Surface Water Data Viewer User Guide

Contents

Launch page
http://dnr.wi.gov/topic/surfacewater/swdv/

The Surface Water Data Viewer (SWDV) launch page provides a link to launch the viewer in its default state, links to launch different viewer themes, and links to a variety of other surface water topics.

Also note the related links in the lower right of the page, including a recently added changelog to document updates and changes over time.

Map navigation tools

Navigations tools are found on the **Basic Tools** tab. These tools allow the user to control the extent and scale of the interactive map.
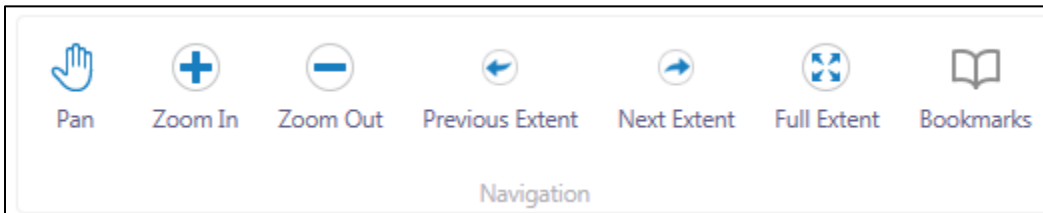
Pan: Cancel any active tools and put the map in pan mode. Click and drag to move the map extent.

Zoom In: Click and drag to create a rectangle on the map, and the map will zoom to that location.

Zoom Out: Drag a rectangle on the map to zoom out while keeping that area centered.

Previous Extent and **Next Extent**: Zoom to recently viewed extents (like the forward and back buttons in a web browser).

Full Extent: Zoom to the full extent of the map (the entire state).

Bookmarks: Save (bookmark) your current location on the map to return to later. The bookmark will persist in future sessions (assuming you are using the same device and web browser).

You can also zoom to a particular scale by selecting it from the scale drop down menu. It is only possible to zoom to the discrete scales provided, which correspond to the cache levels used in DNR's cached map services.
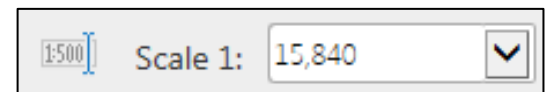
Working with feature labels

For features in the viewer that support labels, the labels can be toggled on and off. The attribute to use for the label can also be changed, as can the color, size and placement of the label.

Click the arrow to the right of the layer name. From the resulting menu select **Toggle labels** or **Customize labels**.

Use the Field drop-down menu to select what attribute you want as the label.
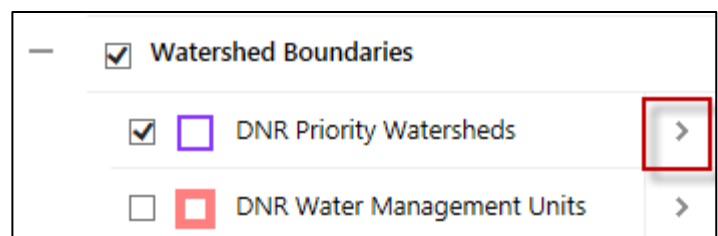
Click **Apply** to see the change in the map, and **Done** to exit.

NOTE: Currently, not all map layers in the viewer support feature labels.

Changing feature symbology

You can change the way point, line and polygon features are symbolized in a variety of ways.

Click the arrow to the right of the layer name. From the resulting menu select **Turn on/off layer visualizations**.

In nearly all cases, the only visualization option is **Custom Layer Style**. Select this option and the Visualization Options panel opens.
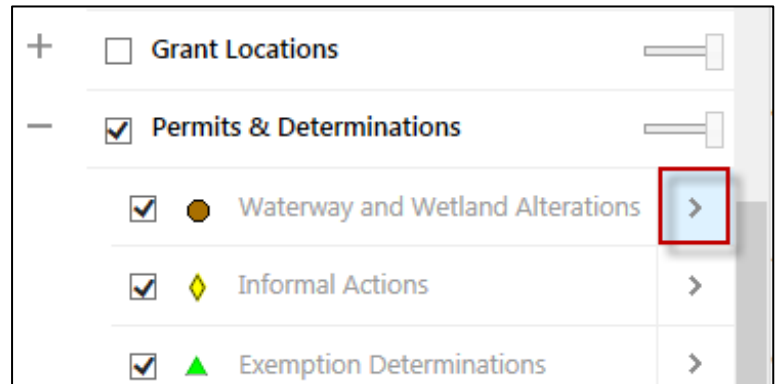
Select a symbology type. The Simple type applies the same symbol to all features. The Attribute type applies a different color to features based on the attribute you select. For example, you could symbolize permit features differently based on the Permit Decision attribute (below right).
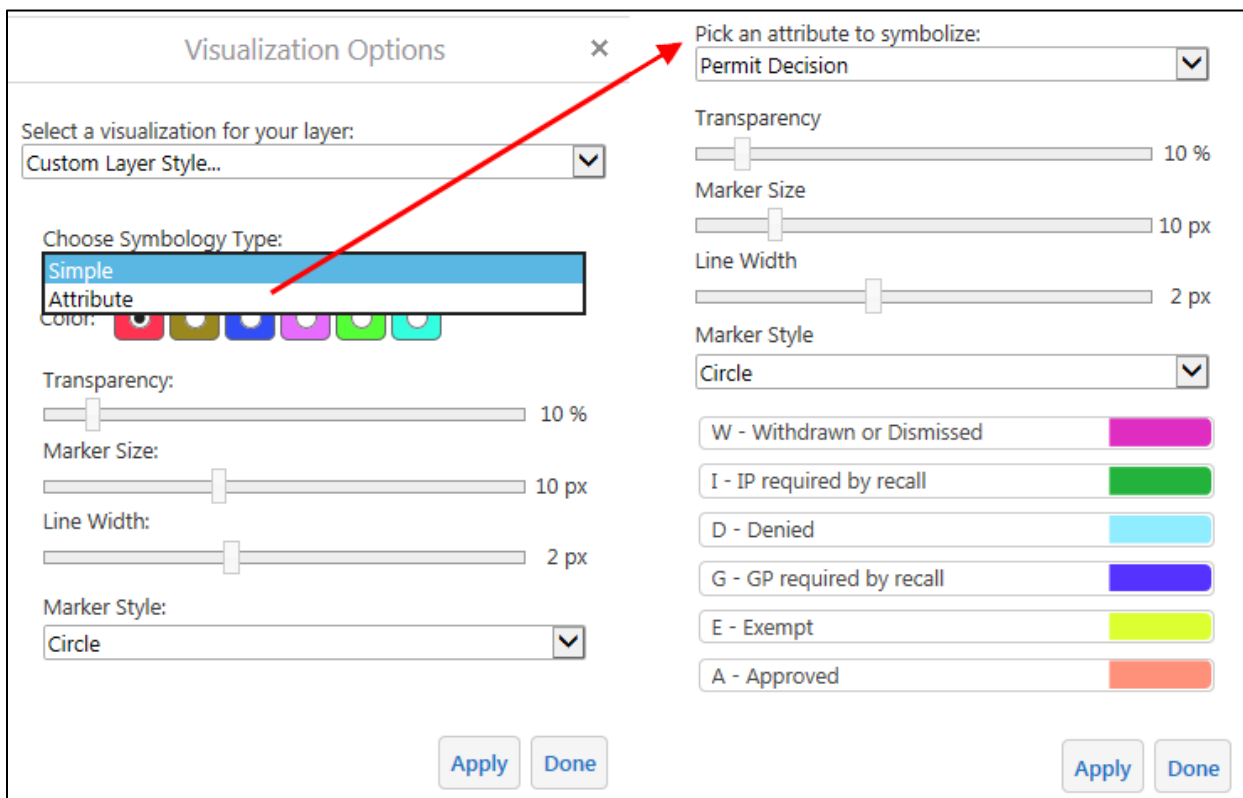
Change other symbol settings as desired (e.g. transparency, size, marker style). Available settings differ based on whether you have point, line or polygon features.

