Tutorial Set 2: Data interpolation

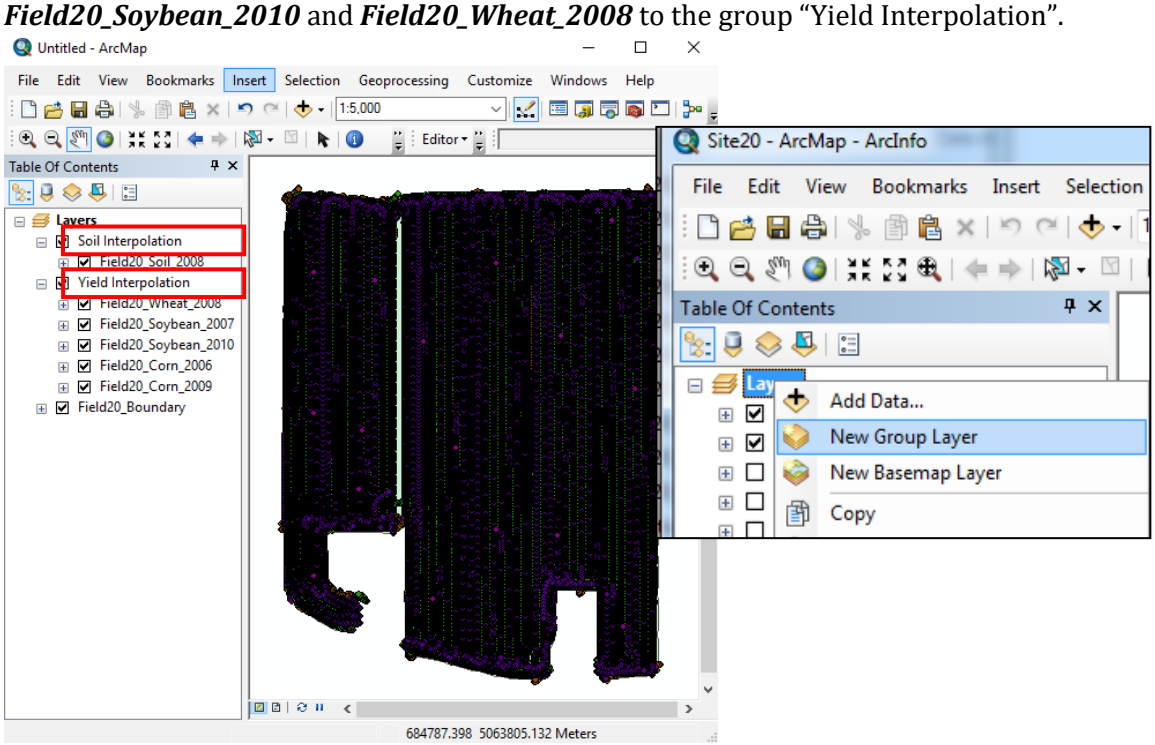
Exercise Site20_2-1 Interpolating soil sampling data

Learning objective: Generating soil properties variability maps: Potassium (K), Organic matter (OM), pH, phosphorus to Aluminum ratio (P/Al)
Techniques: Geostatistical Analyst – Ordinary Kriging
Data Source: Dataset2

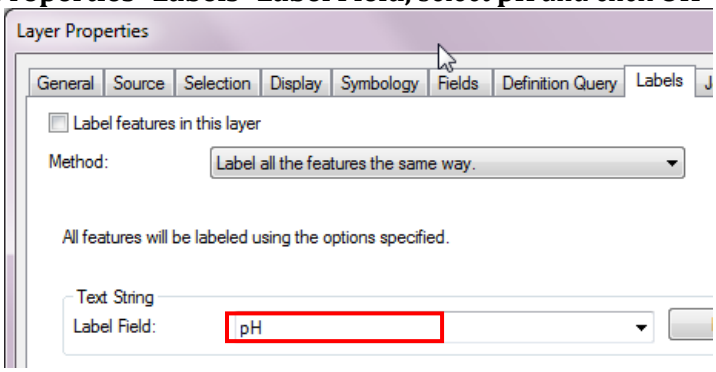
Part 1: Layer management

1. Bring following required layers into ArcMap:
   - ***Field20_Boundary.shp***
   - ***Field20_Corn_2006.shp***
   - ***Field20_Corn_2009.shp***
   - ***Field20_Soybean_2007.shp***
   - ***Field20_Soybean_2010.shp***
   - ***Field20_Wheat_2008.shp***
   - ***Field20_Soil_2008.shp***

