Viewing Statistics & Summarizing Data

CLS	Cnt_CLS	Sum_Acres
	1745	507.707443
C	594	202.292529
E	206	211.457798
I	96	94.398159
R	11954	1097.094163

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Overview

Often you need to get information for selected sets of records or see data summarized for types of features. For example, planners need to understand the distribution of land use within a community. They will want to know how many acres of each land use the community has in general, and in working with specific area plans, they will need to know the acreage of land use within that area (e.g., how much residential land is there within walking distance of a proposed transit node).

ArcGIS has two tools that make it very easy to get this kind of summary information. You can **view summary statistics** on the fly for selected records, or you can **create a new table of summarized information** by an attribute category.

Viewing Statistics for Selected Records

In addition to selecting features that meet certain criteria, you often need to view summary information about these features (e.g., how many total acres of vacant land are available for development near transit nodes). To view this kind of **numeric** data, ArcGIS has a **statistics function** in its attribute table. Get used to using this function as it can be very useful for exploring your data layers.

1. For this tutorial, we are using the layer *SomervilleParcels04.* Add the data from M:\City\Somerville\MIS\SomervilleParcels04.

2. Right click and open the attribute table for the layer you are exploring.

3. *Right-click the heading of a field* that contains **numeric data** you want to see and click **Statistics...** In the example below, we are looking at the column for *Total Assessed Value (TOTAL_ASSE)* for parcels in Somerville :
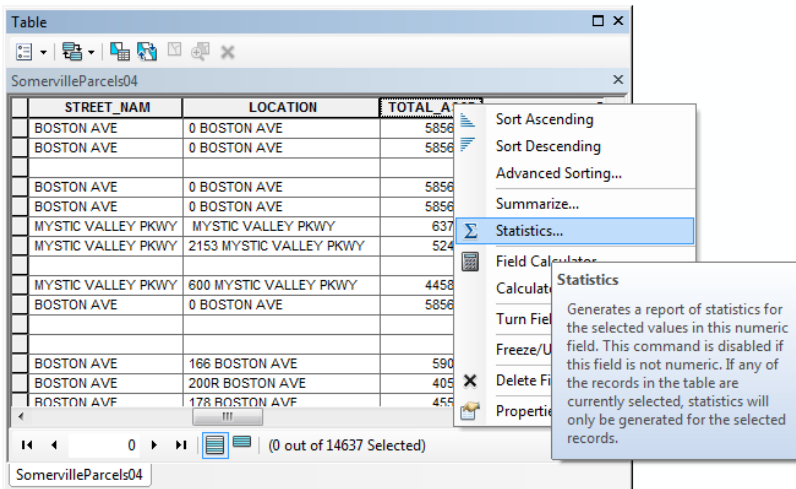
In the *Statistics* dialog box, you'll see information about the values in the field whose heading you clicked. This includes the count of selected features, the sum of the numeric value, as well as the mean, minimum, maximum, and standard deviation, plus a histogram (frequency chart) showing the distribution of values.

