

The National Cooperative Soil Survey: Research Priorities

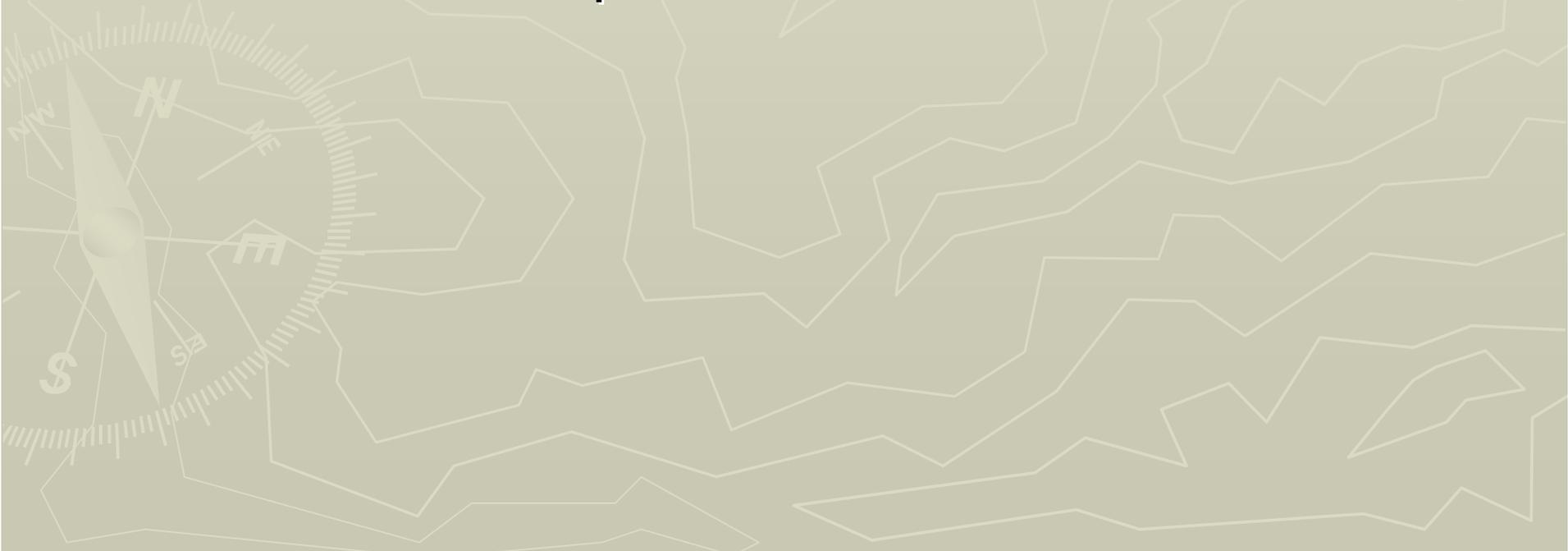
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What's in a Name?

- ▶ “Investigations” changed to “Research”
 - Only unit of NRCS with research mission
 - ▶ Upper administration needs to be reminded as often as possible
 - We are not part of a CSI unit



