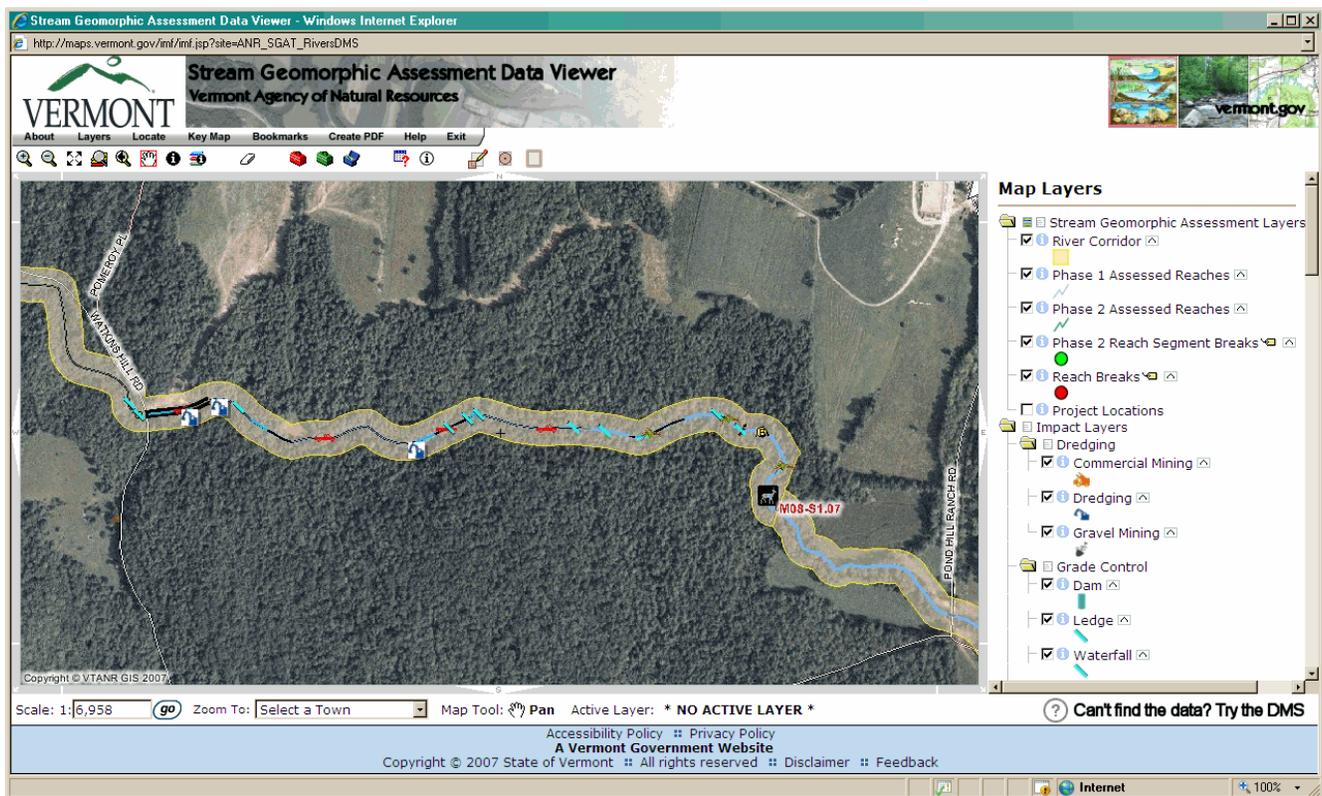


# River Management Stream Geomorphic Assessment Viewer (RMSGAV)



## Instruction Manual

## Introduction

The River Management Stream Geomorphic Assessment Viewer is a web-based map program available through the Vermont Agency of Natural Resources (VT ANR). The Data Viewer provides both public and private groups with geographic information concerning physical assessments of Vermont watersheds. The physical or stream geomorphic assessments are used to help make more informed river protection, management, and restoration decisions.

Stream geomorphic data available on the Data Viewer has been collected using VT ANR protocols, and includes both Phase 1 and Phase 2 assessment data. These protocols can be downloaded at: [http://www.anr.state.vt.us/dec/waterq/rivers/htm/rv\\_geoassesspro.htm](http://www.anr.state.vt.us/dec/waterq/rivers/htm/rv_geoassesspro.htm). The Phase 1 Watershed Assessment consists of watershed-scale evaluation using existing data such as maps, orthophotos, specialist/local knowledge, and some field observation (“windshield surveys”). Phase 1 data include reference stream typing by reach, stream impact ratings, and provisional reach geomorphic condition. The Phase 2 Rapid Assessment consists of more in-depth field evaluation of selected reaches, providing current stream types as well as geomorphic condition and sensitivity ratings by reach. Note that not all Vermont streams currently have assessment data, and some assessed streams do not yet have Phase 2 data. Please also note that the VT ANR River Management Program directly or indirectly contracts the assessment work and conducts data quality assurance checks to ensure the accuracy of the data made available through the Data Viewer. Some data sets are a work in progress and have not passed all quality assurance checks. Each report constructed for printing from the Viewer indicates whether data quality assurance checks are "complete" or if the data should still be viewed as "provisional." The River Management Program Scientists should be consulted on the appropriate use of this data.

The Data Viewer is designed to allow a wide range of users including planners, policy makers, academics, scientists, and the general public to view the available stream geomorphic data throughout Vermont. Users can view maps, create maps, access data reports for specific locations, and query the data. This document aims to present the tools and capabilities of the Data Viewer, functioning as a reference guide for various user needs. The document is organized according to the basic parts of the Viewer window: Menu Bar, Tool Bar, and Active Status Bar. Each bar contains a set of functions and capabilities; however, the user may also wish to locate a particular function via the Table of Contents or Index. Contact information for the VT ANR River Management Program is listed at the end of the document.

## Acknowledgements

Thanks to the Natural Resources Conservation Service (NRCS), USDA, for Data Viewer development funding.

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Thanks to the many state and local agencies and planners, private sector scientists, local watershed groups, and all our partners for their continued support and effort in building Vermont stream geomorphic knowledge and public awareness.

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## Getting Started

Use the following link to navigate to the RMSGAV (Data Viewer):

[http://maps.vermont.gov/imf/sites/ANR\\_SGAT\\_RiversDMS/jsp/launch.jsp?popup\\_blocked=true](http://maps.vermont.gov/imf/sites/ANR_SGAT_RiversDMS/jsp/launch.jsp?popup_blocked=true)

The first screen you will see is a disclaimer (figure 1). Please read and make sure you understand the policies explained in this text.

**VERMONT** River Management Stream Geomorphic Assessment Viewer  
Vermont Agency of Natural Resources vermont.gov

**Welcome to the River Management Stream Geomorphic Assessment Viewer (RMSGAV)**

The purpose of this web map is to provide both public and private groups with geographic information concerning physical assessments of Vermont river watersheds. The physical or stream geomorphic assessments are used to help make more informed river protection, management and restoration decisions. The Viewer is constructed to help with data report and map production for assessed streams and watersheds.

This lightweight web-based viewer provides access to powerful tools and extensive geographic information, designed with an audience of non-expert users in mind. Before continuing please read the following description of the ANR data quality assurance program:

The Geomorphic Assessment Viewer is provided to give the public access to river information collected largely by private sector scientists throughout the State of Vermont. The ANR River Management Program directly or indirectly contracts the assessment work and conducts data quality assurance checks to ensure the accuracy of the data made available through this site. Some data sets are a work in progress and have not passed all quality assurance checks. Each report constructed for printing from the Viewer indicates whether data quality assurance checks are "complete" or if the data should still be viewed as "provisional." The River Management Program Scientists should be consulted on the appropriate use of this data.

