

## Chapter 3: Online Mapping Tools

- Understanding Online Mapping Applications
- The Agency of Natural Resources Atlas
- ArcGIS Online
- Google Maps

### What is an online mapping application?

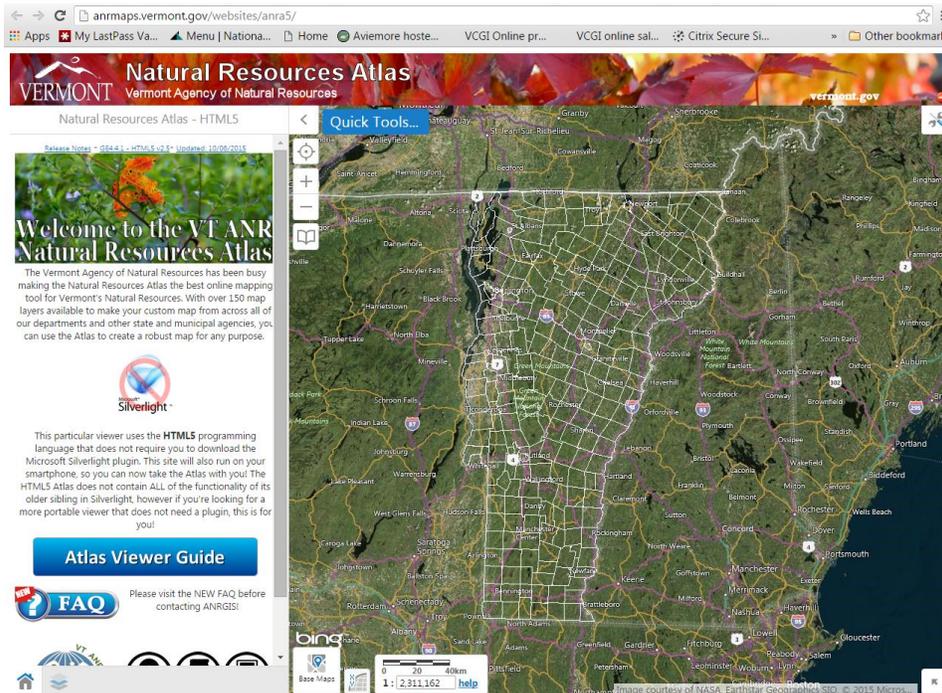
An online mapping application allows users to view geographic information interactively with functionality typical of most GIS software. Functions include, but are not limited to, the ability to zoom, pan, search for features / addresses, and print a map allowing the user to have control over the area displayed and to decide which data layers are visible on the map.

### How do online mapping applications work?

Online mapping applications use the internet to send requests (e.g. zoom in to this area, turn off this map layer) which are then interpreted by the software residing on a server (map will be redrawn to this extent with that layer no longer visible) which then sends a new map image back out to the browser interface (what the user is looking at and interacting with).

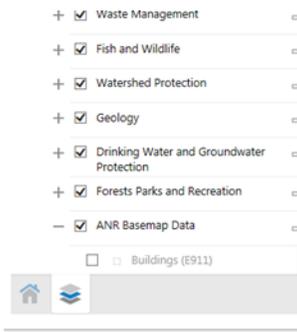
### The Vermont Agency of Natural Resources Atlas (ANRA)

<http://anrmaps.vermont.gov/websites/anra5>

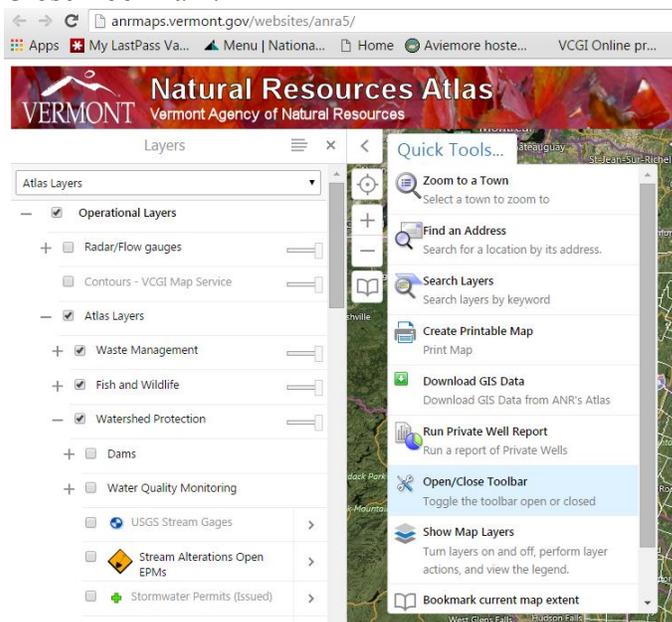


The interface for **The ANR Atlas** is typical of that found with most GIS software packages. It is designed not to be too overwhelming when you first open it, so two key aspects are somewhat hidden.

Switch from the Welcome/Home tab to the Layer List tab by clicking on the layers icon below the Information Panel on the left:



