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# EXERCISE 2b

# Riparian Band Method 2

Introduction

In this exercise, we will create a classified raster that has elevation bands corresponding to different riparian zones, or inundation frequency zones. The difference between this exercise and the previous exercise is that you will not use the Relative Elevation Model (REM). This is because the REM is built specifically from the Geomorphic Gradeline (GGL) of the constructed valley bottom of Phase I and is not accurate for any of the other reaches. You will use the “Region Grow” algorithm to build riparian elevation bands for Phase IIa of Whychus Canyon to find approximate inundation frequency at a given location within your area of interest.

Objectives

* Create a raster file with relative elevation from the estimated water surface for Phase IIb of Whychus Canyon.

Required Data:

* **Water\_classification\_Whychus\_Canyon\_Phase2b – Part of the water classification from Whychus Canyon Phase IIb.**
* **LiDAR\_BareEarth\_DEM** – A LiDAR-derived digital elevation model sourced from a Forest Service database. This model’s vertical units are feet, and it has a cell size of 0.5x0.5m.

Prerequisites

* **ArcGIS Pro**
* **ArcGIS Pro Spatial Analyst Extension**

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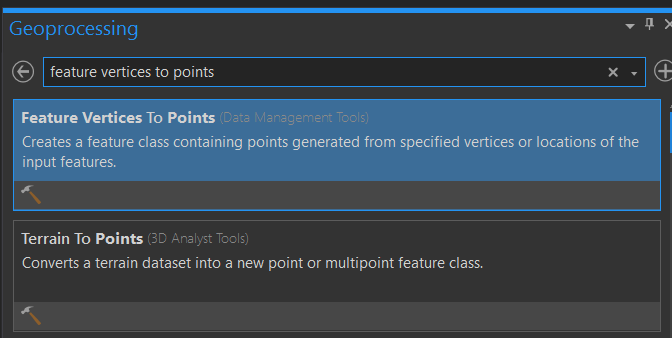
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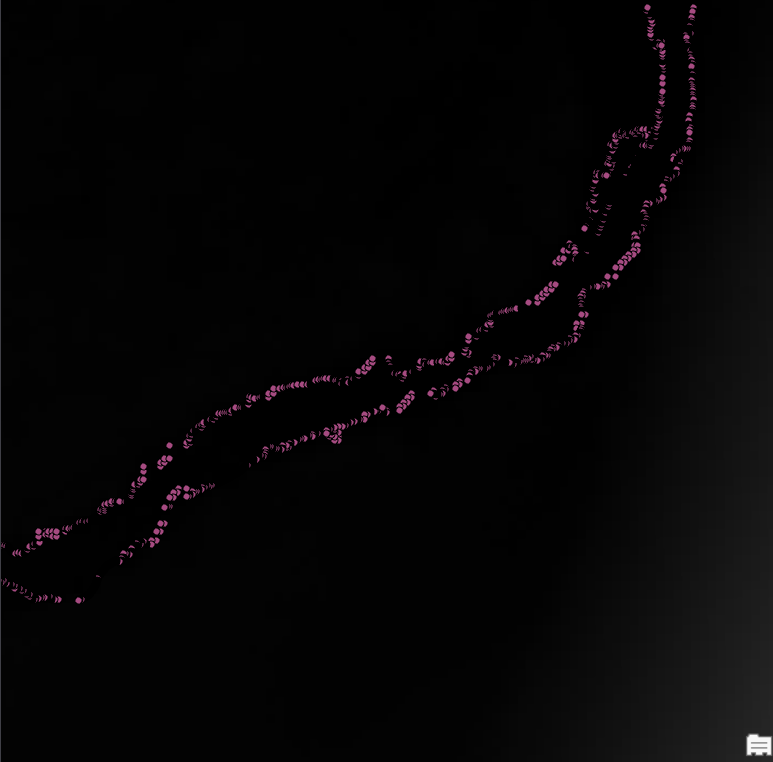
[Part 1: Load and prepare your data 4](#_Toc75357590)

