

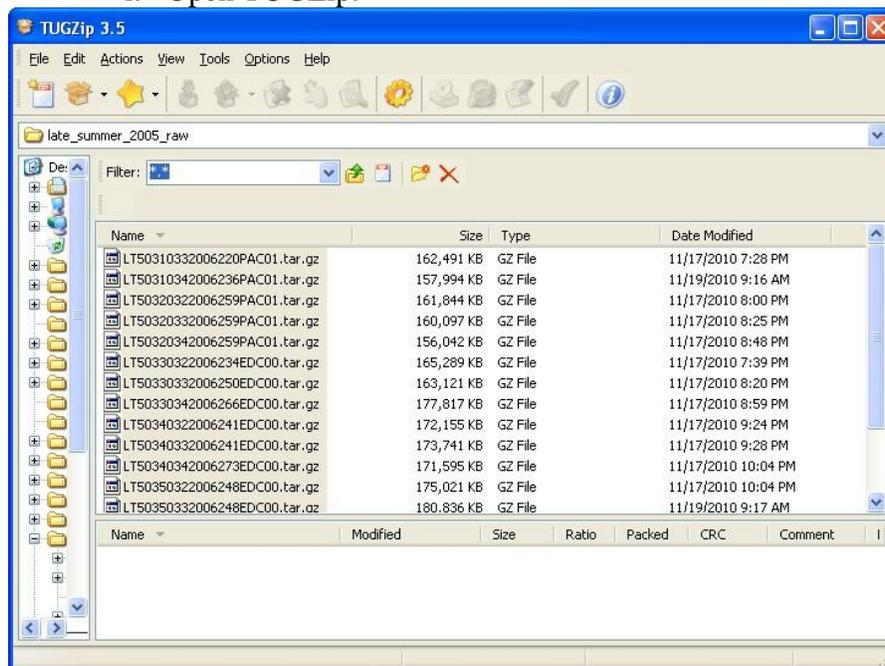


Created By: Grant J. Firl
Advisors: Paul Evangelista, Jim Graham
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Software: ArcGIS v9.2, TUGZip v3.5

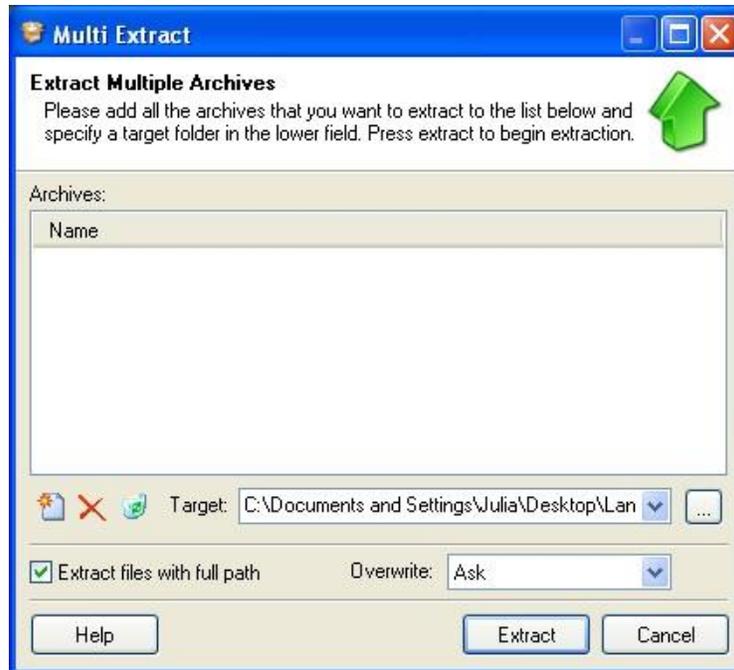
Lesson 8: Mosaicking and Clipping Landsat Data

The purpose of this tutorial is to demonstrate how to process individual Landsat scenes into a mosaic covering some well-defined geographic area. It is assumed that the user has acquired all the necessary Landsat data (see the Acquiring Landsat Data tutorial) and has a boundary polygon for the area of interest.

