PROCEEDINGS OF THE NORTHEAST COOPERATIVE SOIL SURVEY CONFERENCE

BANGOR, MAINE
JULY 20 - 23,1998

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WELCOME

by

M. Darrel Dominick
State Conservationist
Natural Resources Conservation Service
Orono, ME

and

Edward McLaughlin
Commissioner of the
Maine Department of Agriculture
Augusta, ME

NORTHEAST COOPERATIVE SOIL SURVEY CONFERENCE

BANGOR, MAINE JULY 19-23, 1998

AGENDA

Sunday - July 19
Registration - Lobby of Ramada Inn, Odlin Road, Bangor, ME

5:00 P.M. - 7:00 P.M.

Monday - July 20

Moderator, David Wilkinson, NRCS, Soil Resource Specialist, Lewiston, ME

8:00 - 8:15 A.M.	***Welcome to Maine*** M. Darrel Dominick State Conservationist, Orono, ME
8:15 - 8:30 A.M.	**Welcome** Edward McLaughlin, Commissioner of the Maine Department of Agriculture, Augusta, ME
8:30 - 9:00 A.M.	***National Perspective from NCSS Advisory Committee, 1998*** Horace Smith, NRCS, Director, Soil Survey Division, Washington, D.C.
9:00 - 9:30 A.M.	*Soil Chemical Imbalances from Bio Solid Applications* Dr. Tim Griffin, University of ME, Cooperative Extension, Sustainable Agricultural Specialist, Orono, ME
9:30 -9:45 A.M.	***Housekeeping*** Norman Kalloch, NRCS, Assistant State Conservationist for Soils, Orono, ME
9:45 - 10:15 A.M.	**Break**
10:15 - 10:30 A.M.	*National Soil Survey Center - Activities Related Specifically to the Northeast* Gary Muckle, NRCS, Soil Scientist, Lincoln, NE
10:30 - 10:45 A.M.	*SSURGO Update* Christine Clarke, NRCS, SSURGO National Leader, Morgantown, VW

10:45 - 11:00 A.M.	*NASIS Update* Russ Kelsea, NSSC Soil Scientist, Lincoln, NE
11:00 - 11:15 A.M.	***Criteria and Indicators of Forest Sustainabllity*** Connie Carpenter, USFS, Hydrologist, Durham, NH
11:15 - 11:30 A.M.	*Forest Soils Research* Rich Hallett, USFS, Research Ecologist, Durham, NH
11:30 - 11:45 A.M.	***Silver Spade Award*** Dr. John Sencindiver, WVU, Professor of Agronomy & Soil Sciences Morgantown, WV
11:45 - 1:00 P.M.	**Lunch**

Moderator, Andrew Williams, NRCS, Soil Scientist, Amherst, MA

3:30 - 5:00 P.M.	Committee Meetings: Committee 1 - Research Needs Committee 2 - Soil Taxonomy Committee 3 - SSURGO/Map Committee 4 - Role of Experiment Stations in NCSS Committee 5 - Site Specific/ High Intensity Soil Survey
5:30 - 7:00 P.M.	Social - Hospitality Rm
8:00- 9:30 P.M.	NEC-50 Meeting NRCS Technical Soils Consortium

Tuesday - July 21:

8:00- 10:00 A.M.	Committee Meetings: Committee 1 - Research Needs Committee 2 Soil Taxonomy Committee 3 - SSURGO/Map Committee 4 - Role of Experiment Stations in NCSS Committee 5 - Site Specific/ High Intensity Soil Survey
10:00- 10:15 A.M.	Break

1:00 - 1:10 P.M.	***Maryland NRCS & University Report***
1:00 - 1:20 P.M.	***Delaware NRCS & University Report***
1:20 - 1:30 P.M.	***Vermont NRCS & University Report***
1:30 - 2:00 P.M.	*National Cartography* ***& Geospatial Center*** *Status Report* Dick Folsche, NCG Dir, Hof Owen, SSURGO Support, Ft. Worth, TX
2:00 - 2:30 P.M.	*Soil Quality Institute - Technology Transfer* Debra Dirlam, NRCS, GIS Specialist, Ames, IA
2:30 - 3:00 P.M.	***Carbon Sequestration*** Bob Ahrens, NRCS, NSSC, Soil Taxonomy Lead Scientist, Lincoln, NE
3:00 - 3:30 P.M.	**Break**

Moderator, Dr. Mark Stolt, University of Rhode Island, Asst. Professor, Department of Natural Resources, Kingston, RI

10:15 - 10:20 A.M.	***East Region Activities*** Maxine Levin, NRCS, Soil Scientist, Beltsville, MD
10:20 - 10:30 A.M.	*Soil Related Activities In State of Maine Govt* David Rocque, Dept. of Agriculture, State Soil Scientist, Augusta, ME
10:30 - 10:55 A.M.	***Outlook for Soil Survey & Resource Assessment*** Dr. Maurice Mausbach, NRCS, Deputy Chief for Soil Survey & Resource Assessment, Washington, DC
10:55- 11:10 A.M.	*Soils Related Activities at the University of ME* Ivan Femandez, University of Maine, Prof. of Applied Ecology & Environmental Sciences, Orono, ME

11:10 – 11:25 A.M. ***Canadian Soils Program in the Maritimes***
Herb Reese, Potato Research Center, Agriculture and Agriculture Canada

11:25- 11:40 A.M. ***Penobscot Nation GIS Activities***
Theresa Hoffman, Penobscot Nation, Staff Geologist, Old Town, ME

11:40- 11:50 A.M. ***Connecticut NRCS & University Report***

11:50 - 12:00 ***New Hampshire NRCS & University Report***

12:00 - 1:00 P.M. **Lunch**

Moderator Shawn McVey, **NRCS, Asst. State** Soil Scientist, Storrs, CT

1:00 - 1:20 P.M. ***Maine Association of Professional Soil Scientists***
David Marceau, President of MAPSS

1:20 - 1:30 P.M. ***New Jersey NRCS & University Report***

1:30 - 1:40 P.M. ***New York NRCS & University Report***

1:40 - 1:50 P.M. ***Pennsylvania NRCS & University Report***

1:50 - 2:00 P.M. ***Rhode Island NRCS & University Report***

2:00 - 2:25 P.M. *Soil Survey and Soil Climate Interface,*
Doug Miller, Penn State, Research Associate, University Park, PA

2:25- 2:45 P.M. **State *of the Soils for the Centennial of Soil Survey,***
Ronnie Taylor, NRCS,. State Soil Scientist, Somerset, NJ

2:45- 3:15 P.M. **Break**

9:20 - 9:30 A.M. ***West Virginia NRCS & University Report***

9:30 - 9:45 A.M. ***The Use of Soil Information by the National Park Service***
Nigel Shaw, National Park Service Representative,

3:15 - 3:45 P.M. ***Regional Soil Taxonomy Proposals***
Bob Ahrens, NRCS, NSSC, Soil Taxonomy Lead Scientist, Lincoln, NE

3:45 - 4:15 P.M. ***Update on Soil Survey Centennial Activities,***
Gary Muckel, NRCS, Soil Scientist, Lincoln, NE

4:15 - 4:30 P.M. *Regional Technical Committees for Hydric Soils*
Mike Whited, NRCS, Soil & Wetland Scientist, Wetland Institute, Lincoln, NE

4:30 - 5:00 P.M. ***Gelisols***
Bob Ahrens, NRCS, NSSC, Soil Taxonomy, Lead Scientist, Lincoln, NE

5:00 - 5:05 P.M. ***Logistics for Field Trip***
Norman Kalloch, NRCS, Asst. State Conservationist for Soils, Orono, ME

5:30 - 7:00 P.M. Social *Hospitality Room*
Computer Demonstrations
Soil Science Education K-12
Globe Program
CD ROM Surveys
NASIS
Dr. Elissa Levine, NASA, Physical Scientist, Greenbelt, MD
Russ Kelsea, NRCS, Soil Scientist Lincoln, NE

Wednesday - July 22

8:00 A.M. - 5:00 P.M. Field Trip

5:00 P.M. - 9:00 P.M. Banquet

Thursday -July 23

Moderator, Dean Cowherd, NRCS, Asst. State Conservationist, Annapolis, MD

8:00 - 9:00 A.M. ***Break Out Session***
NRCS
NEC-50

9:00-9:10 A.M. *Massachusetts NRCS & University Report*

9:10 - 9:20 A.M. ***Virginia NRCS & University Report***

Boston, MA

9:45 - 10:15 A.M. Break

10:15 - 10:30 A.M. ***MO-12 Report***
Bruce Thompson, NRCS,
MLRA Office Leader,
Amherst, MA

10:30 - 10:45 A.M. ***MO-13 Report***
Steve Carpenter, NRCS,
MLRA, Office Leader,
Morgantown, WV

10:45 - 11:00 A.M. ***MO-14 Report***
John Kelly, NRCS, Soil
Data Quality Specialist,
Raleigh, NC

11:00 - 11:10 A.M. ***Technical Committee #1 Report***
11:10-11:20 A.M ***Technical Committee #2 Report***
11:20-11:30 A.M. ***Technical Committee #3*** **Report**
11:30-11:40 A.M. ***Technical*** **Committee #4 Report**
11:40-11:50 A.M. ***Technical Committee #5 Report***
11:50 – Noon ***Technical Committee Reports Questions & Discussions***

12:00 - 1:00 P.M. **Lunch**

Moderator, Tim Craul, Supervisor of the Compilations and Digitizing Staff, University Park, PA

1:00 -1:10 P.M. ***NEC-50 Breakout Report***
1:00 -1:20 P.M ***NRCS Breakout Report***
1:20 - 3:00 P.M. ***Business Meeting***

3:00 P.M. ***Adjourn***

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Northeast Cooperative Soil Survey Conference July 20-23,1999 Bangor, ME Ramada Inn

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National Headquarters Update and Perspective from NCSS Advisory Committee, 1998[1]

By

Horace Smith
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Thank you for inviting me to be a part of this conference. It is good to be back in Maine and the Northeast. I have nothing but fond memories of the eight years that I spent as a soil correlator at the former Natural Resources Conservation Service (NRCS) National Technical Center in Pennsylvania. During that period I worked with most of you in some capacity.

When Norm called and invited me to participate, he requested that I give a perspective from the National Cooperative Soil Survey (NCSS) Advisory Committee. Before I get into that, I'd first like to quickly touch on a few current topics that I've been receiving a great deal of questions on during the few hours that I've been here:

1. Reorganization of the National Soil Survey Center (NSSC)

During the recent realignment of the NRCS National Headquarters (NHQ), the NSSC was placed under the Soil Survey Division. Based on my recommendations, five major functional areas have been created at the NSSC. These areas are: Soil Survey Laboratory, Soil Survey Investigations, Soil Survey Interpretations, Technical Soil Services, and Soil Classification and Standards. These functional areas are led by a laboratory head and four national leaders, respectively. One of the driving forces behind this reorganization was comments and suggestions from the employees at the NSSC and feedback from customers, cooperators, and partners like you. It was generally felt that some type of formal structure was needed at the NSSC. I believe this structure will allow the NSSC to be more efficient and responsive to the needs of its customers.

2. Digital Map finishing

A little more than a year ago I commissioned a team to take an in-depth look at digital map finishing and make recommendations to me on how this technique can be used to produce high quality hard-copy maps for soil survey areas utilizing certified SSURGO data. The team came up with some excellent recommendations and we are in the process of evaluating them now. We are now in the process of testing software at several locations that would support digital map finishing in a production mode. We are also in the very early stages of trying to identify locations that have the interest and capability to support digital map finishing centers. As we move further into a digital environment, you will be hearing more about digital map finishing. It is essential that we integrate this technology into our ongoing soil survey processes.

[1] Presented at the Northeast Cooperative Soil Survey Conference, July 19, 1998, Bangor, Maine

3. National Headquarters Reorganization

In March, Mr. Pearlie S. Reed took over as Chief of NRCS. During this period, the Agency was reorganized or realigned at NHQ. This new structure includes five deputy areas. These are: Strategic Planning and Accountability; Science and Technology; Programs; Soil Survey and Resource Assessment; and Management. The Soil Survey and Resource Assessment Deputy Area contains three Divisions -- Soil Survey, Resource Inventory, and Resource Assessment. This deputy area is led by Deputy Chief Maury Mausbach.

4. Budget

It looks like the 1999 soil survey budget will be level. If there is an increase, it will be small. We hope to be able to support some new benchmark initiatives in animal agriculture. We still hope to continue supporting RFPs and research initiatives that are beneficial to the Agency's and the NCSS' mission.

5. Mapping Status and Personnel

The following table gives an overview of mapping status:

NATIONAL SOIL SURVEY MAPPING STATUS
October, 1997 -- Water Acreage Excluded

Category	Total Acres Millions	Acres Mapped Millions	Percent Completed
Private	1521.6	1385.0	91
Indian	99.2	46.6	47
All Federal	649.2	299.3	46
Total	2270.0	1730.9 7	6

As you can see, we have mapped more than 90 percent of the private land in the US. We now have detailed maps on a little less than 1.4 billion acres of private land. This percentage is somewhat misleading, as a large portion of this acreage is outdated and in need of updating. The numbers are not as favorable for Federal and Indian Lands. The soils have been mapped on a little less than one-half of all Indian and Federal Lands.

At the present, there are approximately 935 NRCS soil scientist supporting the NCSS. This is the lowest number in many years. A few days ago I was checking the personnel records and discovered that during the past two years we hired a little over 50 new soil scientists. That's not good enough. During 1999 we've already agreed that we will hire at least 50 new soil scientists.

Now let's say a few words about the NCSS Advisory Committee -- the topic for which I was invited to address. Shortly after I was named Director of the Soil Survey Division, I set up this committee. Its purpose is to serve as a sounding board for the Division and provide feedback and recommendations on emerging topics that affect the Division. The committee is composed of a representative from the four Agricultural Experiment Station Regions, the 1890 Universities, State Agencies, the soil survey leaders from the US Forest Service and Bureau of Land Management, the president of the National Society of Consulting Soil

Scientists, and senior leaders from the Division. I've also included a few senior NCSS Cooperators on the committee -- those for whom I can always depend on to tell it like it is and put things in the proper perspective. My good friend Ed Ciolkosz from Penn State falls into that category and is doing an outstanding job on the committee.

The committee held its first meeting August 20 - 22, 1997 in Raleigh, NC. The meeting was facilitated and 22 discussion items surfaced as being important to the group. A summary of the minutes from this meeting was sent to all state soil scientists and I assume these were shared with you. I won't attempt to list and discuss all 22 items, but I would like to emphasize a few:

- Quality control and associated responsibilities as related to MLRA operations;
- Consider a new definition for soil volume, greater than 2 meters;
- Communications;
- University department heads and deans need to be better informed on NCSS;
- Renew efforts to formalize connections to specific groups;
- Accessibility of databases to cooperators (NASIS, plants, etc.);
- Publications (formats; electronic versus hardcopy, etc.);
- Leadership/MLRA management operations (Steering Teams, etc.);
- MOUs for MLRAs need to be signed;
- RFPs need to be continued;
- Correlation tours; special field trips; and
- How do we perpetuate our science with new students?

At the meeting, we grouped the 22 discussion items and divided them among four breakout groups for discussion purposes. An action register has been developed to help us keep track of the status and progress made addressing the recommendations of the four breakout groups. We will issue periodic updates on the status of these recommendations.

I am very proud of the work of this committee and believe its recommendations will be extremely useful to me as I go about implementing the policies of the Agency and providing leadership for the Federal part of the NCSS.

Thank you again for allowing me to be a part of your conference. Have a great week.

National Soil Survey Center Activities Related Specifically to the NE

by

Gary Muckle, NRCS, Soil Scientist, Lincoln, NE

Most products of the center relate to needs of the northeast states. The following list includes many of these products. Specific investigation projects are listed at the end

Training

Six Courses with National Employee Development Center

Basis Soil Survey Soil

Correlation

Soil Technology, Measurement and Data Evaluation

Soil Technology - Programs and Application

Soil Science Institute

Advanced Hydric Soils

Other Training

NASIS Taxonomy

Stream Classification

Generating Interpretations

Forestry Interpretations

Soil Quality

Proposed MLRA Mgt

Guidebooks

Field Book for Describing Soils

Seven major sections

About 185 pages

Designed for easy update as additions and/or revisions are identified by field soil scientists

Standards

Soil Taxonomy

Coincide with revised soil taxonomy

8th Edition will go into effect with delivery of hard copies

National Soil Survey Handbook Revisions released as completed on the WEB

Information

Soil Quality Information Sheets

Fourteen completed; sent to all offices

Soil Survey Publications

Shrink-wrapped or print-on-demand

Editorial assistance, training, pre-written material from NSSC

Glossary of geomorphic terms

In Field book 629 of National Soil Survey Handbook

NASIS & Intepretations

International Anthropogenic Soil Tour (Sept. - Oct. 1998 Las Vegas to San Francisco

NASIS 4.0 and hotline support

Data Dictionary, Point data, Network, Configuration, Reports, Schedule

Soil Survey Explorer Viewer

Goal (phase II - one CD soil survey in each state this Fiscal Year

Most NE participating

Beta test now/August Start

Five copies to State

Demo CDROM later when ready

NSSC - ITC - NCG are involved

NASIS/SURGO interface

Linkage between soils database and SSURGO

NASIS interpretation generation

Capability to develop interpretations - Templates developed by 4.0 release

Fuzzy logic (value of ranges)

Draft NE Forage Suitable Groups/Forestry in NFM

Waste Management interpretations/conservation practice interpretations

Soil biological lab initiative

Carbon Sequestration

Research & Development

Global climate projects

Soil Temperature and Moisture - NY, NH - New and accessible

Carbon sequestration

Agency program support

SRPG (soil rating for plant growth)

LESA (Land Evaluation & Site Assessment programming to NASIS)

Soil interpretations generation (basic set near completion)

Wetlands

Soil Quality

NRI Link

Hydrologic groups (Engineering)

Erosion model testing

Scientific presentations at professional meetings

Maintaining & advancing the science

Support for SSURGO digitizing

Initiative

LIMS

To assist with lab management and facilitate data access

FGDC standards for soil survey
Data exchange standards

Marketing and Outreach

Soil-landscape analysis

Subsurface water movement/connect to watersheds

Site-specific management

Investigated scale and management

Order one soil survey standards

NE has committee

Soil Survey Centennial

Many activities planned

NSSC homepage

National Soil Survey Handbook

Keys to Soil Taxonomy

Cooperative research projects

Eight funded in FY98

One in NE Soil Organic Carbon - Ray Brandt

CD-ROM

Soil lab data

NCSS conferences

Brown County prototype

Hydric soil indicator

STATSGO browser interface

STATUS OF SSURGO UPDATE

by

Christine Clarke
Natural Resources Conservation Service
SSURGO National Leader
Morgantown, WV

Status of SSURGO

Northeast Cooperative Soil Survey Conference

Bangor, Maine

July 19-23, 1998

Presented by
Christine Clarke

SSURGO

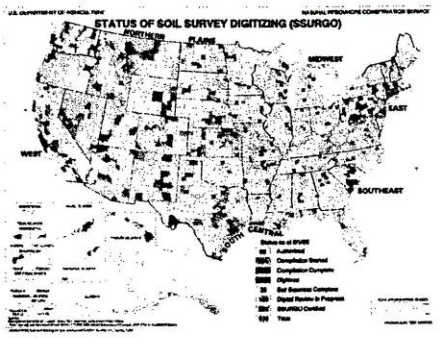
Soil Survey Geographic Database

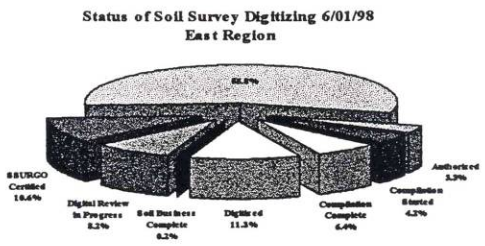
- Most detailed mapping available for the U.S.
- 1:12,000 to 1:63,360
- Compiled to geometrically and radiometrically corrected stable base material
- Linked to tabular data - Map Unit Interpretations Record (MUIR)
- Documented in a standard format such as FGDC compliant metadata

Progress

- Digitizing Units up and running - with equipment!
- Greater understanding of SSURGO development procedures throughout the agency resulting in increased production
- NCG training classes in SSURGO quality review process
- Available SSURGO datasets have increased 100% over the last year (73 to 220)
- SSURGO forum and WWW based bulletin boards established
- Status of SSURGO QIT Report recommendations documented and distributed throughout agency

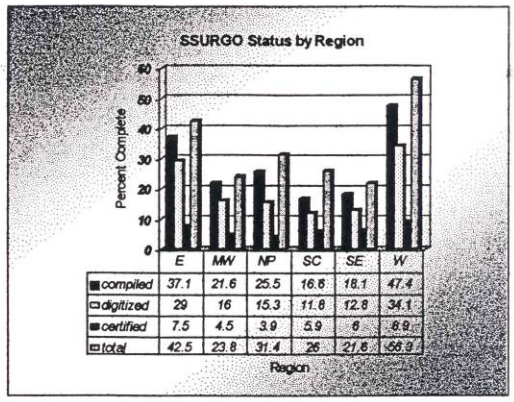
Progress





Funded SSURGO Projects FY95-98 (6/98)

MLRA	Total	Certified
WV	86	28 (1)TX
NC	84	31 (2)
MA	65	15 (5)
IN	57	11 (7)
Nation	**925**	**220**



	E	MW	NP	SC	SE	W
compiled	37.1	21.6	25.5	16.6	18.1	47.4
digitized	29	16	15.3	11.6	12.8	34.1
certified	7.5	4.5	3.9	5.9	6	8.9
total	42.5	23.8	31.4	26	21.6	56.9

Time Frame for Completion of Digital Surveys

SSURGO QIT estimated six years to complete 2600 surveys assuming:

- 12 digitizing centers
- 33 staff in each unit(about 400 staff)
- approximately 18 million dollars/year
- digital ortho availability
- resulting in some 500 digital counties per year

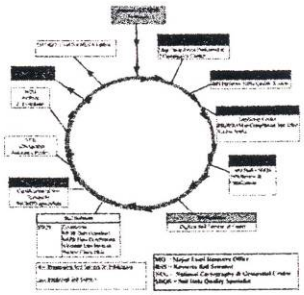
Total SSURGO Workload

- Roughly 3,200 Soil Survey Areas in U.S.
- 2,600 areas identified as priority
- 900+ in some funded for SSURGO and tracked for completion
- 220 SSURGO Certified (rate of 1-3 per week)

Digitizing Units

SSURGO PROCESS

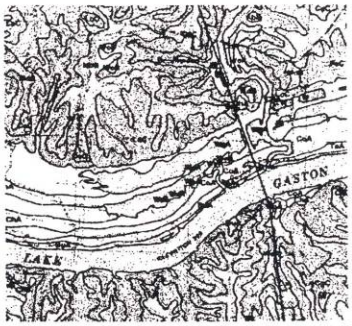
Texas SSURGO Strategy for Published and Progressive Soil Surveys



Workflow Management

Funded	Stateid	Survey Name	Status	Date - Recieved for SSURGO Review at WI-DU	Survey is at or Progress is Controled By	SSURGO Review Source or Controling Current Process	Final Review	Corrections	Final review	Archived	Materials	Special Feat.	MUR Tables	Correlation Doc.	Comp & Jdn Cert.	SSURGO Cert.	Scale Wavor	Gamo 19	Letter
96	WV079	Putnam*	6_		WI	Barb-d	x	x	x		x	x	x	x	x	x	-	x?	x?
96	WI087	Outagamie	3_	2/27/98	WI	Barb-d	x	x	x	B	x	x	x	x	x	x	-		
[redacted]	POLK		2_	3/19/98	WI	Barb-d	x	x	x	B	x	x	x	x	x	x	x	x?	x?
97	WV075	Pocahontas	6_		WI	Mark-d	x	x	x	B	x	x	x	x	x	x	x	x?	x?
97	NY077	Otsego	5_		WI-work	Barb-d	x	x	x	B	X	x	x	x		NY	-		
[redacted]		Mahnomen	3_	5/1/98	WI-work	Barb-d	x	x	x	B	X	x	X	x	X	X	x		
97	WV005	Boone*	6_		WI-work	Barb-s	x	x	x		B	x	P	x	x	WV	-		
NA	WI017	Chippewa	6_		WI	Barb-s	x	X	x	x	X	x	x	X	X	X	-	x	x
97	ME027	Waldo	6_	4/13/98	WI-work	Barb-s	x	B			B	X	p	x?	Need	MA	-		
[redacted]		Marshal	0_	8/1/98	WI-work	Barb-s	B					X	H	MN	Need	MN	x		
97	WV067	Nicholas	6_		WI-work	Gretta-S	H				B		P	x	x	x?	NHO		
97	IA027	Carroll	5_	4/17/98	WI-work	Gretta-s	X	B			B	x	P	x?	Need	MN	-		
97	WI116	Shawano	3_		WI-work	Mark-s	x	x	B		X	x	P	X?	x	x	-		
96	WI105	Rock	6_		WI-work	Mark-s	x	x			B	x	P	x	x	x	-		
96	NY103	Suffolk	0_		WI-work	Mark-s	x	x	B		B	x	P	x	Need	MA	-		
96	WI106	St. Croix	6_		WI	Bill					B	X	P	x			-		
97	WI027	Dodge*	3_		WI	Amy-next						x	H	x?			Needs		
96	WI019	Clark	5_		WI	Kent							H	X?			Needs		

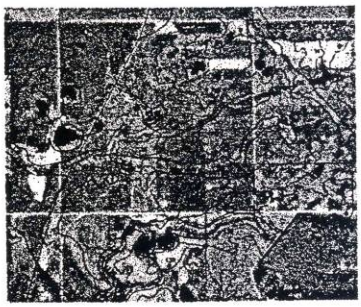
Hardcopy Options



Bracey, VA

digital raster graphic (DRG) and SSURGO data

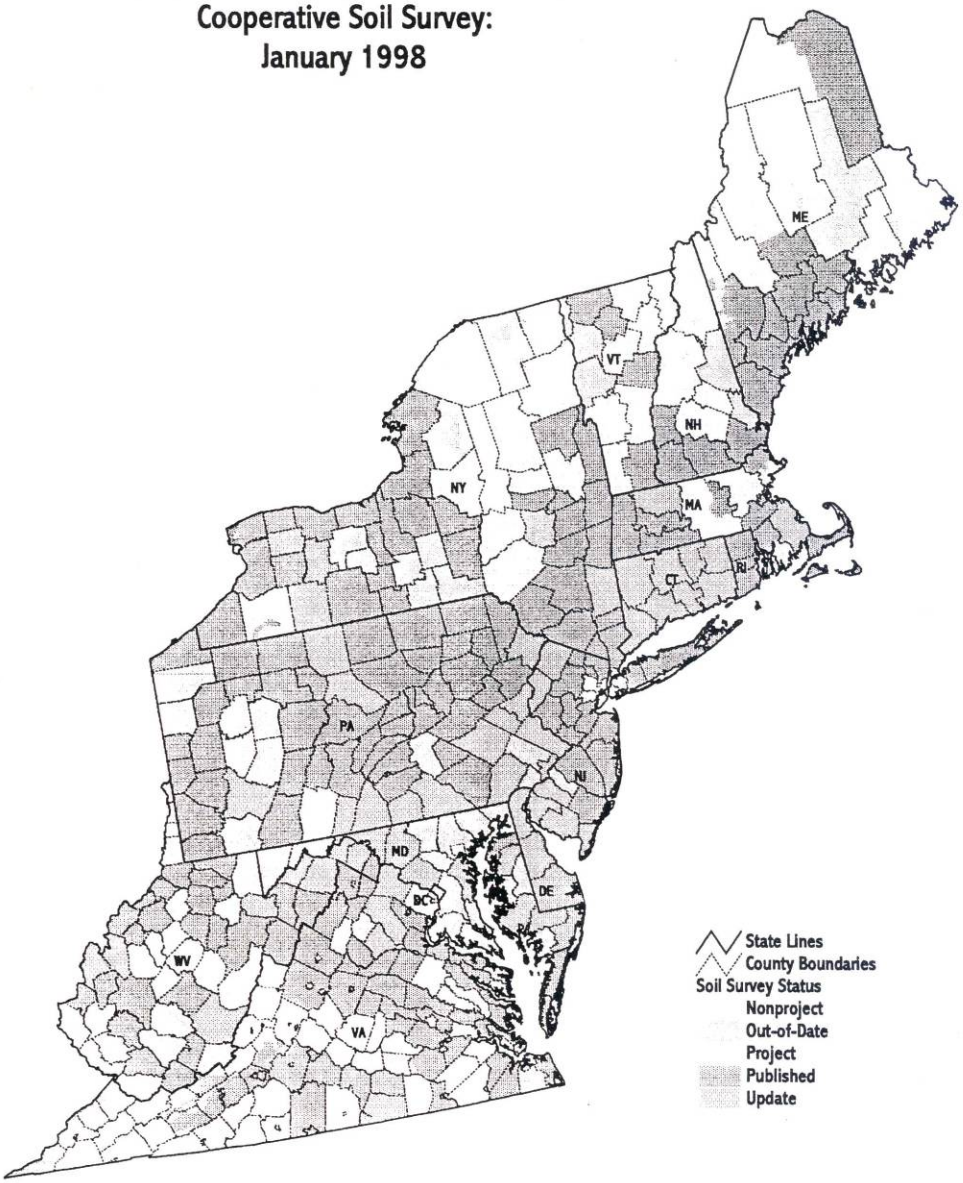
Hardcopy Options



Future Directions/Investigations

- Automated compilation techniques using GPS and orthoimagery algorithms
- Web based metadata generation and validation tools
- Access to consistent timely status information for SSURGO development
- Spatial component operational in NASIS
- NASIS attribute format for SSURGO

Status of Soil Surveys in the Northeast Cooperative Soil Survey: January 1998



USDA NRCS
Natural Resources Conservation Service

Natural Resources Conservation Service
East Regional Office
11710 Beltsville Drive; Suite 100
Beltsville, MD 20705

01/28/98 (Edited 7/14/98)

1998 NASIS Update
a summary of remarks made at the
Northeast Regional Cooperative Soil Survey Conference
Bangor, Maine July 20,1998
by
Russell J. Kelsea
National Soil Survey Center
Lincoln, Nebraska

NASIS -- the National Soil Information System -- is envisioned as a comprehensive and integrated information system to accommodate the needs of all partners in the National Cooperative Soil Survey. Major parts of the system are deployed and operational, but many other aspects of the system are still under development. In order to understand the current status of NASIS it is best to gain a historical perspective on its development.

In the mid-1980s, several scientists throughout soil survey began to recognize that increasing demands on soil survey data required that we respond to rapidly changing data needs, manage vast amounts of data, deliver those data in a timely manner in a variety of formats, and ensure the integrity, quality, and consistency of those data. Our existing data systems did not have the capacity, nor were they designed to meet those needs.

In 1988, the Soil Survey Division undertook a intensive analysis of all aspects of soil survey. By 1990, with the help of professional systems analysts, the Division realized that trying to analyze, design, and build a complete information system all at once was not practical due to the complexity of soil survey. The Division decided to implement NASIS in phases, based on four major areas identified by the analysis team:

Map unit attributes	The characteristics of map units, components, and horizons familiar to us as the text and tables typically included in published soil surveys.
Point attributes	The characteristics associated with individual pedons, including profile descriptions, laboratory characterization data, crop yield plots, soil-woodland correlation plots and other kinds of actual measured data collected at sites.
Spatial data	The geographic location of points and polygons, typically depicted on maps.
Concept and Criteria	The corporate knowledge base that defines soil survey, Aggregation including Soil Taxonomy, Official Series Descriptions, National Soil Survey Handbook, Soil Survey Manual, and field guides.

Debate about which of the major areas to implement first focused on map unit attributes and point attributes. Some argued that delivering map unit attributes would bring the most gain in the shortest time. Others argued that point attributes are the essence of our science upon which all other parts of soil survey depend and should thus be implemented first. In the end, the pragmatic argument related to costs and benefits lead us to choose map unit attributes as the first major area of NASIS to be implemented. The software capabilities we have today reflect this emphasis, but it is important to recognize that only the map unit attribute part of

NASIS is substantially complete, considerable work remains to complete the spatial, point, and concept parts of NASIS.

The NASIS 3.1 version currently installed at offices throughout the country has the capability to manage virtually all aspects of map unit attributes, including the ability to create new interpretations based on fuzzy logic, create seamless joins between survey areas and handle multiple legends for survey areas. The system will even accommodate student mapping projects and detailed mapping on research plots. These capabilities make NASIS useful as a teaching tool in courses such as *Land Classification and Mapping* and *Soils and Land Use Planning.*

The 4.0 version, scheduled for release in August 1998, will provide new capabilities to record soil profile descriptions, manage soil survey schedules, create new interpretive reports, and consolidate data at a single national replicated site. However, the team working on profile description capability identified two significant concerns with this implementation. First, although we know that soil features such as roots and pores transcend soil horizons, our data model treats each soil horizon as an independent entity without regard to other horizons in the soil profile. Second, we know that color, texture, structure, consistence, and other features are related to each other in a soil, but again our data model treats each of these features as an independent entity. The process of creating a data model helps us to recognize weaknesses in our understanding of relationships in our science. We need help from our NCSS partners to understand the correct representation of these soil features so that we can improve our databases.

Priorities for the 5.0 release, scheduled for 1999, include importing laboratory characterization data into NASIS. We recognize that the National Soil Survey Laboratory is only one of many soil laboratories contributing data to the National Cooperative Soil Survey. Once again, we need help from NCSS partners to be confident that the data structure in NASIS will accommodate all kinds of site specific data created by the NCSS. Other priorities for NASIS 5.0 include developing a field data recorder for profile descriptions and importing profile descriptions into NASIS, implementing the fully functional client/server NASIS design, making soil survey data available to the general public via the World Wide Web, and initiating the detailed business analysis for the spatial part of NASIS.
We have made great progress in developing NASIS, but we still have a long way to go to make it a truly comprehensive tool for all of us in the National Cooperative Soil Survey. We can be successful with your help.

USDA Forest Service
Northeastern Research Station
Forest Soils Research
Transcending Disciplines and Scales

Richard A. Hallett, Research Ecologist, Durham, NH

The Northeastern Research Station (NRS) (formerly the Northeastern Forest Experiment Station) is one of 7 Research Stations within the USDA Forest Service. NRS conducts extensive research to enhance and protect productivity on forests and rangelands with special attention to long-term resource issues of national and international scope in the Northeastern United States. NRS headquarters is in Radnor, Pa and maintains 12 forestry research laboratories and 10 experimental forests throughout the northeastern states.

The focus of this talk is on the NRS's role in forest soils research. The National Forest Management Act mandates that we must "maintain the productivity of the forest." To a large degree the answer to how we do this lies in understanding forest soils. The relationships between forest soils, health, and productivity are complex and require a multidisciplinary approach in order to study them. The Northeastern Research Station is uniquely positioned to do this. The research projects and techniques discussed in this talk involve soil scientists, geologists, pathologists, ecologists and foresters. Studies range from the cellular level to the regional scale, and involve extensive laboratory analyses, GIS, and remote sensing.

