

gSSURGO Mapping Toolset

(a member of the Soil Data Development Toolbox)

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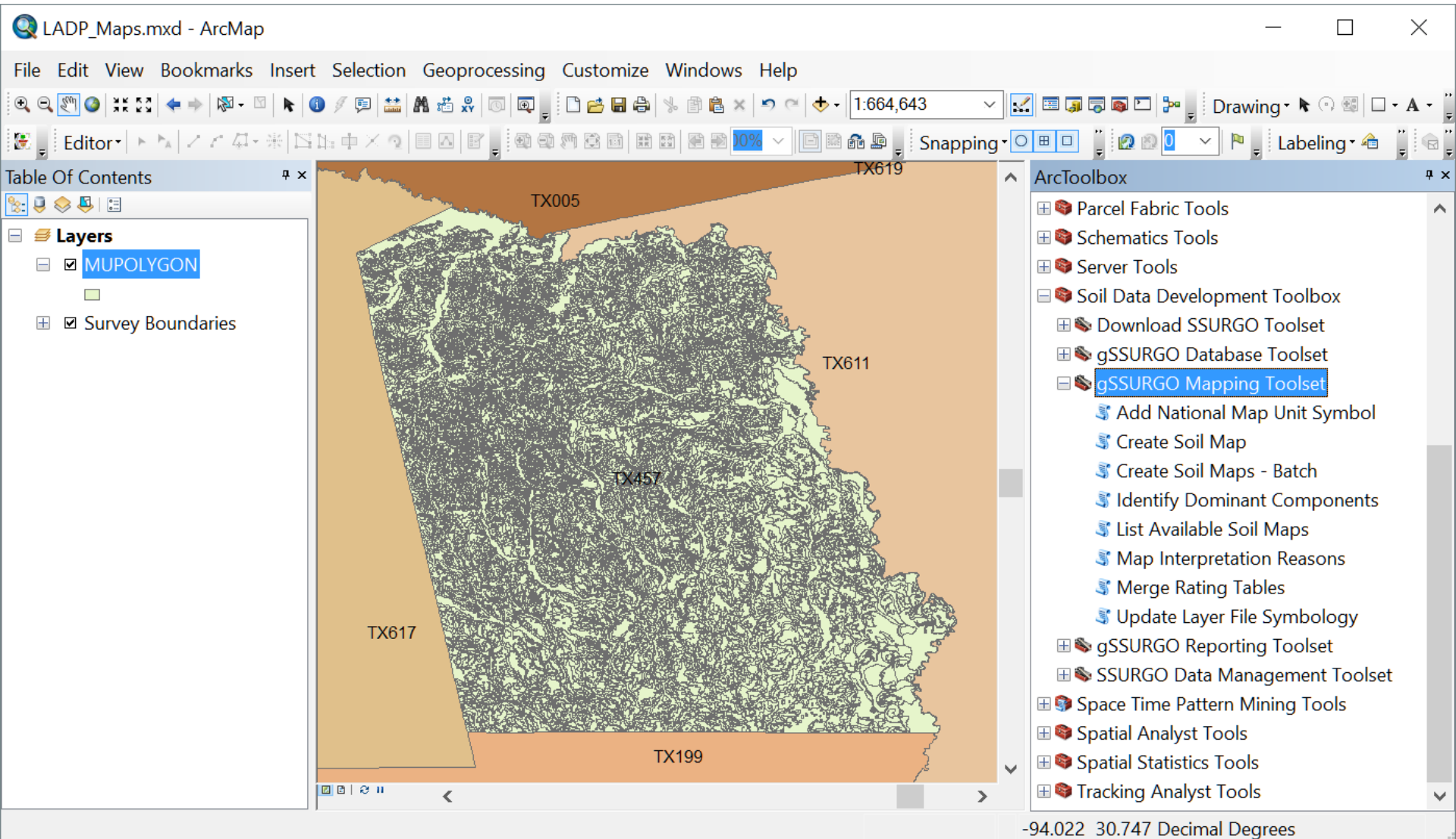
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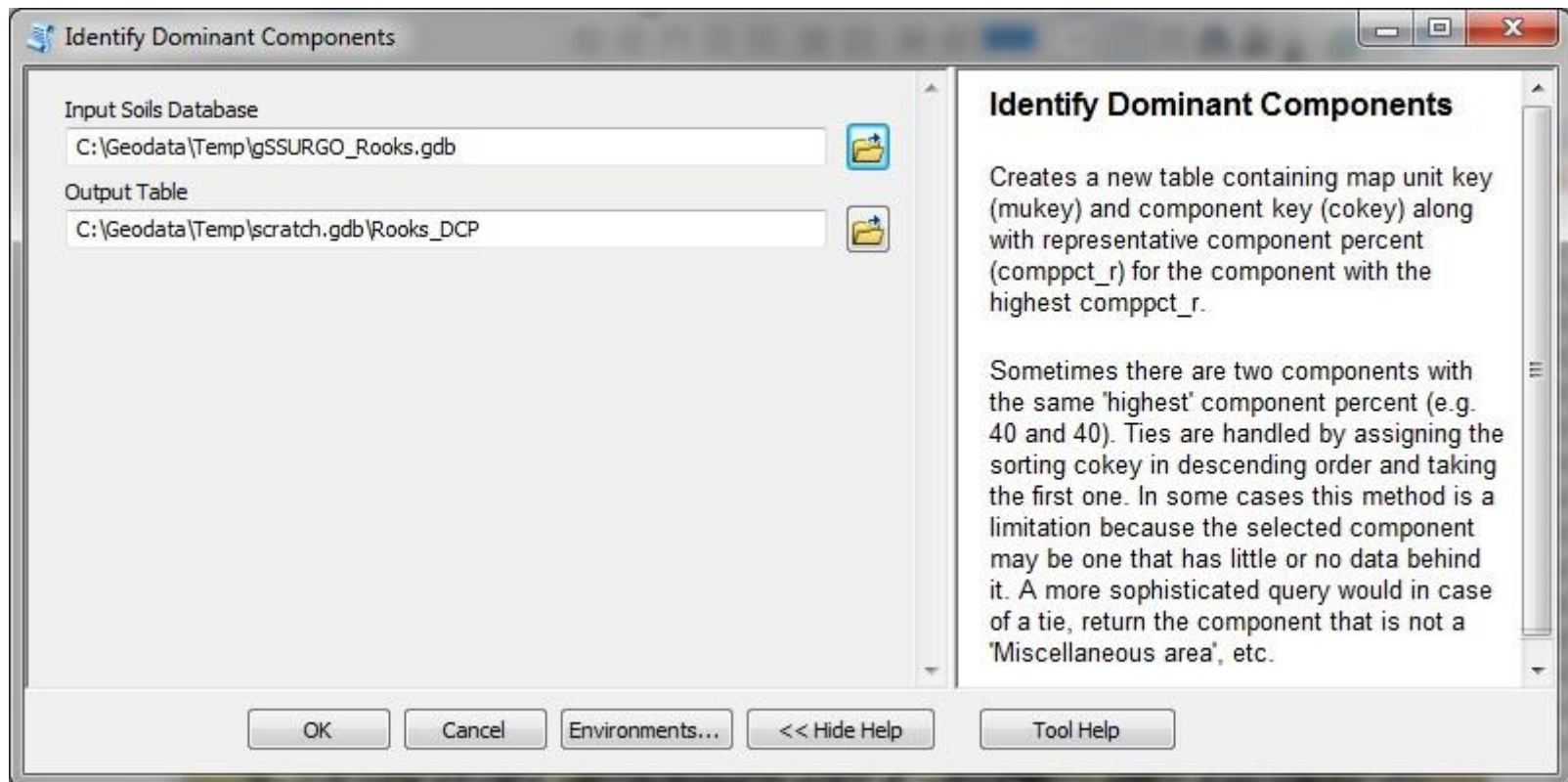
[Update Layer File Symbolology](#)

The 'gSSURGO Mapping' toolset is a part of the 'Soil Data Development' toolbox for gSSURGO. This toolbox is compatible with ArcGIS Desktop versions 10.3 – 10.5.



