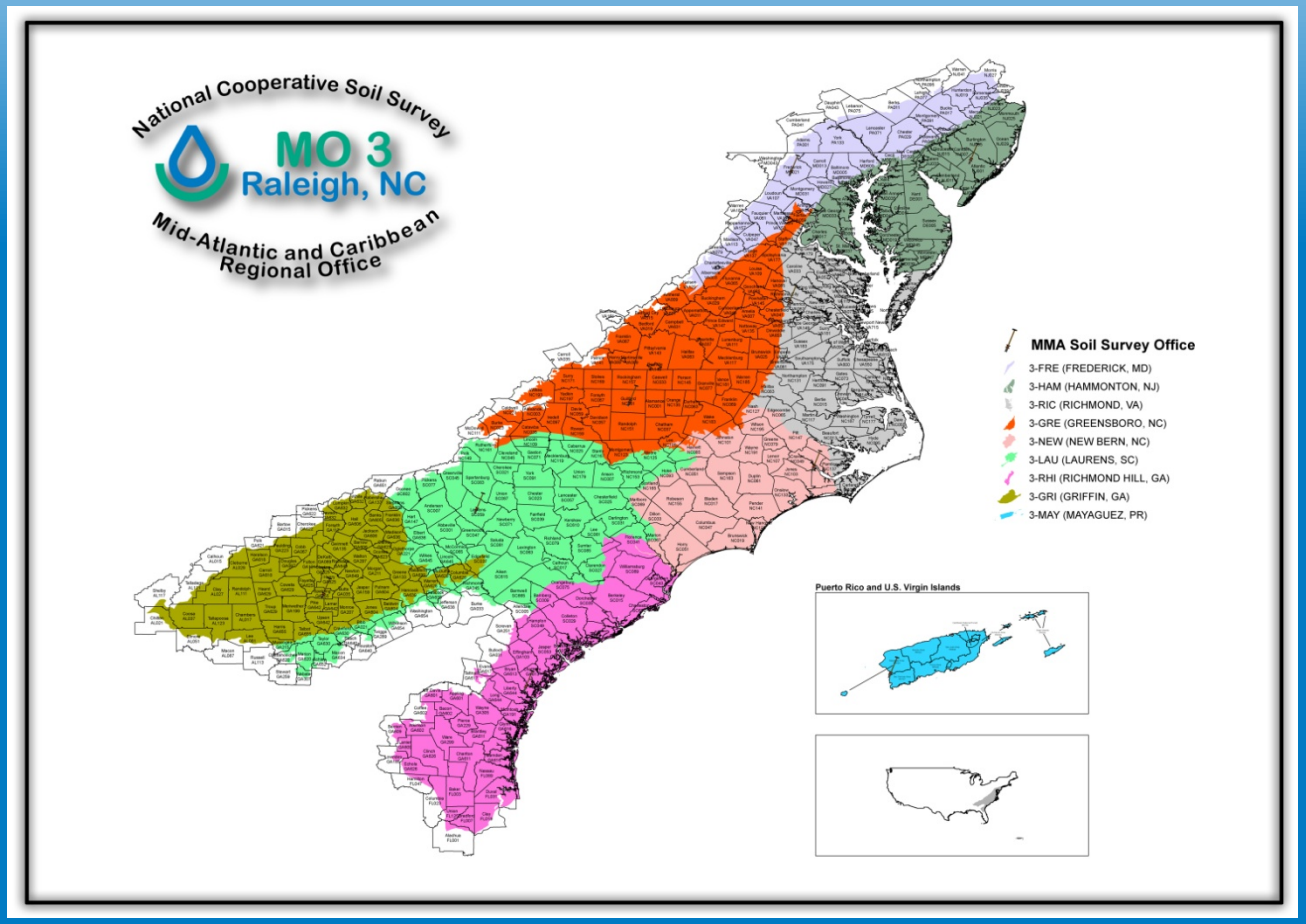
Mid-Atlantic and Caribbean Area Soil Survey Region 3