- **Armillaria**
  Although Armillaria spp. are found in most soils this fungus has greatest impacts on trees that are stressed by drought, defoliation, and low nutrient status.
- **Weathering**
  Species such as sugar maple may derive significant amounts of Ca and Mg from bedrock or till in the lower horizons.
- **Biogeochemistry**
  Streams integrate across watersheds and show increasing concentrations of Ca and Mg over time. Do these losses matter to forest health or productivity?
- **Long-term Soil Productivity**
  Studies involving harvesting treatments measured biomass removals and N and S additions. Will these sites recover and maintain productivity?
- **Sugar Maple Decline**
  A regional study that compares sites from PA to ME. Decline in PA is thought to be linked to low nutrient status, defoliation and drought. NH and ME have sites w/ low nutrient status but no history of drought and/or multiple defoliations.
- **Remote Sensing Technology**
  New sensors may be used to predict forest canopy nutrient status over large areas. This can be related to soil and stream water chemistry and forest productivity over a large scale.

Silver Spade Award

Submitted by John C. Sencindiver

Since 1984, the Silver Spade award has been presented at the Northeast Cooperative Soil Survey Conference. It is presented to a member of the conference who has contributed outstanding regional and/or national service to soil survey. The selection committee is made up of past award winners with the last award recipient acting as chair. Recipients are presented a silver spade tie tack and become members of the Silver Spade Club. The 1998 Silver Spade award winner is Dr. Peter Veneman, professor at the University of Massachusetts.

Past award winners are:

1984 Ed Ciolkosz
1986 Ed Sautter
1988 Sid Pilgrim
1990 Bill Wright
1992 Del Fanning
1994 Bob Rourke
1996 John Sencindiver

Maryland Report
1998 Northeast Cooperative Soil Survey Conference

Current Staffing in Maryland

Name/Position	Location
James H. Brown, State Soil Scientist	Annapolis
William Dean Cowherd, Asst. Soil Scientist	Annapolis
Rebecca Hickman, Secretary	Annapolis
Susan Davis, Soil Scientist	Annapolis
David Verdone, Soil Scientist	Annapolis
Jim Patterson, Soil Scientist, Volunteer	Annapolis
John Trach, Soil Scientist, Volunteer	Annapolis
Lenard Woods, Soil Scientist, Volunteer	Annapolis
Soil Scientist Vacancy	Annapolis
Lenore Vasilas, Soil Scientist COE	Baltimore
Diane Shields, Soil Scientist - part time	Centreville
Carl Robinette, Soil Scientist	Cumberland
Joseph Kraft, Soil Scientist	Frederick
Valerie Cohen, Soil Scientist	Frederick
Soil Scientist Vacancy	Frederick
George Teachman, Soil Scientist, U.S. Army – APG	Hartford
James Brewer, Soil Scientist	Salisbury
Susan Demas, Soil Scientist	Salisbury
Dr. George Demas, Soil Scientist	Snowhill

Current University of Maryland Staff
College Park and Eastern Shore

Dr. Martin Rabenhort, Prof. of Pedology	(301) 405-1343
Dr. Delvin Fanning, Prof. of Soil Science	(301) 405-1344
Jim Jordon, Asst. Researcher Plants & Soil Science	(301) 651-2200, Ext. 634

Soil Surveys that are SSURGO Certified
- Cityof Baltimore
- Dorcheser
- Montgomery
- Queen Anne's
- Washington
- Worcester

Soil Surveys Published in 1998
- City of Baltimore Dorcester

Soil Survey Updates in Progress
- Anne Arundel
- Frederick
- Wicomico

Special Studies
- Acid Sulfate Study - Anne Arundel County
- Subaqueous Soil Studies - Worcester County
- Geomorphic Surfaces, Soil Genesis and Morphology Studies - Wicomico County

University of Delaware Report
Bruce Vasilas, Professor, Agronomy

The University of Delaware has not sent a representative to the Northeast Cooperative Soil Survey Conference since 1988. This lack of participation was due, in part, to the absence of a pedologist on the faculty. This presentation brought the participants of the conference up to date with the University of Delaware soil science faculty and their research.

The soil science faculty are housed in the Department of Plant and Soil Sciences in the College of Agriculture and Natural Resources. At present, there are six faculty: Jeff Fuhrmann, Associate Professor of Soil Microbiology; Yan Jin, Assistant Professor of Environmental Soil Physics; Mark Radosevich, Assistant Professor of Environmental Soil Biochemistry; Tom Sims, Professor of Soil and Environmental Chemistry; Don Sparks, Professor of Environmental Soil Chemistry; and Bruce Vasilas, Professor of Agronomy. Funding is in place to hire an Extension Specialist in nutrient management and a soil molecular biologist. In addition, funds have been requested to hire a pedologist.

The main challenges to the sustainability of agriculture in Delaware and urbanization and the detrimental effects of agriculture on water quality. From 1975 to 1996, 130,000 acres of farmland was lost. Nitrogen and phosphorous contamination of surface and groundwater is due to a number of factors: the intensive poultry production in southern Delaware (>250 million broilers annually), the continuous application of poultry manure to light-textured soils, and shallow tables. In keeping with the land grant philosophy, soil science research emphasis reflect these challenges: remediation of contaminated soils and nutrient management that minimizes detrimental effects to water quality.

Laboratory research projects emphasize: (a) microbial degradation of xenobiotics in soils, (b) fate and transport of contaminants in soils, (c) kinetics of soil chemical reactions, and (d) ecology ofrhizobia. Field research projects include: (a) drainage ditches as sources of P contamination of inland bays, (b) use of coal fly ash as a soil amendment, (c) agronomic and environmental impacts of poultry manure applications to soybeans, (d) host and symbiont effects on the soybean-brady rhizobium symbiosis, and (e) soil-borne biological indicators of hydrology.

Delaware Report
1998 Northeast Cooperative Soil Survey Conference

National Cooperative Soil Survey
Current Staffing in Delaware

Name/Position	Location
James H. Brown, State Soil Scientist	Annapolis, MD
Chuck Parker, Soil Scientist	Georgetown, DE
Dick Hall, Soil Scientist, Volunteer	Salisbury, MD
Mary Anne Levan, Soil Scientist, Volunteer	Wilmington, DE
Current University of Delaware Staff	
Dr. Bruce Vasilas, Prof. of Soil & Crop Management	(302) 831-1391
Dept. of Plants & Soil Sciences	

Soil Survey Updates in Progress

New Castle Sussex

Vermont Report
1998 Northeast Cooperative Soil Survey Conference

Staff

- Program management is under direction of the State Resource Conservationist
- 2 state wide positions - Soil Liaison and GIS Specialist
- 3 soil survey project leaders
- 2 soil scientists

Soil Mapping

- State approximately 87 percent completed.
- Windsor County will be completed in 1998, final field review will be held in 1998.
- Orleans and Caledonia Counties are ongoing.
- Essex County will state in 2004. Finish 2008

Digital Soil Surveys

- Rutland, Windhan, and Washington counties are SSURGO certified.
- Bennington County will be certified shortly.
- Franklin and Lamoille Counties are in the SSURGO pipe line.
- Digital data is also available for Addison, Chittenden, Grand Isle, and Orange Counties.

Published Soil Surveys

- Available - Chittenden, Franklin, Lamoille, Orange, and Windam Counties.
- In the pipeline - Rutland, Bennington and Washington Counties.
- Out of Print - Addison and Grand Isle Counties.

Northeast Cooperative Soil Survey Conference
Bangor, Maine
July 19-23,1998

NATIONAL CARTOGRAPHY & GEOSPATIAL CENTER STATUS REPORT
by
Dick Folsche, NCG Director,
Ft. Worth, Texas

The National Cartography and Geospatial Center (NCGC) is the mapping and spatial data center for the Natural Resources Conservation Service (NRCS). Located in Fort Worth, Texas, it supports regional offices and states with services, products, and technical leadership in the areas of cartography, natural resources data access and distribution, geospatial data base development, and assistance in mapping, digitizing, and publishing soil surveys.

The NCGC provides a variety of map products and services for all areas administered by the NRCS and is a focal point for digital imaging, modern mapping, global positioning systems, geographical information systems, and remote sensing. In addition, to these technologies, NCGC is the center for natural resources' data collection and analysis, World Wide Web coordination and data archive and distribution.

NCGC Organization and Functions

- **Center Support Branch**
    - Technical information support for Center and other National staffs at Ft. Worth ISS Scheduler
    - Printing (litho and copy)
    - Order control
    - Contracting
    - Library (hard copy)
    - Reports
    - NBMC - Mailroom and Supplies
        - Mailroom Services/Schedules
        - Ordering Supplies - Inventory Program

- **Geospatial Data Branch**
    - Geo Database Library Services Team
        - Library Maintenance - on/off site
            - On/Near/Off-line Storage, Access, Maintenance
            - Archive NRCS Data-OSP
            - Database Entry
            - Data Catalogs, Reports, Thematic Maps
        - Data Distribution - NRCS and Public
            - Inquiries (1-800#, phone, FAX, email, mail)
            - Technical Referrals
            - Distribution (Physical Media, AFTP, WWW)
            - Reports

- WWW and Database Operations Team
    - WWW Applications
    - Database/WWW Integration
    - Database/WWW Search
    - Custom Applications for NRCS Programs
    - FDGC, GILS Clearinghouse Activities
    - JAVA, Informix, Oracle
- Database Administration: Informix, Oracle
- Web Operations
    - NRCS Technical Material Coordination
    - NRCS Data Resources Coordination
    - National NRCS Website Coordination
    - Development, Posting, Maintenance of NSTC, WWD, NBMC, NCG, NEDC, NPSS, NSMC, GLTI, ITI, SCRO
- Maps and Integrated Data Systems Team
    - Cartography
        - Maps and Charts
        - Display Graphics and Reports
        - Map and Database Automation (AML and AVENUE)
        - Mapping Applications (SDE and ArcView IMS)
        - R&D of Digital Cartography Enhancements
        - PRISM - Web Browsing/Data Processing - Digital Base Maps
    - Data Integration
        - Compilation (Assemble Layers, Thematic Themes)
        - Acquisition (Purchase, Scan, FTP, Digitize Thermatics)
        - Processing (Format, Edit, Convert Spatial and Tabular Data)
    - GIS Training and Support
        - Classics and Hotline Support
        - Development of Technical Instructions, Procedures, Guidelines
- Database Development and Analysis Team
    - Data Analysis
    - Develop Applications (Arclnfo and ArcView)
    - Provide Assistance to COTS GIS Users
    - BPR Support
    - Soil Explorer Support
        - Cursory Review of Soil Interpretations
        - Application Development
    - Production
        - Data Aggregation (Reproduction, Format Conversion)
        - DOQ Processing (Resample, Mosaic, etc.)
    - Arc Explorer
        - Project Design, Production Support
        - Project Enhancements
- Map Objects
    - Administration of MO Internet Server and its Interface with the Netscape Web Server
    - Provide Applications Expertise

- Quality Control of Spatial Data
    - HU-Hydrologic Units
        - Review HU Datasets
        - Recommend HU Datasets Certification
        - Coordinate with SO Program Mgrs.
    - RUSLE and WEQ Data
        - Certify Accuracy of Existing Datasets
        - Certify New Datasets
        - Develop Maps of RUSLE and WEQ Spatial Data from Tabular Data
- **Resources Inventory Support Branch**
    - Data Collection Support Team
        - NRI Help Desk
            - Questions
            - Announcements
            - Instructions
        - GPS Help Desk
            - Questions
            - Announcements
            - Technical Documents
        - Data Utilization Team
            - Data Analysis Reports
        - Quality Assurance Team
            - Quality Assurance Tools and Materials
            - PSU Spatial Data Base Development
        - Remote Sensing Team
            - Aerial Photography Acquisition
            - Satellite Imagery Acquisition
            - Remote Sensing Training
            - Digital Orthophotography
            - Digital Image Processing
            - Digital Raster Graphics
        - Technology Implementation Team
            - Implementation Projects
    - **Soils Support Branch**
        - Imagery Acquisition and Data Input Team
            - Field mapping imagery
                - scheduling
                - ordering
                - status
            - Digital Orthophotography Production Team
                - DOQ CD preparation
                - DOQ hardcopy output
            - Photobase Team
            - Publication imagery
                - scheduling
                - ordering
                - status
            - Compilation materials
        - SSURGO Training and Communication Team
            - Standards and Specifications

    - SSURGO forum-Help Desk
    - Training
    - Procedures
- SSURGO Review Team
    - Prepare SSURGO for archive
    - Status of SSURGO projects
- SSURGO Quality Assurance and Research Team
    - Quality assurance on certified data
    - Maintain and update certification and archive software
- General Soils Map Team
    - GSM development
    - Legends
    - Locator maps
    - Index maps
- Digital Map Finishing Team
    - Standards and Specifications
    - Maping Forum - Help Desk
    - Training
    - Procedures
- Printing Contract and Special Development Team
    - Status soil survey publications
    - Technical specifications for printing contract
    - GPO liaison
    - Quality assurance of soil survey publication maps
    - Prepares publication materials for national archives

NCGC STAFF DIRECTORY

NCGC Subject Contacts
Phone: (817)509-3400

Subject	Contact (Area Code 817)
Aerial Photography - NRI	509-3348 Plunk
ARC/INFO	509-3366 Nechero 509-3360 English 509-3432 Justice 509-3346 Griffin
Archiving Digital Data	509-3360 English
Carto 19's (Order Control)	509-3413 Willis 509-3386 Eng 509-3394 Gaster
Climatic Data	509-3370 Prochnow
Compilation Materials	509-3424 Christner 509-3430 Hay
Conservation Practice Standards Coordination	509-3363 Kuenstler
Contracting Litho	509-3394 Gaster
Contracting Photomechanical	509-3406 Martinez
Data Dissemination	1-800-672-5559 509-3360 English 509-3370 Prochnow
DEMs	509-3357 Carrington 509-3346 Griffin
DLGs-SSURGO	509-3432 Justice
DLGs-Other	509-3395 Fukuhara
DOQs-Orthophotography	509-3438 McWilliams 509-3424 Christner 509-3346 Griffin 509-3434 Kimmet
Field Mapping Imagery	509-3424 Christner 509-3430 Hay

General Soils Maps Global Positioning	509-3435 Kortum
Systems (GPS)	509-3350 Rasher 509-3347 Hallbauer
GPS-NRI	509-3350 Rasher
GRASS/MAPGEN - Ft Collins	(970)282-1440
Hydrologic Unit Digitizing Coordinator	509-3372 Sebert
Institute Liaison	
GLTI	509-3340 Harlow
NRIA	509-3340 Harlow
SQI	509-3420 Parham
SSI	509-3386 Eng
WLI	509-3358 Daniels
WS1	509-3348 Plunk
Map Finishing - Development Map	509-3447 Schramm
Finishing-Quality Assurance Map	509-3435 Kortum
Finishing - Training	509-3446 Ruiz
National Centers Liaison	
NPDC	509-3363 Kuenstler
NSMC	509-3420 Parham
NSSC	509-3420 Parham
NWCC	509-3348 Plunk
NCG Library	509-3394 Gaster 509-3411 Venable
NCG Operations	509-3386 Eng
NRI-Data Analysis	509-3342 Bogusch
NRI-Data Collection	509-3352 Stockbridge
NRI-Elimination Keys	509-3342 Bogusch
NRI-Help Desk	509-3352 Stockbridge
NRI-PDA Support	509-3352 Stockbridge 509-3357 Carrington
NRI-PSU Spatial Database	509-3351 Steiner

National Archive-Soil Survey Publications	509-3435 Kortum 509-3413 Willis
Photo Interpretation	509-3348 Plunk
Photo Interpretation (NRI)	509-3348 Plunk
QA Soils Data	509-3443 Owen
Remote Sensing	509-3348 Plunk 509-3346 Griffin 509-3347 Hallbauer
Remote Sensing (NRI)	509-3348 Plunk
Scanning/Digitizing (NRI)	509-3345 Grantham
Soil Survey Locator Map	509-3435 Kortum
SSURGO-Archiving	509-3421 Brookover
SSURGO-Quality Assurance	509-3421 Justice
SSURGO-Scanning/Digitizing	509-3432 Owen
SSURGO-Training	509-3421 Brookover
STATSGO.SSURGO (technical support)	509-3455 Minzenmayer
Thematic Maps	509-3366 Nechero
TIGER data (Census)	509-3357 Carrington
Water Quality Modeling	509-3348 Plunk
World Wide Web	509-3370 Prochnow

To view the following files in PDF you will need to download the Adobe Acrobat Reader. Acrobat and the Acrobat logo are trademarks of Adobe Systems Incorporated. The Adobe Acrobat Reader symbol will be (A).

NRCS Field Office users running UNIXWARE should download the three files in this directory to view PDF files.

NCGC Technology Report

- NCG Technology Report - Spring '97 (A)
- NCG Technology Report - Fall '96 (A)

NCGC Technical Review

- ARC/INFO
  - Creating a "DEM" in ARC/INFO - A Tutorial
  - Hydrologic Unit Quality Assurance Review Procedures in ARC/INFO
  - Labeling a Contour Coverage (Layer) in ARCEDIT - A Tutorial
  - Creating a Plot File and Plot a Coverage (Map) in ARCPLOT

    - Procedures for the use of Redefined Items Listed in the (.pat) Polygon Attribute Table
    - Digitizing Soils in ARC/INFO
    - Importing DLG-3 Optional Format Files into ARC/INFO
    - Displaying a DOQ in ARC/INFO
    - Importing Precipitation ASCII Files into ARC/INFO
    - An ARC/INFO Procedure to Produce a Soil Interpretation Map and Cover from SSURGO Data
    - Downloading PLGR96 Data into ARC/INFO and Creating a Coverage
    - Converting GRASS Data to ArcView (A)
    - ARC/INFO Procedure to Produce Soil Restrictive Feature Maps from SSURGO Data
    - A Procedure to Georeference Farm Service Agency Crop Compliance Slides with USGS Orthoquads in ARC/INFO
    - ARC/INFO Procedure in Subdivide a DOQ for Natural Resource Evaluation Purposes
    - Accessing SSURGO Soils Data in ARC/INFO for Viewing or Hardcopy
    - An ARC/INFO Procedure to Prepare Line or Point Grids for Natural Resource Sampling Activities
    - Production of Three Dimensional Soil Maps Overlaid on Digital Orthoquad Imagery
    - A Procedure in ARC Grid to Resample DOQ's
    - How to Access INFO Data Files to Create Soil Interpretation Thematic Maps Using ARC View
- DOQs
    - Mosaicing Digital Orthophotoquads into County Coverage
    - ARC/INFO Procedure to Subdivide a DOQ for Natural Resource Evaluation Purposes
    - Production of Three Dimensional Soil Maps Overlaid on Digital Orthoquad Imagery
    - A Procedure in ARC Grid to Resample DOQs

- ERDAS Imagine
  - Importing and Attributing USGS 1:2,000,000 DLG-3 Optional Format Files in ERDAS Imagine
  - ERDAS Imagine Method for Importing, Georeferencing and Eliminating Viewer Overlap on USGS 1:24,000 Scale Digital Raster Graphic (DRG) Files
  - Importing Precipitation ASCII Files into ERDAS Imagine
  - Importing USGS 1:250,000 (3 ARC Second) Digital Elevation Models (OEM) into ERDAS Imagine
  - Creating an Area of Interest (AOI) from a Digital Vector Coverage using ERDAS Imagine Version 8.21
  - Importing, Subsetting, Matching Histrograms on, Resampling and Exporting Scanning Imagery Using ERDAS Imagine 8.21
  - Advanced RGB Clustering in Erdas Imagine Version 8.3
  - Performing Resolution Merging of 20M SPOT MS and 10M SPOT PAN Imagery Using ERDAS Imagine 8.3
- GPS
  - Using Global Positioning Systems (GPS) to Aid 1997 NRI Data Collection
  - Determining GPS PLGR Needs
  - Procedure to Download Waypoint Data using ASCII Output into Windows 3.1 for Workgroups
- Plotters
  - Hewlett Packard InkJet Plotter Report March, 1997
- Scanners
  - SSURGO Scanning Information

Northeast Cooperative Soil Survey Conference
July 20 - 23,1998

Soil Quality Institute - Technology Transfer
Debra Dirlam, GIS Specialist

The Natural Resources Conservation Service Soil Quality Institute (SQI) was established in 1995. It is one of eight Institutes in the Science and Technology Consortium. The role of the institutes is to identify needs, acquire technology, and develop and distribute products.

The Institutes developed collaborative partnerships with:
- Institutes
- Centers
- Divisions
- Information Resource Technology
- State, Field, MLRA offices
- Universities
- Other Federal Agencies (ARS, FS,USGS)
- Other Organizations - many entities within and outside the NRCS. The SQI is an 8-member staff located in 6 locations throughout the US.

Our charges are New Technology:
- Assessment Tools for Field Staff
- Present state of soil health
- Impact of cropping systems on the soil
- Systems to improve soil quality
- Marketing
- Training/Informational materials for field staff and clientele

The SQI accomplishments include:
- Soil Health Card Design Manual (7 states)
- Soil Quality Kit Manual/Interpretations
- Reference Soils
- Soil Biology Primer
- Agronomy Soil Quality Technical Notes
- Soil Quality Information Sheets developed in cooperation with National Soil Survey Center
- Soil Quality Concept Book

In recent years there have been increasing interests in the concept of soil quality. ***"Protecting soil quality, like protecting air and water quality, should be a fundamental goal of national environmental policy"*** **(National Research Council, 1993).** This quote, from the 1993 book "Soil and Water Quality: An Agenda for Agriculture" by the board on Agriculture of the National Research Council, emphasizes that the quality of soil is as important as the quality of air and water in determining the overall health of our environment.

A discussion of soil quality brings up key questions: What is it, how do you measure it, and how do you maintain or improve it? This presentation addresses these questions and discusses ways that the SQI is working to help people improve and maintain soil quality.

Soil is a basic natural resource that is fundament to the ability of agriculture to meet basic human needs for food and fiber. Soil is also critical for supporting natural ecosystems and in the cycling of water and essential elements like carbon and nitrogen throughout the biosphere. **The Soil Science Society of America has adopted this definition soil quality:**

Soil Quality is the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, to maintain or enhance water and air quality, and to support human health and habitation (Karlen et al, 1996). Implicit in all soil quality definitions is the idea that the most important attributes of a healthy soil will vary, depending upon a value judgement about the primary function of the particular soil.

To abbreviate this definition, soil quality is the capacity of the soil to function.

Soils naturally vary in their function; therefore an important part of the definition is the concept that soil quality is specific to a kind of soil. **The concept encompasses two distinct but interconnected parts: Inherent quality and Dynamic quality.**

- **Inherent soil quality** results from innate properties of soil as determined by the factors of soil formation: climate, topography, living organisms, parent material and time.
- **Dynamic soil quality** results from the changing nature (health or condition) of soil properties that are influenced by human use and management decisions. Collectively, the effects of management will either result in a net positive or negative impact on the health of the soil. **This dynamic aspect of soil quality is the focal point of the concern for assessing and maintaining healthy soil resources.**

Our use of soil may alter soil properties, which can result in degradation, which is the decline in the soil's inherent capacity to produce economic goods and perform ecological functions. Indicators of soil degradation include:

- Erosion
- Organic matter loss
- Acidification
- Reduced biological activity
- **Nutrient depletion**
- **Compaction**
- **Salinization**
- **Water-logging**
- **Chemical toxicity**

On a worldwide basis, the biggest threat is the actual loss of soil by erosion. Organic matter levels cross the Midwest have declined since the introduction of cultivated agriculture. Poor drainage is a problem in many areas and wet conditions frequently result in excessive compaction. Lowered pH, nutrient levels and biological activity are other indications of degraded soil conditions.

With this new perspective of soil quality, there is:

- growing appreciation of the diverse functions that soils perform in watersheds and ecosystems
- increased awareness of the biological diversity in soils
- evolving recognition of the importance of soil biology in both agricultural and natural landscapes

There is increased public concern about the environment and depletion of our natural resources. The fact that soil formation is measured on a geologic time scale makes the preservation of health and high quality soils a matter of widespread concern.

Soil performs many functions. We depend on it for healthy food, clean water and air, wildlife habitat, and scenic landscapes. Soil Quality is assessing terms of how it performs multiple functions:

- Biological productivity
- Regulating and partitioning water
- Filtering and buffering

- Storing and cycling nutrients
- Support socio-economic structures

Soil Quality can also be divided into three goals and evaluated on the soil's affect on productivity, environmental quality and health. The three goals:

- **Productivity** the ability of soil to enhance: plant and biological productivity
- **Environmental Quality**: the ability of soil to attenuate environmental contaminants, pathogens, and offsite damage
- **Health**: the interrelationship between soil quality and plant, animal, and human health

(International Conference on the Assessment and Monitoring of Soil Quality. Rodale Institute, 1991)

Soil quality indicators:
Linked to the specific soil functions discussed above, are surrogate measures of each function. These surrogate measures of the ability of the soil to function are commonly called **"indicators of soil quality".** Soil quality indicators can be measured directly, either in the field or laboratory. They must be characteristically sensitive to changes as a result of management, easily measured with reproducible results, accessible to users, and applicable to field conditions.

Soil quality is an integration of processes occurring in the chemical, physical, and biologic components of soil. Therefore, the assessment of soil quality requires a data set of chemical, physical, and biological indicator properties such as:

1) chemical properties
- **total organic C**
- **total organic N**
- **electrical conductivity**
- **Extractable NH_4^+**
- **$N0_3^-$**
- **Extractable P**
- **Exchangeable K**

2) physical properties
- **texture**
- **bulk density**
- **infiltration**
- **water holding capacity**
- **aggregate stability**

3) biological properties
- **Microbial biomass C**
- **Microbial biomass N**
- **Potentially mineralizable N**
- **Soil respiration**

Our Challenge:
Identifying how individual soil indicator properties should be interpreted into qualitative soil quality ratings or scores, and how to assess overall soil quality with respect to the critical functions, is a major challenge for current and future soil quality research.

Carbon Sequestration - Climate Change Initiative
Dewayne Mays - Head, Soil Survey Laboratory

The NSSC and the SSD is doing a large amount of work related to Global Change. Specific projects are tied to the areas covered in this summary. Understanding the effects of agriculture and forestry on the global atmosphere composition of greenhouse gasses and the role that soils play in these processes is important. Identifying soil's contributions has been one major component of the USDA Global Change research and development program over the last several years.

The research undertaken by the NRCS to help us understand terrestrial soil carbon and its interactions with the biochemical fluxes with the atmosphere. The resulting knowledge will enable future generations of general circulation modelers to more accurately describe, at the regional scale, the contributions of agriculture and forestry to the mitigation of greenhouse gas emissions, and to project the capability to adapt to these changes.

A very broad range of projects is being conducted by scientists in Soils Division, cooperating universities, and the Agriculture Research Service. Such free exchange of ideas allows others to understand what is going on in various projects and lets changes be made in existing projects.

Six books have been published related to soils and global change and three more are in process. One special one is being completed on the potential for the Cropland to Sequester Carbon.

Recently a group has been established to do a book on carbon sequestration and range land. The group is made up of representatives from NRCS, ARS, and several Universities. This address range land but not grazed woodlands, that is being done by the Forest Service.

Why Are Soils Important to the GLOBAL CHANGE ISSUE

- Sink and Source of Organic Carbon.
- Soils control potential agriculture and forest productivity and determine limits of plant succession.
- Soils influence nutrient cycling and hydrology of watersheds.
- Soils may change in physical, chemical biological and mineralogical properties as soil genesis process become altered by climate change.
- Soils are benchmarks of landscape stability and provide evidence of past climate regimes and vegetative patterns. Footprint of Climate Change
- Soils are responsible for the storage, transformation, and release of environmental contaminants; soil properties change in response to climate, the ability of soils to retain, transform, and release pollutants will change.

The Role of Soil Scientists in Global Change

- Characterize and map soil carbon sources and sinks around the world.
- Identify and map paleosols which are benchmarks of past vegetative shifts and climate regimes.
- Develop process models of soil genesis to evaluate impact scenarios of climate change on soil properties and landscapes.
- Develop soil survey databases (physical, chemical, mineralogical, and geographic) needed to support global circulation models (GCM's).
- Assess the impact of climate change on soil properties and the implications for agriculture and forest productivity.
- Develop a long-term soil inventory and monitoring program to gather soil information needed in models of soil genesis and global circulation.

- Promote interdisciplinary research approaches to explore the ecological relationships of soils climate, and vegetative among sensitive ecosystem boundaries.
- Contribute to a better understanding of Earth Systems History through soil genesis research.

SCS Global Change Initiative

Define and Predict Soil Responses to Changes in The Soil Environment

- By making existing soil survey information more useful and more accessible.
- By filling data voids and collecting additional information about soil-landscape processes.
- By modeling soil genesis and soil-landscape systems.
- By providing the information to global change modelers.

Projects to fill data voids and collecting additional information about soil-landscape processes

- Additional sites for monitoring of soil moisture and temperature. Summary of data on Web.
- Monitoring of wet soils.
- Carbon studies (carbonates and organic carbon)
- Collect data on properties sensitive to change.
- Collect data on MLRA's.

Projects dealing with modeling soil genesis and soil-landscape systems

- Development of soil genesis models for MLRA-77.
- Soil genesis modeling meeting.
- Develop soil genesis models with existing data.
- Modeling data on properties sensitive to change.
- Develop models dealing with carbon sequestration.

Projects to provide information to global change modellers

Support for database development (CD-ROM)
Providing STATSGO and MLRA maps to user. With soil attribute for the map units.
Provide soil moisture and temperature maps and data to users.

Projects to make existing soil survey information more useful and more accessible

- Completion of SCS-8 to include location, classification, and map unit for the sampled pedon.
- Conversion of FAO maps to Soil Taxonomy.
- Updates of soils of the U.S. and MLRA maps.
- Updates of Soil Moisture and Temperature maps.
- Updates of STATSGO and NATSGO maps.

SOIL-GEOMORPHIC PROCESSES

1. MLRA 77 - Southern High Plains.

NASIS/TAXONOMY
1. Stratigraphic and geomorphic controlled age estimation of Central Kansas soils.
2. Soil Process Response to Climate.
3. Arctic Tundra LTER and High Latitudes Soils in Alaska and Russia
4. Soils of the central plains experimental range station (CPER)

FIELD, LABORATORY, AND GEOSPATIAL METHODS

1. Bulk Density Methods for Fragile Surficial Horizons.

CARBON SEQUESTRATION AND BIOLOGICAL PROCESS

Method for Determination of Field Biomass
Updating desert project
Soil biological activity and the biological active carbon pool
Soil carbon map of North America
Permafrost soils map of the world
Soil-C Storage within Soil-Profiles of the Historical Grasslands of the USA:

INTERPRETATIONS

Soil properties sensitive to climatic change
Relationship between Soils and Incidence of Human Cancers

FACILITATING ACTIVITIES

Soil Data Base Updates of Classification and Site Locations

COMPLETED PROJECTS

This is not a complete list but covers the major projects. Many of the ones listed earlier have complete phase of the projects. There have been many scientific articles written on different aspects of the work. Many of the projects are long term in nature (monitoring of wetlands, soil moisture, and temperature for example).

1. Carbon Sequestration in Arid and Semi-arid Environments: A Case Study of Texas: OBJECTIVE(S): (1) To develop a data base of content as kg C/m2/m of arid and semi-arid Texas; (2) To relate C content to land use and other land variables to evaluate the biogeochemical cycles and thereby provide understanding needed for policy decisions; (3) to elucidate the pools of organic carbon sequestration and the processes involved in organic carbon decomposition in calcareous soils of arid and semi-arid regions of Texas; and (4) To develop working hypotheses on C sequestration and recommend research proposals for future study.

2. Carbon Sequestration in New York State. A case study. Done by Cornell University as a cooperative project.

3. Carbon Sequestration in Puerto Rico. A case study. Done by University of Puerto Rico as a cooperative project.

4. Erosion Effects on Carbon Redistribution and C02 Flux: OBJECTIVE(S): (1) Determine the effect of landscape position on carbon distribution in the soil profile for given soil series: Canfield, Centerburg, Eldean, Glynwood, and Miamian; (2) Estimate the magnitude of past erosion by soil profile characteristics and 137Cs analyses; (3) Monitor temporal changes in C02 flux for different landscape positions for paired mapping units; and (4) Determine the effect of carbon displaced by soil erosion on C02 flux.

5. Soil Carbon in New England Forests - Analysis and Modeling: OBJECTIVE(S): To develop a predictive model based on the integration of regional-specific factors (bth physical and biotic/chemical) by which soil organic carbon content can be estimated. The model will be developed by relating soil organic carbon content to forest types and

soil series as well as to other site parameters such as aspect, slope, soil depth, pH, etc. The model will provide resource professionals with a technique for rapid field estimation of soil organic carbon content.

6. Soil Organic Carbon and Associated Properties on an Aerial Basis for Global Climate Modelers - MLRA 106: OBJECTIVE(S): (1) To determine the soil organic carbon for soils in MLRA 106 by both sampling pedons and deep boring; (2) Link the data collected to the map units within the MLRA.

7. Organic Carbon Data Collection Project for New England States: OBJECTIVE(S): (1) Improve the soil organic carbon data base for the New England States by correcting inconsistency, and or incorrect data elements; (2) Improve sampling of organic surface layers and the standing biomass; (3) Determine organic matter accumulations in the Bb and Bs horizons for Spodosols in the New England region. Panola mountain watershed, Georgia: Objectives: (1) To provide a detailed soil map unit from GPS systems that can be loaded into a GIS system spatially integrated previous, current and future research; (2) To sample representative soil profiles.

The heavy metals/trace elements capabilities under development at the Soil Survey Lab will help to address:

1. Animal waste management
2. Water Quality
3. Phosphorus leading/nutrient loading
4. Mine spoil run-off
5. Background levels of micro-nutrients/heavy metals.

COMMITTEE CHARGES ESTABLISHED

FOR

1998

NORTHEAST COOPERATIVE

SOIL SURVEY

CONFERENCE

Northeast Cooperative Soil Survey Conference, 1998
Committees

Committee 1: Research Needs

Members:

Maxine Levin, Chair, NENCSS, Beltsville, MD
Bruce Thompson, M012 Leader, NRCS, Amherst, MA
Edgar White, NRCS State Soil Scientist, Harrisburg, PA
Edward Ciolkosz, Professor, Pennsylvania State University, University Park, PA
Bob Rourke, Professor, University of Maine, Orono, ME
Thomas Villars, Project Leader, White River Junction, VT
Phillip Schoenberger, NRCS National Soil Survey Center Liaison, Lincoln, NE
Mary Beth Adams, USFS Representative, Parsons, WV

The major goal of the committee is to improve communication of soil survey research needs and activities in the NE Conference area within the NE NCSS at all levels.

Committee charges:

1. Identify, document and prioritize the critical research for soil survey in the NE
2. Identify sources of funding for critical research and ties to the current national NCSS funding initiatives.
3. Identify and establish channels of communication for technology transfer and feedback between researchers and the field. Develop a protocol to measure performance of research agenda milestones and progress.
4. Identify cooperative interstate opportunities for research.