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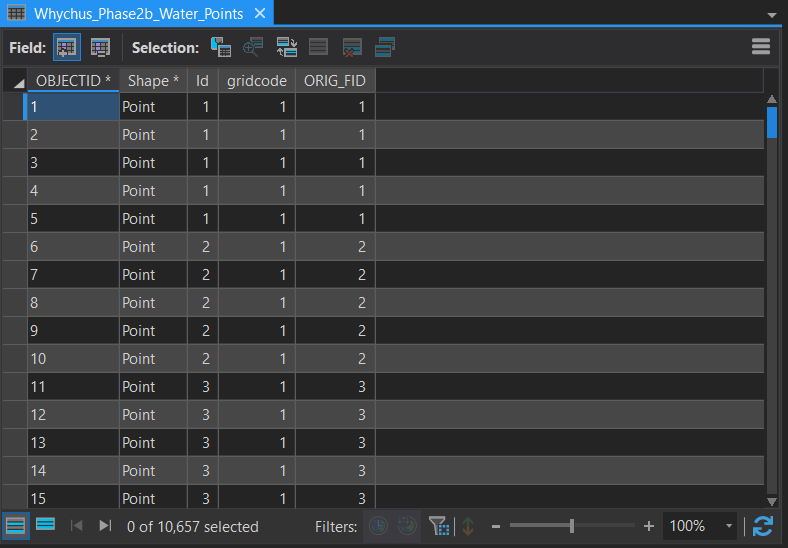
1. Load and prepare your data
   1. Add data to map
      1. Add “Water\_classification\_Whychus\_Canyon\_Phase2b.tif” to your map from your exercise folder.
      2. Add “LiDAR\_BareEarth\_DEM.tif” to your map from your exercise folder.
   2. Convert your water raster to a polygon
      1. Navigate to the “Raster to Polygon” tool in your Geoprocessing toolbox.
      2. Select “Water\_classification\_Whychus\_Canyon\_Phase2b” as your input raster.
      3. Name the output raster “Whychus\_Phase2b\_water\_polygon.”
      4. Run the tool!
      5. Next, find the “Feature Vertices to Points” tool in your Geoprocessing toolbox.



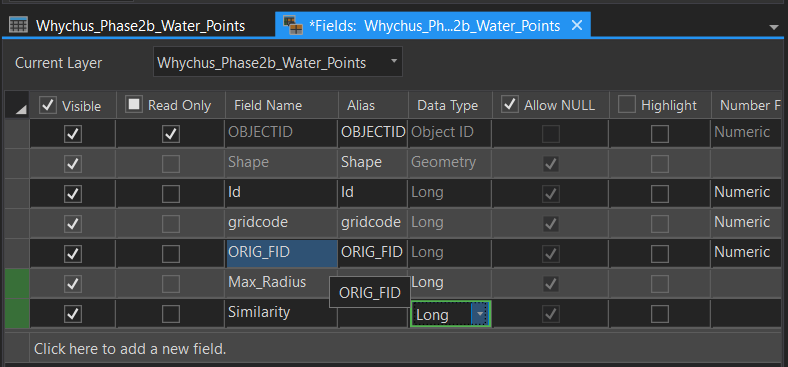
* + 1. Choose “Whychus\_Phase2b\_water\_polygon” as your input layer.
    2. Leave all defaults and name the output “Whychus\_Phase2b\_Water\_Points”.
    3. Run the tool!
    4. This will leave you with points around the edges of your stream layer.



