ConservationMapper

Thematic Viewer User's Guide

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The User Interface

The thematic viewer user interface defines the look, feel, and functionality of the ConservationMapper maps. It consists of a set of web pages and files that together determine how the different components—such as the legend, toolbar, overview map, layer list, and map itself—work and interact with each other.

Viewer layout

Figure 1 shows the general layout of the ConservationMapper thematic viewer.

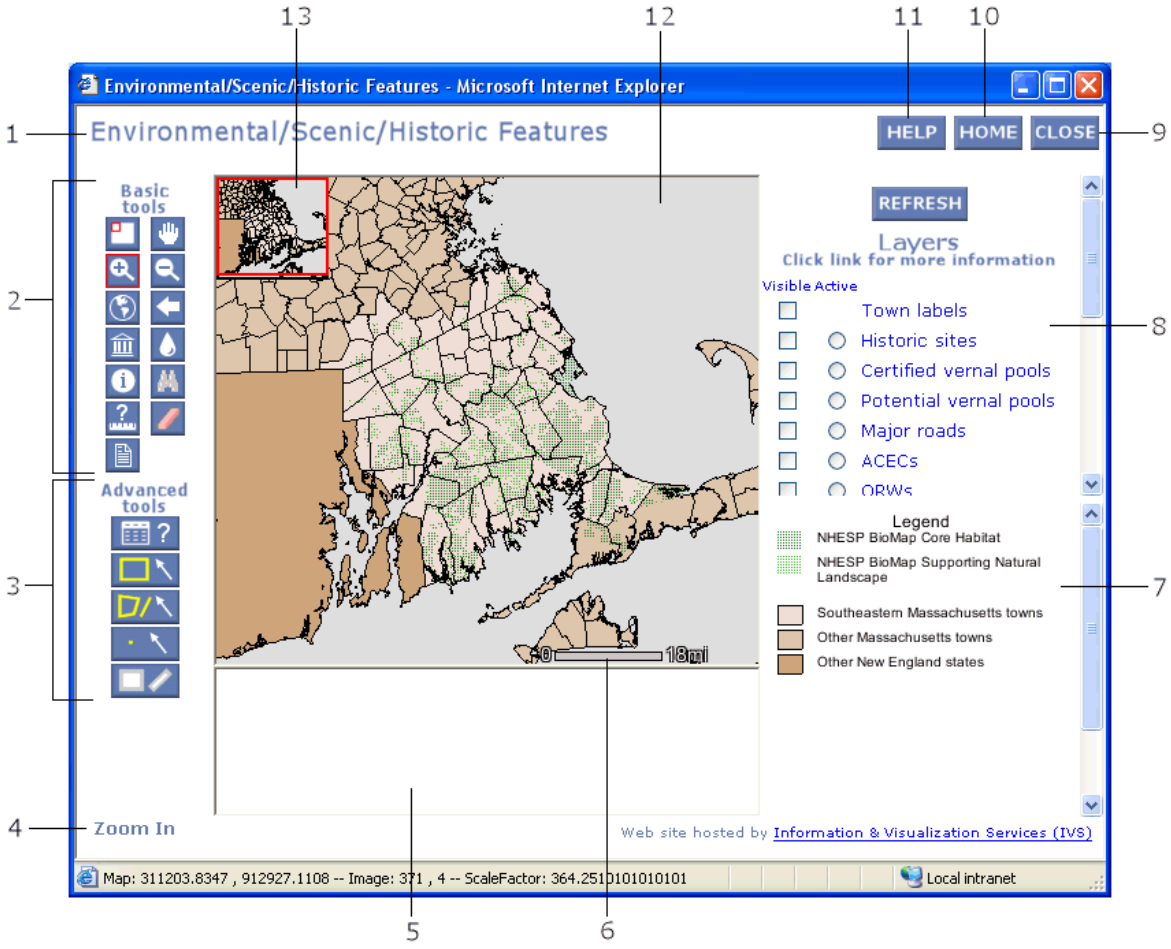

Figure 1. Thematic viewer user interface.

1 – Title
Title of the thematic viewer.

2 – Toolbar (Basic Tools)
Contains various buttons for interacting with and using the map. These tools are discussed in detail in the “Basic Tools” section of the user’s guide.

3 – Toolbar (Advanced Tools)
Contains various buttons for interacting with and using the map. These tools are discussed in detail in the “Advanced Tools” section of the user’s guide.