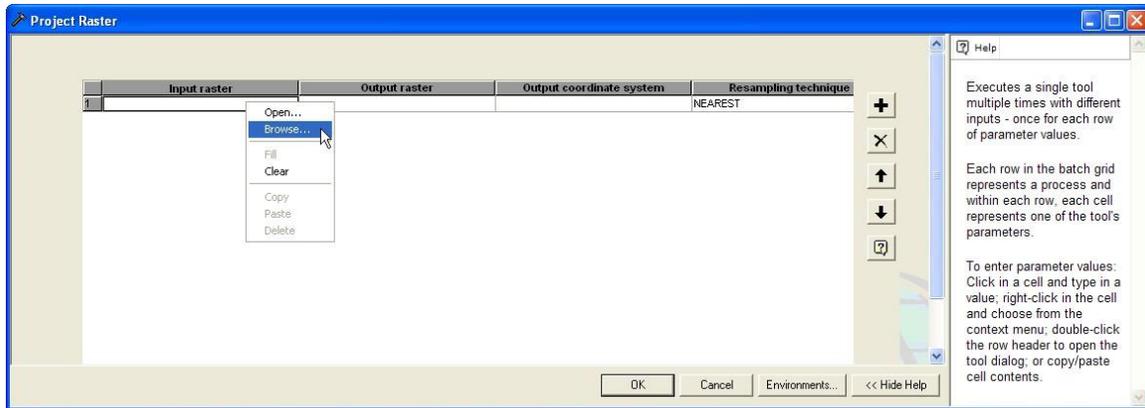
1. Extracting the data
 - a. By default, the downloaded Landsat data is in a double-compressed format, using the TAR and GZIP compression algorithms. There are many freely available programs to extract data in this format. One such easy-to-use program is TUGZip (v3.5). Once installed, the Landsat data can be extracted using the following procedure.
 - i. Open TUGZip.



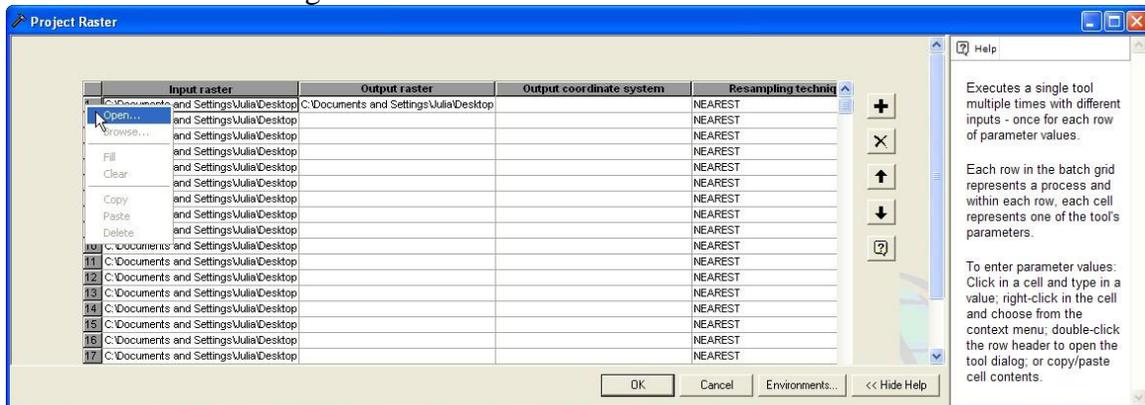
- ii. From the “Tools” menu choose “Multi-Extract...”