- If you are new to the application, check out our quick, informative [Tutorial](#).
- Read, understand & accept our [Terms of Use](#).

**!** Important: We have detected you are using a Pop-up blocker.  
You must disable this feature while using this web map. [More Info...](#)  
Once you have disabled your Pop-up blocker, click below to verify

 **Launch Map Viewer**

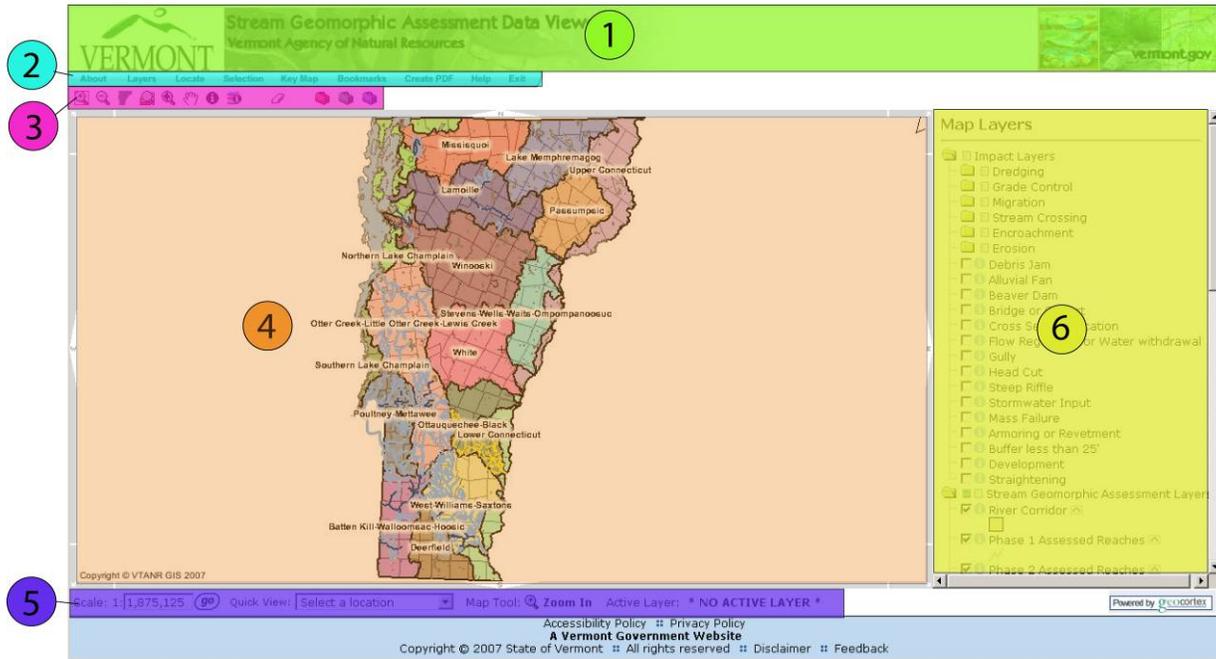
The web map viewer uses licensed [Geocortex® IMF](#) technology

**Figure 1** Image of Data Viewer initial window with disclaimer, policies, pop-up detection, and map launch.

The Data Viewer uses pop-up windows to display some of its information. Before you can get started with the Data Viewer, you must disable your pop-up blocker. To find out if your pop-up blocker is on and needs to be disabled, click the test button found in the initial window (figure 1). If your pop-up blocker is disabled, a window will appear that says “Thank you! You have successfully disabled your Pop-up blocker”. If you have not disabled your pop-up blocker, a window will appear with the message “Error: Your pop-up blocker was not successfully disabled”. Click on the “More Info...” link for directions on disabling pop-up blockers (figure 1). For those using Internet Explorer, go to the tools menu and either turn off the pop-up blocker or allow pop-ups from this website. A drop down message located just below the tool bar may appear that says “Pop-up blocked. To see this pop-up or additional options click here...” By clicking there, you have the same options to disable the blocker as in the tools menu. Once you have disabled the pop-up blocker, click the “Launch Map Viewer” icon (figure 1).

# Basic Navigation

When the program first opens, the following image will be visible (figure 2):



**Figure 2** The Data Viewer main window

1. Banner
2. Menu Bar
3. Tool Bar
4. Main Display
  - A map of Vermont with all 17 planning basins
  - Phase 1 assessed rivers in light blue
  - Phase 2 assessed rivers in green blue
5. Active Status Bar
6. Active Menu Window (default “map layers”)

## The Banner

(Figure 2, Number 1)

The banner (figure 2, number 1) provides links to sponsors of the Data Viewer. The link on the left will take you to the Agency of Natural Resources page (<http://www.anr.state.vt.us/index.cfm>) and the link on the right will take you to the Vermont state government page (<http://www.vermont.gov>).

## Menu Bar

(Figure 2, Number 2)

A nine-button Menu Bar is located just below the Banner (figure 3). When you click on any of these buttons (except “Help” and “Exit”), the Active menu window (figure 2, number 6) will change to reflect the chosen tool.



Figure 3 The menu bar

**About:** Click the ‘about’ button to learn about the Geocortex IMF application framework.

**Layers:** The layers menu is the default active menu for the Data Viewer. For those familiar with ArcMap or ArcView, the layers menu is similar to the table of contents. When the Layers button is selected from the Menu Bar, a list of map feature types will become visible in the Active Menu Window. All layers can be turned on/off and their symbols can be modified.

**Turning on and off layers-** A check box appears next to each layer in the Layers Active Menu Window. The box can be either white or grey. Any white box may be turned on; if a box is grey, see the ‘Scale’ section below. To turn a layer on, click the box and a check will appear:   River Corridor . To turn the layer off, click the box again and the check will disappear:   Project Locations. Layers are arranged in folders. To see all of the layers in a folder, click on a closed folder icon:   Impact Layers; the folder icon will expand into an open folder symbol:   Impact Layers and underneath will be a listing of all the layers in that folder. Some folders have these icons located next to them:   . The icon on the left will turn on all the layers in that folder and the icon on the right will turn all the layers off in that folder.

By default, each time a layer is turned on or off the map will refresh. This can sometimes be time consuming. The user can set the map to refresh on command rather than every time a layer is turned on or off. There is a check box in the Layer Active Menu Window located below all of the layers that is called “Automatically Refresh Map”. After removing the check from this box, a refresh button will appear just above the box. The user will have to hit this button to refresh the map.

**Scale-** The scale of a map is the amount of actual land area represented by a unit of area on the map. For example on a map with a scale of 1:100,000, every inch on the map represents 100,000 inches on the ground. The smaller the scale, the less land is represented for every inch on the map and the more zoomed in the map appears. Not all layers are available at all scales. If a layer is available to be turned on, the box next to it will be white. If it is not available, the box will be grey. To turn on a layer with a grey box, the user must zoom to the proper scale. A plus  Reach Breaks  sign is located to the right of the layer name. Click on the plus icon, and the map will be zoomed to the proper scale in order for the layer to be available. Most often the map will have to be zoomed in closer to display the layer, but if it has to be zoomed out to view the layer, a

minus sign will appear next to the layer name. Click on the minus sign in the same way that a plus sign is used to alter the scale. The scale can be altered manually by typing it into the active status bar (see Active Status Bar section, page 20).

