Tufts University GIS Tip Sheet

Creating a Smaller Data Set from a Larger Data Set – Raster Data

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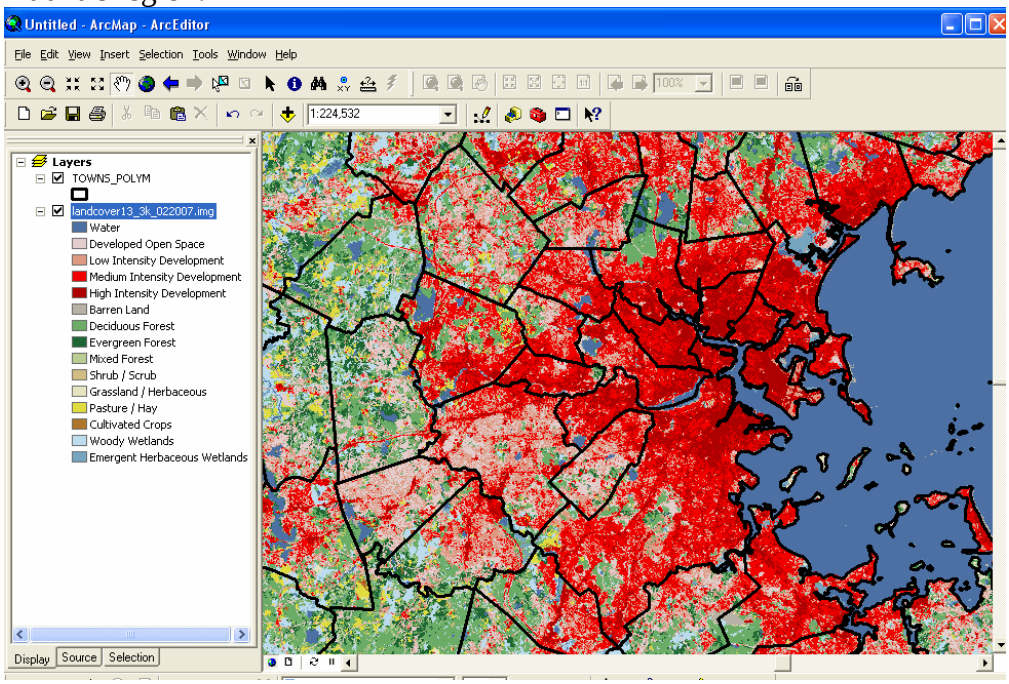
Raster data sets can be quite large, and often you just need the data for a small area within the larger data set. This tip sheet discusses how to clip raster data to a smaller area. If you need to clip a vector data set, please see the tip sheet for vector data.

There are several ways to create a smaller raster data set from a larger one. Here we will look at two methods. The first is good technique when you want to maintain a subsection of the original data set for your files. The second is good during the actual analysis phase of a project and if all you need to maintain are the analysis results.

ArcGIS 9.2 Online Help has a discussion of the other extraction tools which can come in very handy in different situations, so you should become familiar with these - http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=An_overview_of_the_Extraction_tools

