

Soil Survey



Soil Variability

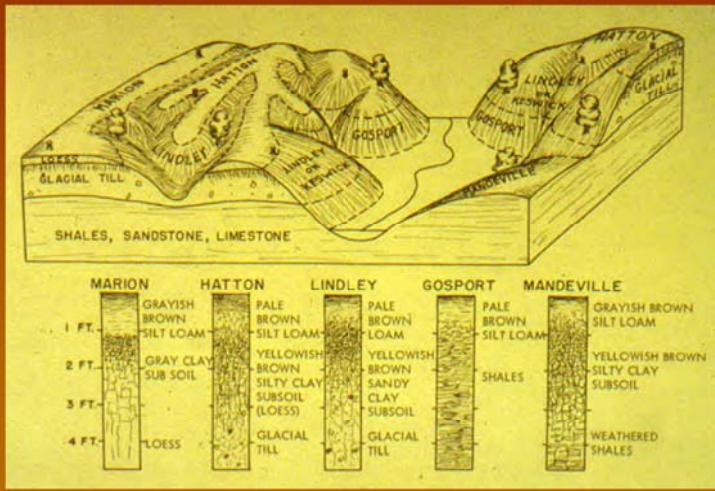


Objectives

- History of Soil Surveys
- Soil Variability
- How Soil Surveys are Made
- The Components of a Soil Survey
- Map Scale
- Map Unit Composition
- How to Use Soil Surveys



Block Diagrams

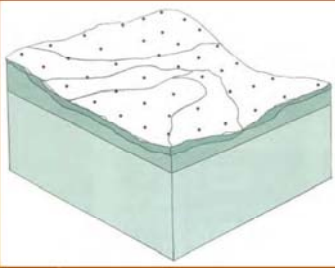


A CATENA OF SOILS



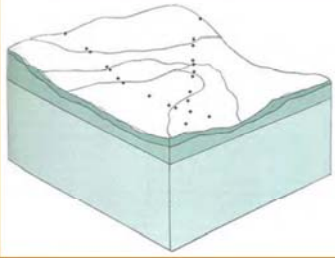
Soil Mapping Tools





“Grid” Mapping

- Used for very detailed mapping or where very complex soil patterns exist.



Landscape Traverses

- Requires far fewer observations but requires that the soil landscape/parent materials are predictable

With Drainage Patterns Added



Aerial Photograph



With Soil Boundaries and Symbols



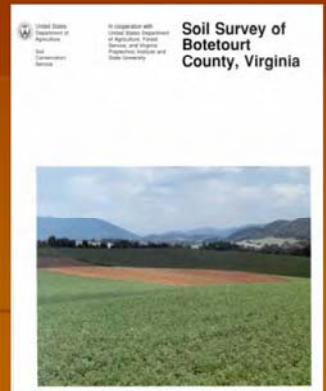


Soil survey reports

❖ A soil survey report reveals the kinds of soils that exist in the county (or other area) covered by the report at a level of detail that is usually sufficient for agricultural interpretations.

❖ The soils are described in terms of their location on the landscape, their profile characteristics, their relationships to one another, their suitability for various uses, and their needs for particular types of management.

❖ Soil survey reports are available from county and state USDA-NRCS Cooperative Extension offices and on-line (for certain counties).



Soil Survey of Botetourt County, VA (USDA-NRCS, 1994).

Published Soil Surveys

❖ The soils of most counties have been mapped by the USDA-NRCS Cooperative Soil Survey Program, and these maps are available in *soil survey reports*.

❖ Each soil survey report contains information about soil morphology, soil genesis, soil conservation, and soil productivity.



NRCS soil scientist
(photo by Jeff Vanuga, USDA-NRCS)

Parts of a soil survey

2. Narrative:

• Symbols on each map are keyed to a list of soil mapping units.

• The nature, properties, and classification and use potentials of all mapping units are described in detail.

