

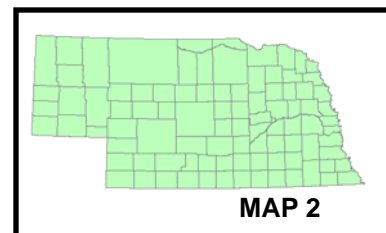
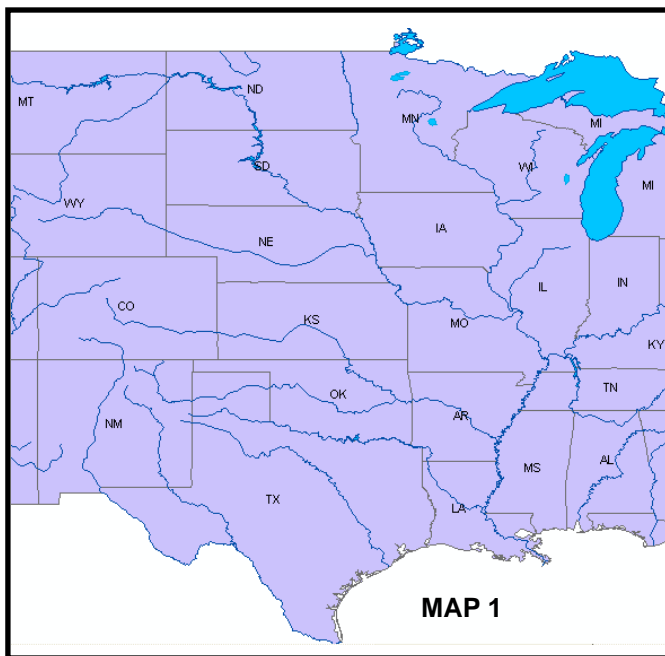
Soil Mapping

SSURGO, Soil survey geographic database was established by Natural Resources Conservation Service for soil mapping. The attribute data base contains physical and chemical soil properties for approximately 18,000 soil series recognized in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The scale of the map and the complexity of the soil patterns determine what can be shown on the soil map. In this activity you will overlay field boundary on an image, import publically available SSURGO data and reduce large data files to the extent of the field.

Explorer's Guide

Before You Start

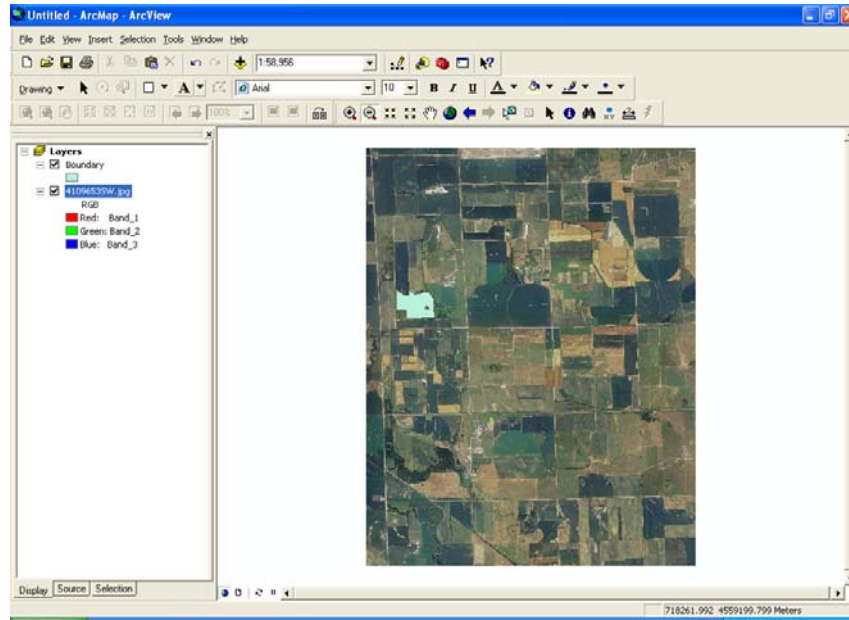
Map 1 represents the mid western states of the USA and Map 2 shows a state. Can you identify the state in Map 2? Where does it fit in Map 1?