4 – Mode display
Shows which interactive tool, or button, is currently selected.

5 – Text area
Displays forms or map information when certain tools are chosen.

6 – Scalebar
Displays the map’s scale in miles.

7 – Legend
Legend for those layers currently displayed in the map.

8 – Layer list
Enables user to choose which layers are visible on the map, and which layer is the active layer. Also includes **Refresh** buttons, which are used to update the map image when the visibility for any of the map layers is changed.

9 – **Close** button
Shuts down the viewer.

10 – **Home** button
Opens the ConservationMapper home page in a new window.

11 – **Help** button
Opens the tip sheet in a new window.

12 – Map image
Spatial data displayed in an image.

13 – Overview map
Displays the map image’s relative location and extent.

Using the layer list

The layer list is used to determine which data layers will be visible on the map. The visibility of any layer listed can be toggled on or off by clicking in the checkbox located in the same row as the layer name (in the column labeled “Visible”), then clicking on the **Refresh** button. This feature provides the user with a great deal of flexibility in creating the actual maps displayed onscreen. Some data layers are set to appear only within certain map scale ranges; this will cause the data layers shown in the layer list to vary as one zooms in or out.

The layer list is also where the active data layer is selected. Several tools, such as **Identify**, **Find**, **HyperLink**, **Query**, **Select by Rectangle**, **Select by Line/Polygon**, **Select by Single Point** and **Buffer**, work only on the active layer. Any combination of data layers can be visible at any time, but only one layer can be active at any time. The active layer must also be visible for the above-mentioned tools to work. To select an active layer, click on the radio button located in the same row as the layer name (in the column labeled "Active").

Each data layer listed is linked to a web page that provides information on that layer, such as the source of the data, its attributes (i.e. descriptive information associated with the features in a data layer), codes used, etc. Simply click on the name of the data layer, and the web page will open in a new window. The "Visible" and "Active" labels shown at the top of the layer list are linked to web pages that provide short explanations of these concepts.

Using the Home, Help and Close buttons

The **Home** and **Help** buttons are used to access the ConservationMapper home page and tip sheet, respectively.

Figure 2. **Home** and **Help** buttons.

Clicking the **Home** button will open the ConservationMapper home page in a new window, while clicking the **Help** button will open up an HTML version of the thematic viewer tip sheet (a PDF version of the tip sheet can be found on the Help documents page of the ConservationMapper web site).

Once you're done working with a viewer, just click the **Close** button, and it will shut down.

Figure 3. **Close** button.

Basic Tools

Interactive maps offer several advantages over static maps, including the ability to zoom in and out, pan back and forth, and even access information on map features. The ConservationMapper thematic viewers include a number of basic tools that provide such capabilities and are easy to use—even for beginners!

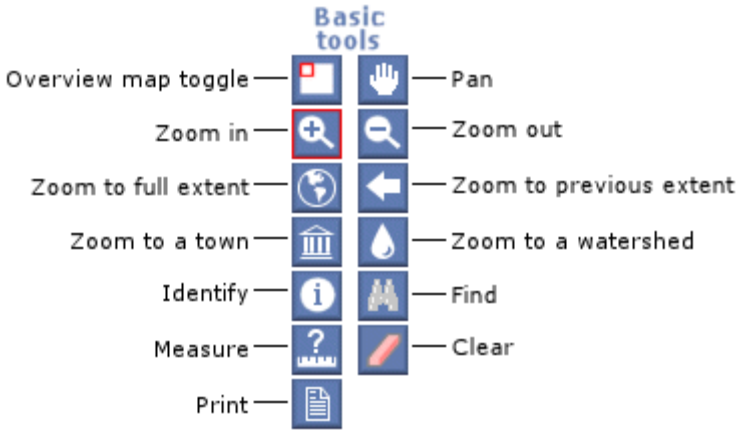

Figure 4. Basic tools.

Overview map toggle

When each thematic viewer is first opened, the overview map appears in the upper-left corner of the main map image by default. The **Overview Map Toggle** button can be used to remove it from the viewer.

Figure 5. **Overview Map Toggle** button.

Simply click the button, and the overview map will disappear. To make the overview map reappear, click on the button again.

Pan

The **Pan** tool allows the user to "move" the map in any direction. To use the tool, click on it with the left mouse button to activate it; a red box surrounding the button will appear to indicate that the tool is active.

