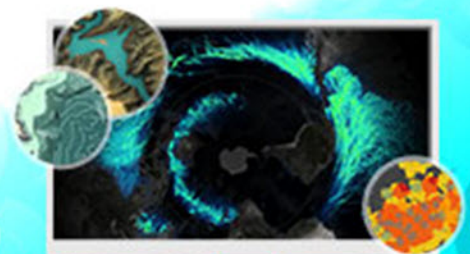


# Exercise

## Generalization

### Section 3 Exercise 2

January 20, 2021



## Generalization

### Instructions

Use this guide and ArcGIS Pro to reproduce the results of the exercise on your own.

*Note: The version of ArcGIS Pro that you are using for this course may produce slightly different results from the screen shots that you see in the course materials.*

### Time to complete

Approximately 10-20 minutes

### Software requirements

ArcGIS Pro 2.7

ArcGIS Pro Standard license (or higher)

*Note: The MOOC provides a separate ArcGIS account (user name and password) that you will need to use to license ArcGIS Pro and access other software applications used throughout the MOOC exercises. This account (user name ending with \_cart) provides the appropriate ArcGIS Online role, ArcGIS Pro license, ArcGIS Pro extensions, and credits. We strongly recommend that you use the provided course ArcGIS account to ensure that you have the appropriate licensing to complete the exercises. Exercises may require credits. Using the provided course ArcGIS account ensures that you do not consume your organization's credits. Esri is not responsible for any credits consumed if you use a different account. Moreover, Esri will not provide technical support to students who use a different account.*

## Introduction

In this exercise, you will learn about the process of generalization (simplifying or refining features for display at smaller scales), which evaluates and alters the actual features themselves.

Generalization is a broad term that encompasses many operators that transform the data. There are different classifications and accountings of all the possible generalization operators and their nuances, but they can be generally categorized as the following:

- **Eliminate:** Remove inessential features or feature detail.
- **Simplify:** Remove inessential feature complexity.
- **Exaggerate:** Enlarge or enhance representative feature detail.
- **Aggregate:** Combine unique features together to form a homogeneous collection.
- **Displace:** Reposition details or features to reduce graphic conflict, simplify, or exaggerate.

In ArcGIS Pro, generalization processes are run as geoprocessing tools (<https://bit.ly/2J6RuvW>). Geoprocessing typically makes copies of input layers and transforms those copies. (In some cases, the input layer itself is modified.) The power of geoprocessing is that these processes can be linked together so that the output of one process becomes the input of another and so on. These workflows can be performed by opening the tools in ArcGIS Pro, supplying parameter information, and running them. Or, after you have worked out the details of a complex workflow, you can run them from ModelBuilder, a visual programming language for building geoprocessing workflows, or as a script.

Although seemingly contradictory (*simplify and exaggerate?*), these operations are often employed in conjunction with one another, sometimes in quite detailed workflows. For this exercise, you will apply the process of generalization to the Vegetation layer to simplify the vegetation polygons to show less detail in the forest stands at smaller scales.

### Step 1: Simplify vegetation polygons

- a If necessary, start ArcGIS Pro and open the ScaleAndGeneralization\_<your first and last name>.aprx project that you saved in the previous exercise.
- b In the Contents pane, turn on the Vegetation layer, if necessary, and expand the layer to see its symbology.

