

FieldScope Map Inquiry

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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	
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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
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- 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
 - Stream health
 - 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 use, impervious surfaces, and stream health.
- You can save your map for later use.

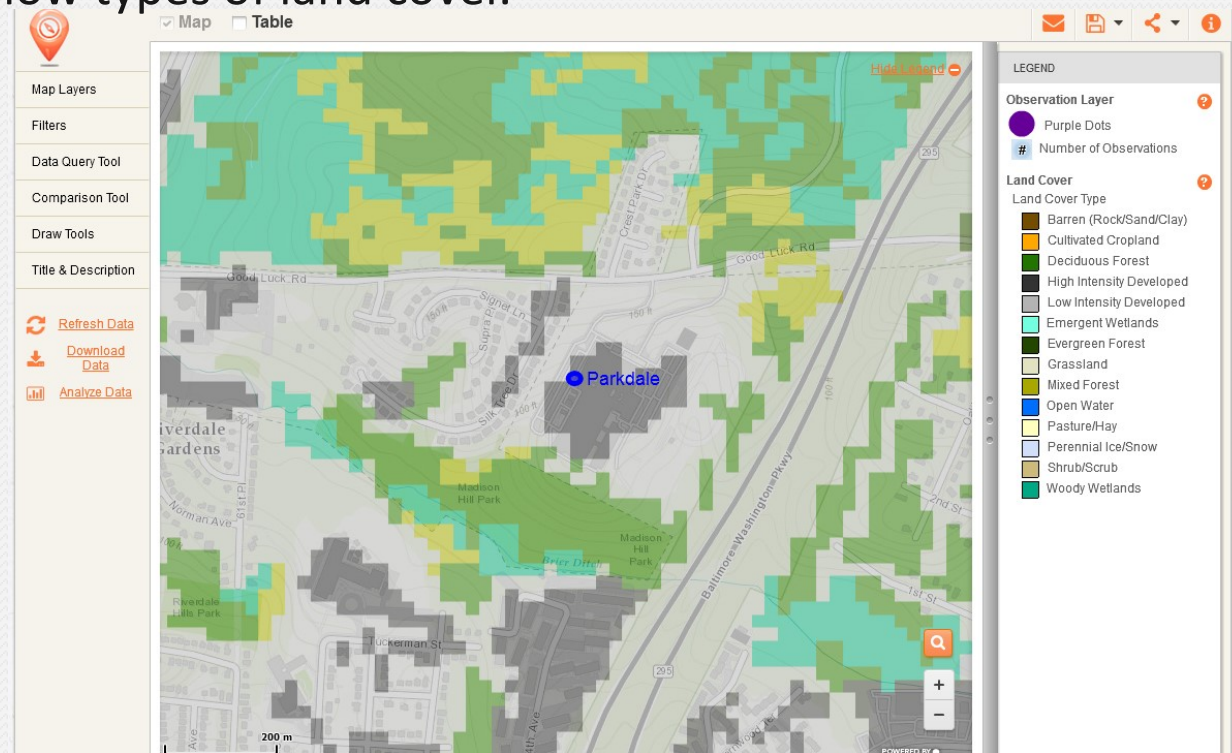


Example of a Data Layer

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

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

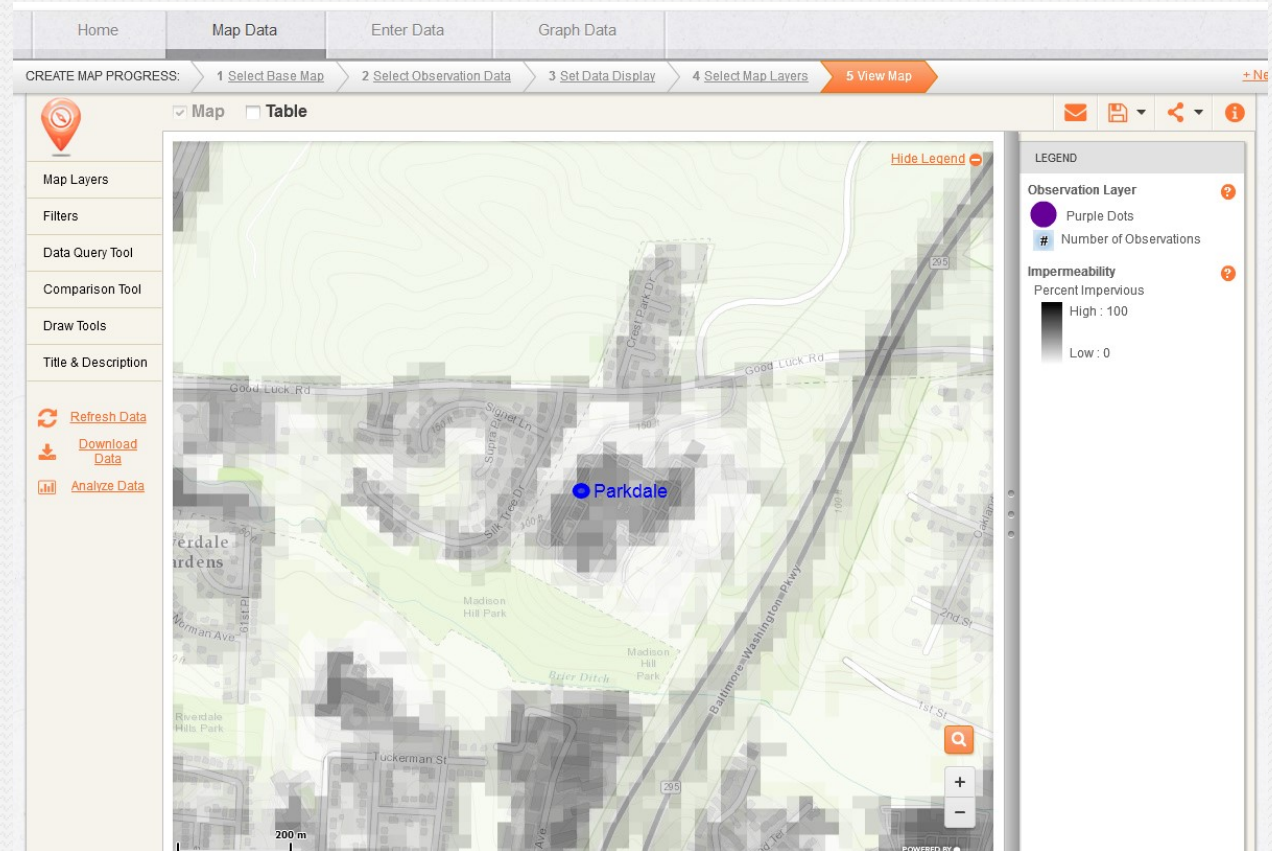
1. *Using the legend, name two types of land cover in this area.*
2. *What land cover is not on this map?*



