Lesson 3.1: Developing a P fertilizer prescription map

Data Source: *dataset3.zip*

Part 1: Data Management

1. Unzip **Dataset3.zip**, bring in data layers (*Field20_Boundary, Field20_Soil_2008, k, om, pal*) into ArcGIS Pro.
2. Right-click on Layers in the Table of Contents to add **New Group Layer**, name it "**Soil Interpolation**" and arrange them as shown below. k, om and pal layers are interpolated soil properties from Lesson 2 Exercise 1.
3. Right-click on **Layers** in **Table of Contents** to add another **New Group Layer**, name it "**Nutrient Prescription**". Then add a subgroup named "**P2O5**" under the group "**Nutrient Prescription**". *In the following steps you can pull the files you create into the appropriate group-layers to make it easier to navigate and avoid clutter.*
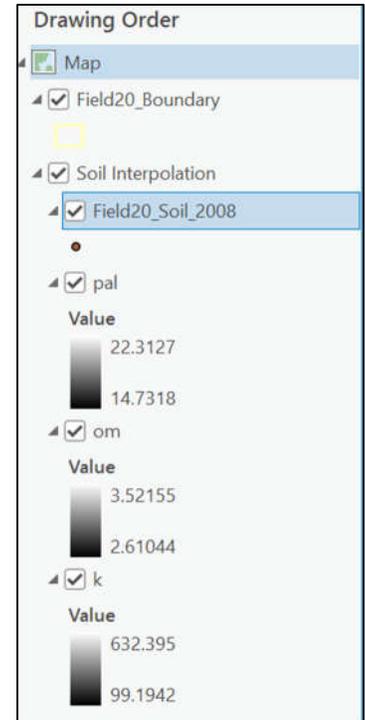
Part 2: Creating a P_2O_5 prescription map using the **Raster Calculator.**

1. Understand the formula used to estimate the P2O5 prescription.

$$\begin{cases} if \frac{P}{Al} > 20 \ \rightarrow \ P_2O_5 \ rate = 0 \ ^{kg}/_{ha} \\ if \ \frac{P}{Al} \leq 20 \ \rightarrow \ P_2O_5 \ rate = \left(20 - P/_{Al}\right) \times 4 \ ^{kg}/_{ha} \end{cases}$$

2. Search **Raster Calculator.**
3. Generate a P2O5 prescription map by **entering the following map algebra expression** (without any space) in the **Raster Calculator dialog window**.

   Int(Con("Soil Interpolation\pal">20,0,(20-"Soil Interpolation\pal")*4))

   Meaning of the operators:
   Con: an operator for IF statement
   Int: an operator to convert the values to integer type

4. **Change the Output raster file location** and **name it P2O5_1**. A new raster P2O5_1 is added to the Table of Contents.
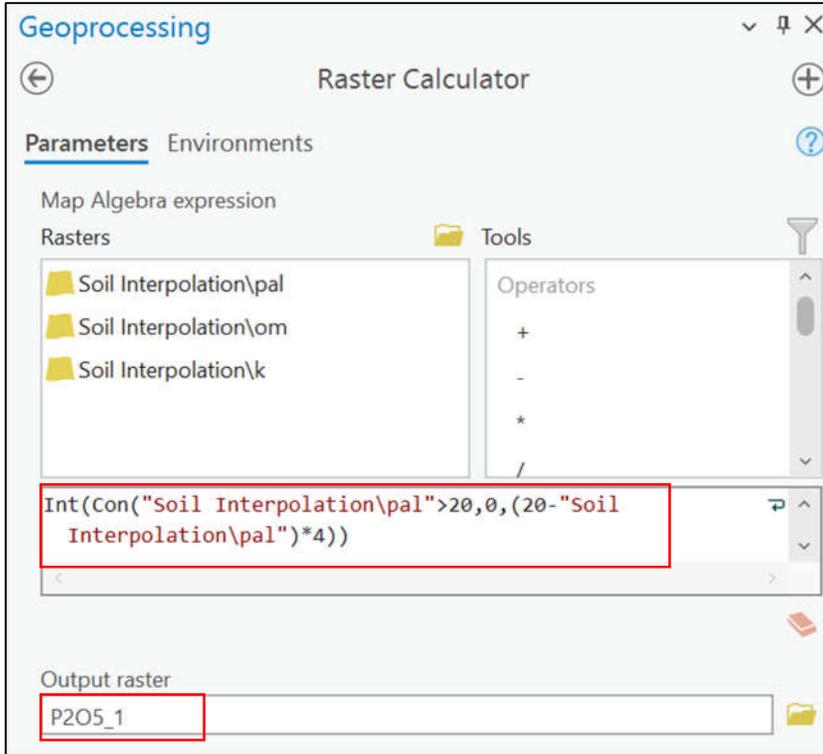
Part 3: Converting P2O5 prescription map (raster) into a classified polygon layer.