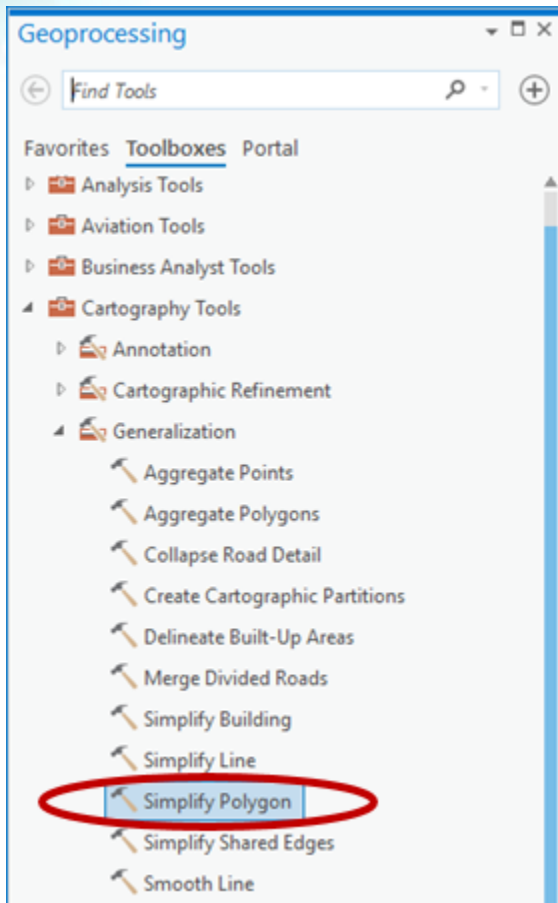
This layer is currently set to draw at all scales.

- c Zoom in and out in various areas across the map to get a feel for how detailed the vegetation polygons are.



You will use a generalization geoprocessing tool called [Simplify Polygon \(https://bit.ly/2v3qZUb\)](https://bit.ly/2v3qZUb) to simplify this layer for use at smaller scales. The goal is to limit the detail and complexity at smaller scales subtly enough to not be readily noticeable.

- d** On the Analysis tab, in the Geoprocessing group, click Tools to open the Geoprocessing pane.
- e** Click the Toolboxes tab, and then expand the Cartography Tools toolbox.
- f** Expand the Generalization toolset, and then click the Simplify Polygon tool to open it.



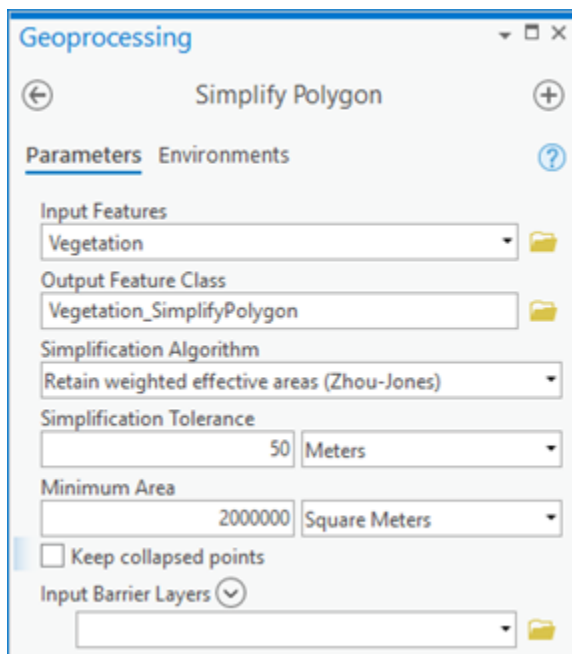
The Simplify Polygon tool opens in the Geoprocessing pane.

- g Set the following parameters:

Parameter	Value
Input Features	Vegetation
Output Feature Class	<b>Vegetation_SimplifyPolygon</b>
Simplification Algorithm	Retain Weighted Effective Areas (Zhou-Jones)
Simplification Tolerance	<b>50 Meters</b>
Minimum Area	<b>2000000 Square Meters</b>
Keep Collapsed Points	Uncheck the box
Input Barrier Layers	Leave blank

*Note: Keep the data path for the Output Feature Class as-is. If necessary, just rename the feature class.*

The completed parameters should look like the following graphic.



- h** Click Run to execute the tool.

Execution may take some time. The bottom of the Geoprocessing pane shows the tool's progress.

*Note: Processing time may be extended for computer systems running less than the recommended ArcGIS Pro system requirements.*

After the process has completed successfully, you will see a confirmation message at the bottom of the Geoprocessing pane.




