Use of Gridded Soil Survey Geographic Data

(gSSURGO and gSTATSGO2)

(USDA Legacy Detailed Soil Survey and General Soil Map of US Geographic Databases)

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Acknowledgements

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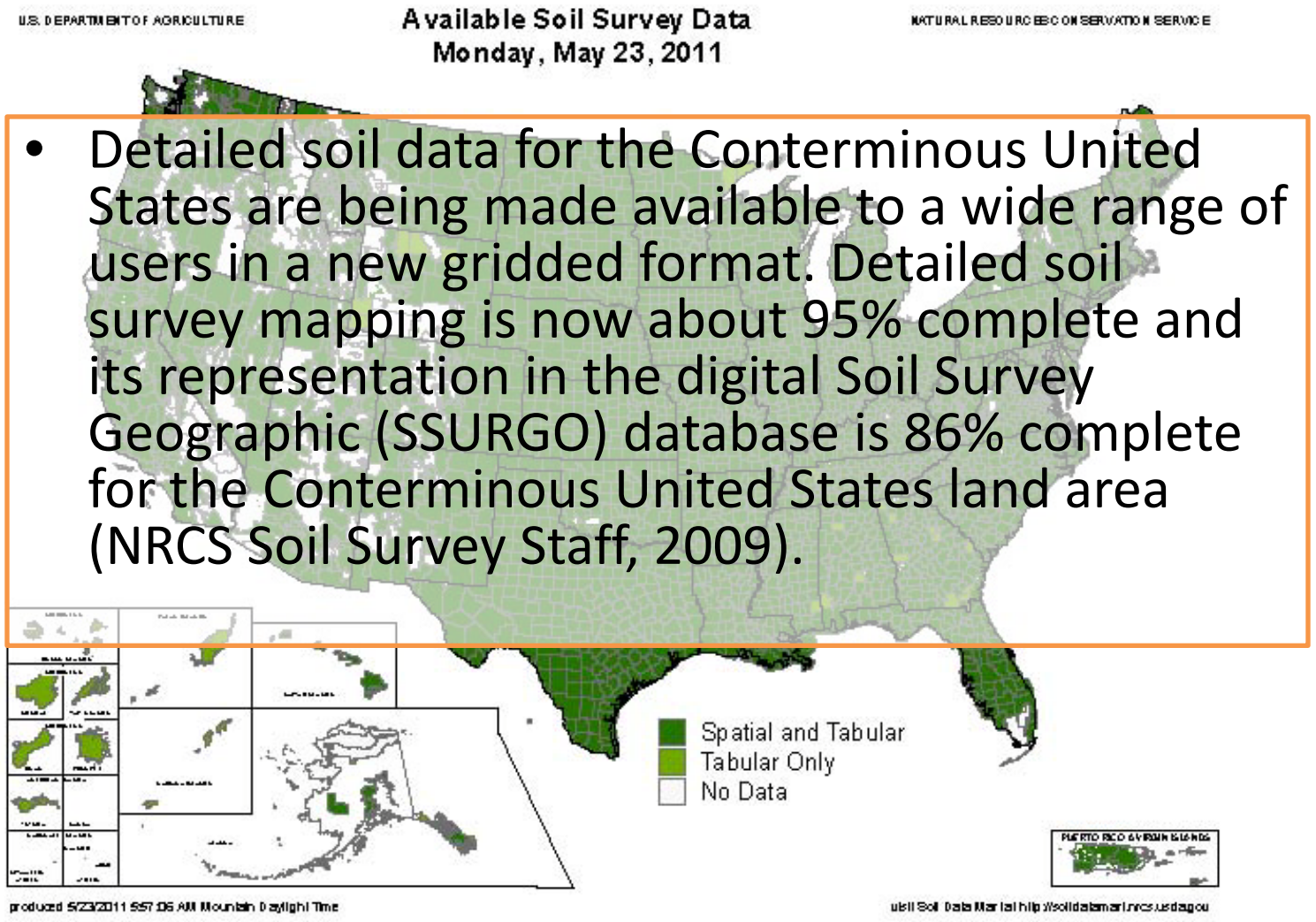

- Detailed soil data for the Conterminous United States are being made available to a wide range of users in a new gridded format. Detailed soil survey mapping is now about 95% complete and its representation in the digital Soil Survey Geographic (SSURGO) database is 86% complete for the Conterminous United States land area (NRCS Soil Survey Staff, 2009).

Source: Bliss, Norman B., Sharon W. Waltman, and Anne C. Neale (2010), Detailed soil information for hydrologic modeling in the Conterminous United States, Abstract H43B-1227 presented at 2010 Fall Meeting, American Geophysical Union, San Francisco, Calif. 13-17 Dec.

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NRCS Natural Resources Conservation Service

Detailed Soil Information for Hydrologic Modeling in the Conterminous United States

H43B-1227

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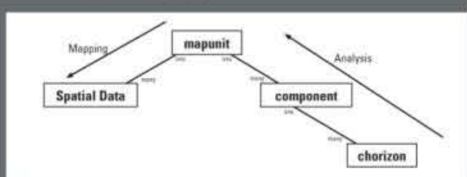
Introduction

Detailed soil data for the Conterminous United States are being made available to a wide range of users in a new gridded format. Detailed soil survey mapping is now about 95% complete and its representation in the digital Soil Survey Geographic (SSURGO) database is 86% complete for the Conterminous United States land area (NRCS Soil Survey Staff, 2009). The soil properties of interest to one specific group of users, hydrologic modelers, include available water capacity, bulk density, saturated hydraulic conductivity, field capacity, porosity, average soil thickness, soil organic matter or carbon content, and percentages of sand, silt, clay, and rocks. The methods for creating the gridded format data summarize the attributes across soil horizons and soil components to create a value for each attribute at the map unit level. Separate [illegible] developed for specific depth zones as required. The SSURGO data are being continuously improved by the National Cooperative Soil Survey (NCSS) under the leadership of the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). Readily accessible gridded [illegible] several advantages over vector data, such as easier integration with other [illegible]. Currently, these data are being made available at a 30-meter resolution in the Albers Equal Area projection. The compilation of the new database has been made possible [illegible] of Sustainable Ecosystem Services being developed under the leadership of [illegible] Protection Agency (EPA), along with many partner organizations including the NRCS and the U.S. Geological Survey. When complete, the Atlas information will include [illegible] will be used in a wide variety of ecosystem service assessments. The Atlas [illegible] created through this effort to help estimate ecosystem services related to climate regulation, food and fiber, water quality and quantity, habitat, and protection from flood events.

Methods

The soil attributes for each map unit were calculated following the methods of Bliss (2003) and Bliss et al. (1995). The primary data source was the SSURGO database (NRCS Soil Survey Staff, 2009), using a snapshot of SSURGO data as of December, 2009. The SSURGO database has a relational database structure, so estimates of attributes were calculated by horizon, component, and map unit, as shown in figure 1. The estimates for each map unit were computed as mass measures in g m^{-2} or volume measures as m m^{-1} or as the percentage of component area having a specific class of soil properties. We began with a 10-meter gridded version of SSURGO from NRCS and resampled to a 30-meter cell size for analysis and a 1,200-meter cell size for national display. Where SSURGO data were not available, the results were substituted from a similar analysis using the General Soil Map (STATSGO2) of the United States, a successor to the State Soil Geographic (STATSGO) Database (NRCS Soil Survey Staff, 1992; 1994).

The basic SSURGO and STATSGO2 data attribute structure is given in figure 1. The analysis of soil attributes starts on the component horizon (*chorizon*) table, aggregates the quantitative measures over the appropriate layers for a given analysis, and stores the result at the level of the component table (*component*). A weighted average of the component values is computed using the representative component percentage (comppct_r) as the area weighting factor, and the results are stored at the level of the map unit (*mapunit table*). These results are then copied to the spatial datasets where they are used to display maps.

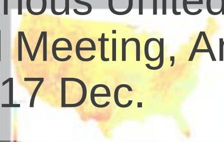


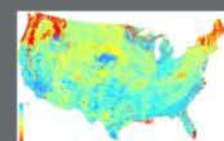
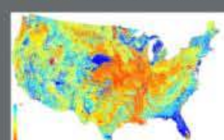
Ideally, the component percentage would add to 100 percent for each map unit; however, this currently occurs for only 54 percent of the map units. If the sum of the component percentages was not 100 percent, then the results were scaled to 100 percent. If no data were present for SSURGO, information was substituted from STATSGO2.

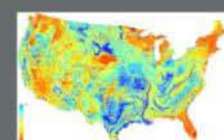
Additional soil attribute datasets (not shown) have been computed by depth zone. Depth zones (in centimeters) can be defined by users, and we have chosen 0–5, 5–20, 20–50, 50–100, 100–150, and greater than 150 cm, plus three additional zones at 0–30, 0–100, and 0–150 cm. The results presented here are for the total profile (all horizons present in the database) unless otherwise noted.

Results and Discussion

The soil attributes useful for modeling water in soils may be considered in four categories: 1) volume of water, 2) bulk density, 3) mass of soil particles, and 4) rates of water movement. The volume of water is useful for parameterizing water storage terms in hydrologic models, and examples of relevant soil variables would be available water capacity, average soil thickness, field capacity, and porosity. The bulk density [illegible] mass basis and is required for analyses that include soil mass [illegible] given in the soil dataset [illegible] (derived from soil organic matter) and percentages of sand, silt, clay, and rocks. The organic matter holds water in greater proportion to its mass than the mineral soil particles. The percentages of sand, silt, clay, and rocks are used by some models to estimate water capacities, but if this is the purpose, we recommend using the available water capacity, which can more precisely summarize this information. The hydrologic group variable is an ordinal ranking of relative infiltration rates where code "A" represents fast infiltration and code "D" represents slow [illegible] and "C/D") where the infiltration will be slow (i.e., code "D") if the soil is not artificially drained, and higher [illegible] give information on whether or not a soil has been drained. A separate map is generated for each case showing the percentage of land area (percentage of components) with that case, and only case "B" is shown here. The saturated hydrologic conductivity is a measure of the movement of water through a soil (e.g., μm s^{-1}). As a rate variable, this cannot properly be averaged across soil horizons, so the map shown here is not recommended for direct use in models. A better approach would be to use the conductivity measure of specific depths, or to use the [illegible] types of maps that can be generated from the SSURGO data, with gaps filled from the STATSGO2. Figure [illegible] the "representative value").





Conclusions

Many hydrologic models use soil information to represent the capacity of soils to hold water and the rates of infiltration and flow of water through soil. The national Soil Survey Geographic (SSURGO) Database provides an excellent source for this type of information, but it is a complex database designed to capture as much information as possible. Its native vector format requires pre-processing to match the needs of distributed hydrologic modeling which generally uses raster grid cells. The examples shown here were designed to preserve as much detail as possible from the original datasets while making the data structure [illegible] modelers.

We consider the results from SSURGO (compiled at 1:12,000 and 1:24,000 map [illegible] than those from the STATSGO2 (compiled [illegible]). NRCS and cooperating agencies have invested considerable resources in upgrading the quality of the soil databases in [illegible] reflected in the SSURGO data. Most of [illegible] SSURGO data are on Federal lands in the Rocky Mountains and Alaska.

[illegible] attributes, of which perhaps 300 will be useful for biogeochemical modeling and 50 will be useful for hydrologic modeling. The SSURGO processing for the National Atlas of Sustainable Ecosystem Services is designed to create raster versions of soil attributes by depth zones that are easy to use, and to save modelers the effort of having to spatially mosaic information from many soil survey areas and to learn a complex hierarchical relational database structure for attribute information. We welcome interchange with modelers on the formats and data attributes that will meet their needs.

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Acknowledgments

This work was supported by the U.S. EPA Landscape Ecology Program, the USGS Climate Effects Network, and by the USDA/NRCS Soil Survey Program, and uses data collected by the National Cooperative Soil Survey.

Figure 2. Average soil thickness is the maximum depth of soil recorded by soil scientists or the depth to bedrock, whichever is less. There may be “county boundaries” in the data because different soil surveys used different conventions on the maximum depth of soil to record in the database (e.g., 60 inches or 80 inches). [hzdepb_r] (SSURGO + STATSGO2 12/30/2009)

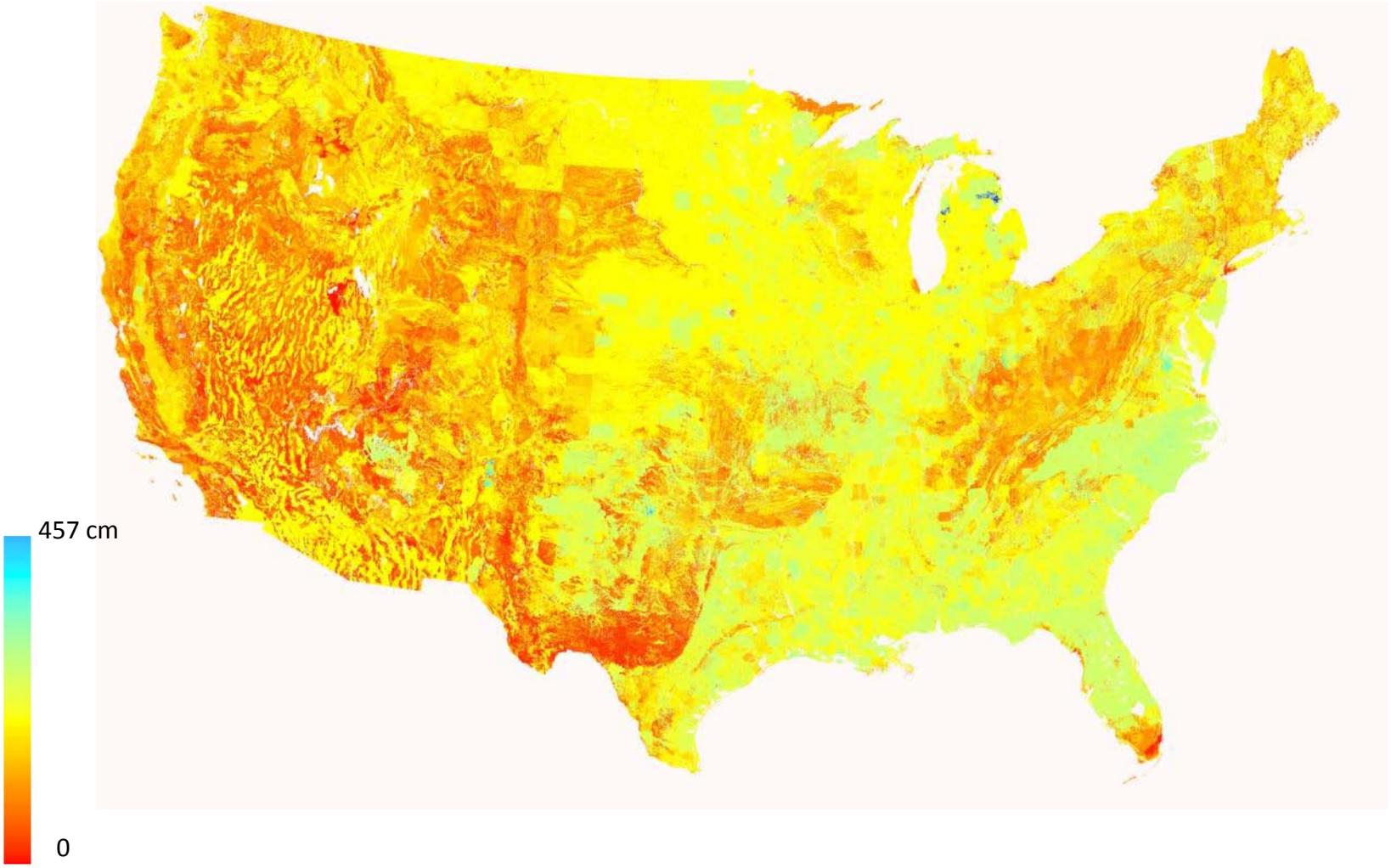


Figure 5. Available water capacity is a measure of how much water the soil can hold and make available to plants. Intuitively, it is the difference between the moisture content at field capacity and the moisture content at the permanent wilting point, which are represented in laboratory measurements as the water contents at 33 kPa and 1,500 kPa, respectively. The measure is a dimensionless ratio of the volume of water divided by the volume of soil, where the volumes are often represented as a thickness on a per-square-meter basis (e.g., cm of water per cm of soil). [Uses SSURGO variable awc_r.]