Click **Apply** to see the change in the map, and **Done** to exit.

To return to the default symbology, select None for the visualization option.
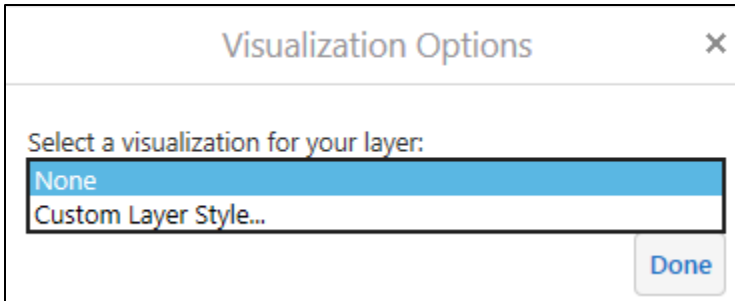
There are a few other visualization options for point features that were added using the **Upload Data** tool.
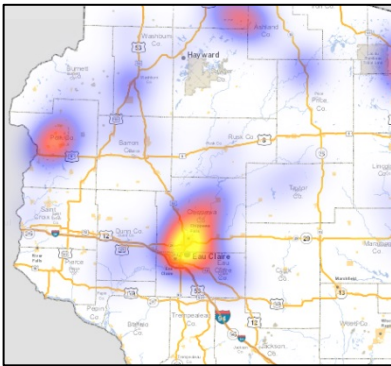
Heat Map—Heat mapping is a data visualization that represents the density of features on the map (left).
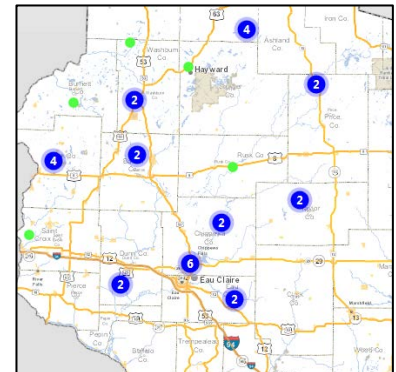
Feature Clustering—displays the number of points within a user-defined radius (right).

Locating a feature

There are multiple ways to locate a feature, including the **Search Bar**, the **Find Location** tool, and the **Query** tool.

The **Search Bar** provides a quick way to find waterbodies (by name or WBIC) and monitoring stations (by name or SWIMS ID). Successful matches are returned in the **Search Results** panel. For performance reasons, most layers are not searchable by this method.

The **Find Location** (found in the **Locate & Identify** tab) tool provides more options for locating features, including coordinates.
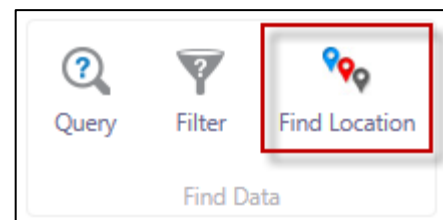
Click the radio button to select a type of feature to look for, then click **Find**.

The next screen will provide search options, which differ based on the feature type. For example, for Lakes and Open Waters you can search by waterbody name or WBIC, and can search the whole state or by county.

Click **Find** again to run the search.

The **Query** tool (also found in the **Locate & Identify** tab) is the most advanced method for finding a feature. You can search almost every layer in the map and set up multiple conditions for your search
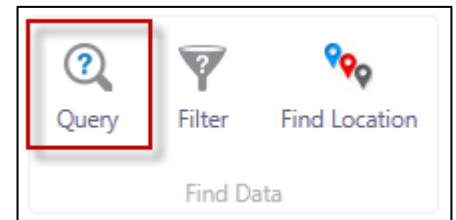
Select the **Data Source** (map layer) you would like to Query.

Use the dropdown menus to select a field for the condition and the query type. For example,

- HUC Name contains Black
- Hydrologic Unit Code = 0703000103

Note than when you start typing a value in the empty box, matches are automatically generated.

If necessary, **Add Another Condition**.

You can also filter the search spatially. Use the **Spatial Filter** dropdown menu to gather results from the entire map (no filter) or from the Current Extent being viewed.

Click **Search** to run the Query**.**

May 2017

Identify tools (including buffers and exporting data)

There are many useful functions associated with the **Identify** tool. It addition to finding out what features are at a location or within an area, you can also create buffers around features to identify features within the buffers, combine results from multiple searches, and export these results to shapefiles or Excel files.

Map tips

You can find out what features are at a location simply by clicking anywhere on the map, without first selecting the **Identify** tool. Results appear in a pop-up box and are referred to as map tips. Whether you use maps tips or the **Identify** tool is a matter of preference.

In the example below, there are three features at the location with the red push pin. Use the drop-down or scroll through the list to view basic information on each one. Click **View Additional Details** to add a feature to the Results panel for more detailed information.
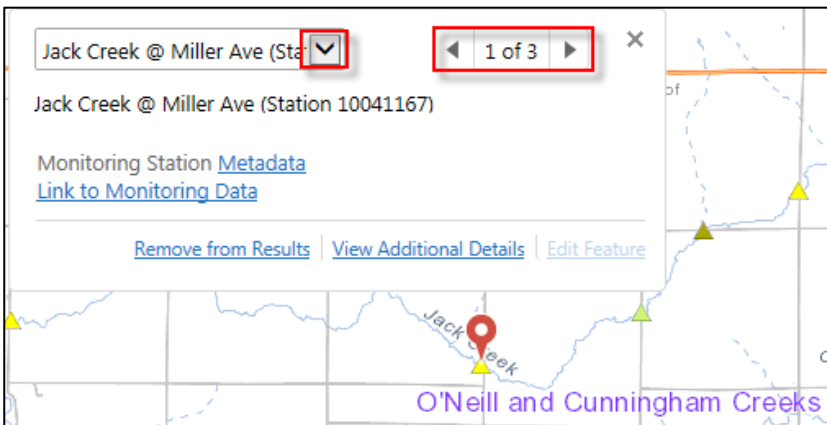
Basic identify operations

The **Identify** tool is located in the Identify region of the **Locate and Identify** tab. Click the drop down menu from the **Identify** tool and choose the method to use.

For example, select Point and click on the map to identify features at a particular location; or select Rectangle to identify features within a box you draw on the map.