4. Here are the results for Somerville parcels so you can see that in 2004, the GIS data set records 14,637 total parcels, for a sum of $7,091,188,500 of total assessed property value, with the highest assessed value for a single parcel being $41,667,500:
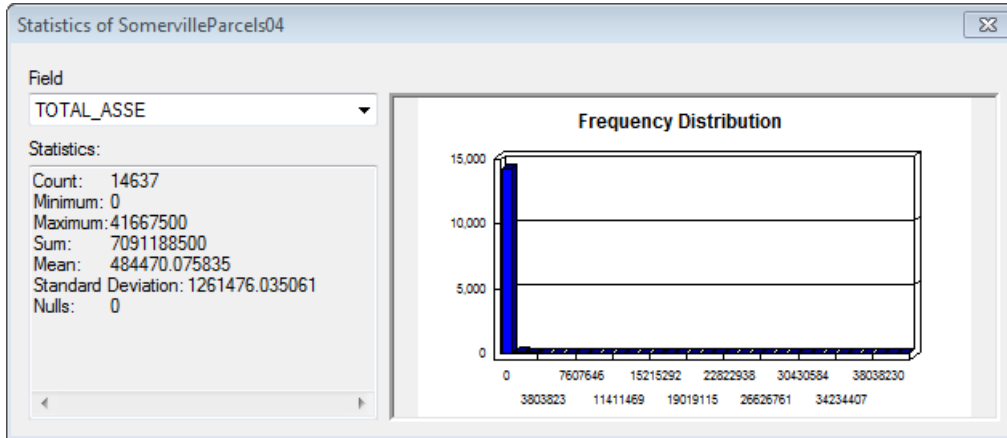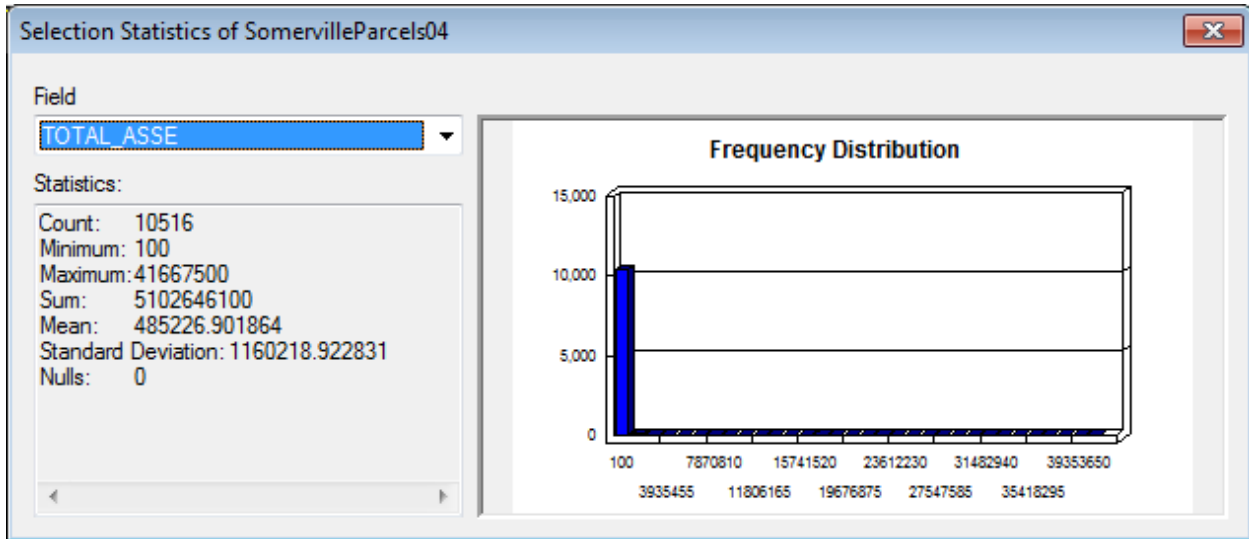

5. If you want to see statistics for another numeric field, click the *Field* drop-down arrow and click the field's name.

6. Let's say we now want to see the total assessed value for just residential parcels in Somerville (make sure to select for all spelling versions of "Somerville"). We would first select residential parcels using the **Select by Attribute** function, then use the **Statistics** function as shown below – you see that at the bottom of the table, it says that 10,516 parcels have been selected – now when we use the Statistics function it is reporting for just those selected parcels:

7. The results look like this:

8. Close out of the *Statistics* dialog box when you are finished exploring statistics of the selected features.

See a full description of how to use this tool on the online ArcGIS 10 Help - Viewing Statistics for a Table

Creating a Summary Table of Aggregated Information by an Attribute Category Class

This tool works very well for summarizing *numeric* information **by a *category* type value** in an attribute field. For example, calculating the total acreage and assessed value of parcels by land use category within walking distance of a transit station (e.g., knowing how many acres of residential, commercial, industrial, and civic land, and the total valuation within each of those categories). **Note:** Generally you would ONLY summarize on a category type of attribute column, **NOT** on a column containing numeric data. See the example below.

You can create a summary table for all the records in a layer (e.g., all parcels in a community) or just the selected records (parcels within walking distance of a transit station). Instructions can be found in the ArcGIS 10 online help for Summarizing Data in a Table.