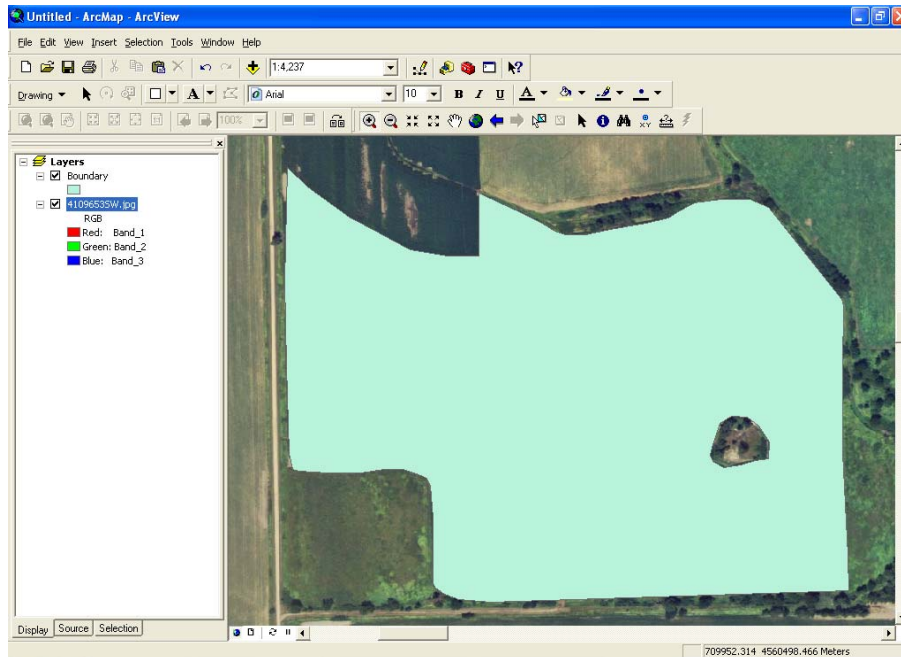
Learning by Doing

1. Start ArcMap and add Boundary.shp. In the same way add 4109653SW.jpg to ArcMap. Your map should be as shown below.

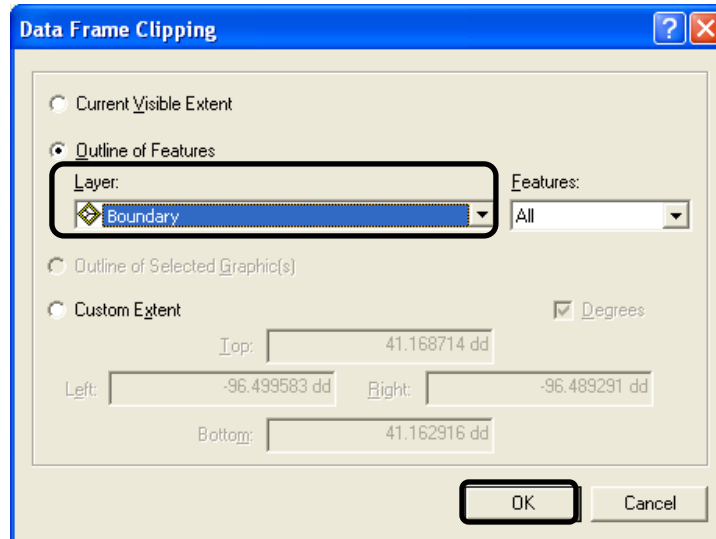
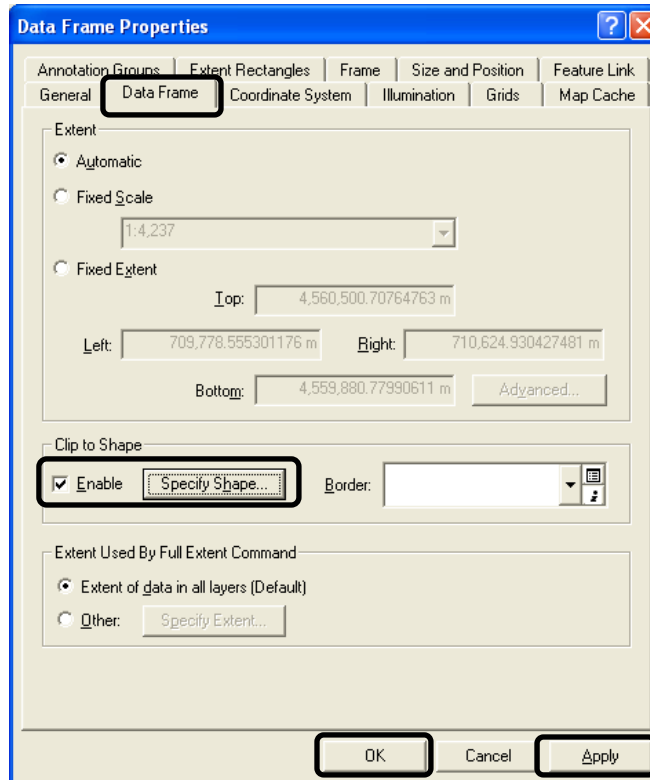