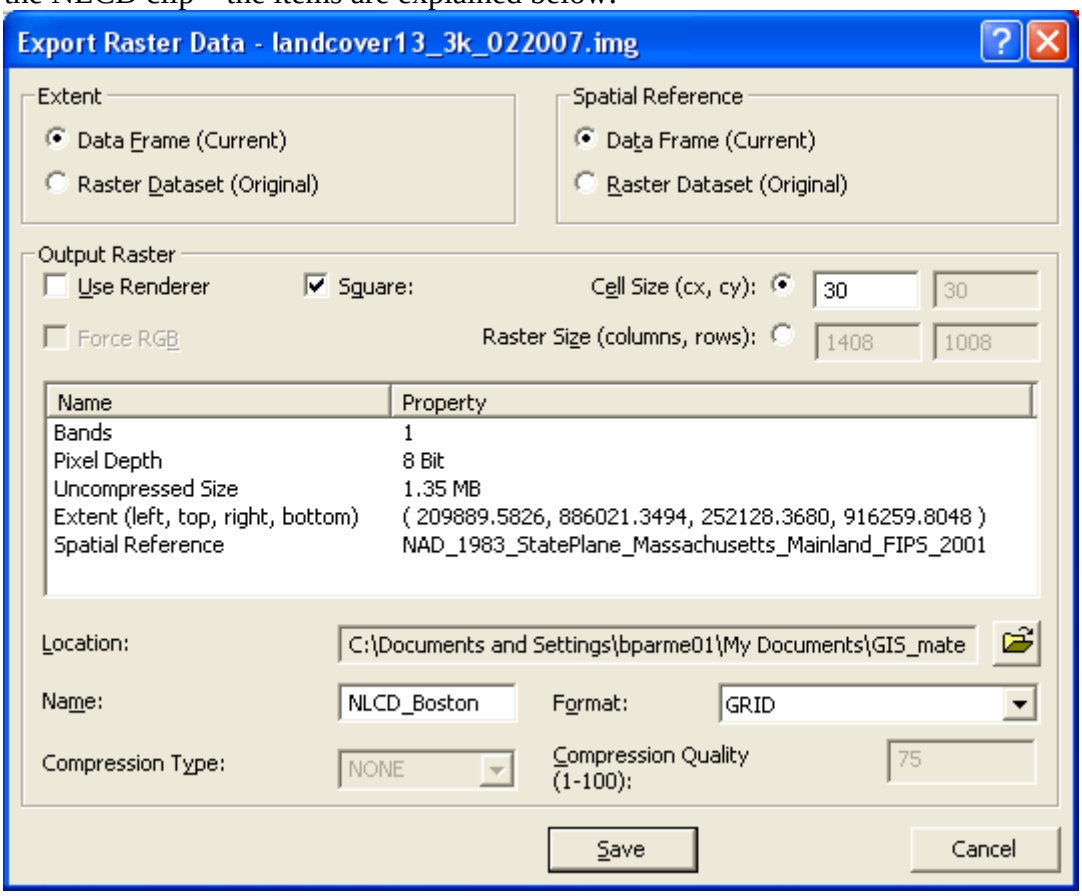
Clipping a raster data set using the Data Export option

The easiest way to "clip" a raster data set is to zoom in to the area you want to clip and export just that area to a new raster data set. You do this in ArcMap. In this example, we will clip the 2001 National Land Cover Data set (NLCD) to the Boston metro area. The original data set covers all of the Northeast and Middle Atlantic region.



1. Add the raster data set you want to clip to your ArcMap session (it should have a defined coordinate system, and your data frame should also have a defined coordinate system. Note that you can size the ArcMap window so that it better contains the area you want to clip (e.g., is more square or more rectangular – whatever you need it to be – the clip will be to this window.
2. Right-click on the data layer to be clipped (e.g., landcover) and choose Data – Export Data

3. There are several items you need to carefully fill in the Export dialog box – here is my example for the NLCD clip – the items are explained below:



   a. For Extent, I set it to the Data Frame – this is critical for getting the smaller clip!
   b. For Spatial Reference, in this example I set it to the Data Frame which was in the Massachusetts State Plane Mainland, NAD 83, matching data from MassGIS. This is not critical for you, but it is good practice to get all your data sets into a common coordinate system before analysis.
   c. I know that the original cell size for the NLCD data is 30 meters by 30 meters. The calculated cell size when the dialog box came up was slightly different, so I set it back to 30 by 30 under the Cell Size option. Setting the cell size is a good option if you know what cell size your analysis will be working with.
   d. I checkmarked "square" to enforce a square cell size
   e. Next to Location – you need to click on the FOLDER where this data set is going to go (don't specify a name here) – I recommend that you create a separate folder for your data layer (e.g., create an NLCD folder ahead of time), then navigate to this Folder name for the Location.
   f. Next to Name – here is where you specify the name. **IMPORTANT!** Your name must not have spaces in it, and it has to be less than 13 characters.
   g. For format, I like the GRID format. A TIFF format is another good option.