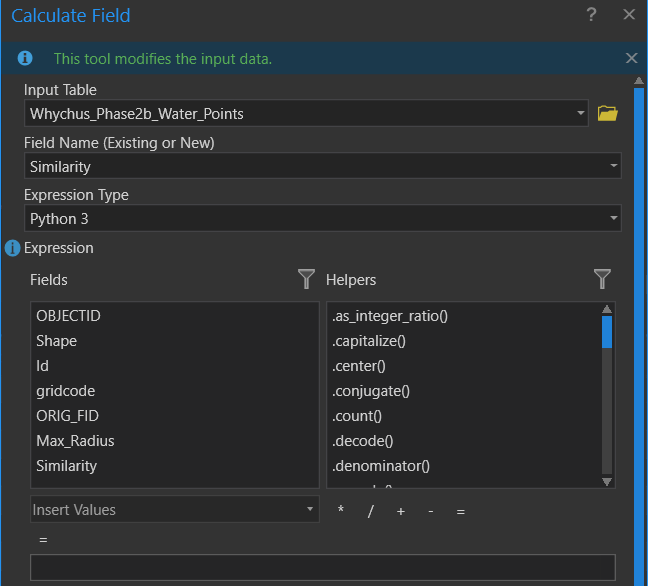
* + 1. Open the attribute table for your water points and click the Add Field button.



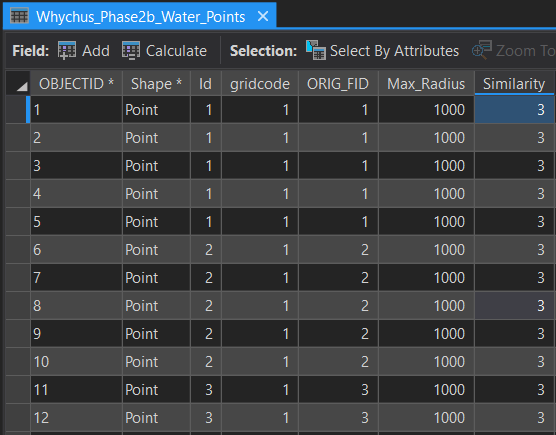
* + 1. Create two new fields, both with a Long data type
       1. “Max\_Radius”
       2. “Similarity”



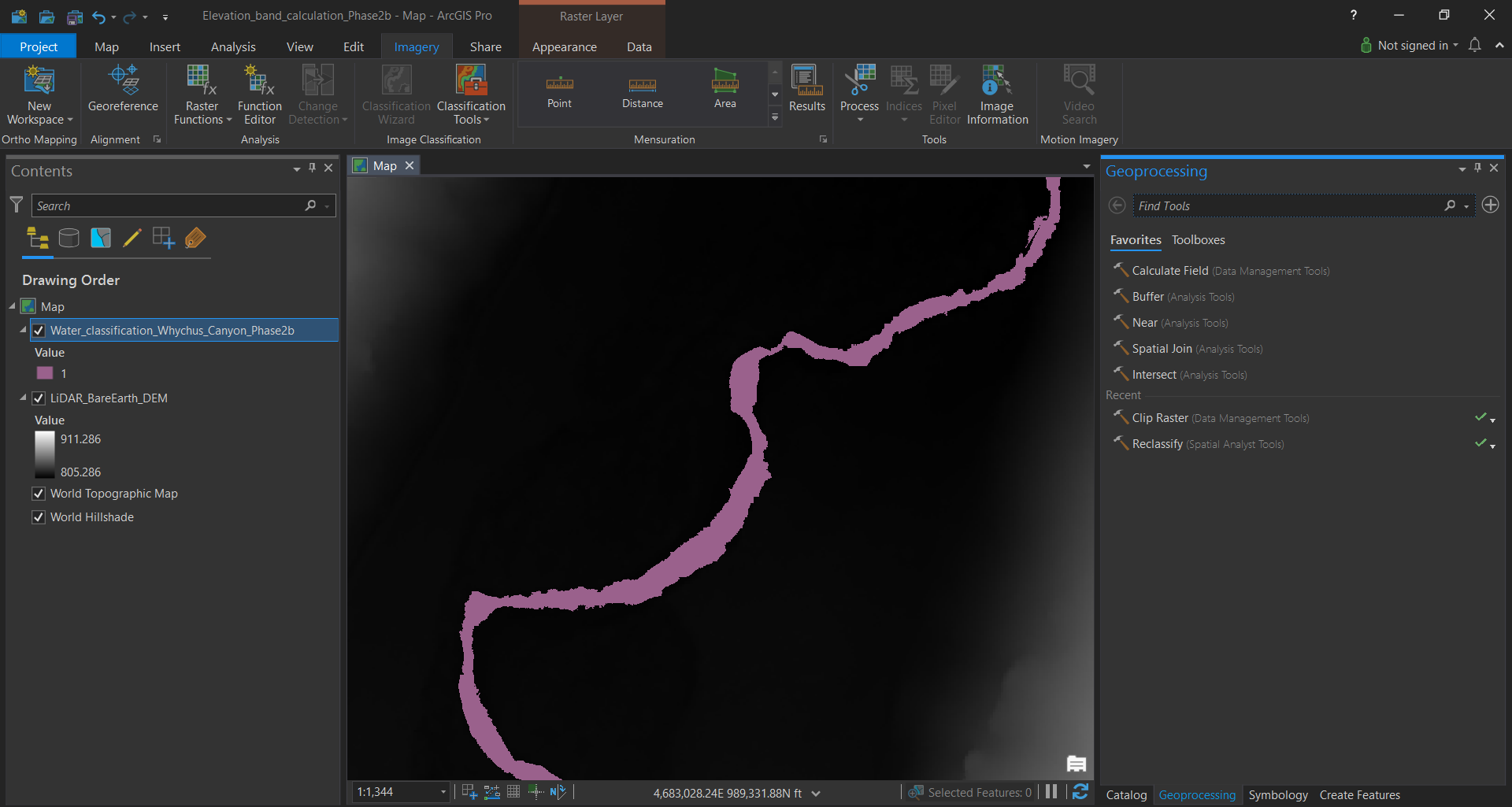
* + 1. Save your edits.
    2. Back in the attribute table, right-click on the Similarity field and select Calculate Field.
    3. In the “Expression” section, type in 3 under the “=” box.