1. In **Table of Contents**, right-click on *P2O5_1* layer and then click **Symbology.** Under **Primary Symbology** select **Classify.**
2. Change **Classes** to **12.** Make sure to do this before changing the method. Change **Method** to **Manual Interval.** This process only changes the classification for visualization. Next, we will create a raster with classes.
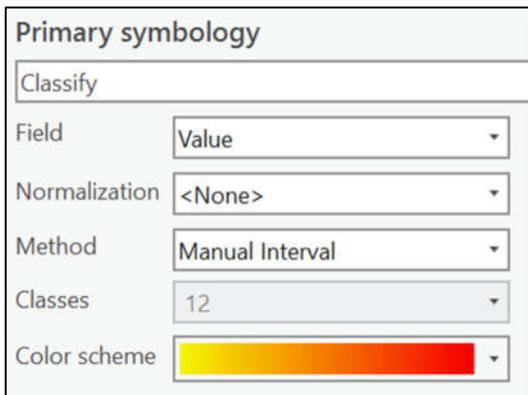
3. Search **Reclassify (Spatial Analyst Tool).**
4. In the **Reclassify** window, change the following inputs and then hit **Run**:
   Input Raster : *P2O5_1*
   Reclass Field: *Value*
   New: *Change the values in **New** to match the values in **End**. (except for the last which will be 12)*
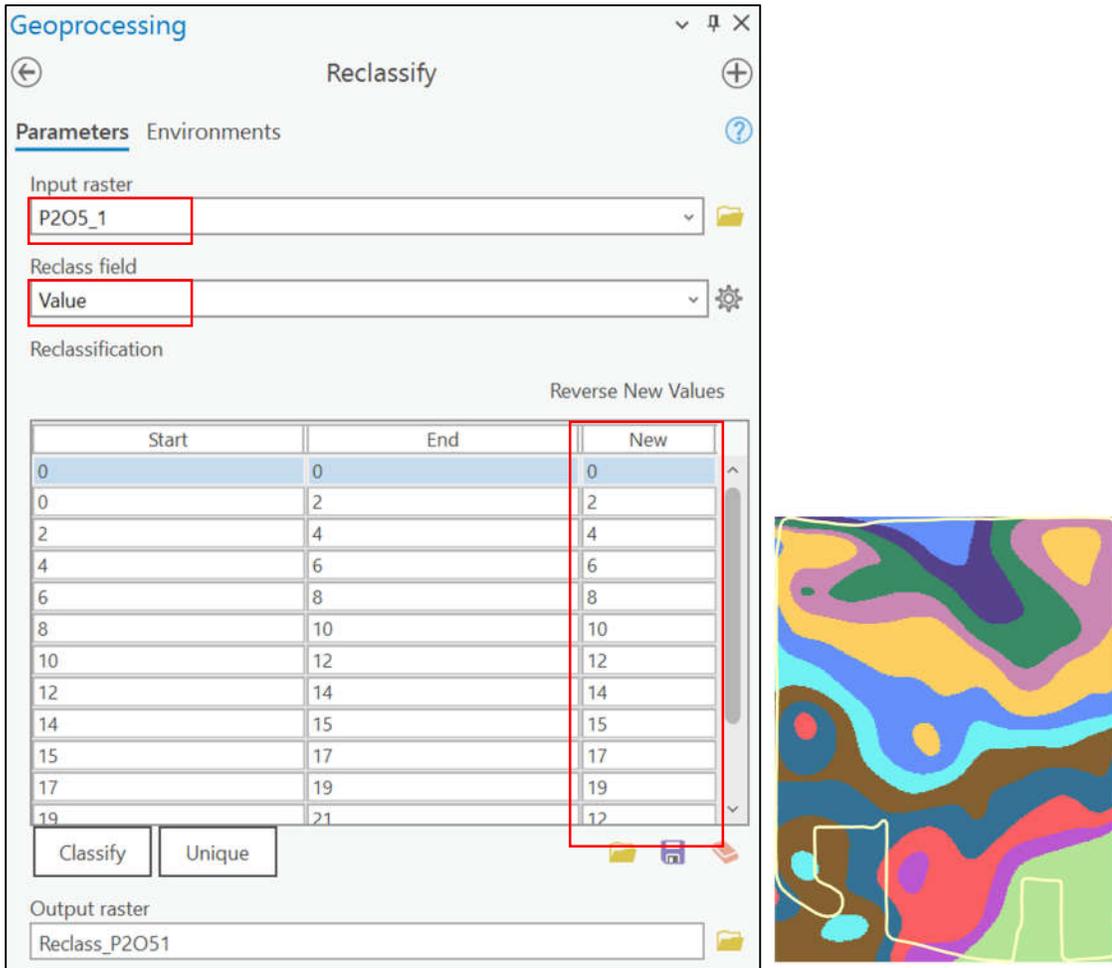
5. Search **Raster to Polygon.**
6. In the window fill out the following parameters, then hit **Run**:
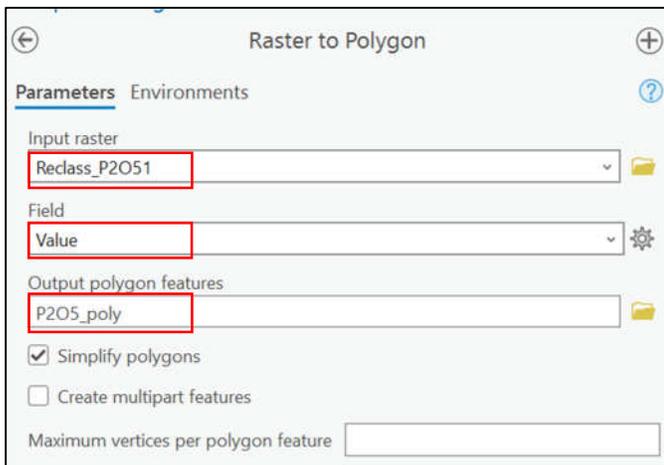
7. Right click on the new polygon layer and select **Symbology.**
8. Fill out the window as follows:

Primary symbology

Graduated Colors	
Field	gridcode
Normalization	<None>
Method	Natural Breaks (Jenks)
Classes	11
Color scheme	
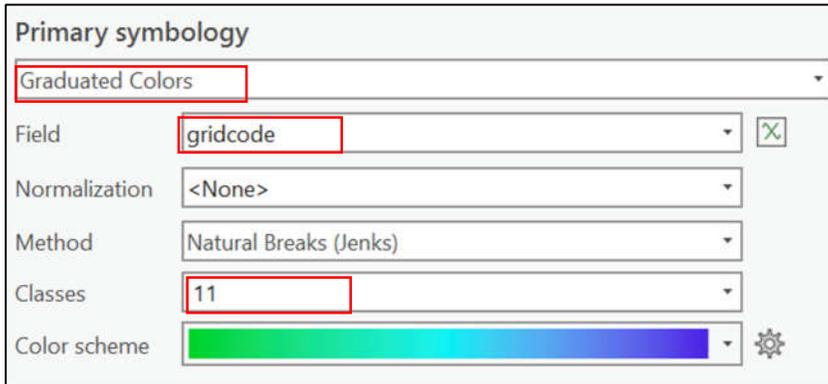
9. Search **Clip (Analysis Tool)**
10. Fill out the window as follows:

Geoprocessing

Clip

Parameters Environments

Input Features or Dataset
P2O5_poly

Clip Features
Field20_Boundary

Output Features or Dataset
P2O5_poly_Clip

Save your Project. Done!