Identify Dominant Components Tool

The 'Identify Dominant Components' tool selects the component within each map unit that has the highest component percent. The mukey, cokey and comp_pct_r values for each selected record are written to the specified table. This table can then be used to in creating simple joins between a soil map layer and the component table using the MUKEY field. All tools include Tool Help on the right side.



Table

Rooks_DCP

| OBJECTID * | mukey * | cokey | comppct_r |
|------------|---------|----------|-----------|
| 1 | 2876217 | 11805065 | 80 |
| 2 | 1150273 | 11804906 | 50 |
| 3 | 1150242 | 11805154 | 45 |
| 4 | 1150271 | 11805026 | 95 |
| 5 | 1150270 | 11805051 | 87 |
| 6 | 1150277 | 11805110 | 45 |
| 7 | 1150276 | 11805082 | 90 |
| 8 | 1150275 | 11805076 | 90 |
| 9 | 1150243 | 11805150 | 55 |
| 10 | 1150255 | 11804949 | 100 |
| 11 | 1150279 | 11804952 | 100 |
| 12 | 1150278 | 11804950 | 100 |
| 13 | 2496154 | 11804996 | 100 |
| 14 | 1150257 | 11804897 | 100 |
| 15 | 1150253 | 11804948 | 100 |

(0 out of 68 Selected)

Rooks_DCP

Output table containing the cokey associated with each map unit's dominant component.

1. Join output table to soil map layer on MUKEY field.
2. Join COMPONENT table to soil map layer on COKEY field
3. Use add join component table soil property map

Join Data

Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.

What do you want to join to this layer?

Join attributes from a table

1. Choose the field in this layer that the join will be based on:
MUKEY
2. Choose the table to join to this layer, or load the table from disk:
Rooks_DCP
☒ Show the attribute tables of layers in this list
3. Choose the field in the table to base the join on:
mukey

Join Options

☒ Keep all records
All records in the target table are shown in the resulting table. Unmatched records will contain null values for all fields being appended into the target table from the join table.

☐ Keep only matching records
If a record in the target table doesn't have a match in the join table, that record is removed from the resulting target table.

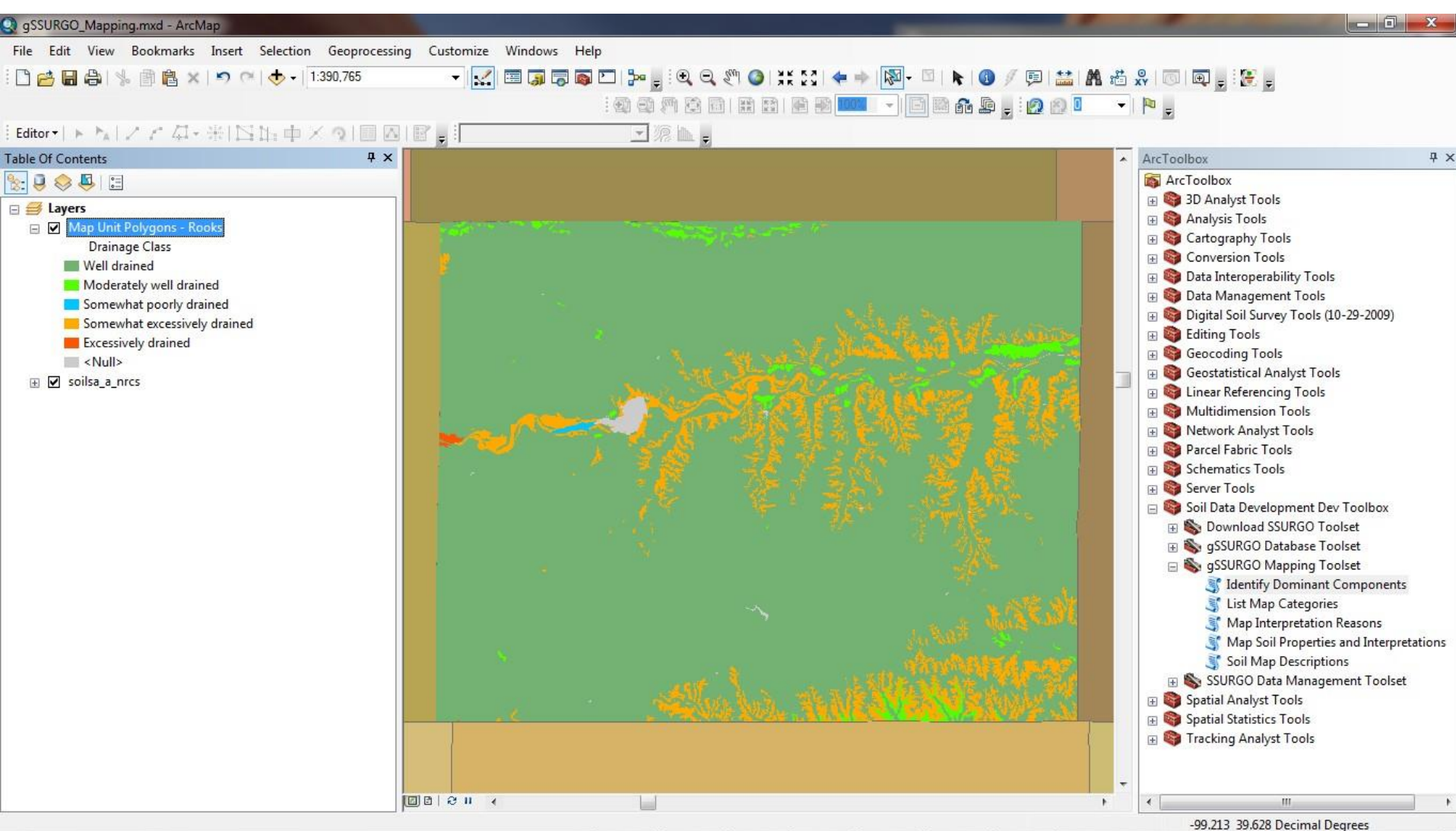
Validate Join

[About joining data](#)

