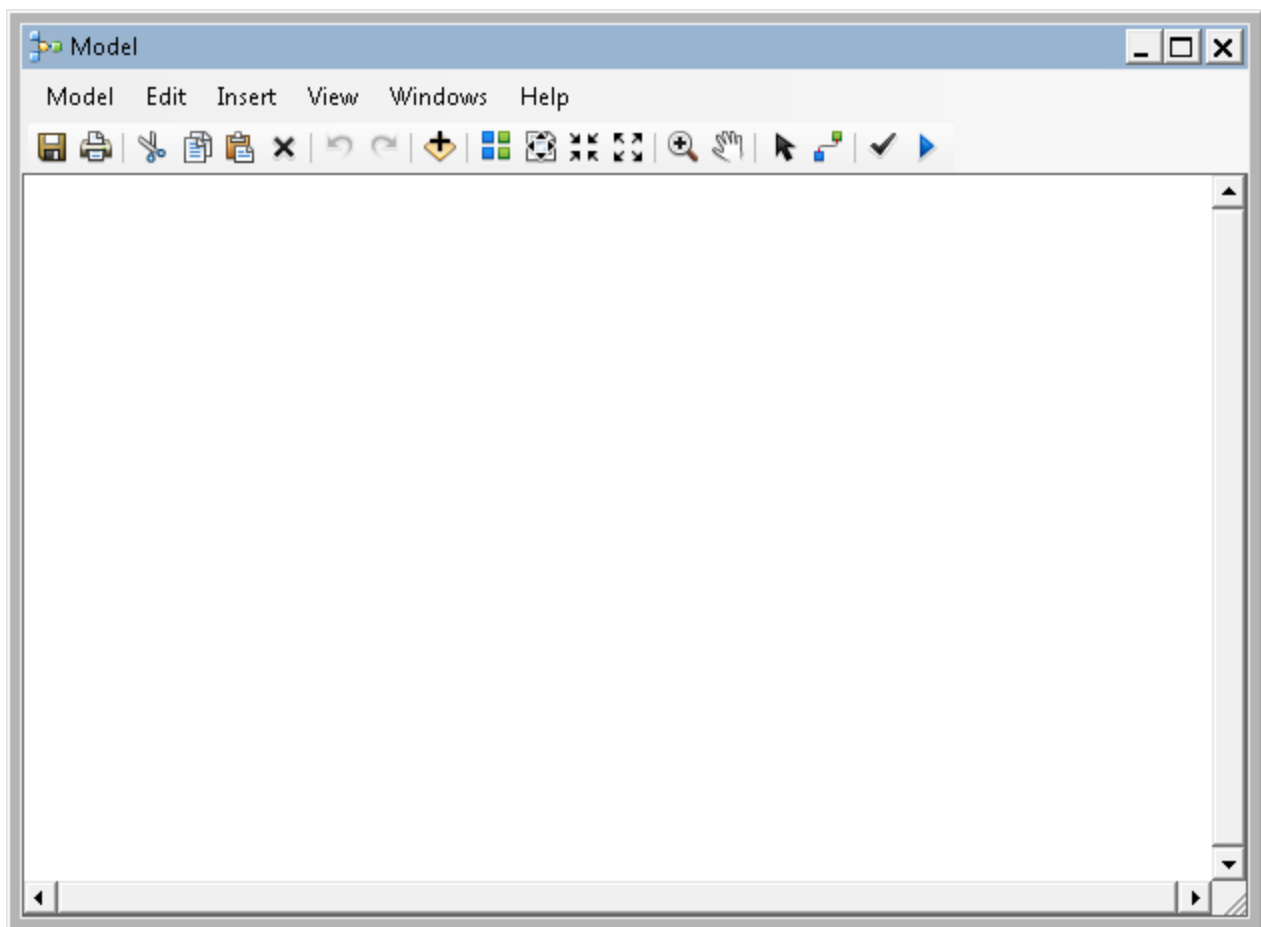# Using ArcGIS ModelBuilder to batch process files