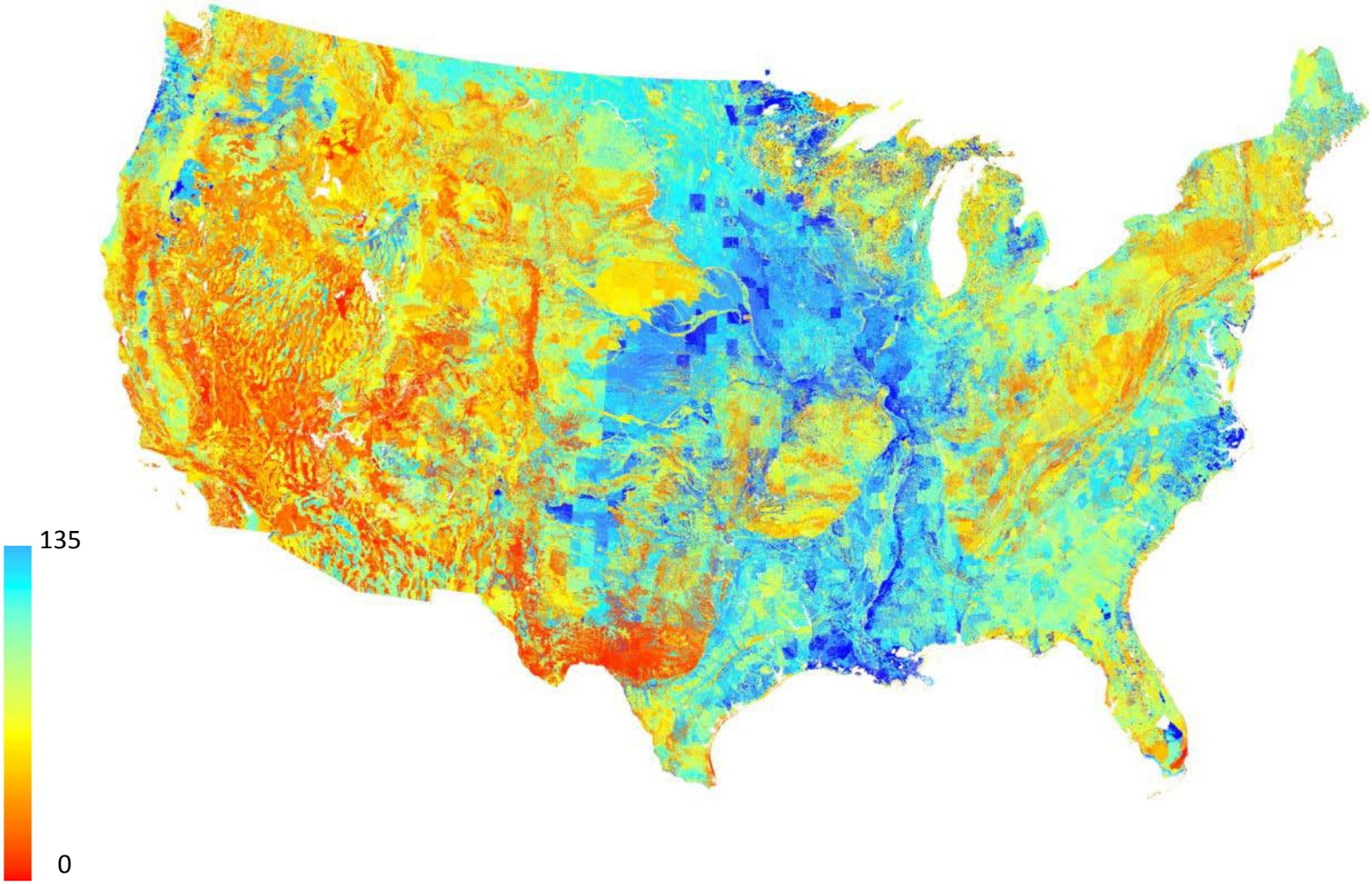


Figure 7. Bulk density is the mass of soil divided by the volume of soil for the fraction of soil with particles less than 2 mm in diameter (i.e., excluding rocks). The mass is measured on an oven-dry basis, and the volume at a water content with 33 kPa soil water tension. [dbthirdbar_r]

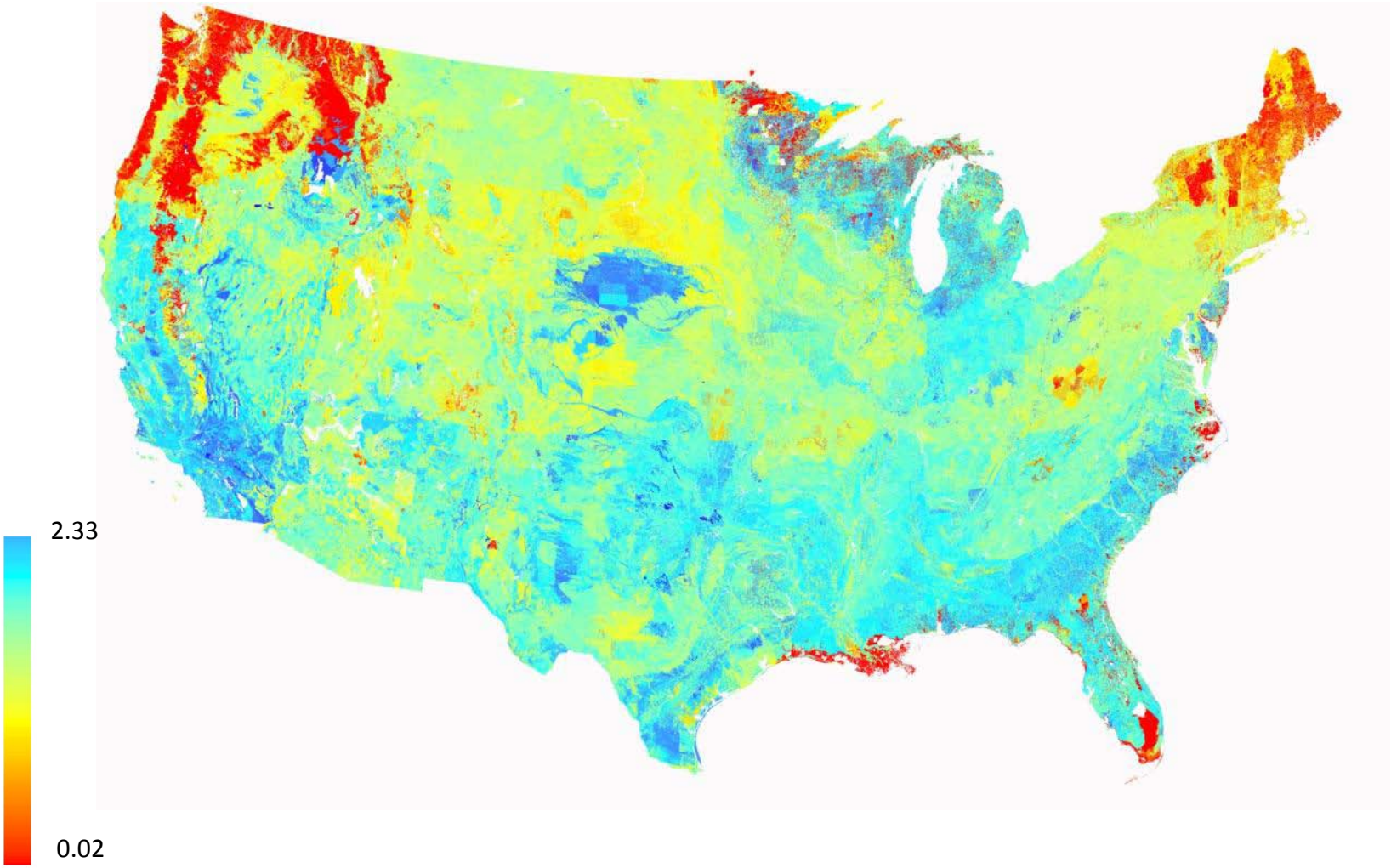


Figure 8. Sand percentage from the ratio of the mass of sand to the mass of soil fines (soil particles less than 2 mm diameter). [sandtotal_r, dbthirdbar_r, and others]

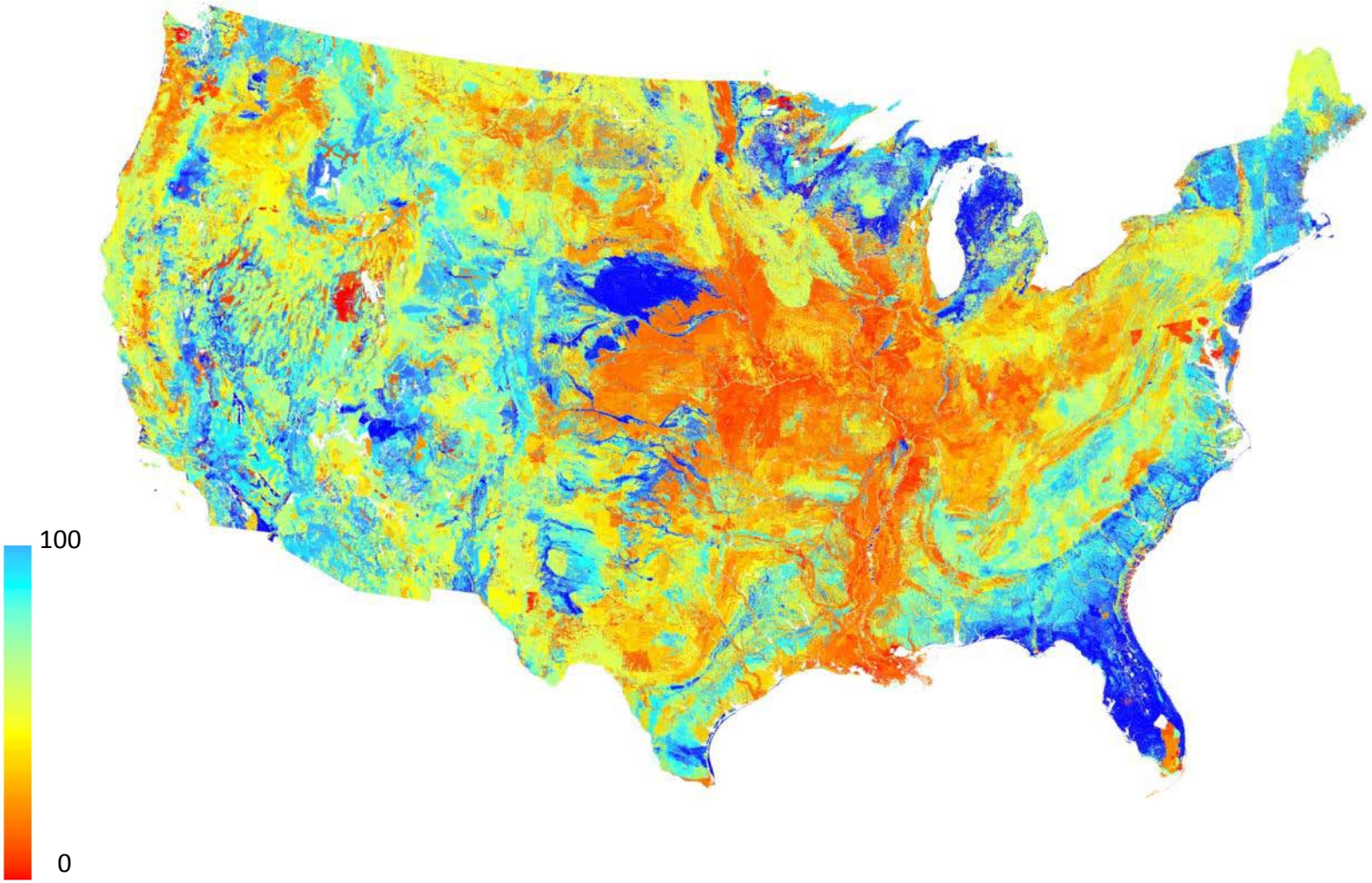


Figure 9. Silt percentage from the ratio of the mass of silt to the mass of soil fines. [silttotal_r, dbthirdbar_r, and others]

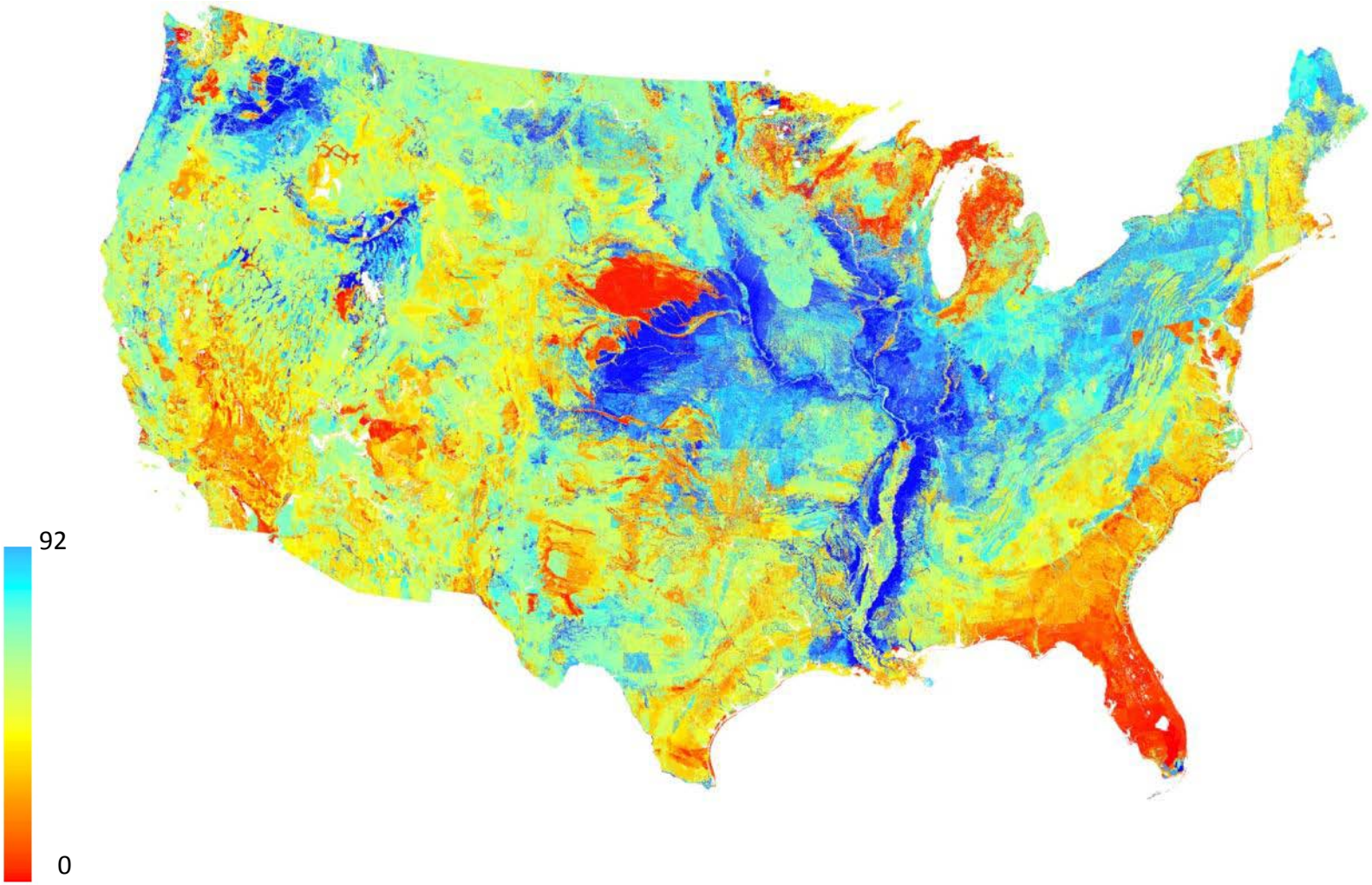


Figure 10. Clay percentage from the ratio of the mass of clay to the mass of soil fines. [claytotal_r, dbthirdbar_r, and others]

