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Using the ArcMap model builder to clip, and export to multiple ascii raster files
Compiled by: Kevin Koy

BACKGROUND
In order to use environmental data layers in Maxent, the data must be in the ASCII grid format, and all layers must have the same geographic bounds and cell size. This guide is a brief description of *ONE* method that can be employed to format Worldclim bioclimatic data for use in Maxent. By no means is this the only way to accomplish this formatting, but is a working method that is *relatively* easy to use.

This guide serves as an example utilizing Worldclim data, as it is a common source of data used in Maxent, however, these methods may be adapted to format other environmental data layers. In this example, we will format global data to a subset of California.

INSTRUCTIONS

1. Open ArcMap (this guide was written using version 9.3), and open the ArcToolbox.
2. Right-click in the white space of the Toolbox, and click **New Toolbox** to create an area to build your model.
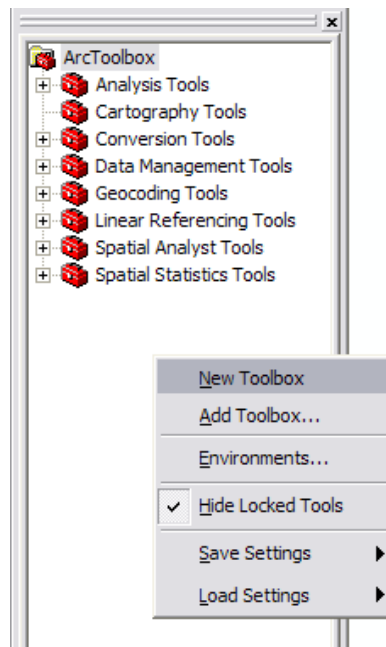