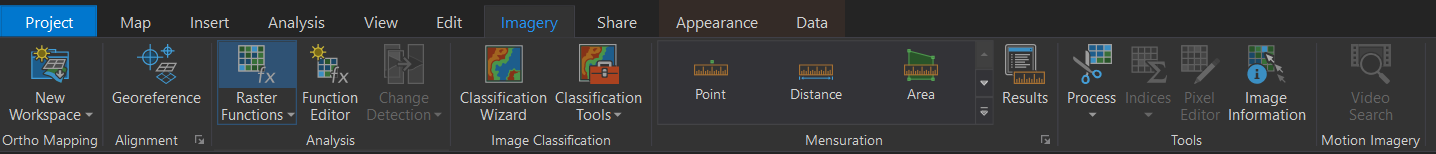
* + 1. Your attribute table should look something like below:



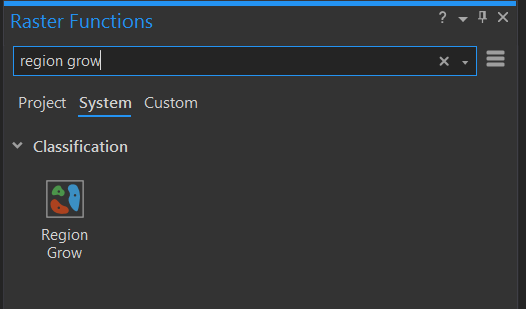
1. Sort your digital elevation model into elevation classes
   1. Create your first elevation band
      1. Navigate to the Imagery tab in your top ribbon.