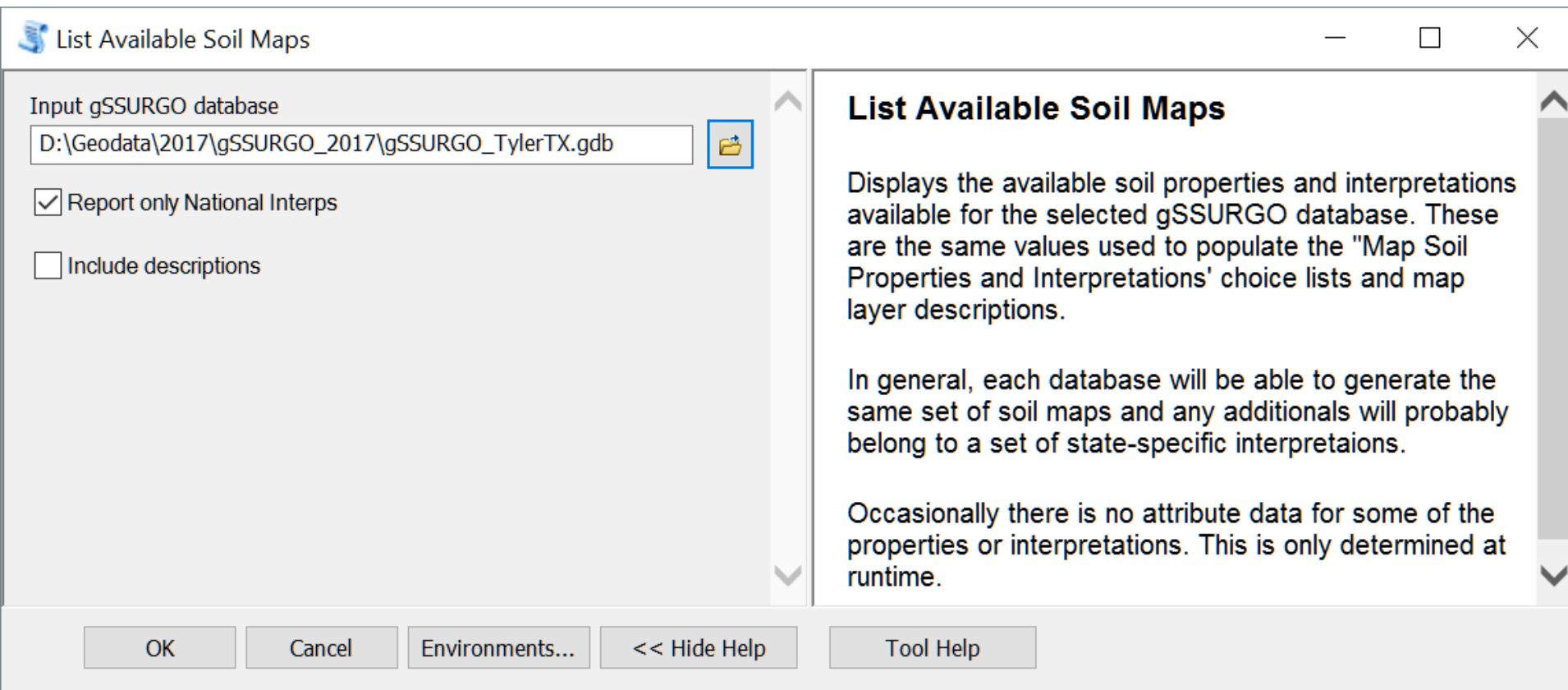
OK Cancel

The 'Add Join' tool located in Data Mgmt/Joins

Simple component-level 'Drainage Class' map created with the assistance of the 'Identify Dominant Components' tool. Three tables were joined to create this map (Mupolygon, Rooks_DCP*, component). The Rooks_DCP table was created by the tool.



List Available Soil Maps Tool



List Available Soil Maps

Input gSSURGO database

D:\Geodata\2017\gSSURGO_2017\gSSURGO_TylerTX.gdb

☒ Report only National Interps

☐ Include descriptions

List Available Soil Maps

Displays the available soil properties and interpretations available for the selected gSSURGO database. These are the same values used to populate the "Map Soil Properties and Interpretations" choice lists and map layer descriptions.

In general, each database will be able to generate the same set of soil maps and any additional will probably belong to a set of state-specific interpretations.

Occasionally there is no attribute data for some of the properties or interpretations. This is only determined at runtime.

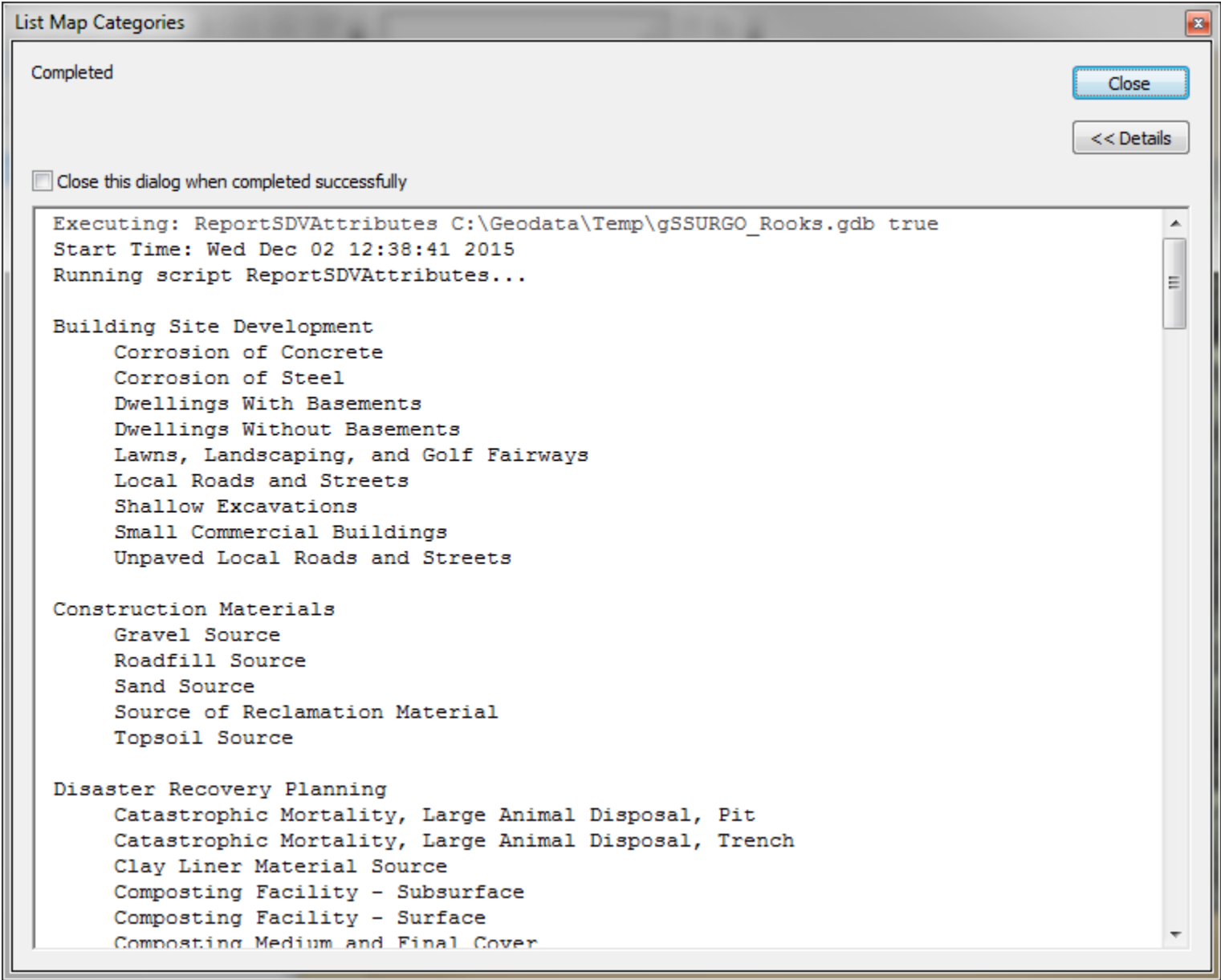
OK Cancel Environments... << Hide Help Tool Help

The 'List Map Categories' tool generates a tree-listing of all 'Soil Data Viewer' type maps that the 'Create Soil Maps' tool can produce with this database.

