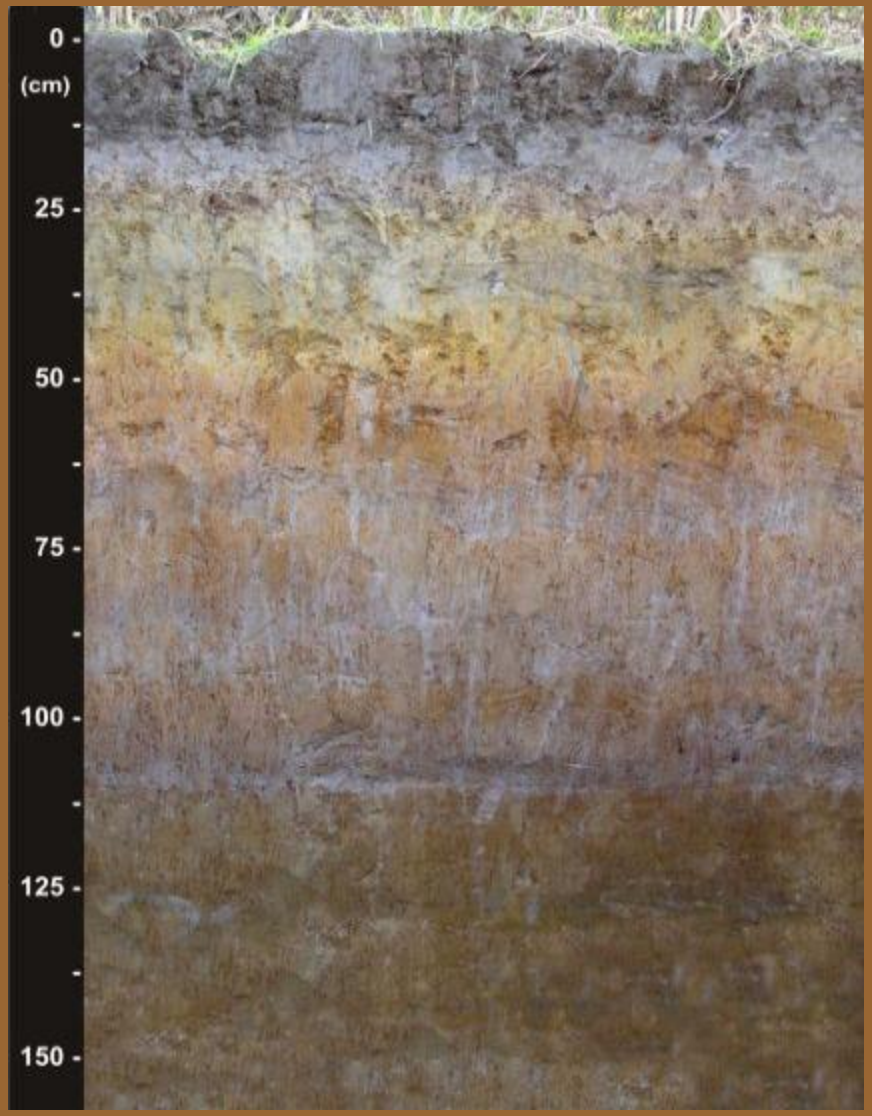
- Depletions - colors with a chroma <2 on a background matrix of higher chroma colors.

- Reduced matrix – The background color of the soil has a chroma of <2. Usually concentrations of iron and manganese are present.

