

## Chapter 7

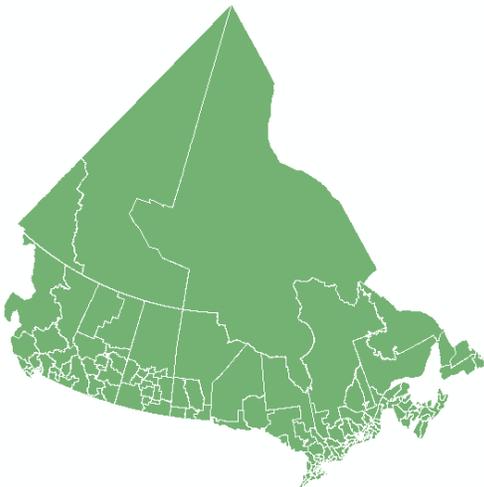
# Modifying Layers in Arc GIS Desktop

**Skills you will learn:** How to simplify polygons, merge features and dissolve layers in ArcGIS desktop.

For a general discussion of these tasks, please see chapter 7 of *The Data Journalist*.

### Simplifying polygons

Sometimes, you will want to reduce the file size of a polygon layer, perhaps so you can keep its size within limits allowed by a web mapping service (see chapter 6 of *The Data Journalist*). This image depicts a layer of federal electoral districts in Canada, available for download at <https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2011-eng.cfm>



Some ridings in Canada are extremely large, especially those in northern areas. The largest is more than 2 million square kilometres in area. A great many vertices are required to draw these very large ridings, and all of those points can make for very large file sizes if the layer is converted to a format such as KML.

Simplification is the process whereby some of the vertices can be removed, to make the file size smaller. As discussed on page 159, if you remove too many vertices, you may end up with jagged boundaries that don't line up properly with other polygons.

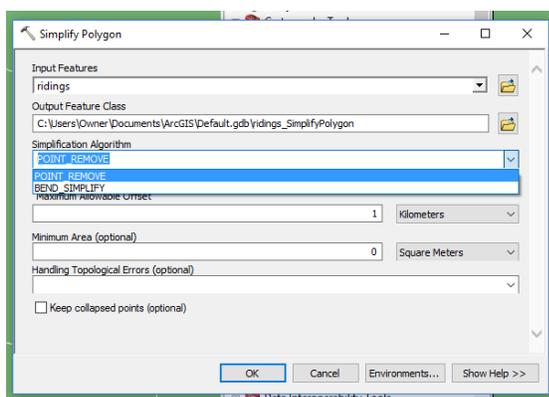
To begin the process, go to the Arc toolbox, and choose Cartography

Tools>Generalization>Simplify Polygon. This will bring up the simplify polygon dialogue.

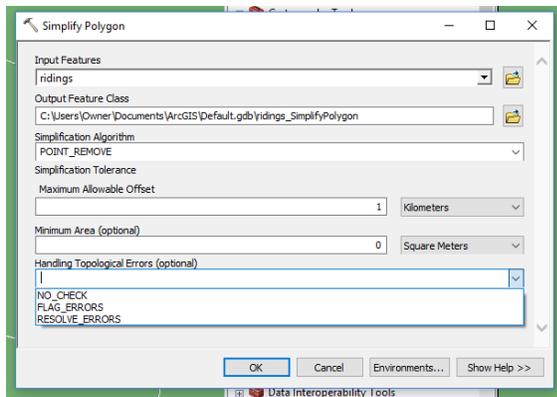
In the first input box, choose the layer you would like to simplify. If you have already added the layer to the map document, choose it from the dropdown list. Otherwise, click on the file folder icon and navigate to the file in your folder connections.

In the Output Feature Class area choose the destination for the simplified layer, either a feature class in a file geodatabase or a shapefile.

There are two choices for simplification methods. The first, point remove, eliminates unneeded points while preserving the shape of the polygon. Bend simplify removes some of the bends in a polygon. Generally speaking, if you are looking to reduce the size of a file, use the first method.



There are three more choices, maximum allowable offset, minimum area and how to handle drawing (topological) errors introduced by the simplification process.



The offset refers to the greatest distance allowable between vertices. Here, we have set this to 1 kilometre. The larger the offset, the less refined will be the output.

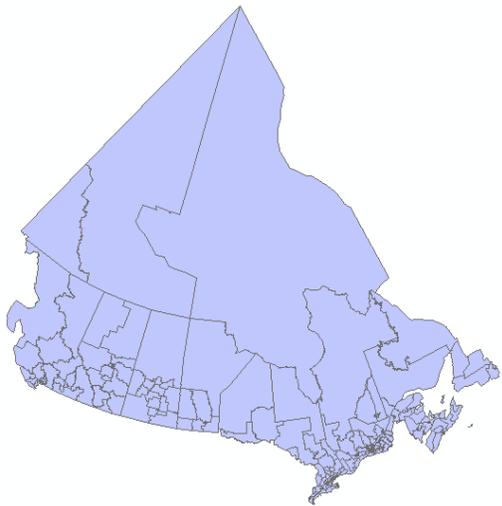
Minimum Area is used to set the minimum size for a polygon before it will be collapsed to a single point in the simplification process. Setting this to 0 means no polygons will be collapsed. This is generally the setting you would use.

