Proceedings

of the

Southern Regional Cooperative Soil Survey Conference

Biloxi, Mississippi
June 7 – 10, 2004

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- Not all speakers provided copies of their presentations for inclusion into these proceedings.

Southern Regional Cooperative Soil Survey Conference

June 7-10, 2004
Biloxi, Mississippi

Meeting Agenda

Monday, June 7

9:30 a.m. - 1:30 Registration

1:00 p.m. - 3:30 p.m. Meetings (main room)

Moderator - Wayne Hudnall

1:30 p.m. - 2:00 p.m. Introductions and meeting overview-Mike Lilly

2:00 p.m. - 2:30 p.m. Maxine Levine, Program Manager

2:30 p.m. - 3:00 p.m. MO leaders: Charles Love (Auburn), Edgar Mersiovsky (Little Rock)

3:00 p.m. - 3:30 p.m. Joe Schuster – National Society of Consulting Soil Scientists

3:30 p.m. - 4:00 p.m. Committee: Hydric Soils (Karl Hipple)

4:00 p.m. - 4:30 p.m. Committee: Water Table (George Martin & Joey Shaw)

4:30 p.m. - 5:00 p.m. Committee: Sharkey Study (MO-16) (Doug Slabough)

5:00 p.m. - 6:30 p.m. Cocktail Mixer

Tuesday, June 8

8:00 a.m. - 10:00 a.m. Meetings (main room)

Moderator - Delaney Johnson

8:00 a.m. - 8:30 a.m. Lincoln Representative (Karl Hipple)

8:30 a.m. - 9:00 a.m. World Soils Congress (Warren Lynn)

9:00 a.m. - 9:30 a.m. Thermic-Hyperthermic Study (Henry Mount)

9:30 a.m. - 10:00 a.m. Committee: Soil Taxonomy (Craig Ditzler)

10:00 a.m. - 10:15 a.m. Morning Break (refreshments)

10:15 a.m. - 11:30 a.m. Meetings (main room)

10:15 a.m. - 10:45 a.m. NCSS Conference Task Force-Mike Lilly

10:45 a.m. - 11:15 a.m. Field identification (quantification), classification, and interpretation of high mica soils and plinthite/ironstone (John Kelley)

11:15 a.m. - 11:45 a.m. Committee: Temperature (Wayne Hudnall)

11:45 a.m. - 1:00 p.m. Luncheon: Speaker- West Higginbothom, **U.S. Senate Agriculture, Nutrition and Forestry Committee**

1:00 p.m. - 2:30 p.m. Meetings (main room)

Moderator – Steve Lawrence

1:00 p.m. - 1:30 p.m. Marketing (Gary Muckel)

1:30 p.m. - 2:30 p.m. Flooding (Doug Slabaugh)

2:30 p.m. - 4:45 p.m. Breakout meetings

Wednesday, June 9

8:10 a.m. - 10:00 a.m. Meetings (main room)

Moderator, Joe Schuster

8:00 a.m. - 8:30 a.m. Committee report: Hydric Soils

8:30 a.m. - 9:00 a.m. Committee report: Soil Taxonomy

9:00 a.m. - 9:30 a.m. Committee report: Water Table

9:30 a.m. - 10:00 a.m. Committee report: Sharkey Study

10:00 a.m. - 10:15 a.m Morning break (refreshments)

10:15 a.m. - Noon Meetings (main room)

10:15 a.m. - 11:30 a.m. Mark LaSalle, Coastal Research & Extension Center

Mark Woodrey, Grand Bay National Estuarine Research Reserve

11:30 a.m. – Noon Wrap up

Lunch on your own

1:30 p.m. - Until Field Trip to Gulf Coast National Wildlife Refuge

Thursday, June 10

State Soil Scientists

8:00 a.m. - 10:00 a.m.	Meetings (main room)
10:00 a.m. - 10:15 a.m.	Morning break (refreshments)
10:15 a.m. - Noon	Meetings (main room)

MO Board of Directors

1:00 p.m. - 2:30 p.m.	Meetings (main room)
2:30 p.m. - 2:45 p.m.	Afternoon break (refreshments)
2:45 p.m. - 5:00 p.m.	Meetings (main room)

SOUTH REGIONAL SOIL SURVEY CONFERENCE MINUTES

June 7-9, 2004

BILOXI, MS

Meeting chaired by William Kingery

Minutes of the 2002 conference that was held in Tybee Island, GA were read.
The research committee consisted of Wayne Hudnall, Mike Vepraskas, Charles Love, and Warren Lynn
The minutes from the 2002 conference were approved.

OLD BUSINESS

The soils properties data has been completed.

It was reported that the committee/task force to gather information on Kandic soils has completed its work.

Bill Craddock will follow up on gathering information on Umbric Subgroups.

A motion was passed to abolish the Hydric Soils committee.

There was a motion by Karl Hipple to review the By-Laws prior to the next conference. The motion was amended by Jerry Daigle to allow the steering committee to review the By-Laws. The amended motion passed.

The Taxonomy Committee function was discussed as it relates to the distribution of taxonomy updates. Karl Hipple will discuss this with Craig Ditzler. It was noted that all MO Leaders are on the Taxonomy Committee. Bill Craddock will serve as Chair of the Regional Taxonomy Committee.

There was a discussion of the need for a Research Committee.

NEW BUSINESS

There was a motion by Mike Lilly to accept a proposal presented for the Consortium of Soil Science Organizations to have representation on the steering committee of Regional Conferences and also of the Soil Science Society of America. The group discussed this proposal and determined that they did not have the authority to make this decision. The motion was withdrawn.

There was a motion by John Kelley to support a plinthite special study. The motion passed. This proposal will be forwarded to the Research Committee.

There was a motion by John Kelley to support the mica study. The motion passed.

Larry West addressed conference attendance. He expressed disappointment with the poor representation from the NRCS staff in Lincoln, NE. Also, it was felt there should be more representation from the Universities. Karl Hipple accepted the responsibility to get the conference back on the right track.

Jim Ford extended an invitation from Oklahoma to host the next conference in 2006.

Adjournment

South Regional
Work Planning Conference

SOUTHERN REGIONAL COOPERATIVE SOIL SURVEY CONFERENCE
BILOXI, MS
June 7-11, 2004

NRCS Soil Survey Program Director's Message

By: Maxine J. Levin, NRCS, National Headquarters, Washington D.C.

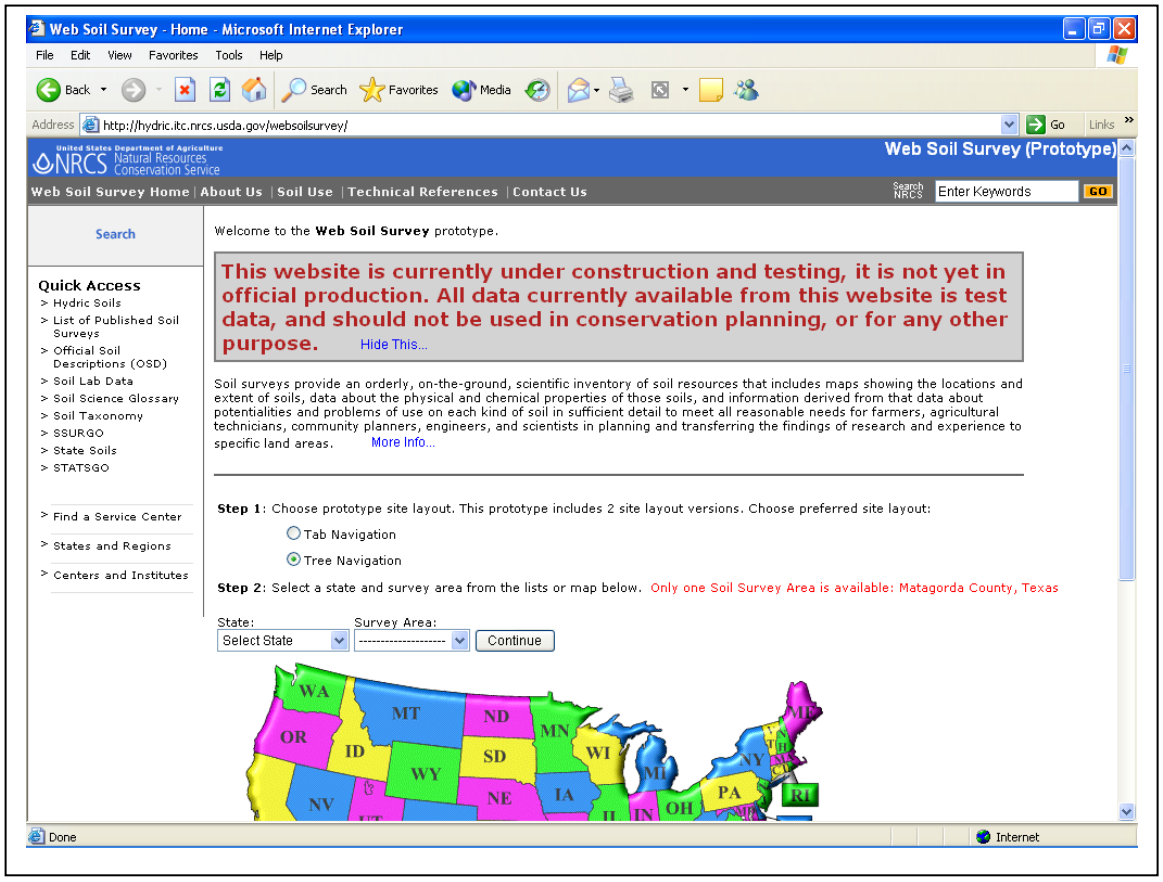
Micheal L. Golden
Director, Soil Survey Division

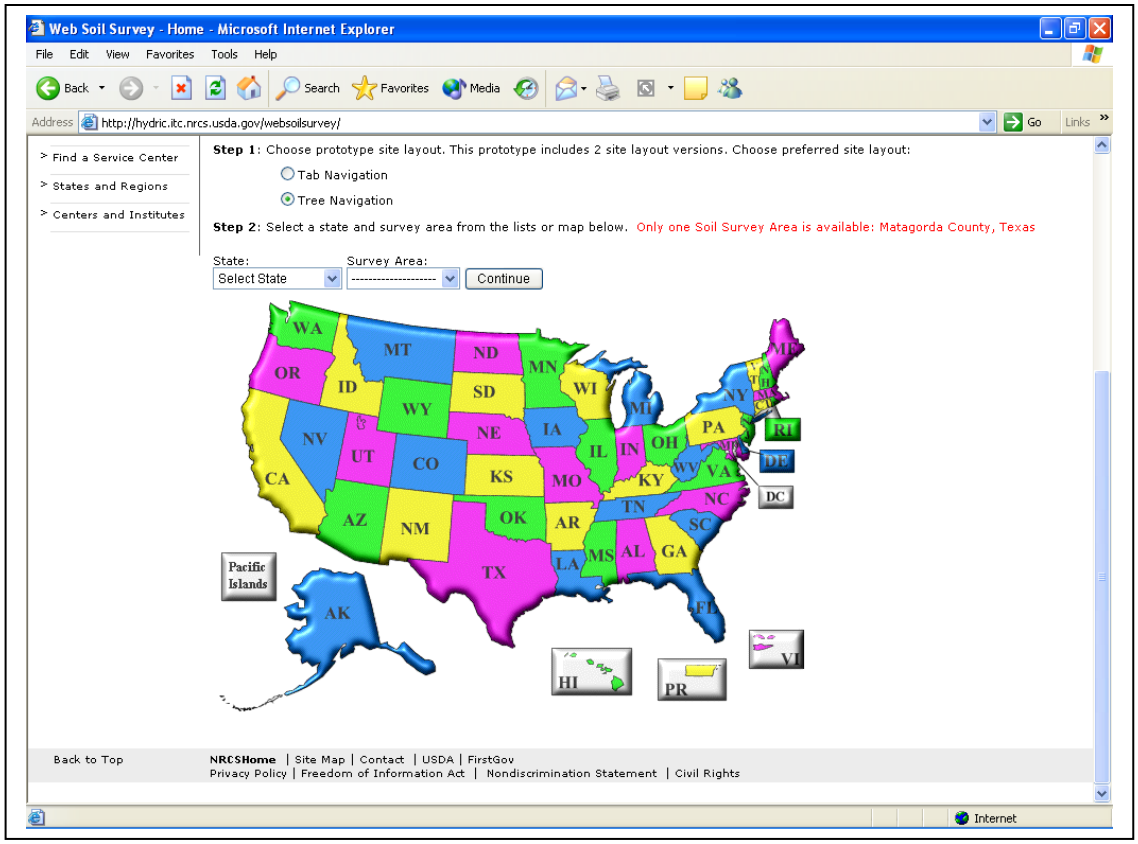
- Grew up near Ada, Oklahoma
  - (South Central) Cross Timbers MLRA
- BS 1974 Oklahoma State University
  - Agronomy (Soils)
- 30 years Work Experience TX & NM
- Confirmed as Director January, 2004

Director's Goals

- Support MLRA Project Office Concept
- Support MO Office Structure
- Support States' Technical Soil Services
- Support NSSC and National Leaders
- Support NCGC - Soil Support Branch

- Support NRCS Information Technology
  - Geospatial Data Warehouse
  - Publication “Web Soil Survey” Data Mart
  - NASIS Next Generation
  - Soil Data Viewer/Web Data Viewer
- Soil Survey Program Reviews—Several every year—working with partners to improve the soil survey
- FY2004----
  - Indiana – November 2003
  - Washington – February 2004
  - Maine – May 2004
  - Wyoming – August 2004
- Publication “Web Soil Survey” Data Mart
  - West Texas Project as Prototype
  - Include Web SDV (GIS and Reports Capability)
  - Include Tabular and Map Unit Information
  - Customized Soil Survey by User
  - Options for Output
    - Examples – print, write to CD, download, or re-access online
    - http://hydric.itc.nrcs.usda.gov/websoilsurvey

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States and Regions
Centers and Institutes
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Tab Navigation
Tree Navigation
Step 2: Select a state and survey area from the lists or map below. Only one Soil Survey Area is available: Matagorda County, Texas
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Survey Area:
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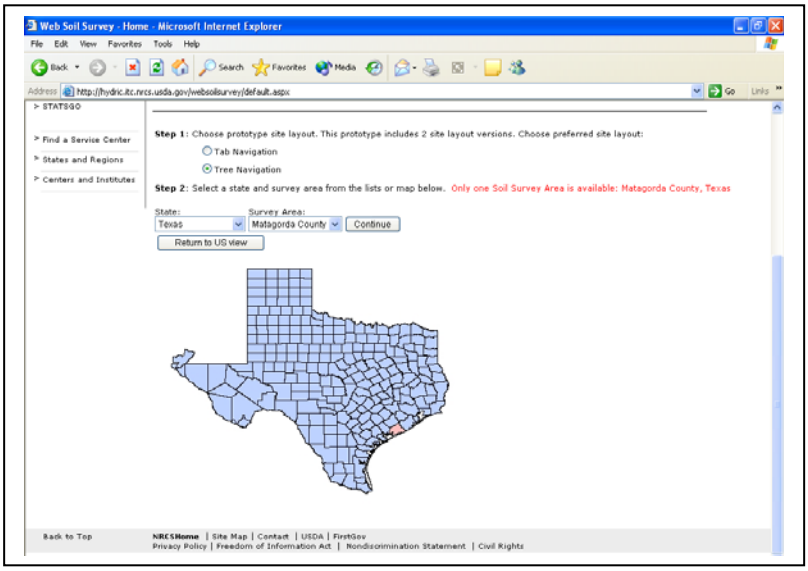
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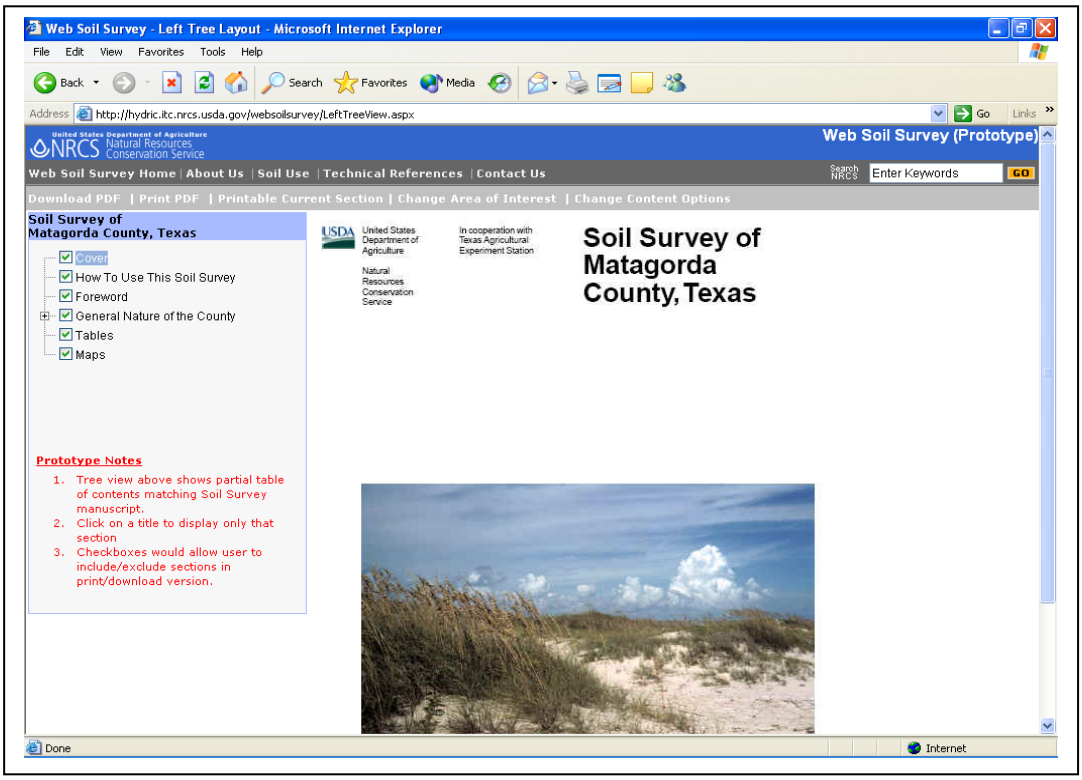
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Web Soil Survey (Prototype)
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Search NRCS
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GO
Download PDF | Print PDF | Printable Current Section | Change Area of Interest | Change Content Options
Soil Survey of Matagorda County, Texas
Cover
How To Use This Soil Survey
Foreword
General Nature of the County
Tables
Maps
Prototype Notes
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2. Click on a title to display only that section
3. Checkboxes would allow user to include/exclude sections in print/download version.
USDA
United States Department of Agriculture
Natural Resources Conservation Service
In cooperation with Texas Agricultural Experiment Station
Soil Survey of Matagorda County, Texas
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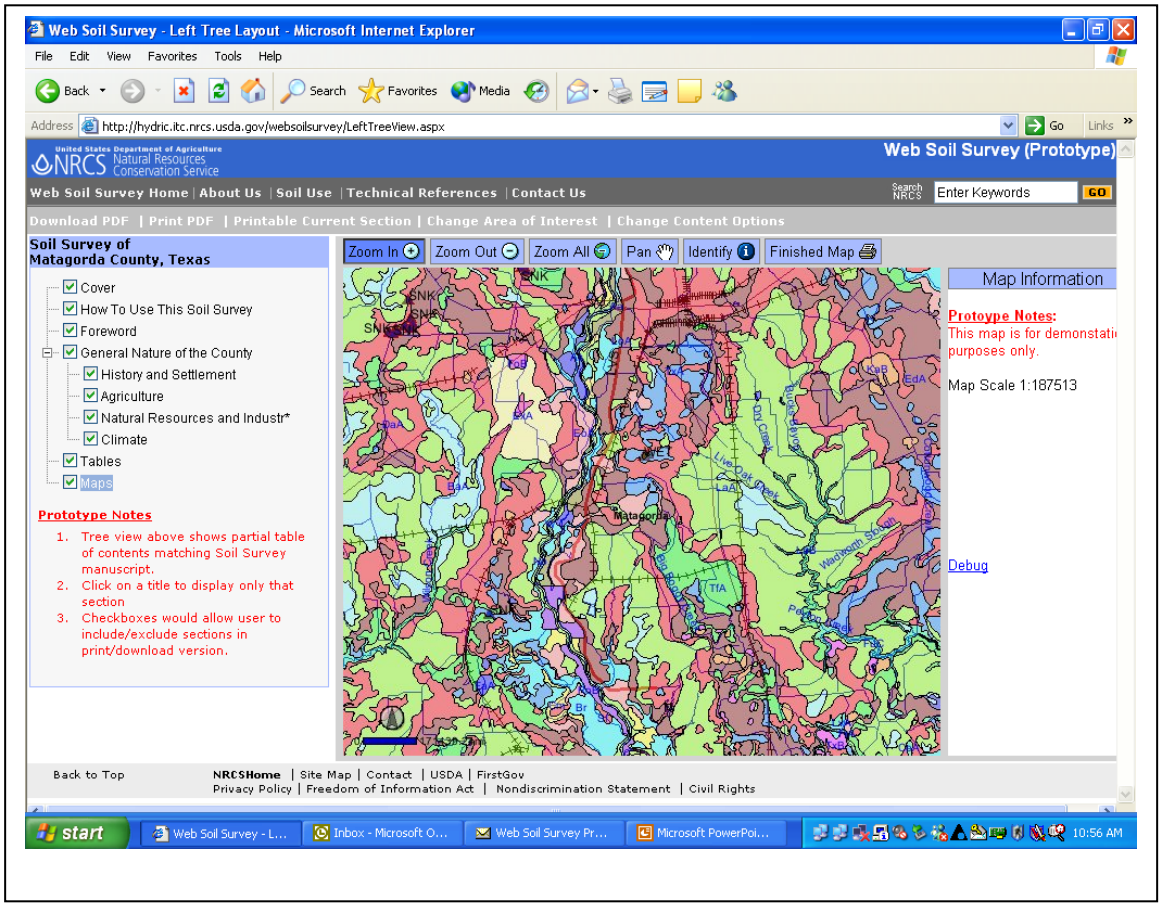
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Download PDF | Print PDF | Printable Current Section | Change Area of Interest | Change Content Options
Soil Survey of Matagorda County, Texas
Cover
How To Use This Soil Survey
Foreword
General Nature of the County
History and Settlement
Agriculture
Natural Resources and Industr*
Climate
Tables
Maps
Prototype Notes
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NRCS Goals

- Raise the Bar in Way We Do Soil Survey Using New Technology
- Provide More and Better Technical Soil Services (Internal & External Customers)
- Examine How We Can Provide a Better Statistical-Based Soil Survey
- Integrate State and Local Soil Lab Information with LIMS
- Begin to Address Variability - Time & Space
  - Dynamic Soil Properties – Use work initiated by Soil Quality Institute
  - Establish protocol for data collection and storage
  - Use of SoLIM and similar landscape modeling/ inference programs
- Implement New Technology in Soil Survey with Toolbox for Soils
  - On-Screen editing using ARCGIS
  - Utilize 3D Mapper software
  - Test and implement Soil Landscape Inference Model (SoLIM) or similar systems

National Geospatial and Development Center

- Establish National Geospatial Development Center (NGDC)
  - Finalizing MOU and Cooperative Ecosystems Study Unit (CESU-Agreement) with West Virginia Univ.
  - Primary function is research & test concepts with Business Analysis
  - Look out into future a few years & Develop new GIS/Geospatial tools for Soil Scientists & Others
- Areas of Interests
    - Spatial Applications (GIS/SSURGO)
    - Database Integration (NASIS/LIMS/OSD/SC)
    - Application Integration (Web Soil Survey)
    - Information Management (Marketing)
  - Use University, Private Contractors & NRCS personnel
- Reaffirm and Strengthen NCSS Partnership
  - Establish NCSS Cooperator Award
  - Re-Vitalize NCSS Advisory Group

Closing

- Like to Get Feedback
- Discuss Pros and Cons
- Make Best Informed Decision Possible
- Big on MLRA Concept
- Big on Development/Implementation of Business Plans
- Big on People Working Together & Getting Along
- Big on Improving NCSS Cooperator Relationships

MLRA SOIL SURVEY REGION #15 PROGRAM
Status

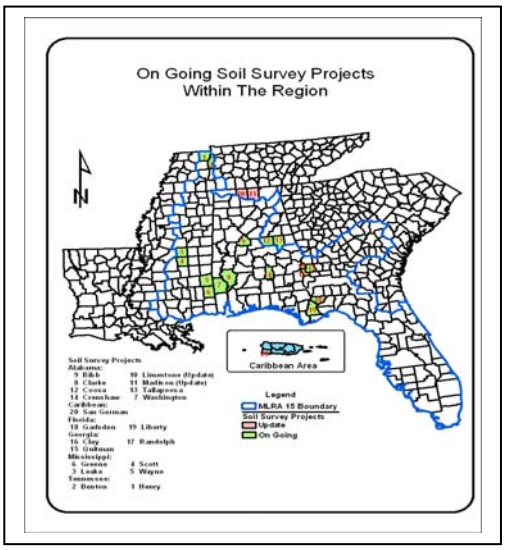
2004 South Regional NCSS Conference
Biloxi, MS
June 7 – 10, 2004

By: Charles Love, Alabama State Soil/MO-15 Team Leader

On-Going/Update Surveys and Correlation Activities

- Alabama 4
- Caribbean 1
- Florida 2
- Georgia 1
- Louisiana 0
- Mississippi 2
- Tennessee 1

Total 12



Field Assists

- Initial Field Reviews 3
- Field Assists 7
- Progress Field Reviews 6
- Final Field Reviews 7

Total 23

Manuscript/Publication

Quality assurance review/manuscript

- Barbour County, AL
- Houston County, AL
- Pinellas County, Florida

Published

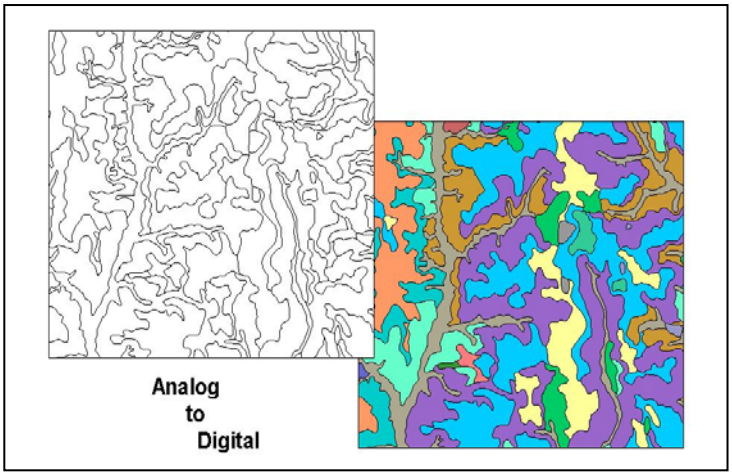
- Alabama 2

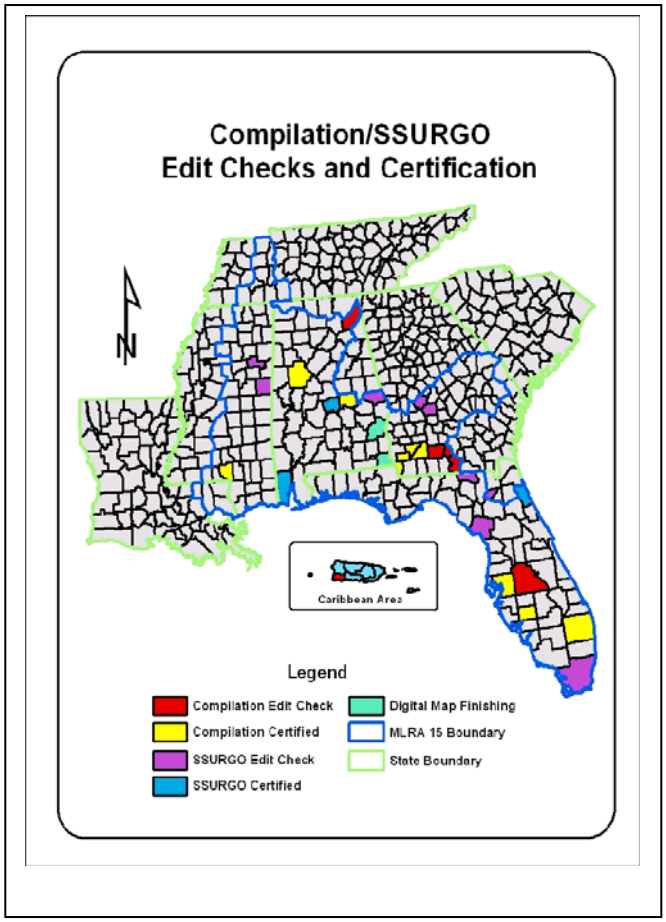
Database Assistance

- NASIS assistance - Visited project offices, upon request
- Provided training to Puerto Rico State Office
- NASIS Soils Interpretation training at Auburn University (for the MO-15 Region)
- States posted 24 counties of NASIS datasets with a digital spatial data on the Soil Data Mart, in the MO–15 Region as of 05/13/04

Soil Data Warehouse & Soil Data Mart 2004 Compilation/SSURGO Activities

	Map Compilation	SSURGO	Digital Map Finishing
Quality Review	5	9	3
Certified	9	8	3





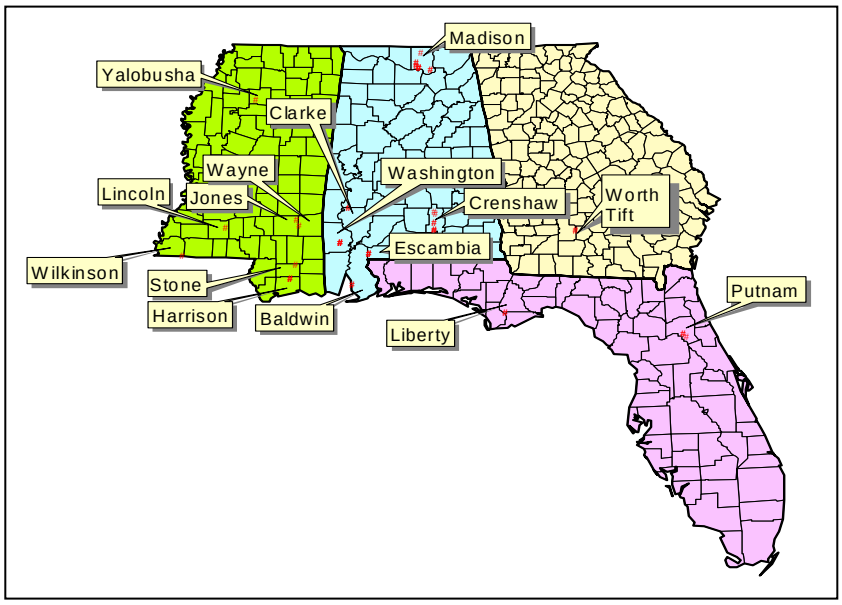
Overall MO- 15 Compilation/SSURGO Status

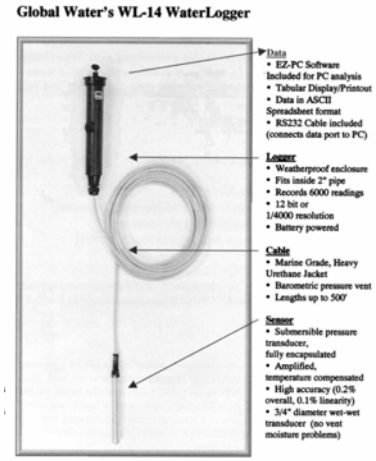
- 59% -- Compilation Certification
- 38% -- SSURGO Certification

Special Studies Activities

- Assisted Auburn University with Soil Mineralogy Field Trip
- Coordinated soil temperature data (Florida, Louisiana & Mississippi)
- Soil sampling for the 2006 World Soils Congress Field Tour (involving soil scientists and cooperators from Alabama, Georgia, and Mississippi)
  Regional Soil-Water table study (using new technology)

Soil-Water Data Logger Sites (new technology)





Training Activities

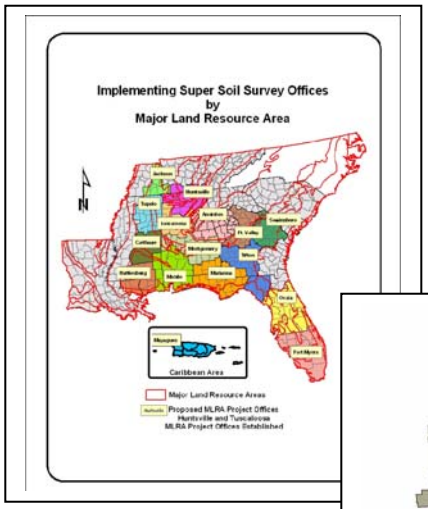
- Correlation and Management of MLRA Soil Survey course at Auburn, AL – September 2003
- NASIS Interpretations training at Auburn University—June 2003
- Soil Water Table Workgroup meetings at Auburn, AL—August and October 2003
- Introduction to ArcGIS for USDA–SCA at Auburn University—May 2004
- Joint MO–14 and –15 State Soil Scientist Workshops at Sumter, SC—March 2004

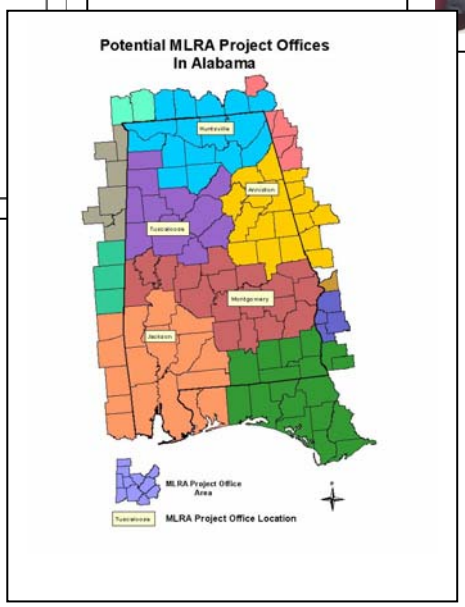
Marketing Activities

- Published three issues of *The Coastal Plainer*
- Dissemination of soils information within the region:
- FY04 - 8,975 soil-related items
- Soil displays or demonstrations at various conferences, agency meetings, etc.,
- Radio spots – 4 (use of soil surveys and soil Judging contests) – provided by Southeast AgNet radio station

What's New?

Implementation of Soil Survey Offices by MLRA





Regional 15 MOU Benefits:

- Establish a working agreement with MLRA Regional 15 Board of Directors
- Carry-out scientific based soil survey update and maintenance activities by MLRA/geographic area
- Ensure that uniform standards are applied over a large geographic area
- Correlate soils on a regional basis
- Serve as a business document for more potential funding support from National Soil Survey Division

HOW ARE WE ACHIEVING MLRA REGIONAL 15 GOALS?

- Good Communication!
- Good Planning!
- Good Cooperation!
- Good Team Work!