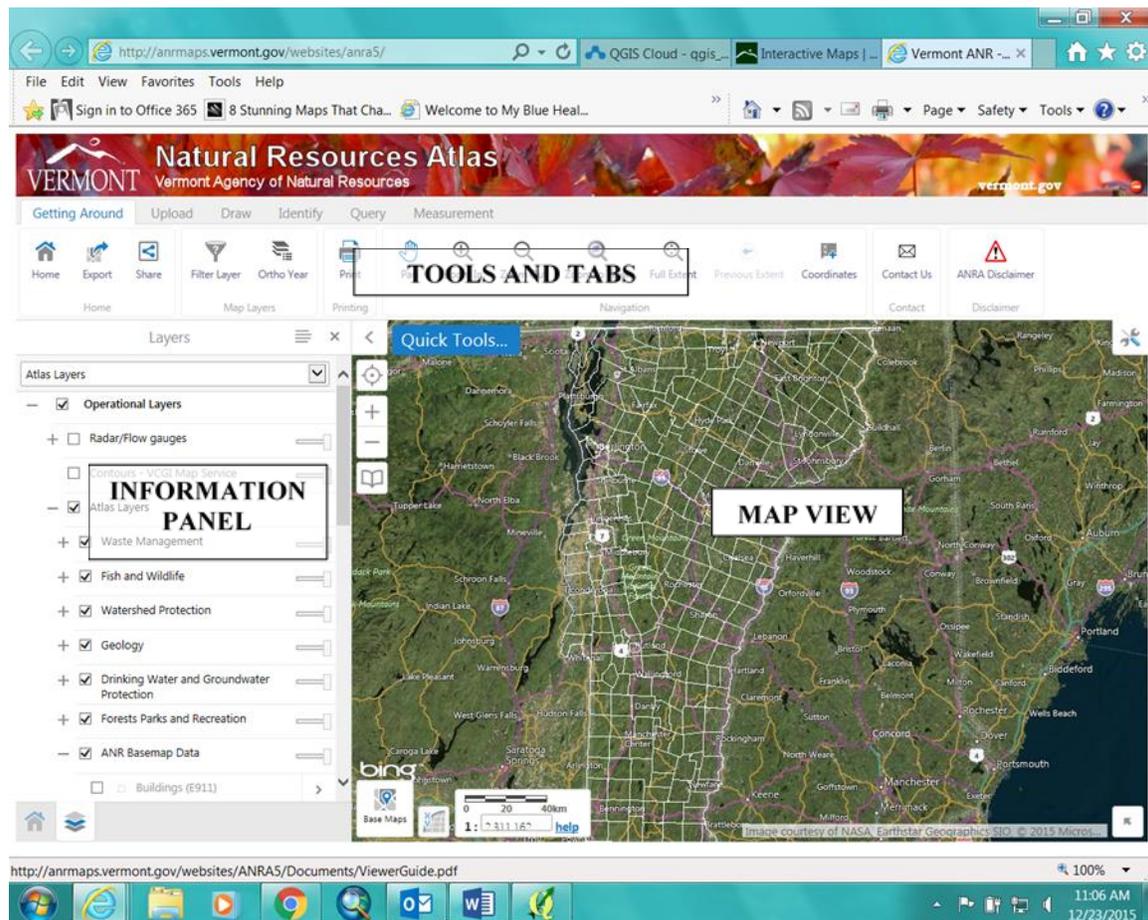
Open the Tools and Tabs bar by clicking the Quick Tools button and choosing “Open/Close Tool Bar”:



## Elements of the interface include:

The **MAP VIEW** is the window where the map is displayed. The map image will change (redraw) depending on options selected.

The **blue "Quick Tools" drop down menu** should appear in the upper left area of the map image. Click on it to see what your options are. This menu serves as a quick link to popular functionality (i.e. all of this functionality is found in various other tools and buttons).



The **"Base Maps" menu** is found in the lower left area of the map image. When you click on it, you will see a list of base map choices that can appear behind the map layers listed in the information panel. Choose a different background by clicking on it. Keep in mind that the level of detail may change quite a bit as you zoom in.

The **Zoom buttons** appear just below the "Quick Links" menu and allow you to quickly zoom in or out (while staying centered on the same spot) by clicking on the + (zoom in) or - (zoom out).

The **INFORMATION PANEL** displays the list of map layers associated with the map. To change the visibility of layers, simply click to add or remove a  to the box next to the layer, keeping in mind that not all layers are currently visible (varies depending on zoom level) AND that a plus sign next to a "layer" means that is actually a collection of layers. Click on the plus sign to see the collection of individual layers.

The map will automatically redraw when you turn visible layers on or off. After clicking a check box, allow the map image to refresh before checking a second layer.

### Move the slider bar down to see more layers

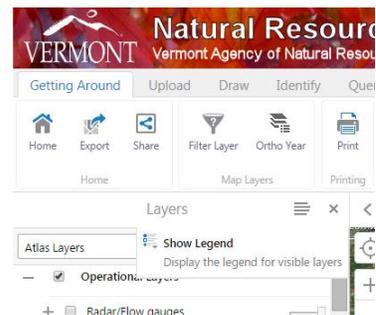
Note: When zooming in and out certain layers will be enabled or disabled based on their set scale range. Click on the arrow to the right of the layer name to zoom to visible scale range. The names of disabled layers appear grey rather than black

- Town Names
- Cities and Village Centers
- City Points
- Interstate Exits

The **TABS AND TOOLS BAR** above the Map View and Information Panel enable the user to do many things. Notice that there are 6 different **TABS** (Getting Around, Upload, Draw, Identify, Query, and Measurement) with a variety of tools available within each tab. If you hold your cursor over each tool a brief explanation of that tool will appear. We will explore these tabs and tools in the next section.

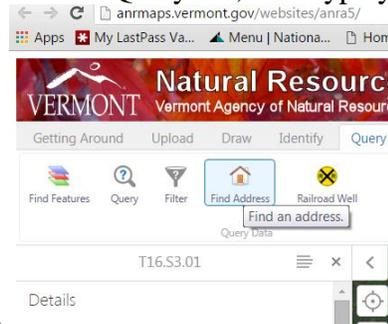
In addition to the **Tabs and Tools**, there are several buttons and drop-down menus with which to interact.

If you are wondering what a symbol on the map is you can click on the icon that looks like three horizontal lines just to the right of the word "layers" above the Information Panel and then choose Show Legend in order to see the listing of symbology for visible layers. Click that same icon to choose Show Layers to return to the listing of map layers.

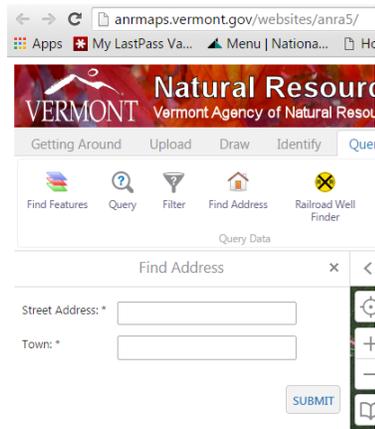


## Mapping Exercise: locate your home or office

- a) Open the **ANRA** in a web browser making sure the browser is large enough to see all interface features.
- b) Click on the Find Address button in the Query tab, then type your address and

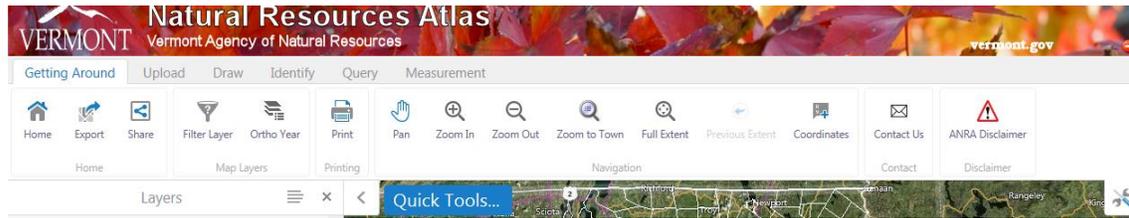


town in the "Find Address" box



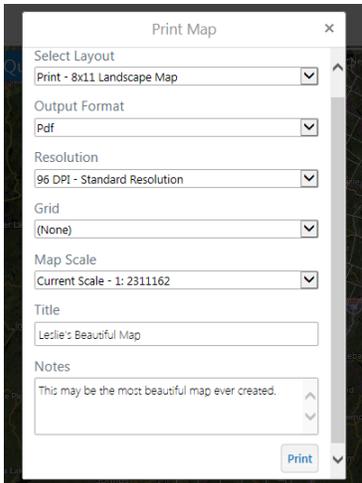
- c) If your search returns a valid result, you will see one or more blue circles on the map and the map will zoom in and center on the address(es).
- d) Change the background of the map by clicking on the Basemaps icon in the lower left corner of the Map View.
- e) Find the map layers "BUILDINGS" and click to place a check  $\surd$  in the visibility box. Notice that you may have to click on a plus sign to open up a group of layers (ANR Basemap Layers) to see the actual data layers. Zoom in until you see address labels and can confirm you have found the correct place on the map.

