## Welcome to WikiWatershed Tools

Description from the website: *WikiWatershed is a web toolkit to support citizens, conservation practitioners, municipal decision-makers, researchers, educators, and students to collaboratively advance knowledge and stewardship of fresh water. WikiWatershed web tools offer rapid visualization of watershed data, advanced geospatial analysis capabilities, and science-based predictions of human impacts on stormwater runoff and water quality.*

Explore the WikiWatershed Toolkit

1. Go to WikiWatershed Home Page of the Stroud Water Research Center.

2. In your own time, I encourage you to browse all the tools on the WikiWatershed website, especially the Macroinvertebrates.org section (which we will not get to today).

https://wikiwatershed.org/
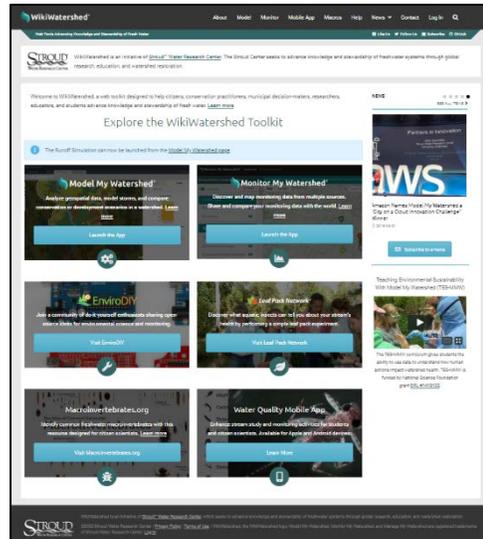
Runoff Simulation Model

This simple model (not so simple underneath the hood) allows the user to explore the interplay of the major factors governing the fate of rainfall hitting the earth. ***Description from the website:*** *The Runoff Simulation is an animated version of the Site Storm Model package of Model My Watershed. It allows users to learn how land use and soil together determine whether rainfall infiltrates into the soil, runs off into streams or is evaporated and transpired by plants.*

https://wikiwatershed.org/model/
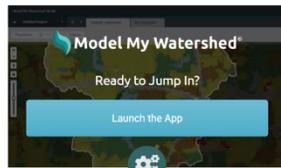
Open the Runoff Simulation Model

1. Go to Model My Watershed page

2. Scroll down & launch the Runoff Simulation App

3. Spend some time playing with the three variables of the model: rainfall amount, land cover type, and soil type (see diagram, next page). Then, answer the questions on the following page.

adjust size of storm event

choose a land cover

choose a soil type

Note where the water goes

4. Keeping the rainfall setting at 5 cm and soil type "A" (the default settings), choose different land covers and note the difference in the results of what happens to the rainfall.

Q: What is the difference in runoff generated by a 5 cm storm (the default setting) between:

- *Forest and Highly Developed Land?* _____

- *Crops and Low Intensity Developed Land?* _____

Q: What percentage of a 5 cm rainfall becomes runoff in medium intensity developed land? _____

5. Adjust the soil type for 2 or 3 different land covers.

Q: For the three developed classes, what changes occur in infiltration and runoff with different soil types? _____

Q: For grassland and crops, how does the infiltration and runoff change as the soil goes from "A" to "D"? _____

6. Finally, see what happens when a bigger storm arrives. Choose a land cover and soil type and move from the 5 cm to the 8 cm to the 21 cm storm settings.

Q: Circle the land cover that does the best job of infiltrating large storms:

developed/open   forest   grassland   wetland

Q: For a 21 cm storm, what percentage of the rainfall becomes runoff for a medium intensity developed area with highly infiltrating soils? _____

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<div style="border:1px solid; padding:10px;">WikiWatershed Activity 2</div>

Model My Watershed

Model My Watershed is a powerful new tool created by the [Stroud Water Research Center](https://) that demonstrates the relationship of land and water. It has some sophisticated models working behind the scenes to allow you to choose an area and:

- Describe the area with national datasets showing land cover and soils;
- Model the runoff quantity and quality for the area using different storm sizes; and
- Compare the current runoff conditions to those in scenarios that you create with tools that can alter the land cover and/or install conservation practices in the area.