Figure 6. Inactive (left) and active **Pan** buttons.

Move the cursor over the map (the cursor will appear as a crosshairs with arrows), and click and drag in the direction you want the map to "move." The shifted map image will then appear in the viewer.

Zoom in / zoom out

The **Zoom In** and **Zoom Out** tools located on the toolbar allow the user to change the map extent (i.e. the area shown in the map image) by zooming in or out.

Figure 7. Inactive **Zoom In** (left) and **Zoom Out** buttons.

To use either of these tools, first click on it with the left mouse button. You'll see a red box surrounding the button, indicating that the tool is active (the **Zoom In** tool is set to be active upon initial loading of the viewer).

Figure 8. Active **Zoom In** (left) and **Zoom Out** buttons.

Move the cursor over the map (the cursor will appear as a crosshairs) and click once. The map will then either zoom in towards that point, or zoom out away from that point, depending on which tool is active. You can also click and drag a rectangle on the map rather than click a single point; the map will then either zoom in to that area or zoom out from it.

Zoom to full extent / zoom to previous extent

The **Zoom to Full Extent** and **Zoom to Previous Extent** tools often prove to be very convenient when navigating the map.

Figure 9. **Zoom to Full Extent** (left) and **Zoom to Previous Extent** buttons.

Clicking the **Zoom to Full Extent** button will cause the map to zoom back to the extent shown upon initial loading of the viewer—namely, the southeastern Massachusetts region. The **Zoom to Previous Extent** button will, as its name indicates, cause the map to zoom back to its previous extent. However, one cannot go back any further than the immediate previous extent, since that is the only one kept in memory.

Zoom to a town / zoom to a watershed

The **Zoom to a Town** tool is a special feature that allows the user to quickly and easily zoom to a desired town, rather than search for it within the map image.

Figure 10. **Zoom to a Town** button.

To use the feature, click the button, and a form containing a drop-down menu and a **Go** button will appear in the viewer's text area.

Figure 11. Zoom to a Town form.

Select the town desired from the drop-down menu, then click the **Go** button to the right. The map will zoom to the extent of the town selected.

The **Zoom to a Watershed** feature works basically the same way as the **Zoom to a Town** feature.

Figure 12. **Zoom to a Watershed** button.

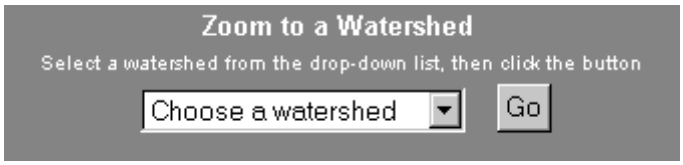

Figure 13. Zoom to a Watershed form.

Just click the button, select the watershed you wish to zoom to from the drop-down menu in the text area, then click the **Go** button. The map will zoom to the extent of the watershed selected (although watershed boundaries are not shown on all maps).

Identify

The **Identify** tool allows users to obtain descriptive information about a feature (i.e. its attributes) by simply clicking on that feature.

Figure 14. Inactive (left) and active **Identify** buttons.

To use this tool, first make sure the data layer containing the feature to be identified is active; the **Identify** tool only works on the active layer (to make a data layer active, click

on the radio button next to its name in the layer list). Click on the **Identify** button (the red box around the button indicates that it is active), then click on a feature on the map. The attributes for that feature will appear in tabular format within the text area, with each field (i.e. column) in the table representing a different attribute. Occasionally more than one feature may be accidentally clicked, especially if the features are very close together or the **Identify** tool is used at a small scale; in this case, the attributes for all the features clicked will be displayed, with each record (i.e. row) in the table representing a different feature. To prevent this from happening, try zooming in more before clicking.

When you are done viewing the attributes, click on the **Clear** button to clear the text area.

Figure 15. **Clear** button.

Find

The **Find** tool locates features based on a character string entered by the user; searches based on numeric values are not allowed. All character-based attribute fields in the active layer are searched. To use the tool, first make sure the desired data layer is active, then click the **Find** button.

Figure 16. **Find** button.

A form containing a text box and a button will appear in the text area.

Figure 17. Find form.

Simply type the desired character string in the text box (you don't need to put quotation marks around the string), click the **Find String** button, and the attributes of all features in the data layer that contain the string in any of their character-based attribute fields will be displayed in the text area. The corresponding features will also be highlighted in the map image. The **Find** tool is case sensitive, so make sure you use the correct case when entering the string into the text box.

