Glacial Gazette

Glaciated Soil Survey Region 12 Newsletter

Winter 2015

In this Issue

Maine NRCS Soil Scientist Serves as an Earth Team Volunteer in Hawaii

by Matt Dorman, NRCS Soil Scientist, Dover-Foxcroft, Maine

In late July, I visited Hawaii — The Big Island — for two full weeks. While there, I assisted the MLRA soil survey staff and the Kona Soil and Water Conservation District as an Earth Team volunteer. I was exposed to new unique vegetation, landforms, and soils from the eight different climate zones on the island.

On the west side of the island in the city of Kona, I assisted local soil staff as we visited a coffee plantation located *mauka* of a volcano. The Hawaiian directional word for inland and upland is *mauka*, and the word for towards the sea is *makai*.

While at the plantation, we provided technical soil services, dug two soil pits to record full pedon descriptions, and collected samples. The samples were sieved, weighed, baked, and measured for percent organic matter and pH. The soils we found were Puna and Kapua, which are Euic, Isothermic Typic Udifolists and Euic, Isothermic Typic Ustifolists. These soils are moderately deep and deep, respectively. They are both sitting above 'A'A lava which is a sharp and spiny, rigid lava flow. Pahoehoe lava is the name for smooth lava flows. While visiting, I saw two other soil series: Hapuna (medial-skeletal, amorphic, Isohyperthermic Petrocalcic Duritorrand) and the state soil of Hawaii, Hilo (medial over hydrous, ferrihydritic, isohydritic, isohyperthermic Acrudoxic Dydrudands). I was fortunate enough to visit the city of Hilo, on

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2015 International Year of Soils

Monthly Themes

January
Soils Sustain Life
January IYS video is available on YouTube.

February
Soils Support Urban Life

March
Soils Support Agriculture

April
Clean and Capture Water

May
Soils Support Buildings/Infrastructure

June
Soils Support Recreation

July
Soils are Living

August
Soils Support Health

September
Soils Protect the Natural Environment

October
Soils and the Products We Use

November
Soils and Climate

December
Soils, Culture, and People

Regional Director's Message

Greetings and Happy International Year of Soils 2015!

On behalf of the Glaciated Soil Survey Region 12, I invite you to take some time and read through this very informative newsletter filled with updates from our National Cooperative Soil Survey (NCSS) staff and partners. If you didn't know, soil surveys began in 1899 as part of the nation's earliest efforts of cooperative conservation. One of the first soil surveys was completed in the Connecticut Valley, which is located in Soil Survey Region 12. It was also the beginning of the NCSS, which has evolved into a partnership of local, state, and federal agencies, universities, and professional societies working together to deliver science-based soils information.

As the current Acting Glaciated Soil Survey Regional Director, I am proud to be a part of the NCSS. Through the years I have seen the amount and diversity of partnerships increase as innovative research and ideas for the use of soil survey and ecological sites has grown. In this newsletter you will read about one of those new research projects on soil organic matter completed by Northeastern University in Boston, Mass.

The NCSS not only produces a lot of information, but we share it too! On August 16, 2005, Secretary of Agriculture Mike Johanns annouced the launch of the USDA Web Soil Survey. The Web Soil Survey was promoted as being a simple, yet powerful way to access and analyze soils data that contributes to every aspect of public and private land use and development. Ten years later, it is still known as the largest natural resources information system in the world — and is used by millions!

Let me close this message by inviting you to the National Cooperative Soil Survey Conference in Duluth, Minnesota from June 7 to 11, 2015. Please also take some time to read about and attend any of the wonderful International Year of Soils 2015 events. You can find more information at the USDA NRCS soils website.

Thank you again for your continued support for soil survey — and please know that Al Averill, State Soil Scientist for Massachusetts and Vermont, will be the next Acting Glaciated Soil Survey Region 12 Director starting February 9, 2015.

I hope to see you at the NCSS conference!

Deborah Surabian

Deborah Surabian, Acting Regional Director

Soil Organic Matter Measurement by Loss-on-Ignition: Optimum Conditions Proposed

by Elham A. Ghabbour and Geoffrey Davies, The National Soil Project, Northeastern University, Boston, Massachusetts

By far the easiest and least expensive way of measuring the total organic matter (SOM) content of a dried soil sample is by loss-on-ignition (LOI). But labs use different ignition times and temperatures, leading to data uncertainty. Based on concerns for loss of occluded water in clays and minerals and carbonate decomposition that would bias the results, temperatures of 350 to 400 degrees Celsius with short ignition times are often used. But thermogravimetric analysis (TGA) studies show that organic-coated clays and minerals are more resistant to combustion and heat than SOM or parent materials themselves. On the basis of this information, a recent paper in the Journal of Plant Nutrition and Soil Science (DOI: 10.1002/jpln.201400326) resulting from collaboration of the National Soil Project (NSP) (www.neu.edu/hagroup) and the Agricultural Laboratory Proficiency Program (ALP) (www.collaborativetesting.com) reports the effect of temperature on SOM measurement at a fixed ignition time by LOI.

The study investigated 23 ALP soil samples with widely different carbonate, clay, sand, and silt contents using a 12-hour ignition time. The study shows that:

❶ LOI at 350 degrees Celsius is sample dependent, with a spread of 62 to 88 percent of the LOI at 650 degrees Celsius;

❷ the sample dependence decreases with increasing temperatures of 450 degrees Celsius (77 to 97 percent spread) and 550 degrees Celsius (90 to 100 percent spread);

❸ the spread becomes zero at 650 degrees Celsius; and

❹ the coefficient of variation drops from 8 percent at 350 degrees Celsius to 4 percent at 650 degrees Celsius.

The authors propose LOI at 650 degrees Celsius for 12 hours as optimum conditions for SOM measurement by LOI, except perhaps for very high carbonate soil samples. Please contact the National Soil Project or Bob Miller at the Agricultural Laboratory Proficiency Program with questions and for more information.

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Kapua soil pit in a coffee bean plantation.

the west side of the island, about 35 miles from the recent volcanic lava flows in Hawaii. It was here in Hilo that I saw the state soil at the local field office while helping prepare for a soil health training course.

