

Introduction to ArcGIS 10 Workshop: Selection

<http://guides.library.upenn.edu/arcgisselection>

Prepared by Christine Murray, Van Pelt Library

chrmur@upenn.edu

Navigating ArcMap

Toolbars

Tools you need for navigating and manipulating your data, at the top of the window. To choose which to display, go to Customize > Toolbars.

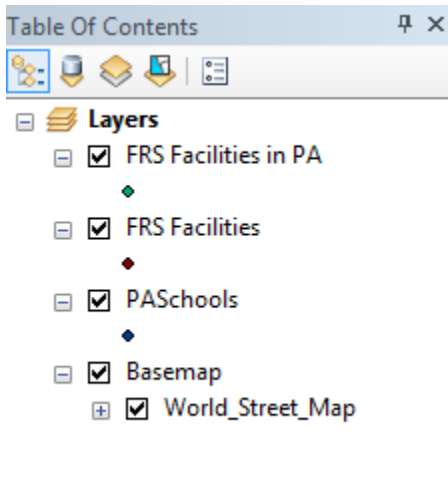
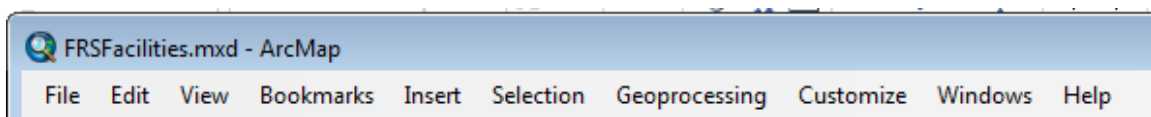


Table of Contents

Shows you which data files have been added to your map and lets you control how the layers will be displayed.

Menu Bar

Allows access to important tools and functions. The Selection menu is particularly important in this example.



Tutorial: Selection

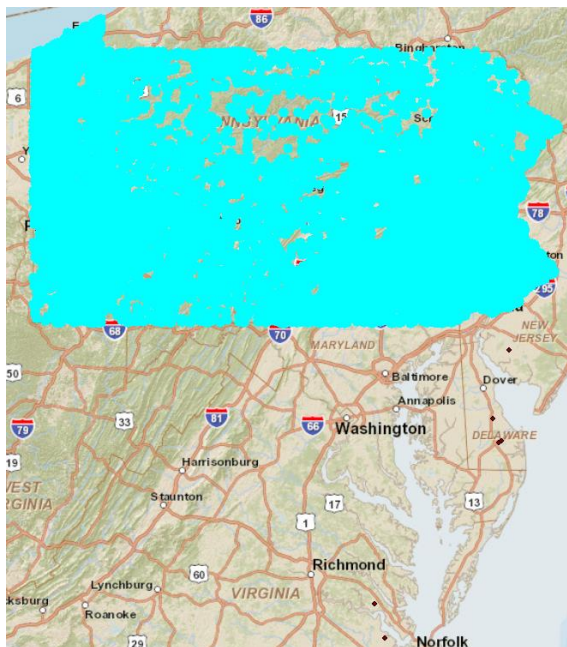
This tutorial will guide you through the various methods for selecting features in ArcMap, including interactive selection, selection by attribute, and selection by location.

1. Unzip selectiondata.zip to your Desktop. Open the file **FRSFacilities.mxd**. This map displays points for all facilities in the Environmental Protection Agency's Facility Registration System with a Pennsylvania address (in layer **FRS Facilities**), as well as the locations of public schools (layer **PASchools**).
2. You'll notice that some of the FRS facilities actually fall outside of the state. First, let's select the facilities that really are in Pennsylvania. You can do this with interactive selection.

Since there are two feature layers displayed in the map, and for now we only want to select features from one, we have to designate **FRS Facilities** as the only selectable layer. To do so, right-click on "**FRS Facilities**" in the Table of Contents, and hover over Selection. From this menu, click on "Make this the only selectable layer."



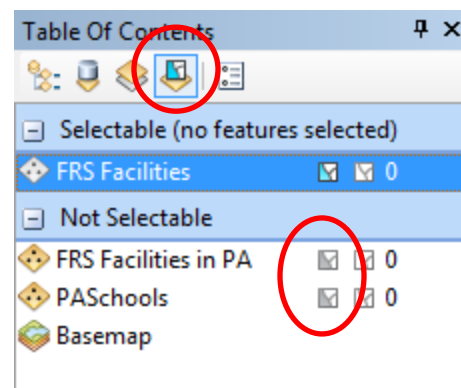
Click the Select Features button in the Toolbar, then draw a box around the facilities, excluding those that appear outside of Pennsylvania. Once selected, the features should appear highlighted.