## Tools Within the Getting Around Tab



The tool buttons in the Getting Around tab allow you to (from left to right):

- **Go Home** – changes the Information Panel to the welcome page, and gives access to the Atlas Viewer Guide and FAQ.
- **Export** – export an image file of the map image (no title, legend, etc.).
- **Share** – generates a link which the user can share via social media or capture in an email. When another user clicks on the link, it opens the viewer and zooms in to the map (and turns on or off layers as appropriate) to the extent the first user was at when he/she created the link.
- **Filter Layer** – filter features shown on the map based on the attributes in that layer. E.g. I only wish to show hazardous waste sites within Fairlee. Also allows user to filter features to the geographic extent visible when the filter is performed.
- **Ortho Year** - adds an ortho to the map (on top of current basemap) and offers the actual years available for that location.
- **Print** – select layout, size, and file format for map image with title, legend, locator map, scale, notes, etc.
- **Pan** – click on this icon to turn your cursor into a pan tool. Left click on the map and drag it around, changing extent but not zoom level.
- **Zoom in** - click on this icon to turn your cursor into a zoom in tool. Zoom in by drawing a box to indicate the area of interest (or clicking to zoom in a preset amount)
- **Zoom out** – click on this icon to turn your cursor into a zoom out tool. Click on map to zoom out a preset amount
- **Zoom to town** – click on this icon and then start to type in the name of a town. When you see the right name being offered, click on that to actually zoom to the town.
- **Zoom to full extent** - see the whole state
- **Zoom to the previous extent**
- **Coordinates** – zoom to or plot coordinates that you type in (decimal degrees)
- **Contact Us** - send an email to ANR GIS staff



## More on Printing/Exporting the Map:

Click on the "Print" icon to create a printable map. The map will include a title, legend, scale, and other features found on actual maps. You will choose a size and orientation, output format, resolution, scale, title, and notes (description). After you click "Print" the application will ask you to click one more time to open your map file, which you can then save, email, print, etc.

Clicking on "Export" will allow you to create an image of your map (not including title, legend, etc.) in the format of your choice: BMP, PDF, JPG, PNG, GeoTIFF, or TIF.

## Tools Within the Upload Tab

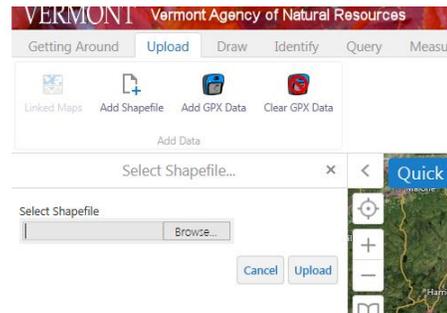


The tool buttons in the Upload tab allow you to (from left to right):

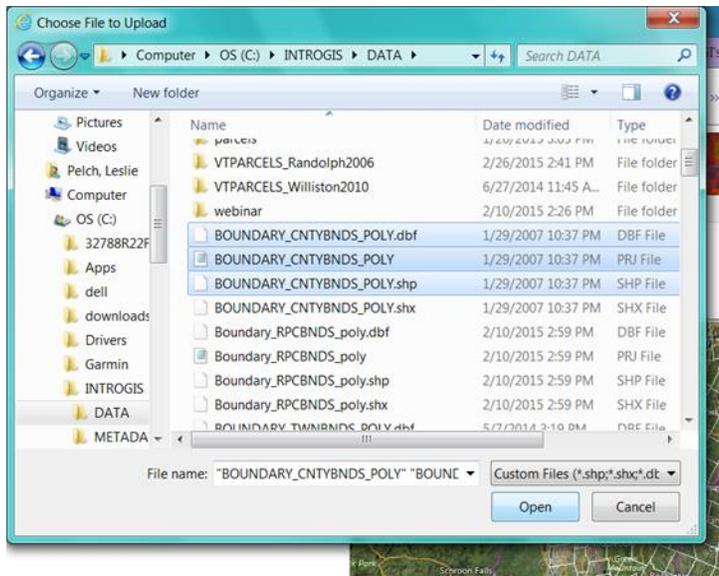
- **Add Shapefile** - a GIS data layer residing on a local computer or network drive
- **Add GPX data** (downloaded from a GPS)
- **Clear GPX data** – remove it from your map.

## Adding a Shapefile

- Click on the “add shapefile” icon - you will be asked to select the shapefile on your computer or a drive to which you have access. Click Browse to open a file manager. **PLEASE NOTE** that you must indicate **THREE** files in this step. You must highlight the **.shp**, **.dbf**, and **.prj** files associated with the shapefile in order to add it to the project and have it show up in the correct geographic location!
- Navigate to where the shapefile is located. Hold down your **CTRL** key as you click on the **THREE** files you must indicate. Then release the **CTRL** key and click "open."



- c) Click Upload in the Select Shapefile window, then click OK when the application tells you the shapefile upload is complete. It may take a few seconds, but the data should show up on the map. Note that in order to edit or delete the layer you must use the Draw Tools as each of its features is treated as a separate drawing.

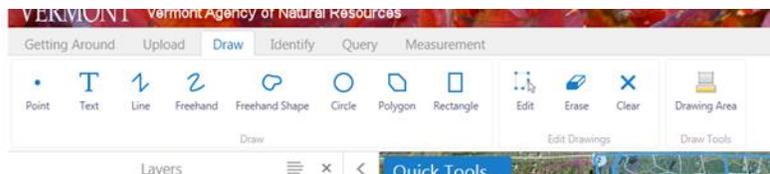


- d) The data is temporarily uploaded to the application so that it can be viewed along with the rest of the map. There is a limit to the size of shapefile that can be uploaded: 6 MB.

## Adding GPX Data

Click on the icon, navigate to your data (downloaded from a GPS in its native format .gpx), choose the file and click “Open” then click on “OK” and your data should be temporarily uploaded to your map.