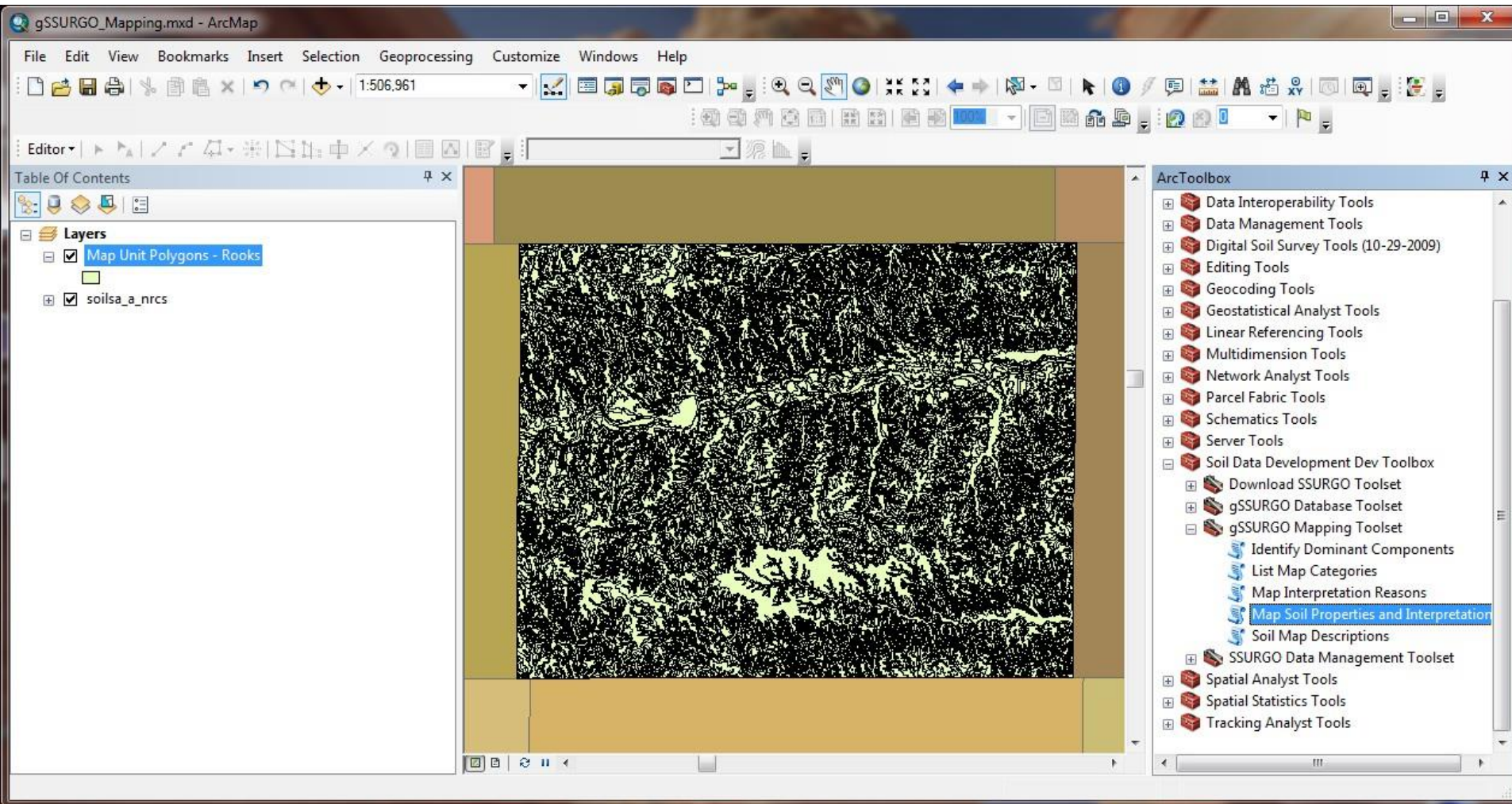
The default 'Report only National Interps' option will list only the national interpretations. Unchecking this option will add any custom state interpretations present in the selected database.

Including descriptions will add the narrative information for each property or interpretation.

Example of 'List Available Soil Maps' tool output to the console window. This text can be pasted to a Word document for future reference using the mouse to highlight and then Ctrl-C to copy.



Create Soil Map Tool



'Create Soil Map' tool creates soil maps in a similar manner as Soil Data Viewer. Parameter choice lists can vary between gSSURGO databases, especially when the user selects a soil interpretation. Some parameters may be grayed-out when their use is not appropriate for that soil property or interpretation. The following slides explain the user menu.

The current version of the 'Create Soil Map' tool has 16 parameters. Many of these parameters may be enabled or disabled, depending upon choices made above. Disabled parameters will be grayed-out.

Parameters will have a default setting which normally does not be changed unless the user has a specific reason for doing so.

Create Soil Map

Map Unit Layer

MUPOLYGON

SDV Folder

SDV Attribute

Aggregation Method

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth

0

0

200

Bottom Depth

0

0

200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values

Representative

OK

Cancel

Environments...

<< Hide Help

Tool Help

Create Soil Map

Soil Data Viewer-type mapping tool for gSSURGO. The purpose is to create soil property or soil interpretation maps using gSSURGO file geodatabases.

Warning. Creating several maps with the same parameters can result in map layers being overwritten.



Create Soil Map

Map Unit Layer
MUPOLYGON

SDV Folder

SDV Attribute

Aggregation Method

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth
0 0 200

Bottom Depth
0 0 200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values
Representative

Create Soil Map

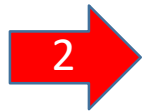
Soil Data Viewer-type mapping tool for gSSURGO. The purpose is to create soil property or soil interpretation maps using gSSURGO file geodatabases.

Warning. Creating several maps with the same parameters can result in map layers being overwritten.

OK Cancel Environments... << Hide Help Tool Help

If a single soil polygon layer containing MUKEY is found in the ArcMap table of contents (TOC), that layer will be automatically selected in the first parameter.

If multiple soil polygon layers are present, the user will have to choose from the drop down menu.



The 'SDV Folder' parameter has 17 different choices. The 'Wildlife Management' choice may not be always be used.

Create Soil Map

Map Unit Layer
MUPOLYGON

SDV Folder
Soil Physical Properties

- Building Site Development
- Construction Materials
- Disaster Recovery Planning
- Land Classifications
- Land Management
- Military Operations
- Recreational Development
- Sanitary Facilities
- Soil Chemical Properties
- Soil Erosion Factors
- Soil Health
- Soil Physical Properties
- Soil Qualities and Features
- Vegetative Productivity
- Waste Management
- Water Features
- Water Management
- Wildlife Management
- Bottom Deposition

0 0 200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values
Representative

OK Cancel Environments... << Hide Help Tool Help

SDV Folder

Top level category of soil properties or interpretations.