As far as error handling goes, you can choose to ignore errors (`NO_CHECK`), add extra fields to the output attribute table indicating which polygons had errors introduced (`FLAG_ERRORS`), or fix the errors (`RESOLVE_ERRORS`). The tolerance for the distance between points will be successively reduced until errors are corrected. The latter choice takes longer, but may save you needing to rerun the simplification and will avoid the kind of jagged result shown on page 160 of *The Data Journalist*.

If the Keep Collapsed Points checkbox is ticked, any polygons collapsed to points as a result of the setting in the Minimum Area box will be placed in a separate points layer.

When you are done, click OK and simplification will proceed. The new layer will be added to the map document. If you are satisfied with the result, proceed with the rest of your analysis. If not, you can do the simplification again.

The following two illustrations show the results of the simplification above, using 1 km tolerances. In the first, the `NO_CHECK` option for topology errors was used, while in the second the `RESOLVE_ERRORS` option was chosen. Notice the large gap between some polygon boundaries in the first image.

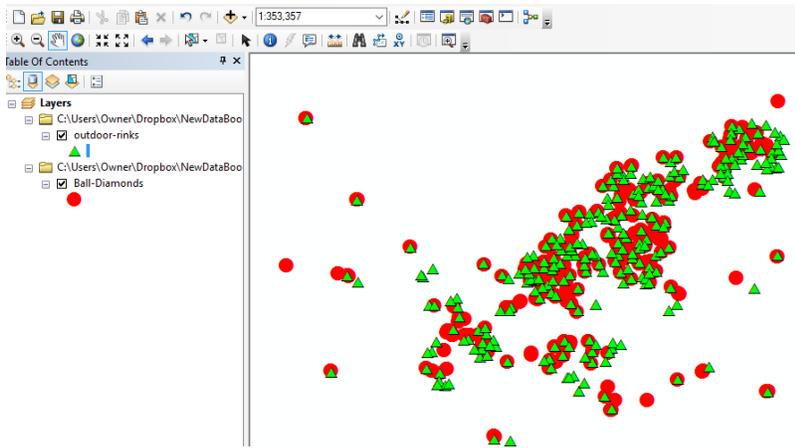


The error resolution doesn't make jagged boundaries go away, but it does eliminate the errors that can make the simplified polygons aesthetically unpleasing.

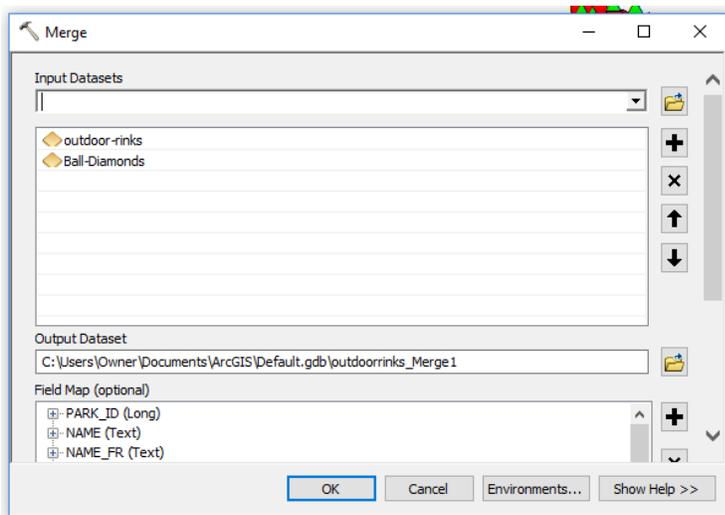
### **Combining layers**

If you have two layers you would like to combine, of the same feature type (points, lines, or polygons), use the merge tool.

We'll merge two point files, one of outdoor skating rinks and one of baseball diamonds, both in the City of Ottawa and obtained from the city's open data site (<http://data.ottawa.ca/group/geography-and-maps>). Here, we can see the xxx as red dots and the xxx as green triangles.



To merge the layers, choose Merge from the geoprocessing menu.



This will open the merge dialogue.

If you have added the layers you are going to merge to the map document, choose them from the Input Datasets dropdown. They will be added to the list in the centre of the dialogue. In the Output Dataset area, choose the destination for the output table, either a feature class in a geodatabase, or a shapefile.

The optional Field Map area allows you to modify how the fields will be represented in the output attribute table.

When you click OK, ArcMap will work for a while, then add the new merged layer to the map.