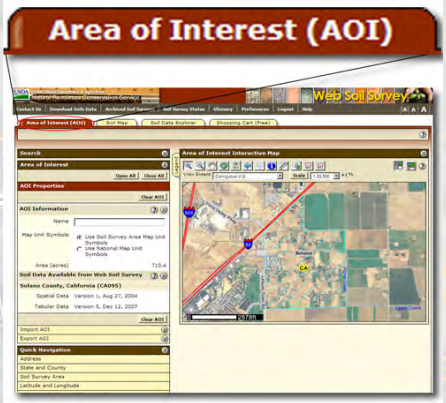
Matt Dorman preparing samples for the soil oven. *(See more pictures on page 8.)*

During my Hawaiian adventure, I also went to Mauna Kea observatory information center, tented in the Volcano National Park, witnessed the huge craters, and drove on the infamous Mauna Loa Road. I saw macadamia trees, banana trees, cocoa trees and countless other species of plants and animals for the first time. If anyone ever has a chance to visit Hawaii, I would highly recommend it. You won't regret it. Aloha!

Web Soil Survey

Did you know…

- Web Soil Survey was put online on August 16, 2005.



- Area of interest (AOI) created in Web Soil Survey have reached almost 17.5 million.
- From September 2005 to January 2015 we have had 17,448,645 hits.
- If we reach 17.5 million hits by August 2015, that is about 4,860 hits per day.
- August 2015 is Web Soil Survey's 10-year anniversary — How appropriate during the International Year of Soils!
- Helpful tips that will make your use of Web Soil Survey more effective and enjoyable are available online.

Great Lakes Restoration Initiative (GLRI) Forum

by Glenn Stanisewski, NRCS Modeling Unit Team Leader, Amherst, Massachusetts

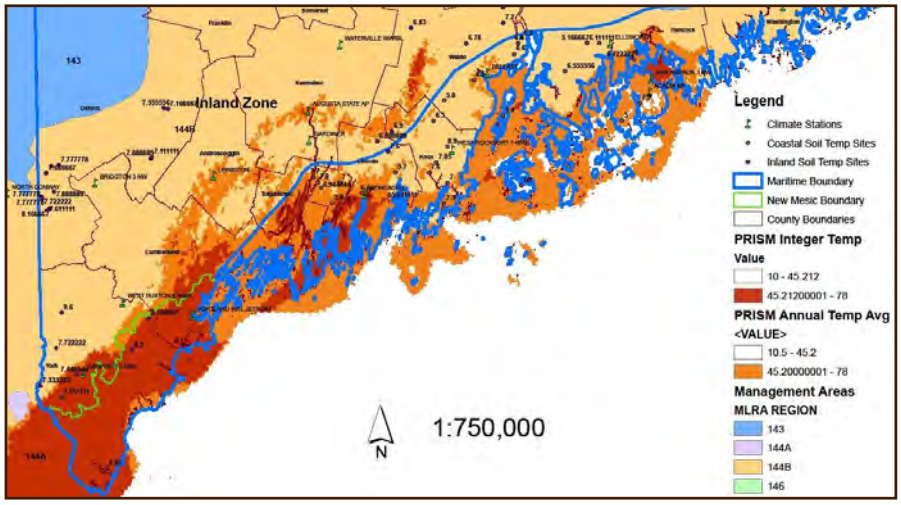
Glenn Stanisewski and Mari-Vaughn Johnson from the NRCS Conservation Effects Assessment Project (CEAP) Modeling Team attended the NRCS Great Lakes Restoration Initiative (GLRI) Forum held in Chicago, Ill. from November 13-14. Glenn and Mari-Vaughn attended an inter-agency Modeling Team breakout session with staff from Environment Protection Agency (EPA), U.S. Geological Survey (USGS), and professors from the University of Wisconsin, Green Bay and Heidelberg University (Ohio). The purpose of the breakout session was to discuss modeling approaches and study design to assess the effectiveness of Best Management Practices (BMPs) implementation in GLRI priority watersheds. Discussions centered on training opportunities and technical assistance that the NRCS CEAP Modeling Team can provide to EPA, USGS, and university staff in the use of the APEX (Agriculture Policy Extender) model in conjunction with their Edge-of-Field and In-stream water quality monitoring efforts in the GLRI priority watersheds.

NRCS Soil Scientists Propose a Change in the Temperature Regime for Soils in Southern Maine

by David Turcotte, NRCS Soil Scientist, Dover-Foxcroft, Maine

MLRA boundaries are re-evaluated nationally every five years, and in preparation for this occurring in 2015, the 12-Dover-Foxcroft (12-DFX) office has been working with members of the Tolland, Conn. and New Hampshire soil survey staff on a proposal to justify a change in the temperature regime of soils correlated in southern Maine. The result will be MLRA 144A, which is comprised of mesic soils and currently ends at the New Hampshire-Maine state line, extending into the southern half of York County and the southeast tip of Cumberland County, Maine.

The foundation for this proposal to change some of southern Maine from frigid to mesic is a study conducted by 12-DFX soil scientists David Turcotte and Matthew Dorman. The study compared archived soil temperature data (at 50cm depth) to archived air temperature data. In almost all cases, air temperature data from the closest National Oceanic and Atmospheric Administration (NOAA) climatic station (that had records for the same year that soil temperature was monitored) was used to determine the relationship between mean annual soil temperature (MAST) and mean annual air temperature (MAAT). On average from 38 inland sites, the soil temperature was 0.66 degrees Celsius warmer than the air temperature. Areas along the immediate coast were not included because they are influenced by a maritime effect.



Mesic Boundary—New proposed boundary between MLRA 144A and 144B in southern Maine.

A maritime zone (within approximately 20 kilometers of the coastline from Casco Bay to New Brunswick) was excluded from an inland zone as far as MAAT and MAST data comparisons and will remain frigid. In this maritime zone, MAST was (on average from 28 sites) 0.37 degrees Celsius colder than MAAT. This relationship (where soil temperatures at 50cm are, on average, less than air temperature) has been observed in other maritime zones outside of Maine, and is to a large extent a function of fog laden summer days and spruce-fir forest cover types.

With the frigid maritime zone in place and our soil and air temperature difference offset of 0.66 degrees Celsius established, we used the Java Newhall Simulation Model and documentation out of Soil Taxonomy (2nd edition) and Smith et al. (1964), where MAST = MAAT + n °C and n = 0.66° C, to project a zone with MAAT $\geq$ 7.34° C across southwestern Maine using PRISM (Parameter-elevation Regressions on Independents Slopes Model). The subsequent change from frigid to mesic soils in York and Cumberland counties were fine-tuned digitally using parent materials, landscape position, landform, and elevation. The figure portrays the Inland and Maritime Zones and the part of the Inland Zone which is proposed to become mesic.