2004 National Technical Committee for Hydric Soils Meeting Report

South Region NCSS Conference
Biloxi, MS
June 7, 2004

By: Karl W. Hipple – Chair, NTCHS

National Technical Committee Hydric Soils Members

- Chris Noble (COE)
- Ed Blake, Mike Lilly, Mike Whited, Lenore Vasilas, Wade Hurt, Karl Hipple (NRCS)
- Chien-Lu Ping (U of Alaska), Mike Vepraskas & Wayne Skaggs (NC State), Jimmie Richardson (ND State), Herb Huddelston (Oregon State), Dave Zuberer (Texas A&M), Richard Griffin (Prairie View A&M)
- Bill Volk (BLM)
- Randy Davis (USFS)
- Ralph Spagnola (EPA)
- Vacant (USFWS)

2004 NTCHS Meeting Report

NTCHS met in Newark, Delaware – Jan. 13-14, 2004
Meeting was hosted by Mid-Atlantic Hydric Soils Committee

Test Indicators – test status

Work being done on the following indicators:
TF7 (Midwest)
TF2 (Mid-Atlantic states)
Letters of support received for TS3, TS5, TS6, and TS2

NTCHS reaffirmed its position that data <u>is required</u> to move a test indicator to approved status – <u>goal is short active list of test indicators</u>

Indicator files are established and will be maintained for each indicator at NSSC

"**<u>PRELIMINARY Action</u>"** regarding existing Test Indicators

- **3 Strategies**
  1. Maintain as test indicator (short term)
  2. Move to Approved Indicator
  3. Delete

Test Indicators Proposal

DELETE

TA1 – Playa Rim Stratified (Magnetic Susceptibility (MS) technology captures these)
TA2 – Structureless Muck (no activity)
TS4 – Sandy Neutral Surface (no activity)
TF1 – Cm Mucky Peat or Peat (no activity)
TF8 – Redox Spring Seeps (MS technology captures these)

MOVE to Approved Status

TA3 – Coast Prairie Redox (data available)
TF9 – Delta Ochric (data available)
TF11 – Reduced Vertic (data available)

MAINTAIN in test status

TS1 - Iron Staining
TS2 - Thick Sandy Dark Surface
TS3 – Dark Surface 2
TS5 – Chroma 3 Sandy Redox
TF2 – Red Parent Material (Mid-Atlantic HS Comm)
TF3 – Alaska Concretions
TF4 – 2.5Y/5Y Below Dark surface
TF5 – 2.5Y/5Y Below Thick Dark Surface
TF6 – Calcic Dark Surface
TF7 – Thick Dark Surface 2/1
TF10 – Alluvial Depleted Matrix

Field Indicators of Hydric Soils in the United States

Goal is to re-publish the Field Indicators in 2005 after review of any additional data/information submitted prior to November 1, 2004 and a final review of test indicators at the 2005 NTCHS meeting

Hard copy & CD plus posted on Web
Estimated date – July 1, 2005
<u>VERY</u> small supply of hard copies left
CDs of version 5.01, electronic copy on Website

New National List of Hydric Soils

- **January 2005** – **compiled from stored NASIS ratings** (NASIS component Interp table) and available from Soil Data Warehouse
- **January 2006** – **generated from** NASIS data in Soil Data Warehouse

IRIS Sticks/pipes

- PVS pipes coated with Fe oxide or hydroxide
  - Anaerobic soils - FE oxide/hydroxide dissolves off PVC pipe, indicates redox

- Experiments to verify IRIS stick verify redox potential – may use as alternative or substitute for measurements required by HSTS- Mike Vepraskas NC State and Marty Rabenhorst, Univ. of Maryland

1987 COE Manual Regionalization Efforts

- Started in Alaska and arid Western States
- NTCHS Committee appointed to include the Field Indicators of Hydric Soils as part of the new regionalized COE manuals (Hipple, Whited, Spagnola, Levin)

NTCHS 2005 meeting will be held January 24-28, 2005 – hosted by Army COE

Field trips with Mid-Atlantic Hydric Soils Committee to examine 2 sites that may involve the addition of one or more hydric soil indicators

Participated in Mid-Atlantic Hydric Soils Committee meeting
NTCHS 2004 Meeting Report

NTCHS Website:
http://soils.usda.gov/soil_use/hydric

NSSC Soil Survey Interpretations Staff Report

2004 South Regional NCSS Conference
Biloxi, MS
June 7-10, 2004

By: Karl W. Hipple, National Leader – Soil Survey Interpretations, NSSC

SS Interpretations Report - NSSC

- Milton Whitney - 1899
- "We need to be able to transfer experience from research or the use of soils, from the fields or areas where we have experience, to other soils or areas where it is applicable"
- Are we there yet?

SSI Staff and assignments

Janet Bauer – Administrative Assistant (The Boss)
Jim Fortner – Soil Scientist (NASIS Development/Reports, Training, VAL/CALC, Web soil survey efforts)
Dave Lightle – Conservation Agronomist (RUSLE2. Erosion models, Soil Conditioning Index, STIR applications, Conservation Security Program)
Joyce Scheyer - Urban Interpretations, NE Lab Liaison, VAL/CALC, Interpretation criteria
Cathy Seybold – Soil Scientist (NASIS Validations, Soil physical properties, Use-dependent soil properties, Soil/Water relationships, Soil Quality)
Bob Dobos – Soil Scientist (reports 8/8/04 - Soil Interpretations, Documentation, Criteria, NASIS Interpretations trouble shooting, Standards)
Lyle Steffen – Geologist (Geology & Engineering support, Training, Ag Handbook 296 for short term)
Curt Talbot – Range Management Specialist (Range and Forestry support, Ecological Site Descriptions)
Vacant – Forester - Job announcement closed (5/26/04)
Bob Grossman – Research Soil Scientist (Physical Soil properties, Use-dependent properties, VAL/CAL, Field techniques, Training) *Bob has announced his retirement for 6/30/04
Karl Hipple – National Leader (SSI Program, Use-dependent properties, T Factor criteria)

Major Emphasis for SS Interpretations FY04

Agriculture Handbook 296 Update

- Map Unit Description Progress
- Base map complete
- Inset maps and graphs are complete
- New or Subdivided MLRAs – state/MO has responsibility to author the Map Unit Descriptions – Deadline 9/1/04
- Target release dates for next State/MO reviews
  (mid-month)
  - **July - 58D, 65, 66, 69, 72, 73, 270, 271, 272, 273**
  - **Aug. - 21, 30, 95A, 95B, 99, 103, 104, 105, 106, 109,112, 113**
  - **Sept. - 84B, 117, 119, 121, 122, 127, 129, 142, 143, 144A, 144B, 145**
  - **Oct. – 96, 97, 98, 101, 139, 140, 141, 146, 148, 149A, 149B**

- New product will be hard copy in color,; web version will be based on Flash technology (file is too large for CD)
- Publication date Fall 2005
- NSSC Team – Talbot, Steffen, Fortner, Lightle, Waltman, Bauer, Hipple

Use Dependent Soil Properties

- Team to develop project plan – Arlene Tugel, Lisa Krall, Cathy Seybold, James Komar, Bob Grossman, Mike Sucik
- Plan components
  - Develop examples to demonstrate changes in properties tied to management systems (from existing studies and data)
- Outreach – SSSA meeting poster, fact sheet, etc.
- Identify interim "core soil properties"
- Develop interim sampling protocol

Iowa Project – Develop runoff curves for no-till soils

- ARS, NRCS, NWMC (Nat. Water Mgmt Center)
- Also collect Use-dependent samples (forestland & cropland)

Validation-Calculation Committee

- Members - Seybold, Grossman, Bigler, Talbot, Scheyer, Reinch, Fortner, Hipple
- CEC/ECEC turned on in NASIS (April)
- Calculation for percent passing & rock fragments
- Calculation of sand fractions

Urban Soil Primer

- Tool to introduce soil surveys to urban user groups
- Scheyer, Hipple, Cadre of urban soil scientists
- Color, hard copy version + electronic CD and web versions

Climate change support (SS Investigations)

- Talbot and Seybold
- Alaska and Antarctica

RUSLE2 – Cons. Security Program assistance

- Erosion modeling, SCI, STIR
- Dave Lightle

T Factor – request from FSA for uniform national criteria; programmable; generated from NASIS data

- Long term goal of NASIS database containing only soil property data; remove calculated values (K,T, I, Prime Farmland ratings, etc.
- Hipple

NASIS Support

- Retool; NASIS enhancements; Information Technology priorities; Soil Data Viewer; NASIS Report Writing
- Fortner

O horizon minimum data set

- Requirement list released
- Small experiment underway AK, MI, FL, ME to try methods to determine % mineral matter in O horizons
- Lynn and Seybold

NSIAG (National Soil Interpretations Advisory Group)

- Website http://soils.usda.gov/use
- List of issues (proposed, active, completed) for comment

Field Support for FY04

- Rupture resistance- Ortstein soils
- Mica Research project assistance
- Custom Rangeland Interpretations – BLM
- Forage Suitability Group assistance
- Web Soil Survey design
- NASIS Retool effort
- Infiltration methods
- Training – Soil Interpretations, NASIS report writing, NEDS Basic Soils course, Programs and Applications course
- Runoff Curves for no-till agriculture (use dependent issue)

MICA RESEARCH PROJECT

Southern Regional Cooperative Soil Survey Conference
Biloxi, MS
June 7 – 10, 2004

By: John Kelley, SDQS, MO-14 Office, Raleigh, NC

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TEAM GOALS--

Field Morphology:
1. Determine how (visible) mica should be described.
2. Study the relationships of geology, climate, topography, etc to mica content and determine if patterns exists.
3. Develop a list of field management indicators as influenced by mica.

Data Population/Soil Interpretations:
4. Determine an appropriate depth for the interpretative control section of soils influenced by mica (possibly 0 to 200 cm or bedrock contact).
5. Define use and management factors that affect interpretations.
6. Determine a list of soil properties or qualities (+/-) that are affected by mica.
7. Establish parameters (ranges) for limitation classes and their appropriate class separations.
8. Choose methods (field, laboratory. etc.) for comparing soil conditions within the interpretive control section.

NASIS Issues:
9. Determine which NASIS data elements (primarily RV's) to be modified in order to achieve appropriate soil interpretations.
10. Determine NASIS reports needed to reflect soils influenced by mica.

Application:
11. Revise existing series range in characteristics (on a continuum) to eliminate gaps in the range of soil properties.
12. Study taxonomic criteria and make necessary recommendations.

Effects of Mica Content on Engineering Properties of Sand
W. G. Harris, J. C. Parker, and L. W. Zelazny

During shear, mica grains tend to orient parallel to the shear plane, strength, high compressibility, and poor compactibility of micaceous soils are problems for highway subgrades, building foundations, earthen dams and embankments, and other engineering uses. The amount of mica necessary to cause such problems will vary with properties of the material. Effects of mica may be less in fine-textured soil than in sand because (i)moisture-strength interactions increase with decreasing particle size and (ii) clay minerals are commonly platy and therefore do not contrast morphologically with mica.

Results and Discussion
Compressibility of the mica-quartz mixtures was markedly affected by mica. The largest reductions in the modulii occurred for mica contents of up to 10% with greater additions having a relatively small additional effect.

Both the calculated bearing capacity values and the CBR data exhibit an inflection in their relationship to mica content at 10 to 15% mica. Beyond this point the material behaves essentially as a continuous micaceous matrix.

Summary and Conclusions
Results of this study and related studies (Gilroy, 1928; Moore, 1971) indicate that mica in amounts as low as 10% can significantly reduce the strength and bearing capacity and increase the compressibility of sandy materials. The relative effect of mica content is most pronounced at lower weight percentages and tapers off about 10 to 15%. Grain count data may be a better index of mica effects on certain engineering properties than mica weight percentage.

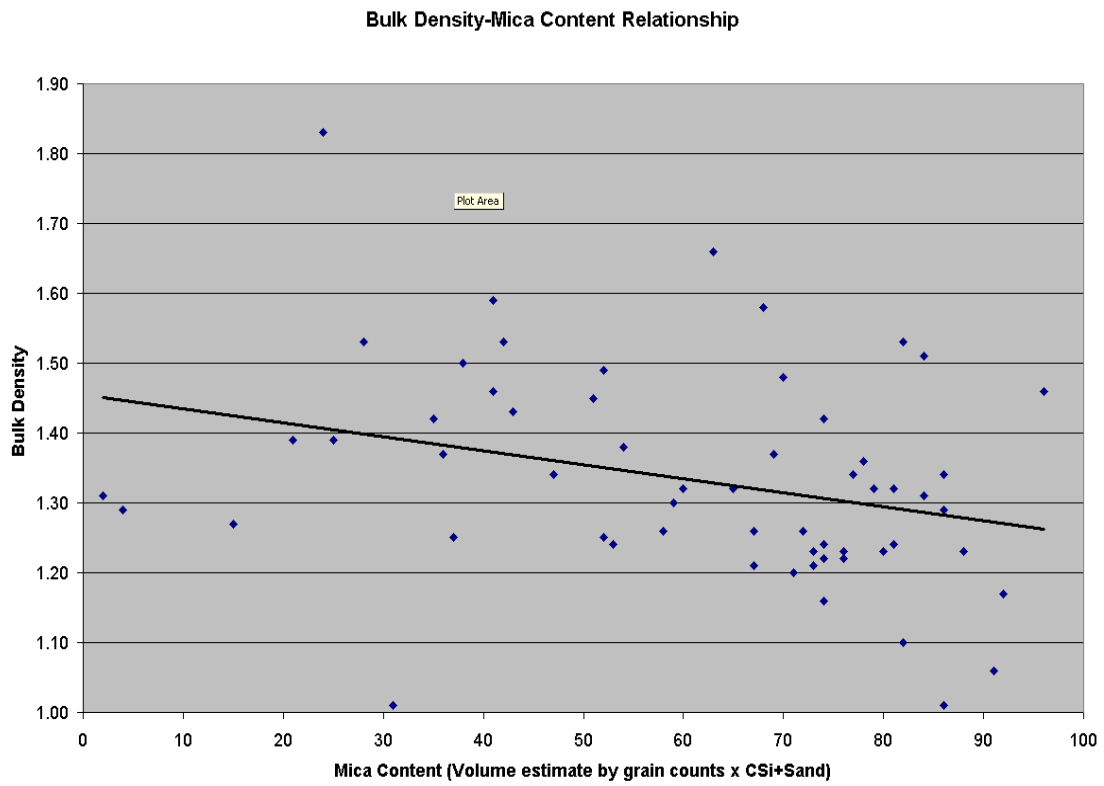
MICA Research Project
-- Field Tour --

November 5-7, 2003

Asheville, Wilkesboro, and Statesville, NC

	A	B	C	D	E	F	G	H
1			***MICA RESEARCH PROJECT***					
3	**Table Head Notes:**						Monday, June 07, 2004	
4	**(1)** Soil series identification at the time of sampling							
5	**(2)** Latitude at site location							
6	**(3)** Longitude at site location							
7	**(4)** Geology identified by NC State General Geology map							
8	**(5)** NSSL Sample number							
9	**(6)** County Name and Site Number--initial field investigation; Stop Number--Mica Field Tour; Subsample Number							
10	Engineerinig Index Data for the Watauga soil (Ashe14-07) was divided into 3 layers at depths (cm) of 10-100, 100-200, and 200-350.							
11	**(7)** Master horizon designation							
12	**(8)** Sample depth (centimeters)							
13	**(9) Mica Size Class**	Dominant Size Range	**Mica Amount Class**	Volume: **Fine-loamy or Fine**	Volume: **Coarse-loamy or Sandy**	PSC	Mica Volume	
14	Extremely fine (XF)	<0.25 mm (VF+F sand)	Low (L) [G] [MX]	<1/5 (<20 percent)	<1/3 (<35 percent)	**Fine-loamy or Fine**:	0.50 x 45 (PM) = 23 (1/5)	
15	Very Fine (VF)	0.25-1.0 mm (M+C sand)	Intermediate (I) [Y] [PM]	1/5 to 1/3 (20 to 35 percent)	1/3 to 1/2 (35 to 50 percent)	w/ avg. COSI+S=50	0.50 x.70 (MI) = 38 (1/3)	
16	Fine (F)	1.0-2.0 mm (VC sand)	High (H) [R] [MI]	>1/3 (>35 percent)	>1/2 (>50 percent)	**Coarse-loamy or Sandy**:	0.75 x 45 (PM) = 34 (1/3)	
17	Medium (M)	2 to 5 mm (fine gravel)				w/ avg. COSI+S=75	0.75 x 70 (MI) = 53 (1/2)	
18	**(10)** Greasiness; Grittiness; and Fluffiness							
19	**GY-Greasiness Class**	Criteria						
20	Non-greasy (0)	*Material ribbons as expected for texture class. No residue on hands*						
21	Slightly greasy (1)	*Material ribbons somewhat easily between thumb and forefinger. Slight residue.*						
22	Moderately greasy (2)	*Material ribbons easily between thumb and forefinger. Moderate residue.*						
23	Very greasy (3)	*Material ribbons very easily between thumb and forefinger. Significant residue.*						
24	**GC-Grittiness Class**	Dominant Sand Size	**GD-Grit Dominance**	Criteria				
25	Fine (1)	VFS or FS	Non-gritty (0)	?				
26	Medium (2)	FS or MS	Slightly gritty (1)	?				
27	Coarse (3)	MS or COS	Moderately gritty (2)	?				
28	Very coarse (4)	VCOS or FGR	Very gritty (3)	?				
29	**FY-Fluffiness Class**	Bulk Density						
30	Non-fluffy (0)	>1.40						
31	Slightly fluffy (1)	1.31-1.40						
32	Moderately fluffy (2)	1.20-1.30						
33	Very fluffy (3)	<1.2						
34	**(11)** 1/3 Bulk Density							
35	**(12) General Tex Group**	Texture classes	Clay content	****OR****	**(12) General Tex Group**	Clay content		
36	Coarse (C)	s, vcos, cos, fs, vfs, ls, lcos, lfs, lvfs	< 18 percent		Coarse (C)	< 18 percent		
37	Medium (M)	sl, cosl, fsl, vfsl, l, sil, si	18 to 35 percent		Fine (F)	> 18 percent		
38	Fine (F)	sc, sic, c	> 35 percent					
39	**(13) Interpretation Flag**	***Left Column--field determination. Right Column--measured data***						
40	**Class:**	**Criteria:**	***Management Statement:***					
41	Green (G)	No limitation	No additional planning required.					
42	Yellow (Y)	Management concern	Additional planing may be necessary to overcome soil limitation for selected uses. On-site investigation may be needed.					
43	Red (R)	Use limitation	Additional planing will be needed to overcome soil limitation for selected uses. On-site investigation is recommended.					
44	**(14)** Percent clay; silt; and sand (SSL)							
45	**(15)** Texture (SSL)							
46	**(16)** Coarse silt plus sand fraction (SSL)							
47	**(17)** Sand fraction analyzed for grain count (SSL). Parenthesis indicates data available for FS and VFS.							
48	**(18)** Percent Biotite (SSL)							
49	**(19)** Percent Muscovite (SSL)							
50	**(20)** Total Mica (Biotite plus Muscovite values from grain counts.)							

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	**(1) Soil Sampled**	**(7) Hor**	**(8) Depth (cm)**	**(9) Mica Size**	**(10) GY**	**GC**	**GD**	**FY**	**(11) Bk Den**	**(12) Gen Tex**	**(13) Field Det.**	**(13) Lab Data**	**(14) C**	**Si**	**S**	**(15) Tex**	**(16) CSI +S**	**(17) Sand Fract**	**(18) BT**	**(19) MS**	**(20) Tot MI**	**(21) Min**	**(22) V1**	**(23) V2**	**(24) Mica VE**	**(25) LL**	**(26) PI**	**(27) AAS**	**(28) UN**
15	Watauga	Ap	0-15	VF-F	0					M	Y	G	27	28	45	CL	53	FS	4	23	27	MX	12	14	15-20* (18)				
16	Watauga	Bt1	**15**-51	VF-F	0				1.43	F	R	G	37	25	38	CL	45	FS	10	33	43	MX	16	19	15-20* (18)				
17	Watauga	Bt2	51-74	VF-F	2					M	R	R	28	27	45	SCL	55	FS	25	42	67	PM	30	37	20-35* (28)	52	13		MH
18	Watauga	BC	74-**94**	VF-F	2					C	R	Y	12	25	63	FSL	72	FS	27	34	61	PM	38	44	40-50* (45)				
19	Watauga	C1	94-193	VF-F	3				1.34	C	R	R	5	24	71	FSL	81	FS	33	30	63	PM	45	51	40-50* (45)		NP		SM
20	Watauga	C2	193-356	VF-F	3				1.42	C	R	R	4	20	76	LS	84	FS	37	37	74	MI	56	62	50* (50)	37	3		SM
21	Buladean	B	10-75	XF-F	0	1	1	0		M	G	G	22	32	46	L	59	(VFS)	13	19	32	MX	15	19	10-15 (13)	38	7		ML
22	Buladean	C	**75**-125	XF-F	0	1	1	0		C	Y														25-50 (38)				
23	Buladean	Cr	125-**200**	XF-F	0	1	1	0		C	Y	Y	13	32	55	VFSL	74	(VFS)	22	24	46	PM	25	34	25-50 (38)	34	1		ML
24	Rhodhiss	B	10-75	VF-F	1	1	1	0		M	Y	Y	18	41	41	L	54	(FS)	7	59	66	PM	27	36	20-30 (25)	45	5		ML
25	Rhodhiss	C	75-150	VF-M	1	2	1	0		C	Y	R	4	31	65	FSL	79	(FS)	20	64	84	MI	55	66	25-50 (38)	53	5		MH
26	Lloyd	B	10-75	VF-F	0	0	0	0		F	G														5-20 (13)				
27	Lloyd	BC	75-150	VF-F	1	2	1	1		M	Y														25-50 (38)				
28	Lloyd	B	10-75	VF-F	0	0	0	0	1.34	F	G	Y	43	16	41	C	46	FS	17	30	47	PM	19	22	10-20 (15)	59	26		MH
29	Lloyd	BC	75-125	VF-F	0	0	1	1		M	Y	Y	24	16	57	SCL	64	FS	25	33	58	PM	33	37	20-30 (25)	47	13		ML
30	Lloyd	C	125-150	VF-F	1	0	0	1		M	R														50-75 (63)				
31	Fairview	B	10-75	VF-F	1	0	0	0		F	G														5-10 (8)				
32	Fairview	C1	75-150	VF-F	1	1	1	1		M	Y														25-50 (38)				
33	Fairview	C2	150-250	VF-F	2	1	1	2	1.32	C	R	R	10	13	77	SL	82	FS	78	3	81	MI	62	66	50-75 (63)		NP		SM
34	Fairview	C	100-150	VF-F	1	1	1	1	1.40	C	Y														30-50 (40)				
35	Bellspur	A	5-23							C		G	9	35	56	VFSL	80	VFS	3	3	6	MX	3	5					
36	Bellspur	B	71-91							C		G	9	35	56	VFSL	78	VFS	19	6	25	MX	14	20					
37	Brownwood	B	25-71							M		Y	18	30	52	FSL	62	FS	27	20	47	PM	24	29					
38	Brownwood	B	25-69							M		G	19	30	51	L	58	FS	17	17	34	MX	17	20					
39	Brownwood	B	25-100							C		R	15	19	66	FSL	84	FS	33	40	73	MI	48	61					
40	Buladean	A	2-7							C		G	10	27	63	VFSL	75	VFS	15	21	36	MX	23	27					
41	Buladean	BA	12-33						1.37	C		G	14	30	56	VFSL	70	VFS	14	22	36	MX	20	25					
42	Buladean	B	33-68						1.45	M		Y	20	32	48	L	61	VFS	21	30	51	PM	24	31					
43	Buladean	B	68-86						1.48	C		Y	16	34	50	L	66	VFS	35	35	70	PM	35	46					
44	Buladean	Cr	106-136						1.58	C		R	5	28	67	VFSL	84	VFS	34	34	68	PM	46	57					
45	Cashiers	BA	20-32							M		Y	18	23	59	FSL	63	FS	31	28	59	PM	35	37					
46	Cashiers	B	32-73							M		R	18	20	62	SL	64	FS	44	39	83	MI	51	53					
47	Cashiers	B	73-128							C		R	12	17	71	SL	74	FS	46	32	78	MI	55	58					
48	Cashiers	CB	128-150							C		R	6	12	82	LS	85	FS	48	23	71	MI	58	60					



Mica Meeting-3 Minutes
Statesville, NC
October 6, 2003

The third meeting of the Mica Study Team was held at the Statesville, NC USDA Service Center. Those attending included Mike Sherrill, Roger Leab, Roy Mathis, Doug Thomas, Chip Smith, Alan Walters, Perry Wyatt, Kent Clary, and John Kelley. The meeting was facilitated by Phil Tant. Also in attendance was Angela Jessup, Engineer and Dr. Stan Buol, Professor, NCSU.

The meeting began at 9:30 am with the introduction of Dr. Buol and Angela.

Kent reviewed the minutes from the previous team meeting. No corrections or additions were made.

The team reviewed a questionnaire sent to several engineers and technical experts.

Doug reported on information provided by Howard Tew, Engineer, NRCS. Howard was in agreement that soils high in mica had interpretative limitations beyond those similar soils and recommended soil tilth be added as an affected soil property. He also suggested the whole soil (not just the fine-earth) be considered in rating for interpretations.

Alan reported he had made several calls to specialists, but no responses were available at this time.

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Working together to **MARKET SOILS**

Southern Regional Cooperative Soil Survey Conference
Biloxi, MS
June 7 – 10, 2004

By: Gary Muckel, National Soil Survey Center

Helping people Understand Soils Equals Marketing

- **Whose job is it?**
- **What is it?**
- **When do we do it?**
- **Why do we want to do it?**
- **What results can we expect?**

Key Point – we are in it together!
Don't expect someone else to do it for us!

State NCSS Partnerships

* In-state soil information and services
* Training potential soil survey users
* Putting surveys to use

Marketing and new partners

- The NRCS State Soil Scientist and the in-state NCSS partnership are responsible for in-state marketing through technical soil services and data delivery.
- Today's role is focused on derivation and presentation of soil information, not just distribution of soil survey reports.
- This role means concentrating on the purpose of the information and on the NCSS mission.
- It means identifying those people or clients who can make a difference to your mission.
- It means establishing customer contacts and relationships, seeing **what they want and how they want it.**
- It means tailoring the information to meet customer needs.
- It means doing so in an organized efficient manner.

Marketing is oriented toward organizational goals

- **NRCS**-to help people conserve, improve, and sustain our natural resources and environment
- **USFS**-to sustain the health, diversity, and productivity of the Nation's forests and grasslands
- **BLM**-to sustain the health, diversity and productivity of the public lands
- **NPS**-to conserve the scenery and the natural and historic objects and the wildlife of the National parks.
- **Univ Exp St** -to provide information and education, and encourage the application of research-based knowledge in response to local, state, and national issues.

These goals establish a basis for marketing

Where are we with marketing??

Where is the soil survey program going with marketing?

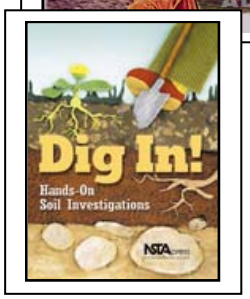
The whole point of marketing is to identify and meet customer needs and expectations. You will **focus efforts and resources, increase efficiency, and support your agency missions.** The spinoffs are greater exposure and increased support.

The marketing strategy we are displaying today focuses our marketing efforts to a specific goal **each year**. The thought is that each year we concentrate materials, contacts, and Web site development on a common goal. The list of goals and target audiences for 5 years were discussed at the National State Soil Scientist meeting and the National Soil Survey Conference.

Future in Marketing

- We have a five year marketing plan with focused audiences each year
- Over ambitious although excellent progress
- Missing has been a strategic plan for marketing other than a 1994 version
- Strengthen marketing with combined effort of NSSC, GIS center, and NHQ

2001 - Science teachers



PROJECT LEARNING TREE

National Association of Conservation Districts

NSTA

GOAL - soils into natural resource education

ACTIONS

- **National Science Teachers convention and PLT**
- **soil biology primer and planner**
- **textbook reviews**
- **"Dig In" booklet**

- **bookmarks, soil color poster, soil order map**
- **soil science education Web site and CD**
- **NACD stewardship and educ items**

Smithsonian display

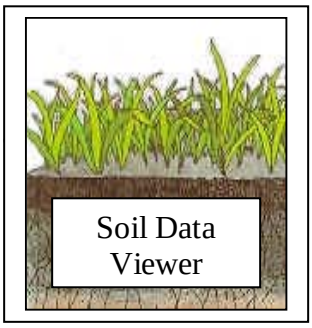
The first year we focused on including soils in natural resource education. The list you see are various items that center around that theme. Each item supports the others.

Soil Quality Institute and the NSSC are close partners within the SS Division. The NRCS Public Affairs Division is also a major player. So were many of you with universities and other agencies through the SWCS and SSSA.

We are assembling and incorporating more lesson plans and materials for teachers into our Web site all the time. We recently piloted a soil education CD and are building partnerships with Project Learning Tree, USFS, NSTA, NASA, and NACD.

Our educational Web site receives over 30,000 hits a month. We promote the Web "url" to this targeted audience. We also link to your sites.

2002 - Land managers & consultants



GOAL - improved soil management

ACTIONS

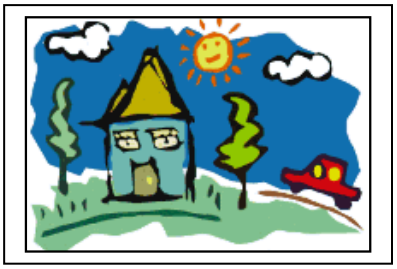
- **liaison to agricultural groups**
- **expand materials for soil quality**
- **expand on-line products**
- **maps, planner, Web information**
- **increase accessible soil information-efotg**
- **Soil Data Viewer and Soil Data Mart**

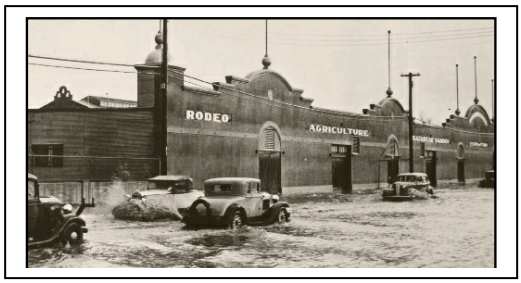
Web Soil Survey – coming this summer!!

Land managers in production agriculture are a current target. Targeted groups for this goal are: **field staff within NRCS**, extension service personnel, and consultants that deliver our materials. Strengthening people in their understanding of soils seems to have concern and interest among many of us. Soil Data Viewer, electronic FOTG, Lab Information Management System (LIMS) and the soil data warehouse (SDW) are products for this goal.

The **Paperwork Reduction Act** and **Freedom to E-File** legislation requires agencies including NRCS to migrate their service delivery functions to the Internet. We will provide an alternative Web-based access for land owners to sigh up for programs. This means a new on-demand delivery system for soils data and maps. The NSSC is working with FSA to bring this about.

2003 - Land use planners & contractors





GOAL - reduced loss of life and property

ACTIONS

- **liaison to homebuilders & contractors**
- **info on flooding, compaction, shrink-swell, and other risks and hazards to minimize losses**
- **identify construction hazards**
- **info on how to minimize impact**
- **on soils**

Material nearly ready

Next year our goal of reducing life and property gives special attention to land use planners, realtors, bankers, land contractors, and homebuilders as target audiences.

We seem to have continued needs to get the message across that soil information can help reduce the loss of life and property. Many of our "problem" soil conditions will be highlighted.

Among these target groups are those influential with Congress.

Slides and write-ups are needed before we can prepare marketing materials. Keep them coming in to Gary Muckel.

2004 - Wildland managers

GOAL - understanding the function of soil in using and protecting wildlands

ACTIONS

- **ecological sites**
- **soil-vegetation relationships**
- **endangered species**
- **special interpretations for rangeland, military use, forests, parks**
- **visitor center materials, stories for interpreters**

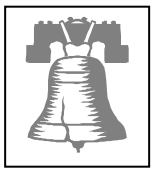
A large number of soil surveys address wildlands used for military, parks, rangeland, and forestland. Special attention to goals on these lands will address different audiences and partnerships.

With each goal, attention will be devoted to establishing a closer relationship. We would hope the same might be the case with each of you and your in-state partnerships.

We would not divorce ourselves from groups of the past year as we move to a new group, but instead maintain products and liaison that support continued relationships.

Efforts for the Lewis and Clark bicentennial have already started and initiate the 2004 goals with the National Park Service. The first event will be in Monticello this next year.

2005 - International Soils Leadership



GOAL - showcase the soil survey of the US to International soil scientists at the World Soils Congress

ACTIONS

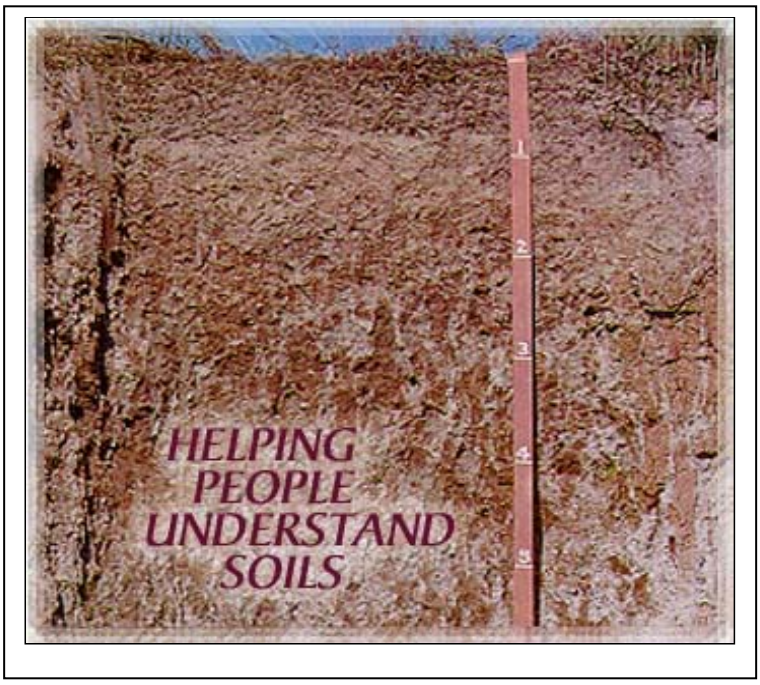
- **soil carbon maps plans**
- **world soil maps**
- **prepare tours**
- **symposia**
- **exhibits**

Few action steps have been developed for this goal. The intent is a build up for the International Soil Science Congress in Philadelphia, PA in 2006.

The Smithsonian exhibit is timely for this event. The Soil Survey Centennial monoliths are phase one for the exhibit. The design for the more permanent soils exhibit is in the planning phase.

More specific actions and planning will begin soon for this 2005 campaign.

OUR MARKETING IS ABOUT



Overall, you see marketing is about Helping People Understand Soils.

I see nothing but opportunities to improve the job we do in soil survey, assuring that soil information fits the needs of primary client groups, finding new ways to tailor and deliver our information to help people conserve, improve, and sustain our natural resources and environment.

Our job within the National Cooperative Soil Survey is making a real shift to a proactive force in **Selling Soils to Society**. I thank you for your input into this renewed direction.