3. Right-click on the name of the new toolbox that you have created and select **New** > **Model** as seen below.
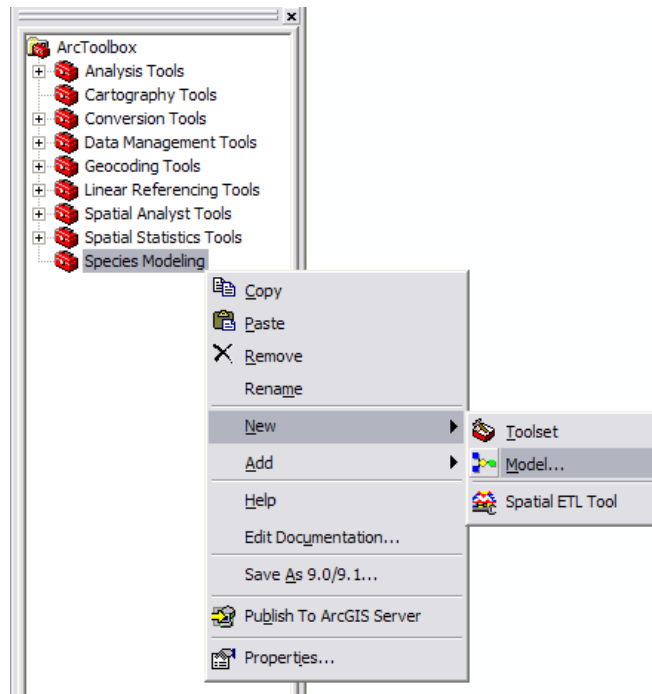
4. In the new Model window that opens, you can drag and drop any of the tools from the toolbox. Begin by navigating to **Data Management Tools** > **Raster > Raster Processing** and drag and drop the **Clip** tool from the toolbox to the model builder. You should see two connected objects appear as seen below.
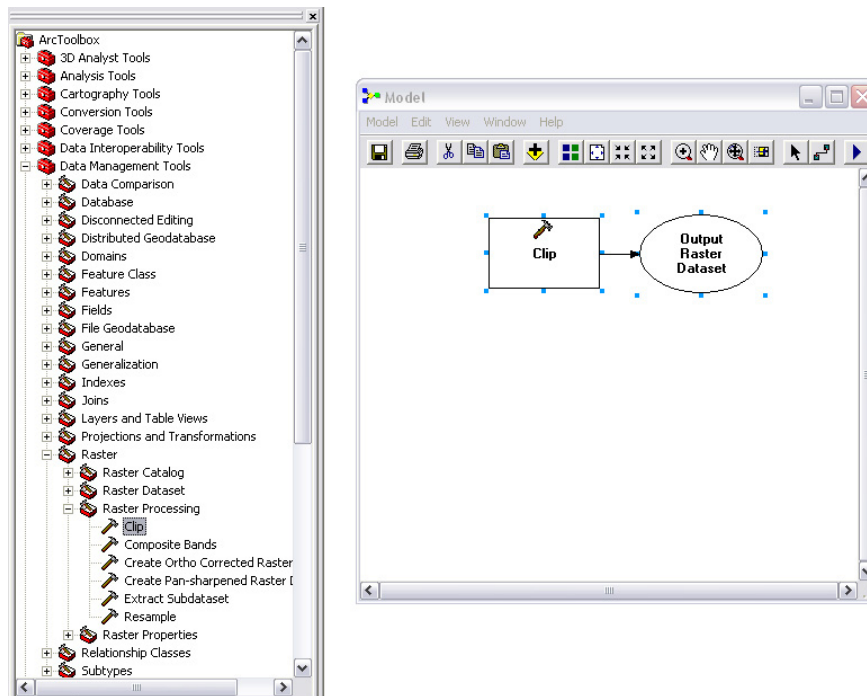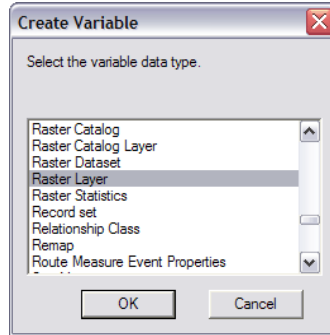
