NCERA-3 Annual Meeting Minutes and State Reports
June 13 - 14, 2010

2010-2014 Project title: Soil & Landscape Assessment, Functions & Interpretations

Location of meeting: 333 Kottman Hall, The Ohio State University

Minutes – June 13, 2010

Members Present
James Crum (MI), David Hopkins (ND – Chair), Mark Kuzila (NE), Maxine Levin (NCSS Liaison), Jerry Miller (Administrative Adviser), Ken Olson (IL), Phillip Owens (IN), Mickey Ransom (KS), Brian Slater (OH – Host), Larry West (USDA-NRCS Representative), Lee Burras (IA– secretary)

Members Absent

Andrew Sharpley (AR), A.D. Karathanasis (KY), Terry Cooper (MN), Douglas Malo (SD)

Guests Present

Randy Miles (MO)

Dr. Hopkins called the meeting to order at 3:15 pm. Dr. Olson and Dr. Kuzila moved and seconded, respectively, approval of the 2009 minutes. Motion passed unanimously.

Dr. Hopkins asked Dr. Miller for the Administrative Adviser Report at 3:20 pm.

Dr. Miller asked each participant to review an information sheet that lists each of our names, emails and such in order to insure he (Dr. Miller) has accurate contact information. Then Dr. Miller reported:

(1) Our project has been approved by NIMS for 2010-2014. Our project is entitled "Soil & Landscape Assessment, Functions & Interpretations." Dr. Miller reminded us to tie all of our outcomes to the project objectives. He cautioned the NCERA-3 secretary to create final minutes that integrate individual State Reports to show multistate effort. He reminded the entire committee that Subcommittees should have charges consistent with project objectives. He noted that our reports are reviewed by the Department Chairs from the North Central Region and they assess our impact based on how well we show deliverables matching our objectives. Dr. Owens asked how much latitude we have in terms of "multistate" work. Drs. Miller, West, Olson and others pointed out we have many valid options to illustrate the multistate nature of our collaborations and impacts. Drs. West and Miles specifically used the PEDONPC project as an example of multistate collaboration and impact. This project uses funds provided by the NCSS to the universities in order to get university pedons into the national database, PedonPC. In the case of the University of Missouri over 3,000 pedons have been added to PedonPC.

(2) NIFA has five objectives, none of which is directly soil survey related but several of which rely on good soils knowledge – either directly or indirectly. As a result he suggests we need to be creative in showing our relevance. As additional background, Dr.

Miller told us that Cathie Woteki is likely to become the new Undersecretary of Agriculture responsible for Research, Education, and Economics (REE). Her background is food science although she is highly cognizant of the Land Grant Mission and historical importance of Soil Survey.

Drs. Ransom and Olson then asked questions regarding NIFA research priorities, reviews, and conflict forms. Dr. Miller pointed out that our work remains important to current research priorities albeit not directly mentioned as a priority by NIFA or Dr. Woteki. In addition, Dr. Miller noted that "Big ideas get big money for five years" in the current funding model of NIFA. Hence, he encouraged us to participate with colleagues in multi-disciplinary research that uses our knowledge while letting us fund our own work. Dr. Ransom suggested we add a "Multistate Collaborations" to our State Report form. His idea was well received by the group.

At about 3:50 pm Dr. Burras asked Dr. Miller, "Why do we have NCERA-3?" In part he asked this in light of the ambiguity to which soil survey is seemingly viewed by NIFA and our respective university administrations. He received replies from Dr. Miller and many of the other scientists with the two most common ones being (a) Hatch funding mandates we cooperate and collaborate to insure soil survey succeeds for society, and (b) NCERA-3 provides a unique opportunity for agency and university scientists and administrators to discuss critical issues in order to insure state of the art research, outreach, and teaching occurs across the North Central Region. Several members stressed it is important that we all understand each other as well as our historical mandates if are to take our science forward.

At 4:00 pm, Dr. Hopkins asked Dr. West for the USDA-NRCS Report.

Dr. West reported:

(1) The USDA-NRCS National Soil Survey Center (NSSC) is undergoing significant personnel and responsibility changes. Specifically,
   a. Jon Hempel is now the Director, following Karl Hipple's interim directorship and Bob Ahrens' long-term directorship.
   b. Karl Hipple retired in January 2010. Dr. Levin is temporarily serving as the National Leader for Soil Interpretations as well as fulfilling her traditional responsibilities. The permanent position is open.
   c. Craig Ditzler retired quite suddenly from his position as National Leader for Soil Standards to become Director of the Soil Survey of the United Arab Emirates. Mark Crouch is acting Leader.
   d. Several other leading NRCS Soil Survey personnel across the USA are likely to retire in the foreseeable future.
   e. Other leadership positions and research positions are being created or opening due to changes in personnel and priorities.

(2) NSCC has expanding responsibilities, e.g.,
   a. Geospatial Laboratory in West Virginia is now part of the NSSC.
   b. Ecological Site Indexing.
   c. Soil Quality.

(3) NSSC is examining K and T to insure they are accurate. It has been documented that individual states are handling K and T differently yet a national standard is needed because of federal programs.

(4) Several publications are being updated and considered for updates. For example, Keys to Soil Taxonomy (11th Edition) just came out. A 3rd edition of the field manual should be available soon. It will have increased explanations of dynamic soil properties. The Soil Survey Manual is considered for updating since the current manual was published in 1991. It is possible any new manual will be written by a variety of authors across all of the NCSS. NRCS has interest in updating Soil Taxonomy to include a more international approach.

(5) NSCC education activities and plans regarding education include:
   a. Offering 12 regular training courses with four of them being distance courses.
   b. Possibly training private sector scientists. Dr. West reported NSCC is currently trying to determine a best means to insure all soil scientists have access to NSCC expertise and standards. It is likely future NSCC courses will be more widely available on a fee basis. This will tie into possible mapping certification needs and standards.
   c. Sponsoring university-hosted Soil Geomorphology Institutes and Soil Science Institutes with the former being offered on even years and the latter being offered on odd years. Currently the University of California Davis is hosting the Soil Geomorphology Institute. Next year Kansas State University is expecting to host the Soil Science Institute.

(6) NSCC is working extensively in SOC and Soil Quality as well as extending its work in wetland sampling and methods. It is doing the latter with EPA. In each case, Dr. West reports that NSCC Research Scientists are charged with examining all relevant approaches in order to insure a suite of approaches are available and understood.

(7) NSCC is seeking to expand its understanding of:
   a. Impact on mitigating soil salinity including any that might occur in the North Central Region.
   b. Soil moisture regimes and soil temperature regimes.
   c. Models that include soils knowledge and are used across any aspect of natural resource planning and environmental quality.

(8) Dr. West is funding four university projects annually at $40,000/project. Current projects are looking at vesicular horizons, spodic horizons, hydraulic conductivity, etc. Dr. West plans to continue funding research at universities to the very best of his ability because he recognizes such work advances all of pedology and exemplifies the “cooperative” mandate of our mission. Drs. West and Levin point out the Conservation Innovation Grant (CIG) program is increasingly recognizing soil survey work and they encourage all of us to apply for the $160 million appropriated to that program. Considerable discussion on this point occurred with Drs. Hopkins, Slater, Burras, Ransom, Miles, Miller and others offering ideas and input.

Dr. Miles asked Dr. West about archiving university soil samples. Dr. Miles noted he currently has Sanborn samples. Dr. West noted NSCC has 180,000 archived samples of their own. They are open to university samples as space and time permits. Considerable addition discussion followed. Dr. Slater noted the difficulties The Ohio State University has had in long-term storage. Dr. Kuzila suggested we may want to link with a USGS geological specimen archiving program.

Dr. Hopkins asked Dr. Levin to give her report at 4:55 pm.