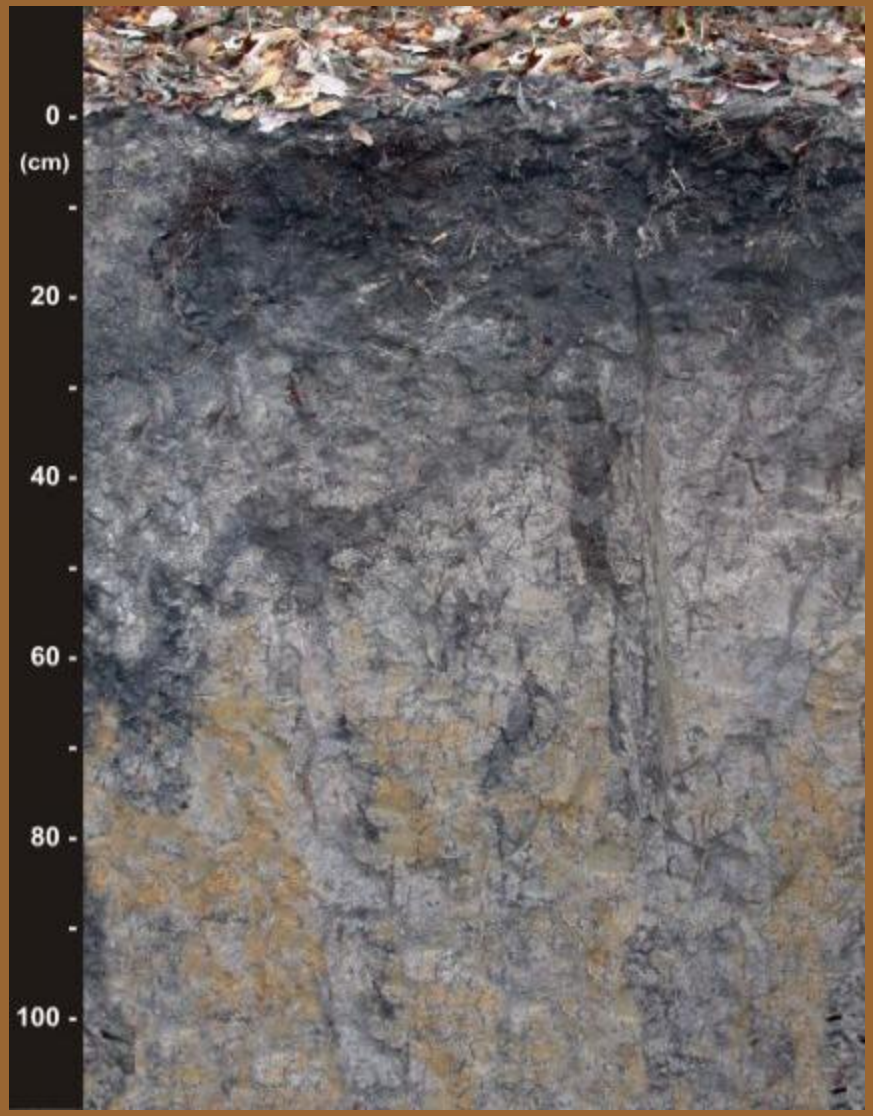
- Concentrations – Areas where iron and manganese lost from depletions have reconcentrated.

- Oxidized rhizospheres – Area around roots in poorly drained soils that have been reoxidized.

Depletions



Reduced matrix



Concentrations

Oxidized Rhizoshperes

Consistence

- The degree and kind of cohesion and adhesion that soil exhibits, and/or the resistance of soil to deformation or rupture under an applied stress.

- Loose - Intact specimen not obtainable
- Very friable - Very slight force between fingers
- Friable - Slight force between fingers (like good cornbread)
- Firm - Moderate force between fingers
- Very firm - Strong force between fingers
- Extremely firm - Moderate force between hands

Link to soils information

http://websoilsurvey.nrcs.usda.gov/app/

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- Soil Series Extent Mapping Tool
- Soil Data Mart
- Geospatial Data Gateway
- eFOTG
- National Soil Characterization Data
- Soil Geochemistry Spatial Database
- Soil Quality
- Soil Geography
- Geospatial One Stop

The simple yet powerful way to access and use soil data.

START WSS

Welcome to Web Soil Survey (WSS)

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

Three Basic Steps

1 Define.

Mouseover to enlarge image.

Use the Area of Interest tab to define your area of interest.

2 View/Explore.

Click the Soil Map tab to view or print a soil map, or click the Soil Data Explorer tab to access soil data for your area and determine the suitability of the soils for a particular use. The items you want saved in a report

I Want To...

