

**2009 NCSS Conference
Research Agenda Standing Committee
Final Report**

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Charges:

1. Review reports and recommendations from 2008 NCSS Regional Conferences.
2. Identify, document, prioritize, and address the critical research and development issues within the NCSS.
3. Identify opportunities for partnering on priority research needs.
4. Identify opportunities for funding priority research needs.
5. Update progress on activities related to past committee recommendations:
 - a. **Benchmark Soils and Landscapes in Soil Survey.** This activity relates to plans to re-establish a NCSS field and laboratory program to evaluate chemical, physical, mineralogical, biological, and hydraulic properties of Benchmark Soils and Landscapes. This activity also includes compilation of NCSS cooperator soil characterization data into a central NCSS database.
 - b. **Gypsum and Expanding Salts in Western States.** This activity was initiated to plan and implement targeted NCSS program to investigate measurement of morphological, chemical, and physical properties of soils with gypsum and more soluble salts, relationships among properties of these soils, and relationships of the properties to landscape conditions. Interpretation and classification of these soils was were also components of this overall effort.
 - c. **NCSS Publications (Open File Publications).** The activity was to propose and develop a publication outlet for NCSS data and reports similar to the Open File system maintained by USGS.
6. Report activities of the Committee at the National NCSS Conference.

Charge 1: Review reports and recommendations from 2008 NCSS Regional Conferences.

**Summary of Discussions and Recommendations from 2008 NCSS Regional Conference
Research Agenda Committees**

Northeast Region

Discussion topics and recommendations:

1. Enhancement of cooperation between MLRA Soil Survey Office Soil Scientists with university cooperators:

Suggestions include:

- Funds for cooperator travel and laboratory support
- Opportunities for MLRA SSO Soil Scientists to pursue graduate degrees.

2. Use of Benchmark Soils to address research priorities:

Suggestions:

- Re-evaluate the list and clarify meaning and purpose
- Include subaqueous soils and soils that dominantly occur in urban/suburban environments
- Develop complete data set for a subset of the benchmark soils
- Sample and analyze multiple pedons to evaluate mean and variance for horizon properties
- Measure hydrologic properties
- Promote for research sites

3. Priority research needs (order listed has no meaning)

- Soil change (dynamic soil properties)
- New technologies and techniques for inventory and evaluation
- Hydropedology
- Carbon
- Geochemistry
- Development and application of soil property ranges for site specific urban/suburban interpretations

Other research topics

- Water table relationships in Aquods and identification as a hydric soil
- Post active acid sulfate soils
- Basic research on interpretations
- Sampling and analysis protocols for subaqueous soils

North Central Region

Discussion topics and recommendations:

1. Ksat measurements on soil landscapes

- Critical need for data
- Central database is needed that is linked to other NCSS data

Recommendation: Link NASIS and NCSS Pedon Database with K_{sat} composite database to formulate a single delivery vehicle for this information. The supporting data to be included will be components of calculated K_{sat} and will encompass a broad range of acquisition methods. Keep this portion of the database updated with real time data whenever possible.

2. Benchmark soils and landscapes

Benchmark Soils/Soilscapes are the recommended focus for MLRA research projects

Need for a unified updated list of critical benchmark soils

NCERA-3 committee plans on producing a publication in which characterization information from one benchmark soil from each state will be presented

Align Benchmark soils and soilscapes with emphasis on catenary relationships with water movement through landscapes

Each MO or State Soil Scientist, in conjunction, should update benchmark soil list

Recommendation: Revise and update the Benchmark Soil List to provide a framework for future investigations. Each State Soil Scientist should provide a list of their benchmark soils, categorized by the qualifying four criteria: 1) extent of area; 2) holds a significant position in Soil Taxonomy; 3) has a great deal of information on characteristics; or 4) occupies a unique ecological/agronomic niche.

3. Soil change (Dynamic soil properties):

Potential to integrate benchmark hydroscape evaluation with dynamic soil properties as a baseline assessment across different locations and management systems. This integration would produce a framework for collaborative work and would satisfy the need for critical data acquisition

4. Topics for future focus

1) Digital technology,

2) providing real time data for modelers, and

3) fine-tuning soil characterization database to suit an audience of novice users who are not familiar with soil science principles.

5. Ecological Site Descriptions

Need additional discussion of the feasibility of connecting ESD work with benchmark soils and dynamic soil properties.

West Region

Discussion topics and recommendations:

1. Regional Project:

A regional project to evaluate mineral weathering on soilscapes as related to climate has been approved by CSREES

Most western states participating

NSSC will provide laboratory and other support as requested

2. Gypsiferous soils

Additional research is needed on laboratory characterization, soil geomorphology, and ecosystem functions

Recommendation: Research should continue and need to organize a task force to evaluate the ecology of gypsiferous landscapes

3. Digital Soil Mapping

Three projects underway (Bruce Frazier, Toby O'Geen, and Jay Noller) to evaluate digital mapping technology

Recommendation: This committee, the Applied Technology/Digital Soil Mapping committee, and the Soil Change working group have potential synergism and should have greater linkage

4. Other

Support a sharepoint for exchange of information via the internet
Additional opportunities for communication and exchange of ideas are needed

South Region

Discussion topics and recommendations:

1. Gypseous soils

Develop and test standards for physical and chemical properties, morphology, descriptive terms, and horizon designations

Taxonomy – be sure we have soils and data before taxonomic classes are proposed

2. Sampling requirements for dynamic soil properties

Identify existing data sets in the Southern Region that can be used to determine the spatial variability of near surface dynamic soil properties