Examples:

- Building Site Development
- Land Management
- Soil Physical Properties

These choices are obtained from the gSSURGO database. They are not hard coded.



The 'SDV Attribute' parameter is dependent on the previous selection made for 'SDV Folder'.

In all, there are over 160 possible selections for soil properties or interpretations, not including custom state versions.

Create Soil Map

Click error and warning icons for more information

Map Unit Layer
MUPOLYGON

SDV Folder
Soil Physical Properties

SDV Attribute
Percent Sand

Available Water Capacity
Available Water Storage
Available Water Supply, 0 to 100 cm
Available Water Supply, 0 to 150 cm
Available Water Supply, 0 to 25 cm
Available Water Supply, 0 to 50 cm
Bulk Density, 15 Bar
Bulk Density, One-Tenth Bar
Bulk Density, One-Third Bar
Linear Extensibility
Liquid Limit
Organic Matter
Percent Clay
Percent Sand
Percent Silt
Plasticity Index
Saturated Hydraulic Conductivity (Ksat)
Saturated Hydraulic Conductivity (Ksat), Standard Classes
Surface Texture
Water Content, 15 Bar
Water Content, One-Third Bar
Beginning Month (optional)
Ending Month (optional)
Tie Break Rule (optional)
Higher
☐ Treat Null Values as Zero
Component Percent Cutoff (optional)
☐ Map Interp Fuzzy Values
☐ Include Null Values
Use Property Values

SDV Attribute

Specific soil property or interpretations to be mapped. Examples include "Corrosion of Concrete", "Available Water Capacity", "

These choices are obtained from the gSSURGO database at runtime.

OK Cancel Environments... << Hide Help Tool Help

As soon as the user chooses a horizon-level ‘SDV Attribute’ such as ‘Percent Sand’, the two parameters for horizon depth are automatically enabled.



A red ‘X’ is immediately displayed, letting the user know that they must set the top and bottom depths before the tool can be executed.

Create Soil Map

Click error and warning icons for more information

Map Unit Layer

MUPOLYGON

SDV Folder

Soil Physical Properties

SDV Attribute

Percent Sand

Aggregation Method

Dominant Component

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth

0

0200

Bottom Depth

0

0200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)

Higher

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values

SDV Attribute

Specific soil property or interpretations to be mapped. Examples include "Corrosion of Concrete", "Available Water Capacity", "

These choices are obtained from the gSSURGO database at runtime.

OK

Cancel

Environments...

<< Hide Help

Tool Help

Top depth setting always defaults to the surface (0 centimeter). To only report properties for the surface horizon, set the top depth to 0 and bottom depth to 1 cm.



Create Soil Map

Map Unit Layer
MUPOLYGON

SDV Folder
Soil Physical Properties

SDV Attribute
Percent Sand

Aggregation Method
Dominant Component

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth
0 0 200

Bottom Depth
25 0 200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)
Higher

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values
Representative

Beginning Month (optional)
Beginning month for the time period.

OK Cancel Environments... << Hide Help Tool Help

Inappropriate settings for top or bottom depth will result in an error. In this example, the top depth is set lower than the bottom depth.



Create Soil Map

Map Unit Layer
MUPOLYGON

SDV Folder
Soil Physical Properties

SDV Attribute
Percent Sand

Aggregation Method
Dominant Component

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth
45

Bottom Depth
1

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)
Higher

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values
Representative

Create Soil Map

Soil Data Viewer-type mapping tool for gSSURGO. The purpose is to create soil property or soil interpretation maps using gSSURGO file geodatabases.

Warning. Creating several maps with the same parameters can result in map layers being overwritten.

OK

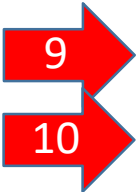
Cancel

Environments...

<< Hide Help

Tool Help

For 'Percent Sand', the 'Beginning Month' and 'Ending Month' parameters have no application and are disabled.



Create Soil Map

Map Unit Layer

MUPOLYGON

SDV Folder

Soil Physical Properties

SDV Attribute

Percent Sand

Aggregation Method

Dominant Component

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth

0

0

200

Bottom Depth

25

0

200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)

Higher

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values

Representative

Beginning Month (optional)

Beginning month for the time period.

OK

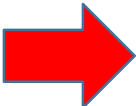
Cancel

Environments...

<< Hide Help

Tool Help

The Tie Break Rule controls which rating or property value is reported in case of a tie in component percent.



Create Soil Map

Map Unit Layer

MUPOLYGON

SDV Folder

Soil Physical Properties

SDV Attribute

Percent Sand

Aggregation Method

Dominant Component

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth

0

0

200

Bottom Depth

25

0

200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)

Higher

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values

Representative

Tie Break Rule (optional)

Use to control which value or rating is selected when there is a tie in component percent for dominant component. Also used to control "Minimum or Maximum" aggregation method.

Currently, the final output table name does not incorporate the tiebreak method. This means that when the user creates a map based on the 'Lower' tiebreak method and then subsequently generates a map using the 'Higher' tiebreak method, the first table and map will be overwritten.

OK

Cancel

Environments...

<< Hide Help

Tool Help

The 'Include Null Values' parameter controls how null values in certain numeric soil properties are handled. When checked, null values will be converted to zeros in the aggregation calculation.



Create Soil Map

Map Unit Layer
MUPOLYGON

SDV Folder
Soil Physical Properties

SDV Attribute
Percent Sand

Aggregation Method
Dominant Component

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth
0 0 200

Bottom Depth
25 0 200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)
Higher

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☐ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values
Representative

Include Null Values
Check this box to include NULL rating values

OK Cancel Environments... << Hide Help Tool Help

The Map Interp Fuzzy Values will create a soil map based upon fuzzy values rather than the rating class.



Create Soil Map

Map Unit Layer

MUPOLYGON

SDV Folder

Disaster Recovery Planning

SDV Attribute

Catastrophic Mortality, Large Animal Disposal, Pit

Aggregation Method

Weighted Average

Primary Constraint (optional)

Secondary Constraint (optional)

Top Depth

0

0

200

Bottom Depth

0

0

200

Beginning Month (optional)

Ending Month (optional)

Tie Break Rule (optional)

Higher

☐ Treat Null Values as Zero

Component Percent Cutoff (optional)

☒ Map Interp Fuzzy Values

☐ Include Null Values

Use Property Values

Representative

Map Interp Fuzzy Values

Map soil interpretations using the weighted average fuzzy value (0.00 -> 1.00) for the map unit rather than the rating class (No limitation, Somewhat limited, etc).

