National Cooperative Soil Survey Newsletter

November 2017
Issue 81

In This Issue—

2017 North Carolina National Cooperative Soil Survey Planning Conference 1

Tennessee Hosts the 37th Central States Forest Soils Workshop 2

Overachieving Earth Team Volunteers 4

Earth Team Volunteer Brings Unique Experiences to Ecological Site Work 5

A Closer Look at the Coast..... 6

Lending a Hand to the Finger Lakes National Forest 8

Connecticut's 17th Century History Exposed Using Ground-Penetrating Radar 9

Soil Survey in the Northern Territory of Australia 10

Web Soil Survey and Soil Data Access: New Features and Fixes 15

Get Your 2018 Soils Planner!..... 16

Nondiscrimination Statement 16

Editor's Note

Issues of this newsletter are available at http://soils.usda.gov/. Under the Soil Survey tab, click on Partnerships, then on NCSS Newsletters, and then on the desired issue number.

You are invited to submit articles for this newsletter to Jenny Sutherland, National Soil Survey Center, Lincoln, Nebraska. Phone—(402) 437–5326; FAX—(402) 437–5336; email—jenny.sutherland@lin.usda.gov. ■

2017 North Carolina National Cooperative Soil Survey Planning Conference

The North Carolina National Cooperative Soil Survey Planning Conference was held at the East National Technology Support Center in Greensboro, North Carolina, on Wednesday, October 25. The 28 attendees represented NRCS, the North Carolina Department of Agriculture, North Carolina State University, North Carolina Agricultural and Technical State University, the National Park Service, and the Albemarle-Pamlico National Estuary Partnership (APNEP).

The purpose of the meeting was to provide an update to members on NRCS Soil Science Division activities, at both the national and regional levels, and to reestablish relationships with fellow NRCS employees and university and agency partners.

Roy Vick, NRCS Soil Science Division Associate Director, provided an overview of soil survey activities at the national level, including Soil Health, Rapid Carbon Assessment, National Soil Survey Handbook updates, NEON sampling, provisional ecological site descriptions, national Focus Teams, and Soil Science Division priorities and goals.

State Soil Scientist Kent Clary provided an overview of the NRCS Technical Soil Services structure and activities in North Carolina.

Debbie Anderson, Regional Director of Soil Survey Region 3, and Dave Kingsbury, Regional Director of Soil Survey Region 6, gave presentations on their organizational structures and current activities in their respective regions.

Each of the five MLRA soil survey offices with areas of responsibility in

North Carolina gave an overview of their geographic extent and the various projects they have completed and are planning for the coming year.

Dean Carpenter, program scientist for APNEP, provided a presentation of his organization and how it works with various policymakers, managers, scientists, and stakeholders in planning, managing, monitoring, and assessing the various ecosystems within the Albemarle-Pamlico watershed.

Debbie Anderson provided a presentation on Coastal Zone Mapping activities along the East Coast, including how these surveys are conducted, a view of the mapping products and interpretations available on Web Soil Survey, and how this information can be utilized for shoreline restoration, shellfish habitat, inventory of acid sulfate soils, and ecological site descriptions.

Troy Evans, from the National Park Service, and Tiffany Allen, MLRA soil survey office leader in Waynesville, described work done in the Great Smoky Mountains in response to fire damage from last year, the testing of ArcSIE on certain geologic formations to improve soil survey data, and their collaborative work on soil-vegetation relationships in the area.

Mike Vepraskas, from North Carolina State University, and Godfrey Uzochukwu, from North Carolina Agricultural and Technical State University, provided overviews of changes and activities in their respective departments. ■

Tennessee Hosts the 37th Central States Forest Soils Workshop

By Belinda Ferro, ESD specialist, Clinton, Tennessee.

The Central States Forest Soils Workshops (CSFSWs) came into existence during a Lake States Forest Soils Council Meeting at Bloomington, Indiana, in the fall of 1979. Individuals from Illinois, Indiana, Ohio, Missouri, and Kentucky met and decided to form their own group in order to focus more on the soils and forests of the Central States Region. The group chose the name “Central States Forest Soils Workshop” to identify the geographic region and to signify that the organization intended to be a working group dedicated to field trips, onsite discussions, and learning experiences. Six States are involved: Illinois, Indiana, Kentucky, Missouri, Ohio, and Tennessee.