Measure dynamic soil properties at the same time a soil is sampled for characterization

Total C, N and P data should be obtained for all horizons

3. Identify known elements of ground water Spodosols formation and develop model to predict their occurrence in landscapes

Form a task force with specific charges in order to develop a model or research the water table and spodic horizon relationships

4. Evaluate and identify ways to integrate soil spectroscopy and other measurement tools into soil survey activities

5. Plinthite

States in which plinthite occur should cooperate to understand processes associated with landforms, root restriction (chemical and/or physical), and water movement relationships (Ksat)

Re-evaluate the slaking procedure and cementation criteria (do you create an abnormal condition when you dry the sample)

Review past literature and evaluate current data in order to develop classes and criteria (do not follow WRB just to be the same)

6. Anthropogenic soils (reclaimed mine soils both lignite and phosphatic soils)

Reclaimed lignite soils, descriptions and classification have been addressed and publications are available

Phosphatic soils have not been addressed and some consideration of their characteristics and classification should be addressed

Charge 2: Identify, document, prioritize, and address the critical research and development issues within the NCSS.

Consensus of the committee discussions was that research needs should be prioritized in a different manner than has been done in the past. The committee suggestion was to group research issues into three broad categories; **Short-Term Priorities, Global Priorities, and Application of Soil Survey Data.** Specific priority topics within each category include:

Short-Term Priorities

- Soil change
- New technology
- Ecological site descriptions
- Subaqueous soils
- Landscape soil water relationships (hydropedology)
- Gypseous and salt-affected soils

Global Priorities

- Scaling/extrapolation
- Landscape-scale carbon processes and accounting
- Integration of soil organic carbon and landuse
- Soil adaptation and mitigation strategies for climate change
- Soil function
- Soils and ecosystem services
 - Sustainability
 - Resistance
 - Resilience

Application of Soil Survey Data

- Decision support tools
- Integration of carbon and landuse
- Data validation
- Landscape soil water relationships (hydropedology)
- Urban/suburban interpretations

The committee also recognized important issues that were more regionally based. These include:

- Urban/suburban interpretations
 - Criteria/rules for site specific evaluation
- Aquods - genesis, landscape distribution, water table heights
- Plinthite - landform related processes, water movement, identification (slaking)
- Anthropogenic soils (mine soils)

The committee recommended that these lists of research topics identified at the NCSS conference should be prominently posted on the Soil Survey Division web site such that they referred to in research proposals as topics identified as important by a national group.

Much of the discussion within the committee as these topics were identified centered on the need to become more involved in high priority issues including carbon dynamics (soil organic carbon), ecosystem services (soil function and impact on ecosystem services), and wetland function. **A major point of these discussions was that the strength of Pedology and Soil Survey was addressing these topics at a landscape scale instead of a point or plot.** One problem is that other disciplines and agencies currently have the lead in carbon and ecosystem services. Soil survey and Pedology must play catch up.

ACTION: Susan Andrews and Larry West will draft a position paper on the role of soil survey in evaluations of soil quality and ecosystem services.

Charge 3: Identify opportunities for partnering on priority research needs.

The National Soil Survey Center and Soil Survey Laboratory are open to collaborative projects with NCSS partners

Need to emphasize that best opportunity for partnering is the MLRA Soil Survey Offices.

They can provide field support and enlist assistance of NSSC, etc.

Charge 4: Identify opportunities for funding priority research needs.

The NRCS Soil Survey Division has committed a limited amount of money to fund research projects.

The Soil Survey Laboratory is available for analytical support of NCSS proposals and projects.

Charge 5: Update progress on activities related to past committee recommendations:

a. **Benchmark Soils and Landscapes in Soil Survey.**

The NCSS Standards Committee is initiating discussions of standards, criteria, and evaluation for benchmark soils and landscapes at this conference.

Use of benchmark soils for NRCS SSD funded is strongly encouraged and will be a factor in funding decisions

MLRA Soil Survey Offices are encouraged to consider characterization sampling, measurement of hydraulic properties, and evaluation of dynamic soil properties of benchmark soils as potential projects. This may include evaluation of multiple sites and pedons to estimate property mean and variance

Development of a national NCSS soil characterization database is progressing. Data from four cooperating universities are in the database and about 15 additional universities are participating.

b. Gypsum and Expanding Salts in Western States.

The current status report of the Gypsum Task Force is available.

Activities of this task force will be reported at the 2009 National NCSS Conference (this meeting).

The Gypsum Task Force will be continued although it may be restructured to reflect current research questions.

c. NCSS Publications (Open File Publications).

Business requirements for a NCSS publication outlet similar to the USGS Open File system have been developed. The publication outlet will be established as part of a larger Content Manager system within NASIS as resources become available

The Soil Survey Investigations Report (SSIR) series is proposed as an interim publication outlet. Proposed protocols for SSIR publications are attached.

Review process for SSIRs may be a way to strengthen involvement of NCSS partners if a standing editorial committee is formed.

An award for the 75th or 100th SSIR might increase interest in the series.

Charge 6: Report activities of the Committee at the National NCSS Conference.

Other committee recommendations:

- The committee should continue as a standing committee of the National NCSS conference.
- The committee recommended that the Research Agenda and New Technology committees be more closely linked including potential for joint forums and discussion periods at the regional and national NCSS conferences. If possible, overlapping sessions for these two committees should be minimized.
- Establishment of advisory groups for specific applications such as spectroscopy, hydrogeological measurements, and remote sensing should be considered. These groups could be composed of NCSS members and others recognized as experts in the field. Advice from these groups would help ensure that data is collected in a scientifically defensible and efficient manner.