Dr. Levin reported:

(1) It is the goal of the NCSS to be open and accessible to all relevant scientists. She noted that the 2010 meeting in Las Cruces lived up to that goal, being widely attended by many non-soil survey personnel. Their reports are available in the Las Cruces proceedings.
(2) It is likely in 2011 that the NCSS National Meeting will be in conjunction with the National Consulting Soil Scientist meeting. The NCSS meeting will be in mid to late May in Ashville, NC.
(3) Three other regional meetings have occurred/will occur:
    a. Northeast Cooperative Soil Survey meeting was last week
    b. Western Cooperative Soil Survey meeting will be next week in Las Vegas,
    c. Southern Cooperative Soil Survey meeting will be later this summer in College Station, TX.
(4) Our goal should be to be "5 years ahead" and that regional and national conferences should feed off of one another to insure our knowledge advances rapidly enough to serve society while insuring new ideas are validated before they need to be used.
(5) Examples of major issues being addressed in the pedology world are:
    a. Soil risk associated with natural gas exploration in Northern Appalachia,
    b. Mapping improvements in Africa (global soils), Spain (moisture/temperature regimes), Haiti (general mapping) and Italy (GIS).
(6) Dr. Levin noted some interesting projects occurring with terroir in Pennsylvania. Dr. Miller reminded the group of Farm Bill mandates in research funding on specialty crops as well as biofuels and organic agriculture. Dr. Levin noted a need for better understanding of corrosion as well as K and T, which tied into Dr. West's earlier comments. Across the board, Dr. Levin stressed the need for science-based criteria that continues to be rigorously tested.

Dr. Levin concluded her report at 5:30 pm.

Dr. Hopkins adjourned the meeting at 5:35 pm. The meeting was scheduled to reconvene at 8 am on June 14, 2010.

Minutes – June 14, 2010

Attending

Mark Crouch (USDA-NRCS guest) James Crum (MSU), David Hopkins (NDSU – Chair), Mark Kuzila (UNL), Maxine Levin (NCSS Liaison), Randy Miles (UM guest), Jerry Miller (Administrative Adviser), Ken Olson (UI), Phillip Owens (PU), Mickey Ransom (KSU), Brian Slater (OSU – Host), Larry West (USDA-NRCS Representative), Lee Burras (ISU – secretary)

Absent. Same as those absent on June 13

Dr. Hopkins called the meeting to order at 8:15 pm. He then asked for Committee reports.

(1) The Soil Taxonomy Committee had no report. Dr. Miller asked for clarification regarding membership on that committee. Dr. Olson pointed out that ambiguities exist between how NCERA-3 and NRCS works with taxonomic reviews and updates. Dr. Levin assured the group that NCERA-3 input in taxonomy is valuable, citing the ongoing work in sulfide soil designations originating with NCERA-3.

(2) Dr. Owens reported the High Intensity Soil Survey Committee co-hosted the Scaling Symposium at the 2009 Soil Science Society of America conference in Pittsburgh. Dr. Hopkins asked if the committee should be kept as is or redirected. During the ensuring discussion Dr. Owens suggested it should be kept, using research linking benchmark catenas and digital mapping in MLRA 120 as evidence – beyond the Scaling Symposium – of multistate cooperation. Dr. Miller asked which objective this committee was meeting. Dr. Hopkins said "Objective 3." Dr. Miller, Dr. Levin and others noted there is continued interest in high intensity/modeling soil survey tools and that linkages with the private sector should be encouraged.

(3) The Education and Training Committee had no report, which Dr. West used to segue into a statement that NSSC is deeply interested in the continued training of soil scientists, which is why he encouraged Dr. Crouch to join us. Dr. Crouch asked the group how many NC universities continued to offer a pedology course with some aspect of mapping involved. All university representatives affirmed they do, with most having both pedology and soil judging. Drs. Crouch, West and Levin thanked the universities for doing so while pointing out that NSSC has a growing concern that new hires are getting too little practical field experience. Dr. Crouch noted NRCS soil scientists are ideally proficient at pedon descriptions, landscape identification and interpretation, stratigraphy, surficial processes, hydrology, traditional mapping, and cartography. Dr. Slater suggested that 21st century soil survey requires they also have firm understanding of GIS and spatial variability models. Several members noted that soil judging gives many of these skills. Dr. Burras concurred but pointed out that no curriculum and no hiring system will succeed if it is centered around soil judging – and that it is remiss of universities and the NRCS to limit their hiring based on a course that most universities tremendously limit enrollment to, especially given the robust nature of many other field courses and field-based programs (e.g., field laboratories offered by geology, geography and environmental science programs). Dr. Levin noted the strength of the University of California field course popularly known as "Soils 105." Dr. Slater noted he is preparing to create and teach a three-week long immersion course on soils. Dr. Crum and Dr. Owens expressed interest in seeing the course being offered across the eastern north-central region.

Considerable discussion ensued ranging from technical course content questions to practical curriculum and placement issues. Dr. Kuzila, Dr. Crouch and Dr. West suggested that some of the placement needs concern the fact that:

(a) NRCS has a weak system for hiring and placing interns,
(b) Potential employers who actually get student interns into the field the most win – and increasingly that is difficult for field offices to do with their interns, given specific program work with NASIS or other activities.

Dr. West noted that a good intern and beginning employee is a good employee for 35 years. Dr. Burras suggested that if NRCS is serious about wanting to hire the best people that federal hiring practices need to become more adept – and they need to recognize new courses as being soil survey suitable in a timely manner. His experience has been that personnel protocols lag far behind State Soil Scientist goals. As a result, he rarely sees any of his 60-plus advisees placed with NRCS even though many of them list NRCS as their preferred employer. He said his best advisees routinely have three or

more internship offers before OPM even confirms that NRCS internships will be available.

Dr. Levin asked "what can NRCS do to be both more competitive for students and facilitate a continued in field-based education in curricula?" The university representatives replied that Deans and Curriculum Chairs respond to quality and quantity. It was agreed NRCS needs to educate Deans of Agriculture, Natural Resources and Environment that NRCS defines and sets the legal standards associated with soils use and knowledge.

It was agreed this committee is essential. The new Education & Extension Committee membership is Drs. Slater (chair), Owens, Miles, and Crouch.

(4) Dr. Olson reported the Effective Management of Soils Committee co-hosted the Soil Carbon and Greenhouse Gases Symposium at the 2009 Soil Science Society of America Conference, Pittsburgh. Sixty-six presentations were given over the three sessions of the symposium with the audience size being as large as 200. Dr. Miller commended Dr. Olson for this success and accomplishment. He then reminded all of us that offering a symposium is one important multi-state activity but in itself is of limited impact. He noted publications resulting from the symposium are needed to show "outcomes."

Dr. Miles reported two other effective management research presentations were made by him and coauthors at Pittsburgh. One was on the Sanborn Plots at the University of Missouri. The other was examining active carbon.

Dr. Levin noted that SSSA symposia often result in new NRCS initiatives and new USDA funding opportunities. She encouraged our committees to be very active in all steps of this process. Dr. Olson noted that the effective management symposia "started here (with NCERA-3)," Dr. Olson further noted soil carbon sequestration continues to be a critical issue, with this group needing to set standards and guidelines for effective research practices.

(5) Dr. Ransom reported the Research Committee will meet later this week. Dr. Miller asked Dr. West if there were any action items from the previous year. Dr. Levin reported the Rapid Assessment of Carbon is an accomplishment for this group. Dr. West agreed, noting new research thrusts come from these meetings. He noted that active carbon, salinity, soil quality and integration of pedons through PedonPC are all accomplishments. He noted that Dr. Miles has added over 3,000 pedons from the University of Missouri into the national database.

Drs. Hopkins and Olson asked for clarification on subcommittees and their membership. The discussion led to the following committee assignments:

(a) Education, Extension & Recruitment: Slater (chair), Crum, Owens, Miles, Crouch.
(b) High Intensity Soil Survey: Owens (chair), Kuzila, Miles, Hopkins.
(c) Effective Management of Soils: Olson (chair), Malo, Ransom.

During this clarification many side bars occurred, most of which these minutes fail to capture. Dr. Levin stressed NCERA-3 needs to be involved in review of – and standard setting for - Dynamic Soil Properties (DSP) and for data mining. Drs. Owens and Olson gave supporting

examples of where this is important. Dr. West and Kuzila noted Nebraska is very active in working with DSP and benchmark soils. Dr. Levin noted that that "state and transition models" need to be investigated and included in investigations.