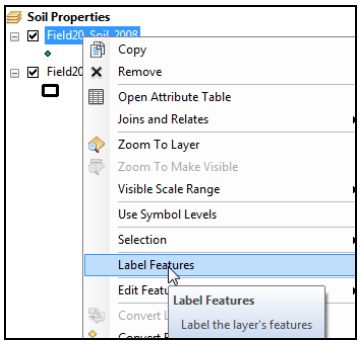
2. In the **Table of Contents (ToC):**
   - Right click on **Layer** to add **New Group Layer**, name it as "Soil Interpolation".
   - Add another group layer and name it as "Yield Interpolation".
   - Move/drag ***Field20_Soil2008*** to the "Soil Interpolation" group.
   - Move/drag ***Field20_Corn_2006***, ***Field20_Corn_2009***, ***Field20_Soybean_2007***, ***Field20_Soybean_2010*** and ***Field20_Wheat_2008*** to the group "Yield Interpolation".



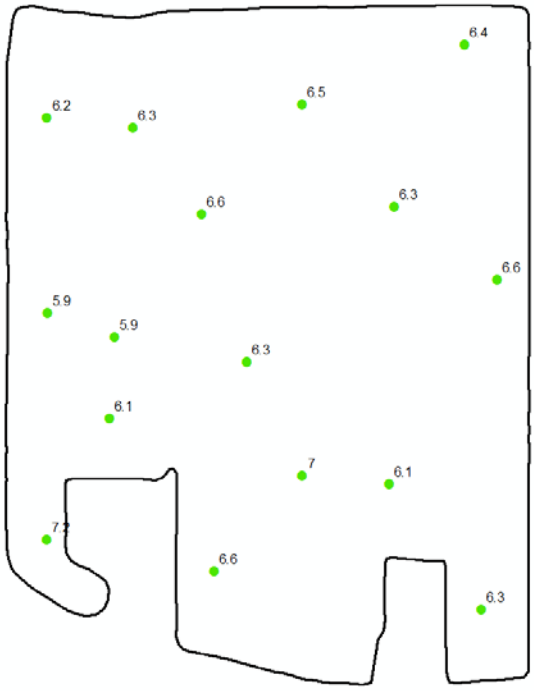
3. For the following section, we are going to work with **Field20 soil properties** data under **Soil Interpolation** group layers
   - Display the label: (right click on the **Field20_Soil_2008** data layer in ToC): **Layer Properties>Labels>Label Field,** select **pH** and click **OK**