Personnel

▶ New to the Center

- Cindy Styles
 - ▶ Soil chemistry supervision
 - ▶ Liaison
 - ▶ Research
- West

▶ Research

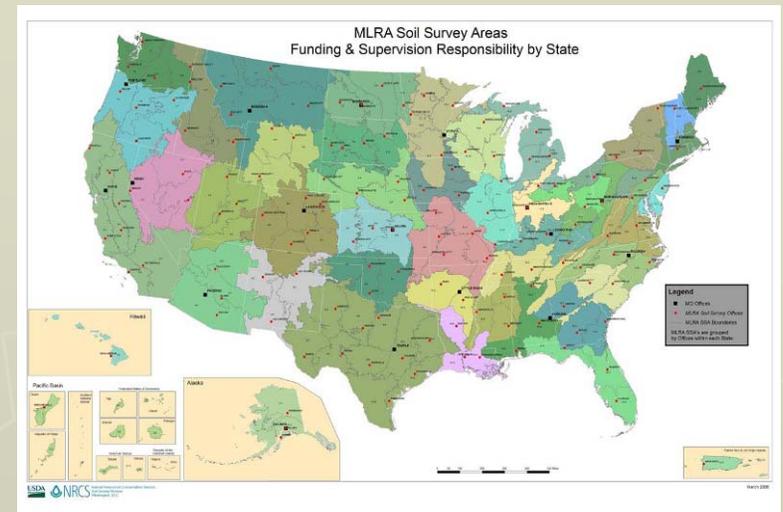
- 12 Soil Scientists; 1 Chemist (soil scientist wannabe)
 - ▶ Geomorphology
 - ▶ Soil chemistry
 - ▶ Hydropedology
 - ▶ Geophysics
 - ▶ Climate – soil moisture and temperature
- Hoping to fill two positions this year

▶ Laboratory

- 19 technical staff
- State of the art analytical equipment

Reorganization and Research

- ▶ Enhanced Soil Survey
- ▶ 146 permanent soil survey offices (MLRA SSOs)
- ▶ Responsible for soil survey activities in all or part of a MLRA
 - Updates
 - Database management
 - **Research**



MLRA SSO Research Projects

- ▶ Projects to address issues or enhance understanding of soils
- ▶ Any number of topics
 - Local issues
 - Part of broader regional or national effort
- ▶ Encouraged to address NCSS research priorities
- ▶ Encouraged to work with benchmark soils

Liaisons

- ▶ NSSC and Soil Survey Laboratory will provide support for all aspects of the projects
 - Planning
 - Data collection and analysis
 - Publication
- ▶ Expanded network of liaisons to meet needs
 - Historically 4 serving 4 regions
 - Currently 11
 - Area of responsibility by MO
 - Expected to be additional liaisons as personnel become available

Liaisons - South

MO	Location	Liaison
8	Phoenix	Cindy Stiles/Deb Harms
9	Temple	Cindy Stiles/Deb Harms
13	Morgantown	Mike Wilson
14	Raleigh	Ellis Benham/Sofi Elrashidi
15	Auburn	Ellis Benham/Sofi Elrashidi
16	Little Rock	Ellis Benham/Sofi Elrashidi
18	Lexington	Mike Wilson

Cooperators and MLRA SSO Research

- ▶ 11 liaisons – 146 MLRA SSOs
 - The ratio is not good
 - 14-26 MLRA SSOs per liaison
- ▶ Need university cooperator involvement
- ▶ What is the carrot? (there is no stick)
 - Input on projects (type and scope)
 - Field assistance
 - ▶ Site selection
 - ▶ Monitoring
 - NSSC assistance
 - ▶ Laboratory
 - ▶ Geophysical
 - Grad students?
 - Funding for projects

Research Funds

- ▶ NRCS is not NSF
- ▶ Yes, we have no money (today)
- ▶ Limited funds available for projects addressing specific needs
- ▶ NCSS Research Priorities Committee
 - Protocols
 - ▶ Open process
 - Proposal solicitation
 - ▶ NCSS research priorities
 - ▶ Short fuse
 - Proposal review
 - Funding recommendations
 - Advisory

National Research Priorities

- ▶ Developed through recommendations from 4 regional soil survey conferences
- ▶ Final recommendations developed at the National Soil Survey Conference
 - Regional research needs committees chairs and co-chairs are members of national committee



Research/Development Outside the Process

- ▶ Research to answer specific questions
 - Fast track
- ▶ Soils with high mica
- ▶ Soils with plinthite



Soils with High Gypsum

- ▶ Initial soil surveys of areas with these soils
 - Limited knowledge of genesis, properties, and behavior
- ▶ Gypsum task force
 - Comprised of NRCS, university, and other agency cooperators
 - Soil-geomorphic relationships
 - Laboratory methods
 - Standards
 - Interpretations
- ▶ Longer term studies?
- ▶ Model for similar types of immediate needs



