

## Chapter 7

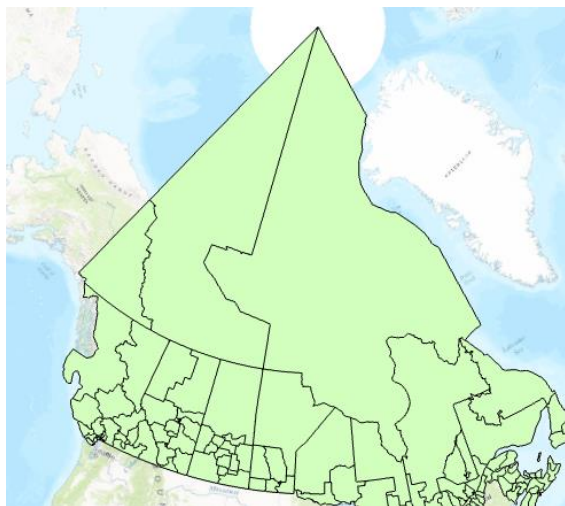
### Modifying Layers in ArcGIS Pro

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

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

#### Simplifying polygons

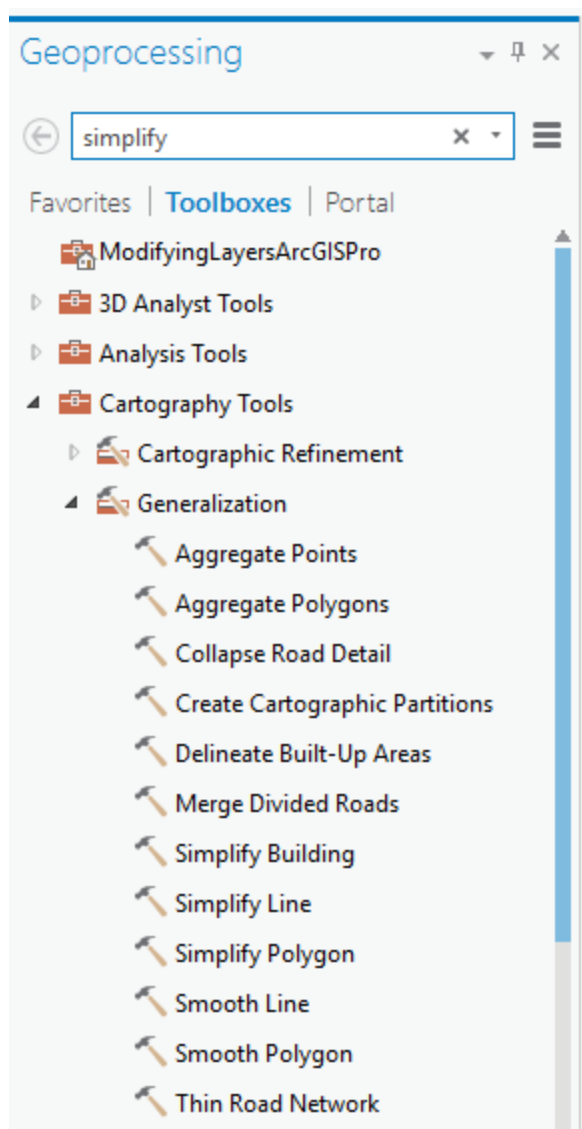
Sometimes, you will want to reduce the file size of a polygon layer, perhaps so you can keep its size within limits allowed by a web mapping service (see chapter 6 of *The Data Journalist*). This image depicts a layer of federal electoral districts in Canada, available for download at <https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-lim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