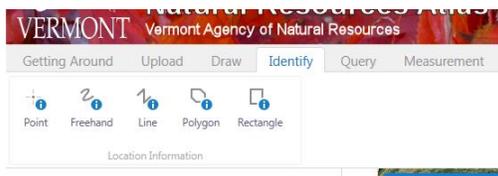
## Drawing on the Map:



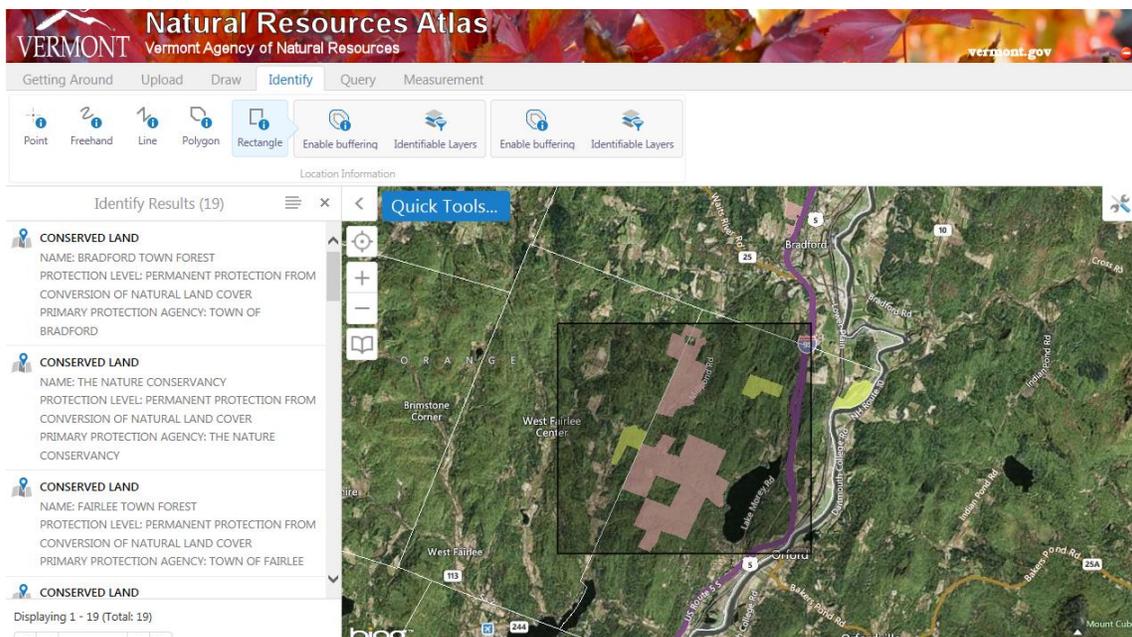
- a) Clicking on the Draw tab will reveal a set of drawing tools. Each tool’s functionality can be displayed by placing your cursor over it and waiting a moment for a descriptive label to appear. Common sense will guide your use of most of the tools, though you will find a few tips below.
- b) Click on the “Add polygon to map” tool. Set the “Style” before you start to draw!

- c) Create a polygon by clicking to set the locations of the vertices. Double click to indicate your polygon is done (and to stop adding vertices)
- d) Click on the “Erase Drawing ” tool and then click on your polygon to erase it, or click on "Clear All Drawings."
- e) Edit the drawing to change its size, move its vertices, etc.
- f) Note that you can measure the area of a drawing!

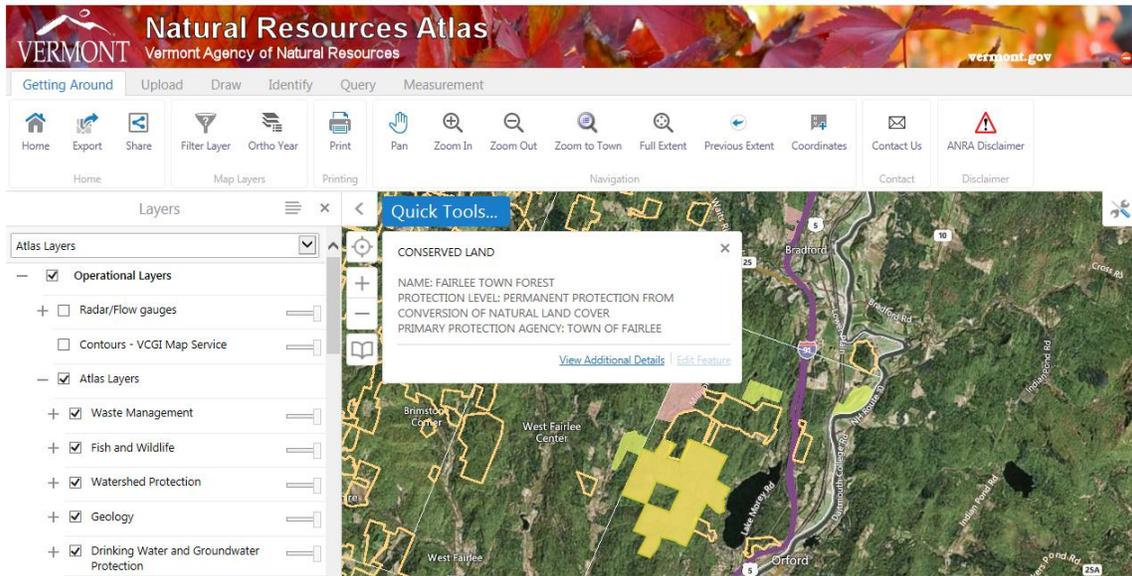
## Exploring the Identify Tab



Identify means specifying a geographic area of interest (or particular feature) in order to look at the attribute (tabular) data for features in that area. There are several different ways to access the attribute data for a feature on the map. The example below involves drawing a polygon and then exploring the attribute data of various features of the Conserved Lands Layer that are contained within the area drawn. You can use the point or line identify to choose features that intersect with the point or line you draw. Note that you can click on any of the identify results to zoom to a particular feature.