**Symbols-** Each layer has an associated symbol that represents it on the map. The symbol is located directly below the layer in the active menu window. Symbols only appear when their associated layers are turned on. If a symbol is not displayed below the layer name on the Active Menu Window, zoom to the proper scale when the layer becomes available, and turn the layer on. Some layers have an icon located to the right of the name  Phase 1 Assessed Reaches  that allows you to show or hide the layer symbol in the Active Menu Window. Clicking on the  icon will hide the symbol below the layer name in the Active Menu Window but it will not affect the map. At the bottom of the Layer Active Menu Window there is a “Show Legends” check box. When this box is unchecked all active layers’ symbols will be hidden.

Nearly all layers have default symbols set but the appearance of the project location symbol can be modified. To modify the symbol, click on the colored triangular symbol to the right of the layer name   Project Locations . This will bring up the Symbolize Layer Active Menu Window. Under “Polygon Symbolization” in this window, the user can set the parameters for the fill and outline of the project location symbol. Changeable parameters include: color, type, and width. Under “Label Symbolization”, the project location labels can also be changed, according to color, size, type, and maximum scale. To see these changes on the Main Display, press the submit button.

**Labels-** Map labels are available for many layers. A label consists of a small amount of text summarizing an important field of information for a layer (figure 4). All layers with labels that can be turned on have a tag icon to the right of the layer name:   Reach Breaks . When the labels are turned on, the tags are yellow. To turn the label off, click the tag and it becomes grey; clicking a grey tag icon will turn the label back on. Labels are only visible at certain scales. For nearly all layers, the labels become visible when the scale is at 1:100,000 or less.

**Note: 1:100,000 is the label threshold (i.e., at 1:100,001 the reach point labels will not appear).**

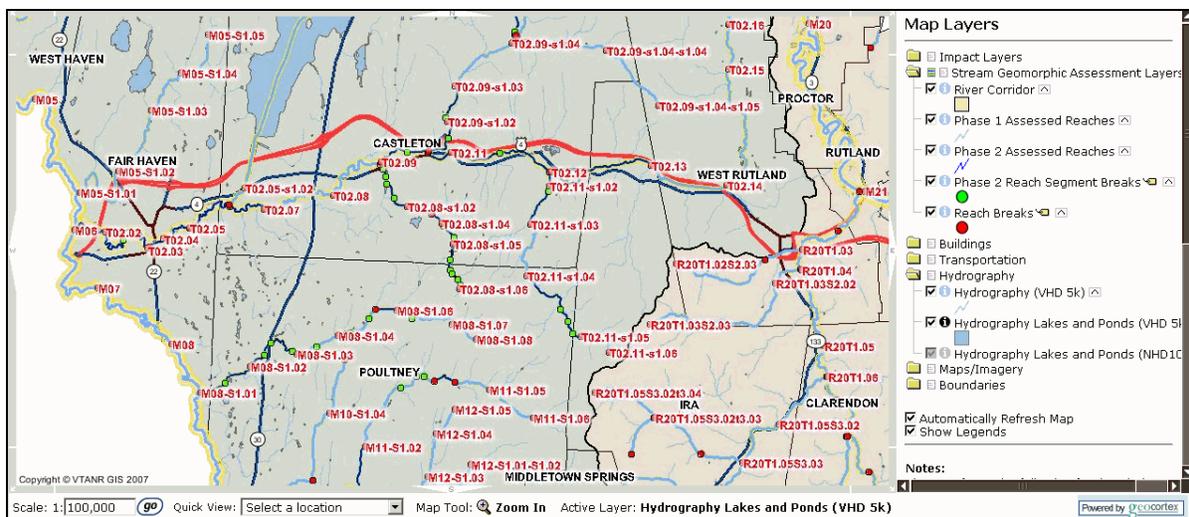
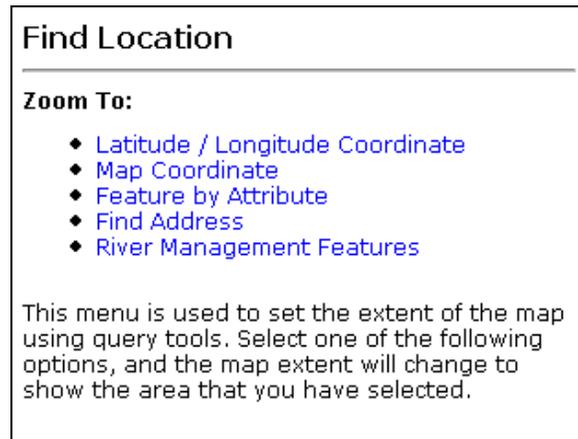


Figure 4 Map with reach point labels

**Locate:** The locate menu (accessed from the Menu Bar, figure 3) allows a user to navigate to a location in Vermont based on certain types of site information. When “Locate” is clicked on the Menu Bar, the Find Location menu (figure 5) appears in the Active Menu Window.



**Figure 5** The “Find Location” active menu, opened by pressing the ‘locate’ button

The Find Location menu provides five ways to query a location: Latitude/Longitude coordinates, Map Coordinate, Feature by Attribute, Find Address, and River Management Features (figure 5). When a user selects one of these options, the map extent zooms to the results of this query. The options are discussed in detail below.

**Latitude/longitude coordinate-** Clicking on the latitude/longitude coordinate option in the “Find Location” Active Menu Window (figure 5) will bring up another screen in the Active Menu Window. In this window, the user enters the latitude and longitude coordinates (+/-xx° xx’ xx.xxx”) for a desired location. The width of the map can also be selected. These parameters allow the user to specify where a map will be centered, as well as its extent (or scale). This option allows a user to navigate quickly to a known coordinate location. For example, a user might enter a set of coordinates from another data source (such as fish population data) in order to see the stream geomorphic conditions of the site.

**Map coordinate-** This option is very similar to the latitude/longitude coordinate option; however, the coordinates are relative to the current map’s extent rather than to external geographic locations. Clicking on the “Map Coordinate” option in the “Find Location” Active Menu Window (figure 5) brings up the “Zoom to Map Coordinate” screen in the Active Menu Window. In this screen, the user enters the x, y coordinates that they want to zoom in on. The user also sets the width of the map. This option allows the user to zoom into a particular area and set the extent of the resulting map.

**Feature by attribute-** This option allows the user to zoom the map based upon a query of layer attributes. Clicking on this option in the “Find Location” Active Menu Window (figure 5) will bring up the “Find by Attribute” screen in the Active Menu Window (figure 6).

**Find By Attribute**

Select the layer and a field from the layer, type in a value to search for, then press the Submit button. If the value is found in the layer's attribute table, the map will zoom to the extent of the feature(s) with that attribute value.

**Layer Name**

**Field**

**Search Operator**

**Attribute Value**

Find within visible extent

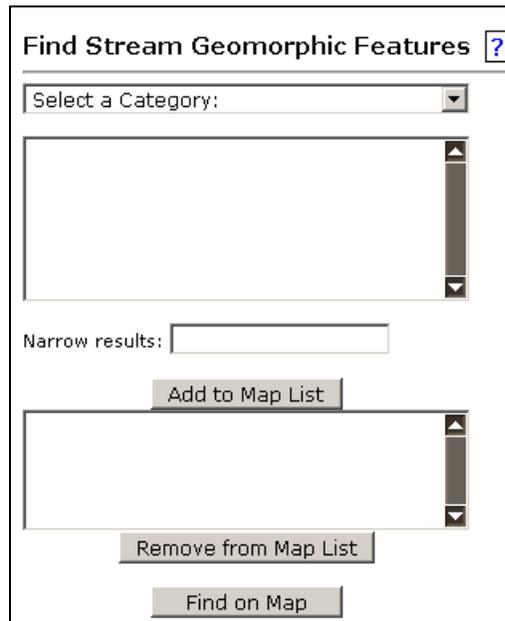
**Figure 6** The “Find by Attribute” Active Window zooms to areas based upon layer attributes.