Example of an Impermeability Data Layer

This data layer shows the percentage of impermeable surfaces over the base map.

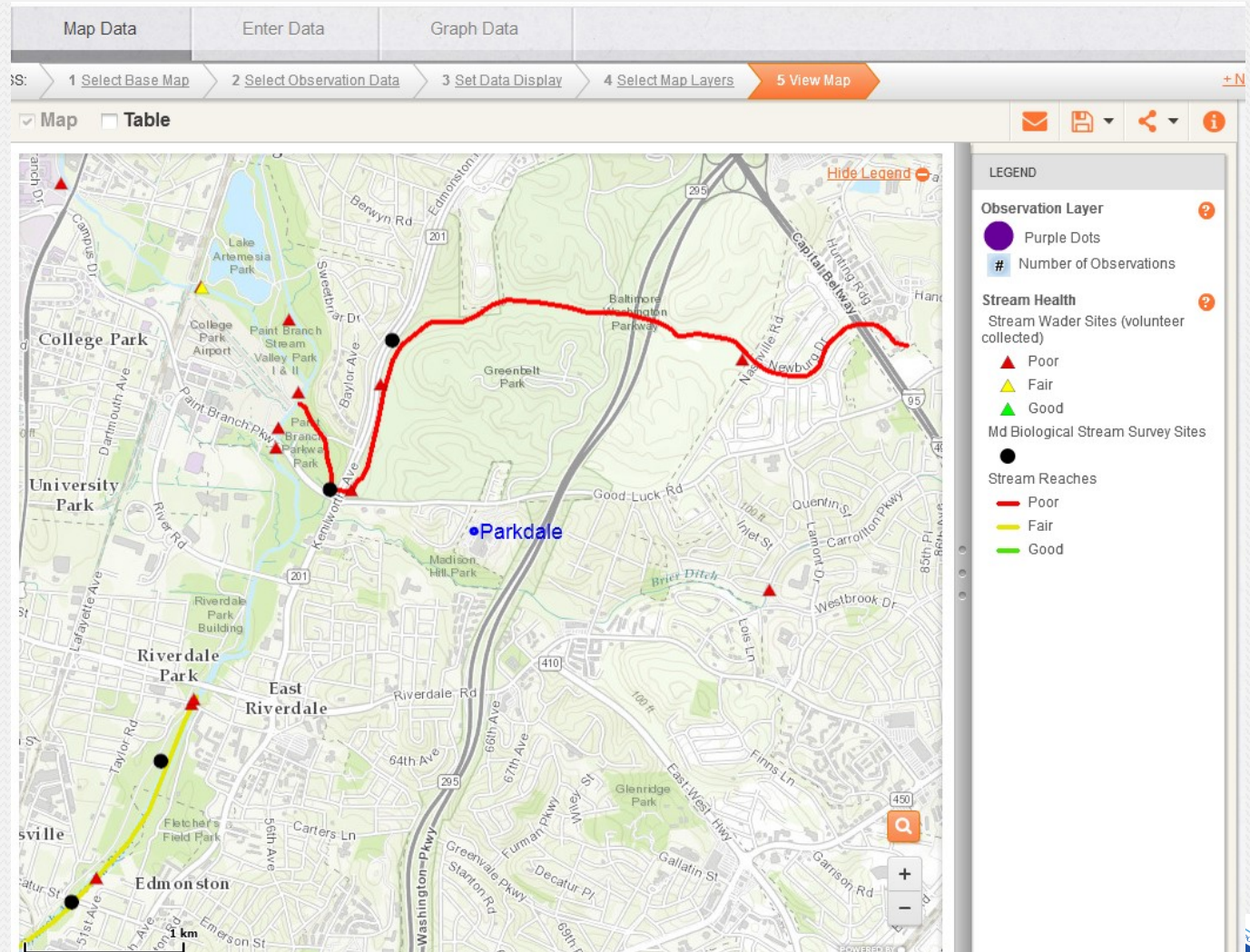
Why might some areas show a higher percentage of imperviousness than other areas?



Example of a Stream Health Data Layer

This layer provides graphic data from stream surveys conducted by the Maryland Department of Natural Resources.