The CSFSW is a loosely structured organization without officers or a charter. It has operated successfully on an informal, volunteer basis. Each year, an individual or a group of individuals volunteer to organize and host the next year’s workshop. Missouri will be the host State in 2018.

This year, Soil Science Division Staff Jennifer Mason, Belinda Ferro, and David Moore (soil survey office in Clinton, Tennessee) and Caleb Gulley and Gabe Krantz (soil survey office in Cookeville, Tennessee) teamed with David McMillen, Tennessee State Soil Scientist, to host the 37th annual Central States Forest Soils Workshop, October 10–12, in cooperation with Sewanee–The University of the South and with Tennessee State Parks. The workshop was held at Sewanee and included field trips around the University Domain, Franklin State Forest, and the Great Stone Door/Savage Gulf State Natural Area.

The first evening included presentations on the geologic history of the Cumberland Plateau by Dr. Don Byerly (Professor Emeritus of Earth and Planetary Sciences, University of Tennessee–Knoxville) and on soils of the Cumberland Plateau and ecological site descriptions by soil survey staff from Clinton. Students from the university presented posters on their research projects and mingled with workshop attendees during the break.

Dr. Jon Evans (from The University of the South) kicks off the field tour at Franklin State Forest.

The next day was spent entirely in the field. We began at Franklin State Forest, where Dr. Jon Evans (professor at Sewanee) presented the land-use history and some of the research being conducted on the forest. Two soil pits allowed participants to see examples of Cumberland Plateau soils. As always, conversation around the pit was lively.

Next, we traveled to several stops on the Domain, owned by the University of the South. The Sewanee Domain is located at the southern end of the Cumberland Plateau, which extends through Kentucky and into Tennessee and Alabama. It is the westernmost portion of the Southern Appalachian region. The biologically rich hardwood forests of the Cumberland Plateau are considered to be among the highest conservation-value forests remaining in North America. Dr. Evans led with several discussions about the research being conducted on the Domain. Topics included the effects of deer herbivory on plant communities, the importance of vernal pools for biodiversity conservation on the Cumberland Plateau, differences in ecological site classification in uplands vs. coves, a long-term chestnut oak regeneration study, and the effect of agricultural legacies on forest change dynamics.

We wrapped up the evening at the banquet with presentations by Wally Akins from the Tennessee Wildlife Resources Agency and Bobby Fulcher from Tennessee State Parks. These excellent presentations covered restoration efforts on plateau lands and the diverse mix of natural and cultural history on the Cumberland Plateau, respectively.

The last day of the workshop was beautiful, with perfect fall weather and a hike over the sandstone uplands to overlooks with panoramic views of the escarpment and coves below (a classic Cumberland Plateau experience). Our hosts were George Shinn and Aaron Reid from Tennessee State Parks. They led us on a guided hike to the Great Stone Door and gave talks about the history of the park and the current treatment program for hemlock woolly adelgid, an invasive exotic pest that has decimated native populations of eastern hemlock. Hemlock is an important tree species in the gorges of the Cumberland Plateau, and its conservation is a priority among land managers.

View of the Cumberland Plateau from Laurel Overlook at Savage Gulf.

The Central States Forest Soils Workshop is truly unique in that it brings together representatives from an array of forestry and soils professions. Our attendees included Federal and State agency staff from the central States region as well as private consultants and members of educational institutions. This workshop provides one of the last remaining opportunities for cross-disciplinary, field-based discussion and collaboration. Any day in the woods around a pit with colleagues is a good day! ■

Overachieving Earth Team Volunteers

The National Soil Survey Center's Earth Team Volunteer Program did itself proud, claiming 6 of the 17 members of the soil judging team that swept the regional competition this past September. As regional winners, the team is now on its way to the national competition this spring, in Tennessee.

Earth Team Volunteers (ETVs) on the winning team include Robert Clark, Laura LeCuyer, Nicole Musgrave, Ashley Nassar, Bryan Petersen, and Adam Romans. As ETVs, these overachieving students work at the center 3 or 4 days a week, assisting with the processing of soil samples—not the easiest nor the cleanest work. These ETVs have a passion for all areas of conservation and natural resources, not the least of which are healthy soils.

The competition took place in South Dakota. The out-of-State location made it a little tougher for the Nebraska team. On competition day, the team had to correctly identify, evaluate, classify, and describe five soil profiles in previously unseen soil pits and also rate the area for land use. It is the second time in the history of the competition that the Nebraska team earned first place and the first time that the team swept the competition, winning both team and individual competition.