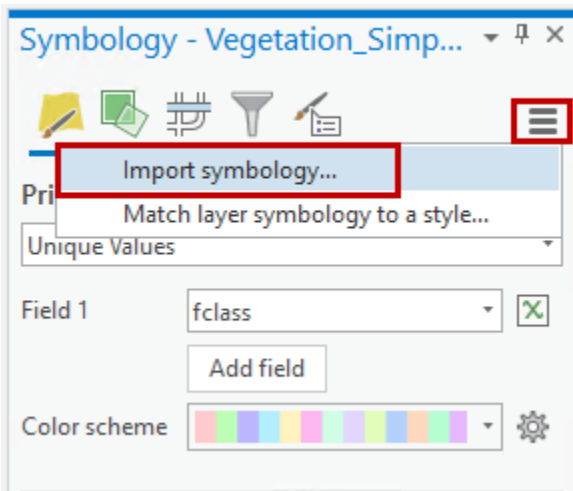
- i** Close the Geoprocessing pane.

The new Vegetation\_SimplifyPolygon layer should be selected in the Contents pane.

## Step 2: Symbolize simplified vegetation polygons

You will now apply the symbology and grouping from the Vegetation layer to the simplified vegetation layer.

- a In the Contents pane, right-click the Vegetation\_SimplifyPolygon layer and choose Symbology.
- b At the top of the Symbology pane, click the Menu button  and choose Import Symbology.



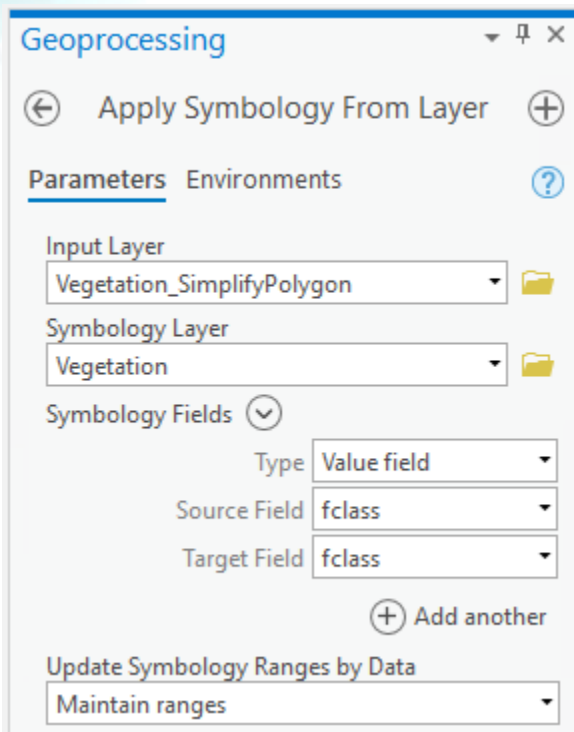
The Apply Symbology From Layer tool opens in the Geoprocessing pane.

- c Set the following parameters:

Parameter	Value
Input Layer	Vegetation_SimplifyPolygon
Symbology Layer	Vegetation
Type	Value field
Source Field	fclass
Target Field	fclass
Update Symbology Ranges By Data	Maintain ranges

The completed parameters pane should look like the following graphic.





- d Click Run to execute the tool.



*Note: You may need to zoom in or out to see the result.*



The symbology and grouping from the Vegetation layer is applied to the simplified vegetation layer.

- e Use what you have learned so far to apply scale ranges to the two layers, Vegetation and Vegetation\_SimplifyPolygon, so that vegetation polygons appear in appropriate detail across the scale ranges of the map.

*Hint: On the Appearance tab, use the fields in the Visibility Range group. The original polygons are detailed and therefore suitable for the largest scales (zoomed in close) in your map. The simplified polygons are better suited for the smaller scales (zoomed out far).*

- f Zoom in and out on the map to see how simplifying the vegetation polygons affects the display of features at different scales.
- g Save your project.

There are many other Generalization tools (<https://bit.ly/2GRk2He>) and processes that are appropriate for other layers in the map. Learn more and experiment as you wish.

- h If you are continuing to the next exercise now, leave ArcGIS Pro open.
- i If you will continue to the next exercise at a later time, exit ArcGIS Pro.