- What does it tell you about the stream near Parkdale?*



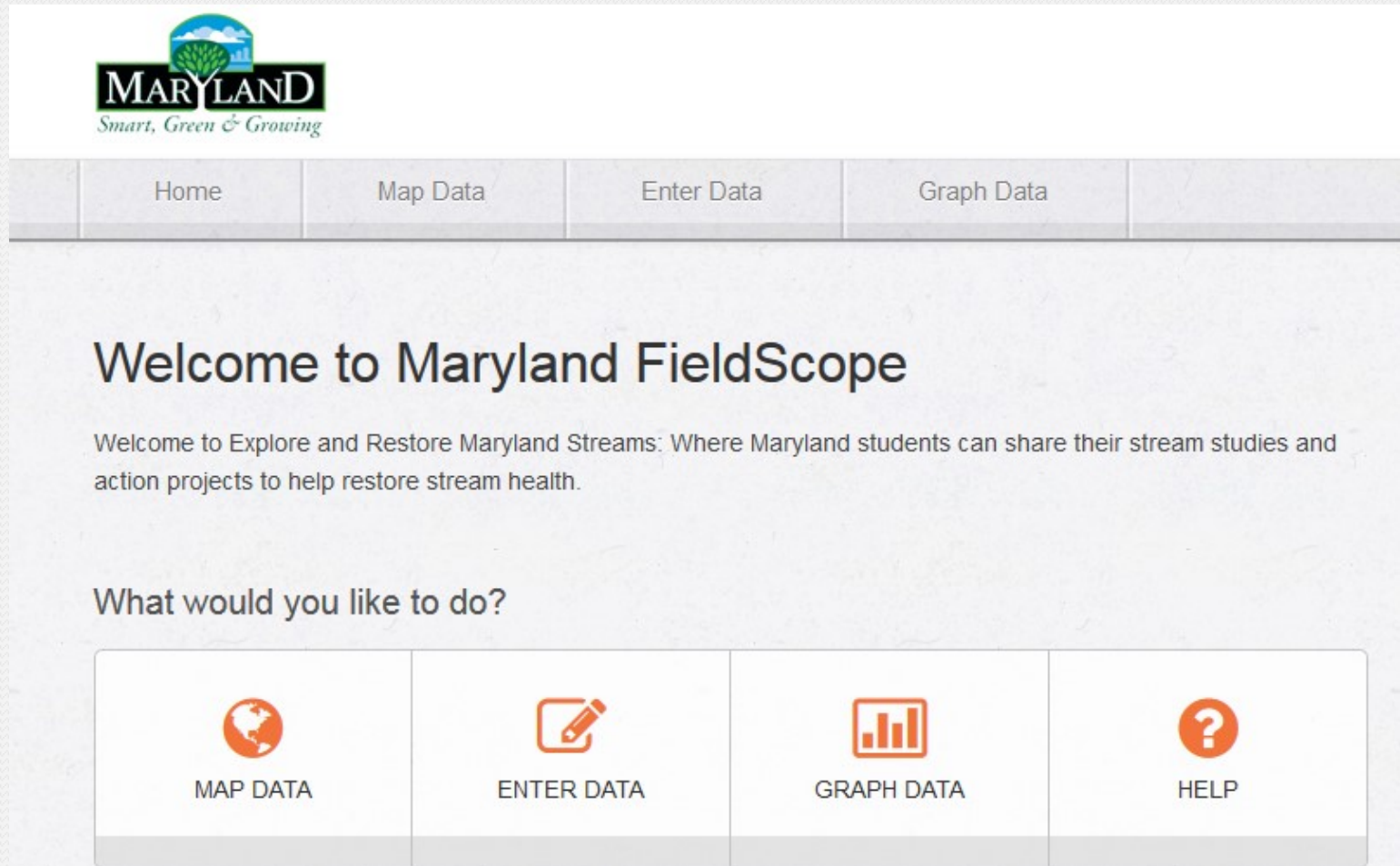
An Overview of FieldScope Basics

The following slides will familiarize you with FieldScope.



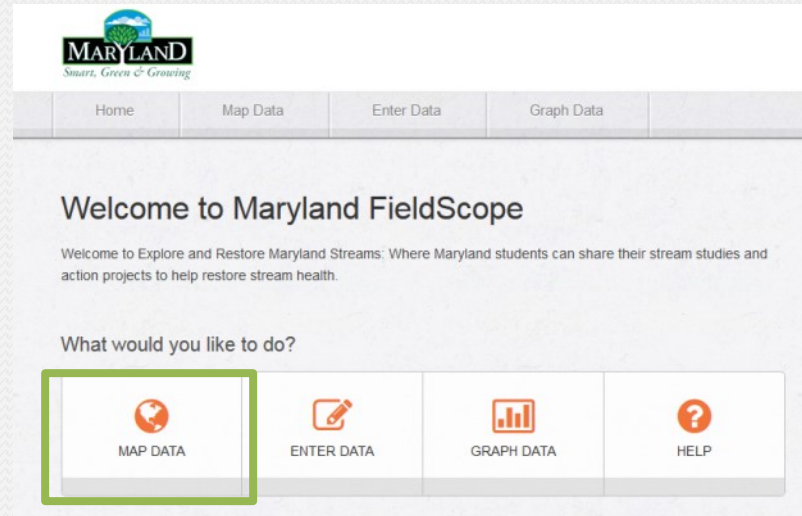
How We Get To FieldScope and What We See