The **ArcGIS Model Builder** is a tool you can use to help process a large number of files in an automated fashion. To open a new ModelBuilder document, either choose **ModelBuilder** from

the **Geoprocessing menu**, or click the shortcut on the **Standard Toolbar**: . A new **ModelBuilder window** should open.
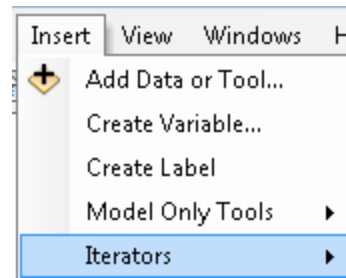

Nearly ANY tool from ArcToolbox tool can be added to a **ModelBuilder** model, and this tutorial will only scratch the surface of what can be accomplished in a model. If you are interested in using **ModelBuilder** to automate the processing of your files, I suggest you begin with the Help topic "**A quick tour of ModelBuilder**".

An **iterator** is a **ModelBuilder** tool that will run the same process repeatedly until all inputs have been examined. There are **iterators** for working with tables (rows and field values) and for processing all files in a directory or all data sets in a workspace such as a **Geodatabase**. Please read the Help topic "**Examples of using iterators in ModelBuilder**" for more details and examples.

The example below will illustrate how to use an iterator to process a number of watershed boundaries (polygons) in a **Geodatabase** and convert them to **raster** files. Whatever tool you connect to the **iterator**'s output will be run on each layer sequentially.

Choose the **Insert** menu, then select the **Iterators** submenu. Select

Feature Classes from the list. The **Feature Classes iterator** will be added to your model.
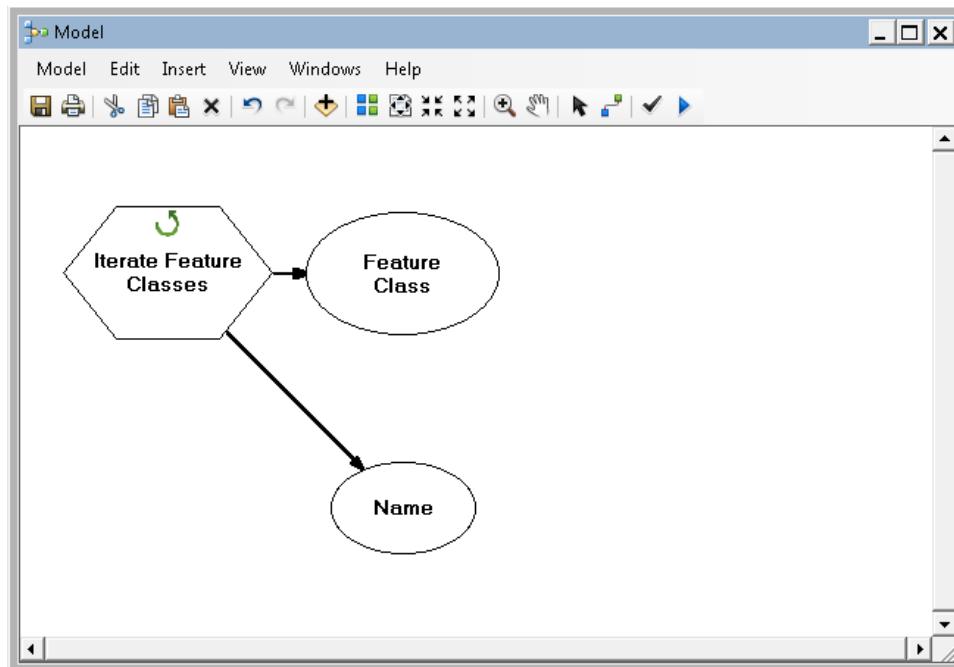
Double-click the **Iterate Feature Classes** box in the model. Here you should select your **Workspace or Feature Data Set**, in this case a Geodatabase. Please note that your Geodatabase name and location will differ from what is shown in the examples.
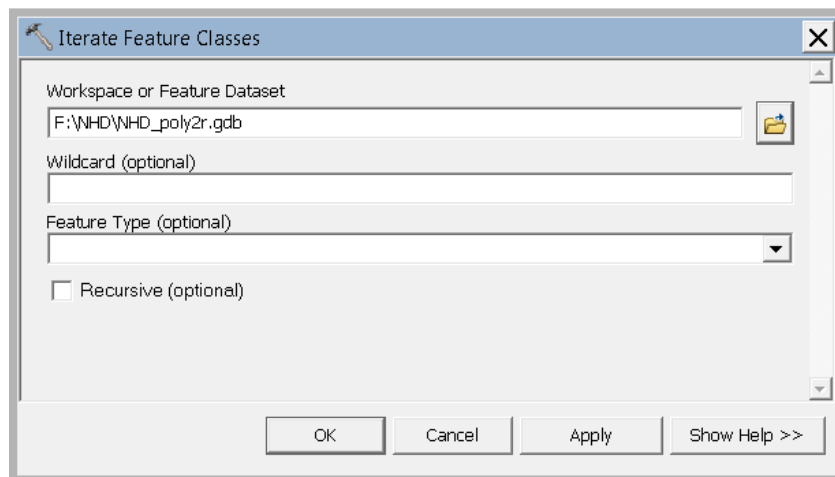
With just the geodatabase selected as your workspace, the iterator will process every file it finds. This is OK if you have only files you wish to process in the workspace. If you have a subset of files you'd like to convert, you can set three more options to restrict which files are acted upon.