3. Not only are the facilities highlighted, but now that they are selected we can create a new layer with just those features. To do so, right-click on **“FRS Facilities”** in the Table of Contents, and hover over Selection. From this menu, click on **“Create layer from selected features.”** You should see a new layer in the Table of Contents called **“FRS Facilities selection.”**
4. Unfortunately, you can’t actually see this new layer because features in the original layer are still highlighted. Click on the Clear Selected Features button in the Toolbar to undo the selection.



5. In the Table of Contents, click once on **“FRS Facilities selection”** and change it to **“FRS Facilities in PA.”**
6. In step 2, we made **FRS Facilities** the only selectable layer. To undo this, click on the List by Selection button at the top of the Table of Contents. If any layers are listed under **“Not Selectable,”** click on the small icon directly to the right of the layer name to toggle selectable.



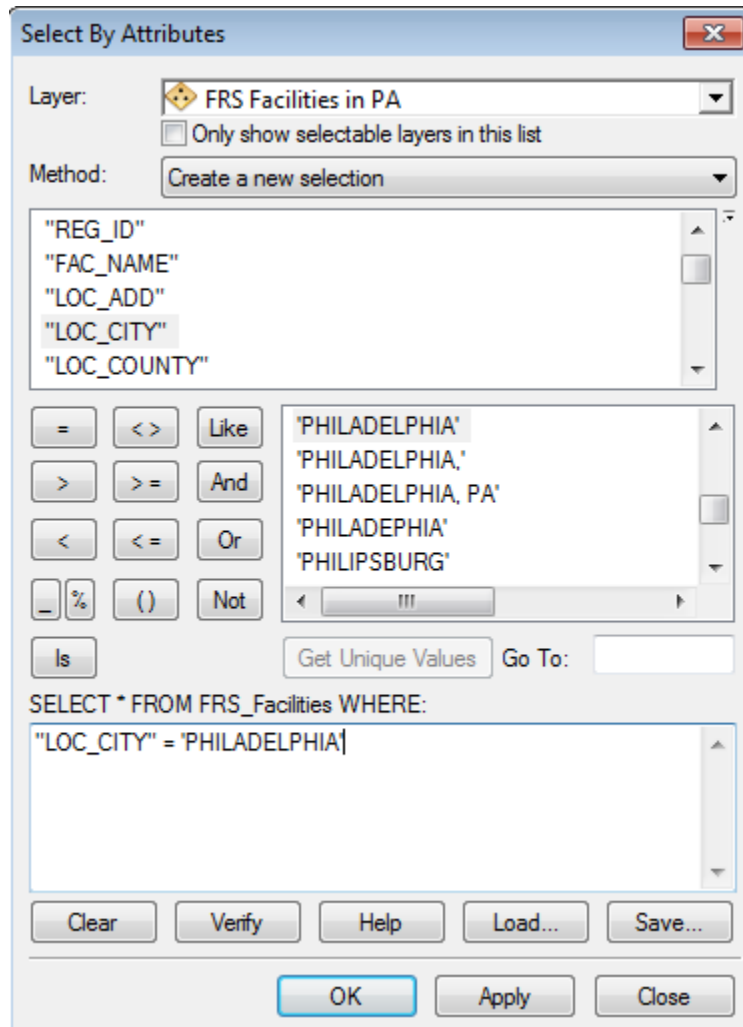
7. Clearly there are some limitations to interactive selection. For example, if we wanted to select facilities in Philadelphia County, it would be tedious to select them interactively, and possibly inaccurate. Instead we can use the attributes stored in the attribute table. Click on **Selection > Select by Attributes** in the menu bar.

This dialog allows you to select features that have particular values in particular fields of the attribute table. The attributes will be listed in the middle. The attribute **“LOC_CITY”** is the city where the facility is located. First click on **“LOC_CITY”** then **Get Unique Values**, and you will see a list of all the cities that appear in this field.

This dialog uses Structured Query Language (SQL) to make selections. The SQL here begins with **SELECT * FROM FRS_Facilities WHERE:**, and ends with the query that you enter. It may look intimidating if you’ve never seen SQL before, but in its simplest form, it’s fairly straightforward. If we want to select facilities in Philadelphia, we enter:

```
"LOC_CITY" = 'PHILADELPHIA'
```

You can type this in the box, or you can double-click on the attributes and values to enter them automatically. This is preferred, so that correct spelling is ensured. When your Select by Attributes dialog looks like the example below, click on Verify to check that your SQL is written correctly, then click OK.