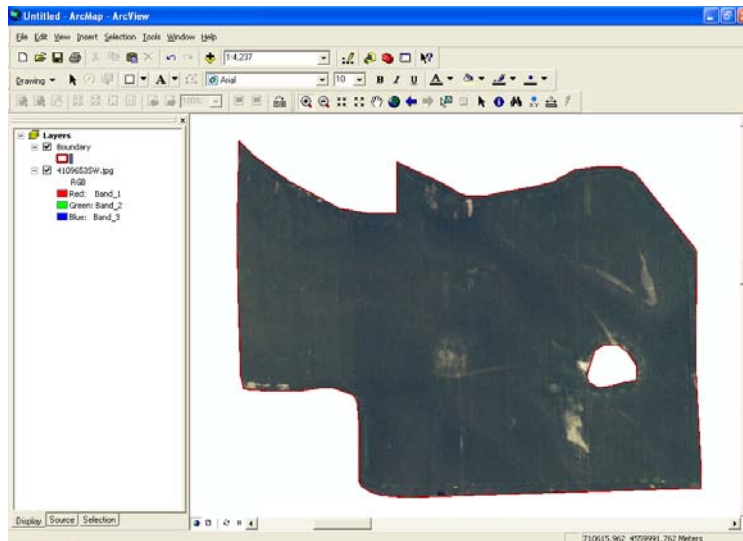
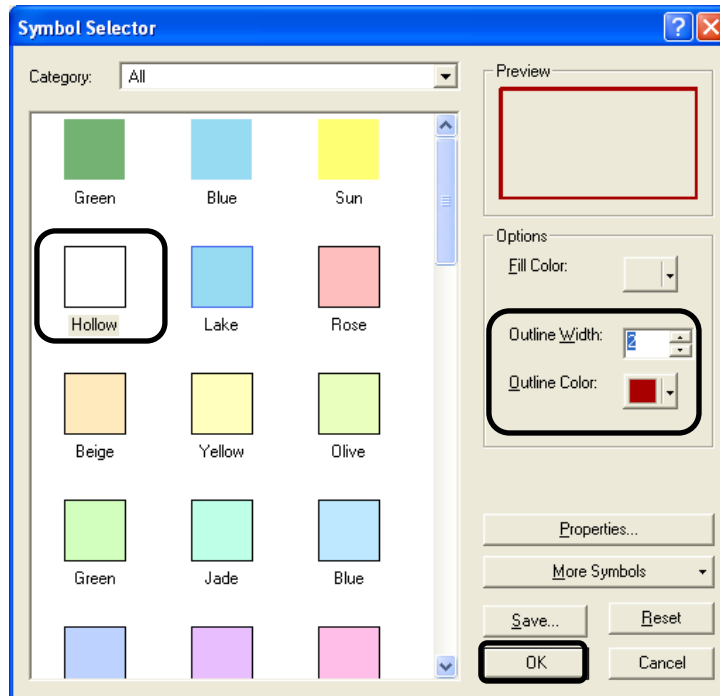
2. Zoom into the boundary of the field.