A **Wildcard** lets you enter file name text that must be matched to be processed. The files in the example geodatabase are all named "WBD_HU12_04NN" for "**w**atershed **b**oun**d**ary", **H**ydrologic **U**nit Code **12**-digit, and sub-watersheds beginning with **04**: 0401, 0402, and 0403.

□ 🏠 **NHD_poly2r.gdb**
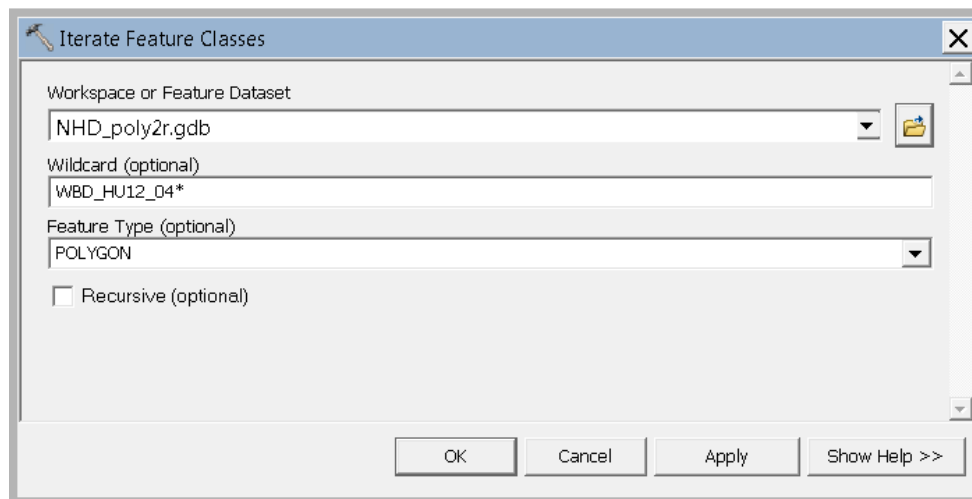⊠ WBD_HU12_0401
⊠ WBD_HU12_0402
⊠ WBD_HU12_0403
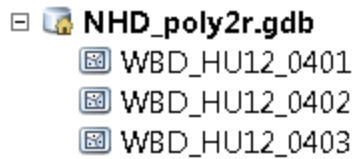
If you had other files in the workspace you did not want converted to raster, you could add a wildcard WBD_HU12_04* to process only the watershed files.

