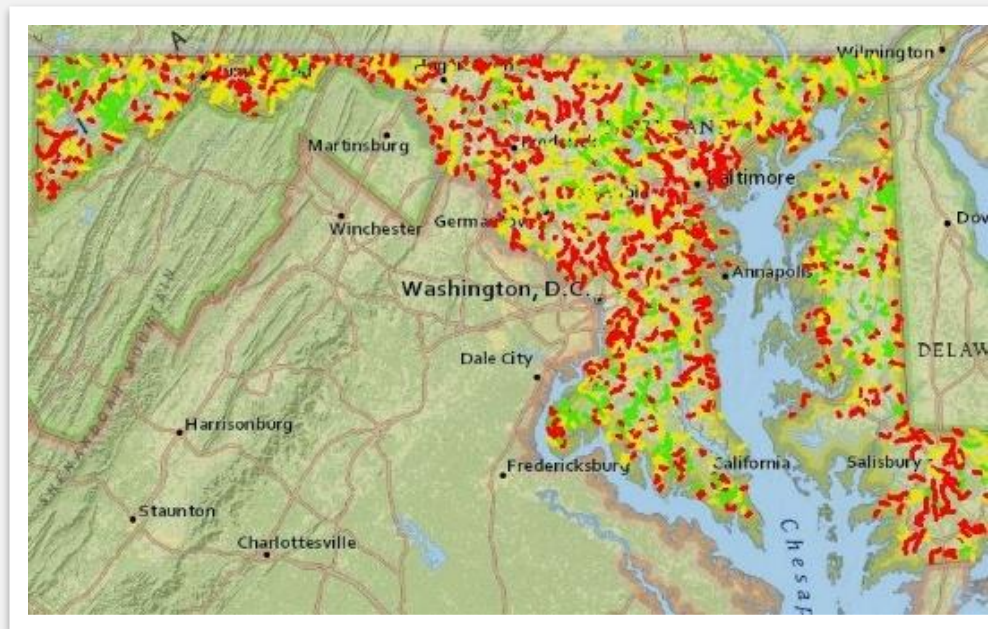


FieldScope Map Inquiry



Score Four: Students, Schools, Streams, and the Bay


Rebecca Wolf and Nguyen Le
Interstate Commission on the Potomac River Basin

How FieldScope Maps Can Support Your Watershed Inquiries



Maryland FieldScope

FieldScope is an online mapping program where students can analyze, interpret, and share environmental data about their school's watershed or an adopted stream.





[Home](#) [Map Data](#) [Enter Data](#) [Graph Data](#)


Welcome to Maryland FieldScope


Welcome to Explore and Restore Maryland Streams: Where Maryland students can share their stream studies and action projects to help restore stream health.

What would you like to do?


MAP DATA


ENTER DATA


GRAPH DATA


HELP



- Outline of this PowerPoint:

- **Introduction**

- Find out what you will be analyzing and learning from FieldScope.

- **FieldScope Map Inquiry Instructions:**

- *Part One: FieldScope Basics*

- Learn how to use FieldScope and become familiar with tools you will need for this activity.

- *Part Two: Explore Your Watershed*

- Analyze and explore different data layers in your watershed.



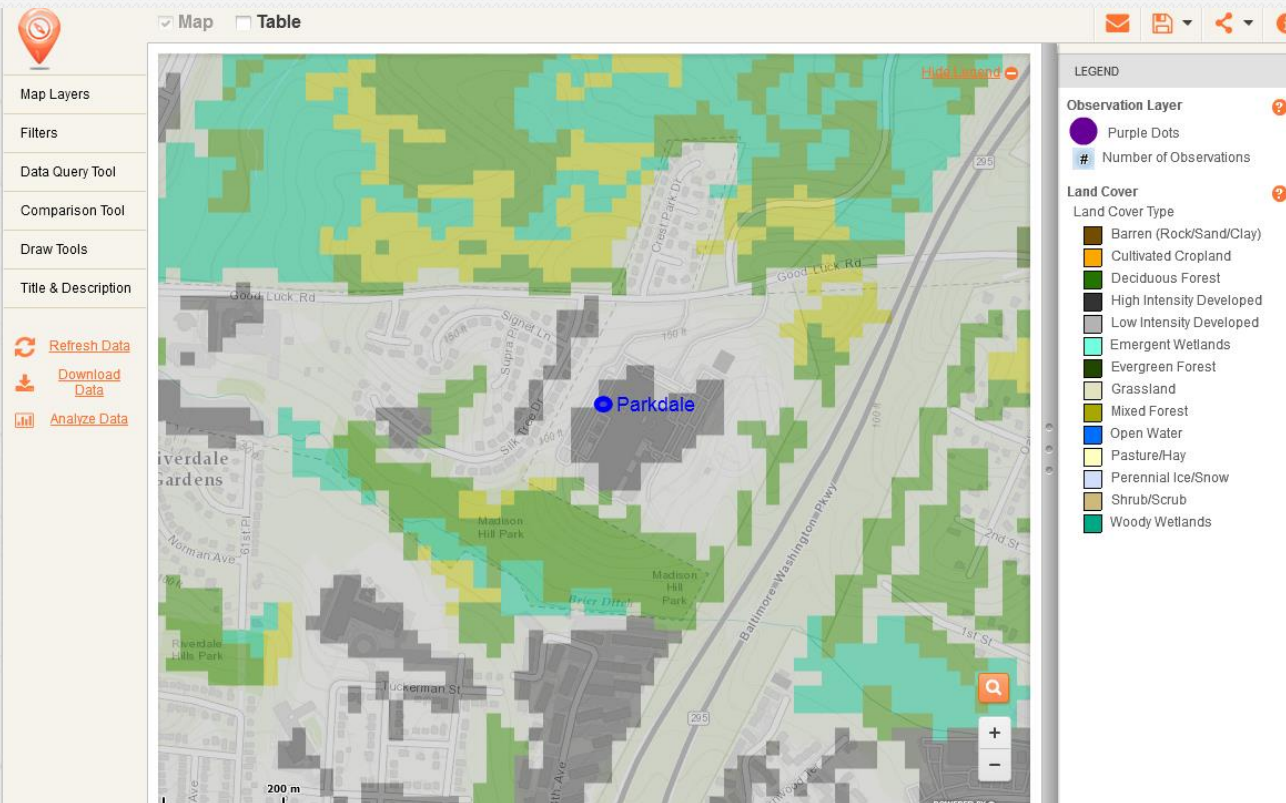
- You can use FieldScope to analyze and explore the following features:
 - Watersheds
 - Rivers and streams
 - Land cover
 - Impervious surfaces
 - Impermeability
 - And more...
- You will create a map that consists of:
 - A base map with roads and some geographic features
 - **Data layers that go over the base map and show specific aspects of those areas,** such as land cover and impervious surfaces.
- You can save your map for later use.



Example of a Data Layer

This data layer shows the land cover around Parkdale High School in Riverdale, Maryland.

- The base map shows houses and streets.
- The blocks of color show types of land cover.



1. Using the legend, name two types of land cover in this area.
2. What land cover is not on this map?

FieldScope Map Inquiry Instructions

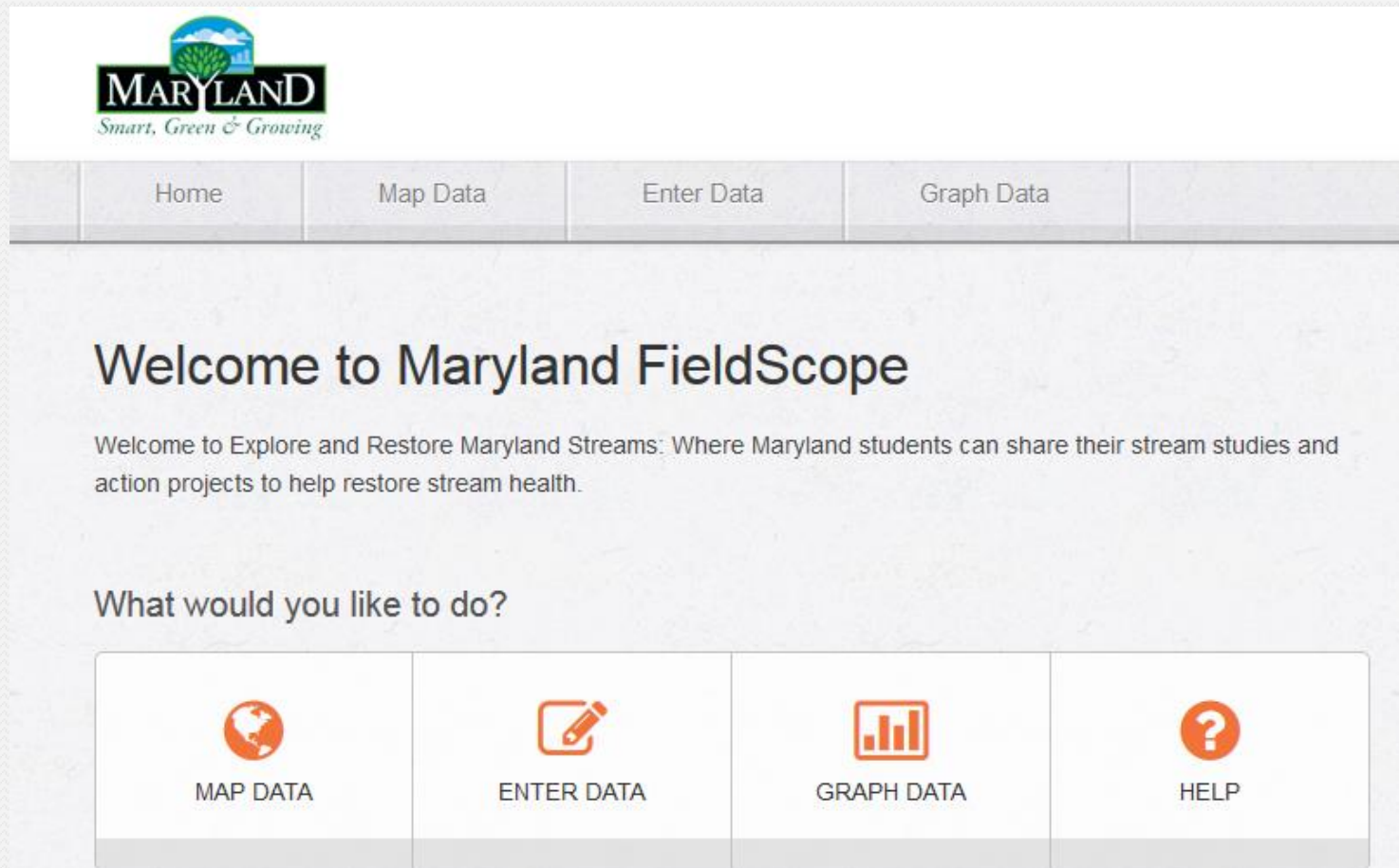
Part One: FieldScope Basics

The following slides will familiarize you with FieldScope.