Soil Systems Approach—An example from MLRA 140 The Glaciated Allegheny Plateau and Catskill Mountains

by Matt Havens, NRCS Soil Scientist, Belmont, New York

We have all been informed that one of the latest goals for the Soil Survey Program is to provide a new focus for Soil Survey. We want to be able to use and transfer our knowledge of soil processes and soil geography gained during the process of making soil maps to explain water movement through landscapes and to understand the subsequent material/chemical movement in order to guide management decisions (e.g. to reduce water pollution; timing and location of soil treatments; to anticipate the fate of soil amendments; etc.).

Below is an example of a Soil System that occurs on higher elevation landscapes (frigid) along the southern and eastern rim of MLRA 140 where we have locally reddish colored tills. This basic landscape system can also be applied to this catena's mesic analog, and for the brownish colored glacial till catenas as well—just the soil series names would need to be changed. Note how in the block diagrams, geomorphology, pedology, stratigraphy, and hydrology are simultaneously displayed in a way that relates each to the other. This is something that cannot be done with words alone in a text-only document. This is the power of the Soil Systems approach.

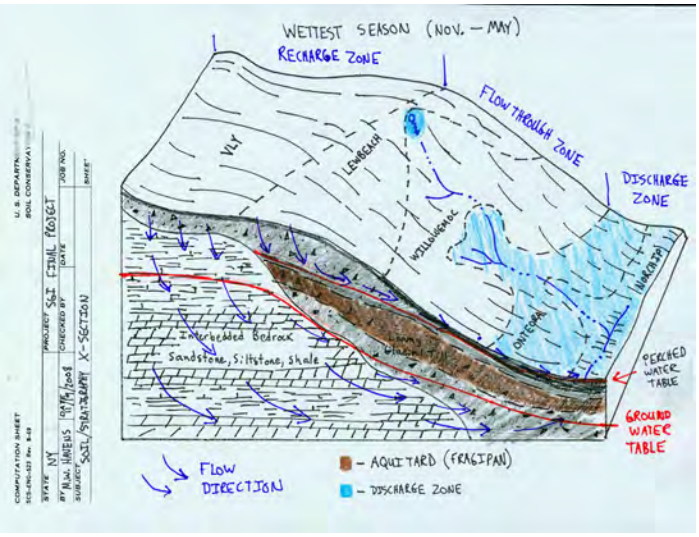


Figure 1.— Block diagram showing the stratigraphy, aquitards, and hydrology, etc. during the wettest season.

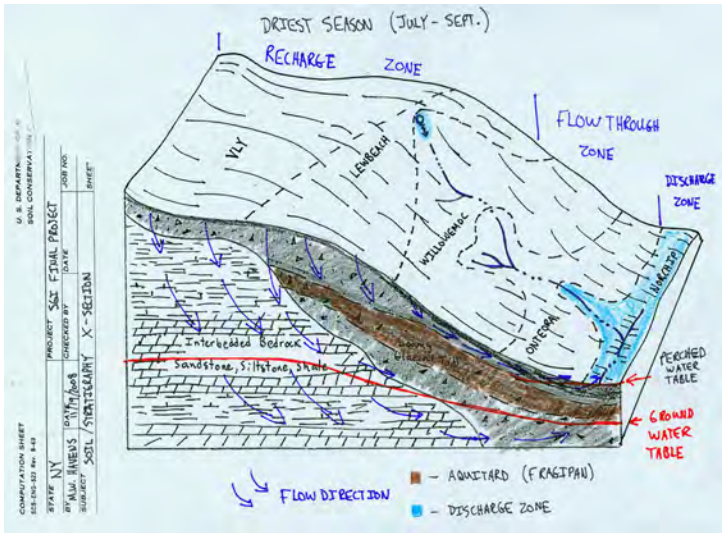


Figure 2.— Block diagram showing the stratigraphy, aquitards, and hydrology, etc. during the driest season.

Background

The soils on this continentally glaciated upland landscape are glacial tills. Some of the soils contain fragipan soil horizons, which act as aquitards, and some do not. Figure 1 is a block diagram showing the stratigraphy, aquitards, and hydrology, etc. during the wettest season and figure 2 shows the stratigraphy, aquitards, and hydrology, etc. during the driest season.

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The soils on the diagram are the following (in order from hilltop to valley bottom):

Vly Series—The Vly series consists of moderately deep, well drained or somewhat excessively drained soils formed in till. These soils are on glaciated bedrock controlled uplands. Slopes range from 0 to 70 percent. Mean annual temperature is 44 degrees Fahrenheit and mean annual precipitation is about 50 inches. **Taxonomic Class:** Loamy-skeletal, mixed, superactive, frigid Typic Dystrudepts.

Lewbeach Series—The Lewbeach series consists of very deep, well drained soils formed in till derived from sandstone, siltstone, and shale. They are gently sloping through steep soils on hillsides and hilltops in the uplands. Permeability is moderate in the surface, moderately slow or moderate in the subsoil, and very slow or slow in the fragipan. Slopes range from 3 to 55 percent. Mean annual temperature is 44 degrees Fahrenheit and mean annual precipitation is 52 inches. **Taxonomic Class:** Coarse-loamy, mixed, semiactive, frigid Typic Fragiudepts.

Willowemoc Series—The Willowemoc series consists of very deep, moderately well drained soils formed in till derived from sandstone, siltstone, and shale. They are nearly level through moderately steep soils on till plains and hillsides in the uplands. Permeability is moderate above the fragipan and slow or very slow in the fragipan. Slopes range from 0 to 35 percent. Mean annual temperature is 44 degrees Fahrenheit and mean annual precipitation is 45 inches. **Taxonomic Class:** Coarse-loamy, mixed, semiactive, frigid Typic Fragiudepts

Onteora Series—The Onteora series consists of very deep, somewhat poorly drained soils formed in till derived from sandstone, siltstone, and shale. They are nearly level through strongly sloping soils on till plains and the lower parts of hillsides in the uplands at elevations of 1,750 to 2,500 feet. Slopes range from 0 to 15 percent. Permeability is moderate above the fragipan and slow or very slow in the fragipan and C horizon. Mean annual temperature is 44 degrees Fahrenheit and mean annual precipitation is 52 inches. **Taxonomic Class:** Coarse-loamy, mixed, semiactive, frigid Aquic Fragiudepts.