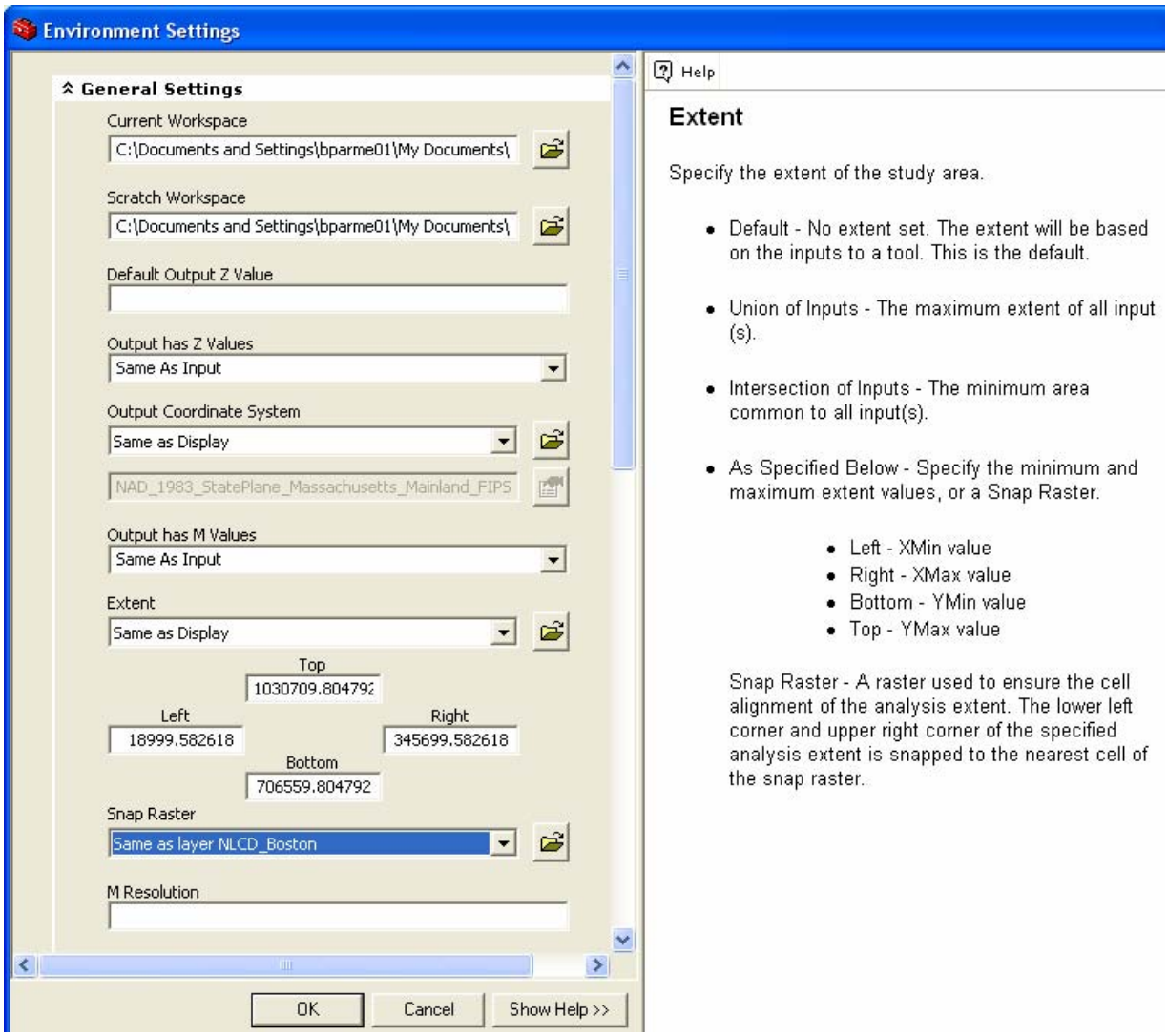
That's it – the data set can then be added to your map.

Limiting the Extent of your raster data during analysis operations

If you are using a large raster data set, and you want to limit your analysis to a smaller region, you can do this by setting the Extent when setting up for spatial analysis. This is appropriate if you don't need a smaller copy of the original data set – you just need the analysis results for the area in question. For example,

suppose you simply want to reclass the National Land Cover Data set for the Boston area, so that all development is coded as 1, water is coded as 0, and all other land covers are coded as 2.

1. To set the extent for all your analysis during your session, go to Tools – Options on the ArcMap menu.
2. Click on the Geoprocessing Tab
3. Click on the Environments button to set the environment settings
4. Click on the General Settings to open them out.
5. Click on the Show Help button to see what each setting does and what your options are.
6. Fill the Coordinate System and Extent options out – the example below shows that I set the extent to the Display (I had zoomed in to the area I wanted to be the extent). But you can also set the extent to be another data layer in ArcMap, e.g., the Somerville City Boundary or the Massachusetts state boundary.
7. The Snap to Raster option is important for analysis because you want all your raster data sets to overlay each other so each cell overlays perfectly with other cells. If you have a raster that will form the basis of your analysis, you can specify it here, and then any analysis results overlay properly.
8. Now whatever analysis functions you perform in your session, they will all have the extent you set here.



Note there is another section of the environments settings that you should set before you do raster analysis - the Raster Analysis Settings. To see these scroll down in the Environments settings window. Here you can set the cell size and mask. You should keep the same cell size throughout your analysis steps. The mask is optional. It can be a polygon feature, and all cells outside the polygon boundaries will be set to No Data in the results. For example, you can specify a town boundary and any cells outside that boundary will be coded as no data.