# *Vegetation Analysis: Making Riparian Masks for GEE*

You may wish to do some Riparian Analysis/Calculation in Google Earth Engine (GEE). This document will help guide you step-by-step on how to create simple and complex riparian masks to import into GEE using ArcPro, though the process is similar in ArcMap.

1. Getting the shapefile of your county's streams/river banks

The first thing you need to do is get a shapefile that somehow denotes the streams or river banks in your region of interest. Depending on the size of your streams/rivers, you may need to use different datasets to accomplish this (see example below).

Here, you see the downloaded/imported shapefile for WDFW Fish Distribution Data in Walla Walla County. Notice the shapefile nicely overlaps most of the streams in the county.
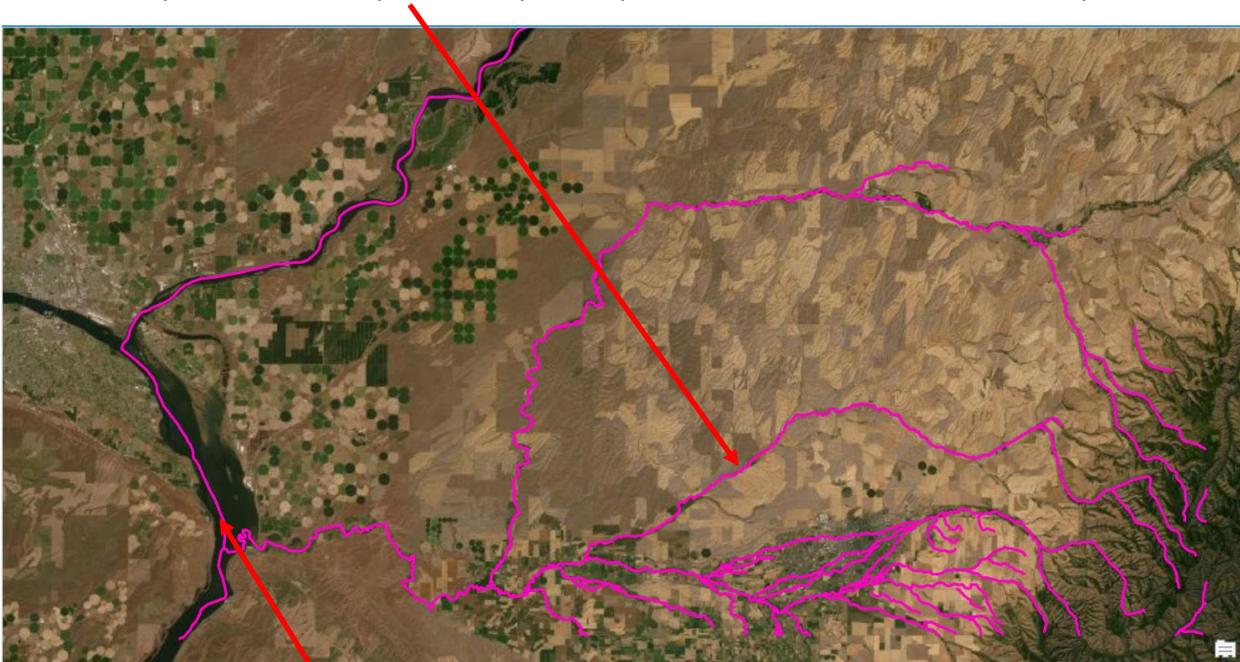
However, along the Snake River, it doesn't follow riparian zones closely at all, with large gaps between the shapefile and shoreline. For smaller streams, there are several useful datasets to obtain shapefiles in your Region of Interest. These include but are not limited to...

    a. WDFW Fish Distribution
    b. Department of Ecology 303(d) data
    c. National Hydrography Data

If you only have smaller streams, skip to page 6. If you have some large streams, continue on to the next page.

You will need a custom shapefile for the riparian zone of larger streams…follow these steps…

Download the NHD Dataset (USGS Data) for your state or region of interest

Note: You can download specific areas by using the USGS app, or you can simply download the data for your entire state. Click "search products" to see your options.