   - Select **Layer Properties>Label Features**, click OK

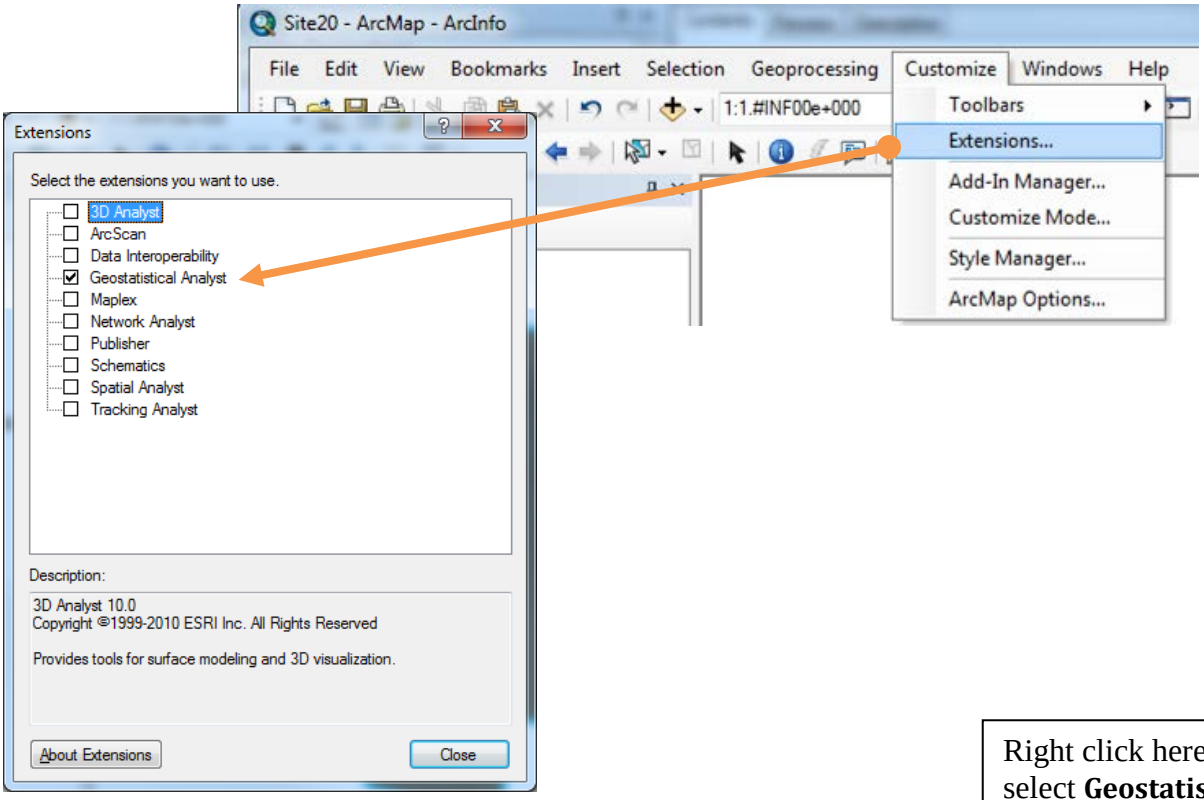


   - A non-interpolated map showing pH at the soil sampling locations:



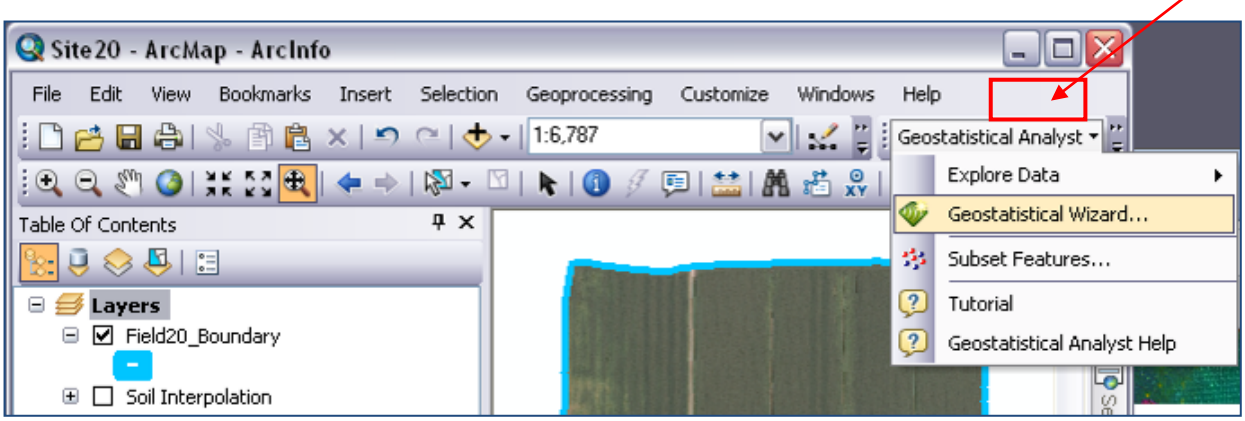
Part 2: Activating the Geostatistical Analyst

1. Go to **Customize** > **Extensions** to launch **Extension** dialog window and select (checkbox on) **Geostatistical Analyst**, then **Close**.
   (By default, Geostatistical Analyst is not activated in ArcGIS. You only need to activate once.)