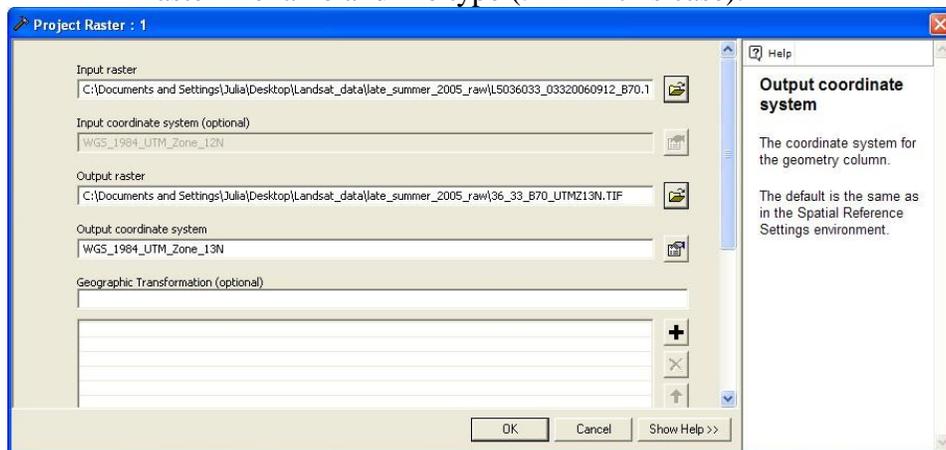
- iii. Add the Landsat data files by using the  icon and browsing for the files (you can select multiple files at once using Shift-Click).
 - iv. Set a target folder in the provided dropdown box below the Archives Name list. You can browse for the folder using the provided button.
 - v. Click the “Extract” button to begin the extraction process. Each compressed Landsat file (about 160 MB) is extracted into the target folder as 9 files totaling more than 400 MB.
2. Reprojecting the data
- a. Depending on how large of an area you are intending to mosaic the Landsat data, it may be necessary to reproject the data into a common projection. To do this, follow this procedure.
 - i. Open ArcMap. From the ArcToolbox, select “Data Management” => “Projections & Transformations” => “Raster” => “Project Raster.”
 - ii. If there are many scenes that you need to reproject, it is often easier to use this tool in “batch mode.” To do this, instead of left-clicking “Project Raster” in the previous step, right-click on it and choose “Batch...” A new dialog will open that looks like the following:



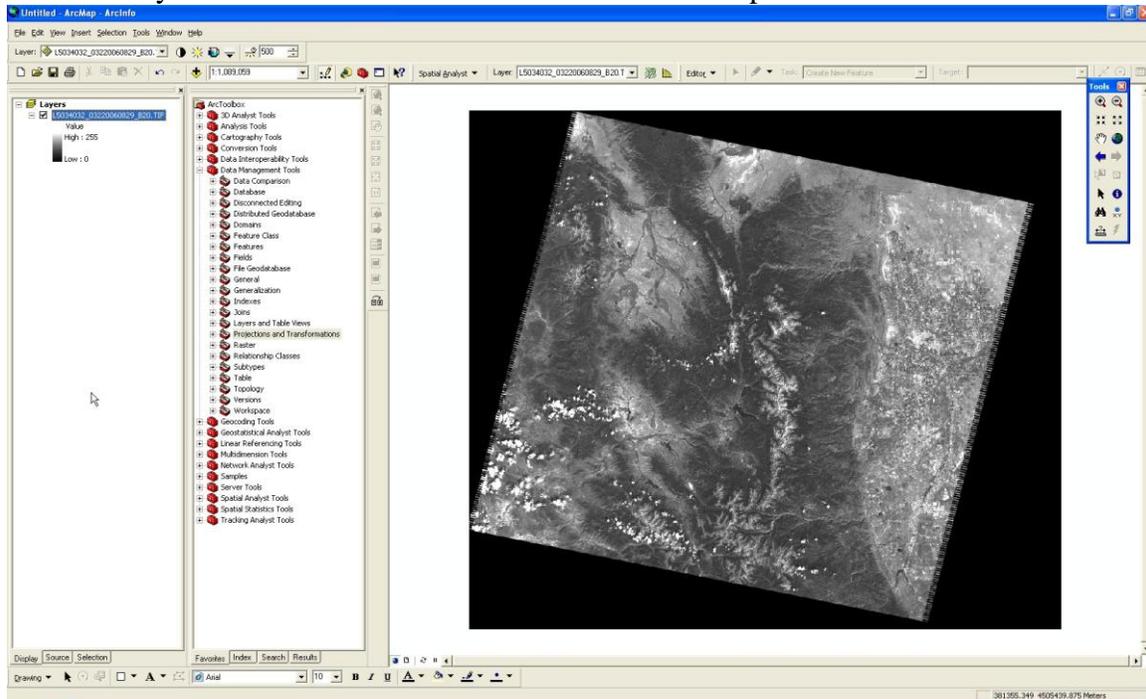
- iii. The batch project raster dialog works much like the dialog for the individual raster project. First, identify all of the rasters that need to be reprojected. Right-click in the “Input Raster” column and select “Browse.” You can select multiple rasters at once using Shift-click.
- iv. Once the rasters are added into the “Input Raster” column, right click on the header column for each row and select “Open.” This will bring up the project raster dialog for the individual raster for easier configuration.



