

# **Model My Watershed Site Storm Model Guide**

<https://wikiwatershed.org/help/model-help/>

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## 1. Introduction

*Document was last updated on October 21, 2019.*

*Note: Model My Watershed web applications are under active development and the appearance of screenshots will change over time. Updates to this guide will be released with major changes to the ModelMW User Interface.*

The Model My Watershed (ModelMW) Site Storm Model (<https://modelmywatershed.org/>) simulates storm runoff and water quality by applying the TR-55 (<http://bit.ly/2MxpfJC>) and STEP-L (<http://it.tetrattech-ffx.com/step1web/>) water-quality models for a single 24-hour rainstorm over a selected land area within the continental United States. The results are calculated based on actual land cover data (from the USGS National Land Cover Database 2011, NLCD2011, <http://www.mrlc.gov/nlcd2011.php>) and actual soil data (from the USDA Gridded Soil Survey Geographic Database, gSSURGO, <http://bit.ly/32AawmM>) for the selected land area of interest.

The complementary ModelMW Runoff Simulation (<https://runoff.modelmywatershed.org/>) performs the same model calculations on a hypothetical land parcel with a single land cover class and a single hydrologic soil group.

There are additional resources at <https://wikiwatershed.org/help/model-help/> that explain in-depth technical details about the models.

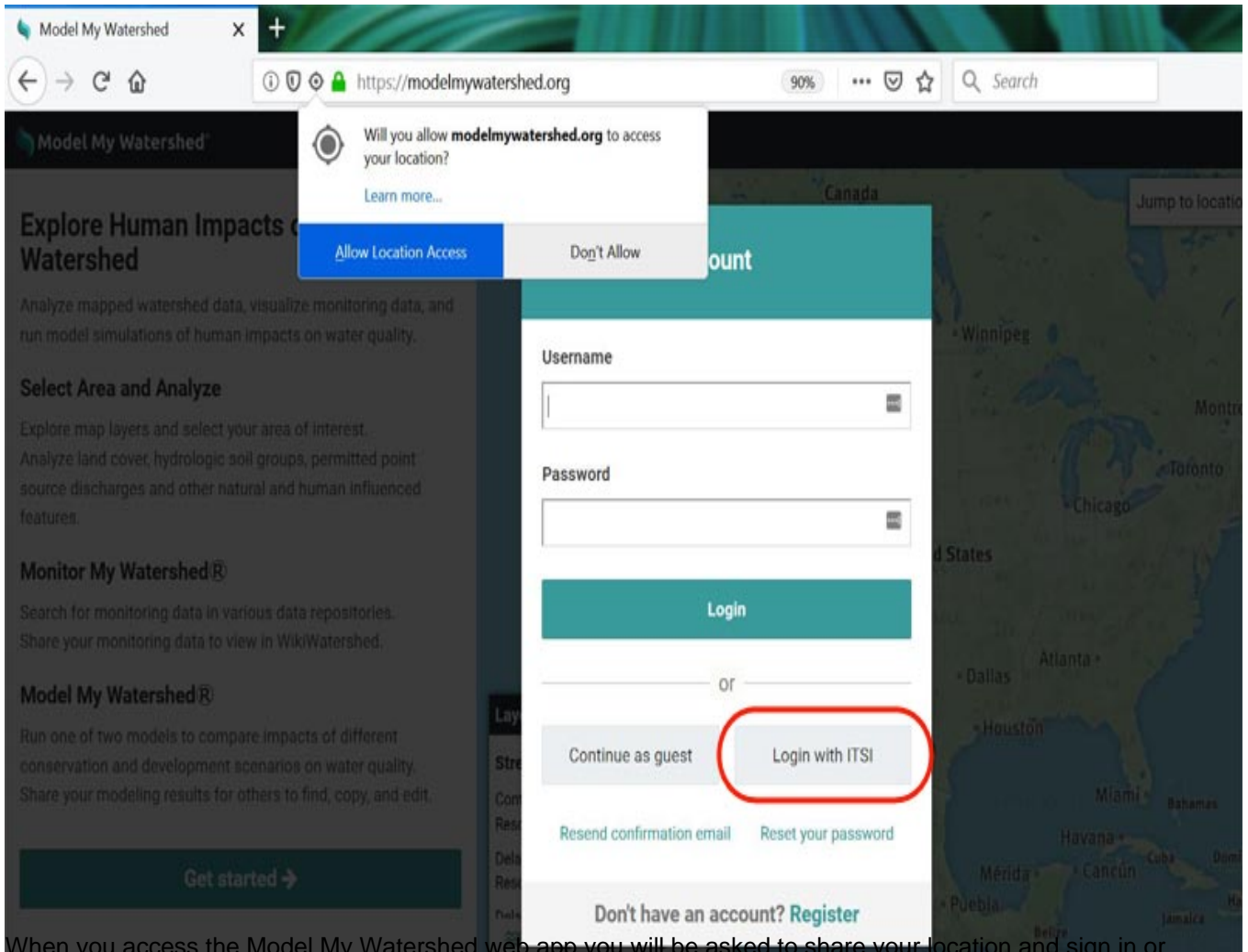
## 2. Sign In and Share Location

The Model My Watershed (ModelMW) Site Storm Model can be accessed online from any web browser at <https://modelmywatershed.org/> or through the Innovative Technology in Science Inquiry (ITSI) portal (<https://itsi.portal.concord.org/>).

When you first navigate to the ModelMW application, depending on your browser's settings you may be asked to share your location data with the application. Sharing your location will automatically start the application at approximately your current location, but it is not necessary for the application to work.