Northeast Cooperative Soil Survey Conference, 1998
Committees

Committee 2: Soil Taxonomy

Members:

Bob Ahrens, National Leader Soil Taxonomy, NSSC, Lincoln, NE - Chair
Wayne Hoar, NRCS, Dover-Foxcroft, ME
Bob Rourke, University of Maine, Orono, ME
Bruce Thompson, NRCS, Amherst, MA
Steve Gourley, NRCS, Winooski, VT
Steve Carpenter, NRCS, Morgantown, WV
John Sencindiver, University of West Virginia, Morgantown, WV
Marty Rabenhorst, University of Maryland, College Park, MD
George Demas, NRCS, Snow Hill, MD

The goal of the Soil Taxonomy Committee is to:

1. Sponsor or coordinate Workshops
2. Sponsor proposals
3. Look over proposals or changes in Soil Taxonomy in detail.

It used to be that the committees were the only reviewers of Soil Taxonomy, but now all the states participate. Proposals are sent in directly to Bob Ahrens and then distributed to all the committees and all the State Soil Scientists. It is up to the State Soil Scientists to distribute soil taxonomy proposals and changes to any other cooperators.

Potential Soil Taxonomy Proposals from the Northeast:

1. Steve Gourley has a proposal for Densic materials and pedogenesis in fragipans. Perhaps during the idea to the great group level such as Densiorthods. Tighten up the definition of pedogensis. He will share the proposal with the committee before submitting it to Bob Ahrens.

2. Joe Homer - Proposal for Foli epipedons

3. Dave Kingsbury - Another proposal to ask that some of the mineralogies (micaceous and para micaceous) key out before isotic.

4. Dave Kingsbury - Andic subgroups for Dystrocrepts that lack the glass content in North Carolina, New York but interp the same as Andisol (acid oxidant extractable silicate) - separate on extractable silicate. Revisit amorphous properties as a possibility as well.

5. George Demas - proposal for changing the definition of soil

Committee Charges:

1. Selection of new committee members for 2000.

2. Gaining more consistency in application of morphologic descriptions within the Region. An example would be horizon designations for using suffixes - Bs, Bhs, Bh, Bw.

3. Discuss any of the proposed changes for Soil Taxonomy Edition 1998.

4. Identify and prioritize Regional Soil Taxonomy and correlation issues as recommendation for action by the MRLA Offices.

5. Proposal recommendations to Research Needs Committee for analyzing data support for Soil Taxonomy issues.

6. Preparatory discussion of ICOMATH field trip in CA October 1998 and review proposals for new order for disturbed soils (John Galbraith).

Northeast Cooperative Soil Survey Conference, 1998
Committees

Committee 3: SSURGO/Map Finishing

Chair: Caroline Alves, Williston, VT
Vice Chair: Dr. Rick Day, Pennsylvania State University, University Park, PA

Members:

Darlene Monds, NRCS, Amherst, MA
Tim Craul, NRCS, University Park, PA
Lindsay Hodgman, NRCS, Orono, ME
Steve Indrick, NRCS, Syracuse, NY
Christine Clarke, NRCS. Morgantown, WV
James Ware, NRCS, Washington, DC
Hof Owen, NRCS, Ft. Worth, TX
Ray Bryant, Cornell University
Ken Lubrick, NRCS, Madison, WI
Bruce Stoneman, NRCS, Richmond, VA
Charlie Delp, NRCS, Sommersville, WV

This Committee has been in place since the 1994 Conference. SSURGO and GIS development continues to be a top priority in the National Cooperative Soil Survey Programs of the Northeast. There is still a concern about digitized material meeting SSURGO standard and being certified. The Committee should also look at what progress has been made in the past two years towards regional coverage of SSURGO certified products. Barriers to attaining the goal of providing digital soil survey products for all private lands in 2002 need to be identified so that they may be addressed in the next few years.

Committee Charges:

1. What barriers exist to achieving NRCS-NCSS SSURGO Goals for 2002 and what solutions to these problems can be suggested?

2. How are map finishing problems being addressed in the NE Region and what suggestions can be made to solve problems?

3. What training issues are in the NE as related to SSURGO and map finishing? Are workshops needed that could be sponsored regionally by NCSS?

4. How are we ensuring quality and consistency across state lines of SSURGO tabular data bases? How could we improve soil data quality regionally?

5. Review Committee reports from 1994 and 1996 Conference and determine what progress or accomplishments have been made.

Northeast Cooperative Soil Survey Conference, 1998
Committees

Committee 4: Define the Role of the Experiment Stations in the Future of the National Cooperative Soil Survey in the Northeast

Chair: Jim Baker, VPI, Blacksburg, VA
Vice Chair: Jim Brown, State Soil Scientist, Annapolis, MD

Members:

Chris Evans, University of New Hampshire, Durham, NH
Mark H. Stolt, University of RI, Kingston, RI
Del Fanning, University of Maryland, College Park, MD
Ivan Fernandez, University of Maine, Orono, ME
Dave Rocque, Maine Department of Agriculture, Augusta, ME
Tyrone Goddard, NRCS, Syracuse, NY
Bill Taylor, NRCS, Amherst, MA
Dr. Asmare Atalay, Petersburg, VA
Bruce Vasilas, University of Delaware, Newark, DE

In the National Cooperative Soil Survey Proceedings from Baton Rouge, LA, 1997, the role of the Experiment Stations was alluded to in the Future of Soil Surveys Committee and Marketing Strategies Committee. As the resources and infrastructure of the Agricultural Experiment Stations in the Northeast has been declining in the past 10 years, there has been a general concern as to what is the Agricultural Experiment Stations' future with the NCSS. The Committee should refer to the Committee reports of Natural Resources Soil Surveys, Future of Soil Surveys and Marketing on Soil Surveys from the National Meeting held in Baton Rouge, LA, June, 1997. Notes from the NCSS Advisory Group, Raleigh, NC, August 20-22, 1997, will also be helpful in formulating ideas for this committee charge.

Committee Charge:

1. Define the role of the Experiment Stations with the NCSS in the Northeast

Northeast Cooperative Soil Survey Conference, 1998
Committees

Committee 5: Site Specific Soil Survey/High Intensity Soil Survey, NCSS Standards

Chair: Henry Mount, NSSC National Leader, Lincoln, NE
Vice Chair: Steve Hundley, NRCS, Durham, NH

Members:
Russ Briggs, NY State University, Syracuse, NY
Bill Griffith, VA Tech
Pete Veneman, University of Massachusetts, Amherst, MA
David Marceau, ME Association of Professional Soil Scientists
NH Association of Professional Soil Scientists
Ed Ciolkosz, Pennsylvania State University
Bill Jokela, University of Vermont, Burlington, VT
Bruce Dubee, NRCS, Richmond, VA
Carl Robinette, NRCS, Cumberland, MD
Lenore Matula, ACOE/NRCS, Baltimore, MD
John Davis, NRCS, Beltsville, MD

As the use of CIS systems becomes more prevalent in onsite farm activities and development projects, soil survey information needs to be adapted to be used in these site specific/high intensity situations. There has been some activity in the Northeast in establishing standards for site specifc/high intensity soil mapping as well as research in its application. The goal of this committee is to increase communication and knowledge of this emerging topic in the Northeast.

Committee Charges:

1. Review Site Specific Soil Survey/High Intensity Soil Survey National Standards and evaluate applicability in the Northeast.
2. Review literature on uses of Site Specific Soil Survey/High Intensity Soil Survey in the Northeast and define the relevance of these products.

i.e., Agronomic Management Systems, Bill Griffith & Mark Alley, VA Tech. measurements of corn yield and soils in VA, HY, MD, PA, NC

NE NATIONAL COOPERATIVE SOIL SURVEY CONFERENCE

COMMITTEE #1 - RESEARCH NEEDS COMMITTEE

June 16, 1998
Teleconference: 10:00 A.M. -11:00 A.M.

Participants:
Maxine Levin, Chair NENCSS, Beltsville, MD
Edward Ciolkosz, Professor, Pennsylvania State University, University Park, PA
Bob Rourke, Professor, University of Maine, Orono, ME
Thomas Villars, Project Leader, White River Junction, VT
Bruce Thompson, MO-12 Leader, NRCS, Amherst, MA
(Input by Mary Beth Adams, USFS, Parsons, WV & Ed White, SSS, NRCS, Harrisburg, PA to Maxine Levin before the teleconference)

The Committee meeting began with an overview of the progress to prepare for the NCSS Conference July 19-23,1998. Maxine Levin asked Ed Ciolkosz to give a brief summary of a meeting he attended on the National Soil/Moisture Temperature Committee in College Park, MD in March, 1998. This committee was primarily sponsored by NRCS-USDA with Ron Paetzold, NSSC, NRCS-USDA as Chair. The committee was originally put together in 1991 to track progress of an interagency National Soil Moisture/Temperature Pilot Project. Twenty-one remote sites were monitored around the country (NY, MD, NC, OH, KY, GA, MS, FL) for a planned ten years to measure soil and atmosphere conditions and soil temperature to 2 meters depth. Possible stations are also planned for NH and OK. The pilot project was set up to work out mechanics of monitoring with the present technology that is available. Other smaller studies on soil moisture and temperature around the country are also reporting their progress to this committee. The NE NCSS research needs committee conferred that this study was very important to the soil survey partnership and yet it had not been publicized at all. None of the levels of NRCS (Villars, Levin, or Thompson) or the university representatives had known much about the project or committee before the teleconference. Ciolkosz had been actively working with soil moisture and temperature studies in PA and had not known of any of the studies until he attended this meeting. It was suggested that NSSC of NRCS-USDA needs to do a better job of transmitting information to the field soil scientists. Progress on this sort of studies is of immediate interest to the field soil scientists and to university partners in soil survey for interstate cooperation (Committee Charge #3 & #4). Levin suggested that we make this suggestion as a recommendation for improvement to Horace Smith, Director of Soil Survey, NRCS-USDA and NCSS Advisory Leadership. (Report for Committee Charge #2 & #4).

We reviewed briefly notes from last teleconference (October 15, 1997) and accomplishments since that meeting. Members of the committee with access to the INTERNET had explored use of potential databases from USFS Directory and CRIS. They considered the feasibility of putting together lists of active Soil Survey research in the Northeast Region through this medium. Maxine Levin had explored setting up an access page with hot buttons to other sites on the INTERNET through the NRCS. However she found that there are roadblocks to accomplishing this in the next year because of firewalls, staffing and equipment issues for the East Regional Office in NRCS. The committee confirmed that, at least for this coming conference proceedings to fulfill Committee Charge #1, we would compile lists of research from off the INTERNET and agency sources. Maxine Levin would consolidate lists in a draft report by June 26, focusing on research that is specifically soil survey related.

1. Mary Beth Adams had already submitted lists for USFS Soil Science research activity.
2. Bruce Thompson and Phil Schoenburger will compile lists of NRCS/NSSC activities in the East Region and Virginia.

3. Bob Rourke and Ed Ciolkosz would work with Maxine in querying the CRIS database by State and researcher names to filter a subset of soil survey research with the Ag Experiment Stations and Cooperative Extension.

In the month before this teleconference, Tom Villars, NRCS was asked to poll NRCS project leaders in the field as their research needs in the NE Soil Survey. He received an excellent response with a lot of comments from NRCS staff around the region. He volunteered to summarize the responses for the coming NCSS conference in Orono, ME. He will also send copies of the responses to all the members of the committee so that they can read some of the responses in detail for themselves. This summary will also be part of the committee conference report (Committee Charge #1 & #3).

At this time, committee members, Villars, Rourke, and possibly Adams will not be able to attend the conference in Orono, Maine. Levin hopes finish a rough draft of a committee report addressing the charges to date by the end of June 1998, for review by the other committee members.

NE NATIONAL COOPERATIVE SOIL SURVEY CONFERENCE
COMMITTEE #1 - RESEARCH NEEDS
October 15, 1997 Teleconference: 9:00 A.M. -10:00 A.M.

Participants:

Maxine Levin, Chair NENCSS, Beltsville, MD
Edgar White, NRCS State Soil Scientist, Harrisburg, PA
Edward Ciolkosz, Professor, Pennsylvania State University, University Park, PA
Bob Rourke, Professor, University of Maine, Orono, ME
Thomas Villars, Project Leader, White River Junction, VT
Phillip Schoeneberger, NRCS National Soil Survey Center Liaison, Lincoln, NE
Mary Beth Adams, USFS Representative, Parsons, WV

The Committee meeting began with a discussion of goals for the committee in general. It was suggested that the major goal of the committee would be to improve communication of soil survey research needs and activities in the NE Conference area within the NE NCSS at all levels.

The purpose of this teleconference meeting was to address committee charges that were identified in previous meetings:

1. Develop guidelines and a protocol as to this permanent committee will function in the future.

   • How often will the committee meet?
   • What Products will it deliver?

2. Identify, document and prioritize the critical research for soil survey in the NE

The discussion centered on primarily what products could the committee deliver, how the products would be transmitted to all NCSS participants, and if there were lists as part of the products, how would they be maintained. It was agreed that maintenance of any lists or NE NCSS homepage would create the most difficulties in any system that we set up.

The following decisions were made:

1. The NE NCSS Research Needs Committee would meet quarterly by teleconference and communicate by EMAIL in between. The Committee Chair would facilitate the teleconference. In the even years (scheduled NE NCSS Regional Conferences), the committee will meet once in person at the regional conference. In the odd years, the committee will search for opportunities for other conferences in which all the committee members would have an interest, and try to schedule a face-to-face meeting in lieu of a teleconference.

   2. Instead of the NE NCSS Research Needs Committee developing its own lists and maintaining those lists independently the committee agreed that it should access ongoing research lists that are already maintained as part of normal agency administrative functions. Committee members will research access by INTERNET or other sources to agency/university lists of ongoing research:

      • CRIS (Ed Ciolkosz)
      • NRCS-NSSC (Phil Schoeneberger)
      • USFS Directory (Mary Beth Adams)
      • NCSS and other sources (Maxine Levin)

The committee hopes to develop a homepage for NENCSS that will keep these list locations as hot buttons for NCSS participants to access.

3. It was pointed out that informal research by field soil scientists is often lost or not shared by all interested parties in NCSS. The committee needs a method to capture this information and have it easily accessible without a dedicated person to maintain it. Ed White pointed out that the use of WEB search engines to sort out and find some of this information would be feasible. Also, if NE NCSS field participants were given instructions on how to put abstracts of their work with contract numbers on the INTERNET, then some of the maintenance of the information would be covered by the original source contacts, Ed White volunteered to research what is needed to store research information in the form of abstracts on the INTERNET that can be accessed by the WEB search engines. The committee can distribute this information at the planned regional conference next July 1998 in Maine.

4. The committee needs further study to address methods that would prioritize soil survey research needs in the Northeast. A mechanism is also needed to provide feedback to researchers from users in the field. The committee has developed lists in the past but it still has no mechanism to critically prioritize research needs by demand. Suggestions to think about for the next time we meet are:

- Use a "chat room" on the INTERNET to collect comments on needed research topics.
- Use of an access counter on INTERNET to count # of hits of interest for a particular subject. Whatever mechanism that the committee puts into place needs to be a system that is low maintenance by committee members.

Northeast Soil Taxonomy Workshop
Committee 2
Nov.4-6,1997
Barnstormers Conference Center
Pease International Center
Portsmouth, New Hampshire

Introductions - **Dawn Genes, NRCS State Conservationist, NH**
Randy Shey, Gove Environment Services, NH
Steve Hundley, NRCS State Soil Scientist, NH
Maxine Levin, NRCS Soil Scientist East Region, MD

National Cooperative Soil Survey, NE Conference, Soil Taxonomy Committee
(See attached list)

OVERVIEW OF CHANGES IMPACTING SOIL TAXONOMY in the Northeast Bob Ahrens, NRCS National Leader Soil Taxonomy, Lincoln, NE

Ornstein - spodic materials that are thicker 25mm and more than 50% cemented
Densic Contact - proposed by the NE
A densic contact that is relatively unaltered
Densic materials - relatively unaltered, non cemented but root limiting, and differ from paralithic materials (which are cemented) noncemented material test: Dry specimen slakes in water within an hour cemented material specimens will not slake within an hour. Series control section will only extend 10 in. into densic material; paralithic material can be used to differentiate soil series if the materials are within the series control section.
Lithic contact - strongly or very strongly cemented material contact with soil material
Lithic and Paralithic materials - will not slake in water
Pararock - paralithic materials that are more than 20 cm wide and are slightly to moderately cemented
Fragipan - > 15 cm thick; root limiting physical or chemical with evidence of pedogenisis; spacing of 10 cm crack or more on horizontal dimensions with very coarse prismatic, columnar or blocky structure; not cemented; 60% of volume with firm or very firm consistence at or near field capacity and roots are virtually absent
Fragic intergrade - < 60% volume or too deep
Lamenllae - more clay (oriented, silicate clay) than above horizons
accumulation of jarosite - j suffix
evidence of cryoturbation - jj suffix
Dry permafrost - ff suffix
Water layers from bogs or permafros layer - W master soil horizon (put us into arena of wetland ecologists) must be a permanent feature of the horizon
www.statlab.iastate.edu/soils/soiltax - must bring it in to your computer (cannot read off the net)
Cyroturbation - needs moisture/swirled with broken horizons - difficult to describe the "Bor" suborder and great groups as well as the "Trop" great groups and subgroups will be eliminated in the new edition. Frigid and iso soil temperature regimes will be the "Bor" suborder and great groups as well as the "Trop" great groups and subgroups will be eliminated in the new edition. Frigid and iso soil temperature regimes will be delegated at the family level. We plan to redo the Inceptisol Order level to add temperature to family level and moisture at a subgroup level.
Gellisols:
Soils that have permafrost within 100 cm of the soil surface and gelic materials within 100 cm of the soil surface

Gellisol Diagnostic characteristics -

- **Anhydrous conditions**
- **Gelic materials**
- **Cyroturbation**
- **Glacic layer**
- **Changes were made to permafrost and cryic soil temperature regime definitions**

Soil Taxonomy New Edition -timeline
Vertisol and Inceptisol chapters needs to be redone
Relationship of mapping and taxonomy chapter needs to be finished

SOIL TAXONOMY KEYS on the WEB:
http://www.stalab.iastate.edu:80/soils/keytax

ISOTIC CRITERIA/FAMILY PLACEMENT - ICOMFAM Charges

Change particle size control sections with argillic horizons (simplify to 25-100 cm) when tested it was found to split so many series that it wasn't worth doing. The committee decided to withdraw the suggestion

Changes are only made when it will be a good change

Mineralogy classes—
Key format/Back of the book chapter (to make the user wait until soil is keyed to subgroup level before keying out the mineralogy)
Northeast—Illitic soils
Southeast Appalachians—Kaolinitic

Monmorillonitic—Smectitic

Isotic-Spodisols and Volcanic influences (higher water holding capacity & amorphous or poorly ordered materials; low bulk density) cool temperature, high precip
High 15BAR to clay ratios
High NaF pH values - Can order powder from a lab Spectrum Co 1-800-772-8786 FAX 800-525-2299 S1280 NaF, Powder Reagent, call Fred Kawasaki NRCS, NSSL for instructions (kicks out the calcareous materials from potential of being Isotic)
Range of data within NE - 7.0-10.7 NaF pH
NE has not overcome dispersion problem in measuring clay with isotic materials
Adjusted for waterholding capacity but not for plasticity

Cation Exchange Activity classes—
Ratio of fine-earth cation exchange capacity at pH 7 to percent clay

Classes	Superactive	Smectites	>=.60
	Active	Partially Smectitic	.40-<.60
	Semiactive	Partially Kaolinitic	>.24<.40
	Subactive	Kaolinitic	<=.24

Example:

Oe	0-4cm	--	
E	4-7cm	0.48	
Bs1	7-10cm	0.67	Control Section—4-39cm (use the whole soil)
Bs2	10-14cm	0.69	0.545 weighted average - **Active**
BC	14-30cm	0.54	2 significant figures; match soil taxonomy
C	30-39cm	0.47	
R	39cm		

OXIAQUIC SUBGROUPS FOR WELL DRAINED SOILS IN NEW HAMPSHIRE
Kathy Swain, NRCS, Concord, NH

Sandy pan - basal till - Frigid Oxiaquic Dystrocrepts
They have not tested for cementing with slaking test -redox concentrations are just above pan or as part of the top of the pan at 50 cm.
Soils sit at the top of the hill slopes....there is a traditional assumption that these soils are well drained, however, the redoximorphic feature in the profile as part of the dense till and just above it create some controversy as what the drainage class is. Are the features relic? Peziometers were placed just above the pan in 3 sites. Redoximorphic features are not consistent with water tables. We also tested with tensionmeters.-to test break between Oxiaquic and Typic at 50cm. and just above the pan. We also asked the NSSL to come out to work with us to measure permeabilities with amouzameters. We also looked at the sites with GPR to look for possibilities of "holes" in the dense till.

questions that we still have -

Do we have free water in the system?
Do we need free water to create redox features?
Are the sites actually Oxiaquic?
Are the redox features relic?

OXIAQUIC CONDITIONS
Bob Ahrens
How long is enough to measure Oxiaquic conditions—
30 cumulative days or 20 consecutive days to measure saturated conditions
This is meant to be used for broader definitions and interpretive conditions than agricultural drainage classes.

We are finally starting to monitor water tables for input of data to NASIS and move past agricultural drainage classes.

Oxiaquic covers a whole range of wet conditions depending on location, temperature and water movement.

Questions -

Aquods Clay bulge usually disappears with long term analysis Aquod developments is not well understood and it is hard to discern redox features in E horizons. Where is the bottom of spodic? We still have a problem with discerning the beginning of the C horizon because we do not recognize a cambic horizon below spodic horizons. We see very little ornstein here. Only the polychromatic E is visible in these areas.

HUMOD/ORTHO STUDY - DETECTING HUMODS IN MAINE
Bob Rourke, Professor University of Maine, Orono, ME

Humods are Spodisols that have more than 6% OC in the upper 4" of the spodic horizon.

Transects were done in Northern region, Southern region, and South Coastal region 10 transects, 180 sites
Organized town areas were more disturbed as opposed to other areas that had never been disturbed.

Hach kit for H-F (P-Value) 23% to correlate w/6% OC	**best correlation;**
Percent Albic/Thickness	**poor correlation**
Thickness of Oa	**poor correlation except in nondisturbed sites**
Spodic Hue/Value/Chroma	**Redder the color better the correlation (Hue)**
Elevation	**Poor correlation; High elevation better than low elevation**
Aspect	**no correlation**

Spodic Hue worked best in Northern area
Hach H-F value worked best for all locations

CHROMA 3 COLORS AS AN INDICATOR OF WETNESS
Pete Veneman, University of Massachusetts

Southern New England Hydric Soil Study Regional Indicators and relationship between hydrology and soil characteristics

104 individual locations with groundwater monitoring well at depths of 25 and 50 cm. We had redox probes as well and looked for translocation of Fe (colors)

Loamy Anaerobic within 15 cm or reduced within 30 cm eH is less than or equal to 200mV (pH7)

Sandy saturated and reduced within 15 cm of the soil surface

Length and duration of Hydrology is landscape dependent

Level - Floodplain and glaciolacustrine sediments (little fluctuation, long term saturation, gleyed colors)

Sloped Wetlands - Glacial Tills (flashy saturation, large differences winter/summer) (lateral flow, toe slope wetlands)
Steeply Sloped Wetlands - Sandy Glacial Drift (flashy saturation, small differences winter/summer) (Kame terrace)

Steeply stored Wetlands in kame terraces, sandy soils; have high iron upwelling precipitation showing as redox features. They have wetness to surface for significant time (2 weeks or more) but soils are brown from iron. Redox potential is not always definitive (affected by OM & sandy textures)

84% Hydrology and criteria matched
Of the 16% of locations that did not have a good correlation of criteria and Hydrology;

Fac Neutral test supported soil criteria for chromas of 3
Sandy soils with high iron (i.e. ferihydrite), redox features but high chroma, were clearly a problem and we need more research in these categories
Disturbed, altered sites that have relict hydric features (fac neutral test support hydrology)

Stone walls can be significant in altering sites and create poorly drained sites

We cannot always depend on morphology - use fac neutral (plants) to support professional judgement

Soils with depleted horizon immediately below A is hydric
Landscape position should be considered at problem sites particularly with soils adjacent to a steep escarpment
Landscape position and sandy problem wetland soils still need vegetation to support professional judgment call of wetland
Seasonal variation in sandy soils; need to look at whole picture of landscape, soil & plants at more than one season

Southern New England growing season (We think vegetation is best indicator for wetland biological activity)

Vegetation	3/23-10/12
Soil Taxonomy (50cm)	4/17-1 /23
Killing Frost Free (28 degrees F)	4/23 -10/12

DENSIC MATERIALS VS. FRAGIPAN REVIEW
Steve Gourley, Soil Liaison, NRCS Winooski, VT

Originally called Cx horizons
1977 NE Fragipan Study - lot of information that applies today

Some had true fragipans. Some had dense basal till, some are altered materials with some pedogenesis.
Removed fragipans from the New England soil surveys (began using r instead of x, and then after a year was replaced by Cd in about 1983)
Many of our Cd horizons have redoximorphic features and structure which imply pedogenesis of a fragipan.
Based on the 4 categories of pedogenesis, I looked at pedons throughout the NE in official series to see how Densic Materials vs. Fragipans were described to see where pedogenesis was not a good indication of how we can separate the two description of root resistant materials:

1. **Layer Thickness**
   - **Fragipans**
     - commonly less than 50 in. thick
     - ranges from 6 to 80 inches by definition

Densic Materials

No thickness criteria (never a bottom layer described)
Can not be more than 20 ft. thick

2. Structure

Fragipan

Bx - very coarse prismatic
Cd - platy or massive

3. Slake in Water

Both Densic and Fragipan layers slaked in water

4. Layer Properties Fragipan

Firm or very firm
Brittle
Root resistant except between cracks

Densic

Firm or very firm
Sometimes brittle
Root resistant

5. Pedogenesis

Fragipans

Very coarse prismatic
Redoximorphic features
Evidence of clay movement

Densic

Platy structure or are massive
Redoximorphic features
No evidence of clay movement

NY samples and characterized Fragipans and Dense layers (Illinois Formation had opportunity for interglacial soil formation creating B horizon in older dense layers) Academic topic - Does the user care?

What is the evidence of clay movement and differences in structure - are the best ways to separate fragipan from densic materials.
Need to refine description of structure as an indication of pedogenesis - platy structure is present in most densic materials.
Problem - If we classify as a fragipan, then we need to look at up to 80 inches to separate out the fragipan layer because the brittleness is not that important. Another opinion is to call it either fragipan or densipan but not bother to separate conceptually both. Not convenient to map. 80 inches is now the general series control section which is difficult for the field mapper. There was no consensus with this discussion.

Bob Ahrens requests proposals to test many of these ideas.

SOIL TAXONOMY EXERCISES
Issues
Bw is not a transitional horizon
Does the fragic integrades properties key out when describing similar properties of fragipans?
Bs should be tied to illuviated sesquioxides not spodic horizons.
Bo is tied to residual sesquioxides.
Need to be careful because the layer suffixes and designations do not correlate directly to soil taxonomy.

MORPHOLOGY OF SATURATED ALBICS - A Color Study
Karen Dudley, NRCS Soil Scientist, Concord, NH

Difficult to discern redox features in spodosols in Bhs or E horizons
Is enough iron available in albic horizons to show redox feature? test with alpha-alpha test
Criteria used by soil scientist for wet albics
Aquods
Stripped matric

5% redox features in the albic (includes OM)

Are variegated colors in albic are indicators of wetness or illuviation?

I will be collecting:
Watertable data - 60 samples/12 sites; must be in sandy outwash; range of drainage conditions
Range of variegated colors vs. water table depths - create an index; grided sets of samples measuring variegation both vertically and horizontally
Micromorphology - thin sections
Hydraulic Conductivity - suction infilltrometer (could not use amouzameter with less than 4 in depths)

So far I have observed that the polychromatic colors are present in well drained albics as well as poorly drained sites. I might add vegetation to my sampling grid method.

EPI VS. ENDO SATURATION
Bob Ahrens

perched water tables - epi saturation - endo
epi is keyed out because it is assumed to be more limiting in 200 cm epi conditions are not mutually exclusive with endo situations

Dense till soils create a problem in that they are similar to lithic soils where the whole soil is wetted; i.e. Ridgebury (pd) &Whitman (vpd) soils are really endo with horizontal flow; Paxton (w-mwd) and Woodbridge (mwd-swpd) are truly epi systems the difference is whether there is an aquitard within the control section.

gathering data for duration (information from Texas so far) could be temperature dependent - need data from other parts of the country

Difficulties with lithic profiles where water is perched on lithic contact - classified as endo because is the whole soil but really is interpreted the same as epi. Epi is described as water being perched by relatively impermeable materials. Examples of aquitards:

Lithic - endo
Fragipan - epi
Densipan - epi
Paralithic - endo
Claypan - epi
Sand or gravel layers - epi

Care should be taken where the official description describes an apparent water table (vs. perched one) but the soil taxonomy keys out as epi.

National Cooperative Soil Survey Conference
Committee #3
SSURGO/Map Finishing

Chair: Caroline Alves, Willison, VT
Vice Chair: Dr. Rick Day, Pennsylvania State University, University Park, PA

Members:

Tim Craul, NRCS, University Park, PA Lindsay Hodgman, NRCS, Orono, ME
Steve Indrick, NRCS, Syracuse, NY
Christine Clarke, NRCS, Morgantown, WV James Ware, NRCS, Washington, DC
Hof Owen, NRCS, Ft. Worth, TX
Ray Bryant, Cornell University
Ken Lubrick, NRCS, Madison, Wl
Bruce Stoneman, NRCS, Richmond, VA Charlie Delp, NRCS, Sommersville, WV
Kathy Swain, NRCS, Durham, NH
Daniel Waters, GIS, Augusta, ME

1. COMPLETION OF GOALS BY 2002 AND PROPOSED SOLUTIONS

The original proposed goal was to certify 500 surveys per year. To date 238 surveys have been certified out of 2,600 total that need to be completed by 2002.

Compilation Issues:

Availability of staff to perform compilation work has been the overriding bottleneck in meeting certification goals. Staff are not available for compilation due to numerous conflicting priorities. The best people for map compiling are also the best people at mapping, conducting on-site investigations, report writing, NRI, NASIS, etc. More resources need to be devoted to compilation.

Options for solving this problem include dedicating soil scientists/compilers to map compilation or contracting it out. The numbers of staff available to perform this task has decreased as workload has dramatically increased.

A barrier to effective use of contractors is the funding process. Funds are not made available right at the beginning of the fiscal year or in some cases authorization to spend the money is withheld. This prevents completion of compilation in an efficient manner and results in long delays. Contractors need to be paid in cash and states find it difficult to "front" the money.

The lack of availability of digital orthos has greatly slowed compilation. We need to revise our goals and schedule compilation jobs to be reflective of what USGS can make available for DOQs. If DOQs are not available other compilation bases need to be evaluated. Soon 70% of the country will have DOQ coverage.

The process of compilation needs to be adjusted to the digital age. Before the advent of digital surveys, a few errors slipping through was inevitable. Now with the unrelenting accuracy of computers, errors are more easily detected. Prior to investing resources for scanning or digitizing it is crucial that the compilation process has met certain criteria, particularly around certain type of errors.

Careful Quality Control of compilation needs more emphasis. Several states have put together "Compilation Guides" to help prevent compilers from introducing mistakes which are time-consuming and expensive to fix once the data is in electronic format. It would be helpful to consolidate these Quality Control processes to share with all compilation shops. Additionally, certain types of errors are better left for the computer to find, such as common boundaries. In that case it is not efficient to have compilers manually checking for those errors.

Finally, in the rush to complete a compilation job it is essential to ensure the lines fit the imagery and the landscape. Having topologically perfect data means nothing if it is not an accurate soil map. Maximizing the output of digital surveys must not result in compromising the quality of our data.

Digitizing Issues:

One DU commented "we are keeping up with compilation at this time, but if compilation problems get solved, then more resources will have to be also dedicated to digitizing."

It is useful to review the recommendations made in the SSURGO QIT Report, in particular recommendation #6. "State Programs that have successfully produced SSURGO data should be allowed to continue". This will lessen demands on the DUs and help speed certification of more surveys. Funding needs to be allocated to states that have successful programs for digitizing. This funding needs to be based on performance.

Although, there is an unwillingness to take funding away from DUs to allow state digitizing efforts to continue, more discussion is needed on this issue. Sources of additional funding should be made available to states with a proven track record. In addition, DUs should be encouraged to swap digitizing jobs and funding to utilize staff resources to the greatest efficiency.

NRCS is often reluctant to see funds go to outside contractors but with such an enormous workload, contracting out digitizing is an option that needs to be considered. It is a task that lends itself to being contracted out, now that clearly defined standards exist for the end product. If the goal is to maximize the number of surveys certified, the workload needs to be spread out.

Technical Support Issues:

The SSURGO Forum out of Fort Worth, Texas has been an invaluable resource to all those involved with producing SSURGO data. Unfortunately there seems to be a selective process as to which questions are answered. There is no acknowledgment to the sender that a question has been received. Bewildered data producers are left with questions unanswered. To those reading the output from the server, the anonymous nature of how the questions are presented, makes it impossible to contact others who might be having the same problem. It would be helpful to know where the questions originated from. There needs to be some means of using a search engine to find all questions relating to a particular topic.

NHQ has set up a SSURGO discussion Web site which allows those involved with SSURGO data to communicate more openly. Getting advice from colleagues is very useful but is not the definitive SSURGO authority. NCG should monitor the discussion to ensure that no mis-information is given out. Is this being done? Do all producers of SSURGO data know of the existence of this Web site?

The Review Portion of Certification:

There was much positive feedback about the Digitizing Units. States have been pleased with the willingness of DUs to make adjustments in-house to the data. Another plus is the quick response time of the DUs to concerns and questions with one-on-one conversations. It has taken some time for the DUs to become operational but they are doing an excellent job. They generally have fast turn-around times for reviews which make the process more streamlined.

The process as a whole:

An emphasis on project planning has often been lacking in NRCS initiatives. To reach a goal the entire process must be understood; realistic time estimates for each stage of the process need to be developed; and then staffing, financial resources and training must be provided.

Setting unrealistic deadlines and goals leads to frustration from the public that is hungry for soils data. If SSURGO is not made the top priority, there is no chance of meeting our goals. It is impossible to have multiple "top" priorities, unless each priority is adequately staffed and funded. Getting SSURGO finished in a timely fashion will result in less acres mapped. Conversely, maintaining current mapping goals will mean less counties will be SSURGO certified. This is an "either/or" situation. Unless more soil scientists are hired or work is contracted out, one priority comes at the expense of another.

In parts of the northeast, mapping in the winter is not feasible; thus, ideally compilation should be done only during this time. Unfortunately this is not the reality of the situation. Materials are not available on time and thorough checking of the maps once they are in digital format requires a large amount of hours. Many factors cause compilation to spill over into the mapping season. There is a risk if non-soil scientists are employed to work on compilation that poorly done or unacceptable quality work will result. These risks may outweigh the benefits.

We need to revise the goals that were originally proposed. If they are not revised there is a danger in damaging the image and credibility of NRCS. Certainly the number of certified surveys will continue to increase at a more rapid pace but it is highly unlikely the goal of 2,600 surveys by 2002 will be achieved.