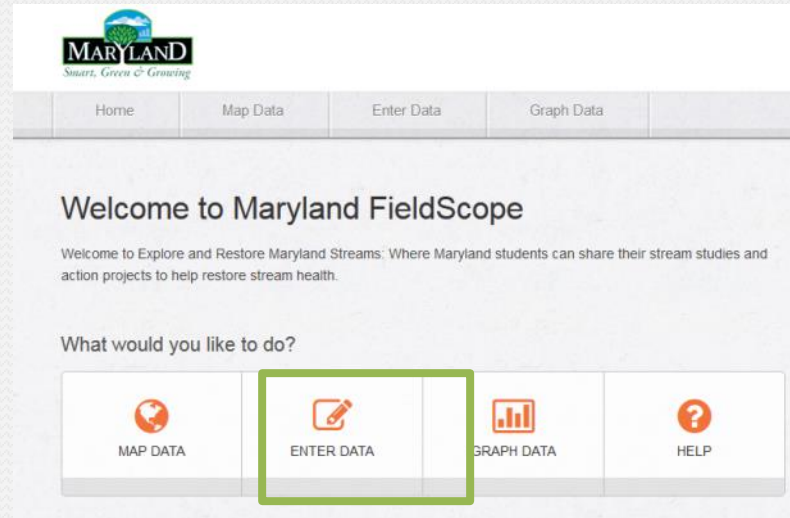
How We Get to FieldScope and What We See

1. Go to: <http://maryland.fieldscope.org/>

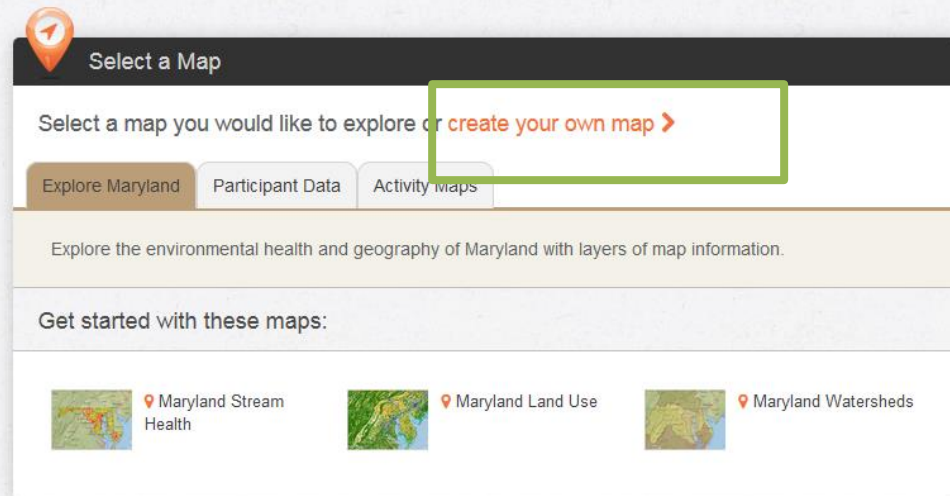


Starting Your Map: A Few Easy Steps

2. Click on “Map Data.”



3. Click on “Create Your Own Map.”

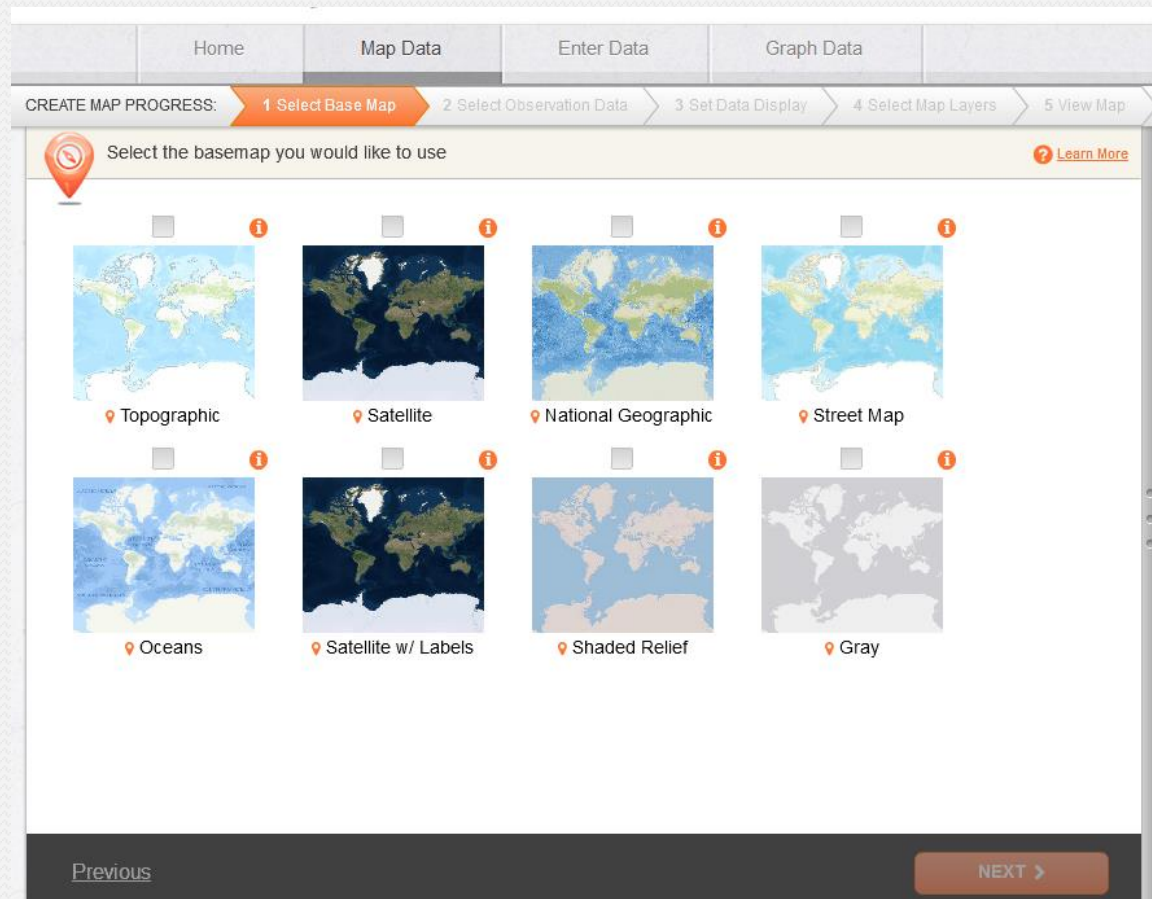


4. Selecting a Base Map.

A base map is the bottom layer of your map. Other map layers with data will be displayed over the base map.

Learn more about different base maps on the following slides.

Then, select your chosen base map and click “Next.”

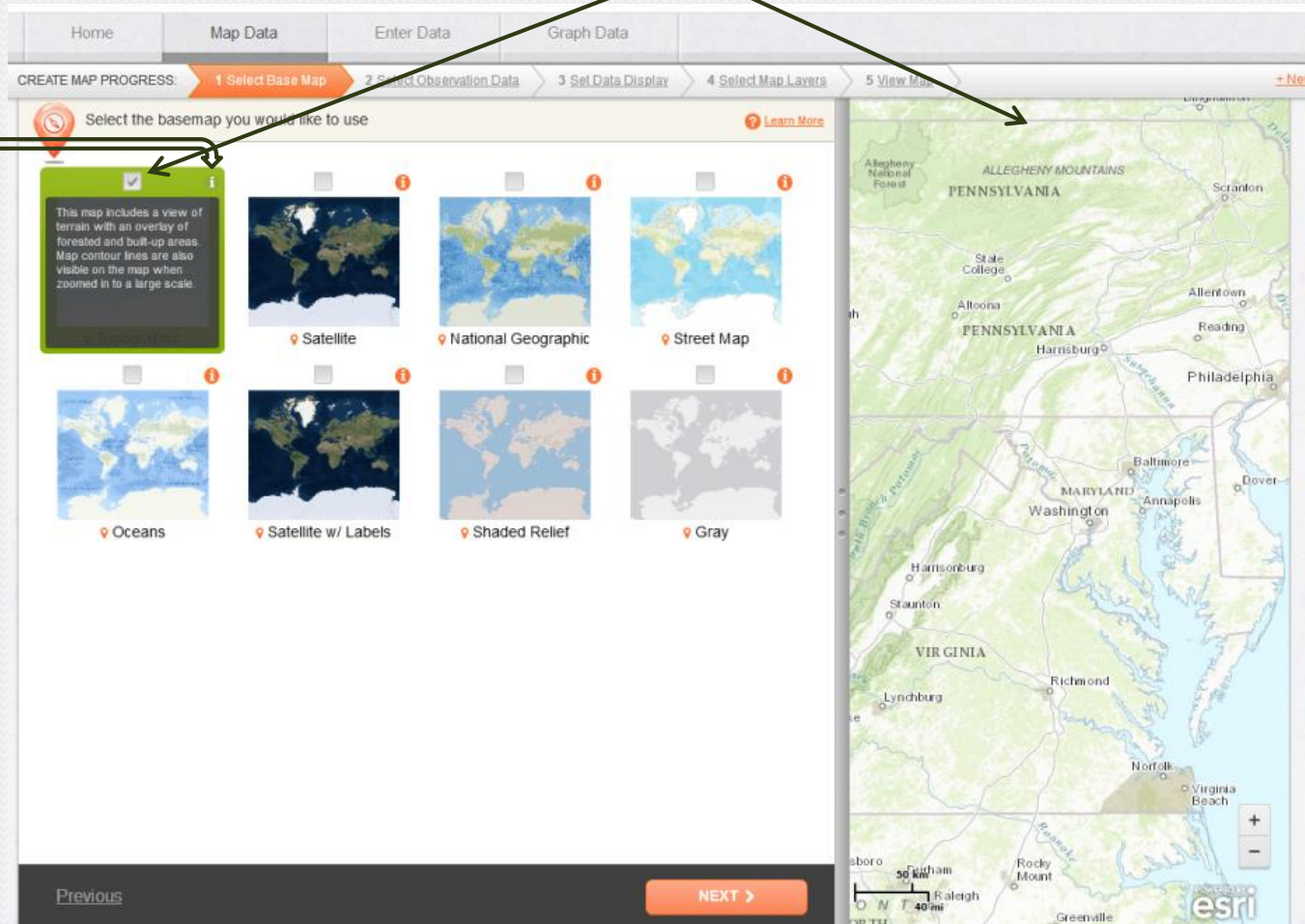


- Topographic base map.

Checking the base map will show you a preview on the right side.

Hovering over the Orange Info Icon will give you a description of the base map.

"This map includes a view of terrain with an overlay of forested and built-up areas. Map contour lines are also visible on the map when zoomed in to a large scale."





- National Geographic base map.

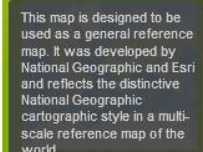
Home Map Data Enter Data Graph Data


CREATE MAP PROGRESS: 1 Select Base Map 2 Select Observation Data 3 Set Data Display 4 Select Map Layers 5 View Map + New


Select the basemap you would like to use [Learn More](#)


☐  Topographic


☐  Satellite


☒  This map is designed to be used as a general reference map. It was developed by National Geographic and Esri and reflects the distinctive National Geographic cartographic style in a multi-scale reference map of the world.

☐  Street Map

☐  Oceans

☐  Satellite w/ Labels

☐  Shaded Relief

☐  Gray

[Previous](#) [NEXT >](#)

Map view showing the Eastern United States, including Pennsylvania, Maryland, Virginia, Delaware, and Washington, D.C. Major cities like Philadelphia, Baltimore, Washington, D.C., Richmond, and Norfolk are labeled. The map features topographic details, state boundaries, and major water bodies like Chesapeake Bay. A scale bar indicates 50 km and 40 miles. The Esri logo is visible in the bottom right corner.

POWERED BY **esri**





- Street Map base map.


Home Map Data Enter Data Graph Data


CREATE MAP PROGRESS: 1 Select Base Map 2 Select Observation Data 3 Set Data Display 4 Select Map Layers 5 View Map + Ne


Select the basemap you would like to use [Learn More](#)


☐  [Topographic](#)


☐  [Satellite](#)


☐  [National Geographic](#)

☒  [Street Map](#)
This worldwide street map presents highway-level data for the world and street-level data for many places including the United States, much of Canada, Japan, Australia, and most countries in Europe.

☐  [Oceans](#)


☐  [Satellite w/ Labels](#)


☐  [Shaded Relief](#)

☐  [Gray](#)

[Previous](#) [NEXT >](#)

Map view showing a street map of the Washington, D.C. area, including labels for cities like Washington, Baltimore, and Annapolis, and major highways like I-495 and I-270. The map is powered by Esri.

POWERED BY 



5. Selecting Observation Data.

“Select Observation Data” enables you to select the sources of data for your map. This includes data from the U.S. Geological Survey, Maryland Biological Stream Survey, other schools and organizations.

We will not be looking at specific stream data, so you will *de-select* the **“Participant Water Quality Data”** during your exercise.

[illegible]

6. Setting Data Display.

“Select Data Display” enables users to modify how observation data is displayed on a map.

We will not
make changes
to this during
our exercise.

Click “Next.”