Norchip Series—The Norchip series consists of very deep, poorly drained and very poorly drained soils formed in till derived from sandstone, siltstone, and shale. These soils are in upland depressions and have a dense fragipan. Slopes range from 0 to 8 percent. Mean annual temperature is 45 degrees Fahrenheit and mean annual precipitation is 40 inches. **Taxonomic Class:** Fine-loamy, mixed, active, frigid Aeric Fragiaquepts.

Hydrology, Wettest Season: During the period from about November to May, these soils are the wettest. During this time, the Vly soils on the hilltop are the primary recharge area. The soils below the Vly soils contain a fragipan, which acts as an aquitard to downward movement and causes the water to flow laterally across the top of the pan and through the soil, discharging in the lower parts of the landscape (the Onteora and Norchip soils). Sometimes at the contact of the moderately deep (20 to 40 inches to bedrock) Vly soils and the fragipan till soils there are springs that "pop out" on the side of the hill as local discharge points.

Driest Season: During the period from about July to September, these soils are the driest. During this time, the Vly and portions of the Lewbeach soils are the areas of recharge. The Willowemoc and Onteora soils have significantly less (sometimes no) flow through. Occasionally during several days after a heavy summer rain event, the conditions may mimic those of the wet season, but only for a few days. The Norchip soils, at the lowest point of the landscape, are the only place where significant discharge occurs, and even then, it is much less than during the wet season. Some of the discharge from springs will dry up in summer and some will continue to flow throughout the dry season.

Summary—Soil systems are really nothing new to most experienced soil scientists. It is just a way for us to communicate some of the knowledge that exists in our heads to the users of our soil survey information. Often we have taken for granted that others already know this type of information, so we have not always done a good job of communicating it in the past. The soil systems approach will contribute a great deal towards the understanding of our soil maps and the movement of water and other solutes through the landscapes.

Soil Survey Office 12-DFX, Dover-Foxcroft, Maine

More pictures from Matt Dorman's Volunteer Experience in Hawaii

Manini'owali Beach, Kalaoa, Hawaii.

Puna soil pit.

Preparing samples for soil health training course in Hilo, Hawaii.

Extensive Revision of Southern Penobscot County Nears Completion

By Nicholas Butler, NRCS Soil Scientist, Dover-Foxcroft, Maine

Published in 1963, Penobscot County Soil Survey (ME614) is the oldest survey in the state of Maine. The county exceeds 2.1 million acres with the southern third seeing significant urban sprawl since the completion of the mapping in 1958. In 1997, it was determined that the southern third of the county needed an extensive revision to account for the urban development of the Greater Bangor Area.

The extensive revision of Southern Penobscot was approached as if it were an initial soil survey. A memorandum of understanding (MOU) was developed stating the survey would be order 2 in fields, along major water bodies, and in the Greater Bangor Area, with the remaining acreage being mapped as order 3. The original legend was comprised of a collection of map units brought in from the six existing soil surveys that border Southern Penobscot on all sides.

Through the years, there have been three project leaders and over a dozen soil scientists who have worked at some capacity on this survey. With a high priority of completing the once-over soil surveys, very little work was done in Southern Penobscot until recent years. Maine completed the statewide initial soil survey in 2010. Since then, all mapping attention has been focused on completing Southern Penobscot. The final acres were mapped and claimed for the extensive revision in December of 2013; however, at this point there were all of eight map units approved from a legend of 135 and numerous modal pedons to be found.

In 2014, amidst the Soil Data Join Recorrelation Project, the 12-Dover-Foxcroft office was able to collect over 1,200 transect observation points and find the remaining seven approved modal pedons. We are hopeful that the extensive revision of Southern Penobscot will be available to the public in 2015.

Metropolitan-Detroit Soil Survey

by Joseph K. Calus, NRCS Soil Scientist, Flint, Michigan

The Metropolitan-Detroit Soil Survey is in its third year of field work. The soil survey involves 170,000 acres inside of Wayne County which was unmapped when Wayne County was published in 1977. The office responsible for mapping the Metropolitan-Detroit area is the Flint MLRA Soil Survey Office. The Flint office has a staff of three and is 80 miles or 1.2 hours from the study area. The travel time challenged the staff to discover new innovative ways to get the most out of our time. We decided to try to find existing lab data from other sources to supplement our current lab data. Our plan has always been to sample the seven landforms that exist in the city to collect data to help assist us in our mapping efforts. The landforms in the survey area include, water-lain moraines, wave-worked till plains, lake plains, near-shore zones, till-floored lake plains, glacial deltas, and beach ridges.

Figure 1.—A fine-loamy, mixed, mesic, semiactive Aeric Epiaqualfs with an average depth of 38 cm on a water-lain moraine.

In 2012, we contacted Wayne State University's (WSU) Geology Department. Geology professor, Dr. Jeffrey Howard, was working on a contract with U.S. Geological Survey (USGS) on the Detroit Quadrangle. Dr. Howard and some graduate students were mapping out landforms, and along with that project, a graduate student was working on artifacts and their effects on urban soils. The information provided through WSU yielded lab data on more than 12 sites. We also collaborated with WSU on three additional soil pits which were sampled and sent to Kellogg Soil Survey Laboratory.

In 2013, we were notified that the Environmental Protection Agency (EPA) was performing a study on stormwater runoff in urban environments. This study provided us with Geoprobe soil cores and the resulting lab data from over 28 sites. The study was conducted in Detroit and lasted two weeks.

In 2014, the City of Detroit began the demolition of more than 84,000 dilapidated structures. The demolition crews removed all the debris, which includes basement walls, foundations, and basement floors. Figures 1 and 2 were taken from a demolished site. We estimate we saved about three hours of work by not digging or refilling at each of these demolished sites. We also saved time by eliminating the need for cultural resource reviews. The only caveat to the demolished sites is that they are only open for one to three days on average. So when we travel down to Detroit to map, we bring our sampling equipment with us. When we see a sampling opportunity, we simply switch from mapping to sampling.