Dr. West said – specifically for the minutes – "From a conservation management perspective, NRCS will use Ecological Site Assessments, with the point being the Range Scientists do these very well. They include assessments of the state of the site and its ability to improve with better management. The Forest Scientists, e.g., in Ohio, also do this very well. The weakness, currently, is with agronomists. We need to get agronomists trained to document and assess management expectations relative to dynamic soil properties. We need to learn and identify transition states in agronomic systems." He further noted "This is a protocol for whole packages so we will know changes caused by management and can predict which management decisions will result in the soil and landscape properties we want. It needs to be an ecosystem package. It is what we are doing as an agency. He concluded with "We – NRCS – need to sell systems that have ecosystem services. We need to be able to predict what any given management will do in terms of changing soils and changing wildlife and changing water quality and changing etc, etc. It must be a whole package."

Dr. Olson suggested method identification and agreement is the key. Dr. Levin said we need to create soil change guides wherein we have protocols that let us scientifically trade time for space. Dr. Hopkins noted this is what pedologists have always done.

Dr. Hopkins called for a break at 10:30; meeting reconvened at 10:45.

Dr. Kuzila stated we need an annual topic of mutual interest to anchor our committee around one of our objectives and insure we meet our responsibilities. He suggested we should agree to prepare a state-by-state extension-style report using a standard format on a single theme. Drs. Owen and Hopkins stated their support for this. Dr. Miles proposed it should be "Role of Soils in On-Site Waste Water." Dr. Olson noted this fits into our education committee. Dr. Miller advocates we create a very simple fact sheet that documents the role of soil in wastewater treatment. It should be an awareness-raising document of the major role soils play. All agreed it is a good idea.

Dr. Miles asked "Do we need an Interpretations Committee?" Considerable discussion followed, with all agreeing that interpretations are a critical area of knowledge that we offer. The upshot is we created a Interpretations Committee. The chair is Dr. Miles and other committee members are Drs. Crum and Hopkins.

Discussions of other committee charges continued, especially with respect to databases and global soil maps.

Old Business

Several old business topics were briefly discussed.

Concluding actions

Dr. Olson moved that for FY11 that Dr. Phillip Owens is Chair, Dr. Lee Burras is Chair-elect, Dr.Doug Malo is Secretary, and Dr. Brian Slater is Secretary-elect. Dr. Owens seconded the motion. Motion passed unanimously.

Dr. Olson moved – and Dr. Ransom seconded – that NCERA-3 meet next year in conjunction with the National Cooperative Soil Survey Conference in North Carolina. Motion passed unanimously.

Dr. Hopkins adjourned the meeting at 11:30

Submitted by:

Lee Burras, Secretary, 2010

Approved:

David Hopkins
NCERA-3
Chair, 2010

Gerald Miller
NCERA-3
Administrative Advisor, 2010

NCERA-3
Iowa State Report
2010

Academic Unit: Iowa State University

Name: C. Lee Burras, Thomas E. Fenton (*emeritus*), Gerald A. Miller, Andrew Manu, Jonathon Sandor

Summary of Report:
Four active faculty members, one emeritus faculty member, one staff member and four graduate students from Iowa State University are involved in the Iowa Cooperative Soil Survey. Faculty are Jerry Miller, land use and extension, Andrew Manu, GIS and landscape analysis, Jon Sandor, pedology teaching and soil judging, and Lee Burras, experiment station coordinator for soil survey. In addition, Tom Fenton graciously continues to play an important role as an *emeritus professor*. The staff member and graduate students are Mostafa Ibrahim, Soil Characterization Laboratory; James Jordan, Landscape Analysis Laboratory; David Keninger, soil productivity; Brad Oneal, ISPAID; and Jessica Veenstra, education and basic pedology. Collectively these 10 individuals work through Mike Sucik, State Soil Scientist, NRCS, and his staff - as well as representatives from a variety of state and local agencies - to implement the program.

Program highlights include:
- All 99 counties have modern soil surveys and are on line at the Iowa Cooperative Soil Survey website (http://icss.agron.iastate.edu/). These same surveys are available through Web Soil Survey and the Soil Data Mart. Hard copies are distributed on a limited basis, being printed and organized by the NRCS State Soils Staff.
- NRCS soil scientists are using an integrated county-MLRA approach in order to provide improved local and regional understanding of soils and supporting data. Surveys are in MLRA 103, 104, 107, 108 and 109.

Ongoing Research Activities:
- Quantifying the pedological impact of the past fifty years on selected soil series of Iowa - Jessica Veenstra, PhD candidate, defending on July 02 and becoming an Assistant Professor, Flagler College, September 01, 2010.
- Quantifying the role of silica in pedon horizonation - Mostafa Ibrahim, PhD candidate, expected completion Summer 2011.
- Spatial variability in soils of Iowa - James Jordan, expected completion Summer 2011.
- Using corn and soybean yield maps to evaluate CSR and soil productivity – David Keninger, MS student, expected completion Summer 2011.

Outreach and Extension Development (Calendar Year 2009)
Veenstra, J.J. February 6, 2009. Carbon Sequestration 101, Practical Farmers of Iowa Cooperators' Meeting, Ames, IA

Veenstra, J. J. June 3, 2009. Understanding Planet Earth: Environmental Science. Soil and

Water. Wesley Acres Retirement Home.

Burras, L. September 24, 2009. Soil productivity and corn suitability ratings in Iowa. Iowa State University Extension Agronomist In-Service Workshop.

Miller, G.A. and J.J. Veenstra. September 24, 2009. Describing soil profiles to understand drainage and growth. Iowa State University Extension Agronomist In-Service Workshop.

Miller, G.A., T.E. Fenton & J.J. Veenstra. October 09-10. Iowa FFA Soil Judging Contest, 150 attendees, 30 high schools, Ames.

Burras, C.L. September 07, 2009. Pedologic & hydrologic context for Midwest agriculture. Food, Energy & Life in Iowa.

Publications (2009):

Peer-reviewed: 1; chapters: 1, abstracts: 5; Dissertations/theses: 1; research reports: 1; popular reports: 1.

Peer-reviewed

Veenstra, J.J., D. Dembe, J. Nsamba, L. Wasko, C.L. Burras, G. Nonnecke, B. Orum, S. Downie, and R. Cox. 2009. Mapping Soils in Central Uganda. Soil Survey Horizons 50:30-34.

Book-chapters

Sauer, T.J., C.L. Burras and Y.G. Chendev. 2009. Dynamics of forest areas within a basin of the Iowa River, USA, from 1972 to 2008. Y. Chendev (Ed.) Proc. Climate Change, Soils & Environment., Belgorod State University, Belgorod, Russia. p. 162-169

Abstracts

Burras, C.L., Y. Chendev, and T.J. Sauer. 2009. Evolution of an Alfisol into a Mollisol with 150 years of cropping in Iowa. ASA-CSSA-SSSA Annual Meeting Abstracts 54227.

Konen, M.E. and C.L. Burras. 2009. Quantification of soil carbon stocks in the field – some anthropedogeomorphic issues from the corn belt. ASA-CSSA-SSSA Annual Meetings Abstracts 53735.

Oneal, B.A. and C.L. Burras, T. Papanicolaou, M. Ibrahim and J.J. Veenstra. 2009. Quaternary stratigraphy and pedology of Clear Creek Watershed, Iowa County, Iowa. ASA-CSSA-SSSA Annual Meetings Abstracts 54718.

Veenstra, J.J. and C.L. Burras. 2009. Do "typical" pedons change with 50 years of low intensity land use? ASA-CSSA-SSSA Annual Meetings Abstracts 53254.

Veenstra, J.J. and C.L. Burras. Has Soil Changed in Iowa after 50 Years of Agriculture? Henry A. Wallace Chair for Sustainable Agriculture Advisory Committee Meeting, Iowa State University, November 9, 2009

Dissertations/Theses

Oneal, Brad. 2009. Quaternary stratigraphy and pedology of Clear Creek watershed, Iowa County, Iowa. Unpubl. MS thesis. 205.

Research Reports

Papanicolaou, A.N., C. L. Burras, M. Elhakeem and C. Wilson. 2009. Hydropedological investigations on a benchmark catena: Performance of semi-automated measurements of Ksat via different sensors under different hydrologic and land management conditions. Technical Report, USDA-NRCS Nat'l. Soil Survey Center (USDA contract number 68-3H75-3-122). 59 p.