[illegible]

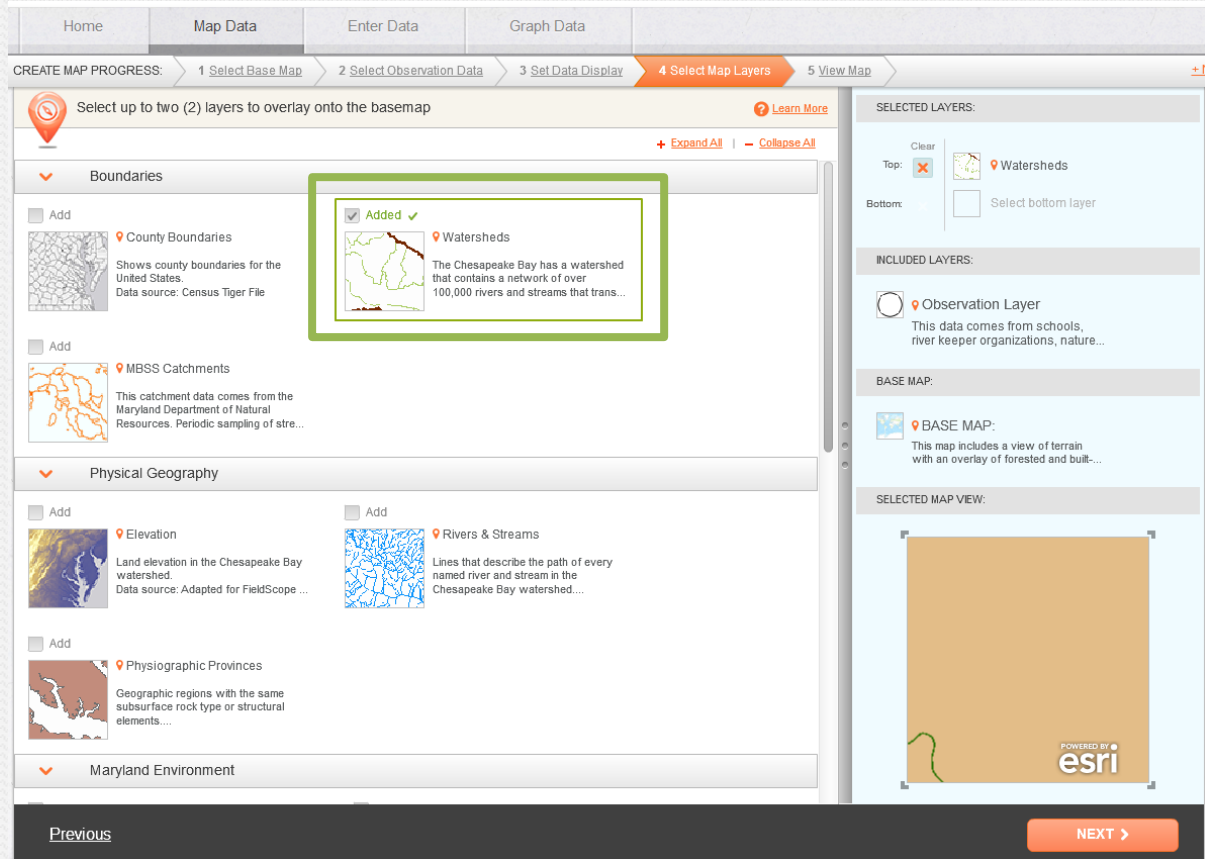
7. Selecting Map Layers.

*With “Select Map Layers” you can select which data layers you want to view on your map. **Up to 2 layers can be selected at a time.** You may go back to the menu to switch the map layers any time.*

While learning to use tools, we will use one map layer.

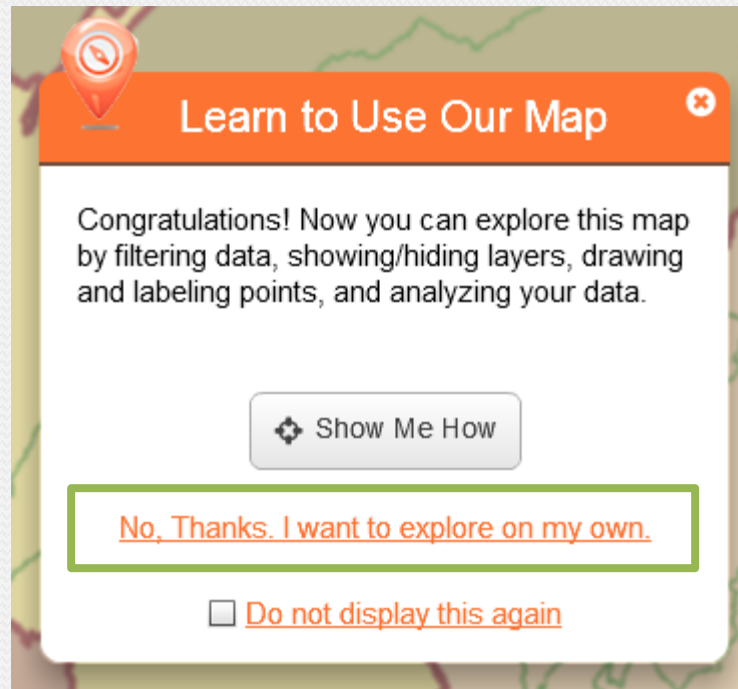
Select Watersheds.

Then, click “Next.”



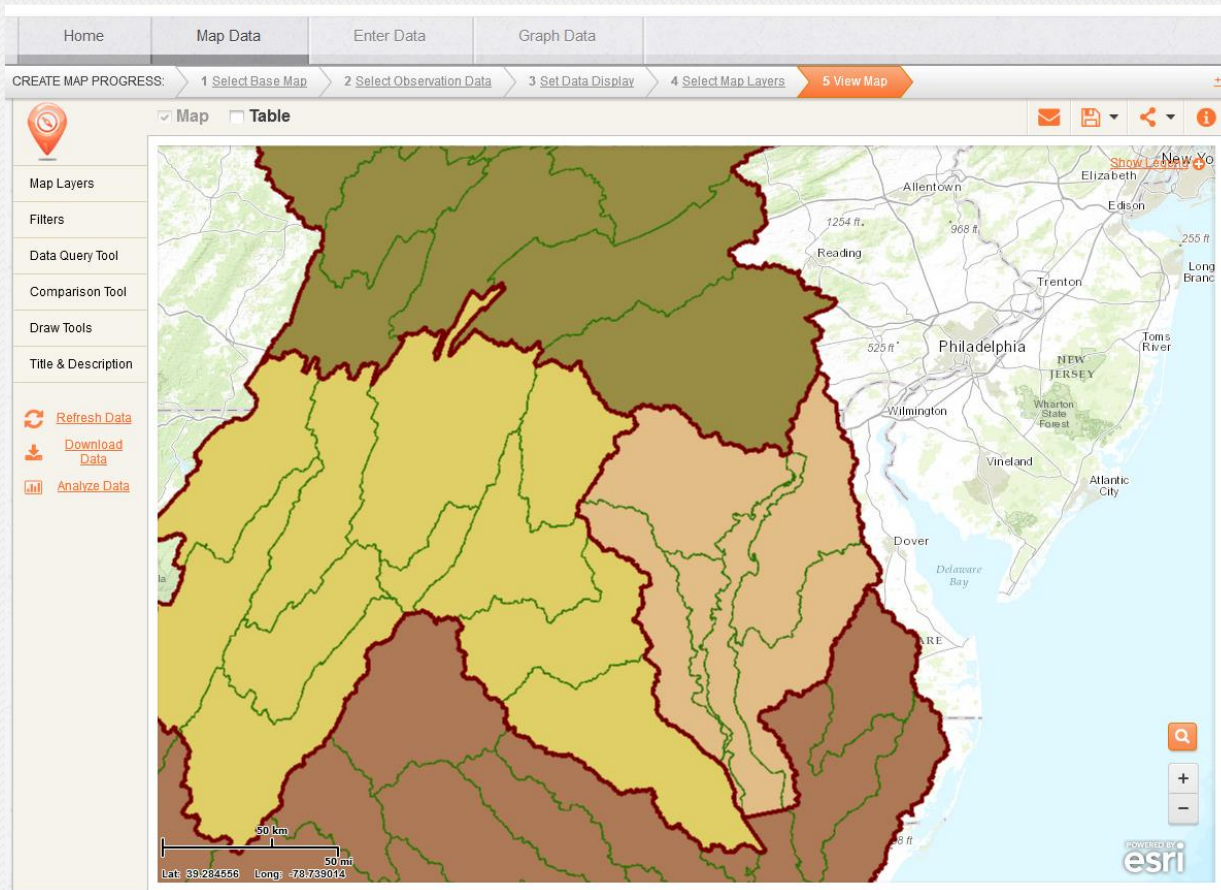
A pop-up will appear.

- If you would like to watch a FieldScope Tutorial Video, then click on **“Show Me How.”**
- Otherwise, click on **“No, Thanks. I want to explore on my own.”**



8. Viewing Your Map.

- Now, you will see your map. It should look similar to the example below.



What watershed is represented by this layer?



Key FieldScope Tools

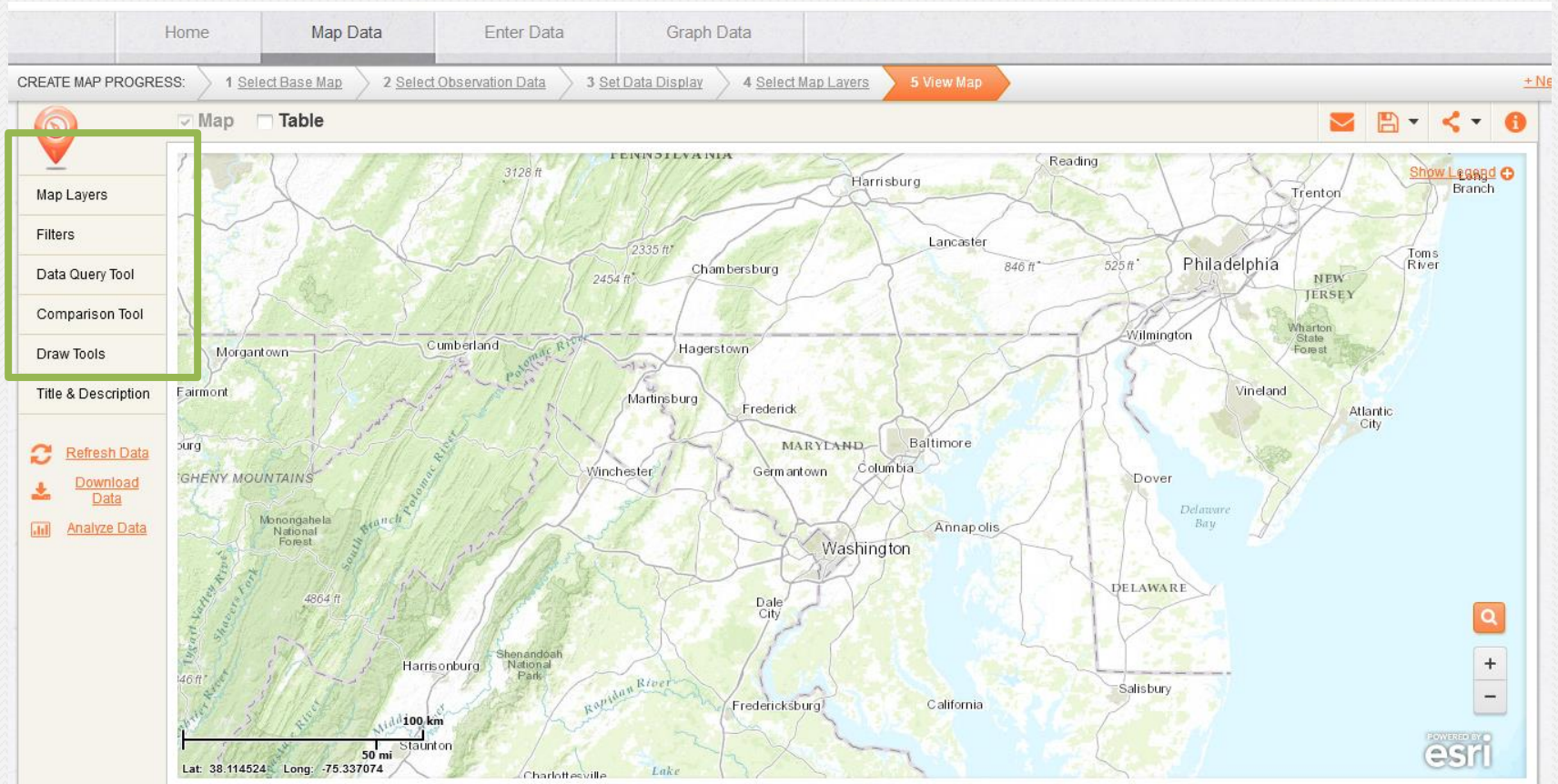
Now that you have your map, you will use online tools to research the data layers. The following slides will introduce some key FieldScope tools that enable you to adjust the view and use the map for research.