- Start Web Soil Survey (WSS)
- Know the requirements for running Web Soil Survey
- Know whether my web browser works with Web Soil Survey
- Know the Web Soil Survey hours of operation
- Find what areas of the U.S. have soil data

Announcements/Events

- Web Soil Survey 2.0 has been released! View description of new features.

I Want Help With...

- How to use Web Soil Survey
- Known problems and workarounds
- Frequently Asked Questions
- Citing Web Soil Survey as a source of soils data

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Area of Interest (AOI) | Soil Map | Soil Data Explorer | Shopping Cart

Area of Interest Properties

Clear AOI

AOI Information

Name

Map Unit Symbols
- (•) Use Soil Survey Area Map Unit Symbols
- ( ) Use National Map Unit Symbols

Area (acres) 590.4

Soil Data Available from Web Soil Survey

Sumter County, South Carolina (SC085)

Soil Maps Version 2, Nov 7, 2005

Soil Data Version 5, Jul 3, 2007

Clear AOI

Quick Navigation

Navigate By...

Address

View

Address 2060 bethel church rd.

City Sumter

State South Carolina

Zip Code 29154

Show **Postal Code** Layer in Map ☐

View

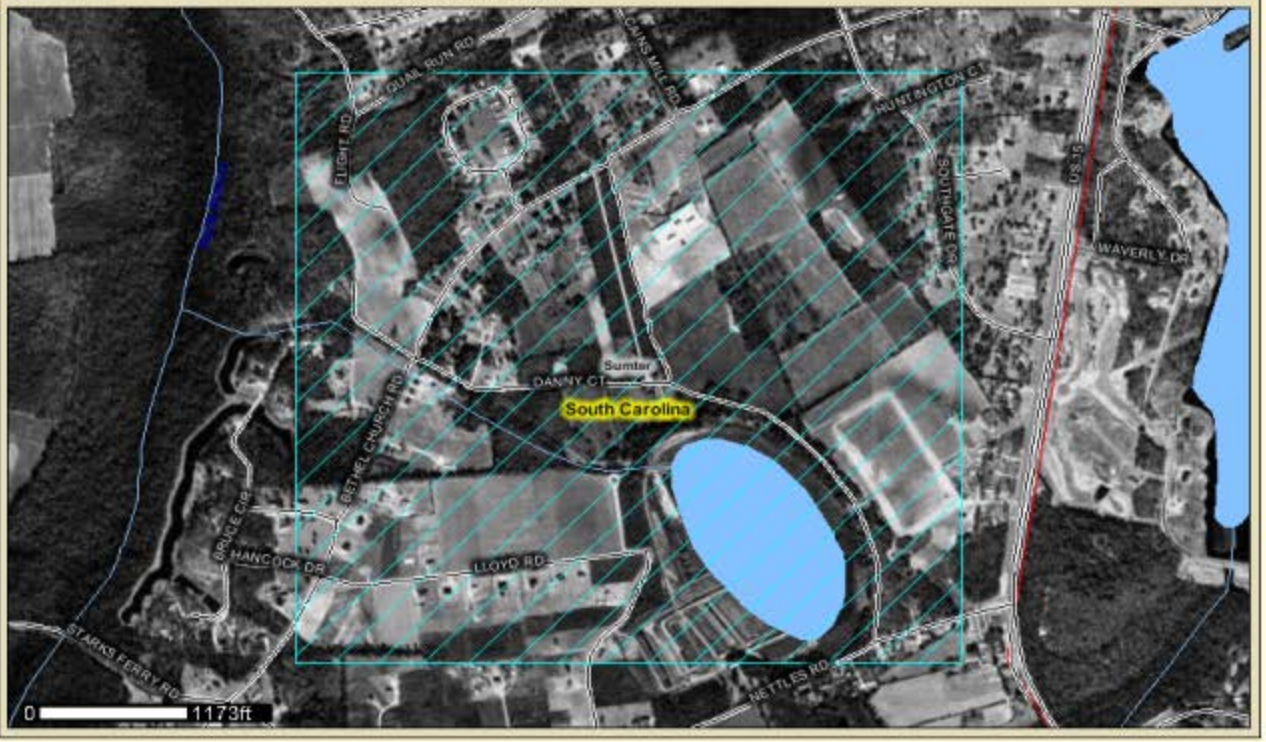
Area of Interest Interactive Map

Legend

View Extent Continental U.S.