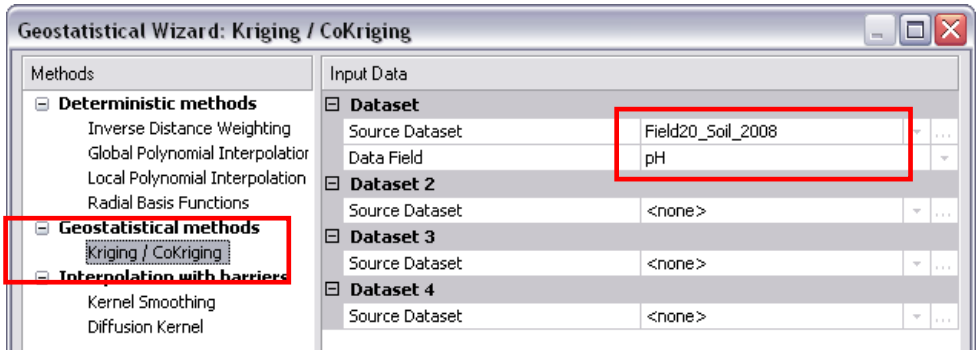
2. Right click on Menu bar to add **Geostatistical Analyst** to the Toolbar. Then launch **Geostatistical Wizard**.

Right click here and select **Geostatistical Analyst**

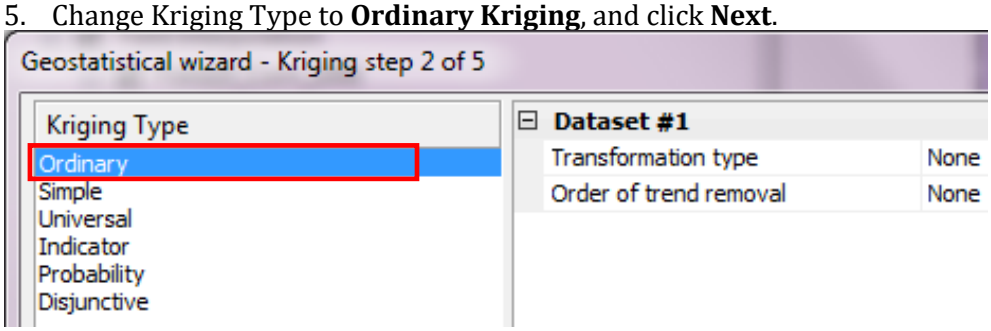


Part 3: Creating interpolated soil property map using Kriging method

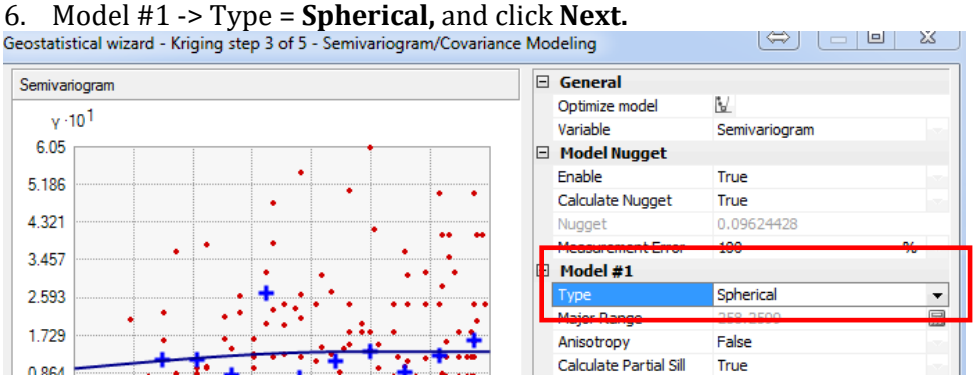
1. In Geostatistical Wizard, choose **Kriging/CoKriging** method under Geostatistical methods.
2. Source Dataset: ***Field20_Soil_2008*.**
3. Data Field: **pH**
4. Click **NEXT**