8. Back in the Table of Contents, right-click on the layer and click on Selection > Zoom to Selected.
9. You may have noticed there were some variations of spelling for Philadelphia. We only selected one spelling. Go back to the Select by Attribute screen. We can use SQL to fix this problem. This time, enter

`"LOC_CITY" = 'PHILADELPHIA' OR "LOC_CITY" = 'PHILA'`

OR will select features that match either of the criteria you've entered. Now click on Apply.

10. This selects a few more features, but we're still missing several variations of spelling. There is way to cover them all, with this SQL:

```
"LOC_CITY" LIKE 'PHILA%'
```

This will select all features for which that attribute, "LOC_CITY," begins with PHILA and ends with any combination of letters. Enter this text and click Apply.

11. Numeric values can also be used in Select by Attributes. In this example, the field ACC_VALUE contains a score for the spatial accuracy of the points. The values are in meters, so that a score of 0 means that the point's location is perfectly accurate, while a score of 500 means that the point is within 500 meters of the actual location. If we want to limit our selection to points with a fairly accurate location, we can edit our SQL to this:

```
"LOC_CITY" LIKE 'PHILA%' AND "ACC_VALUE" < 50
```

Enter this SQL in the text box and click OK.

12. Sometimes, you will need to select features not by their attributes, but by their location. This is difficult to do with other ways of storing data, but simple with a GIS. For this example, let's say we want to select all the Philadelphia FRS facilities that are near schools. To do this, go to Selection > Select by Location.
13. Within Select by Location, there are several selection methods. Because we already have selected Philadelphia facilities, we don't want to create an entirely new selection, but rather select from within the current selection. Under "Selection Method," choose "select from the currently selected features in."
14. The target layer is the layer whose features we would like to select from. In this case, we want FRS facilities, so under Target layer, check the box next to FRS Facilities in PA.
15. We are selecting facilities based on their location relative to schools; in this example, the layer containing the schools features is the source layer. Under Source layer, select PASchools.
16. Next, we choose a spatial selection method. These are rules that guide the software in selecting features. In the spatial selection drop-down menu, you'll see many options. In this case, we want facilities that are near schools, but they don't necessarily have to overlap. Therefore, choose "are within a distance of the source layer feature," and under "Apply a search distance," enter 0.25 miles. When the Select by Location menu looks like the example below, click OK.

Select By Location

Select features from one or more target layers based on their location in relation to the features in the source layer.

Selection method:
select from the currently selected features in

Target layer(s):

- ☒ FRS Facilities in PA
- ☐ FRS Facilities
- ☐ PASchools

☐ Only show selectable layers in this list

Source layer:
PASchools

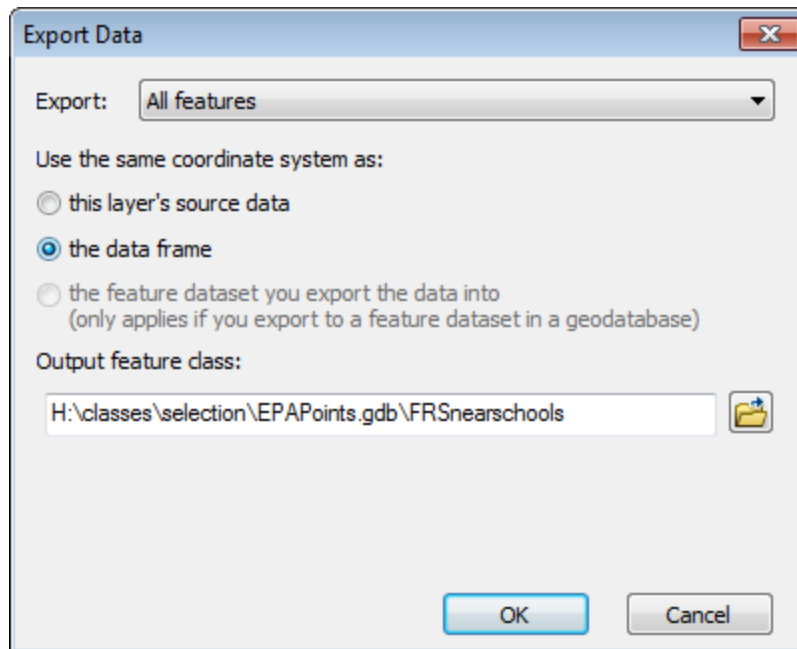
☐ Use selected features (0 features selected)