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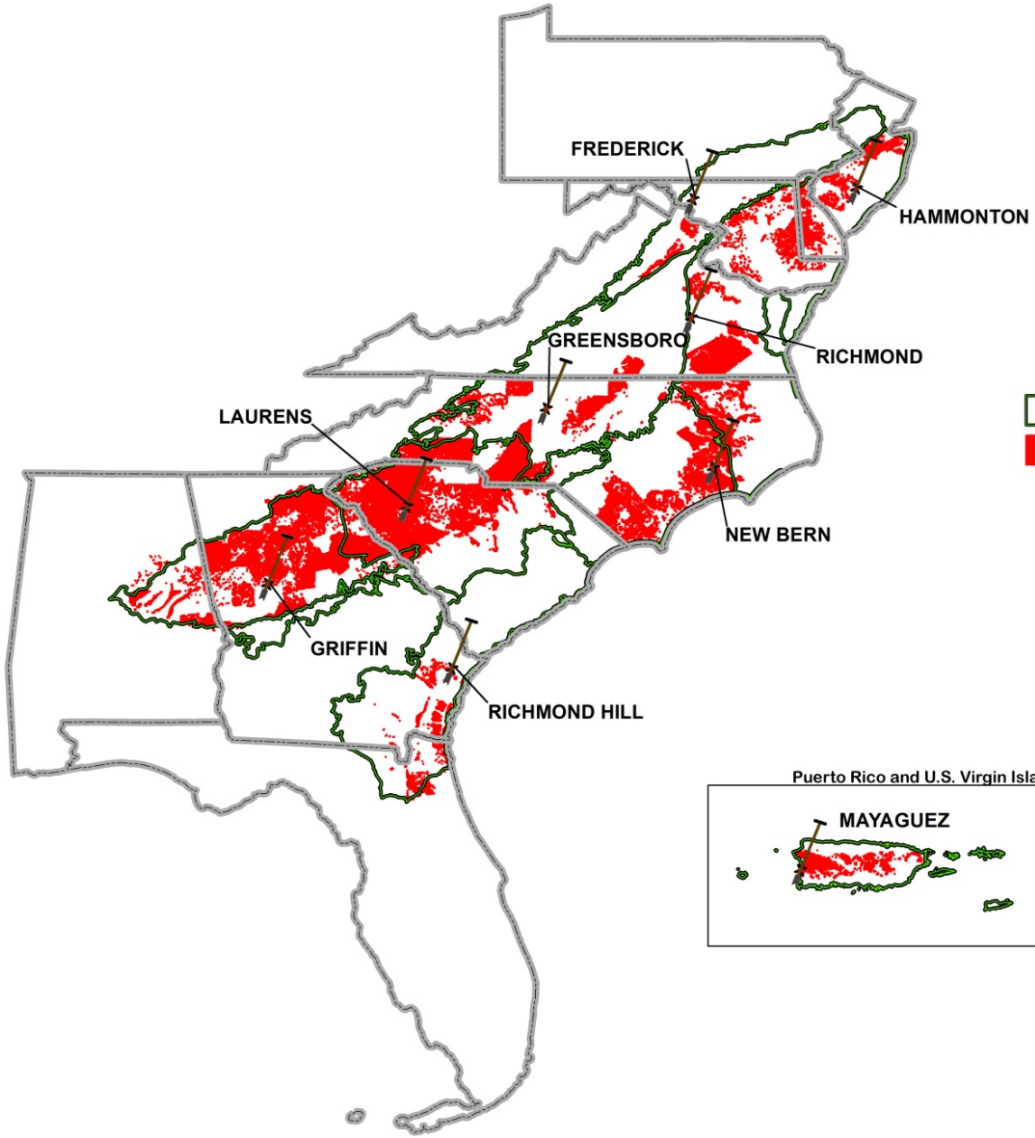

Carolina and Georgia Sand Hills Ecological Site Descriptions, NatureServe in partnership with the Natural Resources Conservation Service