To clear the map image and the text area, click the **Clear** button. Search results are not stored, so if a new search is performed without clearing the results of the old one, only the results of the new search are shown on the map image and in the text area.

Note: The first page of search results may show only the character-based attribute fields, while the remaining pages will show all of the attribute fields. This will hopefully be corrected in future versions of the thematic viewers.

Measure

The **Measure** tool allows the user to measure distances on the viewer's map image.

Figure 18. Inactive (left) and active **Measure** buttons.

When the **Measure** tool is clicked, two boxes displaying the line segment length and the total line length appear at the top of the map image.

Figure 19. Total line length and line segment length display.

Click on the map image to define the first point, then click again to define the second point. Continue clicking to add segments to the line. When you are finished, click the **Clear** button to clear the map image. To clear the measure totals and end measuring, click another interactive tool on the toolbar.

Clear

The **Clear** tool acts to reset the viewer following the use of the **Measure**, **Identify**, **Query**, **Find**, **Select by Rectangle**, **Select by Line/Polygon**, **Select by Single Point** and **Buffer** tools.

Figure 20. **Clear** button.

When clicked after using the **Measure** tool, it removes the line from the map image and resets both the line segment length and total line length to zero. When clicked after using the **Identify** tool, it removes any information displayed in the text area. When clicked after using the **Query**, **Find**, **Select by Rectangle**, **Select by Line/Polygon**, or **Select by Single Point** tools, it both clears the text area and deselects those features selected on the map image. Clicking it following use of the **Buffer** tool clears the text area, deselects all selected features, and removes any buffers drawn.

Print

To print the map displayed, click on the **Print** button.

Figure 21. **Print** button.

A form with a text box and a button will appear in the text area.

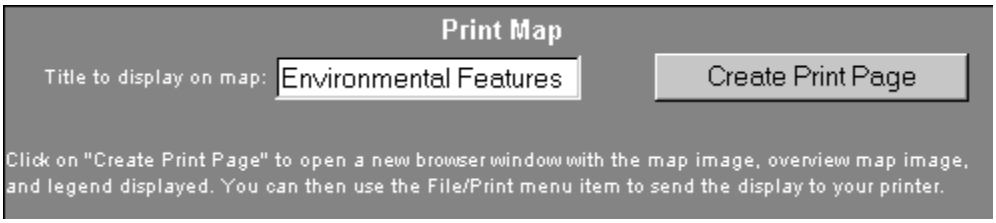

Figure 22. Print form.

Enter a title for the map into the text box, then click the **Create Print Page** button. A new browser window containing the map image, the overview map, and the legend will appear. The browser's **Print** function can then be used to print out the contents of the browser window.

To save any of the individual print page components, right-click over the desired component, select the **Save Picture As…** option in the context menu (shown as **Save Image** in Netscape), then save the image to your computer. In Internet Explorer the image can be saved in either Portable Network Graphics (.png) format, which is a bit-mapped graphics format similar to GIF, or in Bitmap (.bmp) format. In Netscape the image can only be saved in Portable Network Graphics format. The saved images can then be inserted into practically any document or presentation, where they can be arranged as desired. The images can also be edited using most any commercially available image processing software. Print page component images can also be inserted directly into a document or presentation without first saving them by right-clicking over the desired image, selecting **Copy** from the context menu, then pasting directly into your document or presentation.

Hyperlink

The **HyperLink** tool links a map feature to a web page containing information about that feature. Only the Wildlife Viewer contains this tool, and it can only be used on the viewer's wildlife data layers (i.e. *Breeding Bird Atlas* data, *Bird Observer* sightings, Harvard Museum of Comparative Zoology mammal and fish data, MassWildlife furbearer data, UMass Amherst mammal data, and National Museum of Natural History mammal data). Attempts to use the **HyperLink** tool on any other data layer will result in an error message.

Figure 23. Wildlife Viewer basic tools.

Figure 24. Inactive (left) and active **HyperLink** buttons.

To use the tool, first make sure the appropriate data layer is active. Click on the **HyperLink** button, then click on a feature on the map. A web page showing information about that feature will open in a new window. For the *Breeding Bird Atlas* data layer, the web page will contain a table of species records for the block that was clicked. For all other wildlife data layers, it will contain a table of sightings for the town that was clicked. In many cases the table will be continued on additional pages; links to these additional pages will appear both at the top and the bottom of each web page. The web pages are also resizable—just click and hold a corner or side of the window with the left mouse button, then drag it to the desired location.