Bryan Petersen, a sophomore at the University of Nebraska—Lincoln, earned first place in the individual competition. He competed against 70 other students, including his own teammates as well as students from Iowa State University, Kansas State

Earth Team Volunteers (left to right) Ashley Nassar, Robert Clark, and Nicole Musgrave—three of the six volunteers on the winning soil judging team.

University, University of Minnesota, South Dakota State Universiy, and the University of Montana. Petersen attributes a great deal of his knowledge of soils to the time he spends as an Earth Team Volunteer. He's been volunteering at the National Soil Survey Center for almost a year. "My volunteer work made the difference," said Petersen. "Prior to being an Earth Team Volunteer, in the same competition I didn't even make the top 10, but rather I landed somewhere in the 20s. This past year of experience made the difference."

Laura LeCuyer, an environmental restoration student at the University of Nebraska—Lincoln, placed in the top 10, finishing fifth overall in the individual competition. LeCuyer has been a volunteer for almost 2 years.

College soil judging provides training and practical experience on the methods of soil and site evaluation used by professional soil scientists. The national competition will take place in April, in Martin, Tennessee. The top four winners will qualify for the international competition as a member of Team USA. ■

Earth Team Volunteer Brings Unique Experiences to Ecological Site Work

By Lisa Kluesner, NRCS ecologist.

A vital aspect of ecological site development is the inclusion of an interdisciplinary work group to harness local expert knowledge. Academics, private landowners, conservation partners, and land managers harbor a plethora of practical knowledge that can help inform the ever-important state-and-transition models, which are the heart and soul of ecological site work. This practical knowledge, however, can also provide context and applicability to the end product: ecological site descriptions.

In his first year as an Earth Team Volunteer, Sean Kluesner contributed nearly 70 hours over 3 months, providing technical editing services for 26 provisional ecological site descriptions (PESDs) for MLRA 107B, the Iowa and Missouri Deep Loess Hills.

"As an editor, it's my duty to ensure the material is relevant to the reader. So the first questions I asked were 'Why is the document needed?' and 'How is the reader going to use this?'" Sean says of his approach to the task. "From there, I make sure the information in the PESD is ecologically accurate as well as accessible to the reader. I also look to ensure the document is clean, from clarity and flow to grammar and spelling."

Sean brought a unique perspective to his role as technical editor. "I've worked over a dozen years in public land management in a couple States. I also spent about a year and a half working under an NRCS cooperative agreement with a resource conservation district developing conservation plans." Sean's past duties have been wide-ranging, including forest management, vegetation inventory and analysis, wildlife conservation, and NEPA analysis. "Understanding what habitats and successional forces are at play can assist the landowner—private or public—in choosing what they want their plan to look like and even the feasibility of the different options. So I tapped into those past experiences and tried to highlight areas that would benefit from additional detail or explanation for the manager."

Sean plans to continue to contribute to future ecological site work. In addition to technical editing, he hopes to take on a more hands-on approach and assist with field data collection as well. "I've always enjoyed discovering new tools for the old land management toolbox. Being a part of the [ecological site development] process, I can see how useful these reports can be in making land management decisions." ■

A Closer Look at the Coast

Regional ecological site specialists Michelle Clendenin (covering Soil Survey Regions 3 and 7—offices in Raleigh, NC, and Auburn, AL) and Nels Barrett (covering Soil Survey Regions 6 and 12—offices in Morgantown, WV, and Amherst,

Left to right: Dr. Elizabeth Lacey (Stockton University), Martha Maxwell-Doyle (Barnegat Bay Partnership), Michelle Clendenin (NRCS), Rob Tunstead (NRCS), Kathleen Strakosh-Walz (New Jersey Natural Heritage Program), Dr. Nels Barrett (NRCS), and (seated) Rick Brown (NJ Department of Environmental Protection).

MA) and MLRA Soil Survey Office Leader Rob Tunstead (Hammonton, New Jersey) met with a core technical team of coastal community experts from the New Jersey Heritage Program, the Barnegat Bay Partnership, and Stockton University. The focus of the field meeting was to deepen the understanding of coastal ecosystems in southern New Jersey and vicinity and facilitate partnerships which would enable better characterization of coastal ecological sites.