Note that additional options auto-expand once you select the method.
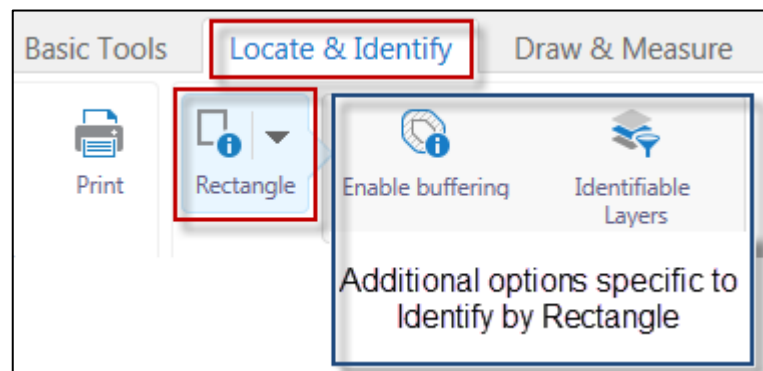
The **Identify** tool returns all results directly to the Results panel without creating the map tips pop-up.

The tool identifies all features from visible layers (those turned on in the Layer List). You may need to turn a layer on to get results.

On the other hand, let's say you want both waterbodies and monitoring stations visible on the map, but only want results for the stations. In this case, click the **Identifiable Layers** button and uncheck the waterbody layers. You can also choose to **Select All** or **Clear All** layers as identifiable.
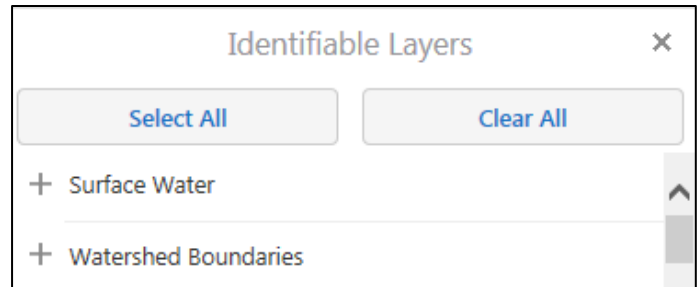
NOTE: Your selections for Identifiable Layers will persist for future Identify actions.

It is also possible to filter your results by what layer they are in. Click the **More Options** button and select **Switch to Table**.

Click on a tab to filter all results to only those from a single layer.
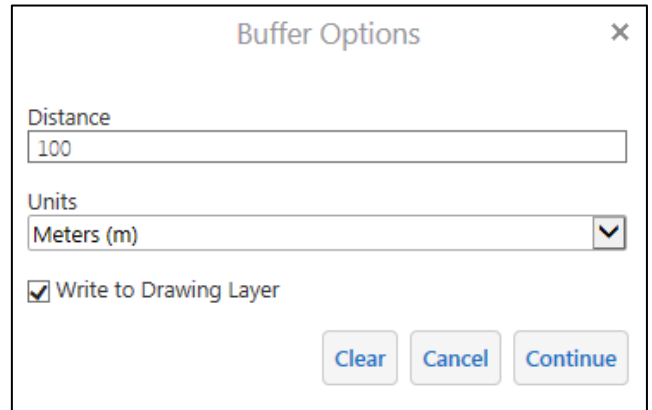
12-digit HUCs (Subwatersheds)	Station Points with Recent Data (10 years)		Boat Access		Rivers and Stre...
Landing Name	Landing Type	Ramp Type	ADA Accessible	Waterbody Name	
Hemlock Slough Sauk County Park	RAMP	Concrete	No	Hemlock Slough	
Baraboo River Access	RAMP	Paved	No	LaValle Mill Pond	
Lake Redstone Access	RAMP	Concrete Panels	No	Lake Redstone	

Identify with buffers

Click the **Enable Buffering** button to identify features within a specified distance of the point clicked or rectangle drawn.

In the Buffer Options panel, enter the distance and units for the buffer, and check the Write to Drawing Layer box if you want the buffer feature to persist as markup on the map.

Click **Continue**, then click a point or draw a shape on the map to create the buffer and return results.
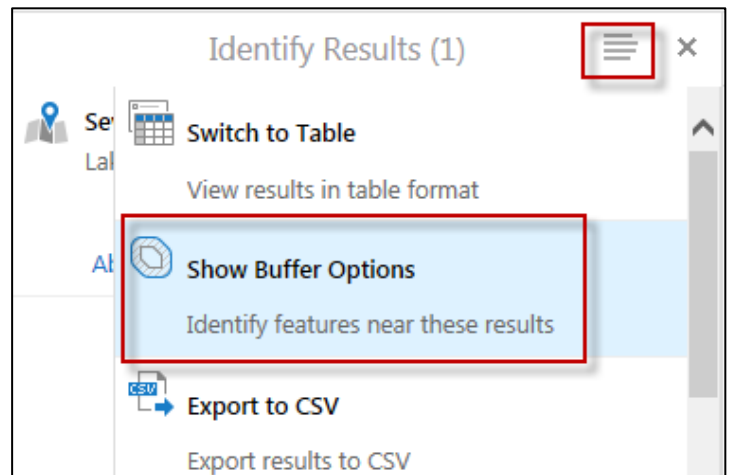
In addition to buffering around points, lines or polygons, you can create a buffer around any feature in the map (e.g. a lake, stream or watershed).

First identify the desired feature to get it into the Identify Results panel (Disable buffering if needed). Then click the **More Options** button, and then **Show Buffer Options**.

Enter the Buffer Options and click **Continue**.

HINT: Use this method with a buffer distance of zero to return all features within the selected feature. For example, you could also use this method to return all impaired waters within a watershed or all Chapter 30 permits within a township.
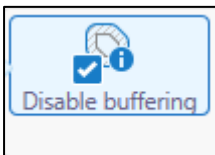
NOTE: Buffering will persist for future Identify actions until you check the box to Disable Buffering.

Working with results from identify operations

For any list of results, there are other useful options available from the **More Options** menu:

Switch to Table: This view of the results makes it easier to locate a feature since results are separated by the layer they are in.

Export to CSV or XLSX: Results are saved as tabular data.

Export to Shapefile: Results are saved as one or more shapefile.

Save Results, Open Saved Results, Combine Results: These options provide advanced methods for working with multiple queries. You can save any set of results you generate in a viewer session, and access each set by selecting Open Saved Results from the More Options menu.

For example, you could create two sets of results from two different buffer operations:
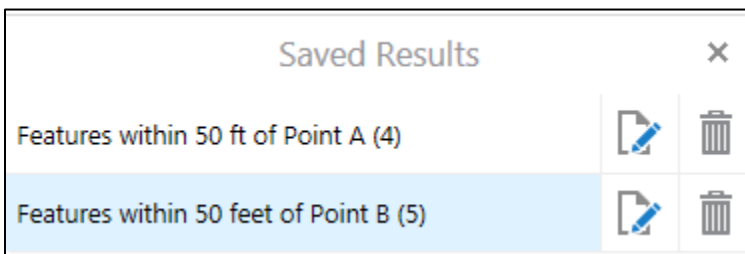
You could then combine these results the following ways:
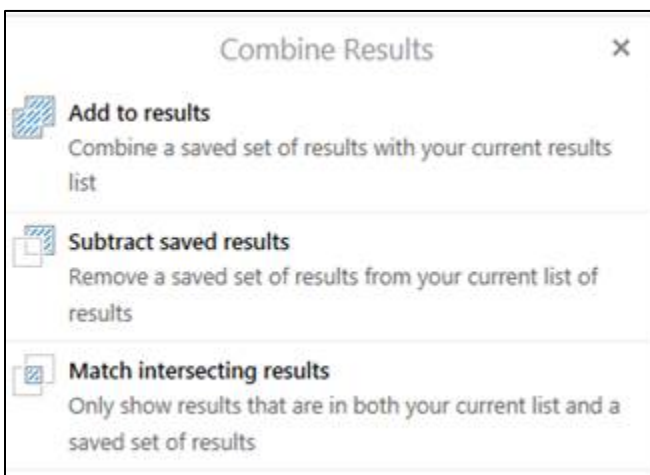
Extracting and downloading data

The steps below describe the general method to extract and download data from within the viewers. The example provided extracts all features from user-specified layers within a user-specified area. In this example the area is a single county (Vilas County).