Popular Reports

Burras, C.L. 2009. Soils and their degradation in Iowa – an eclectic overview. Getting into Soil & Water. The Soil & Water Conservation Club & The Iowa Water Center, Iowa State University - University Extension, p. 16.

Courses Taught (Academic Year 2009-2010)

- Fundamentals of Soil Science (Manu);
- Soils & Environmental Quality (Burras);
- Field Experience in Soil Descriptions (Veenstra & Jordan),
- Soil Formation & Landscape Relationships (Veenstra);

NCERA-3
Illinois State Report
2010

Academic Unit: NRES, ACES, UIUC, Illinois

Name: Kenneth R. Olson

Summary of: Continue to represent the UIUC at Soil Survey conferences at the state, regional, and national levels. My research activity related to NCERA-3 includes: soil productivity-erosion relationships, evaluation of conservation tillage systems for restoration of productivity, crop yield prediction by soil type, and quantification of erosion rates. The effects of tillage on soil carbon sequestration is also being studied on sloping and eroding, low productivity soils in southern Illinois and on highly productive soils in west-central IL. Crop yields trends over time are also being monitored at these sites. An ongoing research project related to land degradation links teams of soil scientists from UIUC with Moscow State University (Russia) geographers. Co-organizer of the Symposium on Soil Carbon and Green House Gas Dynamics in Agricultural Lands to be held at 2009 SSSA meeting in Pittsburgh, PA. Symposium was co-sponsored by NCERA-3.

Research Activities:

- Productivity index ratings for new Illinois soils and crop yield updates for established soils
- Impacts of long term tillage on soil properties and crop yields
- Assessing soil erosion and deposition in Illinois landscapes
- NC-1178 Impacts of Crop Residue Removal for Biofuels on Soils.

Outreach and Extension Development:

- North Central soil Survey Conference Soil Taxonomy and Standards Committee
- Illinois Farmland Assessment Technical Advisory Committee

Publications (*number of peer-reviewed (3), symposia (1), reports (0), and abstracts (2)*

Lowery, B.C. Cox, D. Lemke, P. Nowak, K R. Olson and J. Strock. 2009. The 2008 Midwest flooding impact on Soil Erosion and Water Quality: Implications for Soil Erosion control practices. Journal Soil Water Conservation. 64:166A.

Olson, K.R. 2009. Impacts of 2008 Flooding on Agricultural Lands in Illinois, Missouri and Indiana. Journal Soil Water Conservation.64:167A-171A.

Olson, K. R., S. A. Ebelhar and J.M. Lang. 2010. Cover crop effects on crop yields and soil organic carbon content. Soil Science 175:89-98.

Courses taught (*titles*):

Co-taught Introductory Soils (NRES 201) - 70 students
Soil and Water Conservation and Management (NRES 474) on campus -24 students

NCERA-3
Indiana State Report
2009

Academic Unit: Purdue University
Names: Phillip Owens

Summary of Report:
All 92 Indiana counties have been initially surveyed, have published soil survey reports, and are now digitized and available online at the Soil Data Mart and Web Soil Survey. Twelve counties have been updated at a scale of 1:12,000 and updates are near completion in two additional counties. The 12 completed update surveys have been published with hard copy manuscripts, Soil Survey CD's, and hard copy soil maps available. All 92 counties are released on an interactive CD as Soil Survey Interim Reports. 54 Historical Replica Soil Survey publications covering 58 counties are online at the NRCS Indiana State Web Site: http://www.in.nrcs.usda.gov/mlra11/manuscript_publications/Manuscripts.html.
Maintenance to soil surveys in Indiana is now being done on a MLRA and landform basis. Indiana is now serviced by 9 MLRA Soil Survey Offices in five states. Additionally, Indiana NRCS soil scientists are collaborating with Purdue University testing the efficacy of using terrain attributes with SoLIM as a tool for updating soil surveys.

NRCS currently has 20 soil scientists working in Indiana as follows: 4 Resource Soil Scientists (1 vacant currently); 1 Soil Scientist on the Planning & Technology Staff at the Indiana State Office, 9 Soil Scientists and 1 part time graduate student working on project Soil Surveys in two MLRA Soil Survey Offices and 2 subset soil survey offices; and 6 Soil Scientists in the MLRA Soil Survey Region 11 Office.

Research Activities:

- Regional benchmark catena study covering MLRA 120A and 120B covering parts of Indiana, Illinois and Kentucky. This project is focused on hydropedologic processes which impact soil development.
- Characterizing the usefulness of soil landscape inference models coupled with terrain attributes on low relief topography for digital mapping.
- Determining the relationship of seasonal water tables and hydraulic conductivity in benchmark soils within small watersheds to predict soil hydrology and related pedological features.
- Quantification of spatial variability of soil properties and trace elements within benchmark catenas using maps created by soil evaluations, digital elevation models, remote sensing and geostatistics.
- Landscape scale assessment of soil processes and pedochemical tracers across watersheds.
- Characterize the hydraulic conductivity variations between the concentric series of recessional moraines formed from the Erie-Ontario glacial lobe in northeastern Indiana.
- Assessing the potential for acid sulfate weathering in NW Indiana glacial outwash.

Outreach and Extension Development:

- National Soil Survey Advisory Committee, 2008-present

- Chair of Hydropedology Working Group 2008-present with SSSA Division S-05
- NCR-3 Chair of the Research Needs Committee, 2010-present
- President Elect – Indiana Association of Professional Soil Classifiers

Classes: Introduction to Soil Morphology (AGRY 565), Soil Morphology Geography, Soils Genesis and Classification (AGRY 655), Field Techniques in Soil Science (AGRY 598)

Publications: Research: 9, Book Chapter: 0, Abstracts: 9, Extension Bulletins: 3, Non-peer reviewed publications: 4

Peer Reviewed Publications:

1. Basu, N.B., P.S.C. Rao, H. E. Winzeler, S. Kumar, P. R. **Owens**, and V. Merwade. 2010. Parsimonious modeling of hydrologic responses in engineered watersheds: Structural heterogeneity vs. functional homogeneity. Water Resources Research. 46: W04501. http://www.agu.org/journals/wr/wr1004/2009WR007803/

2. Armstrong, S.A., D.R. Smith and P.R. **Owens**. 2010. Transport and fate of phosphorus during and after manure spill simulations. Journal of Environmental Quality. 39:1-8.

3. Armstrong, S.D., D.R. Smith, P.R. **Owens**, B.C. Joern and C. Williams. 2009. Manure spills in streams: current practices and remediation methods to minimize water quality degradation. Journal of Sustainable Agriculture. *In Press*.

4. Farley, A.L., P. R. **Owens**, Z. Libohova, X. B. Wu, S. A. Archer, and L. P. Wilding. 2010. Using GIS as a tool to explore the interaction of Vertic soils and surface hydrology in South Texas playa-wetland systems. Journal of Arid Lands Research. – *In Press*

5. Smith, D.R. and P.R. **Owens**. 2010. Impact of time to first rainfall event on greenhouse gas emissions following manure applications. Communication in Soil Science and Plant Analysis. *In Press*.

6. Nouwakpo, K., C. Huang. L.C. Bowling and P.R. **Owens**. 2010. Pore-water effects on soil erodibility and its implication in ephemeral gully erosion modeling. Soil Science Society of America Journal. *Accepted.*

Abstracts:

1. **Owens**, P.R., Z. Libohova, H.E. Winzeler and Jon Hempel. 2009. Quantifying soil-landscape relationships to create functional maps and methods for scaling soil data. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

2. Schulze, D.G., S. Mitzman, P. R. **Owens**, M. Wigginton and R. Neilson. 2009. A dominant soil parent material map for Indiana derived from SSURGO data. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

3. Mitzman, S., D. G. Schulze, P. R. **Owens**, R. Neilson and M. Wigginton. 2009. Interpretive maps of soil properties for Indiana derived from SSURGO data. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

4. Schulze, D.G**.**, S. Mitzman, P. R. **Owens**, L. Unruh Snyder, G. E. Van Scoyoc, J.G. Graveel, G.C. Steinhardt, C.C. Miller, M. Stowell Bracke, R.J. Glotzbach and B. Benes. 2009. Integrating Spatial Educational Experiences (Isee) into crop, soil, and environmental science curricula. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