Several members of the committee feel it is impossible to even come close to meeting the goals. "More realistically, we are on a 10 year pace, and even that may be too ambitious." "Don't even try! We don't have the people needed to perform the work in an acceptable manner within the time constraints." "Pushing the system too hard at this point will create errors and cause backtracking."

2. MAP FINISHING PROBLEMS IN THE NE & SOLUTIONS

Lack of procedures available for performing digital map finishing has slowed progress. The agency has been going through a transition in software which has contributed to preventing the effort from getting off the ground. NCG now has developed procedures in Arc/Info and is offering training. One respondent wanted to see regional training offered.

Another issue that impacts map finishing is which data layers, other than soils, will be shown on the maps. The main layers of interest are hydrography, roads and culture. The next question to consider is: which data source will be used for these layers. Often the USGS DLGs are used. How are situations with errors in USGS layers or soil lines overprinting with other layers going to be handled? This problem has been noted going back to the 1990 Conference Proceedings. In the old days of manual map production, soil lines could be

adjusted for cartographic clarity, in the world of certified data this is not an option. The options for published maps are: to show nothing but SSURGO data over a photo background; show SSURGO data, photo background and additional layers with some overprinting of features; or develop additional digital data layers in-house to use on published maps.

One solution to this problem is to use State data layers, which can be edited as opposed to USGS layers that are set in stone. Again, readjusting how we do compilation is needed. As soil lines are drafted, this needs to be done in relation to the data layers that will be shown on the published map. Some states are using these techniques very successfully, such as Vermont. A mylar template is used for compilation showing the other digital data layers, so that overprinting of soils lines with other features can be prevented.

If NRCS is going to be involved with editing or correcting other data layers, cooperating agencies need to share funding or resources with NRCS for the work. Are USGS DLGs set in stone? Is it possible to work out procedures to correct USGS data if errors are discovered? NRCS does not want to be responsible for creating and maintaining a different version of USGS data. Since USGS has no plans to develop a 1:12,000 scale digital water layer - what other options exist? Looking ahead to GIS in field offices, the lack of a digital water layer integrated with the soil layer is a serious stumbling block.

We have a wide variety of users of our data. The advanced GIS-oriented user is content with a CD of our SSURGO data. Yet there are many users of soils data, both in-house and outside the agency, who rely on published soil maps. They expect a high quality cartographic product matching our traditional publications. We need to provide data to our customers in the format they need or we will cease to exist. We may be hampered by funding to provide what the public needs but we should at least offer various options and discuss possibilities of cost-share.

Once fully functional procedures exist and technical problems have been overcome, who will do the work? We need to set up map finishing centers with the people, equipment, and expertise to do it. We can't take resources from the digitizing centers thus further slowing progress on certifying counties. The re-occurring barriers of funding and staffing will also have a major impact on the rate soil surveys are map finished.

The level of success of digital map finishing will be directly correlated to the funding made available for this purpose. It is impossible for many states to carve time out from already over-extended soils staffs for map finishing. Digital map finishing is a more expensive and complex process than manual map finishing, thus requiring additional funding. As a plan is developed, there needs to be clarification on the respective roles of NCG, MOs, DUs and states.

One historical problem has been the timing of the manuscript being ready to publish at the same time as the maps. How can this be coordinated in a better way?

3 TRAINING ISSUES IN THE NORTHEAST NEED FOR WORKSHOPS

There were a variety of responses to this question.

<u>SSURGO Training:</u>

One DU responded "I don't think that we need a training session on creating SSURGO, because there is such a vast difference on how each state is creating the data. As a digitizing unit, we have worked with each state to solve its unique problems and I think we can move forward with what we are getting from them".

Monitoring the "alternative SSURGO Web site" shows there is some interest in a meeting of all great SSURGO minds. Limiting the meeting to the Northeast might limit the exchange of information. Involving only the DUs also might limit what ideas and techniques would be shared. Some states have been using Arc/Info for a long time and could bring much experience and knowledge. A national conference involving all those working on SSURGO including Universities, State programs and contractors might be the best forum.

Map Finishing Training:

Map Finishing Training was high on the list for some respondents but others questioned if they would have time for map finishing in the foreseeable future. NCG should continue to provide training in this area.

Tabular Data Training:

One training issue of a different nature, was that of educating users of SSURGO data on how to make interpretive maps using the tabular data. "We need to train people on the concepts of the MUIR/MUR such as whether each data element relates to a whole map unit, a component of a map unit, or just a layer of a component of a map unit. This is very confusing to our users. We need workshops developed for both NRCS and outside users of our data". It would be very helpful to hear from all the states in the NE on how (if at all) they have worked with the users to help them understand the tabular data.

Many people are probably re-inventing the wheel, independently developing their own training materials.

For internal users of the data, one respondent emphasized the need to ensure soil scientists were given in-depth training in NASIS.

4. DATA CONSISTENCY OF TABULAR DATA - HOW TO IMPROVE?

This question was answered by further questions by the respondents.

"This gets into a whole big thing on NASIS and MLRA concepts. Is NASIS a tool which can be used to copy a data map unit from another survey and then edit it to fit the local conditions? Or is NASIS a tool that we can use to link to map units in another survey so that the data map units are exactly the same? Actually NASIS has the capability to do both, but which are we going to do?"

"We are creating plenty of quality joins, but then what do we supply for the attribute data? The data for which map units? There shouldn't be a big difference since they make a quality join, but there will still be that decision to make - choose between the map units, provide both map units, or a hybrid of the two map units in question. This hybrid would probably be data from the MLRA Legend. If we do use the MLRA legend, will this data be so watered down that it won't be considered SSURGO (by this I mean county-wide data-which is the most detailed that we have in most cases) or more like a STATSGO product?"

"I don't think it will be adequate to provide the same attribute data to all users. NASIS is more complex than SSSD. I believe we will need to work more closely with clients requesting information to ensure they are getting the information that they need. This probably means even more technical soil services than we are currently providing. And it means that all soil scientists need to know at least what is available and the right questions to ask clients in order to get the appropriate information for their needs."

"What is SSURGO attribute data supposed to be? - The soil survey attribute data, the state legend attribute data, the MLRA attribute data, or something else?"

NASIS can allow better consistency of the data and better exchange of information throughout the national soils program. Does the goal of consistency end up resulting in watering down the data? Can we provide more generalized data to some users and more customized data to local conditions to other users? It sounds as though there needs to be clarification of our ultimate plan and intentions. If we in the agency are confused where does that leave the user?

We need a complete transition plan to describe and conceptualize how the shift from SSSD to NASIS will occur, for the tabular data. There also needs to be fully documented procedures on how to update SSURGO data, the tabular data will undergo more frequent updates than the spatial portion. There needs to be procedures for both in order that we maintain a dynamic database.

5. REVIEW PROGRESS AND ACCOMPLISHMENTS, BY REVIEWING THE 1994 AND 1996 REPORTS

Rather than going point by point through old reports, it suffices to say that we have moved from developing strategies and procedures into production mode with SSURGO. The number of certified surveys is rapidly increasing every week. The DUs are up and running. NCG is providing training in the SSURGO review process. On line help is available through the NCG forum and NHQ. Progress has been made in addressing join issues.

QUESTIONS FOR THE NEXT COMMITTEE IN THE YEAR 2000

1. Evaluate the best formats for data distribution. With GRASS being phased out, if DLGs are continued as the format of choice, is it necessary to have separate "attribute" files for the labels, why not just use minor2 and major2?
2. Which states and DUs have been the most successful in producing SSURGO data? What are they doing right?
3. Is it possible for the DUs to write our DLGs and let SSURGO data producers submit Arc/Info coverages (in order to maximize the number of surveys certified)?
4. Should we be archiving data by quad? or by county? or both?
5. How do we update the SSURGO maps when errors are found? Should this be done on a quad basis rather than re-certifying the entire county? Should each quad have a date of the last edit performed?
6. How do we provide digital soils data to FSA, when they want to have data on a county-wide basis? or perhaps by section? Is this our responsibility?

RECOMMENDATIONS

1. Remove acreage values from tables for SSURGO datasets (the ssarea item)
2. Provide clear guidelines for county boundary issues, it is important not to lock states into using approximate USGS boundaries if more accurate State data layers exist.
3. Provide stand-alone procedures so that data producers can take an Arc/Info coverage and write out a SSURGO compliant DLG.
4. Provide stand-alone procedures for editing as data is being created. We need more emphasis on interactive error checking routines in addition to error checking that is part of the review process.

5. Provide guidelines as to what tolerances should be used in Arc/Info for fuzzy, dangle, weed, grain, nodesnap, snap, precision.
6. Have the person who reviewed the work sign off on the SSURGO certification.
7. Create a new updated "Compilation Technical Specification" booklet that is geared towards creating data in the digital age & provide compilation workshops.
8. Allow detailed join statements in the metadata.
9. Revise the current goals, based on what we know now, for a realistic estimate of surveys to certify, by 2002.
10. Make a clear decision if the agency wants to maximize acres mapped or surveys certified. There needs to be greater accountability of what products are output when funding is provided to states for SSURGO work.
11. Devote resources to plan for the transition from SSSD to NASIS. Determine the strategy on how MLRA legends will be used with SSURGO data.
12. There needs to be a clear maintenance policy for SSURGO data: spatial, tabular and metadata.
13. NCG should continue to provide training in creation of SSURGO data and map finishing.
14. There should be a national forum on SSURGO to share techniques and to tap into the brain power of states that have developed procedures that may be useful to all.
15. Develop a plan for the proposed Map Finishing Units, spell out who is responsible for what and clearly indicate what funding will be available to support these units.
16. For the 150+or-surveys that are scheduled for publication examine each on a case by case basis and determine how best to expedite the publication process.
17. To determine the course we will take for future publication efforts (those surveys yet to be added to the publication schedule) have a "Town Hall" meeting in the Northeast region to discuss with our customers the direction we will go and what options exist.
18. Allow successful state digitizing efforts to continue and provide funding in order to maximize the number of surveys to be certified.
19. Lincoln should provide courses and training materials in use of the tabular data.
20. NCG should amass all information on ArcScan from states that have procedures and provide information on how to use this software to produce SSURGO soils data.
21. Improve the data delivery to internal and external GIS data users who are confused by the current tabular data. Provide customized tables that contain only the data that is relevant to their needs.
22. Ensure coordination between the NCG and the NHQ SSURGO on-line help forums. On the NCG SSURGO forum send acknowledgment when a question has been received.
23. This committee should be continued.

Northeast Cooperative Soil Survey Conference
Bangor, Maine
July 19-July 23,1998

COMMITTEE #4 REPORT

Define the role of the Experiment Stations in the future of the National Cooperative Soil Survey in the Northeast.

This report is a summary of condensed comments from a questionnaire sent to committee members.

1. **What in the past has been the level of participation by the Agricultural Experiment Station (AES) in your state with the National Cooperative Soil Survey (NCSS) in the Northeast?**

   Traditionally, there has been close cooperation between the academic department housing the soil sciences and the Maine Agricultural and Forest Experiment Station. As NRCS resources, funding, staff and job opportunities have declined, so too, has the strength of the infrastructure connection. The University has enjoyed a faculty position in this area, working with NCSS, but as retirements and faculty replacements occur, it is clear that we will not be able to fill that vacancy with only that focus. Thus, it becomes more and more difficult to build or maintain bridges between NRCS and the AES. We have enjoyed a good working relationship in the past due to individuals, history, and proximity in a small state. It is not clear the existing infrastructure does much to further this.

   In Maryland, we have had a high level of activity. One big role in training soil scientists for soil survey and other positions in NCSS. Soil judging teaching programs have helped with maintaining a good collaborative relationship with NRCS soil scientists. We have participated in soil survey field reviews on a regular basis and our graduate students have worked on projects that have had a direct bearing on ongoing soil surveys. I don't agree that the level of support for soil survey related activities has decreased, at least by a lot in our state.

   Rhode Island's soil survey was published in 1981 and the RI-AES has participated in the NCSS program by supporting research efforts in soils that are directly related to soil survey and the use of soil survey information. In addition, the RI-AES supports faculty as university representatives to the NCSS efforts.

   Traditionally, Virginia Tech has enjoyed a strong level of participation in the NCSS including: 1) Virginia Tech Field Soil Scientists, 2) a soil characterization laboratory that served the NCSS program in Virginia. 3) interpretative soil scientists supported by localities, and 4) faculty positions on campus with major time allocations devoted to the NCSS. At the high water mark of NCSS in Virginia, combined field investigations and studies by NRCS, USFS, and VT soil scientists were conducted regularly and with great success. This effort has diminished considerably in the past 8 years due to a number of causes. Priorities set at the State level have reduced university and other state funded programs, faculty downsizing, and increases in Crop and Soil Environmental Sciences causing heavier teaching loads with less faculty time for NCSS activity.

   We also lost extension positions that served the interpretative programs relative to NCSS. With the exception of on-campus faculty, all NCSS support has been from the Virginia Division of Conservation and Recreation and through local funding.

2. **Again, from your perspective, what should be an appropriate role for AES's in the NCSS?**

Ideally there should be a shared program between the two entities (NRCS and AES). The character of that program is totally a function of available resources and priorities, rather than intrinsic merit. It is critical to have all possible information readily available on the web in graphical, text, tabular, map, and other formats for users of the NCSS information. The linkage between AES and NCSS should then focus on use and interpretation of this type of soils information for dealing with management and environmental issues of the day.

What we have been doing, as described previously. It would be good if there could be opportunities for students to get experience in soil surveys. AES's also provide facilities for research studies that go beyond what NRCS can normally do.

The AES role should depend on the state being represented. In Rhode Island urban and environmental concerns are the important land-based issues. Therefore, supporting efforts that aid in resolving some of these soils-land use problems should be very high on the AES agenda.

We think Virginia AES participation in the NCSS has been ideal. However, with realities of life and politics. AES participation should be to aid and abet the NCSS by way of providing interpretative information to soil users, researching particular soil behavioral problems (shrink-swell tendencies), and maintaining a viable soil characterization laboratory to serve those efforts. Obtaining funds to support a lab is not easy. Keeping enough expertise in the field and in technical on-campus positions to serve these subject areas is critical for training and educating future soil scientists.

3. **What, realistically, will AES's be able to do to contribute toward the NCSS? Describe your specific institution's possible contributions.**

A recent history of repeated budget cuts, downsizing, and restructuring has had an exhausting effect on our faculty. Availability of external funding plays a major role in directions of agriculture and related fields. In Maine, traditional agriculture is secondary to forest related industries and environmental issues. Thus, our challenge is to demonstrate the clear merits of the NCSS to agriculture as well as nonagricultural opportunities. Our Station's contribution to NCSS will be opportunistic, depending on new faculty hires in the next year. Certainly opportunities for funding from the NRCS or NCSS would greatly enhance such collaboration.

Much depends on the individuals who are hired into soils positions in the state universities. If the universities are able to hire and refill positions related to soil survey programs, when people presently in the positions retire, then the institutions should be able to continue to contribute as they have in the past. If positions are closed out, as they have been at some schools, then the AES's role will diminish as may the whole cooperative soil survey.

I think the AES support of the NCSS program will be limited to the funding of research directed toward the use of soil survey information. For example, monies have been obtained from the AES to support a graduate student working on a study to determine if soil survey and land use information in a GIS framework can be used to estimate carbon storage in Rhode Island landscapes.

Maintaining a characterization laboratory to service current and future needs of the NCSS is a high priority. Utilization of GIS technology to service special interest research groups would allow the AES to compete for limited grant funds and utilize the mass of data already collected. Providing soil interpretations for NCSS data to other

disciplines is an important role for the AES(s). Little is likely to happen without extramural funding.

4. Teaching, Research, and Extension (outreach) have traditionally been University (AES) roles in supporting the NCSS Program. Please indicate your perception of what your university will likely contribute in the future years relative to NCSS. (Give specific examples)

Teaching:

We remain strongly committed to maintaining an undergraduate education program that allows us to train graduates who can be certified as professional soil scientists at both state and national level.

Should continue strong as in the past. We have talked about teaching our soil morphology, genesis and classification course as a distance learning course, so that it could be picked up and given as a course at other schools, at the same time it is being offered at College Park. Whether this comes about remains to be seen. We have been active in producing textbooks. (Fanning and Fanning text, and Brady and Weil Nature and Properties of Soils: Soil Taxonomy is much used in our teaching and should continue to be.

We will continue to teach soil survey techniques and graduate soil sciences (only a few) that are interested in soil survey and related career opportunities under the NRCS and NCSS programs. We continue to provide interns to local NRCS offices for learning experiences and to help with soils related urban and environmental projects.

We are committed to maintaining a strong soil science teaching program at Virginia Tech. At both the graduate and undergraduate level, we will continue to offer courses in Soil Survey and Taxonomy, Soil Genesis, Soil Geomorphology, Soil Interpretations, Soil Evaluation, as well as Soil Chemistry and Soil Mineralogy. Basic soils courses at Virginia Tech are taught by faculty with Pedology backgrounds, currently serving 275 students per school year.

Research:

As indicated above, our research effort will be determined largely in an if opportunistic fashion. No funding is directed at the Station level specifically towards the NCSS. Funding opportunities from NRCS and NCSS would certainly have a major effect on the ability of faculty to justify redirecting their efforts towards these priorities.

We have been and should continue to be active as long as Rabinhorst remains on our staff. The research by our graduate students should continue to feed into NCSS programs on hydric soils, acid sulfate soils, highly human-influenced soils, and other areas.

We will continue to conduct research using or evaluating soil survey information. The origin of funding will direct the kinds of research we do, although alot of our funded research is peripherally related to NCSS such as: reclamation of disturbed lands, wetlands mitigation, water quality issues, statistical descriptions of soil landscapes, and soil properties that effect soil and land use.

Extension:

This function is housed in a totally separate administrative unit. While individual Extension faculty may have constructive relationships and interactions between NRCS staff, there are no resources directed toward NCSS.

This area has been weakened since the individual in this position has gone into administration. We are active, but not to the extent that we could be if we had a person able to devote full time to the soil water resources extension programs. We do have a program in water quality which is peripherally related to NCSS.
As far as traditional extension activities, I think this aspect is diminishing. We will continue to work with NRCS soil scientists and other NRCS personnel on projects that need our experiences and facilities.

This area has probably been most severely curtailed at least from the support of campus-based faculty. The last extension position that worked with NCSS activities was vacated in 1992. Due to extra academic duties imposed by limited faculty and a six fold increase in undergraduate majors, only a feeble attempt to maintain an extension presence has been possible. Operational funds to support programs, travel, etc. are almost non-existent.

5. How has the NRCS re-organization affected the role of your (AES's) participation in the NCSS?

It is difficult to keep track of what that structure is and was except for a chronic downsizing of staff, programs, and opportunities for graduates. Thus, the motivation to build bridges for the University during a period when it faces its own problems has been markedly lessened. The simple restructuring itself does not appear to have any direct implications for the interaction between the institutions.

Since the role of the state soil scientist has apparently been weakened a bit, we may not have a direct access to the administration of soil survey programs as we once did. It's a little hard to keep up with the NRCS organization.

From my limited experience, there has been minimal effect.

The reorganization has had a profoundly negative effect on the NCSS in Virginia. At a time when state resources were being redirected away from NCSS activities, the reorganization of NRCS diminished the effectiveness and presence of the NRCS state soil staffs. Thus, NCSS in Virginia was hit hard from both state and federal policies. The strong, unified, cooperative soil survey program Virginia once enjoyed, has been weakened and this has made further attempts at obtaining state and local funding even more difficult. I don't think this result was intended, but restructuring of NRCS has not had a positive effect on soil survey in Virginia. The "attitude" of Virginia Government toward federal and state environmental efforts has been equally harmful to the NCSS in Virginia.

6. Have there been significant changes in your State/AES/Department in either policy, level of funding, enrollment changes, etc. that have altered AES participation in the NCSS Program?

Yes, As indicated above, chronic downsizing and budget reductions have made us more highly scrutinize and prioritize limited resources for at least conceptual cost/benefit analyses.
We have reorganized at least in name. We are now the Department of Natural Resource Sciences and Landscape Architecture instead of the Department of Agronomy. The university now has environmental science and policy undergraduate

programs that go across colleges. We expect eventually to have more students in soils courses as a result of these changes.
Levels of funding continue to drop and this most likely has, and will, affect participation of the AES in the NCSS program.

Yes, from 1990 to 1996 Virginia Tech experienced a 26% reduction in funding (state sources) for the AES. The Department of Crop and Soil Environmental Sciences decreased from 34 FTE (faculty) to 22 FTE in 1996. Over the same period, undergraduate student enrollments increased from 70 to 454 majors. This increase in student numbers occurred when a "hiring freeze" was imposed on the State. This has resulted in a dramatic change relative to expectations for faculty time and energy.

7. List other items for discussion relative to the charge of this committee.

What are projected future job opportunities for graduates?

What should these B.S. graduates have as their credentials?

Are there more creative mechanisms, such as shared positions, that could be considered between the Universities and the NRCS?

Are there information needs for the NRCS and NCSS that can be addressed by University research and extension faculty, and could funding come through NRCS to address these needs by University staff?

Perhaps how to help some of our sister institutions who have lost soil survey connected programs, such as Rutgers, to get them back.

SUMMARY

The extent and scope of Agricultural Experiment Station participation in the NCSS of the Northeast will vary from state to state. Availability of resources will have a decided impact on size and direction that participation will take.

Agricultural Experiment Station Activities

Teaching:

- prepare students for certification/licensing as soil scientists
- provide soil-landscape analysis training to undergraduate and graduate students
- <u>there will remain a need for field trained soil scientists</u>
- perhaps NRCS could provide internships to students. This can be accomplished directly by NRCS or by way of direct monies to universities

Research:

- interdisciplinary within universities and between NCSS - focus on natural resource and environmental issues, soils are a basic resource and should be the foundation of any natural resource research program
- GIS based: scale could range from global (global warming) to site-specific (evaluation of soils for shrink-swell potential)

Laboratory characterization:

- could money be directed to land-grant universities for specific data analysis, e.g. Virginia Tech has excellent soil mineralogy facilities, could we focus our characterization program on mineralogy?
- Va. Tech's characterization labs support many research programs in the CSES department, many of which could be of benefit to NRCS, e.g., wetland indentification and mitigation, reclamation of drastically disturbed lands...

Data bases:

- we need to develop web-based databases

Site specific studies:

- see research concerns above
- using GIS/GPS technology is becoming mandatory for natural resource assessment; universities need access to digitized soils information and attribute data

Map scale:

- large demand for more detailed soil information by private sector and by natural resource planners

Northeast Cooperative Soil Survey Conference
Orono, Maine
July 20-23,1998

Technical Committee #5
Site-Specific/High Intensity Soil Mapping Standards

Committee Charges:

1) Review Site Specific Soil Survey/High Intensity Soil Survey National Standards and evaluate applicability in the North East.

   Several states in the Northeast have very definite needs for site-specific soils mapping based on state legislation, municipalities requiring soils information for subdivision and site plan reviews.

   The NCSS currently has very little in the way of guidelines that are applicable to site-specific soil mapping.

2) Review literature on uses of Site-Specific Soil Survey/High Intensity Soil Survey in the North East and define the relevance of these products.

   1) Site-Specific Soil Mapping Standards for New Hampshire and Vermont
   2) Guidelines for High Intensity Soil Surveys in Maine
   3) Documents from other regions of the country and published Order 1 Soil Surveys were discussed.

There was discussion on whether we are talking about establishing guidelines or standards. The consensus of the committee is that the NCSS should focus on developing guidelines for States and local units of government to consider when developing land use regulations, at which time they become standards.

Recommendations of the Committee.

1) As a minimum, states should use NCSS standards (guidelines) for all soil surveys, regardless of scale.

2) Encourage states to set minimum requirements for level of professional expertise.

3) There should be a statement in the site-specific report, or on the soil map product as to the level of detail or precision.

4) There needs to be more coordination with state units of government and the private sector in the development of site-specific soil mapping guidelines. (Mark McClain, Chair of Site-Specific Soil Mapping Standards Committee, National Society of Consulting Soil Scientists.)

5) The NCSS should become proactive on establishing guidelines. Time is of the essence and we need to move forward.

6) Use WWW to post draft guidelines and use forum method to address comments.

7) This Committee should be continued with the development of more specific charges.

NEC-50 Report
Experiment Station Representatives

Submitted by John C. Sencindiver

1. Representatives to the 1999 National Cooperative Soil Survey Conference.

   Representative - Jim Baker
   Alternate - Ed Ciolkosz

2. Elected to Research Needs Committee - Ray Bryant and Harvey Luce

3. Representatives to Northeast Soil Taxonomy Committee

   1996-1998 Martin Rabenhorst
   1997-1999 John Sencindiver
   1998-2000 Peter Veneman
   1999-2001 MarkStolt

4. The University of Maryland will host the 1999 summer graduate student pedology field trip.

5. We discussed the coordination of research between the NRCS and the Experiment Stations. We want to affirm the cooperation that we have in most states, and to confirm our appreciation for those partnerships. However, we see an opportunity for better coordination and communication between the Experiment Stations and the NRCS, especially the National Soil Survey Center. Therefore, it was the unanimous decision of the Experiment Station representatives to request NRCS to take a more active role in coordinating research efforts between the Northeast Agricultural Experiment Stations and the NRCS.

Northeast Cooperative Soil Survey Conference
NRCS Break Out Session
8:00 am, Thursday, July 23,1998
Maxine Levin, Moderator

The minutes of the 1996 NCSSC break out session were read. Proposals made during this meeting will be presented at Business Meeting this afternoon.

I. Northeast Soil Taxonomy Committee

The following 3 people were nominated as Soil Taxonomy Committee members for 1999-2001:

Ned Allenburger - PA - 1999-2001
Dave Kingsbury - MO, WV - 2000-2002
Karen Dudley - NH - 2001 –2003

II. Selection of representatives to the National Conference

After discussion it was decided that format decided upon and added to by-laws in 1996 be adopted. Maxine will select someone who has not recently attended.

III. Host of 2000 Conference

Virginia was nominated and selected for the 2000 conference. New York was nominated and selected

IV. Research Needs Committee

Dr. Richard Shaw, New Jersey, and Maryland State Soil Scientist, Jim Brown, Maryland was nominated as representatives.

V. Regional Hydric Soils Committee

Northeast Cooperative Soil Survey Conference acknowledges the established committees in the Mid-Atlantic States and New England with the appointment of an NCSS Liaison to these committees.

New York would belong to both committees. Formalize action to add Virginia to Mid-Atlantic Committee. NCSS liaison could be University representative.

Additional Topics of Discussion - Proposals

1. Charge for Technical Committee on Hydric soils NCSS conference 2000. It was suggested that sub-committees should meet at next session to discuss similarities and differences in their operations. Discuss problems each group is having on on-going issues,

2. Establish technical committee for 2000 conference to address field indicators for hydric soils in Northeast with Chair and Co-chair made up of Mid-Atlantic and New England hydric soils committee. At that conference it would be decided if the committee would continue after 2000.

George Teachman presentation on potential Army Soil Survey Workload.

Material presented discussed possible soil survey requests from Army. The Army has required that soil surveys be conducted by NRCS. NRCS will decide how surveys will be conducted. Army will pay all costs.

Possible workload for Northeast Region:

State	#	Acres
ME	6	12,400
VT	3	15,100
NH	2	100
MA	3	1,000
NY	4	31,400
CT	5	8,000
DE	2	300
MD	5	8,600
NJ	2	37,500
PA	5	28,700
VA	2	7,000

East Region - Soil Survey NRCS-USDA
Maxine J. Levin
Soil Scientist for Oversight and Evaluation, East Region
Beltsville, MD

NCSS Conference
Bangor ME
July 19-23,1998

Staffing in the East Region:

- There are presently 110 soil scientists in NRCS in the East Region:
    - 9 State Soil Scientists (2 have dual duties as MLRA Office Leaders)
    - 1 Soil Scientist, Regional Oversight & Evaluation
    - 10 State Office Soil Scientists (Statewide interpretations & data responsibilities)
    - 7 MLRA Office Data Quality Specialist Soil Scientists (MLRA regional correlation responsibilities)
    - 13 Resource Soil Scientists
    - 26 Project Leader Soil Scientists
    - 38 Soil Mappers
    - 1 Wetland Institute Soil Scientist
    - 1 Research Soil Scientist (NSSC--PA)
    - 1 Soil Scientist- US Army, Aberdeen Proving Grounds, MD
    - 1 Soil Scientist ACOE Baltimore MD
    - 1 IRT Soil Scientist
- About 11% of the positions are supported by reimbursable funds from sources outside of USDA

Attached is a directory of all the soil scientists working for NRCS in the East Region.

Training

- NRCS field and state office soil scientists in the East Region continue to have a need for training in computers (particularly NASIS software), digital remote sensing, soil interpretations, wetland delineations and hydric soil characteristics. With water quality and soil quality being two top resource issues in the East Region NRCS Strategic Plan, interpretations in these fields will need a focused effort.

State (State) Soil Scientist Report
by David P. Rocque
Maine Department of Agriculture

Background

I have heard a number of you mention the pains of downsizing and reorganizing within the federal government. That is a subject we in state government are also all to familiar with. Tens years ago this month, I accepted the position as State Soil Scientist with the Maine Soil and Water Conservation Commission. It was my introduction to the National Cooperative Soil Survey. Then, one day about 2 *Vi* years ago, I discovered by reading the newspaper at the breakfast table that the Soil and Water Conservation Commission was abolished the night before, by an act of the legislature. State government was trying to save money by paring back programs and personal and I apparently was a casualty! I went to my office not knowing what to expect and discovered that my position had been transferred to the Maine Department of Agriculture. This past spring, the Department of Agriculture became an official Cooperator with the National Cooperative Soil Survey and I was named as the Departments representative.

State Perspective

Soil surveys and soil survey information are widely used within Maine State government. That is a subject we in state government. Some examples are as follows:

Maine Department of Agriculture

- Prime Farmlands are selected on the basis of soil properties.
- Soils of state wide and local importance are selected based upon soil properties.
- Purchase of Development Rights of high value farms are partly based on soils.
- New or expanded agricultural operations use soils information (cranberry bogs).
- Rules for the disposal of Animal Carcasses and Cull Potatoes are soil based for burial.
- Nutrient Management Plans for animal agriculture (or other cropland where a residual will be spread) require soil information.

Maine Department of Conservation - This agency acts much like a local government for the unorganized territories of Maine.

- Development permits (new or expanded roads, houses, camps, commercial development) require soil information (usually maps) and Erosion/Sediment control measures and stormwater management measures.
- The soil suitability guide was extensively used but is being replaced by Soil Potential Ratings.
- Minimum lot sizes are based upon soil characteristics.
- Forestry operations require permits based upon soil properties (E&S measures, what time of year the operation can take place)

Maine Department of Environmental Protection - This agency oversees environmental issues in the organized parts of the state. They work with local governments.

- Residuals utilization is based upon soil type and soil characteristics.
- Soil maps are used in the identification of wetlands.
- BMP's for erosion and sediment control and stormwater management are soil based.
- Hydrologic soil ratings are extensively relied upon.
- High Intensity Soil Mapping Standards were developed to satisfy agency needs (in cooperation with NRCS and the Maine Association of Professional Soil Scientists).
- Phosphorous mitigation measures in pond watersheds is based on soil types and hydrologic soil groupings.

- Solid Waste Disposal Rules contain some requirements which are soil based.

Maine Department of Transportation

- Soil Maps are required by regulatory agencies when reviewing permit applications for road alterations or expansions.
- Soil maps and information are used for selection of appropriate BMP's (erosion and sediment control and stormwater measures).
- Wetland identification or potential mitigation sites.

Maine State Plumbing Program - Regulates septic systems

- The Maine State Plumbing Code for design of septic systems is based entirely upon wastewater characteristics and soils (since 1974). Perc tests are no longer used. Sizing and installation depend upon parent material, texture, slope, depth to seasonal water table (mottling), depth to bedrock and depth to hard pan as well as other pertinent soil characteristics.

Maine State Planning Office

In the early 1990's Maine passed a law requiring all towns and cities to develop comprehensive plans. The law was later rescinded due to a severe economic downturn but many municipalities either had already completed their plans or went forward anyway and developed plans. Soils and the Land Evaluation and Site Assessment program developed by NRCS was frequently used in this process.

Personal Perspective

In my position as State (state) Soil Scientist, I work with all of the state agencies, consultants, municipalities and the public, on a daily basis. Participating in the National Cooperative Soil Survey allows me to bring the needs of my constituents to other cooperators and to bring knowledge gained from being a cooperator back to my constituents.

Though Maine government does not provide monetary or staffing assistance to the National Cooperative Soil Survey, it is a partnership which has still been mutually beneficial. I've enjoyed being a part of it and look forward to continuing the relationship in the future.

SOIL RELATED ACTIVITIES AT THE UNIVERSITY OF MAINE

Ivan Fernandez
University of Maine Professor of
Applied Ecology & Environmental Sciences
Orono, ME

There has been some noteworthy activities at the University of Maine regarding Soil Science. Indeed, there has been a significant amount of change in the past year, which will continue through 1998 and 1999. We think the change is good for the profession and for Maine, although some of the departures are significant. The Department of Applied Ecology and Environmental Sciences is the name that has housed the soil science faculty at the University since 1994 when it was renamed as a product of one of a series of restructurings. In the past year, Robert Rourke (soil taxonomy and morphology) has retired, and Larry Zibilske (soil microbiology) will move to USDA ARS in Texas this coming Fall. That leaves Sue Erich and Stom Ohno, both in soil chemistry, and Ivan Fernandez (forest soils) as the remaining soils faculty in the department. Most of our soil science majors are majors in the Natural Resources program with concentrations in Soil and Water Quality or Environmental Science, and interest remains healthy in these programs. In addition, there are other faculty and programs in agricultural and horticultural disciplines housed in our department.

The good news is that we believe we are past the era of downsizing and recapturing the best of the past to build for the future. That is, we returned to the name of the Department of Plant, Soil and Environmental Sciences that accurately describes who we are, and who we will be for the next millennium. We are completing the search for a new Assistant Professor in Soil and Water Quality who will teach soil taxonomy and courses related to their areas of interest and strength. We also recently hired Dr. Aram Calhoun as a new tenure track Assistant Professor in Wetland Ecology, who will be teaching courses in wetland sciences, including delineation and mapping. This winter we will be hiring a new faculty member in soil microbiology/ecology who will teach and do research in their respective disciplinary area. In short, this year we will see important but exciting developments in the Department of Plant, Soil and Environmental Sciences and promises to continue the tradition of a strong academic program in soil sciences at the University of Maine. The challenge to soil science departments everywhere is to maintain the critical mass of expertise to offer depth in the discipline of soil science in an era when multidisciplinary and interdisciplinary programs prevail. Our approach is to devote enough resources to soil science within our department to be able to provide a full curriculum, and to be able to train soil scientists for the next generation when fewer such departments may exist. At the same time, our faculty are actively involved with cross-disciplinary research and education in sustainable agriculture, forest ecosystem sciences, wetlands sciences, and global change.