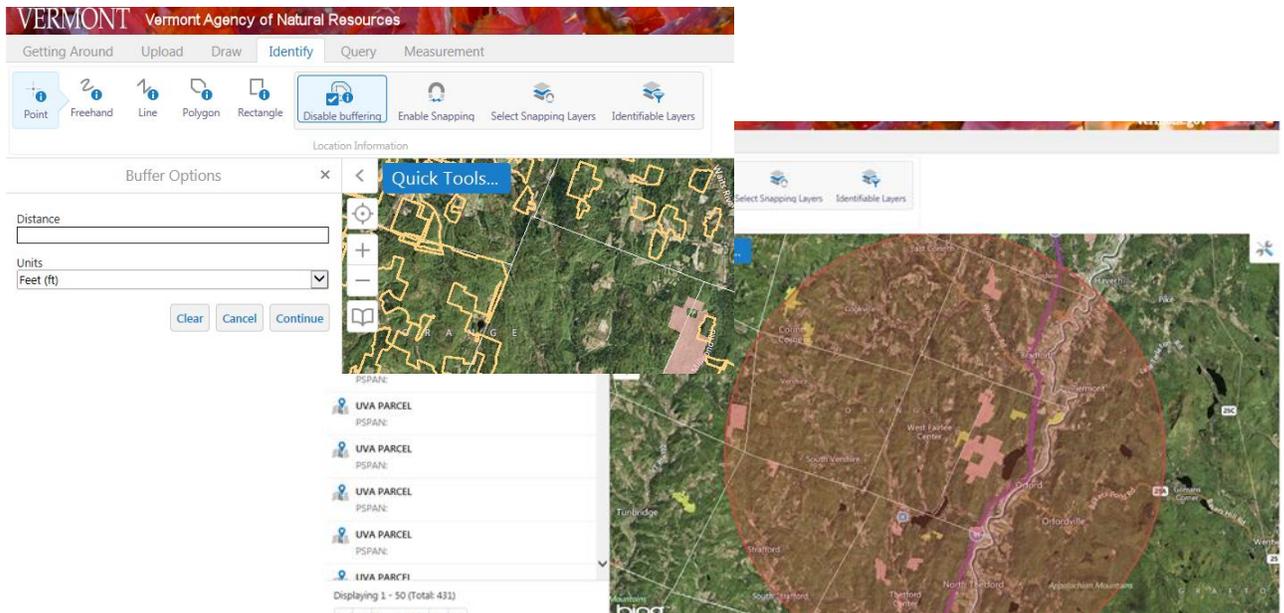


The next example involves simply left clicking on a particular feature (a parcel of conserved land), which results in an information box popping up on the map.



## Enable Buffering

If you click on one of the Identify tools (Point, Freehand, Line, Polygon, Rectangle), you will see the option to Enable Buffering. This tool allows you to add a buffer of specified dimension to your query shape. An example might be using a point but adding a buffer of 10 miles to see how many UVA parcels fall within that area.



## Exploring the Query Tab



**Find Features** is a simple search through all vector layer attributes for a value or word.

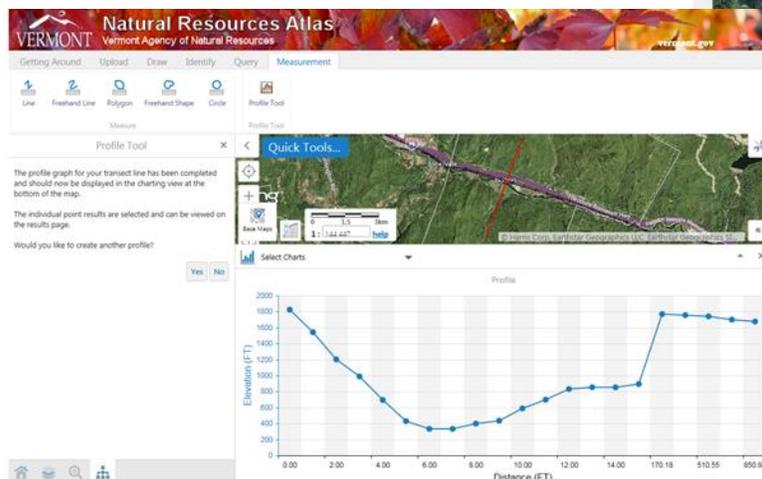
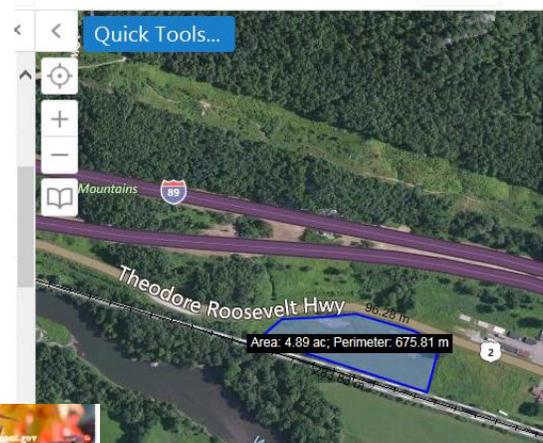
**Query** provides a more robust search where you can assign multiple conditions. An example might be searching for ????

**Find Address** allow you to enter an address and town to search for.

## Exploring the Measurement Tab

### Measurement Tools:

You can measure distance or area, and you can set the units for those measurements (before you start measuring!). In order to "finish" measuring, you double-click on the map. What you have drawn plus the measurement information will be added to the map as a drawing. You can remove it using drawing tools.

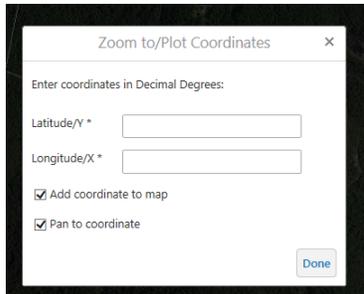


**The Profile Tool** allows the user to draw a line and generate an elevation profile for that "transect." Click on the icon, then click on the icon of a line in the information panel.

Now you will click the beginning, vertices, and end point of your transect. When you are done, double click to end your line, then click OK and the tool will generate an elevation profile!

### Coordinate Tools:

If you know the coordinates of a location on the map in decimal degrees and wish to change your extent to show that location, use the coordinates tool in the Getting Around Tab.



If you want to know what the coordinates of a location are, open the Coordinates Widget located at the bottom of the map area.

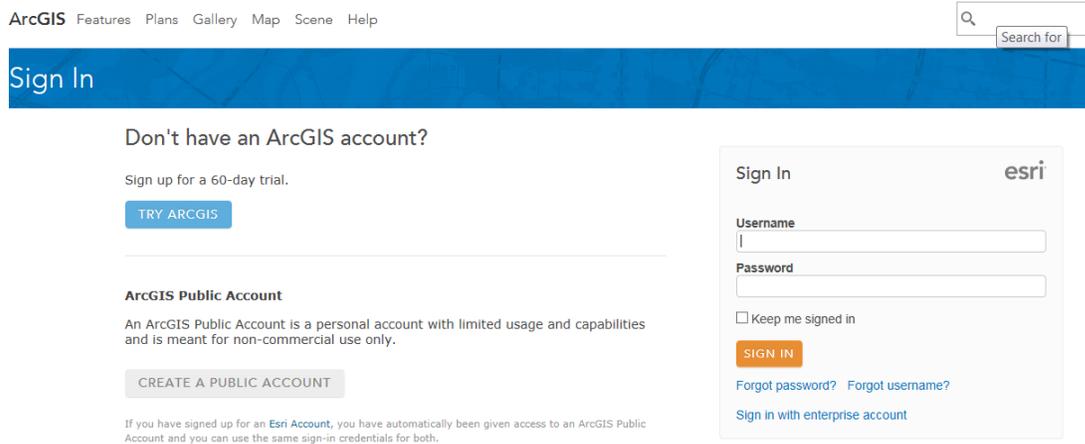


Choose the WGS 84 or State Plane coordinate system and then move your cursor over the map to see the coordinates for any particular location.