Figure 2.—A sandy, spolic, mixed, semiactive, mesic Anthropic Udorthents with an average fill of 40 cm on a wave-worked till plain.

The field work will be completed in fiscal year 2015, and we are planning to have the survey ready for Web Soil Survey in the winter of 2017.

Dynamic Soil Properties Project

by Jon Quisler, NRCS Soil Scientist, Grand Rapids, Michigan

This October, members of the Grand Rapids Soil Survey Office started work collecting soil samples as part of their approved Dynamic Soil Properties (DSP) project looking at hydric soils in restored wetlands. Their work is one of a series of nationally proposed DSP projects supported by the staff of the National Soil Survey Center (NSSC) in Lincoln, Nebraska.

Dynamic soil properties are those properties such as surface infiltration rate, nutrient content, and bulk density, which can change relatively quickly over human lifetimes due to changes in management practices. The Grand Rapids MLRA staff is turning their attention to organic soils, which are common throughout the state of Michigan. In the southern half of Michigan's Lower Peninsula, these soils have often been drained and farmed. Over the years, NRCS has spent a lot of time and resources to restore converted and drained wetlands back to their original states. In Michigan, this has included a large number of organic soils, or Histosols, as they are known to soil scientists. One of the questions that this project hopes to help answer is to what extent do restoration efforts restore the soil health of Histosols? This will be accomplished by collecting samples and analyzing the resulting dynamic soil property data on Histosols in MLRA 98 under four different states. These are: actively farmed, recently restored (less than 5 years), established restorations (of more than 5 years), and sites with native vegetation and relatively undisturbed hydrology.

Grand Rapids MLRA Soil Scientist Jon Quisler prepares to take a soil infiltration measurement on the surface of a recently restored wetland. This will measure the amount of time needed for the soil surface to absorb the equivalent of an inch of rain.

The primary organic soils this study is addressing are the Adrian series and the similar Houghton series. These are hydric soils common to the sandy outwash channels and lake plains that comprise large areas of the southwestern Lower Michigan landscape. The Adrian and Houghton mucks in the study comprise over 360,000 acres in MLRA 98. Current sampling sites span six counties in the central portion of the MLRA. Matt Bromley, 12-GRR Office Leader and Jon Quisler, MLRA Subset Leader are doing the sampling for the project, with Greg Schmidt, Ecological Site Inventory Specialist doing concurrent and future ecological site description development for the sites. In addition to the MLRA staff, Erin Segar, Area Resource Soil Scientist, and Dr. Martin Rosek, State Soil Scientist for Michigan, have assisted with project plan development and potential site selection. Also, they will be assisting with analysis of the data.

The data collection is expected to be completed in late summer of 2015. The end result will be data that can be readily populated in NASIS for properties such as Ksat, bulk density, nitrogen and phosphorus content, electrical conductivity, and others. This benefits users with a database populated from real world data. Our ecological classification system specialist will be using the site data gathered to develop future ecological site descriptions.

A summary report will be available which can hopefully be used by NRCS conservationists during program delivery, outreach, and promotional efforts to quantitatively demonstrate the benefits of wetland conservation and restoration.

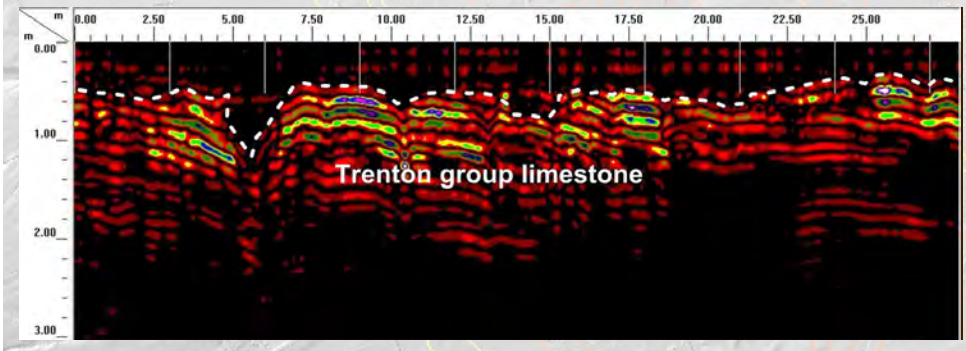
Lewis County, New York Ground-Penetrating Radar Study

by Jerry Smith, NRCS Soil Scientist, Paul Smiths, New York

During the week of September 8, 2014, Jim Doolittle, Research Soil Scientist from the National Soil Survey Center, New York Resource Soil Scientists Olga Vargas and Amy Langner, and Jerry Smith, Paul Smiths MLRA Soil Survey Office Leader, completed ground-penetrating radar (GPR) and electromagnetic induction (EMI) surveys in areas of Amenia and Nellis soils in the Black River Corridor of Lewis County in northern New York.

When originally mapped in the late 1940s and 1950s, both Amenia and Nellis soils were described as having depths to bedrock ranging from about 12 to greater than 40 inches. Different depth phases (shallow, moderately deep, and deep) were recognized and mapped for these soils. Transect data recently collected by traditional methods, shows that the deep phases are variable in bedrock depth and appear to range from moderately deep to very deep. Both Nellis and Amenia are presently recognized as being very deep to bedrock, so GPR studies on these "deep" phases will hopefully give us a better picture of bedrock depth variability and assist us with legend design and improved interpretations for this soil survey update project.

The GPR and EMI information combined with the traditional transect data will hopefully help us determine map unit composition, and develop better interpretations for the high value agricultural areas in these limestone bedrock controlled landscapes in the Black River Corridor of Lewis County, N.Y. This is also an excellent opportunity to employ advanced technologies for soil survey update work and partner with our resource soil scientist staff on these important MLRA update projects. Our plan is to transect with GPR representative Nellis "deep" phase map units in the spring.



Resource Soil Scientist Olga Vargas completes electromagnetic induction (EMI) survey in areas of Amenia soils.

Soil Survey 12-PAS Office Leader Jerry Smith and Resource Soil Scientist Amy Langer excavate soil profiles to confirm a radar depth interpretation.

Pictured to the left is a representative radar record from an area of Amenia loam, 3 to 8 percent slopes (AgB).