The 'Very limited' class would have a fuzzy value of 1.0

The 'Not limited' class would have a fuzzy value of 0

OK

Cancel

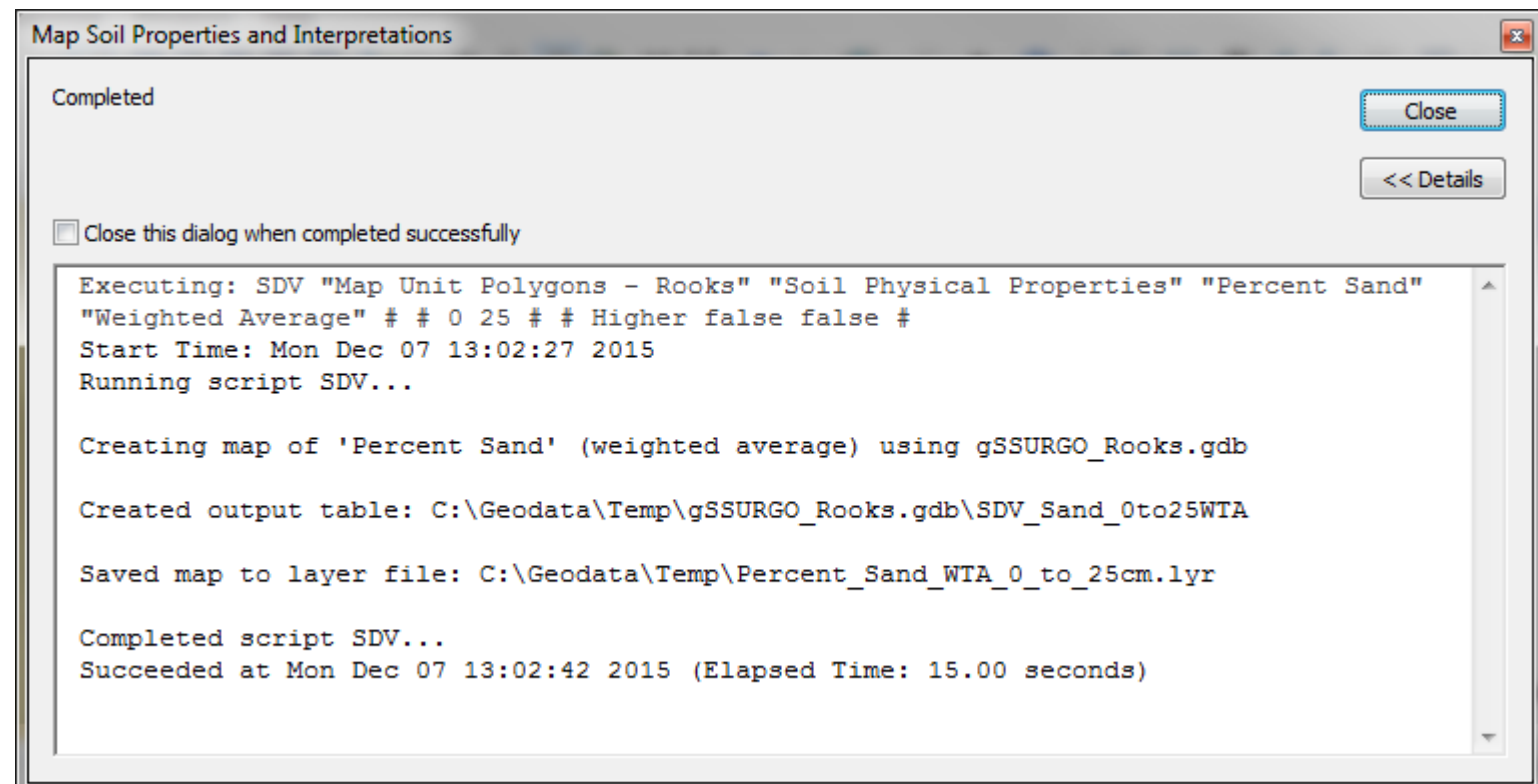
Environments...

<< Hide Help

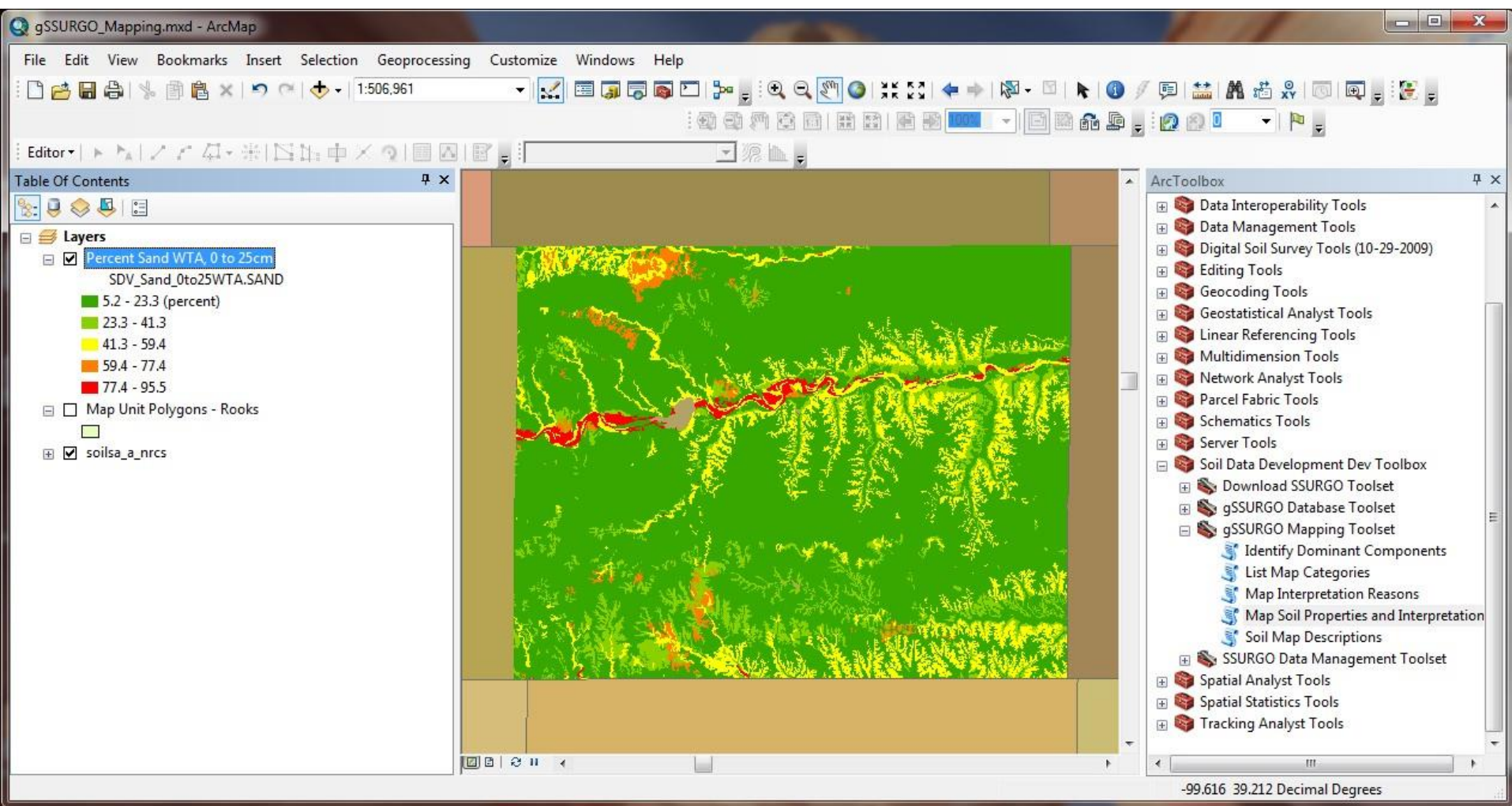
Tool Help

Below is an example of the console messages from the 'Create Soil Map' tool for 'Percent Sand'. These messages include important information such as:

1. Input database
2. Output rating table which can be joined to the MapunitRaster layer
3. Layer file (.lyr) that can be used in other ArcMap projects while preserving joins and symbology.