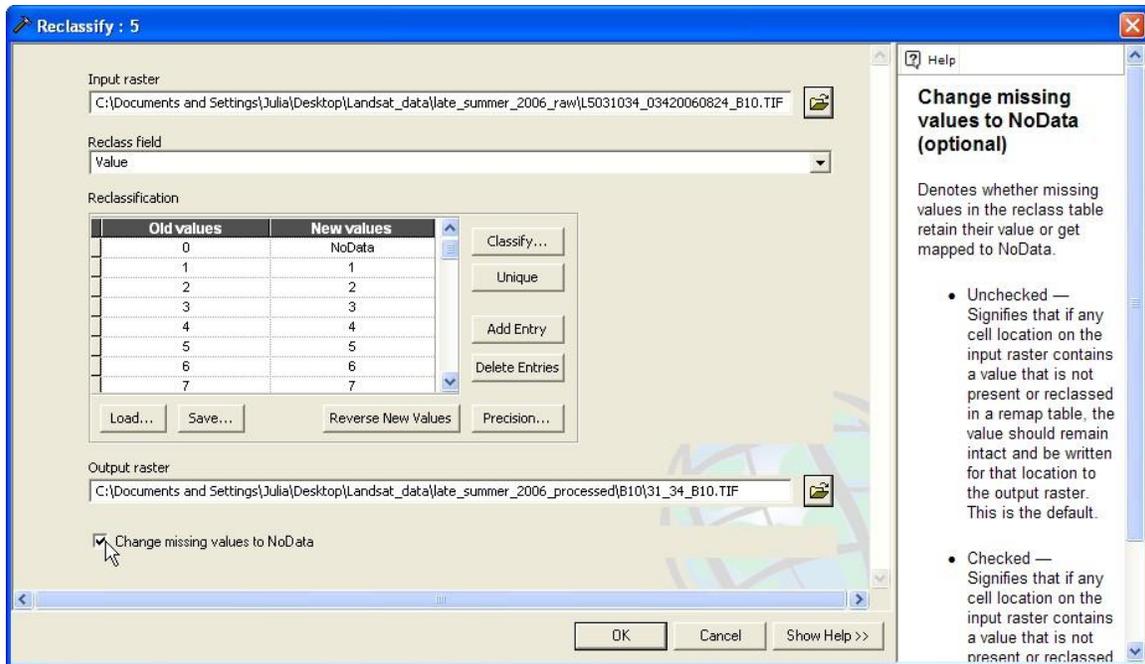
- v. Use the individual project raster dialog for each input raster in your batch dialog to specify the desired projection and datum and the output raster filename and file type (.TIF in this case).



- vi. Once the output raster and desired projection and datum have been specified for each input raster, click the “OK” button in the batch raster projection dialog. This will begin the reprojection of all selected input files.
3. Each Landsat scene is a raster in the shape of a rectangle rotated by some angle. Due to this rotation, and the fact that raster datasets need to be unrotated rectangles in ArcMap, each Landsat scene is an unrotated rectangle containing 0 values where there is no data. In order to properly mosaic many scenes together, it is necessary to reclassify the 0 values as NoData values within ArcMap.