The information displayed on the web pages can be saved, if desired. Simply use the left mouse button (the cursor will appear as an I-bar) and select the desired records. If the cursor moves outside of the table borders, all of the records will be automatically selected; make sure the cursor stays within the borders if you only want to select some of the records. Once you have made your selection, enter **Ctrl-C** on the keyboard to make a copy of the records. The records you copied can then be pasted into just about any spreadsheet program, where they can be processed further, if necessary. A somewhat easier way to save table records is to right-click anywhere in the window and choose **Select All** from the context menu, then right-click again and select **Copy**. The copied data can then be pasted into your spreadsheet program, where unnecessary information can easily be deleted.

Add a parcel datalayer

The **Add a parcel datalayer** tool, found only in the Conservation Value Viewer, allows the user to display parcel data for selected towns on the map image.

Figure 25. Conservation Value Viewer basic tools.

To use the tool, click the button, and a form containing a drop-down menu and two buttons will appear in the viewer's text area.

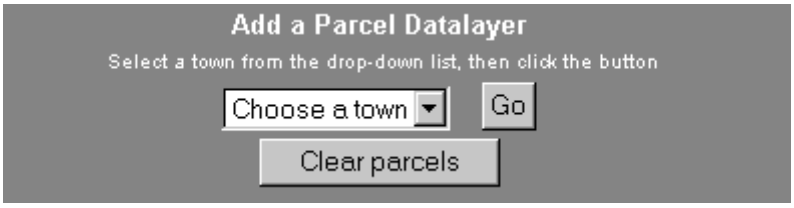

Figure 26. Add a parcel datalayer form.

Select the desired town from the drop-down list, then click the **Go** button. The map will zoom to the extent of the town selected, and the parcel data for that town will be displayed. The parcel datalayer will also appear in the layer list. To clear all parcel datalayers from the map image and from the layer list, just click the **Clear parcels** button in the form.

Advanced Tools

In addition to the basic tools discussed in the previous section, the ConservationMapper viewers also have several advanced tools available for selecting, querying, and buffering the data layers. We strongly suggest you read the instructions for using them in this guide before you attempt to use them in the viewers!

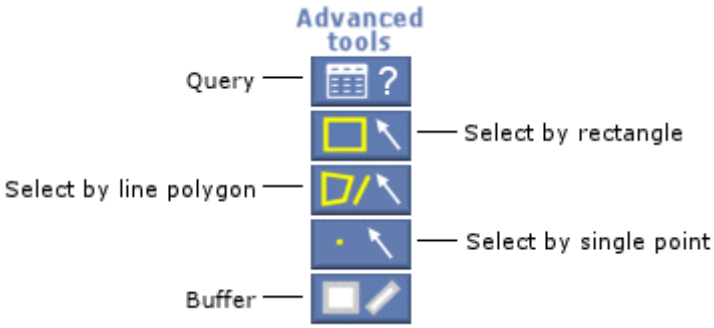

Figure 27. Advanced tools.

Query

The **Query** tool allows users to query a data layer based on the attributes associated with it. To use the tool, first make sure the desired data layer is active (as with the **Identify**, **Find** and **HyperLink** tools, the **Query** tool only works on the active layer), then click on the **Query** button.

Figure 28. **Query** button.

A form containing drop-down menus, text boxes, and several buttons will appear in the viewer's text area (you may have to use the scrollbar on the right side of the text area window in order to see all of the form's contents).

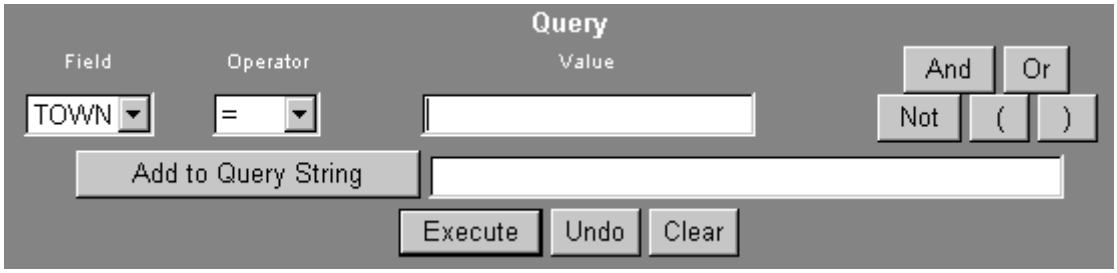

Figure 29. Query form.

