**Exercise 5, Part 1. Selecting by location.**

* Open Internet Explorer and go to

<http://www.mass.gov/mgis/townssurvey.htm>

This is a page at the Massachusetts state GIS site. You will be downloading a shapefile of town boundaries.

* In the yellow box at the top of the page is a link that says “ESRI Shapefiles”. Click this link and download the shapefiles to your desktop. Extract the files.
* Now go to

<http://www.mass.gov/mgis/lighthouses.htm>

* In the yellow box at the top of the page is a link that says “Download this layer”. Click this link and download the shapefile to your desktop. Extract the files.
* Open ArcMap and use the following shapefiles for a new map:

TOWNSURVEY\_POLY.shp

LIGHTHOUSES.PT.shp.

The town data are in a polygon layer and the lighthouses are in a point layer.

The lighthouses are shown as small diamonds on the map and are rather hard to see. This can be changed.

* In the Table of Contents, left-click on the little diamond under the name of the lighthouse layer. This will open the Symbol Selector box.
* Choose a symbol you like and adjust the symbol size to 10.
* In the Table of Contents, right-click on the symbol under the name of the lighthouse layer. This gives you a choice of colors for the symbol. Choose a color that contrasts with the town map.
* Save your map to the desktop.

**Selection of features by location**

* Left-click on “Selection” in the menu bar at the top of the ArcMap window. In the pull-down menu, choose “Select by Location”. This brings up a dialog box that allows you to make a selection request.
* In the “I want to” field, select “select features from”.
* In the box below the “I want to” field, select the TOWNSSURVEY\_POLY layer by checking the small box next to it.
* In the “that” field, select “completely contain”.
* In the “the features in this layer” field, select LIGHTHOUSES.PT.

Your completed request is : I want to select features from the TOWNSSURVEY\_POLY layer that completely contain the features in the LIGHTHOUSES.PT layer. In other words, if a town polygon contains a lighthouse point, the town will be selected and highlighted on the map.

* Click “Apply” and then “OK”. All the towns that have a lighthouse have been selected.

We can now look at the attribute table that ArcView automatically compiled when we made the selection.

* At the bottom of the Table of Contents, there is a “Selection” tab. Click on it.

The name of the selection is TOWNSSURVEY\_POLY (34). This is the name of the file from which we made the selection, and the number of features that were selected.

* Right-click on the name of the selection and select “Open Table Showing Selected Features”.

The table will open and show a list of the town polygons that contain a lighthouse feature on the map.

* Right-click on the column heading “TOWN” in the table and select “Sort Ascending”. This will put the town names in alphabetical order. Close the table.
* Right-click on TOWNSSURVEY\_POLY (34) in the Table of Contents and select “Create Layer From Selected Features”.
* Right-click on the name of the new layer (TOWNSSURVEY\_POLYselection) and select “Properties”. Select the “General “ tab in the Properties dialog box.
* Rename the layer “Lighthouse towns” or something similar (and brief).
* Click “Apply”.
* Select the “Symbology” tab in the Properties dialog box.
* Right-click on the colored square in the dialog box and and choose a color for the new layer.
* At the bottom of the Table of Contents, select the Display tab. Uncheck the box next to the Lighthouses point layer. Now the towns with lighthouses are a different color than the other towns.

**Exercise 5, Part 2. Adding a hyperlink to a map feature. Work through on your own.**

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* Look at the attribute table for the “Lighthouse towns” layer.
1. Which towns have more than one lighthouse?
2. Which town has the most?
* In ArcMap, turn the LIGHTHOUSES.PT layer back on. Use the Find tool to find Minots Ledge Light.
1. What town is Minots Ledge Light in?
* Select the Identify tool from the Tools toolbar and click on Minots Ledge Light.
* When the Identify dialog box comes up, right-click on the feature’s name, Minots Ledge light, and select “Add Hyperlink”.
* In the Add Hyperlink dialog box, select “Link to a URL”.
* Type in the following URL: <http://www.lighthouse.cc/minots/index.html>
* Click OK.
* Choose the Hyperlink tool (the lightning bolt) from the Tools toolbar.
* Left-click on Minots Ledge Light with the Hyperlink tool. This will open the web page about the lighthouse. On the web page, click the History link.
1. What happened to the iron lighthouse at Minots Ledge?
2. What is the current lighthouse made of?

Optional extra practice: In the LIGHTHOUSES.PT layer, use Select by Attribute to select the lighthouses that are on islands. Make a new layer consisting of only those lighthouses.