

Exercise 3: GIS Analysis

Overview

This exercise demonstrates the reporting phase of your burn severity mapping. Most reports will need to include acres of burn severity as well as acres of burn severity summarized by ownership, watershed, or other delimiters. In this exercise, you will perform several GIS analysis techniques using SBS data.

Required Software

- ArcGIS Pro
- Microsoft Excel

Required Data

- Holy_perimeter.shp (fire perimeter)
- Holy_sbs_poly_filled.shp (final SBS shapefile from Exercise 2)
- LandOwnership_CPAD.shp (ownership)

Overview of Major Steps

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Part 1. View Data and Add Attributes

We now have a 4-class Soil Burn Severity layer that is calibrated to field observations. To facilitate the creation of meaningful reports from the BARC, we'll attribute this layer by creating and populating additional attribute fields.

A. Start ArcGIS Pro and Add the Data

1. Open an ArcGIS Pro project and add the following layers:

- Holy_sbs_poly_filled.shp
- Holy_perimeter.shp
- LandOwnership_CPAD.shp

Note: The Holy_sbs_poly_filled.shp dataset was created in the previous exercise. If you did not complete that exercise, you can use the shapefile in the **catch_up_data** folder.

2. Symbolize the perimeter layer with no fill.
3. Symbolize the ownership layer to show a different color for each land owner/manager ("AGENCY_NAME"). What agencies other than the Forest Service manage land within the fire perimeter?

B. Create and Populate New Field (Polygon Area)

In order to summarize data in a later step, we need to create a new field to store the size of each polygon and calculate the value (acres).

1. Open the Attribute Table for **Holy_sbs_poly_filled.shp**
2. Click the **Add Field** button.
3. Configure the following in the **Add Field** dialog:
 - **Name:** Acres_GIS
 - **Type:** Double
4. Click **Save** in the **Fields** ribbon.
5. Close the fields table.
6. Right-click on the **Acres_GIS** field heading and choose **Calculate Geometry**.
7. In the **Property:** drop-down menu, choose **Area**.
8. In the **Area Unit** drop-down menu, choose **Acres**.
9. Click **OK**.
10. All the records in the shapefile should now have an acres value.
11. Inspect the results.

Part 2: Determine Size of each Soil Burn Severity Class

Now that we have meaningful attributes for Acres and Soil Burn Severity we can determine the acres by severity class.

A. Summarize Acres by Severity Class

1. In the **Holy_sbs_poly_filled.shp** attribute table right-click the **gridcode** field heading and select **Summarize**.
2. Ensure that following steps are taken in the Summary Statistics dialog:
 - Specify **Output Table** by navigating to the working directory and setting the name to something meaningful
 - Set **Field** to **Acres_GIS**
 - Set **Statistic Type** to **Sum**
 - Set **Case field** to **gridcode**
3. Click **OK**.
4. Right-click on the table in the **Contents** pane and select **Open**. The table should contain the total number of acres for each gridcode value (1–4).
5. View the results and make sure they seem reasonable.
6. If desired, export the table as a .csv or .txt file for use outside of ArcGIS.

Part 3: Determine Acres of Burn Severity by Ownership

Using the ownership layer and the Tabulate Intersection tool, we can calculate the acres for each burn severity class within each land management area.

A. Calculate Burn Severity Acres by Ownership

1. In the **Geoprocessing** pane, search for the **Tabulate Intersection** tool. (If needed, open the Geoprocessing pane by clicking on the **Tools** button in the **Analysis** ribbon.) This tool performs a spatial overlay, clips the intersecting data, and summarizes the attributes for selected fields.
2. Configure the Tabulate Intersection dialog as follows:
 - Set the **Input Zone Features** to **LandOwnership_CPAD**.
 - Set the **Zone Fields** to **AGNCY_NAME**.
 - Set the **Input Class Features** to **Holy_sbs_poly_filled**.
 - Set the **Output Table** location to the geodatabase (.gdb) created with this ArcGIS Pro project and give it a meaningful name.
 - Set **Class Fields** to **gridcode**.
 - Set **Sum Fields** to **Acres_GIS**. This will sum the acres for each combination of land owner and severity class.

- Set **Output Units** to **Acres**.
3. Click **Run**.
 4. Once the process is complete, open the table and view the results.
Export the table as a CSV file by choosing **Export** from the “hamburger” menu at the upper right of the table. Change the file location to a folder outside of the project database, and give the file the **.csv** extension.
 5. Open the CSV file in Excel and format it as desired. (See example below. Note: Change gridcode to the corresponding soil burn severity term: 1 = “Unburned to very low”, 2 = “Low”, 3 = “Moderate”, and 4 = “High”.)
 6. Save the document as an Excel workbook.

AGENCY_NAME	Soil Burn Severity	Acres
Lake Elsinore, City of	Unburned to very low	2.0
Lake Elsinore, City of	Low	0.1
Riverside, County of	Unburned to very low	145.7
Riverside, County of	Low	298.3
Riverside, County of	Moderate	523.2
Riverside, County of	High	2.9
San Bernardino Mountains Land Trust	Low	2.2
San Bernardino Mountains Land Trust	Moderate	125.7
San Bernardino Mountains Land Trust	High	41.2
United States Forest Service	Unburned to very low	797.2
United States Forest Service	Low	1,162.4
United States Forest Service	Moderate	12,983.6
United States Forest Service	High	3,025.0

Congratulations! You have successfully completed this exercise.