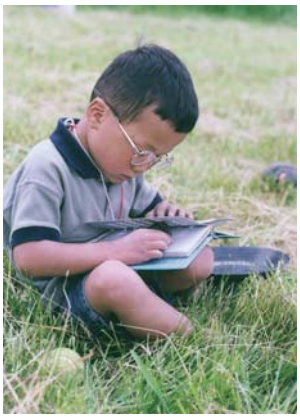
Soil Selling Points and Issues

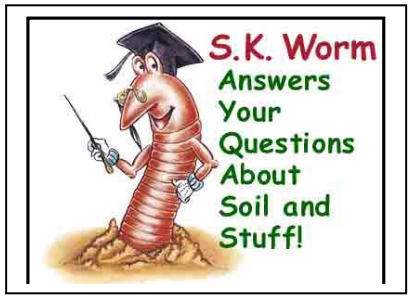
Food and fiber production
Wind and water erosion
Important farmland loss
Sedimentation of lakes and streams

Excess runoff
Water conservation
Soil quality
Soil contamination
Waste management
Carbon sequestration

Biological diversity
Wildlife habitat
Hydric soils and wetlands
Construction materials

Risks and hazards in use of soils
National esthetics
Urban planning





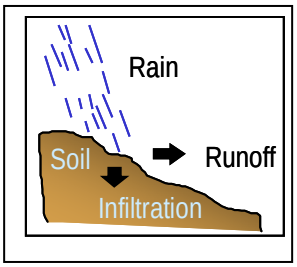
Key Soil Messages for Marketing

Following are key messages that are included with each focus area

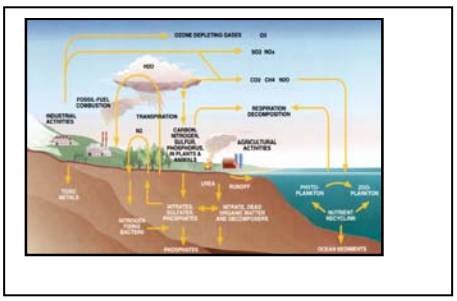
Soils Perform Vital Functions

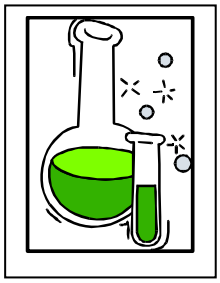
Sustaining plant and animal life above and below the land surface

Regulating and partitioning water and solute flow



Filtering, buffering, Degrading, immobilizing, And detoxifying



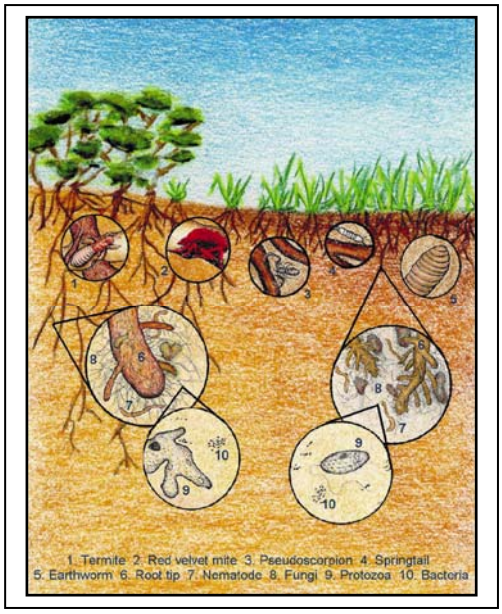


Storing and cycling nutrients

Providing support to structures

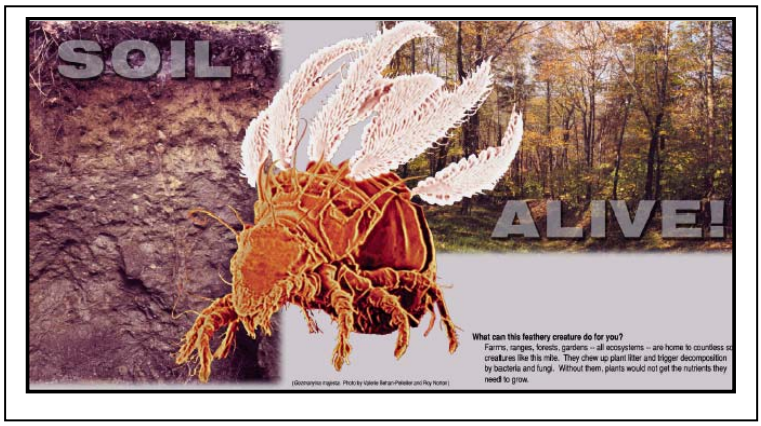
Soil is the Basis of the Ecosystem

The living systems occurring above and below the ground surface are determined by the properties of the soil. We often ignore the soil because it is hard to observe.



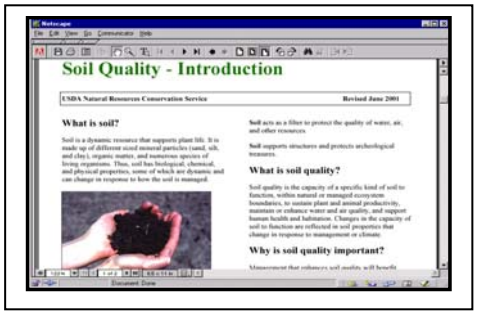
Soils Support Life

Organism Types	Roles & Benefits
bacteria	decomposition
fungi	release nutrients
protozoa	create pores
nematodes	stabilize soils
arthropods	
earthworms	



Soil Management Affects Soil Quality

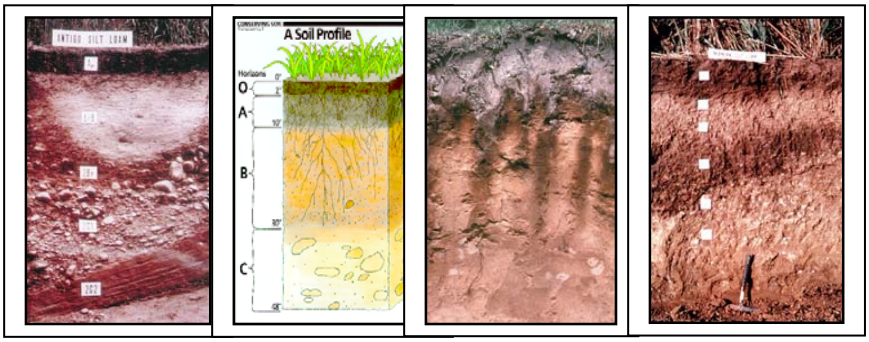
Soil Quality



Soil Test Kit

Soils Have Unique Physical, Chemical and Biological Properties That Are Important to Their Use

Color
Texture
Structure
Consistence
Roots
Pores
Other features



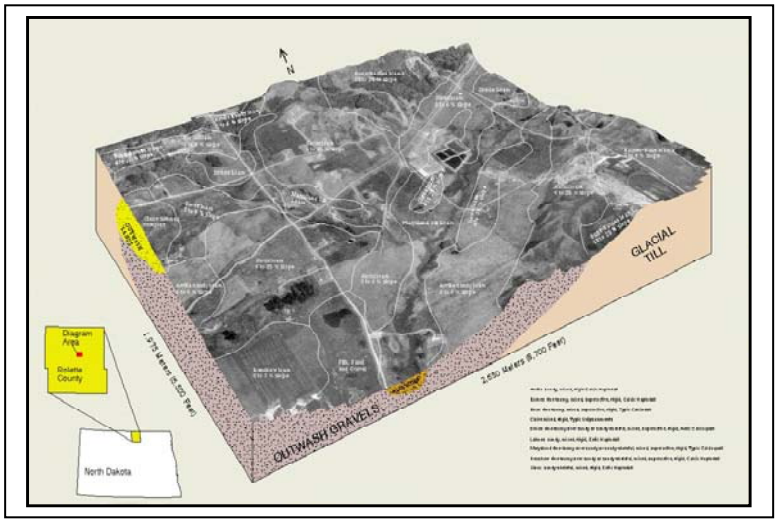
Soil is a natural body of solids, liquids, and gases, with either horizons or layers and the ability to support rooted plants
Pedology, the study of soil, is a unique discipline

Soil-forming Factors Determine the Location and Kind of Soil

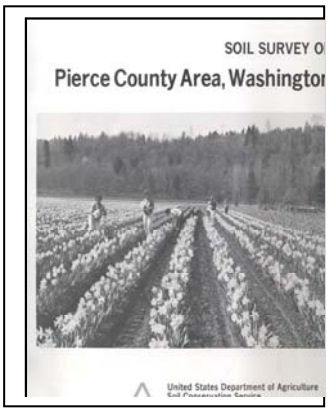
There are 23,000 soil series in various combinations with different slopes and surface textures in the United States

Soil Forming Factors:

Parent Material
Climate
Living Organisms
Topography
Time

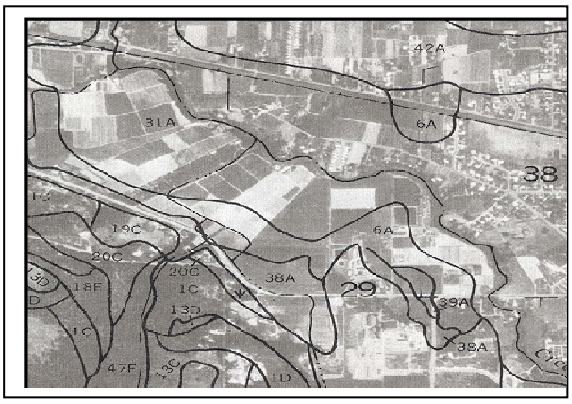


Soil Survey is a Scientifically-Based Inventory



A soil survey includes maps, descriptions, properties, climate, and interpretations. These are excellent sources of information.

About 3,000 counties in the United States have a soil survey



Soils Have Limitations Which Must be Understood

Concerns for life and properties

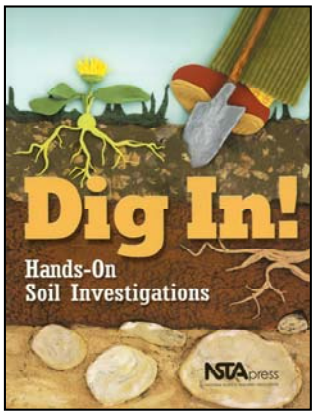
allergies
corrosivity
dust
flooding
gypsum dissolution
piping
rapid runoff
sand blowing
septic failure
sinkholes
soil borne disease
sulfidic materials
water tables
contaminants
crop loss
erosion
frost action
liquefaction
radon
salt build up
sedimentation
shrink-swell
slope failures
subsidence
urban hydrology

Scientific Names for Soils Reduces Ambiguity

- **Like plants and animals, soils are classified**
- **The system is called *Soil Taxonomy***
- **The highest level is the Soil Order (12)**
- **The lowest level is the soil series, often a place name**

Soil Order	Formative terms
Alfisols	Alf from combination of al (aluminum) and f (ferrous) iron
Andisols	Ando from Japanese term dark referring to dark volcanic ash
Aridisols	Latin, aridies, dry arid
Entisols	Ent meaningless, root recent
Gelisols	Latin gelare, to freeze
Histosols	Greek, histos, tissue
Inceptisols	Latin, incepum, beginning, inception
Mollisols	Latin, mollis, soft, mollify
Oxisols	French oxide
Spodosols	Greek spodos, wood ash
Ultisols	Latin ultimus, last, ultimate
Vertisols	Latin verto, vertical cracking

Soil Science Can be Usefully Incorporated Into Other Studies



Science
ecology, biology, chemistry

Social Studies
world trade, land use

Mathematics
soil loss over one hectare

History
settlement of the U.S., dust bowl

Art
soil crayons, acrylic paints

Help is available
From the
National Cooperative Soil Survey
http://soils.usda.gov

3 Stages of Soil Survey

1. Outreach
   Information transfer and education

2. Application
   Products and Services

3. Science
   Basic Collection and Analysis

Marketing ideas within a state

- Establish a user conference
- Establish an outreach to targeted customers
- Develop a soil tour guide
- Develop interpretive maps
- Relate soils to water use or other hot topics
- Train districts, county agents, and TSPs

National Soil Survey Center

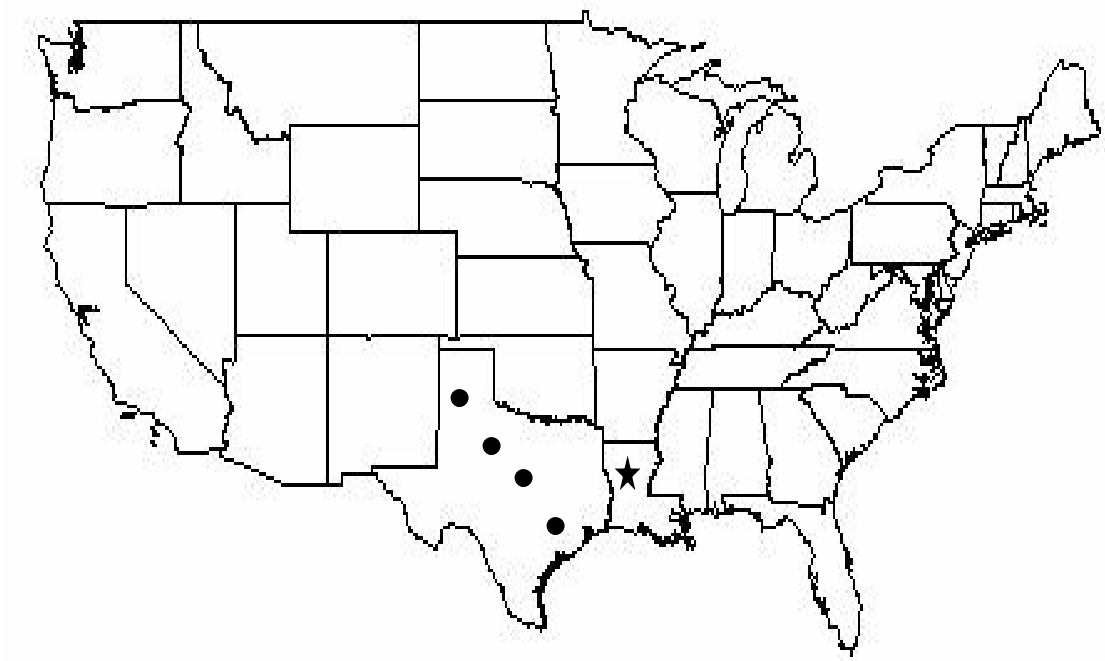
Contact: gary.muckel@usda.gov

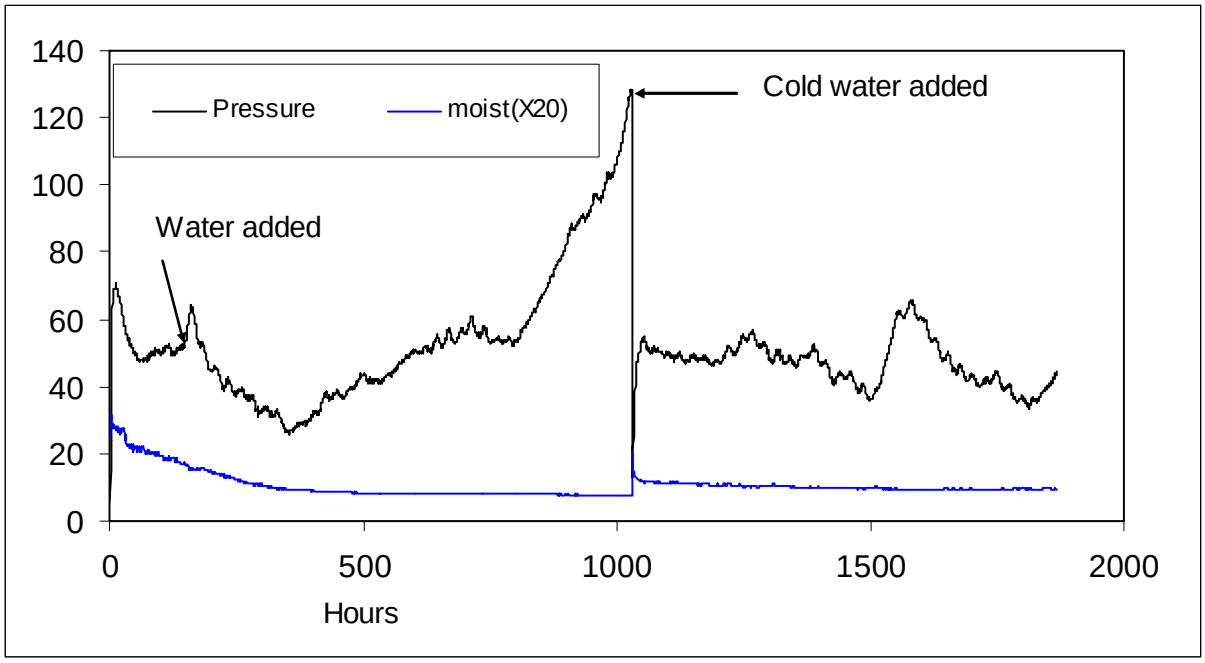
MOISTURE, TEMPERATURE, and PRESSURE RELATIONSHIPS within VERTISOLS

INTRODUCTION

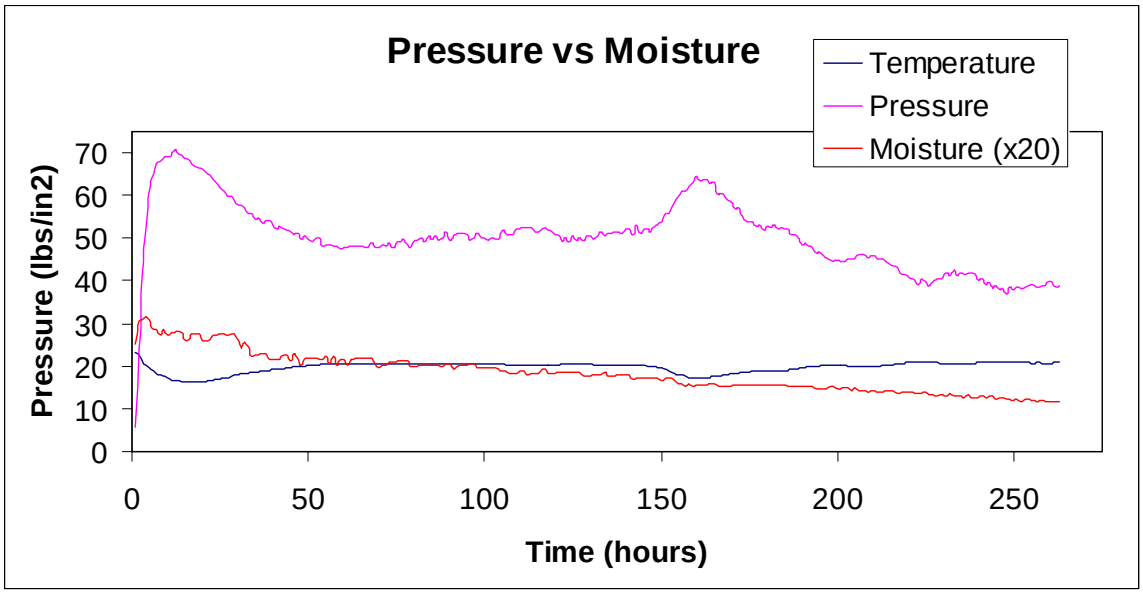
OBJECTIVES

- Measure soil temperature to verify temperature regimes
- Measure soil moisture to verify moisture regime
- Measure pressure to understand moisture-pressure relationships
- Measure carbon isotopes to understand carbonate formation



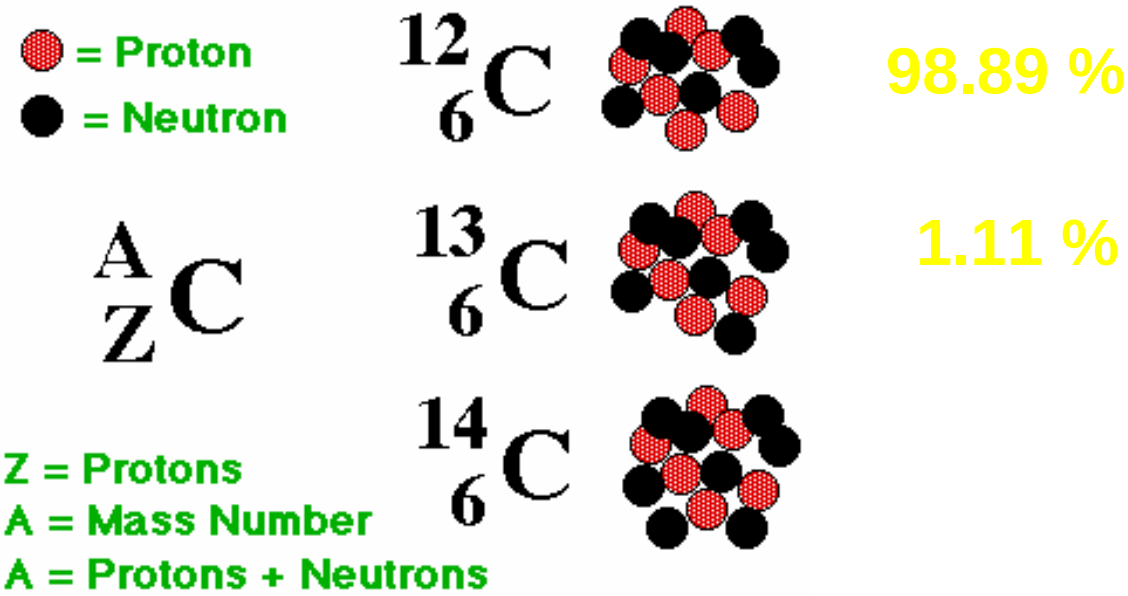

140
120
100
80
60
40
20
0
Pressure
moist(X20)
Cold water added
Water added
0
500
1000
1500
2000
Hours

MEASURING MOISTURE AND PRESSURE RELATIONSHIPS WITHIN VERTISOLS



STABLE CARBON ISOTOPES RATIOS AND THEIR SIGNIFICANCE TO PEDOLOGY

STABLE C ISOTOPE: THEORY



ISOTOPE FRACTIONATION

The isotopes of carbon are fractionated by a wide variety of natural processes, including photosynthesis and isotope exchange reactions among carbon compounds.

Two main processes produce isotopic fractionations:

- **Kinetic processes**
- **Isotope exchange reactions**

C ISOTOPE FRACTIONATION

- **Kinetic Fractionation**

Unidirectional reactions (biological processes)

- **Equilibrium fractionation**

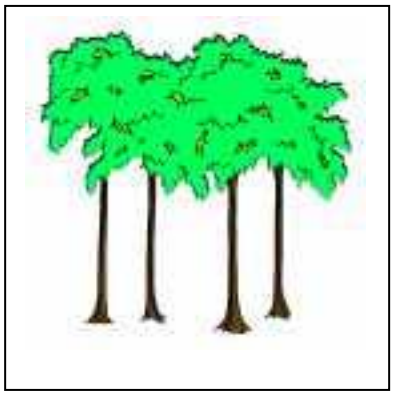
Differences in energy due to mass
At equilibrium the heavy isotope will tend to occupy the site with the stronger bond
(Hoefs, 1997)

Stable isotopes are commonly expressed in delta notations where (δ) notations where $\delta^{13}C$ is the difference (in per mil, o/oo) between $^{13}C/^{12}C$ ratio of the sample and that of the standard. Increases in the δ value denote increases in the relative amount of the heavy isotope component (^{13}C) or a reciprocal decrease in the light isotope component (^{12}C).

C ISOTOPE FRACTIONATION
(Kinetic)

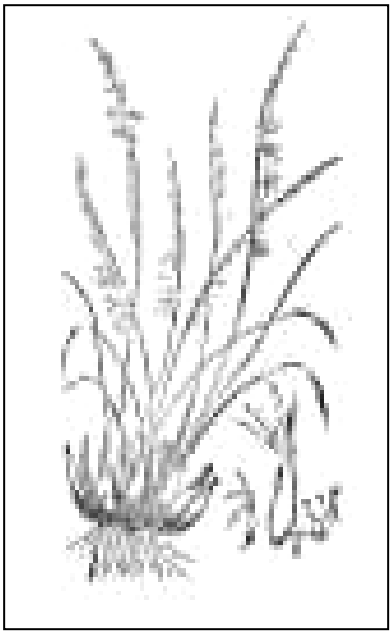
$C0_2$
(-7.8 %)

C3



Phosphoglyceration
(Calvin Cycle)
-32 to -20 $_{0/00}$ (-27 $_{0/00}$)

C4

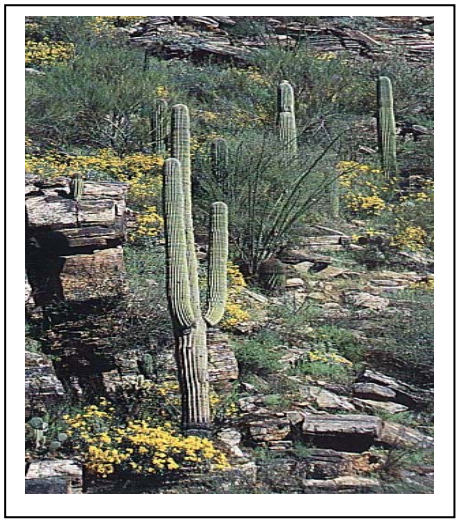


Dicarboxylation
(Hatch-Slack cycle)
-17 to -9 $_{0/00}$ (-13 $_{0/00}$)

C ISOTOPE FRACTIONATION

Crassulacean Acid Metabolism (CAM)

CO_2
(-7.8 $_{0/00}$) **Cacti**



CAM

-25 to -11 $_{0/00}$ (-18 $_{0/00}$)

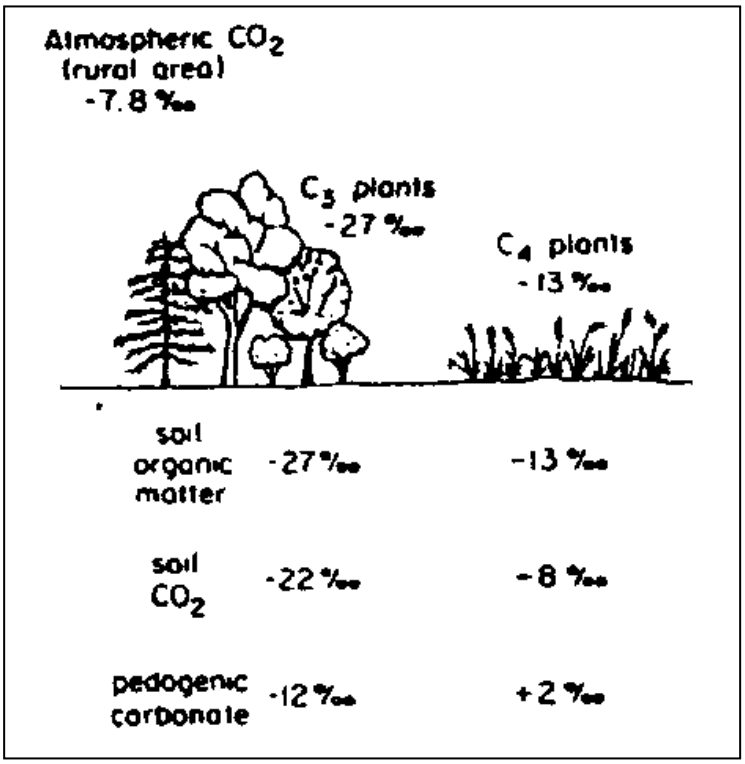
C ISOTOPE FRACTIONATION

What is the Relative contribution Of C3 plants to the Soil OM?

$$X = \frac{\delta^{13}C_{soil} - \delta 13 C_{C3}}{\delta^{13}C_{C4} - \delta^{13}C_{C3}}$$

x = proportion of OC from C4 source

(Boutton, 1996)



CARBONATE EQUILIBRIA AND ISOTOPE FRACTIONATION

CO_2 (gr) CO_2 (aq)

CO_2 (aq) + H_2O H^+ + HCO_3
$CaCO_3$ (lithogenic) + H^+ Ca_2+ + HCO_3^-
Ca_2^+ + HCO_3^- CO_2(g) + H_2O + $CaCO_3$ (pedogenic)

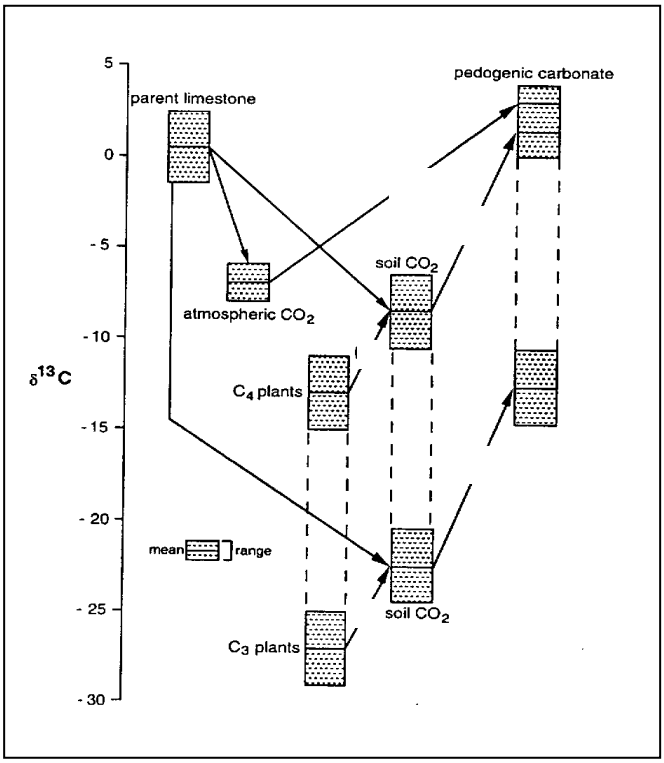
$$\delta^{13}C_{\text{pedogenic carbonate}} = \delta^{13}C_{SOM} + \Delta_{CO_2\ diffusion} + \Delta_{CO_2-CaCO_3}$$

= (-27 or -13 o/oo) + 4.4 o/oo + 12 o/oo at 0oC or 9 o/oo at 25 oC

C ISOTOPE FRACTIONATION

- **What is the proportion of pedogenic carbonate?**

$$= \frac{(\delta^{13}C_{soil} - \delta^{13}C_{parent})}{(\delta^{13}C_{pedogenic} - \delta^{13}C_{parent})} X100$$



ISOTOPE RATIO MEASUREMENT

- Absolute $^{13}C:^{12}C$ ratio = 0.0112372
- Relative ratio ($\delta^{13}C$) is measured with reference to a standard

$$\delta^{13}C(‰) = \left(\frac{R_{sample} - R_{standard}}{R_{standard}} \right) \times 1000$$

R = 45/44 from CO2 gas
(Boutton, 1996)

$$\% \text{ C4} = \frac{\delta^{13}C_{soil} - \delta^{13}C_{C3}}{\delta^{13}C_{C4} - \delta^{13}C_{C3}} \text{ X } 100$$

$$\% \text{ Pedogenic} = \frac{(\delta^{13}C_{soil} - \delta^{13}C_{parent})}{(\delta^{13}C_{pedogenic} - \delta^{13}C_{parent})} \text{X}100$$

% Carbonate = (100/12) X % IC
(Boutton, 1996; Nordt et al., 1996)

SUMMARY: $\delta^{13}C$ INTERPRETATION

- **Can be positive (enriched with ^{13}C) or negative (depleted in ^{13}C)**
- **Values depend on source and processes**
  - C3 plants = -32 to -20 $^{o}/_{oo}$ (-27 $^{o}/_{oo}$)
  - C4 plants = -17 to -9 $^{o}/_{oo}$ (-13 $^{o}/_{oo}$)
  - CAM plants = -25 to -11 $^{o}/_{oo}$ (-18 $^{o}/_{oo}$)
  - Lithogenic carbonate C = 0 $^{o}/_{oo}$
  - Pedogenic carbonate C = +3 to -12 $^{o}/_{oo}$

OBJECTIVES

- **To reconstruct the vegetation history of the Keiffer prairies**
- **To document the proportion of C3 and C4 plants**
- **To investigate carbonate pedogensis**

SITE CHARACTERISTICS

- **Geology – Eocene marly clays of the Tertiary period, Jackson group**
- **Prairie soil – fine-silty, carbonatic, thermic, Rendollic Eutrochrepts**
- **Adjacent Soils:**
  - **Oktibebeha silt loan – very-fine, montmorillonitic thermic Vertic Hapludalts**
  - **Hollywood silty clay loam – fine, montmorillonitic, thermic, Typic Pelluderts**
- **Landuse**

  Grazed

  Not farmed

Site 1
(0.3 Ha)

South side of Site 1 burned several times, last burn in 1998

Site 2
(0.9 ha)

Sites 2 and 3 not burned recently

Site 2

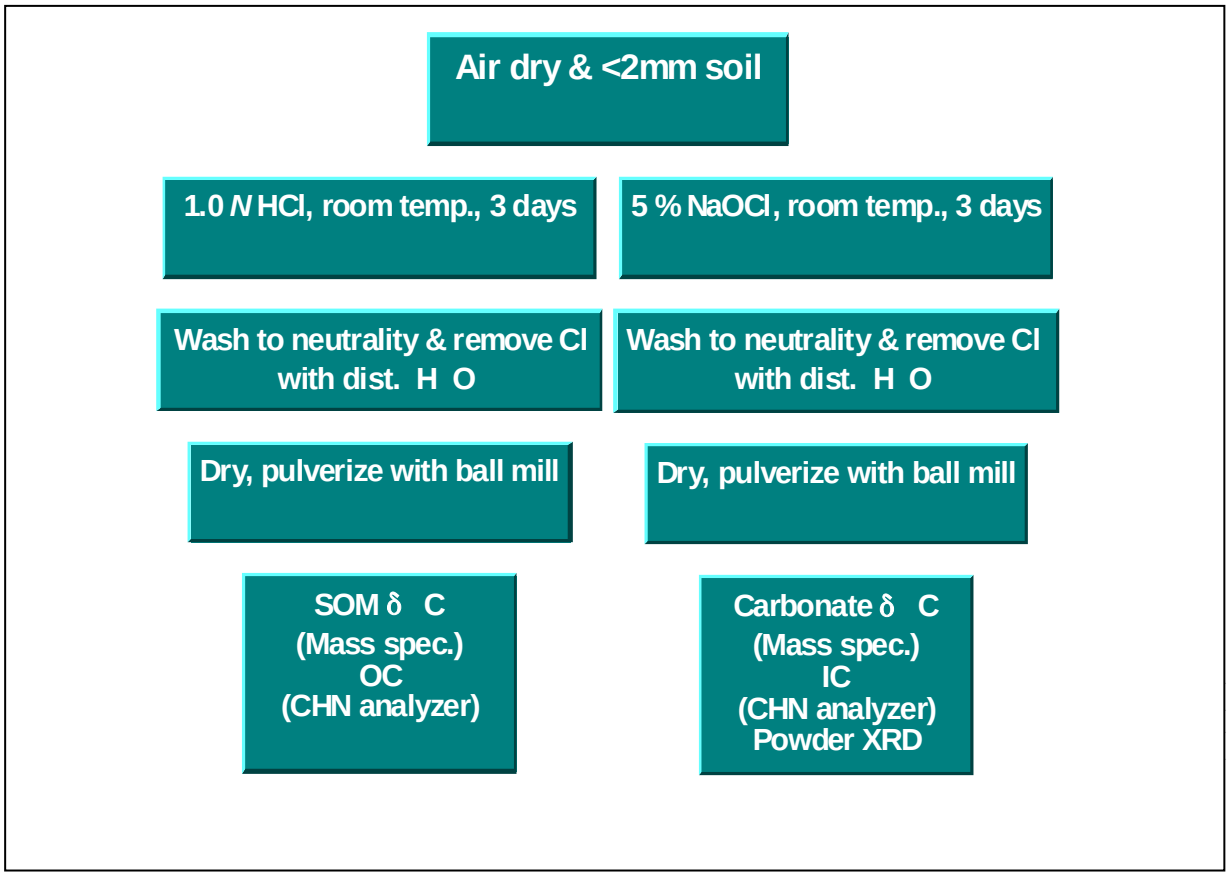
Site 3 (1.4 ha)