See also Stroud Center's Online Guide: https://wikiwatershed.org/documentation/site-storm-guide/

Model YOUR Watershed

In this activity, you will use the Model My Watershed App to simulate stormwater runoff and water quality on your school property.

⇒ Open the **Model My Watershed** app from the Wikiwatershed home page or by typing https://app.wikiwatershed.org/ into a browser window.


https://app.wikiwatershed.org
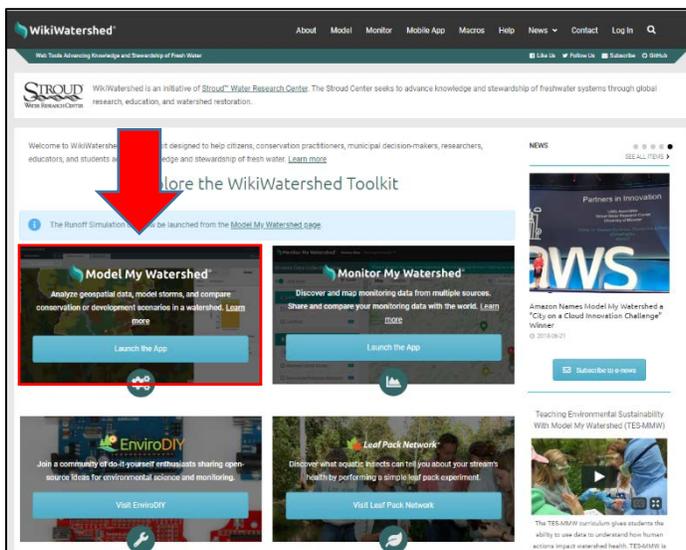
⇒ ***Optional:*** Create an account (Login box, upper right). You may need to log into your email to verify your account before going on to the next step. Write down your username and password for safe keeping.

Username _____
Password _____

⇒ Use the **search box** to locate your high school using an address or place name. Or, you can just pan and zoom to it.

⇒ Once you are zoomed to your campus, **change your base map** from the **Layers** box on the map. Choose "Satellite with Roads" for a base map. Once the base map updates, **minimize** the Layers box to see more of your screen by clicking the small down arrow to the right of the word Layers.

search
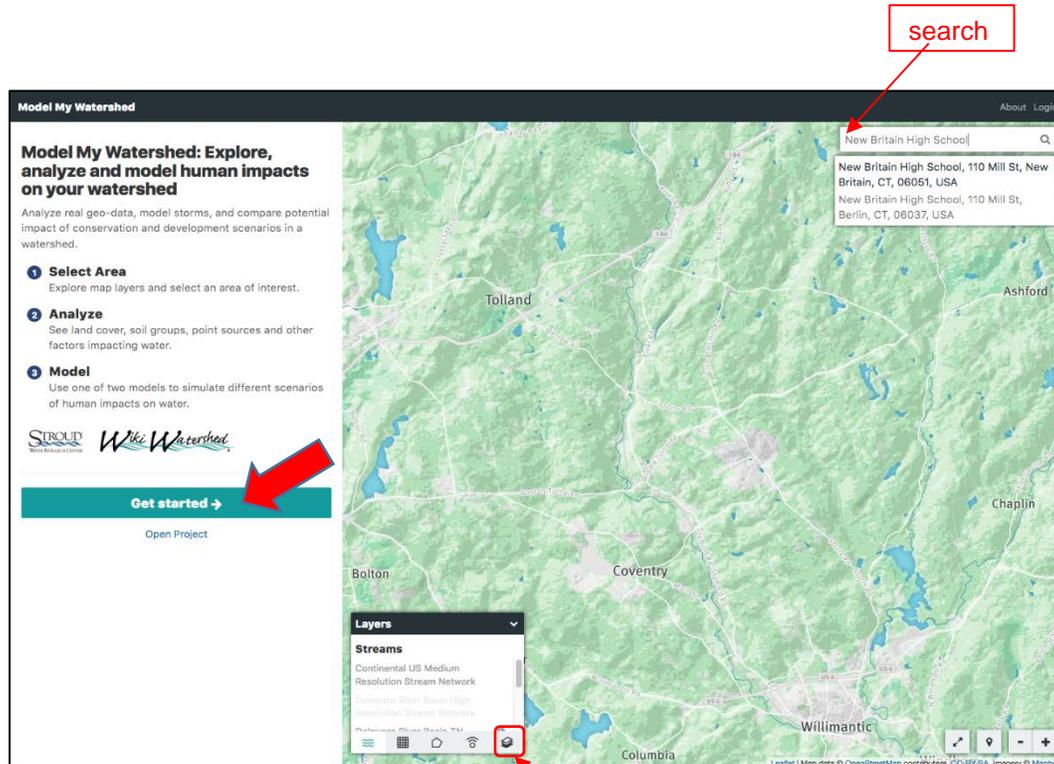
After you zoom into your area of interest, choose a satellite image for your background. Then minimize the Layers box.