5. Follow with the Raster to ASCII tool which is found in **Conversion Tools** > **From Raster** as seen below.
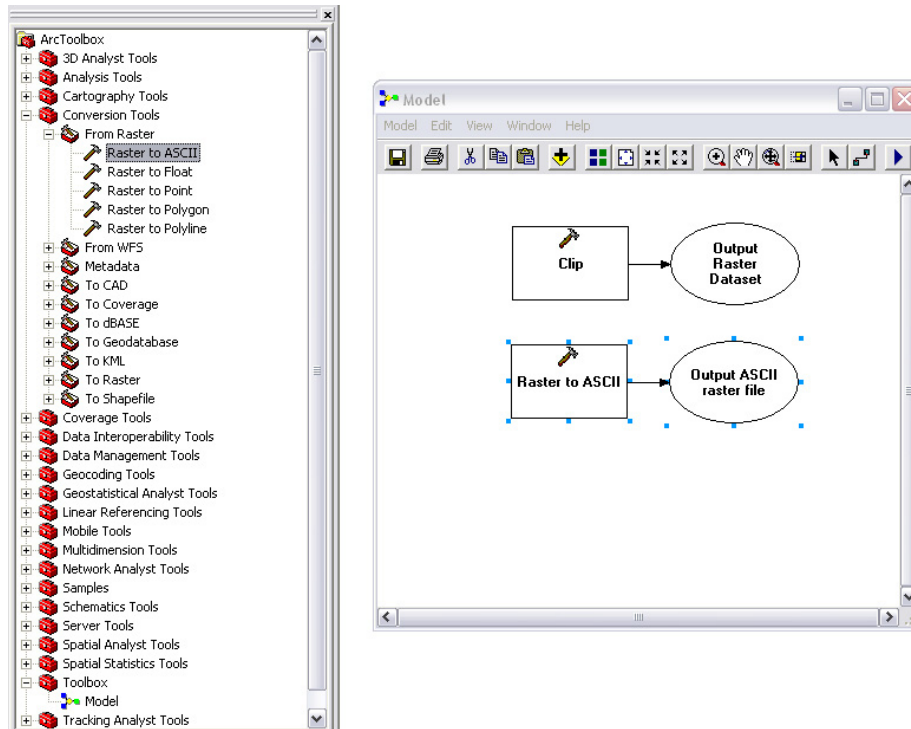
7. Next, you will need to add an Input Raster Variable, this is done by right clicking in the model, and selecting **Create Variable**… as seen below.
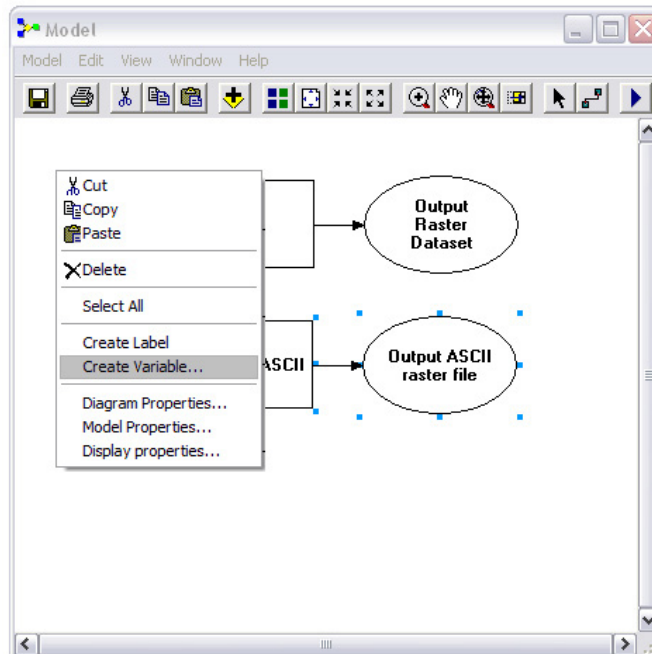
8. Select **Raster Layer** in the menu that comes up, as seen below. This will add an oval "Input Raster" to your model.