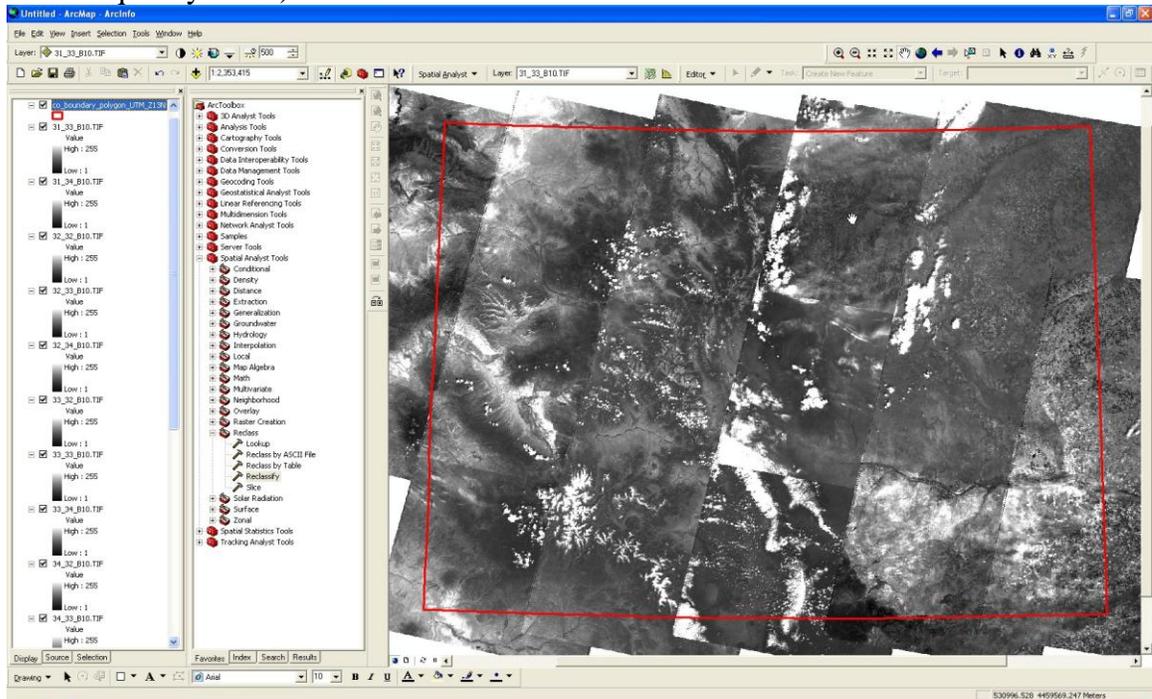


- a. To reclass many scenes efficiently, it is wise to first create a reclassification “remap table.” This can be achieved in the Reclassify dialog found in “Spatial Analyst Tools” => “Reclass” => “Reclassify”. **To create the remap table, use as the input raster a raster that has already been reprojected in the previous step** (the reason will become clear shortly). The reclass field should be “Value.” In the reclassification section, choose the “Unique” button on the right-hand side. This should create a remap table that maps 0-> 0, 1 -> 1, 2 -> 2, 3 -> 3 ... 255 -> 255. If another unprocessed raster is used in this step as the input raster, this reclassification table is not created correctly and it becomes necessary to manually type in each old value to new value in the reclassification table. **The only modification needed is to map the old value 0 to the new value NoData.** Once the reclassification table is correct, click “Save ...” below the table, and save it somewhere convenient with a descriptive name. Cancel out of the dialog.