Site 3

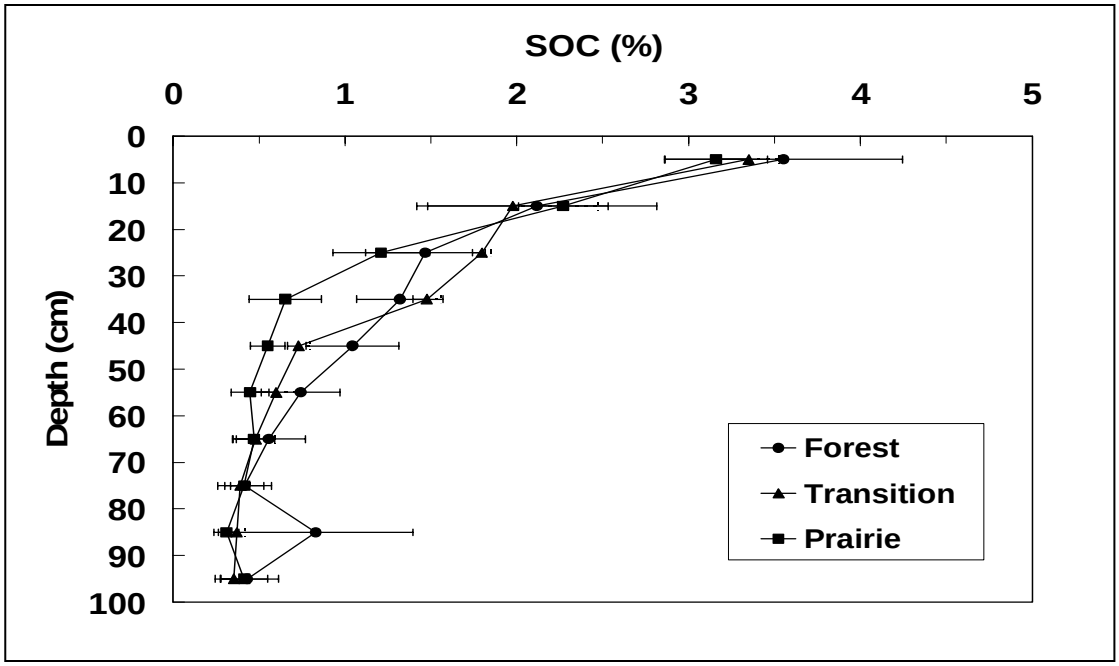
FIELD METHODS

- **Soil samples were collected from each site using a push probe at 10 cm increments to a depth of 1 m. Two sets of samples were collected from each of prairie, transition, and forest, each representing contrasting slope positions.**
- **Carbonate nodules were sampled separately to obtain $\delta^{13}C$ of pedogenic carbonate. Rock fragments and carbonate samples from the lower portion of the profiles from each site were collected to obtain $\delta^{13}C$ estimate for the parent material (lithogenic carbonate).**
- **Plant specimens were collected from the prairie, transition, and forest using a 1 m x 1 m quadrat in the prairie, and 5 m x 5 m quadrat in the transition and forest for stable C isotope analysis.**

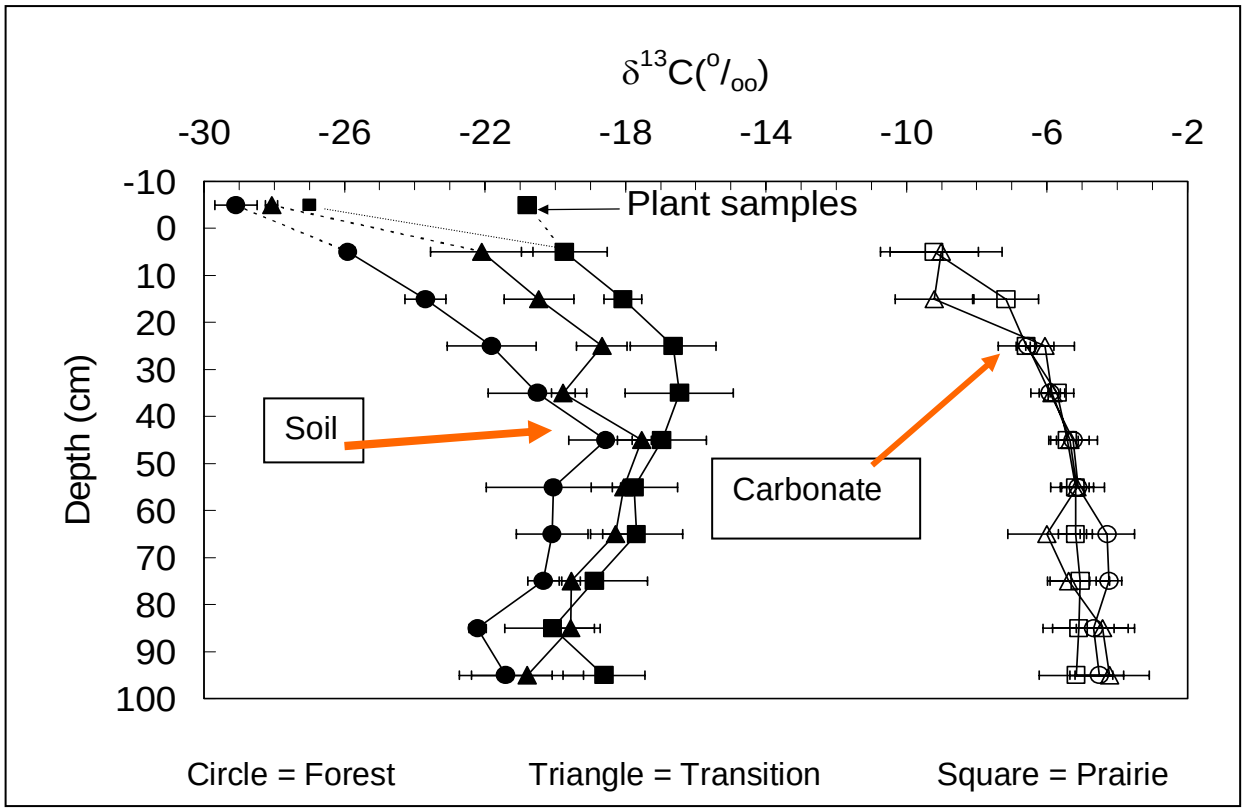
LABORATORY METHODS



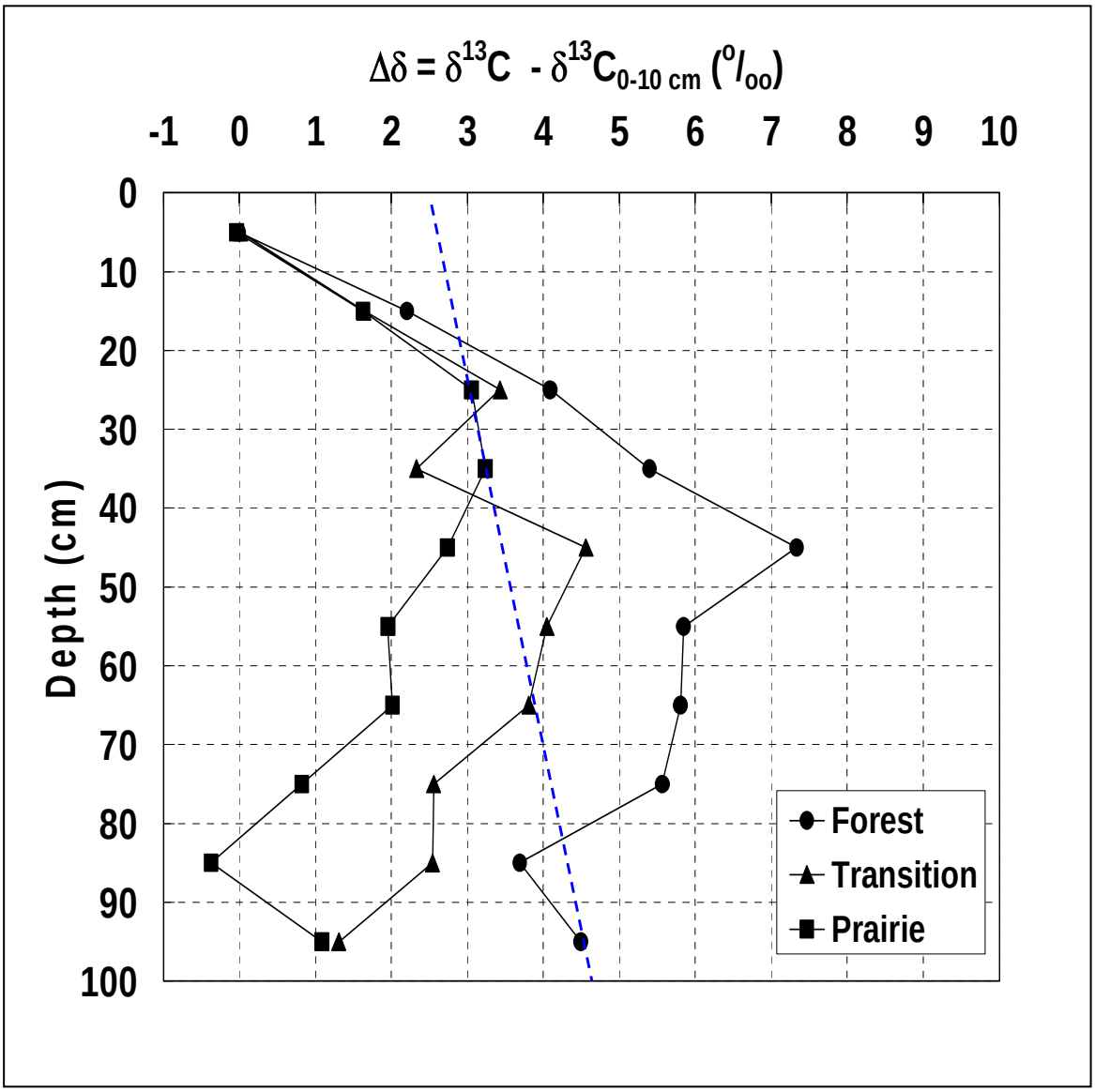
RESULTS



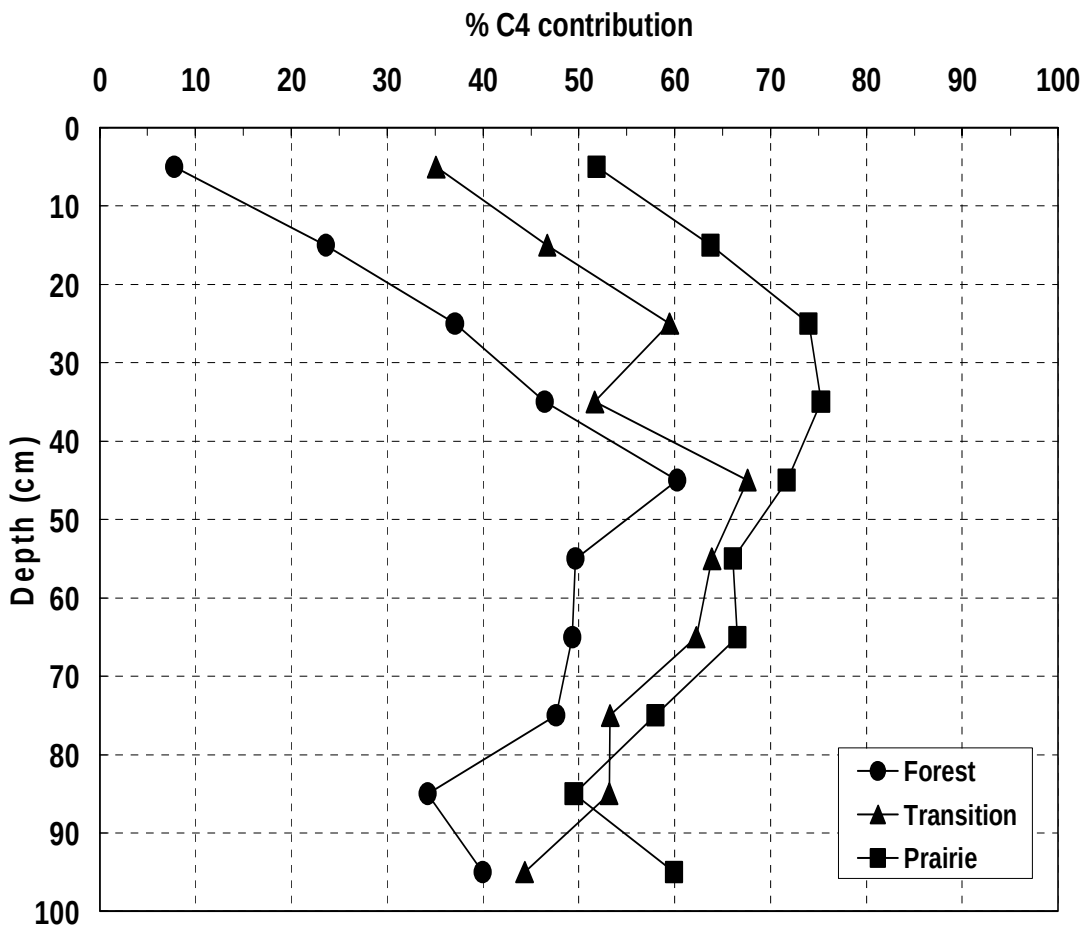
Vertical Distribution of Soil OC



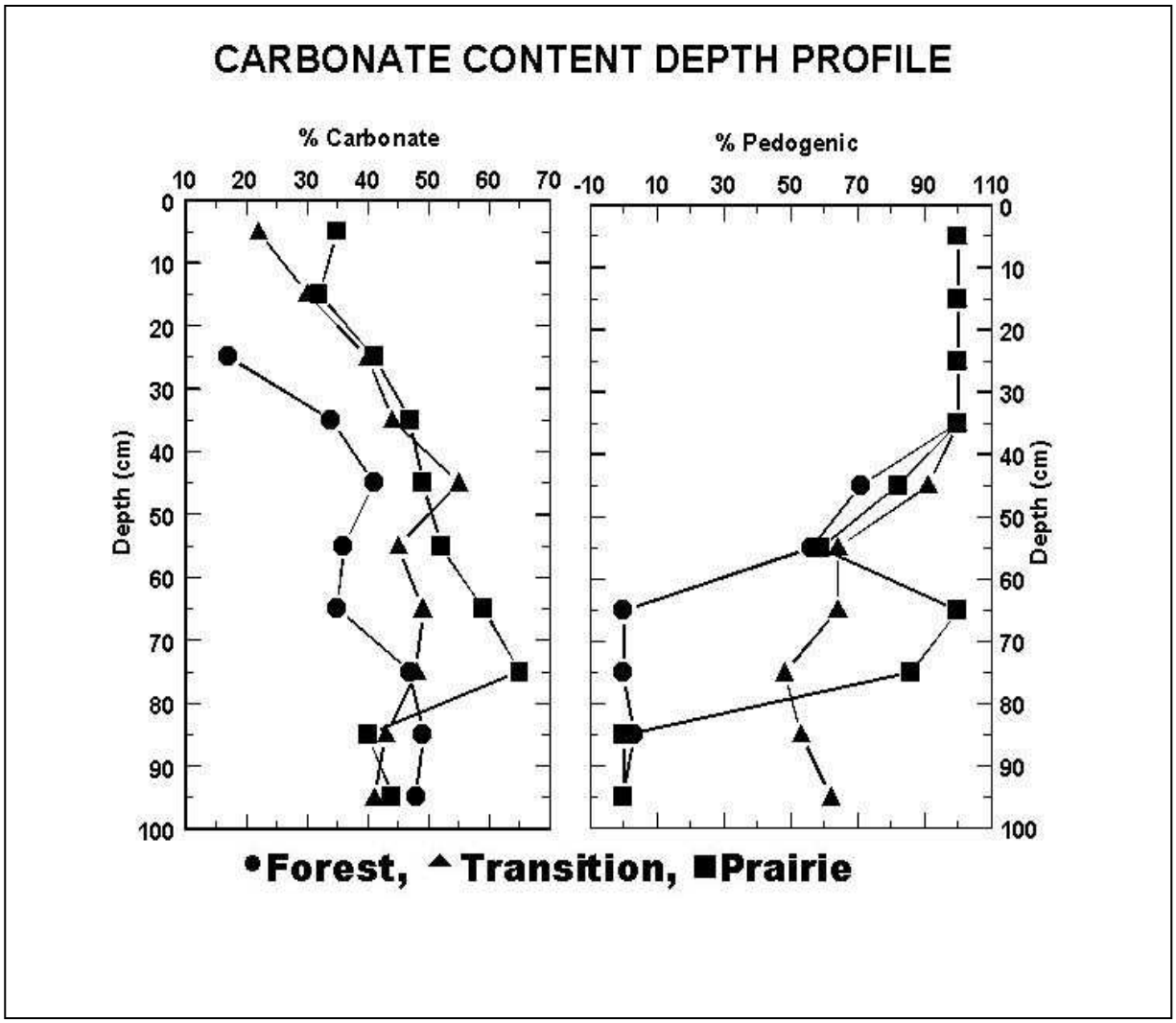
D^{13} C of Plant, SOM, and Carbonate



d^{13}C Enrichment Relative to 0-10 cm Depth



PROPORTION OF C4 VEGETATION WITH DEPTH



SUMMARY & CONCLUSION

- **Explored $\delta^{13}C$ of SOM, $\delta^{13}C$ of pedogenic carbonate, SOC and carbonate mineralogy**
- **SOC varied with depth but variation due to vegetation and landscape position were not statistically significant**
- **The depth profile of SOM $\delta^{13}C$ served as a signal of temporal vegetation dynamics**
- **The forest was exclusively C3, and the transition**

and prairie were composed of a mixture of C3 and C4 plants

- The relative proportion of C3 and C4 plants varied with season
- The invasion by C3 plants within the transition ecosystem may not be a recent phenomenon
- A depth of 40-50 cm may represent an undisturbed prairie signal
- Calcite constituted the bulk of the soil carbonate
- The carbonate pedogenesis was controlled by CO_2 derived from the vegetation
- Pedogenic carbonate was not a result of dissolution of lithogenic carbonate and precipitation

ACKNOWLEGEMENTS

This research was funded by a Challenge Grant from The United States Department of Agriculture – USFS

Defining Growing Season From Measured Soil Temperature

Jacqueline A. Prudente

Southern Regional Cooperative Soil Survey Conference
Biloxi, MS
June 7-10, 2004

Soil

- **S = f (c, t, r, o, p)**

– temperature
– moisture

(Soil Taxonomy, 1975)

Soil Temperature

- **plant growth**
- **biological processes**
- **5°C**

(Soil Taxonomy, 1975)

Soil Temperature

- **plant phenology**
  - **bud burst**
  - **flowering**
  - **shoot growth**
  - **leaf size**

(Young, 1980)

- vegetative development of plants
- seed germination
- growth and other functions of the roots
- bacterial and chemical activities in the soil

(Weaver,1926; Taylor and Jackson, 1985)

- low soil temperature
  - slow biological decomposition
    - limits availability of nutrients such as N, P, K S, Ca, etc.
    - affects absorption and transport of water and nutrient ions by higher plants

(Brady and Weil, 1996)

Factors Affecting Soil Temperature

- aspect and slope
- vegetative cover
- depth
- color
- texture
- structure
- soil moisture / water

(Soil Taxonomy, 1975; Petr, 1991; Taylor and Jackson, 1985)

Hydric Soils

"soils that formed under conditions of saturation, flooding, or ponding long enough during the "growing season" to develop anaerobic conditions in the upper part"

(Soil Survey Staff, 1991)

Majority of the criteria to reflect the soils which meet the definition, all contain the phrase "growing season".

Growing season?

Growing Season

"Includes that portion of the year when soil temperature at 50-cm below the soil surface are higher than biologic zero (5°C)"

(Soil Taxonomy, 1975; National List of Hydric Soils; NRCS National Food Security Act Manual; Corps of Engineers Wetland Delineation Manual,1987)

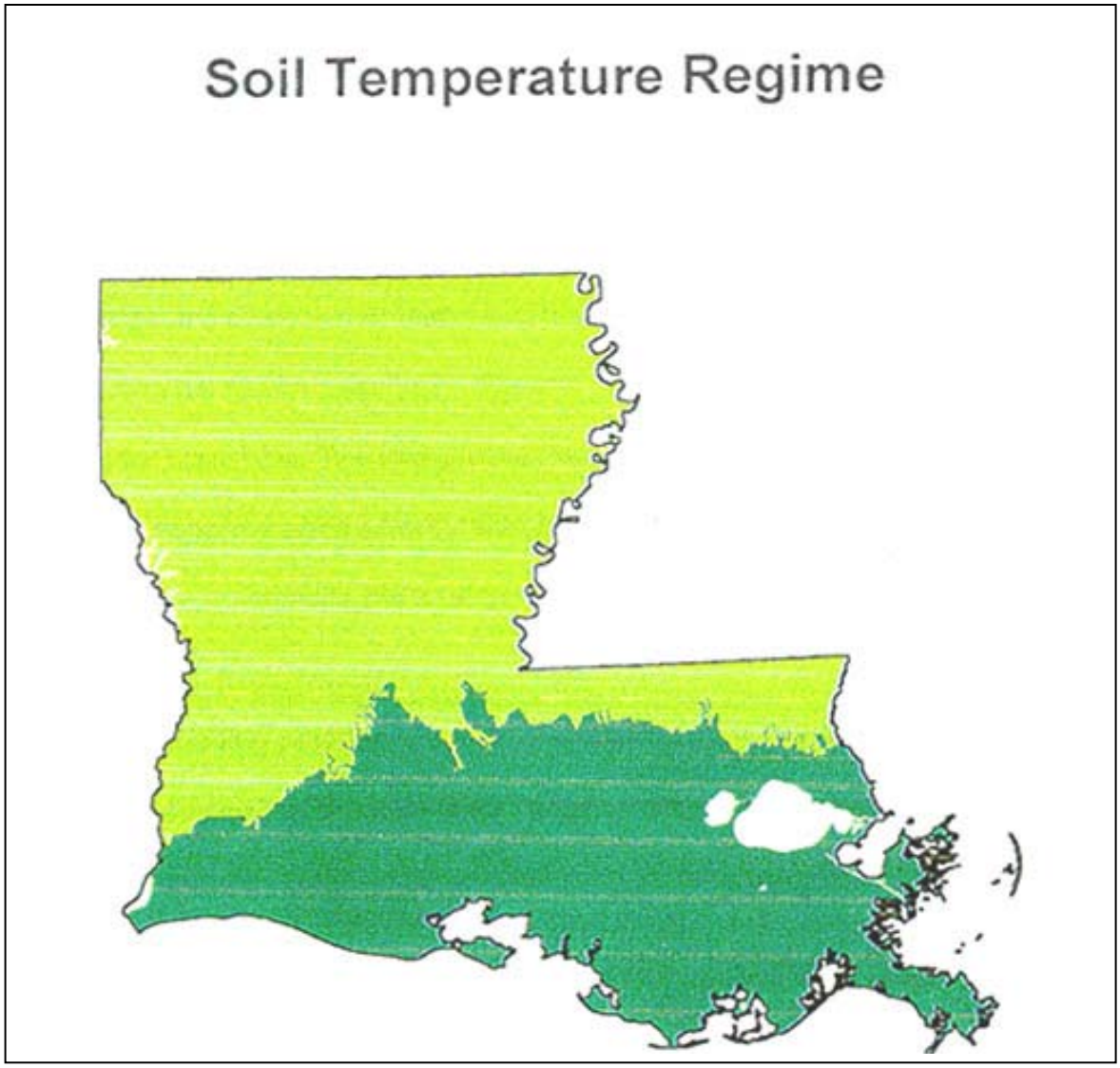
- **thermic temperature regime- February to October**
- **hyperthermic regime- February to December**

(Soil Survey Staff, 1993)

- **thermic temperature regime-**
- **15°C or higher but < 22°C**
- **mean winter and mean summer difference > 6°C**

- **hyperthermic regime-**
- **22°C or >22°C**
- **mean winter and mean summer difference > 6°C**

(Soil Survey Staff, 1993)



- **the average date of the last killing frost in spring and the average date of the first killing frost in fall.**

- **temperature threshold of -2°C (28°F) or lower**

- **microbial activity season**
  - **the portion of the year when soils were less than 5°C**

- **"growing season"**
  - **plant activity**

(Megonigal, et al., 1996)

Previous Findings

- **soil temperature was never below 5°C (Pringle, et al., 1997)**
- **year- round oxygen consumption and soil respiration**
  - **34 bottomland hardwood forest soils - never less than 5°C (Megonigal, et al., 1996)**
- **biologic zero concept**
- **soil temperature at 50-cm - never below 5°C**
- **therefore, growing season is continuous?**

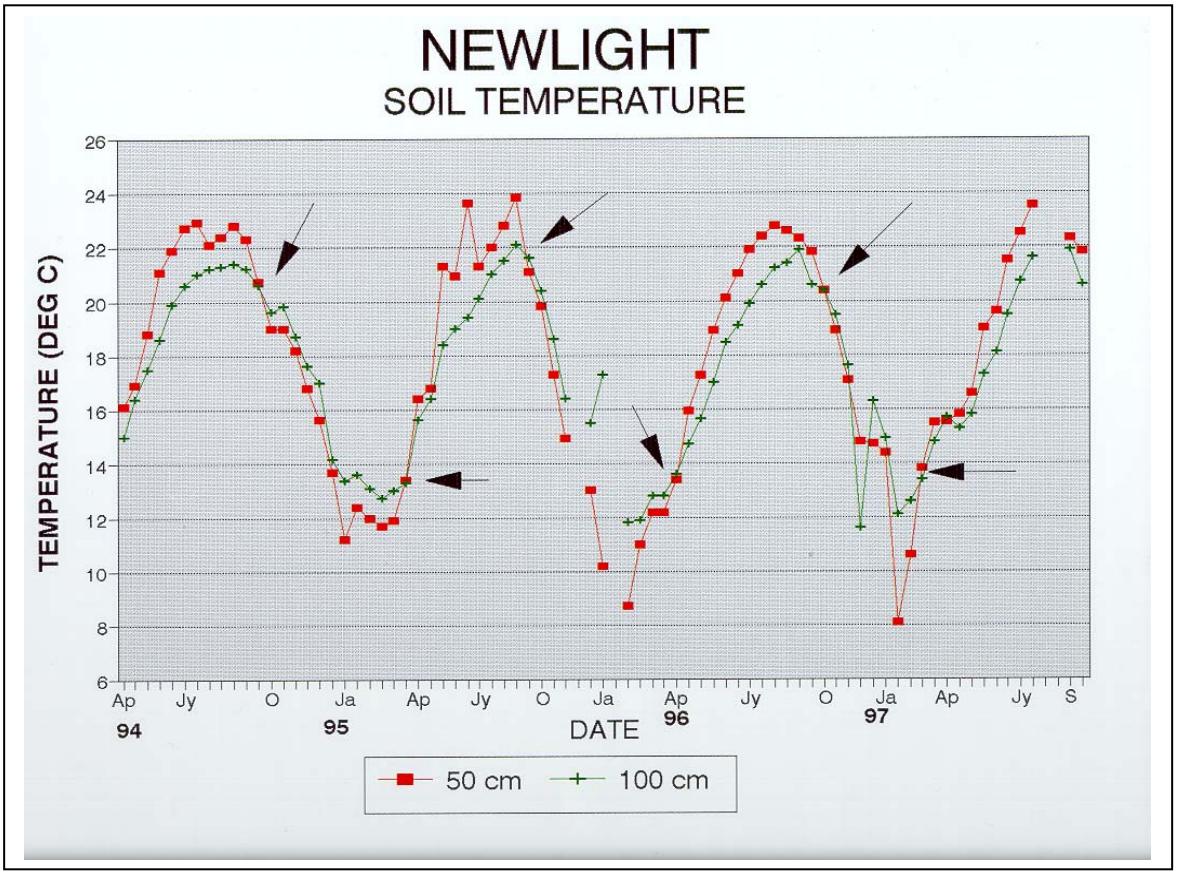
Result

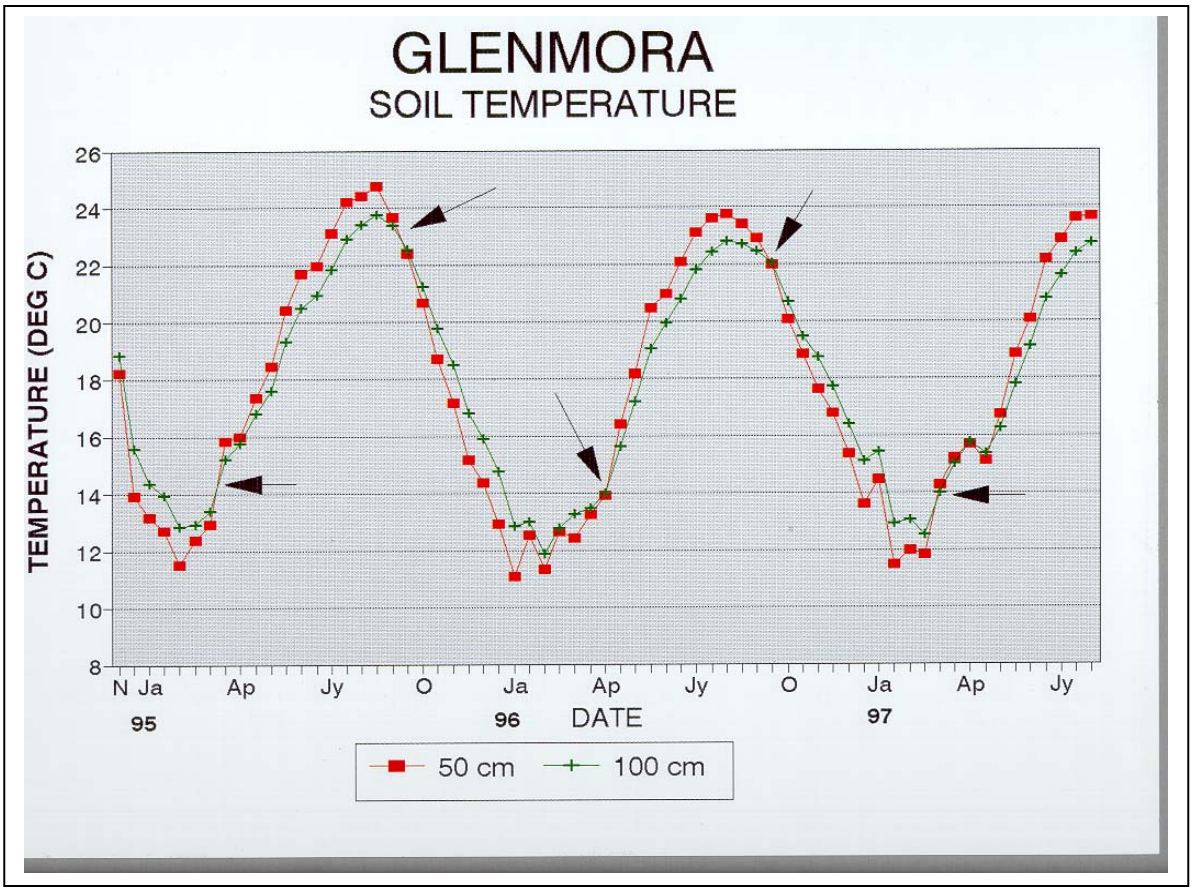
- **disagreement in length of growing season as defined by the biologic zero concept and as indicated by the actual dormant period of native vegetation**
  - **-2°C temperature threshold?**
  - **Short- lived cold temperature - trigger dormancy in native vegetation**
  - **soil temperature (- 2°C or below)**

Preliminary Results

- **spring - soil temperature at 50-cm depth progressed from lower than to higher than at 100-cm**

- **temperature at 50-cm - remained higher until some date in fall when it again fell below that at 100-cm**





Temperature cross dates

- **Glenmora**
  - **Fall dates**
    - **September 24 & 30, 1995**
  - **Spring dates**
    - **March 18, 1995; April 20, 1996 and March 30, 1997**
- **Newlight**
  - **Fall dates**
    - **September 30, 1994; September 26, 1996; September 20, 1997**
  - **Spring dates**
    - **March 20, 1995; April 10, 1996 and March 7, 1997**

- **temperature cross**
  - **correlated with vegetation initiation and dormancy to define growing season**
- **growing season**
  - **March/April to September**

Problem

- temperature cross
  - spring dates were late and fall dates were early
  - result: very short growing season length

- does not agree with NRCS definition

- thermic temperature regime- February to October
- hyperthermic regime- February to December

(Soil Survey Staff, 1993)

Objectives

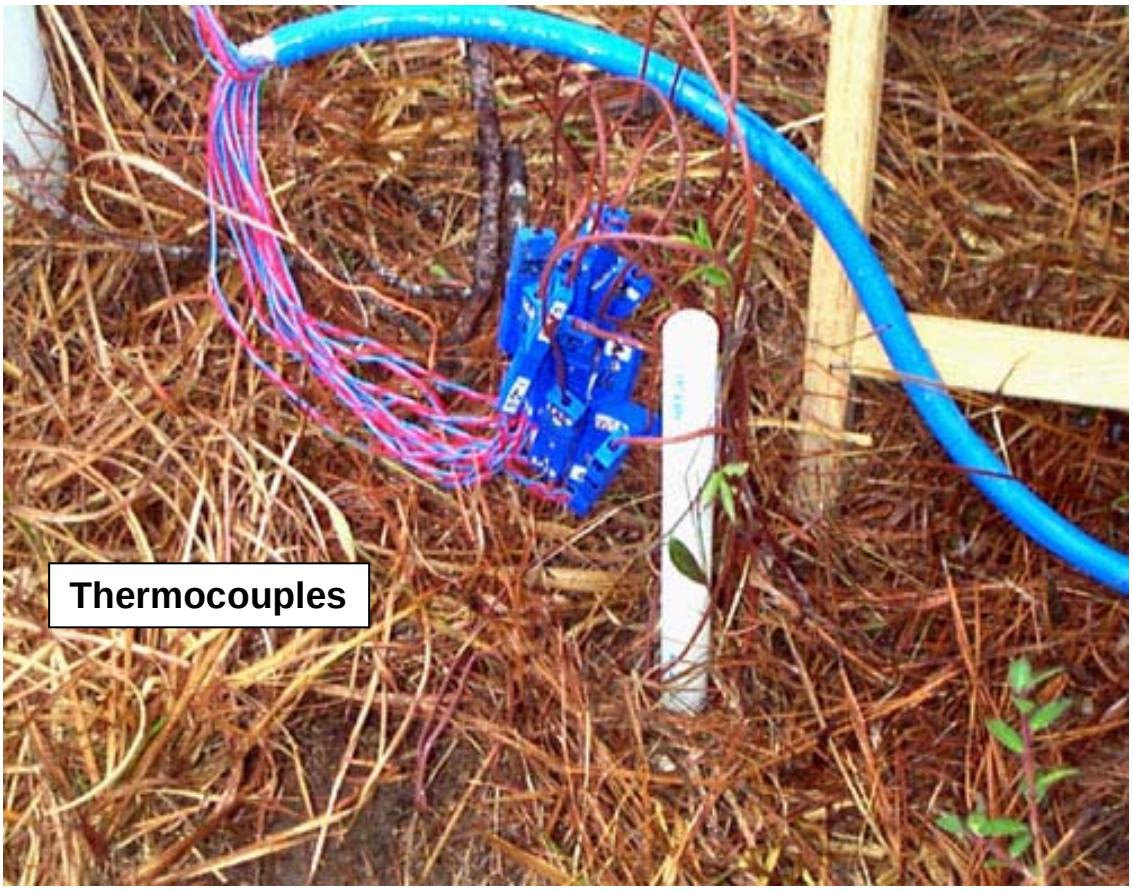
- To define growing season using soil temperature.