In this example, we will create a summary table of information about parcels within ¼ mile of a T station in Somerville, MA. We have a layer of parcel polygons with assessor attributes, and MBTA stations (you can download this layer from MassGIS). The parcel layer includes an attribute field called **CLS**, which indicates R for residential, C for commercial, I for industrial, E for exempt (public or other civic institution that is exempt from property taxes), and some blank values (unknown). This is what we mean by a "category" type of attribute value. We want to know, within the ¼ mile buffer, how many acres of each land use there are and what the total valuation of property is, as well as the valuation of land and structure value. Thus we are summarizing numeric information by category type of land use.

1. We first use the *Select by Location* function to select parcels that are within .25 miles of a T station:
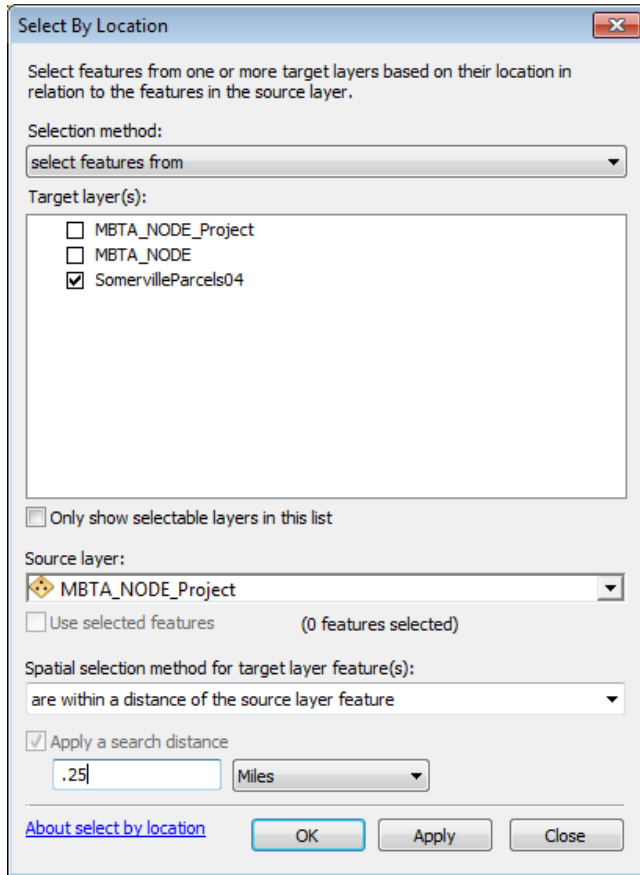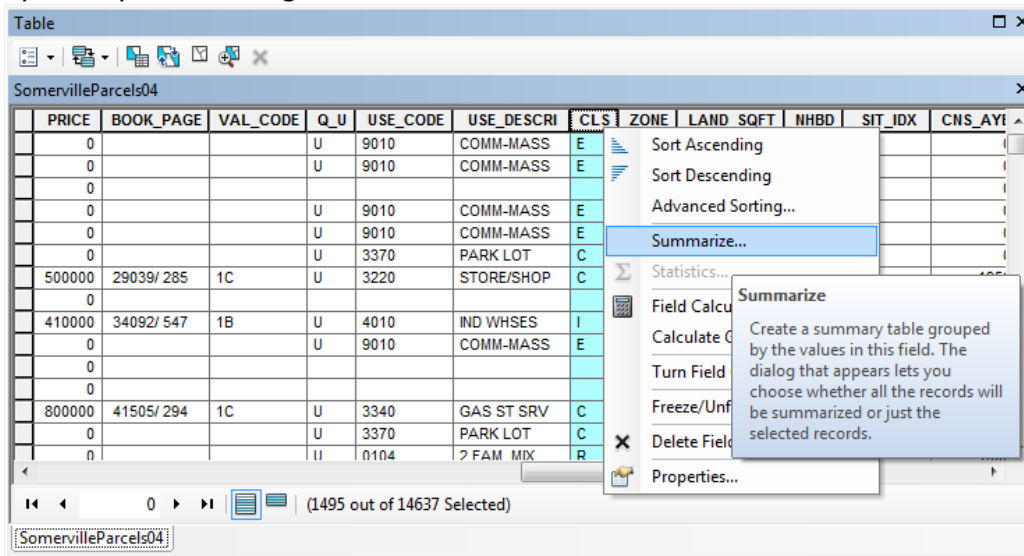
2. The results look like the following image:
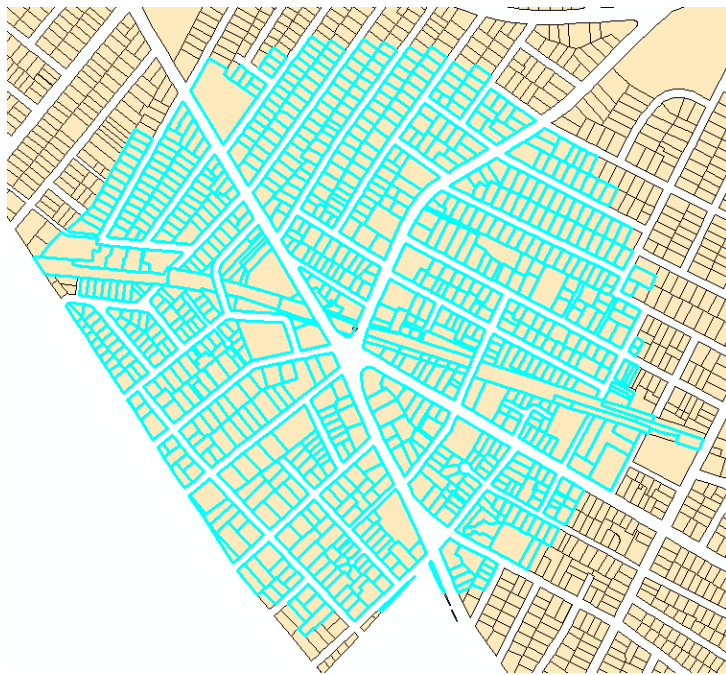
3. Next, *open the attribute table* for the parcels layer.