Contents

Index to map units	iv	Glipon series	144
Summary of tables	vii	Gladesville series	145
Foreword	ix	Grovesdale series	146
General nature of the county	1	Haysville series	146
How this survey was made	3	Inongata series	147
Map unit composition	3	Ladig series	147
General soil map units	5	Lafayette series	148
Detailed soil map units	15	Lily series	149
Soil descriptions	15	Lindside series	149
Prime farmland	118	Liz series	150
Use and management of the soils	121	Massanetta series	151
Crops and pasture	121	Moonsaw series	151
Woodland management and productivity	122	Opequon series	152
Recreation	123	Oriskany series	153
Wildlife habitat	124	Pakia series	153
Engineering	125	Purdy series	154
Engineering index properties	131	Railtown series	154
Physical and chemical properties	132	Shelocia series	155
Soil and water features	133	Shubover series	156
Classification of the soils	135	Thurmont series	157
Soil series and their morphology	135	Timberville series	158
Algonville series	135	Tops series	158
Balagoo series	136	Tumbling series	159
Barka series	137	Tygart series	160
Burnside series	139	Udacton series	160
Carbo series	139	Wolkart series	161
Chilwell series	139	Wolgap series	161
Clawwell series	139	Zoar series	162
Death series	140	Formation of the soils	163
Denno series	141	Factors of soil formation	163
Edneytown series	141	Morphology of the soils	164
Ernest series	142	References	167
Fairbode series	142	Glossary	169
Frederick series	144	Tables	177

Issued September 1994

Table of contents from the Soil Survey of Botetourt County, Virginia (USDA-NRCS, 1994).

Parts of a soil survey

1. Soil maps:

- Usually printed over an aerial photographic base image.
- Current USDA-NRCS mapping is published at 1:24,000 to match United States Geologic Survey (USGS) topographic quadrangle maps.
- Each soil area is delineated by an enclosing line on the map. Soil delineation boundaries are drawn wherever there is a significant change in the type of soil. The boundaries may follow contour lines but they also cross contour lines.



Portion of soil map from Soil Survey of Botetourt County, VA. (USDA-NRCS, 1994).

Using a soil survey

❖ To Find:

- **Overall picture of the soils in a county:**
 - See soil association section of the soil survey report. The general soil pattern of the county is discussed in this section.
- **Soils of a particular farm:**
 - Locate farm on the soil map by using index sheets included with soil maps
 - Determine what soils are present using map and map legend.
- **Nature and properties of the soils mapped:**
 - See narrative portion of the soil survey report.
- **Use and management of the soils:**
 - See soil interpretations. These give management needs, estimated yields, engineering properties, etc.

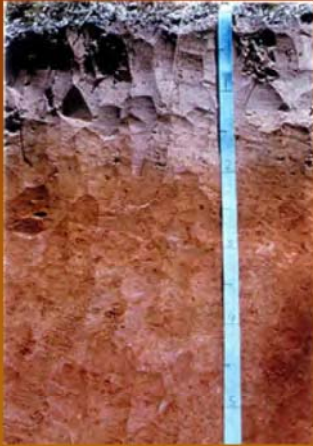
TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill
20B----- Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight-----
20C----- Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.
20D----- Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.
21C----- Frederick	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.
21D----- Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.

Soil Series

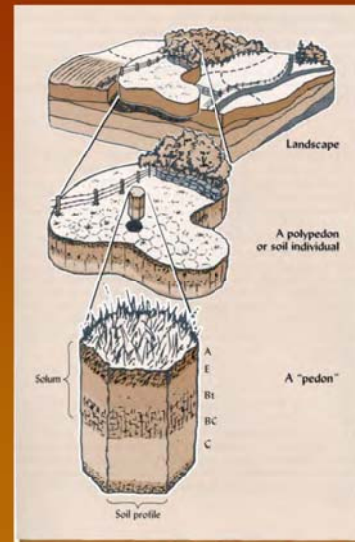
- Soils that may be slightly different but have the same classification
- They have a range of properties but must look and behave similarly

Example - Pamunkey Series



Classification

Fine-loamy,
mixed,
semiactive,
thermic
Ultic Hapludalfs

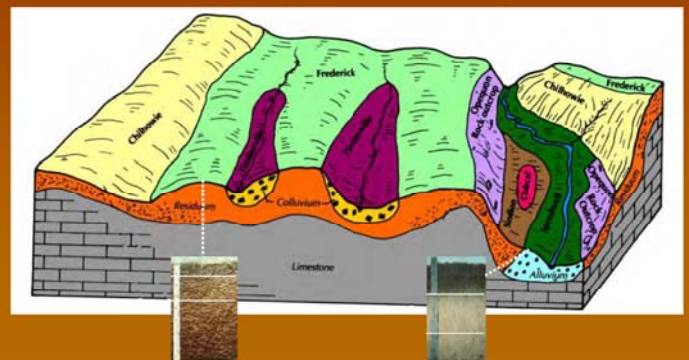


Map Units Subsections of the landscape



What Does a Map Unit Represent?

