

FNR 65 Introduction to GIS
Lab 8: Spatial Analysis II: Estimating Event Capacity

Introduction

Now that we have our Final Parcel(s) for our Music Festival, we must determine the maximum capacity so that we don't under or over-sell tickets for the event.

Learning Outcomes

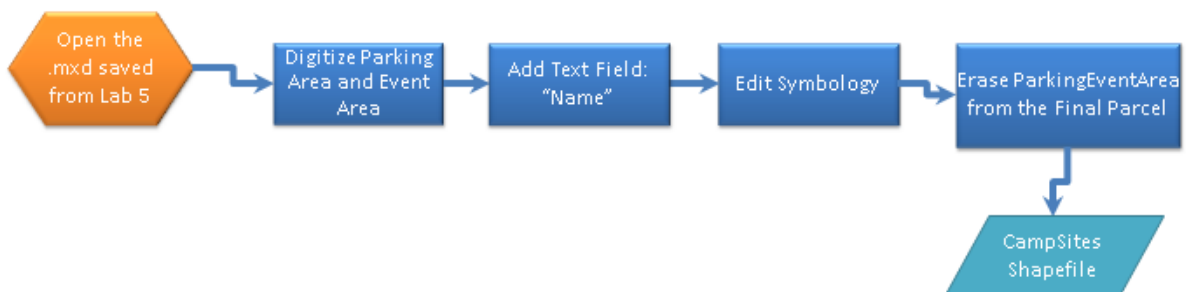
- Articulate the relationship between attributes and features
- Create attributes
- Select correct data types for attributes (float, string, integer)
- Calculate geometric attributes of a feature (area)
- Use field calculator
- Delete attributes (fields)

Setup

You'll want to continue to use your folder structure from Labs 6 and 7, especially the final parcel that was selected for the festival. You'll also need the NAIP imagery for digitizing.

All work will be done in NAD 83, UTM Zone 10 North for this lab.

Walk Through



For this next step we will be defining the event area, parking space, and camp sites:

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1. Create a shapefile for the event area, parking space, and camp sites named "venue.shp." Digitize your parking area adjacent to the road as shown below.

Make sure your parking lot is adjacent to the road, is within the parcel, and has no tree cover.

2. Within the same shapefile as your parking lot, create a new polygon for your event area. It should snap to the border of the parking lot.

This will be the open field where participants, performers, and vendors will gather.