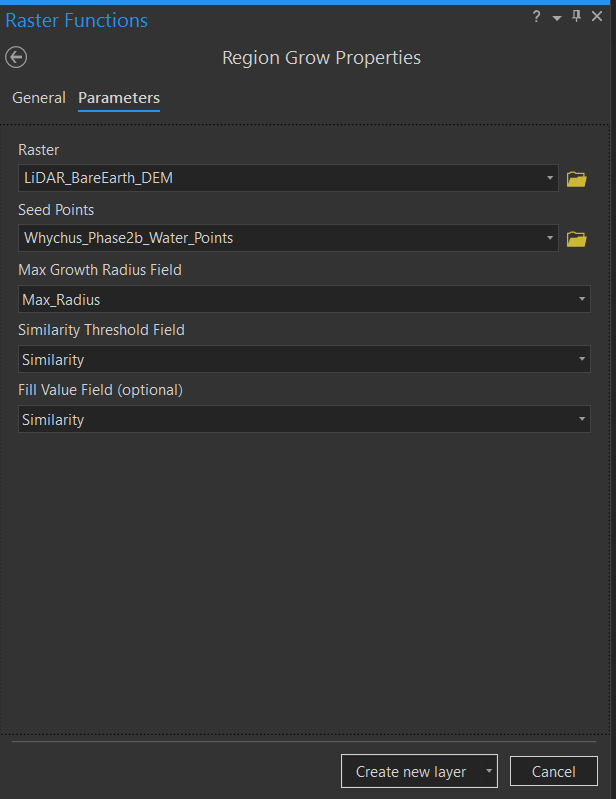
* + 1. Select “Raster Functions” from the list of Imagery options.



* + 1. In Raster Functions, use the search bar to find the “Region Grow” tool.



* + 1. Under “Raster”, select the “LiDAR\_BareEarth\_DEM” layer.
    2. Under “Seed Points”, select Whychus\_Phase2b\_Water\_Points.
    3. Under “Max Growth Radius Field”, select Max\_Radius.
    4. Under “Similarity Threshold Field”, select Similarity.
    5. Under “Fill Value Field”, select Similarity.



* + 1. Click “Create new layer” to run the tool!

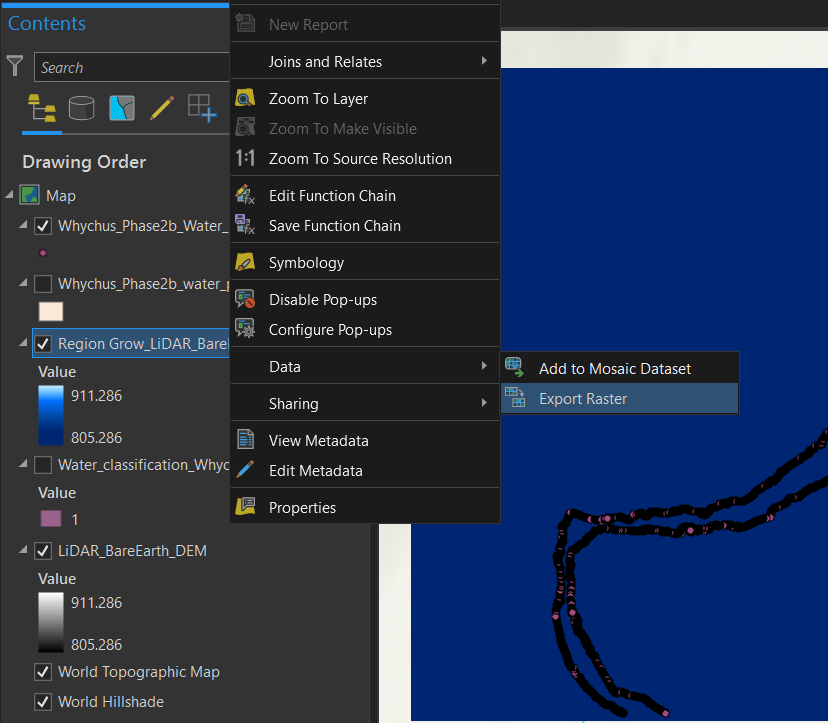
**About the Region Grow tool**

The region grow tool will create a new raster layer based on inputs that you provide.