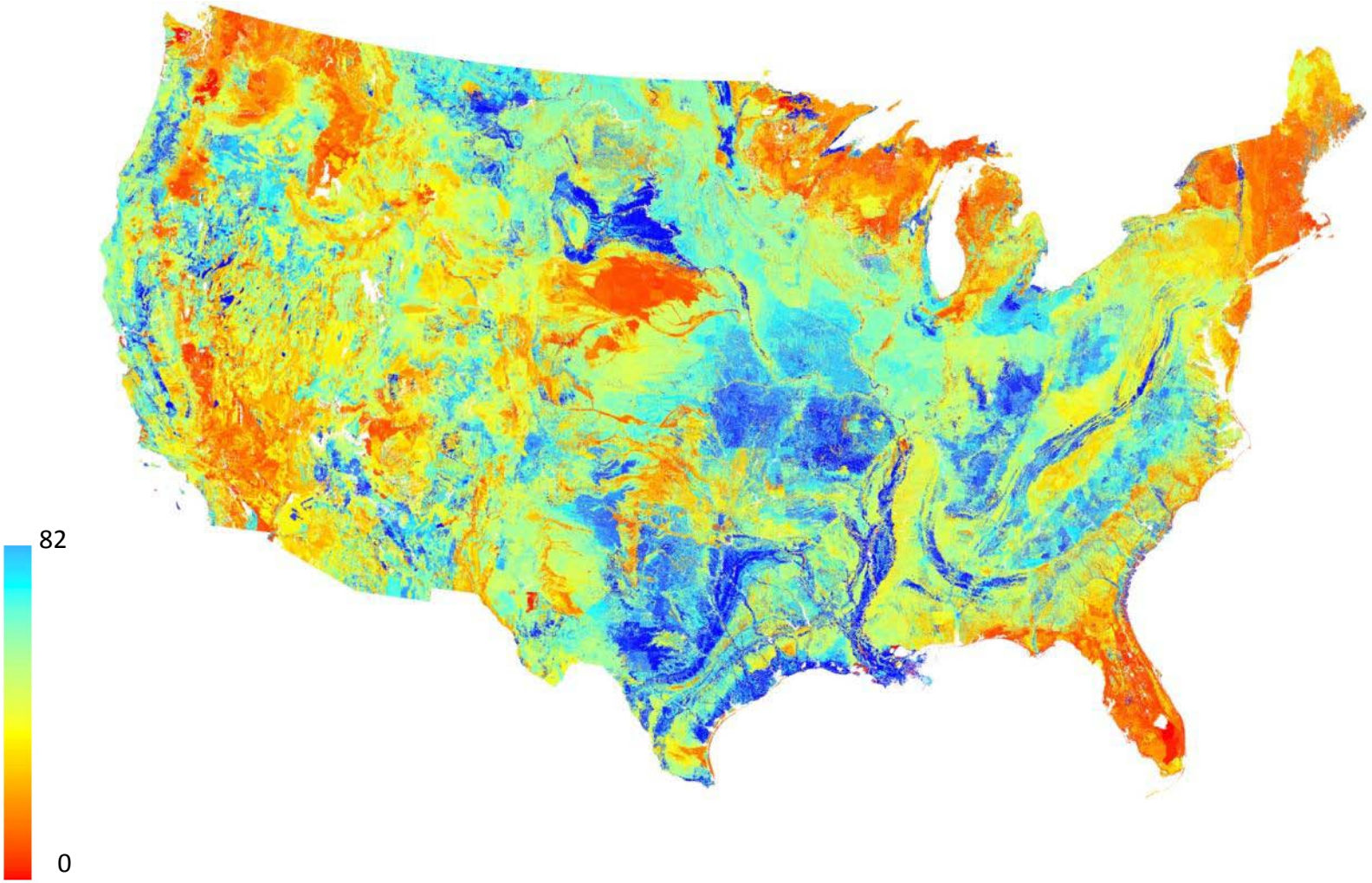
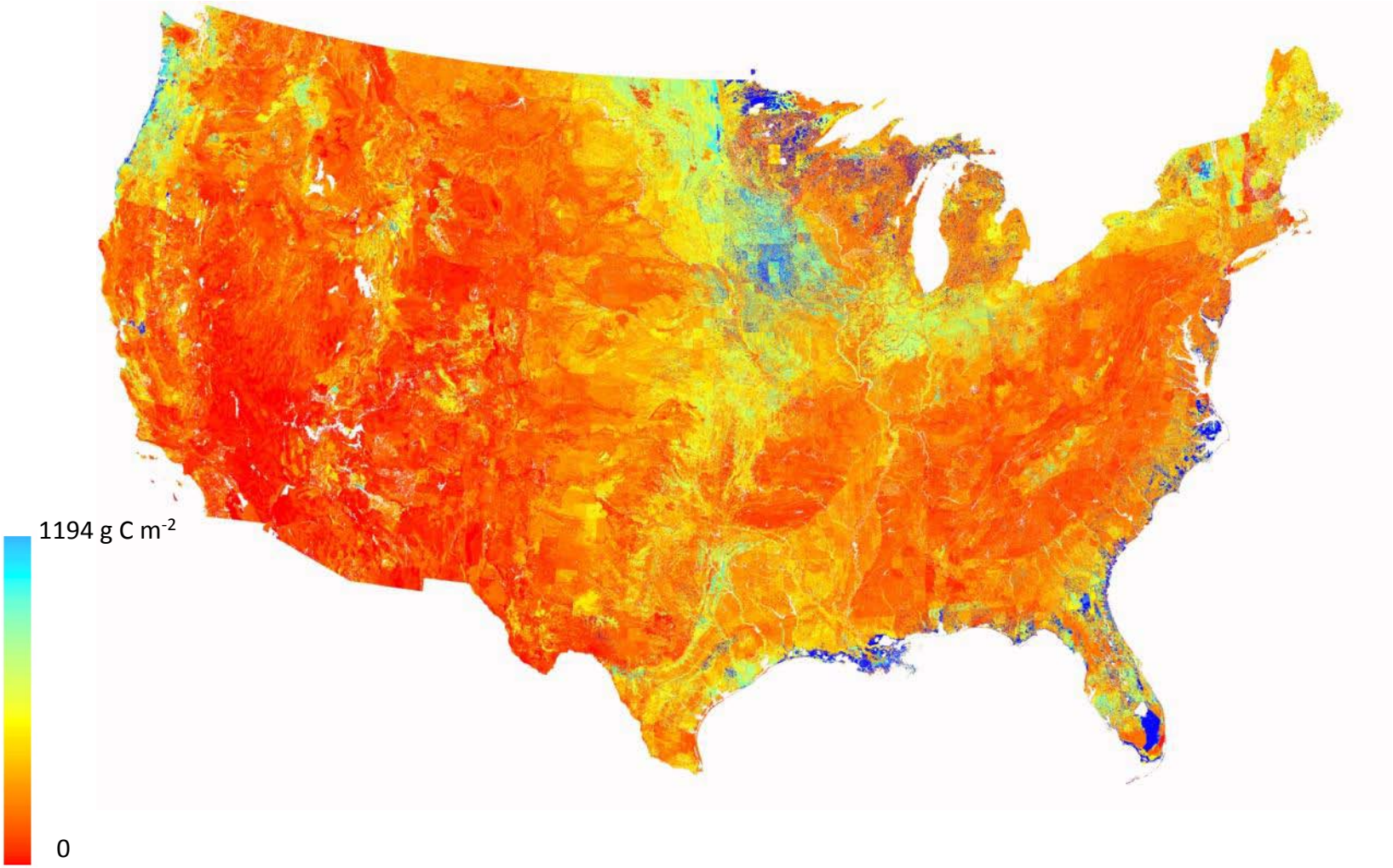


Figure 11. Soil carbon content (from soil organic matter content). The carbon content is computed from the organic matter content, accounting for the bulk density, volume of rocks, and a conversion factor (0.58) for the mass of carbon per unit mass of organic matter. [om_r, dbthirdbar_r, and others]

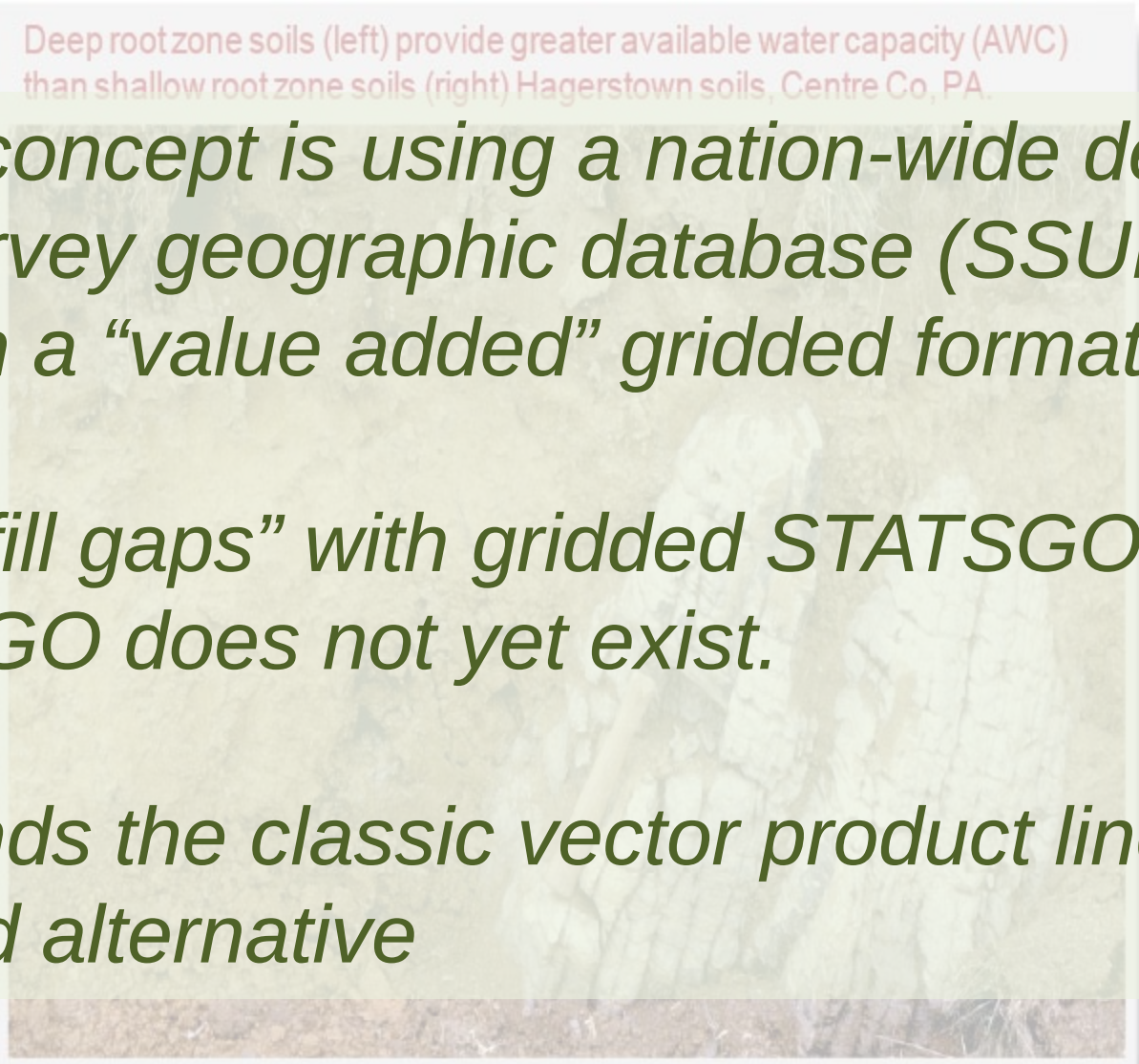


Gridded SSURGO

Deep root zone soils (left) provide greater available water capacity (AWC) than shallow root zone soils (right) Hagerstown soils, Centre Co, PA.

NRCS

Gridded SSURGO



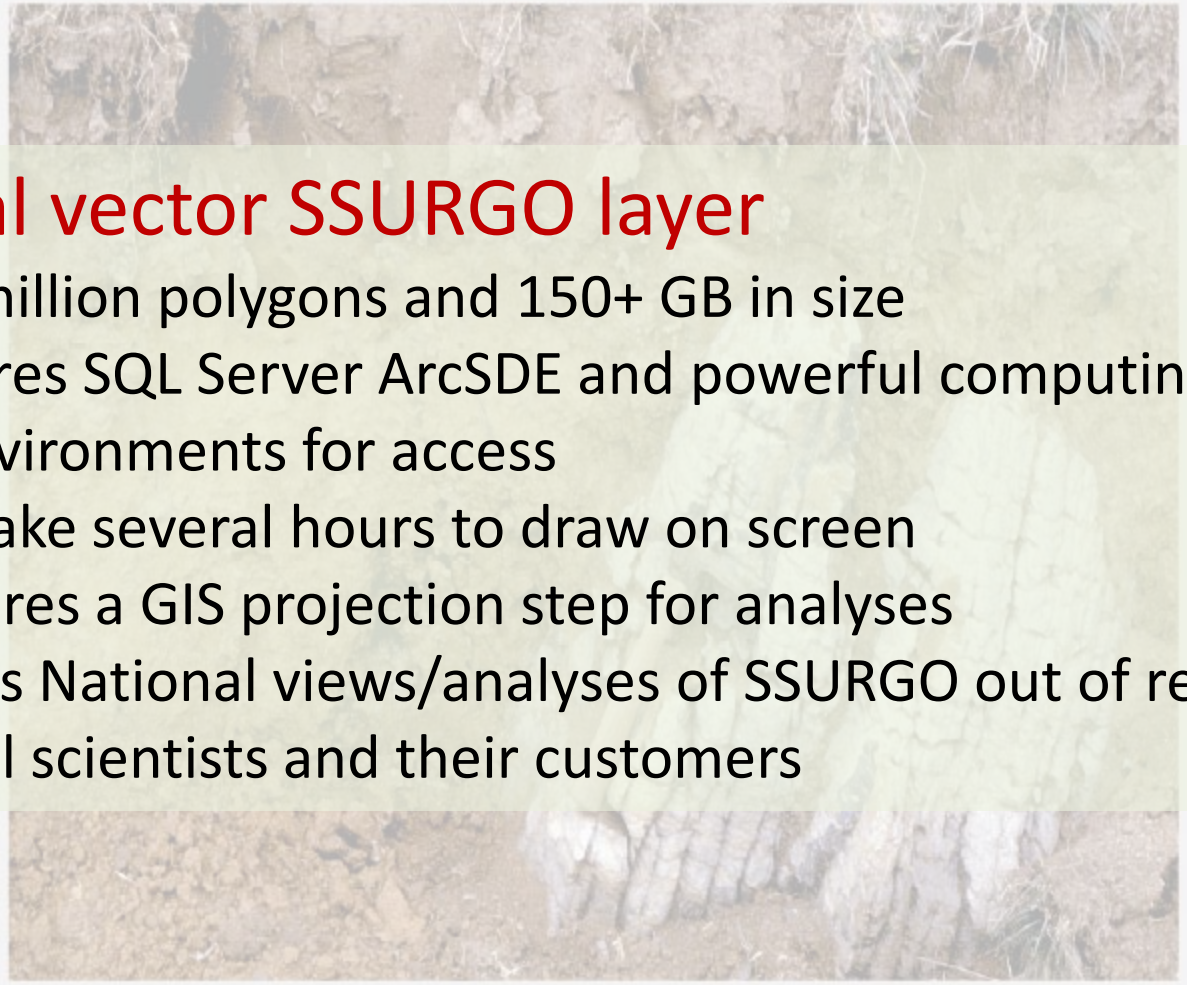
A key concept is using a nation-wide detailed soil survey geographic database (SSURGO) layer in a "value added" gridded format.

Also, "fill gaps" with gridded STATSGO2 where SSURGO does not yet exist.