**You can use ModelMW as a guest but if you would like to save your work and/or share your work with others, you will need to create an account.**

- New users: Create an account by clicking "Login" in the main menu, then clicking the "Register" link at the bottom of the form. Fill out the required information, click the "Register" button, and then check your email for an activation link. Be sure to check your spam folder if you don't receive the email within a few minutes. Some institutional email systems may quarantine emails for up to 24 hours; you will need to check with your email systems administrator if you do not receive the email.
- Students and teachers using the ITSI portal: click the "Login with ITSI" button to verify your credentials for the ITSI portal and prevent you from needing to set up a new user for the application. This also allows you to quickly and easily send data and screenshots back and forth to assignments and lessons on the ITSI portal.
- Other existing users: Type in your username (not your email address!) and password and click "Login."



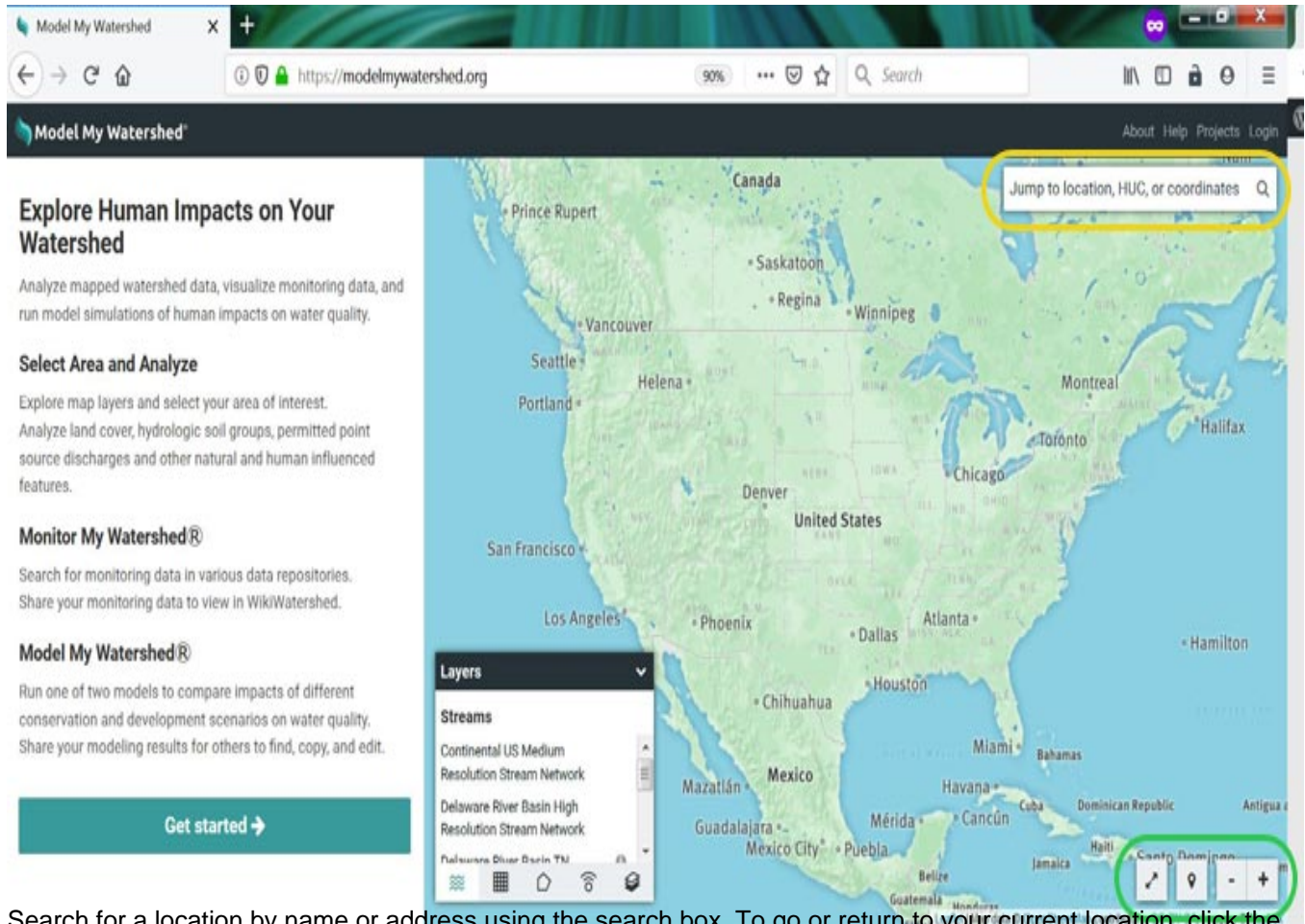
When you access the Model My Watershed web app you will be asked to share your location and sign in or proceed as a guest. Sharing your location allows the app to zoom to your current location, but it is not necessary for the application to work.

### 3. Navigate the Map

Once you have logged into the application, you will see a map looking much like Google Maps. If you shared your location, the application may zoom directly to your location, otherwise it will begin by showing a map of North America.

As with most online map tools, you can navigate the map by clicking and dragging and zoom by pinching, using a scroll wheel, or using the zoom buttons (circled in green in the screenshot below).

You can also search for a location by name or address using the search box (circled in yellow). To go or return to your current location, click the map pin icon to the left of the zoom buttons (circled in green). The double-arrow icon to the left of the map pin icon will expand the map to full screen.