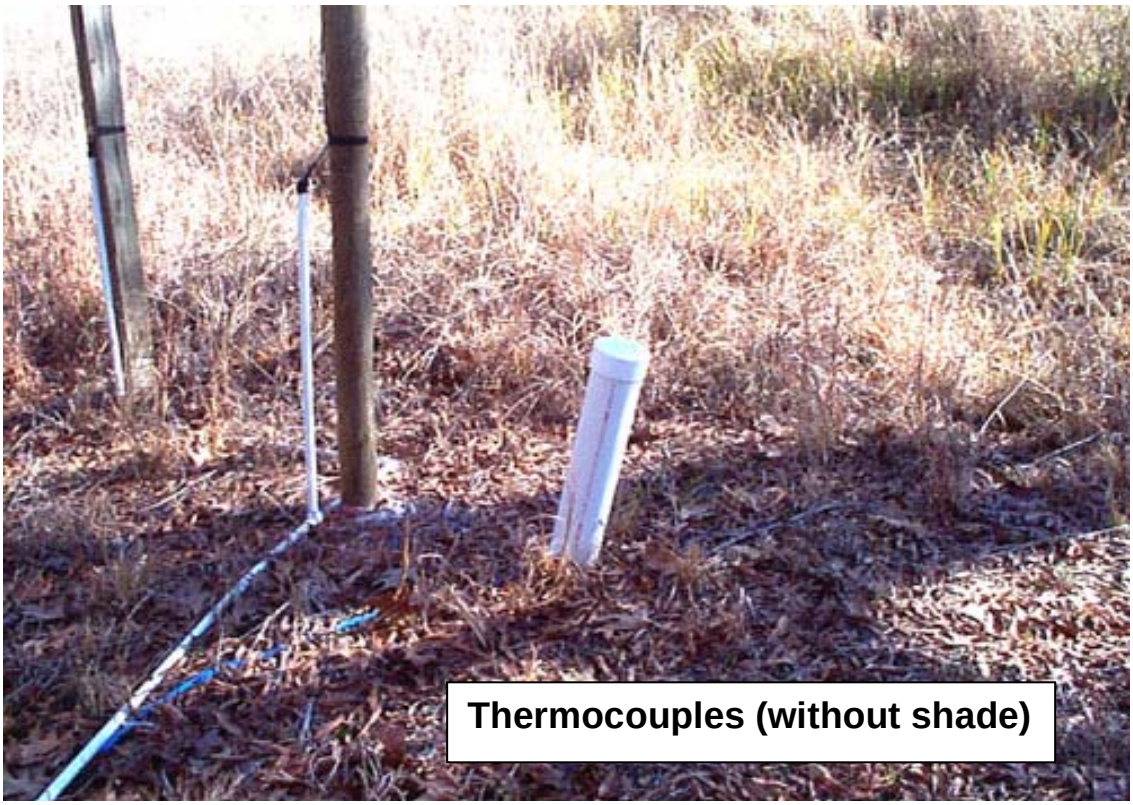
- To correlate vegetation data with soil temperature.

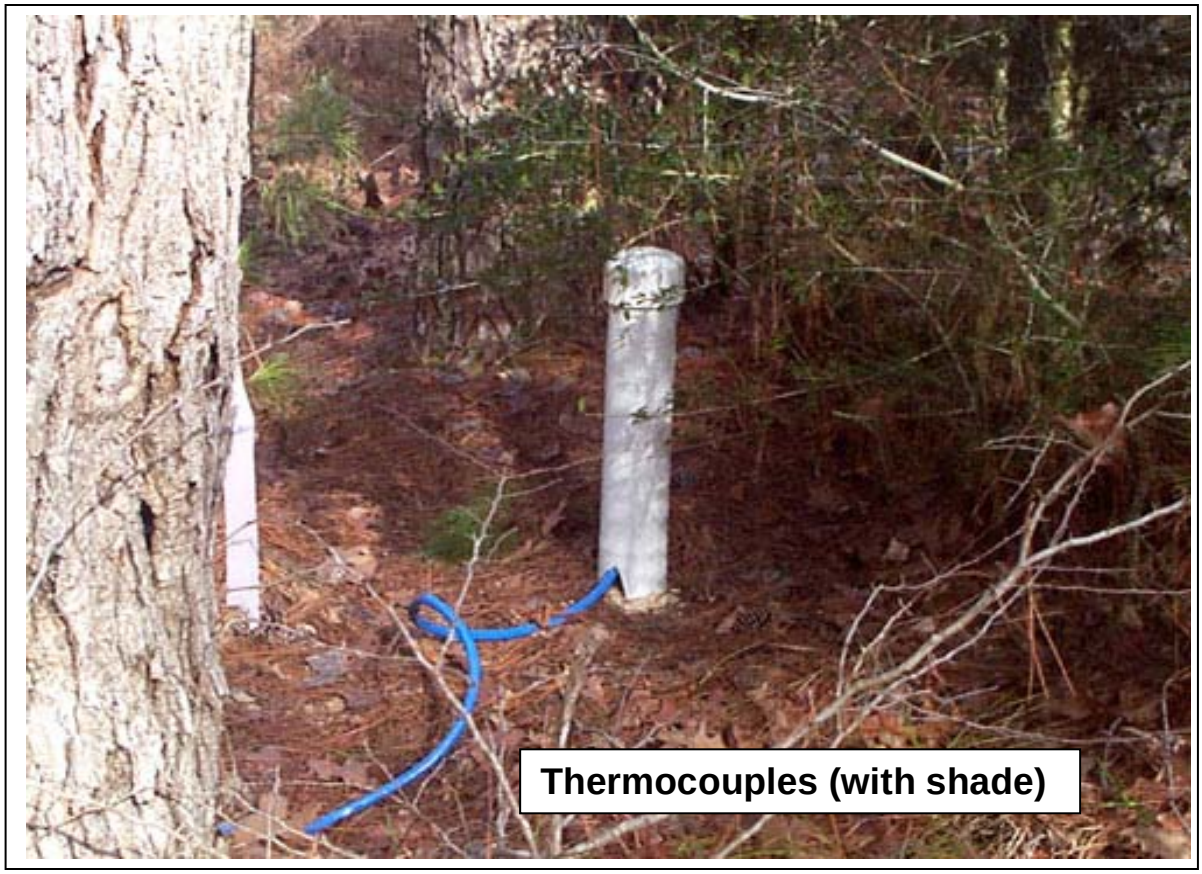
- To determine at what depth one can measure soil temperature to estimate the length of growing season at any location.

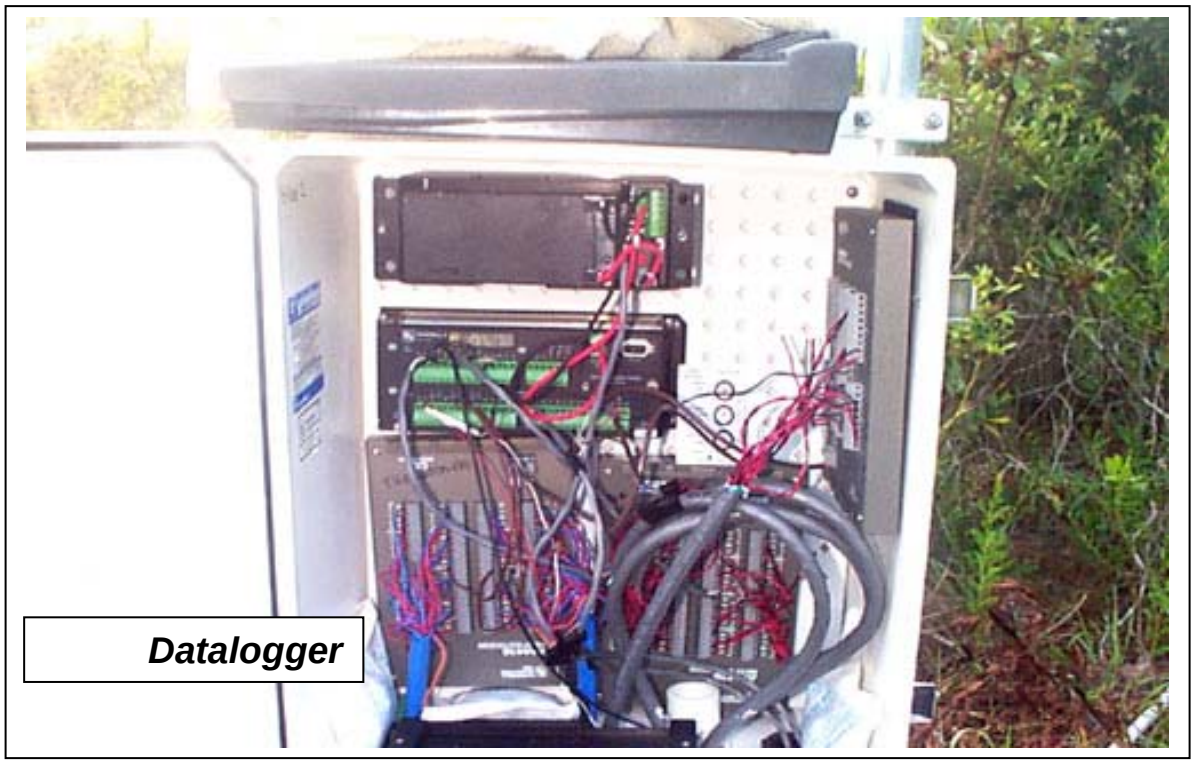
Methods

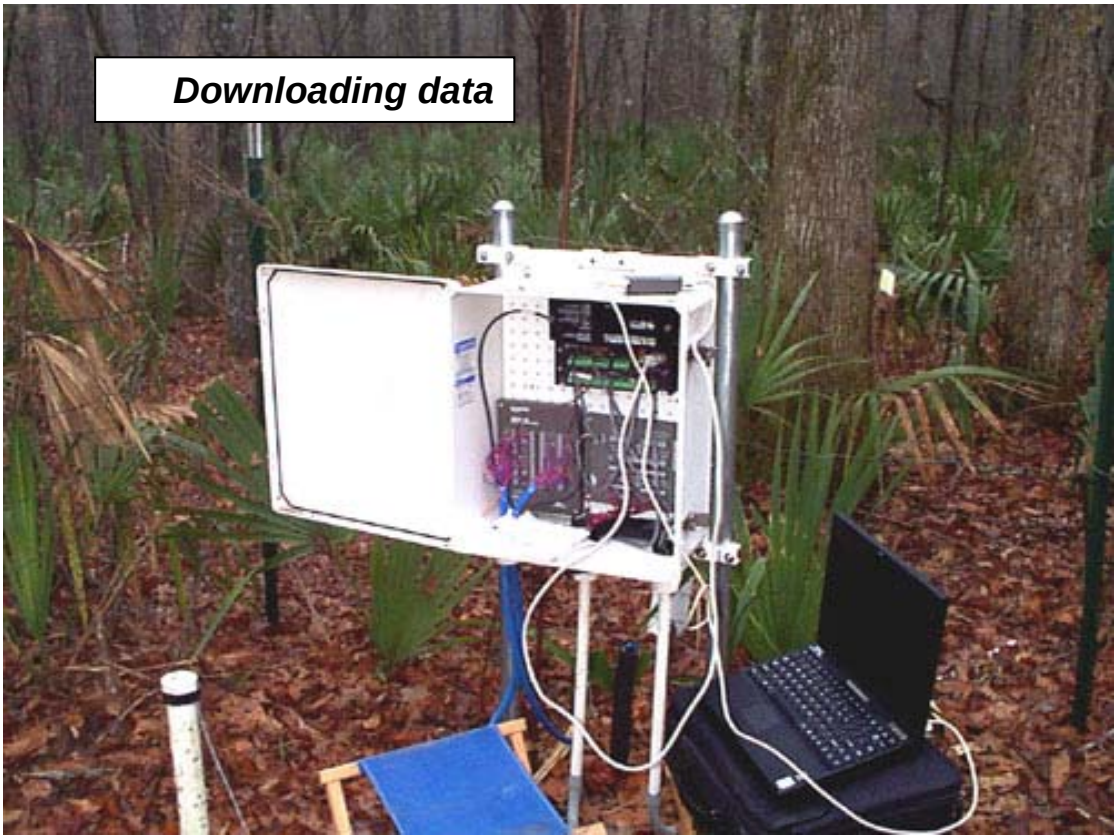
- 7 locations with duplicate thermocouple connected to a data logger (Table 1)
- woody areas and a coastal marsh
- 4 thermic and 3 hyperthermic regimes
- 2 sites per location (with and w/o canopy)
- soil depths (cm): 25, 50, 75, 100, 125, 150, 175 and 200
- air temperature


Thermocouples


Thermocouples (without shade)

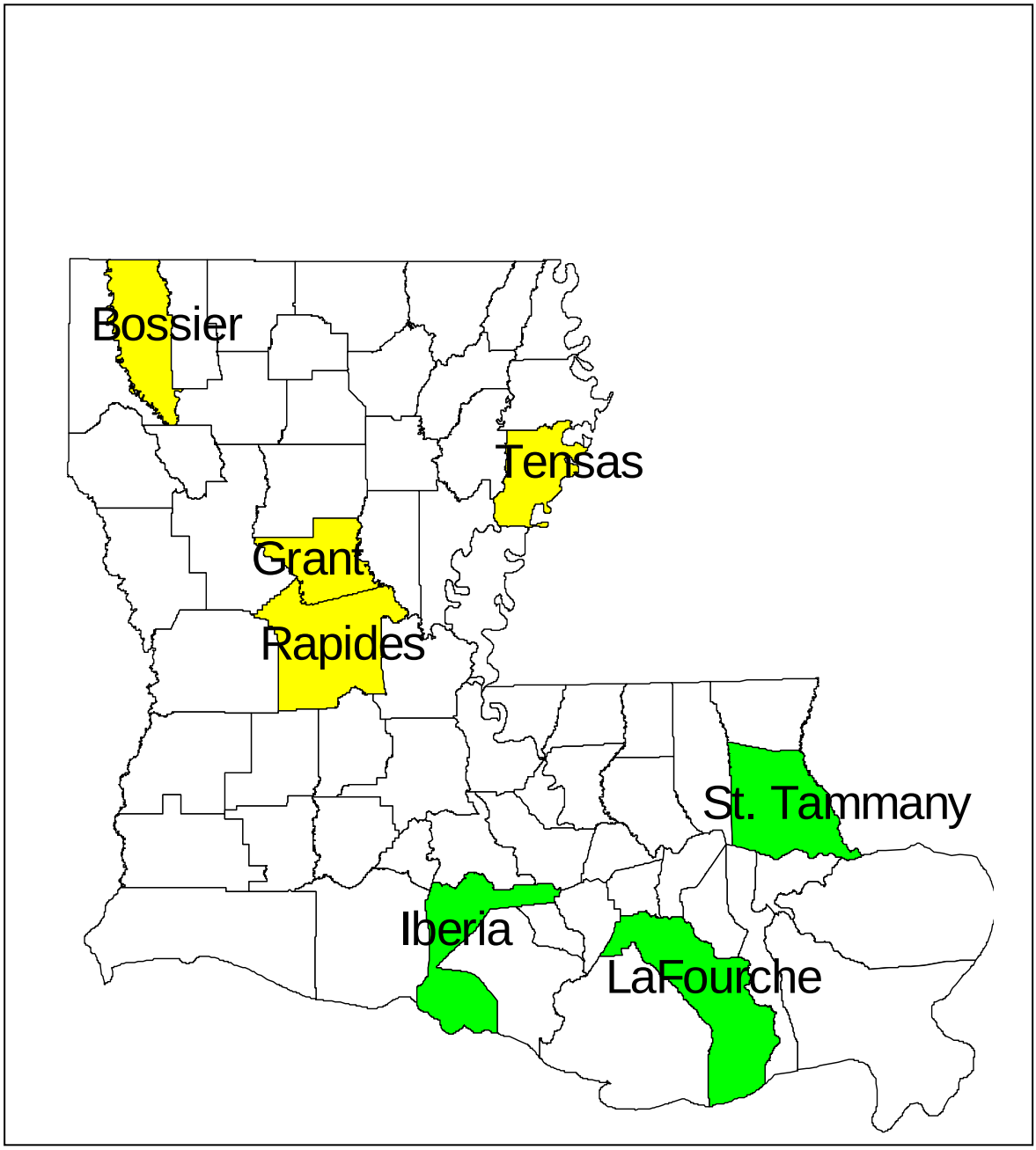

Thermocouples (with shade)


Datalogger



Soil Series and Study Sites

Parish	Location	Soil Series
La Fourche	LUMCOM	Scatlake
Iberia	Jeanerette	Jeanerette
St. Tammany	Camp Villerie, Slidell	Stough
Rapides	Glenmora	Malbis
Grant	Winnfield	Mayhew
Tensas	Newlight	Newlight
Bossier	Plain Dealing	Barso



Study 1

- **hourly and daily air and soil temperature**
- **each site will be geo-referenced using GPS**
- **vegetation**

- coastal marsh
  - date of first and last killing frost
  - date of first identifiable new growth
- wooded areas
  - date of bud initiation
  - date of flower initiation
  - date of first and last leaf fall
  - date of first identifiable new growth

Results

Stough soil series vs Barso soil series

Soil description

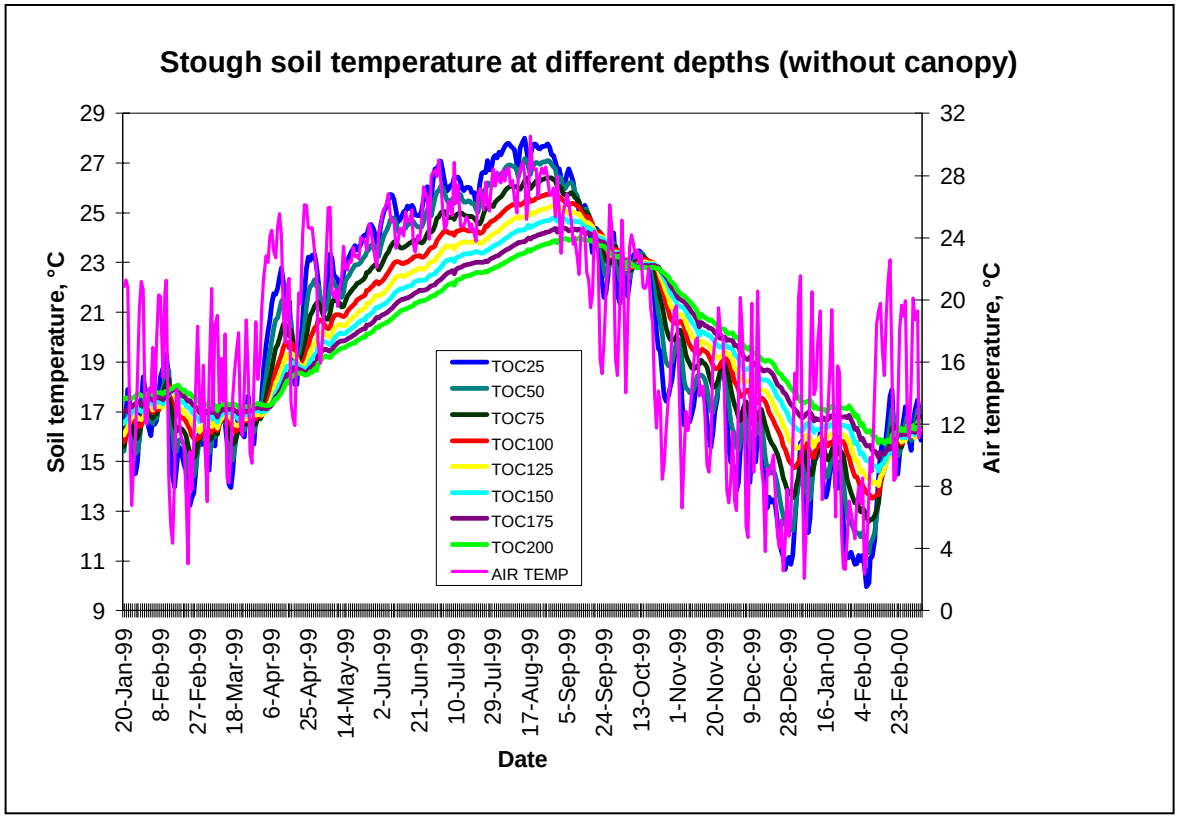
- Stough series (St. Tammany Parish)
- coarse-loamy, siliceous, thermic Fragiaquic Paluedults
- consists of somewhat poorly drained, moderately slowly permeable soils

(Soil Survey of St. Tammany Parish, 1990)

Soil description

- Barso series (Bossier Parish)
- Fine, smectitic, thermic Aeric Dystraquerts
- consists of very deep, very poorly drained, very slowly permeable soils

(USDA-SCS)


Stough soil temperature at different depths (without canopy)
Soil temperature, °C
Air temperature, °C
Date
TOC25
TOC50
TOC75
TOC100
TOC125
TOC150
TOC175
TOC200
AIR TEMP
29
27
25
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21
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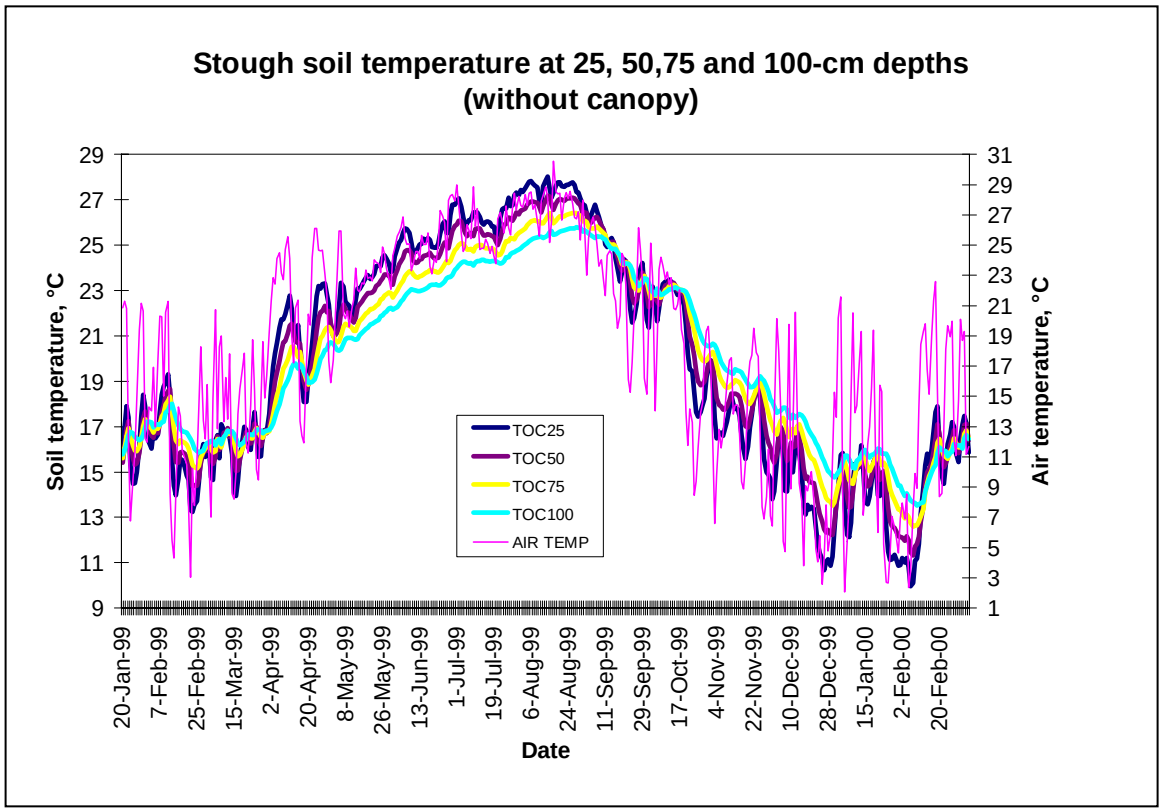
20-Jan-99
8-Feb-99
27-Feb-99
18-Mar-99
6-Apr-99
25-Apr-99
14-May-99
2-Jun-99
21-Jun-99
10-Jul-99
29-Jul-99
17-Aug-99
5-Sep-99
24-Sep-99
13-Oct-99
1-Nov-99
20-Nov-99
9-Dec-99
28-Dec-99
16-Jan-00
4-Feb-00
23-Feb-00


Stough soil temperature at 25, 50,75 and 100-cm depths (without canopy)
Soil temperature, °C
Air temperature, °C
Date
TOC25
TOC50
TOC75
TOC100
AIR TEMP
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20-Jan-99
7-Feb-99
25-Feb-99
15-Mar-99
2-Apr-99
20-Apr-99
8-May-99
26-May-99
13-Jun-99
1-Jul-99
19-Jul-99
6-Aug-99
24-Aug-99
11-Sep-99
29-Sep-99
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15-Jan-00
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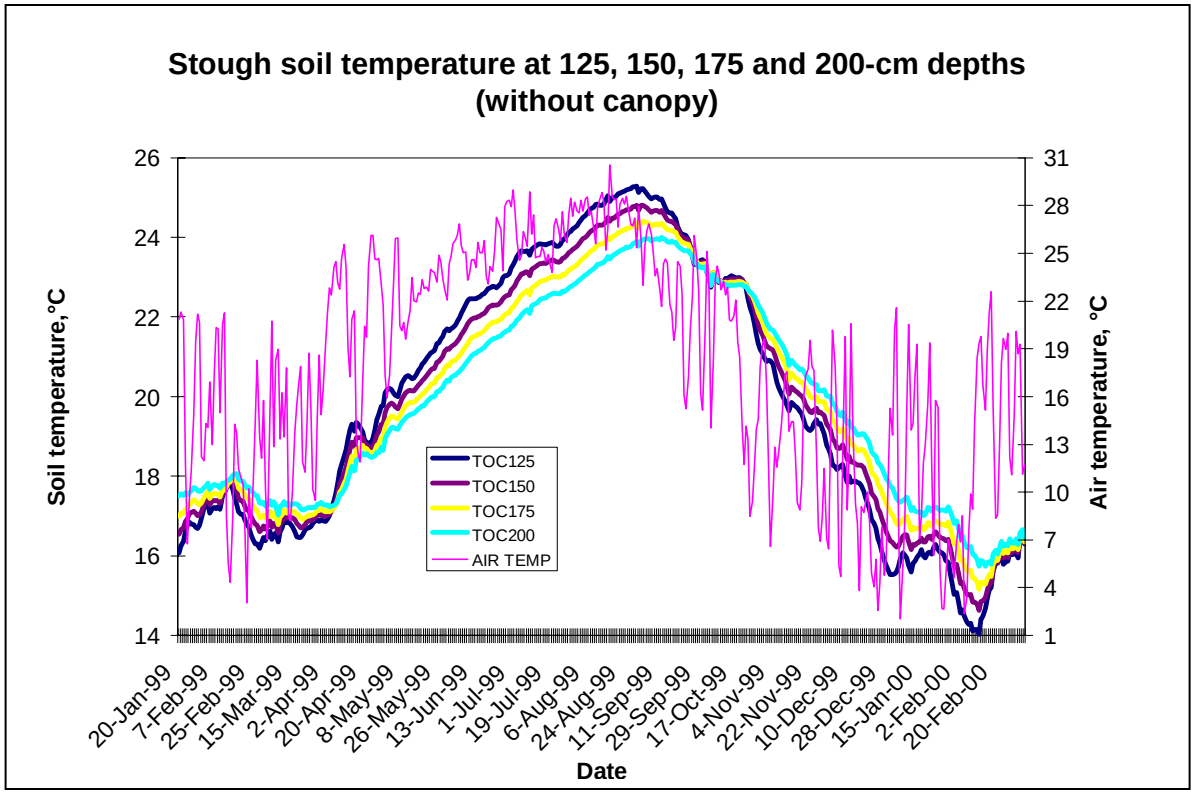
20-Feb-00