Status of Soil Survey in Atlantic Canada
By

Herb Rees Potato Research Centre
Agriculture and Agri-Food Canada
Frederiction, New Bunswick
CANADA

I would like to start off by thanking the organizing committee for its invitation to attend the Northeast Cooperative Soil Survey Meetings and the opportunity to present to you an overview of the status of soil survey activities in Atlantic Canada. The last Northeast Cooperative Soil Survey meeting that I attended was in 1984 in Amherst, Massachusetts. I found it to be a very rewarding experience in terms of personal contacts and information exchange. As I recall, there was a demonstration of the ground penetrating radar at the 1984 meeting. We subsequently purchased a unit and have employed it in a number of research projects. I do regret that this time I am only able to attend one day of your meeting.

Over the ensuing years, the soils community in Atlantic Canada has had a number of opportunities to meet and exchange information on soil survey and related topics with our American colleagues. USDA-presented workshops on the USLE and RUSLE and the Fifth International Soil Correction Meeting on the characterization, classification and utilization of spodosols, come to mind.

A lot has changed since 1984. You've had two new Presidents and in Canada we're on our third Prime Minister. In 1984 the Canadian dollar was worth $0.76 American. It's now worth only $0.67 American. And I dare say, my hair may have even been a touch darker than it is today. Likewise, soil survey has undergone monumental shifts in terms of what is being done and by whom. I never thought that I would see the day when the Soil Conservation Service would be renamed, but I have. Similarly, in Canada, we have undergone historical shifts within the government soil survey community.

For those of you who might have attended the National Cooperative Soil Survey Conference in Baton Rouge, Louisiana in June of 1997, some of what I am saying will be old news.

Soil survey, mapping, classification, taxonomy and interpretation have had a long and lustrous life in Canada from the first surveys conducted in the province of Ontario in 1914 to the development of a national taxonomic system of soil classification in 1955, through to the establishment of a computerized soil information system (CanSIS) in 1971. By the late 1970's almost all agricultural land in Canada had been mapped and a number of re-surveys were underway. In the 1980's provincial government staff directed their efforts towards on-farm soil survey. Nationally, Soil Landscapes of Canada was completed at a scale of 1.1 million.

Prior to 1996, there existed a formalized network, with "headquarters' in Ottawa and a "Soil Survey Unit" in each province. Each Unit was "headed" by a federal employee who was responsible for administration, coordination and correlation oat the national level, and reported to a manager in Ottawa. The scientific aspects of the network were governed by the "Canada Soil Survey Committee", consisting of the manager. Unit Heads and other invited participants. On a number of occasions USDA Soil Conservation Serviced representatives attended these meetings. The Ottawa headquarters was responsible for financing, support for the Canada Committee, correlation and laboratory analysis, data standards and quality control, map digitizing, printing, and distribution, and data management. The provinicial units were responsible for within province coordination, soil survey mapping and reporting, representation on steering Committees, local interpretations, and support for national interpretations.

In 1996 a federal "Program Review" reduced soil survey staff by about 50% and dramatically restructured the national program. After the 1996 "Program Review", what remained was an informal network of "Land Resource Units" administered by regional Centers of Excellence related to one or more commodities, with each unit increasingly specializing on issues for a particular ecoregion or broad soil type. In many instances, these "Land Resource Units" have been dissolved. One of those regional centres, the Eastern Cwercal and Oilseen Research Centre in Ottawa, Ontario, has been given the mandate for management of the National Soils Data Base, but there are no formal links to other regions. In Atlantic Canada, former soil survey staff now report to either the Potato Research Centre in Fredericton, New Brunswick, The Crops and Livestock Research Centre in Charlottetown, Prince Edward Island, or the Atlantic Cool Climate Crop Research Centre in St. John's Newfoundland. My colleagues and I no longer have primary mandates in soil survey. Presently I am involved with applied research activities dealing with soil and water conservation, surface water quality and precision farming. My role in soil survey consists of completing outstanding projects and providing interpretations of the existing soils data bases.

To provide some level of coordination, the federal members of the former soil survey units have formed an ad hoc Canadian Land Resource Network (CLRN) as a means of maintaining communication.

With the exception of some specific site investigations and reporting and map attribute file compilation, soil survey projects per se are no longer undertaken by government agencies in Atlantic Canada. Most detailed re-survey programs and on-farm soil survey initiatives were discontinued in the late 1980's and early 1990's. Some detailed soil surveys of research plots have been undertaken to characterize soil variability and will, in all likelihood, be used in precision farming research to investigate and define management zones delineated by yield monitoring. The major soil inventory activities are in application of the data.

Ironically, at a time when both federal and provincial government agencies are getting out of soil survey programs, the demand for land resource information is increasing. With greater availability and accessibility of other sources of digital geographic information, more sophisticated models and algorithms, and more powerful desktop and micro computers, this demand for land resource information will only increase.

Government agencies, including agriculture, routinely use digital soils information in combination with land use data to provide support for both rural and municipal land use planning and environmental investigations. The private section is heavily involved in environmental assessment type work relating to the implications of such facilities as gas pipeline corridors, highway routes, solid waste landfill sites and sewage treatment plants. Environmental risk assessment of contaminated sites is proliferating in Atlantic Canada. Soil remediation is a large part of the workload where such techniques as land farming, soil venting, and bioremedition are used to cleanup impacted sites. All of these remediation techniques require background soil information.

More broad-based applications of soil survey data for regional and national purposes include the following:

The environmental farm plan is an industry drive initiative sponsored by the Atlantic Farmers' Council. It calls for each farm in Atlantic Canada to complete an environmental assessment of its operation and develop and action plan tailored to its specific conditions. The goal of the environmental farm plan is to develop a practical plan for operating farms in a way that is environmentally responsible. The program is voluntary. The Atlantic Environmental Farm Plan includes a rating of the risk of surface water contamination, groundwater contamination, soil erosion by wind,water, and tillage, and soil compaction. Provincial and federal soil surveyors and/or soil specialists used existing soil data bases to provide lists of provincial soils with those interpretations needed by the farmer or producer to assess his/her risks.

Various provincial departments of natural resources uses soils data in forest site classification including ecosystem mapping, site sensitivity mapping related to forest management activities, and analysis of forest research and productivity data. Of all the interpretations applied to soil inventory data, forest site classification is by far the most active in terms of interpretation verification. Several projects are underway that are attempting to quantify forest site productivity.

The Agri-Environmental Indicator (AEI) Project of Agriculture and Agri-Food Canada was initiated in 1993 with the objective of developing and providing information to help integrate environmental considerations into decision-making processes of the agri-food sector. The project aimed to develop a core set of regionally sensitive national indicators that build on and enhance the information base currently available on environmental conditions and trends related to primary agriculture in Canada. The AEI project is focussed on six indicators and their associated components, farm resource management, risk of water contamination, agroecosystem biodiversity change, agroecosystem greenhouse gas balance, input use efficiency, and soil degradation risk. Trends in water erosion risk have been established for Canada using the Soil Landscapes of Canada data base in conjunction with land use information from census data (StatsCan). Interpretations for risk of compaction and risk of tillage erosion are being investigated.

Potato production in Atlantic Canada, and particularly Prince Edward Island, has increased dramatically over the past decade. With the processing industry's need for more raw product, areas for possible potato land expansion in all three maritime Provinces are being investigated. Interpretations have been based on information assembled from soils, climate, land use and property ownership maps. Non-traditional areas are being considered for potato production.

As soil survey applications expand, the need for more consistent and more detailed information is often raised. Regional surveys have been compiled at various levels of intensity ranging from scales of 1:50,000 to 1:126,720. Reporting methods often vary significantly, not only between provinces, but also with provinces. This has been largely offset by the compilation of standardized map attribute files, but some problems still exist. Concerns have been expressed about the level of correlation between the "old" and "new" maps, soil variability, limited analytical data for many of the soils and lack of data for non-historically collected attributed (i.e., hydraulic conductivity, bulk density, moisture retention, heavy metals, etc.) Modem interpretations are required for older surveys. There is a need to utilize today's technologies to develop new, affordable methods to update old soil surveys to meet the data needs of today's clients and applications.

Unfortunately, support for soil science training is declining. Concerns are expressed that pedology and the discipline of soil science is threatened and lacks direction in Canada. There are fewer and fewer opportunities for soil science graduate and theirs numbers are declining in Canada. Pedologists are retiring and are not being replaced by new graduates. It is impossible to retain, and will be difficult to rebuild, the expertise lost through the retirement of many of our senior soil scientists. Maintaining soil survey standards and explaining soil variability and its impact of data use will be challenging under this new regime. However, given all of this, the soil science community in Canada has still managed to forge ahead. This is no better exemplified than by the publishing this year of the third revision to the "Canadian System of Soil Classification"

NCSS ACTIVITIES IN CONNECTICUT

The Connecticut Statewide Soil Survey Update project started in 1991. Currently, field mapping activities are approximately 90 percent complete for this project (105/114 quads) with the remaining acreage being located in the northwest comer of CT. Acceptable joins have been completed with MA, NY, and RI for the statewide soil survey. Outside funding is needed to accelerate completion of the survey.

In cooperation with CT DEP and the University of Connecticut (Uconn), about 80 percent (93/114 quads) of the new statewide soil survey data is digitized and available to the public as interim digital data on the UConn Map and Geospatial Information Center (MAGIC) site. The site. **Error! Reference source not found.,** provides the digital data in ARC export, Map Info, and AutoCad formats for public use.

The Soil Catenas of Connecticut brochure was reworked and released this year in cooperation with CT DEP. The brochure diagrams the inter-relationships of the soils of CT as they relate to landscapes, geology, and parent material.

Another cooperative effort with CT DEP has resulted in the development and recent release of the new State Wetland Maps for 139 of the 169 towns in CT. NRCS provided the latest soils data and expertise for DEP to produce the maps. The Wetland Soil Maps show the general location of areas that may be subject to regulation as defined in the Inland Wetlands and Watercourses Act of the CT General Statutes. The maps are available for use by towns and private landowners to make better landuse decisions.

With over 3 million people and a growing economy, CT's soil resources are intensively used. Updates of soil series, soil database information and tracking land use changes are ongoing. Technical services to assist people in the proper use of soil information continues to be important also. Some examples of these activities include:

- Timely completion of the 1997 NRI.
- Timely completion of the Conversion from SSSD to NASIS 3.0 & 3.1 and upload to M012. Remote access to Amherst, MA, using HP term running off of a Sun Spark 10, using ppp and dxpc is working well for us.
- Participated in technical support for 4 Realtor's workshops and 1 wetland workshop. Over 150 Realtors and commission members received training.
- Provided leadership and technical support for Statewide Envirothon workshops and competition. Provided 2 workshops with participation from over 200 students and teachers representing 34 schools.

Special activities planned for the remaining year and next year include:

- Completion of the Soil Carbon in New England Forests: Analysis and Modeling Study being conducted in cooperation with Yale School of Forestry and Environmental Studies. The goal of the study has been to develop a predictive model based on region-specific factors that will estimate soil organic carbon and nitrogen content for the forested highlands of CT. This is the third year of the study and the final year for funding.
- Participation in the Soils Explorer Project for the RI soil survey with anticipated completion and release of survey on CD-ROM in September.
- Conducting a Soil Characterization Study including 9 pedons. The study ties together 3 ongoing agency projects and provides a foundation to support future technical soil activities in the state in addition to providing information for the soil survey.

SUMMARY OF SOIL SURVEY RELATED ACTIVITIES OF THE STORRS AGRICULTURE EXPERIMENT STATION
Harvey Luce

Study of a Palesol in Middlefield, Connecticut: What is thought to be a buried paleosol (paleo-argillic horizon) has been field identified in a cross section of till exposed in a deep gully. Particle size, mineralogical analysis, thin section analysis and selected chemical tests are being conducted at the National Soil Characterization Laboratory in an effort to elucidate the magnitude of weathering that has occurred in the layer assumed to be a palesol. Harvey Luce, Plant Science Dept. and Douglas Wysocki, Natural Resource Conservation Service Lincoln, NE.

Use of Clay Free Particle Size Ratios to Detect the Presence Eoliam Soil Manties: An abrupt change in clay-free particle size distribution with depth can be used as strong evidence of a litho logical discontinuity. In the study of three Canton, three Montauk and three Paxton soils, discontinuities were field identified in all of the Canton and Montauk pedons and in one of the Paxton pedons. A shift in the ration of the sum of vcs, cs and ms (0.25-2,0 mm) to coarse silt (0.02-05 mm) coincided with the location of field identified discontinuity in each of the seven soils with identified discontinuities and in Paxton pedon which was not recognized as having a discontinuity in the field. Harvey Luce, Plant Science Department.

Soil Lead Levels Elevated by Intensive Hunting. Robins Island. New York: Intense hunting and some skeet shooting has occurred on this 454 acre island in Peconic Bay. About 30 soil pedons were sampled with depth. Soil leads levels in excess of assumed natural or background levels were found in about one-third of the pedons tested bit were less than action or advisory levels. However, the fraction of total lead that appears to plant available and/or mobile appears to be unusually high. Factors that could account for this include: (1) very low soil pH, (2) very low soil P, (3) sand textured soils; (4) chelation of lead by fulvic acids (podzolization), and (5) effects of salt spray on lead solubility. Harvey Luce and John Barclay, Natural Resources Management and Engineering.

Aanniion adsorption Mechanisms on Soil Constituents: Studies focused on the effect of inorganic-C on the adsorption of anions on the surface of oxides. Christian Schultess, Plant Science Department.

Study on agriculture use of water treatment plant residual (WTR): There are two primary concerns relative to the application of WTR to cropland or turf. This material tends to reduce the plant availability of P. This is a problem if the material is being applied to soils that need P fertilizer but it could be a solution for soils that contain excessive levels of P. Both aspects are being studies on WPR generated by the South Central Regional Water Authority of Connecticut. Preliminary result show that the amount of P fertilizer that is needed to counteract the tendency of WPR to reduce available P is much lower than expected. Obviously its capacity to reduce available P is much lower than expected.

The second concern is heavy metals content. This particular WPR had a much lower content than expected. Tom Morris, Christian Schulthess, Plant Science Department.

Nitrogen Mineralization as a predictor of grassland nitrogen requirements: The June nitrate test is currently in use in Connecticut and other localities to estimate N fertilizer needs for corn. The research underway in this project is directed toward developing a similar predictive tool for perennial grasslands. Preliminary results found critical levels to vary from 2-8 ppm nitrate nitrogen in tests involving tall fescue and red canary grass. D. W. Allinson and Sr.

Nitrate Leaching losses from Lawns Following Late-Season Nitrogen Fertilization: A field study using zero-tension funnel lysimeters showed that up to 30% of the N applied in late November as ammonium nitrate was lost by leaching. Much lower losses were found for the slow release fertilizers, sulfur-coated urea and an organic compost (Sustane). Karl Guillard and Kelly Kopp, Plant Science Department.

Quantifying the Water Quality Benefits of the Pre-sidedress Nitrate Test: Two years of data suggest that the reduction in nitrate leaching from use of the test are substantial. Karl Guillard and Thomas Morris, Plant Science Department.

Northeast Cooperative Soil Survey Conference
Bangor, Maine
July 20-23, 1998
New Hampshire Report

The New Hampshire Soils program is completing the last initial soil survey this year. There is one soil survey update that is on-going in Merrimack and Belknap County. The White Mountains National forest remains a void in the State with no soil resource information available. Current trends in budget and staff indicate there is no immediate plans by the National Forest to initiate a project soil survey.

Of the 10 counties in the state, 2 have been SSURGO Certified. Five counties have been digitized with SSURGO certification pending in F/Y98. One County has SSURGO certification scheduled for F/Y99. The two remaining counties are the two that are currently being updated

Significant Activities within the New Hampshire Soil Survey Porgram.

1) The soil survey programs in New Hampshire and Vermont have entered into a memorandum of understanding to share staff and resources both in project soil surveys and technical soil services. This MOU, signed by both State Conservationists, is perhaps the first of its kind in the country. It allows for the sharing of soil scientists and resources across state lines without the need to record reimbursable time or transfer funding. Two MLRA field offices were established, one in the South and one in the North, that will work directly with the M012 office. New Hampshire supports the Soil Data Set manager for both New Hampshire and Vermont. Vermont supports the soil Liaison for New Hampshire and Vermont. This MOU also recognizes the separation of technical soil services, establishing two technical soil services positions in the two-state region.

2) The last acre of private land in New Hampshire will be mapped on September 9, 1998, at the top of Mount Washington, weather permitting!! This is the final acre ceremony for the Coos County Soil Survey.

3) The Site-Specific Soil Mapping Standards for New Hampshire and Vermont was published in June 1997. It has received very strong support in New Hampshire and is being well received in Vermont. The standards have been indorsed by the New Hampshire Office of State Planning, the New Hampshire Department of Environmental Services, all of the regional planing commissions and many municipalities have written these standards into the regulatory process for subdivision and site plan reviews. As of this date the standards are being recognized in the New Hampshire Administrative rules for Land Application of Municipal Sludge, the Administrative Rules for Subsurface Wastewater Disposal, the Model Shoreland Protection Ordinance, and Model Subdivision Review Ordinance.

4) The Mascoma Wetland Project continues to expand. We currently have 7 data collection sites. Two sites are partially automated and three sites are fully automated. Up to 70 data elements are collected at these sites. During the first week in august, 1998 we will be installing a SCAN site with the assistance of the national Water and Climate Center in Portland, Oregon. This will be the first SCAN site East of the Mississippi River.

5) Sid Pilgrim, State Soil Scientist, Retired, recently completed and published the 100 year history of the New Hampshire Soil survey. This publication is available for anyone desiring a copy. It will be promoted throughout New Hampshire during our centennial year and into the future.

MAPSS and it's Relationship to NRCS History

1. Organization formed in 1973 by a group of 8-10 people who called themselves Maine Association of Consulting Soil Scientists.

2. The following year the group decided that the name was not appropriate and change its name to Maine Association of the Professional Soil Scientists.

3. Maine had one of the first soil scientist certification programs in the nation established a basic soil scientist test and an area of specialization: morphology and maping, soil fertility, forest soils and soil chemistry.

Roland Structmyer, Bob Rourke, John Ferwenda, Ken LaFlamare

Membership

1. Currently consists of approximately 100 members. 60 certified soil scientists full members. 40 non-certified associate members.

Bruce Verrill, Bruce Whitney Darryl Brown, Peter Crane.

Objectives:

1. To promote the profession of soil science by maintaining high professional standards and a code of practice.

2. To assist in continuing education and training necessary for professional development of soil scientists.

3. To provide a forum for the discussion and exchange of ideas.

4. To promote cooperation among it's members and other professional organizations.

MAPSS - NRCS Relationship

There has always been a solid working relationship between MAPSS and the NRCS

1. 1990 Soil Mapping Standards
2. Compiled a hard copy of OSD's. Kept MAPSS apprised of changes.
3. Exchange of all kinds of technical information.
4. Soil Survey Manual
5. Soil Survey Handbook
6. State Regulations
7. Defining Hydric Soils
8. Workshops, field days

Most Recently MAPSS

Web site

New Jersey Report
1998 Northeast Cooperative Soil Survey Conference

Current Research/Extension Programs in Soil Fertility:

- Sustainable Phosphorous Fertilizer Recommendations for Corn Production in the Northeast USA
- Turfgrass Quality Response **to** Mowing and Nitrogen Fertility Management
- Correction of Manganese Deficiency in Soybean.
- Nutritional Control of Take-all Patch Disease on Bentgrass.
- Sweet Corn Nitrogen Tissue Status at Harvest
- Foliar Fertilization of Soybeam with Monopotassium Phosphate
- Presidedress Soil Nitrate Test for Fall Cabbage
- Potato Scab Control with Manganese and Ammonium Sulfate Fertilizers
- Liming Practice for Kentucky Bluegrass and Summer Patch Disease Control
- Corn Response to Foliar Applied Boron Fertilizer
- Nitrogen Mineralizatin from Grass Clippings Applied to Soil

NRCS - New Jersey Personnel - FY 98

Hackettstown Service Center	Fred Schoeagel	Soil Scientist
North Jersey RC&D Field Support Office Annandale, NJ	Rich Shaw Edwin Muniz	Project Leader Soil Scientist
State/Office/ Central Jersey Field	Ron Taylor Chris Smith Gary Casabona	State Soil Scientist Resource Soil Scientist Resource
Conservationist/GIS	Ken Henry	Resource
Conservationist/GIS Conservationist/GIS	ShayMaria Silvestri	Resource (special term project)
	Karen Mitchell	WAE
South Jersey RC&D Field Support Office Hammonton, NJ	Scott Keenan Seth Gladstone Thorny Hole	Project Leader Soil Scientist Soil Scientist (Volunteer)

New York Report 1998 Northeast Cooperative Soil Survey Conference

I. Current Staffing

A. State Office
Tyrone M. Goddard, State Soil Scientist, Syracuse, NY
Steve Indrick, Assistant State Soil Scientist, Syracuse, NY
John Kick, NRI Specialist, Syracuse, NY
Kathy Carpenter, Secretary, Syracuse, NY
Erwin C. Rice, Soil Scientist, Volunteer, Syracuse, NY
Henry Stamatel, Soil Conservationist, Volunteer, Syracuse, NY

B. Western New York Staff
Steve Carlisle, Resource Soil Scientist, Seneca Falls, NY
Paul Puglia, MLRA Project Leader, Ellicottville, NY
Steve Antes, Soil Survey Project Leader, Belmont, NY
Matt Havens, Soil Scientist, Belmont, NY
Victoria Smith, Soil Scientist, Belmont, NY
Joe Senney, Soil Scientist, Belmont, NY

C. Eastern New York Staff
Edward Stein, Resource Soil Scientist, Utica, NY
Steve Seifried, MLRA Project Leader, Walton, NY
Luis Hemandez, Soil Survey Party Leader, Staten Island, NY
Robbie Tunstead, Soil Scientist, Staten Island, NY

D. Northern New York
Ted Trevail, MLRA Project Leader, Plattsburgh, NY
Gerald Smith, Soil Survey Party Leader, Westport, NY
Steve Page, Soil Scientist, Westport, NY
Mark Silverman, Soil Survey Project Leader, Malta, NY
Paul Konopka, Soil Scientist, Malta, NY

The above staffing represents a major effort to add two resource soil scientists at the GS-12 level, one to serve eastern and the other to serve western New York. Also included are three MLRA Soil Scientists positions, also at the GS-12 level. One serves the MLRAs in eastern, another of those serve in western, and the third serves in northern New York. The staffing also reflects two new NRCS soil scientists hired this spring.

II. Digitizing and Recompilation

1. Soil Surveys re-compiled
- Columbia County
- Genesee County

2. Soil Surveys Digitizing
-- Madison County
-- Saratoga County
-- Clinton County
-- Otsego County

3. Soil Surveys SSURGO Certified
-- Saratoga County
-- Seneca County

III. Soil Survey Report Published

-- South Latourette Park, Staten Island, New York

IV. Soil Survey in Progress
- -- Essex County
- -- Cattaraugus County
- -- New York City

V. Updates Underway
- -- Allegany County
- -- Genesee County
- -- Livingston County

VI. NRI - Complete, over 6900 psus, plus 1998 special study

VII. Special Studies
Soil Temperature - Throughout State
Soil Quality - New York City

Cornell University Agricultural Experiment Station Report

Presented by Peter Kleinman, Ph.D. Candidate, Dept. Soil, Crop and Atmospheric Sciences.

PERSONNEL

Dr. Jeff Wagenet, former chair of the Dept. of Soil, Crop and Atmospheric Sciences, passed away in August, 1997 after a prolonged battle with brain cancer. During his tenure at Cornell, Jeff made an indelible imprint, both professionally and personally. A memorial symposium will be held in his honor at this year's Tri-Societies meeting in Baltimore.

Dr. John Galbraith completed his Ph.D. in 1997 and conducted a year of post-doctoral research at Cornell. He is now serving as a research associate at the University of Florida where he will play a lead role in developing an urban soils program and will teach a variety of undergraduate and graduate soil classes.

Dr. Ray Bryant spent his sabbatical leave at CH2MHU1, an environmental engineering firm, with the dual objectives of exploring current uses of soil information to address modem environmental problems, and identifying opportunities for improved cooperation between academic and private sectors.

RESEARCH

A variety of research projects (outlined below) were completed in the last two years, ranging in focus from soil quality, to soil heavy metal distribution, to nutrient management, to carbon sequestration. Several of these projects were conducted in close coordination with NRCS. While the bulk of the research was conducted in New York State, the concerns address by this research have been clearly identified as both national and international priorities.

Soil Quality

Impact of Site Use on Soil Quality and Runoff Potential in A Degraded Watershed in Central Park, New York City (Angela Singleton, Ray Bryant and Harold van Es).

- Evaluate relationship between urban land use and soil quality indicators related to runoff potential.

Soil Quality Index to Evaluate Soil Degradation in Guarico River Watershed, Venezuela (Angel Corona, Ray Bryant and Stephen Degloria).

- Develop soil quality index to assess site-specific erosion potential of rural land use alternatives.

Heavy Metals

Heavy Metal Distribution in Soils of South Latourette Park, Staten Island, New York (Jonathan Russell-Anelli, Ray Bryant and Tammo Steehuis).

- Assess factors affecting spatial distribution of heavy metals in urban soils.

Nutrient Management

Predicting Soil Phosphorus Saturation in Agricultural Soils of Delaware River Watershed (Peter Kleinman, Ray Bryant and Shaw Reid).

- Develop pedotransfer functions to relate readily-available Cornell soil test data to alternative measures of soil phosphorus saturation.

Use of Decision Simulation Model to Evaluate Alternative Manure Management Strategies for Water Quality Protection (Peter Kleinman, Megan Marshall, Wolfe Tone and Ray Bryant).

- Develop spreadsheet-based model to simulate farmer decision making process under alternative nutrient management scenarios.

Differential Soil Fertility Dynamics Under Rubber (Hevea brasiliensis) and "Wild" Fallows in an Indigenous Slash-and-Bum Agro-ecosystem (Peter Kleinman, Ray Bryant and Steven Schwager).

- Assess effect of rubber-enriched fallows on long-term soil fertility dynamics of slash-and-bum fallows in West Kalimantan, Indonesia (Borneo).

Carbon Sequestration

Quantitative Evaluation of Carbon Sequestration in Soils of Tug Hill MLRA (John Galbraith, Peter Kleinman and Ray Bryant).

- Evaluate effect of alternative data sources (spatial and soil organic carbon) on aerial estimation of organic carbon content of Tug Hill soils.

Rhode Island Report
1998 Northeast Cooperative Soil Survey Conference

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RHODE ISLAND NRCS SOILS STAFF ACTIVITIES AND ACCOMPLISHMENTS

- The "Soil Survey of Rhode Island" was SSURGO certified in 1996.
- Rhode Island NRCS staff have been working with Connecticut and Massachusetts NRCS personnel to achieve single nodejoins and common map unit names across the state line. Work is complete for joins with both Connecticut counties and one of the Massachusetts counties.
- Rhode Island NRCS staff have provided assistance to other states with SSURGO production work. Specifically, New York and Maryland.
- About a year ago Rhode Island received statewide digital ortho-photoquads. Since the state has both SSURGO soils data and DOQ's, we are assisting to plot both the "Soil Explorer" and FOCS/GRASS Interface" (FGI) softwares. Connecticut NRCS staff have been actively involved in assisting with the Soil Explorer project.
- Rhode Island NRCS staff have provided a variety of "Basic Soil Services" during the past two years. Numerous training sessions have been held for Realtors, teachers, the Environthon, environmental specialists, state regulatory staff, etc. On-site investigations have been conducted for NRCS assisted projects. Environmental Review Team projects, etc.

RHODE ISLAND AGRICULTURAL EXPERIMENT STATION

RESEARCH

Tidal Flooding of a Freshwater Coastal Ecosystem:
Evaluating Marsh Restoration and the Effects of Sea Level Rise.
Mark Stolt

The area of tidal marshes on the landscape waves and wanes in response to the activities of man. Marshes have been destroyed and disrupted because of development. Tidal marshes have also been created because of rapid sea level rise. Because the freshwater coastal wetlands are the lowest lying of the freshwater ecosystems, they are the first to be inundated by incoming marine waters related to sea level rise. How much an effect seal level rise will have on the coastal freshwater ecosystems in Rhode Island has not been explored.

The Galilee restoration project provides an ideal setting to study the effect of sea level rise on the soils in freshwater ecosystems. Parts of the Galilee marsh were cut off from the marine waters in the 50's and developed into a freshwater dominated coastal ecosystem. Tidal flooding was reintroduced into the Galilee marsh in the October, 1997 to try to recreate the former tidal marsh. Prior to this date, soils were described and samples collected from representative areas of the freshwater ecosystem. These samples are providing baseline data to evaluate the changes that occur to a soil system in response to seal level rise.

The objectives of this study are: i) to document to environmental, physical, and chemical changes that occur in the Galilee soils in response to marine water inundation and marsh restoration; ii) to begin to understand the effect that sea level rise will have on a freshwater coastal ecosystem; and iii) examine the function of the created marsh for the attenuation of pollutants in the soils and sediments.

Four sampling sites were chosen based on elevation and vegetative communities. Vegetation at the lowest elevation is dominated by hydrophytic herbaceous plants. Water tables are at or near the surface throughout the year. Soils have historic epipedons, or are classified as organic. At the highest elevation, tall shrubs are the dominant vegetative species, and soils are entirely mineral. Between the upper and lower limits of the ecosystem are two transition areas. Soils were described and sampled in triplicate in each sampling location. Soil materials of a known composition were buried within each site. Materials were packed to form a simulated soil structural unit (simulated ped) and buried at a shallow depth. Natural and simulated ped samples are being collected on a regular basis to establish rates of change in soil pH, electrical conductivity, and nutrient, Fe, S, and carbon levels. Environmental conditions such as water table levels will be compared with those measured during the previous years prior to tidal flooding.

Carbon Sequestration Dynamics in Southern New England: Using Soil Survey and Remotely Sensed Data to Estimate Carbon Stored in a Outwash Landscapes within a Watershed
M. Stolt, J. Compton, and A. Davis

Terrestrial ecosystems rely on the cycling and storage of nutrients, especially carbon, to remain in their present form. Land use change and changes in global weather patterns have drastically altered the amount of carbon stored in soils and vegetation. In order to estimate and model the expected changes in the future, a data base of the carbon pool in the terrestrial ecosystem is necessary. We are evaluating the use of soil survey information and remotely sensed land use patterns to estimate the amount of carbon stored in outwash landscapes of the Pawcatuck watershed of Rhode Island. Soil types were chosen sequestration and CO; flux.

Mapping units of excessively drained Winsor, well drained Merrimac and Enfield, Poorly drained Rumney and Raypol, and very poorly drained Carlisle and Adrian are being evaluated to locate representative study areas with uniform deciduous vegetation (soils, vegetation, and land use data are available in the RI GIS database). Three representative mapping units of the aforementioned soil types will be chosen to estimate the amount of carbon stored in the soils and vegetation. Random points within each mapping unit will be sampled to calculate the average carbon content within the mapping unit and to elucidate variability. Carbon fractions will be partitioned and CO; fluxes will be determined for each soil type. Our long-term goal is to collect similar data for other land uses, such as agriculture or urban development, to determine the effects of land use change on carbon storage in these soils. Based on archived remotely sensed data (late 30's) and recent land use inventories, we hope to be able to model changes in C sequestration due to land use changes.

Response of Micro-pore Distribution to Redox Fluctuation in Relation to Bioremediation of Hydrocarbon Contaminated Soils.
M.H. Stolt, J.A. Amador, and J.H. Gorres

Micro-pores, although small in size, comprise a considerable proportion of the total pore area in soil. Contaminants can diffuse into the minuscule micro-pores and become trapped. Entrapment can diminish the accessibility of these compounds to microbial degradation and contaminants become more persistent. We suspect that Fe coatings alter micro-pore distribution, connectivity, and location within the soil, altering the potential for bioremediation. To test this hypothesis, we are using mercury porosimetry to determine pore distribution and connectivity in soils with various Fe content and mineralogy. Soils are then treated with DCB to determine the effect of reducing conditions on pore structure and potential bioremediation.

Micromorphology of Seasonally Saturated Soils Formed in Low Chroma Parent Materials
M.H. Stolt, B.C. Lesinski, and W.R. Wright

Soils formed in dark-colored till (chroma <3) are common in southern New England. The low chroma colors are due to the carbonaceous nature of sedimentary and metasedimentary rocks the till formed in. Much of this till is very dense resulting in soils with seasonal episaturation. These soils are classified as Aquic Dystrochrepts, Typic Epiaquepts, and Typic Humaquepts. The inherent low chroma colors of the soils make the use of redoximorphic features to estimate depths of seasonal saturation difficult. Understanding the location of the seasonal water table is critical in making various land use decision. We are examining the effectiveness of micromorphology to identify certain features indicative of seasonal saturation in these low chroma soils. Water table observations wells were monitored to establish seasonal fluctuation. Hydromorphic features are being examined in the field and in thin section to correlate with the seasonal water table levels.

Effectiveness of Sand Filter and Shallow-Narrow Drainfield Components to Treat Domestic Wastewater
M.H. Stolt, G. Loomis, and A. Sykes NRS-URI

On-site systems are used in approximately 30% of the households and a majority of the coastal communities in Rhode Island. Because land is a limited resource, more and more OSWDS are being placed on marginal land for waste disposal. Many of these marginal areas have coarse-textured soils and high water tables that provide minimal treatment of domestic wastewater before reaching ground or surface waters. As a result, pollution in the form of N and coliforms are a problem in coastal ecosystems. In order to try to reduce or alleviate such pollution, we are evaluating alternative on-site systems that combine sand filter with shallow-narrow drainfield components. Ideally, a sand filter provides the primary treatment following the septic tank. Most of the suspended solids are removed in this step and N is transformed to the nitrate form. The majority of the pathogens are filtered out. The sand filter effluent is disposed of in the shallow (< 30 cm the soil surface) narrow-drainfield. This environment is well within the root zone and is very biologically active. Pathogens must compete against a multitude of soil organisms and quickly die-off. Plants take up N or denitrification occurs in anaerobic locations. To test these treatment zones, 4 systems, consisting of a septic tank, a sand filter, and a shallow narrow drainfield, are being sampled at various junctions in the disposal system. Levels of N, P, organics, and coliforms are being measured from these samples. The shallow-narrow drainfield environment will be documented in regard to soil temperature and redox potential. Levels of N. C02, flux, root distributions, and soil structure in the shallow narrow drainfield soils will be compared to adjacent soils away from the sand filter effluent. Grass biomass and N and P levels in the grasses will also be compared.

Patterns of Soil Drainage Classes in Riparian Areas of the Pawcatuck Watershed:
RI-GIS Data vs Field Data
Art Gold and Adam Rosenblatt

Riparian zones are the interfaces between terrestrial and aquatic systems. The recognition of riparian zones in the attenuation of anthropogenic pollutants (especially N) has increased in recent years leading to special management of these areas to abate nutrient movement into surface waters. The effectiveness of the riparian zones to remove nitrate has been found to strongly correlate with soil drainage class. The objective of this study are to evaluate the occurrence, approximate size, topography, and pattern of riparian soils drainage classes along toposequences and compare these field data to the RI-GIS data. The long-term goal is to be able to use a combination of GIS data, such as vegetation, soil survey mapping units, and contour lines, to predict drainage class distinctions and near surface water flow patterns in riparian areas.