First Raster Soil Survey Published in 2014

by Bob Long and Jessica Philippe, NRCS Soil Scientists, St. Johnsbury, Vermont

The Raster Soil Survey (RSS) of Essex County, Vermont was posted to the NRCS Geospatial Data Gateway in 2014, making it the first officially published RSS in the nation. The RSS is a new product, created using automated, knowledge-based mapping methods and terrain derivatives produced from high-resolution digital elevation data. Arc Soil Inference Engine (ArcSIE), a custom ArcMap extension, was used to integrate soil scientists' knowledge of soil-landscape relationships with data representing environmental conditions, in order to create a highly detailed soil map. The project was a joint effort between the 12-STJ MLRA Soil Survey Office, Soil Survey Region 12 staff, and the National Soil Survey Center.

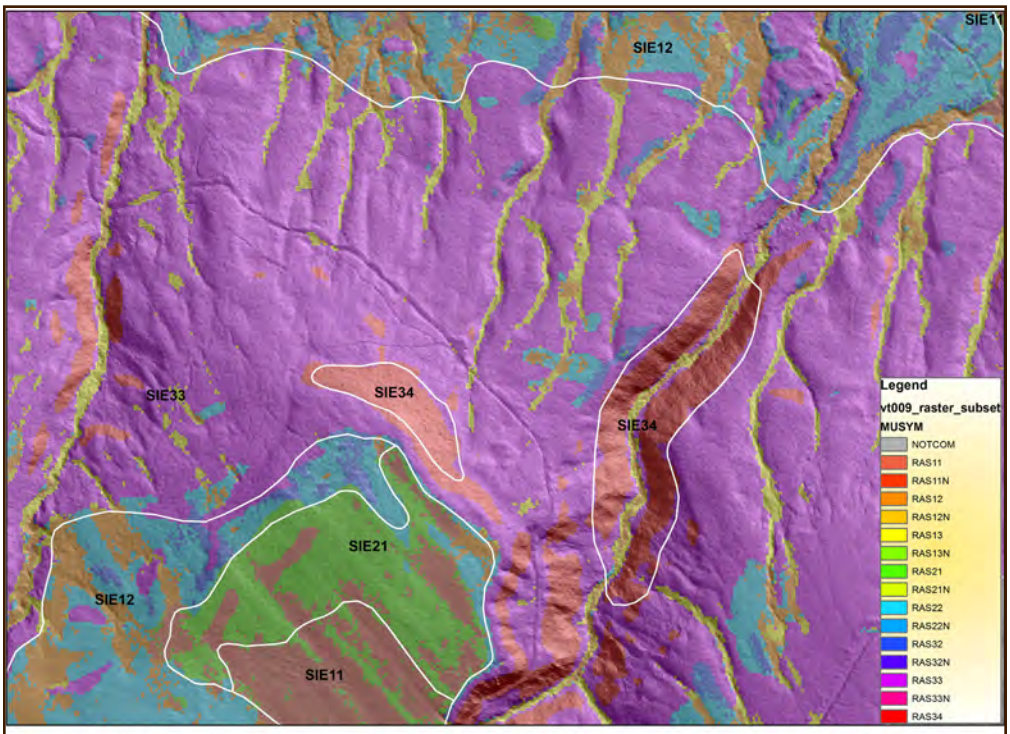


Figure 1. Essex County Raster Soil Survey classes (color) overlain by SSURGO polygons (white lines with black symbols). The image represents an area that is approximately 1.8 kilometers wide.

The RSS depicts the distribution of individual soil classes within the portion of Essex County dominated by loamy lodgment till parent material with predictable soil-landscape relationships. It is considered supplemental to the SSURGO product, which for this parent material was based on the RSS data. The RSS is not limited by a minimum size delineation (other than the 5m pixel size of the product) and thus can show in great detail the complex distribution of what would otherwise be considered minor components within a SSURGO map unit. Figure 1 illustrates the highly detailed RSS catena class raster (shown in color) compared with the SSURGO map unit polygons (white lines).

Similar raster mapping techniques are currently being utilized and expanded in other soil surveys around the country, including the White Mountain National Forest in New Hampshire, and Boundary Waters Canoe Area in Minnesota.

For more information, visit the USDA-NRCS soils website.

MLRA Soil Survey Office Staff Assists Brooklyn College with Soil Microbial Diversity Study

by Marissa Theve, NRCS Soil Scientist, Tolland, Connecticut

Brooklyn College's Alonso Córdoba in a soil pit during the New York City soil microbiology sampling.

In fiscal year 2014, Donald Parizek, Jacob Isleib, and Marissa Theve, NRCS staff located at Tolland, Connecticut, assisted NRCS staff from New York and New Jersey (including State Soil Scientist Richard Shaw and Resource Soil Scientists Olga Vargas and Fred Schoenagel) and researchers from Brooklyn College in describing and sampling soils for a microbial diversity study. The objective of this study, which is sponsored by an NCSS Soil Survey research grant, is to sample soil microbiological communities throughout the city and northern New Jersey and study their connection to dynamic soil properties, including carbon stocks for important urban soils. The principal investigators are Dr. Zhongqi "Joshua" Cheng (an associate professor and chair of Brooklyn College's Department of Earth and Environmental Sciences), Dr. Theodore Muth (an associate professor and head of the microbiology curriculum), and Hermine Huot (a post-doctoral research scientist from France).

In addition to its main objective, the project also provided opportunities for learning and research in soil science for students at an underserved urban university. Brooklyn College undergraduate and graduate students were thrilled to assist in the field with sampling and to learn about urban soils and soil mapping practices in the United States. Many asked about careers in natural resources and about classes they should take to qualify for soil scientist positions. Students from the undergraduate class EESC 3675: Environmental Aspects of Urban Soils will characterize the physical, chemical, and biological properties of the samples collected during the most recent 3-day sampling trip as part of their class exercises.

NRCS soil scientists and students at the Rockaway series pit in northern New Jersey.

The characterization data from the project will ultimately fill a need in the recently completed 1:12,000 initial survey for New York City and complement a 2011 Urban Soil Carbon project. This allows for the calculation of carbon stocks for the entire city. Dynamic soil property data will have applications to urban soils worldwide. Soil series to be evaluated include Charlton, Haledon, Deerfield, Preakness, Laguardia, and Greenbelt soils, which are all benchmark soils, as well as Fortress and Todthill soils. Data will cover more than 26,000 acres of urban parkland and other urban open space.