3. To view image only within the boundary go to View > Data Frame Properties. Click the Data Frame tab and enable clip to shape. The shape being the boundary of the field. Click Apply and OK as shown below.



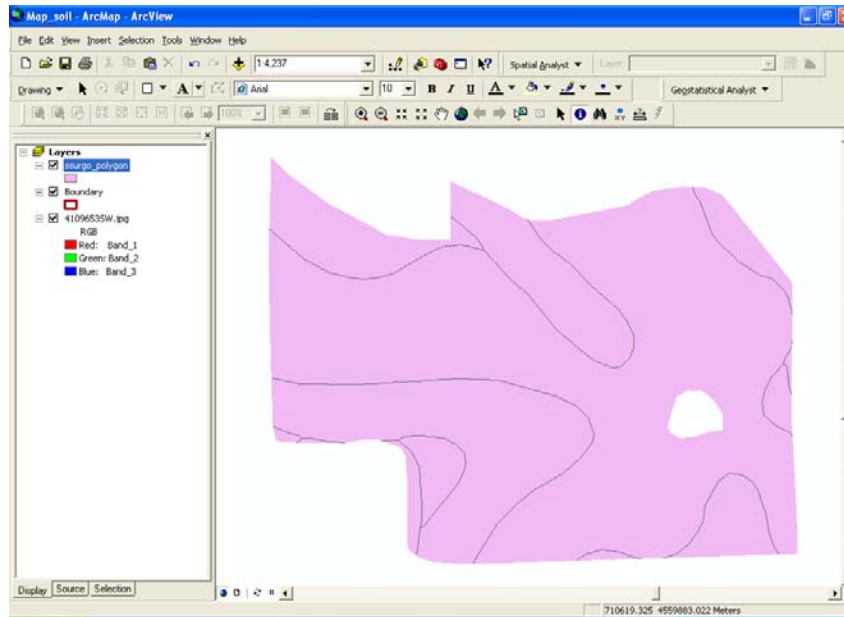
4. To view your image you need to change the symbology of the boundary shapefile. In the layers panel, click on the icon for boundary shapefile to get the symbol selector. Select Hollow, change line thickness to 2 and change line color as indicated below. Then click OK.



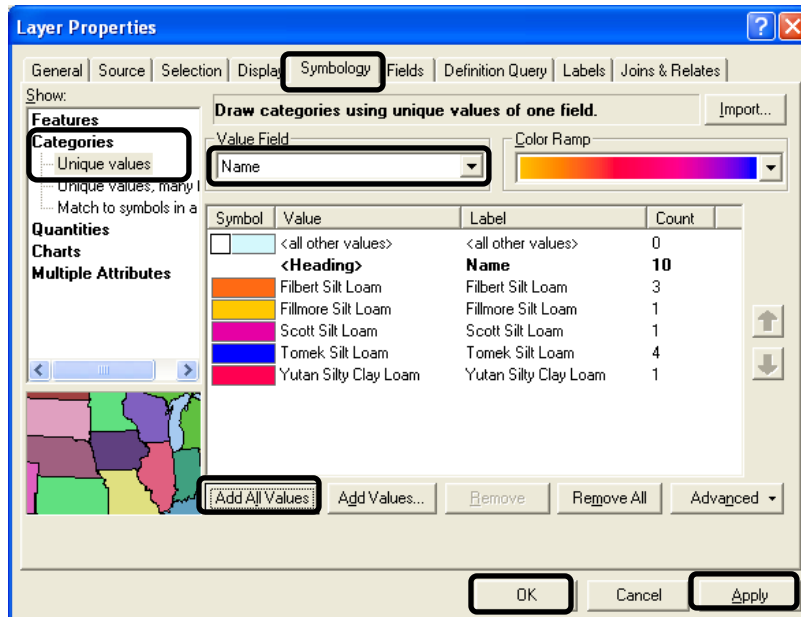
5. Your map should be as shown above. To add soil data into this map click add data icon and double click on `ssurgo_polygon.shp`. This shapefile is created from the original `ssurgo.e00` file. The `ssurgo.e00` is an archive with multiple data layers.