"Expands the classic vector product line" with a gridded alternative

NRCS

Gridded SSURGO



National vector SSURGO layer

- 35+ million polygons and 150+ GB in size
- requires SQL Server ArcSDE and powerful computing environments for access
- Can take several hours to draw on screen
- Requires a GIS projection step for analyses
- Makes National views/analyses of SSURGO out of reach for NCSS soil scientists and their customers

NRCS

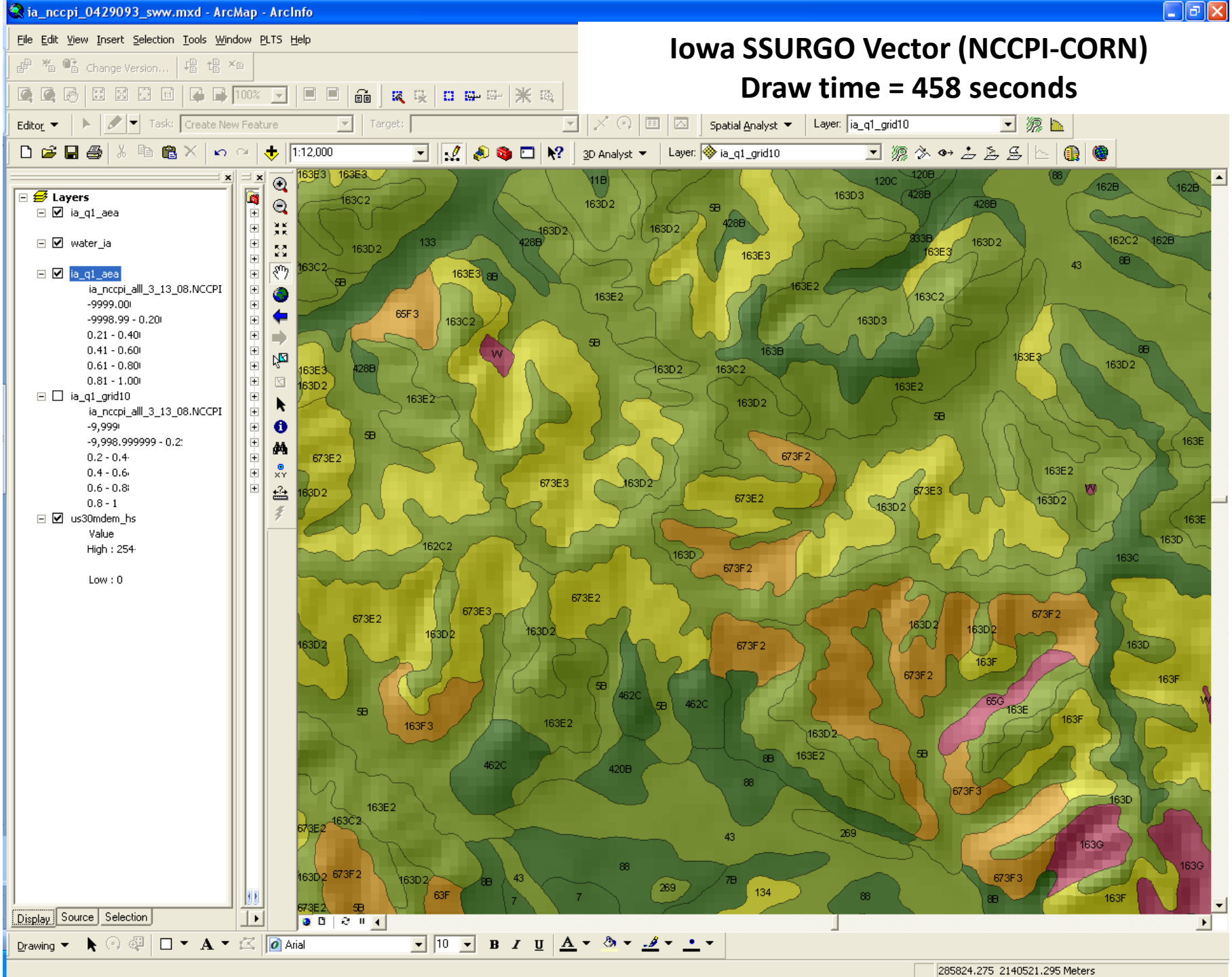
Gridded SSURGO

Gridded SSURGO

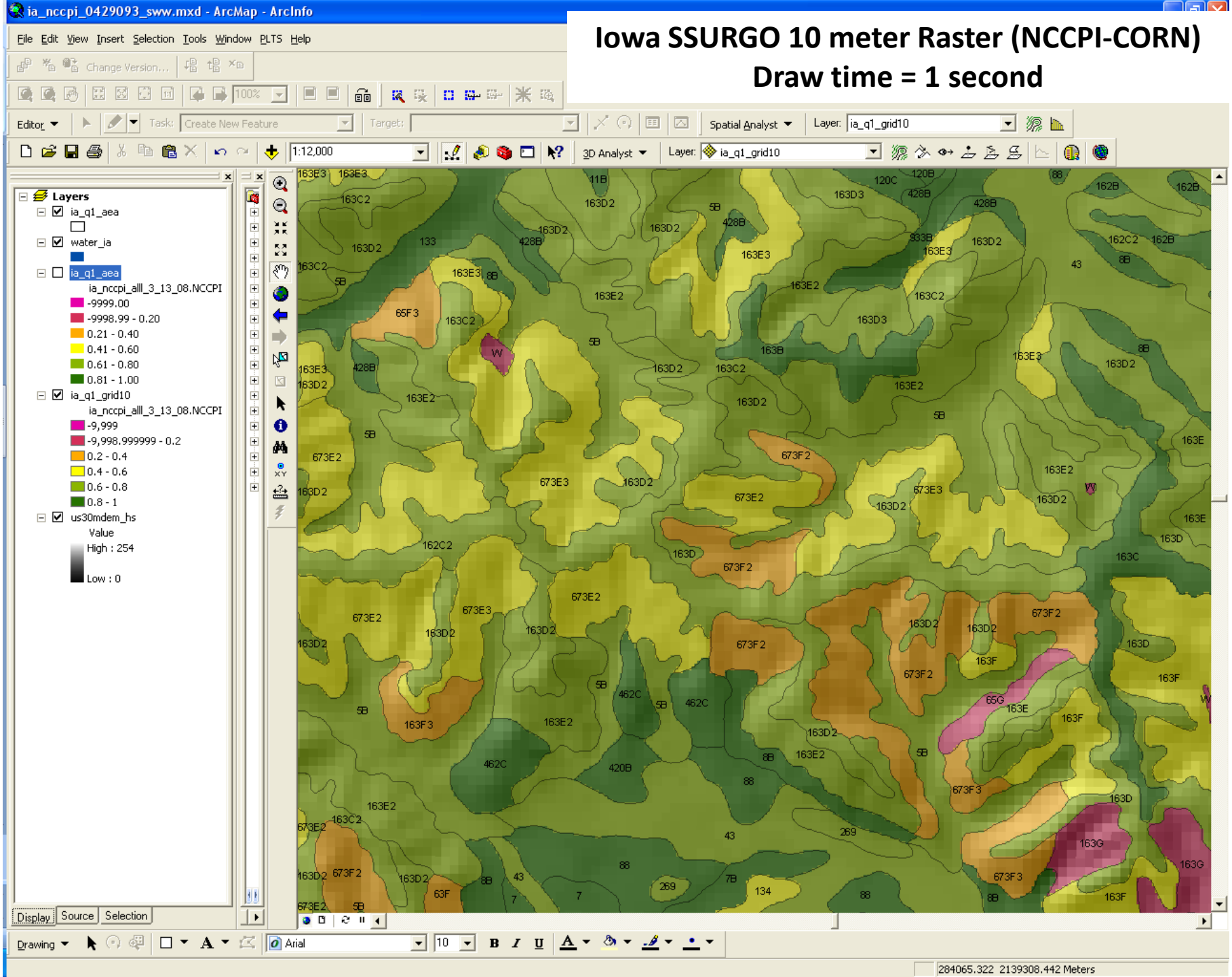
- Is created by a simple GIS technique that "grids" the SSURGO polygon using the mukey (integer)
- Uses a map projection that can be used across Lower 48 states (Albers Equal Area, NAD83)
- Gridded SSURGO resolutions: 10, 30*, 90 or 100 meters (100 meter creates a 1 hectare cell size)
- Is created from an annual or semi-annual Soil Data Mart (SDM) SSURGO snapshot (12/30/2009)
- R&D SSURGO grids prepared by NSSC (Lincoln and Morgantown) to aid in *Rapid Assessment of Carbon and Deepwater Oil Spill*
- *Utilized by USGS EROS Data Center and EPA to prepare the Value added Gridded SSURGO layer with standardized layers*

NRCS

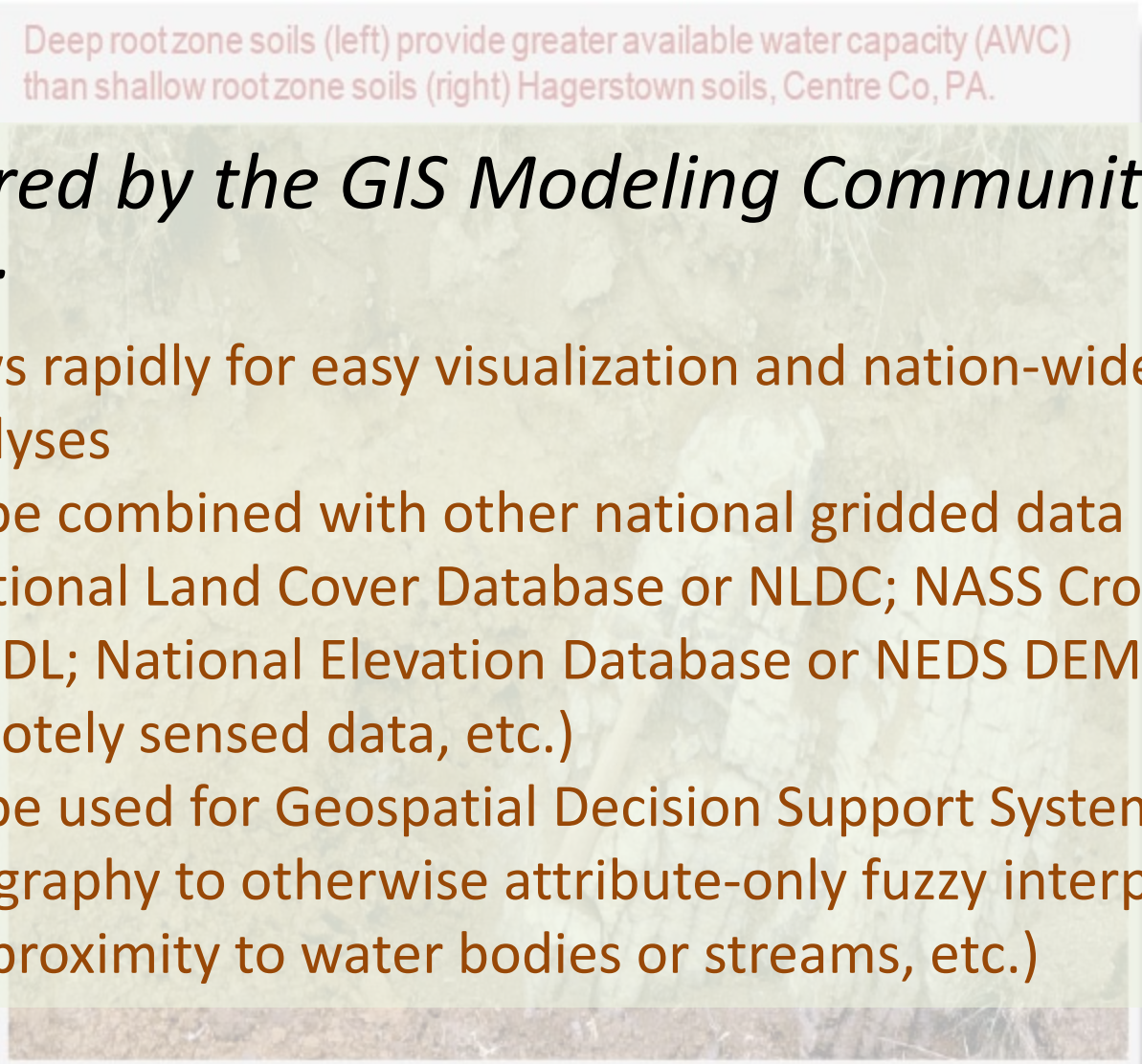
Iowa SSURGO Vector (NCCPI-CORN)
Draw time = 458 seconds



Iowa SSURGO 10 meter Raster (NCCPI-CORN)
Draw time = 1 second



Gridded SSURGO

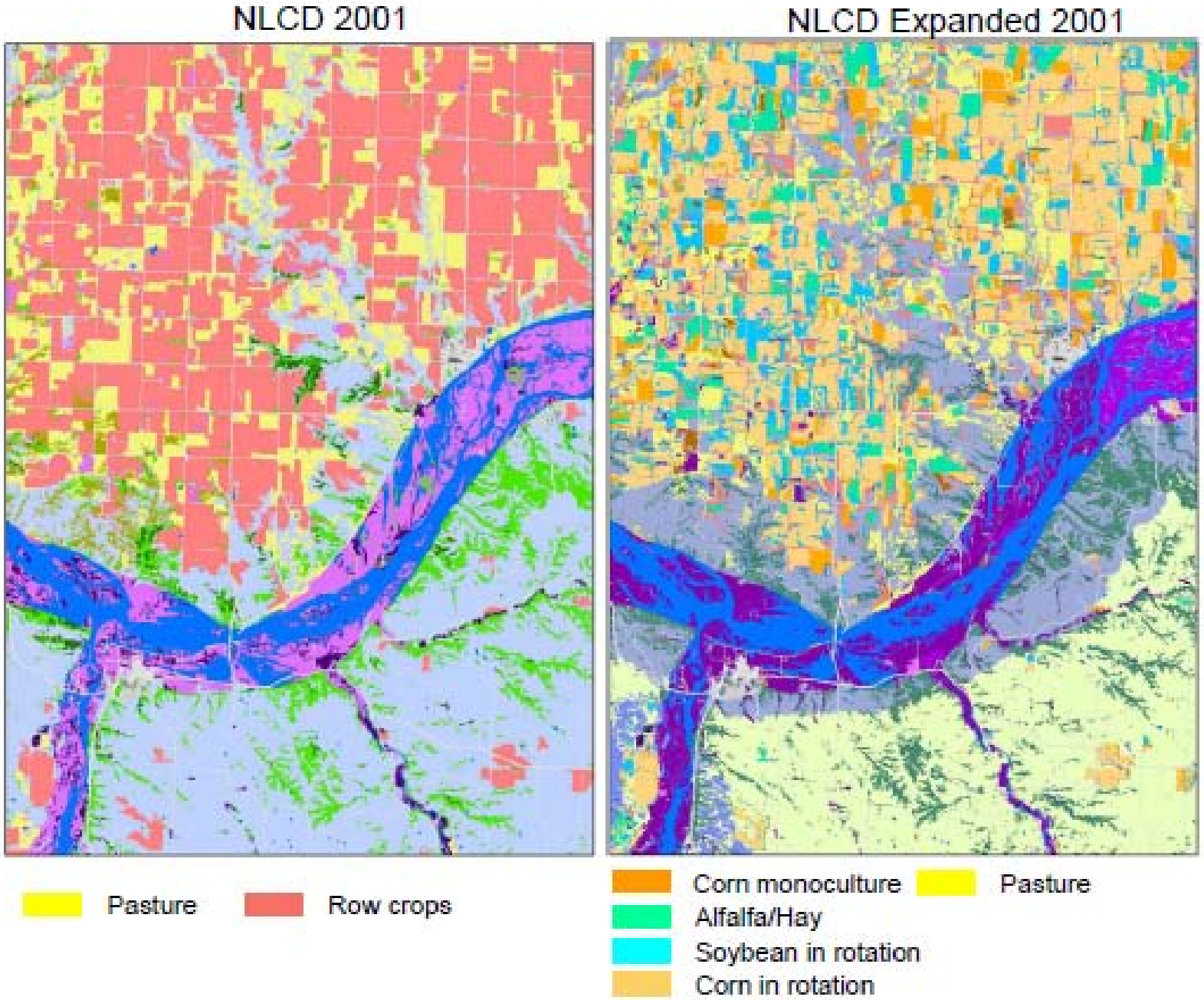


Is preferred by the GIS Modeling Community because:

- It draws rapidly for easy visualization and nation-wide GIS analyses
- It can be combined with other national gridded data layers (National Land Cover Database or NLDC; NASS Crop Data Layer or CDL; National Elevation Database or NEDS DEM, other remotely sensed data, etc.)
- It can be used for Geospatial Decision Support Systems (provides geography to otherwise attribute-only fuzzy interps – set rules for proximity to water bodies or streams, etc.)

NRCS

NASS – Crop Data Layer (CDL)



Targeted Gridded SSURGO Themes

- Summary levels
  - Soil Map unit/Component Level (series/phase of series)
    - Component percentage of map unit
    - SOC (Kg per square meter)
    - %S, %Si, %C, rock fragement content, bulk density
    - AWC for reported depth
    - Rooting Depth (crops, trees, range, etc.)
    - Bedrock Depth
    - Reported Depth and others
    - Hydrologic group
    - National Commodity Crop Productivity Index (NCCPI)

The Gridded SSURGO project takes a similar approach to the successful CONUS-SOIL project (Miller and White, 1997) that created a 3-dimensional soil physical properties geographic database for the Conterminous United States (1 km resolution)
(http://www.essc.psu.edu/soil_info/index.cgi?soil_data&conus)
based upon the USDA-Natural Resources Conservation Service State Soil Geographic Database (STATSGO-Soil Survey Staff,1994).