If you select a **Feature Type**, you can restrict processing to files of a certain class (e.g., point, line, or polygon). In this case, I will select **Polygon**.

```
Feature Type (optional)
|                                                              ▼
ANNOTATION
ARC
DIMENSION
EDGE
JUNCTION
LABEL
LINE
NODE
POINT
POLYGON
REGION
ROUTE
TIC
```

Finally, if you select the **Recursive** check box, files in subdirectories will be processed.

```
🔧 Iterate Feature Classes                                      ×

 Workspace or Feature Dataset
 NHD_poly2r.gdb                                         ▼   📂

 Wildcard (optional)
 WBD_HU12_04*

 Feature Type (optional)
 POLYGON                                                     ▼

 ☐ Recursive (optional)


              OK        Cancel       Apply      Show Help >>
```

Your **iterator** is now set up properly. Click the **OK** button to close its window. Your model will now appear different in the ModelBuilder window because you have made choices about input files. Your workspace will be shown on the left, and the first watershed boundary will be shown in green as one of the **iterator**'s outputs.
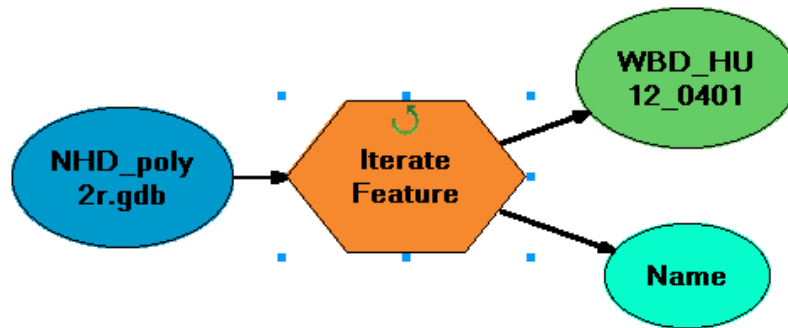
If you were to run the model now, it would process quickly because it would only read each file's name into memory and would not act on the files in any other way. The true power of an iterator, though, is that it will perform the same operation on all input files, so we now need to add the "operation" to the model, in this case, the **Polygon to Raster** tool.

If you know the location of the tool in **ArcToolbox** (**Conversion Tools** > **To Raster** > **Polygon To Raster**) you can expand the toolbox and drag the tool into the model. It is simpler and faster, however, to use the **Search window**: Click the shortcut to open Search 🔲 , type **polygon to raster** in the Search box, and tap the Return key (or click the magnifying glass next to the Search box). The **Polygon to Raster (Conversion)** tool should show up in your search results.

Drag the tool from the **Search window** into the model and close (x) or hide (📌) the **Search Window**. it will appear in black-and-white, indicating you still have choices to make.
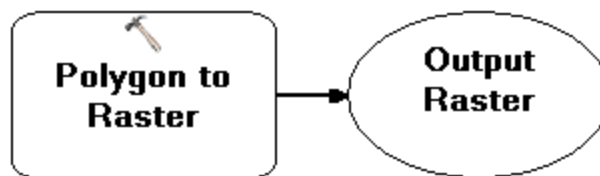
Add a **connector** 📊 between the iterator's output (green oval) and the **Polygon to Raster** (**P2R**) tool. Simply select the connector tool, click once on the **iterator** output box, and click a second time on the **P2R** rectangle. Select Input Features from the menu that appears.
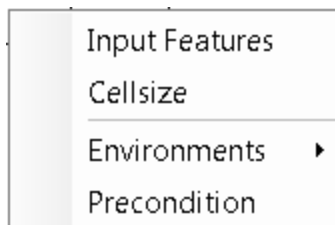
A blue connector should now run between the iterator and the **P2R** tool. Select the **arrow** tool