However, any user-specified area is possible (e.g. watersheds, townships, lakes, municipalities). It is also possible to extract featues that are within a user-specified distance of a user-specified line feature (e.g. river) or point feature (e.g. permit location).

1. In the **Layer List** (table of contents), turn on only those layers you wish to extract features from.

    Note: You may wish to turn off the Surface Water base map to prevent extracting the large number of features it contains.

2. Use the **Identify** tool to get a desired feature (e.g. Vilas County) into the **Identify Results** panel.

    Note: you will need the County layer turned on in order to **Identify** it.
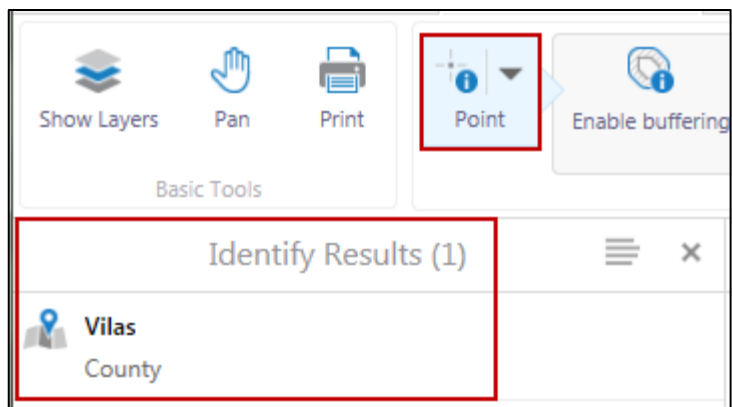
3. Click the desired feature in the **Identify Results** panel to open its detailed description:
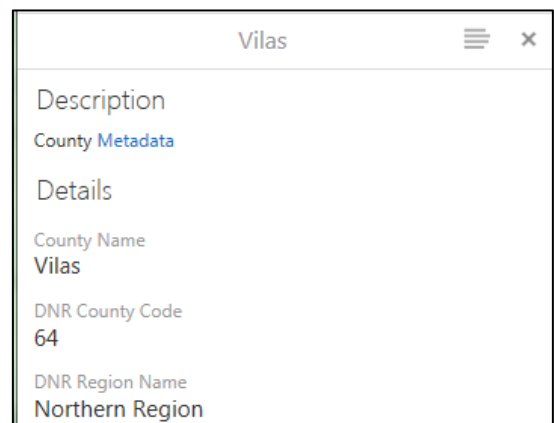
4. Click the button for **More Options** and select **Show Buffer Options**.
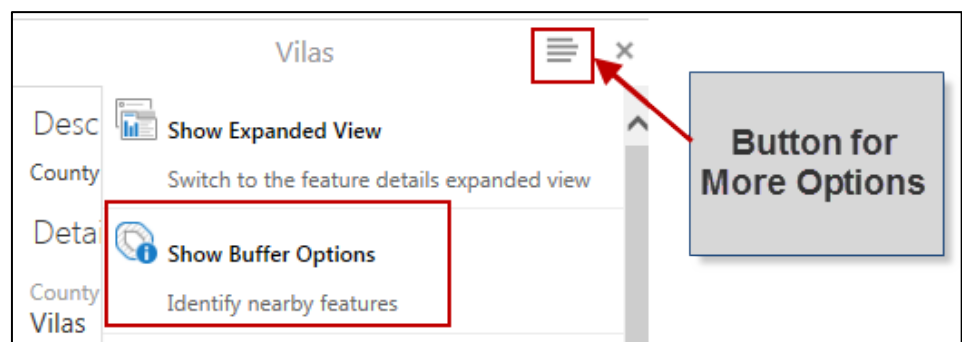
5. In the **Buffer Options** panel, enter a buffer distance of zero. This will return all features that are *contained within or touch the boundary of* the input feature (e.g. Vilas County). For a buffer of zero the units are irrelevant.

   HINT: If your input feature is a line or point, rather than an area, enter a Distance and Units to return all features that are *within that distance from* the input feature.

   There is no need to check the Write to Drawing Layer box. Click **Continue**.

6. The **Identify Results** panel will now contain all features within or touching the boundary of area input feature (or within the specified distance of line or point input features). If you do not see all the features you were expecting, refer to Step 7: Troubleshooting. To download these features, again click the **More Options** button and choose to **Export to Shapefile** (or CSV or XLSX).
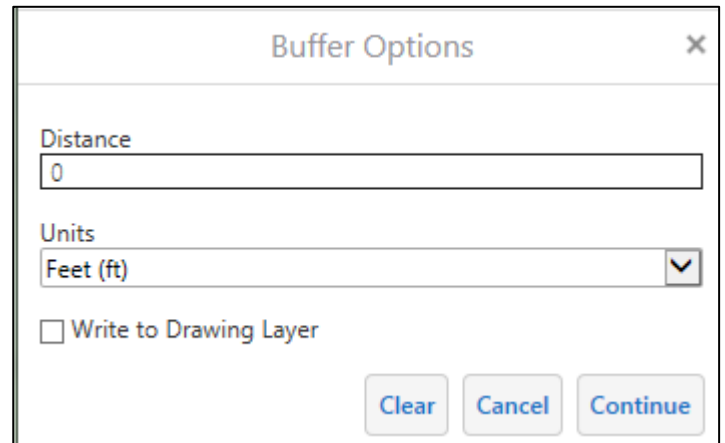
   NOTE: If there are results from multiple map layers, a separate shapefile (or Excel file) will be created for each one.

   HINT: If there are many results from multiple map layers, you can preview the results more easily by switching to table view:
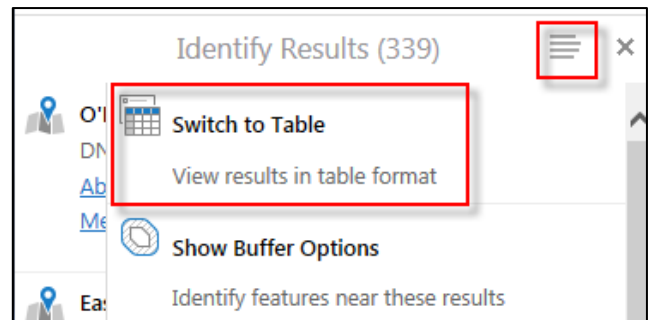
   In table view, click on a tab to filter all results to only those from a single layer:

12-digit HUCs (Subwatersheds)	Station Points with Recent Data (10 years)		Boat Access	Rivers and Stre
Landing Name ⇕	**Landing Type** ⇕	**Ramp Type** ⇕	**ADA Accessible** ⇕	**Waterbody Name** ⇕
Hemlock Slough Sauk County Park	RAMP	Concrete	No	Hemlock Slough
Baraboo River Access	RAMP	Paved	No	LaValle Mill Pond
Lake Redstone Access	RAMP	Concrete Panels	No	Lake Redstone

7. Troubleshooting

For this method to work, the features you wish to extract need to be visible on the map. Oftentimes features are not visible until zoomed in beyond a predefined map scale. If you had a layer turned on in the Layer List but no results are returned, make sure to zoom in far enough so these layers are visible prior to conducting the Buffer.