9. In order to set the **Input Raster** to accept multiple files, right click on the newly created oval, and choose **Properties**. In the properties dialog, choose "**A series of values**." Click **OK**.
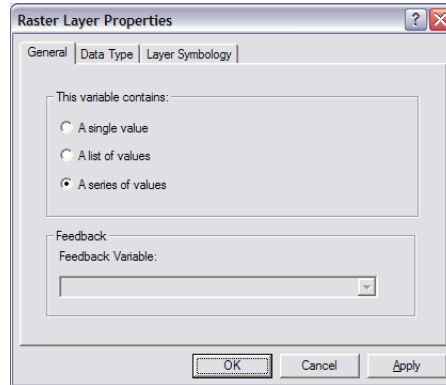
10. Next we will need to connect the different variables and processes in the model. To make these connections, choose the **Add Connection** tool. Drag the wand from the starting variable (oval) to the connecting process (rectangle). Use the example below to create all of the necessary connections.
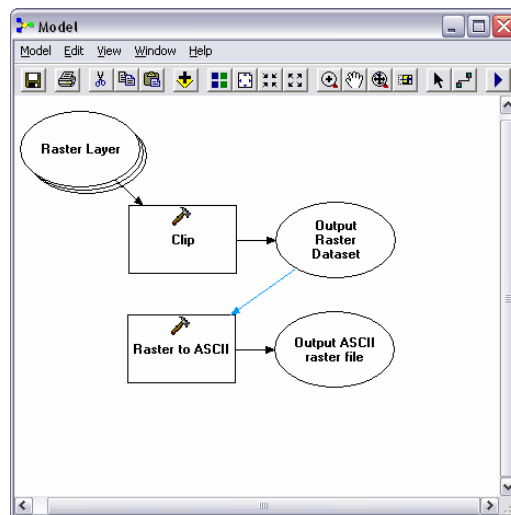
11. The basic format of the model is now complete, next we will set up the specific variables for your area of interest. Begin by selecting all of your input files. Double click the **Input Raster** oval, and use the plus sign to create 19 entry spaces. Populate these spaces with the 19 bioclimatic variables. This can be done by double clicking and selecting each file, or copy pasting the paths. One of the easiest methods for this is to actually use excel to create your entries, and copy paste into the input.
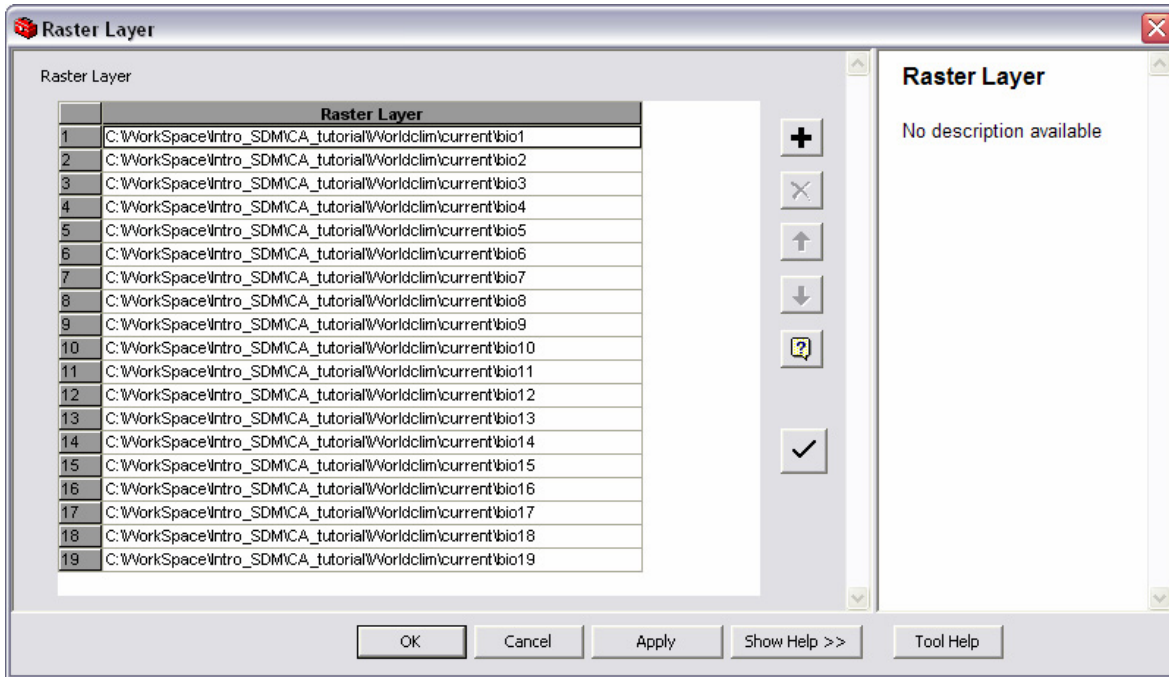