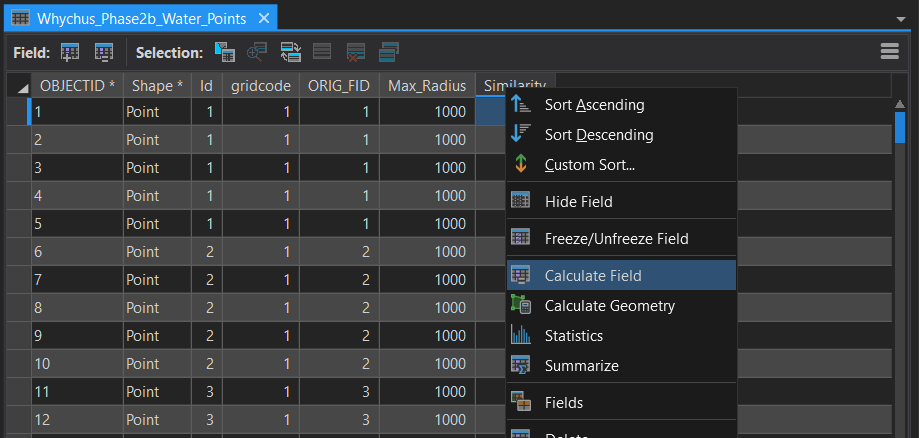
You provide the region grow tool with a raster layer and a “seed points” layer. The region grow tool will “grow” a new raster layer out from the location of the seed points. The amount of growth depends on the values in your raster layer compared with the “Similarity” value. For example, we set our Similarity value to 3 so that the raster will stop growing as soon as it meets a raster cell that is 3ft above the elevation of our seed point.

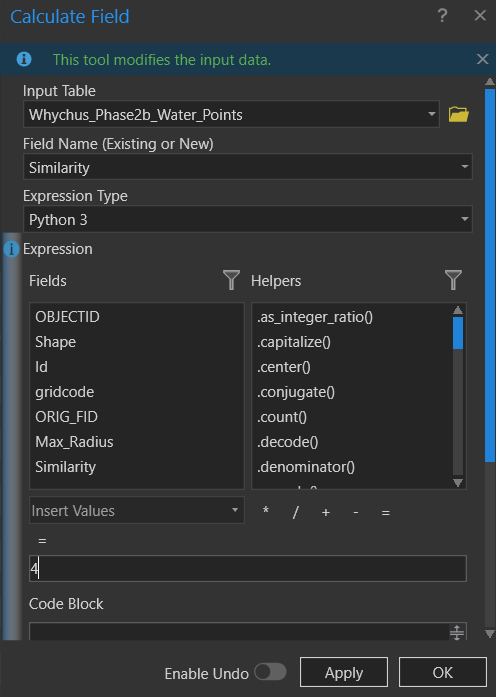
The upshot of this process is that it allows us to define a layer that defines a sort of contour zone – everywhere along the river that is three feet or less feet above the edge of our stream.

* + 1. You should now see a new layer load above your elevation model. Be patient – this part of the process can take a few minutes.
    2. This raster is just a temporary layer file at the moment. To save this layer, we will need to export the raster.
    3. To export the raster, right-click on the new layer file that you have created, and navigate to Data and then Export Raster.