4. *Right click* on the **CLS** field name and choose **Summarize.** Always choose the field that has the categorical data by which you want things summarized!


5. Expand the attribute field for any field with numeric data that you want to summarize. In our case we want to summarize information for total assessed value (TOTAL_ASSE), and for Land Value and Building Value.
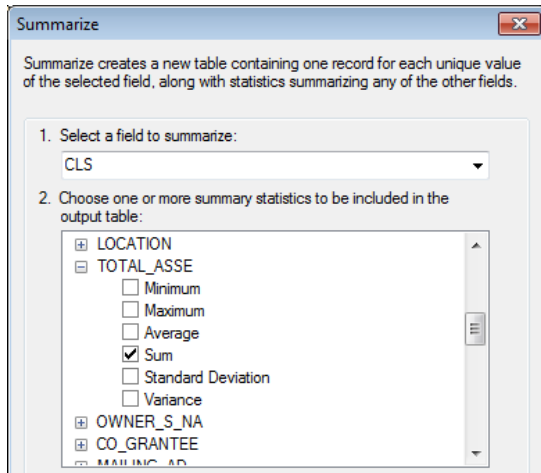
6. Scroll down and find LAND_VAL and choose Sum and then the same for BLDG_VAL.
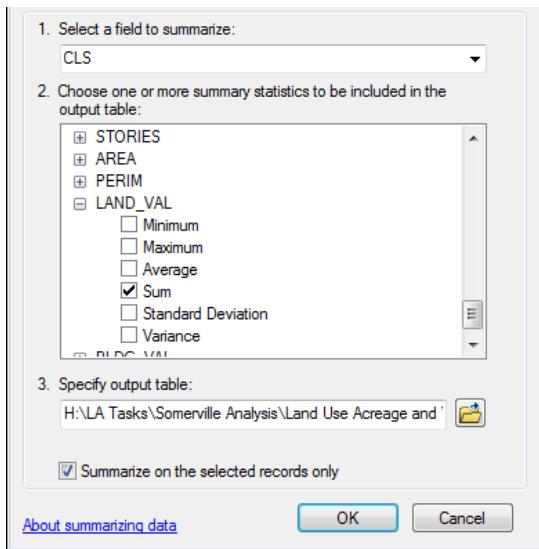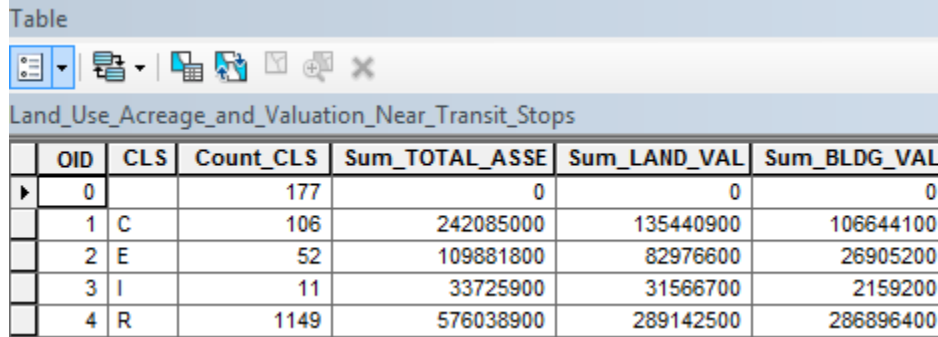
7. Make sure you check *Summarize on the selected records only*. In this case we don't want information for all of Somerville!