An orientation meeting was held at Stockton University's Marine Field Station, located in the Jacques Cousteau National Estuarine Research Reserve. The group discussed common interests, data needs, resource concerns, and future work, especially work associated with developing the NRCS Ecological Site Inventory program. Of particular interest was recent work in describing subaqueous soils in Barnegat Bay and in mapping eelgrass populations. The subaqueous soil survey for Barnegat Bay was posted to the Web Soil Survey with the annual refresh in 2016 and is currently available to the public. Other discussions covered gap-style approaches to fitting landscape gradients to SSURGO layers as a rapid means to frame provisional ecological sites for larger areas. Another highlight was a cross-reference of NatureServe's list of southeastern ecoregion vegetation to the New Jersey Natural Heritage Program's Vegetation Classification in order to rectify scale and commonality in the plant community data sets.

Atlantic white cedar (*Chaemaecyparis thyoides*) swamp forest at the lowest end of the hydrological gradient. Sphagnum moss (*Sphagnum* sp.) and Collins' sedge (*Carex collinsii*) are in the foreground.

Interdunal swale between the primary and secondary dunes at Island State Park, New Jersey. The soil series is Hooksan. Pictured is pine barren goldenheather (*Hudsonia ericoides* L.), the native ground cover, which helps stabilize shifting sands due to wind erosion.

The field excursions were within the Northern Tidewater Area, MLRA 153D, and covered three ecosystems: tidally influenced ecosystems, the Pine Barrens within the coastal zone, and maritime barrier ecosystems. The first field excursion consisted of boarding a research boat owned and operated by the Stockton University Marine Lab. The boat motored up the open waters of the Mullica River, where high-salt marsh meadows and brackish reed marshes transition to mixed freshwater tidal marshes far up the river reaches.

On the second excursion, participants explored sites in the

New Jersey Pine Barrens. One stop was at the Shinns Branch Natural Area, where the soil-vegetation association along a hydrologic gradient was examined. While the gradient was subtle in relief, the transition of vegetation and soils from the Pine-oak upland to an Atlantic white cedar forest was visible. Soil components identified were Lakehurst, Astion, and Manahawkin series.

The third excursion was a closer inspection of the barrier island at Island State Park in Seaview. These conserved lands represent the most exemplary dune system in southern New Jersey. ■

Lending a Hand to the Finger Lakes National Forest

By Mary Ellen Cook, NRCS soil scientist.

During the first week of October 2017, the 12-BEL soils staff, located in Belmont and Binghamton, New York, spent 3 days helping U.S. Forest Service (USFS) staff describe and sample 11 soil pits in the Finger Lakes National Forest. The purpose of this sampling effort was to establish baseline soil data for the Forest Service's Long-term Ecosystem Monitoring Project (LEMP). Traveling to Hector, New York, from Rutland, Vermont, Angie Quintana, USFS soil scientist for the Green Mountain/Finger Lakes (GMFL) National Forests, arrived with her Vermont seasonal staff, Sophia Larson and Josh Lobe. Matt Kautz, seasonal staff for the Finger Lakes National Forest, was also on hand to help with the project.

The Finger Lakes National Forest is situated on a Devonian-age ridge that was capped by till during the Wisconsinan glaciation. This broad ridge separates Seneca Lake, to the west, from Cayuga Lake, to the east. It is located within the Glaciated Allegheny Plateau and Catskill Mountains (Major Land Resource Area 140) but is in close proximity to the Lake Plains of Ontario and Erie (Major Land Resource Area 101). The soil series sampled were Bath, Mardin, Volusia, and Lordstown, all benchmark soils in MLRA 140. With only about 16,250 acres, this national forest is one of the smallest in the country. As with all national forests, it provides wonderful outdoor activities.

Between 1938 and 1941, more than 100 farms were acquired by the Soil Conservation Service and administered as the Hector Land Use Area. Early management emphasized soil stabilization and conversion of cropland to pasture for domestic livestock grazing. The intent was to demonstrate productive land uses that would conserve the land's long-term productivity. In the 1950s, when there was a stronger emphasis on multiple land use, administrative responsibilities were transferred to the USFS. Since 1985, this land has been known as the Hector Ranger District of the Finger Lakes National Forest.