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Introduction

Ecological Site Descriptions including state and transition models have been developed for rangelands in the western United States. These have been valuable tools for incorporating ecological site information into rangeland management decisions. NatureServe and the USDA Natural Resources Conservation Service developed a partnership to develop Ecological Site Descriptions in the Carolina and Georgia Sand Hills, Major Land Resource Area 137 (MLRA 137). NatureServe is a network connecting science with conservation, and is a leading source of information about the rare species and vegetation of North America. NatureServe is also a conservation science network with partner agencies in each of the 50 states. The USDA Natural Resources Conservation Service has technical expertise in soil science, and the productive capabilities of the lands of the United States. In partnership, we have developed Ecological Site Descriptions (ESD) for the Carolina and Georgia Sand Hills, a special region which supports the imperiled longleaf pine ecosystem. For this effort, six sets of Ecological Site Descriptions (ESD) were developed, representing most of the lands of the Carolina and Georgia Sand Hills. Here we present the overall effort, and focus on one ESD, for Xeric Sandhill Scrub.

The Xeric Sandhill Scrub Ecological Site Description

The soils of the Xeric Sandhill Scrub include deep sandy soils of four series. These soil series are Candor (Sandy, kaolinitic, thermic Grossarenic Kandiudults), Lakeland (Thermic, coated Typic Quartzipsamments), Troup (Loamy, kaolinitic, thermic Grossarenic Kandiudults) and Wakulla (Siliceous, thermic Psammentic Hapludults). These are nutrient poor, acidic deep sands which are somewhat excessively drained to excessively drained and have slow runoff. These sands are nearly all eolian or marine in origin, and occur on gentle ridges, summits in broad upland areas, and on dry upper slopes.

These are the least productive sites within the Sand Hills region. The structure and composition of the vegetation is generally driven by fire, and by the characteristics of the excessively drained deep sandy soils. The Xeric Sandhill Scrub is naturally occurring woodland vegetation which is found on deep sands of dry uplands in the Carolina and Georgia Sand Hills (MLRA 137). These sites are prone to wildland fire and probably naturally burned as frequently as every few years. Fires are ignited by lightning or by humans. Prior to the construction of roads, wildland fires may have burned extensive areas (1000s of acres). Today prescribed fire is used by land managing agencies, to maintain and restore the Xeric Sandhill Scrub. There are two sources of fuel for the surface fires typical of the Xeric Sandhill Scrub, longleaf pine (*Pinus palustris*) needles and native grass such as wiregrass (*Aristida stricta*). Naturally functioning examples of Xeric Sandhill Scrub need both these sources of fuel. The loss of either the longleaf pine trees, or the native herbaceous ground cover can lead to less frequent surface fires, and transitions to other ecological states. Many areas that used to have longleaf pine have become dominated by loblolly pine (*Pinus taeda*) and hardwood trees after industrial logging and control of wildland fires began in the early 20th century. In recent decades land managers have become skilled at managing remnant longleaf pine woodlands and the value of longleaf pine forest products has gained more attention. The special qualities of the longleaf pine woodlands are now recognized for their beauty and high biological diversity. Numerous rare plants and animals persist in the Xeric Sandhill Scrub habitats, especially on the larger public lands, such as Fort Bragg and the Sandhills Gamelands.

State and Transition Model for Xeric Sandhill Scrub (see diagram lower right)