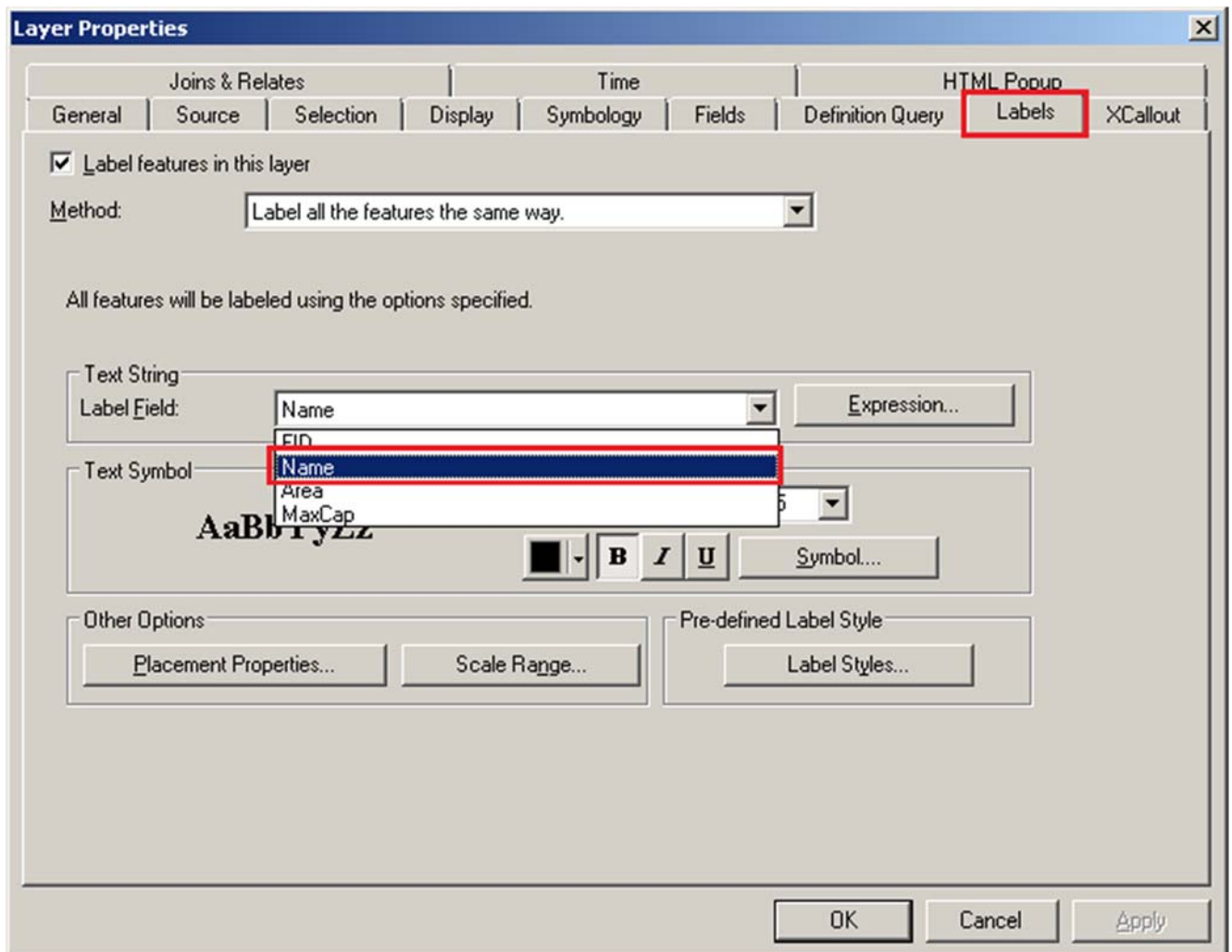


3. Save your edits and stop editing.
4. Add a text field called "Name" to your shapefile with the data type of "Text".
5. Start and edit session and then put "Parking Lot" into the first features "Name" attribute and "Event Area" in the second. These will be used as labels.