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

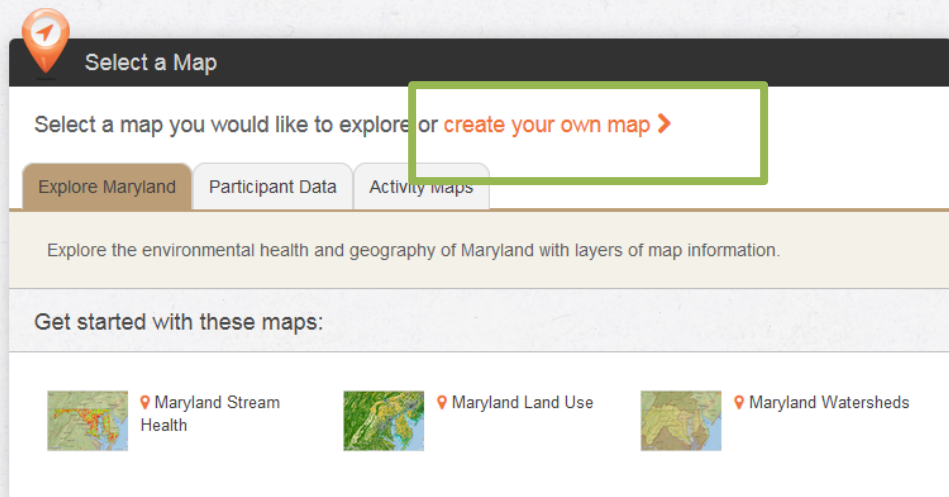


Starting Your Map: A Few Easy Steps

1. Click on “Map Data”.



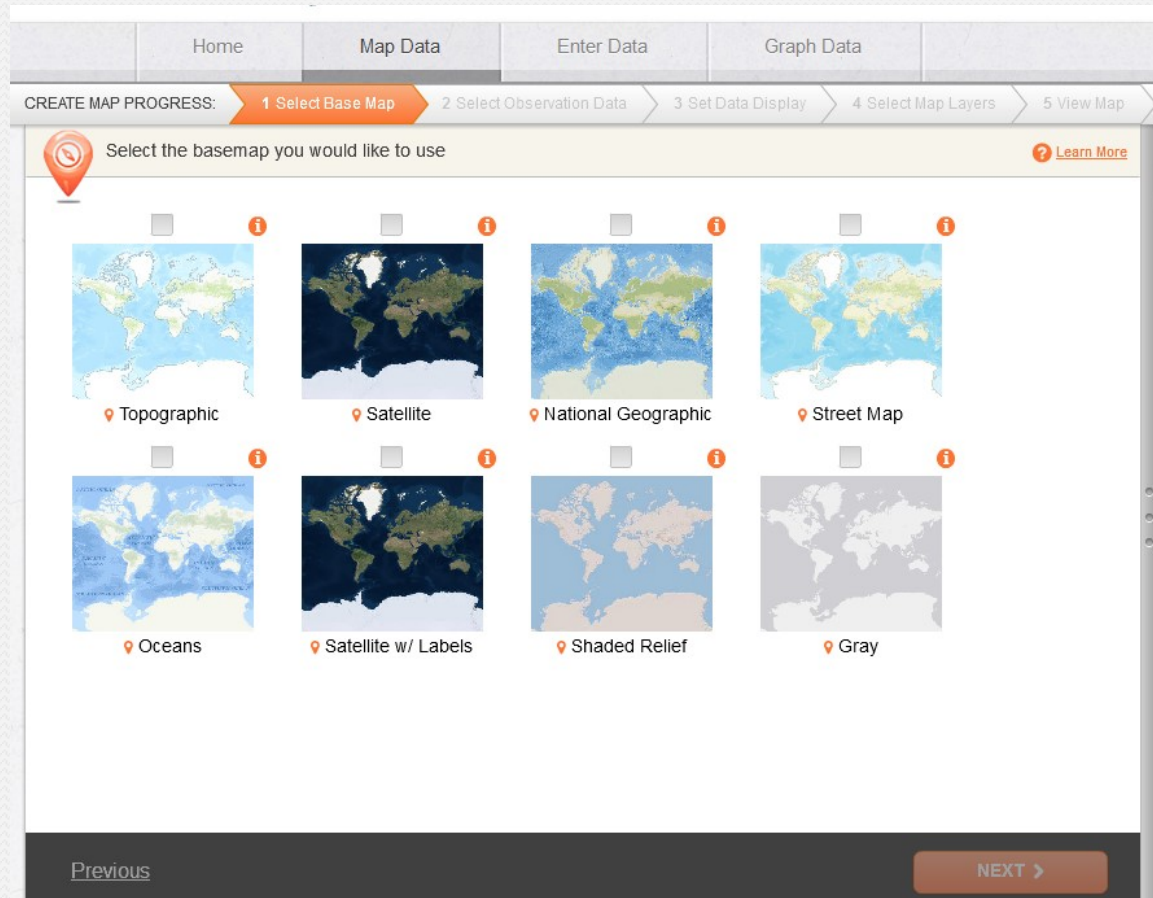
2. Click on “Create Your Own Map.”



4. Select a Base Map. Then, click “Next”.

Reminder: the base map is the bottom layer of your map.

Learn more
about different
base maps on the
following slides.