There is no single "correct" posture or arrangement of components that will fit everyone. However, there are basic design goals, some of which are pictured above.

- **Top of monitor at or just below eye level**
- **Head and neck balanced and in-line with torso**
- **Shoulders relaxed**
- **Elbows close to body and supported**
- **Lower back supported**
- **Wrists and hands in-line with forearms**

Soil Survey Region 12 Safety—Beating the SDJR Blues

by Shawn Finn, NRCS Senior Regional Soil Scientist, Amherst, Mass.

Source materials from the Occupational Health and Safety Administration

Beating the SDJR blues—is it possible? Not surprisingly, Soil Data Recorrelation (SDJR) and other sedentary office work and viewing computers for long periods can lead to health issues and affect safety. Initiatives such as SDJR will come and go, but elements of sedentary office work will always exist in soil survey work.

Office workers are exposed to a number of health risks. Problems can result from: sedentary work, prolonged static postures, incorrect workstation set-up, frequent and repetitive hand or wrist movements, unsuitable temperatures or drafts, inadequate lighting, noise, and restricted access and obstructions. High levels of concentration and information overload, work that is demanding with time pressures, and lack of control over one's work day can lead to stress and fatigue.

The main health problems resulting from office work are musculoskeletal disorders (MSDs), stress, and visual fatigue. Employers, and hence managers, have obligations to analyze workstations, provide information and training to workers, plan daily work routines, and protect workers' eyes and eyesight. There are also requirements relating to equipment and the working environment.

Employees should also take the initiative and free themselves from the chain of computer workstations by taking proper, reasonable steps as well. Here are some suggestions that may help depending on your circumstances:

- Take a 10-minute activity break at a scheduled time every day
- Park farther away from the places where you work, shop, play, study, and worship
- Take the stairs instead of the elevator in multi-story buildings
- Put printers a short walking distance away from your work or study space instead of right next to it
- Replace desk chairs with stability balls — or use a standing desk to get rid of the chair entirely — to burn more calories while working
- Stand up and stretch at intervals during meetings
- Take a walk during lunch

Formal tools exist, too. The Occupational Health and Safety Administration (OSHA) provides an online analysis tool regarding computer workstations that you may find helpful in mitigating negative health risks in this environment.

Personnel Updates—Meet the Newest Members of the Soil Survey Region 12 Team

Carla Ahlschwede, Soil Scientist

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Carla Ahlschwede reported for duty as a Soil Scientist to the Flint, Michigan Soil Survey Office on August 10, 2014.

Carla is from Lincoln, Nebraska. She received two Bachelor of Science degrees and a Master of Science from the University of Nebraska in Lincoln. Her undergraduate research focused on wildlife and water sciences, and she conducted an independent research project using stable hydrogen isotopes to monitor bird migration. During her graduate career, Carla worked as a Pathways Intern with USDA Agricultural Research Service office in Lincoln. Carla's thesis included work on soil microbiology, nitrogen balances, and greenhouse gas emissions in soils used for switchgrass production. She spent part of her graduate tenure volunteering for Environmentors, a program that encourages high school students from under-represented backgrounds to pursue degrees in science, technology, engineering and math (STEM) fields by offering research opportunities and scholarships.

After graduation, Carla worked for the Nebraska Department of Roads as a National Environmental Policy Act (NEPA) permitting specialist. She moved to Michigan in June of 2014, and has been assisting the Flint office with the initial soil survey in Detroit.

Donna Miranda-Berneche, Administrative Assistant

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Donna Miranda-Berneche was the Administration Non-Commissioned Officer in Charge (NCOIC) for the 58th Aerial Port Squadron, 439th Aircraft Maintenance Squadron, 439th Maintenance Squadron, and 42nd Aerial Port Squadron at Westover Air Reserve Base, Chicopee, Massachusetts, for 27 years before joining us at the Soil Survey Region 12 Office on March 23, 2014. She was called to active duty in October 2001 in response to the September 11th attacks. She coordinated over 15 deployments involving more than 500 personnel. Donna brings extensive administrative and human resource experience to our regional office. She hopes to make all the new administrative transformations as smooth as possible for everyone.

When not working at SSR 12, Donna enjoys spending time with her husband, two children, and two grandchildren. She's also looking forward to gardening with her grandson in the backyard of their new home utilizing the new skills and knowledge she's learned from the soils staff.

Estella Smith, Soil Data Quality Specialist

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Estella Smith joined the Soil Survey Region 12 staff as a Soil Data Quality Specialist on October 20, 2014. Prior to joining the SSR 12 staff, Estella worked as a soil scientist with USDA-Forest Service Southwestern Regional Office on the Terrestrial Ecological Unit Inventory (TEUI) in Phoenix, Arizona for six years. She worked on a detail to Tonto National Forest to assist on soils analysis for forest plan revision and served as the Acting Project Leader for Arizona's TEUI program from February 2013 until the position was filled in April 2014. She has completed all the initially TEUI ecosystem mapping on the Tonto National Forest. Estella was also a member of the Incident Management Team (IMT) Type One Fire Team as a computer specialist. "Being a part of IMT is very rewarding by providing assistance to others during natural disasters," Estella said.

Estella started her federal career with NRCS in the Student Career Experience Program (SCEP) as a Soil Conservationist Student Trainee, working in the Adams and York County offices in Pennsylvania. Estella graduated in May 2006 from Delaware Valley College (Doylestown, Pa.) with a Bachelor of Science in Agronomy and Environmental Science and a minor in chemistry. After graduation, she worked as an NRCS Soil Scientist Student Trainee in the Western Pennsylvania Soil Resource Office located in Greensburg, Pa. She assisted in updating soil surveys and entering data into PedonPC. In addition, she assisted the Pennsylvania NRCS State Soil Scientist with site descriptions for the 18th World Congress of Soil Science, the Mid-Congress Tours. Estella has attended Cryosols and Arctic Tundra Ecosystem, Alaska Post Congress Tour associated with World Congress of Soil Science in July 2006.

Jamin Johanson, Ecological Site Specialist

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Jamin Johanson has been an Ecological Site Specialist in Utah since 2008. He received his Bachelor of Science and Master of Science degrees in Range Science from Utah State University, where he studied state-and-transition model development for ecological site descriptions (ESD) within the great basin region. For his work on ecological site descriptions, Jamin was recognized in 2014 as the Outstanding Young Range Professional in the state Utah by the Society for Range Management.