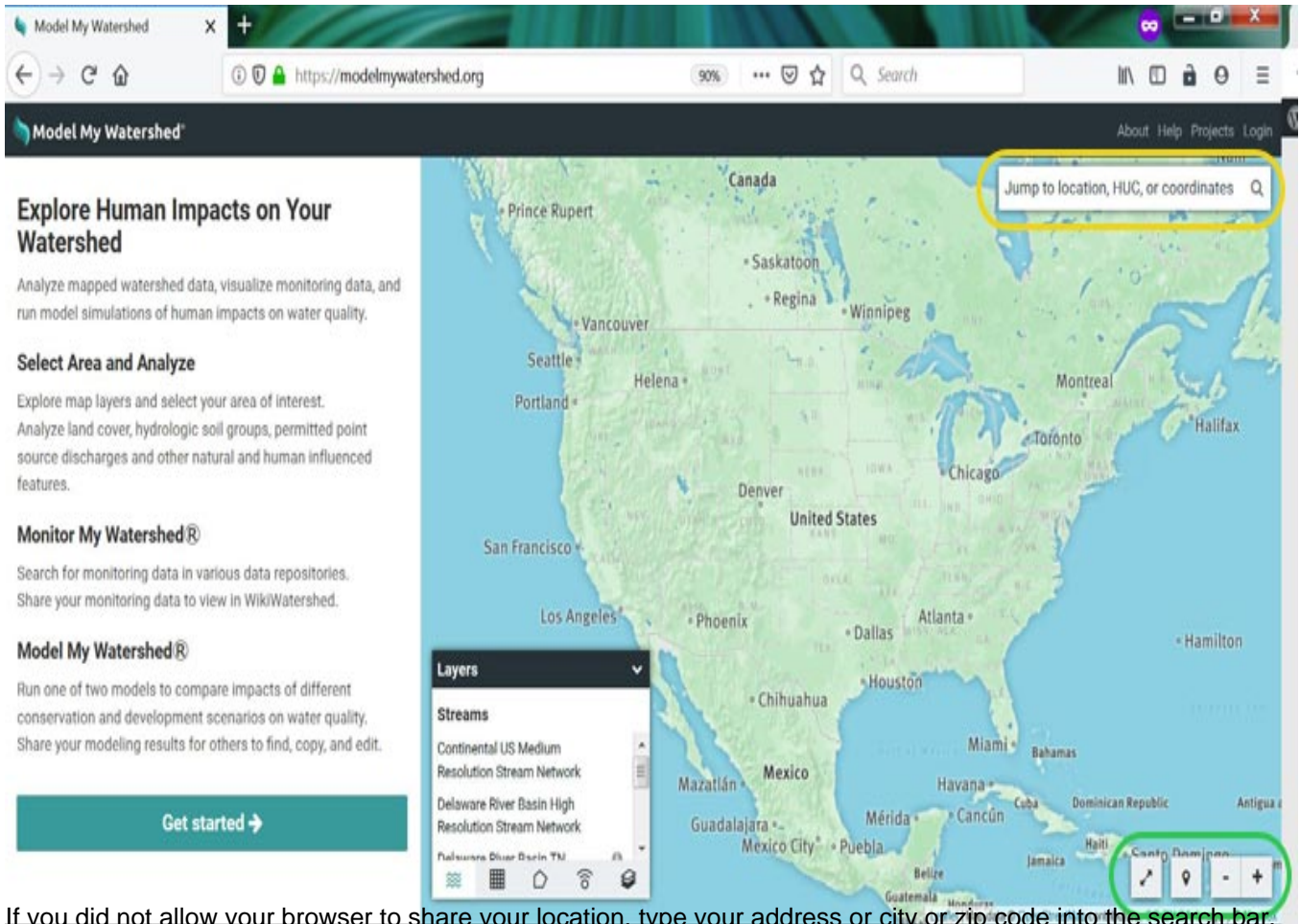


Search for a location by name or address using the search box. To go or return to your current location, click the map pin icon.

## 4. Find Your Watershed

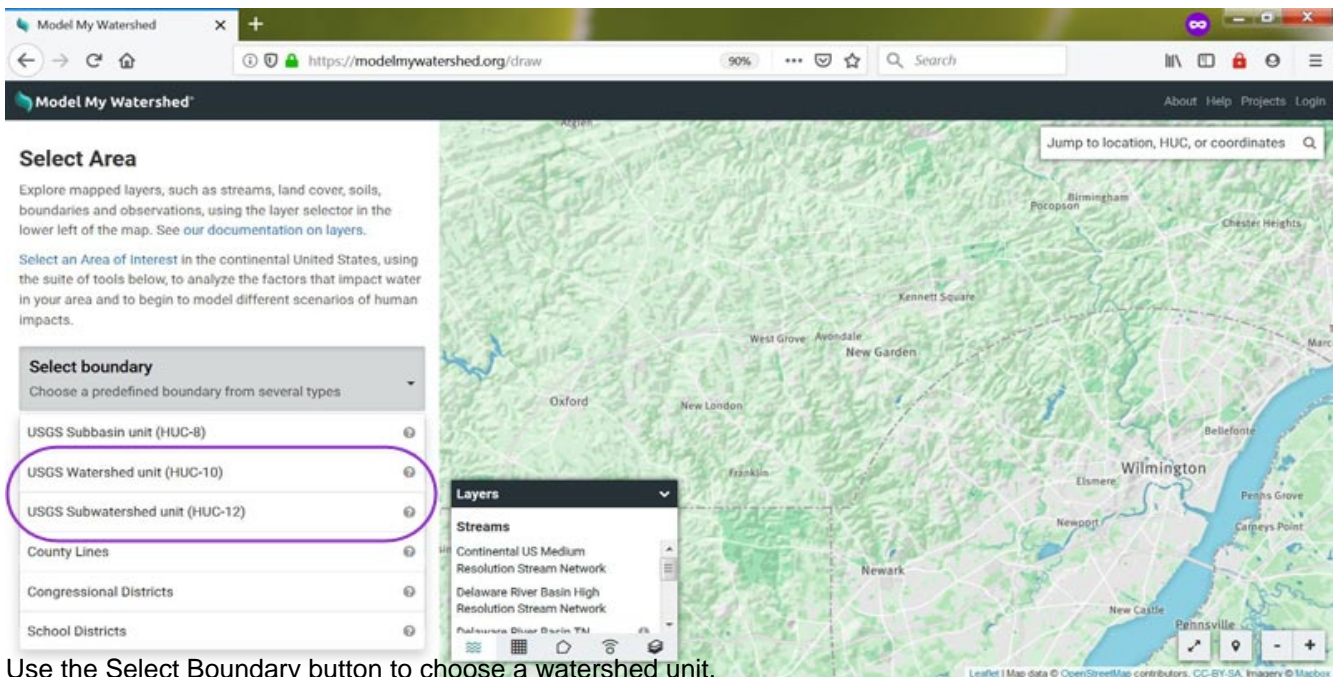
If you chose to share your location, the application should zoom directly to the location your internet provider or mobile device is sharing. If you chose not to share your location, find the location you want watershed information for by typing an address or city or zip code into the search bar.