In the “Find by Attribute” Active Menu window, there are a number of parameters for the user to set. The map is then zoomed to the results. The first parameter is Layer Name; the user may choose one of ten layers for the query. Within that layer, the user may select a field (a category of data found within one layer) for the search.

Once the layer name and field have been selected, the user chooses a search operator and enters an attribute value. The attribute value is a certain data value for the selected field (e.g., an attribute value for the field Town Name = Rutland). The search operator describes the relationship between the selected field and the attribute value. The search operator determines the subset of data shown in the resulting map. Examples of search operators include: equals, less than, greater than, and contains. For instance, if the layer is Vermont Town Boundaries and the field is “Town Name”, selecting “equals” for the search operator and inputting a town (e.g. Poultney) will zoom the map to the chosen town. Another example is as follows: setting the layer to “Reach Breaks”, the field to “Channel Width”, the search operator to “greater than” and the attribute value to “10”, will zoom the map to the extent of river reaches with channel widths greater than 10’. There is an “Example Values” button located at the bottom of the window that provides examples of attribute values for the given field. The query can be conducted on the entire state or only in the visible extent of the current main view; this query limit is defined by selecting the “Find within Visible Extent” check box.

**Find address-** This option allows the user to zoom the map to a particular Vermont address. After clicking on the “Find Address” option in the “Find Location” Active Menu Window (figure 5) a “Zoom to Address” Menu appears in the Active Menu Window. In this window, the user can enter the Street Number, Street Name, and Town Name, and the map will zoom to that location. The map will automatically zoom to a scale of 1:10,000.

**River management features-** This option allows the user to zoom the map to particular river management features. When the “River Management Features” option is clicked in the “Find Location” Active Menu Window (figure 5), the “Find Stream Geomorphic Features” menu appears in the Active Menu Window (figure 7).



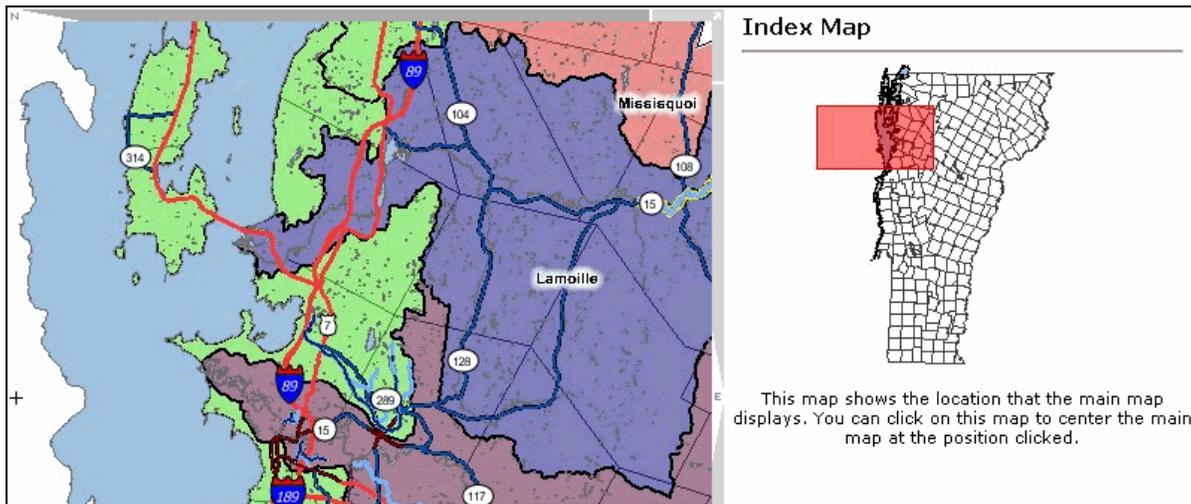
**Figure 7** The “Find Stream Geomorphic Features” active menu. Accessed by using “River Management Features” to “Find Location”

A search can be based on a number of categories. A list of the available categories is located below:

- Find Stream by Name
- Find Watershed Planning Basin
- Find Phase 1 Project
- Find Phase 2 Project
- Find Phase 1 Assessed Reaches
- Find Phase 2 Assessed Reaches
- Find SGAT Project by Name

After a category is chosen from the dropdown menu, all of the features registered in the DMS for that category will populate the results box just below (figure 7). A word of caution, it may take a few tries to populate the results box after selecting a category to search by. Once the results box is populated with features the user selects the desired features from the list to be displayed on the map. The user can filter the results by entering a value into the narrow results box (figure 7). For example, when the results box is populated with the list of all the phase 1 assessed reaches, there is a large amount of data. The user can narrow the results list to only tributaries by typing the letter “T” in the narrow results box. The user selects which results are displayed on the map. Selected features populate the lower box (figure 7). Features are selected by highlighting the desired feature in the results box and then clicking on the **Add to Map List** button. Selected features can be removed from the list by highlighting them and clicking on the **Remove from Map List** button. To display the features located in the bottom box, click the **Find on Map** button. The map will automatically navigate to the location, and the selected features will be highlighted and labeled.

**Key Map:** The key map menu (figure 3) displays a window with a map of Vermont’s full extent and your exact location shown within a red box (figure 8). The box orients the user to the current location and scale of the Main Display map viewer relative to the entire state of Vermont. This key map can also be used for large navigational jumps. Click on another location in Vermont and your screen will now be centered in this new location.



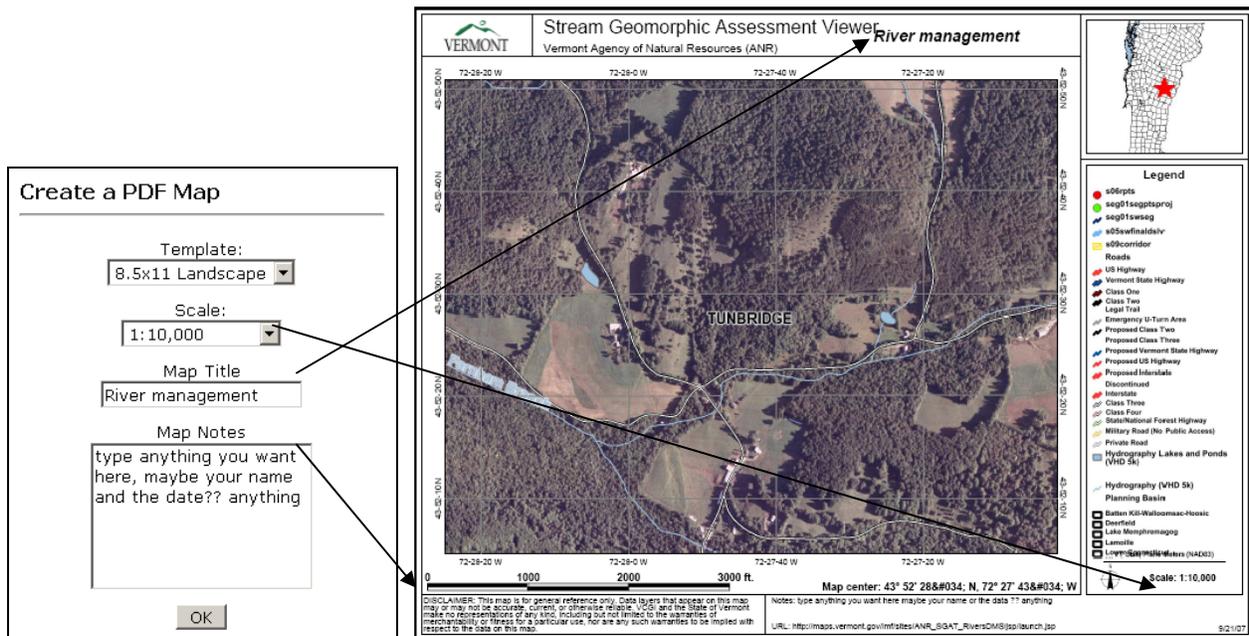
**Figure 8** The Key map window with current extent (left) and location within full extent of Vermont (right).

