Research Agenda Committee

Larry T. West, NSSC
Nancy Cavallaro, NIFA

Charges

1. Review reports and recommendations from 2010 NCSS Regional Conferences.
2. Identify, document, prioritize, and address the critical research and development issues within the NCSS.
3. Discussion of Rapid Soil Carbon Assessment Activities in the NCSS.
4. Identify opportunities for funding priority research needs.
5. Continue and update progress on Task Force / Working Group activities:
   a. Benchmark Soils and Landscapes in Soil Survey
   b. Gypsum and Expanding Salts in Western States
   c. Open File Task Force
6. Identify an Outstanding Research Project within the NCSS partnership to present at the National NCSS Conference.
7. The NCSS Research Agenda Standing Committee will be required to report its activities at each National Conference

North Central

- Combined Research and New Technology committees
- Gridded surveys (SSURGO):
- Rapid assessment of soil C
- ESD and dynamic properties
- Digital mapping
- Water table research
- Other
  - Argillic vs. Cambic
  - Illititic mineralogy class
  - Global issues – Phosphorus related issues, hydraulic conductivity, bulk density scaling, North American Node of Global Soil map.
  - Develop methods for stratifying applicability of pedotransfer functions
  - Hazards research – high intensity rains, soil slippage.
  - Urban soils – much needed research for predictions and estimating properties

Northeast

- Short term soil survey mission needs
  - Revision of hydrologic soil groups (too many Group D)
  - Salinity classes (data?) for subaqueous soils
  - Nutrient and trace element fate and behavior in subaqueous soils
  - Data mining – have data; what does it mean
- Global research areas that would benefit from pedological research and inclusion of soil survey concepts and data
  - Soil temperature and moisture data (SCAN)
- Soil organic C fractions
  - What do they mean?
    - Broad application?
    - Often developed in limited geographic region
- Soil buffering capacity related to atmospheric deposition
- Research that would enhance the Rapid Carbon Assessment initiative
  - Urban/suburban data collection
  - Landscape and landuse
  - Sample archive
  - Carbon fractions and meaning
  - Urban/suburban data and models
- Urban/suburban distribution, property, and behavior research

South

- Class criteria for gypsum content in soil interpretations.
- The “new soil survey” needs sampling requirements for dynamic soil properties.
- Identify methods to predict variable soil properties from less costly measures.
- Identify known elements of groundwater Spodosol formation and landscape models
- Evaluate and identify ways to integrate soil spectroscopy tools into soil survey activities.

South – Additional Priorities

- Validating soil hydraulic properties on benchmark soils
- How does climate change affect soil properties? – water tables, Vertisols cracking
- Soil properties to define oxyaquic?
- Relict features are not well-defined, especially for seasonal high water tables.
- Urban soils
- Predicting compaction, relating to runoff
- Storm water design -- how and where to evaluate the soil (A vs B vs C horizon etc)
- Low-impact development; objective is to maintain hydrology
- Very fine sands – distinctions between vfs and silt
- Urban development and its effect on surface and drinking water quantity, quality, and distribution
- Loss of prime farmland soils
- Wastewater treatment and dispersal
- Fate and transport of pollutants in both terrestrial and subaqueous environments
- Data mining from the Soil Mechanics lab
- Reinvigorate the soil geomorphology studies on large-scale physiographic, higher land use intensity areas to incorporate new technologies

West

- Construct an atlas or geospatial database of land use history
- Is fractured bedrock or tubular bedrock (limestone), a C horizon? The focus should be on hard bedrock that transmits water as opposed to saprolite which is no longer hard
- Can diffuse reflectance spectroscopy (VisNIRand MIR) be used to characterize andic soil materials and/or ultra-mafic soils?
- Remote sensing techniques for digital soil mapping.
- Differences in properties of playas.
- Rock mulch. A more comprehensive way to describe it, sample it

Charge 3: Rapid Assessment of Soil C

- More than ½ of the locations sampled.
- 80% of the locations sampled by September 30.
- Processing of bulk density samples is on-going as are collection of the VNIR spectra
- Completion of sample processing by March 30, 2012.
- Cooperative agreements were established with various universities for student help in sample collection and processing.
- Needs to help expand inventory and make it more robust include:
  - Samples from or access to long-term tillage and agricultural management research plots
    - Verification of VNIR models
    - place RaCA data in perspective relative to other soil C research results.
  - Soil C data from urban and suburban ecosystems.
  - Data from long term monitoring studies to evaluate rates of change under different management systems or other types of disturbance.
- The VNIR spectrometers will remain in the MOs after the initial soil C data collection is complete
  - May be used for other property evaluations

Charge 4: Funding Opportunities

- Soil Survey Division has made a limited amount of funds available for competitive research projects in 2011 to address priority areas
  - Expected to continue in future years as the budget allows
- Other?

Charge 5: Task Force Updates

- Benchmark Soils and Landscapes in Soil Survey
  - Benchmark list is being continually revised
  - Benchmark pedons are being sampled for characterization and other properties including Ksat and infiltration rate
  - Data from 8 university characterization programs have been incorporated into the NCSS Soil Characterization database.
  - Data from ~20 additional universities are in process
- Gypsum and Expanding Salts in Western States
  - Limited Task Force activity since 2009 NCSS conference.
  - Field trip through Colorado and Nevada in 2010
  - Pedons with salts and gypsum sampled and analyzed
- Open File Task Force
  - Open file system is still on agenda as part of content manager that will be part of NASIS database system
  - NSSC Soil Survey Investigations Report series is available in the interim

Charge 2: Priorities identified at the 2009 NCSS conference

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

Charge 2: Priorities identified at the 2009 NCSS conference

- Regional issues
  - Urban/suburban interpretations
  - Aquods - genesis, landscape distribution, water table heights
  - Plinthite - landform related processes, water movement, identification (slaking)
  - Anthropogenic soils (mine soils)
- Which of these should be removed from the list and new topics added.
- Should the topics be more or less general?
- Suggestions for new priority research topics?

Soil Systems (Benchmark Landscapes?)

- Limited number of aerially extensive “Soil Systems”
  - Potential for extrapolation of information and knowledge
- Permanent infrastructure
- Soil and landscape relationships intensively evaluated
  - Distribution, genesis, and properties of important horizons and features
  - hydraulic properties
  - digital mapping
  - Ecological sites
  - dynamic soil properties
  - nutrient and soil C distribution and relationships
  - other properties and relationships deemed important for the soil system
- Most evaluations in a relatively small watershed(s) typical for the soil system
- Cooperative effort
  - MLRA Soil Survey Offices
  - University and other agency scientists
  - NSSC
- Outcomes
  - Data and understanding
  - Interpretations
  - Training

Soil Systems (Benchmark Landscapes?)

- Shawnee Hills project as example
  - IL, IN, KY loess covered landscapes
- Urban, subaqueous, drastically disturbed
- Plinthic soils in SE Coastal Plain
  - Millions of acres
  - Soil and plinthite genesis, distribution, properties
  - Seasonal water tables
- 4-6 year projects
- Limited number

Other

- Salinity and sodicity in Great Plains
  - Inconsistently mapped
  - Criteria
  - Measurement methods
  - Expanding problem?

- Other priorities