If you did not allow your browser to share your location, type your address or city or zip code into the search bar.

To see watershed information click on the “Select Boundary” button on the left of the screen and then select “USGS Watershed unit (HUC-10)” or “USGS Subwatershed unit (HUC-12).”



Use the Select Boundary button to choose a watershed unit.

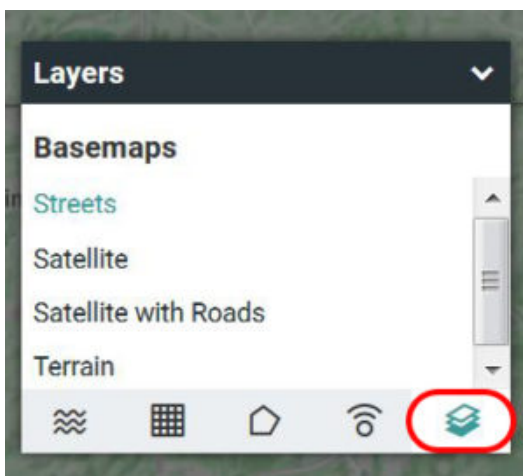
Red border lines should appear on your map. If you do not see any, try zooming out — you may be zoomed in too much to see more than one watershed unit.

The name of a watershed unit will be displayed in the pane on the left side of the screen. If you realize you made a mistake in selecting your area, click the “Change area” button and try again.

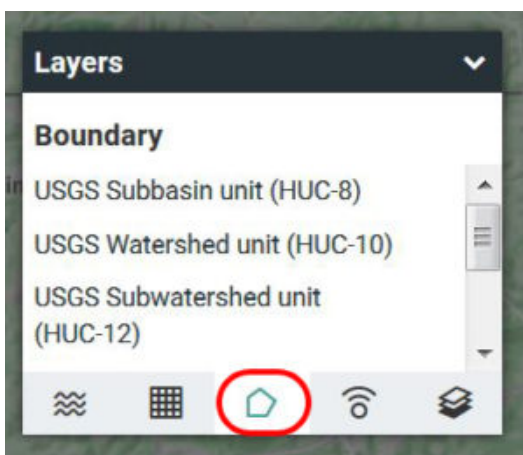
## 5. Choose Basemaps and Overlays

Just as Google Maps allows you to switch between road and satellite maps, there are several options for both the basemap and data overlays on top of the map. These are available in the Layers pane.

You can select a basemap image and several different types of overlays. The basemaps themselves come directly from ESRI or Google Maps and are not built into the application. If you have a very slow internet connection, the base maps may be slow to load.




The Basemaps tab in the Layers pane.



The Boundary tab in the Layers pane.

The overlays include boundary lines (like school districts and USGS hydrologic units) and color shading for land uses and soil types. There are also observation data overlays, which display locations and data from the USGS and other national river and weather monitoring stations. *Please note that observation data is not available in all locations!*

## 6. Select an Area to Model



**Select boundary**  
Choose a predefined boundary from several types

**Draw area**  
Free draw an area or place a square kilometer

**Delineate watershed**  
Automatically delineate a watershed from any point

**Upload file**  
Upload a polygon for your area

Select an Area of Interest in the continental United States, using the suite of tools below, to analyze the factors that impact water in your area and to begin to model different scenarios of human impacts.

## Select Boundary

You can select by political (county lines, congressional districts, and school districts) or major watershed (HUC 8-12) boundaries in the “Select boundary” tool. Once you have selected a boundary type, those borders will appear on the map and the name of each region will appear as you hover over it.

Be aware of your zoom level when selecting by boundaries. If you are at too high of a zoom level, you may not be able to see the boundaries on your map.

## Draw Area

**Free Draw:** Free draw an area of interest polygon by clicking on the map and repeatedly clicking at boundary corners. Close the polygon by double clicking on the last point of clicking on the first point.

**Square Km:** Draw a perfect square with one kilometer sides by clicking on the map where the square's center will be.

## Delineate Watershed

**Continental US Medium Resolution:** Click on the map to select the nearest downhill point on the medium resolution flow lines of the National Hydrography Dataset. The watershed area upstream of this point is automatically delineated using the 30-meter resolution flow direction grid.

**Delaware High Resolution:** Click on the map to select the nearest downhill point on our Delaware River Basin high resolution stream network. The watershed area upstream of this point is automatically delineated using the 10-meter resolution national elevation model.

## Upload File

You can select or drag and drop a file to upload a polygon for your area. File must be a shapefile (zip containing shp and prj files) or geojson. Only the first feature is used.