Forest Ecosystem Carbon, Nitrogen and Phosphorus Retention Process after Agricultural Abandonment
J.E. Compton and T. Hooker

Over the last 150 years, much of the landscape of eastern North America has been transformed from predominantly agricultural lands to forest. In central New England 50-80% of forested uplands were cleared for agriculture by the mid-1800s. Today, 60-85% of these lands support mature forests. Despite the widespread importance of this land-use change, little is known of the duration of agricultural impacts on biogeochemical cycling in the forest soils. Such an understanding would provide important insights into the recovery of nutrient retention processes after disturbance, and the residual impact on water quality (N and P leaching), forest production, and response to forest management practices.

Our objectives are to determine 1) storage ofC, N and P in the above and belowground biomass and soil, 2) soil nitrogen mineralization-immobilization balance, and 3) long-term storage of P in organic vs. inorganic forms. We are comparing these processes in active agriculture fields, recovering forests and forested areas which were never cultivated. Gross nitrogen mineralization and fractionation will identify organic vs. inorganic storage as a long-term retention mechanism. Our long-term goal is to develop a base of information on forest C, N and P cycling in order to move ahead in determining the impact of present-day forest management on growth and nutrient cycling, and to ultimately link this information to study the composition of surface waters and nutrient loading in coastal watersheds.

Nitrogen and Phosphorus Interactions in Forested Uplands and Wetlands
J.E. Compton, J. Lyons and A. Davis

The importance of nutrient interactions in controlling primary productivity, decomposition, and nutrient release has long been recognized. There are several possible interactions: 1) phosphorus availability increases presence and activity of N2 fixers; 2) phosphorus can stimulat3e N mineralization and nitrification; 3) nitrogen fertilization can increase P uptake; 4) high N inputs can decrease foliar P levels. Few experiments have tested these interactions. Site history and present-day management can influence N and P availability, yet few studies directly examine the effects of P availability on N cycling and vice versa. The interactions between nutrients could be as important as single nutrient effects.

This study examines the influence of factorial additions of ammonium-nitrate and phosphate on soil respiration, microbial C. N and P, net nitrogen cycling and available phosphorus. We are sampling monthly over a six month period, and will be determining nitrogen mineralization, nitrification, and available phosphorus. We are also examining the response of microbial biomass C, N and P, and microbial efficiency (activity per unit biomass) in response to changing N and P availability. We will determine the influence of enhancing phosphorus availability on critical biogeochemical processes such as N mineralization, nitrification and microbial respiration, in order to increase our predictive and management capabilities and understanding the links between land-use and soil quality.

Distribution of Soils Affected by Aeolian Processes in Rhode Island
M. Stolt

Soils occurring on glacial landscapes often form in multiple parent materials. In Rhode Island these soils are recognized as silt-mantled till or silt-mantled outwash (Soil Survey of Rhode Island Rector, 1981). In some publications, the upper soil parent material is referred to as an aeolian (wind blown) mantle (Lawson, 1995). Aeolian deposits that are predominantly composed of silt-sized particles are usually termed loess (American Geological Institute, 1962; Wright and Sautter, 1988). The term loess, however, is rarely used in the literature suggesting a skepticism to mode and origin of the predominantly silt-sized capping. The objectives of this study are: 1) to understand the geographic distribution of soils affected by aeolian processes (not exclusive of those soils without obvious silt

mantles); 2) to develop an understanding of the relationships between the soils and the surficial geology; 3) to determine the mode of deposition and the origin of the materials; and 4) to determine the affects the underlying till or outwash have on the near-surface hydrology and soil morphology.

EDUCATION AND TRAINING

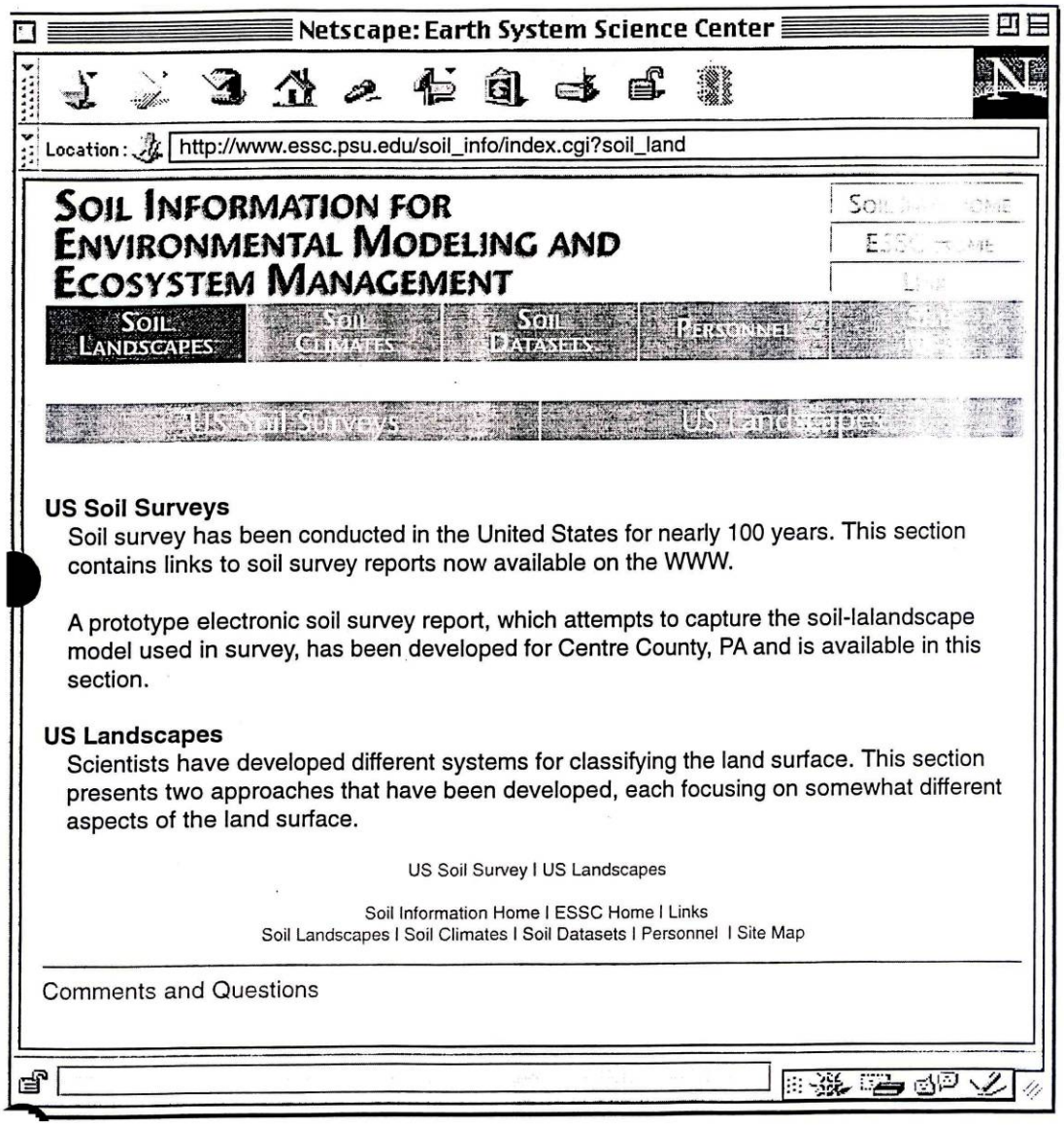
On-site Wastewater Training Center George Loomis and David Dow

The Rhode Island On-Site Wastewater Training program has continued to provide numerous workshops for contractors, engineers, environmental specialists, town officials, and homeowners. Workshops have been focused on the use of various alternative and innovative technologies for on-site wastewater disposal and treatment. This program has gained both regional and national recognition an important facility for the development of new technologies and a training and education center for those involved in regulating on-site wastewater disposal.

Soils Training for Site Evaluation Certification Program M. Stolt, G. Loomis, A. Gold, J. Amador, and J. Compton

The Rhode Island Department of Environmental Management (RIDEM) recently promulgated that legislation has been passed requiring certification of persons performing and conducting site evaluations for on-site wastewater systems (Class IV Soil Evaluators). The legislation requires that Soil Evaluators pass 9 semester hours of soils curses in order to be eligible to take the RIDEM Soil Evaluators exam. Certain soils courses (General Soils and Soil Morphology and Mapping) at the University of Rhode Island have been scheduled at times most convenient for professional wishing to apply for certification. A new course is also being developed to focus on the elements of soil science that directly relate to on-site wastewater treatment and disposal.

Soil Survey and Soil Climate Interface
by
Doug Miller, Penn State,
Research Associate, University Park, PA



Netscape: Earth System Science Center

Location: http://www.essc.psu.edu/soil_info/index.cgi?soil_land

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Interactive Map
A map interface to WWW-available electronic soil survey reports.

Tabular Index
A series of pull-down menus of WWW-available electronic soil survey reports.

MLRA Soil Survey Regions
The USDA-NRCS has organized all soil survey activity into 17 Major Land Resource Area (MLRA) Soil Survey Regions. See thess regions and link to their WWW sites.

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Comments and Questions

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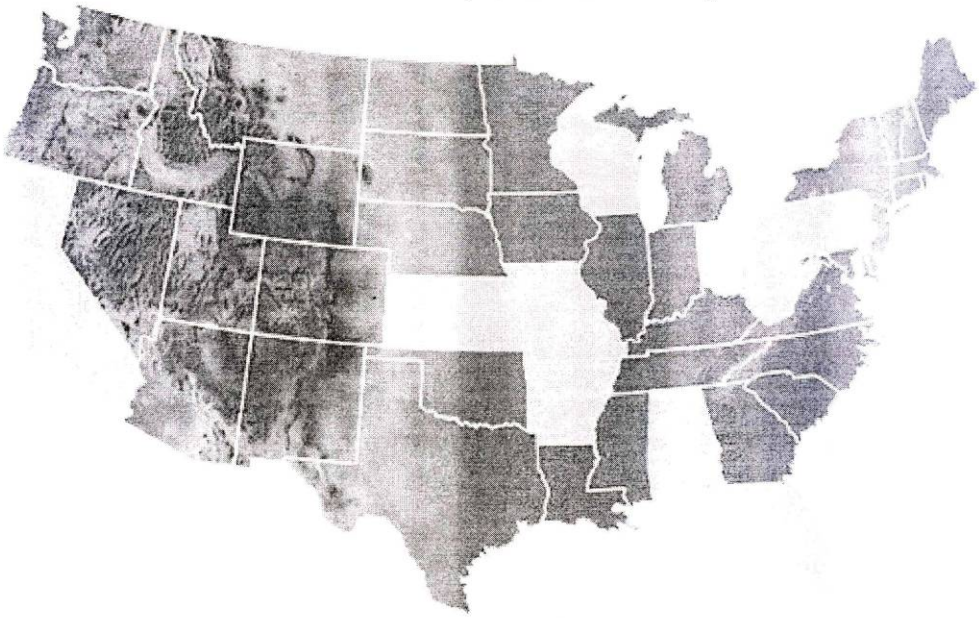

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Location: http://www.essc.psu.edu/soil_info

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Soils are a key component of the earth system. A wide range of natural science and ecosystem management disciplines require soil information resources.

The mission of soil-related research at the Earth System Science Center in the College of Earth and Mineral Sciences at The Pennsylvania State University is focused on serving the community of scientists and managers who require information about soil resources. This Web site strives to provide soil information in understandable forms which can be used by non-soil scientists.

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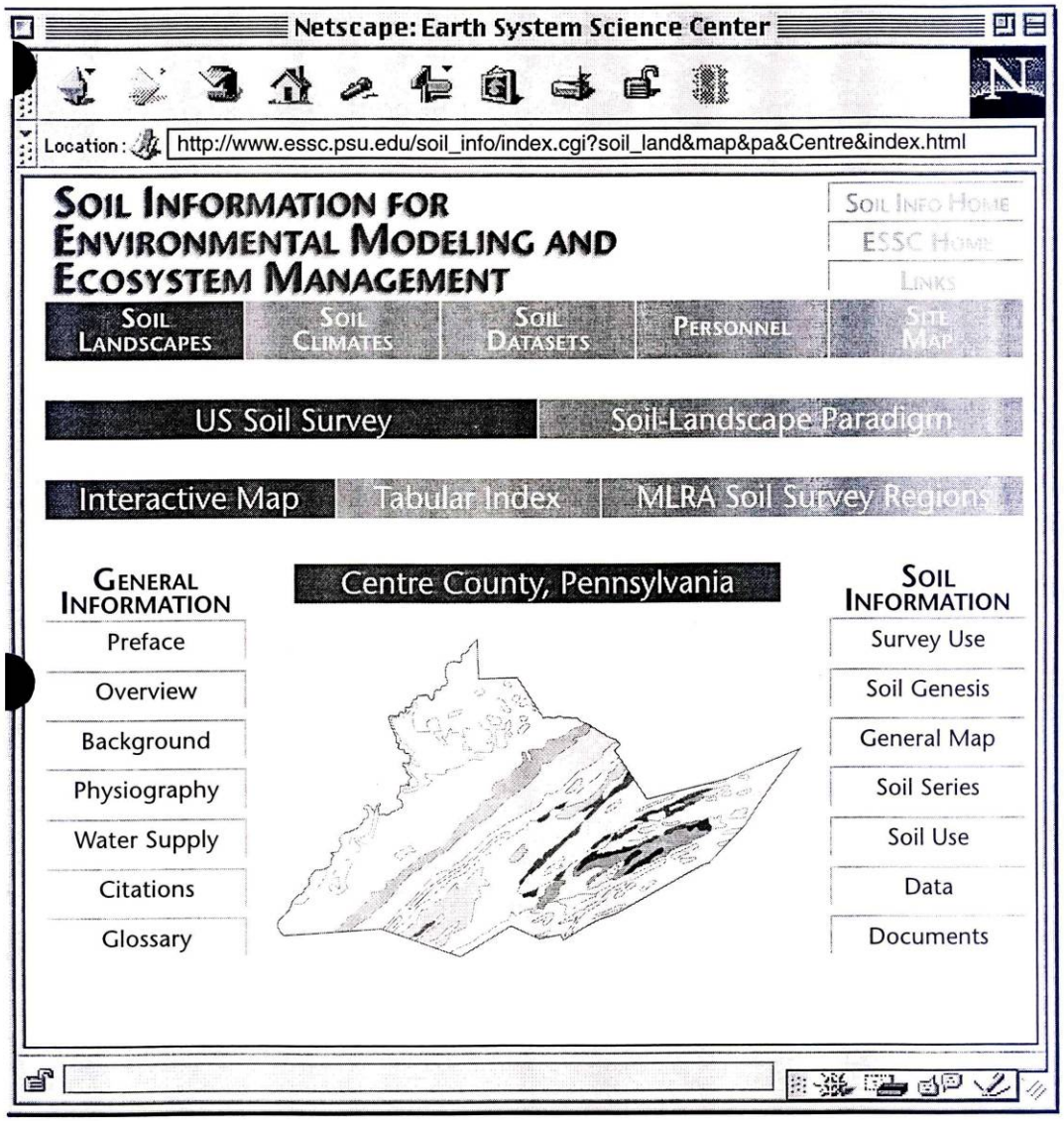
10/8/98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Location: http://www.essc.psu.edu/soil_info/index.cgi?soil_land&map&pa&Centre&index.html
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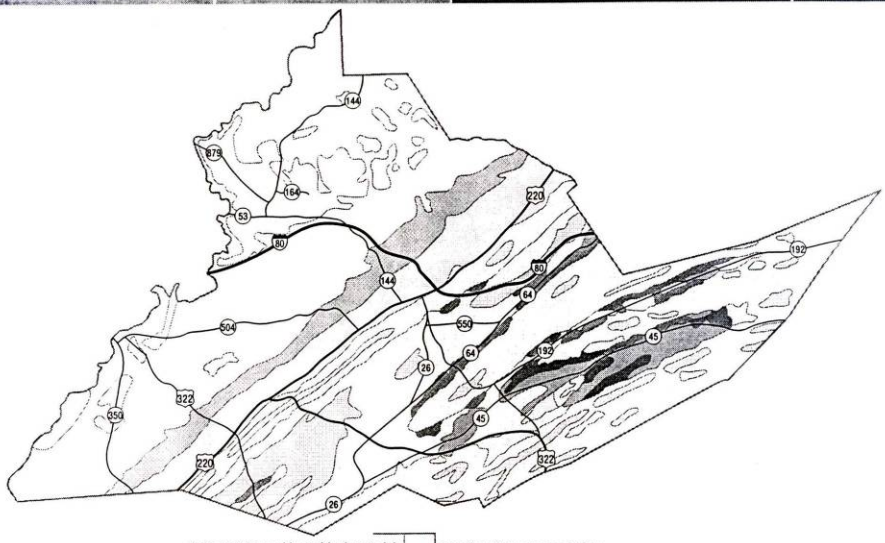

Soils that formed in residual material weathered from sandstone and shale on the Allegheny Plateau	Hazelton-Clymer association
	Wharton-Gilpin-Strip Mines association
Soils that formed in residual material weathered from shale of the Valley and Ridge Province	Berks-Weikert association
	Leck Kill-Albrights-Meckesville association
Soils that formed in residual and colluvial material weathered dominantly from limestone in valleys	Hagerstown-Opequon-Hublersburg association
	Morrison association
	Opequon-Hagerstown association
	Murrill association

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Location: http://www.essc.psu.edu/soil_info/index.cgi?soil_land&map&pa&Centre&soil_info&general

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Hazelton Series

Landscape

Profile

Map Units

The Hazleton series consists of deep, well drained soils that formed in sandstone residuum. These nearly level to very steep soils are on mountains.

In a representative profile in woodland, 3 inches of organic matter covers a surface layer of black channery sandy loam about 1 inch thick. The subsurface layer is grayish brown channery sandy loam 7 inches thick. The subsoil is yellowish brown channery and very channery sandy loam 27 inches thick. The substratum is brown very channery sandy loam to a depth of 60 inches.

Permeability is moderately rapid to rapid, and available water capacity is low to moderate. Most limitations are related to the many coarse fragments throughout the soils, slope, and surface stones in some extremely stony areas.

Most of the acreage of these soils is in woodland.

The solum is from 25 to 45 inches thick. Depth to bedrock ranges from 3 1/2 to 7 feet or more. Content of coarse fragments of gray and brown sandstone ranges from 10 to 75 percent in the solum and from 35 to 80 percent in the C horizon. Reaction ranges from strongly acid to extremely acid throughout.

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Hazleton Series

Representative Profile

Representative profile of Hazleton channery sandy loam in an area of Hazleton extremely stony sandy loam, moderately steep, in woodland, along a trail, 1,500 feet southeast of Moshannon Creek, 4.5 miles northwest of Philipsburg, beyond the end of T-535 in Rush Township:

O1-3 inches to 1 inch; hardwood leaf litter.

O2-1 inch to 0; black (l0YR 2/1) mostly decomposed organic material.

A1-0 to 1 inch; black (l0YR 2/1) channery sandy loam; weak fine granular structure; very
friable, nonsticky and nonplastic; 25 percent coarse fragments; extremely acid; abrupt
smooth boundary.

A2-1 inch to 8 inches; grayish brown (l0YR 5/2) channery sandy loam; weak fine granular
structure; very friable, nonsticky and nonplastic; 30 percent coarse fragments; very strongly

Netscape: Earth System Science Center

Location: http://www.essc.psu.edu/soil_info/index.cgi?soil_land&map&pa&Centre&soil_info&general

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Hazleton Series

Map Units

HhB-Hazleton channery sandy loam, 3 to 8 percent slopes

This gently sloping soil is mainly in convex areas on broad mountaintops. Areas generally range from 5 to 80 acres in size. Runoff is medium, and the erosion hazard is slight to moderate in cultivated areas.

Included with this soil in mapping are a few small areas of nearly level, sloping, or very stony Hazleton soils and small areas of Clymer, Buchanan, and Dekalb soils. Also included are a few small areas of soils that are similar to Hazleton soils but that have a layer of clay accumulation in the subsoil.

Nearly all of the acreage is in woodland. This soil is well suited to woodland. Although suitability for crops is excellent, very little of the acreage of this soil is cultivated because areas are inaccessible.

Most limitations are caused by the many coarse fragments throughout the profile. Capability subclass IIe.

HhC-Hazleton channery sandy loam, 8 to 15 percent slopes

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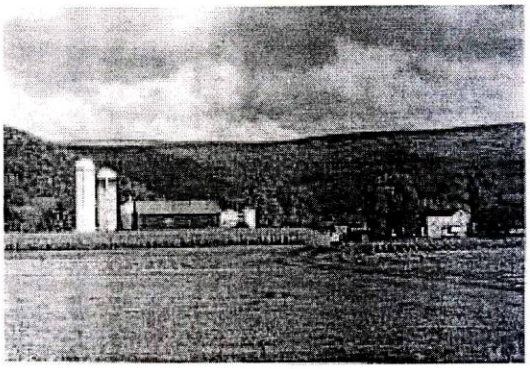
Hazleton Series

Representative Landscape



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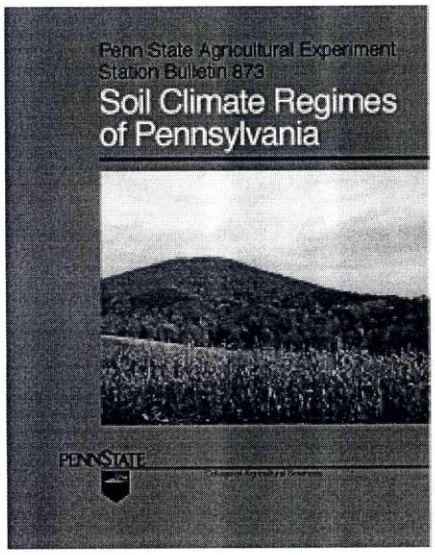

The landscapes of Pennsylvania reflect a complex history of geomorphic and climatic events, which also have affected soil and ecosystem development significantly. The interaction of soil, climate, and landscape produces considerable natural resource diversity.

Penn State Agricultural Experiment Station Bulletin 873 summarizes the soil climatology of Pennsylvania and provides spatial estimates of the Commonwealth's soil moisture and temperature regimes. Agro-climatic regions are defined over relatively homogeneous areas of soil, climate, and landscapes that affect the agronomic crop production.

Download Soil Climate Regimes of Pennsylvania with maps (PDF-19.5mb) or without maps (PDF-2.2mb).

View maps from *Soil Climate Regimes of Pennsylvania*

- MAP Agro-Climatic Regions (PDF-1.6mb)
- MAP Soil Moisture Regimes (PDF-1.6mb)
- MAP Mean Annual Soil Temperatures (PDF-2.3mb)
- MAP Potential Evapotranspiration (PDF-1.6mb)
- MAP Annual Water Balance (PDF-2.9mb)
- MAP Growing Degree Days (PDF-2.5mb)
- MAP Soil Temperature Regimes (PDF-1.0mb)
- MAP Soil Climate Regimes (PDF-2.1mb)

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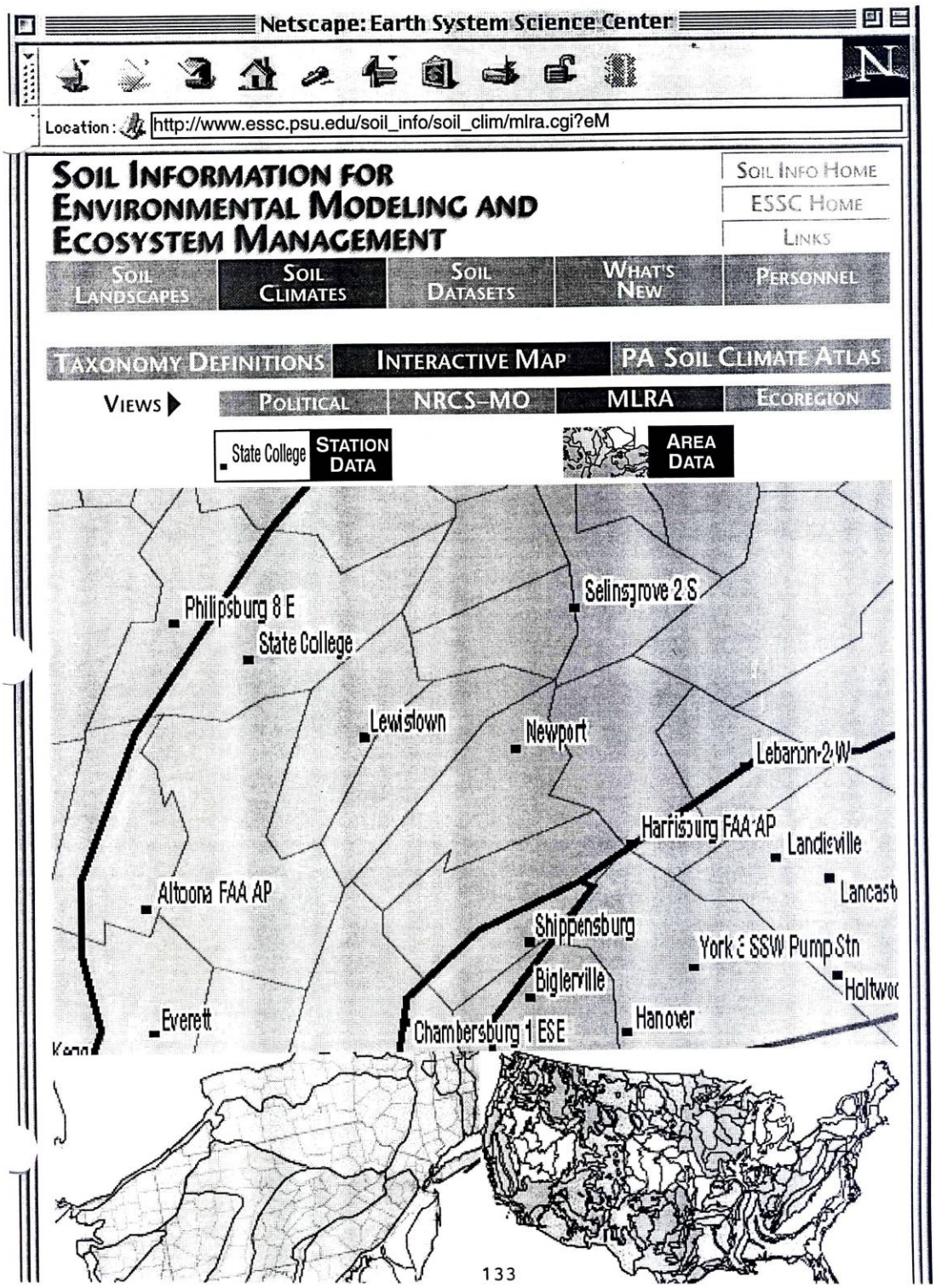
Netscape: Earth System Science Center
Location: http://www.essc.psu.edu/soil_info/soil_clim/mlra.cgi?eM
SOIL INFORMATION FOR ENVIRONMENTAL MODELING AND ECOSYSTEM MANAGEMENT
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Harrisburg FAA AP
Landisville
Altoona FAA AP
Shippensburg
York 3 SSW Pump Stn
Biglerville
Everett
Chambersburg 1 ESE
Hanover

Netscape: Earth System Science Center

Location: http://www.essc.psu.edu/soil/StateCollege.html

Soil Information for Environmental Modeling and Ecosystem Management

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Taxonomy Definitions | Interactive Map | PA Soil Climate Atlas

State College, PA 8449

View	Download PDF
Temperature and Precipitation Tables	Temperature and Precipitation Tables, Climograph, Summary Station Information
Climograph	
Summary Station Information	
Station data	Station data

Taxonomy Definitions | Interactive Map | PA Soil Climate Atlas

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7/17/98

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Netscape: Earth System Science Center

Location: http://www.essc.psu.edu/soil_info/soil_clim/information/stationdata/pa/8449/month.jpg

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TAXONOMY DEFINITIONS | INTERACTIVE MAP | PA SOIL CLIMATE ATLAS

WETS Station: STATE COLLEGE, PA 8449

Latitude: 4048 Longitude: 07752 Elevation: 01170 ft
State FIPS/County(FIPS): 42027 County Name: Centre
Start yr. - 1961 End yr. - 1990

Month	Temperature (OF)			Precipitation (in.)				
	avg daily max	avg daily min	avg	avg	30% chance will have less than	30% chance will have more than	average number of days with 0.10 inch or more	total snow fall
January	32.1	16.3	24.2	2.41	1.55	2.91	5	13.8
February	35.5	18.0	26.7	2.58	1.66	3.11	5	12.1
March	46.2	26.9	36.5	3.11	2.34	3.63	7	9.8
April	58.3	37.1	47.7	2.91	1.92	3.49	7	1.8
May	69.7	47.6	58.7	3.63	2.69	4.25	8	0.0
June	78.0	56.2	67.1	3.98	2.49	4.80	7	0.0
July	82.0	60.6	71.3	3.57	2.61	4.21	7	0.0
August	80.4	58.9	69.7	3.16	2.05	3.80	6	0.0
September	73.0	51.6	62.3	3.25	2.43	3.80	6	0.0
October	61.4	40.5	51.0	2.83	1.64	3.44	5	0.2
November	49.3	32.6	41.0	3.30	2.22	3.95	6	2.8
December	36.9	22.5	29.7	2.58	1.83	3.06	6	8.4
Annual	—	—	—	-	32.70	39.08		-
Average	58.6	39.1	48.8	-	-	-		-
Total				37.31	-	-	75	49.0

GROWING SEASON DATES

Probability	Temperature: 24 F or higher	28 F or higher	32 F or higher
	Beginning and Ending Dates Growing Season Length		
50 percent *	4/ 4 to 11/ 8 218 days	4/13 to 10/27 197 days	4/28 to 10/15 170 days
70 percent *	3/30 to 11/12 227 days	4/ 9 to 10/31 205 days	4/23 to 10/19 179 days

Netscape: Earth System Science Center

Location: http://www.essc.psu.edu/soil_info/soil_clim/information/stationdata/pa/8449/graph.jpg

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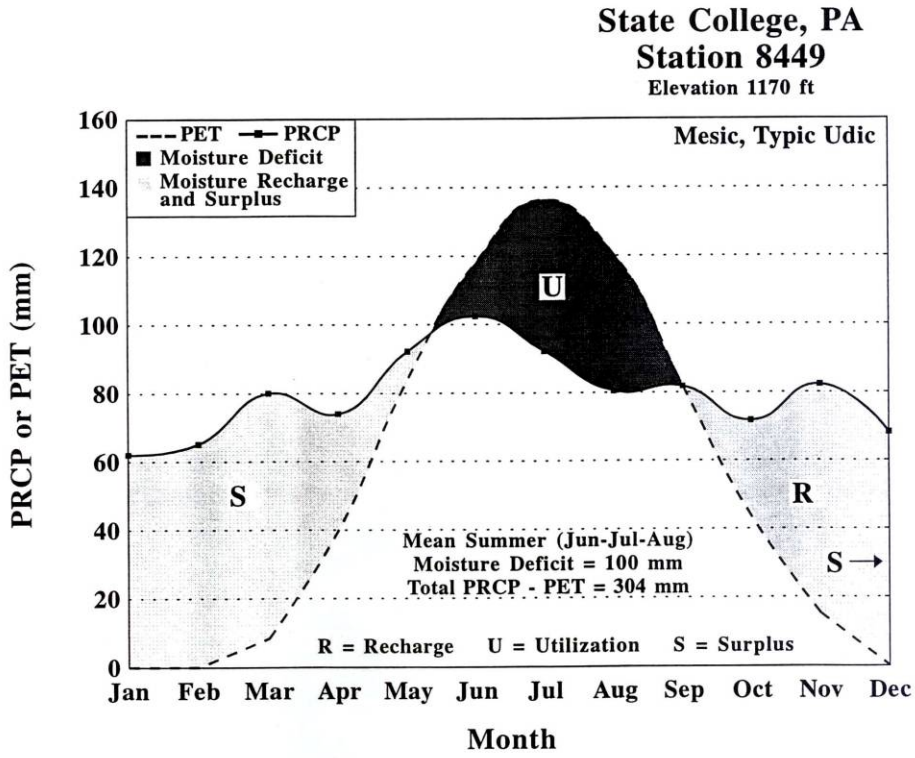

Moisture balance for State College, Pennsylvania, based upon a period of 1961-1990. PET calculated by Newhall Simulation Model (Van Wambeke et al., 1992).

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Location: http://www.essc.psu.edu/soil_info/soil_clim/information/stationdata/pa/8449/chart.jpg

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TAXONOMY DEFINITIONS | INTERACTIVE MAP | PA SOIL CLIMATE AREAS

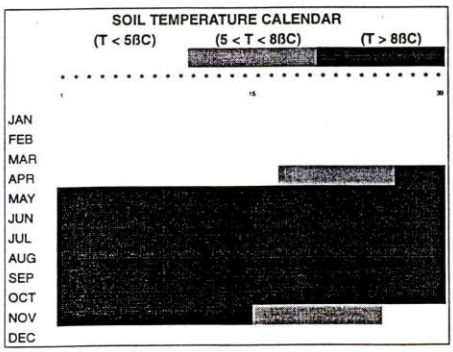
Station: State College, PA
Elevation: 1170 ft
Period of Record: 1961-1990
Mean Annual Precipitation: 952 mm
Soil Temperature Regime: Mesic

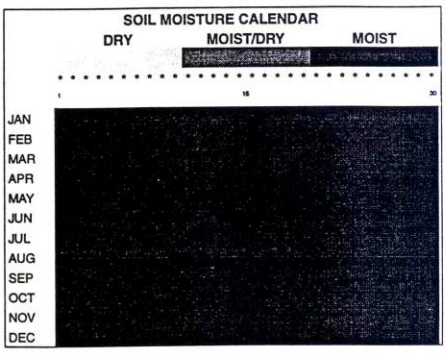
MLRA: 147 Northern Appalachian Ridges and Valleys
Country: USA

Latitude: 40 48 00N
Longitude: 77 52 00W
Waterholding Capacity: 200 mm
Soil Moisture Regime: Udic

SOIL CLIMATIC REGIME ACCORDING TO NEWHALL SIMULATION MODEL (MAST = MAAT + 1.2ß C; amplitude reduced by 1/3)											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly Precipitation (mm)											
62.0	65.0	80.0	73.9	92.2	102.4	92.2	80.5	81.8	71.6	82.3	68.1
Monthly Air Temperatures (ßC)											
-4.1	-2.9	2.5	8.7	14.8	19.6	21.8	20.9	16.8	10.6	4.9	-1.2
Monthly Evapotranspiration (mm)											
0.0	0.0	8.4	39.9	84.0	117.8	136.4	120.6	81.9	43.6	15.2	0.0

Mean Annual Potential Evapotranspiration: 648 mm
Mean Annual Moisture Surplus: 304 mm
Mean Annual Growing Season (Apr to Sept) Precipitation: 523 mm (55% of MAP)
Mean Summer (Jun-Jul-Aug) Moisture Surplus/Deficit: -100 mm





Number of Cumulative Days That the Moisture Control Section						Highest Number of Consecutive Days That the Moisture Control Section is			
During One Year is			When Soil Temperature is Above 5ßC			Moist in Some Parts		Dry After Summer Solstice	Moist After Winter Solstice
Dry	Moist/Dry	Moist	Dry	Moist/Dry	Moist	Year	T > 8ßC		
0	0	360	0	0	217	360	198	0	120

Netscape: Earth System Science Center

Location: http://www.essc.psu.edu/soil_info/index.cgi?soil_clim&information&general&taxonomy_defs

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SOIL MOISTURE REGIMES | SOIL TEMPERATURE REGIMES

Soil Moisture Regimes I Soil Temperature Regimes

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Comments and Questions

Research Agenda

NOAM-SOIL: The overwhelming positive response to CONUS-SOIL has led to the early stages of development for a North American (NOAM-SOIL) multi-layer soil characteristics data set that will combine STATSGO with similar data from Canada and Mexico. This data set will be placed on the WWW for easy access.