Simple queries are composed of a **field**, an **operator**, and a **value**. To create a simple query in the query form, first select the desired field (i.e. attribute) on which the query will be done. Queries can be performed on either numeric or character-string attributes. If you

are unsure as to whether a certain attribute is defined as a number or a character string, check the data layer information.

Next, select the desired operator; available operators are listed below:

=	Equals; can be used with numeric or character string data
<	Less than; used with numeric data
>	Greater than; used with numeric data
<=	Less than or equal to; used with numeric data
>=	Greater than or equal to; used with numeric data
LIKE	Like, or similar to; used with character string data

Then enter the desired number or character string in the “Value” text box. If the selected attribute is numeric, then the value entered must be a number, e.g. 100, 1.414, etc. If the selected attribute is a character attribute, then the value entered must be a character string surrounded by double quotation marks, e.g. “S”, “John Smith”, “61A”, “508”, etc. Queries on character strings are case sensitive, so be careful when entering them.

The LIKE operator is a special operator that allows you to use wildcards when performing queries on character string attributes. There are two types of wildcards available: the multiple-character wildcard, designated by an asterisk (*****), and the single-character wildcard, designated by a question mark (**?**). The multiple-character wildcard, as its name suggests, is used as a placeholder for multiple characters within a string. For example, the expression

NAME LIKE “S*”

will return all features where the value of the NAME attribute begins with an “S”, e.g. “Smith”, “Sanderson”, “Sims”, etc. The single-character wildcard, on the other hand, is used as a placeholder for just one character. More than one single-character wildcard can be used in a string, with each one representing a single, non-blank character. For example, the expression

STATE_AGENCY LIKE “D??”

will select features where the value of the STATE_AGENCY attribute begins with “D” and has exactly three characters (e.g. “DEP”, “DEM”, “DOC”).

Once the field, operator and value have been entered for a simple query, click the **Add to Query String** button to enter the expression into the query string box. If you need to start over and create a new query expression, click the **Clear** button, and the expression will be removed from the query string box. If the query expression is okay as is, click the **Execute** button and the query will be performed, with the selected features highlighted in the map image, and their associated attribute information displayed in the text area.

Complex queries can be created by combining simple query expressions with the **And** and **Or** operators. The **And** operator allows you to select features that satisfy both of two query expressions. If, and only if, both expressions on either side of the **And** operator are true, then the entire expression is true. If either one—or both—of the expressions is false, the entire expression is evaluated as false.

Expression 1	AND	Expression 2	=	Result
True	and	True	=	True
True	and	False	=	False
False	and	True	=	False
False	and	False	=	False

For example, the expression

(AREA > 1000) AND (TOWN = “PLYMOUTH”)

will select features with an area greater than 1000, *and* located in the town of Plymouth. Features within Plymouth with an area less than or equal to 1000 will not be selected, nor will features with an area greater than 1000, but located outside of Plymouth.

The **Or** operator allows you to select features that satisfy at least one of two query expressions. If either one of the expressions on either side of the **Or** operator is true, then the entire expression is true. Only if both expressions are false does the entire expression evaluate to false.

Expression 1	OR	Expression 2	=	Result
True	or	True	=	True
True	or	False	=	True
False	or	True	=	True
False	or	False	=	False

The expression

(AREA > 1000) OR (TOWN = “PLYMOUTH”)

will select features that either have an area greater than 1000, are located in Plymouth, or both. Those features that are both located outside Plymouth and have an area less than or equal to 1000 will not be selected.

Complex queries may be composed of more than two simple queries; however, it may be necessary to use parentheses in order to force certain expressions to be evaluated first. For example, the expression

(NAME = “SMITH” AND TOWN = “TAUNTON”) OR AGE = 30

will most likely return different results than the expression

NAME = “SMITH” AND (TOWN = “TAUNTON” OR AGE = 30)

When using parentheses, make sure that every opening parenthesis is paired with a closing parenthesis; unclosed parenthetical expressions in the query string will result in errors.