🔺 and double-click the **P2R** rectangle to set some options.
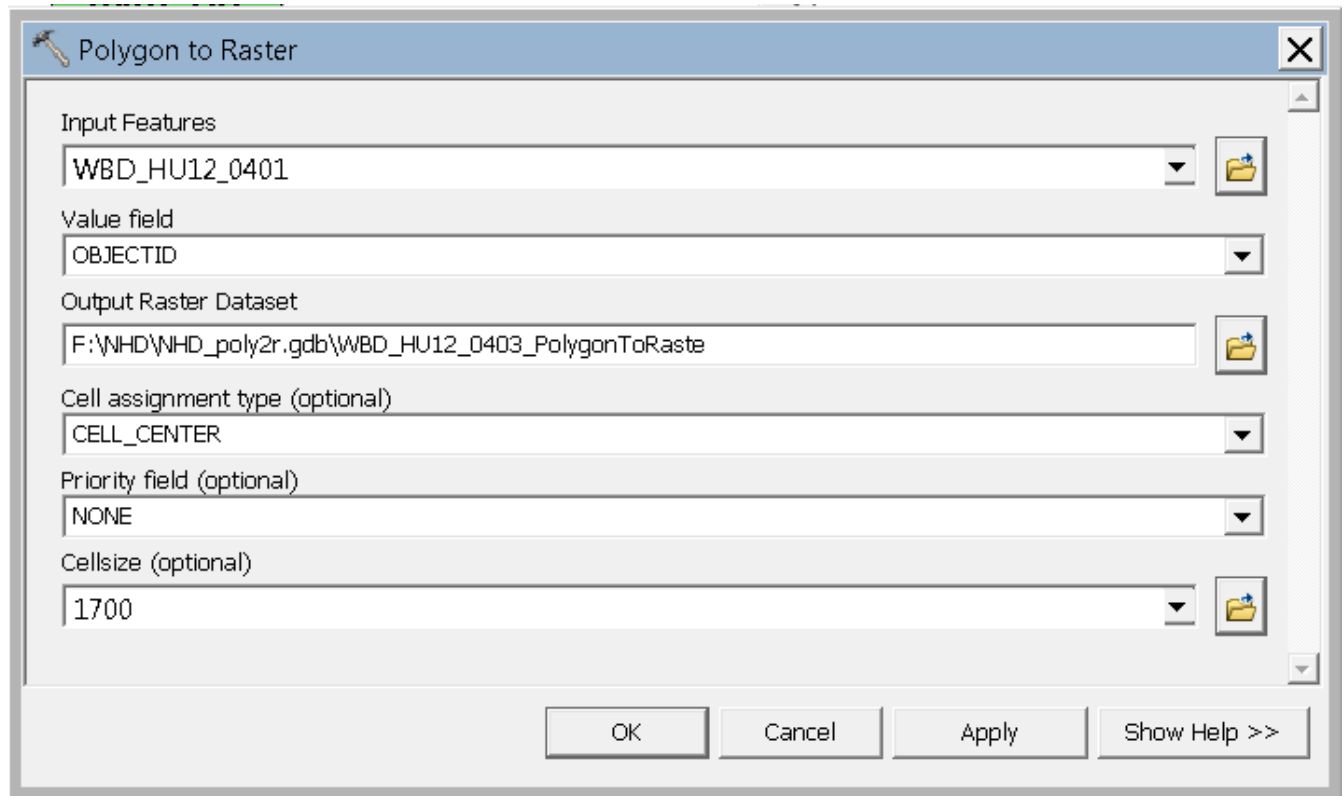
Leave the I**nput Features** set to the default. This value will change each time the iterator processes a new file.

Change the **Value Field** to point to the polygon layer's unique identifier. For the example watershed HUC files, the field name is **HUC_12**. The contents of the Value field is written as the cell value in the output raster, so this is an important choice.

Change the **Output Raster Dataset** so it still points to the geodatabase, but alter the file name to read **%Name%_r**. The **%Name%** is a 'replacement string' that will write the same output file name as the input file name. The **_r** will indicate the file is a raster layer (and keep you from getting a 'file exists' error. If you omit this step, you will end up with one output raster with the name of your first polygon file but the contents of the last one processed. The iterator changes only the input file name.
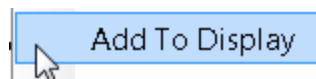
Set the **Cell Assignment Type** to **MAXIMUM_AREA**.