Focus on Benchmark Soils

- ▶ Cannot work with every series recognized
- ▶ Benchmark series intended to maximize
 - Extrapolation of data collection and research results
 - Ability to test predictions of properties and test interpretations

Benchmark Criteria

- ▶ Large extent
- ▶ Key soils (key positions in Soil Taxonomy)
 - Typically do not share same family
- ▶ Important soils
 - Specialty crops
 - Engineering purposes
 - Ecological niche
- ▶ Existing data

Benchmark Data

- ▶ 1,403 benchmark series
- ▶ 223 benchmark series with no data
 - University lab data may help rectify this problem
- ▶ Basic data to begin to understand system
 - Classification
 - Interpretation
 - Basic information for design and interpretation of other studies
- ▶ Multiple pedons of same series
 - Property means and variability
 - Selling point for research outside NCSS
- ▶ Benchmark landscapes (soilscapes)
 - How do we define?

NCSS Research Priorities

- ▶ New technology
- ▶ Hydropedology
- ▶ Soil change (dynamic soil properties)



New Technology

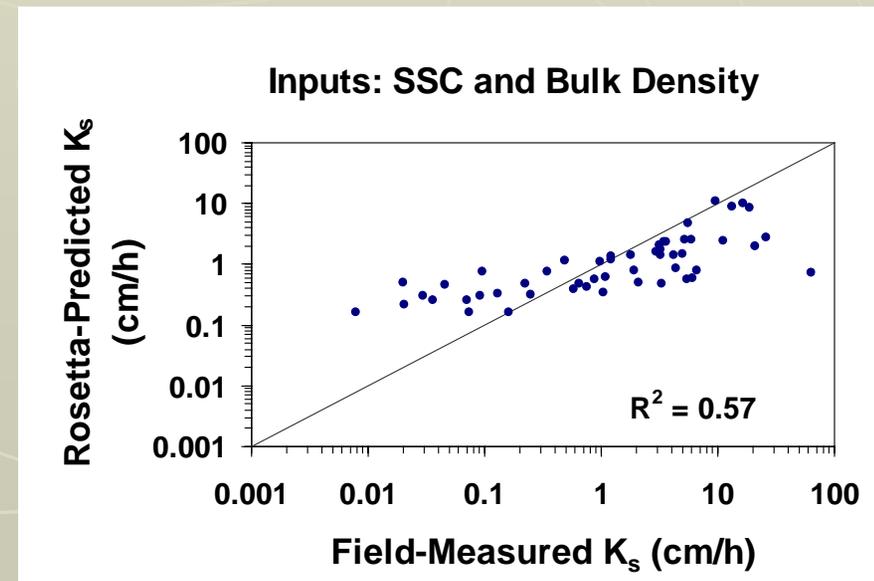
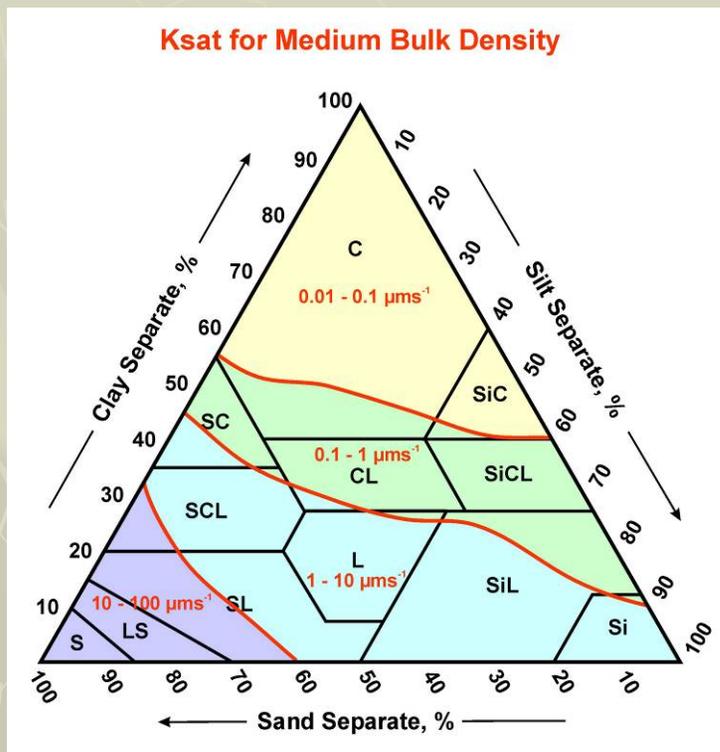
- ▶ Soil landscape models (digital mapping)
 - SOLIM
 - Inference models
 - Others
- ▶ LIDAR, etc.
- ▶ Data capture technologies
- ▶ Display and dissemination