5. Mitzman, S., D.G. Schulze, P.R. **Owens** and L. Unruh Snyder. 2009. Assessing the effectiveness of mobile GIS on students' ability to identify landforms and predict soil properties in the field. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

6. **Owens**, P.R., Z. Libohova, H.E. Winzeler and J. Hempel. 2009. Quantifying soil-landscape relationships to create functional maps and methods for scaling soil data. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

7. Libohova, Z., P.R. **Owens**, H.E. Winzeler, J. Hempel and D.E. Stott. 2009. Predicting spatial distribution and stability of soil carbon based on soil-landscape models, terrain attributes and remote sensing. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

8. Winzeler, H.E., P.R. **Owens**, K. Norwood, Z. Libohova and J. Hempel. 2009. Terrain attribute soil mapping (TASM) for numerical representation of soil-landscape relationships in creating raster-based soil maps and property maps. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

9. **Owens**, P.R**.,** Z. Libohova, P.J. Schoeneberger, M.A. Wilson and T. Neely. 2009. Hydraulic conductivity and pedogenesis of a benchmark loess catena in southern Indiana. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, SSSA. Madison, WI

10. Libohova, Z. P. **Owens**, L.C. Bowling, K.A. Cherkauer, B.S. Naz, and H.E. Winzeler. 2009. Scale and resolution relationships of soils information with hydrology modeling. Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract NG33B-1091.

11. Schulze, D. G. and P. R. Owens. 2009. Visualizing soil landscapes. p. 11 in Program and Abstracts, Bridging the Centuries: 1909 – 2009 Budapest. Celebration of the legacy of agrogeology and the 100 years of advances in soil sciences – From the Dokuchaev School to numerical soil classifications. 18 September 2009, Gödöllő, Hungary

12. Schulze, D. G., S. Mitzman, P. R. Owens, L. Unruh Snyder, G. E. Van Scoyoc, J. G. Graveel, G. C. Steinhardt, C. C. Miller, M. Stowell Bracke, R. J. Glotzbach and B. Benes. Abstracts. 2009 Integrating spatial educational experiences (Isee) into crop, soil, and environmental science curricula. ASA-CSSA-SSSA 2009 International Annual Meeting, November 1-5, 2009, Pittsburgh, PA. Available online at: http://a-c-s.confex.com/crops/2009am/webprogram/Paper55460.html

Extension Publications

NA

Non-Peer Reviewed Publications

1. Cole, J.R., D.D. Myrold, C.H. Nakatsu, P.R. **Owens**, G. Kowalchuk, C. Tebbe, and J.M. Tiedje. 2010. Development of Soil Metadata Standards for International DNA Sequence Databases. 19th World Soils Congress.

2. Golden, M., E. Micheli, C. Ditzler, H. Eswaran, P. **Owens**, A. McBratney, J. Hempel, L. Montanarella, G. Zang. Time for a Universal Soil Classification System. 19th World Soil Congress.

3. Schulze, D.G., P.R. **Owens**, S. Mitzman, L. Unruh Snyder, G. Van Scoyoc, J.G. Graveel, G.C. Steinhardt, C.C. Miller, M. Stowell Bracke, R.J. Glotzbach, L.A. Kocur, B. Benes, T. Neely, M. Wigginton and R. Nielson. 2010. Isee - Integrating Spatial Educational Experiences into Soil, Crop, and Environmental Sciences. 19th World Soil Congress.

NCERA-3
Kansas State Report
2010

Academic Unit: Kansas State University

Name: Michel D. Ransom, Gerard Kluitenberg, DeAnn Presley

Summary of Report: Updates of soil surveys are done on a multi-county (MLRA) or some other geographical basis. Updates are in progress in MLRA 72, 74, 79, 106, and 112. All updates will be on a 1:12,000 ortho-quad base. Most surveys in Kansas have been published at a scale of 1:20,000 and are not geo-referenced. The hard soil survey publication is not being disturbed to the public. The official soil survey information for Kansas is accessible from the Soil Data Warehouse through the NRCS electronic field office technical guide, Soil Data Mart, or the Web Soil Survey. The soil surveys for all counties in Kansas are digitized up to NRCS standards for SSURGO certification. This work was completed by the Agronomy Department, the Geography Department, and NRCS as part of an effort to develop a statewide GIS. The work was completed in the Geographic Information Systems/Spatial Analysis Laboratory of the Geography Department. The K-State Soil Characterization Laboratory analyzed about 500 grab samples in FY10 for the soil survey program. The Agronomy Department is assisting NRCS with data interpretation and analysis on a project that monitors water table levels and saturated hydraulic conductivity.

Research Activities:

- Genesis and morphology of soils with vertic properties in southeast Kansas and western Missouri
- Clay translocation and carbonate accumulation in central and western Kansas using soil micromorphology
- Distribution and properties of clay minerals in Kansas soils with emphasis on fertility
- Soil genesis and parent material stratigraphy in the Bluestem Hills
- Carbon sequestration using benchmark sites to estimate soil organic C stocks
- Development of a Laser Induced Breakdown Spectroscopy (LIBS) procedure to determine the organic carbon content of soils in the field
- Development of improved procedures for determining soil physical properties, such as saturated hydraulic conductivity, for application to the soil survey program
- Effect of tillage on the hydrology of claypan soils in Kansas
- Cooperative work with NC-1018, Impact of Climate and Soils on Crop Selection and Management and NC-1179, Food, Feed, Fuel, and Fiber: Security Under a Changing Climate

Outreach and Extension Development:

- USDA-NRCS Advisory Panel to the Director of Soil Survey
- National Cooperative Soil Survey Conference Steering Committee
- Kansas Soil Survey Technology and Work Planning Conference
- Soil Science Society of America Soils Geomorphology Committee
- American Society of Agronomy Resident Education Award Committee

Publications (2009-10): Peer-reviewed journal articles: 1; Abstracts: 1; Thesis: 1

Presley, D.R., P.E. Hartley, and M.D. Ransom. 2010. Mineralogy and morphological properties of buried polygenetic paleosols formed in Late Quaternary sediments on upland landscapes of the Central Plains, USA. Geoderma 154:508-517.

Hartley, Paul, Michel D. Ransom, DeAnn Presley, and Larry T. West. 2009. Genesis, mineralogy, and micromorphology of vertic soils in southeastern Kansas. *In* Annual Meetings Abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.

Hartley, Paul. 2010. Genesis, Mineralogy, and Micromorphology of Vertic Soils in Southeastern Kansas. M.S. Thesis, Dept. of Agron., Kansas State University, Manhattan, KS.

Courses taught: Soil Judging, Soil Genesis and Classification, Soil Mineralogy

NCERA-3
Missouri State Report
2010

Academic Unit: School of Natural Resources; College of Agriculture Food and Natural Resources, University of Missouri

Name: Randall J. Miles.

Summary of Report:
Missouri hosts 5 MLRA update and maintenance Soil Survey Offices. Each office is staffed and functional. A cross-section of project activities include:

- National Calculations for T, K, I, Hydrologic Groups, and corrosion interpretations: During the last 1 ½ years, we have seen 3 national bulletins directing us to complete NASIS calculations for several interpretations. Team Leaders reviewed and adjusted the soil property data where we felt comfortable (items we knew were likely in error).
- As with many states Ecological Site Descriptions (ESDs) are becoming more helpful for many of our conservation programs (CSP, EQIP, WRP, and CRP). These programs aim USDA program participants towards restoration or management to native ecosystems. A simple example is native warm season grass prairies in northern Missouri and southern Iowa.
- The drainageway project serves as one of the key "structure" components for defining ESDs. We are separating landscapes (Flood Plains in River Valleys from Upland Drainageways) in NASIS and on our maps.
- Rapid Carbon Assessment Project – As with all offices across the nation, we are gearing up to help sample ~2 sites per county.
- Ongoing work: Wetland delineations; Farm Tours; Soil Judging (FFA and Region 5 college contest in mid-Missouri) and Envirothons

Research and Outreach Activities:

- Planar Barrowing of Soil in a Plains Indian (Mandan) Village (Crystal Frey, graduate student)
- Development of Ecological Land Types in various regions of Missouri (Amber Marshaus, Research Specialist)
- Development of a mobile wastewater treatment unit for a forward mobile military unit (with faculty in Civil and Environmental Engineering faculty)
- Development of onsite wastewater loading rates and assessment of treatment in soils for a new low pressure dosed dispersal technology (Kerry Clark, graduate student)
- Soil development on steep till soils with various aspects and associated vegetation in the Chariton River Hills Ecological Subsection of the Central

Missouri Dissected Till Plains Ecological Section (Amber Marshaus, graduate student)

- Funding for the Missouri Soil Characterization Laboratory from the Missouri Department of Natural Resources is over. Some internal funding has been found for the immediate future.
- Almost 3,000 pedons out of over 9,000 have been loaded into the National Soil Survey Data base
- Continue Decentralized Wastewater Training around the state
- Development of a Cost Decentralized Wastewater Management Options (with members of the Consortium of Institutes for Decentralized Wastewater Treatment)
- Development and application of new methods to indentify and quantify soil redoximorphic features (Kevin O'Donnell graduate student).