Scale (not to scale)

Define AOI by Rectangle



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4 of 24 - Clipboard
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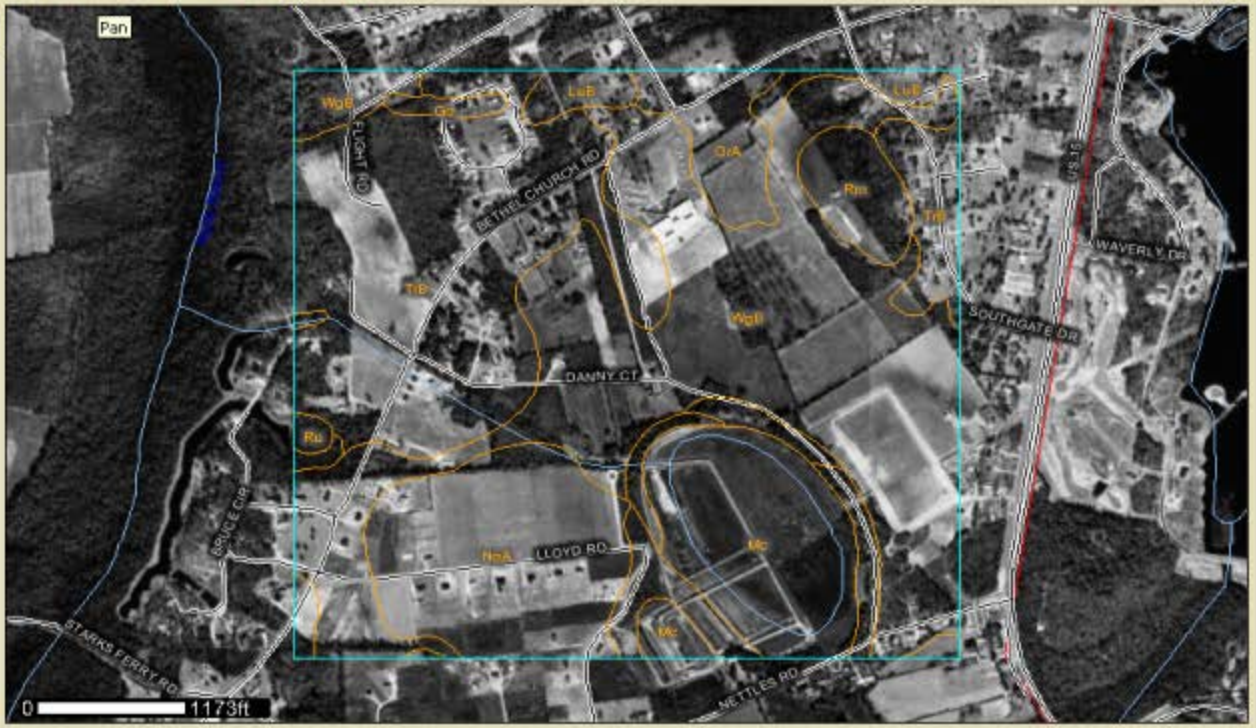
Map Unit Legend

Sumter County, South Carolina (SC085)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Go	Goldsboro loamy sand	3.4	0.6%
LuB	Lucy sand, 0 to 6 percent slopes	23.7	4.0%
Mc	McColl fine sandy loam	60.8	10.3%
NoA	Norfolk loamy sand, 0 to 2 percent slopes	69.2	11.7%
NoB	Norfolk loamy sand, 2 to 6 percent slopes	1.4	0.2%
OrA	Orangeburg loamy sand, 0 to 2 percent slopes	20.5	3.5%
OrC	Orangeburg loamy sand, 6 to 10 percent slopes	4.7	0.8%
Rm	Rembert loam	16.3	2.8%
Ru	Rutlege loamy sand	2.7	0.5%
TrB	Troup sand, 0 to 6 percent slopes	166.0	28.1%
TrD	Troup sand, 6 to	4.0	0.7%
Totals for Area of Interest (AOI)		590.4	100.0%