Hydropedology

- ▶ Water ties soils, landscapes, and management together
- ▶ Data needs to understand and interpret specific soils and landscapes
 - Seasonal saturation
 - ▶ Hydric soils and hydric soil indicators
 - K_s and infiltration rate
 - Subaqueous soils
- ▶ Pedotransfer functions to predict hydraulic properties
 - Need large database

Pedotransfer Functions

- ▶ Prediction of a property from other more easily measured properties
- ▶ Long history of use in NCSS

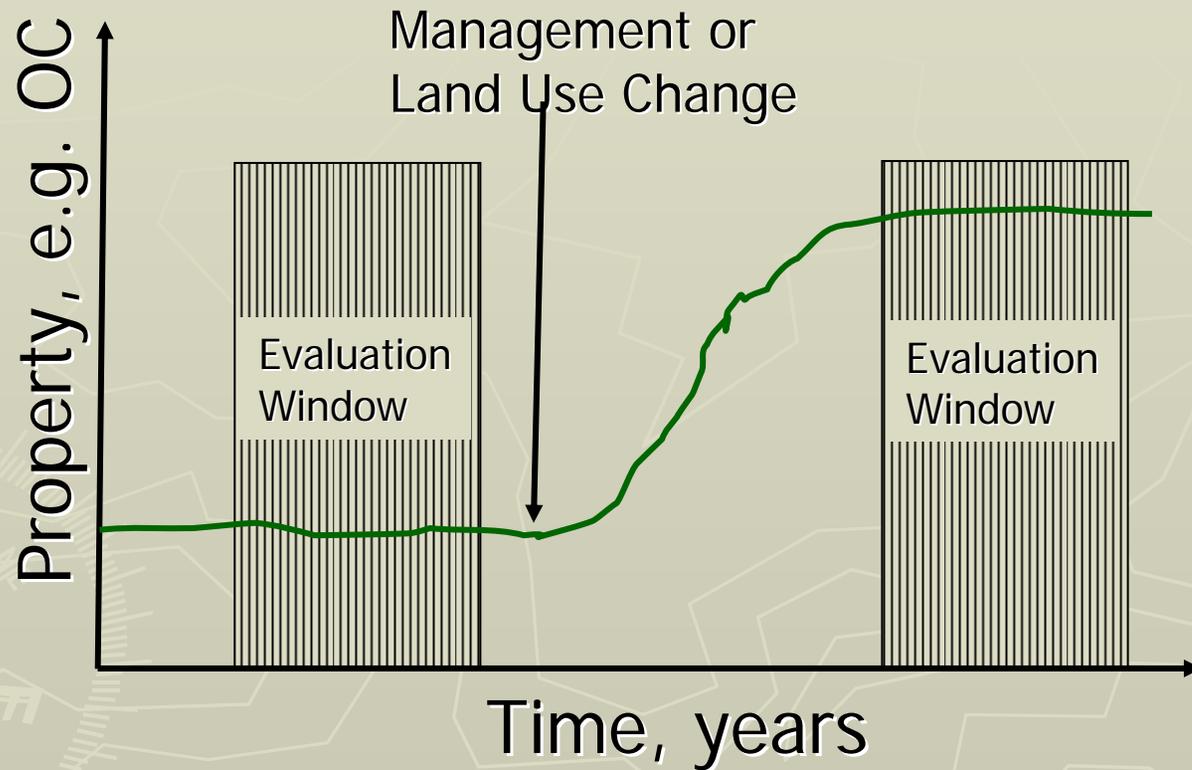


Soil Change (Dynamic Soil Properties)