The **Cellsize** is calculated based on the area covered by the raster. I will be merging these files later with some other 30-meter data, so change the cellsize value to **30**.
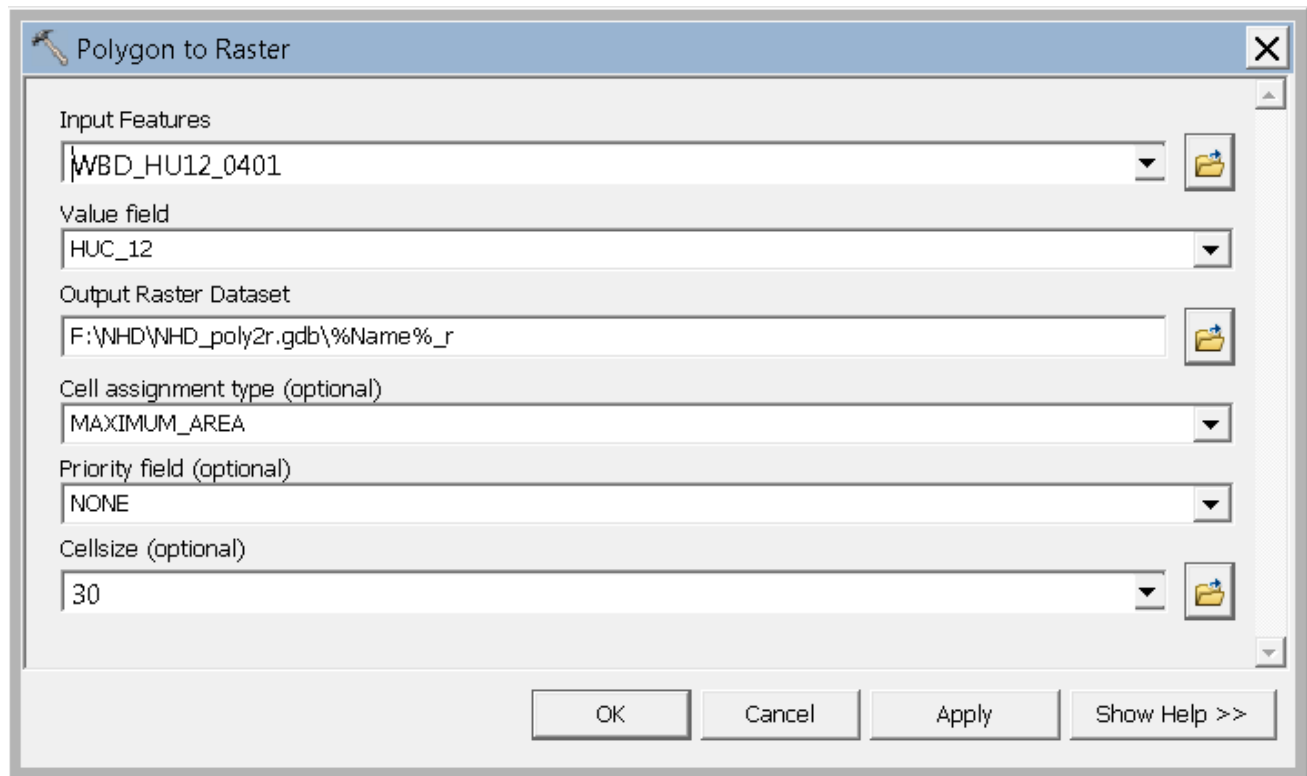
Click OK to save your changes. If you would like your output files added to your map

automatically, right-click the P2R output oval and choose

Now might be a good time to save your model. Click the disk icon 💾 on the toolbar or choose **Save** from the **Model** menu.

Cross your fingers and Validate your model. Use the shortcut ✓ or select **Validate Entire model** from the **Model** menu. If you receive no errors, **Run** your model, either using the shortcut

button ▶ or the option under the **Model** menu. Depending on the number of files you are processing, the model may take a while. If it validated correctly, you should receive no errors. Be sure to verify the output files look correct. If you see any problems, check each of the tool's settings and if necessary, read the help files for each tool!

The **ModelBuilder** can save you hours of tedious work with a (relatively) small time investment up front. As with any GIS tool, process, or operation, the more you use the **ModelBuilder**, the easier it will be to create models efficiently.