- Transparency
- Layer Visibility
- Draw Tools
- Legend
- Search
- Zoom In / Zoom out



Tabs on the Left Side

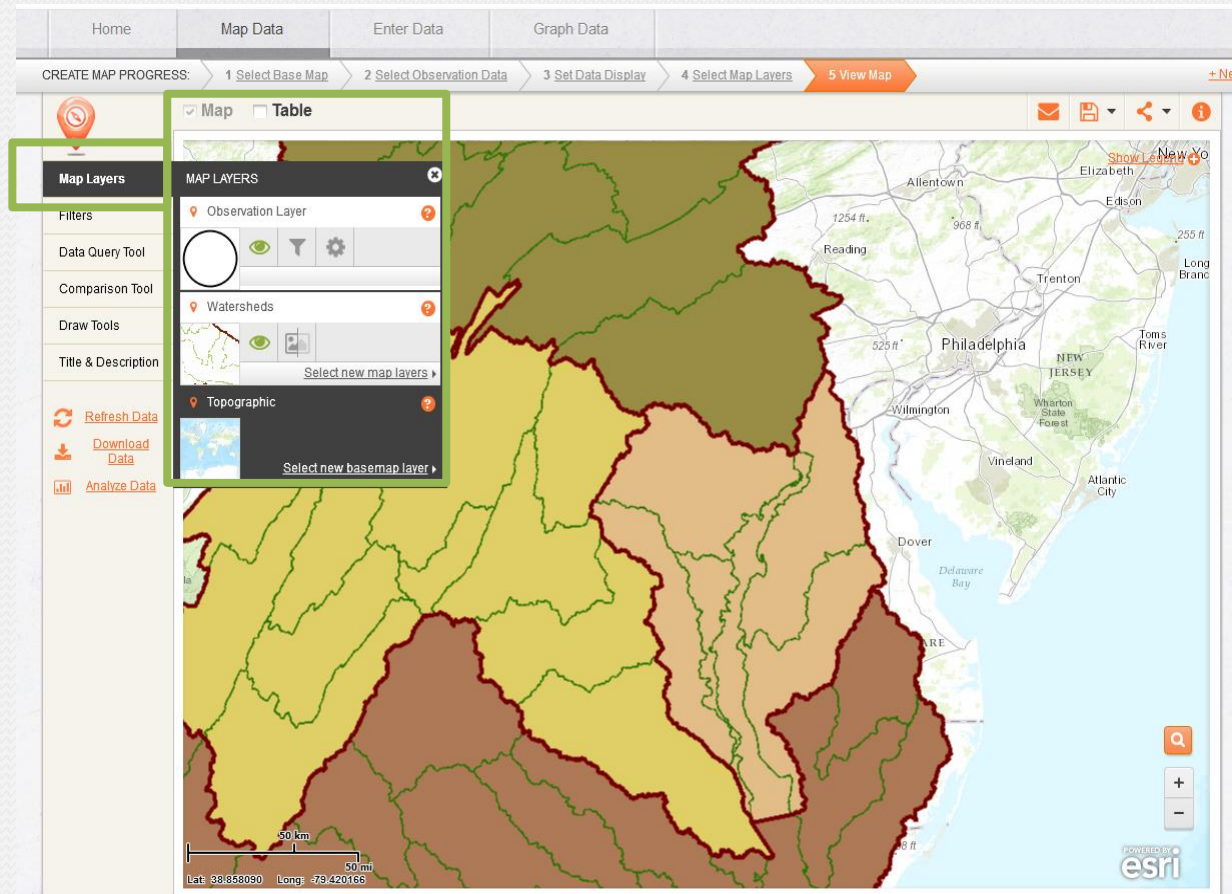
On the left side are tabs that you can use to adjust various settings on your map.



9. Using Map Layers

The “Map Layers” tool allows you to adjust the visibility of your map layers.

Click on
“Map
Layers.”

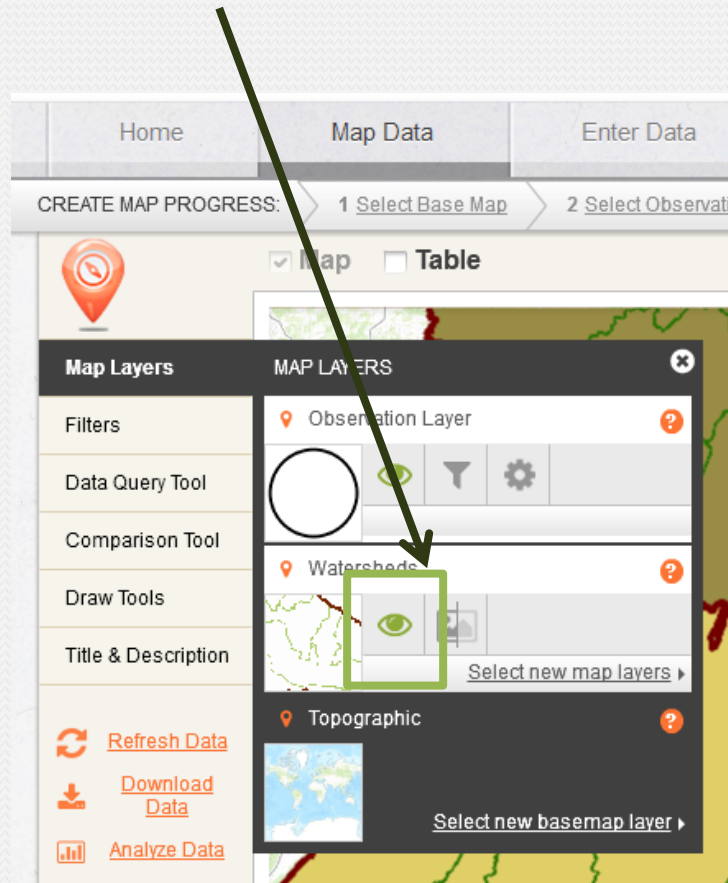


a. Layer Visibility.

Layer Visibility – the EYE – shows or hides the layer.

Click on the **eye**, the **visibility tool**, on the Watersheds layer. What happens?

Make the Watersheds layer visible again, click on the **eye**.

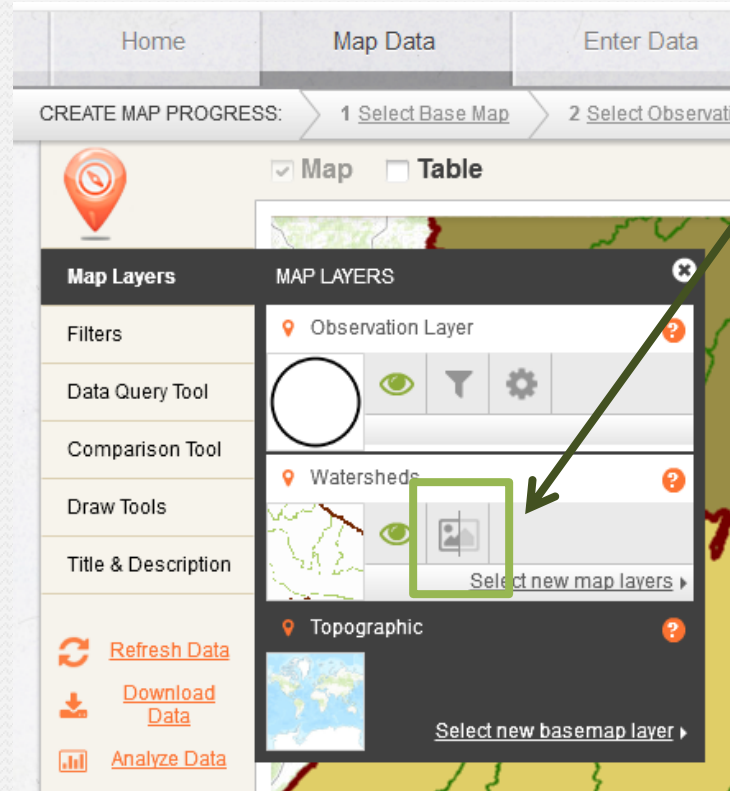


b. Transparency

Transparency controls how much you can see through the layer. At 0% transparency, the layer is opaque. When new layers are added to a map, they initially are set to 0% transparency.

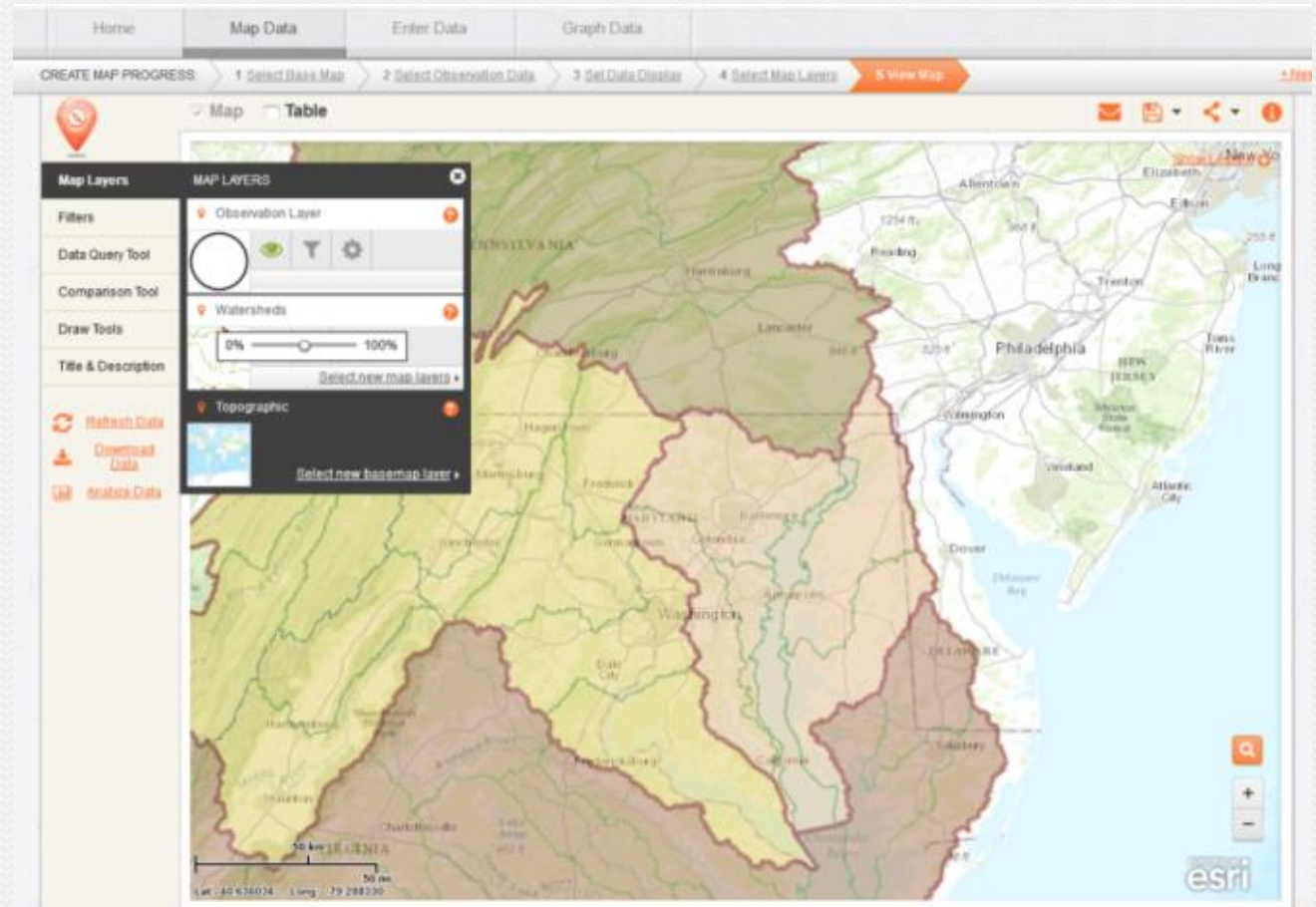
Click on the **transparency bar**. What happens when you slide the transparency bar to **100%**?

Move the **transparency bar** until you can see the base map and the watersheds map. What percentage works for you?



Layers Revealed

This is how the same map appears when the transparency of the Watersheds layer is set to 50%. You can see both the base map and the Watersheds layer.