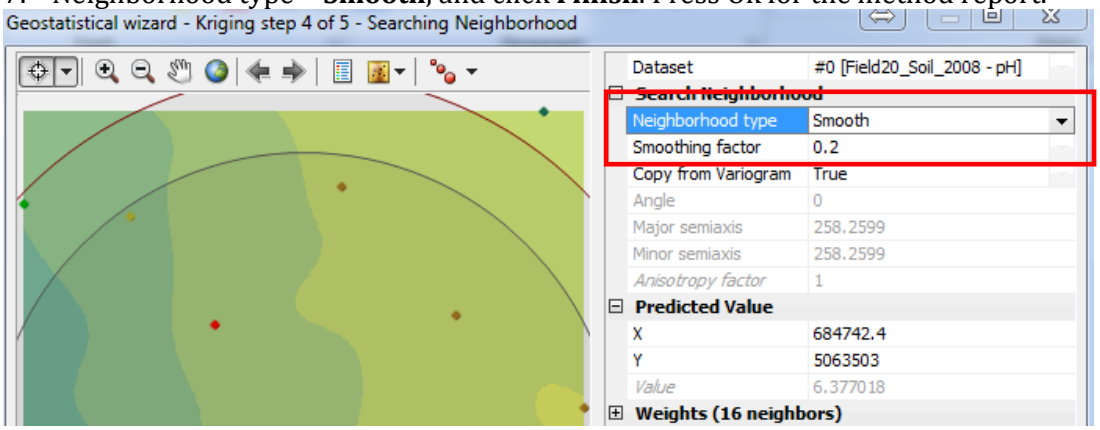
5. Change Kriging Type to **Ordinary Kriging**, and click **Next**.



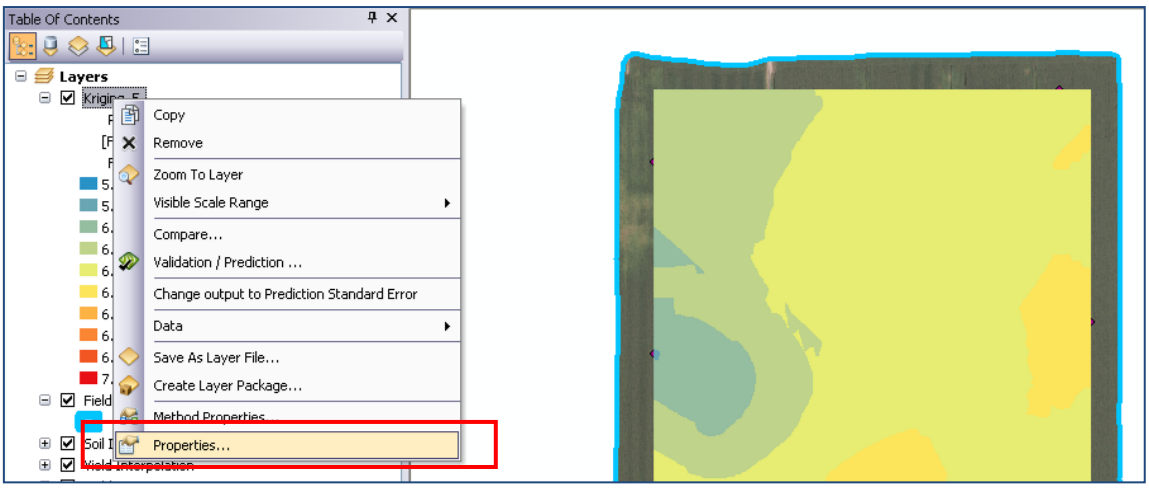
6. Model #1 -> Type = **Spherical,** and click **Next.**