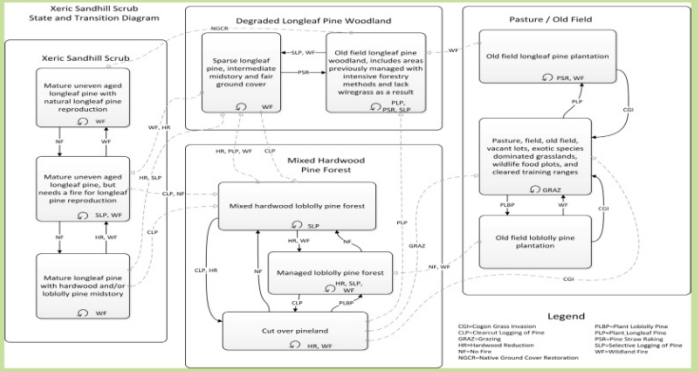
The state and transition model has the natural Xeric Sandhill Scrub on the very upper left, open longleaf pine forests generally along the top and left and closed hardwood and loblolly pine forests along the bottom. Pastures and old fields are on the right. The Sand Barren (Typic Subtype) is an unusual and very dry infertile community which naturally burns less frequently than other examples of the Xeric Sandhill Scrub. Because of the lack of fertility the buildup of grasses and longleaf pine needles is slower in the Sand Barren (Typic Subtype). In its natural condition it is in the middle box on the left side of the state and transition model, where there is more of a Turkey Oak (*Quercus laevis*) midstory. The transitions in the Xeric Sandhill Scrub state transition model can be either transitions between states, transitions within a particular state, or they can be factors which serve to maintain a site in a particular condition. If the factor maintains a site in a particular condition, it is indicated with a looped arrow in the state transition model diagram. Transitions within a state are indicated with solid line arrows and transitions between states are indicated with dashed line arrows. Because of the variety of natural disturbances and land management methods used in the Xeric Sandhill Scrub site, there are many transitions and paths between states as well as within the four states of the Xeric Sandhill Scrub site. Not all the possible transitions are indicated in the state and transition diagram. Multiple factors are indicated on many of the transition arrows. In some cases any of the factors are associated with the transition, but in other cases the several factors together lead to the transition.

Partnership between NatureServe and USDA Natural Resources Conservation Service

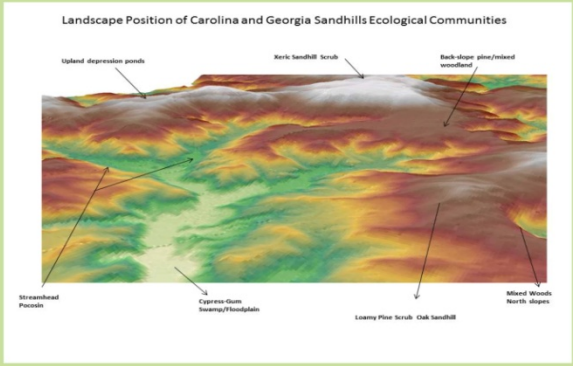
This partnership has started Ecological Site Description work in the eastern United States. NatureServe and NRCS have been able to apply their strengths to this effort, which has progressed quickly. Review of the Sand Hills region Ecological Site Descriptions were done with the help of the North Carolina Natural Heritage Program, USDA NRCS, and the Department of the Army (Ft. Bragg, DPW/Endangered Species Branch). We are thankful to these agencies.

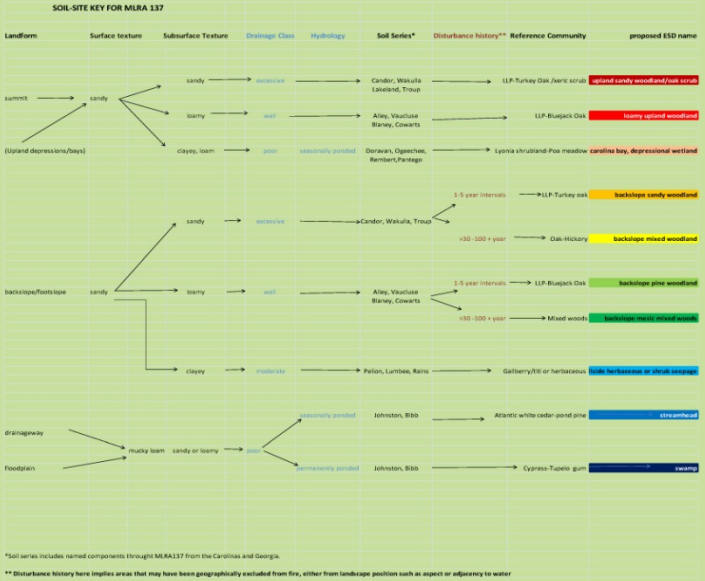
Conclusions

Ecological Site Descriptions and the state and transition models they include will be useful in the eastern United States to land managers. The soils expertise and ecological expertise of the project partners made this work time and cost efficient. This partnership could be continued to complete ESDs in the eastern United States.