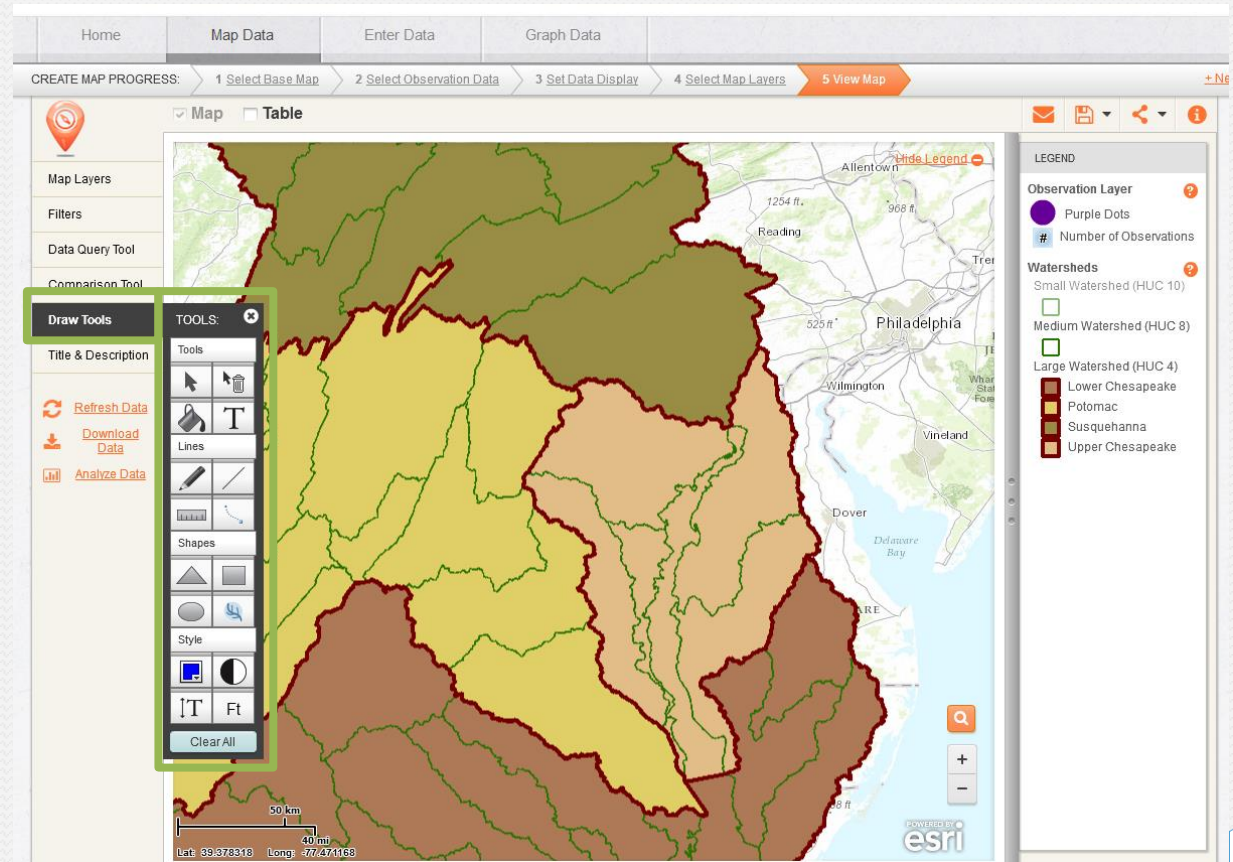


10. Using Draw Tools

The Draw Tools Box allows you to insert text, shapes, and lines on your map and to explore data more closely.

Click on “Draw Tools.”

Hover over each tool to see what it does. Which tool can be used to measure distances on your map?

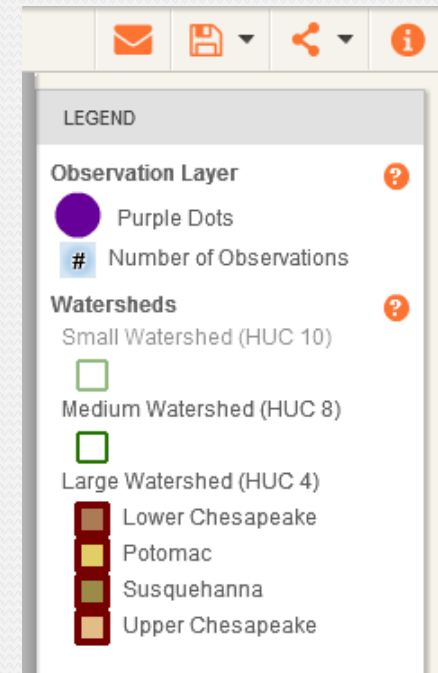
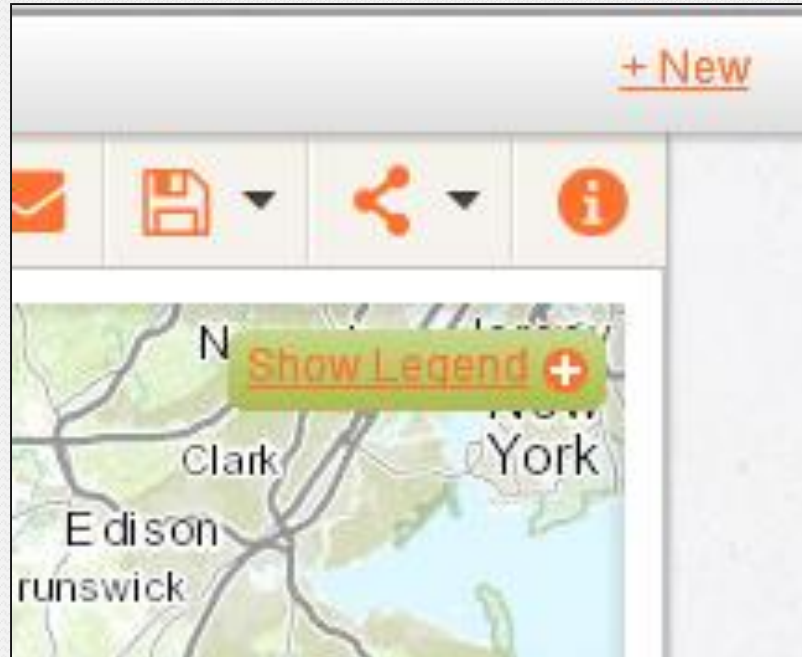


11. Using the Legend

In the top right corner of your map, is a “Show Legend” link. A legend lists what the symbols and colors mean on your map.

Click on “**Show Legend.**”

Look at the legend. What are the largest subwatersheds in the Chesapeake Bay Watershed?

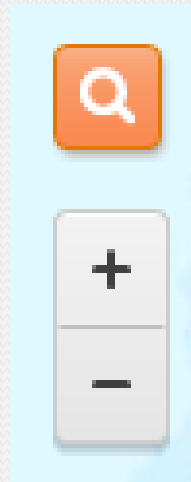


12. Using the Search and Zoom Features

You can search for a location by clicking on the search tool, the magnifying glass, at the bottom right of your screen. The zoom tool (+ and -) is below the search tool.

Click on the **search tool** and enter the name of the city in which you live.

What happens when you close the search bar?



FieldScope Map Inquiry Instructions

Part Two: Explore Your Watershed

At this point, students can work on their own computers with their worksheets independently, or the class may choose to follow the instructions on this presentation.



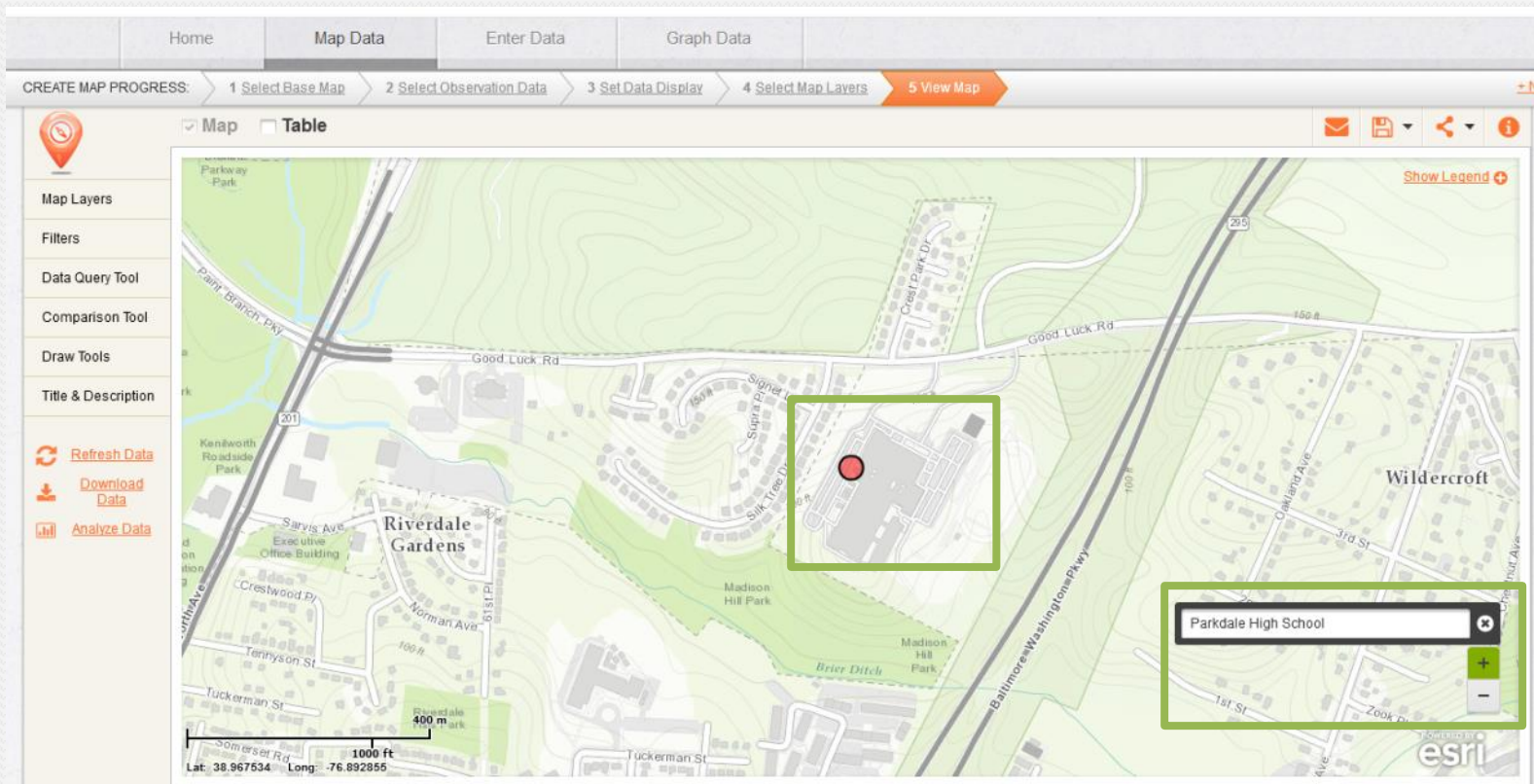
Explore Your Watershed

- The following slides will walk you through examining your local school watershed.
- We will locate your school and analyze the following:
 1. Locate your school
 2. Watersheds
 3. Rivers and streams
 4. Land cover
 5. Impervious surfaces
 6. Impermeability
 7. Stream health
- In the following example, we are using:
 - The topographic base map
 - Parkdale High School as an example location



1. Locate Your School

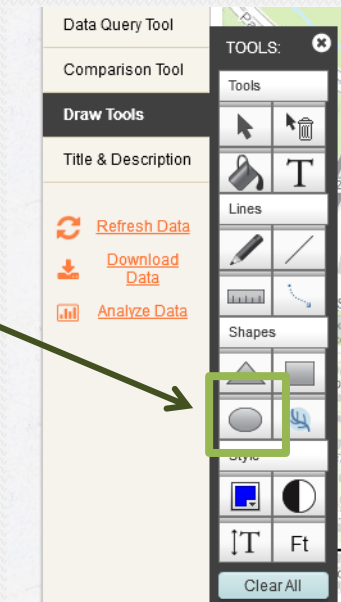
- Use the search tool (magnifying glass) to locate your school. Put in the address or name of your school. The location will appear as a red dot. Keep the search tool open.
- Zoom all the way into your campus.



Creating a Marker and Label for Your School

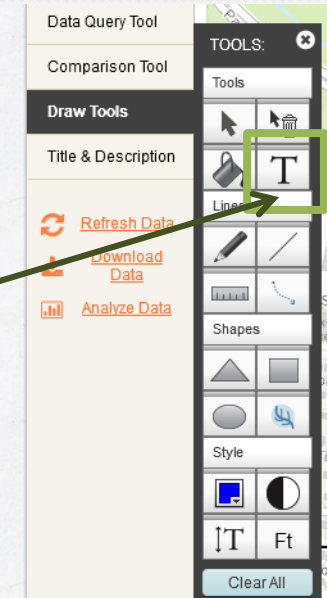
Creating a Marker

- Click on **Draw Tools** to open the tool box.
- Click on the **Circle Tool**.
- Press down on the map where you want the symbol and gently drag outwards to create a circle. Then let go.
- If you are unsatisfied with your shape or its location, use: The **Select Tool** to move it, or the **Erase Tool** to delete it.