Fig.4 Gridded SSURGO - Standard Layers Product (5 layers proposed)

Difference would be focus on the detailed soil survey geographic data base called SSURGO (10 or 30 m resolution)rather than the general STATSGO or STATSGO2

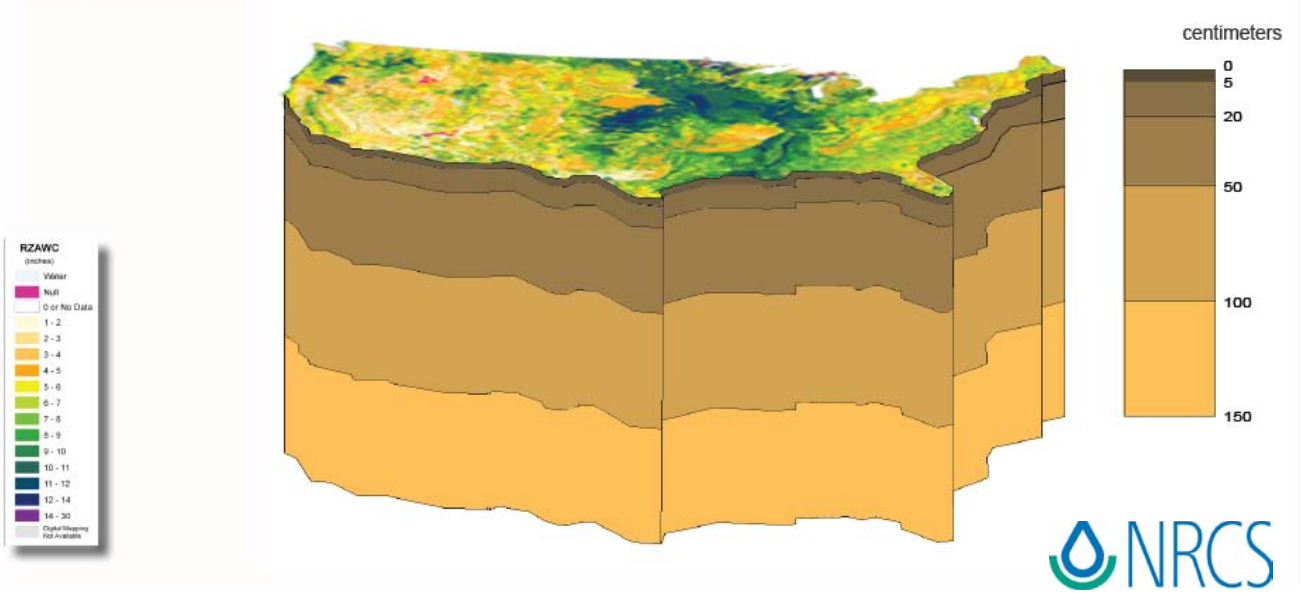
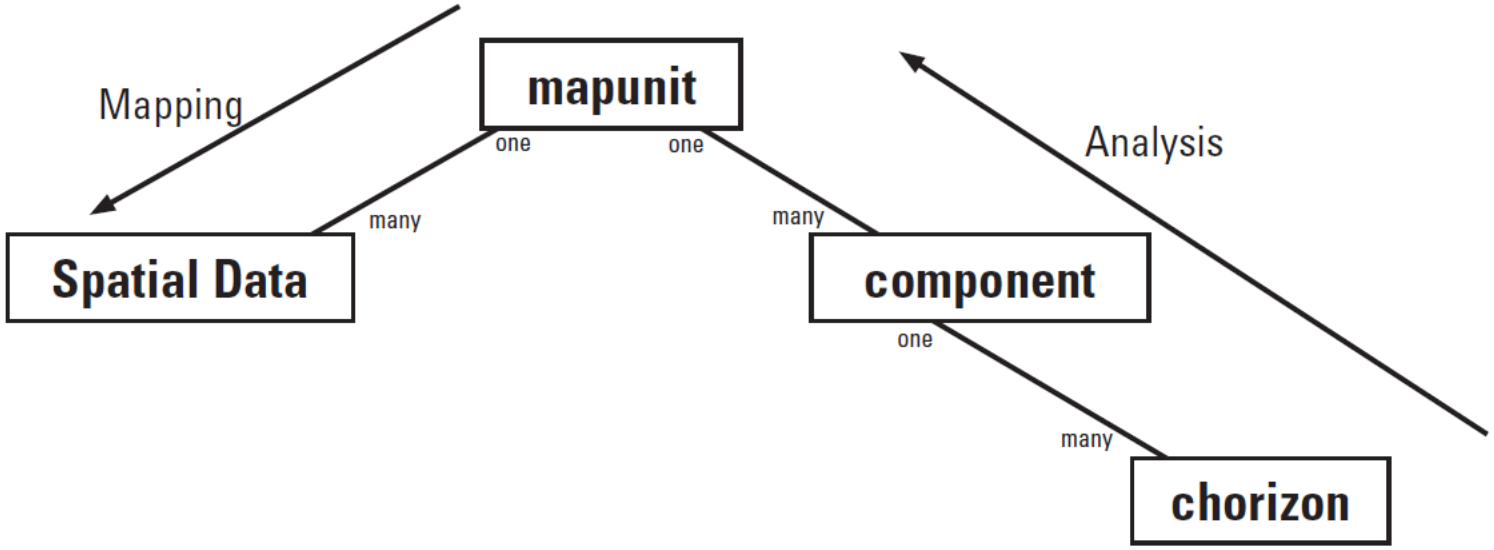
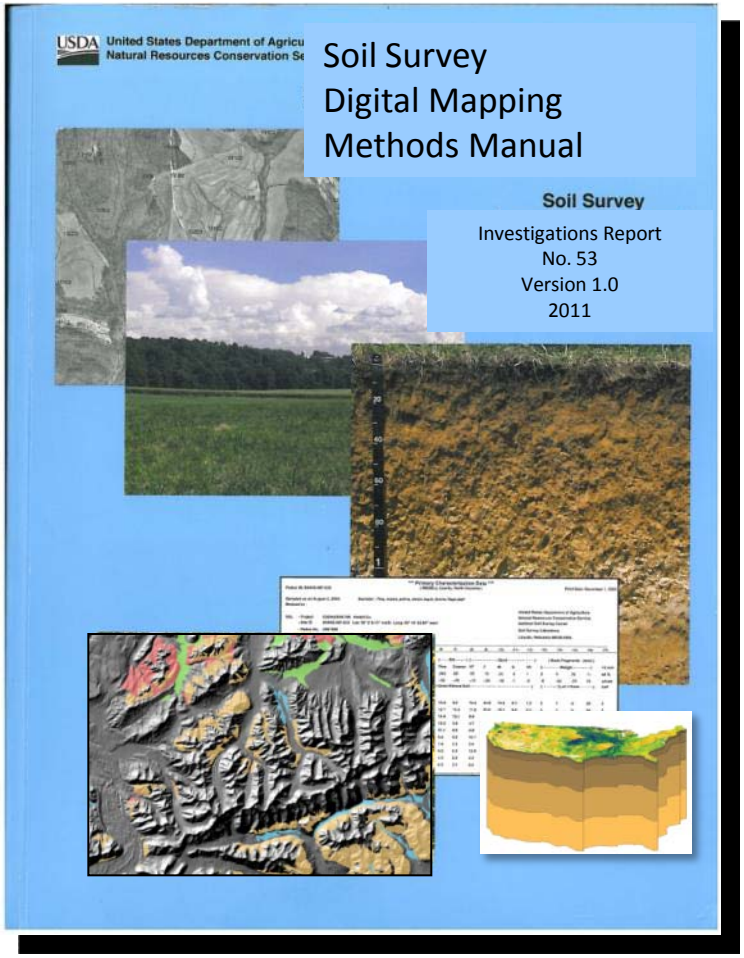


Figure 1. Overview of the SSURGO data structure. The data analysis sequence proceeds from the *chorizon* to the *component* to the *mapunit* tables, and the mapping sequence from the *mapunit* table to the *spatial* data.



NCSS "Best Practices" for Gridded SSURGO Data Summary Methods Documented…



USGS science for a changing world

NRCS Natural Resources Conservation Service

Detailed Mapping of Soil Organic Carbon Stocks in the United States Using SSURGO

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B51F-0367

Introduction

The quantity of soil organic carbon (SOC) stocks forms a foundation for understanding potential sequestration or release of carbon in the future in response to change in land management and climate. We have made new maps and databases of SOC stocks for the conterminous United States from the Soil Survey Geographic (SSURGO) database, developed by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). These data have much greater spatial detail than the previous maps formed from the State Soil Geographic (STATSGO) data developed by NRCS in 1994. The SSURGO data are now 65% complete for the conterminous United States (CONUS). We show relationships between the SOC stocks and other spatial data such as Federal land ownership status. The new data are expected to improve spatially explicit models of carbon fluxes, and reduce the uncertainty of estimation for scenarios of future [illegible] soil organic carbon as the carbon stock for the soils of the [illegible]

Methods

The SOC for each [illegible] on the maps are for the total soil profile (all horizons present in the database). The primary data source was the SSURGO database (NRCS Soil Survey Staff, 2004). The SSURGO database has a relational database structure, so estimates of SOC were calculat[illegible] was multiplied by t[illegible] version of SSURGO [illegible] on lands controlled by Federal agencies. Where SSURGO data were not available, the results were substituted from a similar analysis usi[illegible]

The basic SSURGO [illegible] horizon (chorizon) table, aggregates the carbon over the appropriate layers for a given analysis, and stores the result at the level of the c[illegible] representative com[illegible] of the mapunit (mu[illegible]

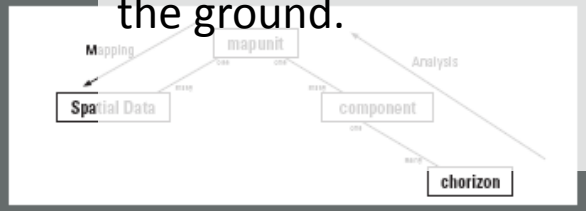

Figure 1. Overview of the SSURGO data structure. The data analysis sequence proceeds from the chorizon to the component to the mapunit tables, and the mapping sequence from the mapunit table to the spatial data.

Ideally, the component percentage would add to 100 percent for each mapunit, however this occurs for only 54 percent of the mapunits. If the sum of the component percentages was greater than or equal to 65 percent, then the results were extended to the unreported soil area, otherwise the mapunit was recorded as "No Data" for SSURGO and information was substituted from the GSM.

The carbon content of a horizon (C_v, g C m^{-2} of horizon area)
$C_v = ODRT$

where
O = Organic carbon content,
D = Bulk density,
R = Rock fragment conversion factor, and
T = Thickness of the layer.

The attributes used in the analysis include:

mukey	mapunit key, link results from attributes to the spatial data
comppct	component percentage, area proportion within a mapunit
om_r	organic matter, representative (percentage by weight)
dbthirdbar_r	bulk density, at a moisture content of 1/3 bar (33 kPa)
fraggt10_r	percentage by weight of rock fragments > 10 inches (25 cm)
frag3to10_r	percentage by weight of rock fragments 3 to 10 inches (7.5 to 25cm)
sieveno10_r	percentage by weight passing No. 10 sieve (2 mm sieve size)
hzdept_r	depth to the top of the horizon (cm)
hzdepb_r	depth to the bottom of the horizon (cm)

The data on rocks and the sieve percentage are used to compute R, the "Rock fragment conversion factor" (NRCS Soil Survey Staff, 2004), and the horizon depths are used to compute the thickness, T.

The results presented here are for the carbon content of the total profile, reflecting all soil horizons for which carbon could be calculated, rather than fixed depth limits.

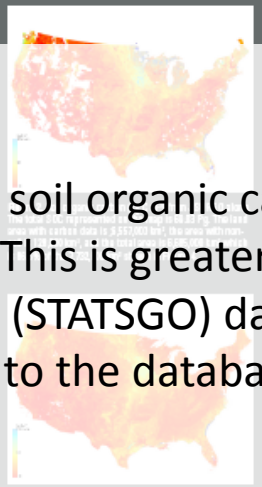

Figure 3. Soil organic carbon (kg C m-2) from the General Soil Map states. The total SOC represented on the map is 51.59 Pg. The land area with carbon data is 7,000,000 km^2, the area with non-soil mapunits is 44,000 km^2, and the total area is 7,713,000 km^2.

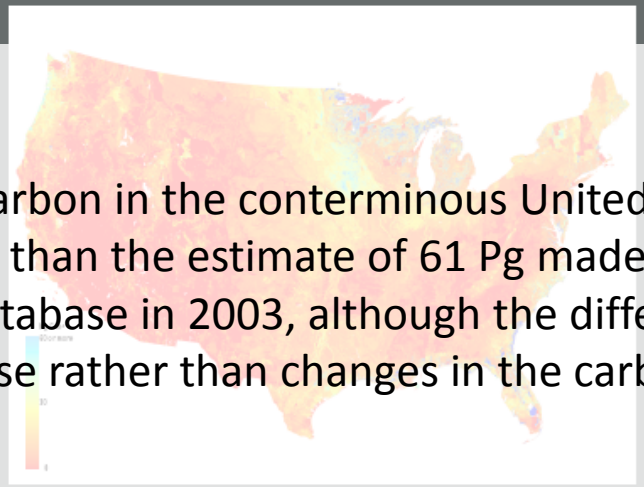

Figure 4. Soil organic carbon (kg C m-2) from SSURGO, with gaps filled from the GSM. The total SOC represented on the map is 73.43 Pg. The land area with carbon data is 7,632,000 km^2, the area with non-soil is 158,000 km^2, and the total area is 7,713,000 km^2.

Results and Discussion

SOC in Conterminous United States

The SOC calculated from the SSURGO data alone (Fig. 2) represents a carbon stock of 69.03 Pg for the CONUS. The gaps in the data are areas where the mapping at the detailed level is not complete. Areas of non-soil (e.g., water, bare rock, gravel pits, etc.) are coded with zero SOC.

The SOC calculated from the GSM data alone (Fig. 3) represents a carbon stock of 51.5 Pg for the CONUS. It remains to be investigated why this estimate is considerably lower than the more detailed estimate from SSURGO. One possibility is that wetland areas that have high soil carbon contents are under-represented in the GSM database. Many of the wetlands are very small, and not appropriate for mapping at the coarse scale of the GSM (original compilation at 1:250,000 map scale).

The SOC calculated from the SSURGO data with gaps filled using the GSM data (Fig. 4), represents a carbon stock of 73.43 Pg. The land area for the combined dataset is 7,731,000 km^2, of which approximately 150,000 km^2 represents non-soils. The average soil carbon per unit area is 9,489 g C m^{-2} for the total area, or 9,666 g C m^{-2} based on just the soil area.

Distribution of SOC

In general, SOC is high where soils are wet and/or cold, and low in mountains and deserts. The highest SOC values are in areas with poor drainage of water, such as wetlands, former wetlands, and peat bogs. There are substantial areas of wetlands along the Eastern and Gulf Coasts, and in Northern states (e.g., Minnesota, Michigan, and Maine). The high SOC in the coastal areas of Washington and Oregon are related to temperate rainforest conditions. The areas that experienced continental glaciations may have either high or low SOC. High SOC is found in southern Minnesota and central Iowa, where the Des Moines lobe of a continental glacier left large areas that are relatively flat and have generally wet soils. Continental glaciations may also contribute to low SOC soils where till or outwash resulted soils with a high rock content, some of which are well drained. Many other factors of topography, microclimate, and vegetation contribute to the SOC content of soils. For example, in some areas clay or volcanic ash may attach to the organic matter, forming a complex that is resistant to decomposition of the organic matter.

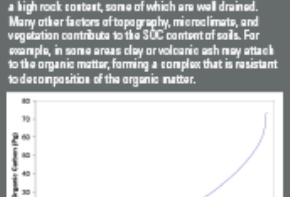

Figure 5. Relationship between cumulative land area and cumulative soil carbon for CONUS.