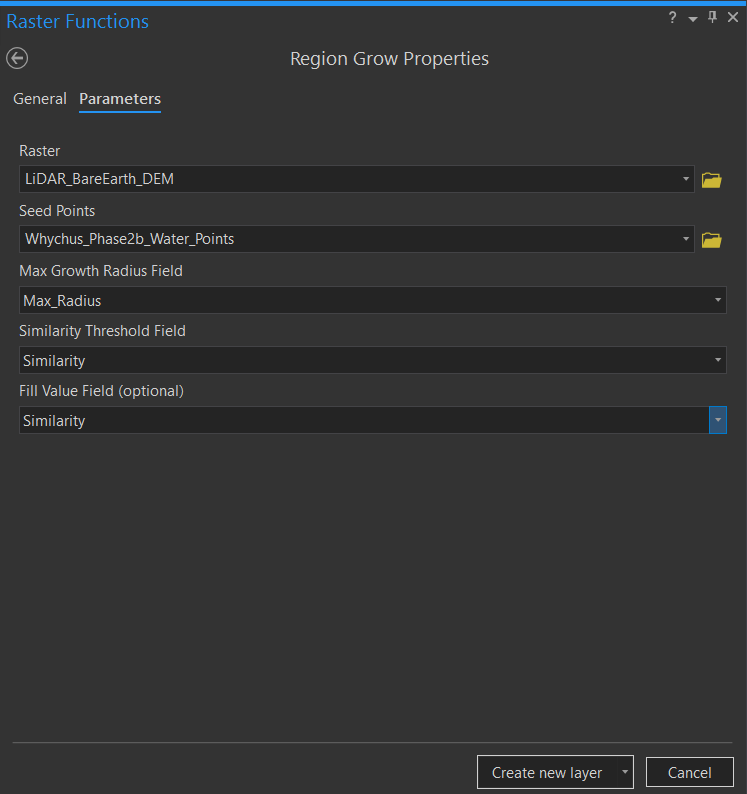


* + 1. The “Output Raster Dataset” box will contain a path to your map document folder. Here, just change the name of the output raster dataset to “Riparian\_band\_3ft\_Phase2b.tif.”
    2. Leave the defaults and hit Export!
    3. Remove your region grow layer (“Region Grow\_LiDAR\_BareEarth\_DEM”) from the map’s table of contents. It will speed up processing.
  1. Create your second elevation band
     1. You need to create a second riparian elevation band for vegetation that lies between three and four feet above the water surface, so that your map has the proper amount of detail (different riparian vegetation types should exist in these different zones/bands).
     2. First, navigate to your “Whychus\_2D\_Water\_Points” attribute table, and re-calculate the “Similarity” field to 4.

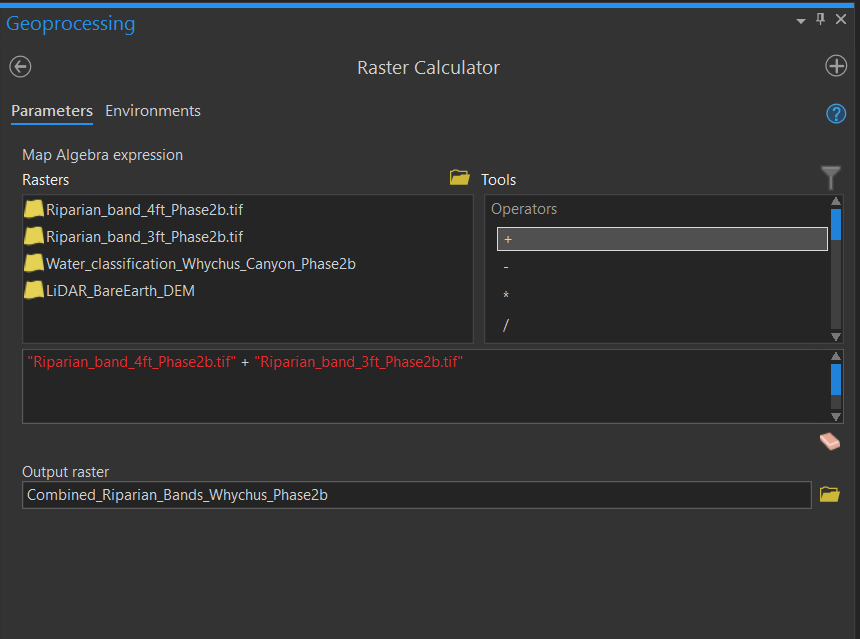




* + 1. Open your Region Grow tool and run with the exact same settings as last time.



* + 1. Export this new layer as “Riparian\_band\_4ft\_Phase2b.”
  1. Combine Bands to form a single layer
     1. You will need to form a single layer using your two bands. We will do this in raster calculator.
     2. Open Raster Calculator from your Geoprocessing toolbox.
     3. Add your two elevation band raster layers together inside raster calculator.
     4. Name the output “Combined\_Riparian\_Bands\_Whychus\_Phase2b”.





* + 1. Above you should see a new layer that displays three distinct bands: these correspond to
       1. 0-3ft above the water surface.
       2. 3-4ft above the water surface.
       3. > 4ft above the water surface.
    2. Examine this layer using the Explore tool.
    3. If desired, use the Reclassify tool and the Attribute Table to clean up your dataset and give the bands specific names.

Congratulations! You have created an elevation band dataset using the Region Grow method.