This method works on most layers in the viewers. However, some layers may have unique configurations that do not allow extraction of data. Additionally, the method does not work for most cached map services and on raster datasets.

Upload a dataset into the viewer

You can upload tabular data (.csv or .xlsx) as point features. You will need a file that has columns for the map's XY coordinates (e.g. Latitude and Longitude in decimal degrees or WTM eastings and northings in meters). For example:

Station Name	Station ID	Latitude	Longitude
Brandy Brook	10021350	43.02093	-88.3441
Brandy Brook :	10029545	43.00186	-88.3216
Pebble Creek	683458	42.98851	-88.2783
Unnamed Trib	10041569	43.00882	-88.358
Unnamed Trib	10041573	43.01529	-88.3132

You can also upload spatial data. Supported ESRI file types are shapefiles and a .zip file containing a file geodatabase or shapefiles. Other supported file types are .kml and .gpx.

NOTE: The maximum file size for uploads is 20 MB.

NOTE: Layers added to the viewer will not be carried over to your next visit.

Click the **Upload Data** button in the **Maps & Data** tab.
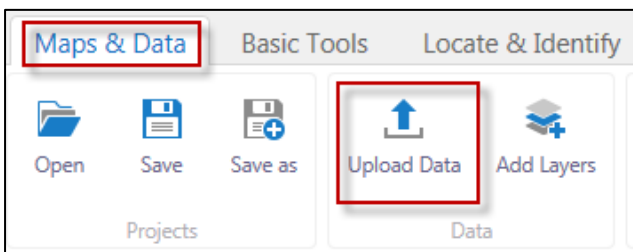
Click the **Browse** button to locate and select your file(s).

If uploading a shapefile, shift+click within the **Choose File to Upload** dialog box to select all of the shapefile's required components (shp, shx, dbf, and prj files).

Name	Type
2014TWAs.dbf	DBF File
2014TWAs.prj	PRJ File
2014TWAs.shp	SHP File
2014TWAs.shx	SHX File

Once your file(s) have been selected, click **Upload** in the **Add Data To Map** dialog box.

If uploading tabular data with coordinates, you will be prompted to confirm the field name containing the X and Y values. Also confirm the Spatial Reference for the points (e.g. WGS 1984 for geographic coordinates in decimal degrees or "Map's Current" for WTM projected coordinates in eastings and northings).

Proceed through the remaining steps to name and symbolize your new layer.

If the dataset loads successfully it will display on the map and appear at the top of the Layers list as a graphics layer.

Layers ≡ ✕

All Available Layers ⌄

☑ 2014 Targeted Watersheds >

\+ ☐ Surface Water
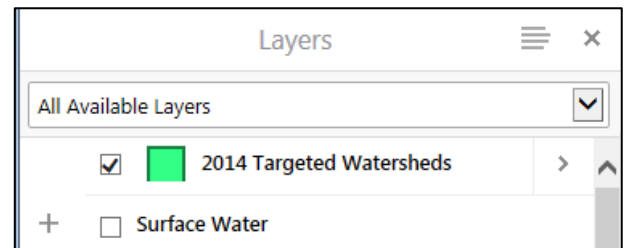
NOTE: Some projections may not be supported by the **Upload Data** tool. If you have a dataset with projection information like a shapefile or geodatabase, it's best to make sure the data is in WI Transverse Mercator (WTM, or EPSG 3071) before uploading. Flat Lat/Long datasets like KML files should load without any problems.

Add a DNR map service into the viewer

Click the **Add Layers** button in the **Maps & Data** tab.
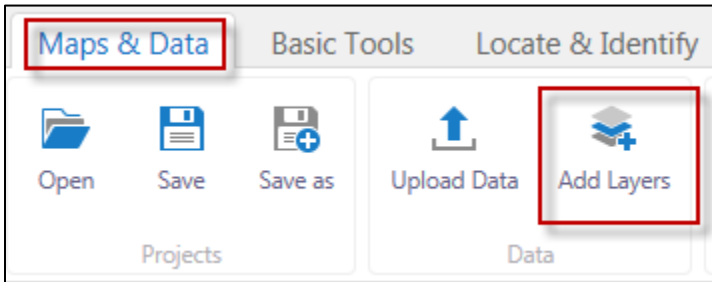
Locate the map service or layer you would like to add from one of these REST directories:
- https://dnrmaps.wi.gov/arcgis/rest/services/
- https://dnrmaps.wi.gov/arcgis_image/rest/services

A REST endpoint provides a URL (web address) for a map service or layer stored on a DNR web server. Copy and paste the desired URL into the Search box and click **Search**.

The example on the right will search for all available map services in the DW_Land_Cover folder on DNR's image web server.

There are 42 available map services in this folder. Click the arrow to discover them:
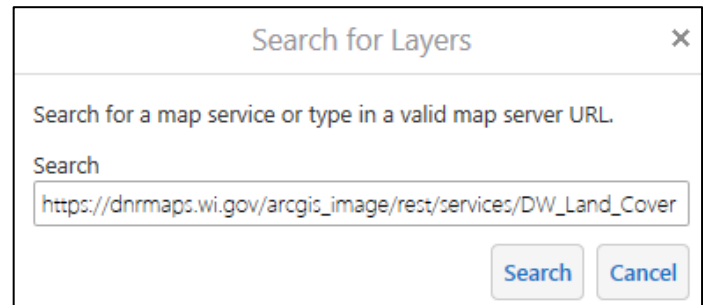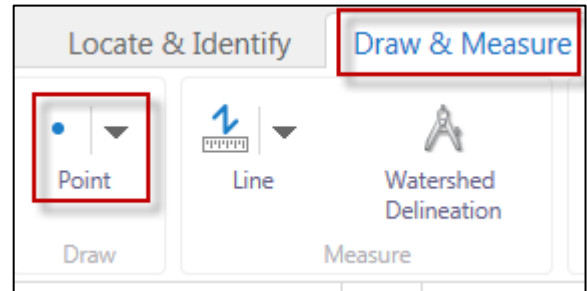

Click a plus sign to add the entire map service or an arrow to drill down to a specific layer from the map service.
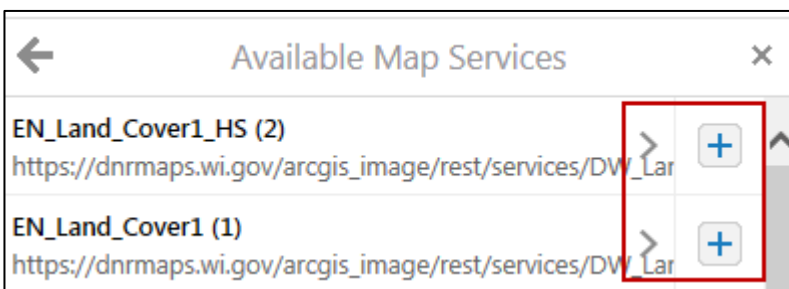
Working with map markup (graphics)

Graphics added to the map such as text, points, lines, and polygons are known as map markup. Map markup can be created, edited and exported.