There are several ways to delineate the area that you're modeling, but the best ones for a small area like a high school campus are the "Draw Area" tools. You can choose a point (like the center of the school) and have the tool draw a 1 square km box around it (Square Km), or, better yet, you can draw your own outline of the campus (Free Draw). Let's take a look.
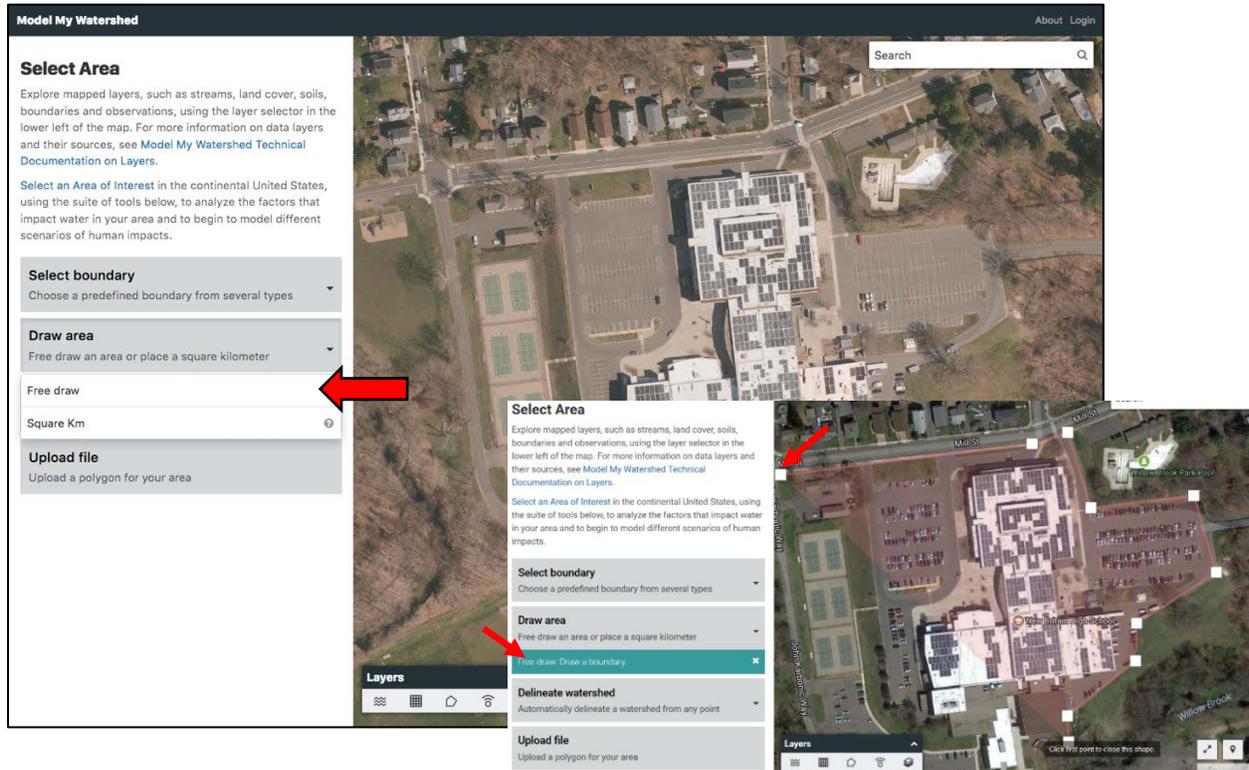