Angie Quintana transferred from NRCS about 4 years ago to become the soil scientist for the GMFL National Forests. I and fellow NRCS soil scientists Matt Havens (MLRA project leader) and Keith Shadle met her and her crew at plot 1, "The Blueberry Patch," where pit digging was already in progress. This site was the first

NRCS Soil Scientists Keith Shadle (left) and Matt Havens.

of 4 plots and 11 pits that we helped describe and sample over the next 3 days. The plan now includes the Finger Lakes National Forest in this USFS study, which has been ongoing since 2008 on the Green Mountain NF. Our NRCS colleague Thom Villars, resource soil scientist in White River Junction, Vermont, has been involved with this project since its inception and has completed 20 plots over the course of 4 sampling seasons. The guidelines state that these plots will be resampled every 10 years for 50 years.

According to the "Progress Report on the Long-term Ecosystem Monitoring Project (LEMP)" dated December 2012, this 50-year monitoring effort examines the long-term effects of broad-scale environmental changes, specifically changes in climate, air quality, soil health, and vegetation. This monitoring effort is intended to increase understanding of changes in forest ecosystems over time in response to environmental factors, such as acid deposition, climate change, and non-native invasive species.

Autumn fieldwork on this little-known gem of a national forest has been a refreshing way to start out the new fiscal year. Thanks to Angie Quintana for inviting us to lend a hand. ■

Connecticut's 17th Century History Exposed Using Ground-Penetrating Radar

Over the years, soil scientists for USDA Natural Resources Conservation Service (NRCS) have found themselves working closer with archaeologists in the field due to their common interest in soils and commitment to the protection of the Nation's cultural and historic resources. In Connecticut, The Office of State Archaeology and NRCS have formed a partnership by working together on archaeological sites around the State. By sharing resources, skills, expertise, and knowledge, this partnership has helped unravel and unearth some of Connecticut's mysteries.

Recently, Brian Jones discussed how fieldwork using ground-penetrating radar in the Connecticut River Valley literally unearths the material culture of the 17th century and uncovers clues to the relationship between early settlers and native peoples. Brian is Connecticut's State Archaeologist and is associated with the Department of Anthropology and the Connecticut State Museum of Natural History at the University of Connecticut (UConn), Storrs. He has worked as an archaeologist since 1992 and received his Ph.D. in Anthropology at UConn in 1998. Brian has a broad background in New England archaeology that spans the Paleo-Indian period through the Industrial Era. He recently made the archaeology of 17th century Connecticut one of his top research priorities. His talk was given at a TEDx event using the TED conference format but was independently organized by a local community. It can be viewed at: https://www.youtube.com/watch?v=QswxVnBOrQg. ■

Soil Survey in the Northern Territory of Australia

By Jon Hempel, Principal Land Resource Officer, Department of Environment and Natural Resources, Darwin, Northern Territory.

In September 2016, I started a position with the Northern Territory Government, Department of Environment and Natural Resources (DENR), in Darwin to assist with ongoing soil survey work.

The DENR mission is similar to that of NRCS in that the department provides advice and support for the sustainable development of the land and water of the Northern Territory and the conservation of its unique flora and fauna. DENR has seven divisions: Flora and Fauna, Rangelands, Weed Management, Bushfires NT, Water Resources, Water Data Portal, and Environment.

The soil survey program is under the Rangelands division. Currently, there are 11 positions dedicated to the program, only 3 of which are permanent. Over the last 3 years, this staff has been engaged in developing soils information in conjunction with the Commonwealth program of "Developing the North." The aim of this broad program is to unlock the abundant natural resources and people potential to provide a basis for economic and social advancement and development in the Northern Territory, Queensland, and Western Australia. Part of this venture is to develop agricultural information, with emphasis on land capable of supporting irrigated horticulture.

The Northern Territory comprises 1.4 million square kilometers. The area is equivalent to that of North Dakota, South Dakota, Nebraska, Colorado, Wyoming, and Montana combined. The entire territory has a population of 235,000, with 135,000 people living in Darwin. One half of the total population is aboriginal. The main land use throughout most of the territory is cattle ranching. These cattle "stations" are Crown land and are offered as perpetual leases to land managers. The leases can be passed down within families or sold outright. Many stations are being purchased by foreign investors. The stations are very large land areas, and helicopters are the main mode of transportation used to oversee the land. The Alexandria Station is the largest station in the Northern Territory and compromises over 1.34 million hectares.