Courses taught (includes students under supervision of Pedologist) (*titles*): Soil/Plant Science 2100 (Introduction to Soil Science) two semesters; Soil/Plant Science 2106 (Introduction to Soil Science Lab) two semesters; Soil Science 4320/7320 (Genesis of Soil Landscapes); Soil Judging

Publications: Research 1: Abstracts 4:

Peer Reviewed Publications:

T. Kevin O'Donnell, Keith W. Goyne, Randall J. Miles, Claire Baffaut, Stephen H. Anderson, Kenneth A. Sudduth. Identification and quantification of soil redoximorphic features by digital image processing. Geoderma accepted.

Abstracts

O'Donnell, T. Kevin, Goyne, K.W., Baffaut, C., Anderson, S.H., Miles, R.J., and Sudduth, K. A. 2009. Representative elementary area determinations through digitial photography, image analysis, and soil color. AnMtgsAbsts2009.53891. Soil Science Society of America annual meetings.

O'Donnell, T. Kevin, Goyne, K.W., Baffaut, C., Anderson, S.H., Miles, R.J., and Sudduth, K. A. 2009. Quantification of soil redoximorphic features by standardized color indentification. AnMtgsAbsts2009.53929. Soil Science Society of America annual meetings.

Miles, Randall J. 2009. Soil organic matter on long-term Sanborn Field plots. AnMtgs.Absts2009.51974. American Society of Agronomy annual meetings

Cynthia A. Stiles, R. David Hammer, Richard Ferguson, Larry West, Patty Jones, Kathy Newman, Mark G. Johnson, Joey Shaw, Julie Arriaga, Anita Falen, Paul McDaniel, A.T. O'Geen, John M. Galbraith and Randall J. Miles. 2009. Development and cooperator testing

of an active carbon field kit. AnMtgsAbsts2009.54941. Soil Science Society of America annual meetings.

NCERA-3
Nebraska State Report
2010

Academic Unit: School of Natural Resources, University of Nebraska

Name: Mark Kuzila. Other collaborators at the School of Natural Resources include Matt Joeckel and Paul Hanson.

Summary of Report:
Nebraska hosts 4 MLRA update and maintenance Soil Survey Offices. Each office is staffed and functional. Project activities include: Documenting the levels of salinity along the South Platte River system and also along Salt Creek (Lincoln area) and its tributaries; continued Soil Survey update within MLRA 65; Dynamic Soil Property Study completed on the Kennebec (southeast NE) benchmark soil comparing till, no-till and organic farming management systems; completed data collection with Amoozemeter for K-sat on Kennebec soil; and Dynamic Soil Property study of Moody-Nora soils (northeast NE) planned for Fall/2010. Hiring of resource soil scientists has been completed, bringing total to 5 individuals delivering technical soil services throughout Nebraska. As soils information is updated and improved, the data is posted to a soils data mart, and then made available to the public through the Web Soil Survey.

Research Activities:

- The effect of a transition from prairie to forest ecosystems on soils in Nebraska.
- Geomorphology and ages of terrace landscapes along the Platte River in Central NE.
- Geochemical analysis of soils at 130 sites across Nebraska.
- Soil characteristics at Tern and Plover nesting sites.
- Genesis and morphology of lamella in glacial deposits in southeastern Nebraska.
- Grape production on soils formed in loess and till in southeastern Nebraska

Courses taught (three faculty) (*titles*): Physical Geology (GEOL 101), Earth's Natural Resources (NRES 108), Geologic Natural Hazards (GEOL 110), Elem Physical Geography (GEOG 155), Soil Evaluation (NRES 279), Great Plains Field Pedology (NRES 477/877), Surficial Processes (GEO 458).

Publications: Research: 5, Abstracts: 11

Peer Reviewed Publications:

Powell, L.A., Tyre, A.J., Hygnstrom, S.E., Wedin, D.A., Hanson, P.R., Kuzila, M.S., Swinehart, J.B., 2009, Wilderness serendipity: how to plan and assess learning experiences during an experiential field course, North American Colleges and Teachers of Agriculture Journal

Hanson, P.R., Joeckel, R.M., Young, A.R., and Horn, J., 2009, Late Holocene dune activity in the Eastern Platte River Valley, Nebraska. Geomorphology, v. 103, p. 555-561.

Fischbein, S.A., Joeckel, R.M., and Fielding, C.R., 2009, Fluvial-estuarine reinterpretation of large, isolated sandstone bodies in epicontinental cyclothems, Upper Pennsylvanian, northern Midcontinent, USA, and their significance for understanding late Paleozoic sea-level fluctuations. Sedimentary Geology, v. 216, p. 15-28.

Joeckel, R.M., and Henebry, G.M., 2008, Channel and island change in the lower Platte River, Eastern Nebraska, USA: 1855-2005. Geomorphology, v. 102, p. 407-418.

Korus, J.T., Kvale, E.P., Eriksson, K.A., and Joeckel, R.M., 2008, Compound paleovalley fills in the Lower Pennsylvanian New River Formation, West Virginia, USA. Sedimentary Geology, v. 20, p. 15-26.

Abstracts

Loope, H.M., Mason, J.A., Knox, J.C., Goble, R.J., **Hanson, P.R.,** 2009, Late Wisconsin optical age chronology of fluvial incision and eolian activity in the Upper Mississippi Valley, 6th North American Luminescence Dating and Dosimetry Workshop, Seattle, WA.

Hanson, P.R., Dillon, J.S., Young, A.R., Joeckel, R.M., Kuzila, M.S., 2009, Late Pleistocene eolian deflation features south of the James River Lobe margin, northeastern Nebraska, USA, Geological Society of America Abstracts with Programs 41, p. 620.

Young, A.R., **Hanson, P.R.,** 2009, OSL and IRSL dating of alluvium buried greater than 15 m in the eastern Platte River Valley, Geological Society of America Abstracts with Programs 41, p. 647.

Attig, J.W., **Hanson, P.R.**, Rawling, J.E., III, Young, A.R., Carson, E.C., 2009, Optical ages from ice-marginal lake deposits in the Baraboo Hills indicate the Green Bay Lobe was at its maximum extent about 20,000 years ago, Geological Society of America Abstracts with Programs 41, p. 334.

Halfen, A.F., Spencer, J.Q.G., Johnson, W.C., **Hanson, P.R.,** Young, A.R., 2009, Luminescence ages for dune formation on a Pleistocene terrace of the Kansas River Valley, Geological Society of America Abstracts with Programs 41, p. 382.

Johnson, W.C., **Hanson, P.R.,** Halfen, A.F., Woodburn, T.L., Young, A.R., 2009, Late Holocene dune activation after the Medieval Climate Anomaly in the Arkansas River Valley, south-central Kansas, Geological Society of America Abstracts with Programs 41, p. 382.

Blasi, A., **Hanson, P.R**., Fucks, E., Prieto, A., Young, A.R., 2009, Infrared stimulated luminescence (IRSL) dating of late Pleistocene deposits from the Middle Course of the Lujan River, Argentina, IV Congreso Arentino de Cuaternario y Geomorfologia.

Attig, J.W., **Hanson, P.R**., Young, A.R., Rawling, J.E., III, Carson, E., Hooyer, T.S., 2009, Optically stimulated luminescence ages of four ice-marginal lakes that existed during the maximum extent of the Green Bay Lobe in the Baraboo Hills, Wisconsin, Geological Society of America North Central Section Meeting, Abstracts with Programs Vol. 41, no. 4.