Site	Landform	Surface Texture	Subsoil Texture	Depth to Seasonal High Water Table	Agricultural Drainage Class	Soil Series	Plant Community
1	Summit	Sandy	Sandy	>60 inches	Well to excessively	Candor Wakulla Lakeland Troup	Dry LLP-Oak; xeric oak scrub
2	Summit	Sandy	Loamy	>60 inches	Well	Alley Vaucluse Blaney	LLP-Blackjack oak/ huckleberry/ wiregrass woodland
3	Backslope	Sandy	Sandy	>60 inches	Well to excessively	Candor Wakulla	No differences in vegetation as 1.
4	Backslope	Sandy	Loamy	>60 inches	Well	Alley Vaucluse Blaney	Mesic LLP woodland
5	Footslope & concave backslope, water-receiving positions	Sandy or loamy	Clayey	12 to 30 inches	Moderately well	Pelion	Hillside seep (Gallberry/titi)
6	Drainageway Floodplain	Mucky loam	Sandy or Loamy	Surface to 12 inches	Very poorly to poorly	Johnston Bibb	Atlantic white cedar-pond pine- tulip tree forested seep

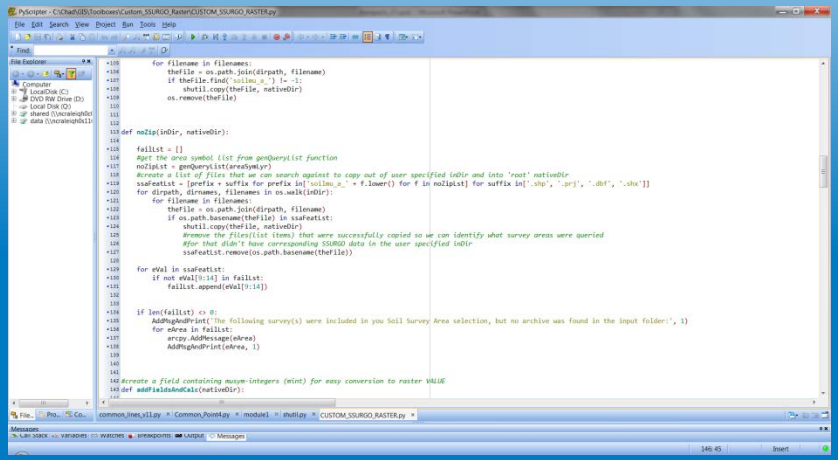




Methods

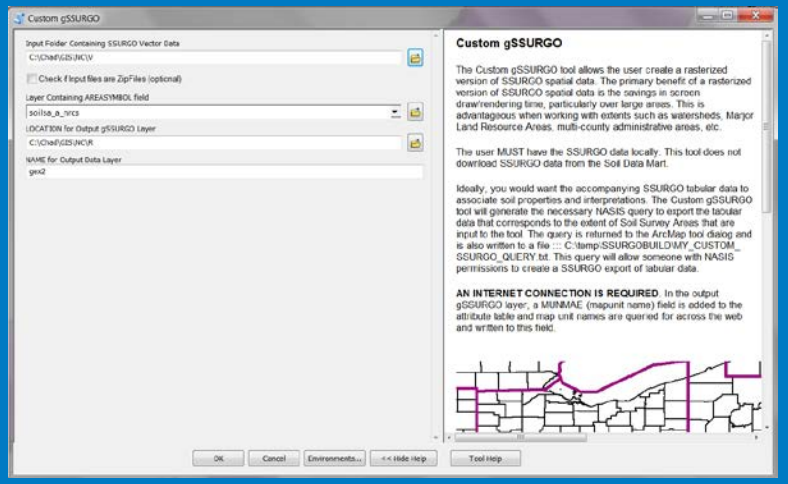
- Applied the methods for Ecological Site Descriptions used on western rangelands, but rarely applied in the eastern United States
- Used the U.S. National Vegetation Classification (U.S. NVC) , which is the Federal Geographic Data Committee Standard
- Used soil description, classification, analysis, and mapping expertise of the USDA Natural Resources Conservation Service
- Incorporated information from NatureServe's Ecological Integrity Assessment (EIA) work, U.S. NVC development, NC NHP, and Landfire
- Developed six Ecological Site Descriptions including state and transition models for Xeric Sandhill Scrub, Pine Scrub Oak Sandhill, Mesic Pine Savanna, Sandhill Seep, Sandhill Streamhead Pocosin and Swamp, and Cypress-Gum Swamp with all states and transitions described
- Peer review by NatureServe Network partner, the North Carolina Natural Heritage Program, plus staff from NRCS, and Department of the Army