## 7. Analyze an Area



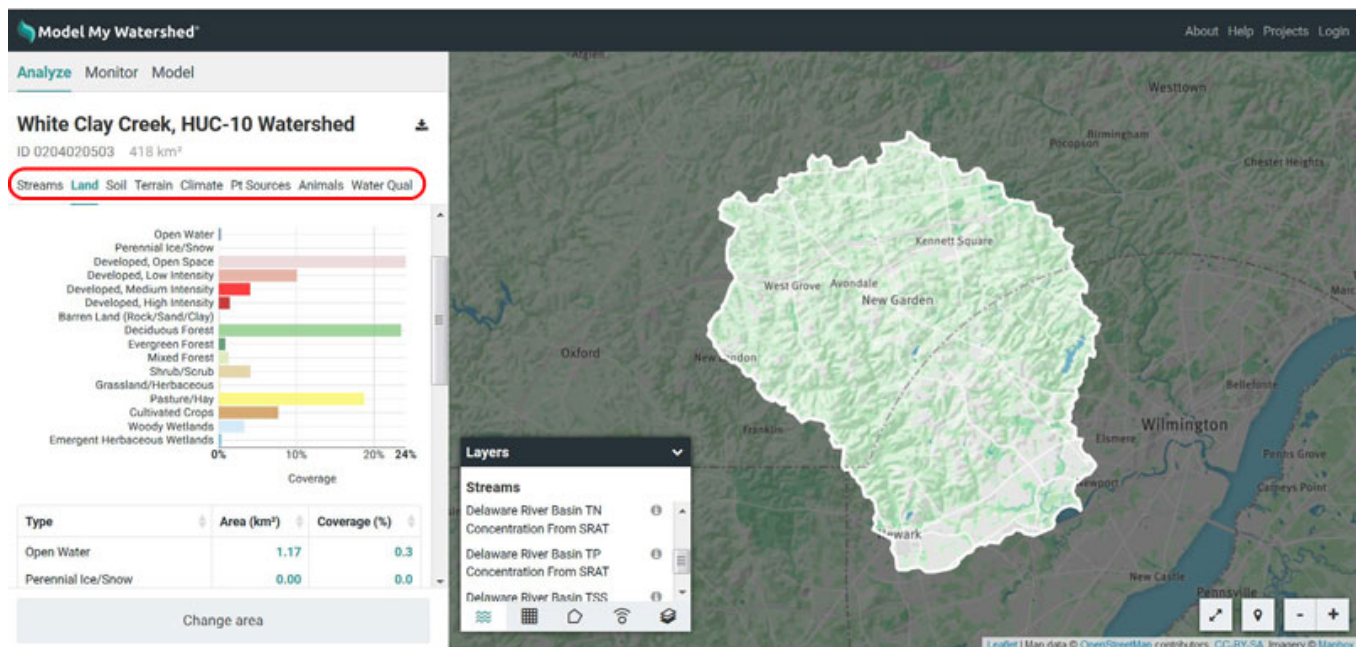
As soon as you have selected an area to model, the application will change into geospatial analysis mode. The map will now show the area you selected in bright colors with the rest of the map grayed out. The Analyze pane will show the following information for your selected area:

- Stream network statistics
- Land cover distribution
- Hydrologic soil group distribution
- Terrain statistics
- Climate
- Point sources
- Estimated number of farm animals
- Water quality estimates (Delaware River Basin only)

These calculations and analysis are done on the fly for each area based on nationally available data. You will not get a pre-computed estimate or “canned” number. These are real values based on the most recently available national datasets. Because of this, the analysis may take a few seconds to complete and you may see a loading wheel as this happens. (It is generally very fast with a good internet connection.)

In the Analyze pane you can view the land use and soil type in both tabular and graphical form. (The table is below the graph. If you cannot see it, scroll down.) Use the tabs to switch between the different types of information.

You can sort the tabular data by type, area, or coverage percent. The bar graph coloring will match up with the colors assigned by the National Land Cover Database and can be used as a legend for the land cover and soil group overlays. The title at the top of the Analyze pane will list the name of the area (if selected by boundary) and the total size of the area. You can still change the map zoom and overlays in the map pane. Try turning on the NLCD overlay to compare the layout of land covers on the map to the percent of each land cover in the area.



## 8. Monitor an Area

Click on the second tab in the Analyze pane to view monitoring data for the chosen area.

Start typing search terms, e.g. “turbidity”, “water” & “MODIS,” to find some datasets that would be useful for

your research. You can add filters if dates are important. Certain catalogs may time out for large areas of interest that contain many results.

Click on “Contribute Data” to learn how you can contribute your own datasets to data repositories that will allow them to be incorporated in the Monitor tab!