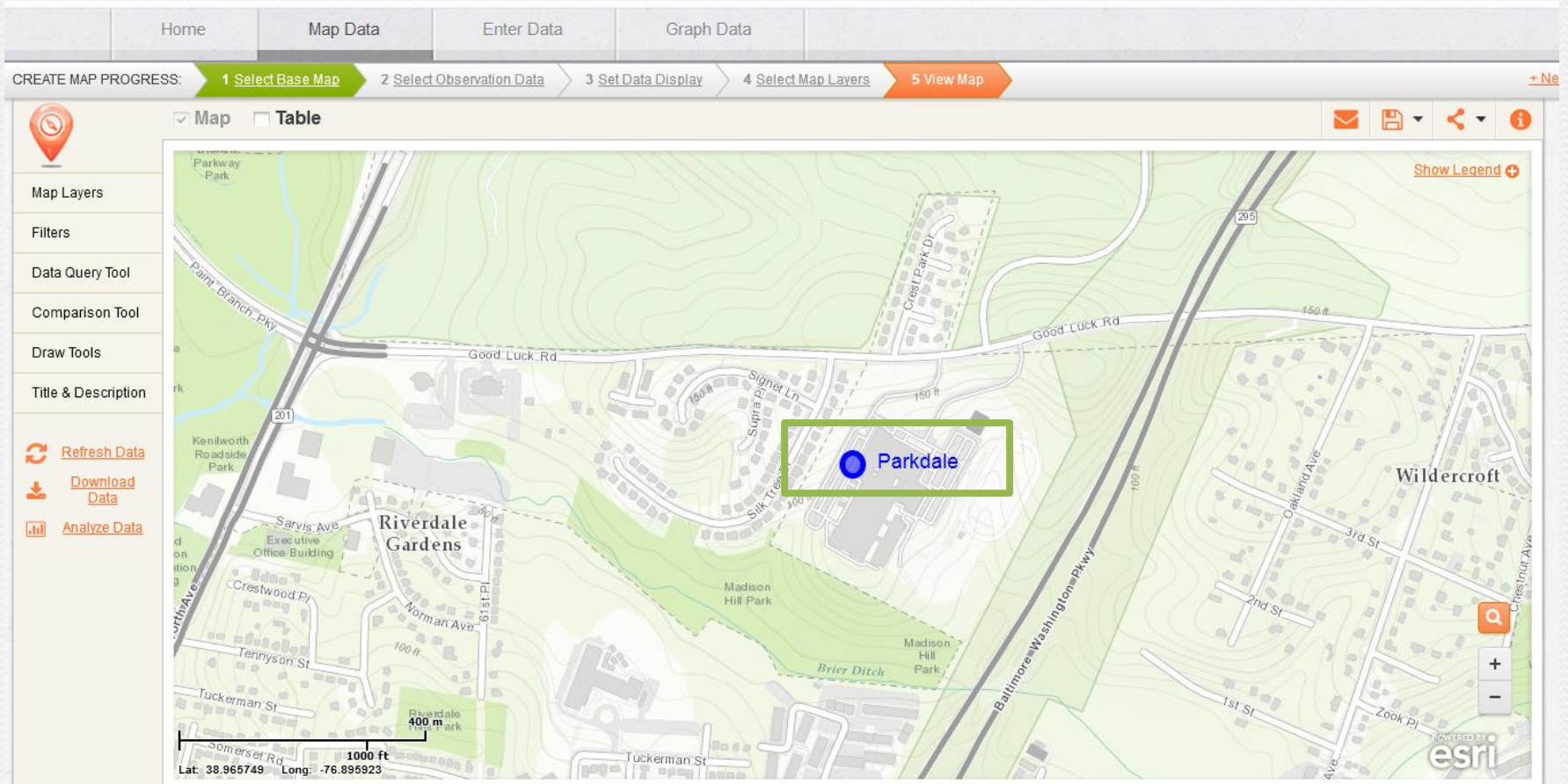


Creating a Label

- Click on **Draw Tools** to open the tool box.
- Click on the **Add Label Tool**.
- Click where you want to place the text and type it in.
- Close the draw and search tools. Zoom out to see the results.



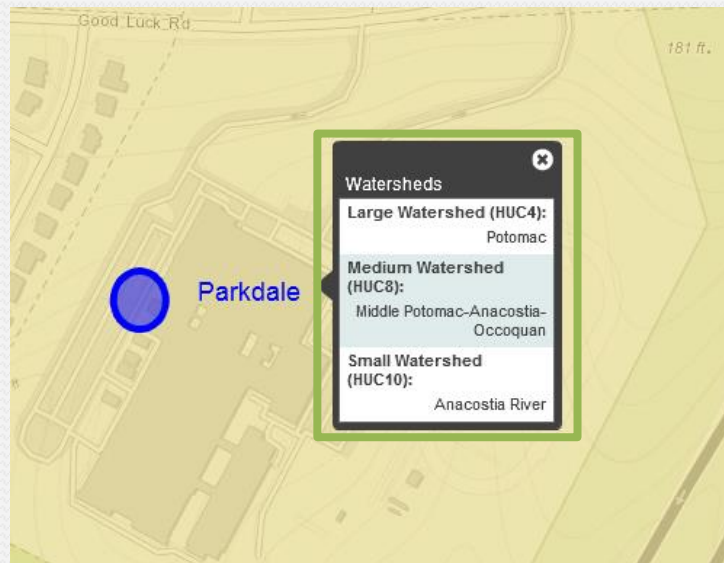
Example



2. Locating Your Local Watershed

The Watersheds layer should still be on your map.

The Chesapeake Bay Watershed consists of large and small watersheds. To learn in which large and small watersheds (subwatersheds) the school is located, click on the school's location. A pop-up will appear.



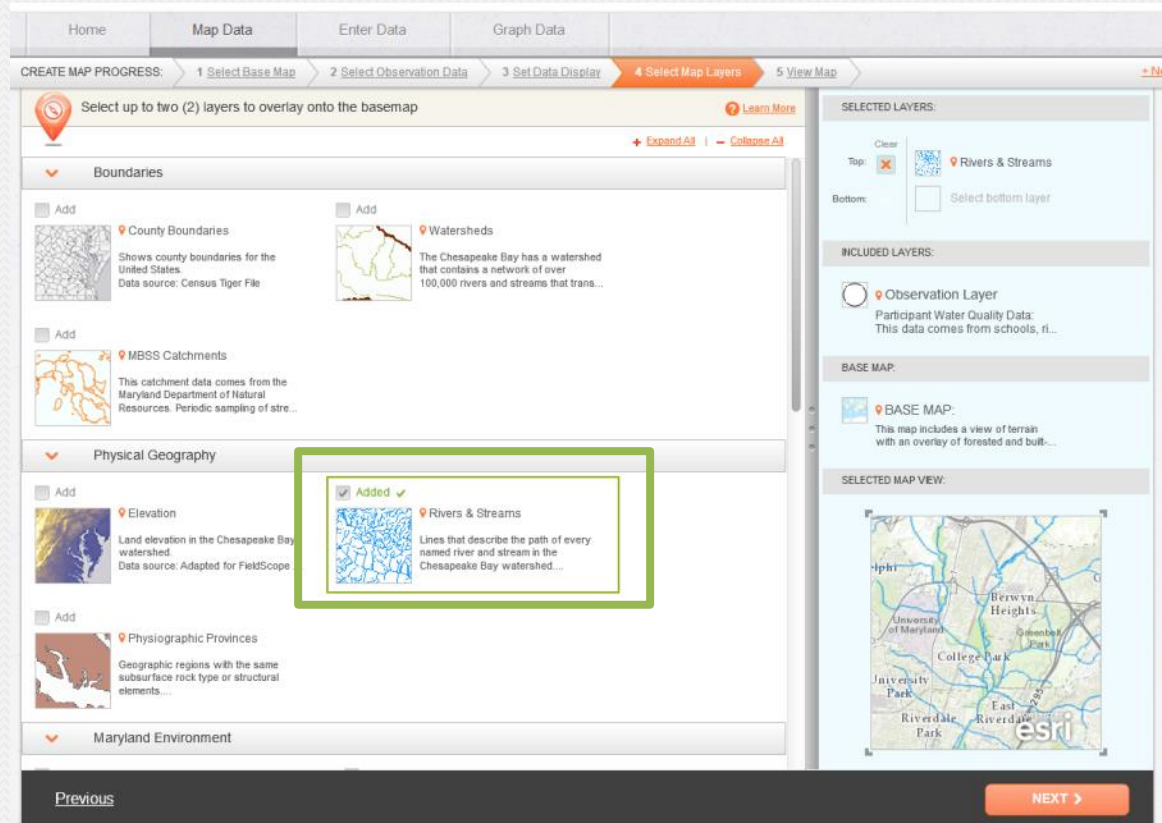
In what small watershed is your school located?

What does this tell you about where stormwater runoff from your campus eventually flows?

3. Viewing Nearby Rivers and Streams

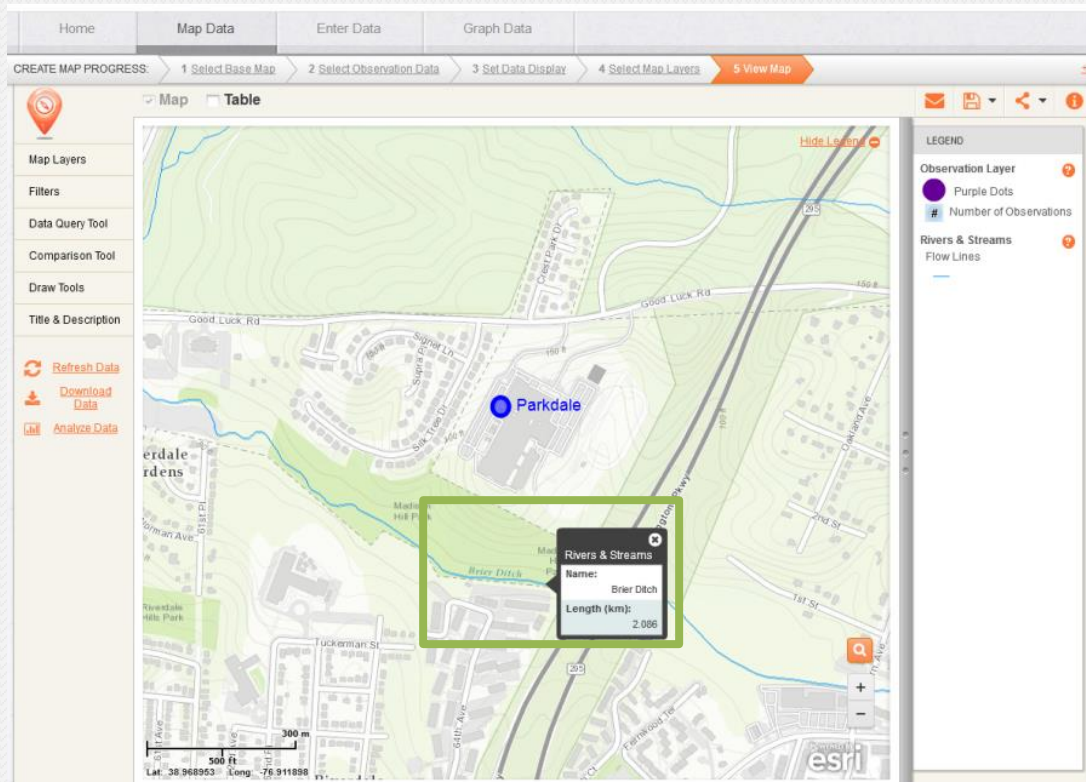
To observe small, nearby waterways, you will add the “**Rivers and Streams**” layer to your map.

- Click on “**4 Select Map Layers**” on the top bar
- Check the “**Rivers and Streams**” box to add it to your map.
- Click “**Next**” to view your map.



Make sure you are zoomed in enough to see what streams are in your watershed and around your school.

Click on the stream that is nearest to your school to see more information.



Does the stream have a name?
If so, what is it?

Use the measure tool (Draw Tools Box) to measure how far the stream is from your campus. What did you get?

One way to tell which direction the stream is flowing, is to find where it joins a larger stream or river. What river does your stream flow to?



4. Land Cover Layer

Now you will observe Land Cover on your map. This layer will show you the physical material on the surface of the earth, such as grass, asphalt, trees, bare ground, and water.

Add the “**Land Cover**” layer to your map.

- Click on “**4 Select Map Layers**” on the top bar
- Uncheck the “**Watersheds**” box to remove it from your map.
- Check the “**Land Cover**” box to add it to your map.
- Click “**Next**” to view your map.