Soil survey work in Australia does not have a federal coordination as in the United States. Each state or territory is responsible for the administration and organization of the work. Some states do coordinate on certain aspects of the program; for example, the Northern Territory and Queensland utilize the same database. This said, there are overarching standards and specifications used across Australia for soil survey work.

Standards and Specifications for Soil Survey Work in Australia

- The *Australian Soil Classification* system is a current and up-to-date structure for soil classification. It is used across the country in all phases of soil survey work.
- The *Guidelines for Surveying Soil and Land Resources* provides detailed information on all phases of soil survey work.
- The *Australian Soil and Land Survey Field Handbook* is intended for the systematic and consistent recording of field observations in Australian soil and land surveys. It provides for a consistency of terms for such categories as landform, vegetation, land surface, soil and substrate, and attributes needed to adequately describe site and soil conditions.
- The *Australian Vegetation Attribute Manual: National Vegetation Information System (NVIS)* provides standards for the recording of vegetation.
- *Interpreting Soil Test Results* provides a consistent means of interpreting soil test results.

- Within the Northern Territory, the *Technical Specifications for Land Unit Core Attributes* specifies a set of core attributes for land unit spatial data sets collected at 1:25000, 1:50000, and 1:100000 that ensures consistency from survey area to survey area.

These standards and specifications are maintained and updated by the Australian National Committee on Soil and Terrain (NCST). The NCST has representatives from each state and territory within Australia. Major scientific institutions, such as the Commonwealth Scientific and Industrial Research Organization (CSIRO), GeoScience Australia, and other government entities and universities active in soil science research, are also represented on the committee.

With the size and remoteness of the territory, detailed soils information is rare. The initial project I became involved with is along the Hugh River in the southern part of the territory, about 1500 km south of Darwin. The project was requested as part of a plan to develop irrigated agriculture on the terraces and sand plains along the Hugh River. The area is designated as hot desert within the Köppen climate classification. It generally receives about 250 mm of rain per year. Temperatures commonly exceed 45 °C in summer and can drop below 0 °C in winter.

Soils Data for Specific Land Units in the Orange Creek Project Area

Land Unit 18b

Level to gently undulating sand plains; very deep, red earth siliceous sands, loamy sand surface and loamy sand subsoil; mid open hummock grassland with low isolated trees (Spinifex, desert oak).

Profile

Surface soil:
A1—Red; loamy sand; single grain structure; no mottles; field pH 6.0-7.5; clear smooth boundary.

Subsoil layer:
B21—Red; loamy sand to clayey sand; massive structure; field pH 6.5-7.5; gradual to diffuse boundary.
B22—Red; clayey sand to sandy loam minus; massive structure; field pH 6.5-7.5.

Substrate layer:
Not described.

Classification

Australian Soil Classification:
Haplic, Eutrophic, Red, Kandosol; thin, non-gravelly, sandy A1, clay loamy B, very deep

Soil Taxonomy (U.S.):
Sandy, siliceous, thermic, active Typic Haplocambid

An area of unit 18b. The soils are described as very deep, rapidly drained, non-gravelly, red earth siliceous sands that have soft to firm surface condition.

Land Unit 20a

Level, depressional playa plains; very deep, strong brown, silty clay loam grading to light and medium clay; low open forbland.

Profile

Surface soil:
A1—Strong brown; silty clay loam; moderate subangular structure; no mottles; no gravels; no mottles; field pH 6.0; abrupt wavy boundary.

Subsoil layer:
B21—Brown; medium clay; massive structure; no gravels; no mottles; field pH 7.0; EC (dS/M) .04; gradual boundary.
B22—Strong brown; medium clay; massive structure; no gravels; no mottles; field pH 7.0; EC (dS/M) .04.

Substrate layer:
Not described.

Classification

Australian Soil Classification:
Haplic, Eutrophic, Brown, Kandosol; thin A1, non-gravelly surface, clayey A, clayey B, very deep

Soil Taxonomy (U.S.):
Fine, kaolinitic, thermic, active Fluventic Aquicambid

An area of unit 20a. The soils are described as very deep, imperfectly drained, strong brown, silty clay loam grading to medium clay that have firm surface condition with crusting.