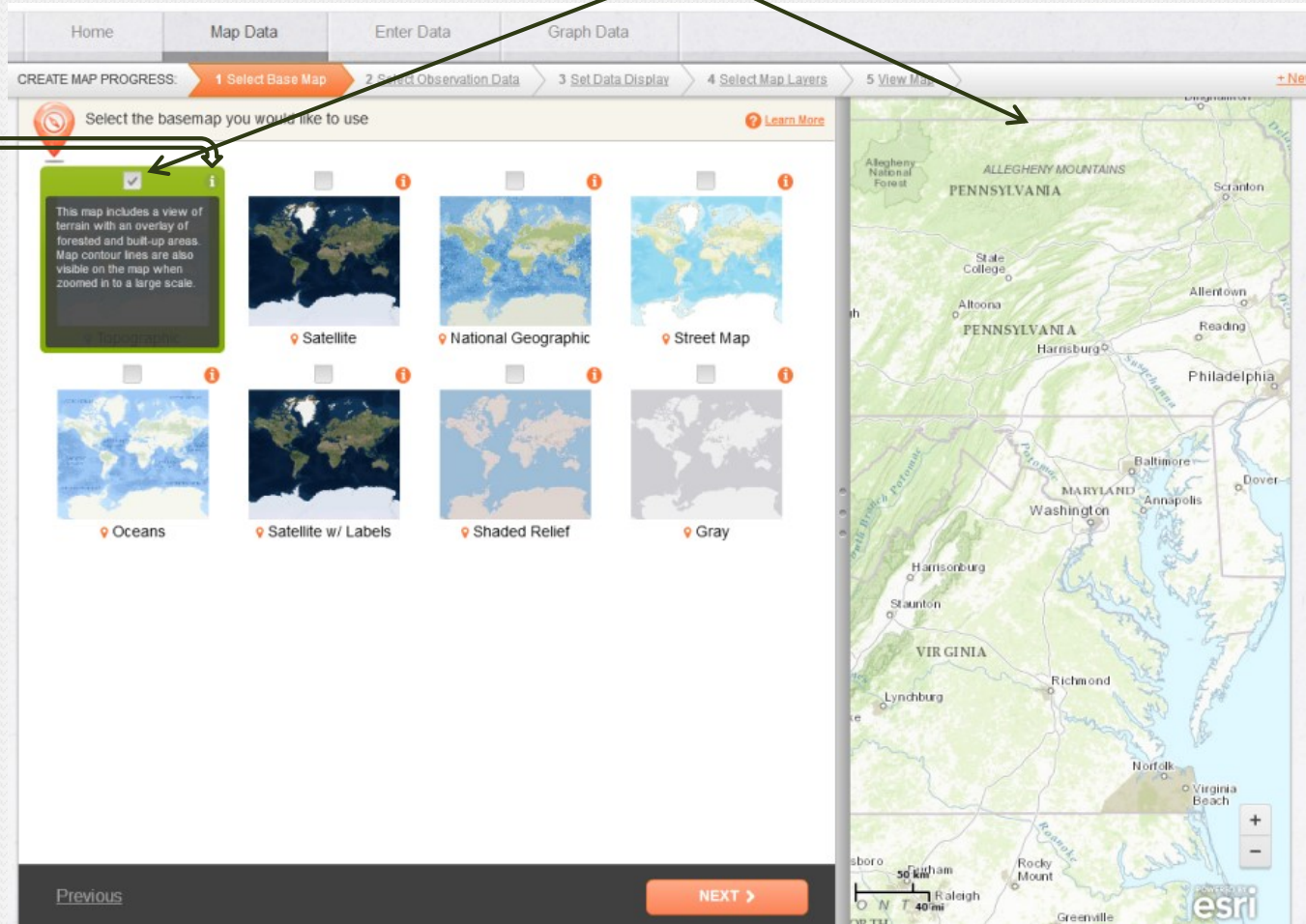


- Topographic base map.

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.

National Geographic

Street Map

Oceans

Satellite w/ Labels

Shaded Relief

Gray

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

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

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.

Street Map

Oceans

Satellite w/ Labels

Shaded Relief

Gray

Previous NEXT >

POWERED BY esri

5. The Next Step: 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.

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

Select and filter the observation data sources for your map [Learn More](#)

Data Sources

- ☒ Participant Water Quality Data ?
- ☐ USGS Water Quality ?
- ☐ NOAA CBIBS - Daily ?
- ☐ Stream Corridor Assessment ?
- ☐ Restoration & Clean-up Data ?
- ☐ Maryland Biological Stream Survey ?
- ☐ NOAA CBIBS - Hourly ?

Data Filter Options

- Filter by value
Filter by value to select and display data on the variables you are interested in.
- Filter by area
Filter by a predefined geographic area, or an area you define.
- Filter by date

BASE MAP:

Topographic Base Map
This map includes a view of terrain with an overlay of forested and built-up areas. Map contour lines are also visib...

DATA INFORMATION:

Number of Stations: 0
Number of Observations: 0

FILTER LIST:

Match: ☒ Any selected filter ☐ All selected filters

Active	Filter Name (double-click to edit)	Delete

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

6. Set Data Display. Then, click “Next”.

“Select Data Display” enables users to modify how observation data is displayed on map. We will not make changes to this during our exercise.


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 +N

 Select how the data will be displayed on the map [? Learn More](#)

Observation Display Options

Display Observations Using:

Purple Dots

Display Count As:
☐ None ☐ Number of Stations ☒ Number of Observations

☐ Display Observation Photos [?](#)

Displayed Variables

Available Variables:

Search for variable name...


Station ID
Latitude
Longitude
Observation ID
Day of Year

Selected Variables (3):

Station Name
Data Source
Observation Date

[Clear All](#)

BASE MAP:

 **Topographic Base Map**
This map includes a view of terrain with an overlay of forested and built-up areas. Map contour lines ...

DATA INFORMATION:

Number of Stations: 0

Number of Observations: 0

Data Sources:

FILTER LIST:
Match: ☒ Any selected filter ☐ All selected filters

Active	Filter Name (double-click to edit)	Delete

Previous

NEXT >

7. Select Map Layers. Then, click “Next”.

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

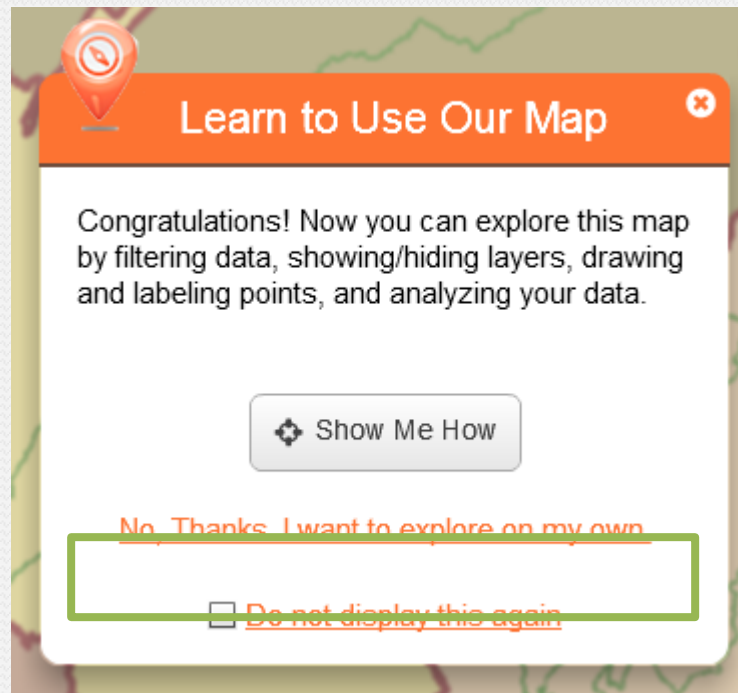
We will explore some data layers in Part Two of your inquiry.

The screenshot shows a web application interface for selecting map layers. At the top, there is a navigation bar with tabs: Home, Map Data, Enter Data, Graph Data, and a partially visible 'View Map' tab. Below the navigation bar, a progress bar indicates the current step: '4 Select Map Layers'. The main content area is titled 'Select up to two (2) layers to overlay onto the basemap'. It features a list of available layers categorized under 'Boundaries' and 'Physical Geography'. Under 'Boundaries', there are 'County Boundaries' and 'Watersheds'. Under 'Physical Geography', there are 'MBSS Catchments', 'Elevation', and 'Rivers & Streams'. Each layer has a small thumbnail map and a brief description. To the right of the layer list, there is a 'SELECTED LAYERS:' panel with 'Top' and 'Bottom' selection options. Below that is an 'INCLUDED LAYERS:' panel showing the 'Observation Layer'. Further down is a 'BASE MAP:' panel showing a map of Maryland. At the bottom right, there is a 'SELECTED MAP VIEW:' panel showing a map of the Chesapeake Bay area with labels for 'MARYLAND', 'Baltimore', 'Columbia', and 'esri'. A 'Learn More' link is visible in the top right corner of the main content area.



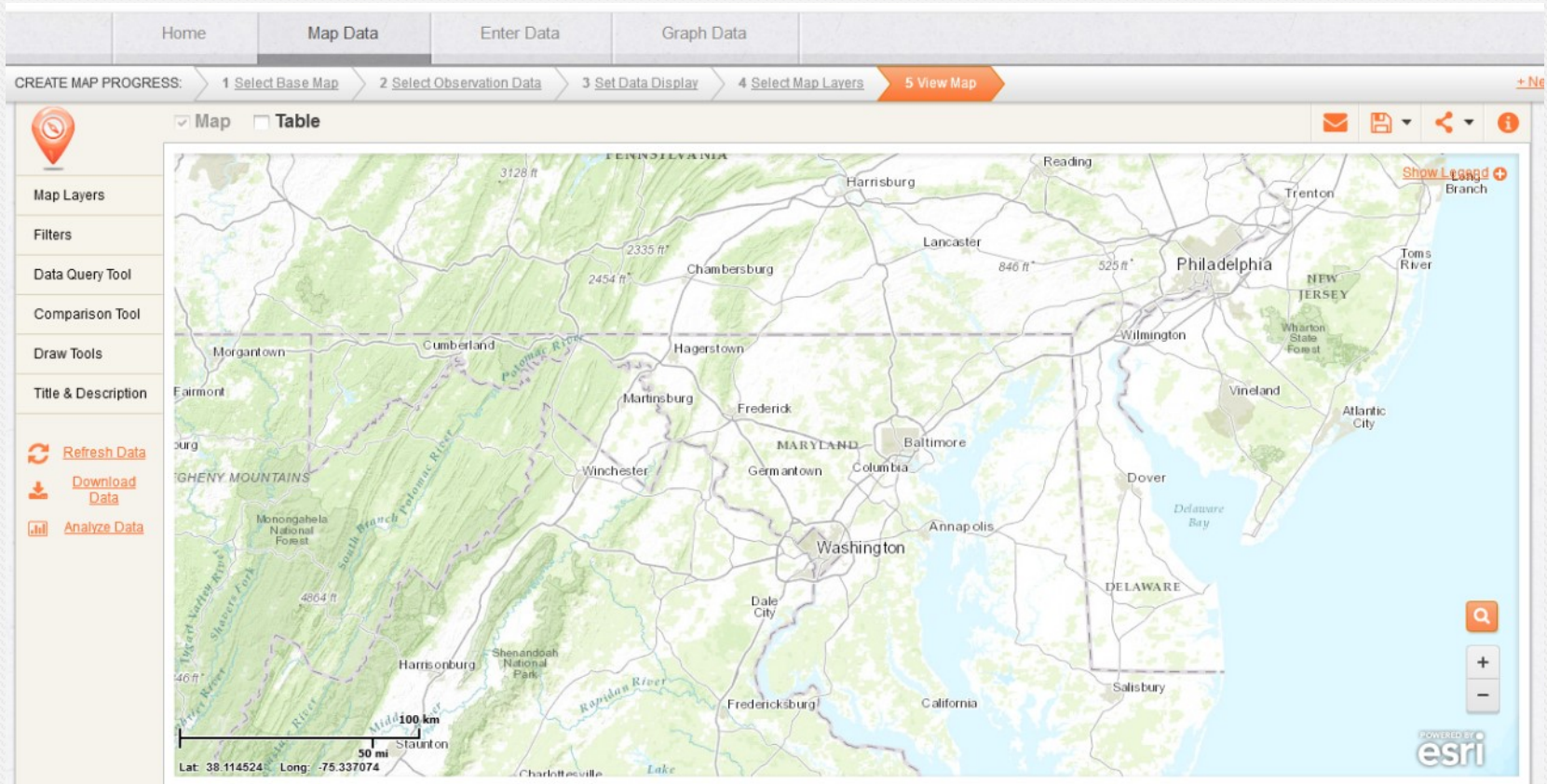
8. A FieldScope Lesson

- 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.”**



9. View Map.

- During your exercise, you will create a map similar to this.