The relationship shown in Fig. 5 is strongly non-linear, as can be illustrated from two points on the graph. Dividing the graph in half along the horizontal axis at point (3695, 14.3), half the land area has 14.3 Pg (19.5%) of the soil carbon and the other half of the land area has 59.1 Pg (80.5%) of the soil carbon. Dividing the graph in half along the vertical axis at point (6484, 36.8), half the SOC (36.8 Pg) is on 6,484,000 km2 (83.8%) of the land, and the other half of the soil carbon is on 1,257,000 km2 (16.4%) of the land. Strategies to manage land to promote carbon sequestration and avoid carbon release will need to account for the variation in carbon stocks in conjunction with other land qualities, management opportunities, and climatic conditions.

Federal Lands

A geographic information system can be used to overlay the SOC map with many other factors such as land cover, elevation, slope, aspect, relief, landscape position, and Federal land ownership status. Table 1 shows the results of overlaying the SOC map from Figure 4 with the Federal Lands derived from the National Atlas of the United States (National Atlas, 2005). Many Federal agencies are exploring how to incorporate management for carbon sequestration into their land management plans.

Table 1. SOC and area by Federal Agency or Bureau, calculated by the overlay of the SOC map (Fig. 4) with the National Atlas Federal Lands dataset. (USDA = United States Department of Agriculture; DOI = Department of the Interior)

Federal Agency or Bureau	SOC (Pg C)	Area (1000 km^2)
USDA Forest Service	6,888	869
DOI Bureau of Land Management	2,256	720
DOI Fish and Wildlife Service	758	68
Department of Defense	658	104
DOI National Park Service	611	113
Other Federal Land	77	25

Conclusions

We calculate the stock of soil organic carbon in the conterminous United States as 73.43 petagrams (Pg). This is greater than the estimate of 61 Pg made from the State Soil Geographic (STATSGO) database in 2003, although the differences represent improvements to the database rather than changes in the carbon on the ground. The soil data were developed between the 1960s and the present. It is likely that most of the data reflect the understanding of soil scientists within the last 20 years, but it is not possible to specify a single date to which the

[illegible] sources of uncertainty in these estimates, but we consider it likely that the true [illegible] within ± 30 percent of the [illegible]. Efforts are ongoing to update [illegible] attribute data for the SSURGO database. Inconsistencies observed in national [illegible] can lead to improvements.

We consider the results from SSURGO (compiled [illegible] 000 map scales) to be much [illegible] ase from the GSM (compiled at [illegible]). The NRCS and cooperating agencies have invested considerable resources in upgrading the quality of the soil databases in recent years and these efforts are reflected in the SSURGO data.

The SSURGO database has over 300 attributes, of which perhaps 30 will be useful for biogeochemical modeling. Future work includes distribution of selected attributes in formats that will enable nationwide data to be easily available for modelers.

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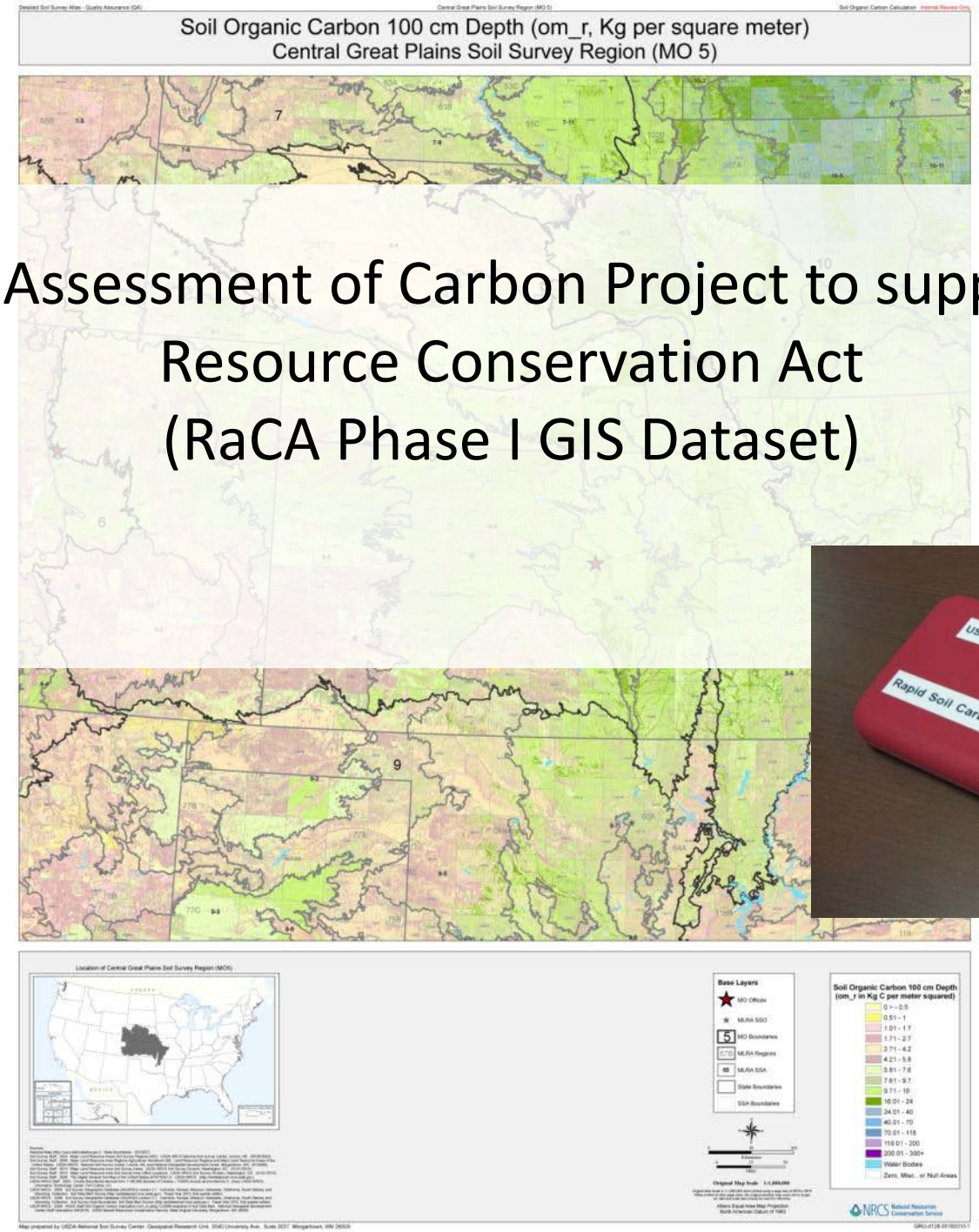
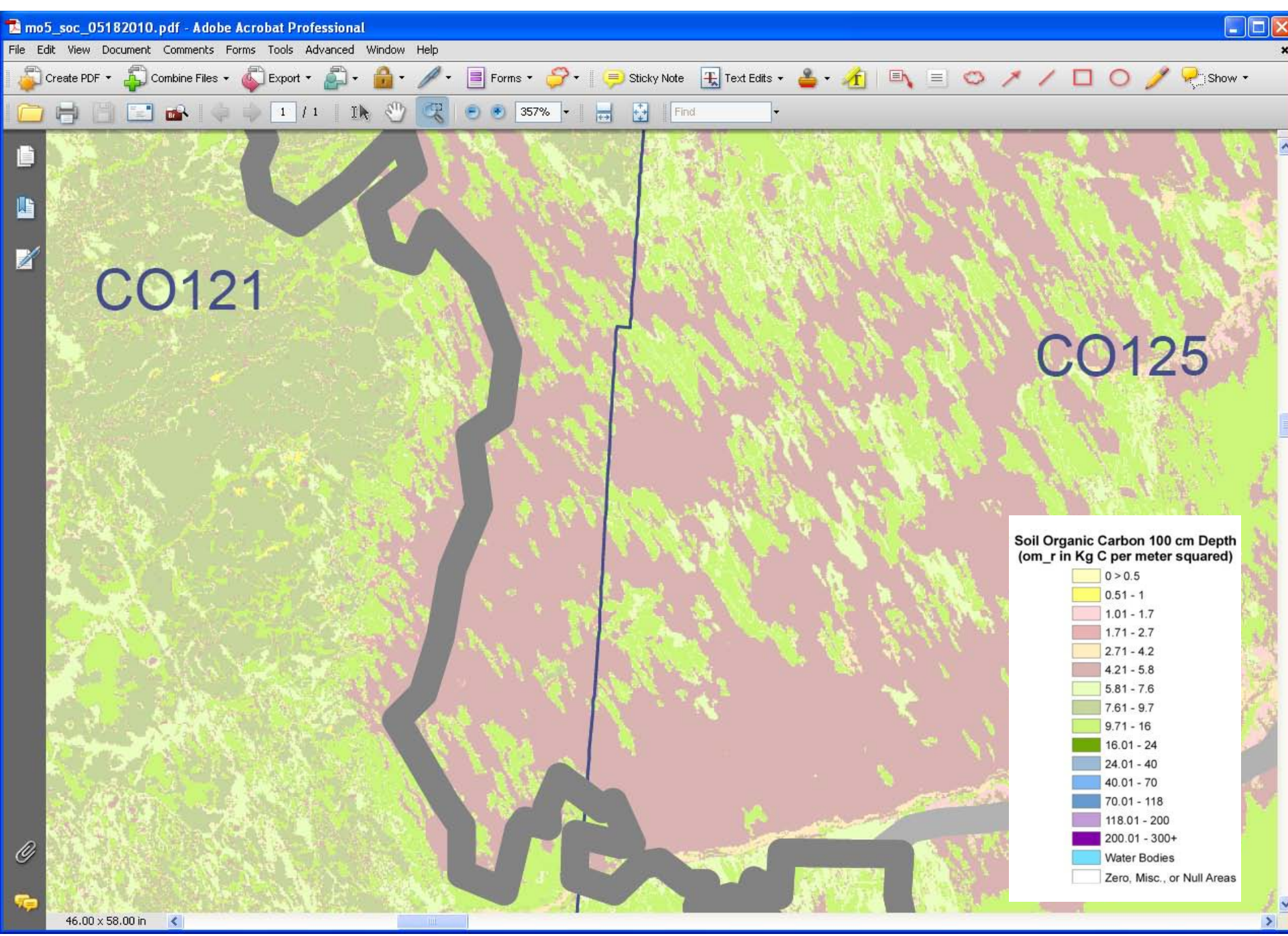
Acknowledgments

This work was supported by the USGS Global Change Program and by the USDA Global Change Program through the USDA/NRCS Soil Survey Program and uses data collected under the National Cooperative Soil Survey.



