

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 10.x
- Microsoft Excel

Required Data

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

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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. In order to create meaningful reports from the BARC, we need to attribute this layer by creating and populating additional attribute fields.

A. Start ArcMap and Add the Data

1. Start ArcMap and add the following layers:
 - Holy_sbs_poly_filled.shp
 - Holy_perimeter.shp
 - LandOwnership_CPAD.shp
 2. If you did not complete Exercise 1, an example Holy_sbs_poly_fill.shp dataset is available in the **Catch_up_data** folder.
 3. Symbolize the perimeter layer like you did previously and also symbolize the ownership layer to show a different color for each land owner/manager. Question: what agencies other than the Forest Service manage land within the fire perimeter? _____
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B. Create new attribute field to store the size of each polygon

In order to calculate acres later on, we need to first create an acres field.

1. Open the Attribute Table for **Holy_sbs_poly_fill.shp**
2. Click on **Table Options** and select **Add Field...**
3. Configure the following in the **Add Field** dialog:
 - **Name:** Acres_GIS
 - **Type:** Double
4. Click **OK**
5. Right-click on the **Acres_GIS** field heading and choose **Calculate Geometry**.
6. Click **Yes** if you are prompted to acknowledge you are working outside an edit session.
7. In the **Property:** drop-down menu, choose **Area**.
8. Keep the projection the same as the input shapefile (it will default to that).
9. In the Units drop-down menu, choose **Acres US [ac]**. Make sure you don't choose "Ares [a]". There's a big difference between Acres and Ares.
10. Click **OK**.
11. Again click **Yes** if you are prompted to acknowledge you are working outside an edit session.
12. All the records in the shapefile should now have an acre value.
13. 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

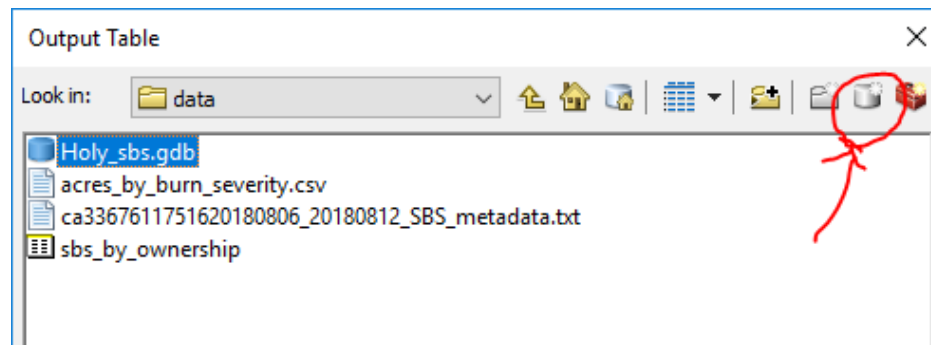
1. In the **Holy_sbs_poly_fill.shp** attribute table right-click the **gridcode** field heading.
2. Choose **Summarize**.
3. Ensure that following steps are taken in the Summarize dialog:
 - **Select a field to summarize** drop-down menu has **gridcode** selected.
 - **Choose one or more summary statistics to be included in the output table**: click the plus sign next to **Acres_GIS** to expand it.
 - Place a checkmark next to **Sum**.
 - **Specify output table**: First go to the Save as Type window and select Text. Then navigate to your Outputs directory and type **acres_by_severity.csv** as the filename. Be sure to overwrite the .txt extension. (This will save the file as comma delimited which is easy to open in Excel. From there, you can save as an .xls if you choose to work with it further.)
4. Click **Save** and **OK**.
5. Click **Yes** to add the table to ArcMap's Table of Contents. If the table doesn't appear in the Table of Contents make sure the **List By Source** icon is selected.
6. Right-click the **acres_by_severity** table in ArcMap's Table of Contents and open the table. View the results and make sure they seem reasonable.