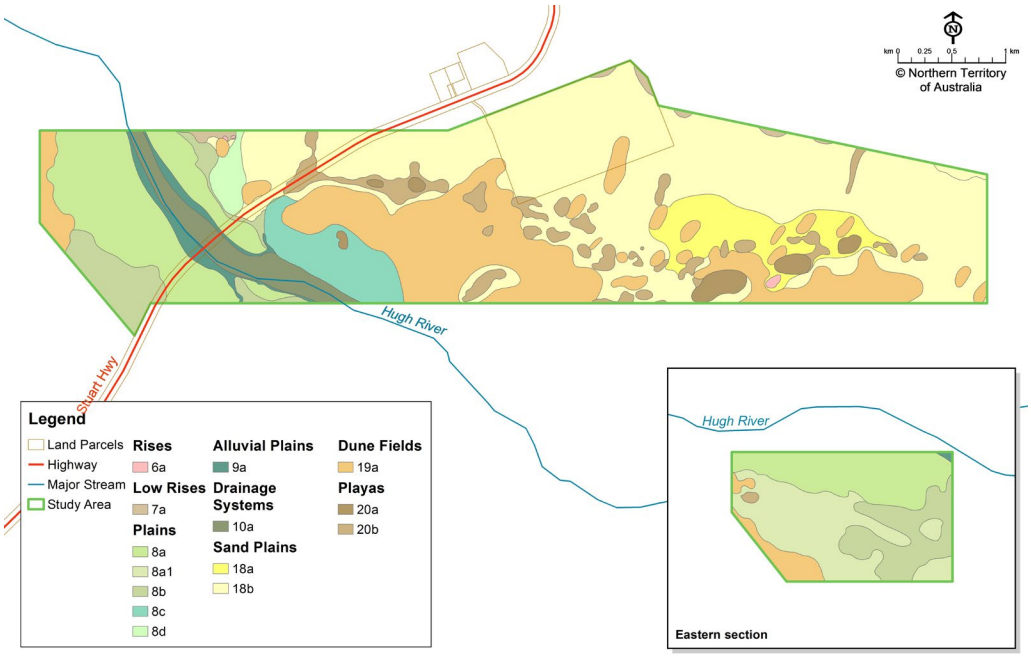
Basic Steps in Soil Survey Work

Preparation for fieldwork, data collection, and subsequent data and information development followed the same basic steps as NCSS work.

- Permission for access was obtained for the Orange Creek Station managers (stakeholder) along with an Abstract of Records from the Aboriginal Areas Protection Authority identifying registered and recorded sacred sites within the study area.
- Map line-work to delineate the extent of the land units was based on interpretation of image pattern, topographic position, observed landscape knowledge from fieldwork, and the site soil classification and vegetation community. Line-work was digitized into the DENR spatial database using ArcGIS.
- Fieldwork and data collection was greatly enhanced with the use of **Mappt**™ (http://www.mappt.com.au/). The software provides real-time GPS and the capacity to store background imagery and database information and to capture, view, and edit data on a tablet computer. (See final land unit map of the project area on following page.)
- Vegetation was described at all sites. Structural and floristic descriptions included identification of strata, measurement of stratum height and cover, identification of plant species, and measurement of species height and cover.

The main land evaluation developed is for irrigated agriculture. Two separate interpretation frameworks were developed. The land capability framework presented in table 1 is a more generalized framework that can be applied to a range of land use suitabilities in addition to irrigated agriculture. Four capability classes are developed within the framework.

In the 14 months I have been working in the Northern Territory, I have been fortunate to have spent 3 of those months working in the field, or as they say here “out bush.” Much of this time was extended trips to remote areas of the territory for



Final soil and landform map for the Soil and Land Suitability Assessment for Irrigated Agriculture for part of the Orange Creek Station, Hugh River Valley.

Land Unit	Slope	Wind erosion	Surface rock	Soil depth	Soil drainage	Flooding	General Land Capability Class*	Area (ha)
6a	4	1	4	4	1	1	4	1
7a	3	2	3	1	1	1	3	12
8a	1	1	1	1	1	2	2	230
8a1	2	1	1	1	1	2	2	88
8b	1	1	1	1	1	2	2	104
8c	1	1	2	2	2	2	2	58
8d	1	1	3	1	1	2	3	16
9a	1	1	1	1	1	3	3	23
10a	1	3	4	3	1	4	4	52
18a	1	1	1	1	1	1	1	71
18b	1	1	1	1	1	1	1	609
19a	4	3	1	1	1	1	4	308
20a	1	1	2	1	3	3	3	22
20b	1	1	1	1	2	3	3	69

Table 1. General land capability classes for irrigated agriculture for Orange Creek land units (1=high land capability, 4=not suitable).