The layer you will need from the NHD Dataset is called "NHD Waterbody" and shows the full shape of large bodies of water. You can delete other layers.
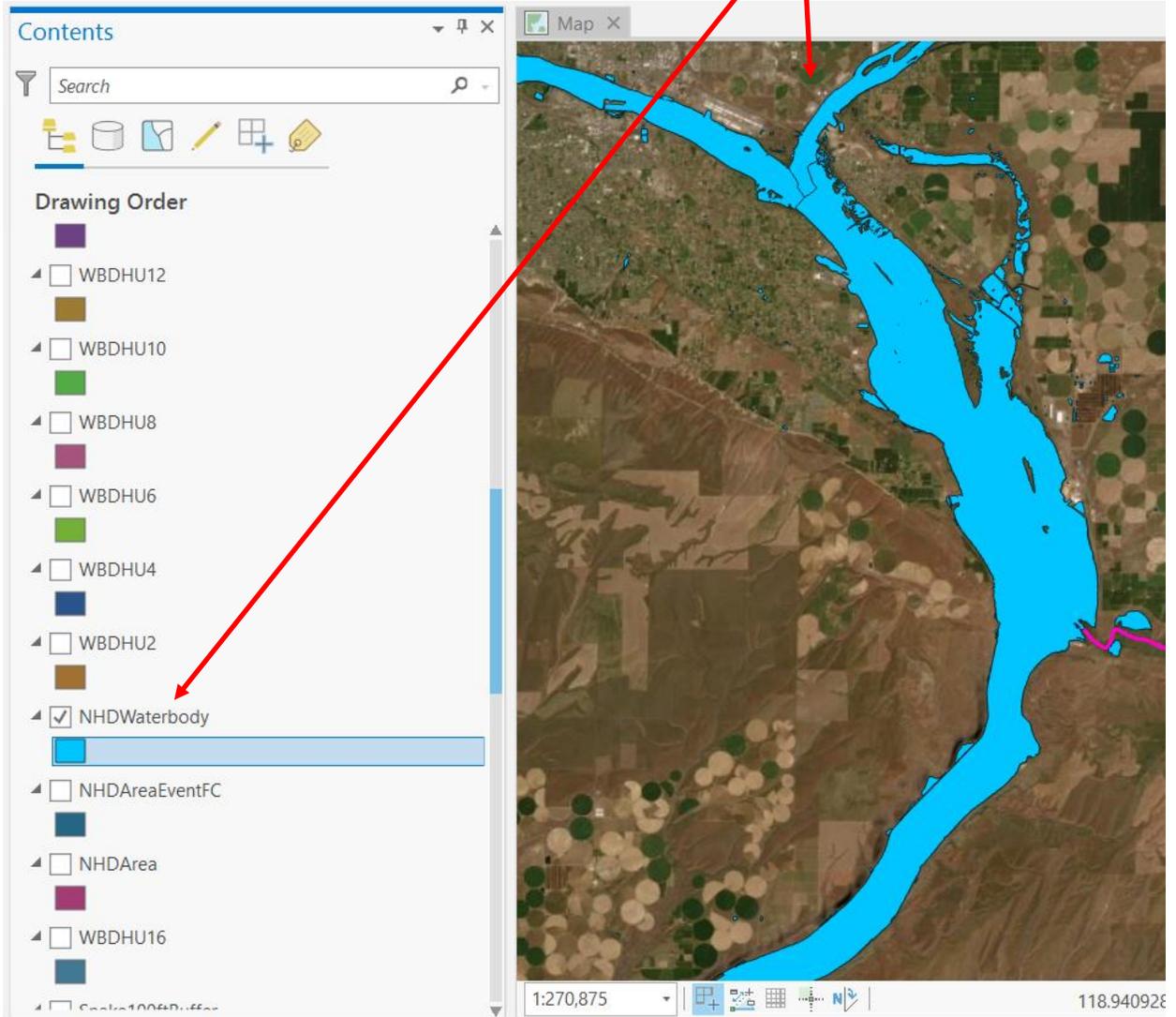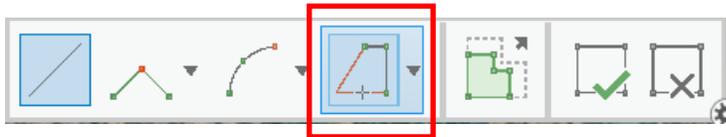
Now create a new Feature Class to in ArcPro (right click on your GDB or just rename a different line layer) to denote the shoreline