## 9. Model an Area

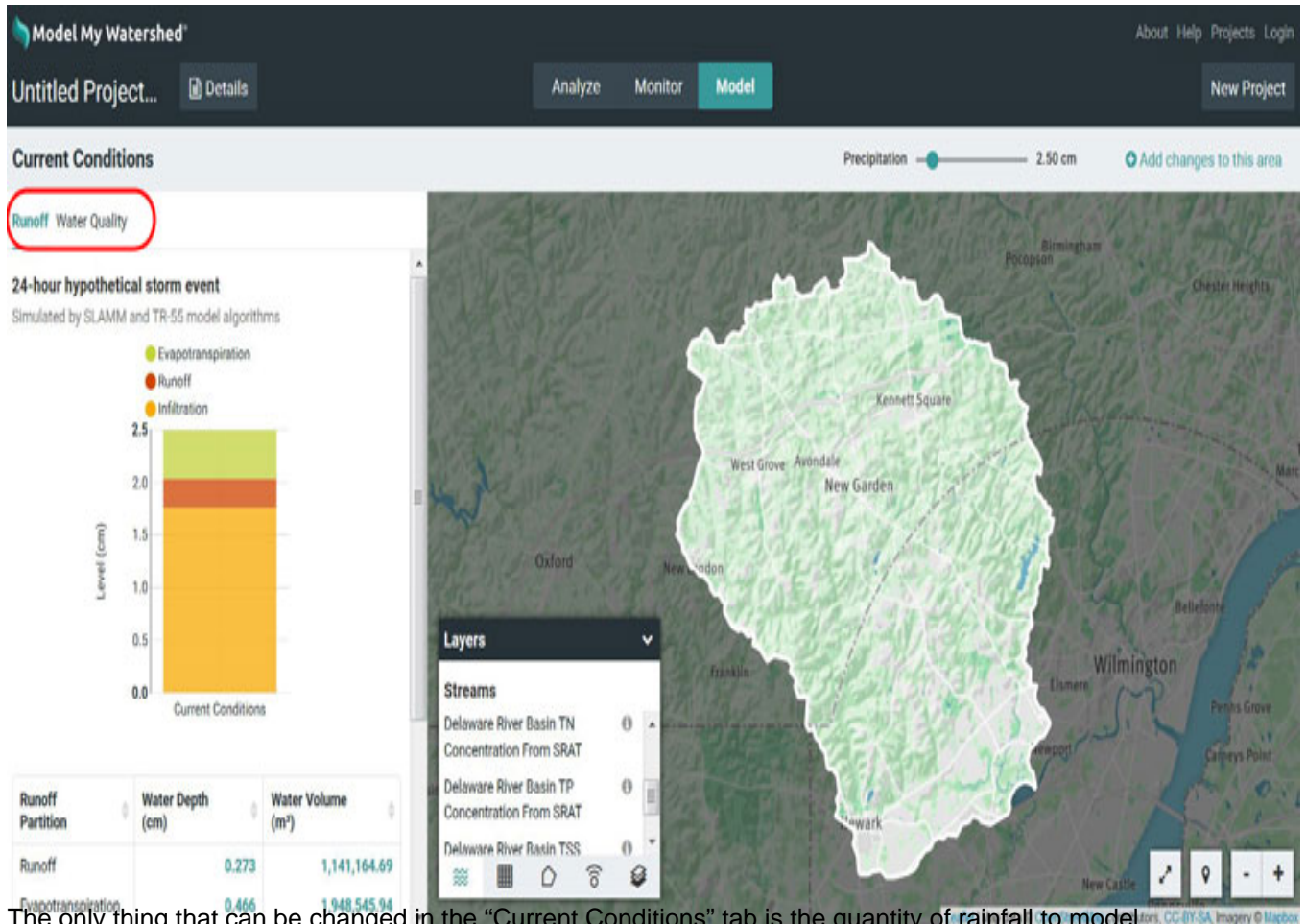
Once you are happy with the area you selected, you can move on to modeling and modifying the area by clicking into the “Model” tab. There are two models available to simulate stormwater runoff and water quality, to create different conservation and development scenarios, and to compare human impacts of these scenarios.

- **Site Storm Model:** Simulates a hypothetical 24-hour storm by a hybrid of multiple algorithms; designed primarily for use with smaller, more developed areas.
- **Watershed Multi-Year Model:** Simulates 30 years of daily data by the MapShed model; designed primarily for larger, more rural areas.

Choose one of the two models. On the next screen, you will see current conditions. The model output pane will now be filled out with predicted amounts of runoff and stream water quality. The runoff quantities are calculated using a combination of the TR-55 runoff model (<http://bit.ly/2MxpfJC>) developed by the U.S. Department of Agriculture and the Small Storm Hydrology Model for Urban Areas developed by Robert Pitt for a single 24-hour rain storm. The water quality parameters are calculated using the EPA's STEP-L water quality model (<http://it.tetrattech-ffx.com/stepweb/>). For more information on the specifics of these calculations, see the technical documentation (<https://wikiwatershed.org/help/model-help/mmw-tech/>).

The runoff tab in the model output pane shows the partitioning of the rainwater into runoff, infiltration, and evapotranspiration as a stacked bar graph. In the water quality tab, you will see both tabular and graphical data showing predicted water quality for any streams in the selected area. Because the model is running with real data on your custom area, it may take some time for the model to run and you may see a loading icon. (It is generally very fast with a good internet connection.)

When you begin modeling, you will always begin in the “Current Conditions” tab. In this tab, you see the analysis and resulting model of the land exactly as it is. The only thing that can be changed in the “Current Conditions” tab is the quantity of rainfall to model.