Characterization Database and P-T Function Linkages: Spatial databases like CONUS-SOIL and NOAM-SOIL can be improved by making direct linkages to pedon characterization databases like the NRCS NSSC Pedon Database and soil hydraulic property databases like UNSODA. Collaboration with researchers working in the area of pedo-transfer function development will improve subsequent versions of CONUS-SOIL.

Soil Landscapes: Soil survey in the United States has, for the past 100 years, provided valuable information about soil resources. Unfortunately, the delivery format for this information has often failed to transmit many details concerning soil-landscape relationships which are discovered in the survey process. We are developing an interactive interface that will provide a landscape context for viewing/accessing soil information. Our prototype will initially be WWW-based. If this approach is successful we plan to develop a *stand-alone* CD-based interactive application.

Research Agenda (continued)

Soil Climates: Analygous to the soil physical and hydraulic properties found in data sets like CONUS-SOIL and NOAM-SOIL we are developing a WWW-based interface that delivers summary climate data and simple water balance model output (Newhall Simulation Model) for Cooperative Observer Stations in the conterminous United States.

Soil Landscapes: Soil survey in the United States has, for the past 100 years, provided valuable information about soil resources. Unfortunately, the delivery format for this information has often failed to transmit many details concerning soil-landscape relationships which are discovered in the survey process. We are developing an interactive interface that will provide a landscape context for viewing/accessing soil information. Our prototype will initially be WWW-based. If this approach is successful we plan to develop a *stand-alone* CD-based interactive application.

State of the Soils for the Centennial of Soil Survey
Ronnie Lee Taylor, State Soil Scientist,
NRCS
Somerset, New Jersey

State	Soil Established	Soil Selected
Vermont	Tunbridge	
Massachusetts	Paxton	
Connecticut	Windsor	
New York		Honeoye Narragansett
Rhode Island		
West Virginia	Monogahela	Sassafras
Maryland		Chesuncook
Maine		Downer
New Jersey		Marlow
New Hampshire		Greenwich
Delaware		Pamunkey
Virginia		Hazleton
Pennsylvania		

State Soils Established by Legislation Loyal Quandt,
Chair State Soil Committee

State Soil list will be in NSSC newsletter and Web in near future.

Some States already have their State Soil information on the Web.

Numeric Sequence	State	Soil Name	Date Established
			June 1979
1	Nebraska	Holdrege	September 1983
2	Wisconsin	Antigo	March 1985
3	Vermont	Tunbridge	April 1987
4	Oklahoma	Port	May 1989
5	Florida	Myakka	February 1990
6	South Dakota	Houdek	April 1990
7/8	Kentucky	Crider	April 1990
7/8	Kansas	Hamey	December 1990
9	Michigan	Kalkaska	May 1991
10	Massachusetts	Paxton	March 1997
11	Arkansas	Stuttgart	April 1997
12	West Virginia	Monongahela	April 1997
13	Alabama	Bama	May 1997
14	Connecticut	Windsor	July 1997
15	California	San Joaquin	

Soil Taxonomy Proposals and Changes
Robert J. Ahrens

The 8th edition of the "keys to Soil Taxonomy" is scheduled for publication this summer. The second edition of Soil Taxonomy is nearly completed and should be released this winter.

The following proposals from soil scientists in the Northeast were approved and will appear in the 8th edition of the "Keys to Soil Taxonomy."

The definition of soil was expanded to accommodate soils that support rooted plants, but are covered by water. "Areas are not considered to have soil if the surface is permanently covered by water too deep (typically more than 2.5 m) for the growth of rooted plants."

The "Keys to the Mineralogy Classes" were changed to allow micaceous and paramicaceous classes to key before the isotic class.

The following proposals have been sent for review.

1. Clarify the distinctions between fragipans and densic materials in terms of pedogenesis. Also add densic subgroups to some great groups.

2. Add a criterion to Andic intergrades that includes an acid oxalate-extractable silicon requirement of 0.20 percent or more. Also add a new subgroup, amorphic, which has an acid oxalate extractable of less than 0.20 percent.

   The 8th edition of the "Keys" will contain a number of changes that will affect the North East Region. The major changes are outlined below.

   The cambic horizon has been revised to include soils with aquic conditions and an irregular decrease in organic carbon. This changes some fairly well developed soils from Aquents to Aquepts.

   Boralfs have also been eliminated. Boralfs will become Cryalfs, Udalfs, and Ustalfs. Use and management of the soil depends largely on soil moisture regime even in a frigid soil temperature regime. With Boralfs the soil moisture regime is not always known from the classification. Frigid will appear in the family name of those Boralfs that are frigid. Soil moisture regime is less critical in soils with a cryic soil temperature regime because the number of growing days is limited.

   Inceptisols have been restructured to bring the soil moisture regime to a higher level. The suborders of Inceptisols will be:

   Aquepts
   Anthrepts
   Cryepts
   UsteptsXerepts
   Udepts

   The Inceptisols were revised to bring moisture in at the suborder level. Soil Taxonomy attempts to have important features at a high level in the system. The importance ofochric and umbric epipedons (Umbrepts and Ochrepts) is overshadowed by the moisture regimes.

   The Histosols were revised in a similar fashion with the frigid temperature becoming part of the family rather than the great group.

As an example the great groups of Saprists will be:
Sulfosaprists
Sulfisaprists
Cryosaprists
Haplosaprists

Note that the "Bor" great group is eliminated and that "Hapl" is used rather than "Med." "Med" has the conotation of middle or temperate climates. Since many of the Borosaprists will become Haplosaprists, the connotation of a temperate climate is not appropriate.

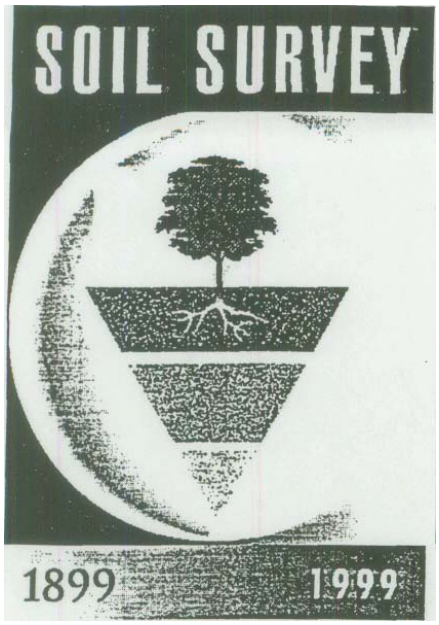
In Soil Taxonomy the terms, 6 out of 10 years or most years, are commonly used. These terms are replaced by normal years.

Normal Years

A normal year is defined as plus or minus one standard deviation of the long-term mean annual precipitation. Long-term refers to 30 years or more. Another part of the definition is that the mean monthly precipitation during a normal year must be plus or minus one standard deviation of the long-term monthly precipitation for 8 of the 12 months. For the most part, normal years can be calculated from the mean annual precipitation. However, when catastrophic events occur during a year, the standard deviations of the monthly means should also be calculated. Normal years replaces the terms, most years and 6 out of 10 years, which were used in the previous edition of Soil Taxonomy.

Update on Soil Survey Centennial Activities

by
Gary Muckel
Soil Scientist
NRCS
Lincoln, NE



USDA
Natural Resources Conservation Service

The soil survey celebrates a centennial in 1999. The event celebrates the accomplishments of soil survey, but more importantly it provides a time to focus attention on soil resources and to market soil information. The following are projects underway.

C E N T E N N I A L

Historical item collection Pictures, equipment, references, and other historical items related to the soil survey are being collected. Items capture the history of soil survey and enhance exhibits.

Historical Volume on Soil Survey The history of soil survey in the United States is being written.

Reprints In 1957 David Gardner for his degree at Harvard produced a history of the soil survey. This history reference has had very little circulation and is now available.

Video tape presentation The video **"Took of the Trade"** covers 100 years of exploring the soil resources.

NRCS Soil Survey Centennial Communications Plan The communication plan for the soil survey centennial targets educators, policy makers, and land users. Packets are in development for marketing soils to each of these audiences. Exhibit materials and handouts will be available for states to use. Kick off nationally is planned for Earth Day at the Mall.

Soils Sustain Life The NRCS joined with other groups to support the American Geological Institute in funding and distributing a poster and educational projects titled "Soils Sustain Life".
International Soil Conservation Organization A pre-conference tour begins in Nebraska City, Nebraska with a symposium on the history and application of soil survey.

Soil And Water Conservation Society The 1998 meeting included two sessions highlighting soil survey. The retired SCS employees association is honoring former soil scientists at the 1999 meeting.

National Cooperative Soil Survey Conference This 1999 conference will highlight the centennial

Soil Science Society Symposia, presentations, and tours The Soil Science Society of America conducted symposia and tours on the history of soil survey each year since 1993. These symposia have stimulated the documentation of the history in soil survey.

Soil Science Society of America Centennial Year Activities The 1999 meeting will be in Salt Lake City. Planned is a midweek field trip of one of the first soil surveys. Various speakers and symposia will highlight the application of soil survey and cover the benefits soil survey has made.

Salt Lake Vallev Soil Survey Map Reprints of the 1899 soil survey map of the Salt Lake Valley are available for use at the 1999 SSSA meeting in Salt Lake. This is one of the first three soil surveys.

Postage cancellation Tentative plans include having the post office provide a special postage cancellation for the centennial using the centennial logo.

Special display The Chicago Field Museum is highlighting the Soil Survey Centennial with the April 1999 opening of a new 14,000 square foot soils exhibit.

Exhibits Display materials for exhibits will be part of a package available to states for use during the centennial. Display material will consist of panels for either Nomadic or poster board size displays with handout material. Exhibits will be presented at many national meetings.

Monthly planner of the 12 Soil Orders A monthly planner for the 1999 centennial year with a different soil order illustrated for each month has been printed in cooperation with the Soil Science Society of America.

Soil Order Chart A wall chart prepared for release with the revised edition of Soil Taxonomy will be part of the information campaign packet.

Logo The centennial logo promotes soil survey **on** products, soil surveys publications, and other items.
Posters 6000 posters of the soil survey centennial logo were distributed.

Promotional products NACD has several centennial products in their products catalog for the centennial. Mugs, hats, notebooks, magnets, and other items can be ordered. Call 804-443-2484

Slide Set The Soil Survey Division is releasing an educational slide set of soils from around the world for the centennial.

State Soils All states have selected a state soil. Landscape and soil profile pictures accompany a soil description and laboratory data for teacher and student access. Posters, fliers, and other state promotions use the state soil. A monolith of each soil is being prepared for display on the Washington, D.C. Mall on Earth Day.

Anecdotes within soil survey Anecdotes within soil survey are available on disk or the web.

Web site for Students An educational web site is planned to include soil survey history, introduction to soils, state soils, map of soil orders, importance of soils, interpretations of soils, classification of soils, and links to various sites.

State and local activities Displays and activities by local partners will market soil survey information. Materials produced nationally support these efforts. Visitor centers for the Bureau of Land Management and other cooperators in the National Cooperative Soil Survey are encouraged to join marketing efforts..

Gary Muckel with the National Soil Survey Center (402-437-4148) is chair of the soil survey centennial.

Source	Liaison	Project ID	Type Assist	Person requested	Date	When Needed	MLRA	State	County	Pedon	Sample	NRCS Contact
State	4	Warren Sussex NJ	Char	Grossman	3/23/98	8/98	144A	NJ	Warren Sussex	9	54	Taylor
State	3	Psda	Ref	NA				ME		0	45	Kalloch
State	3	Fragipan Densipa	Other	NA				ME		0	0	Kalloch
State	3	Soil color	Ref	NA				ME		0	100	Kalloch
State	3	NYC Survey	Char	NA		4/98		NY	Kings Queens	6	80	Goddard
State	3	Organic Carbon	Ref	NA				ME		0	100	Kalloch
State	3	NH Soils WkSp	Other	Ahrens	11/3/97			NH		0	0	Hundley
State	3	GPR Assisl.ince	Other	Doolittle	8/1/98			ME		0	0	Kalloch
State	3	N11 Wet Soils	Char	Lynn Schoeneberger	7/13/98	9/99	143	NH	Grafton	5	50	Hundley
State	3	SW PA	Other	Schoeneberger	10/1/97	3/98	126	PA		0	0	Knight

Regional Technical Committees for Hydric Soils
by
Michael Whited
Soil & Wetland Scientist
Wetland Institute
Lincoln. NE 68583-0822

WLI – Mission

- "Proactively develop, adapt, and disseminate science and technology needed to protect and restore wetlands."

- Products: Field Indicators, Hydrology Tools, Functional Assessment Guidebooks, Educational Materials, Training Courses, Restoration Standards, Wetland "Health" assessment protocol.....

Regional Technical Committees for Hydric Soils

Michael Whited, Chair. National Technical Committee for Hydric Soils

Functions of the NTCHS
- Provide technical consultation on hydric soils to other technical groups
- Provide leadership in the formulation, evaluation, and application of criteria for hydric soils as related to soil, hydrology, and climatic data.

SCS National Instruction 430-303 (Feb. 1992)

Functions of NTCHS
- Develop and maintain the definition and criteria (indicators) for identifying hydric soils
- Consider and respond to comments and suggested changes in the hydric soil definition and criteria
- Periodically publish a National List of Hydric Soils

SCS National Instruction 430-303 (Feb. 1992)

Hydric Soils
Establish NCSS Regional Technical Committees for Hydric Soils
- Establish RTCHS's within the framework of the Regional NCSS
- Provide the link between the NTCHS and the field
- RTCHS would be responsible for hydric soil communication within the region

Today's Situation
- In their 1995 report the National Research Council Committee on Characteristics of Wetlands recommended that..."regional technical committees on hydric soils should be established...each committee should report to the NTCHS."

Today's Situation
- In 1997, Wetland MOA agencies recommended that NRCS and NTCHS establish RTCH's within the framework of the Wetlands MOA

- NTCHS feels RTCHS's are needed and will be established within the framework of the wetlands MOA unless a viable alternative is provided - NCSS should be that alternative

Available Options

- Alternative #1 - Wetlands RTCHS
  - Could minimize NCSS involvement
  - Would give leadership to wetland MOA agencies
  - Would give leadership to mainly non-soil scientists
  - Would lack expertise of wetland researchers

Available Options

- Alternative #2 - NCSS RTCHS's
  - Would maintain NCSS involvement and leadership
  - Would strengthen NCSS
    - more active partnerships, better communication, possibility of targeting research $.....
  - Would insure that soil scientists are the leaders in regional hydric soil decisions

Recommendation #1

- We recommend that this body establish a standing Regional Technical Committee for Hydric Soils and that body be empowered to act in the interest of the NE Regional CSS on matters pertaining to hydric soils

Recommendation #2

- This body urge each of the wetland MOA agencies at the District (COE) and Regional (EPA & FWS) levels to become more active participants in the NCSS

Suggestion for RTCHS Membership

- As per the South Region NCSS

- 3 NRCS members on staggered terms
- 3 University members on staggered terms
  - selected at NCSS business meetings
- 1 EPA, 1 COE, 1 USFWS, 1 USDA-FS member(s)
  - selected in cooperation with agency members of NTCHS

Conclusion

- The NE Regional Cooperative Soil Survey vote to establish a regional technical committee on hydric soils to work with the NTCHS to:

  - strengthen the science
  - improve communication
  - strengthen the NCSS
  - move decision making closer to the field

Gelisols
Robert J. Ahrens

Introduction

In general, the soils of the permafront regions of the world have not received as much scientific attention as the soils of more temperate regions. This can be attributed to the low human populations of the permafrost regions and the limited suitability of the climate for traditional cultivated agriculture. However, on a global scale permafrost is not an unusual phenomenon, and estimates of its extent on the earth's land surface range from 20 (Birkeland and Larson, 1989) to 26 percent (Black, 1954). In Canada alone, permafrost underlies about 40 percent of the land area (Tarnocai and Smith, 1992). During the past several years, the cold soils have attracted increased interest because of the concern for arctic sources and sinks of greenhouse gases, the need to predict terrestrial impacts of global warming, and the problems associated with northern transportation and resource development (Tarnocai et a;., 1991a, 1991b).

For the reasons mentioned above the International Committee on Permafrost-Affected Soils (ICOMPAS), chaired by Dr. James Bockheim, was organized to formulate better concepts for classifying and interpreting permafrost-affected soils.

ICOMPAS recommend a new soils order, the Gelisols. The concepts of the Gelisols are outlined below. Previously, Soil Taxonomy classified the mineral permafrost-affected soils into one of three subgroups.

Gelisols

Gelisols fall out first in the "Keys to the Orders."

The central concept of Gelisols are soils with gelic materials underlain by permafrost. Freezing and thawing are important processes in Gelisols. Diagnostic horizons may or may not be present. Permafrost influences pedogenesis by acting as a barrier to the downward movement of the soil solution.

Cryoturbation (Frost mixing) is an important process in many Gelisols and results in irregular or broken horizons, involutions, organic mater accumulation on the permafrost table, oriented rock fragments, and silt caps on rock fragments. Cryoturbation occurs when two freezing fronts, one from the surface and the other from the permafrost, merge during freeze-back in the autumn. Ice segregation is an important property of gelic materials and occurs when the soil solution migrates toward ice, increasing the volume of ice. Volume changes also occur as the water freezes. In drier areas cryoturbatin is less pronounced or absent, but the soils still exhibit gelic materials as manifested by sand wedges and ice crystals.

Diagnostic horizons including ochric, mollic, umbric, and histic epipedons and argillic, salic, gypsic, and calcic horizons have been observed in Gelisols. However, the importance of these diagnostic horizons is overshadowed by the properties of the gelic materials and associated permafrost. In some Gelisols the effects of cryoturbation are so well expressed that no diagnostic horizons are observed.

Definition

Gelisols are soils that have one or more of the following:

1. Permafrost within 100 cm of the soil surface; or
2. Gelic materials within 100 cm of the soil surface and permafrost within 200 cm of the soil surface.

Suborders

AA. Gelisols that have organic soil materials that met one or more of the following:

1. Overlie cindery, fragmental, or pumiceous materials and/or fill their interstices, and directly below these materials either a densic, lithic, or paralithic contact;

2. When added with underlying cindery, fragmental, or pumiceous materials total 40 cm or more between the soil surface and a depth of 50 cm; or

3. Are saturated with water for 30 days or more cumulative in normal years (or artificially drained) and 80 percent or more by volume organic soil materials from the soil surface to a depth of 50 cm or to a glacic layer or a densic, lithic, or paralithic contact, whichever is shallowest.

Histels

AB. Other Gelisols that contain one or more horizons showing cryoturbation in the form of irregular, broken, or distorted horizons boundaries, involutions, the accumulation of organic matter on top of the permafrost, ice or sand wedges, and oriented rock fragments.

Turbels

AC. Other Gelisols Ortheis

Histels

These are the Gelisols with large amounts of organic carbon that accumulate commonly under anaerobic conditions, or the organic matter at least partially fills voids in fragmental, cindery, or pumiceous materials. Cold temperature contribute to the accumulation of organic matter.

Orthels

Orthels are the Gelisols that have little or no evidence ofcryoturbation and are the second most abundant suborder of Gelisols. These soils occur primarily within the zone of widespread permafrost or in coarse-textured materials in the continuous zone of permafrost. Orthels are generally drier than the Turbels and Histels. These soils occur in the southern Andes and high latitudes of the Northern Hemisphere.

Turbels

These are the Gelisols that contain one or more horizons with evidence of cryoturbation in the form of irregular, broken, or distorted horizon boundaries, involutions, the accumulation of organic matter on top of the permafrost, ice or sand wedges, and oriented rock fragments.

Cryoturbatin occurs only in soils with sufficient moisture. Cryoturbated horizons in soils that are dry for most of the year likely were more moist in the past.

These soils occur primarily in the zone of continuous permafrost. Turbels are the dominant suborder, accounting for about half the Gelisols on a global basis. These soils are common in the High and Middle Arctic vegetation regions of North America and Eurasia at latitudes of 65 degrees north or more.

To provide better interpretations at the family level, soil temperature is family criteria for Gelisols. The classes are below.

A. Soils in the order ofGelisol and that have a mean annual soils temperature as follows:
B.

1.	- 10 degrees C or lower; or	Hypergelic
2.	-4 degrees C to-10 degrees C, or	Pergelic
3.	+1 degree C to -A degree C	Subgelic

Subsidence is common in soils in a subgelic family when the surface is disturbed. Disturbance to the surface of soils in a hypergelic family does not drastically affect the depth to permafrost.

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Morning Session
Pulp Sludge As Organic Component In Manufactured Topsoil
presented by
Andrew Carpenter

In Maine, approximately one million wet tons of pulp and paper mill sludge are generated annually, representing the largest portion of the organic waste stream in the state. Currently, the majority of pulp and paper mill sludges are land filled, but there is considerable interest in recycling these materials as soil amendments. The primary objective of this study was to evaluate the use of pulp sludge as the organic matter component in a manufactured topsoil. Seven manufactured topsoils, containing 5.1, 8.8, 9.6, 10.9, or 13.8% pulp sludge and 0, 8, 4, or 20.7% flume grit on a dry weight basis, were blended and applied to an abandoned gravel pit in a six inch layer. The experimental design was a randomized complete block split-plot design consisting of 64 2x2 meter plots. These manufactured topsoils and a control topsoil were evaluated for changes in soil chemistry, impacts on soil solution chemistry and effectiveness as a growing medium for a grass conservation mix and for hybrid poplars. Soil CEC, pH and P availability were all positively correlated to pulp sludge loading rate in the manufactured topsoils. The greatest impacts of the manufactured topsoils on soil solution were in the first collection period following topsoil placement. Nitrate and Ca were the dominant ions in solution during this period. The manufactured topsoils improved both grass and tree yields relative to the control topsoil. Total grass yields from three harvests in the 15 months following topsoil placement ranged from 3.87 to 7.26 Mg ha^{1} in the manufactured topsoils. For grass plots, yields were positively correlated to soil N03 levels, which hybrid poplar growth responses were largely controlled by the growth of herbaceous vegetation within the tree plots. Results from this study demonstrate that the use of pulp sludge in manufactured topsoils can improve soil fertility and create a favorable growing medium for both conservation grass mixes and hybrid poplars.

Monitoring Global Climate Change
presented by
John Lee
Research Assoc. Atmospheric Measurements Program

The research sites leased by the University of Maine are located in Howland and Edinburg townships, within the International Paper Company's Northern Experiment Forest. Both sites are established in 1986 with support from the EPA mountain cloud chemistry program, the Spruce-Fir Cooperative, and the Integrated Forest Study. The Howland monitor station is located on an esker next to IP's seed orchard. It has been the site of instrumentation and prototype validation by a variety of agencies. As well as serving as NASA's calibration site for Forest Ecosystem Dynamics (http://forest.gsf.nasa.gov/), it was the base elevation reference site for the Mountain Cloud Chemistry Program. Currently it functions as a monitoring site for EPA's CASTNET network. The tower site has been largely an integrated research site with an 88 foot walkup tower as well as nutrient cycling plots, soil warming plots, forest mensuration plots, and sampling sites for government agencies and other research institutions. The current focus of research is the arena of global climate change, primarily carbon and vapor flux and eddy correlation studies.
(http://inferno.asap.um.maine.edu/forest/)

Rogers Farm Research
presented by
Sue Erich
Associate Professor of Plant and Soil Chemistry

Research at this location is focused on crop and fertility management to meet the needs of Maine farmers. As alternatives to herbicide-based weed management strategies both crop rotation and soil nutrient management appear to have potential for reducing weed problems. There is evidence that growth of some weeds and crops may be suppressed by following certain other crops, and that timing and type of fertilization may affect crop-weed competition. Crop growth, weed growth, and soil chemistry are being investigated simultaneously in these plots. Additional studies on weed control involve chemical and non-chemical control of nutsedge in field corn and weed control using cultivation in corn. Dairy production continues to be a significant part of the agricultural sector in Maine. At this location research on fertilization of hayfields which compares treatments consisting of only nitrogen, synthetic nitrogen, phosphorus, and potassium, manure, and a combination of synthetic N, P, K, and manure to a control and evaluates treatment effects on yield and quality of hay. The Northeast Coordinating Committee on Soil Testing (USDA-NEC 67) recently developed a proposal titled "Sustainable Phosphorous Fertilizer Recommendations for Corn Production in the Northeast USA". The proposal has been funded by a USDA-SARE grant with the goal of providing agronomically sound phosphorous recommendations for modern crop and soil conditions. Field experiments will be conducted in 12 Northeast states to evaluate corn response to phosphorous on a total of 64 field sites, one of which is at Rogers Farm. The growing interest in soybean production in Maine is supported in part by research on soybean varieties, maturity rating, planting dates, planting densities and week control.

Lunch
Leonards Mills, Bradley "
The Way it Used to Be"

Afternoon Session

Forest Research
Penobscot Research Forest

Silviculture Modifications presented by
Mike Day
Associate Professor of Forest Resources
University of Maine

New types of silviculture prescriptions designed to combine viable ecological and product values were discussed. Included was a review of proposed modifications of silvicultural treatments that complement traditional methods. The rationale of these proposed techniques were examined. Since these are new practices that have not been in practice long there was little data to present.

Penobscot Experimental Forest
presented by
John C. Brissette, PhD
USDA Forest Service
Northeast Forest Experiment Station

The Penobscot Experimental Forest (PEP) is a 4,000 acre research and demonstration forest in the towns of Bradley and Eddington, Maine. Research to better understand the ecology of northern conifer ecosystems, and how best to manage them, is conducted by faculty and students of the University of Maine and scientists and staff of the Northeastern Research Station of the USDA Forest Service. Much of that research is done cooperatively between the University and the Forest Service.

The tour focused on 40-year results of ongoing, long-term silvicultural research conducted by Forest Service staff on the PEF. An array of silvicultural treatments, representing both even and uneven aged management, were observed. The range of treatments tested have resulted in differences in stand structure, species composition, and product yields. To allow ample time for wandering through the stands and for questions, the tour stopped at just a few representative treatments. Discussions highlighted goals, silvicultural techniques that have been applied to achieve those goals, and results.

Growth Dynamics and Sustainability of Mixed-Species Uneven Aged Stands

presented by
Laura S. Kenefic
Cooperative Education Graduate Student and Research Forester (in training)

Uneven-aged stands are quite common in the Northeast due to the prevalence of small-scale disturbances such as windfall, defoliating insects, and partial cutting. Silviculturists prescribing treatments for stands with many age classes often seek to enhance or maintain structural diversity with selection cutting. The selection method involves removing single trees or small groups in order to regenerate new cohorts and balance (evenly distribute) growing space among all age classes. Target residual stand structures are often defined in terms of number of trees per size class and basal area per acre.

It has traditionally been believed that each age class must have the same amount of growing space to ensure long-term sustainability of production and structural stability. Management for deliberately unbalanced uneven-age structures (in which growing space allocation is not equal) has received little attention. In mixed-species uneven aged stands it is likely that shade-tolerant trees in lower strata can "share" horizontal growing space with older and/or taller trees-rendering equal distribution of space unnecessary.

We are addressing the potential for deliberately creating "unbalanced" stands in a study of two selection stands on the Penobscot Experiment Forest. Our objective is to identify new ways to define target structures for mixed-species uneven-aged stands. To that end, we are assessing stand age structure, growing space distribution, and tree growth dynamics in the USDA Forest Service's 5-year selection stands. We have collected data about soil drainage, tree age, radial growth patterns, competition, crown size, and leaf area in order to model growth and growth efficiency of individual trees and compare alternative target structures. Preliminary results raise questions about structural stability and sustainability of production in the study stands, and highlight inadequacies of traditional approaches to uneven-aged management.

Silviculture and Insect Diversity at the Penobscot Experimental Forest
presented by
S.A. Woods and J.C. Jaros-Su

Virtually all forested landscapes in the United States have been impacted by timber harvesting and will continue to be managed at least partly for fiber production in the future. Management of forest stands and forest landscapes inevitably impacts populations other than the tree species of commercial interest. These impacts have led to conflicts between timber production and the conservation of biological diversity. One of the main obstacles to integrating biodiversity into forest management is the lack of knowledge of the ecological effects of management alternatives.

Invertebrates in general, and insects in particular, make up the vast majority of forest biodiversity. Ecological theory suggests that insect diversity (minimally defined as the number of insect species) within a given ecosystem depends on the availability of distinct niches. The diversity of insect herbivores may depend on plant diversity because many of these herbivores are host specific; however, studies have also suggested also affect insect diversity. Some authors have suggested that overall insect diversity was equally related to plant diversity and structure, however, it has generally been difficult to separate the influences of the two.

In addition to their contribution to biodiversity, insects play important roles in virtually all ecosystem processes and their communities may be particularly sensitive to disturbance. The immature stages of many insects feed within specific microenvironments, and relatively subtle changes in the forest can alter the micro-environments to which they are adapted. Furthermore, insect populations may be particularly sensitive environmental indicators because their high reproductive rates and short life cycles cause insect communities to respond quickly to changes in the environment.

A unique opportunity exists in Maine to substantially increase our understanding of the impact of forest management on biological communities. The Penobscot Experimental Forest (PEF) was established by the USDA Forest Service in the 1950's to conduct a replicated evaluation of long-term productivity for a wide array of silvicultural practices. In 1993, the University of Maine became involved by establishing the Forest Ecosystem Research Project (FERP) and adding silvicultural treatments which were designed to integrate conservation and fiber production objectives. Funding from the National Research Initiative, Competitive Grants Program in 1996, allowed us to initiate a program to monitor invertebrates communities within the experimental forest. Few forests in the United States, if any, offer the potential that is currently available at the PEF for conducting replicated studies of the impact of silvicultural treatments on invertebrate communities.

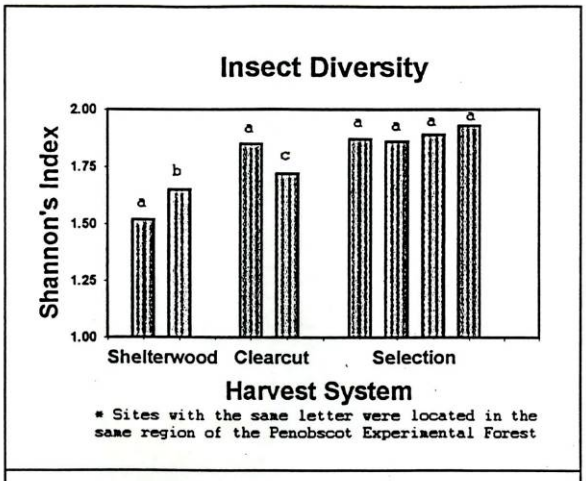
In general, insect traps provide good relative measures of arthropod abundance and diversity, and the use of several trapping techniques provides complementary information because of differential trap success. For these reasons, pitfall, malaise and flight-intercept traps are being used in the study. The flight-intercept traps have been suspended from two towers (18m high rigid conduit) that have been erected in each stand.

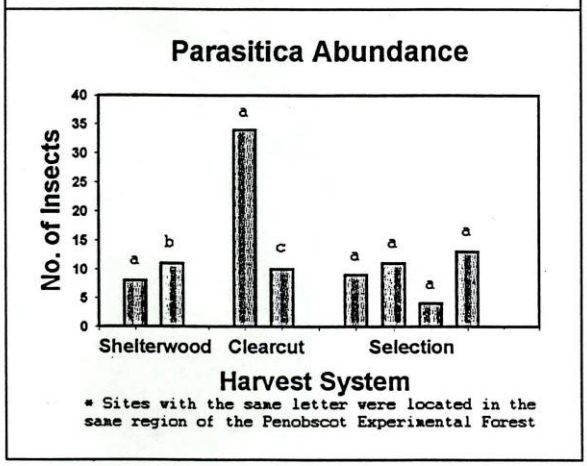
Insects are removed from all insect traps weekly from mid-May through August. Specimens are sorted and identified at least to the family level, and to the genus or species level where possible. Representative specimens are saved as voucher specimens to become part of the University of Maine Insect Collection and will be available for more detailed studies in the future.

Preliminary results suggest that overall insect diversity is highest in stands managed under a selection harvest system which would probably be attributable to the high structural complexity associated with these stands. The high plant species richness found in the clearcut systems also supports a different but diverse insect community. Insect diversity in the shelterwood management system was relatively low. This data suggests that the "expanding-gap" silvicultural system implemented by the Forest Ecosystem Research Project may indeed be a good strategy for maintaining biological diversity in a fashion that is consistent with pulp production objectives.

Parasitic wasps play a beneficial role by parasitizing plant feeding insects. While we did not recover a large number of parasitic wasps, the number recovered in the clearcuts was twice as high as the number recovered from the other stands. From agricultural systems we know that the availability of flowering plants benefits parasitoids because the adults feed on nectar. In this study, flowering herbaceous plants were most common in these clearcut stands and least common in the selection stands. Here again, the "expanding-gap" harvest system may provide a pest management benefit by enhancing herbaceous plant and parasitoid communities over the long run.

Economic studies conducted by Paul Sendak with the USDA Forest Service indicate that long term productivity is highest using harvest systems that remove trees over a protracted period of time and retain high levels of structural complexity. It seems likely that a harvest system which produces a number of small gaps in a forest should meet economic and conservation objectives, while providing some benefits for pest management.