Rapid Assessment of Carbon Project to support the Resource Conservation Act (RaCA Phase I GIS Dataset)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2.71 - 4.2
4.21 - 5.8
5.81 - 7.6
7.61 - 9.7
9.71 - 16
16.01 - 24
24.01 - 40
40.01 - 70
70.01 - 118
118.01 - 200
200.01 - 300+
Water Bodies
Zero, Misc., or Null Areas
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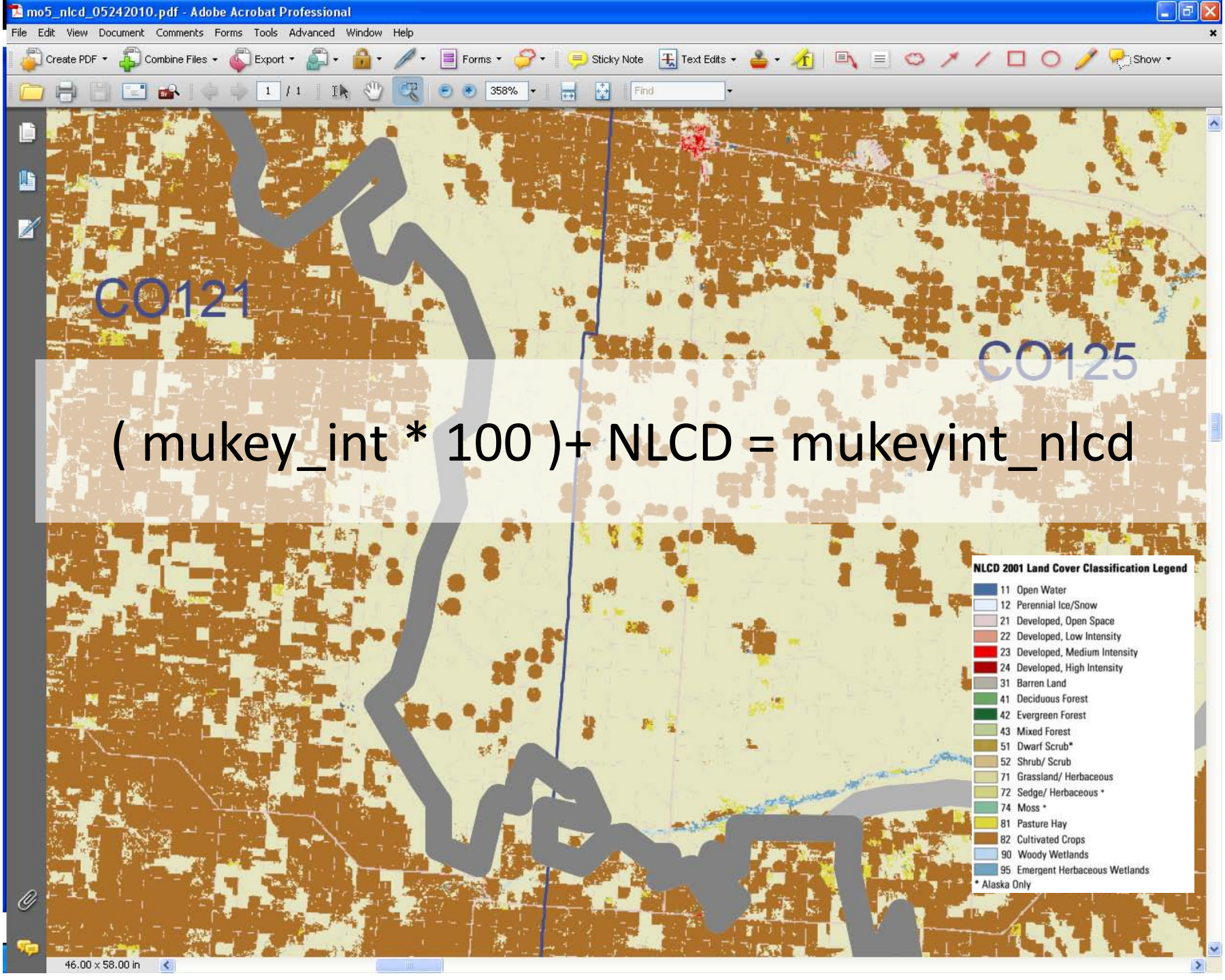
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21 Developed, Open Space
22 Developed, Low Intensity
23 Developed, Medium Intensity
24 Developed, High Intensity
31 Barren Land
41 Deciduous Forest
42 Evergreen Forest
43 Mixed Forest
51 Dwarf Scrub*
52 Shrub/ Scrub
71 Grassland/ Herbaceous
72 Sedge/ Herbaceous *
74 Moss *
81 Pasture Hay
82 Cultivated Crops
90 Woody Wetlands
95 Emergent Herbaceous Wetlands
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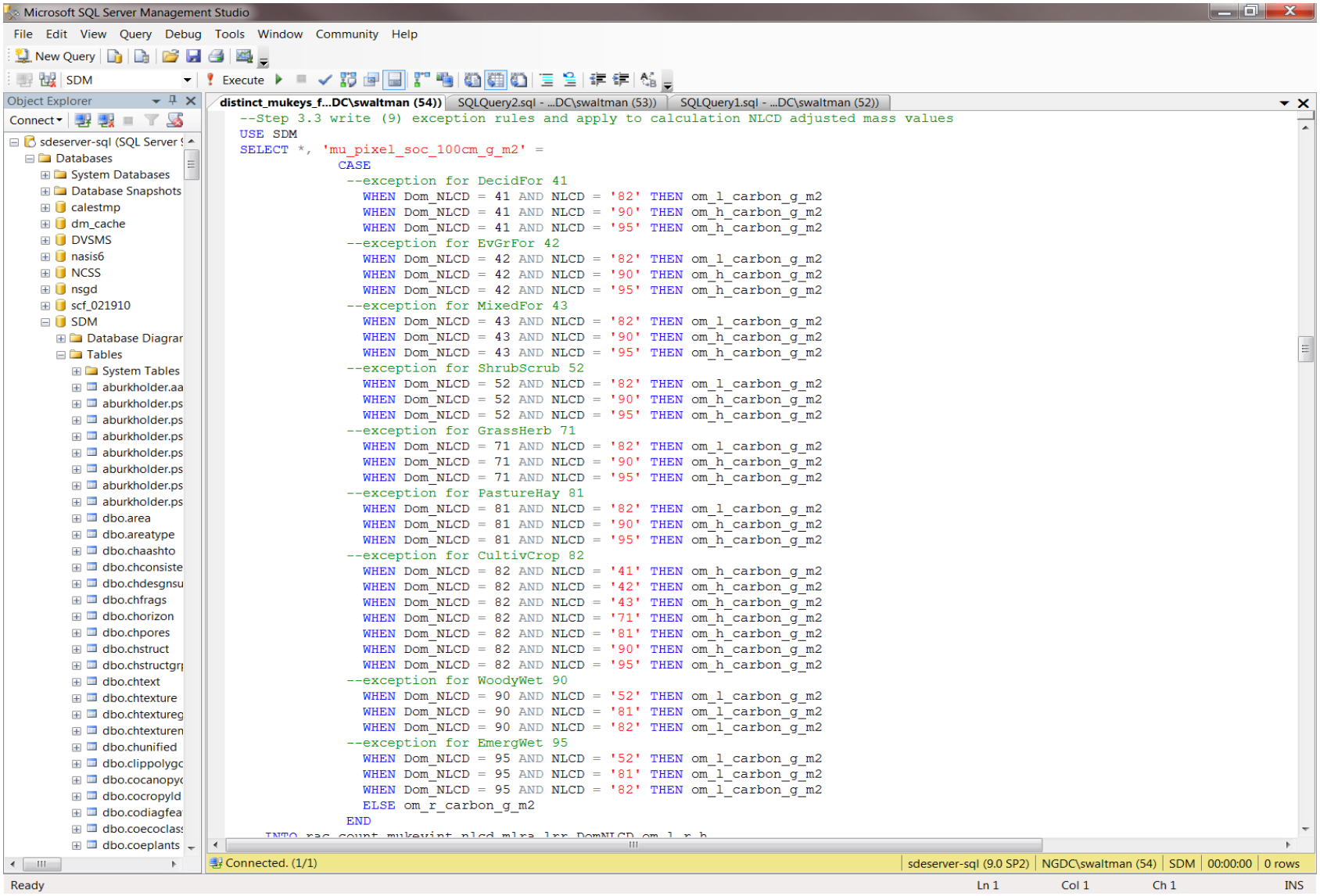
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WHEN Dom_NLCD = 41 AND NLCD = '95' THEN om_h_carbon_g_m2
--exception for EvGrFor 42
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WHEN Dom_NLCD = 42 AND NLCD = '90' THEN om_h_carbon_g_m2
WHEN Dom_NLCD = 42 AND NLCD = '95' THEN om_h_carbon_g_m2
--exception for MixedFor 43
WHEN Dom_NLCD = 43 AND NLCD = '82' THEN om_l_carbon_g_m2
WHEN Dom_NLCD = 43 AND NLCD = '90' THEN om_h_carbon_g_m2
WHEN Dom_NLCD = 43 AND NLCD = '95' THEN om_h_carbon_g_m2
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WHEN Dom_NLCD = 52 AND NLCD = '90' THEN om_h_carbon_g_m2
WHEN Dom_NLCD = 52 AND NLCD = '95' THEN om_h_carbon_g_m2
--exception for GrassHerb 71
WHEN Dom_NLCD = 71 AND NLCD = '82' THEN om_l_carbon_g_m2
WHEN Dom_NLCD = 71 AND NLCD = '90' THEN om_h_carbon_g_m2
WHEN Dom_NLCD = 71 AND NLCD = '95' THEN om_h_carbon_g_m2
--exception for PastureHay 81
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WHEN Dom_NLCD = 81 AND NLCD = '90' THEN om_h_carbon_g_m2
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--exception for CultivCrop 82
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WHEN Dom_NLCD = 95 AND NLCD = '82' THEN om_l_carbon_g_m2
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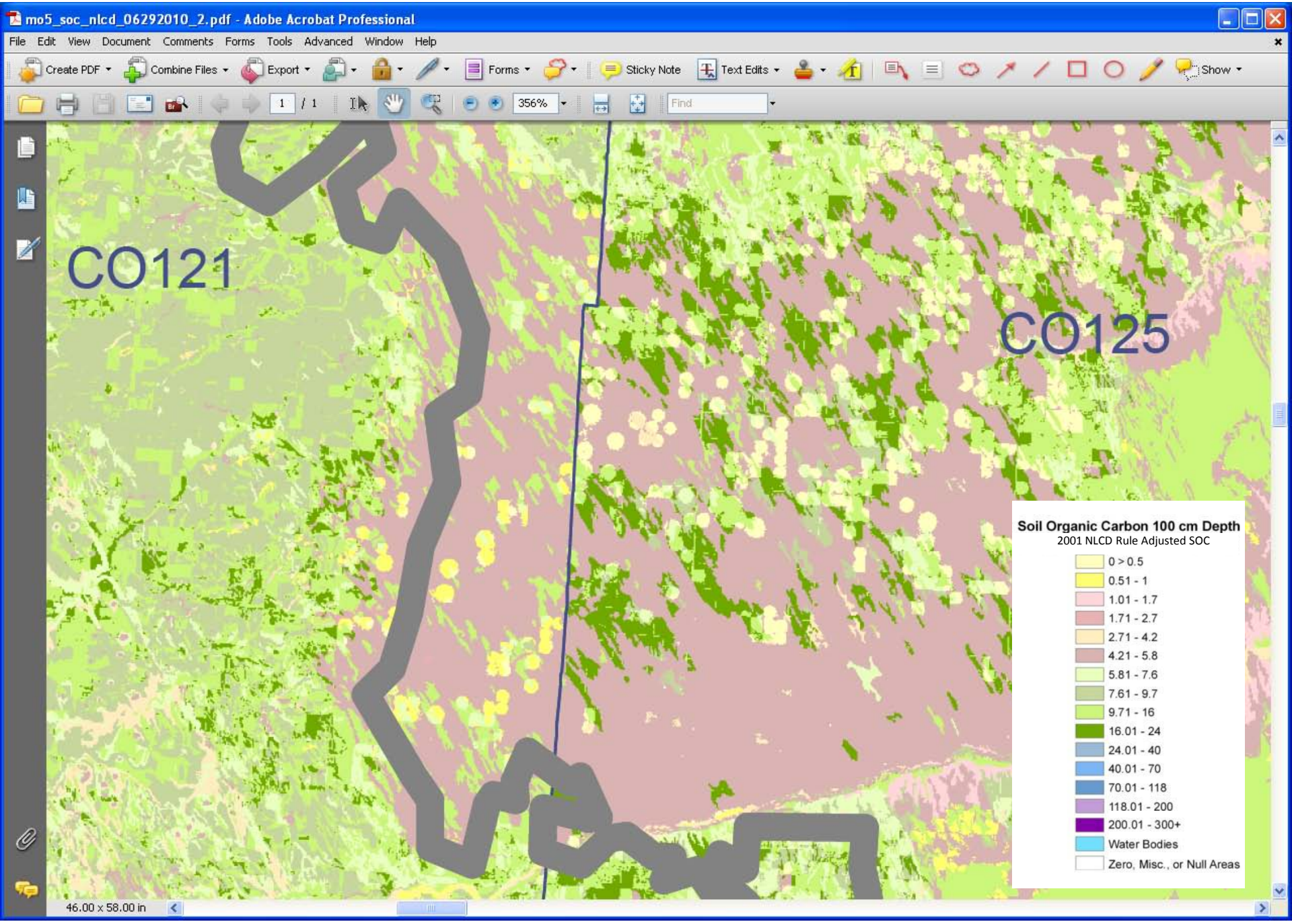
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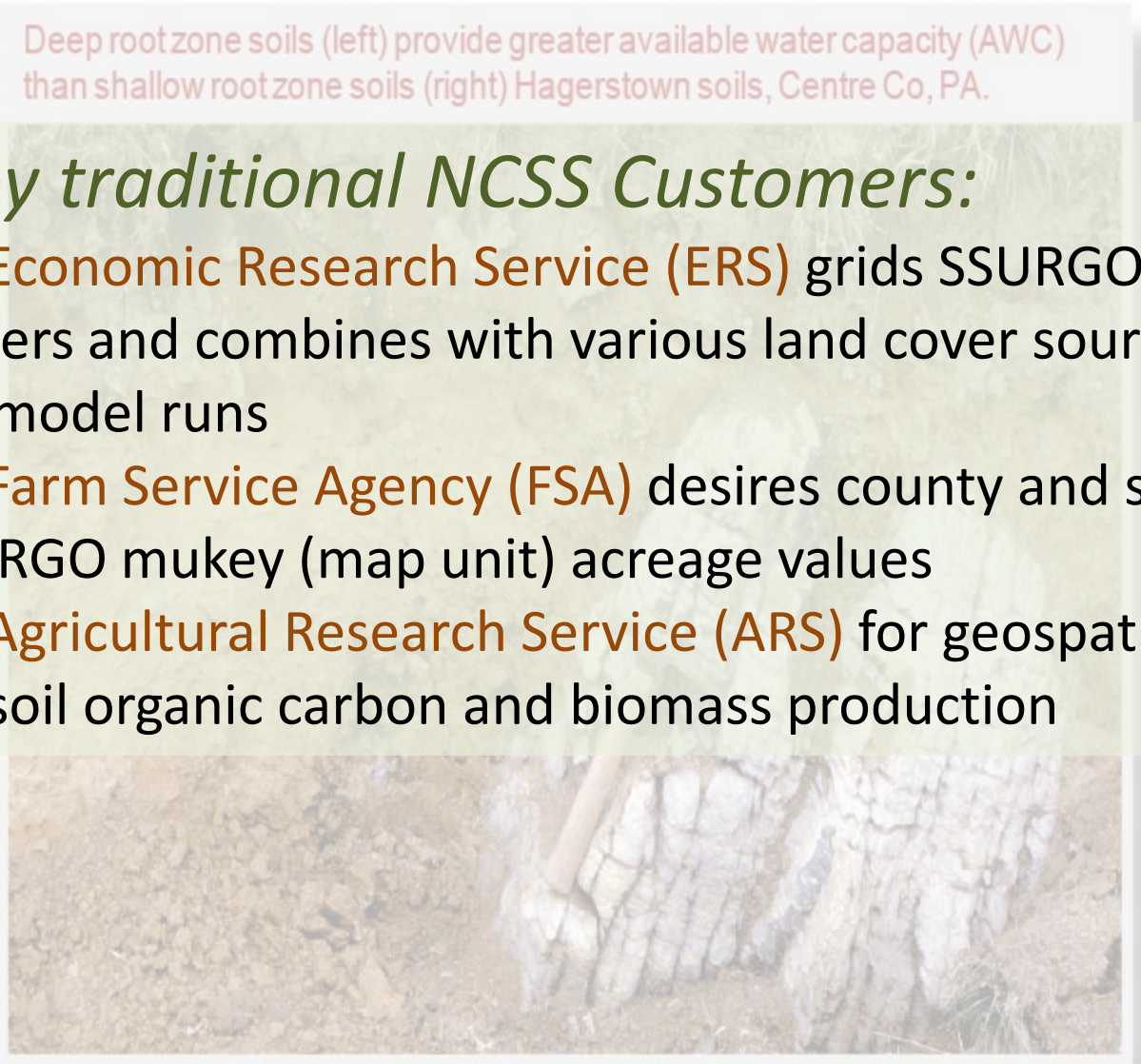
1.01 - 1.7
1.71 - 2.7
2.71 - 4.2
4.21 - 5.8
5.81 - 7.6
7.61 - 9.7
9.71 - 16
16.01 - 24
24.01 - 40
40.01 - 70
70.01 - 118
118.01 - 200
200.01 - 300+
Water Bodies
Zero, Misc., or Null Areas
46.00 x 58.00 in

Gridded SSURGO

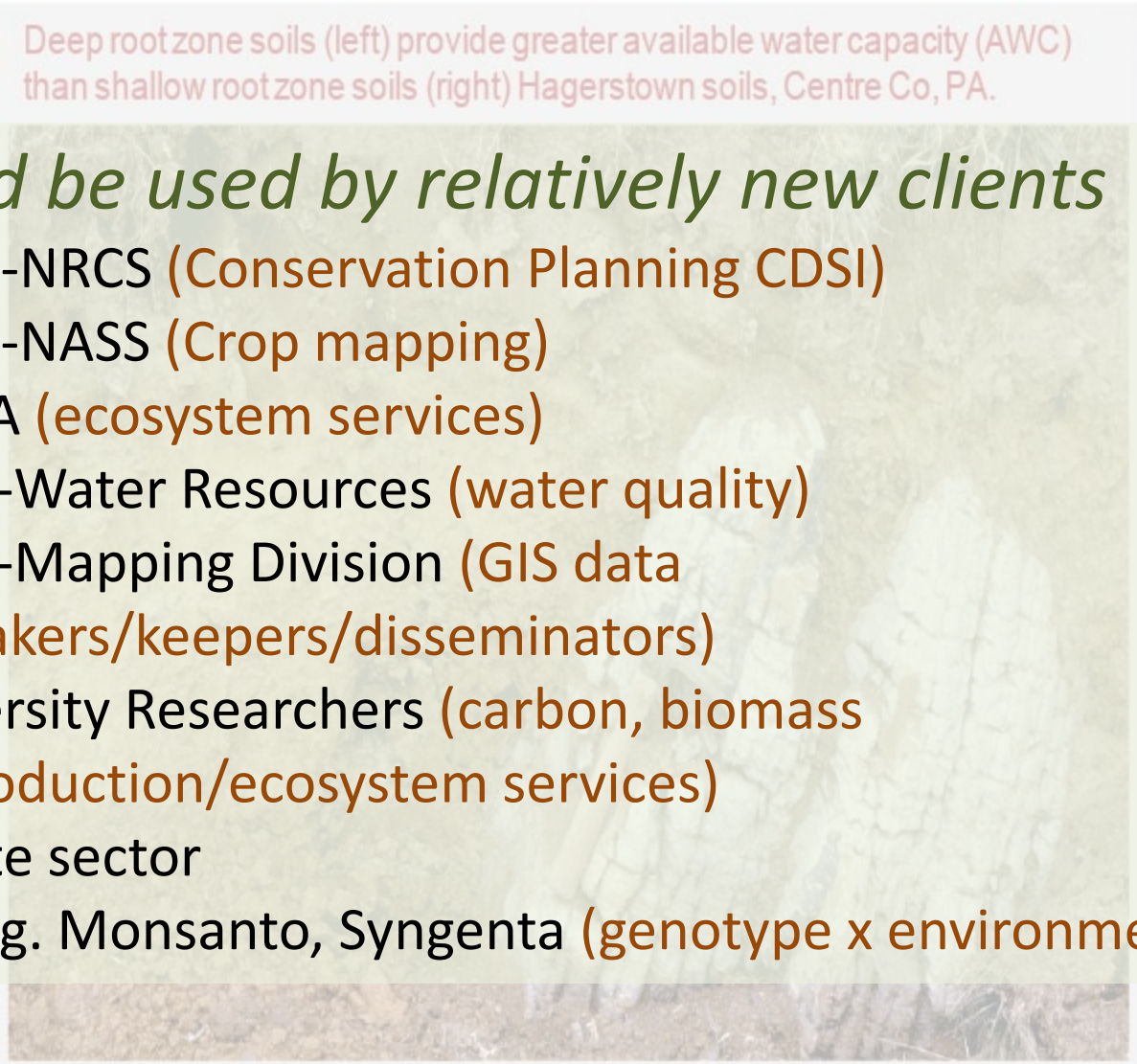


Is used by traditional NCSS Customers:

- USDA Economic Research Service (ERS) grids SSURGO at 30 meters and combines with various land cover sources for Farm Bill model runs
- USDA Farm Service Agency (FSA) desires county and state SSURGO mukey (map unit) acreage values
- USDA Agricultural Research Service (ARS) for geospatial modeling for soil organic carbon and biomass production

NRCS

Gridded SSURGO



Could be used by relatively new clients

- USDA-NRCS (Conservation Planning CDSI)
- USDA-NASS (Crop mapping)
- USEPA (ecosystem services)
- USGS-Water Resources (water quality)
- USGS-Mapping Division (GIS data makers/keepers/disseminators)
- University Researchers (carbon, biomass production/ecosystem services)
- Private sector
  - e.g. Monsanto, Syngenta (genotype x environment)