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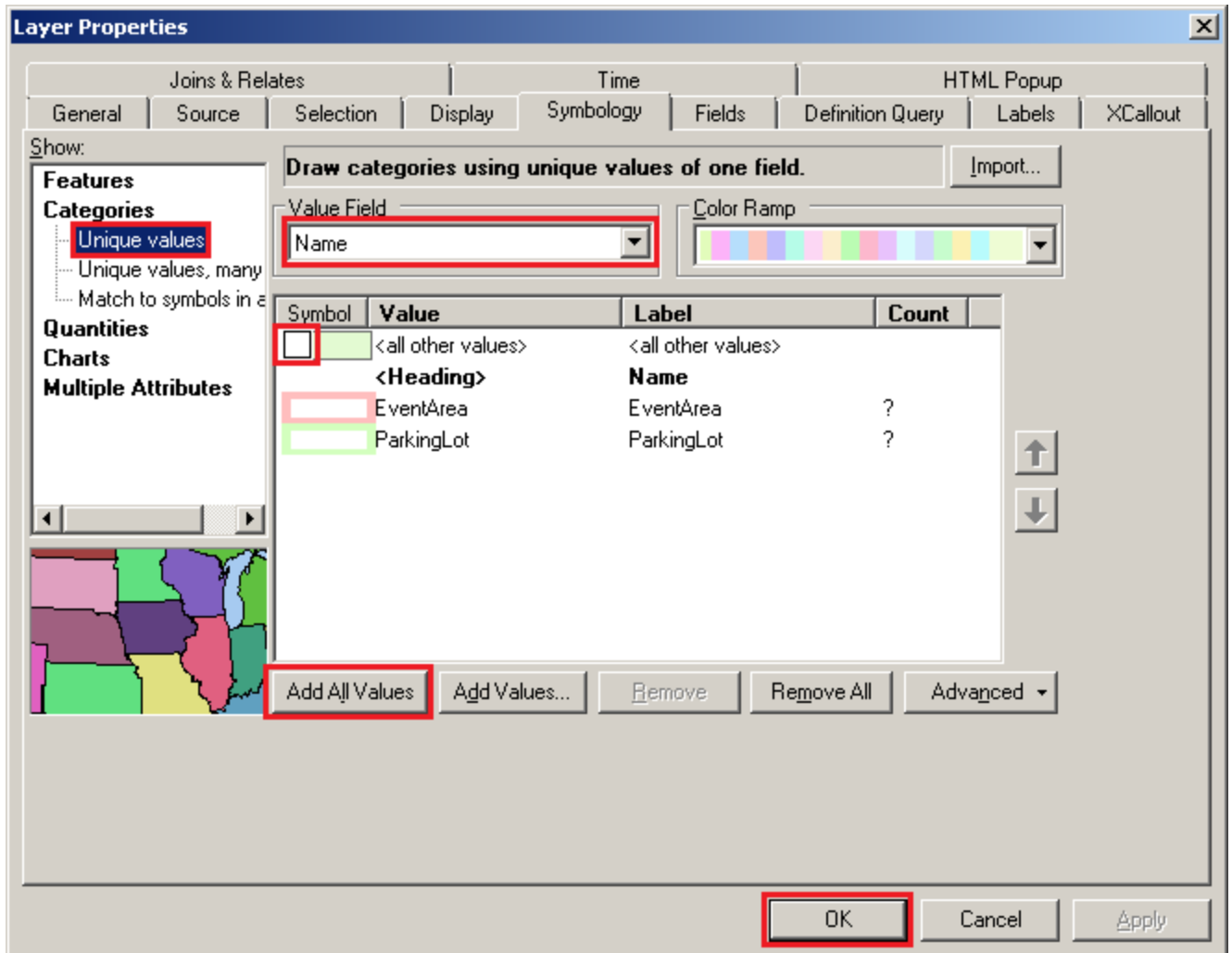
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- Right-click on the shapefile and open properties.
- Click on the Labels tab and select "Name" from the drop-down menu:



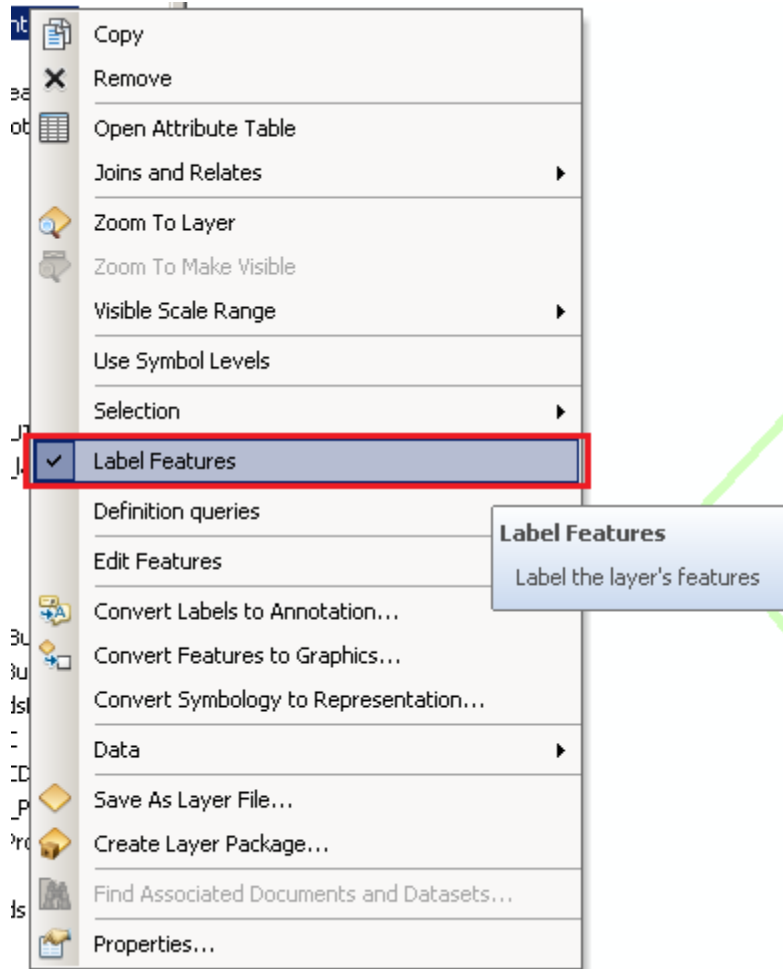
- Click on the Symbology tab, click on Categories, Unique Values, select Name from the Value Field drop-down menu and click on Add all Values.
- Uncheck "<all other values>" and click OK:

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9. Right-click on the shapefile and click on "Label Features:"

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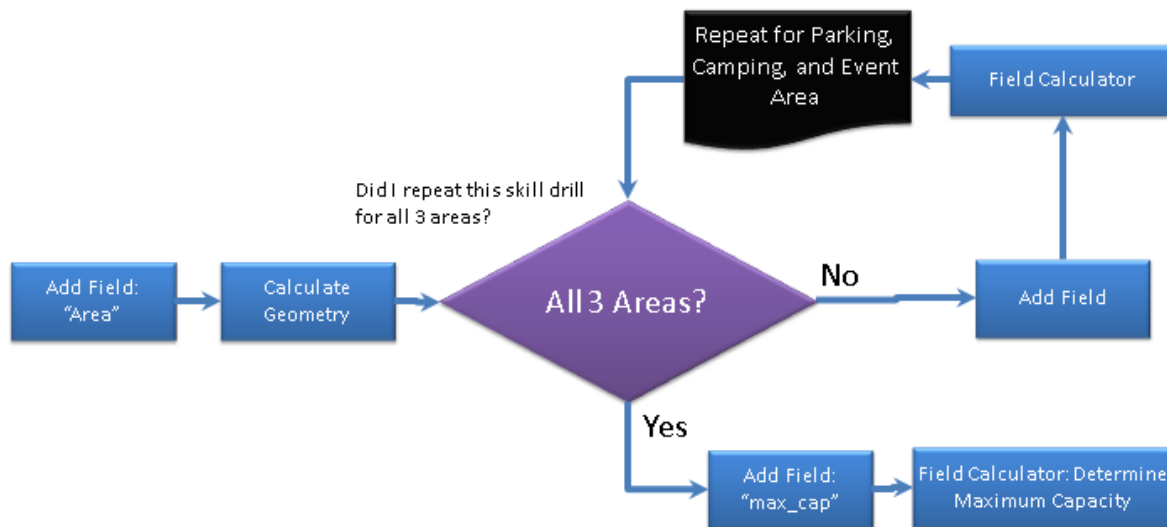


10. You should see the "Event Area" and "Parking Lot" now have labels within them.
11. Search for and open the erase tool.
12. Use your digitized parking lot and event field layer as the erase feature and erase this area from the final parcel layer. This remaining area will be used for camp sites, call the shapefile something like "campsites.shp."

Skill Drill 1: Layer Selection

12. Select parking lot within the attribute table and export the selection as a layer giving it a good name.
13. Right click on the new layer and select "Label Features". Notice that the name "Parking Lot" appears because it was maintained in the attribute table.
14. Do the same for the event area.