Key FieldScope Tools

Once you have a map, you will use online tools to research the data layers. The following slides will introduce some key FieldScope tools.

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



10. Tabs on the Left Side

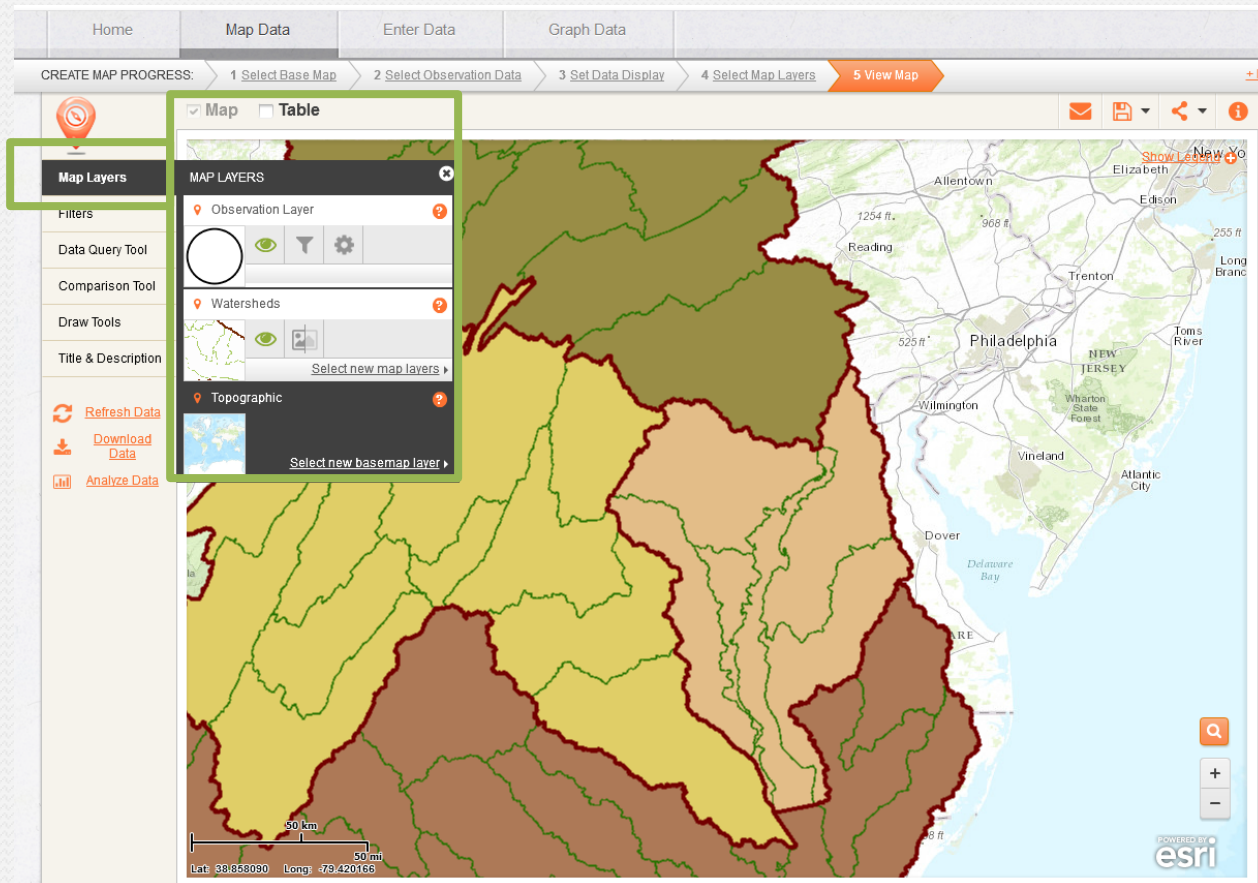
On the left side are tabs that you can use to adjust various settings on your map.

The screenshot displays a web-based map application interface. At the top, there is a navigation bar with tabs: Home, Map Data, Enter Data, Graph Data, and a partially visible 'New' tab. Below this is a progress bar labeled 'CREATE MAP PROGRESS:' with five steps: 1 Select Base Map, 2 Select Observation Data, 3 Set Data Display, 4 Select Map Layers, and 5 View Map (which is highlighted in orange). The main map area shows a topographic map of the Eastern United States, including parts of Pennsylvania, Maryland, Delaware, New Jersey, and Virginia. Major cities like Philadelphia, Washington, Baltimore, and Harrisburg are labeled. The map includes elevation contours and river networks. On the left side, there is a sidebar with a green border. It contains a 'Map' tab (selected) and a 'Table' tab. Below these are several tool icons: a location pin, a magnifying glass, a refresh icon, a download icon, and an analyze icon. The sidebar also has a 'Title & Description' section. At the bottom of the map, there is a scale bar (0 to 100 km) and coordinates: Lat: 38.114524, Long: -75.337074. The bottom right corner of the map area features a search bar, zoom in (+) and zoom out (-) buttons, and the 'esri' logo.