On the **Draw & Measure** tab, click the down arrow to expand the **Draw** multi-tool.

Once you've selected one of the available markup types, more options below will show up. You can change colors by clicking on **Styles**.
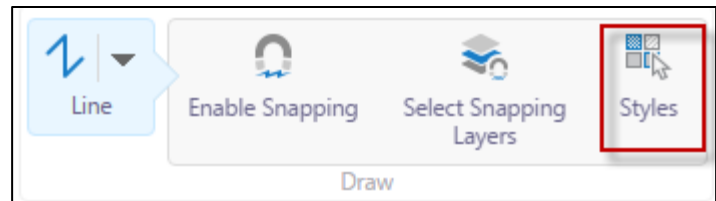
To edit markup, click the drop-down next to the **Edit** multi-tool. The expanded toolset has options to **Edit** a feature, **Erase** (remove) a single selected feature or **Clear** (remove) all markup on the map.

Use the **Export Drawings** tool to export markup to a ZIPped shapefile.

NOTE: If point, line and/or polygon geometry are present, a shapefile for each geometry type will be created and saved within the ZIP file.

NOTE: Saving your markup as shapefiles is the preferred method for saving your work. Projects are only useful for short-term saving of work. You do not need GIS software to save and later re-open shapefiles.

HINT: There is currently no way to draw a polygon without shading, but you can draw a line to mimic a polygon with no fill.
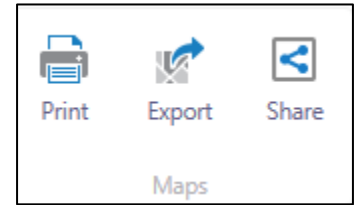
Printing, exporting and sharing maps

There are a variety of ways to convert your map into output.

Use the **Export** tool (**Maps & Data** tab) to save only the map itself as an image.

Use the **Share** tool (**Maps & Data** tab) to share the map via social media or generate a URL for the map within an email.

Use the **Print** tool (found in all tabs) to generate a map that includes the legend, scale bar and overview map. You also have the option to add a title, enter notes and include a grid (e.g. Lat/Long). Multiple layouts, output formats and resolutions are supported.

After clicking the **Print** button, you will receive a notice when your map is ready. Click **Open File** to obtain the map. In most cases the map will open in a new browser window, but behavior may be different depending on your web browser and the type of file requested.
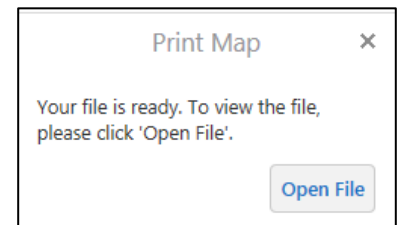
HINT: A resolution of 96 DPI is recommended for maps containing cached map layers (e.g. base maps and the Wisconsin Wetland Inventory). These layers may render poorly or not show up in the map when using higher resolutions.

Sign in to access Intranet content and save/open projects

Signing in allows DNR staff access to Intranet content as well as the ability to open, save and share projects. This functionality replaces the need for a separate Internet and Intranet application.

Use your regular Windows user name and password to sign in. These credentials will work even if you are not using a DNR computer.

IMPORTANT: To protect your credentials, be sure to always access the site with the secured https protocol:

https://dnrmaps.wi.gov/H5/?viewer=SWDV

Working with projects

Projects are suited for short-term project management, temporary storage of features you've created and sharing your work with others. A project saves the current state of your viewer session: the extent, current layer theme, which layers are visible and any markup you've created or data you've uploaded.

Projects are not suited for long-term project management, permanent storage of features you've created or archiving work you've done. This is because projects are tied to a particular version of the software and will no longer work after the viewer is upgraded to a new version. These upgrades occur every 3 to 6 months or so.

If you create any features in the viewer (e.g. drawing markup) you will want to save them elsewhere (e.g. export to shapefile) and not within a project. If you need a long-term project management solution, you will want to explore alternate GIS options such as ArcGIS Explorer (free software) or ArcGIS for Desktop (not free).

The **Open** and **Save** buttons for projects are greyed out until a user signs in. Once you are signed in, you can open and save projects using the buttons in the toolbar under the **Maps & Data** tab:
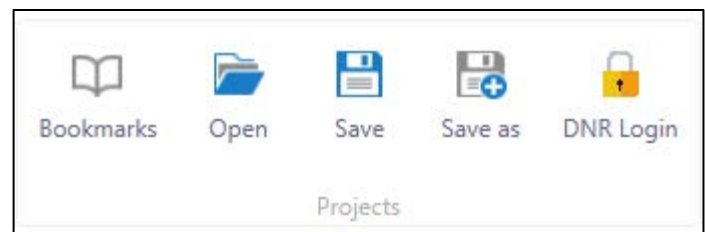
Projects are stored on DNR web servers. When you click the **Open** button, you will be able to search for existing projects directly in the viewer.
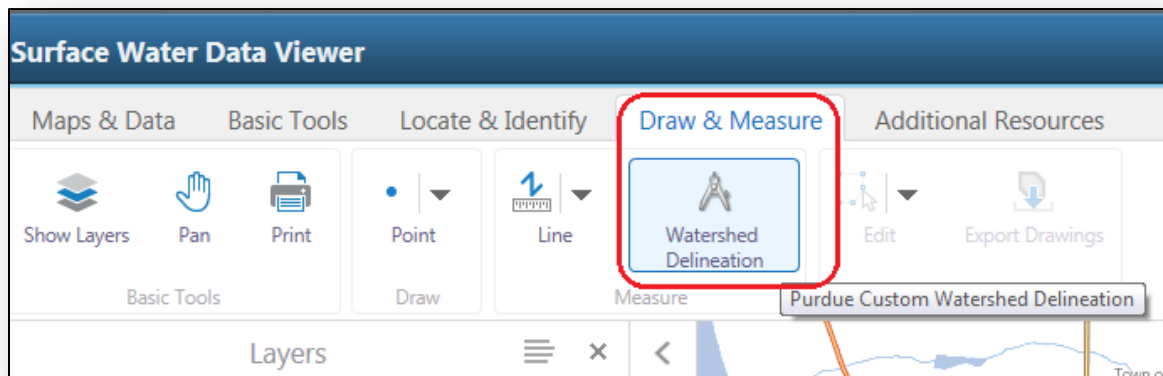
Uncheck "Show my projects only" to expand the list of projects to choose from. Click on a project to open it.
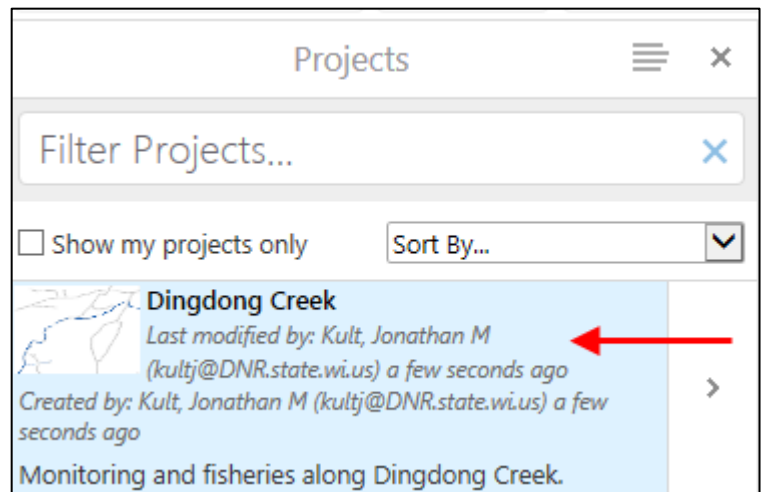
Watershed delineations

Purdue method

From the **Draw & Measure** tab, click the **Watershed Delineation** button.