Stough soil temperature at 125, 150, 175 and 200-cm depths (without canopy)
Soil temperature,°C
Air temperature, °C
Date
TOC125
TOC150
TOC175
TOC200
AIR TEMP
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7-Feb-99
25-Feb-99
15-Mar-99
2-Apr-99
20-Apr-99
8-May-99
26-May-99
13-Jun-99
1-Jul-99
19-Jul-99
6-Aug-99
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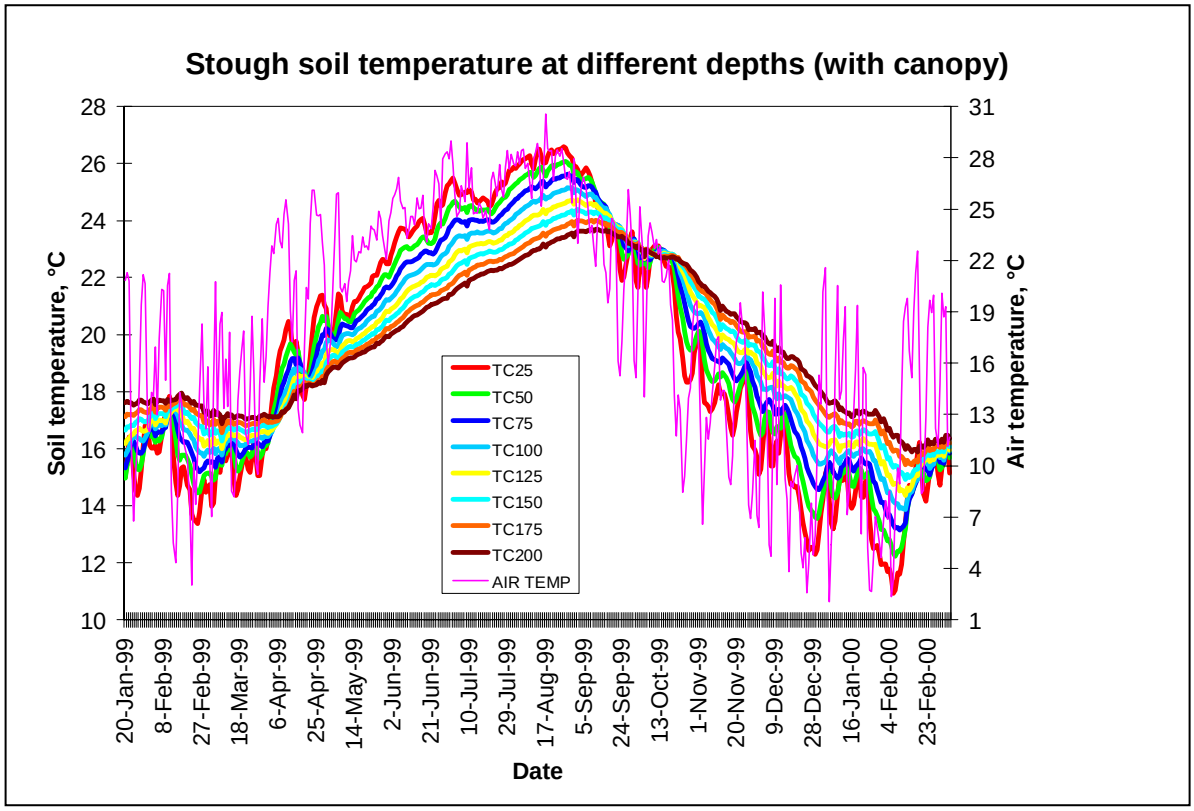
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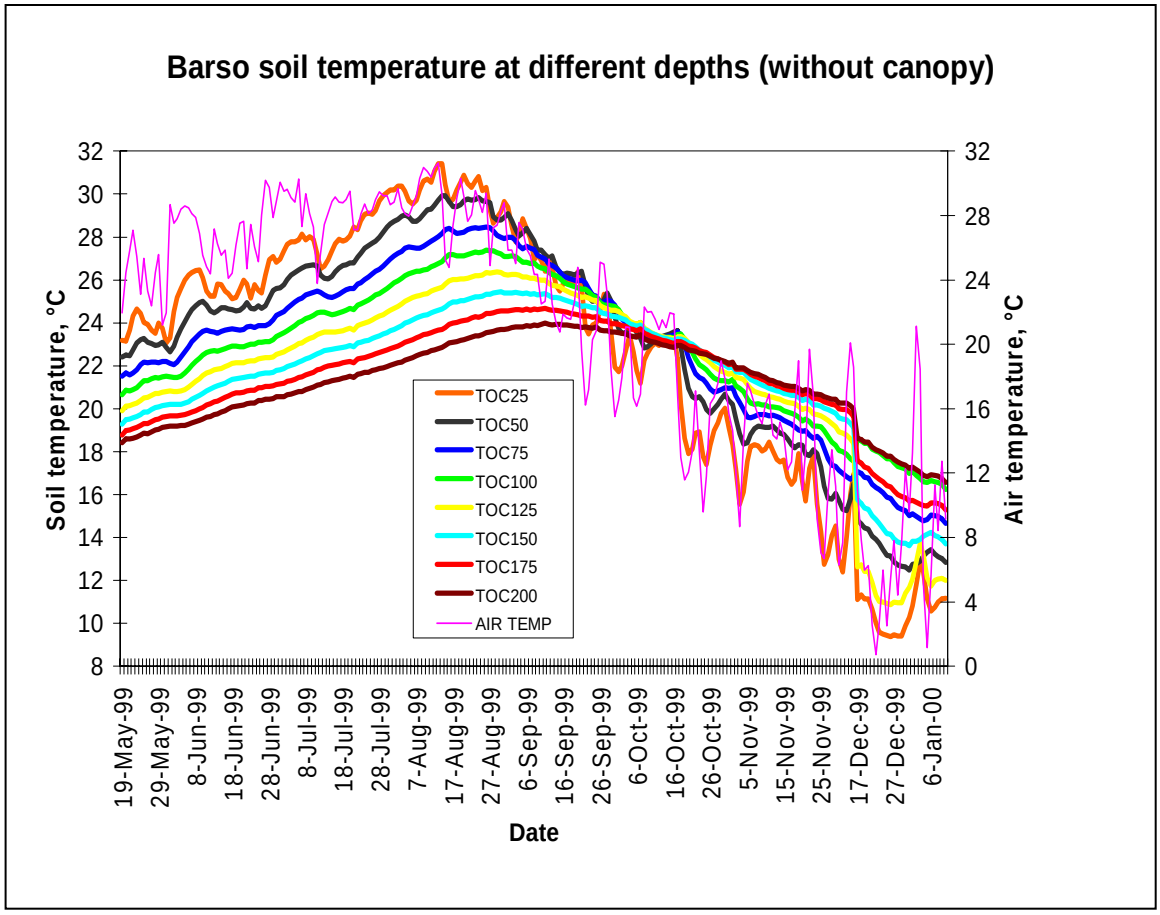
Barso soil temperature at different depths (without canopy)
Soil temperature, °C
Air temperature, °C
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TOC75
TOC100
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TOC150
TOC175
TOC200
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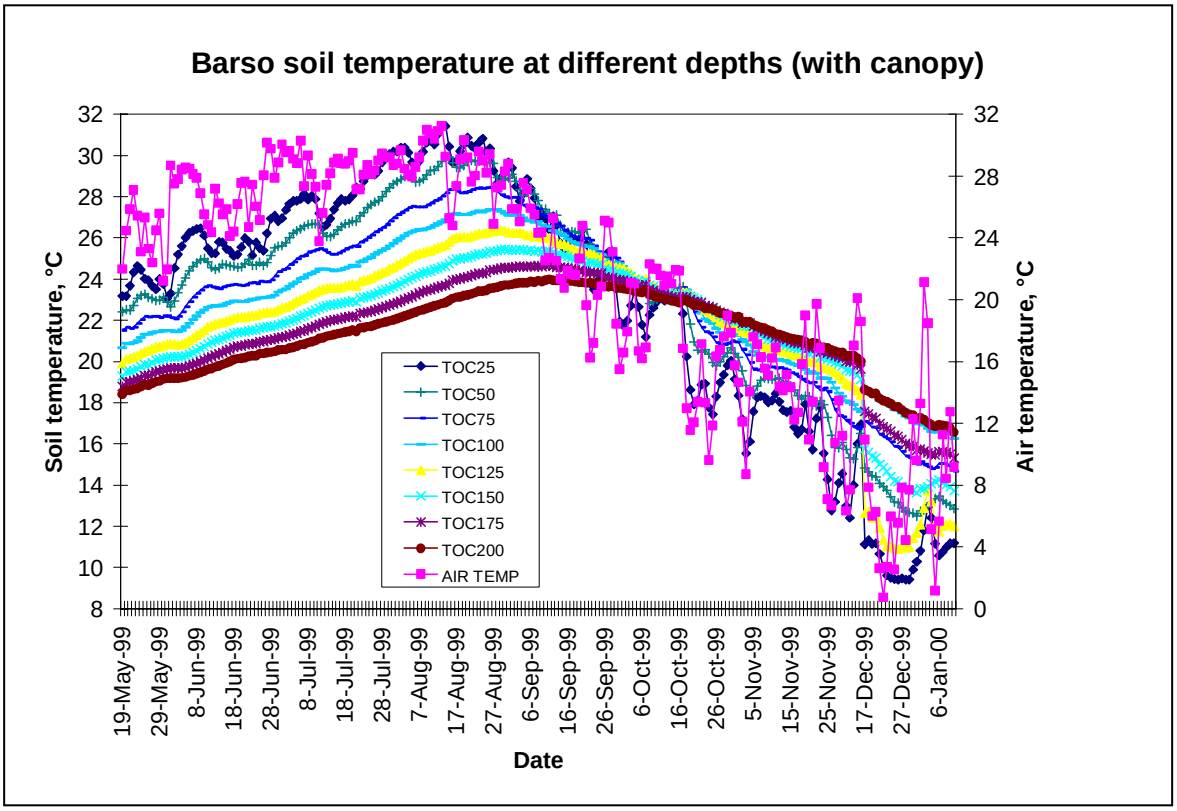
6-Jan-00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6-Sep-99
16-Sep-99
26-Sep-99
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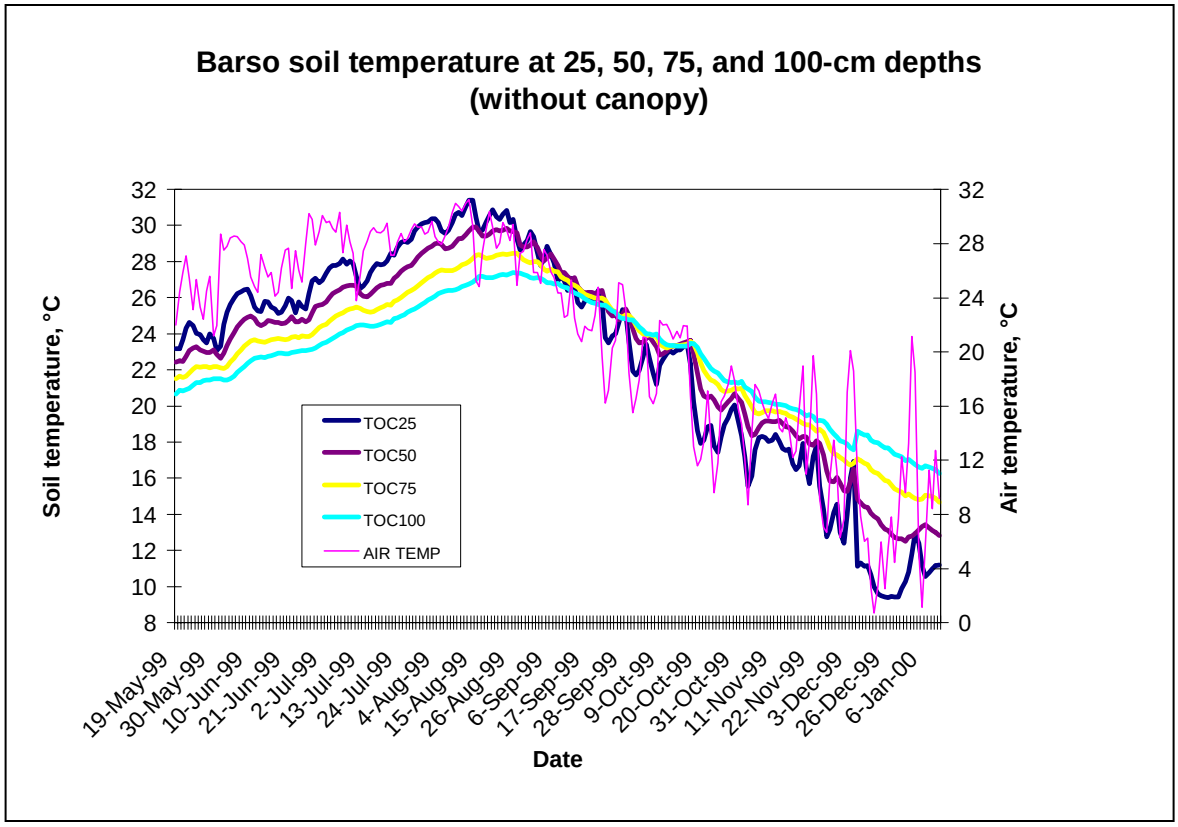
6-Jan-00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2-Jul-99
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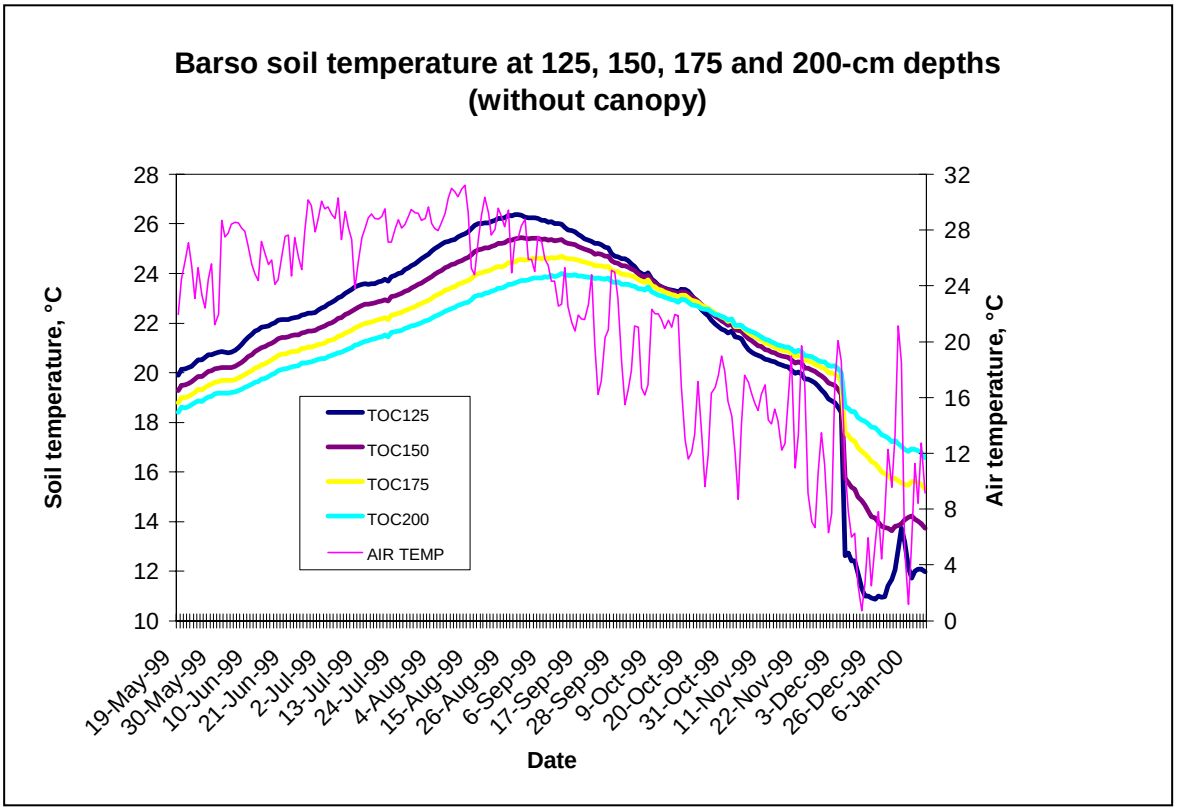
26-Dec-99
6-Jan-00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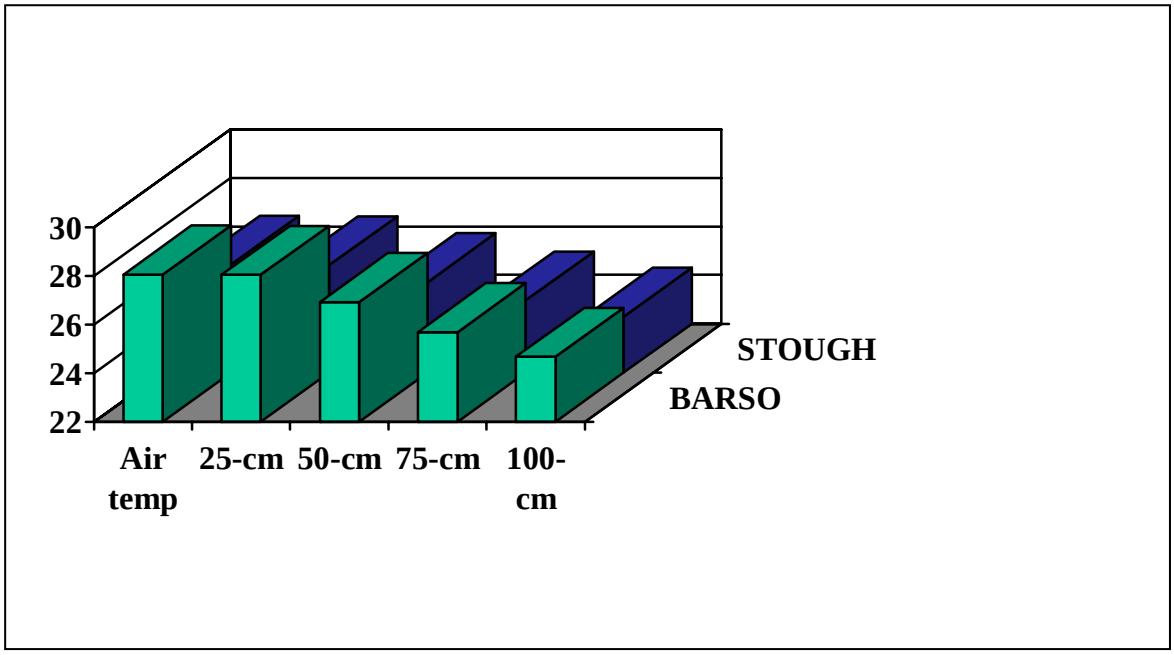
6-Sep-99
17-Sep-99
28-Sep-99
9-Oct-99
20-Oct-99
31-Oct-99
11-Nov-99
22-Nov-99
3-Dec-99
26-Dec-99
6-Jan-00

Mean Temperature

Depth	Strough soil series		
	Mean summer	Mean winter	Mean annual
Air Temp	26.44	11.38	19.23
25 cm	26.42	13.87	18.91
50 cm	25.73	14.48	20.15
75 cm	24.97	15.12	20.11
100 cm	24.30	15.72	20.04
125 cm	23.75	16.13	20.01
150 cm	23.24	16.62	19.94
175 cm	22.79	17.05	19.94
200 cm	22.34	17.49	19.92
* mean summer and mean winter difference > 6^0 C			

Mean summer soil temperature



Summary of results

- Soil temperature at all depths >5°C
- Soil temperature trend in Spring:
- 200>175>150>…….>25

- soil temperature trend in Fall :
- 25>50>75>……..>200

- Stough soil series - thermic instead of hyperthermic

Temperature crossovers

- Stough soil series
  - Spring dates: February, March and April
  - Fall dates: September and October

- Barso soil series
  - Spring dates: not yet available
  - Fall dates: September and October

Growing Season

- Data analysis
  - depth and date?
  - SAS (response surface)
  - Fractals

Study 2

- **crossover depth**
- **root respiration**

Acknowledgments

- ***Dr. Wayne H. Hudnall***
- ***Mr. Jerry Daigle***
- ***Ms. Lois West***
- ***Mr. Asfaw Bekele***
- ***Mr. Dean Goodin***
- ***Mr. Jang-Hung Huang***
- **Etc.**

National Soil Interpretations Advisory Group of the National Cooperative Soil Survey

Southern Regional Cooperative Soil Survey Conference
Biloxi, MS
June 7-10, 2004

By: Karl W. Hipple, Sponsor's Representative to NSIAG

NSIAG Purpose

- Provide coordination and guidance to National Cooperative Soil Survey (NCSS) leadership on existing and emerging issues regarding assessment, documentation, and maintenance of soil resource interpretations

NSIAG Members

- Darrell Kautz, NRCS, AK - Chair
- Pete Biggam, NPS, CO - Co-Chair
- Paul Flood, USFS, Salt Lake City, UT
- David Hammer, U of Missouri, Columbia MO
- Luis Hernandez, NRCS, NE
- Karl Hipple, NRCS, NSSC
- Edgar Mersiovsky, NRCS, AR
- Ron Morton, NRCS, SC
- Jerry Rives, NRCS, TX
- Sue Southard, NRCS, CA
- Martha Stuart, NRCS, VT
- Steve Wangemann, BIA, Toppenish, WA
- Samantha Langley Turnbaugh, Univ. of S. Maine, Gorham, ME
- Bill Ypsilantis, USDI, BLM, Denver CO

National Soil Interpretations Advisory Group

Member photo

How NSIAG operates

- Formal, face-to-face meetings
- Teleconferences
- Developing yearly business plans
- NSCC cooperator input for issues
- Establishing priorities for each issue
- Coordination and cooperation with and among other National advisory groups (SBAAG, NTSAG)

Current NSIAG Charges

- Define/ redefine National Soil Interpretations
- Recommend policies/procedures to evaluate soil interpretation criteria

documentation

- Evaluate existing soil interpretations and their criteria
- Develop guidance for validation and maintenance of soil interpretations
- Coordinate with other NCSS committees (SBAAG/NTSAG) on soil interpretation issues
- Develop and maintain list of NSIAG priority projects
- Develop recommendations for varying levels of documentation based on user requirements
- Investigate nontraditional options for displaying soil survey interpretations
- Investigate and develop recommendations for storing and interpreting use-dependent soil properties
- Develop subcommittees as needed to expand NSIAG expertise and assist in gathering specific information

NSIAG Customer Input

- Contact any member with issue
  - Email
  - Voicemail
  - Regular mail
  - Telephone

NSIAG web site

- Site Location

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

- Site Information
  - Annual plan
  - Member contact information
  - List of projects and priorities
  - Meeting schedule

MO 14, 15, 16, and 18

State Soil Scientist Meeting

Presidents Casino Broadwater Resort Tower

Biloxi, MS

June 10, 2004

Agenda
MO 14, 15, 16, and 18
State Soil Scientist Meeting

Presidents Casino Broadwater Resort Tower
Biloxi, MS
June 10, 2004

Thursday, June 10, 2004

8:00 – 8:15 AM	Introductions and Welcome	
8:15-9:00 AM	Soil Data Mart	Karl Hipple
9:00 – 9:30 AM	SSURGO and Soil Survey Publication Workload	Ken Lubich (D. Potter Substitute)
9:30 – 9:45 AM	Break	
9:45 – 10:15 AM	Performance Measures	Maxine Levin
10:15 – 11:40 AM	Discussion Topics 1. MLRA concept a. Soil Survey Evaluations by MLRAs b. Field Work by MLRAs – have we taken the MLRA concept far enough? 2. Updating benchmark soils by MLRAs 3. Other topics identified by the group	
11:40 – 1:00 PM	Lunch	

Recorders: MO-15 Soil Data Quality Specialist
and
Lawrence McGhee, Soil Survey Project Leader

Soil Data Warehouse Current Developments and Future Plans

State Soil Scientists Meeting
June 10, 2004
Biloxi, MS

By: Karl W. Hipple, National Leader-Soil Survey Interpretations, NSSC

SDW/SDM Purpose

- Provide a single point of delivery of official soil survey data & information
  - FOTG/eFOTG
  - SSURGO
  - Customer Service Toolkit/SDV
  - Technical Service Providers
  - General public
  - Models
- Provides National coverage

SDW/SDM Content

- Tabular data, including interpretations
- Digitized spatial data
  - soil polygons where available
  - soil survey area boundaries
- Metadata file
- Partial SSA or whole SSA
- Certified by State Tech Guide Comm.

Soil Data Warehouse

- Houses current and archived versions of official soil survey data and Information

Soil Data Mart

- Provides access to only the “current” version of official data
- Web accessible
- Link to eFOTG

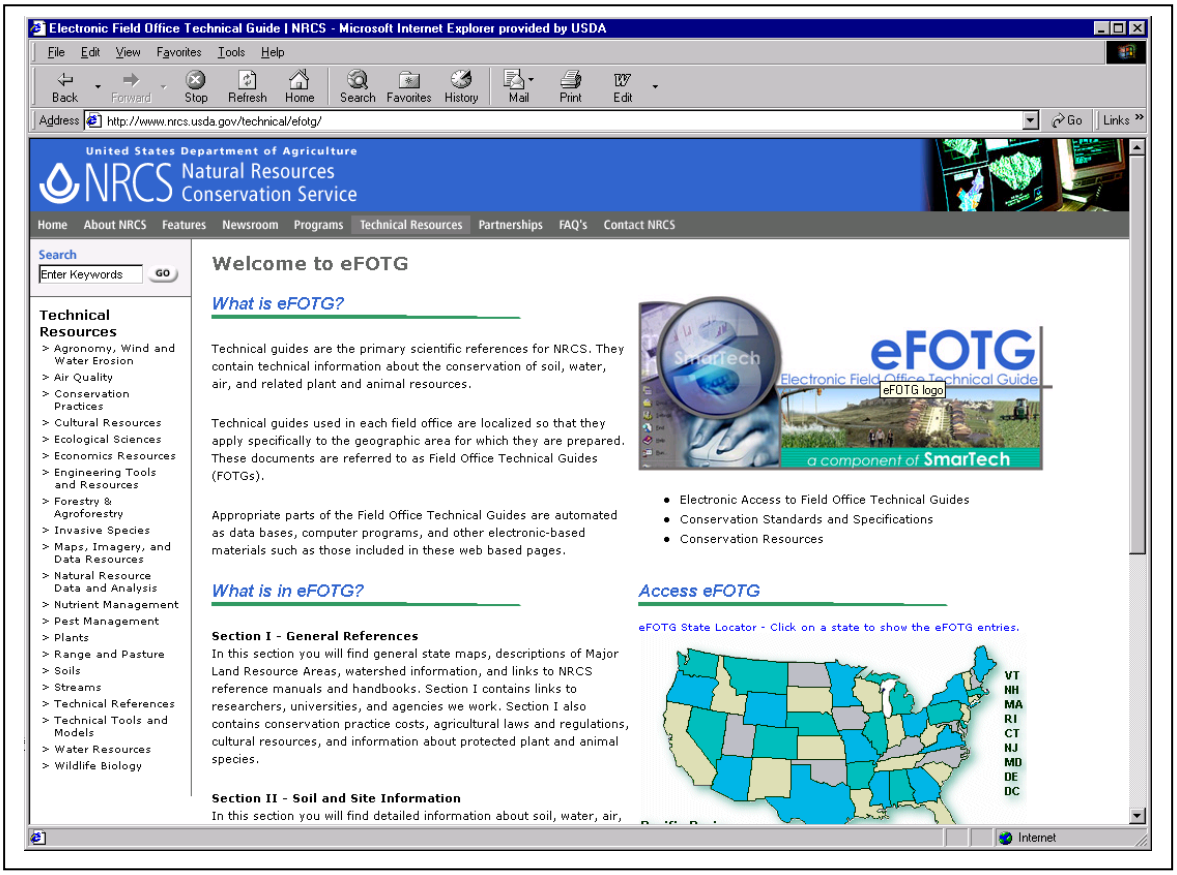
- Previous versions of official data in the SDW can be accessed by request to the respective State Soil Scientist

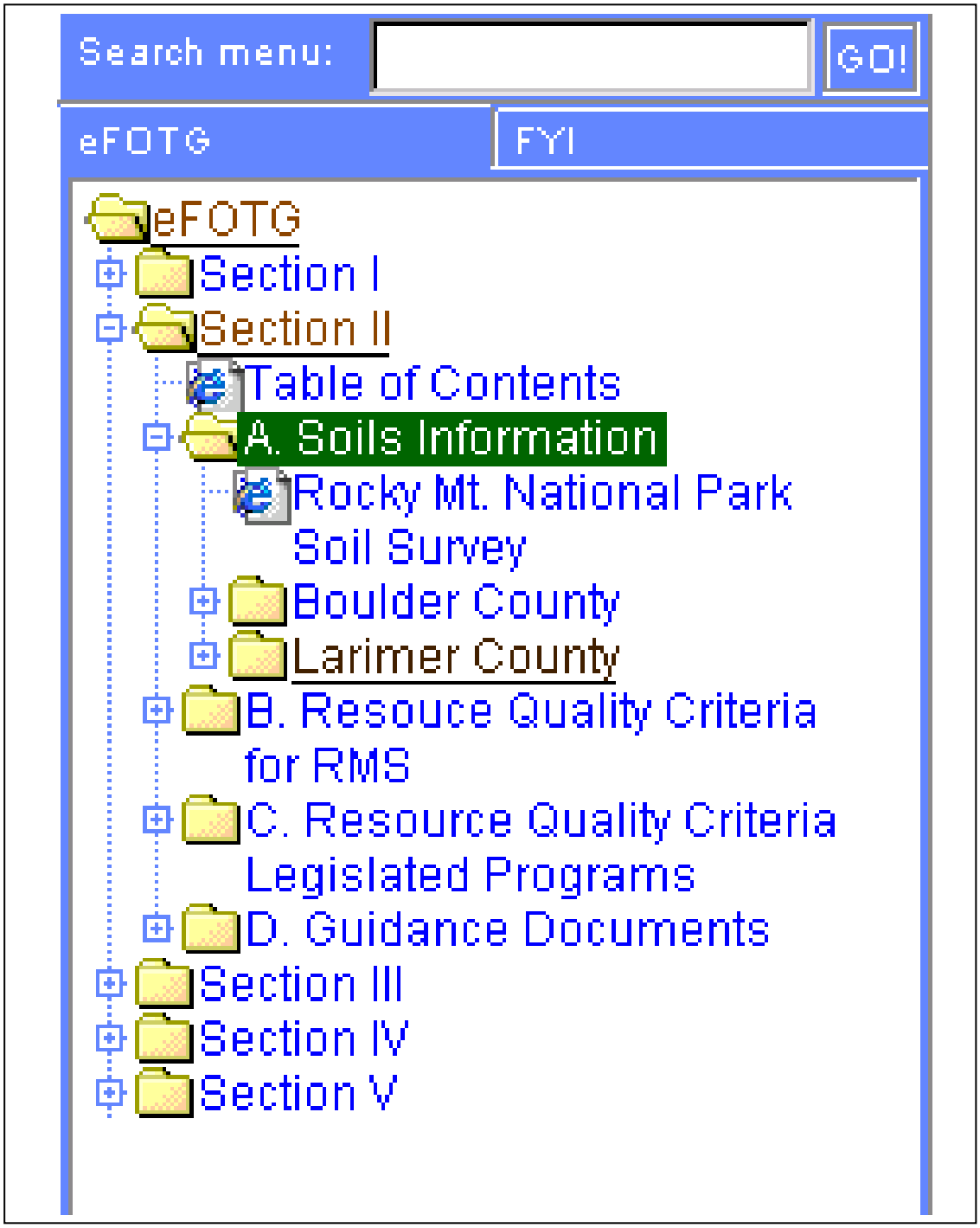
Soil Data Mart

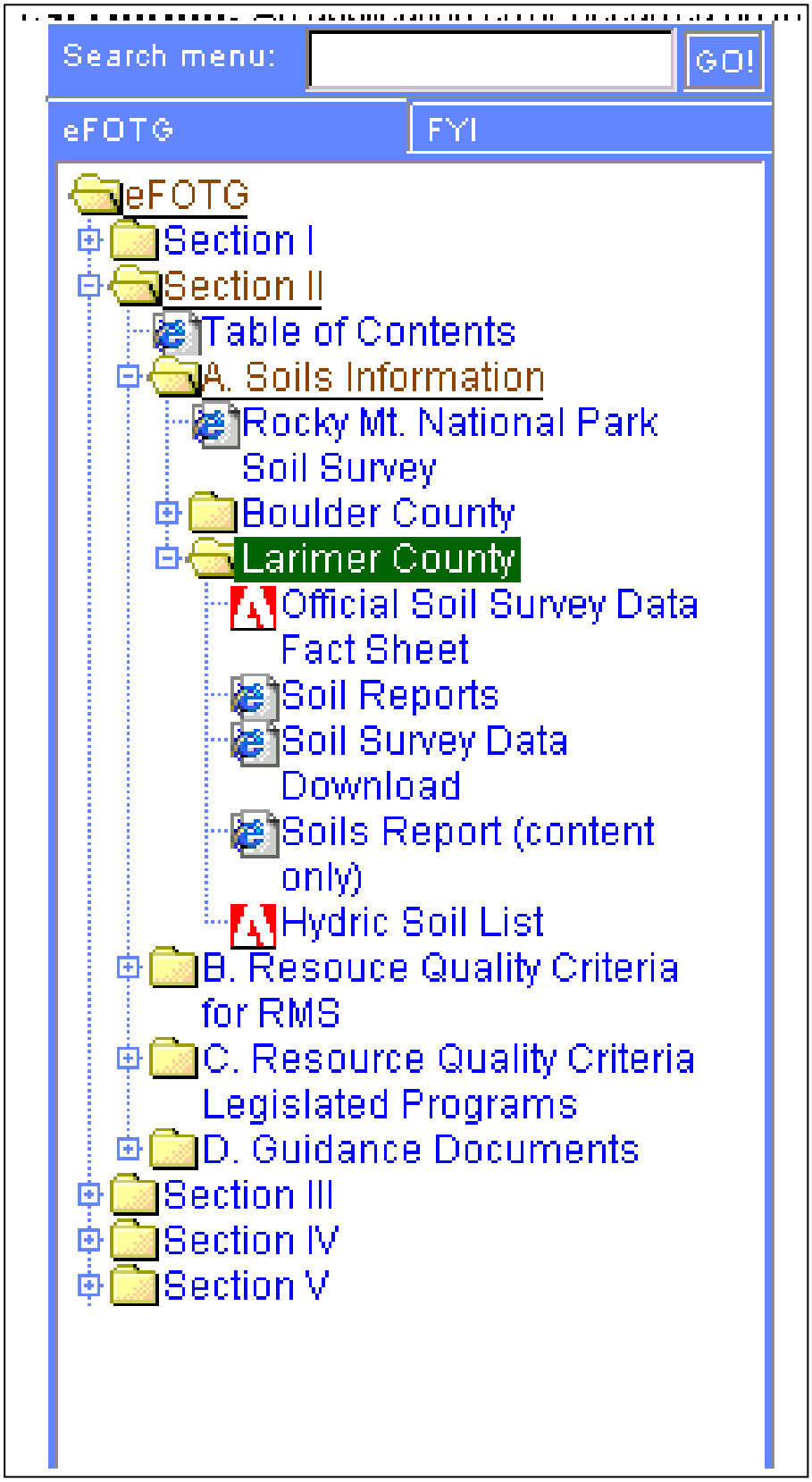
- Access selected map units, or whole SSA
- Generate standard reports
- Download data - ftp
- Download Access template
  - national or state-specific
- View Metadata

Access SDM via eFOTG

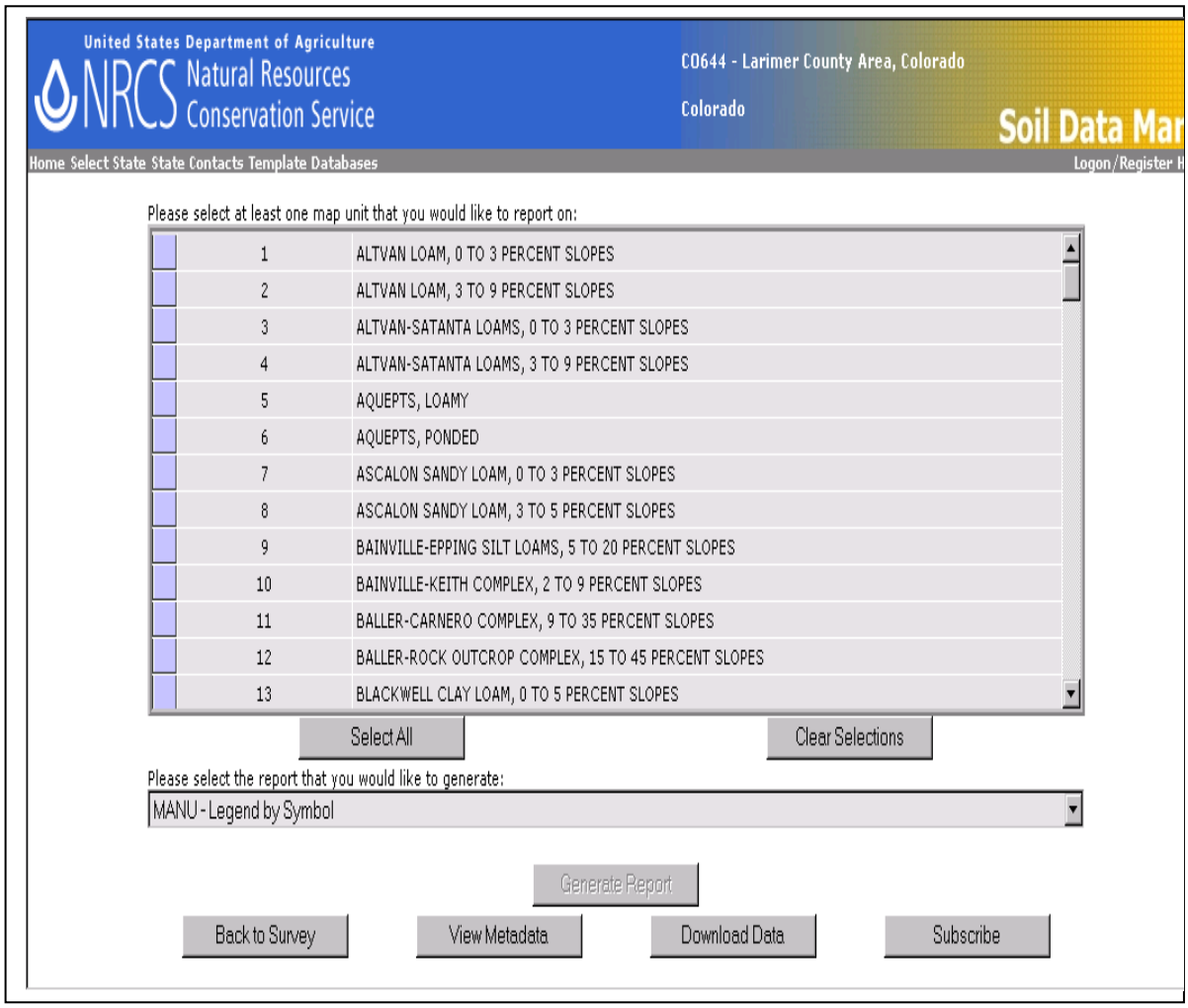
http://www.nrcs.usda.gov/technical/efotg/




Search menu:
GO!
eFOTG
FYI
eFOTG
Section I
Section II
Table of Contents
A. Soils Information
Rocky Mt. National Park Soil Survey
Boulder County
Larimer County
B. Resouce Quality Criteria for RMS
C. Resource Quality Criteria Legislated Programs
D. Guidance Documents
Section III
Section IV
Section V


Search menu:
GO!
eFOTG
FYI
eFOTG
Section I
Section II
Table of Contents
A. Soils Information
Rocky Mt. National Park Soil Survey
Boulder County
Larimer County
Official Soil Survey Data Fact Sheet
Soil Reports
Soil Survey Data Download
Soils Report (content only)
Hydric Soil List
B. Resouce Quality Criteria for RMS
C. Resource Quality Criteria Legislated Programs
D. Guidance Documents
Section III
Section IV
Section V

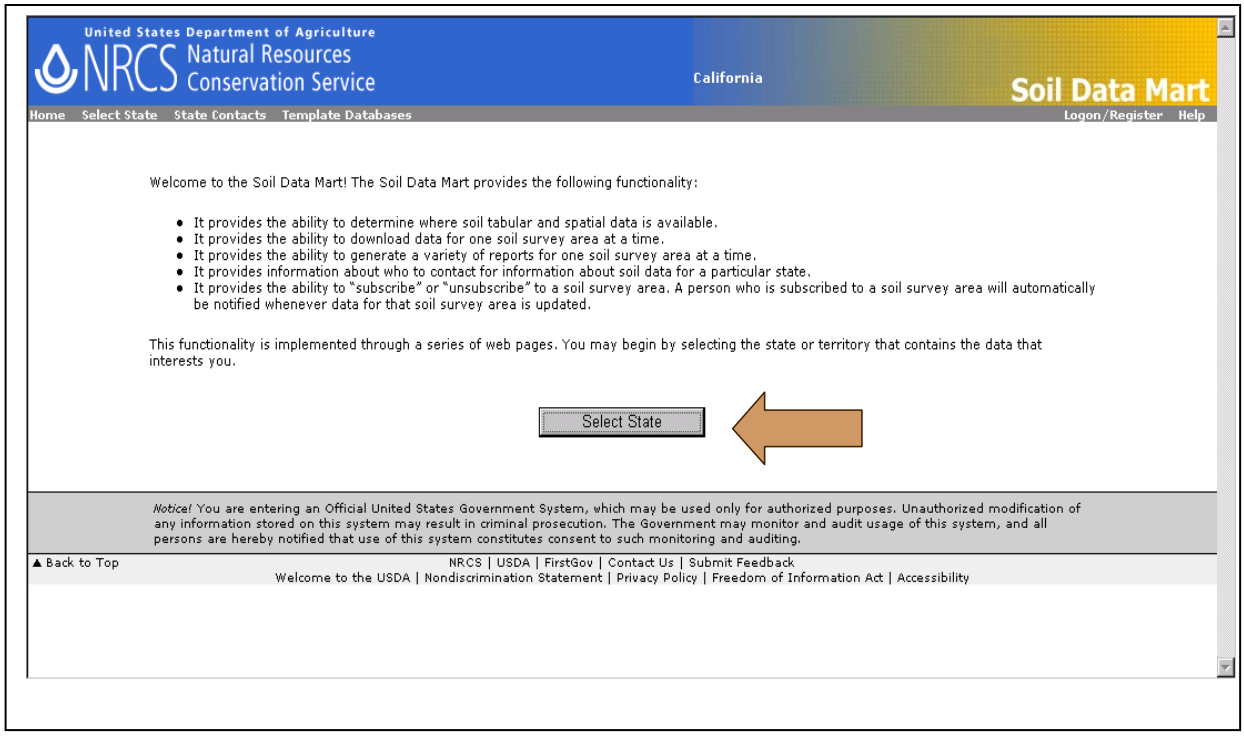
SDM Page



Or Access SDM Direct

http://soildatamart.nrcs.usda.gov

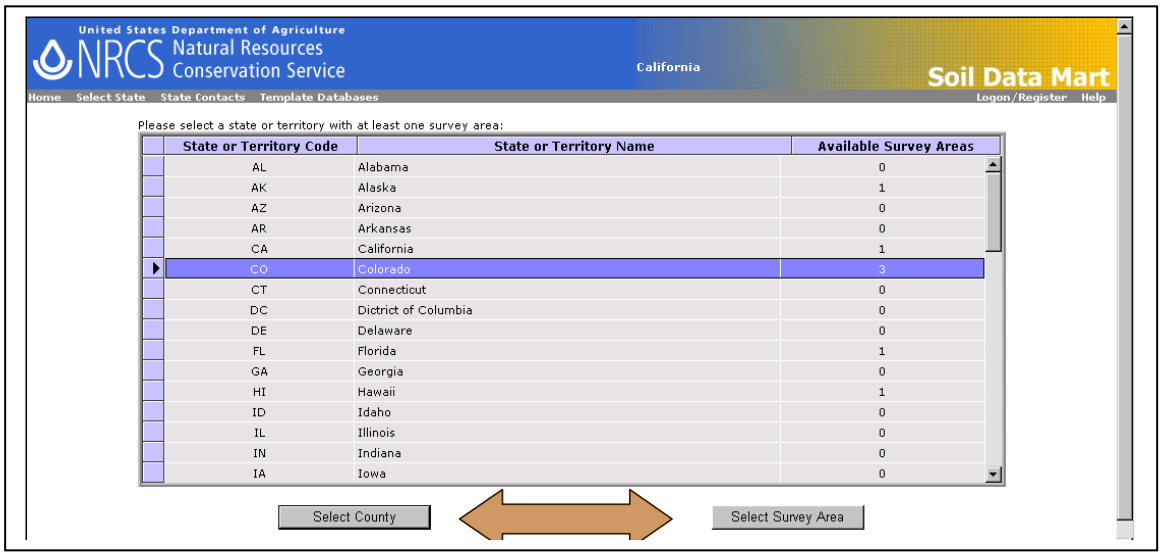
Select a State



Select desired SSA

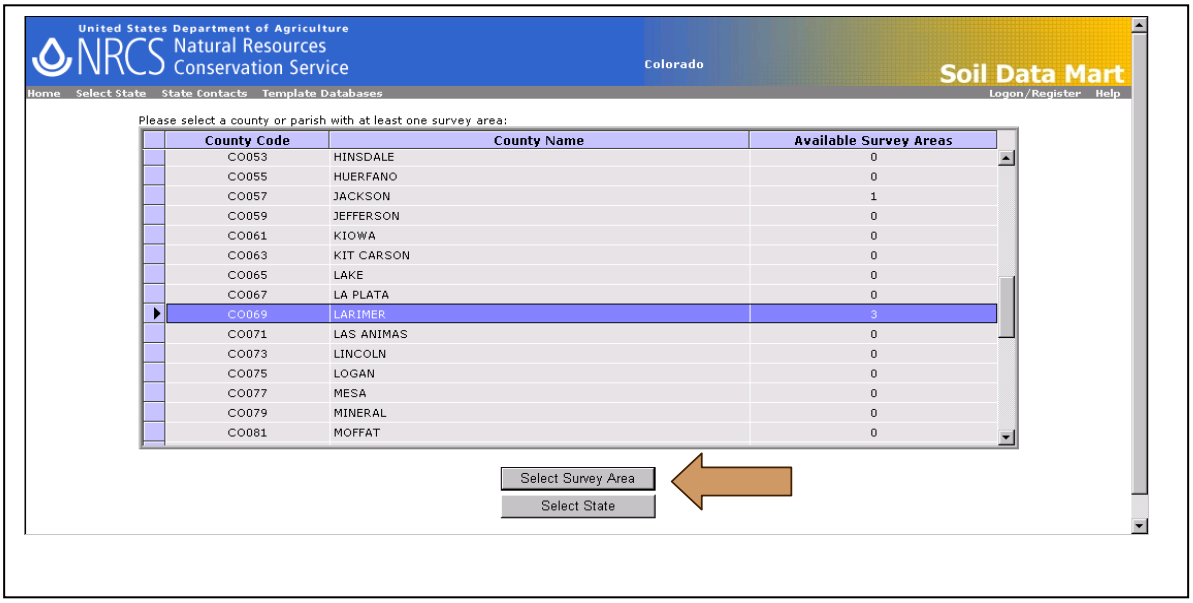
- SDM provides access to data on a single Soil Survey area basis
- You can first select a county of interest, then select the appropriate SSA
- Or, you can go direct to a list of SSA for the whole state and select one from there.