- ▶ Near surface properties change with land use and management
 - Organic C and N
 - Aggregate stability
 - Hydraulic properties
 - Other
- ▶ Change often described and modeled
- ▶ Can we **inventory** these changes?

Soil Change

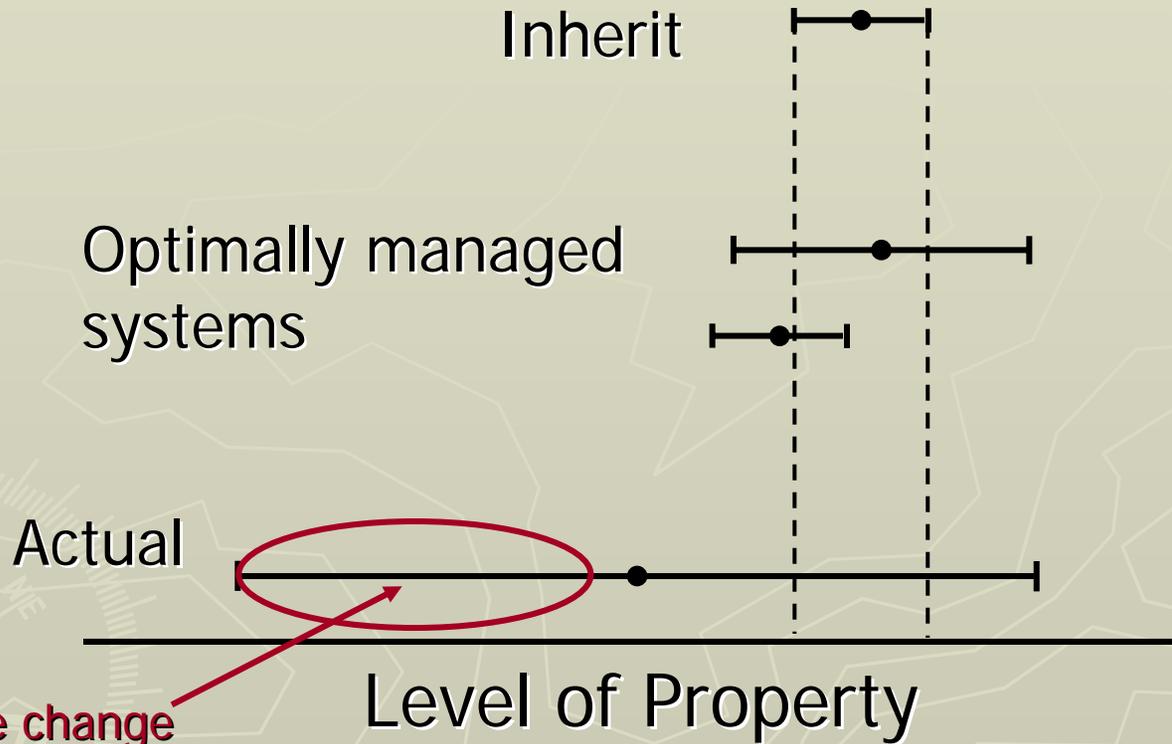
Evaluation of steady state, not transition



Space for time

Same soil; different long-term treatment

Soil Change Application



Can we change these?

Management to achieve optimum state
Do inherit soil properties matter?

The Bottom Line

- ▶ Complexity of current and emerging questions requires multi-faceted approach
- ▶ Research projects to meet local and/or national needs
- ▶ Benchmark soils will maximize our ability to extrapolate data and develop predictive functions
 - Can we multitask?
- ▶ Answers to questions will require everyone's involvement and best efforts