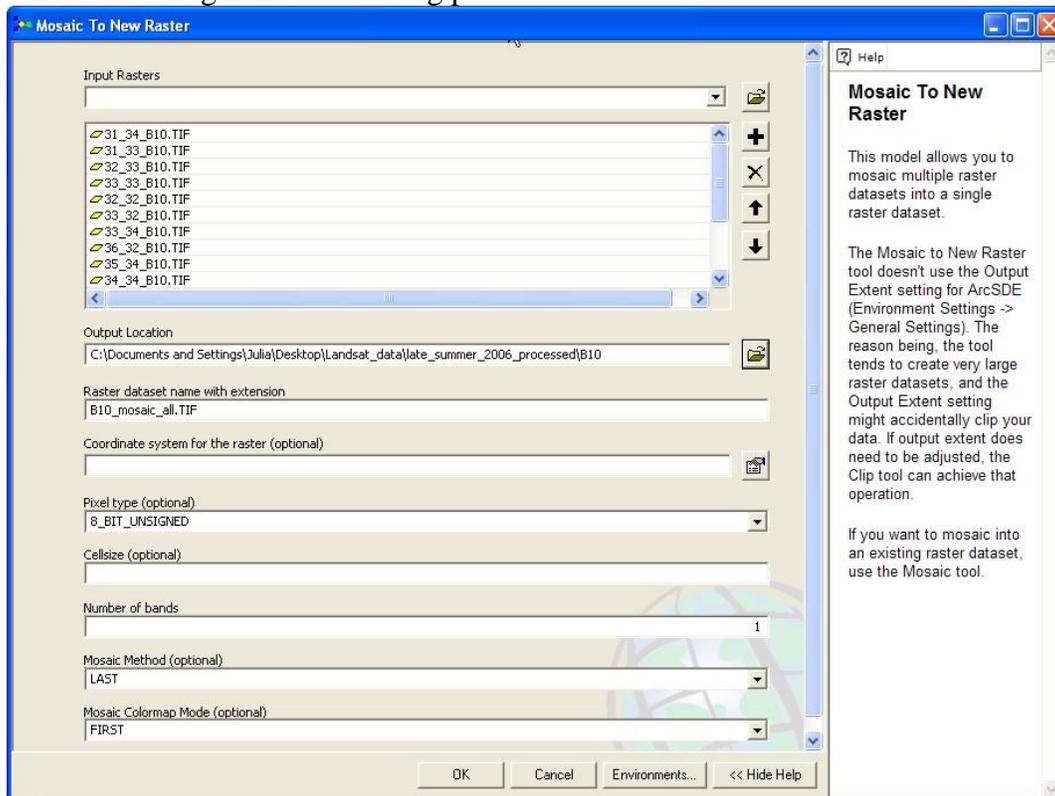


- b. To reclassify many scenes, go back to the reclassify tool, but enter it in batch mode (“Spatial Analyst” => “Reclass” => right-click on “Reclassify” => “Batch...”).
 - c. Right click on the “Input Raster” column to browse and add the files that you need to reclassify. Add multiple files at once.
 - d. Right click on each row header and choose “Open” to open a new reclassify dialog for each input file. The “Input Raster” should be specified as the current row from the batch dialog. The “Reclass field” should be “Value.” Choose “Load” below the reclassification table and browse to and select the remap table created in step (a.). Specify and output raster filename and type (.TIF). Select “Change missing values to NoData” just in case. Click “OK”
 - e. Repeat for all input rasters that you need to reclassify. Once you’ve configured the reclassification parameters for each file, click “OK” in the batch reclassify dialog to begin the reclassification of all files.
4. It is common for some scenes within a large geographical area to have a lower quality than others, e.g. cloud cover in a few scenes. In order to minimize the lower quality data in a mosaic, you can overlap scenes to cover up cloudy areas. This can be accomplished by loading all of the reclassified scenes that you would like to mosaic into ArcMap and adjusting their order by dragging and dropping the individual files in the Table of Contents frame. When finished, take note of the order. (Note: Pay attention to the frequency band of your data. Only mosaic data together from the

same frequency band.)



- To create the mosaic, go to “Data Management Tools” => “Raster”=> “Mosaic to new raster.” Add the input rasters starting with the worst quality raster to the best quality raster (determined in the previous step). Specify a folder to put the mosaic into. Specify a name and extension (.TIF). Make sure the Mosaic Method is “LAST.” Click OK to begin the mosaicking process.



- Once the mosaic is created, load the boundary polygon into ArcMap. To clip the new mosaic raster to the boundary polygon, go to “Spatial Analyst” => “Extraction” => “Extract by mask.” Choose the mosaic as the input raster, the boundary polygon as the feature mask, and specify a name and extension for the output raster.