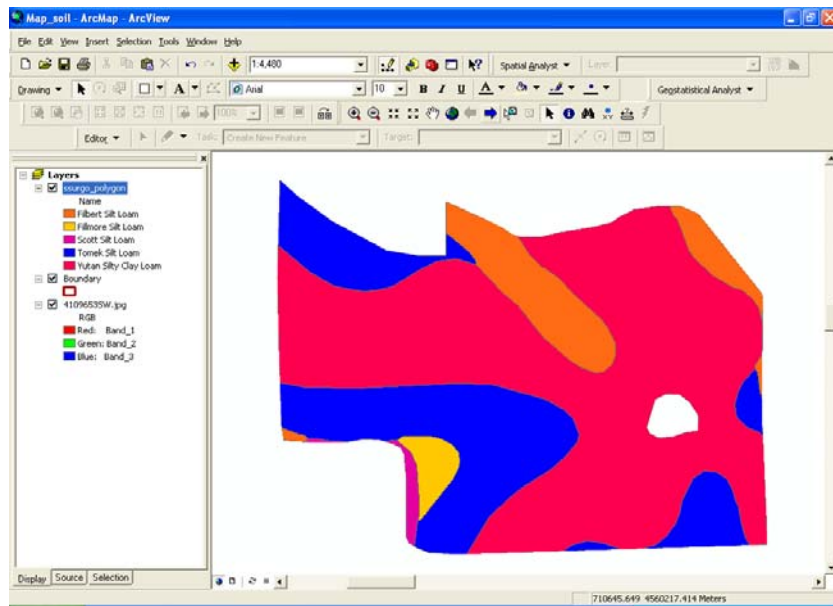
6. Ignore the warning message. Your map should be as shown below.



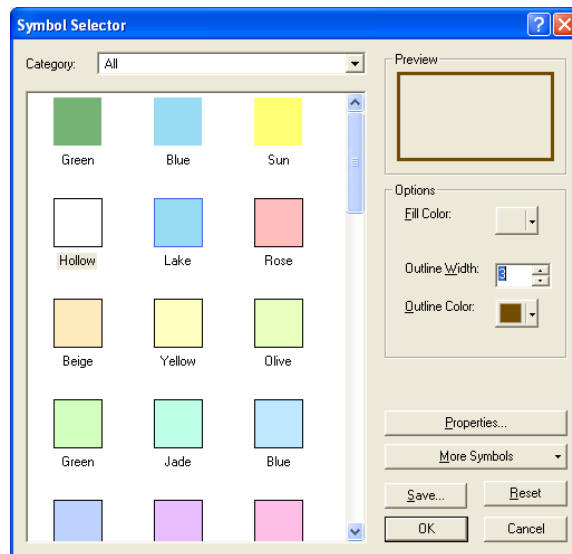
- You have added the different soil types to your map. To view the different soil types right click `ssurgo_polygon` to get layer properties. Click Symbology tab and choose Unique value Categories with Name value field as shown below.