Young, A.R., **Hanson, P.R.**, 2009, Optical dating of sand dunes along the St. Croix River, Northwest Wisconsin, Geological Society of America North Central Section Meeting, Abstracts with Programs Vol. 41, no. 4.

Jacobs, P., Rawling, J.E., III, **Hanson, P.R**., Young, A.R., 2009, A chronosequence of soils developed in eolian sand in the central Wisconsin Sand Plain, Geological Society of America North Central Section Meeting, Abstracts with Programs Vol. 41, no. 4.

Miao, X., **Hanson, P.R.**, Wang, H., Young, A.R., 2009, Timing and implications for sand dune development in the Green River Lowland of Illinois, Upper Midwestern United States, Geological Society of America North Central Section Meeting, Abstracts with Programs Vol. 41, no. 4.

NCERA-3
North Dakota State Report
2010

Academic Unit: Department of Soil Science; School of Natural Resource Sciences
North Dakota State University

Name: David G. Hopkins; Other collaborators in the School of Natural Resources Sciences include Frank Casey, Larry Cihacek, Tom DeSutter, David Franzen, and Shawn DeKeyser, and Laura Overstreet

Summary of Report:
The number of field soil scientists in North Dakota remains static at 11 with three vacancies. A handful of soil scientists went on detail to other states in the 2008 field season and these details will continue in the 2009 field season. The NRCS/ARS salinity study in the northern Red River Valley (MLRA 56) will continue for another two years. Two student interns have been hired for the summer, one from Stevens Point, WI and one from NDSU. Major project plans for the state NRCS staff include developing protocols for mapping strip mined coal lands that have been released from bond in the last few years, evaluating productivity indexes for soils on the northern till plain with a specific emphasis on eroded landscapes, and addressing data needs on sodium and salt affected landscapes in western North Dakota as a result of increased adoption of no-till and minimum tillage practices. The NRCS GIS specialist from the State Office has organized a LIDAR/Landscape Review in Walsh County for late May, 2009. Walsh County is the only county in the state with full LIDAR coverage, and the western part of this county is located in the drift prairie. Improvements in soil landscape interpretation derived from digital soil mapping techniques could be easily extended to other parts of MLRA 55A when more accurate elevation data in made available. North Dakota State University is one of the Land Grant schools involved in the pedon capture program administered by the Soil Survey Laboratory. There are about 700 pedons that can be added to the national database once all the data has verified for accuracy.

Research Activities:

- Devils Lake Basin Joint Water Resource Board: "Devils Lake Water Utilization Test Project" (Terminated 5/31/2010)
- USFS Dakota Prairie Grasslands: "Soil microbiological assessment on reclaimed oil well roads in western North Dakota"
- NRCS; CESU Pending, "Quantifying dispersion potential of North Dakota soils: the role of sodium and soluble salt concentrations"

Outreach and Extension Development:

- "Regional soil properties and lab data". Presented to the Western Crop and Pest Management School, Minot, ND, March 18, 2010
- Prepared an extended soil science demonstration and lecture for a Food, Land and People Educators workshop organized by the ND Farm Bureau; August 11, Fargo.

Publications:

Peer Reviewed

- DeKeyser, E.S., M. Biondini, D. Kirby, and C.L.M. Hargiss. 2009. Low prairie communities of wetlands as a function of disturbance: Physical parameters. Ecological Indicators. Vol. 9 pp. 296-306.
- Hopkins, D., Ulmer, M., and J. Knuteson. 2010. Donald Dean Patterson (1926-2009) -- A composite of our memories. Soil Survey Horizons: Winter; p. 130-132.
- Helms, T.A., R.A. Scott, W.T. Schapaugh, R.J. Goos, D.W. Franzen and A.J. Schlegel. 2010. Soybean iron-deficiency chlorosis tolerance and yield decrease on calcareous soils. Agronomy Journal 102:492-498.
- D.D. Steele, T.F. Scherer, D.G. Hopkins, S.R. Tuscherer, and J. Wright. 2010. Spreadsheet Implementation of Irrigation Scheduling by the Checkbook Method for North Dakota and Minnesota. Applied Engineering in Agriculture. (Accepted)
- Tom M. DeSutter, Guy, A. Viall, E. Podrebarac, F., Rijal, I., Zitnick, K., Murdoff, M., Luciano, R., Koltes, S., Wang, S., Pang, X., Bai, X., Frank X.M. Casey, and David G. Hopkins. 2010. Integrating field-based research into the classroom: An environmental sampling exercise. J. of Natural Res. Life Sci. Educ. (in review)

Book Chapters

- Mikhailova, E., C. Post, L. Cihacek, and M. Ulmer. 2009. Soil Inorganic carbon sequestration as a result of cultivation in the Mollisols. Pg. 129-133 *In* Carbon sequestration and its role in the global carbon cycle. Geophysical Monog. Ser. 183.

Reports

- Steele, D.D., and Hopkins, D.G. 2009. Devils Lake Basin Water Utilization Test Project. Report submitted to the Devils Lake Basin Joint Water Resource Board, 9 June, 2009. Agricultural and Biosystems Engineering Department, North Dakota State University. Fargo. 97 p.
- Saini-Eidukat, B., Hopkins, D., and T. Desutter. 2009. Origin of highly concentrated metals in northeastern North Dakota. Final Report of the NDSU College of Science and Math and ND Agric. Exp. Station Small Grants Program.
- Cihaccek, L. J., B. W. Boten, and E. N. Steadman. 2010. A sampling protocol for monitoring, measurement, and verification of terrestrial carbon sequestration in soils. Energy and Environmental Research Center, Univ. North Dakota.

Theses

- Soil properties affecting oil well access road reclamation in western North Dakota. Heather L. Matthees-Dose, MS Thesis (Co-Advisors Drs. David Hopkins and Frank Casey)
-

Abstracts

- Jyoti, V., Saini-Eidukat,B., Hopkins, D., and T. DeSutter. 2009. Cadmium distribution in soils within the Pembina Escarpment, North Dakota. ND-EPSCoR poster session. North Dakota State University. Fargo.
- Otte M.L., Hopkins D. & Jacob D.L. (2009). (Im)mobilization of multiple elements by plants. In: Burken J.G., Newman L.A., White J.C., Zeeb B.A., Nichols E.G., Zhao D. & Rock S. (Eds.). Abstracts of the 6th International Conference on Phytotechnologies, Dec 2-4, 2009, St. Louis, International Phytotechnology Society. pp. 90.
- Otte M.L., Hopkins D. and Jacob D.L. (2009). Plants immobilize some elements, while mobilizing others: consequences for phytostabilization. In Schwitzguebel J.P., Gupta S., Schulin R. and Demaria P. (Eds). Abstracts of the Final International Conference on Phytotechnologies to promote sustainable land use and improve food safety. Centro Stefano Franscini, Monte Verita, Ascona, Switzerland, 11-16 October, 2009. Pp. 69-70.
- DeSutter, T., D. Franzen, F. Casey, D. Hopkins, B. Saini-Eidukat, A. Akyuz, and V. Jyoti. 2009. Distribution of total mercury in North Dakota soils. In Annual meeting abstracts [CD-ROM]. ASA, CSSA, and SSSA, Madison, WI.
- Viall, E., Overstreet, L., and D. Hopkins. 2010. Comparison of soil enzyme activities under reclaimed roads and adjacent prairie in the Little Missouri National Grasslands, North Dakota. Manitoba Society of Soil Science Annual Meetings. Winnipeg.
-

Courses taught (titles):

Soils 444/644- Soil genesis and survey; autumn, (Hopkins)

Soils 410/610- Soil and land use (DeSutter)

Range 454/654- Wetland Resources Management (DeKeyser)

Soils 721-Environmental field instrumentation and sampling (DeSutter)

NCERA-3
Ohio State Report
2010

Academic Unit: School of Environment and Natural Resources, The Ohio State University

Name: Brian K. Slater

Summary of Report:

In Ohio, the Ohio Soil Inventory Board coordinates soil survey activities, involving representatives of the cooperative agencies (NRCS, OSU, ODNR-DSWC). There are currently 12 NRCS soil scientists and 3 soil scientists in the Ohio Department of Natural Resources actively working on soil survey related activities in Ohio. There are two MLRA Soil Survey offices in Ohio – Marietta and Findlay. (Ten MLRAs cover parts of the state). Soil survey updates on an MLRA basis are continuing in the four quadrants of the state.