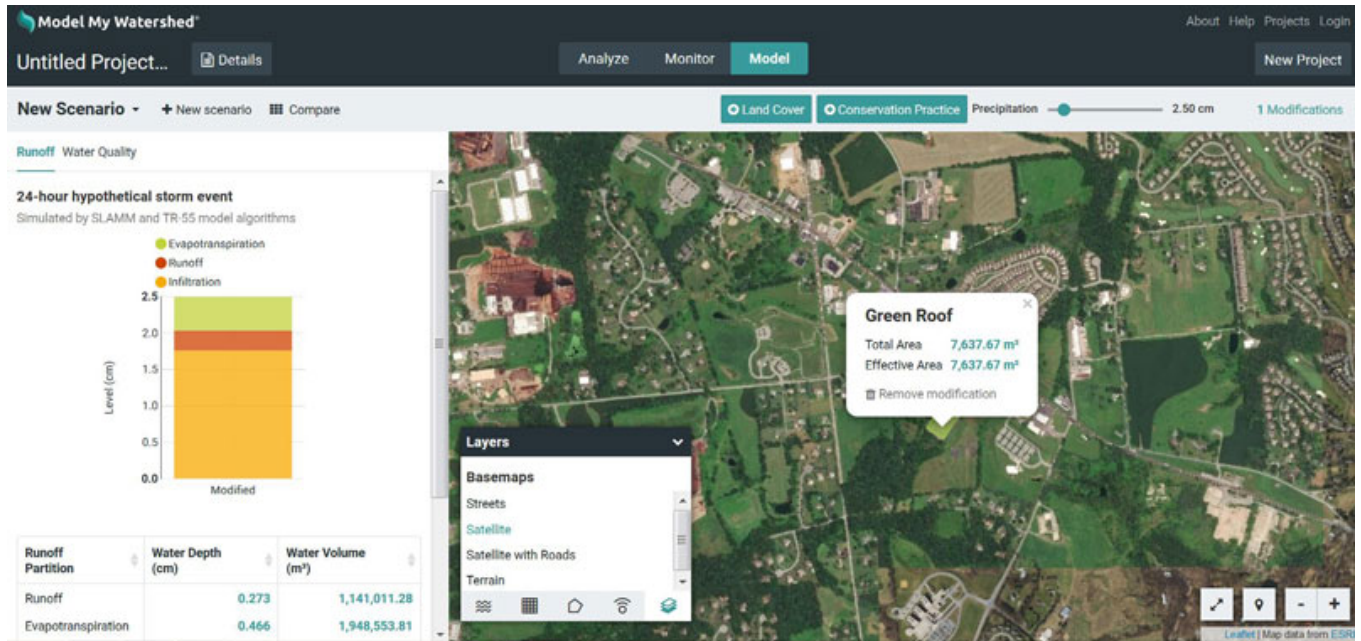
The only thing that can be changed in the “Current Conditions” tab is the quantity of rainfall to model.

## 9.1. Create a New Scenario

To begin making changes to the landscape, click on the “Add changes to this area” link at the top of the screen. To start, this looks exactly like the “Current Conditions” tab but with two new buttons, one for land cover and another for conservation practices. Each of these is a freehand drawing tool to modify the current land use.

Select the Land Cover or Conservation Practice button, choose a new land use or conservation practice, and then click points on the map to draw an area over which to apply it. As soon as you add a new land use or conservation practice, the model will re-run in the background to calculate what has changed and all of the plots will be updated. You will see loading icons again in the model pane as this happens.

See technical documentation (<https://wikiwatershed.org/help/model-help/mmw-tech/>) for an explanation of how the runoff and water-quality contributions of conservation practices are calculated.



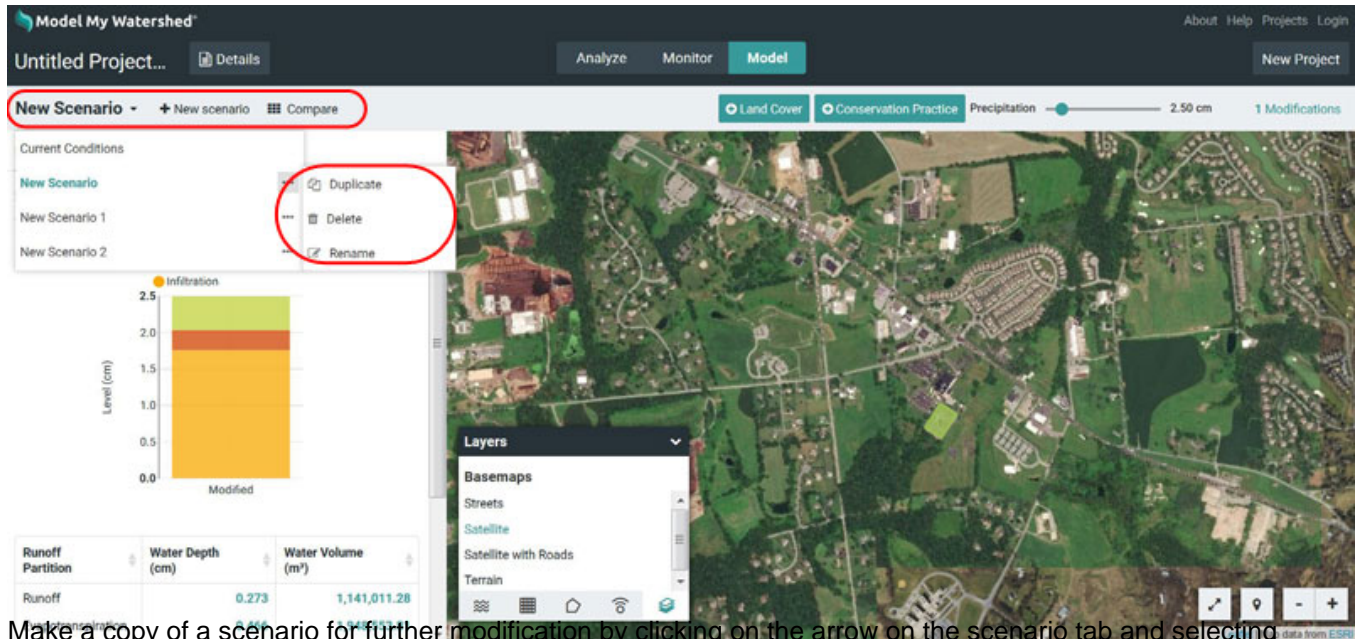
## 9.2. Add Modifications

As you add modifications, you can see details about amount of area modified by clicking on any modification box. You can also see a list of all of the modifications you made in the scenario by clicking on the space in the upper right of the map pane where it says “x modifications.” This gives a sort of “shopping cart” of modifications grouped by the type of modification.

You can delete any modification by clicking the trash can next to it. If it helps to decide where to make changes, you can still use the small globe icon to select which overlays to display on the map.