On the map, click the pour point of the watershed you wish to delineate. Then click the link that appears in the results panel.

This used to send a Lat/Long coordinate off to the L-THIA server at Purdue University to run the watershed delineation. Unfortunately, the functionality was lost with a server upgrade at Purdue in 2016. You'll now be sent to the following interstitial page, prompting you to go to the Purdue site and punch in the Lat/Long coordinates.


At the Purdue site, click on the LatLng tab in the L-THIA GLWMS box. Copy and paste the Lat and Long into the spaces provided, and click Submit. It will take several seconds to delineate the watershed.

Use your mouse wheel to zoom into the watershed that was delineated (it's a Google Map background). You'll also get a breakdown of land use types within your watershed and can run various runoff models for it.
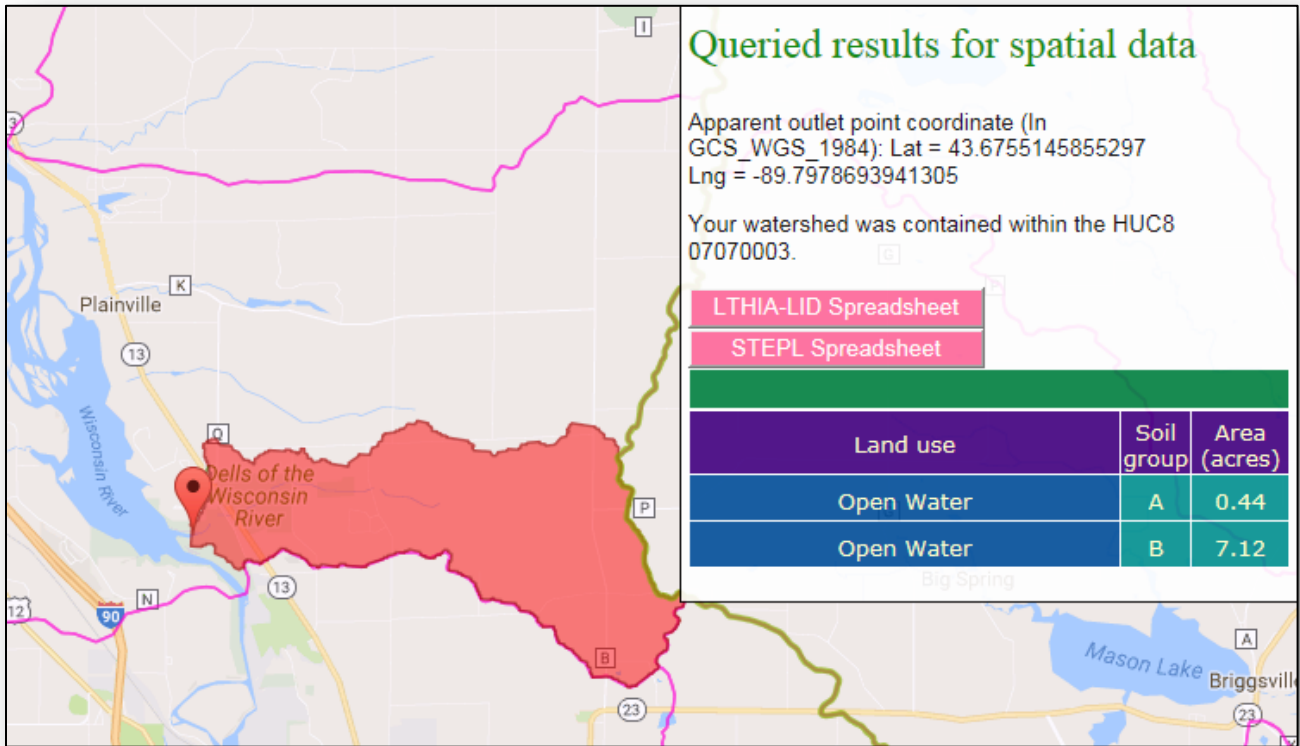