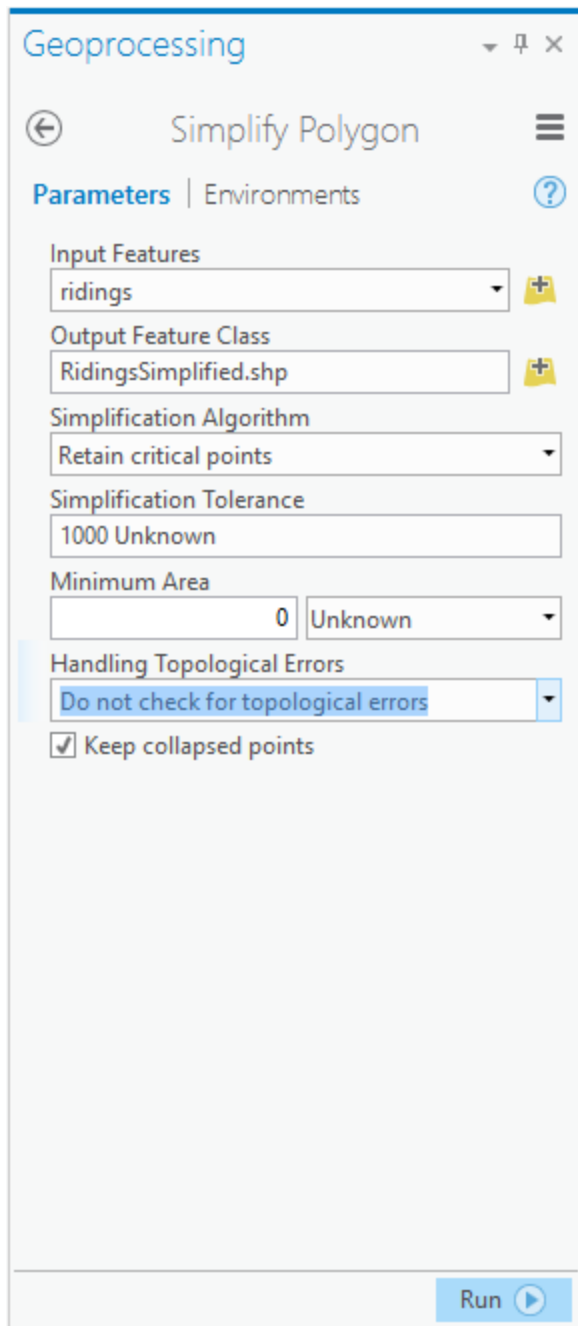
Some ridings in Canada are extremely large, especially those in northern areas. The largest is more than 2 million square kilometres in area. A great many vertices are required to draw these very large ridings, and all of those points can make for very large file sizes if the layer is converted to a 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 Analysis ribbon. Click on the tools icon, the one with the red toolbox.

The Geoprocessing pane will open. Click on the Toolboxes tab, then expand Cartography Tools and Generalization.



Now, click on Simplify Polygon. This will bring up the simplify polygon pane. Choose the shapefile or geodatabase feature class to be simplified from the dropdown list under Input Features. In Output Feature Class, enter the name of the new simplified shapefile or feature class. Clicking on the folder + icon allows you to change save location from the default geodatabase for the project.



There are two choices for simplification. The first, retain critical points, eliminates unneeded points while preserving the shape of the polygon. Retain Critical Bends

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, Simplification Tolerance, 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 (Do Not Check for Topological Errors), add extra fields to the output attribute table indicating which polygons had errors introduced (Flag Topological Errors), or fix the errors (Resolve Topological Errors). With the latter choice, the tolerance for the distance between points will be successively reduced until errors are corrected. This 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 next two images show the difference between using no error correction and correcting errors, for ridings in the Toronto area.

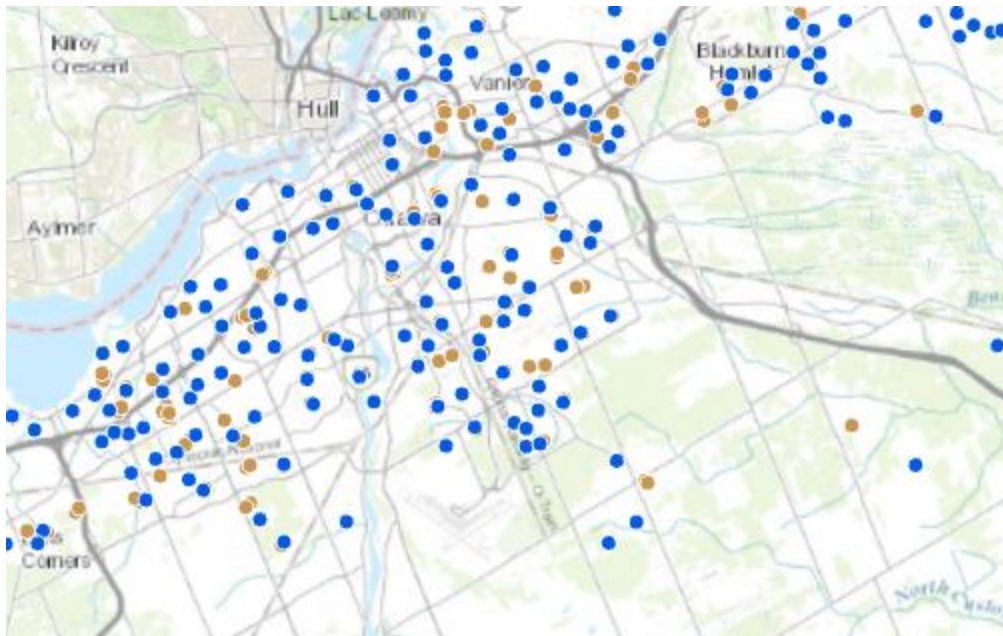


The error resolution doesn't make jagged boundaries go away, but it does eliminate the errors that can make the simplified polygons aesthetically unpleasing.