**Bookmarks:** The bookmarks menu (figure 3) allows a user to name and save a specific location and map scale. The user can return quickly to that location and scale during subsequent Data Viewer sessions. For example, a user might navigate to the Black River at a 1:200,000 scale. To setup the bookmark, the user selects “Bookmarks” from the Menu Bar. The user clicks on “add current extent” and enters a name, such as “Black River Basin”, and clicks “OK.” “Black River Basin” is added to the list of bookmarks. When the user navigates the Main Display map elsewhere, s/he can retrieve the Black River Basin bookmark by returning to Bookmarks. These bookmarks are saved within your temporary internet files so they will be remembered the next time you log on. Bookmarks can be erased by clicking the red “x” just to the left of the bookmark name.

**Create PDF:** The create PDF menu (figure 3) allows a user to save the map as a PDF file. There are various templates and orientations available for the layout. Choosing “Create PDF” button in the menu bar will cause the “Create PDF” view to appear in the active menu window (figure 9, left). The following steps need to be completed to create a PDF file of the current map:

- Select the template (8.5 x 11, 8.5 x 14, or 11 x 17) and orientation (landscape or portrait).
- Set the scale. Or use the current extent.
- Choose the Title (up to 29 characters long).
- Write a brief set of notes about the current map.

After a few seconds, the map will be generated (figure 9, right). To view the map, click on the [\[ open map \]](#) hyperlink in the Active Menu Window. By default the PDF file will have a north arrow, a legend, a location map, a scale, a grid, the date, and the latitude/longitude coordinate for the center of the map. Once created, the map opens in Adobe Acrobat, where it can be saved, printed, or viewed.



**Figure 9** Elements of creating a PDF file of your map. Arrows show where user inputs (left) will appear on the generated map (right).

**Help:** The Help menu (figure 3) provides information that is specific to the Geocortex IMF environment and basic GIS concepts. It is composed of a tutorial, task-based help, and an explanation of the tools and functions. This user guide differs from the help menu in that it provides more information about the types of data available and what can be done with them.

**Exit:** This button (figure 3) is an alternative way to exit the viewer rather than using the “X” button in the top right corner.

## Tool Bar

(Figure 2, Number 3)

The Tool Bar (figure 10) contains icons for map navigation, feature identification, data acquisition and query, editing, and more advanced tool functions. A red box appears around the tool icon when it is active.



**Figure 10** The tool bar

**Zoom in:**  To navigate to a smaller view scale, single click on the destination area in the map view. Alternatively, draw a box around the destination area, and the map will automatically be zoomed to the extent of the box.

**Zoom out:**  Single click on the map to zoom out.

**Zoom to full extent:**  Click this tool icon to return to the full view of the state of Vermont. A word of caution, as you navigate through the Data Viewer the icon may change into , but its function remains the same.

**Zoom to a Selected Layer:**  If you have an active layer, this tool will zoom to the extent of that layer. A layer is made active by clicking on the blue button  to the left of the layer name, thereby changing it to a black button  in the “layers” Active Menu Window. For more information on active layers see the “Setting an active layer” section below (page 20).

**Zoom previous:**  This tool returns the map view to the most recent previous zoom extent. It operates similarly to the back button in an Internet browser. Only the scale and location of the previous map are retrieved; this tool does not alter layers or labels.

**Pan:**  This tool enables map navigation. The user clicks on the map and drags it to the desired location. The user can also navigate around by clicking on the four arrows, each located at an edge of the map; the map will move towards the direction of the arrow.

**Identify:**  This tool allows the user to acquire data contained in one layer for any given location. The information provided is determined by which layer is set as the active layer. The procedure for setting the active layer is outlined above in the “Zoom to a Selected Layer” tool description. For more information on active layers see the “Setting an active layer” section below (page 20). Once the active layer is set, the user clicks on a map location. Any data specific to the chosen active layer that is available for the location will be shown in the “Identify Results” Active Menu Window (figure 11). For example, if the layer “Phase 1 Assessed Reaches” is the active layer, clicking on any Phase 1 assessed reach with the “identify” button will result Phase 1 data for that reach appearing in the Active Menu Window within a few seconds. To retrieve all of the Phase 1 data click on the “More data” link to the Phase 1 Report (figure 11).

Identify Results	
<b>Coordinate Position</b>	
Geographic: 43° 36' 37" N, 73° 11' 6" W	
<b>Phase 1 Assessed Reaches</b>	
Reach ID:	T02.08-s1.01
Link to Phase 1 Report:	<a href="#">More data</a>
Project Name:	Castleton River

**Figure 11** Results of the active layer info tool used on Phase 1 assessed reaches

A pop-up window will open which contains a PDF phase 1 report from the online Data Management System (DMS). For more information on the DMS see page 21. Phase 2 data can also be retrieved by the same procedure using “Phase 2 Assessed Reaches” as the active layer.

**Identify visible:**  This tool displays information for every layer that is in the chosen geographic location. It provides the easiest way to get all the information about a specific area. But for users unfamiliar with our data format, the results of this process may be overwhelming. Time is saved not having to make a layer “active”. However, identify visible is a time consuming calculation that brings up a lot of data. After clicking a location with the tool, a pop-up window will appear in approximately ~15-20 seconds. In this window, data will display from the following broad categories for the exact location chosen: coordinate position, NAIP Color Orthophotos, Planning Basin, River Corridor, Phase 1 Assessed Reaches, Phase 2 Assessed Reaches, Reach Breaks, Bank Erosion, and Impacts.

**Clear Selection:**  This tool allows the user to erase all lines, polygons, labels, and selected (highlighted) features added to the map. For more information on user added graphics, see the ‘Markup tool

box' section below (pages 18-19). If only one user modification exists, it will be erased instantly. If more than one modification exists, the "Clear Selections and User Added Graphics" Active Menu Window will appear. This menu contains a list of all user-added graphics and labels. To delete any or all of these graphics and labels, check the box to the left of the item on the list and click ok.

## ***Tool boxes***

The tool bar has specialized tools that can be found within the red, green, and blue tool boxes.

**Advanced tools:**  Click to open the toolbox.

**Measure a distance:**  - This tool calculates the distance (in feet) between two or more points. The user clicks the map at each end of the desired location with the "Measure a distance" tool on. The "Measure a Distance Tool" window appears in the Active Menu window. Listed are the starting/ending coordinates, distance (feet), and the true course of the line (in degrees). This information is provided for each line drawn and the total distance is given for all the lines combined.

**Measure a user drawn area:**  - This tool calculates the distance of a user defined polygon (in square feet). With this tool as the active tool, the user clicks on the map, creating the vertices of a polygon. The area is calculated each time the polygon is expanded, and the coordinates for each vertex are provided. Some applications of this tool are finding out the area of a project location or finding out the area along a river corridor that has a buffer less than 5'.

**Save a project** (as an SSN file) to your computer:  - Markups (including points, lines, polygons, XY coordinates, and text) as well as bookmarks can be stored as a file on your computer for future use by saving your current map project. To do so click on the "Save a project" button in the advanced toolbox, this brings up the "Save Session" menu in the Active Menu Window. In this window click the "Save session now" link. In Internet explorer there is the option to rename the file and choose where it is saved. If running Mozilla Firefox, the project will be automatically saved to the desktop with the default name. The Data Viewer will choose a different name every time to avoid replacing data.