of the large river. In my example, I have created a new Line Feature Class named "SnakeColumbiaShoreline".
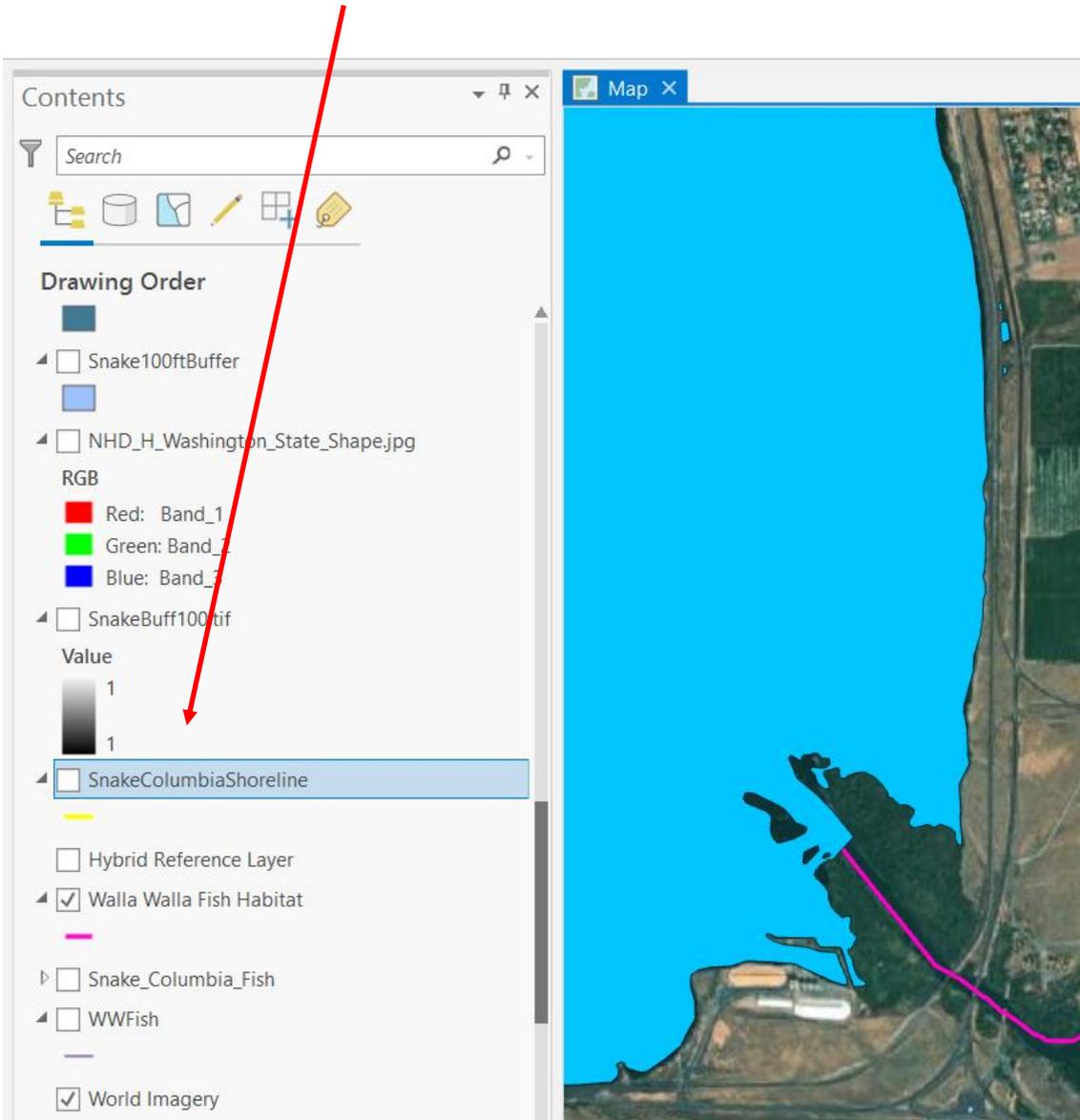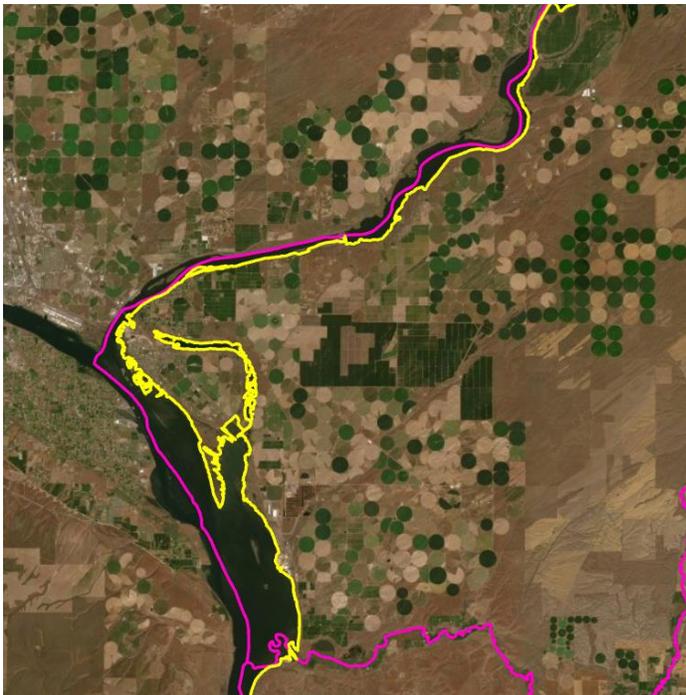
Use the "Create" tab to create a shape for the new Feature Class.
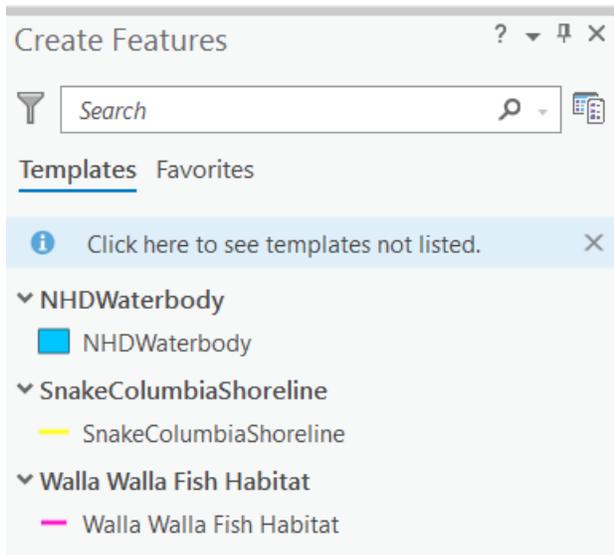
Make sure you are creating a line, and select the "Trace" tool.