Map created by the 'Create Soil Map' tool for 'Percent Sand'



Layer Descriptions

The 'Create Soil Map' tool automatically creates a layer description for each soil map layer (Layer Properties/General Tab). Below is an example of the description for 'Percent Sand WTA'. This information is also stored in the layer file (.lyr) for each map.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In the database, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Units of Measure: percent

Aggregation Method: Weighted Average; Tiebreak rule: Higher

Top horizon depth: 0; Bottom horizon depth: 25

GeoDatabase: C:\Geodata\Temp\gSSURGO_Rooks.gdb

Featureclass: MUPOLYGON

Rating Table: SDV_Sand_0to25WTA

Layer File: C:\Geodata\Temp\Percent_Sand_WTA_0_to_25cm.lyr

Created by steve.peaslee on 2015-12-07

Layer Files (.lyr)

The 'Create Soil Map' tool automatically creates a layer file for each map layer and displays the name and location of this file in the console messages. The layer description information also includes the name and location of the layer file.

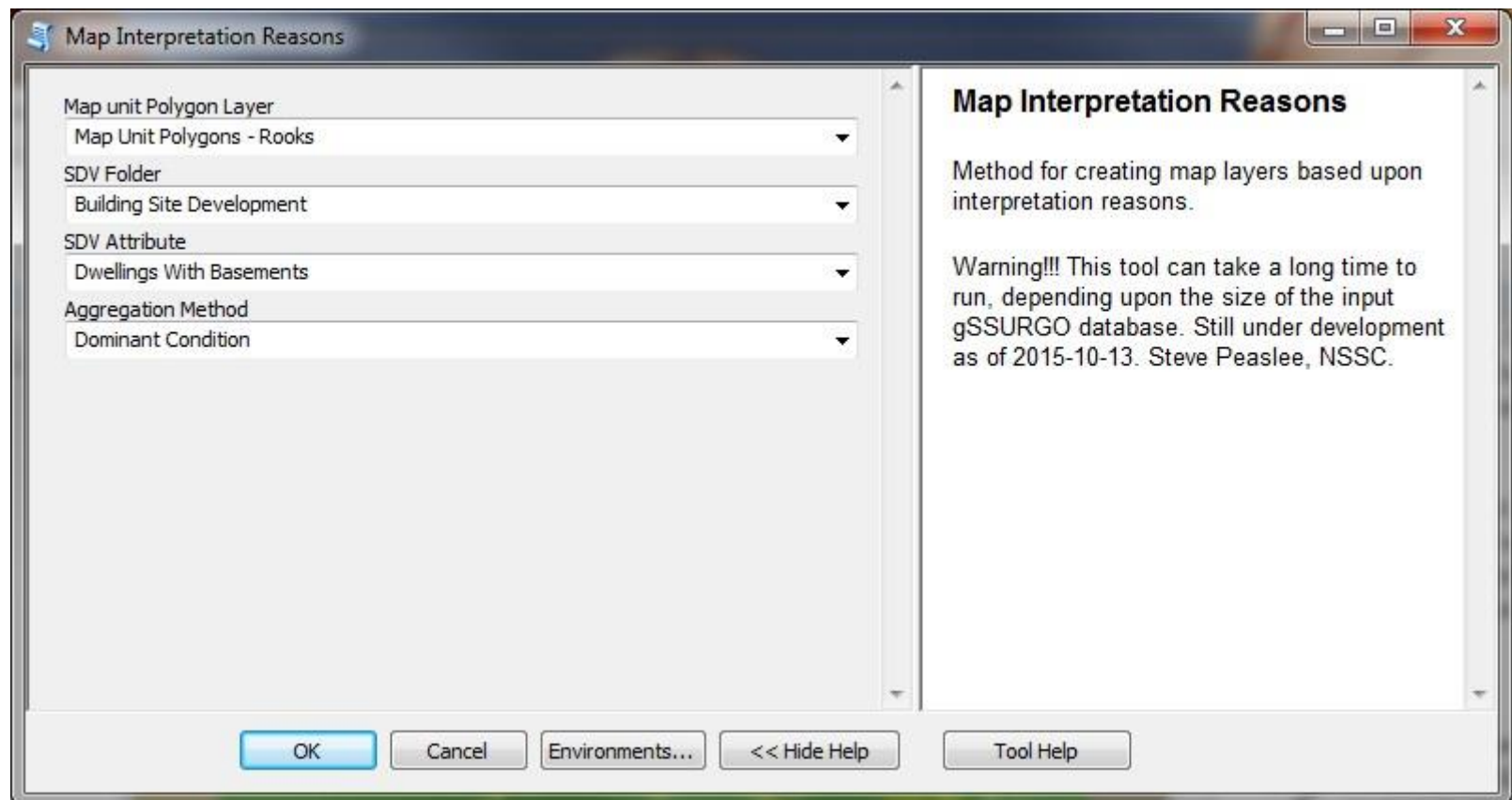
The tool creates layer symbology and temporarily joins the rating table to the soil polygon featureclass (MUPOLYGON). These settings are saved to the layer file and then the layer is added to the ArcMap table of contents (TOC). *Adding the MUPOLYGON featureclass to future ArcMap sessions will not automatically recreate the map legend.* This can only be accomplished by adding the layer file (.lyr) to ArcMap. The layer files are stored in the same folder as the geodatabase. An example might be something like: *C:\Geodata\Temp\Percent_Sand_WTA_0_to_25cm.lyr*. If the gSSURGO databases are moved or copied to a new location, always keep the layer files and databases together and do not change the names of the gSSURGO databases. Failure to follow these instructions will break the layer files.

Since the layer file names are not necessarily unique, it is a good idea to keep each gSSURGO database in its own, separate folder. Storing multiple gSSURGO databases in the same folder can result in layer files being accidentally overwritten.