Walk Through



For the next series of steps you will be using the field calculator to estimate event capacity based on three factors: Parking, Camping, and Event Area. Let's start with parking.

To determine the number of parking spaces, we will use the following criteria:

- 20% of the total parking area must be reserved for access lanes between the spaces.
- Each parking space is 30 meters squared.
- 11 parking spaces must be reserved for staff and emergency vehicles.
- The final result must be a whole number, no fractions.

If you don't remember how to limit the field to whole numbers only, review the field types within the help documentation for 'field data types'

15. In the "Parking Lot" layer add a field called "Area_m".
16. Right click on the "Area_m" field and select Calculate Geometry...".
17. Select "Area" for the "Property" and "Square Meters" for the "Units".

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18. When you click OK ArcGIS will compute the total area for parking in the field.
19. Add another field called "NumParking." Make sure you make this an appropriate "type" for the number of parking spaces.
20. We want to build an equation that will compute the number of parking spaces for our guests.
 1. Since we have to reserve 20% for access between lanes, we will have only 80% left for spaces. We can compute this with: $\text{Area} * 0.8$
 2. Since each space is 30 meters squared, we can compute the number of spaces with: $(\text{Area} * 0.8) / 30$
 3. Then, we need to subtract 11 spaces: $(\text{Area} * 0.8) / 30 - 11$
 4. We need to convert the result to a whole number, the "Int()" function will convert floating point numbers to integers and will "truncate" the result rather than rounding since we do not want any partial spaces. Our final equation is: $\text{Int}((\text{Area} * 0.8) / 30) - 11$
 5. Build the equation in Field Calculator and see what the result it. Notice that Field Calculator uses brackets ("[]") around field names.

If you have problems with equations like this one, add a few "Temp" fields to the attribute table and compute the values one step at a time.

Now we will determine the total number of camping spaces based on the following criteria:

- Each campsite will take up approximately 400 square meters.
- Available spaces will be all areas of the parcel that are not allocated to parking or the event area.
- The home at the south end of the parcel must also be excluded. This will be 3200 square meters subtracted from the total available area.
- 1400 square meters must also be subtracted from the total to exclude areas near the road that runs through the south end of the parcel.
- The final result must be a whole number, no fractions.

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19. Use the dissolve tool on the camp layer (the output from the erase operation). We want a single polygon to represent our campgrounds and to perform our calculations.



Skill Drill 2: Camp Sites

20. Compute the number of campsites and call the field "Campsites."

Walk Through

Now we will determine the capacity of event area based upon the following:

- 122 square meters must be set aside for the staging area.
- 204 square meters should also be reserved for vendor booths.

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- To comply with fire and safety regulations, maximum capacity of the remaining area at any given time is calculated at 2 square meters per person.
- The final result must be a whole number, no fractions.

Skill Drill 3: Event Area

21. Now find the number of individuals that can attend the event and call the field "MaxCap."

Walk Through

For the final calculation, we must assess the limiting factors for determine total event capacity and the number of tickets that can be sold.

These are the assumptions:

- Parking: 3 people per car.
- Camping: Limit 8 per campsite.
- Event Field: 110% of max capacity.

The questions is: How many tickets can we sell?

Deliverables

A report on how you selected the location and that describes the location itself. The report should include:

- A locator map for the site
- A map of the site with the three areas identified using labels
- A table with each of the three areas, their size, and their capacity
- The total number of tickets you recommend selling

Remember to make simple, professional maps and follow the [guidelines](#) on the GSP web site. Refer to the supplemental learning module on [creating Reports in MS-Word](#) if needed. You can also use this as a template if you desire.

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Note: This lab should take you less time to complete than the last few labs so we are expecting the reports to be well written and should contain professional quality maps. Points will be deducted for any issues found in the reports.