With the NHD Waterbody Layer on, drag your cursor and trace the shoreline of the body or water whose riparian zone you want to analyze. This may take several tries and can be frustrating with a slow computer, but just have patience! The resulting line will some out looking something like this.

You can see the yellow line much more closely follows the shoreline of the river than the purple line and will provide a more accurate riparian zone mask.
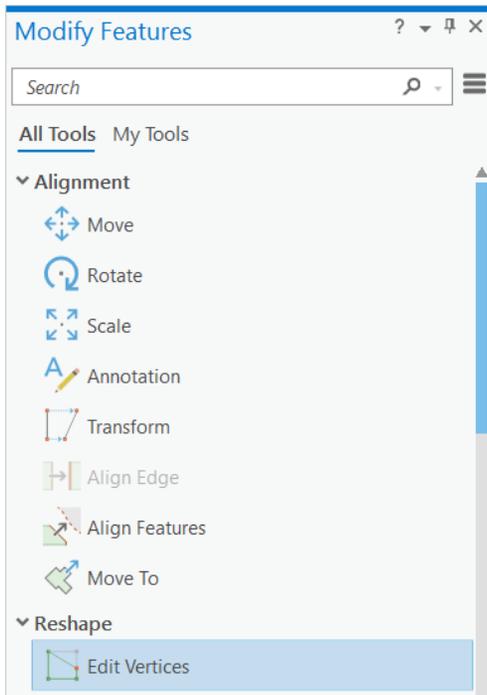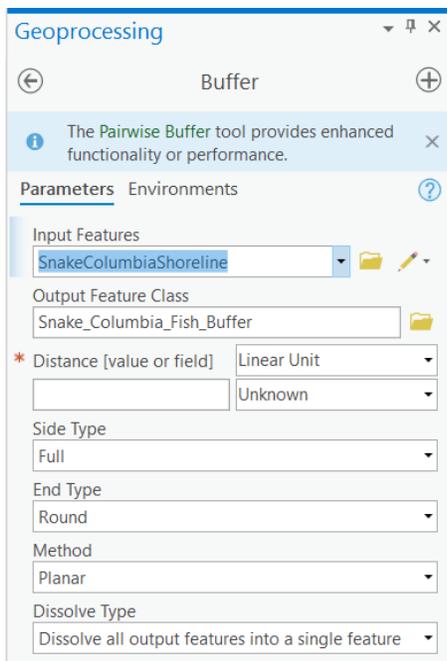
This process isn't 100% perfect and may leave some gaps, so use the "Modify" tab and select "edit vertices" to manually close up any large gaps between the created line and actual shoreline.