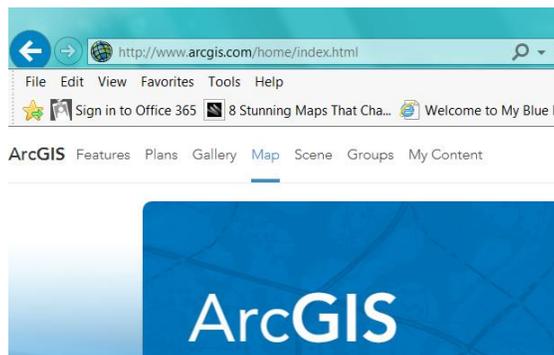
## ArcGIS Online

ArcGIS Online is designed to allow you to create and share custom, dynamic, online maps.

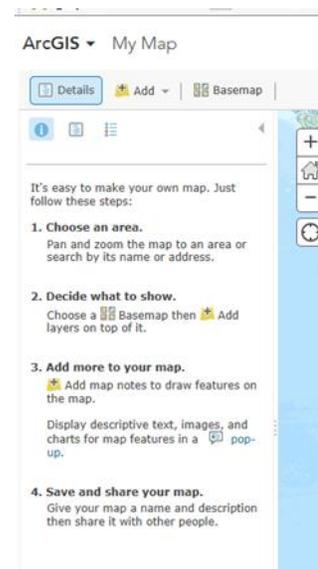
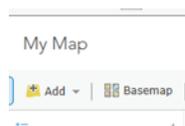
ArcGIS is a mapping software product created by ESRI. It is an expensive software package, but ESRI's online product, ArcGIS Online, is also available, with limited functionality, via a free "public" account.



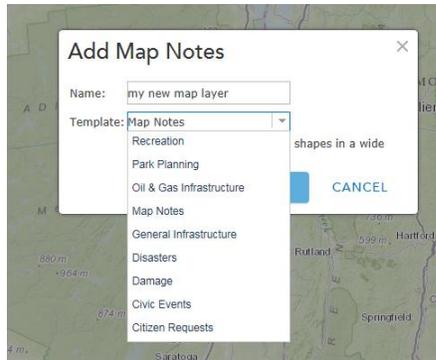
1. Create a public account –then sign in.
2. Click on Map



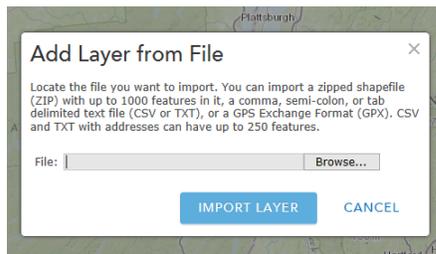
3. Follow the steps provide in the information panel!



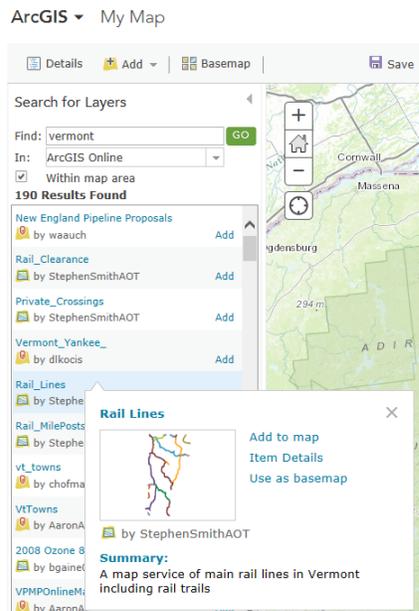
4. Decide what additional data you wish to show on your map
  - a. Map Notes – adding points, lines, or areas free-hand, similar to Google Earth or Google Maps



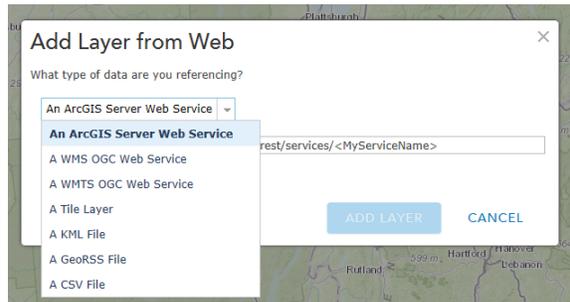
- b. Upload data – CSV, zipped shapefile, GPX



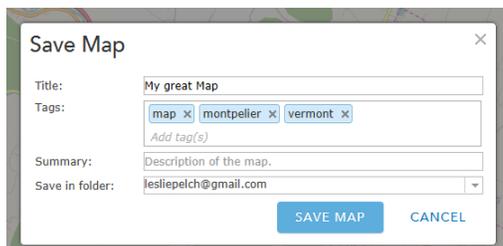
- c. Search for ArcGIS Online published data



