SAES-224 Multistate Research Activity Accomplishments Report

Project Number & Title	NCERA3 Soil & Landscape Assessment, Function & Interpretation
Period Covered:	October 2017 - September 2018
Date of Report:	January 7, 2019
Annual Meeting Date:	October 4, 2018, University of Illinois Turf Grass Research Center
Participants:	Darrell Schulze, Purdue Univ., Brian Slater, Ohio State Univ., Nic Jelinski, Univ. Minnesota, Kevin McSweeney, Univ. Illinois. Judith Turk, Univ. Nebraska and Mickey Ransom, Univ. Kansas were connected on-line to the meeting *via* Googledocs.

Summary of Annual Meeting Minutes

The prime purpose of the meeting was to develop the framework for the project renewal proposal. This task was largely accomplished during a very productive meeting.
As documented in the renewal request, the project proposes several new and revised objectives. The renewal request document is currently under review.

In light of some of the new objectives that will incorporate use of the SoilExporer tool (Soil Explorer.net) developed by Prof. Darrell Schulze and colleagues, the committee is exploring holding its next meeting at Purdue University.

Discussion continued (from last year's meeting) about developing regional and international field experiences for students. Members discussed the institutional barriers that frustrate such initiatives including credit transfer, trip insurance and timing.

Efforts to increase membership are promising with the addition of Judith Turk, University of Nebraska, Alfred Hartemink, University of Wisconsin, Colby Molberg, Kansas State University, and Nic Jelinski, University of Minnesota. At this point, the committee lacks representation from North Dakota and Michigan.

Accomplishments

NCERA-3 members throughout the region are active in providing academic support for the National Cooperative Soil Survey Program, and advancing the science of functioning soil landscapes. Activities include research projects, teaching and mentoring of undergraduate and graduate students, and extension and outreach to a wide range or stakeholders, in addition to general support for ongoing soil survey activities in each state. Although the committee membership is regional members contribute substantive work to the development of soil taxonomy and pedology at the national level (serving on NRCS Advisory Committees and Soil Taxonomy Working Groups). Refereed publications (see attached appendix) reflect an

appreciable number of reports on international studies that are valuable for testing and refining concepts of Soil Taxonomy and provide distinctive opportunities to broaden pedology research, outreach and student training beyond the USA.

Accomplishments include:

1. Continued integration of experiment station and university laboratory pedon descriptions and soil property data into NRCS's national data base.
2. Updating and improving yield predictions and/or soil productivity indices for major crops in a number of States. These data are critical to management decisions and even taxation decisions in some states.

3. Measuring soil dynamic properties and gaining understanding of soil change under a variety of management scenarios.

4. Development of new technologies for soil mapping (Digital Soil Mapping), soil morphology (Digital Soil Morphometrics), and Classification.

5. Extending soil survey to urban and other highly managed or disturbed environments.

6. Evaluation of amendments such as biochar and gypsum as well as waste products and documenting how they affect pedology and land management.

7. Contributions to the assessment of soil quality and soil health.

8. Development of new techniques to measure soil change, across multiple scales from new remote sensing technologies for measuring tillage intensity to micromorphological analyses for measuring erosion impacts.

Impacts:

1. NCERA university cooperators continue to provide a significant role in coordination and planning of ongoing soil survey activities, mainly directed towards improvement and updates of accessible soil survey information in National data bases. The focus is on properties important for land use and management decisions.

2. University, NRCS and other cooperating agencies are working together in a number of states to develop better understanding of specific soil-landscape relationships to improve and update soil surveys. These projects include efforts to characterize benchmark soils and catenas, contributions to research on nutrient loading and development of calibrated P-indices, and Digital Soil Mapping.

3. In a major education-focused project, state wide maps of a variety of soil features such as soil parent materials have been produced for a number of states in the east of the region and integrated into an online and tablet system for field use by students and others.

4. Projects in all states aim to continue to improve the science behind soil assessment and interpretations. Continuing projects include new developments in Digital Soil Mapping, methods for more rapid and accurate soil attribute prediction, effects of land use and management on soil carbon stocks, evaluation of soil moisture sensors for monitoring hydrology and controlling wastewater application within onsite systems, effects of soil amendments on soil health, tillage impacts on soil properties such as soil compaction and on crop yields and product quality.

5. NCERA-3 members and universities continue to provide quality educational programs at undergraduate level. Each state reported noteworthy research, exceptional teaching of pedology and related areas including soil judging and meaningful outreach programs. Example successes include many refereed publications (see list below), thousands of student credit hours in soil science extension publication related to pedology. In addition, members provided a wide range of services to new stakeholders and clients locally, regionally, nationally and internationally.

6. NCERA-3 members continue to work with a broad range of other disciplines to enhance access to high quality information about the soil resource, and to help the public understand the value of the soil resource and to avail the valuable tools for aiding responsible decisions about natural resource management. Notably, colleagues engaged in regional crop, forest, rangeland and climate modeling are consistent users of soil survey information and engage in discussion with our members about access, use and interpretation of soil survey information.

Attached File: Referred Publications, Journal Articles and Book Chapters