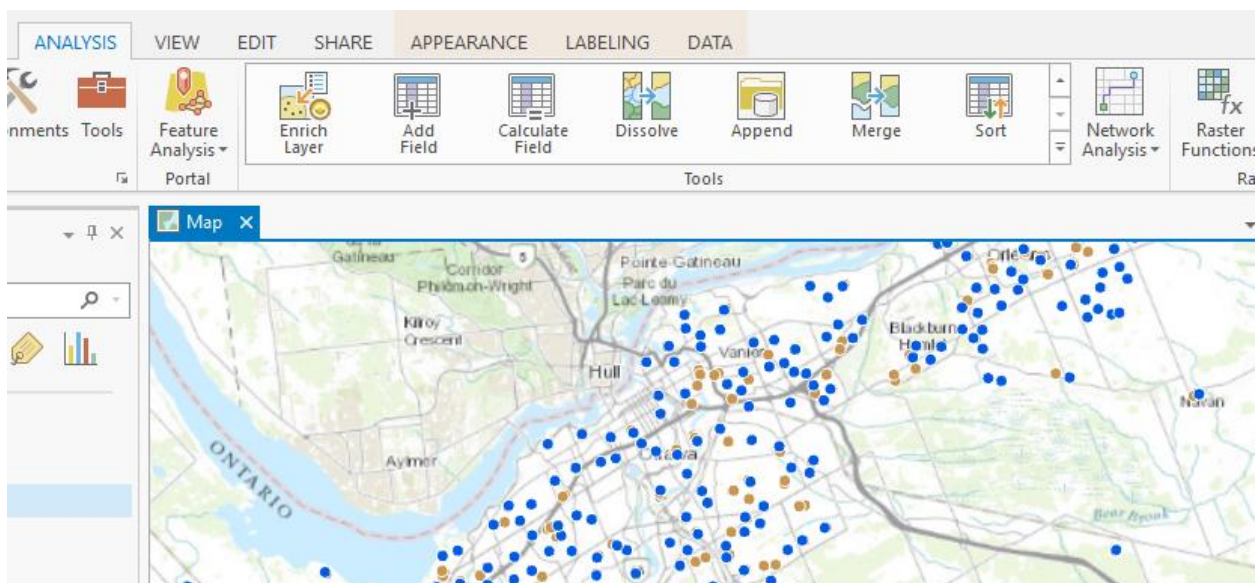
### **Combining layers**

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 rinks as blue dots and the ballfields as brown dots.



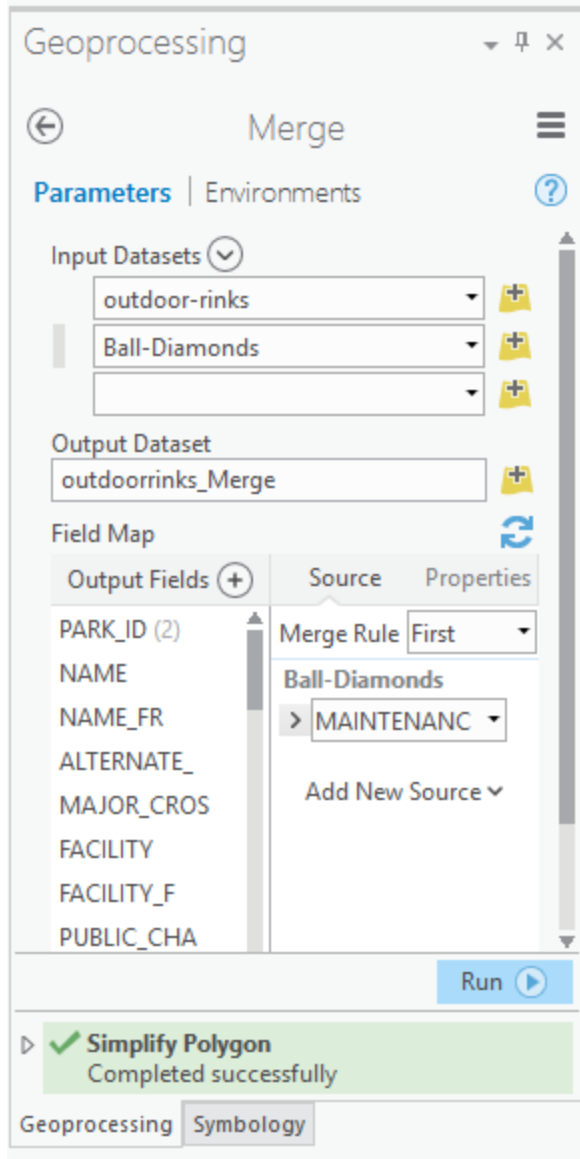
To merge the layers, choose Merge from the Tools area of the Analysis ribbon.



This will open the merge pane.

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 the project's 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 are done making your choices, click Run. ArcGIS Pro will work for a while, then add the new merged layer to the map.

Map X