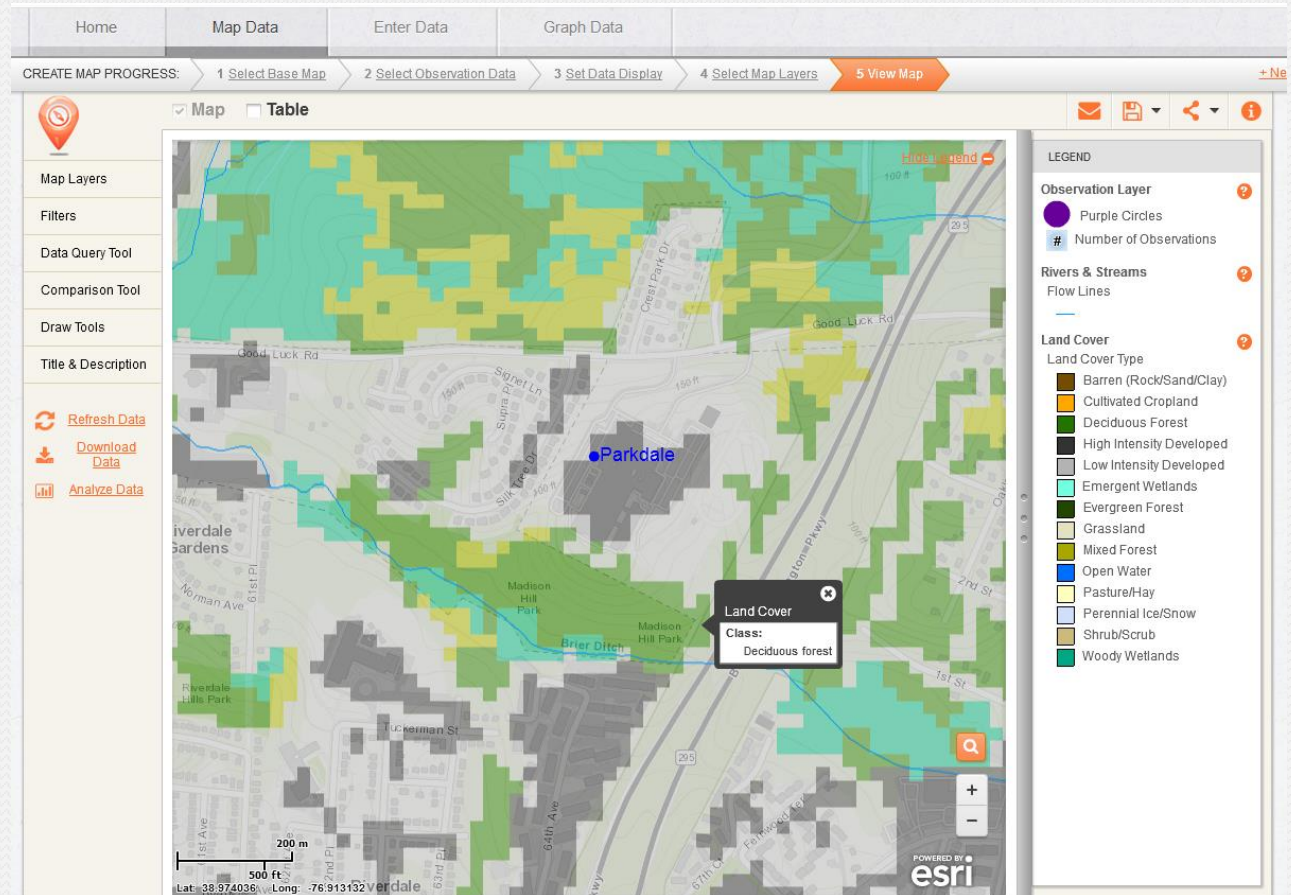
The screenshot shows a web application interface for creating a map. At the top, there is a navigation bar with tabs: Home, Map Data, Enter Data, Graph Data, and a dropdown menu. Below this is a progress bar with five steps: 1 Select Base Map, 2 Select Observation Data, 3 Set Data Display, 4 Select Map Layers (highlighted in orange), and 5 View Map. The main content area is titled 'Select up to two (2) layers to overlay onto the basemap'. It contains a grid of layer options, each with a thumbnail, a title, and a description. The 'Land Cover' layer is highlighted with a green border and has a green checkmark in its 'Add' checkbox. Other layers include Forest Buffers, Sea-Level Affecting Marshes Model, Historical Shorelines, Hydrology, Impermeability, Land Cover, Impervious Surfaces, Sea Level Rise Vulnerability, Stream Health, and Stream Reaches. On the right side, there is a sidebar with sections: 'SELECTED LAYERS:' (showing 'Land Cover' and 'Select bottom layer'), 'INCLUDED LAYERS:' (showing 'Observation Layer'), 'BASE MAP:' (showing 'BASE MAP'), and 'SELECTED MAP VIEW:' (showing a map preview). At the bottom, there are 'Previous' and 'Next' buttons.



Adjust the transparency settings (Map layers, transparency tool) so that you can view land use, as well as the streams and base map.

Show the legend, if it isn't showing.
Hover over the question mark by Land Cover. How recent is the data on this map?

Click on any location to see what the land cover type is.
What types of land cover are in the area surrounding the stream closest to your school?

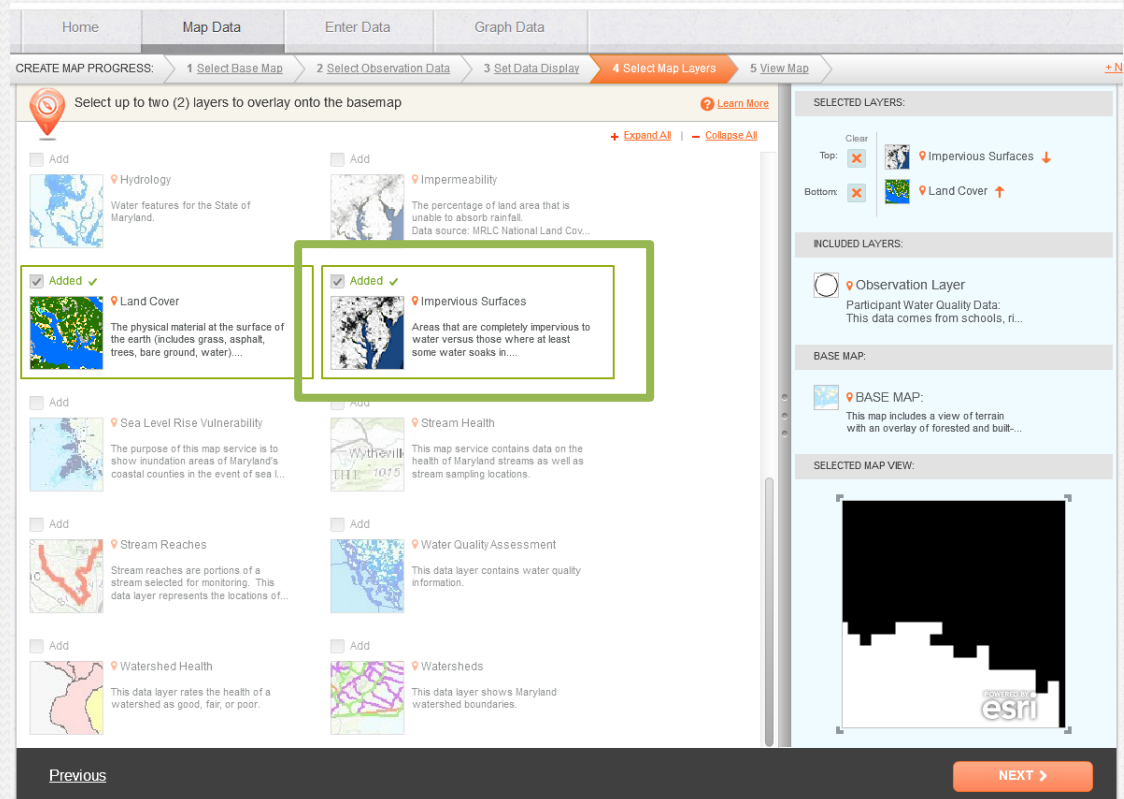


5. Impervious Surfaces Layer

Now you will observe the Impervious Surfaces layer on your map. Impervious surfaces are areas cannot absorb or allow water to soak into the ground. This layer shows areas that are completely impervious to water versus those where at least some water soaks in. You will be able to view areas that have been categorized as impervious and pervious.

To add the **Impervious Surfaces** layer to your map:

- Click on “**Select Map Layers.**”
- Uncheck the “**Rivers and Streams**” layer box to remove it from your map.
- Check the “**Impervious Surfaces**” layer box to add it to your map.
- Click “**Next**” to view your map.
- Adjust the transparency settings, as needed.



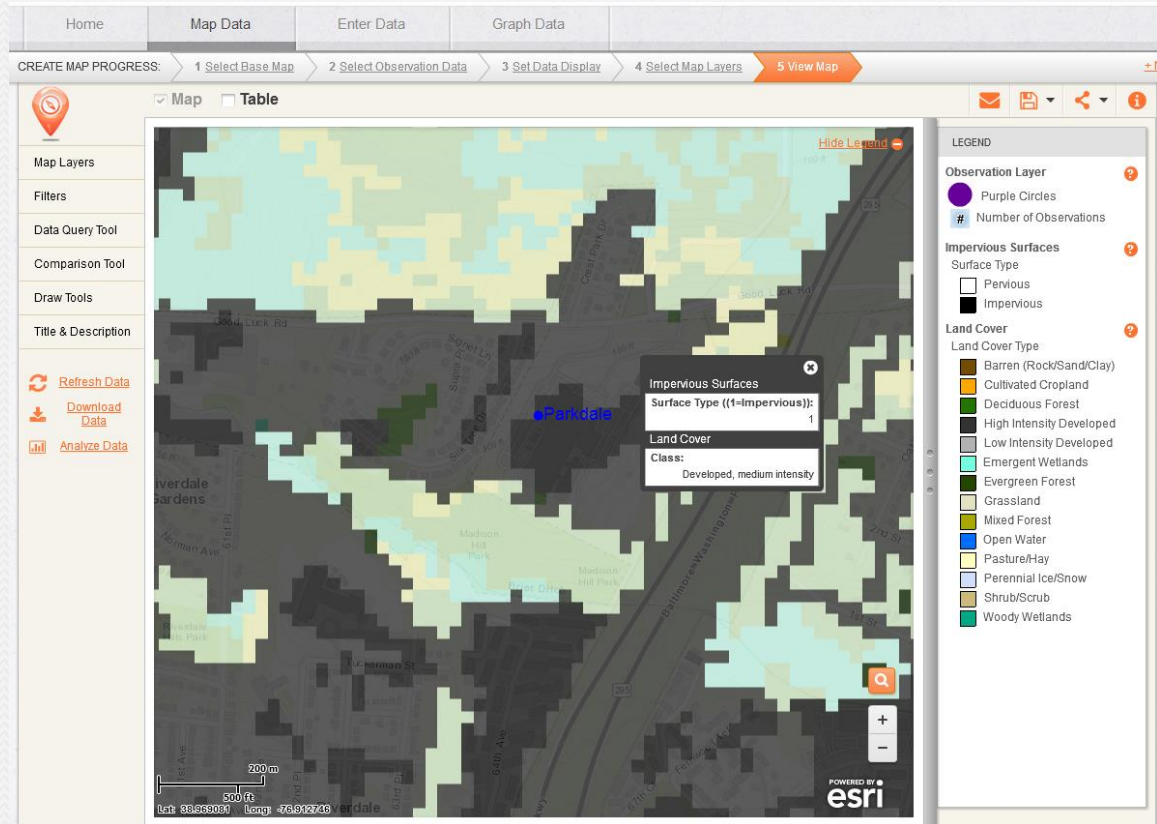
Click on any location to see if the surface is categorized as impervious or pervious. If it is impervious, you will see a number 1 in the bottom right-hand corner of the information box. If it is pervious, you will see a 0.

Generally, where do you find the greatest amount of impervious surfaces?

How do you think the stream health is affected by the amount of impervious surfaces in your watershed?

What are possible ways your class could verify the impermeability of different areas of your campus (known as, “ground truthing”)?

Why might it be necessary to “ground truth” the map data?



6. Bringing It All Together

Make a hypothesis about the health of the stream ecosystem nearest to your school.

Consider your map data and what you have learned about the relationships of different land uses to stream health. Make a hypothesis about the health of your stream, based on the types of land uses and land cover in the area draining to your stream.

You could state that the stream health is good, fair, or poor, based on your reasons. Or you could pick a specific feature, such as the amount of erosion or aquatic life you expect in the stream.



7. Checking Your Hypothesis

If you cannot test your stream quality, you can see if your hypothesis agrees with stream surveys that have been done by government and citizen organizations.

If you are in Maryland, check your hypothesis by doing one or both of the following:

7a. Observe Watershed Health on your FieldScope Map. This layer incorporates the results of stream and watershed surveys done by the Maryland Department of Natural Resources.