Soil Map

Legend | Pan | Scale (not to scale)



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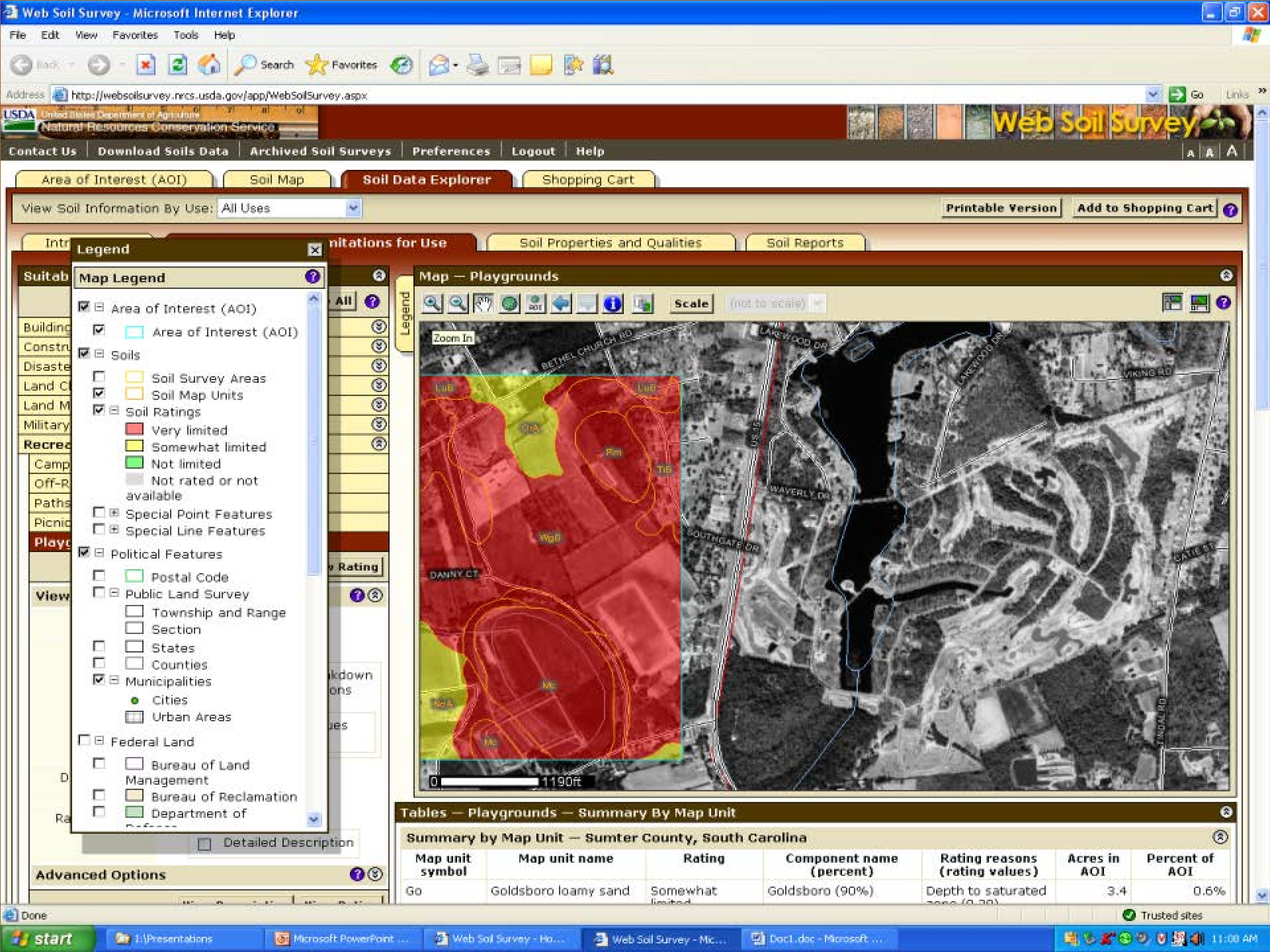


Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (rating values)	Acres in AOI	Percent of AOI
Go	Goldsboro loamy sand	Somewhat limited	Goldsboro (90%)	Depth to saturated zone (0.20)	3.4	0.6%

Rating Options

Detailed Description

Advanced Options

View Description | View Rating

- Sanitary Facilities
- Vegetative Productivity
- Waste Management
- Water Management

Tables — Playgrounds — Summary By Map Unit

Summary by Map Unit — Sumter County, South Carolina

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (rating values)	Acres in AOI	Percent of AOI
Go	Goldsboro loamy sand	Somewhat limited	Goldsboro (90%)	Depth to saturated zone (0.39)	3.4	0.6%
LuB	Lucy sand, 0 to 6 percent slopes	Very limited	Lucy (100%)	Too sandy (1.00)	23.7	4.0%
				Slope (0.13)		
Mc	McColl fine sandy loam	Very limited	McColl (100%)	Depth to saturated zone (1.00)	60.8	10.3%
				Slow water movement (0.94)		
				Too sandy (0.00)		
NoA	Norfolk loamy sand, 0 to 2 percent slopes	Somewhat limited	Norfolk (95%)	Too sandy (0.91)	69.2	11.7%
NoB	Norfolk loamy sand, 2 to 6 percent slopes	Somewhat limited	Norfolk (95%)	Too sandy (0.91)	1.4	0.2%
				Slope (0.50)		
OrA	Orangeburg loamy sand, 0 to 2 percent slopes	Somewhat limited	Orangeburg (100%)	Too sandy (0.81)	20.5	3.5%
OrC	Orangeburg loamy sand, 6 to 10 percent slopes	Very limited	Orangeburg (100%)	Slope (1.00)	4.7	0.8%
				Too sandy (0.81)		
Rm	Rembert loam	Very limited	Rembert (100%)	Depth to saturated zone (1.00)	16.3	2.8%
				Slow water movement (0.15)		
Ru	Rutlege loamy sand	Somewhat limited	Rutlege (100%)	Flooding (0.60)	2.7	0.5%
				Too sandy (0.43)		
TrB	Troup sand, 0 to 6 percent slopes	Very limited	Troup (100%)	Too sandy (1.00)	166.0	28.1%
				Slope (0.13)		
TrD	Troup sand, 6 to 15 percent slopes	Very limited	Troup (100%)	Slope (1.00)	4.0	0.7%
				Too sandy (1.00)		
WgB	Wagram sand, 0 to 6 percent slopes	Very limited	Wagram (95%)	Too sandy (1.00)	216.3	36.6%
				Slope (0.13)		
			Rains (5%)	Depth to saturated zone (1.00)		
WgC	Wagram sand, 6 to 10 percent slopes	Very limited	Wagram (100%)	Slope (1.00)	1.4	0.2%
				Too sandy (1.00)		
Totals for Area of Interest (AOI)					**590.4**	**100.0%**

Tables — Playgrounds — Summary by Rating Value

WgB	Wagram sand, 0 to 6 percent slopes	Very limited	Wagram (95%)	Too sandy (1.00)	216.3	36.6%
				Slope (0.13)		
			Rains (5%)	Depth to saturated zone (1.00)		
WgC	Wagram sand, 6 to 10 percent slopes	Very limited	Wagram (100%)	Slope (1.00)	1.4	0.2%
				Too sandy (1.00)		
Totals for Area of Interest (AOI)					**590.4**	**100.0%**

Tables — Playgrounds — Summary by Rating Value

Summary by Rating Value

Rating	Acres in AOI	Percent of AOI
Very limited	493.2	83.5%
Somewhat limited	97.2	16.5%
Totals for Area of Interest (AOI)	**590.4**	**100.0%**

Description — Playgrounds

Playgrounds are areas used intensively for games, such as baseball and football, and similar activities. Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic.