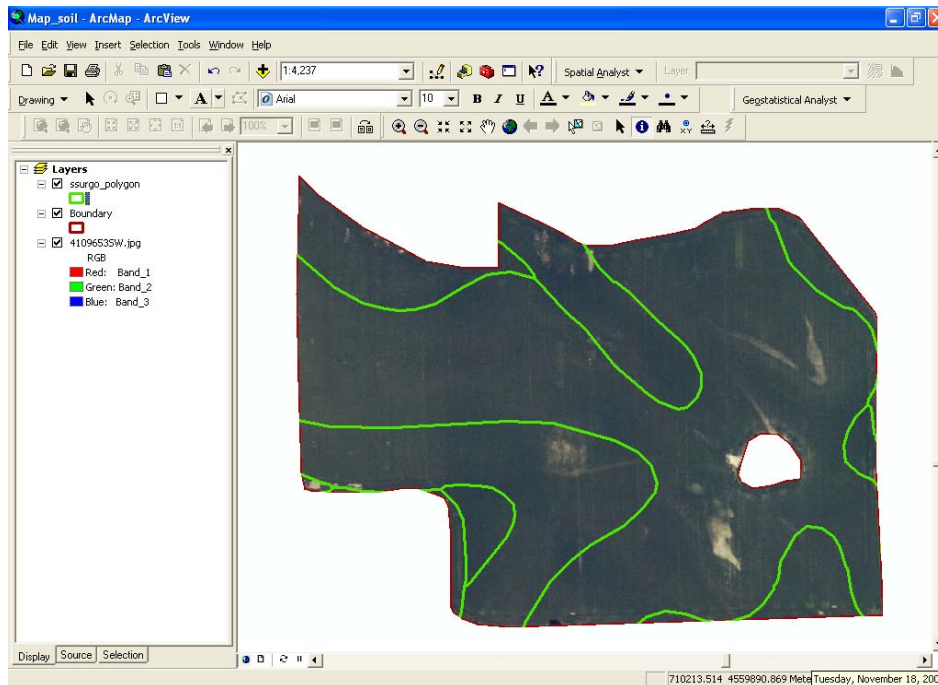
- Your map should be as shown below.



9. Now you have seen the different soil types within the field boundary. But to get an overlying image of the soil data on the boundary and image data we need to change the symbology of the ssurgo_polygon file.



10. Your final map should look like this. Save your soil data map.



How Does It Work

There are many data layers available for the public to access via the Internet. These data can give growers/farmers valuable information pertaining to spatial variability within an agricultural field. The most popular publicly-available data layers include: 1) digital orthophoto quads, 2) digitized soil survey maps (SSURGO) and 3) digital elevation models.

The SSURGO data base provides the most detailed level of information of soil patterns in a landscape. The Map Unit Interpretations Record provides the attributes for the SSURGO data base. The data contain both estimated and measured values for different physical and chemical soil properties and interpretations for engineering, water management, recreation, agronomic, woodland, range, and wildlife uses of soil resources.

The fundamental graphic feature in SSURGO is the map unit. Each map unit is designated as a separate polygon and represents an area dominated by one to three kinds of soil. However, there are no graphic delineations for the locations of the components within a map unit. The unique designation of a soil map unit is the map unit identifier, MUID, which links the graphic feature to attribute data in the Map Unit Interpretations Record. There is no out-of-pocket expense associated with downloading these SSURGO data.

SSURGO data can be used with other data layers, such as streams, roads, geology, land use, administrative boundaries, vegetation, elevation, and slope, in a geographic information system for solving complex problems using spatial analysis.

Additional Challenge

Label the `ssurgo_polygon` using the Name values.

Vocabulary

SSURGO stands for soil survey geographic database and is maintained by USDA, United States department of Agriculture.

Map Unit stores information that applies to all components of a soil map unit

Digital elevation models (DEM) are records of terrain elevations at regularly spaced horizontal intervals. The USGS 7.5-minute DEM data generally correspond to the USGS 7.5-minute topographic maps. DEM data can be used to generate graphics displaying slope, aspect, and terrain profiles. SSURGO soil delineations can be draped over the DEM data to study the placement of soil boundaries to landform features in the landscape and to create 3-dimensional landscape models.

Orthophotography is a photo-map prepared from an aerial photograph in which the displacement of images caused by camera tilt and terrain relief is removed. The digital orthophoto data can be overlaid with SSURGO data and manipulated, displayed, and plotted.

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