Jamin is constantly exploring new and better ways to deliver ecological site information to NRCS planners and partners by developing new tools, organizing ESD workshops, and leading collaborative ESD development projects. Jamin helped initiate and is currently participating on the National Interagency Team for Riparian ESD development.

Jamin enjoys spending time outdoors with his wife and four children. He is looking forward to exploring and describing the forests, coasts, and wetlands of New England.

Janella Cruz, Soil Scientist

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Janella Cruz was born and raised in Bayamon, Puerto Rico. She got her Bachelor of Science in Environmental Science with a minor in chemistry from Universidad Metropolitana in San Juan, Puerto Rico and her Master of Science in Agronomy with a minor in environmental management from New Mexico State University.

Janella's professional career as a soil scientist started in 2009 in Rapid City, South Dakota, where she worked on soil survey updates for the National Park Service and completed a detail in Florida for the rapid carbon project. In 2011, Janella transferred to the Flagstaff Soil Survey Office to further her professional skills. During this time, she went on detail to Wyoming to work on initial mapping, mentor student interns, and update soil survey work for the National Park Service and the Navajo Nation. On November 17, 2014, Janella reported for duty at the Paul Smiths MLRA Soil Survey Office and looks forward to the new professional experiences in the Adirondack region.

During her years in graduate school, Janella was International Service Director for Rotaract club, which helped to manage and mentor community based projects for women and the underprivileged in the southern region of New Mexico and Centro Santa Catalina in Juarez, Mexico. In 2010 Janella became a member of the National Organization of Professional Hispanic Natural Resources Conservation Service Employees (NOPHNRCSE) and is currently a board member serving as Secretary of the organization. Throughout her education and professional career, Janella has been active in civil rights and the mentoring. She frequently coordinated and volunteered in outreach opportunities in Arizona and plans to continue her community involvement in the Adirondack region.

Michael Margo, Ecological Site Specialist

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Michael Margo joined the 12-Tolland Soil Survey Office staff on November 17, 2014, as the Ecological Site Specialist. Originally from Rio Grande City, Texas, a small border town in southern Texas, he received his Bachelor of Science and Master of Science in Rangeland Ecology and Management from Texas A&M University. Michael has a strong background in conducting Ecological Site Descriptions (ESDs) in the west. For over eight years, he led the development and coordination of ecological sites with soil surveys in Marfa, Texas—and he will be applying his expertise developing ESDs across our region. Michael is also a member of the NRCS foreign advisory team and he has presented several presentations on ecological site concepts and development in Guadalajara, Mexico City, and Aguascalientes, Mexico.

Prior to arriving in Marfa, Michael spent two years with the National Park Service as a Supervisory Biological Science Technician at Rocky Mountain National Park in Colorado and two years as an AmeriCorps volunteer promoting environmental awareness issues in Texas' Lower Rio Grande Valley.

(Margo continued on page 18)

Michael's leadership skills include serving as the 2014 Texas Section Society for Rangeland Management Annual Meeting, Alpine/Marfa, Texas, Planning Committee Co-Chair; 2014-2016 National Organization of Professional Hispanic NRCS Employees Executive Vice President; 1999-2000 Soil and Water Conservation Society, Texas A&M Chapter, Vice President; and the 1998 Rio Grande City Sesquicentennial Commission, Public Relations Chairman. He also served as chairman of the Commercial Livestock Committee, Starr County Youth Fair, 1998.

Nels Barrett, Ecological Site Inventory Specialist

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Nels Barrett hails from Mansfield Center, Conn. He holds a Ph.D. in Ecology from the University of Connecticut (go Huskies) and did a post doc at the Institute of Ecosystem Studies in Millbrook, N.Y. Nels has a lot of plant ecology work experience throughout the northeast including: running field ecology labs at the University of Connecticut, coordinating research for the University of Rhode Island's Coop program, conducting numerous ecological and botanical surveys for The Nature Conservancy and State Natural Heritage Programs, and conducting the National Wetlands Inventory for Connecticut. Pre-college years, he was an apprentice cabinet-maker. Most recently, Nels worked on all things ecological at CT-NRCS including initiating Ecological Site Descriptions (ESD). His wife, Dr. Juliana Barrett, is also an ecologist (occasional collaborator or rival). They have two teenage sons, a retired service dog (Fidelco seeing-eye dog), and an indifferent cat. Nels enjoys string music—and will maybe someday even build his own hardanger fiddle.

Rebecca Fox, Soil Scientist

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Rebecca, originally from the southeastern United States, was raised in both Shreveport, Louisiana and Little Rock, Arkansas. She graduated from Louisiana State University, where she received her Bachelor of Science in Environmental Management Systems with a concentration in resource conservation.

Rebecca started with NRCS in 2010 as a summer intern in the Opelousas MLRA Soil Survey Office in Louisiana. She completed her second summer as an intern in the MLRA soil survey office in Denham Springs, Louisiana, where she assisted in field data collection for the Rapid Carbon Initiative. Rebecca was hired as a fulltime soil scientist in the Opelousas office in 2011. She worked on MRLA field projects and assisted with special studies. During the national reorganization, she was relocated to the MRLA soil survey office in Hot Springs, Arkansas. She worked in Hot Springs for two years on Soil Data Join Recorrelation (SDJR) and MLRA field projects.

Rebecca reported for duty in New York on November 17, 2014—and she is very excited for the opportunity to work in the Paul Smiths MLRA Soil Survey Office. In her free time she enjoys hiking, running, camping, gardening, and cooking. She is very excited to try all of these activities and more in the Adirondacks!

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Glacial Gazette is published by USDA-NRCS, Glaciated Soil Survey Region 12 (SSR 12) in Amherst, Massachusetts. SSR 12 provides technical leadership and support in the production, quality assurance, and delivery of scientifically based soil survey and ecological site inventory information throughout the northeastern United States.

Your suggestions, comments, and articles are welcome! Articles may be sent via email as either an MS Word attachment saved as text only, or pasted directly into your email message. Photographs should be emailed as a separate jpg attachment. Please include a caption for each photo submitted.

Send items to SSR 12 editor, **kristina.wiley@ma.usda.gov.**

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