Spatial selection method for target layer feature(s):
are within a distance of the source layer feature

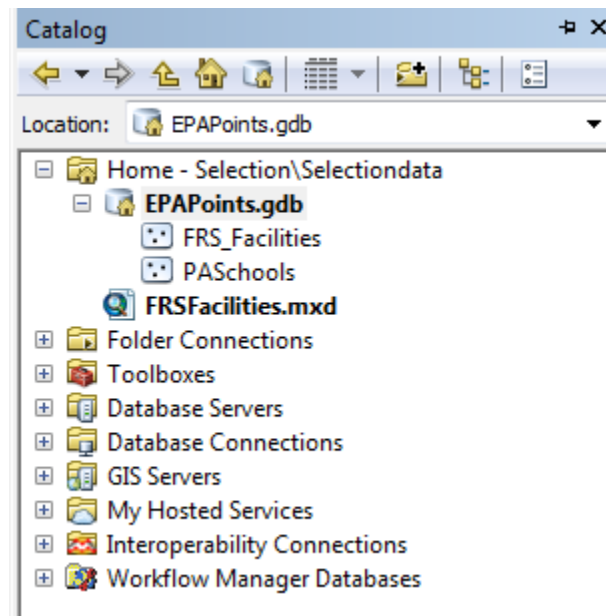
☒ Apply a search distance
0.250000 Miles

[About select by location](#) OK Apply Close

17. Now that the facilities are selected, create a new layer from selected features and rename it FRS Facilities Near Schools. (See step 3 for instructions.) When a layer is created from a selection, it does not exist outside of the map. If we want to share this subset of the data with others, or use it in another map, we have to export it. Right-click on the new layer's title, and from that menu select Data > Export Data. Give the new file a meaningful name and click OK.

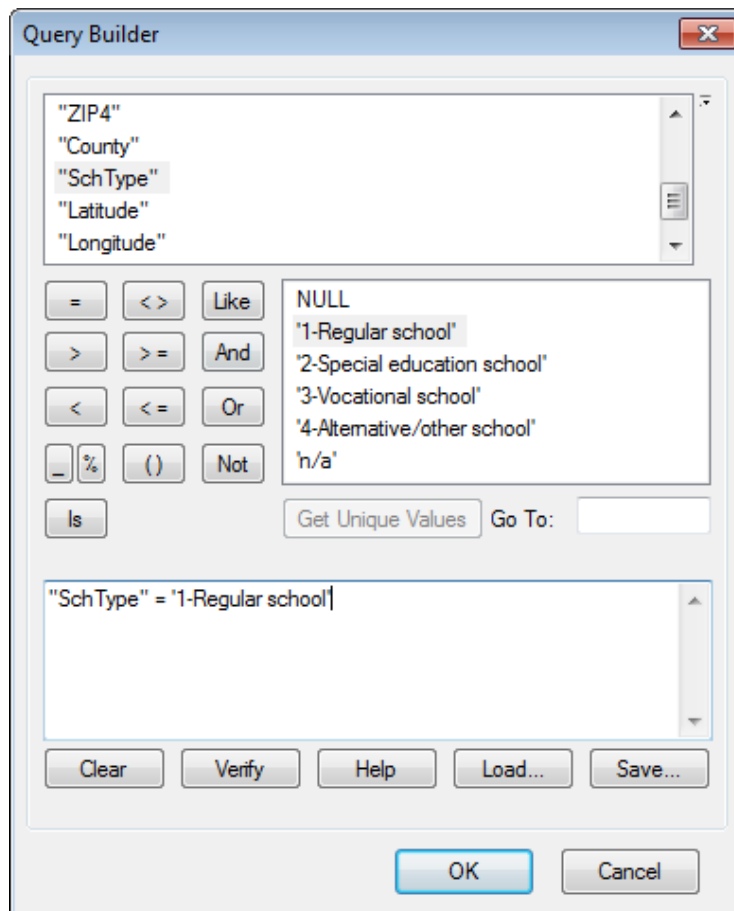


18. There is an additional way to create a new subset of features that does not require you to add the data to the map first: we can import a subset of data as a new feature class in a geodatabase, with the Catalog window. Open the Catalog window, using either the tab of the right-hand side, or from the menu bar selecting Windows > Catalog. In the Catalog window, you should see listed under the Home folder, a file called **EPAPoints.gdb**. (You may have to expand the folder to see it.) This is the geodatabase that contains the data we have been working with.