Sometimes it may be easier to define the features you don’t want in a query rather than the ones you do. In this case the **Not** operator can be used with a query expression. For example, suppose we had a data layer containing well locations for the entire state of

Massachusetts, and we wanted to select all those wells situated outside the town of Easton. Without the **Not** operator, our expression would look something like this:

TOWN = “ABINGTON” OR TOWN = “ACTON” OR TOWN = “ACUSHNET” OR ……

and so on, with a TOWN = “town_name” simple query expression included for each town in the state, except Easton. By using the **Not** operator, our expression is greatly simplified:

NOT (TOWN = “EASTON”)

The **Not** operator can also be used in complex expressions with the **And** and **Or** operators:

(OWNER = “SMITH”) AND (NOT (TOWN = “PLYMOUTH”))

will retrieve those features outside the town of Plymouth owned by people named Smith.

One way to enter parentheses and the **And**, **Or** and **Not** operators into the query string box is to use the buttons on the right side of the form. Using the buttons will add an operator or parenthesis to the end of the string currently in the query string box. If you make a mistake and enter the wrong item, simply click the **Undo** button, and the last item entered into the query string box will be removed. Clicking the **Clear** button will remove the entire contents of the query string box.

As an example, let’s step through the process of entering the following complex expression into the query string box for the “Ground water discharge points” data layer in the Environmental Challenges viewer:

((TYPE = “C”) OR (TYPE = “L”)) AND (NOT (TOWN = “PLYMOUTH”))

This expression will select those features outside the town of Plymouth with a ground water discharge type of either “C” (car wash) or “L” (laundromat). Here’s how we could enter the expression:

1. Click the **(** button twice to put two opening parentheses into the query string box.
2. Select TYPE for the field and = for the operator; enter “C” into the value entry box.
3. Click the **Add to Query String** button to add the expression TYPE = “C” to the query string box.
4. Click the **)**, **Or** and **(** buttons to add “) OR (“ to the query string.
5. Select TYPE for the field and = for the operator; enter “L” into the value entry box.
6. Click the **Add to Query String** button to add the expression TYPE = “L” to the query string box.
7. Click the **)** button twice, then the **And**, **(**, **Not** and **(** buttons to add “)) AND (NOT (“ to the query string.
8. Select TOWN for the field and = for the operator; enter “PLYMOUTH” into the value entry box.
9. Click the **Add to Query String** button to add the expression TOWN = “PLYMOUTH” to the query string box.
10. Click the **)** button twice to append two closing parentheses to the query string.
11. Click the **Execute** button to execute the query.

It seems like a lot of steps to go through just to do a relatively straightforward query, but as you become more familiar with the query form, the process will become easier. It's also important to remember that the procedure outlined above is not the only way to enter a query string expression. For example, you could add each of the simple query expressions to the query string box using the field, operator, and value entry boxes along with the **Add to Query String** button, resulting in the following expression:

TYPE = "C" TYPE = "L" TOWN = "PLYMOUTH"

You could then go into the query string box and manually enter any additional operators or parentheses needed. In fact, the entire query string expression can be entered manually into the query string box. Once you become familiar with the various data layers and their associated attributes, this may ultimately be the quickest way to form and execute queries.

To clear the results of any query from the viewer, simply click the **Clear** button. Query results are not stored, so if a new query is performed without clearing the results of the previous one, only the results of the new query are shown on the map image and in the text area.

Select by rectangle

The **Select by Rectangle** tool, as its name implies, uses rectangles drawn on the map image by the user to select features. To use the tool, first make sure the desired layer is active, then click on the **Select by Rectangle** button. A red box will appear around the button, indicating that the tool is active.

Figure 30. Inactive (left) and active **Select by Rectangle** buttons.

Move the cursor over the map image, then click and drag with the left mouse button to draw the desired rectangle. Those features that are either wholly or partially within the rectangle will be selected, and will be highlighted on the map image. The corresponding attribute data for those selected features will appear in tabular form in the viewer's text area.

To clear the selection, simply click the **Clear** button.

Select by line / polygon

The **Select by Line / Polygon** tool allows the user to select features by drawing either a line or a polygon on the map image. To use the tool, check to see if the desired layer is active, then click on the **Select by Line / Polygon** button.

Figure 31. Inactive (left) and active **Select by Line / Polygon** buttons.

A form containing several buttons will appear in the text area.