MAKE SURE TO SAVE EVERYTHING BEFORE TRYING TO EDIT ANY VERTICES.

2. Buffering the shapefile

Now that you have the appropriate stream shapefile, you will create a buffer to serve as the riparian shapefile. Go to the "analysis" tab and select "Buffer".

Your input layer should be the shapefile you are going to buffer for riparian zones. If I wanted to buffer the smaller streams in Walla Walla County, I would use the WDFW Fish Distribution shapefile. For the larger river, I am using the shoreline shapefile I created and traced.

Designate Output Feature name and file destination

Select how large you want the buffer to be and what units to use.

If you are buffering both sides of a stream, use "Full" for "Side Type". It you are buffering only one side of a stream (like the large shoreline of the Snake River) use "Right" or "Left" to select a one-sided buffer.

If you want one continuous buffer, select "Dissolve all output features into a single feature".

What should come out is a custom buffer shapefile. In this example, I chose 100ft (blue buffer) along the snake river.
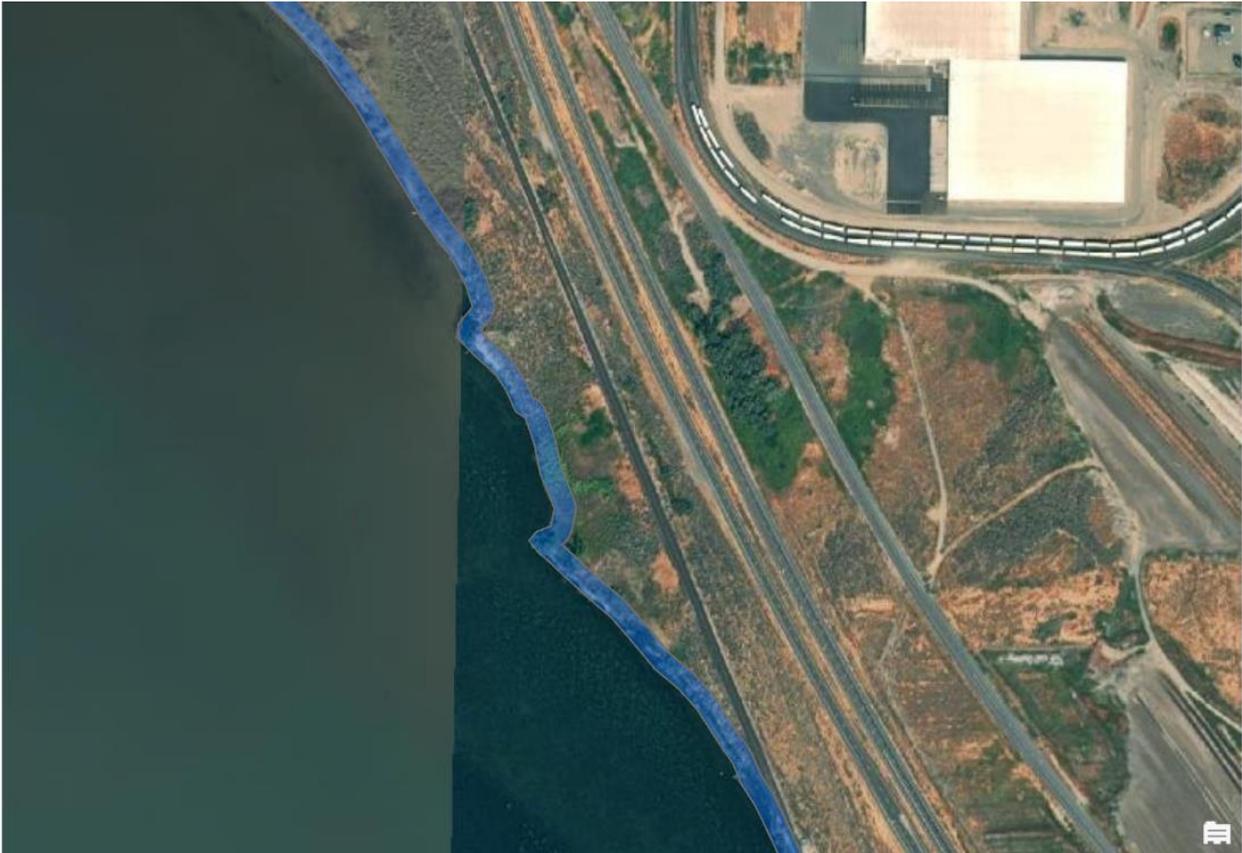
3. Formatting the buffer for Google Earth Engine
The last step is to format this buffer to be used as a riparian mask in Google Earth Engine.

