



0/90 Kilometer Buffer Clip Instructions



Table of Contents

Overview	1
Process using ESRI ArcMap/ArcCatalog	2
Process using Command Line/Anaconda3.....	5
Process using QGIS	6

Overview

LF 2016 Remap Alaska (AK) product rasters will be in 90km extent. There are two methods for obtaining the 0km (AK without buffer) or 90km (AK plus buffer) extent of a given product raster(s).

As there are pros/cons with every method, this document will try and outline any “risks” applicable for the given process method.

The LF Team has provided the following methods as viable options for obtaining the desired results but are not the only way to get results.



In all methods, it is important to keep the coordinate systems matching between the clipper and product rasters, as well as safeguarding from potential resampling and pixel alignment issues/shifting. In ESRI processing, these can be controlled within the environment settings, while in GDAL they can typically be directly indicated with specific arguments. As well, a raster attribute table (RAT), and joining back the original RAT to it, may have to be done for the resulting raster(s) depending on the method chosen. An * is provided along the LF Preferred method for obtaining results. Please contact helpdesk@landfire.gov with any questions, concerns, issues.

Process using ESRI ArcMap/ArcCatalog

With the 0km/90km Extent Shapefiles (*located in the \Spatial_Metadata product mosaic subfolder*)

Allows environment settings: Output Extent to reduce risk of output raster extent shift

1. Clip Raster (*Data Management > Raster > Raster Processing > Clip*)
 - a. <https://desktop.arcgis.com/en/arcmap/10.7/tools/data-management-toolbox/clip.htm>
 - b. <https://pro.arcgis.com/en/pro-app/2.7/tool-reference/data-management/clip.htm>
2. Requires the Spatial Analyst License (*Spatial Analyst Tools > Extraction*)
 - a. *Extract By Mask
 - i. <https://desktop.arcgis.com/en/arcmap/10.7/tools/spatial-analyst-toolbox/extract-by-mask.htm>
 - ii. <https://pro.arcgis.com/en/pro-app/latest/tool-reference/spatial-analyst/extract-by-mask.htm>
 - iii. Requires **Reclassify** to convert *NoData* to -9999 (as user desires)
 - b. Extract by Polygon (*OUTSIDE*)– To isolate the 90km Buffer area of the product only (0km as eraser to 90km raster)
 - i. <https://desktop.arcgis.com/en/arcmap/10.7/tools/spatial-analyst-toolbox/extract-by-polygon.htm>
 - ii. <https://pro.arcgis.com/en/pro-app/latest/tool-reference/spatial-analyst/extract-by-polygon.htm>
 - c. Extract by Polygon (*INSIDE*)– To isolate the 0km area of the product only (90km Buffer area as eraser to 90km raster)
 - i. <https://desktop.arcgis.com/en/arcmap/10.7/tools/spatial-analyst-toolbox/extract-by-polygon.htm>
 - ii. <https://pro.arcgis.com/en/pro-app/latest/tool-reference/spatial-analyst/extract-by-polygon.htm>

With the Alaska 0km/90km Extent Raster Masks (located on the LF Website at

<https://landfire.gov/90kmbuffer.php>)

Allows environment settings: Output Extent to reduce risk of output raster extent shift

Allows environment settings: Snap Raster to reduce risk of pixel shift

1. Extract By Mask – Requires the Spatial Analyst License (*Spatial Analyst Tools > Extraction*) – Same as Above



EXAMPLE – Clip Raster *Obtaining 0km from the 90km Raster product, using the 0km.shp within the \Spatial_Metadata subfolder*