The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, saturated hydraulic conductivity (Ksat), and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, saturated hydraulic conductivity (Ksat), and toxic substances in the soil.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

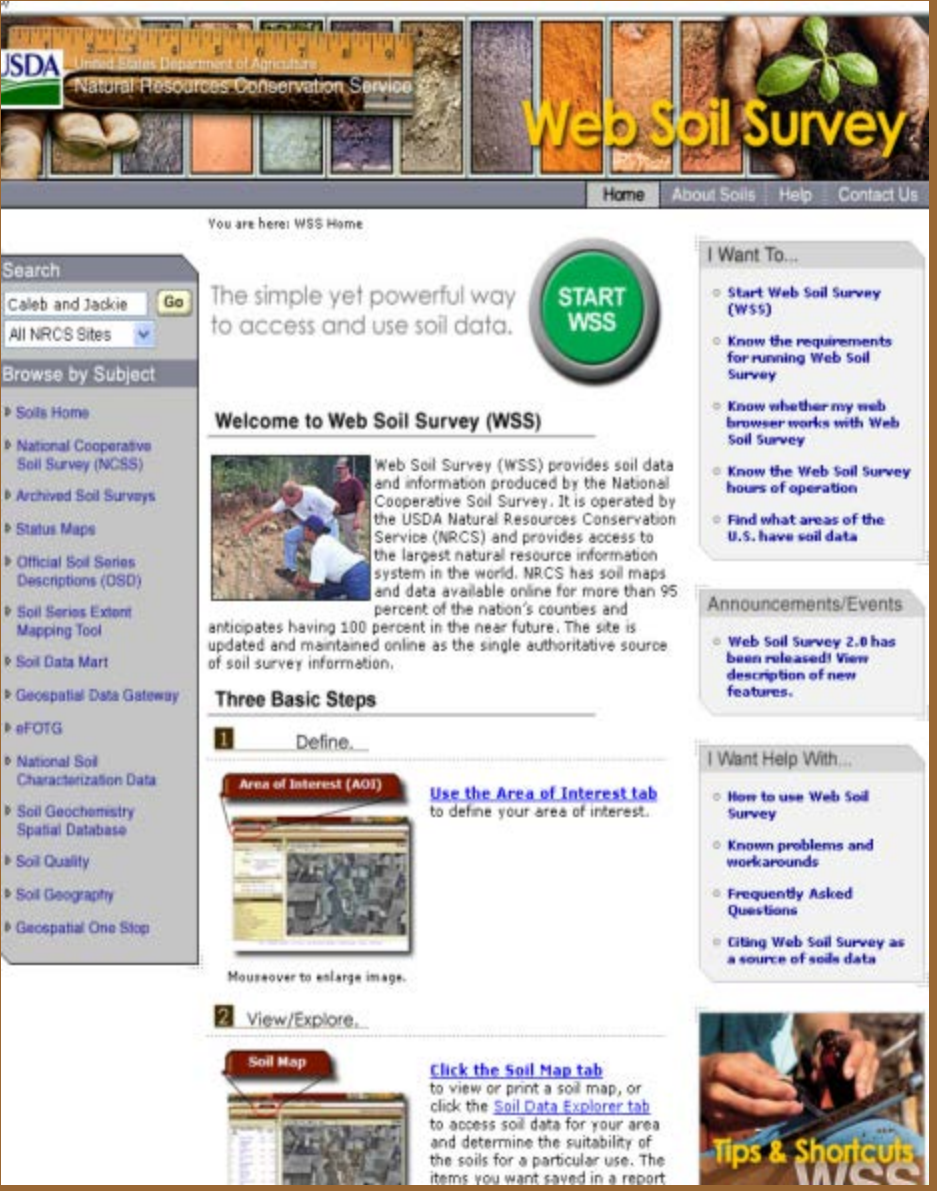
Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating Options — Playgrounds

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher



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