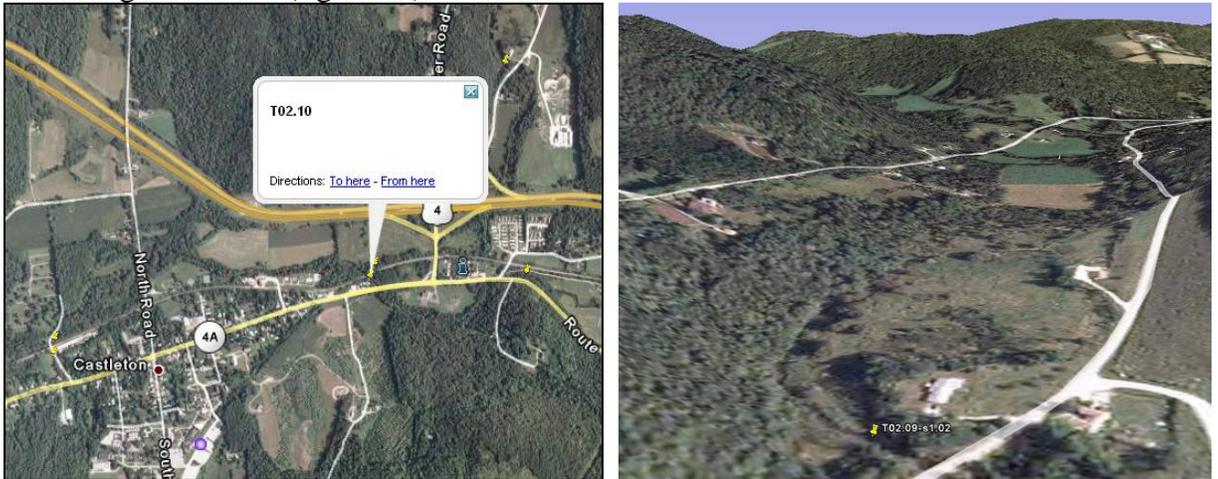
**Open a project** (SSN file):  - To restore a session at a later date, click the 'open session' icon in the advanced toolbox.

**Email a screen shot of the main display:**  - Choose the email button from the advanced toolbox. This will bring up the "Email the Map Image" screen in the Active Menu Window. In this window, enter the email recipient(s) and your email address, select the file type (PDF or JPG), and enter a short message. To finish sending the email, click the "OK" button. In the email there will be an automated message and an attachment of the main display screenshot.

**Extract data:**  - After clicking on the "extract data" icon in the advanced toolbox, the "Extract Data" menu will appear in the Active Menu Window. In this window the user has the option to extract map layers in the form of various data types listed below. The user selects one layer at a time to extract from the "Layer Name" drop down menu in the "Extract Data" Active Menu Window. The user also sets the extent of the extraction: current view or entire state. The extracted files are saved as a .zip file on the server temporarily and will be available for download for a short period of time. The procedure for extraction is basically the same for all of the file types. However, extracting to KML files requires additional steps (see below).

-Shapefile: Extract data layers as a shapefile that can be opened in GIS applications. Not all of the layers can be extracted to a shapefile. Currently (May 2008) Hydrography, roads, and town boundaries will not extract as a shapefile but all other layers work. The data layer to be extracted is chosen, and the resulting zip file is available for download in the "Extract Layer" Active Menu window.

- GML: Extract data layers as a “Geography Markup Language” file. These types of files can present attribute and vector data on web browsers.
- KML: Extract data layers as the file type that Google Earth uses. Google Earth allows 2D and 3D viewing of the data (figure 12).



**Figure 12** A map exported as a KML file and opened in Google Earth with elevation represented in 3D (right).

In the “Extract Data to KML” window, the user defines the layer to extract and the extent of extraction (i.e. the entire state or the current view). After clicking the “OK” button, the attribute data is chosen that will be exported with this file (figure 13).

Name your extract folder:

Briefly describe your extract folder:

Select a field to provide a name for each placemark:

Select a field to provide a description for each placemark:

Select a quantity field to provide a 3D representation of each placemark relative to the others:

**Figure 13** Input attribute data that will be exported with file

The extracted folder is named and a description is given in the first 2 boxes. Then the field that will be used to name each placemark is defined. The placemarks are symbolized in Google Earth with yellow thumbtacks by default (figure 12). In this case the “Reach Point ID” field was chosen; all placemarks in Google Earth will be labeled with the Reach Point ID. In the next box, the user defines a field that will be used for a description at each placemark. In the example provided above (figure 13) the placemarks will have the Reach Point ID and the channel width labeled. If the extracted file is going to be in 3 dimensions, the user has to define which field will provide representation of placemarks compared to other placemarks; for example, choosing height would sort the placemarks across the map based upon their elevation (providing a more 3D look). After clicking the “OK” button again, the “Extract layer to KML” screen will appear

again in the Active Menu window. This window gives a success message and two options. The extracted KML file can either be downloaded as a ZIP file or opened with Google Earth.

-XLS: Export data as an Excel file. All data can be exported to an .xls file. The user defines the layer to be extracted and the geographic extent of the extraction. Excel documents with latitude/longitude coordinates can be converted into shapefiles in most GIS software.

-Map image: Export a screen shot of the main display to be opened with other image programs.

-Markup shapefile: Any points, lines or polygons constituting map markups that can be added to the map can be exported as a shapefile.

## Markup tools:

**Add a point to map:**  - With this tool a point is added to the map wherever on the main display the user clicks. Once the user clicks a location, the “Point Markup Tool” window will appear in the Active Menu window where the user defines the symbol, color, size, and text of the point. The point can be automatically labeled with latitude/longitude or UTM coordinates. Adding points to the map can be useful for marking a location to return to or flagging an area of special concern.

**Add a line to map:**  - With this tool a line graphic can be added anywhere to the map. The user clicks on a location to begin the line. Every location clicked on from there adds another vertex to the line. Once the user clicks the “ok” button in the “Line Markup” window the “Markup Symbol” window appears where the where the line type, color, transparency, and width are determined. Once “ok” is hit in this window, a line will appear on the map with the characteristics and location defined by the user. Adding lines to a map can help delineate property boundaries, animal migration routes, or other user-supplied line data.

**Add a rectangle to map:**  - This tool allows the user to add a rectangle to the map. With “Add a rectangle to the map” as the active tool, the user clicks down on the map and drags the mouse creating a rectangle on the map (in a similar fashion to drawing a box with “zoom in” tool around an area of the map to zoom in to). After the rectangle is drawn, the “Rectangle Markup Tool” appears in the Active Menu window. In here the user defines the fill color and transparency, fill type and interval, as well as the boundary color, type, and width for the rectangle. After the “ok” button is clicked in this Active Menu window, the resulting rectangle will be drawn on the map. Drawing rectangles on the map can be useful in delineating a house or structure on the map that wasn’t included because the base maps and orthophotos were outdated or inaccurate.

**Add a polygon to map:**  - With this tool a polygon can be drawn around any feature by clicking where the polygon vertices will be located. After the user selects the location of the polygon, the “Markup Symbol” screen will appear in the active menu window. In this screen, the settings are chosen for: Fill type, Fill interval, Fill color, Fill transparency, Boundary color, Boundary width, and Boundary type.

**Add text to map:**  - Clicking in a location on the map with this tool will bring up the “Text Markup Tool” screen in the active menu window. Here the user chooses what text to enter, the font, the font style, the text size, the text color, and the background color. The text begins in the location clicked upon and works its way to the right.