You can create many possible scenarios of landscape modification by clicking on “+ New scenario” above the model output pane. Scenarios can be renamed, duplicated, and deleted, and if you are logged in, shared through the same menu. To help sort through many scenarios, click on the arrow next to the scenario name below “Untitled Project.”





Make a copy of a scenario for further modification by clicking on the arrow on the scenario tab and selecting “Duplicate.”

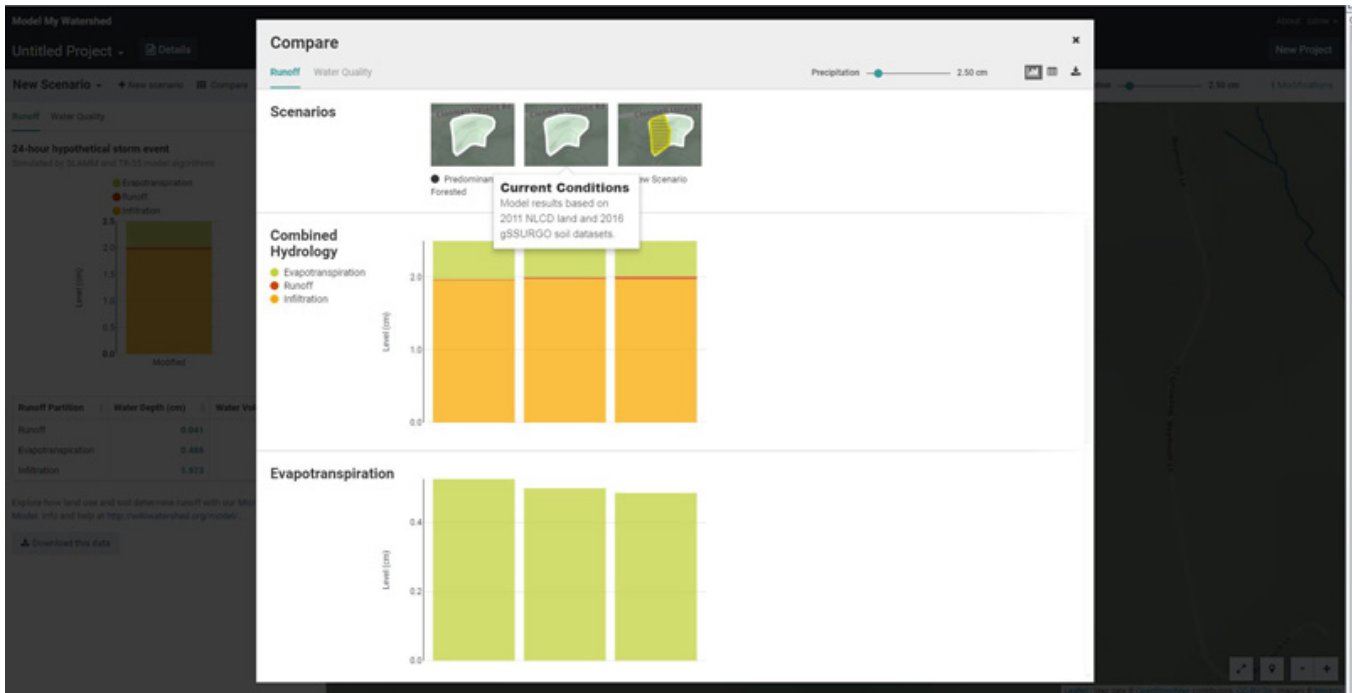
### 9.3. Compare Scenarios

Once you have created several scenarios, you can compare all of them by clicking on “Compare” (above the model output pane) to show the original results from the “Current Conditions” tab and the modified results as you change the landscape.

The “Compare” option doesn’t appear until you have defined a New Scenario in your project, by selecting the “Add changes to this area” button in the upper right-hand side of the panel.

The compare window should now look similar to this:





Clicking “Compare” gives a side-by-side comparison of all of the modified scenarios along with the original conditions before any modifications.

The screen shots above show a side-by-side comparison of all of the scenarios along with the original conditions before any modifications. It also shows what the partitioning would be if the landscape were 100% forested. This 100% forested condition will give the maximum amount of infiltration for the landscape, given its soils.

## 10. Save and Share a Project

At any time while working, you can name and save your work by clicking on the top left “Untitled Project” tab.

You can also make the project publicly accessible to anyone with a link to it, add tags so it can easily be found, print out the maps and graphs, or embed the work into the ITSI portal. **Note that this only works if you logged in when you entered the application** (and embedding in the ITSI portal requires logging in through the ITSI portal).

If you have made your project publicly accessible and given someone the link, they will be able to view all of your scenarios and results. They will not, however, be able to modify it. Any public project can be made private again from the same menu.

## 11. Credits



WikiWatershed is an initiative of [Stroud™ Water Research Center](#). The Stroud Center seeks to advance knowledge and stewardship of freshwater systems through global research, education, and watershed restoration.

## Collaborating Organizations

- Academy of Natural Sciences of Drexel University
- Azavea
- Concord Consortium
- LimnoTech
- Millersville University
- Penn State Institutes of Energy and the Environment
- University of Washington
- Utah State University

See the [About page](#) for more information about these organizations and individuals.

## 12. Send Us Feedback

Please help us improve this guide. You can leave feedback by looking for the “Was this helpful? Yes or No” text at the end of each section. If your answer is no, or if you see something that needs to be changed, please use the “Suggest an edit” link and fill out a quick form. Your feedback will not be displayed on the web page but will be emailed to the webmaster.

Additional resources can be found on the Model My Watershed help page (<https://wikiwatershed.org/help/model-help/>). If you’ve reviewed the resources and still need help, or if you would like to report a bug, please use our contact form (<https://wikiwatershed.org/contact/>).