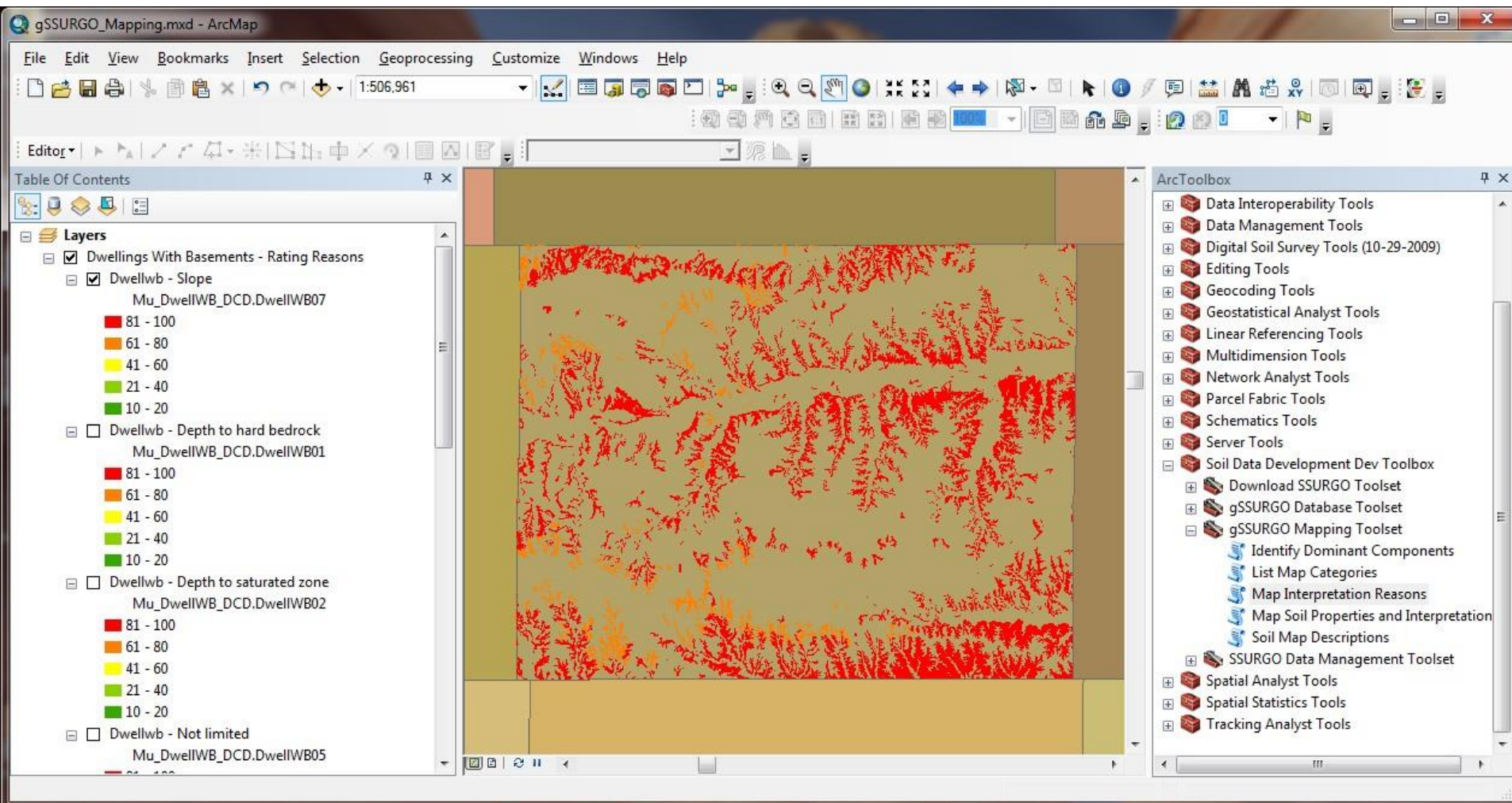
The output rating table names always begin with 'SDV_' and are created within the gSSURGO database. **These same rating tables can be joined to the MapunitRaster layer using the 'MUKEY' column.** Symbology will have to be manually created, but for large databases, drawing performance is greatly improved by using the raster.

Map Interpretation Reasons

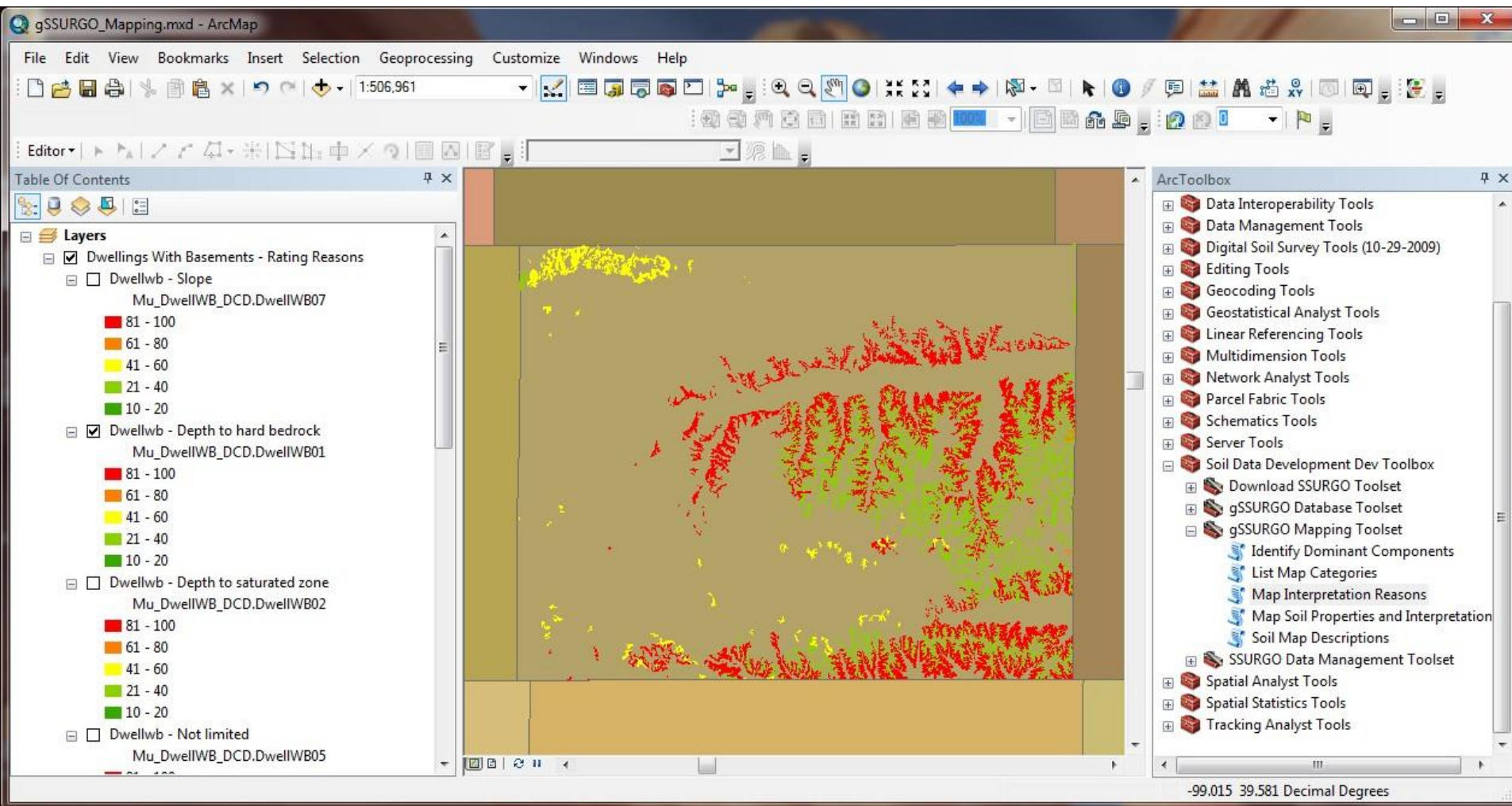
The 'Map Interpretation Reasons' tool is designed to map the extent and component percent of each of the limiting factors that go into the selected soil interpretation. Some interpretations can involve many factors and will thus generate a lot of map layers. Each layer is added to the ArcMap table of contents under a group layer named after the selected interpretation. This tool can take a long time to run, depending on the size of the database and the number of layers generated.



The 'Map Interpretation Reasons' tool will create a separate group layer for each of the limitations. The example below shows areas where 'Slope' is a limiting factor for 'Dwellings With Basements'. Other layers can be turned on-or-off in the ArcMap table of contents. Symbology is based upon component percent for that limitation.



The example below shows areas where 'Depth to hard bedrock' is a limiting factor for the 'Dwellings With Basements' interpretations.



The example below highlights the map units that are rated as being without limitation for 'Dwellings With Basements'.