⇒ Click on the **Draw area** box and select the **Free draw** tool.

⇒ Hover your mouse over the map on one corner of your campus and click to place your first point.

⇒ Delineate your campus boundary by continuing to click along the outside edge of the campus (your best guess will do). Click on your first point to close the shape.

⇒ The Model My Watershed tool will generate statics for a number of variables once your shape is complete. Take a minute to explore the estimated **Land cover** and **Soil** distribution on your campus.
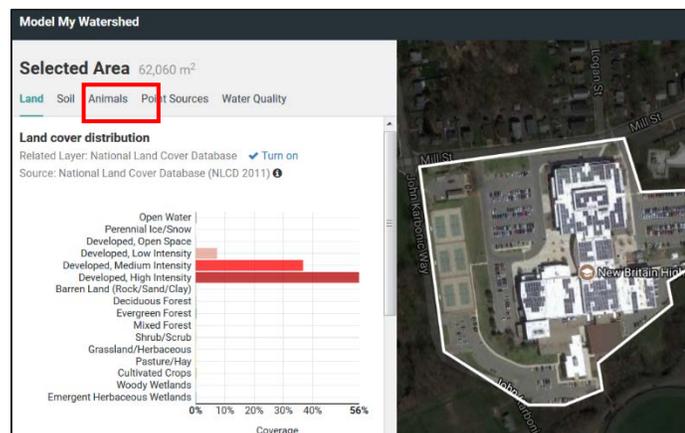
⇒ Once you have delineated your campus and explored the land and soil distribution, click on **Select a Model** and choose **Site Storm Model**. The frame will automatically calculate the runoff of the current site from a hypothetical 24 hour storm and display it in a bar chart.
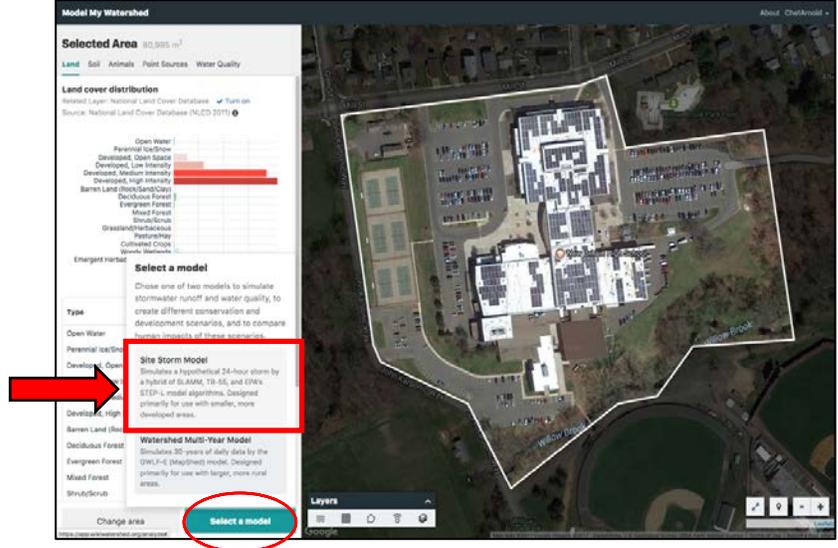
⇒ Take a minute to explore the **Runoff model**. Hover your mouse over the bar chart to see the estimated runoff values for the current condition. Note that you can change the magnitude of the simulated storm event by adjusting the **Precipitation slider** at the top right. *Note it may take a few seconds for the model to recalculate.*

⇒ Now is a good time to **name your project** by clicking on the "Untitled Project" pull-down menu in the upper left-hand corner.