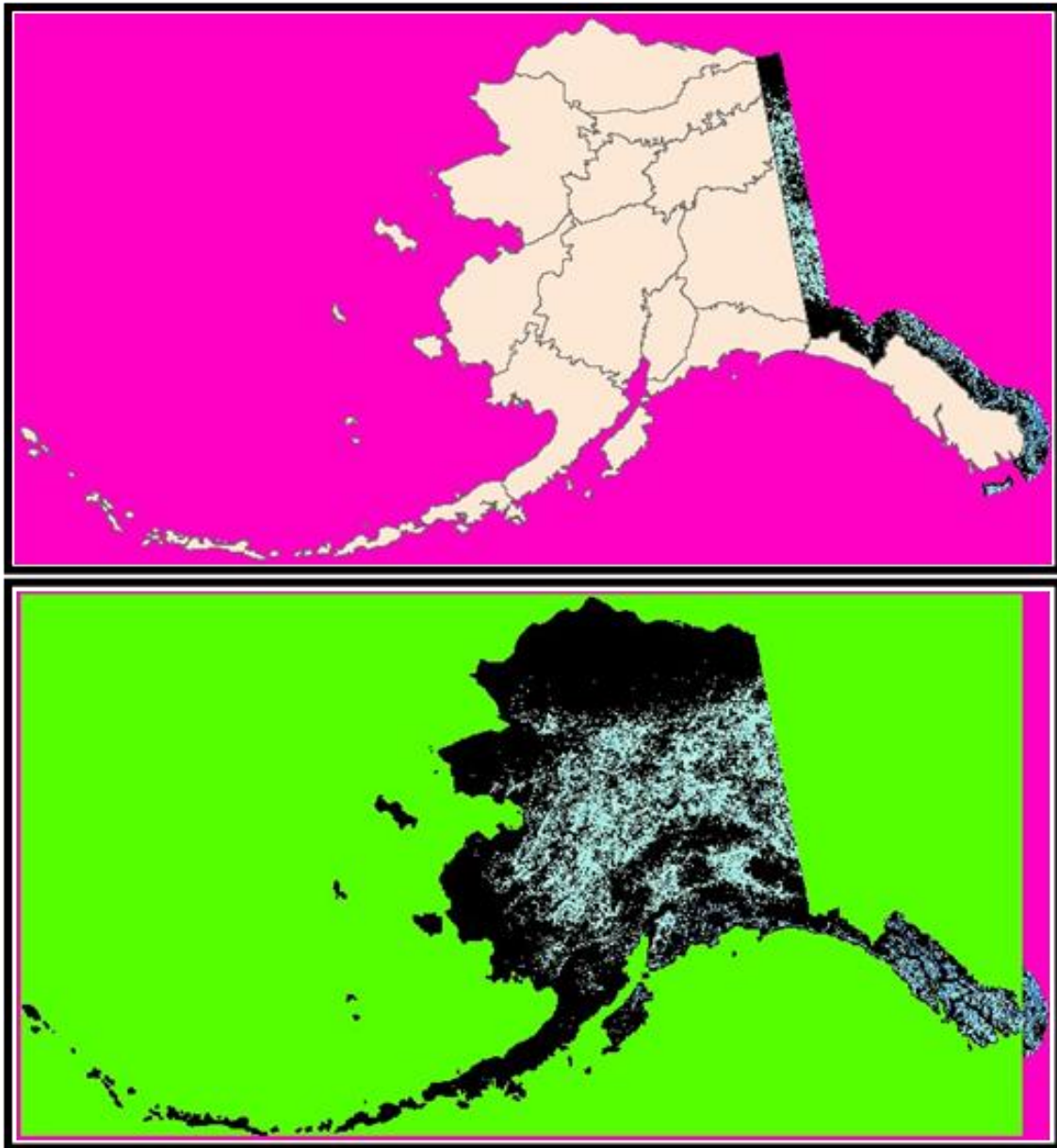


Figure 1: Top image - Original 90km LF 2016 Remap AK Canopy Bulk Density (CBD) product raster with the 0km.shp from \Spatial_Metadata overlaid on it (beige polygons); pink represents the -9999 no data value, included within the RAT. Bottom image - Clipped 0km CBD product raster; green represents NoData; reclassifying NoData as -9999 would be required to directly match the original raster