NRCS

Gridded SSURGO

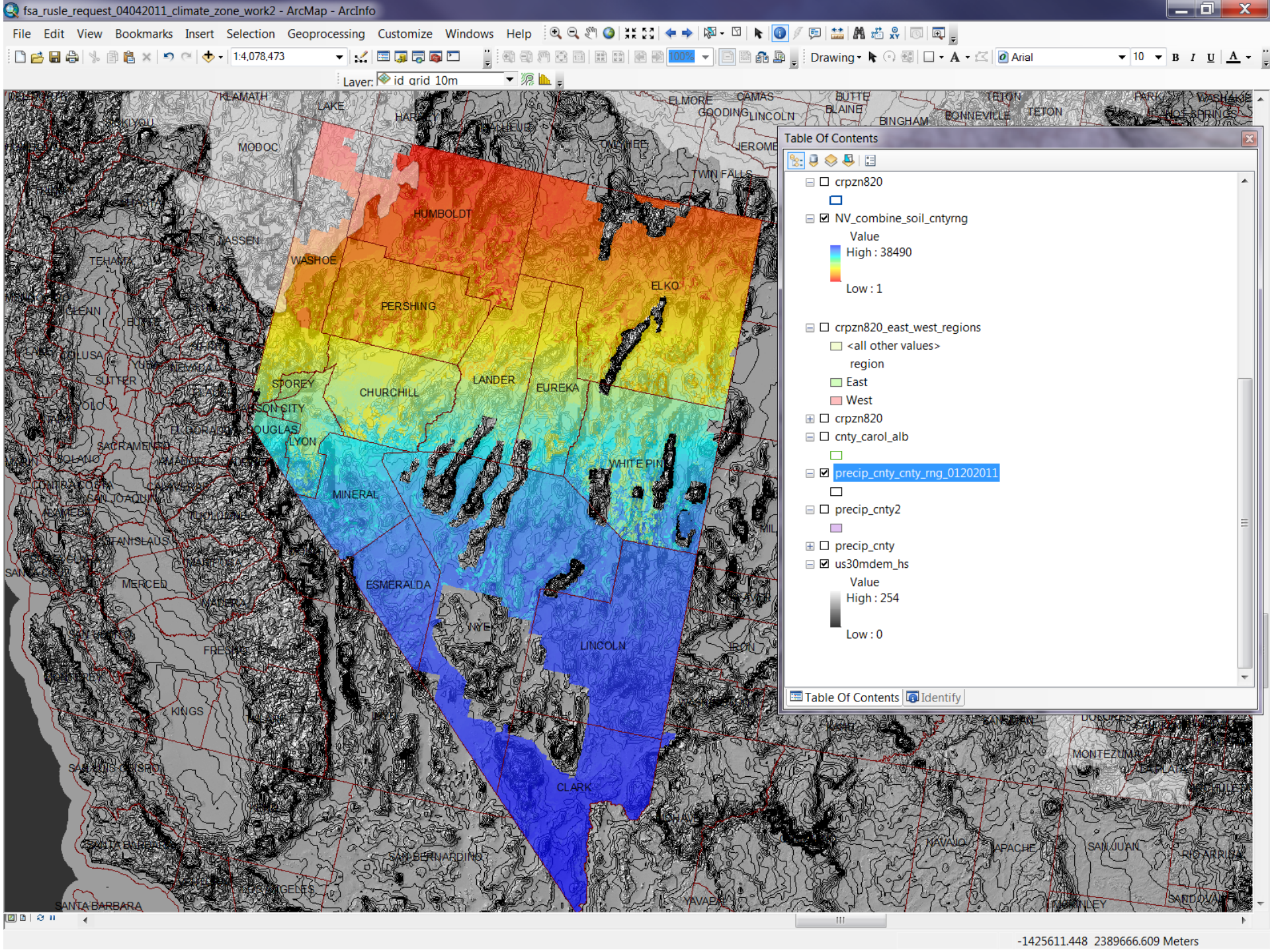
Deep root zone soils (left) provide greater available water capacity (AWC) than shallow root zone soils (right) Hagerstown soils, Centre Co, PA.

Could be used by relatively new clients

- USDA-NRCS (Conservation Planning CDSI)

- USDA – Farm Services Agency Request for National RUSLE2 run
  - 10 meter resolution gSSURGO + climate layers

NRCS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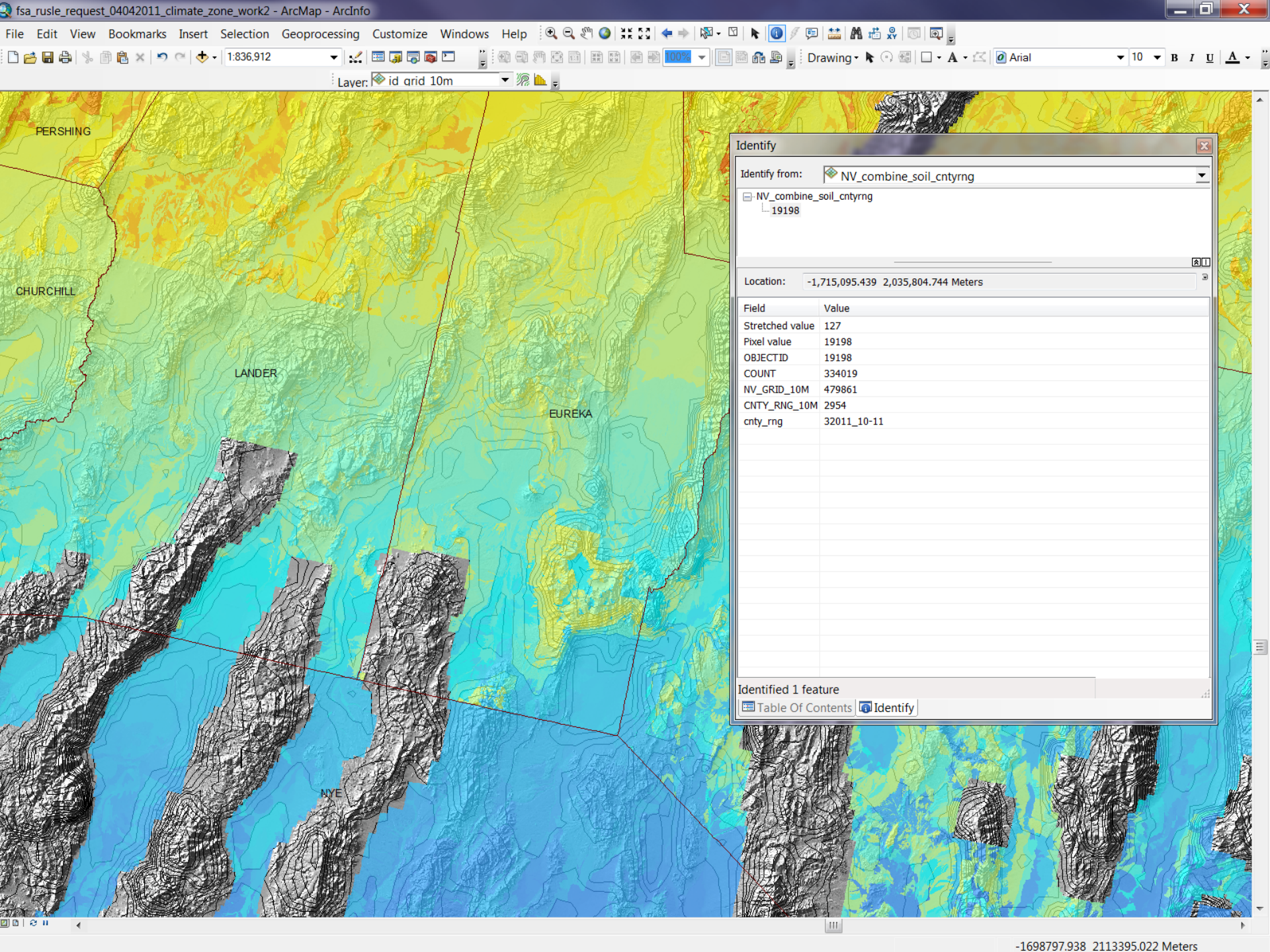
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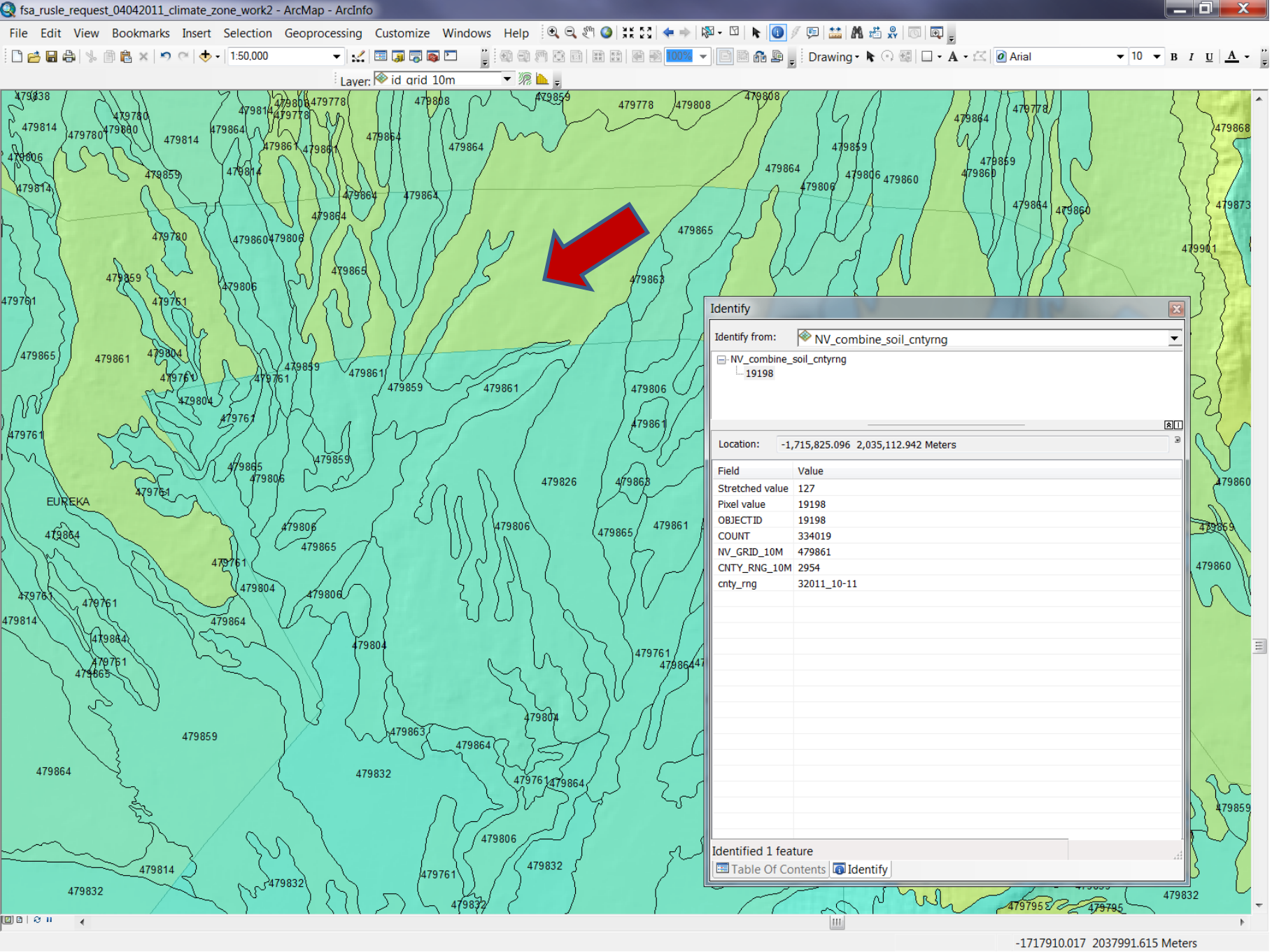
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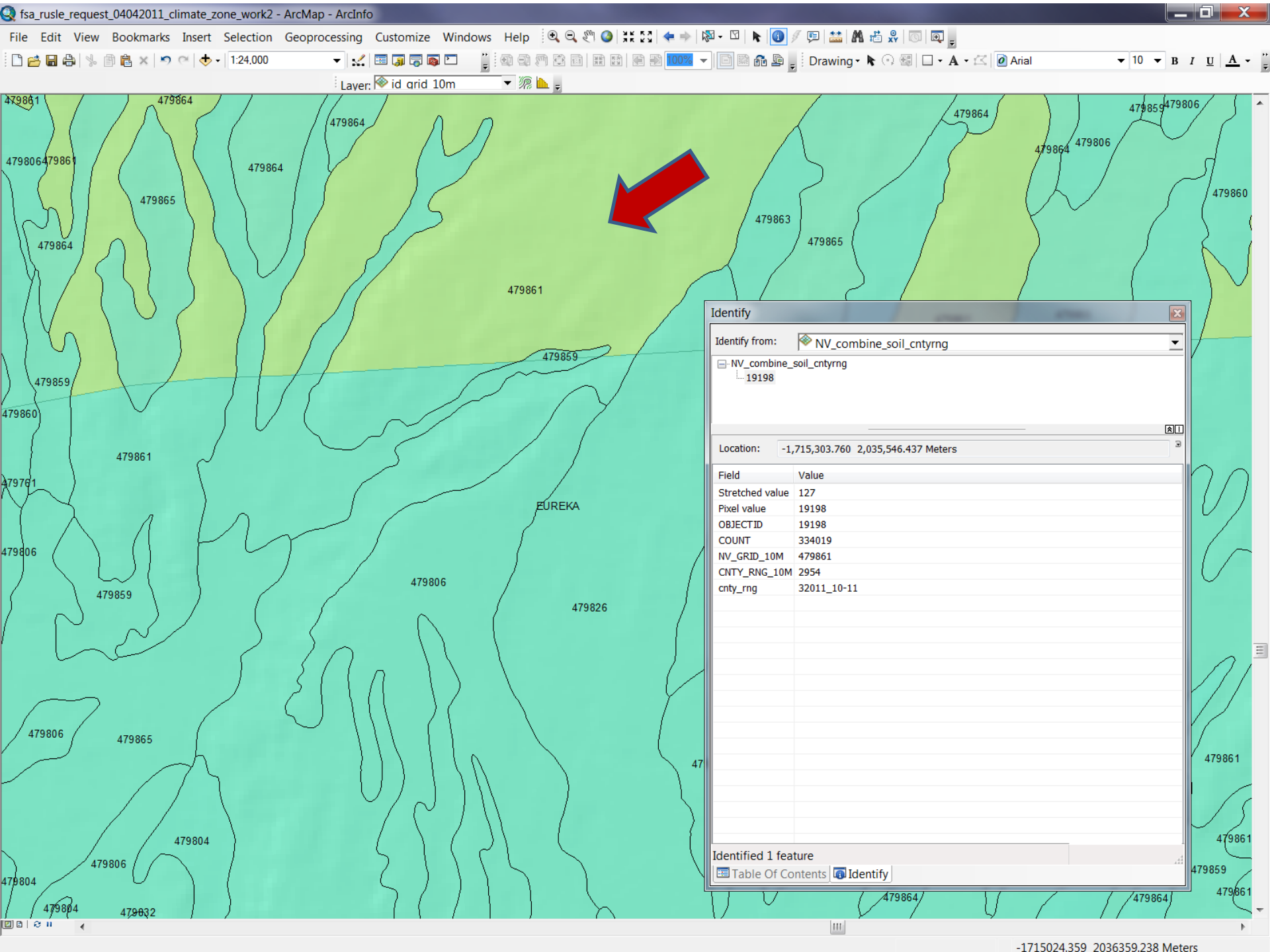
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Next Steps

1. Document Gridded SSURGO Methods in SSIR No. 53 (with peer review)
   - Albers Equal Area Projection, NAD83
   - 10 meter resolution to preserve geometry
   - Snap grid to 2001 NLCD coordinate space
   - Dataset extent = states
   - Source: SDM mupolygon layer snapshot (annual or otherwise)
   - Prepare mapping or mu summary tables (soc, rzawc, etc.)

Next Steps

2. Develop institutional gridded SSURGO
   - Use SSIR No. 53 methods
   - Work with NGMC to prepare prototype
   - Disseminate prototype via Geospatial Data Gateway
   - Prepare web service for SQL query of attributes that correspond to gridded SSRUGO snapshot

- END

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Time Frame

3. Target Q1 FY2012 SDM snapshot
   - Prepare list of SOC logic faults and nulls for SOC calculation
   - Prepare strategy to repair logic faults and nulls
   - Complete before Q1 FY2012 (12/2011)

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