8. Specify the output table by navigating to an appropriate folder and giving the table an appropriate name (e.g., LandUseAcreageValuationnearTransitStops.dbf) – don't use the default name of sum_output.dbf! You will lose track of what you are doing. Be sure to choose dBASE table for **Save as Type** if you are using Shapefiles as shown below.
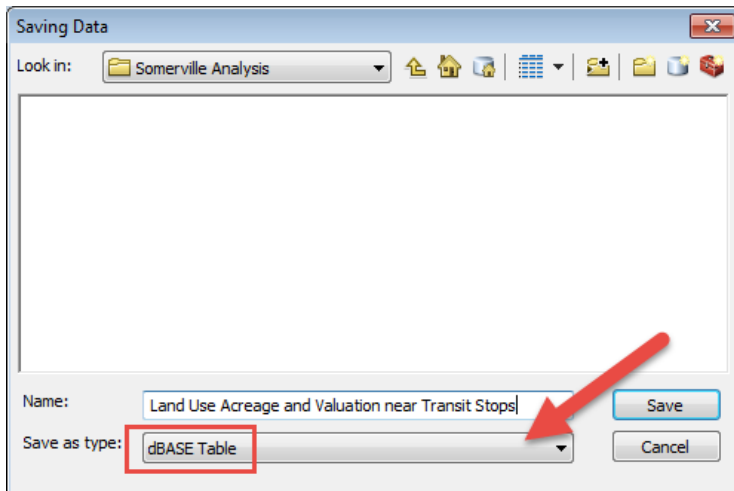
9. Add the new table to ArcMap.

10. To view the table you must be in **View data by Source** in the Table of Contents. You should see your table – right click on it and choose Open.

11. Your new table summarizes the information you requested:

OID	CLS	Count_CLS	Sum_TOTAL_ASSE	Sum_LAND_VAL	Sum_BLDG_VAL
0		177	0	0	0
1	C	106	242085000	135440900	106644100
2	E	52	109881800	82976600	26905200
3	I	11	33725900	31566700	2159200
4	R	1149	576038900	289142500	286896400

Land_Use_Acreage_and_Valuation_Near_Transit_Stops

Note that by default a **COUNT** is always included in the summary table so you don't have to specify that when you are creating the table – in the example above, we see there are 106 commercial parcels near transit stops in Somerville, and a total assessed value for those commercial parcels of $242,085,000.

Also note that calculating the average, minimum, and maximum values is often helpful. In this case it would help you to see the range of values in each land use category, and knowing the average value would help you compare valuation against a similar summary table calculated for all Somerville parcels OUTSIDE the transit buffer.

WARNING: The Summarize function is best used for summarizing **numeric data by category**. It is not good for summarizing numeric data by other numeric data – e.g., don't summarize by a population attribute in a census block, ArcMap has other better-suited tools for that! **Always begin your Summarize task by right-clicking on an attribute field that contains category type.**

For more tips and tutorials, please visit our website

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