13. Next, double-click the Clip rectangle to set the extent of your study area. Enter the maximum and minimum x and y values, and leave the rest of the entries as is. To capture the extent of California, use the lat long values as seen below (screen capture on the following page).

Y Maximum: 42.5
Y Minimum: 32.0
X Minimum: -125
X Maximum: -113.5
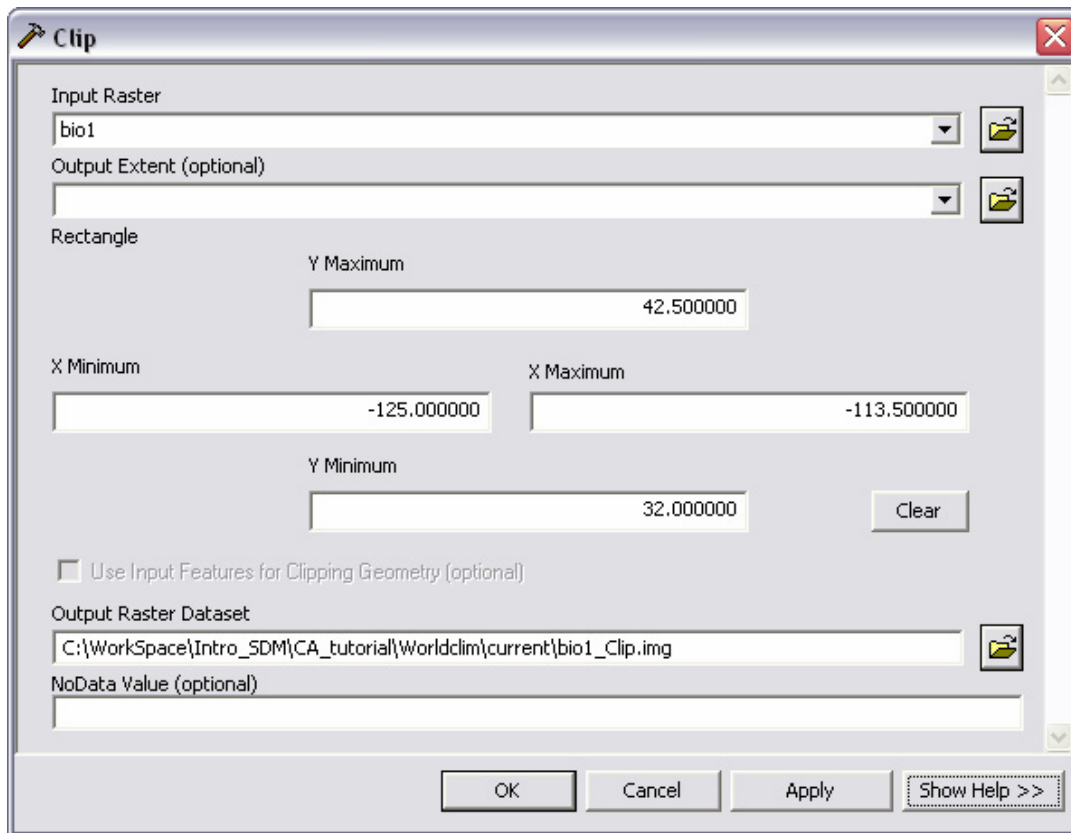
14. Next, double-click the **Raster to ASCII** rectangle to set the output file names. In order to save multiple files, that correspond with the multiple input files, you must enter a variable %n% which lets the model know that it will iterate through the files, and the output will iterate plus one through the output file names in place of the n. In order to distinguish the new files from the global files, we can use "CA_bio%n%.asc"
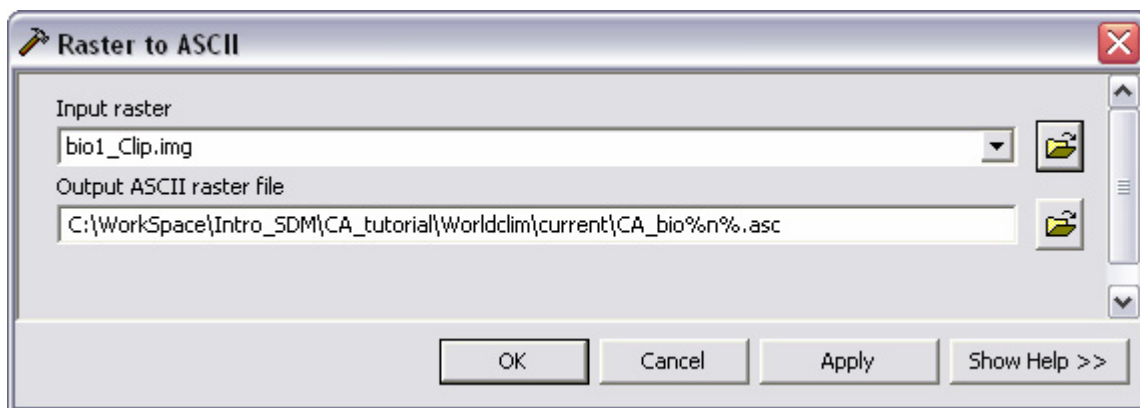
15. Next, set the model to iterate through the values by right-clicking in the white space of the model, and choosing **Model Properties**. In the dialog that comes up, choose the **Iteration** tab at the top, and set the "**Get the iteration count from this variable**" to bio1, or whatever the name of your input layer variable is. The number can remain 1 as it uses the variable to count.
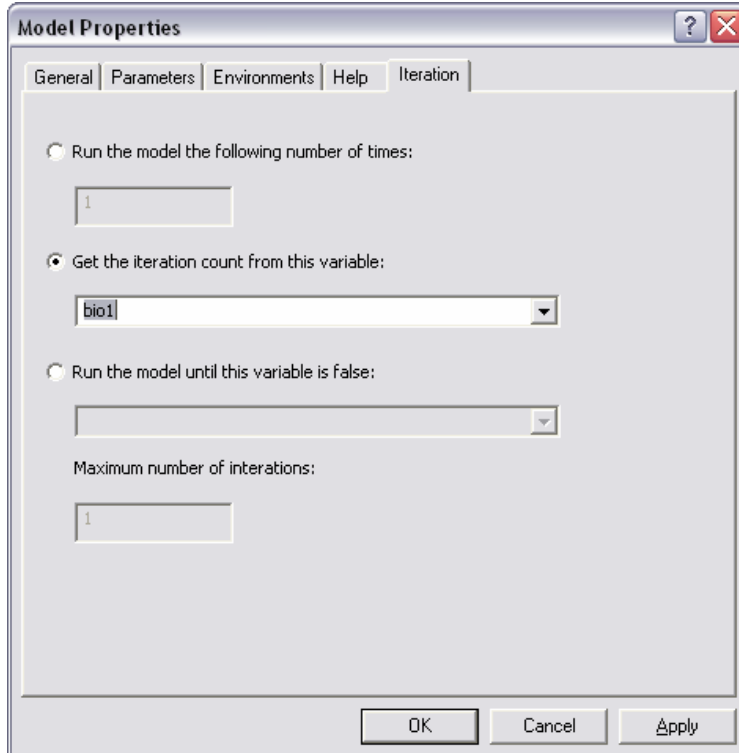
16. The model is now complete and ready to run. Be sure to save your model, and save your project in ArcMap. The model is stored independently in each mxd project file, and will not be available in new projects.

17. To run the model, push the **Run** button ▶ . You should see a dialog box that displays the processes that are being run. For the 19 bioclim variables, you should see 38 (2 each) processes that will be run. You may notice temporary files that are created to run the model. When the model is finished, you can delete these files by choosing **Model** > **Delete Intermediate Data** from the model builder menu. ***Notice that the model number generator begins with 0, so your files will be numbered 0-18, rather than 1-19. You will have to rename the files to correct for this.

This is a very basic introduction to the model builder, which should help to run multiple processes on multiple files with less user input. There are many more capabilities within this environment, including exporting to a script that can be used more generically for other files.