**Add a label to map:**  - Clicking in a location on the map with this tool will bring up the “Add a Label Markup” Active Menu Window. In this window the user defines the layer to be labeled, the field that will provide the information that appears on the label, and the color/size of the label.

**Add X Y coordinates to map:**  - When this tool is used the latitude and longitude coordinates are labeled for a location clicked on by the user.

**Erase markup:**  - This tool allows the user to erase one or more markups. Erasing can be done by clicking on one feature or by drawing a rectangle with the erase tool around one or more markups.

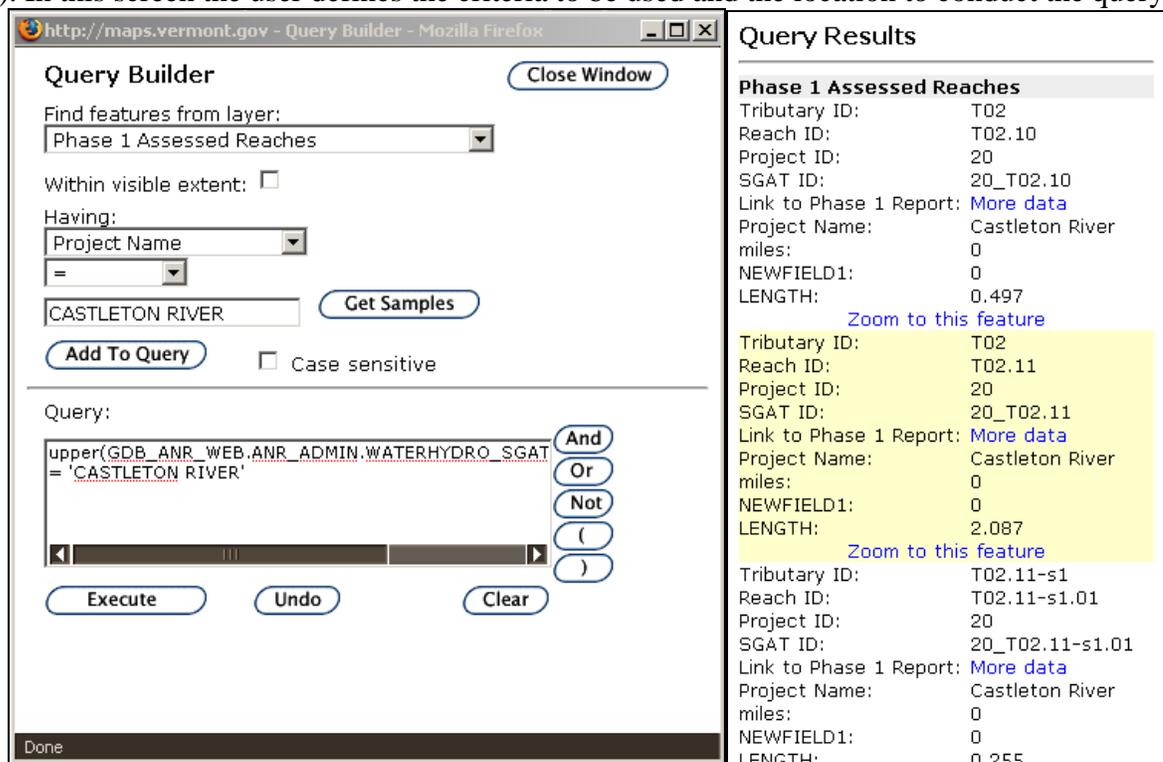
**Erase all markups:**  - This tool erases all of the user supplied markups on the map.

**Selection tools:**  Click to open the toolbox.

A query is a process of retrieving information from a database system. During a query, search and/or logical operators (e.g. and, or, not, =, >) are used to specify criteria, and then the database or table is searched, locating records that match the criteria. Those matching records are displayed as a selected set in the Active Menu window. In the Data Viewer there are a number of ways to query the database to gather pertinent stream geomorphic assessment data; the tools are described below. By changing the active layer, different data results from the query; this is because the active layer defines the pool of data that the query is searching through. Results of the query are shown in the “Query Results” Active Menu window and are highlighted on the main map display.

**Generate query**  -

Once the user clicks on the generate query tool, a “Query Builder” pop-up screen will appear (figure 13). In this screen the user defines the criteria to be used and the location to conduct the query.



**Figure 13** The query builder pop-up window (left) and Query Results Active Menu window (right)

In the top half of the window above the line (figure 13), the user builds one sentence of a query. This is set up in a similar fashion to the “find by attribute” option of the locate menu. The first parameter for the query is the layer. In the top box (“Find features from layer”) the user defines the layer on which the query will be conducted. All layers are available for query but a query can only be conducted on one layer at a time. Then the user defines whether the query will be performed on all locations or only those in the visible extent of the current map view. In the “Having:” drop-down menus the user defines the particular field of the layer to be searched, the search operator to be used, and the value for the field in question. Examples of field values are provided when the user selects the “Get Samples” button. For more information on setting up a query statement see the “Locate” Menu section (pages 10-12).

Single query statements can be strung together using the logical operators “and”, “or”, and “not”. Once a query statement is defined in the upper portion of the window, the “Add to Query” button is chosen and the statement appears in the “Query” window located on the bottom (figure 13). Between these statements are logical operators further defining how the database will be searched. By selecting “And” only records that fulfill *both* of the statements criteria will be selected. For instance if the first statement is looking for ‘phase 2 assessed reaches’ (layer) having a ‘project name’ (field) ‘=’ to (search operator) the value ‘Castleton River’ “And” (logical operator) the second statement is searching for ‘phase 2 assessed reaches’ (layer) having a ‘channel width’ (field) ‘>’ (search operator) the value ‘10 feet’ the results of the query will be all reaches within the Castleton River that have a channel width greater than 10’. Connecting two query statements with the logical operator “Or” will result in all records being selected that fulfill *either* query statement (this is more inclusive than using “And”). Connecting two query statements with “Not” will result in all records being selected that *do* meet first statement’s criteria *but not* the second’s. The more query statements that are used to conduct the query the smaller the pool of results will be because more detailed criteria are used to search the database. The order in which the query statements are executed can be transformed using the parentheses, in a similar fashion to mathematical formulas. The results of the query are displayed in the Active Menu window (figure 13). In the ‘Query Results’ Active Menu window, the results are listed, links to the data reports are provided, and links that zoom the map extent to a particular reach are provided.

#### Active layer selection tools:

Setting an active layer: For many functions, a layer has to be designated active (e.g. “Identify”, “Identify by Radius”, “Select by Rectangle”, and “Select by Buffer”). A layer is made active by clicking on the blue button  to the left of the layer name, thereby changing it to a black button  in the “layers” Active Menu Window. Once you have made a layer active you will be able to use the rest of the “Selection Toolbox”:

**Identify by Radius:**  - This tool allows the user to find all records meeting certain criteria within an amount of distance of the selected location. After choosing the tool, the user clicks on the area of interest in the map view. The “Identify by Radius” Active Menu window will appear. In this window, the user defines which layer to find features from and the radius of area to be searched around the chosen location. The “Identify by Radius” tool will select all the features in the active layer that are within the defined radius. A translucent circle will appear in the main display, the map will zoom to the extent of the results, and the attribute data will appear in the active menu window.

**Select by Rectangle:**  - This tool locates all records within a chosen layer that fall within a user defined area. With the “Select by Rectangle” tool active, the user clicks and drags a rectangle around an area of the map. All features of the active layer that are in the portion of the map within the box are shown in the “Query Results” Active Menu window. For example: while the ‘Phase 1 assessed reaches’ layer is active, choosing the ‘select by rectangle’ tool and making a box around all reaches of interest will cause the phase 1 results to be displayed in the “Query Results” Active Menu window within a few seconds. As with all other query results (figure 13) there are the options of zooming to the feature (which displays the location of each specific reach in the visible extent of the map) and opening the Phase 1 report for each link.