- 3-Dimensional landscape segments



Map Unit Types

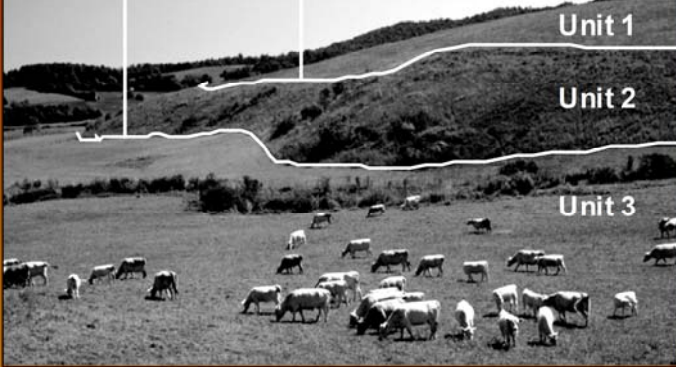
- Consociations
 - Mostly one soil series, but
 - May include other soil series if they are similar and do not limit the land use



These uniform areas are examples where consociations may occur



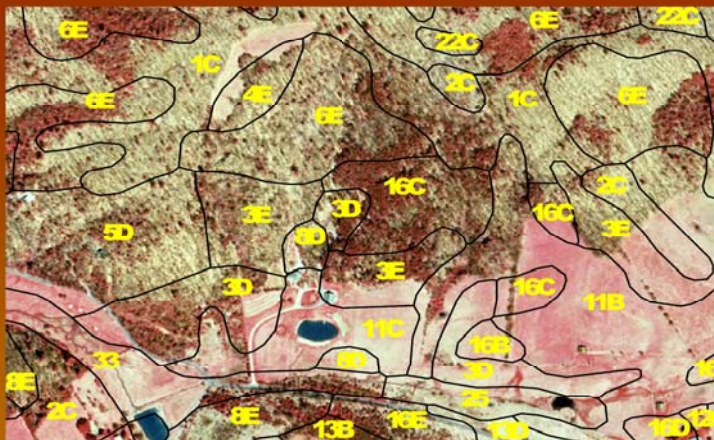
Soil Landscape Unit Boundaries



- Soil Surveyors observe landscape segments from a perspective, 2 dimensional viewpoint

Map Unit Types

- Complexes
 - two or more dissimilar soil series occurring in a regular, repeating pattern but each is too small to be separated at the map scale
- Undifferentiated
 - one or more dissimilar soil series occurring in a random pattern and unpredictable extent. If more than one soil, each is too small to be separated at the map scale. These usually occur in a floodplain unit



- Soil Survey Maps show delineations of landscape segments from a vertical, 2 dimensional viewpoint

Soil Survey

- Map Scale
 - Determines whether adjacent but different soils could be separated into different delineations or not during initial field work. Minimum delineation size is 1/4 inch diameter on the original base map.
 - The legend, map unit type, and delineation boundary are presumed accurate at the original scale ONLY!

Map Scales

1:24000
1" = 2000'



Map Scales



Map Scales

1:12000
1" = 1000'



Map Scales

after

1:6000
1" = 500'



Scale of 1 : 24,000 is a 2.64" / Mile Scale



40 Acres

Scale of 1: 15,840 is a 4" / Mile Scale



40 Acres

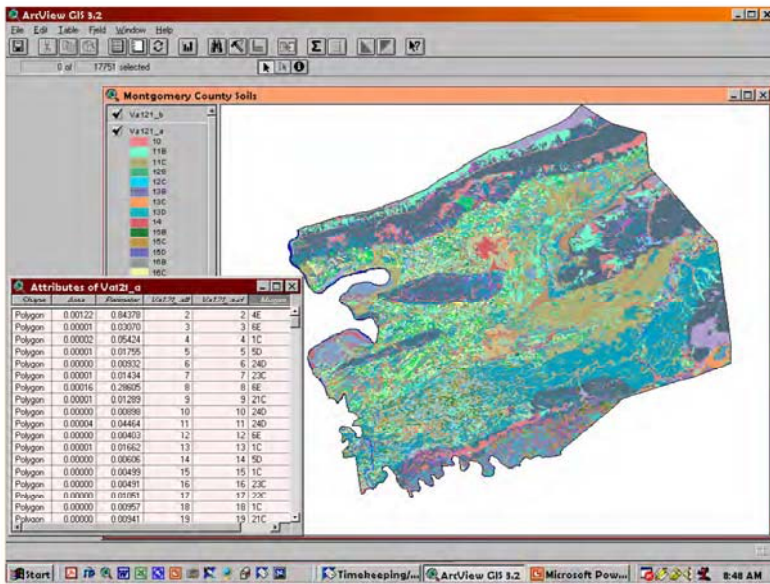
- Ratio of length on the map to length on the ground
- Example:
at 1: 24,000 scale,
1" on the map = 24,000" on ground or
1" = 2,000 ft. on ground
- At 5,280 ft/mile, this is a scale of 2.64" per mile

Soil Geography

- Soils that occur in naturally large landscape units (uniform terrain) may be mapped in consociations and separate delineations at large scales (1" = 200').
- Soils that occur in very small extent (complex terrain) must be grouped with other soils on large scale maps.