#### d. Map Services

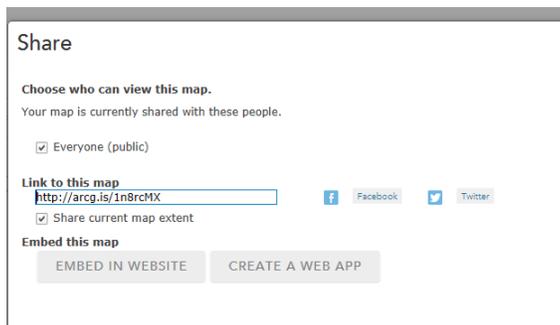


#### 5. Save the map in Your Content

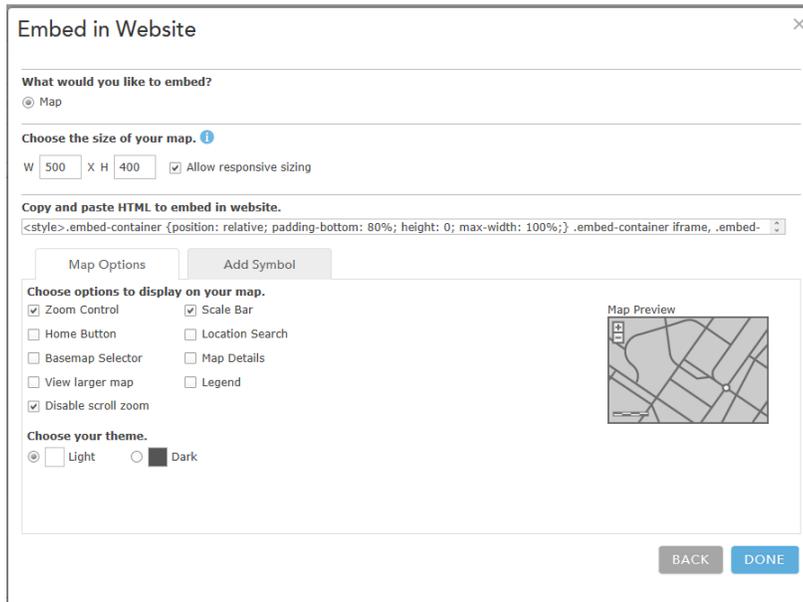


#### 6. Share (embed and/or create map application)

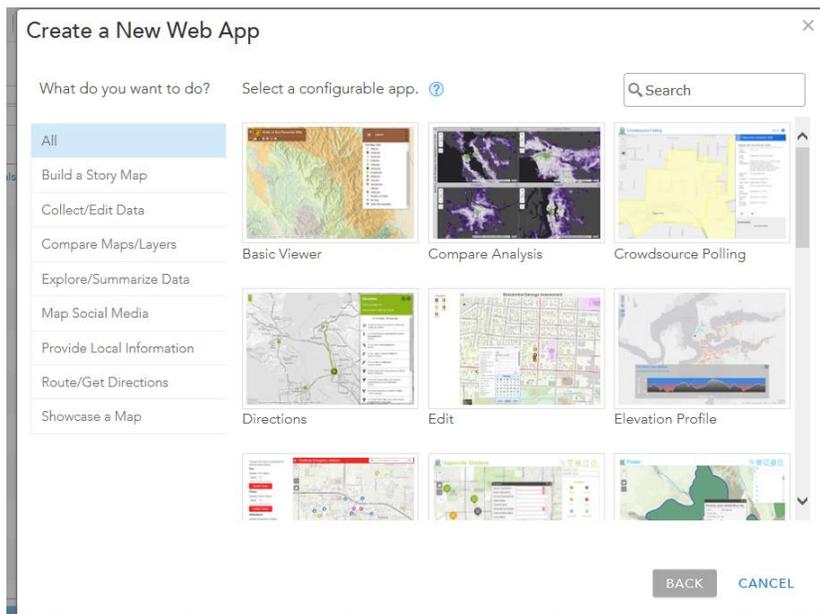
- a. Make it public if you want to embed in a web site or make an application or story map.



- b. Embed: Copy and paste HTML text provided into a website, or provide it to your webmaster.

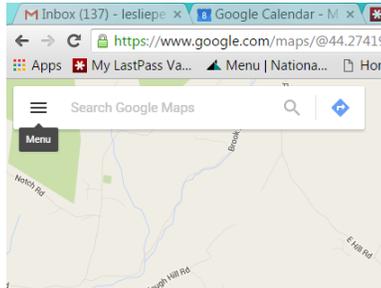


- c. Create a Web App: Many Options! Click on the template of your choice and then Choose "Create App" if your goal is to create an App in the cloud. "Download" is for people who want to download and customize code that they will then insert onto their web site (a more complicated version of embedding).

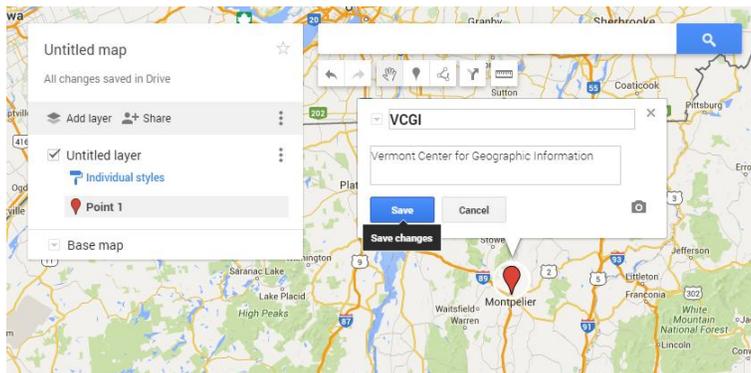


## Google Maps

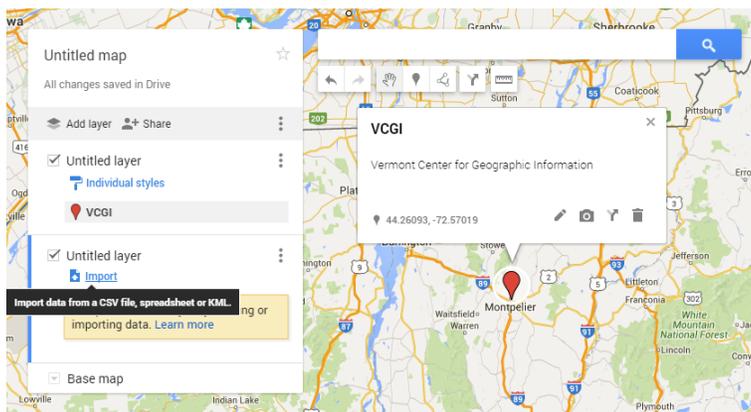
1. Use or create a Google account
2. Click on Menu to go into Mymaps



3. Zoom into your area of interest and either add features to the map interactively...

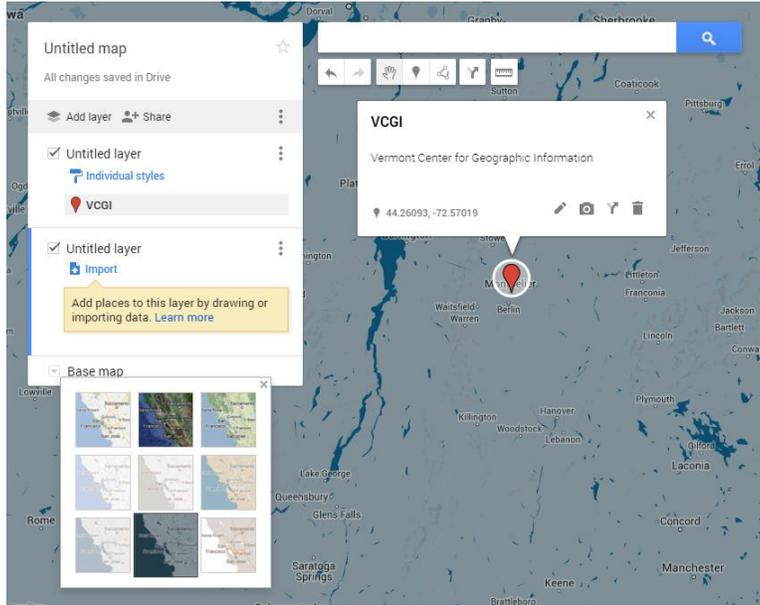


4. ...Or upload KML, CSV, GPX or spreadsheet.