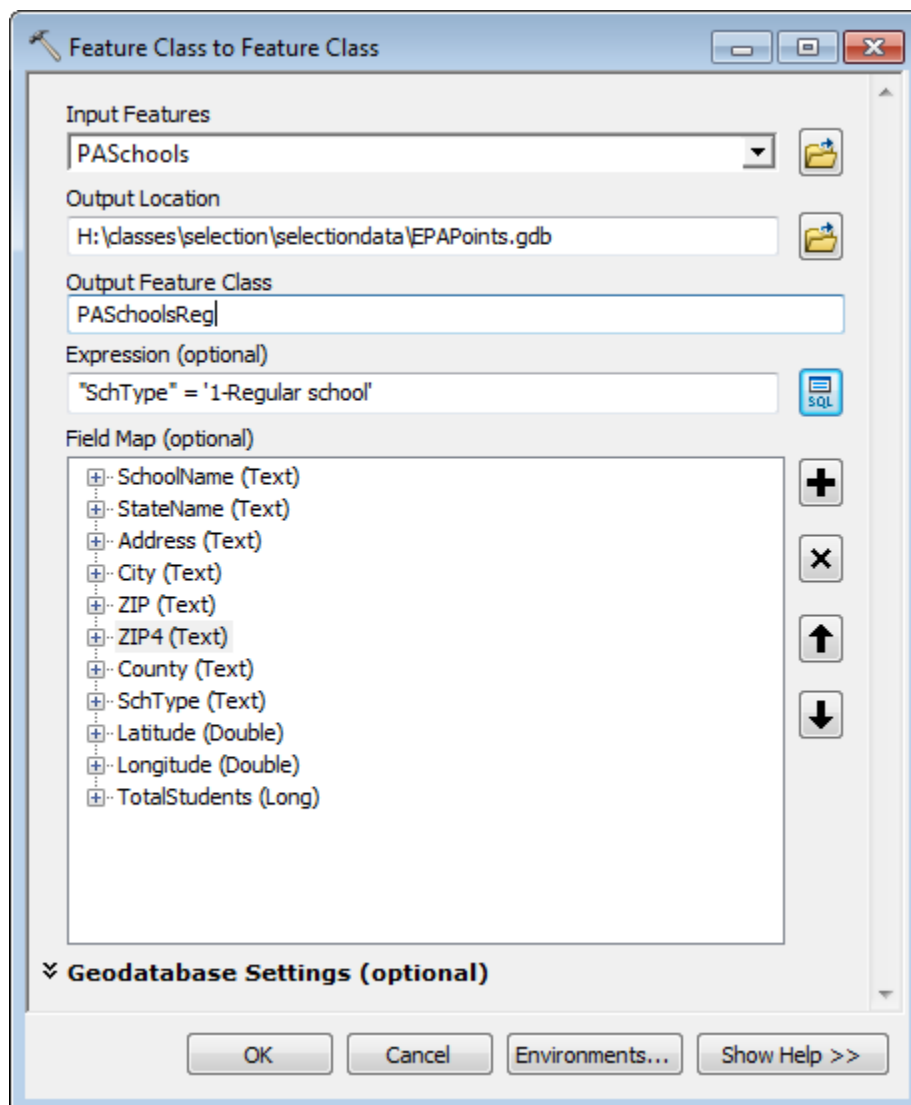


To import a new set of features (or feature class), right click on **EPAPoints.gdb** and click on Import > Feature Class (single). Let's import a subset from the

PASchools features; they are classified by type in the SchType attribute, so we can use this dialog to import only regular schools, excluding vocational or special education schools. In Input Features, select PASchools, and under Output Feature Class, enter a new name, such as PASchoolsReg. Next to Expression, click on the SQL button, which will bring you to the Query Builder. This works the same way as Select by Attribute dialog. Enter the SQL as “SchType” = ‘1-Regular school’ as shown below:



Click OK. When the Feature Class to Feature Class dialog looks like the example shown below, click OK, and your new feature class will be created.



You have successfully used selection tools to create subsets of data according to various criteria.



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Data Used:

U.S. Environmental Protection Agency. (2009) EPA Geospatial Data Download: Facility and Site Information. Available at <http://catalog.data.gov/dataset/epa-geospatial-data-download-facility-and-site-information>

National Center for Education Statistics. (2013) Elementary/Secondary Information System. Available at <http://nces.ed.gov/ccd/elsi/>