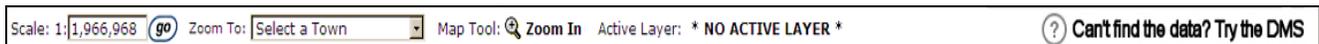
**Select by radius:**  - This tool operates in a similar fashion to the “Identify by Radius” tool. The tool locates all features in the active layer that are within a given distance of a user defined location. The user only has to supply the starting location and the radius of the area to be searched. The active layer is automatically used to conduct the query; whereas the user defines what layer to use for the “Identify by Radius” tool. The results are also displayed in the Active Menu window (except results of the “Select by Radius” tool do not include a link to zoom to particular features as is provided in

the “Identify by Radius” results), a translucent circle appears on the map, and the map zooms to the extent of the results.

**Select by buffer:**  - This tool locates all features within a chosen layer that are a given distance from another feature. This tool requires multiple steps to use. First the user defines the active layer. Then the user selects an amount of records from that active layer using any of the selection tools including but not limited to “Select by Rectangle”. From there the user defines the distance away from these selected features that the query will be conducted; this is the buffer. Finally the user defines what layer to locate features from that are within the defined buffer zone. The results of this query appear in the Active Menu window.

## **Active status bar**

(Figure 2, Number 5)



**Figure 8** The active status bar

Located at the bottom of the screen, the active status bar (figure 8) provides information about the current conditions of your map. These conditions include:

**Scale:** The scale of a map is the amount of actual land area represented by a unit of area on the map. For example on a map with a scale of 1:100,000 every inch on the map represent 100,000 inches on the ground. The smaller the scale, the less land is represented for every inch on the map and the more zoomed in the map appears. Current scale defaults to 1:1,919,949 (the entire state of Vermont is in view). To change the map’s scale click in the scale window, type the scale you want (e.g. 1:10,000), and then click “go”. The map will keep the same map center point but will zoom to this new scale.

**Zoom To:** This option provides a drop down list of all the towns in Vermont. By clicking on a town in the drop down menu, the map view zooms to the extent of the selected town.

**Map tool:** The map tool status bar displays the current active tool. It is important for a user to know which tool is currently active; the pop-up screens and results that appear in the Active Menu window vary depending on which tool is being used.

**Active Layer:** This tells you which layer is active. There are a few reasons it is important to know which layer is active. Setting an active layer narrows down the query results to only include features in that layer. The “Identify” tool only identifies features within the active layer. Query results vary depending on which layer is active as the query is conducted on a pool of data specific to the active layer. An active layer is needed to zoom to the extent of a particular feature with the “Zoom to a Selected Layer” tool.

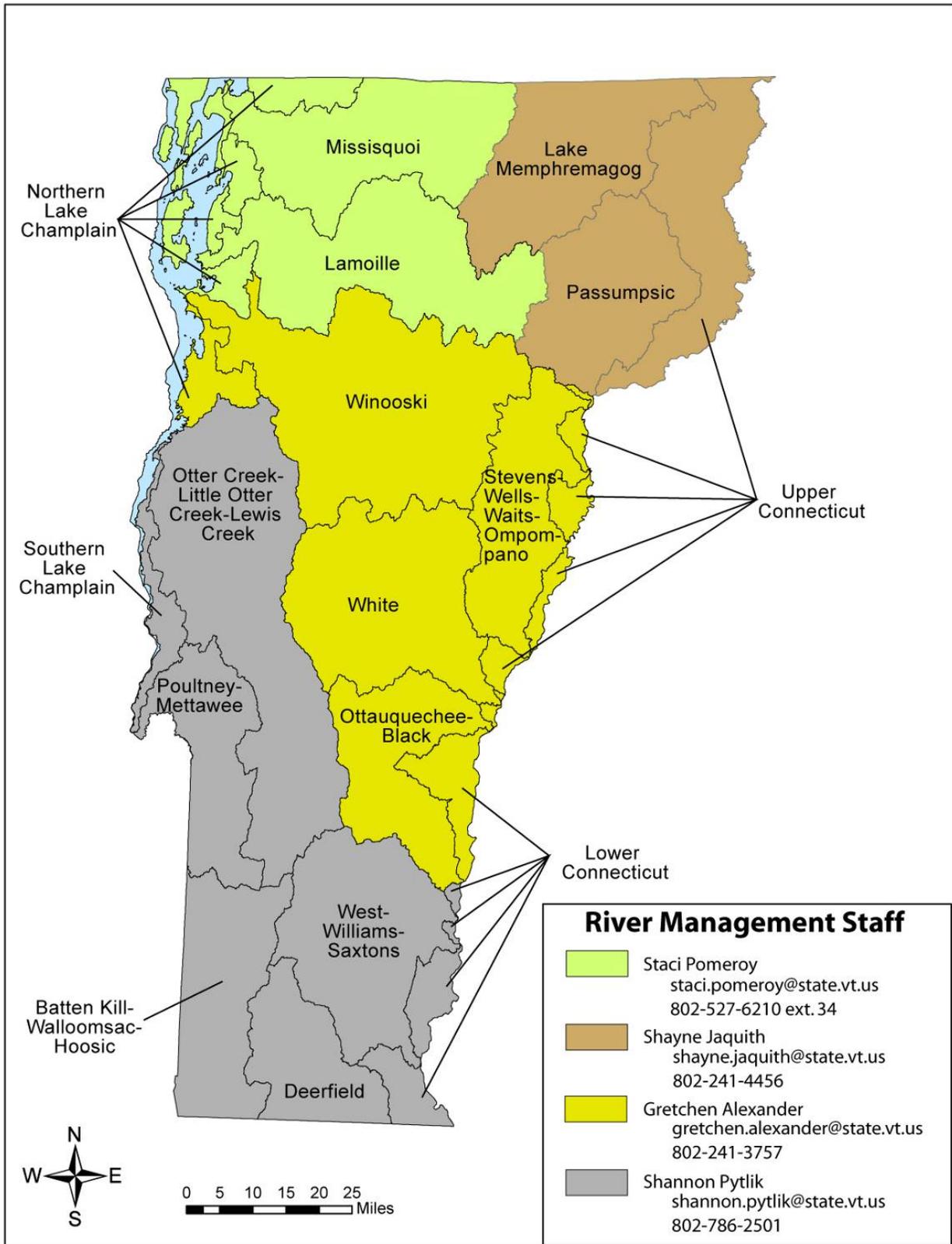
**“Can’t find the data? Try the DMS”:** This is a link to the data management system (DMS). If an existing project is not located on the River Management Stream Geomorphic Assessment Viewer, there is a good chance that it can be found in our online data management system. The DMS is a web-based system that is used to collect, analyze, store, and report stream geomorphic assessment data for Vermont’s Rivers. The DMS is found online at: <https://anrnode.anr.state.vt.us/ssl/sga/security/frmLogin.cfm>. Public can use the DMS to view data only; those contractors and staff involved with the project can add, edit, or remove data from the DMS.

The DMS is more comprehensive than the Data Viewer but the data aren’t portrayed on a map or in an illustrated way. Instructions specific to the DMS can be found at:

[https://anrnode.anr.state.vt.us/ssl/sga/home\\_help.cfm](https://anrnode.anr.state.vt.us/ssl/sga/home_help.cfm).

# Contacts

If you have trouble with the Data Viewer, technical questions, or troubles interpreting the data contact the River Scientist assigned to the region in which the river is located.



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