Before you do this, make sure your buffer is one continuous shape and not multiple polygons (can use the merge tool to fix this).

Open the attribute table for your buffer and format it as follows, making sure to create a column with a RasterValue (RastVal) of 1.

	FID	Shape *	RastValue	Type	ShapeSTLen	BUFF_DIST
1	0	Polygon	1	100ft	0	30.480061
	Click to add new row.					

Save and close the attribute table. Open the "Polygon to Raster" tool and follow the steps below…
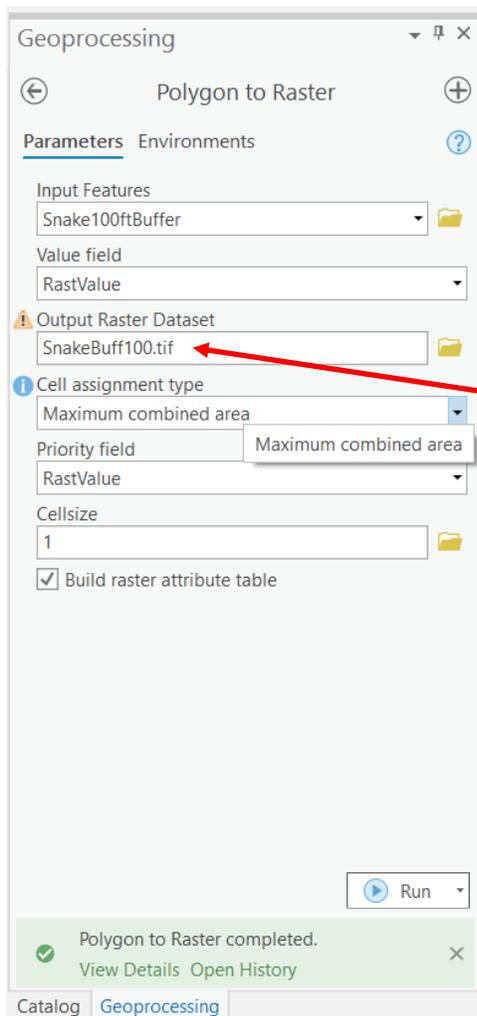
Make sure your buffer is the input feature, and that "RastValue" is the Value Field.

For the Output Feature, if you are getting errors when exporting, you can export to a file instead of a GDB. MAKE SURE to type ".TIF" after the output feature name to save it as a TIFF file type.

In Cell Assignment Type, choose "Maximum Combined area".

In the Priority Field, choose "RastValue".

For Cellsize, choose 1 if you want a very detailed riparian mask (gives a very continuous and fine mask). If you are ok with a blockier mask, you can change the Cellsize to be bigger.

Hit "Run"!

4. Upload buffer mask to Google Earth Engine

Now you have a TIF riparian mask for your Region of Interest. The last step is to upload the mask to your GEE assets. Click "New" and select "GeoTIFF"
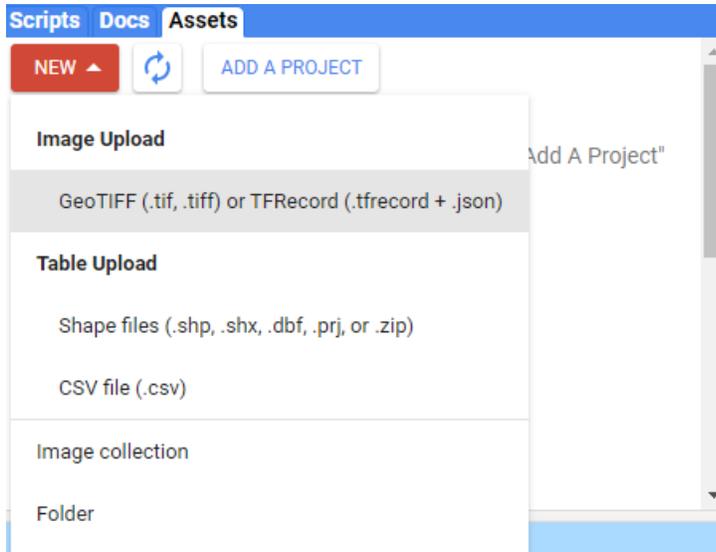
Select the file(s) from your computer with the appropriate extensions and click "upload". You are all done! You now have a GEE asset to mask your riparian zones.