Web Soil Survey <http://websoilsurvey.nrcs.usda.gov>

The screenshot shows the USDA Web Soil Survey homepage. It features a search bar at the top left, a 'START WSS' button, and a 'Welcome to Web Soil Survey (WSS)' section. The page includes navigation links, a 'Three Basic Steps' section (Define, Area of Interest, View/Explore), and various help and announcement links.



USDA-NRCS Soils Data SSURGO - Netscape

National SSURGO Database
USDA-NRCS Soil Survey Division
Data Access

Selected files with this icon are available in Adobe Acrobat PDF (Portable Document Format). To view these files in PDF you will need to download the [Adobe Acrobat Reader](#). Acrobat and the Acrobat logo are trademarks of Adobe Systems Incorporated.

[NRCS Field Office users viewing UNIFORMARE should download the these files in this directory to view PDF files.](#)

Database Descriptions

- [General SSURGO Description \(fact sheet\)](#)
- [SSURGO Listing](#)
- [Archived SSURGO Map](#)

Database Access

[USDA Privacy Policy - NRCS Data Download](#)

SSURGO data is available for selected areas of the United States and its territories, before attempting to download or order SSURGO data, please review the SSURGO Listing for a

<http://www.fv.nrcs.usda.gov/ssurgo.html>

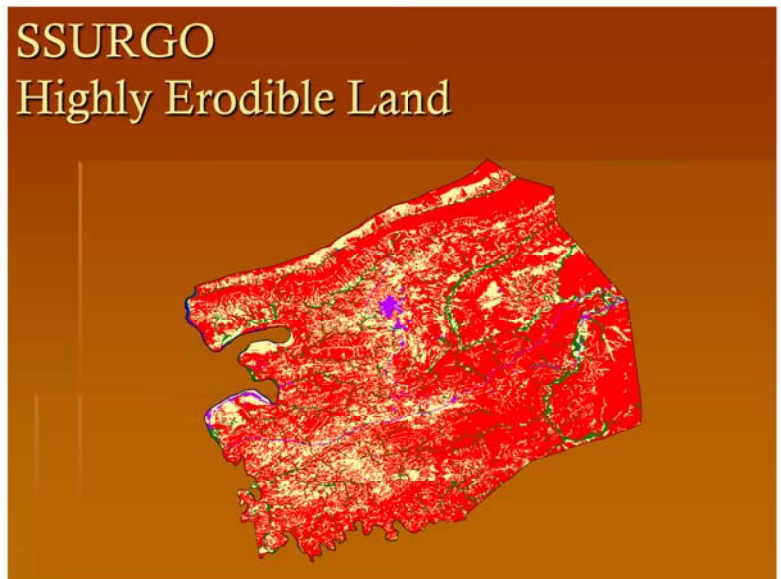
SSURGO

SOIL SURVEY
FOR THE UNITED STATES OF AMERICA

1899 1999
CENTENNIAL

USDA NRCS
Natural Resources Conservation Service

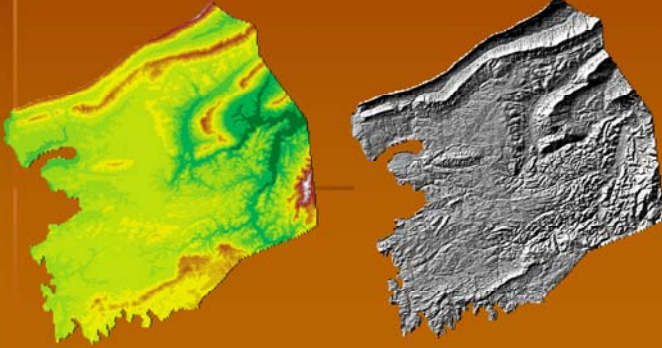
Two men are shown in a computer lab setting, one pointing at a large map on a light table while the other looks on.



SSURGO - Using it in GIS

Digital Elevation Model

Hillshade



Organic Carbon