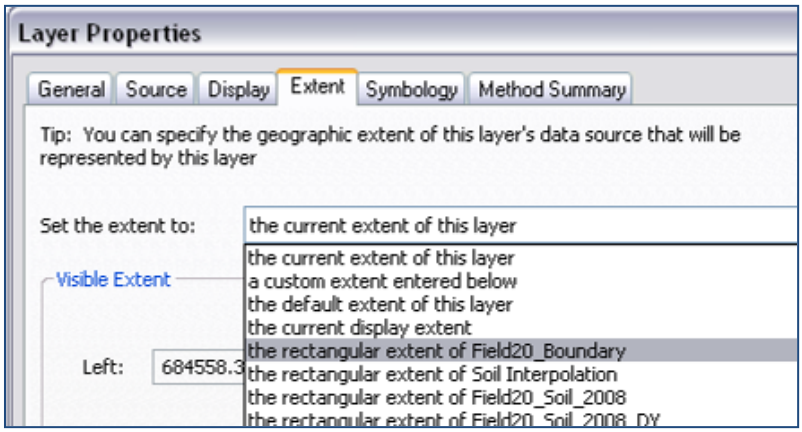


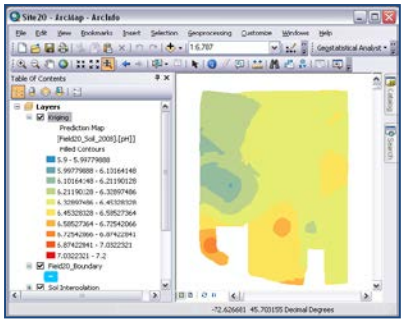
7. Neighborhood type = **Smooth**, and click **Finish**. Press Ok for the method report.



8. A temporal interpolated Soil pH raster is added to the map. Right click on the layer ***Kriging***, then go to **Properties>Extent** and specify shape to the rectangular extent of to **Field20_Boundary**. Then Apply>OK

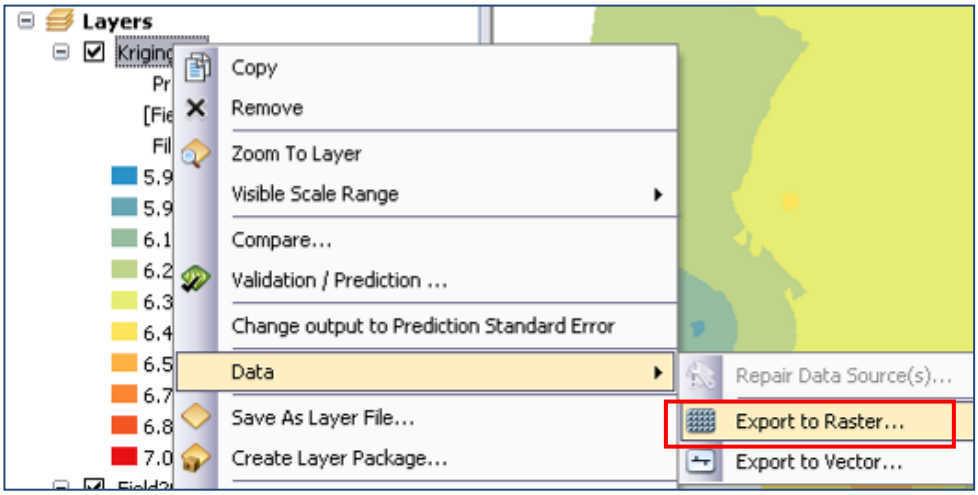






9. Go **Layers>Properties>Data Frame Properties,** select **Clip to Shape** from Clip Options, click tab **Outline of Features, and** then select ***Field20_Boundary***. Click Apply and OK. E.g., Soil PH raster then has the same extent as ***Field20_Boundary***.