To download a KML export of the watershed boundary, click on the **Tools** tab, then the **Download KML** button.
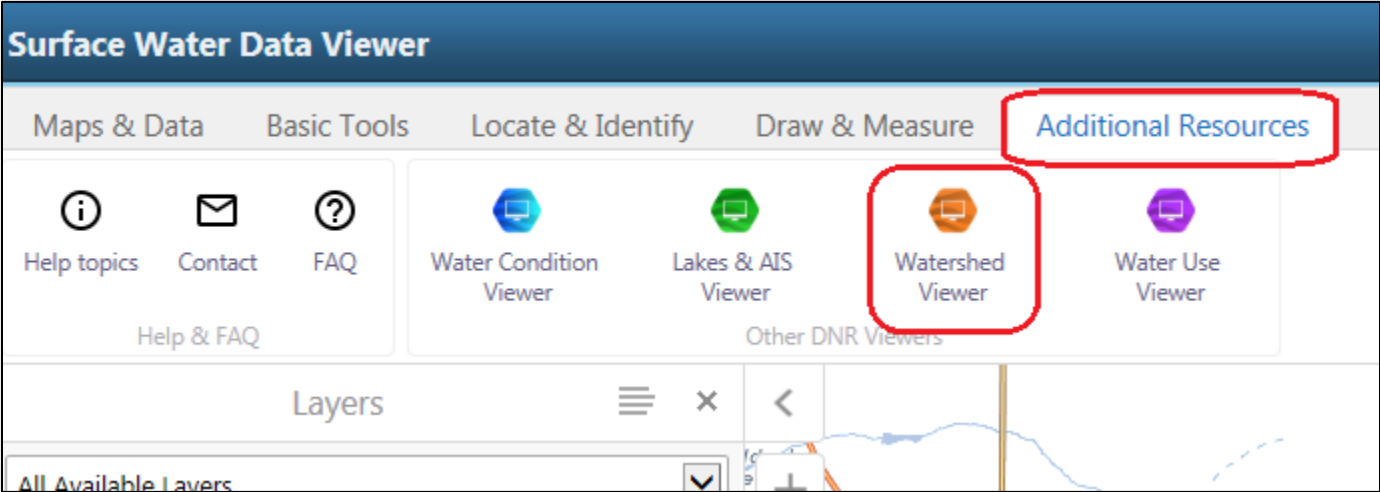
You can then bring the exported KML boundary back into SWDV using the **Upload Data** tool described above.
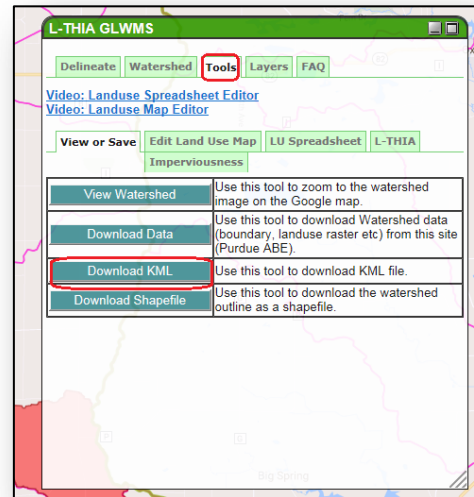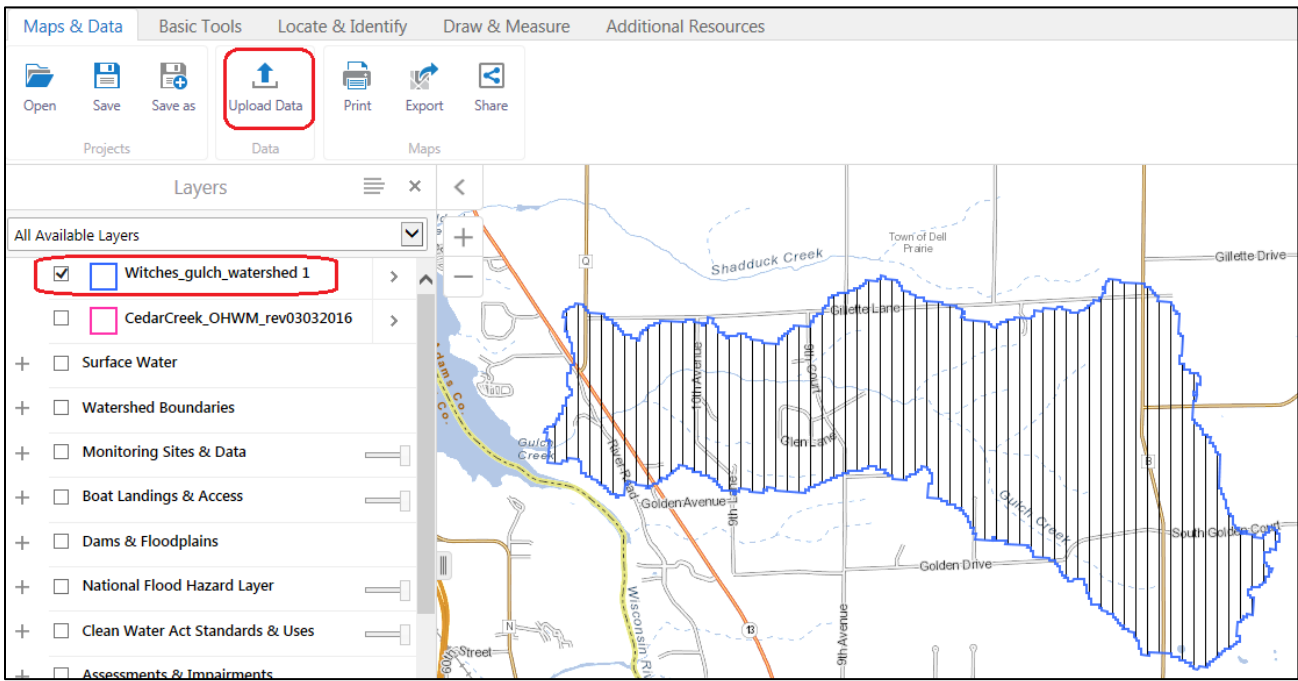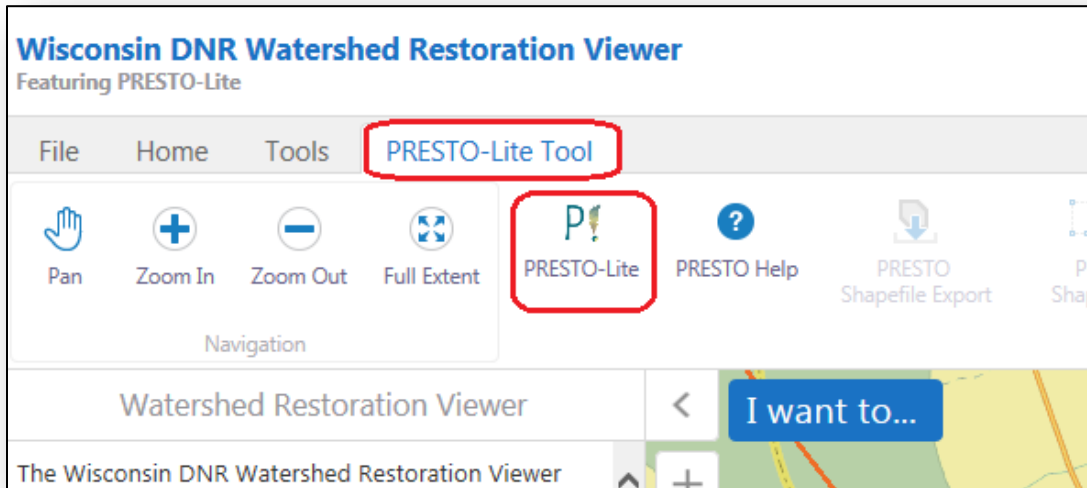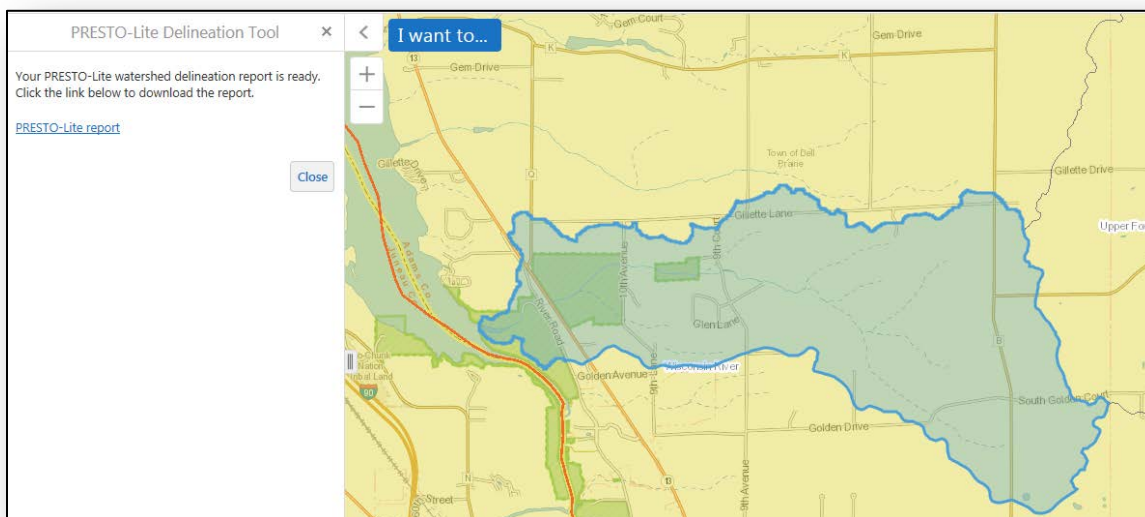
PRESTO-Lite method

You'll need to go over to the Watershed Restoration Viewer to access this tool.

Over in the Watershed Restoration Viewer, click on the **PRESTO-Lite Tool** tab, then **Presto-Lite**.

Click the pour point of the watershed you wish to delineate. Stuff will run in the background, and the shape of the watershed will appear on the map.

You can then click **PRESTO Shapefile Export** to export the watershed as a shapefile. This you can then pull into SWDV via the **Upload Data** tool described above.