Custom GRIDDED SSURGO Tool



A python script

Which runs in ArcGIS / ArcToolBox



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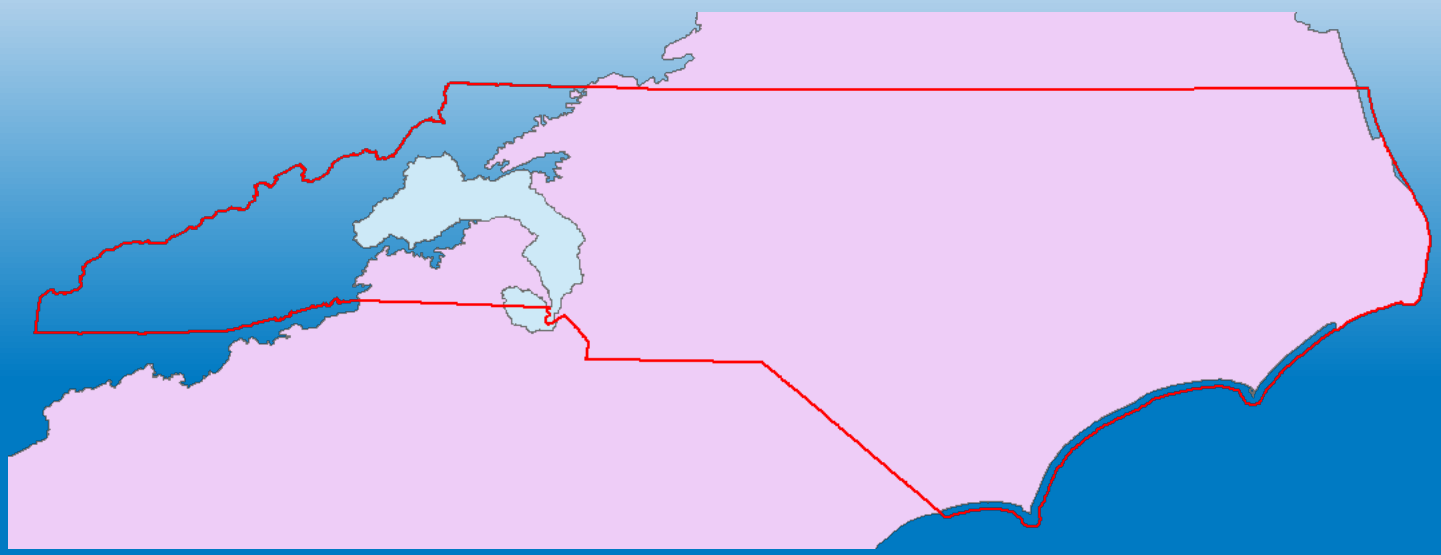

Alternative to currently distributed gSSURGO products (SSRO/State)