Select a County or SSA

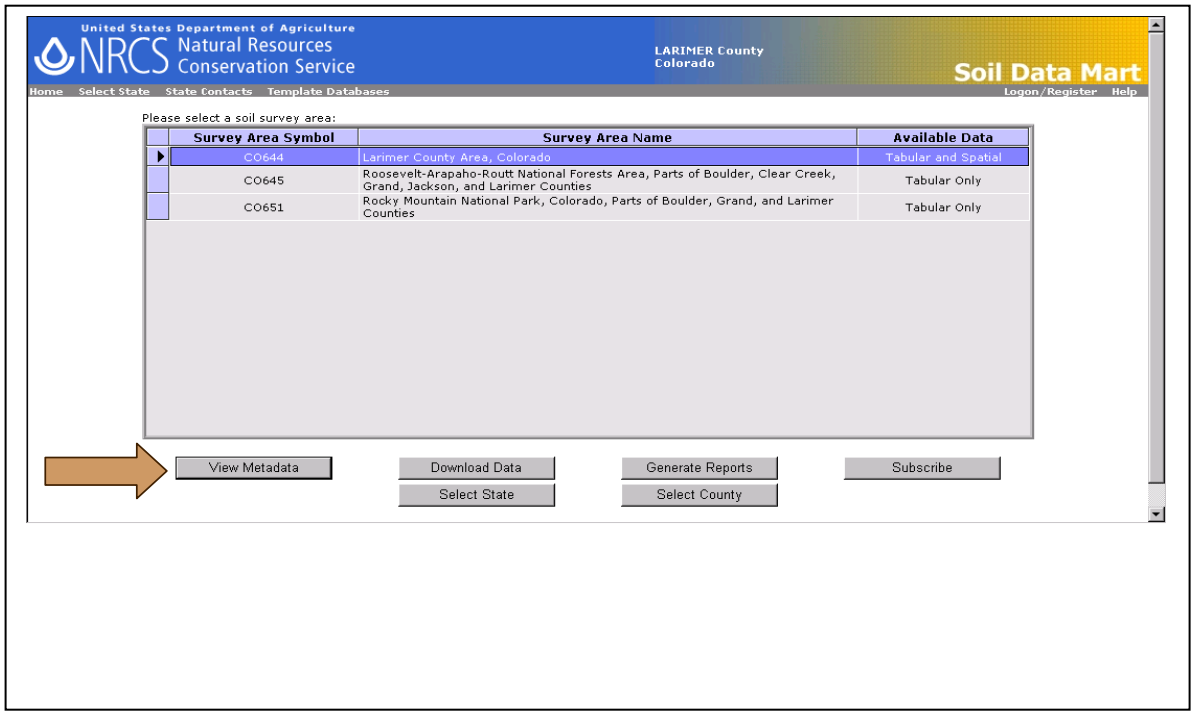


State or Territory Code	State or Territory Name	Available Survey Areas
AL	Alabama	0
AK	Alaska	1
AZ	Arizona	0
AR	Arkansas	0
CA	California	1
CO	Colorado	3
CT	Connecticut	0
DC	Dictrict of Columbia	0
DE	Delaware	0
FL	Florida	1
GA	Georgia	0
HI	Hawaii	1
ID	Idaho	0
IL	Illinois	0
IN	Indiana	0
IA	Iowa	0

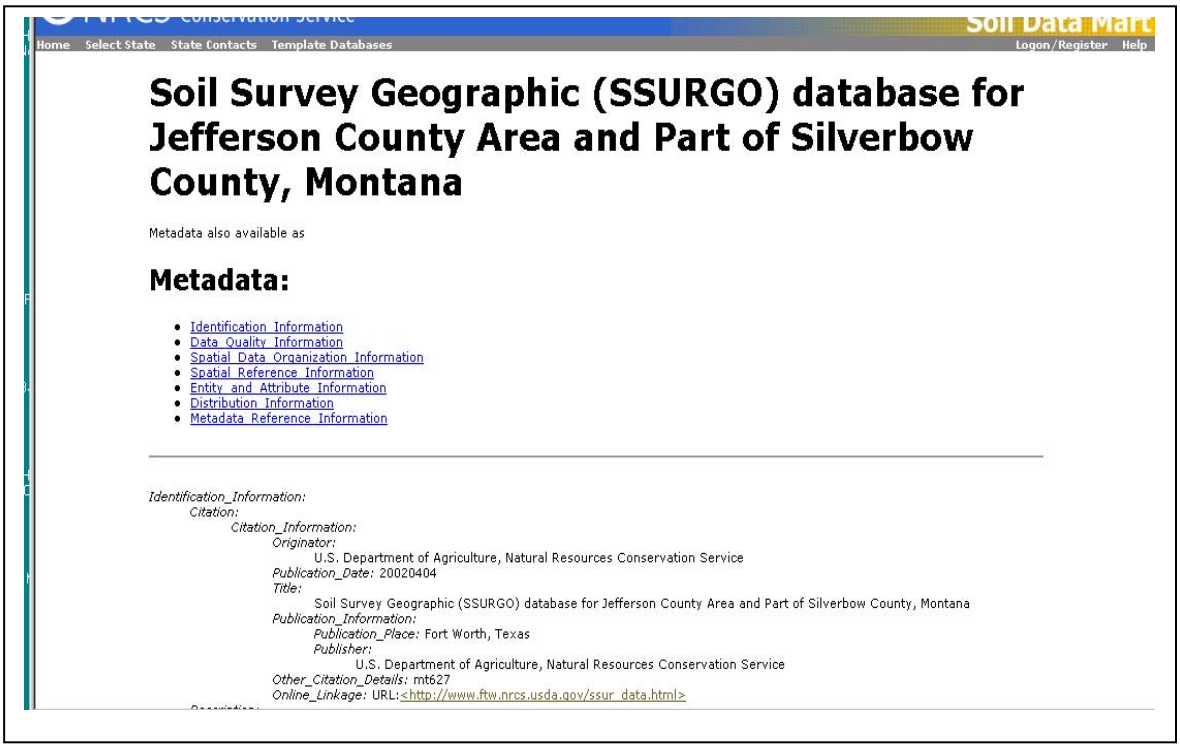
Select a SSA



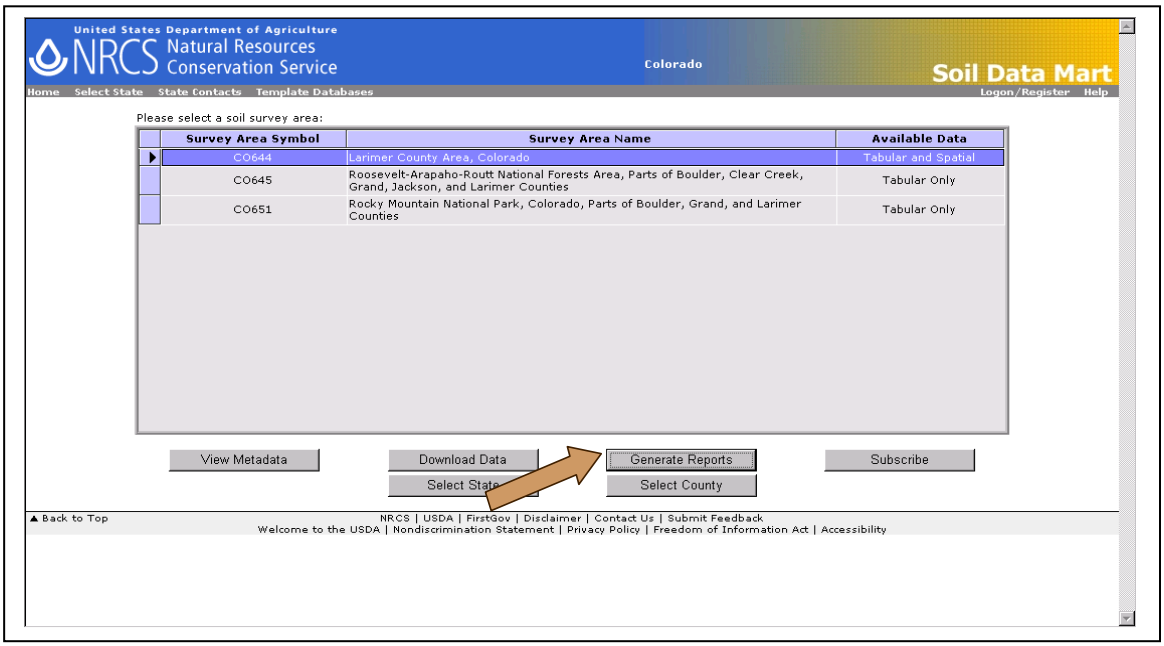
Select an Action



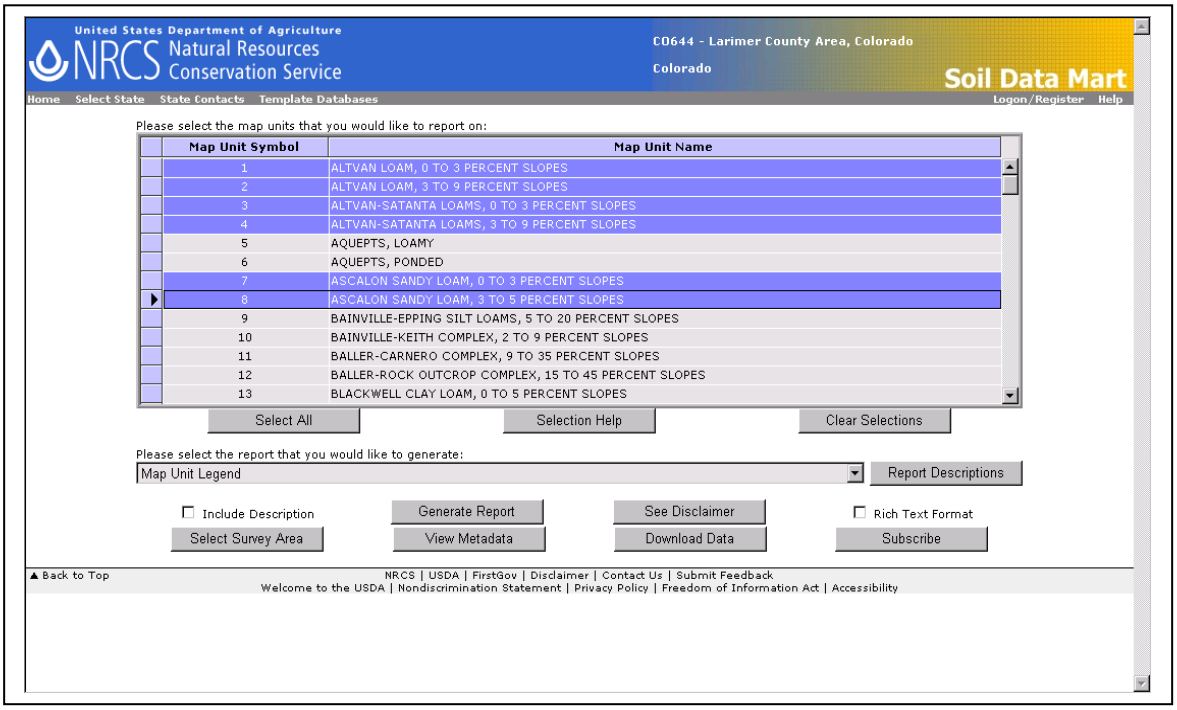
View Metadata



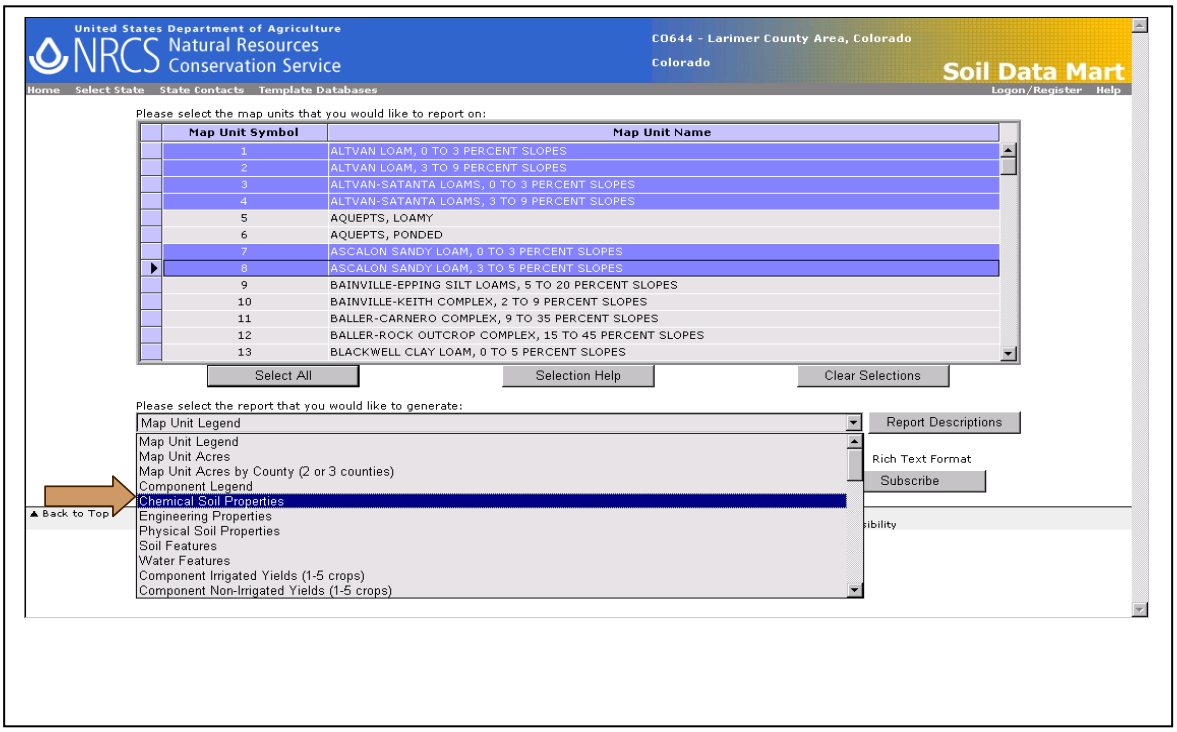
Generate Reports



Select Desired Map Units



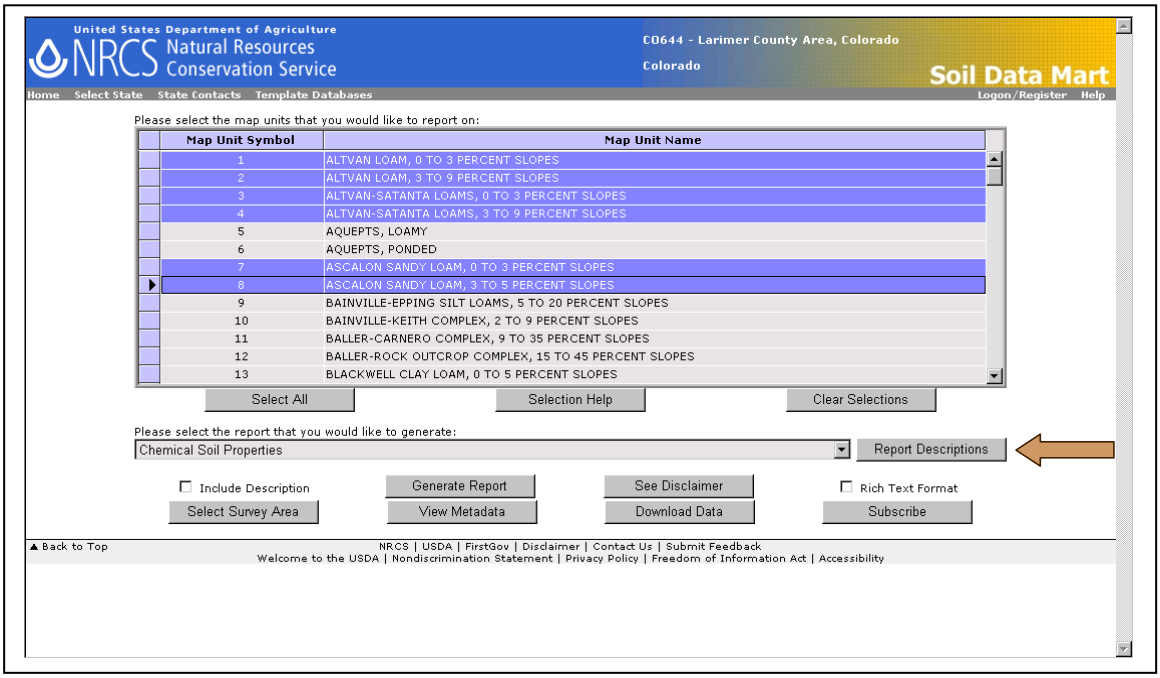
Select Desired Report



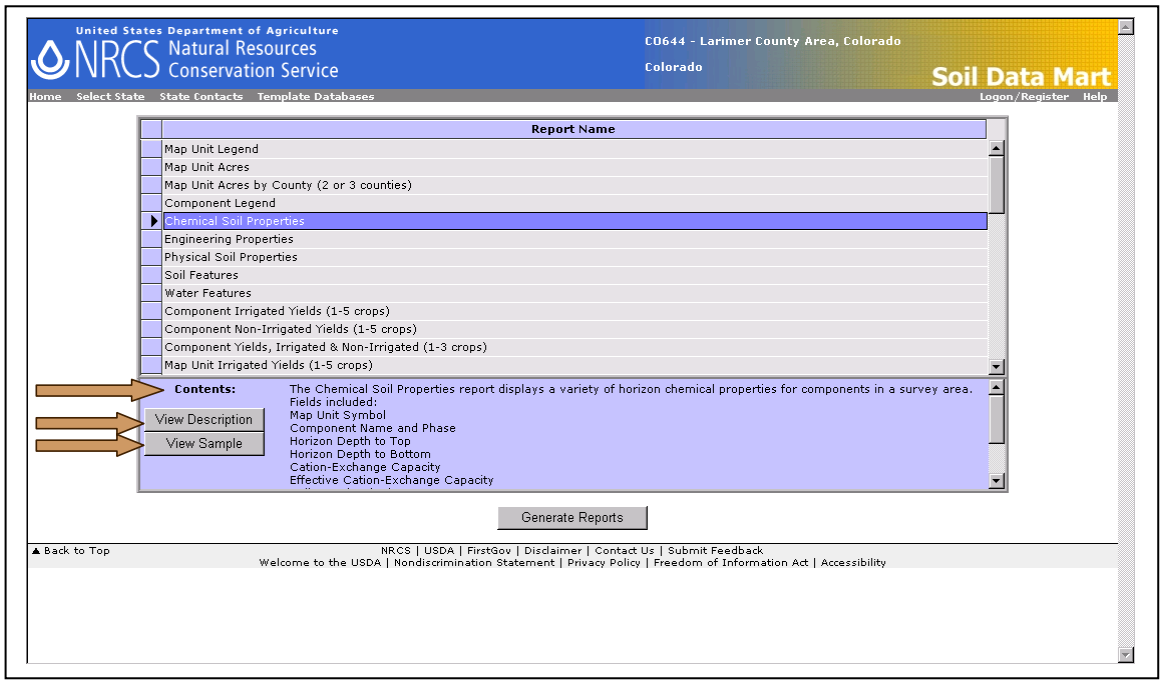
Available reports

- The list of standard reports on SDM match those in the national SSURGO Access template database.
- Note that there is not a Hydric Soils report included at this time. One will be added when an approved format is available from NSSC and the National Technical Committee for Hydric Soils.

View Report Descriptions



Report Descriptions



Full Narrative

Chemical Soil Properties (J2)

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity and aeration, and a general degradation of soil structure.

Sample

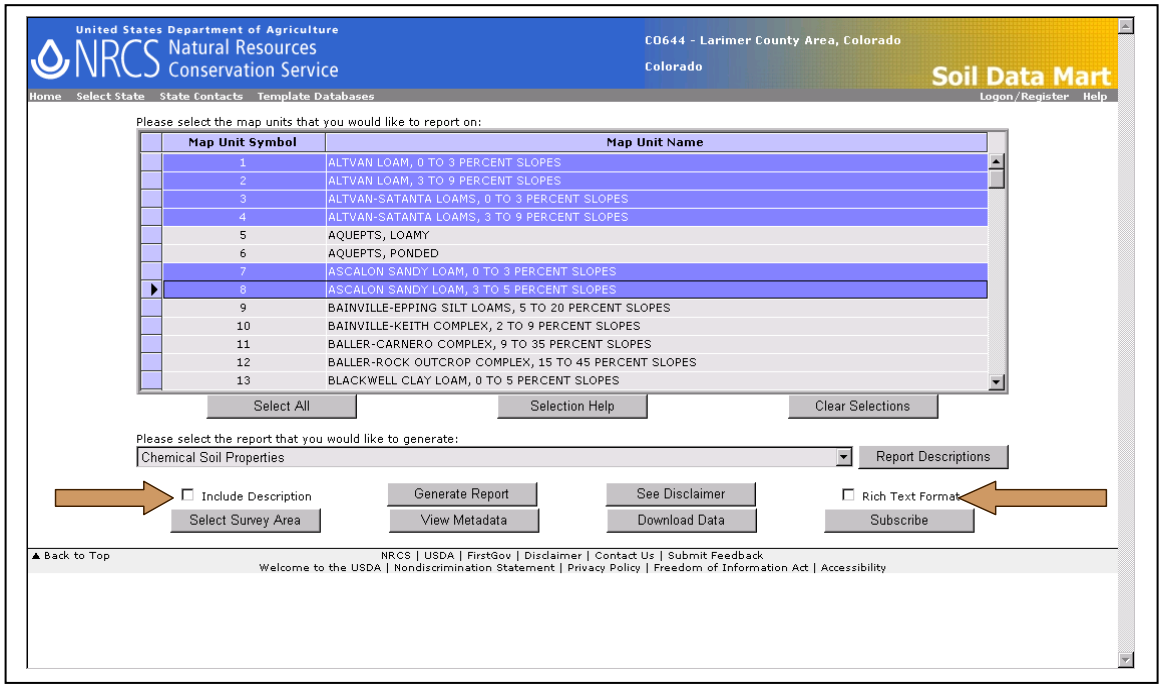
Chemical Soil Properties (J2)

Colville Indian Reservation (Parts of Ferry and Okanogan Counties), Washington

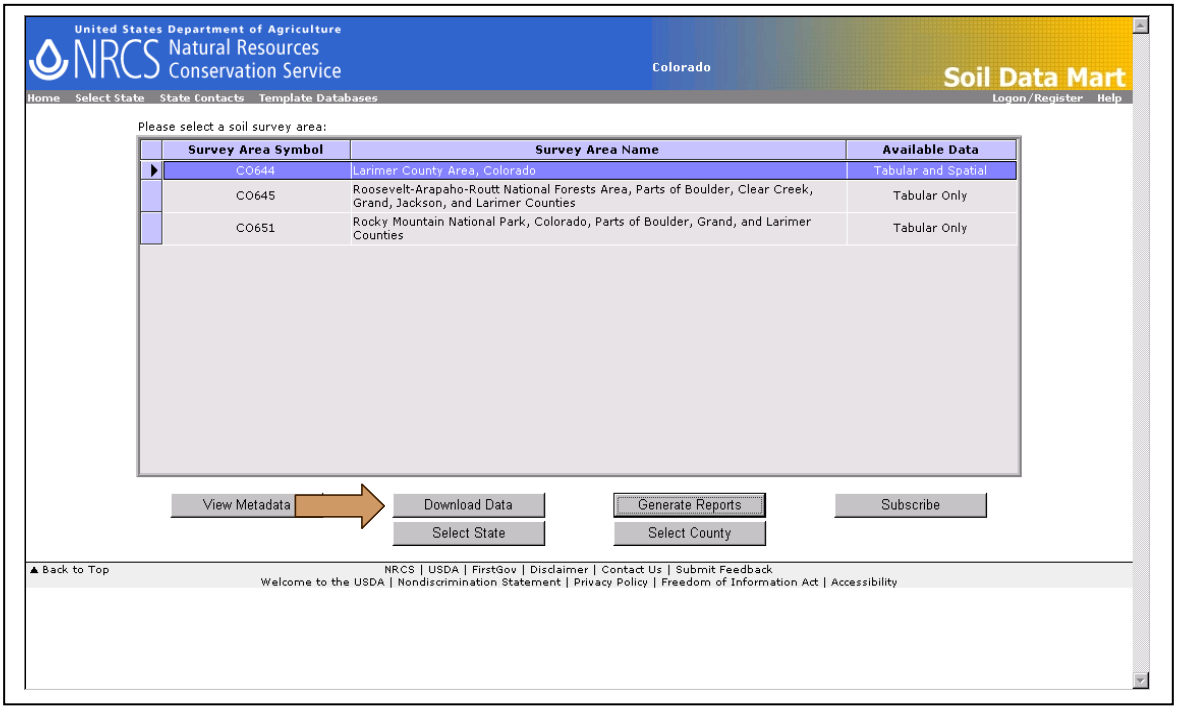
[Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorption ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
1:								
ACHIMIN	0-18	6.0-12	---	6.6-7.3	0	0	0.0	0
	18-34	15-25	---	7.4-8.4	0	0	0.0-2.0	0
	34-60	10-20	---	7.4-9.0	5-10	0	0.0-4.0	0-2
Unnamed	---	---	---	---	---	---	---	---
Wet Spots	---	---	---	---	---	---	---	---
2:								
ACHIMIN	0-18	6.0-12	---	6.6-7.3	0	0	0.0	0
	18-34	15-25	---	7.4-8.4	0	0	0.0-2.0	0
	34-60	10-20	---	7.4-9.0	5-10	0	0.0-4.0	0-2
CALCIC PACHIC HAPLOXEROLLS	0-24	5.0-13	---	6.6-7.3	0	0	0.0	0
	24-42	3.0-9.0	---	6.6-7.8	0	0	0.0	0
	42-60	2.0-9.0	---	7.9-9.0	15-35	0	2.0-4.0	0-2

Other Options



Download Data



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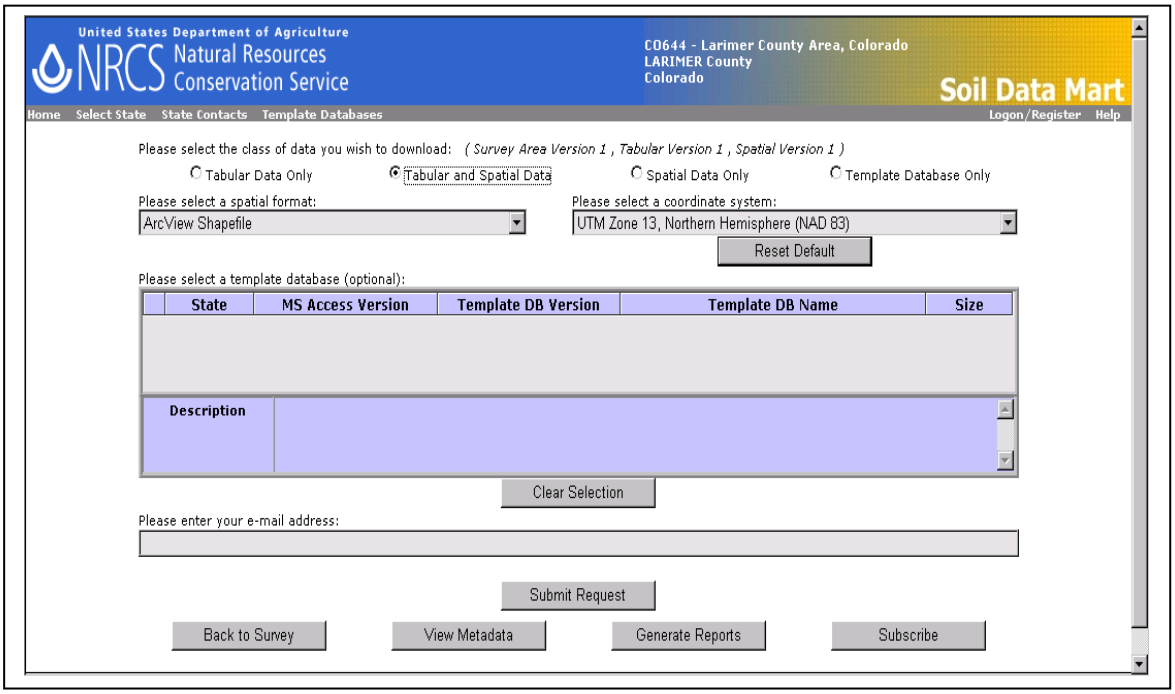
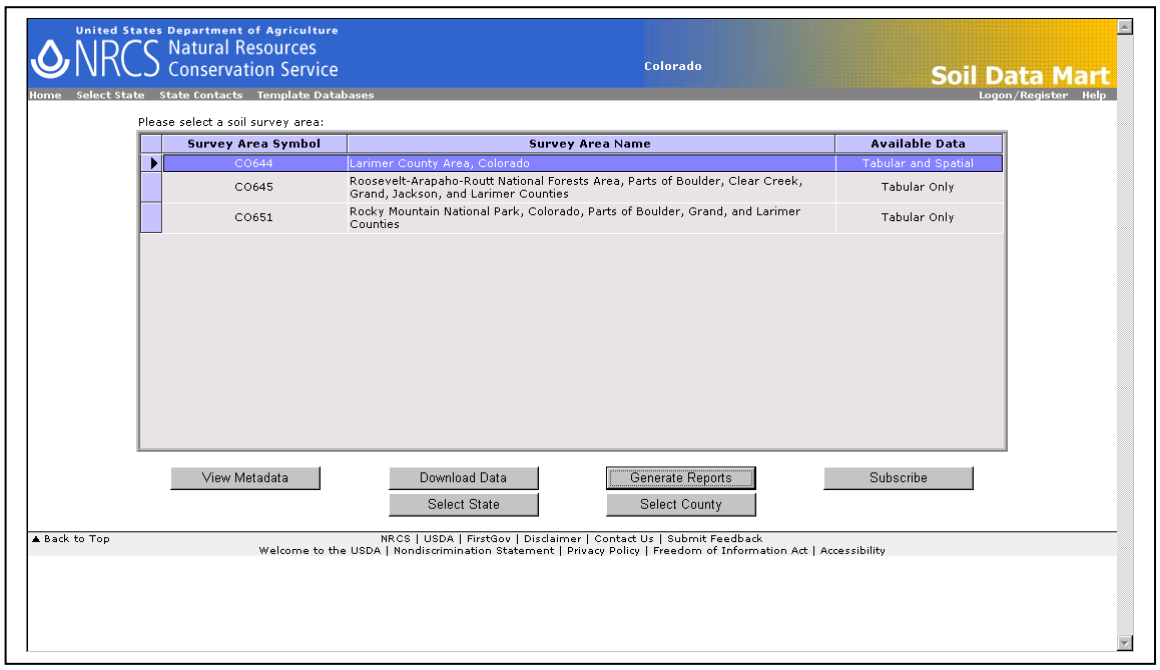


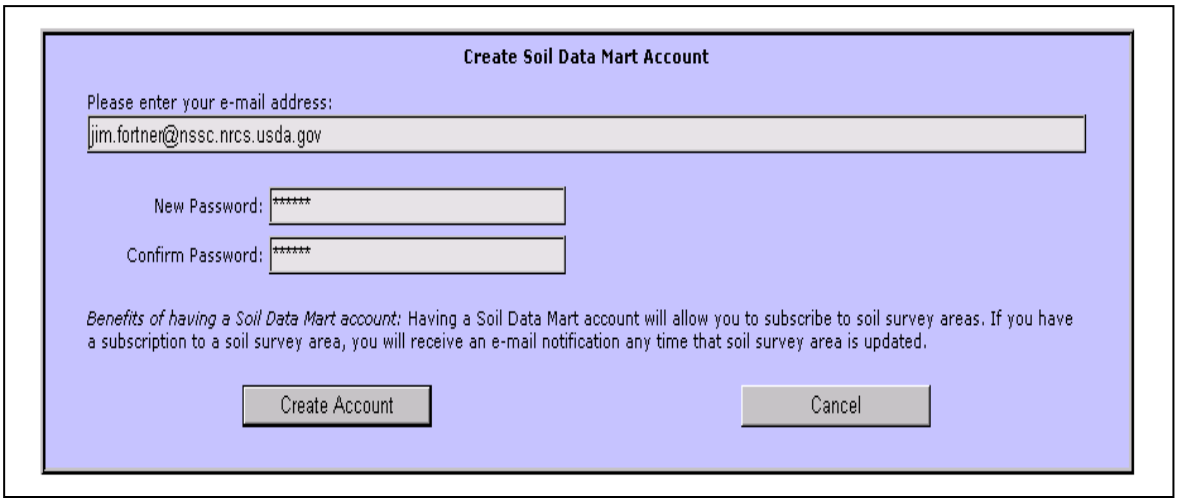
Subscribe

- Subscribing to a survey area adds you to a list of users to be informed each time a new version of the data for the area is posted to the SDM.