Part 3: Determine Acres of Burn Severity by Ownership

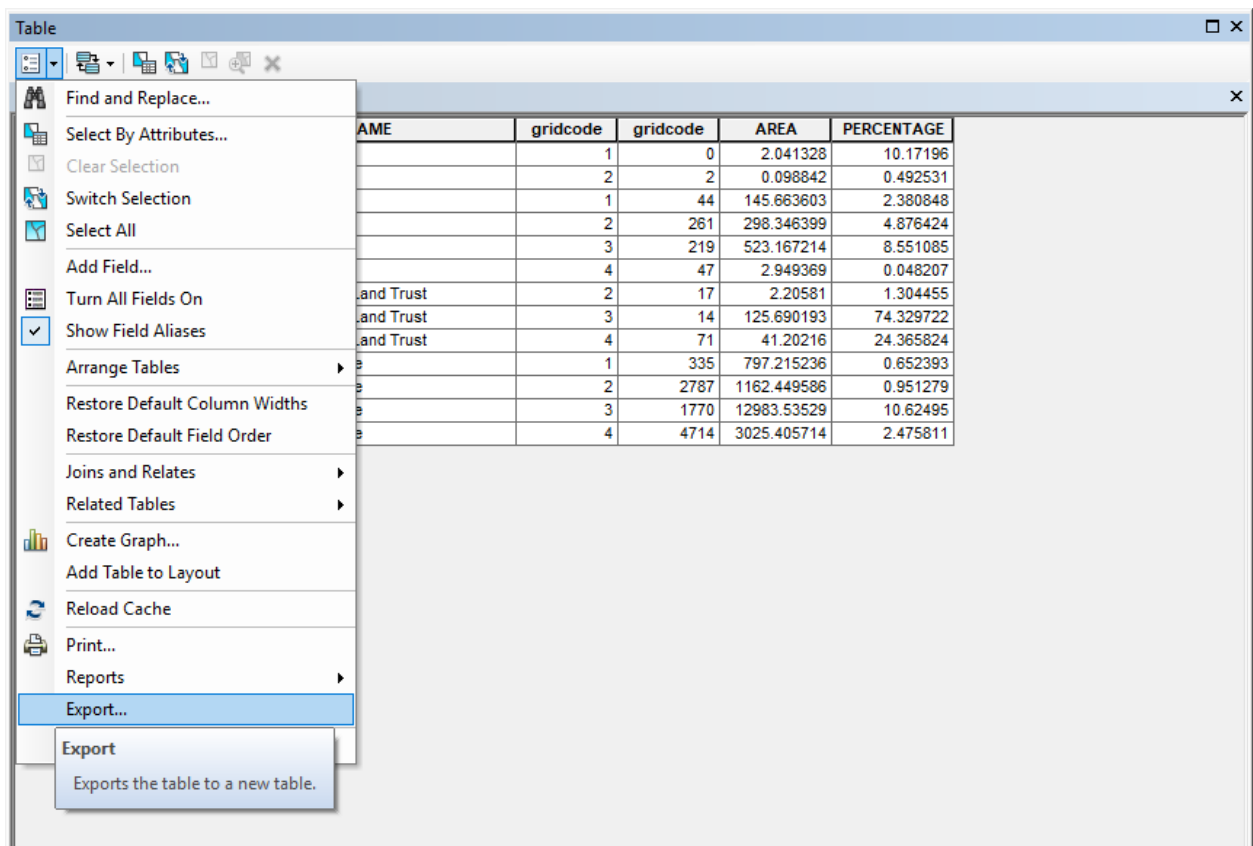
Using the ownership layer and the Tabulate Intersection tool in ArcMap we can calculate the acres for each burn severity class within each land management area.

A. Calculate Burn Severity Acres by Ownership

1. In ArcMap search for **Tabulate Intersection**. This tool performs a spatial overlay process, clips out the data that intersects and then summarizes based on chosen fields.
2. Configure the following in the Intersect dialog:
 - Select the **Input Zone Features** as **LandOwnership_CPAD.shp**.
 - Select **AGENCY_NAME** for the zone field
 - Select **Holy_sbs_poly_fill.shp** as the Input Class and set **gridcode** as the Class field.
 - When selecting the **Output Table** location, click on the '**New File Geodatabase**' and create **Holy_sbs.gdb**. Then save the **Output Table** as **sbs_by_ownership** in that gdb. The reason we do this is to prevent the tool from giving an error.



- Under **Sum Fields**, select **Acres_GIS**. This will add up all of the acres for each combination of land owner and severity class.
 - Under **Output Units**, select **ACRES**
3. Click **OK** to perform the tabulation.
 4. The table is saved to the Holy_sbs.gdb geodatabase but you can open it in ArcMap and then export as a csv. Do that now.



5.

6. Open the csv you just created in Excel. Format the table as shown below and 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.