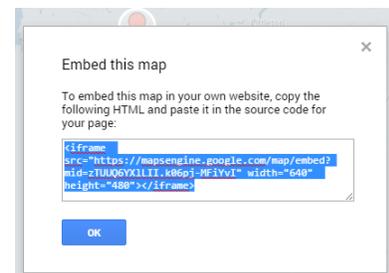
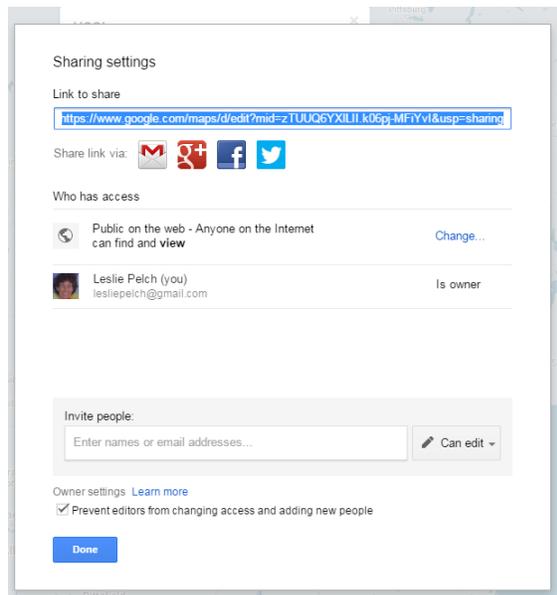
]

5. You can also change your base map!



6. Save, set privacy settings.

7. Share through link or embed.

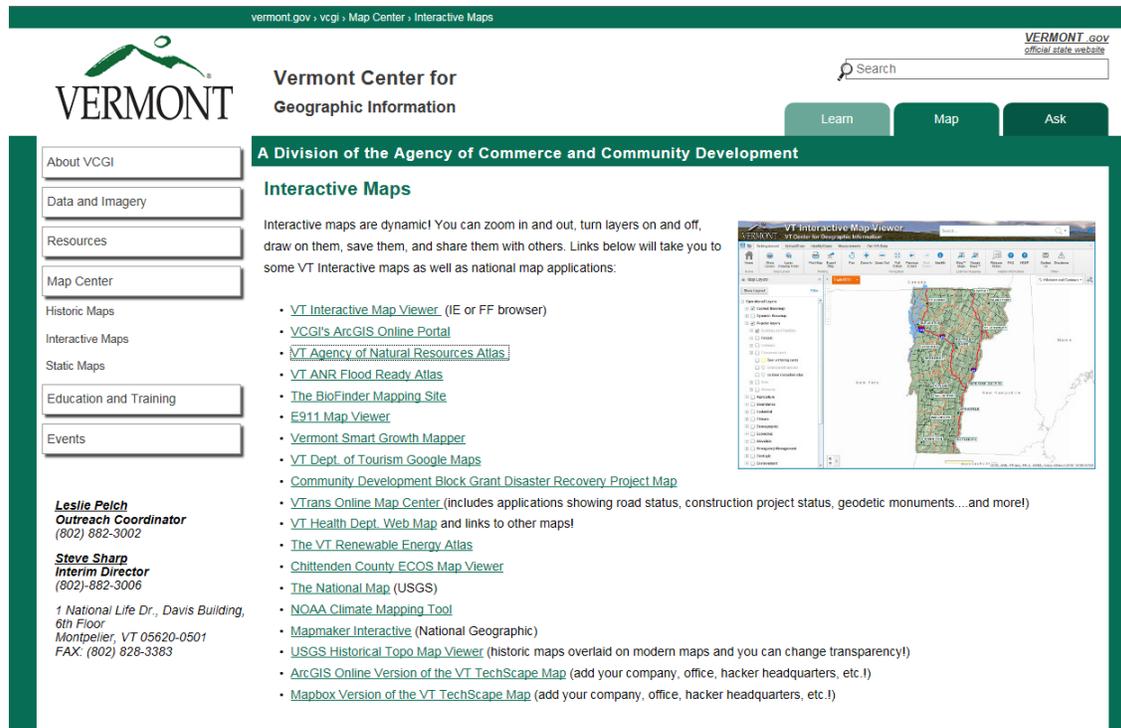


## Additional Online Mapping Applications

The VCGI website includes links to a number of other interactive online mapping applications for Vermont and elsewhere. The E911 Board has an online viewer that provides access to many useful layers.

Interactive maps of Vermont and beyond can be found at

<http://vcgi.vermont.gov/maps/interactive>



vermont.gov > vcgi > Map Center > Interactive Maps

VERMONT  
VERMONT Center for  
Geographic Information

VERMONT gov  
official state website

Search

Learn Map Ask

A Division of the Agency of Commerce and Community Development

### Interactive Maps

Interactive maps are dynamic! You can zoom in and out, turn layers on and off, draw on them, save them, and share them with others. Links below will take you to some VT Interactive maps as well as national map applications:

- [VT Interactive Map Viewer](#) (IE or FF browser)
- [VCGI's ArcGIS Online Portal](#)
- [VT Agency of Natural Resources Atlas](#)
- [VT ANR Flood Ready Atlas](#)
- [The BioFinder Mapping Site](#)
- [E911 Map Viewer](#)
- [Vermont Smart Growth Mapper](#)
- [VT Dept. of Tourism Google Maps](#)
- [Community Development Block Grant Disaster Recovery Project Map](#)
- [VTtrans Online Map Center](#) (includes applications showing road status, construction project status, geodetic monuments...and more!)
- [VT Health Dept. Web Map](#) and links to other maps!
- [The VT Renewable Energy Atlas](#)
- [Chittenden County ECOS Map Viewer](#)
- [The National Map](#) (USGS)
- [NOAA Climate Mapping Tool](#)
- [Mapmaker Interactive](#) (National Geographic)
- [USGS Historical Topo Map Viewer](#) (historic maps overlaid on modern maps and you can change transparency!)
- [ArcGIS Online Version of the VT TechScope Map](#) (add your company, office, hacker headquarters, etc.!)
- [Mapbox Version of the VT TechScope Map](#) (add your company, office, hacker headquarters, etc.!)

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