Subscribe



Enter new account info

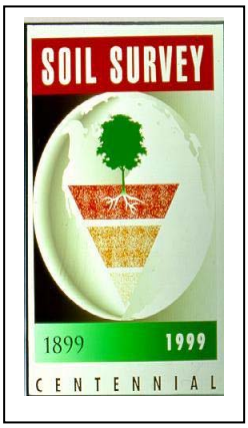


Future SDW/SDM Development

- Finishing items from the initial release, e.g.metadata items
- User requested enhancements
- Future phase custom interps and reports
- Integrate SDM access into other soil survey web pages & supplying archived versions to users

National Soil Survey Digitizing

Southern Regional Cooperative Soil Survey Conference
State Soil Scientist Meeting
Biloxi, MS
June 10, 2004



By: Ken Lubich, Digital Map Finishing and Publication Coordinator
Presented by: Dennis Potter, SSS, Missouri

New Contact Numbers:

- Phone 608-662-4422 ext. 248
- Fax: 608-662-4429
- Cell: 608-444-4805 (doesn't work in office)

New Address:

- 8030 Excelsior Drive, Suite 200
- Madison, WI 53717

Status Maps:

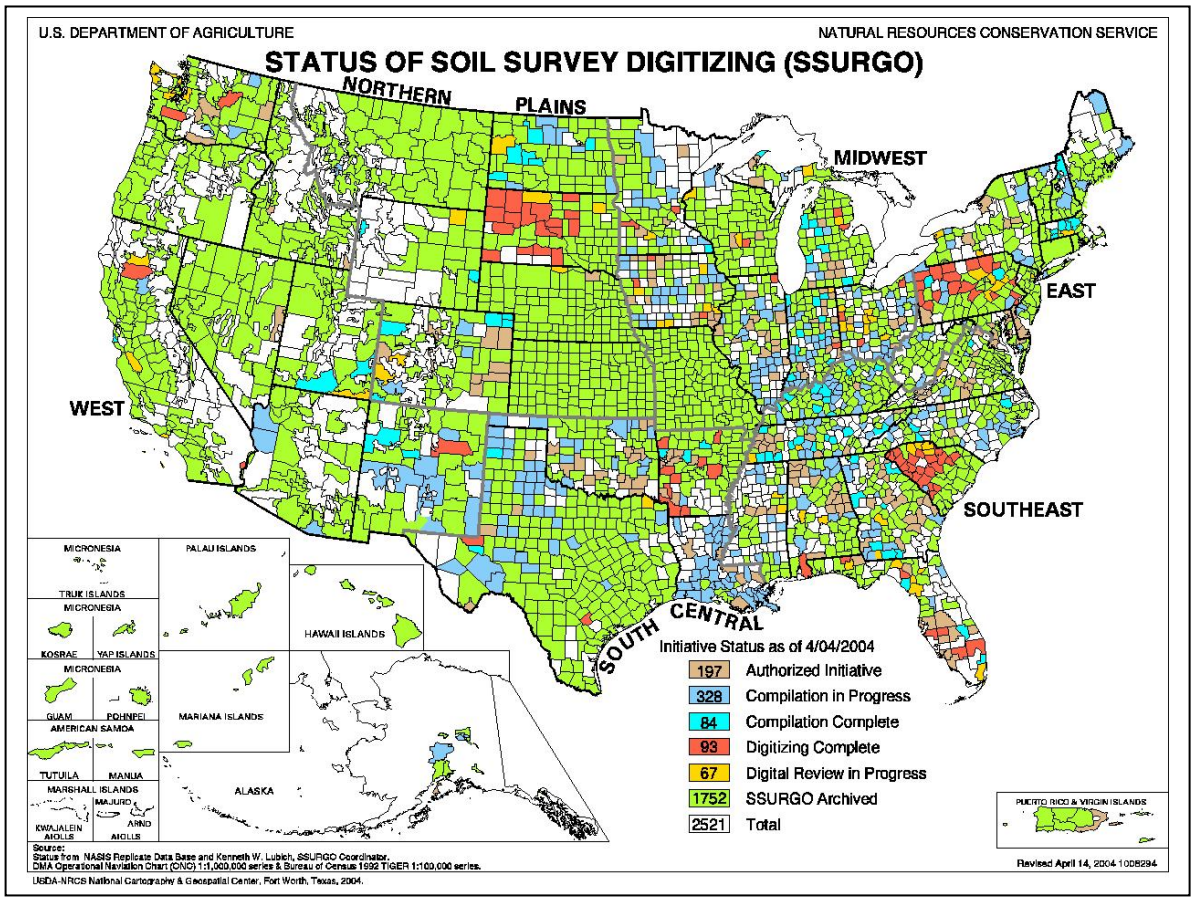
www.ftw.nrcs.usda.gov/nsdi_node.html

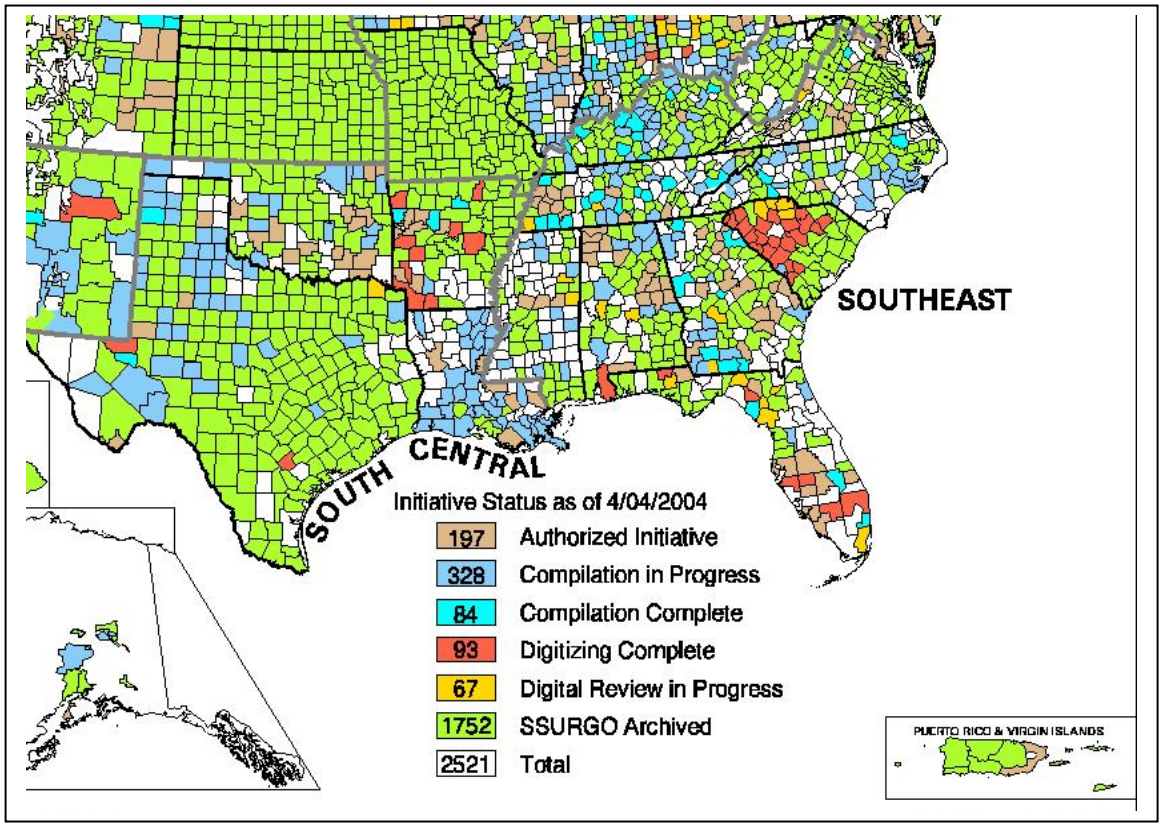
Topics

- SSURGO: Complete by end of FY2007 or earlier
- SDW: Need fully populated by 12/31/04
- DMF: Need to accelerate for initiative to eliminate publication backlog
- Publication backlog: Eliminate by end of FY07

SSURGO

- Progress slow this FY, but picked up this month
- Most DUs having problems getting enough work
- Several surveys shift between DUs to balance workload
- Much of the remaining workload is in the south.


U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
STATUS OF SOIL SURVEY DIGITIZING (SSURGO)
NORTHERN
PLAINS
MIDWEST
EAST
WEST
SOUTHEAST
SOUTH
CENTRAL
MICRONESIA
TRUK ISLANDS
MICRONESIA
KOSRAE
YAP ISLANDS
MICRONESIA
GUAM
PONHPEI
AMERICAN SAMOA
TUTUILA
MANUA
MARSHALL ISLANDS
MAJURO
KWAJALEIN ATOLLS
ARNO ATOLLS
PALAU ISLANDS
HAWAII ISLANDS
MARIANA ISLANDS
ALASKA
Initiative Status as of 4/04/2004
197 Authorized Initiative
328 Compilation in Progress
84 Compilation Complete
93 Digitizing Complete
67 Digital Review in Progress
1752 SSURGO Archived
2521 Total
PUERTO RICO & VIRGIN ISLANDS
Source:
Status from NASIS Replicate Data Base and Kenneth W. Lubich, SSURGO Coordinator.
DMA Operational Navigation Chart (ONC) 1:1,000,000 series & Bureau of Census 1992 TIGER 1:100,000 series.
Revised April 14, 2004 1008294
USDA-NRCS National Cartography & Geospatial Center, Fort Worth, Texas, 2004.


SOUTHEAST
SOUTH
CENTRAL
Initiative Status as of 4/04/2004
197 Authorized Initiative
328 Compilation in Progress
84 Compilation Complete
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2521 Total
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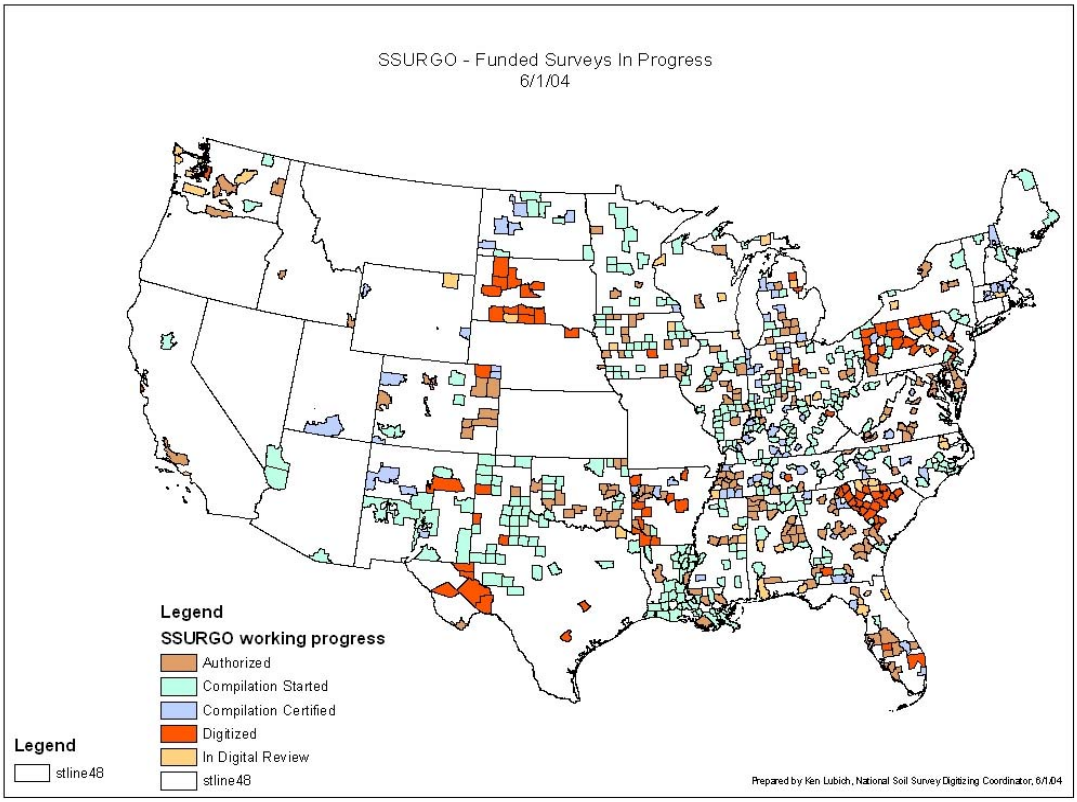
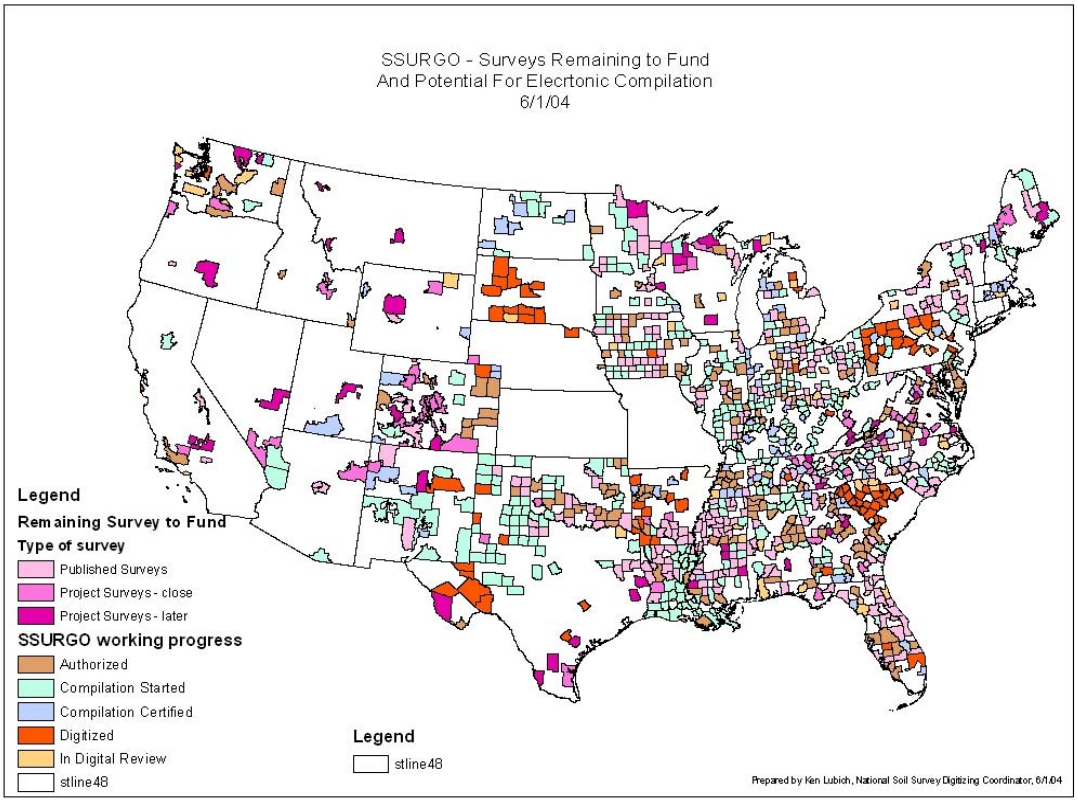
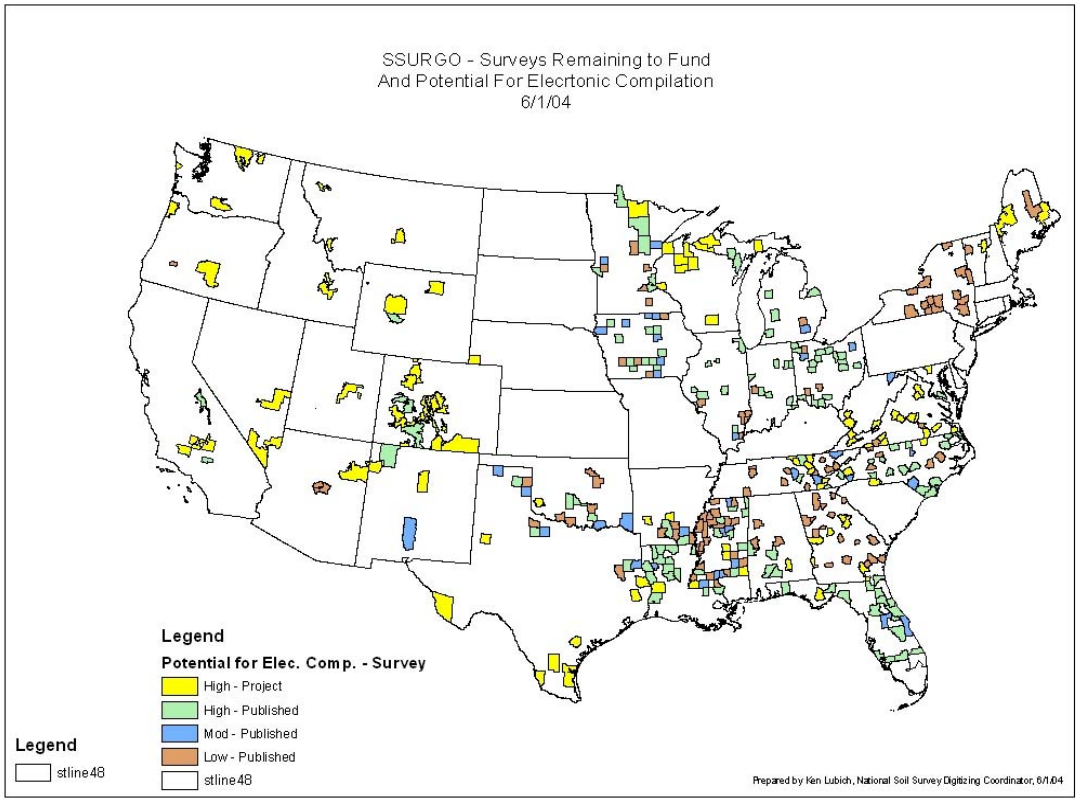
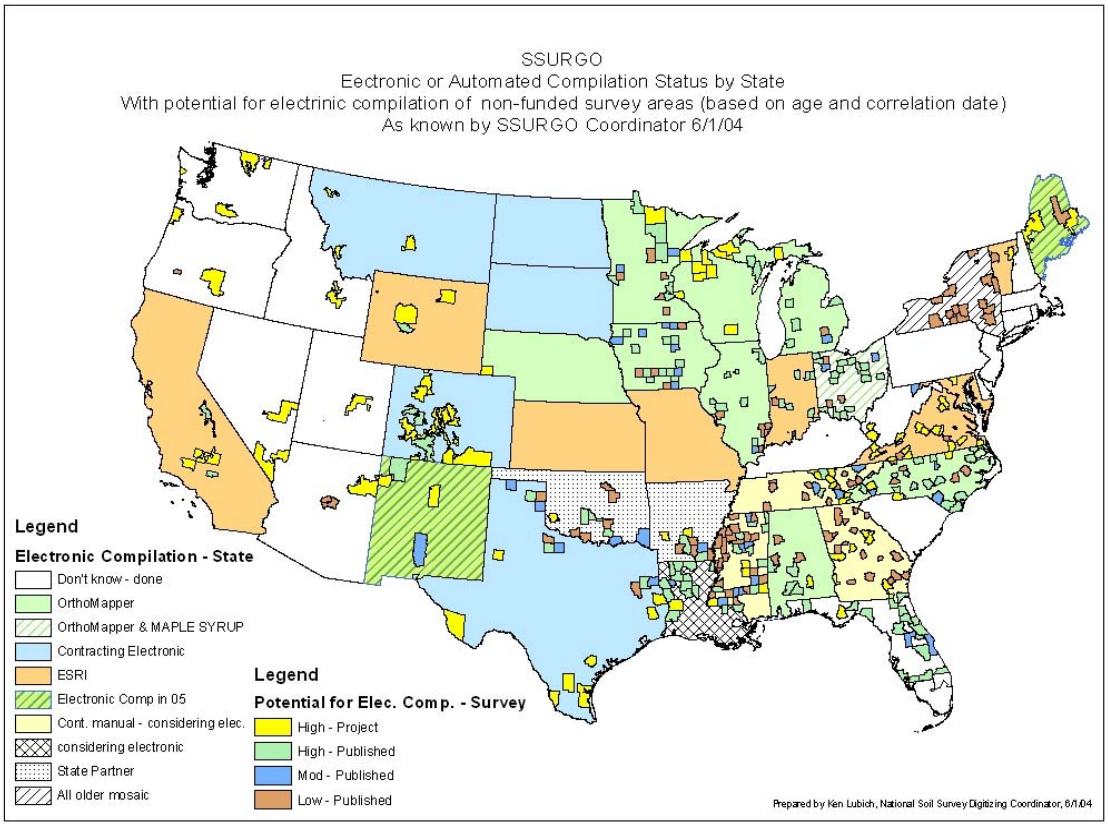

SSURGO - Funded Surveys In Progress
6/1/04
Legend
SSURGO working progress
Authorized
Compilation Started
Compilation Certified
Digitized
In Digital Review
stline48
Legend
stline48
Prepared by Ken Lubich, National Soil Survey Digitizing Coordinator, 6/1/04


SSURGO - Surveys Remaining to Fund
And Potential For Elecrtonic Compilation
6/1/04
Legend
Remaining Survey to Fund
Type of survey
Published Surveys
Project Surveys - close
Project Surveys - later
SSURGO working progress
Authorized
Compilation Started
Compilation Certified
Digitized
In Digital Review
stline48
Legend
stline48
Prepared by Ken Lubich, National Soil Survey Digitizing Coordinator, 6/1/04


SSURGO - Surveys Remaining to Fund
And Potential For Elecrtonic Compilation
6/1/04
Legend
Potential for Elec. Comp. - Survey
High - Project
High - Published
Mod - Published
Low - Published
stline48
Legend
stline48
Prepared by Ken Lubich, National Soil Survey Digitizing Coordinator, 6/1/04


SSURGO
Eectronic or Automated Compilation Status by State
With potential for electrinic compilation of non-funded survey areas (based on age and correlation date)
As known by SSURGO Coordinator 6/1/04
Legend
Electronic Compilation - State
Don't know - done
OrthoMapper
OrthoMapper & MAPLE SYRUP
Contracting Electronic
ESRI
Electronic Comp in 05
Cont. manual - considering elec.
considering electronic
State Partner
All older mosaic
Legend
Potential for Elec. Comp. - Survey
High - Project
High - Published
Mod - Published
Low - Published
Prepared by Ken Lubich, National Soil Survey Digitizing Coordinator, 6/1/04

Training

- Digital Soil Survey Mapping and Updating
- Pilot February,
- ArcGIS and 3dMapper
- Additional Sessions
  - June
  - August
  - 5 for FY05

SDW/SDM

- Need to have all surveys in the SDW by 12/31/2004
- Spatial Data in SSURGO 1 or SSURGO 2 format needs to be brought up to SSURGO 2.1 format.

DMF

- DMF sites continue to improve efficiency
- Always looking for more surveys
- Good turn around time

DMF – April 2004

- Of the 128 survey with maps at NCGC 110 have been DMF
- Software continues to improve
- Still need to hunt for work now and then.

Publication Back Log

- Priority by chief to eliminate the publication backlog and move to electronic publication as main delivery system
- Tried for a budget initiative in FY05 and made it to the last cut.
- Will try again in FY06, but still need to redirect resources.

  - April 2004
    418 Initial Soil Surveys
    372 Updates
    790 total (plus maintenance)

Performance Measures

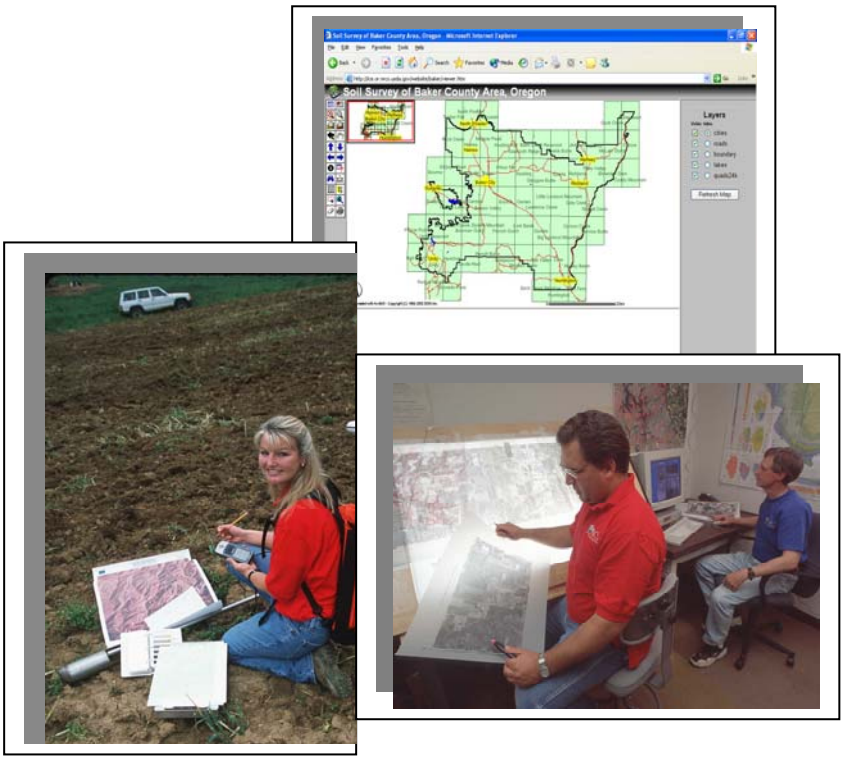
South Regional Cooperative Soil Survey Conference
State Soil Scientist Meeting
Biloxi, MS
June 10, 2004

By: Maxine J. Levin, Soil Survey Division

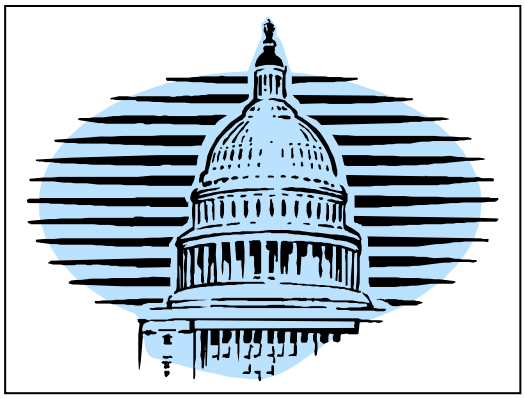
Program Performance Measures Logic Model

Soil Survey

- **Authorities**
- **Web-based Public access**
- **Complete initial Soil Surveys**
- **Maintain all Soil Surveys by MLRA**
- **Research**

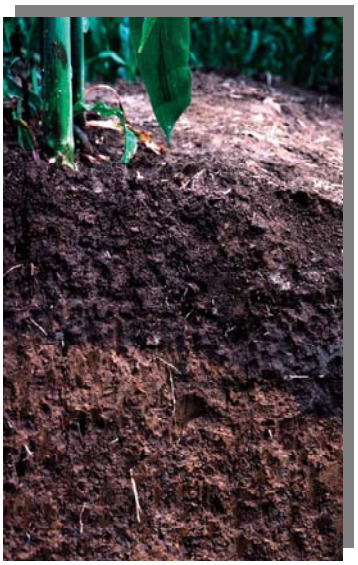


Authorities for the Soil Survey Program



- **1896, (Agriculture Appropriations Act)**
  - Authorized soil investigations (Bureau of Soils) Focus on Agricultural Lands
- **1935, (P.L. 74-46) – Soil Survey Program administered by Soil Conservation Service**
  - Used primarily for conservation planning on Agricultural Land
- **1953, (USDA Memo 1320) – SCS assigned Federal Leadership for Soil Survey Program**
  - Lead Federal Agency for coordinating NCSS- BLM, BIA, DOD, USFS, DOI, etc. to NCSS standards
- **1966, (P.L. 89-560) Expanded applicability of soil survey for multiple purposes**
  - Included community planning and environmental purposes. It also allowed for technical soil services and other assistance in using soil survey information.

The National Cooperative Soil Survey Program



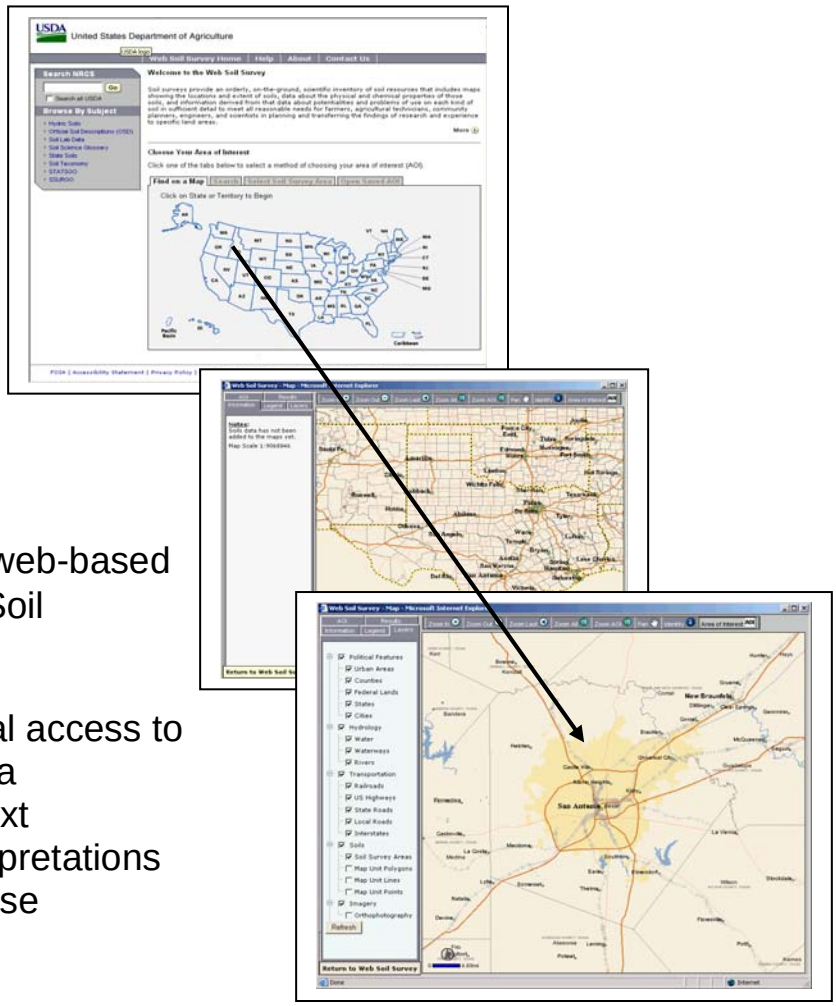
- **Nationwide partnership of Federal, state, and local units of government, including Land Grant Universities and the private sector**

- **NRCS has Federal leadership for NCSS**

- **NCSS develops standards & procedures for soil classification, correlation & mapping**

- **Includes the United States, its trust territories and Commonwealths**
  - Pacific Basin, Virgin Islands, Puerto Rico

Web-based Public Access



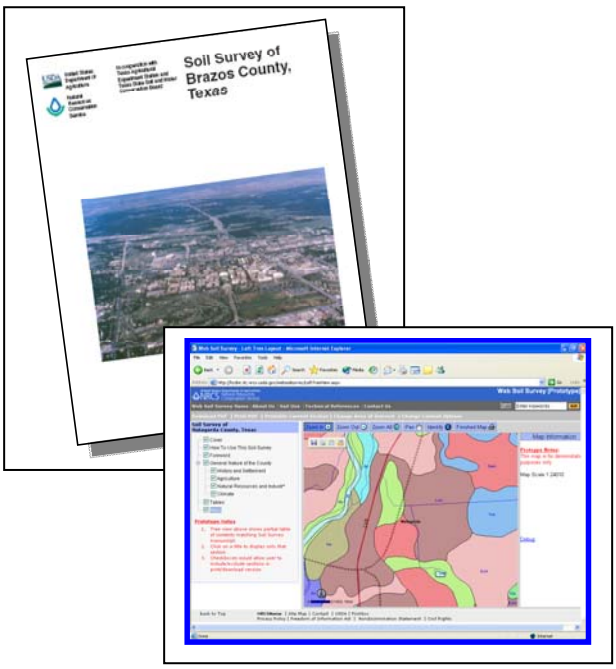
Activities for establishing web-based Soil survey through a Soil Data Mart:

- Primary Public and Internal access to Soils Information and Data
- Customized Maps and Text
- GIS capacity for Soil Interpretations
- Utilize Soil Data Warehouse

Long-term Performance Measures:

- By 2006 – web-based interface is complete. Users can query data and print custom reports.
- By 2007 – all soil survey information is available to public as soon as quality assurance is completed.
- By 2015 – 50% of all soil survey areas are available online.
- By 2035 – all 3,300 surveys are available online

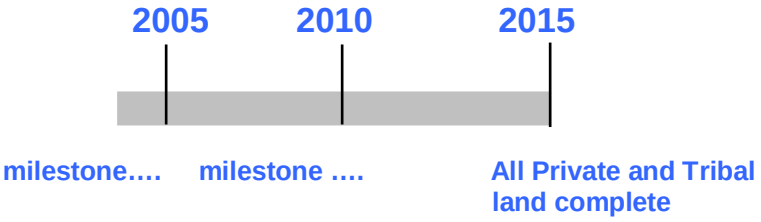
Complete Initial Soil Survey



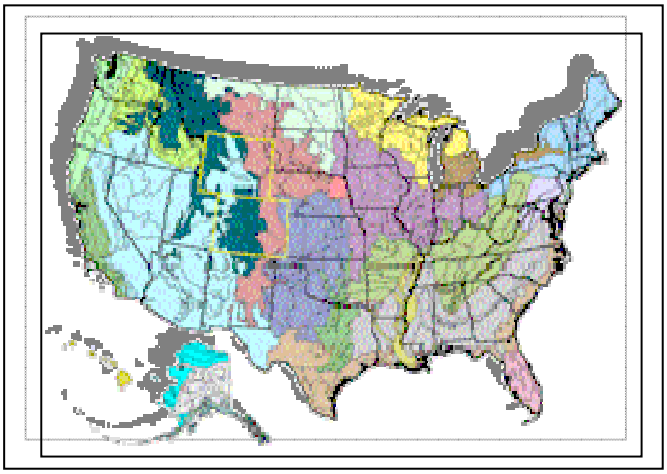
Activities for completing initial Soil survey:

- Field mapping (data collection)
- Populate database (NASIS) and Manuscript development
- Correlation and quality control
- Map compilation and digitizing
- Populate Soil Data Warehouse
- Publication "Web-Based"

Long-term performance measures:



Maintain Soil Surveys By MLRA Management Areas



Activities for maintaining soil Surveys by Major Land Resource Area:

- Field investigations, data collection, (and re-mapping as needed) by MLRA Project Management Area
- Database (spatial, attribute, and text) edits as needed
- Continue correlation and quality control by MLRA
- Maintain NASIS and Soil Data Warehouse
- Access spatial, tabular, and text data in "Web Soil Survey"

Long-term performance measures:

- **By 2010 Establish Project Management Areas**

By 2015 Maintain soil survey information by MLRA Management Areas to meet planning needs on Private and Tribal lands

Research

Authority – USDA Memo 1318, 1952 authorizes Soils to perform research as it relates to soil classification, Morphology, and soil behavior

Activities:

- Field sampling, laboratory analyses (Benchmark and Important soils)
- Developing, testing field tools for soil survey (SQ test kits, Pedon, Use-dependent surface soil properties)
- Soil-landscape field studies to aid mapping and interpretation (SoLIM, ARCGIS, 3DMapper, other landscape models)
- Develop statistical procedures to quantify reliable measures for soil survey information (Knowledge capture of soils-statistically)

Long-term performance measures

By 2007 – soil sampling protocols that address soil variablilty

By 2010 - incorporate statistical reliability information into soil survey publications

By 2006 – draft quantitative reliability measures for international peer review

By 2007 – knowledge capture technology and landscape analyses tools to improve soil mapping efficiency by xx%

By 2020 – complete analyses and measured statistical investigation of benchmark soils