⇒ Switch from Runoff to the **Water Quality** simulation to view the estimated loads delivered during a 24-hour storm event.

Create Your Own Scenario

Now, HAVE AT IT! In this next step, you will remake your school campus by adding conservation practices and/or changing the land cover to see how it changes the quantity and quality of the runoff generated on the property.

⇒ Click on **New Scenario** (upper left) to create a copy of your "current conditions" that you can alter. Click on the **Add changes to this area** link in the upper right hand corner of the tool.

⇒ Two **new tool boxes** will appear: **Land Cover** and **Conservation Practice**.

⇒ Click on **+Conservation Practice** and select **Porous Paving.**

⇒ Change one of the parking areas on campus from traditional paving to porous paving. Click in a corner of the parking lot to get started. Delineate the area by continuous clicks, returning to the first point to close the shape. The runoff model will update once the new conservation practice has been added. Notice you can also change the **Precipitation** amount.

⇒ Before we compare the scenario changes, add a second Conservation Practice. Try a Green Roof or Rain Garden…or both.

⇒ Before we compare our changes to the Current Conditions, let's rename this scenario to avoid confusion. Click on the **small black arrow** next to the words "New Scenario" in the upper left corner of the project. Click on **three dots** next to "New Scenario" and select **Rename**. Name the scenario **LID Practices**.
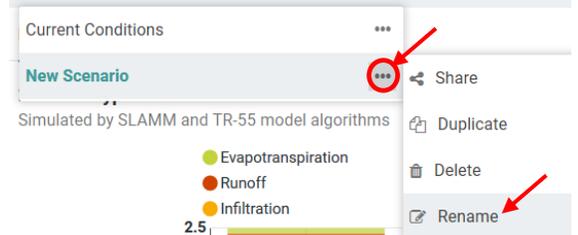
⇒ If you're feeling ambitious, you may wish to add (change) land cover on campus using the **+Land Cover** button. Perhaps there is a big wetland on campus that is not being accounted for, or planned development on campus that could be added.

Compare Scenarios

⇒ Click on the **Compare icon**.
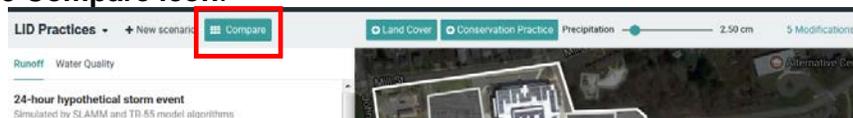
A new window will open showing a comparison of three scenarios – 100% Forest Cover, Current Conditions, and your new LID Practices. This window allows you to efficiently compare both the **Runoff** and **Water Quality** models generated for the three scenarios. *Note you can also still change the size of the storm event by adjusting the **Precipitation** amount.*

⇒ Use the image on the following page to explore your results in depth.

⇒ You can always go back and add more changes, or create yet another scenario with a different suite of changes by clicking the Back button.

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Displays all of your scenarios you've created, plus 100% forested conditions for comparison

Choose Runoff or Water Quality Comparison

Hover mouse

Changes you made will be listed at the bottom of each column

Land Cover

Developed-Low	+1009.9 m²

Conservation Practices

Porous Paving	+5916.5 m²
Green Roof	+2443.9 m²
Rain Garden	+592.5 m²
Porous Paving	+4398.2 m²

CAUTION: scale on bar graph changes to accommodate the results!

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Thinking about your results:

1. If you added LID practices in your scenario, how much were you able to decrease the runoff from your campus? How close was this to the 100% Forest Cover baseline?

2. Test your comparative results in a modest rainstorm (5 cm) versus a gully-washer (25 cm). What happens to the differences between your scenarios, in terms of runoff? Why?

3. What are the best LID opportunities on your campus? If you could build a rain garden or two, where would they go?

4. What did you like best about this tool? What did you like least?