User Defines custom Area of Interest

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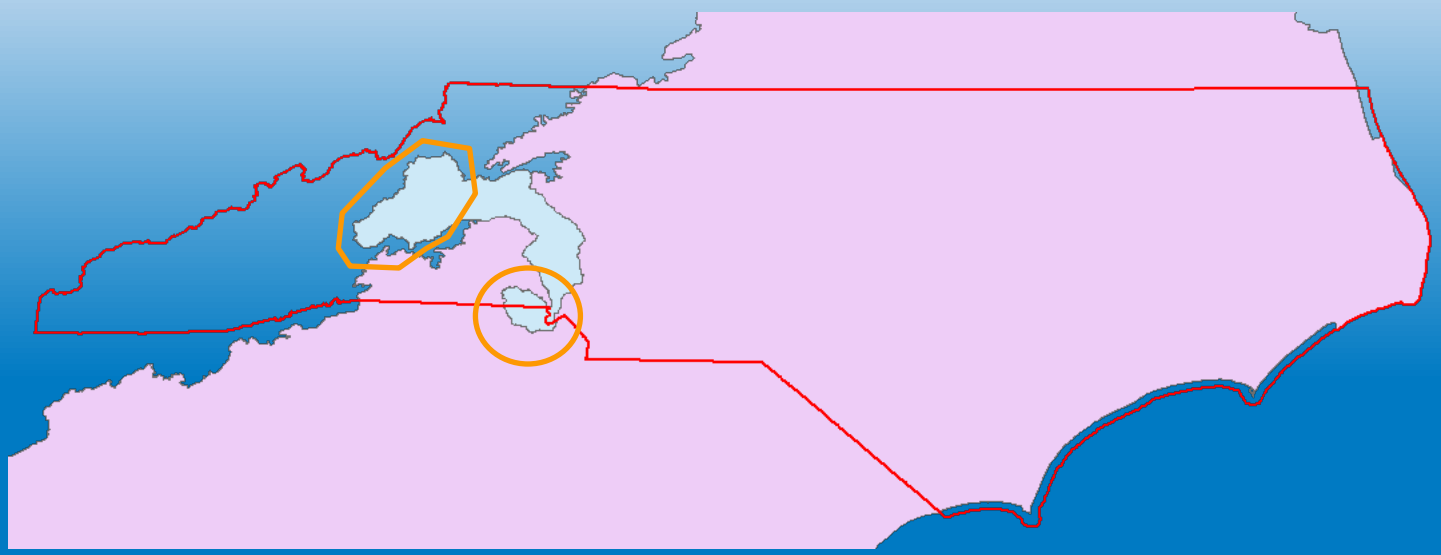

Example – **Upper Catawba River Watershed**

Extends beyond **SSRO-3** and **North Carolina**

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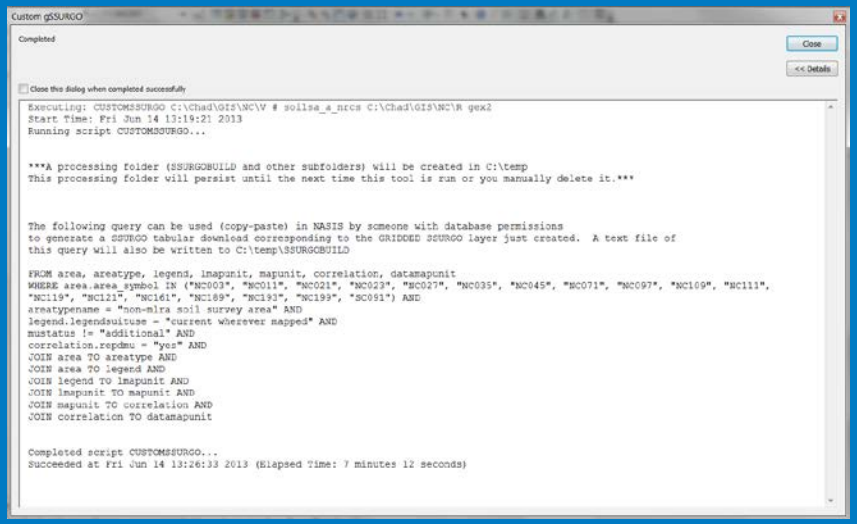
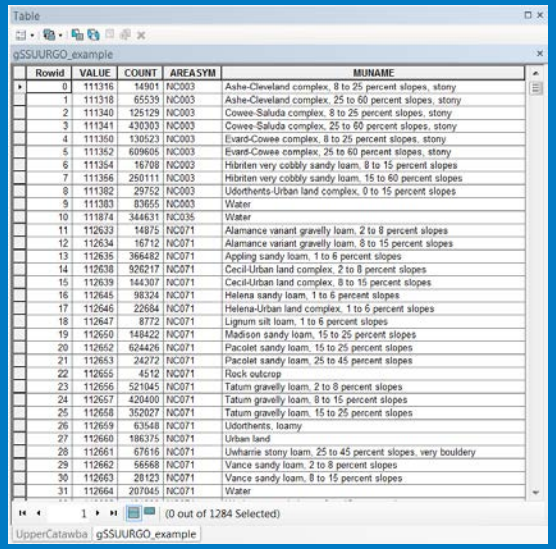
Custom GRIDDED SSURGO Tool