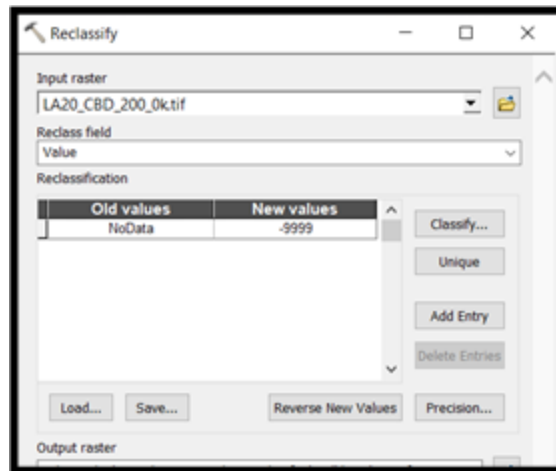


Figure 2: As an optional **Step 5**, Run **Spatial Analyst > Reclass > Reclassify** to obtain NoData as -9999 values (results not depicted in output raster, **BOTTOM LEFT**).

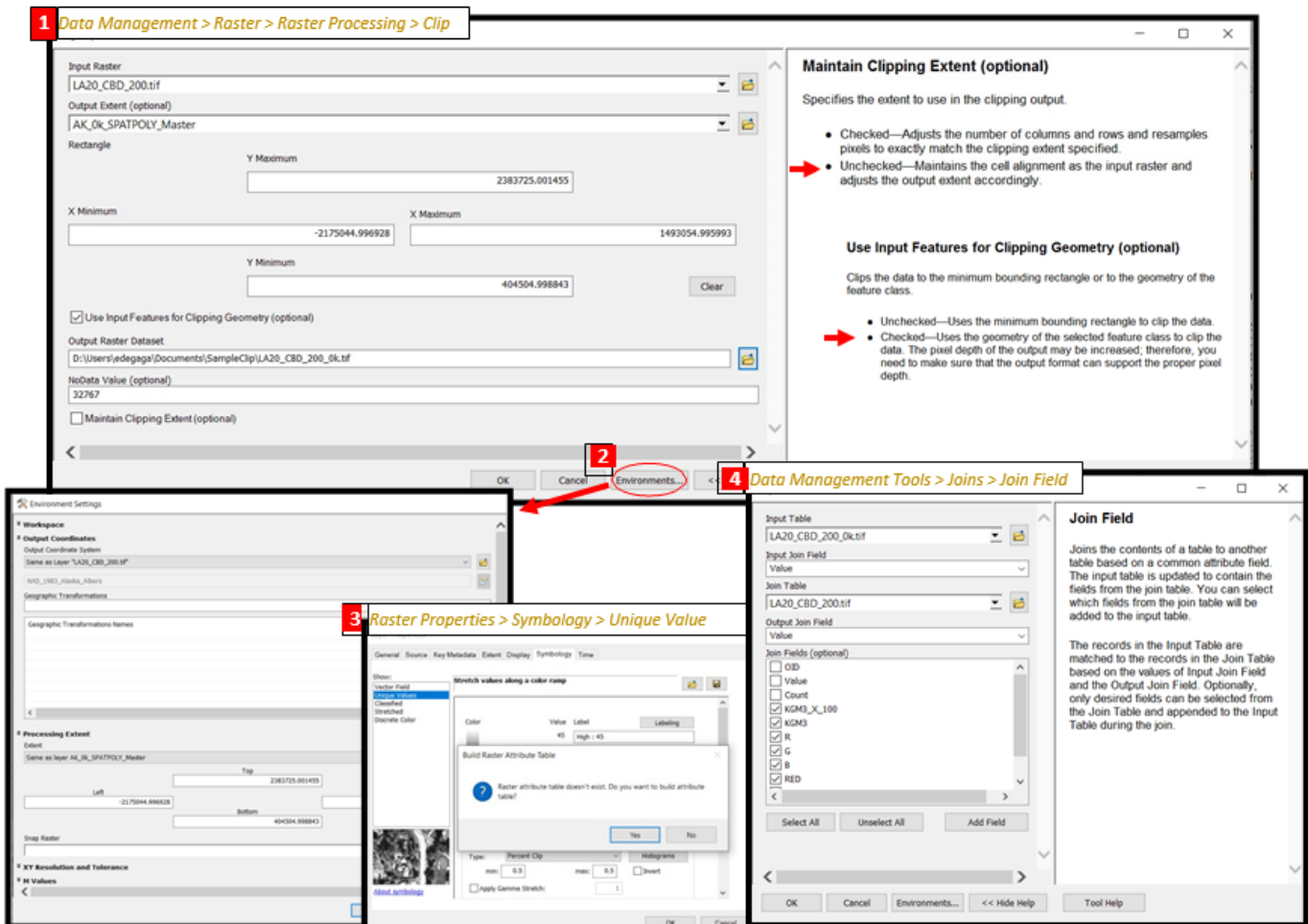


Figure 3: **Alt: Data Management Tools > Raster > Raster Properties > Build Raster Attribute Table**



Process using Command Line/Anaconda3

With the 0km/90km Extent Shapefiles (located in the *\Spatial_Metadata* product mosaic subfolder)

1. Python 3 – GDAL: To cut the raster by shapefile boundary or each polygons' boundary within the shapefile

- a. Using GDAL WARP with -Cutline (<https://gdal.org/programs/gdalwarp.html>), such as:

```
gdalwarp -t_srs EPSG: {Input EPSG CODE} -te {ULX}{LRY}{LRX}{ULY} -te_srs EPSG:{Output EPSG CODE} -tr 30 30 -ot {pixel type} -srcnodata {Input Raster NoData Value} -dstnodata {Output NoData Value} -cutline {Extent .shp} {Input Raster} {output raster}
```

- i. For mosaic product rasters, the resolution is 30x30 (-tr) and the NoData Value will be -9999 while the pixel type should be 16-bit Signed Integer but refer to the raster(s) properties for exact details. All rasters and shapefiles should be full pathed if not running the command line in the current working directory, where all files are hosted together.
 1. The following command snippets are listed to help users build an automated workflow version, which allows for obtaining a given map zones' polygon extent boundaries (for the -te argument) using Python -GeoPandas module. Done so by bringing in the geometry of the shapefile's total bounds (applicable at both map zone and total 0km shapefile:
 - i. Read in the data: `gdf = gpd.read_file({in_shp})`
 - ii. Apply a search for the Map Zone desired to Clip By: `Clip_shp = gdf.loc[gdf[{{field}}] == {id}]`
 1. Where field is "ZONE_" and "id" is the map zone number
 - iii. Make sure the projections match for clipping, if not, can use the following snippet:


```
Clip_shp.to_crs("epsg:{}".format(eps_g_code))
```
 - iv. Obtain the given polygon's Extent: `ULX, LRY, LRX, ULY = Clip_shp.geometry.total_bounds`

2. Python-Rasterio

- a. <https://automating-gis-processes.github.io/CSC18/lessons/L6/clipping-raster.html>

3. *Python- Rasterio w/Fiona

- a. <https://rasterio.readthedocs.io/en/latest/topics/masking-by-shapefile.html>

- b. <https://gis.stackexchange.com/questions/345917/overlay-two-raster-geotiffs-using-rasterio-mask>

With the Alaska 0km/90km Extent Raster Masks (located on the LF Website)

1. Python 3 – GDAL

- a. Using GDAL TRANSLATE (https://gdal.org/programs/gdal_translate.html), refer to method outlined here: <https://gis.stackexchange.com/questions/297460/clip-raster-using-mask-other-raster-using-python-gdal>



Process using QGIS

*With the 0km/90km Extent Shapefiles (*located in the \Spatial_Metadata product mosaic subfolder*), refer to methods outlined here:

1. http://www.ggistutorials.com/en/docs/raster_mosaicing_and_clipping.html

With the Alaska 0km/90km Extent Raster Masks (located on the LF Website at <https://landfire.gov/90kmbuffer.php>), refer to methods outlined here:

2. <https://gis.stackexchange.com/questions/86960/clipping-raster-layer-with-raster-mask-layer-in-qgis>