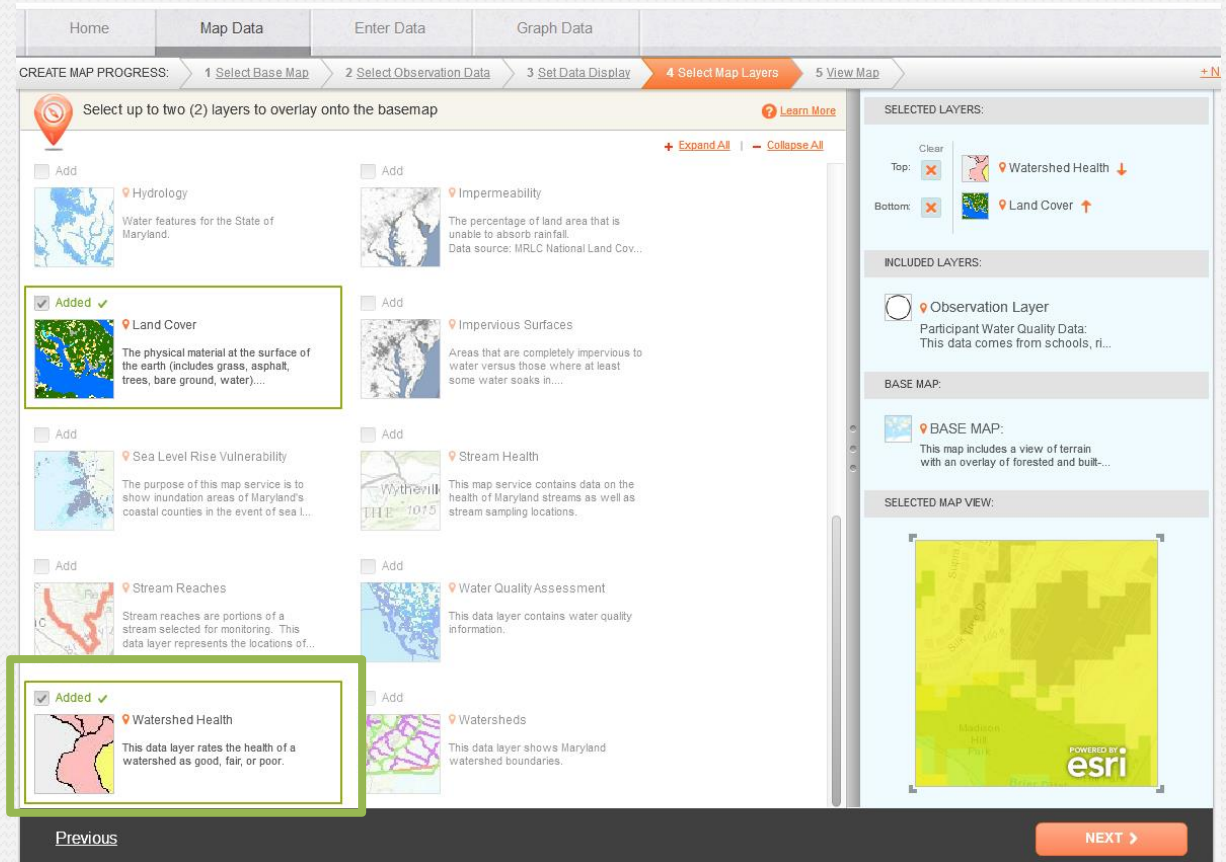
7b. Check the health of your stream by going to a different website, hosted by the Maryland Department of Natural Resources.



7a. Watershed Health Layer

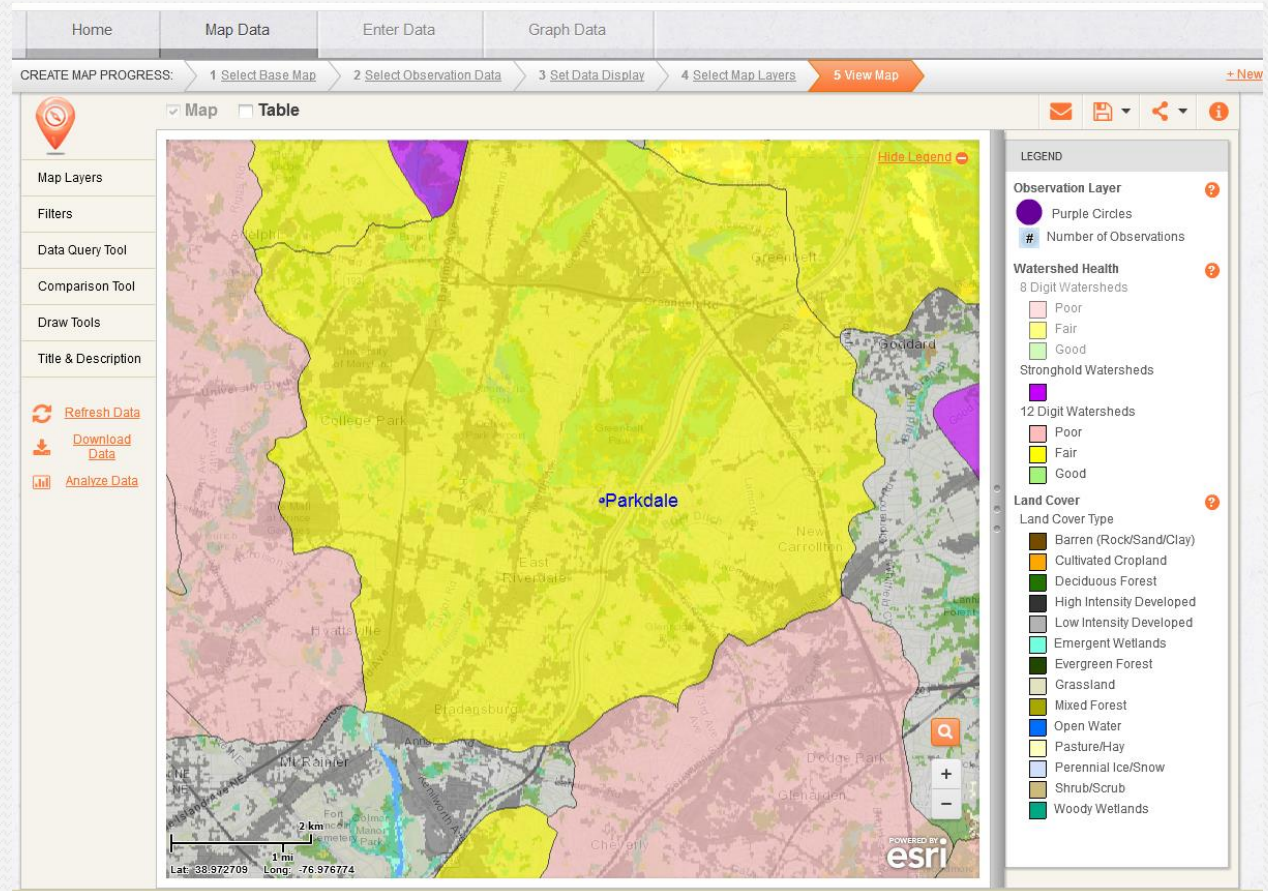
To add the “**Watershed Health**” layer to your map:

- Click on “**Select Map Layers**” on the top bar
- Uncheck the “**Impervious Surfaces**” box to remove it from your map.
- Check the “**Watershed Health**” box to add it to your map.
- Click “**Next**” to view your map.
- Adjust the transparency, as needed.



Match the color of your watershed with the colors on the legend. What is the health of your watershed?

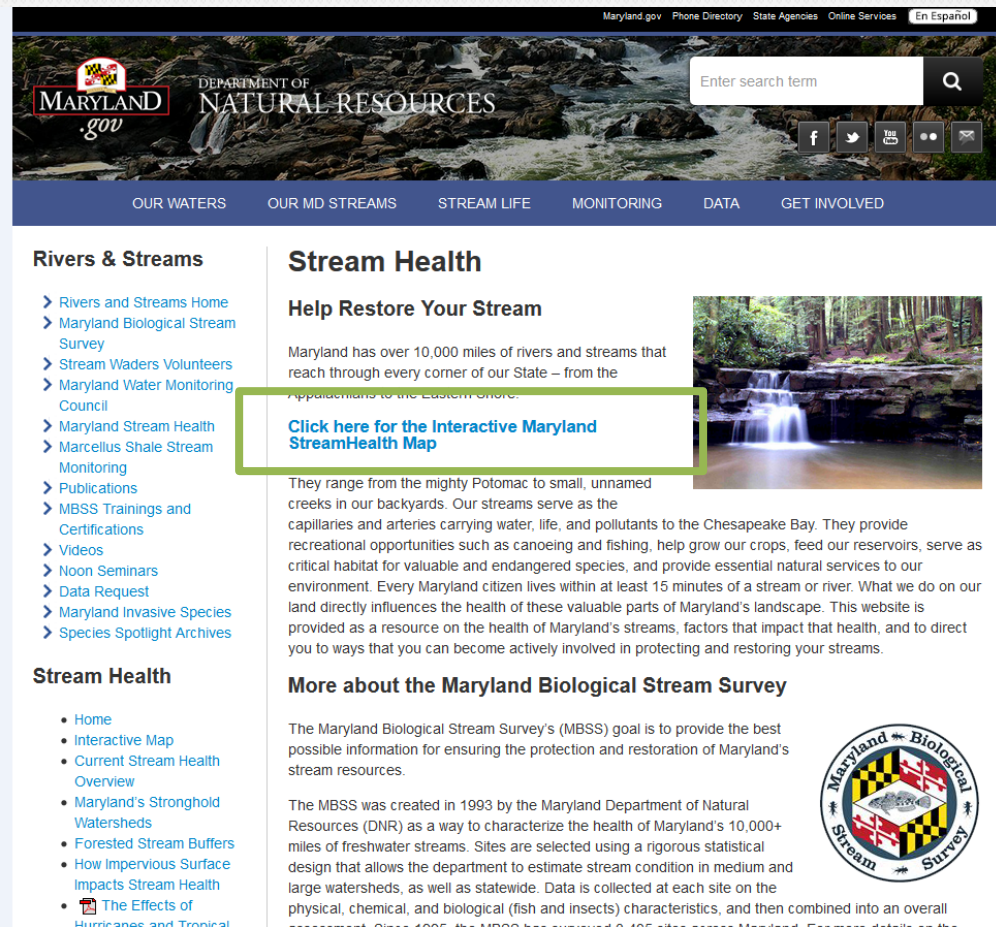
Is it what you expected? If not, do you have ideas on why it is different?



7b. Maryland DNR Stream Health

- Go to:
<http://dnr.maryland.gov/streams/Pages/streamhealth/default.aspx>

- Click on
“Click here for
the Interactive
Maryland Stream
Health Map”



Maryland.gov Phone Directory State Agencies Online Services En Español

DEPARTMENT OF NATURAL RESOURCES

Enter search term

OUR WATERS OUR MD STREAMS STREAM LIFE MONITORING DATA GET INVOLVED

Rivers & Streams

- › Rivers and Streams Home
- › Maryland Biological Stream Survey
- › Stream Waders Volunteers
- › Maryland Water Monitoring Council
- › Maryland Stream Health
- › Marcellus Shale Stream Monitoring
- › Publications
- › MBSS Trainings and Certifications
- › Videos
- › Noon Seminars
- › Data Request
- › Maryland Invasive Species
- › Species Spotlight Archives

Stream Health

- Home
- Interactive Map
- Current Stream Health Overview
- Maryland's Stronghold Watersheds
- Forested Stream Buffers
- How Impervious Surface Impacts Stream Health
- The Effects of Hurricanes and Tropical

Stream Health

Help Restore Your Stream

Maryland has over 10,000 miles of rivers and streams that reach through every corner of our State – from the Appalachian to the Eastern Shore.



[Click here for the Interactive Maryland StreamHealth Map](#)

They range from the mighty Potomac to small, unnamed creeks in our backyards. Our streams serve as the capillaries and arteries carrying water, life, and pollutants to the Chesapeake Bay. They provide recreational opportunities such as canoeing and fishing, help grow our crops, feed our reservoirs, serve as critical habitat for valuable and endangered species, and provide essential natural services to our environment. Every Maryland citizen lives within at least 15 minutes of a stream or river. What we do on our land directly influences the health of these valuable parts of Maryland's landscape. This website is provided as a resource on the health of Maryland's streams, factors that impact that health, and to direct you to ways that you can become actively involved in protecting and restoring your streams.

More about the Maryland Biological Stream Survey

The Maryland Biological Stream Survey's (MBSS) goal is to provide the best possible information for ensuring the protection and restoration of Maryland's stream resources.

The MBSS was created in 1993 by the Maryland Department of Natural Resources (DNR) as a way to characterize the health of Maryland's 10,000+ miles of freshwater streams. Sites are selected using a rigorous statistical design that allows the department to estimate stream condition in medium and large watersheds, as well as statewide. Data is collected at each site on the physical, chemical, and biological (fish and insects) characteristics, and then combined into an overall assessment. Since 1995, the MBSS has surveyed 2,405 sites across Maryland. For more details on the



Enter the name of your stream or your school location in the search box.

Streams that have been assessed are shown in colors or as triangles. Click on these symbols to learn more. It is possible that your stream has yet to be assessed.

What is the health of your stream?

Is it what you expected? If not, do you have ideas on why it is different?