A project to convert site morphology and laboratory analytical data for more than 3000 pedons analyzed at the Ohio State Soil Characterization Lab since the 1940s, to NASIS standards is nearing completion.

Research Activities:

- Developing Digital Soil Mapping Methods (DSM) for Soil Survey Updates – concentrating on MLRA 126 (Central Allegheny Plateau), specifically Monroe and Noble Counties
- DSM methods for soil carbon inventory
- Assessment methods for dynamic soil properties and soil change (condition and trend)
- Effects of land use and management on soil carbon stocks
- Site and soil evaluation methods and designs for onsite wastewater treatment
- Evaluation of soil moisture sensors for monitoring hydrology and controlling wastewater application within onsite systems
- Assessment of crop yield and productivity related to soils for taxation purposes
- Effects of waste products on soil properties, especially FGD-byproducts including gypsum

Outreach and Extension Development:

Workshops on soil and site evaluation for onsite wastewater treatment
Workshops on accessing and using soil information
North Central Regional Soil Survey Conference (host, organizing committee chair)
Ohio Soil Inventory Board (chair)

Publications: (Peer Reviewed 1, Abstracts 4)

Tirado-Corbala, R. and Slater, B. K. 2010. Soil Compaction Effects on the Establishment of Three Tropical Tree Species. Arboriculture & Urban Forestry 2010. 36(4): 164–170

Goodman, J.M. and Slater, B.K. 2009. Updating Soil-Based Yield and Productivity Data in Ohio. AnMtgsAbsts2009.53116 ASA, Madison, WI.

Kolka, P.V., Slater, B.K. and Arnalds, O. 2009. Dynamic Properties of Icelandic Wetland Soils. AnMtgsAbsts 2009.52844. ASA, Madison, WI.

Tirado-Corbala, R., Slater, B. K., Dick, W. A., and McCoy, E. L. and Barker, D. 2009. Micromorphology of Gypsum Amended Soils From No-till Fields in Ohio, USA. AnMtgsAbsts 2009.53114 ASA, Madison, WI.

Tirado-Corbala, R., Slater, B. K., Dick, W. A., and McCoy, E. L. and Barker, D. 2009. Effects of Multiple-Year Gypsum Applications On Alfalfa Yield and Root Growth On Non-Sodic Ohio Soils. AnMtgsAbsts 2009.55526 ASA, Madison, WI.

Courses Taught:

Soil Science (ENR300.01) 220 students
Soil Science Laboratory (ENR300.02) 160 students
Soil Landscapes: Morphology, Genesis and Classification (ENR650) 10 students

NCERA-3
South Dakota Report
July 2009- June 2010

Academic Unit: SD State University (SD Agricultural Experiment Station, Plant Science Dept.)

Name: Douglas D. Malo (0.75 FTE Teaching/0.25 FTE Research)
Douglas.Malo@sdstate.edu

Summary of Report:
SD has all been mapped and all counties have a published soil survey. Soil surveys updates (MLRAs 60A, 61, 62, 64, 65, and 102A/B/C) are being done by the SD Cooperative Soil Survey on a multi-county (MLRA) basis. Working on a project to convert hardcopy soil lab and morphology data to digital format. Initial fact sheet/technical bulletin (technical soil property information) for Houdek soil (a benchmark soil) is out for review with SD Cooperative Soil Survey partners. Assisting SD agencies and the NRCS in improving the SD Soil Productivity Rating System. Soil formation and properties were evaluated in gold mine reclamation area near Lead, SD. New grant initiated looking at Biochar impacts on soil properties.

Research Activities (bulleted titles of projects, no descriptive text):

- Assisted with the SD Cooperative Soil Survey across the state.
- Characterized 250+ soil samples for SDSU research and NRCS soil survey use.
- Soil property and carbon sequestration changes due to grazing management practices in rangeland (42 pedons being characterized from Pennington County).
- Changes in surface soil test levels of P and K since 1950 (county and regional changes).
- Revising SD soil productivity index (PI) values (compare NASIS PI with Yield PI).
- Land management impacts on soil properties after 12 years of cultivation (corn and soybeans), cool season grasses, and warm season grasses.
- Hawaii (Maui) wetland soils reclamation project for endangered species (200 soil samples taken)
- Catalogued soils data (lab, profile description) available at SDSU for 25+ benchmark/important soils for MLRA 102B/C and state NRCS staff.
- Impacts of various biochar types on selected soil properties (different feedstocks, processing temperatures and production processes being tested).
- Updating and revising the soil classification key for SD soils.
- Started analyses on soils for Region 5 collegiate soil judging contest (fall 2011).
- Prepared detailed soils reports for the potential new Agronomy farm sites.
- Assisting NRCS staff with the development of Pedon PC training manual – assist in entering data from existing hardcopy sources into Pedon PC.
- Scanning old air photos to digital format continues.

Publications (7/2009-6/2010): (List of publications available on request)

- 3 peer-reviewed journal articles (research)
- 2 published abstracts, 1 MS thesis
- 1 lab manual and 1 text for Introductory Soils
- 3 CDs (soils teaching)

Teaching and Outreach/Extension Development

- Work Planning Conference for the SD Cooperative Soil Survey
- SD Cooperative Soil Survey/ Water Festival Educational Activities
- Courses taught: Soils, Soil Judging, Integrated Natural Resource Management, Teaching Experience, Soil Geography and Land Use Interpretation, Advanced Soil Genesis (SDSU and at Chungnam National University in Daejeon, South Korea), Undergraduate Research/Scholarship, Special Topics – Soils of MO, and Thesis

Grants (co-investigator/collaborator on all projects listed) received (7/2009-6/2010)

- Gilt Edge Mine Reclamation – US EPA (completed 12/09)
- Biochar Impacts on Soil Quality – US DOE and Sun Grant

List of Selected Publications for South Dakota State University
(D. Malo -7/2009 to 6/2010)

Peer-Reviewed

1. Reitsma, K.D., and Malo, D.D. 2010. Integration of USDS-NRCS Web Soil Survey and Site Collected Data. *In* GIS Applications in Agriculture–Nutrient Management for Improved Energy Efficiency. Ed. Clay, D. and Shanahan, J. 2010. CRC Press. (book chapter in press).
2. Howe, L.E., Winter, S.D., Shurtliff, D.R., and Malo, D.D. 2009. Pedon PC 3.02–South Dakota User's Guide. USDA-NRCS, Huron, SD and SDSU.
3. Malo, D.D. 2010. South Dakota Soils: Their Genesis, Classification, and Management. Annual Meeting Proceedings of Korean Society of Soil Science and Fertilizer 42:28-57 (May 6-7, 2010 – Hongcheongun, South Korea.

Published Abstracts

1. Lobb, D.A., Li, S., Papiernik, S.K., Schumacher, T.E., Malo, D.D., Lindstrom, M.J., and Schumacher, J. 2009. Impact of Soil Erosion on Soil Carbon Dynamics at the Landscape Scale. ASA-CSSA-SSSA 2009 International Annual Meetings, Pittsburgh, PA. http://a-c-s.confex.com/crops/2009am/webprogram/Paper54129.html (verified Jan 11, 2010).
2. Lobb, D.A., Li, S., Papiernik, S.K., Schumacher, T.E., Malo, D.D., Lindstrom, M.J., and Schumacher, J. 2009. Assessment of Soil Erosion in a Cultivated Landscape Using Repeated Measurements of 137Cs. ASA-CSSA-SSSA 2009 International Annual Meetings, Pittsburgh, PA. http://a-c-s.confex.com/crops/2009am/webprogram/Paper53739.html (verified Jan 11, 2010).

Peer Reviewed Teaching Publications

1. Malo, D.D., D.E. Clay, and C.L. Reese. 2009. Soils Laboratory Manual. 38th Edition. Plant Sci. Dept. SDSU. Brookings 57007-2141.
2. Malo, D.D. 2009. Introductory Soils (10th edition). Plant Science Department. South Dakota State University. Brookings 57007-2141.