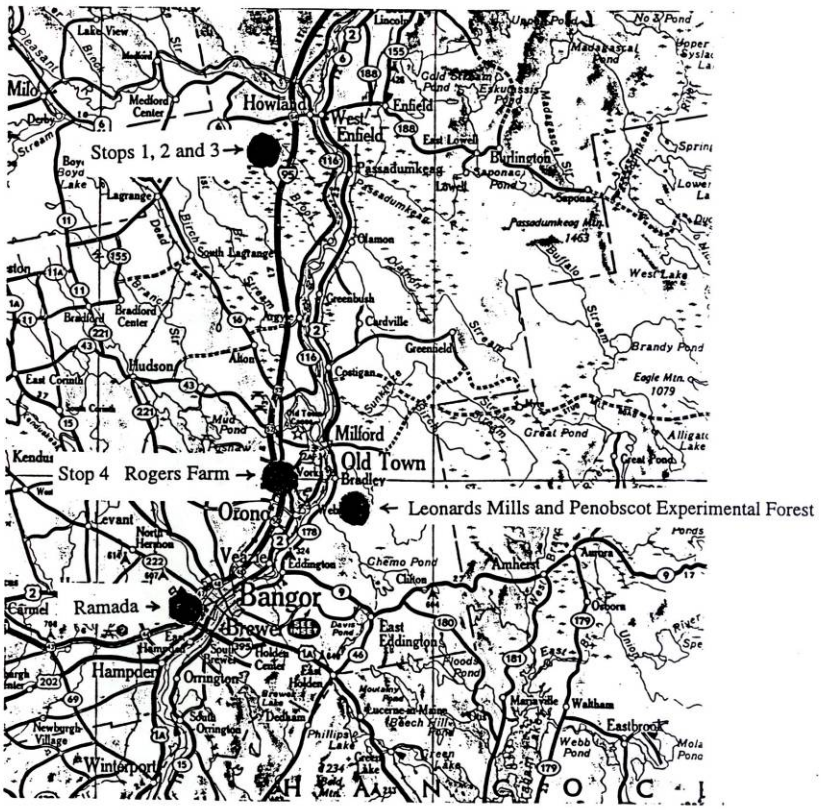


Economic Analysis

Treatment	Mean Annual Yield
Selection, 5 year re-entry	55
Selection, 10 year re-entry	42
Shelterwood, 3 stage	40
Modified diameter limit	38
Clearcut harvest	37
Selection, 20 year re-entry	33
Fixed diameter limit	33
Shelterwood, 2 stage	31

* Sendak, P. 1996. Proc. of the Joint Meeting of Canadian and Northeast Forest Ecomnomists. Fredericton, New Brunswick, Canada

FIELD TRIP SITE LOCATIONS



MASSACHUSETTS RESEARCH REPORT

Peter L.M. Veneman
Massachusetts Agricultural Experiment Station University of Massachusetts
Amherst, MA 01003

Since our last report, Dr. Baoshan Xing joined the faculty as an environmental soil chemist. Dr. Xing established an active research program with an emphasis on soil and water quality focussing on interactions of contaminants or other soil constituents with organic matter. We still have not been able to fill the soil physics position vacated by Dr. Hillel's retirement some years ago.

Soil evaluation training still plays a big role at UMass. Through the University's Division of Continuing Education we are under contract with the Massachusetts Department of Environmental Protection to conduct training in soil evaluation for onsite sewage treatment and disposal purposes. These are week-long courses offered in the Spring and Fall at 4 different locations throughout the Commonwealth. We train individuals in the preparation of soil profile descriptions, assessment of the maximum seasonal high water table, soil textures, and the presence of performance restricting soil layers. We also administer and grade the accompanying examination. To date, UMass, in cooperation with NRCS personnel, has trained close to 2,000 individuals, most of whom are now registered by the state as permitted to conduct soil suitability assessments. Soil scientists, even the course instructors, are not permitted to take the examination to qualify as a soil evaluator! Next year we anticipate presenting a great number of refresher courses as well as expanding our course offerings to include advanced courses, including problem soils (spodosols, soils developed in sandy or red parent materials, floodplain soils), hydrology and advanced design courses.

The Soil Morphology group is studying the relationship between hydrology, vegetation and soil development on a whole landscape basis. At 2 sites we installed tensiometers, groundwater sampling wells, temperature and redox probes, suction lysimeters, and piezometers to monitor a variety of environmental factors. One site is located in a floodplain experiencing calcareous groundwater inflow resulting in a calcareous fen. Differences in vegetation correspond closely to differences in groundwater inflow. This effect is most dominant in the Spring, when the soil system is in equilibrium with hematite, whereas at other times the amount of soluble/suspended iron is much less and in equilibrium with goethite. The second site is located on floodplain sediments derived from acid granites and gneisses. Soils in toeslope positions have significant deposits of iron and manganese, often in the form of well expressed nodules. Most of these materials are deposited during a relatively short period in early Spring when snow melt, soil wetness and precipitation contribute to significant groundwater upflow at the slope break point. At many locations in southern New England where the topography has a sharp break, do we observe soils with high chroma colors, even though these soils experience a distinct wet period as reflected by the presence of hydrophytic vegetation.

We are in the process of installing monitoring equipment in several Wisconsin mound systems to allow evaluation of the performance of these systems in regards to groundwater quality. We are measuring orthophosphate, nitrate, total nitrogen, and total coliforms. We also anticipate performing a survey for the Massachusetts DEP to assess the performance of soil evaluators. We will conduct audits of Boards of Health files to assess completeness of the soil profile description forms and will follow this up with a comparison of soil evaluator deep hole descriptions with those prepared by a professional soil scientist.

The main thrust of the Soil Chemistry group is to protect the environment through improved soil and water quality. Various lines of research are presently pursued, including the characterization and quantification of humic substances using FTIR, and solution and solid NMR. Sorption mechanisms, speciation, and fate of metals and organic chemicals including pesticides, in soil, water, and sediments are investigated to improve site characterization and risk assessment. We are also studying the effects of tillage and cover-crops on soil organic matter and pesticide chemistry in soil.

Virginia NRCS Report
1998 Northeast Cooperative Soil Survey Conference

Staffing at Present time:

14 Soil Scientist
4 Technical Soil Service Specialist
3 Map Compilers
4 in. Digitizing Unit
1 State Soil Scientist
1 Secretary

Total 27 Working in Soil (02) 8 (01)

2,200,000 acres remain to be mapped. Four counties still have no contacts.

Some Hot Items

1. Working with WHHNWI Fish & Wildlife, Army Corp. of Engineers and NRCS to determine if NRI could be used to determine if the data is suitable for the lose of wetlands.
2. NRI 8,000 PSU - completed
3. HGM Model to determine the value of a wetland - VA is responsible for uplands wooded wetlands.
4. Three soil scientist over 46 years
5. Counties are SSURGO certified. Some 15 other are I some phase of digitizing (progress surveys).
6. Counties need map finished.
7. FS-5/7 Soil Scientist requested from the register.
8. Wetland Teams - Soil Scientist, Biologist, Engineer (600 determinations made each year)
9. VA has a Certification Program for Professional Soil Scientist.
10. Digitizing unit is responsible for 9 states: TN, SC, NC, KY, MD, RI, VA, DE & NJ

    28 Soil Surveys funded this year
    84 total backlog
    62 certified since December. All but 2 to are block

Virginia Tech Report

Crop and Soil Environmental Sciences Department

2 majors: Crop and Soil Environment Sciences; Soils, Crops, Turfs, Agrocology Environmental Sciences: Aquatic, Land Resource, Waste Management

1990 - To uppergrads	1998 - 450 undergrads	
Environmental Science = 300	CSES = 150	Graduate Students = 40

Faculty:	1990 - 34 faculty	1996 - 22 faculty	1998 - 25 faculty

Soil Survey, Genesis, Interpretations Program on campus: faculty: Baker, Daniels, Edmond, Thomas, Zeiaroy

Lab personnel; W.T. Price (1/2), student 20/hrs/wk)*

Off Campus:	field soil surveys	4 in two survey areas
	VA Dept. of Health	4 in four health dept. regions
	County Interpretation	2 in Loudoun: Chesterfi9eld

<u>Teaching:</u>

Interpretation Soils:	Baker, Daniels (220/2scm)
Soil Survey and Taxonomy:	Edmonds (60/15 cm)
Soil Interpretations:	Edmonds (20/1 scm)
Soil Genesis:	Daniels (25 every other year)
Geomorphology:	Daniels, Campbell (20/1 scm)
Soil Evaluation:	Thomas (8/2 scm)

Soil Chemistry, Minerology, Soil Phys Chem. 2clazny (grad)

*	In past FY:	CEC, pH, OC:	1.0 horizons
		PSA	1040 horizons
		Atturbergs, BD, H20 retention:	1500
		Clay mineralogy:	68

AES research project soil survey, VA, NC

<u>Research:</u> Opportunistic

<u>Thomas</u>
- Shrink-swell behavior in soils
- Background levels of heavy (trace) metals in soils
- Genesis of smectite in expansive soils
- Long-term water quality trends in VA surface waters

<u>Daniels</u>
- Wetlands mitigation
- Mined land reclamation; coal, tetansium
- Vegetation of sulfrid materials

<u>Zeiazny</u>
- P availability in phytasc amended poultry manures limestone valley, Redmont, Coastal Plain
- Soil retention in Applachian forest ecosystems

Extension

Currently none
Baker will assume extension responsibilities in the upcoming year.

Teaching

Edmonds retiring June 1999
Refilling position January 1999

Teaching/Research

Pedologist/Soil Information Systems
New hard-funded GIS technician

West Virginia Agricultural and Forestry Experiment Station Report

John C. Sencindiver
West Virginia University
Division of Plant and Soil Sciences
P.O. Box 6108
Morgantown, WV 26506-6108

Faculty

Dr. Louis McDonald, assistant professor of environmental soil chemistry, joined the faculty in August 1997. Dr. McDonald received his Ph.D. in soil chemistry at the University of Kentucky under the direction of Dr. Bill Evangelou. Dr. Jim German, research instructor in soil science, also was hired in August 1997 on a three-year contract to teach the introductory soil science course each semester and to conduct research on mined land reclamation. Dr. Gorman received his Ph.D. at West Virginia University under the direction of Dr. John Sencindiver.

Research

Dr. John Sencindiver and his graduate students are conducting the following studies with cooperation from other faculty and NRCS.

1. Mapping, Classification, and Interpretation of Minesoils -This is a regional study initially including representatives from West Virginia, Maryland, Virginia, Kentucky, Tennessee, Illinois, Texas and NRCS. The goal of this group is to establish a southern regional experiment station project to develop a regional map of anthropogenic soils. In a current West Virginia study, soil development has been evaluated on a 13-year old reclaimed surface coalmine. The minesoils were initially described and characterized immediately after regrading and before revegetation. These soils had only C layers. After 13 years, nine soil pits were excavated in the vicinity of the original pits. All of these minesoils had A horizons ranging in thickness from 2 to 9 cm. Subsurface horizons (AC, Bw, C/B), ranging in thickness from 7 to 17 cm, also had formed in each profile. Wendy Noll, a graduate student working with John Sencindiver, is currently writing a thesis on this project.

2. Metal Content of West Virginia Soils- Several faculty and graduate students at West Virginia University are cooperating with NRCS to sample and determine the heavy metal content of major soils of the state. Current emphasis is being placed on forest soils. Soils from three of five MLRAs in the state have been sampled and characterized, including determination of total elemental content of each horizon of each soil. Two graduate students are currently working on parts of this study.

3. Characterization and Carbon Distribution of Frigid Soils of West Virginia-With the cooperation ofNRCS and the U.S. Forest Service, 18 pedons were described and sampled in the Monongahela National Forest above 3500 feet elevation. Although all horizons were characterized, the major objective was to carefully describe and analyze the organic horizons and to determine the total biomass at each site to determine carbon sequestration. A graduate student is nearing completion of this study.

4. Characterization of Soils in MLRA Soil Survey Region 13-The West Virginia experiment station and NRCS are continuing to cooperate on sampling and characterization of soils in active survey areas of MO-13.

Research conducted by other soil science faculty at WVU.

1. Treatment and Control of Acid Mine Drainage-Drs. Jeff Skousen and Louis McDonald.

2. Organic Chemicals in Surface Waters and Organic Solvent/Metal Interactions-Dr. Louis McDonald.

3. Remediation of Metal Contaminated Soils-Dr. D.K. Bhumbla.

4. Phosphorus Management in Heavily Manured Soils-Dr. D.K. Bhumbla.

Selected Publications

1. Gorman, J.M., J.C. Sencindiver, D.J. Horvath, R.N. Singh, and R.F. Keefer. 1997. Erodibility of fly ash-treated minesoils. p. 465-479. *In* Brandt, J.E. (ed.) Proceedings, 1997 Annual National Meeting of the American Society for Surface Mining and Reclamation. Austin, TX. May 10-15, 1997.

2. Skousen, J., D.K. Bhumbla, J. Gorman, and J.C. Sencindiver. 1997. Hydraulic conductivity of ash mixtures and metal release upon leaching, p. 480-495. *In* Brandt, J.E. (ed.) Proceedings, 1997 Annual National Meeting of the American Society for Surface Mining and Reclamation. Austin, TX. May 10-15, 1997.

. Skousen, J., J. Sencindiver, K. Owens, and S. Hoover. 1998. Physical properties of mine soils in West Virginia and their influence on wastewater treatment. J. Environ. Qual. 27(3):633-639.

Selected Published Abstracts

1. Gorman, J. M., J.C. Sencindiver, R.N. Singh, and R.F. Keefer. 1996. Physical property changes over a three-year period of fly ash used as a topsoil substitute on mine land. p. 342. Agronomy Abstracts.

2. Sencindiver, J.C. and J.T. Ammons. 1996. Minesoil genesis and classification, p. 11. *In* Daniels, W.L. (ed.). Reclamation of Drastically Disturbed Lands Presentation Abstracts. 1996 Annual Meeting of the American Society for Surface Mining and Reclamation. Knoxville, TN. May 18-23, 1996.

3 Singh, R.N., J.C. Sencindiver, and D.K. Bhumbla. 1996. Phosphorus immobilization with acid mine drainage sludge, p. 31. Agronomy Abstracts.

4. Noll, W.J. and J.C. Sencindiver. 1998. Minesoil development in central West Virginia, p. 772. *In* Proceedings, 15th Annual National Meeting of the American Society for Surface Mining and Reclamation. St. Louis, MO. May 17-21, 1998.

Other NRCS Activities

1. Three active surveys in four counties (Doddridge, Lincoln, Logan and Mingo) will complete the "once over." These surveys are scheduled to be completed by 2001.

2. Three counties (Greenbrier, Mason, and Morgan) are currently being updated. An update survey is planned to begin in Fayette and Raleigh Counties this fall.

3. The State Soil Conservation Agency is cooperating with NRCS by providing some funding for map compilation.
4. NRCS soil scientists assist schools in the state with the Envirothon program. This program teaches students to appreciate and learn about the environment. Twelve schools participated in 1997, while over 25 schools participated in 1998.

Use of Soil Information by the National Park Service
Nigel Shaw, Research and Natural Resources, BOSO

Servicewide Inventory and Monitoring Program
Soil Information uses within the National Parks

- 375 parks, range in size from .5 to 12 million acres.
- Mission: protection and enjoyment of natural and cultural resources.
- A small but highly visible, heavily used and greatly valued portion of the federal lands.

Inventory and Monitoring Program

- Objective: get 260+ parks up to date on inventories and develop monitoring protocols.
- Inventory categories: species lists; vegetation; base cartography; soils and geology; species surveys and distri.; water resource inventory and chemistry; air quality and meteorological data; natural resource bibliographicies.

Soil and Geology Mapping

- 18 parks underway for Order 3 w/NRCS
- More detailed soils surveys for selected parks.
- Partnership with USGS for developing bedrock and surficial geology maps.
- USGS regional teams visiting each park.

Soil Map uses in NFS

- Broad scale assessments - filtering for suitable locations, activities.
- Project scale planning - natural and cultural resource management projects, design and construction projects.
- Research - pollution impacts, landscape disturbance.

Broad Scale Assessments

- Glacier NP, Montana, used GIS data (surf. Geol; veg;'topo) and expert to generate 5 acre MMU map for 1 million acre park in 3 years, including field survey.
- Ovando soil series: granite; north facing above 4500'; south facing above 6000'; 8-60% slope; medium canopy cover; straight-convex profile corvature.
- Big Bend NP, Texas, is using the soils map in conjunction with GIS data (geol; topo; water source locations) to generate an Environmental Zonation map to be used in predictive analysis for an archaeological survey (predict probability of sites, age and type of sites based on geomorphic characteristics).

Project Scale Planning

- Generally NRCS maps do not offer the detail needed for design and construction, but they prove quite useful for resource management projects.
- Fort Clatsop, NM, Oregon, used NRCS data to plan an extension of the Lewis and dark Trail, avoiding unstable soils and steeper slopes.
- Oregon Caves, NM, Oregon, uses the presence of serpentine soils as an indicator of unusual plant species and incorporated some new areas in a proposed boundary change.

- Minutes Man NHP, Massachusetts, uses soils and other GIS data to establish working farms to restore historic landscapes.
- Glacier NP, Montana, uses soils data as a filter to evaluate potential backcountry campgrounds, site trails, revegetation management (susceptibility to exotic colonization) and fire management (soil-vegetation relationships).

Research

- Denali NP, Alaska, has major landscape restoration issues, a result of the 1970's-SO's gold rush which left debris, trails, tailing piles and deranged streams. Reestablishing stable ecosystems uses a variety of reclamation techniques, testing the rate and pattern of vegetation: substrate; soil moisture; species presence and density; uses of fertilizer.
- Canyonlands NP, Utah, Cyanobacterial-lichen soil crusts, act as "sponges" for air pollutants. Studies show their sensitivity to numerous pollutants, including acid rain, increased chlorophyll, sulfur and nitrogen and effluents from coal-fired power plants. Indicate level of unseen threats to the ecosystem.

MO-13 Report
1998 Northeast Cooperative Soil Survey Conference
Bangor, Maine

Maine - "Once you visit, you won't want to leave!!

• Pleased to be on the Agenda
• Have not been on the agenda in other regions

MO-13 Workload
• Started FY-98 with 149 Projects
• Picked up 4 more in MLRA-120 (153)
• Running with about 159 Projects (with SSURGO)
• MO-13 covers 3 NRCS Regions and 12 states - 75% of workload in South Region

How 15 3 Projects?
• 19 New Starts
• 15 Initial Field Reviews
• 21 Progress Field Reviews
• 12 Final Field Reviews
• 18 Final Correlations
• 64 in Technical/English edit
• 72 in Digital Development (or complete)

Real Life
• We Have Struggled with this workload
• All MO Offices started with similar staffing but varying workloads
• Still adjusting our system to service the projects
• Added One SDQ Specialist and enlisted another this year

Staff
• Alex Topalanchik MLRAs 124,126,127
• Roy Pyle MLRAs 147,148
• David Kingsbury MLRAs 121,125
• Robert Dobos MLRA 128
• John Jenkins MLRAs 120,122,123,129
• M. Kent Clary MLRA 130

MLRA Protect Leaders
• Developed four of these positions this past year:
• Neil Martin - MLRA 126
• Don FLegel-MLRA 128
• James Bell - MLRA 147
•Chip Smith-MLRA 130

This Year and Next
• We Will Work to Improve Our Service to the States this Year
• Redrawing the Areas of Responsibility Map
• Still a Heavy Individual Workload

This Year We Have....
• Got our Data to the HPs
• Made NASIS work for us - getting correlations in
• Worked Together Better
• Took control of our text for publications
Key Issues Still Are
• Communications
• Publications

• Map Finishing
• Getting NASIS to the Project Offices
• Keeping up with Workload

Communications
• MO Leaders seek to improve communications with the states
• We meet several times each year
• Met in Raleigh in January - Portland in July
• Trying several things to improve communication with states

Communications
• If you have a concern, please let me or the MO staff know about it
• With our workload, we can't anticipate your needs as well as we would like to
•CALLUS!

Publications
• Area where we have made most progress
• Past a critical time - typesetting surveys without maps ready
• Some surveys have no maps in sight
• We must address the map finishing issue
• We a large compilation workload to consider

Publications
• In MO-13, we have developed techniques to convert soil survey text and tables from various manuscript formats to PDF files.
• This satisfies our business requirements in providing soils information electronically via internet or CD-ROM or hard copy
• 2 Surveys on the web now

Map Finishing
• Map making is "in the throes of revolution"
• Many US. cartographers are saying that we have to go back to 15th century for precedent
Some say that the current changes in cartography have no precedent - "it is not comparable" - hope we can establish production in TN and PA

Other things...
• Sampling project in Highland Rim and Nashville Basin of Tennessee
• Working with Henry Mount at NSSC on soil climate study in MO-13
• Working on SOC stocks of Appalachians and also forest soil nutrient cycling

More Consistency
• We will continue to work to be more consistent
• Started developing 1999 calendars last week - scheduling has been difficult - not enough weeks in the year or staff to do it
• Continue to refine communications with the states

Positive Signs
• Starting out we knew there were going to be some rough spots
• Having a Deputy Chief area for soils is a great thing
• We are beginning to work together better - MOs are more alike than different
• Beginning to think physiographically

Questions.....?

Northeast Cooperative Soil Survey Conference
Business Meeting
July 23,1998

Maxine Levin, Regional Soil Scientist, NRCS-USDA, East Region opened the meeting.

Old Business:

1. New York offered to host the next Northeast Cooperative Soil Survey Conference. Virginia also offered their state as well. Dean Rector pointed out that Virginia had deferred its turn 4 years ago. Virginia accepted to be the host for the next NE Cooperative Soil Survey Conference in the year 2000. The East Regional Soil Scientist, NRCS, will be the Chair of the Year 2000 Steering Committee. Dean Rector, State Soil Scientist, NRCS, VA will be the Chair of the Conference. Dr. Baker (or substitute), Professor, VA Tech., Blacksburg, VA, the Co-Chair, and Norman Kalloch, NRCS-ME, the Vice-Chair. New York will host the NE Conference in 2002.

2. A discussion was opened as to whether the Hydric Soil Committee in the Northeast (New England and Mid Atlantic) should continue as separate entities or be combined as one regional group under the National Hydric Soils Committee.

   a. The National Hydric Soils Committee has delegated authority for regional groups to continue as separate entities. For those regional committees that want to have approval for new regional hydric soil indicators, a proposal should be submitted to the National Hydric Soils Committee by their next meeting. The National Hydric Soils Committee plans to have their next meeting at the National Agronomy Meetings in Baltimore, MD, Oct 18-23, 1998.

   b. Discussion questions that the group brought up and need to be addressed in a letter or by a committee:

      1. What is the future of the National Hydric Soils Committee? Is it being dissolved or reduced? Will it be an oversite committee for the regional committees?

      2. Can the Regional committees set their own regional indicators? Will they be recognized as official documents or as a subset of test field indicators for the National list?

   c. A proposal was made, seconded and approved to:

      - Endorse Regional Hydric Soil Committees which would support the National Hydric Soils Committee.
      - The Regional Hydric Soil Committees would act as separate entities from the National Committee. The New England and Mid-Atlantic Hydric Soils Committees will continue as separate organizations but report progress to the NE Cooperative Soil Survey Conference biannually.

3. Participants approved and accepted the reports from the 1997-1998 NE Soil Survey Conference Committees:

   Soil Taxonomy
   SSURGO/Map Finishing
   Research Needs
   Site Specific/Precision Farming
   Future Role of the Agricultural Experiment Stations in Soil Survey

New Business:

1. The following committees are recommended for the next NE Cooperative Soil Survey Conference in YR 2000:

    Soil Taxonomy - standing committee
    SSURGO/Map Finishing - continued into the next conference
    Research Needs - standing committee
    Site Specific/Precision Farming - continued into the next conference
    Hydric Soils Committee - Regional Summaries

2. A proposal was made not to have the Business Meeting at the end of the Conference so that more participants with specific interests would be represented. Friday was provided as a travel day, however participants used Thursday afternoon (end of the Conference) to travel instead. The YR2000 Steering Committee for the next conference will consider the request.

3. The NRCS East Regional Soil Scientist will coordinate upcoming conferences with other region so as to have inter-regional cooperation.

Meeting Adjourned.

BY-LAWS OF THE NORTHEAST COOPERATIVE SOIL SURVEY CONFERENCE

ARTICLE I - NAME

Section 1.0

The name of the Conference shall be the Northeast Cooperative Soil Survey Conference.

ARTICLE II - PURPOSE

Section 1.0

The purpose of the Northeast Cooperative Soil Survey Conference is to bring together representatives of the National Cooperative Soil Survey in the northeastern states for discussion of technical and scientific questions. Through the actions of committees and conference discussions, experience is summarized and clarified for the benefit of all; new areas are explored; procedures are synthesized; and ideas are exchanged and disseminated. The conference also functions as a clearing house for recommendations and proposals received from individual members and state conferences for transmittal to the National Cooperative Soil Survey Conference.

ARTICLE III - PARTICIPANTS

Section 1.0

Permanent participants of the conference are the following:

Section 1.1

The NRCS state soil scientist responsible for each of the 13 northeastern states: Connecticut, Delaware, Maine, Maryland (also representing the District of Columbia), Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Virginia, Vermont, and West Virginia.

Section 1.2

The experiment station or university soil survey leader(s) of each of the 13 northeastern states.

Section 1.3

NRCS East Region Soil Scientist

Section 1.4

NRCS, MLRA Office (MO) 12 and 13 Team Leaders

Section 1.5

National Soil Survey Center Liaison to the Northeast

Section 1.6

Cartographic Staff Liaison to the Northeast

Section 1.7

Three representatives from the soils staff of the USDA Forest Service as follows:

1. One from the Eastern Region, National Forest System
2. One from the Southern Region, National Forest System
3. One from the Northeastern Area, State and Private Forestry

Section 2.0

On the recommendation of the Steering Committee, the Chair of the Conference may extend invitations to a number of other individuals to a number of other individuals to participate in committee work and in the conference. Any soil scientist or other technical specialists whose participation is helpful for particular objectives or projects of the conference may be invited to attend.

ARTICLE IV - ORGANIZATION AND MANAGEMENT

Section 1.0 Steering Committee

A Steering Committee assists in the planning and management of biennial meetings, including the formulation of committee memberships and selection of the committee chair and vice-chair.

Section 1.1 Membership

The Steering Committee consists of the following four members:

1. NRCS East Region Soil Scientist (Steering Committee chair)
2. The conference chair
3. The conference vice-chair
4. The past conference chair

The Steering Committee may designate a conference chair and vice-chair if the persons are unable to fulfill their obligations.

Section 1.2 Meetings and Communications

A planning meeting is to be held about one year prior to the conference. Additional meetings may be scheduled by the chair if the need arises.

Most of the committee's communications will be in writing. Copies of all correspondence between members of the committee shall be sent to the chair.

Section 1.3 Authority and Responsibilities

Section 1.3.1 Conference Participants

The Steering Committee formulates policy on conference participants, but final approval or disapproval of changes in policy is by consensus of the participants.

The Steering Committee makes recommendations to the conference for extra and special participants in specific conferences.

Section 1.3.2 Conference Committees and Committee Chair

The Steering Committee formulates the conference committee membership and selects the committee chair and vice-chair.

The Steering Committee is responsible for the formulation of committee charges.

Section 1.3.3 Conference Policies

The Steering Committee is responsible for the formulation of statements of conference policy. Final approval of such statements is by consensus of the conference participants.

Section 1.3.4 Liaison

The Steering Committee is responsible for maintaining liaison between the regional conference and

1. The Northeastern Experiment Station Directors.
2. The East Region State Conservationists, NRCS.
3. Director, Soil Survey Division of the Natural Resources Conservation Service.
4. Regional and national offices of the U.S. Forest Service and other cooperating and participating agencies, and
5. The National Cooperative Soil Survey Conference.

Section 1.4

Responsibilities of the Steering Committee Chair are:

Section 1.41

Call a planning meeting of the Steering Committee about one year in advance of, and if possible at the place of the conference to plan the agenda.

Section 1.4.2

Develop with the Steering Committee the first and final drafts of the conference's committees and their charges.

Section 1.4.3

Send committee assignments to committee members. The committee assignments will be determined by the Steering Committee at the planning meeting. The proposed chair and vice-chair of each committee will be contacted personally by the conference chair or vice-chair and asked if they will serve prior to final assignments. NRCS people will be contacted by an NRCS person and experiment station people will be contacted by an experiment station person.

Section 1.4.4

Compile and maintain a conference mailing list that can be copied on mailing labels.

Section 1.4.5

Serve as a member of the editorial board of the Northeast Cooperative Soil Survey Journal.

Section 2.0 Conference Chair and Vice-Chair

An experiment station representative and an NRCS state soil scientist alternate as conference chair and vice-chair. This sequence may be altered by the steering committee for special situations. The conference chair and vice-chair will serve a two-year term. The conference chair and vice-chair are chosen following the selection of a place for the next meeting and are from the state where the meeting is to be held.

Section 2.1

Responsibilities of the conference chair include the following:

Section 2.1.1

Function as chair of the biennial conference.

Section 2.1.2

Planning and management of the biennial conference.

Section 2.1.3

Function as a member of the Steering Committee.

Section 2.1.4

Send out a first announcement of the conference about 3/4 year prior to the conference.

Section 2.1.5

Send written invitations to all speakers or panel members and representatives from other regions. These people will be contacted before hand by phone or in person by various members of the Steering Committee.

Section 2.1.6

Send out written requests to experiment station representatives to find out if they will be presenting a report at the conference.

Section 2.1.7

Notify all speakers, panel members, and experiment station representatives in writing that a brief written summary of their presentation will be requested after the conference is over. This material will be included in the conference's proceedings.

Section 2.1.8

Preside over the conference.

Section 2.1.9

Provide for appropriate publicity for the conference.

Section 2.1.10

Preside at the business meeting at the conference.

Section 2.1.11

Serve as a member of the editorial board of the Northeast Cooperative Soil Survey Journal.

Section 2.2

Responsibilities of the conference vice-chair include the following:

Section 2.2.1

Function as Program Chair of the biennial conference.

Section 2.2.2

Serve as a member of the Steering Committee.

Section 2.2.3

Act for the chair in the chair's absence or disability.

Section 2.2.4

Develop the program agenda of the conference.

Section 2.2.5

Make necessary arrangements for lodging accommodations for conference members, for food functions, for meeting rooms, including committee loans, and for local transport on official functions. Notify all persons attending the meeting of the arrangement for the conference (rooms, etc.) included in the last mailing will be a copy of the agenda.

Section 2.2.6

Compile and distribute the proceedings of the conference.

Section 2.27

Serve as a member of the editorial board of the Northeast Cooperative Soil Survey Journal.

Section 3.0 Post Conference Chair

The primary responsibility of the past conference chair is to provide continuity from conference to conference. Additional responsibilities include the following:

Section 3.1

Serve as a member of the Steering Committee.

Section 3.2

Assist in planning the conference.

Section 3.3

Serve as the editor of the Northeast Cooperative Soil Survey Journal. This responsibility encompasses gathering information with the other editorial board members, printing the Journal, and distributing it.

Section 4.0 Administrative Advisors

Administrative advisors to the conference consist of the NRCS Regional Conservationist, East Region, Director of the NSSC, and the chair of the NE Agricultural Experiment Station Directors or their designated representatives.

ARTICLE V - TIME AND PLACE OF MEETINGS

Section 1.0

The conference convenes every two years, in even-numbered years. The date and location will be determined by the Steering Committee.

ARTICLE VI – CONFERENCE COMMITTEES

Section 1.0

Most of the work of the conference is accomplished by duly constituted committees.

Section 2.0

Each committee has a chair and vice-chair. A secretary or recorder may be selected by the chair, if necessary. The committee chair and vice-chair are selected by the Steering Committee.

Section 3.0

The kinds of committees and their members are determined by the Steering Committee. In making their selections, the Steering Committee makes use of expressions of interest filed by the conference participants.

Section 4.0

Each committee shall make an official report of the designated time at each biennial conference. Chair of committees are responsible for submitting the required number of committee reports promptly to the vice-chair of the conference. The conference vice-chair is responsible for assembling and distributing the conference proceedings. Suggested distribution is:

Section 4.1

One copy to each participant on the mailing list.

Section 4.2

One copy to each State Conservationist, NRCS, and Experiment Station Director of the Northeast.

Section 4.3

Five copies to the Director of Soil Survey, NRCS, for distribution to National Office staff.

Section 4.4

Ten copies to the National Soil Survey Center (NSSC) for distribution to staff in the center.

Section 4.5

Two copies to the NRCS East Region.

Section 4.6

One copy to each MO 12, 13, and 14 office.

Section 4.7

Two copies to the Region 8 and 9 Forest Service Regional Directors.

Section 4.8

One copy to Agriculture and Ag Food Canada office.

Section 4.9

Much of the work of committees will of necessity be conducted by correspondence between the times of biennial conferences. Committee chairs are charged with the responsibility for initiating and carrying forward this work.

ARTICLE VII - RESPRESENTATIVES TO THE NATIONAL AND REGIONAL SOIL SURVEY CONFERENCES

Section 1.0

The Experiment Station chair or vice-chair will attend the national conference the year prior to the regional conference for which they were selected. A second Experiment Station representative also will attend the conference. The second representative is to be selected by the Experiment Station representatives at the regional conference.

Section 2.0

One NRCS lead soil scientist from the East Region will be designated to attend the National Conference in addition to the NRCS member of the National Conference Steering Team.

Section 3.0

One member of the Steering Committee will represent the Northeast Region at the South, Midwest, and West Regional Soil Survey Conference. If none of the members of the Steering Committee can attend a particular conference, a member of the conference will be selected by the Steering Committee for this duty.

ARTICLE VIII - NORTHEAST COOPERATIVE SOIL SURVEY JOURNAL

Section 1.0

The Northeast Cooperative Soil Survey Conference will publish a journal on soil survey and related topics at least once between conferences. The journal will be governed by an editorial board made of the Steering Committee for the Northeast Conference. The editor of the journal will be the past conference chair. Their responsibility will be to assist in gathering information for the journal as well as printing and distributing the journal.

ARTICLE IX – NORTHEAST SOIL TAXONOMY COMMITTEE

Section 1.0

Membership of the standing committee is as follows:

1. Lead Scientist, Soil Taxonomy (permanent chair)
2. Three federal representatives
3. Three state representatives

Section 2.0

The team of membership is three years, with one-third replaced each year. The Experiment Station conference chair or vice-chair is responsible for overseeing the selection of state representatives. The lead scientist, soil taxonomy NRCS is responsible for the selection of federal representatives.

ARTICLE X - NORTHEAST RESEARCH NEEDS COMMITTEE

Section 1.0

This is a standing committee, the purpose of which is to maintain a formal mechanism within the Northeast Region to identify, document, prioritize and address the critical research and development issues related to soil survey.

Section 2.0

Membership of this standing committee is as follows:

2.1 NRCS East Region Soil Scientist (permanent chair)
2.2 One MO Team Leader (four-year term)
2.3 One NRCS State Soil Scientist (two-year term)
2.4 Two experiment station/university representatives (two-year term)
2.5 One NRCS field soil scientist (two-year term)
2.6 The National Soil Survey Center Liaison (permanent)
2.7 U.S. Forest Service Representative (permanent)

Section 3.0

The state soil scientist and field soil scientist will be selected from a different state every two years alternating between each MO. The state soil scientist and field soil scientist will be from different states and different MOs.

Section 4.0

The regional soil scientist will be responsible for selecting the state soil scientist and NRCS field soil scientist.

Section 5.0

The Experiment Station Conference chair, or vice-chair is responsible for overseeing the selection of the experiment station/university representatives as described in Section 2.4 above.

Section 6.0

The Northeast Forest Service Experiment Station Research Director will select the appropriate U.S. Forest Service representative.

ARTICLE XI - SILVER SPADE AWARD

Section 1.0

The award will be presented every two years at the conference meeting. It will be presented to a member of the conference who has contributed outstanding regional and/or national service to soil survey. One or two individuals can be selected for the award every two years. The selection committee will be made up of past award winners with the last award recipient acting as chair of the selection committee. If multiple awards were given at the previous meeting, the chair of the selected committee will be elected by the committee. The recipients of the award will become members of the Silver Spade Club.

ARTICLE XII – AMENDMENTS

Section 1.0

Any part of this statement for purposes, policy and procedures may be amended any time by majority agreement of the conference participants.

By-Laws Adopted January 16, 1976
By-Laws Amended June 25, 1982
By-Laws, Amended June 15, 1984
By-Laws, Amended June 20, 1986
By-Laws, Amended June 17, 1988
By-Laws, Amended June 10, 1994
By-Laws, Amended June 13, 1996