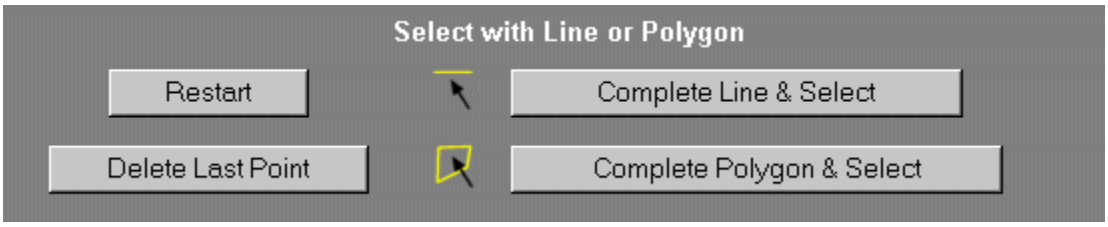

Figure 32. Select by Line/Polygon form.

To select features with a line, simply move the cursor over the map image and start clicking to create the line segments. Clicking the **Delete Last Point** button will remove the last line segment drawn; the **Restart** button will remove the entire line and allow you to start over. When you're done drawing the line, click the **Complete Line & Select** button. Those features on the map image which intersect the line will be highlighted, and their attributes displayed in the text area. Selecting features with a polygon is done pretty much the same way, except that clicking the **Complete Polygon & Select** button will automatically complete the polygon for you (i.e. a line segment will be drawn from the last point clicked to the first point). Those features on the map image that are either wholly or partially within the polygon will be highlighted, and their attributes displayed in the text area.

To clear the selection, just click the **Clear** button. As with the **Query** tool, **Select by Rectangle** and **Select by Line/Polygon** results are not stored; using either tool again without clearing previous results will result in a new set of features being selected.

Select by single point

The **Select by Single Point** tool allows the user to select a single feature with the click of a mouse button. To use this tool, make sure the desired data layer is active, then click on the **Select by Single Point** button.

Figure 33. Inactive (left) and active **Select by Single Point** buttons.

Move the cursor over the map image (it will appear as a hand) and click on the desired feature. The feature will be highlighted in the map image, and its attributes displayed in the text area. As with the **Identify** tool, more than one feature may be inadvertently selected if the features are very close together or the **Select by Single Point** tool is used at a small scale. To keep this from happening, make sure you've zoomed in far enough.

To clear the text area and deselect the feature, click the **Clear** button. Clicking on another feature without clearing the currently selected feature will automatically deselect the current feature and select the new one.

Buffer

Once one or more features have been selected, the **Buffer** tool can be used to create a buffer around those features. The buffer can, in turn, be used to select features from the same data layer or another data layer. To use the tool, click the **Buffer** button (an error message will appear if you have not selected any features).

Figure 34. **Buffer** button.

A form containing a drop-down menu, a text box, a checkbox, and a button will appear in the text area.

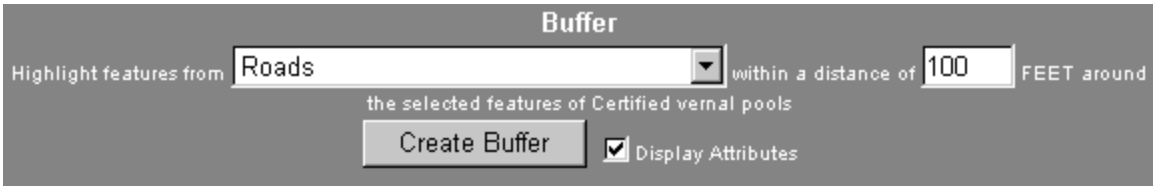

Figure 35. Buffer form.

If the buffer to be created won't be used to select features from a data layer, make sure the **No Layer** option appears in the drop-down list. Enter the buffer width (in feet) in the text box, then click the **Create Buffer** button. The map image will redraw, with a buffer of the indicated width appearing around each of the selected features. In order to use the buffer to select features from a data layer, select the desired layer from the drop-down list. If you also want to display the attributes of those features selected by the buffer, check the **Display Attributes** checkbox. Enter the desired buffer width in the text box, then click the **Create Buffer** button. Those features in the selected data layer that intersect the buffer will be highlighted, and, if the **Display Attributes** box was checked, the attributes of those selected features will be displayed in the text area.

To remove the buffer, selected features, and the attribute data displayed in the text area, just click the **Clear** button.