2-week camping trips. I have travelled to the southern, eastern, and western borders of the Northern Territory, logged about 15,000 km “on the clock,” and described 318 full profile descriptions.

It took me a little time to get used to the reversal of the seasons, though the Northern Territory is truly the land of endless summer. From a climate standpoint, living in Darwin is quite amazing because there is no precipitation for 5 months (fall/winter) and then, within a period of 4 months, during the monsoon (spring/summer), there can be in excess of 2500 mm of rain.

I have developed a great appreciation the Australian Soil Classification system. It is a mature soil classification system that worked well in all landscapes that we encountered. Most sites can be fully classified with only the field recorded data, which is very efficient.

The staff here is well funded and provided with excellent equipment (vehicles, computers, drilling rigs, and field equipment) and administrative support. Each team is completely responsible for all phases of the work.

I have been impressed with the staff. They have a deep understanding of landscapes and geology and are very advanced in technology relating to all phases of soil survey work. They are excellent outdoors people and love to be "out bush." In summary, I state what I have told my boss on numerous occasions, "I feel like I am the luckiest soil scientist in the world." ■

Web Soil Survey and Soil Data Access: New Features and Fixes

The Natural Resources Conservation Service is the gold standard for soil data. As the government's "go to" agency for soil survey work, NRCS collects and maintains a wealth of soil data, enhancing existing data as well as updating all types of soil information. If you use NRCS's soil data, take note of the recent new features and fixes. Join GovDelivery to keep current on any number of soil related issues (https://public.govdelivery.com/accounts/USDANRCS/subscriber/new?topic_id=USDANRCS_134). ■

Soil Data Access 2.1.0.1144—New Features

- All soil data access pages meet Section 508 accessibility requirements for the disabled.
- AOI definition via a Web Service.*
- AOI map retrieval via a Web Service.*
- AOI and map unit rating via a Web Service.*

Web Soil Survey 3.3—New Features

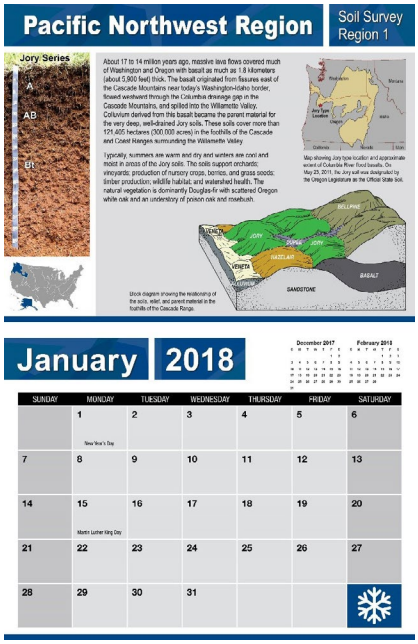
- Section 508 accessibility requirements met.
- Quick Navigation Lat/Long Option guesses your current location.

Web Soil Survey 3.3—Fixes

- Information provided to the Soils Hotline via Soils Hotline email link is now up to date
- Observer errors in retrieving Bing hybrid maps no longer occur.
- Log Viewer now can handle large data input.
- Web service call was implemented to retrieve the proper Bing tile retrieval URL.
- When retrieving Shopping Cart products, long email addresses are now accepted.
- An embedded apostrophe no longer creates an error.
- A map unit description for a map unit containing a plus sign can now be displayed.
- Compressed "zip" downloads can now be unzipped on non-Windows systems.
- Fixes implemented for Section 508 compliance.

* Additional information at: https://sdmdataaccess.sc.egov.usda.gov/documents/AdvancedQueries.html. ■

Get Your 2018 Soils Planner!



The 2018 Soils Planner is now available. You can a request a copy from your state soil scientist or regional office, or you can order directly from the NRCS Distribution Center at https://go.usa.gov/xnj2T (for hard copies, click "Add to Basket" in bottom left corner).

This year's theme is "Regions and Landscapes." Each month features a soil profile and a landscape diagram from 1 of the 12 soil survey regions.

The planner also includes a list of events, ample space to note plans and appointments, and messages from the Acting Chief of NRCS and the President of the Soil Science Society of America. ■

Nondiscrimination Statement

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;
fax: (202) 690-7442; or
email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender. ■