18 Soil Survey Areas mosaiced
Total time 7:50

Writes NASIS query for SSURGO export



Runs NASIS Web report and writes AREASYM and MUNAME to raster attribute table



Rowid	VALUE	COUNT	AREASYM	MUNAME
0	111316	14901	NC003	Ashe-Cleveland complex, 8 to 25 percent slopes, stony
1	111318	65539	NC003	Ashe-Cleveland complex, 25 to 60 percent slopes, stony
2	111340	125129	NC003	Cowee-Saluda complex, 8 to 25 percent slopes, stony
3	111341	430303	NC003	Cowee-Saluda complex, 25 to 60 percent slopes, stony
4	111350	130523	NC003	Evard-Cowee complex, 8 to 25 percent slopes, stony
5	111352	609605	NC003	Evard-Cowee complex, 25 to 60 percent slopes, stony
6	111354	16708	NC003	Hibriten very cobbly sandy loam, 8 to 15 percent slopes
7	111356	250111	NC003	Hibriten very cobbly sandy loam, 15 to 60 percent slopes
8	111382	29752	NC003	Udorthents-Urban land complex, 0 to 15 percent slopes
9	111383	83655	NC003	Water
10	111874	344631	NC035	Water
11	112633	14875	NC071	Alamance variant gravelly loam, 2 to 8 percent slopes
12	112634	16712	NC071	Alamance variant gravelly loam, 8 to 15 percent slopes
13	112635	366482	NC071	Appling sandy loam, 1 to 6 percent slopes
14	112638	926217	NC071	Cecil-Urban land complex, 2 to 8 percent slopes
15	112639	144307	NC071	Cecil-Urban land complex, 8 to 15 percent slopes
16	112645	98324	NC071	Helena sandy loam, 1 to 6 percent slopes
17	112646	22684	NC071	Helena-Urban land complex, 1 to 6 percent slopes
18	112647	8772	NC071	Lignum silt loam, 1 to 6 percent slopes
19	112650	148422	NC071	Madison sandy loam, 15 to 25 percent slopes
20	112652	624426	NC071	Pacolet sandy loam, 15 to 25 percent slopes
21	112653	24272	NC071	Pacolet sandy loam, 25 to 45 percent slopes
22	112655	4512	NC071	Rock outcrop
23	112656	521045	NC071	Tatum gravelly loam, 2 to 8 percent slopes
24	112657	420400	NC071	Tatum gravelly loam, 8 to 15 percent slopes
25	112658	352027	NC071	Tatum gravelly loam, 15 to 25 percent slopes
26	112659	63548	NC071	Udorthents, loamy
27	112660	186375	NC071	Urban land
28	112661	67616	NC071	Uwharrie stony loam, 25 to 45 percent slopes, very bouldery
29	112662	56568	NC071	Vance sandy loam, 2 to 8 percent slopes
30	112663	28123	NC071	Vance sandy loam, 8 to 15 percent slopes
31	112664	207045	NC071	Water

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