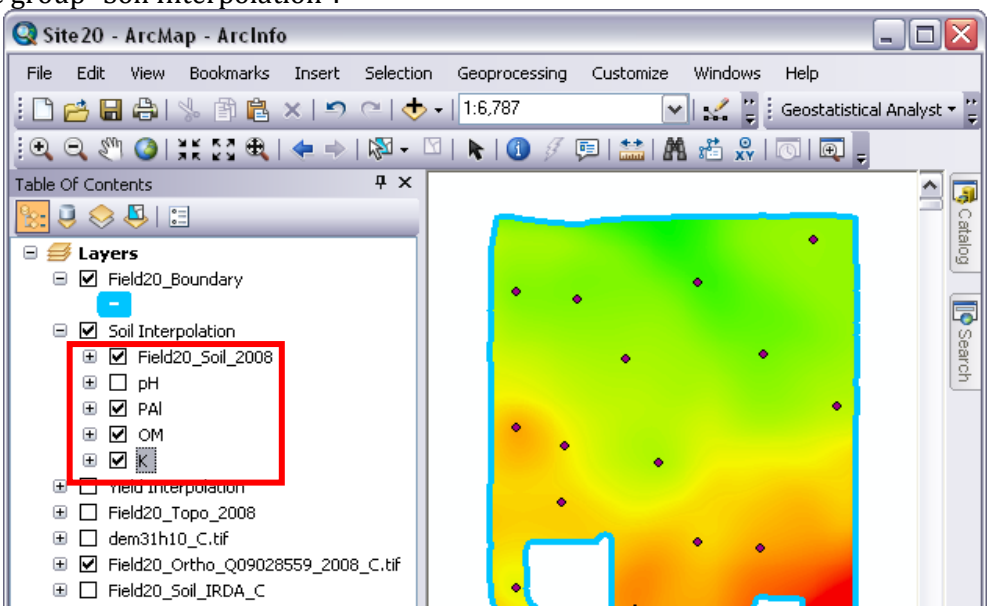
10. Permanently save the interpolated soil pH map by right clicking on the ***kriging*** layer on the Table of Contents (ToC) > **Data** > **Export to Raster**.
11. Store this layer as "***pH***" in the folder Dataset2.



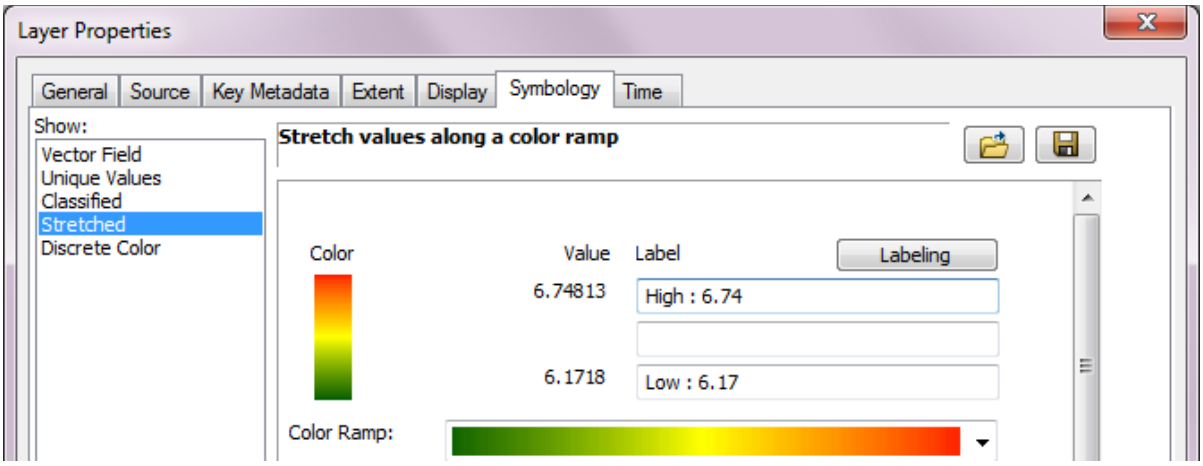
12. Stored pH layer is added to lower part of ToC. Right click on the **Kriging** (Predicted Map of pH) layer and then remove it from **Table of Content**.

Note - Repeat Part 3: Step 1 to 12 to generate maps for **OM** (Organic Matter), **PAl** (Ratio of Phosphorus to Aluminum), and **K** (Potassium) by using ***Field20_Soil_2008*** as source layer and entering the **Data Field** values as "om", "p_al_ratio", and "k_ppm", respectively.

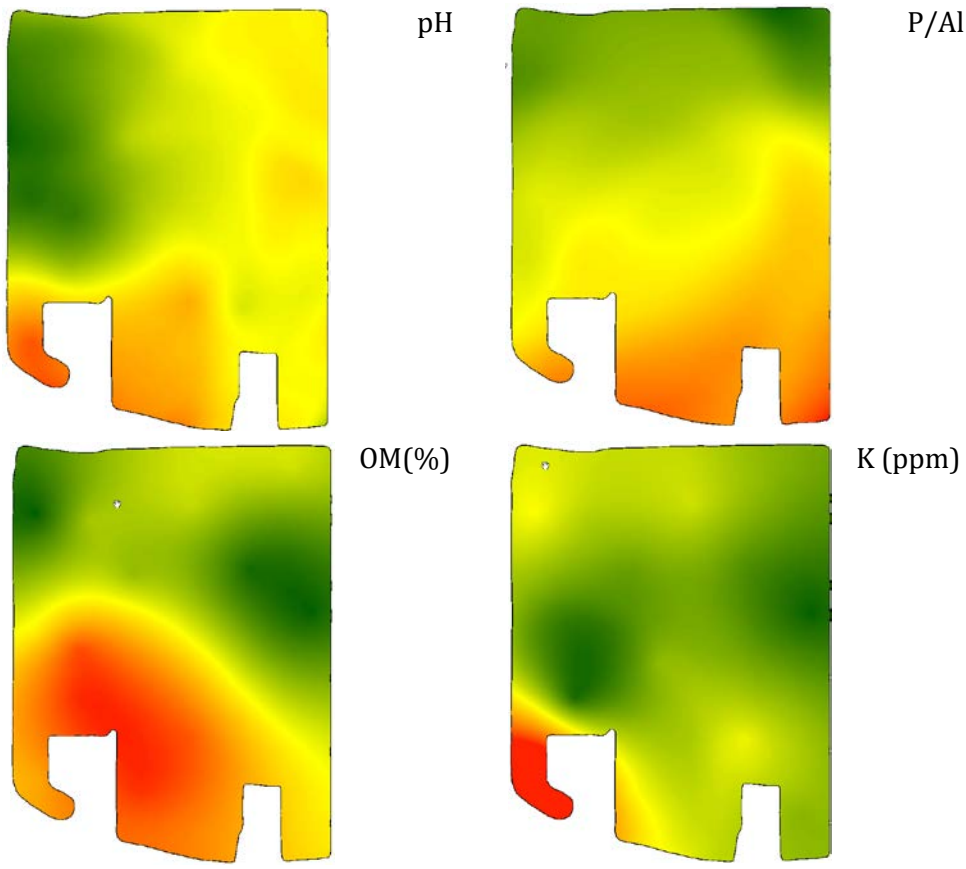
13. Four new raster layers added in your ToC: ***pH***, ***K***, ***OM***, and ***PAl***. Drag and drop them to under the group "Soil Interpolation".



14. To get the color map, you need to change the symbology of the layer
    - Right click one of the layer properties (e.g., pH)
    - **Symbology>Stretched**, and then change the Color Ramp for pH
    - Change the color ramp for all other maps (e.g., P/Al, OM, and K).



15. Results of the four soil property maps.



Or, choose Symbology>Classified, and then change the Color Ramp and no. of classes.

16. Save this project for further exercises.