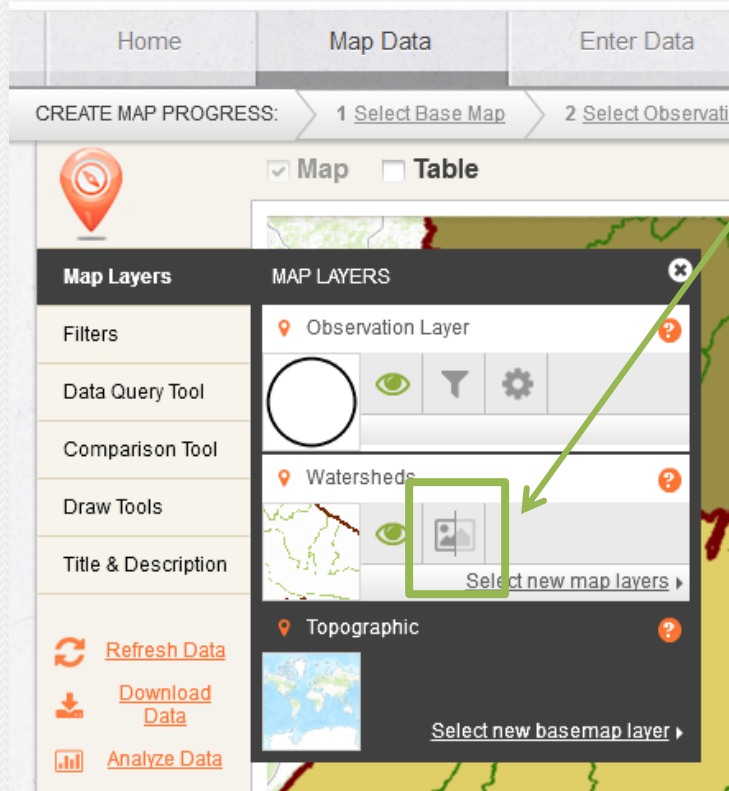
a. Map Layers

The “Map Layers” tab shows you the layers you currently have on your map. It also allows you to adjust the transparency and visibility of the layers. In this example, it is adjusted so that we can only see the sub-watershed data layer.



i. The Transparency Slide Bar

Transparency controls whether or not you can see through the layer. Zero % transparency means you cannot see through it, like on the previous page. 100% transparency means you can completely see through it.

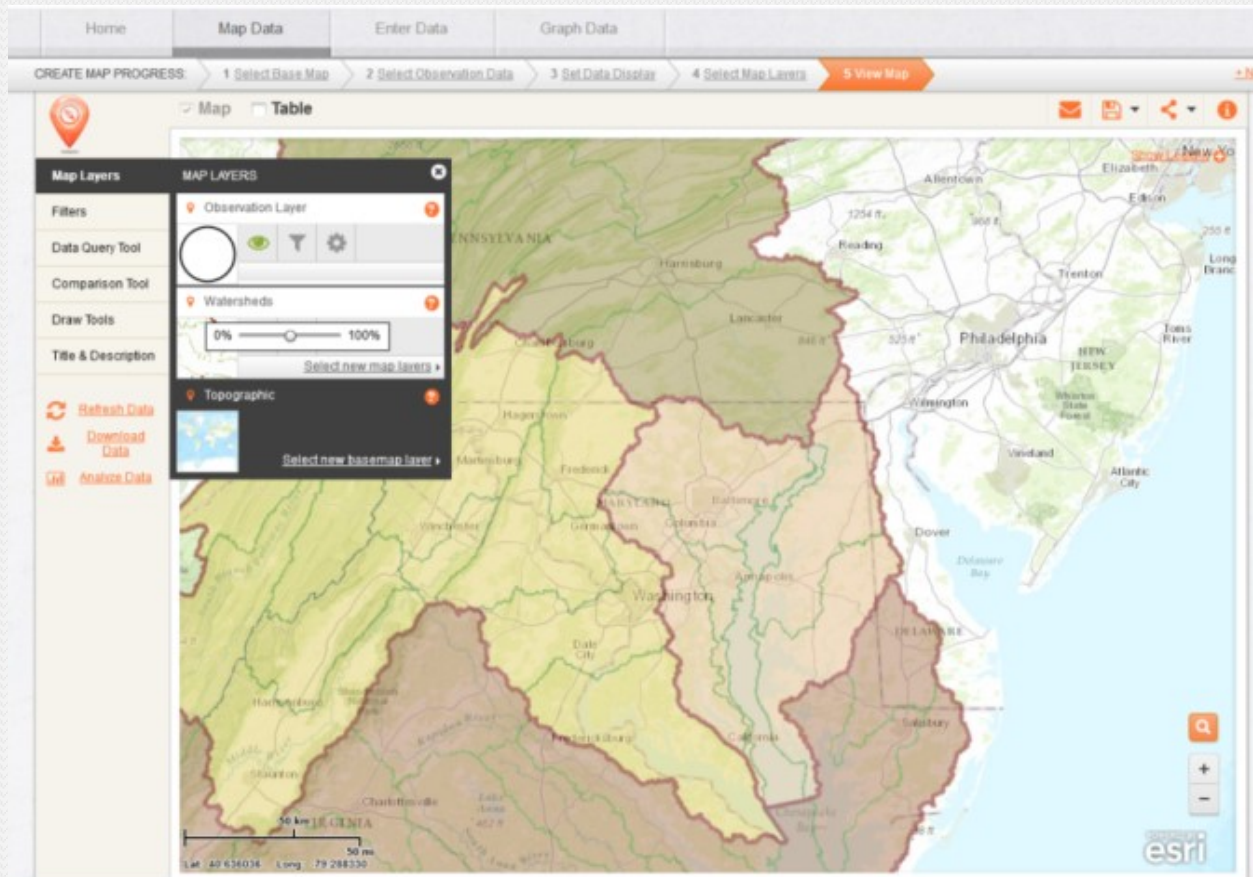


When you add new layers to your map, they are automatically set to 0% transparency.

Layers Revealed

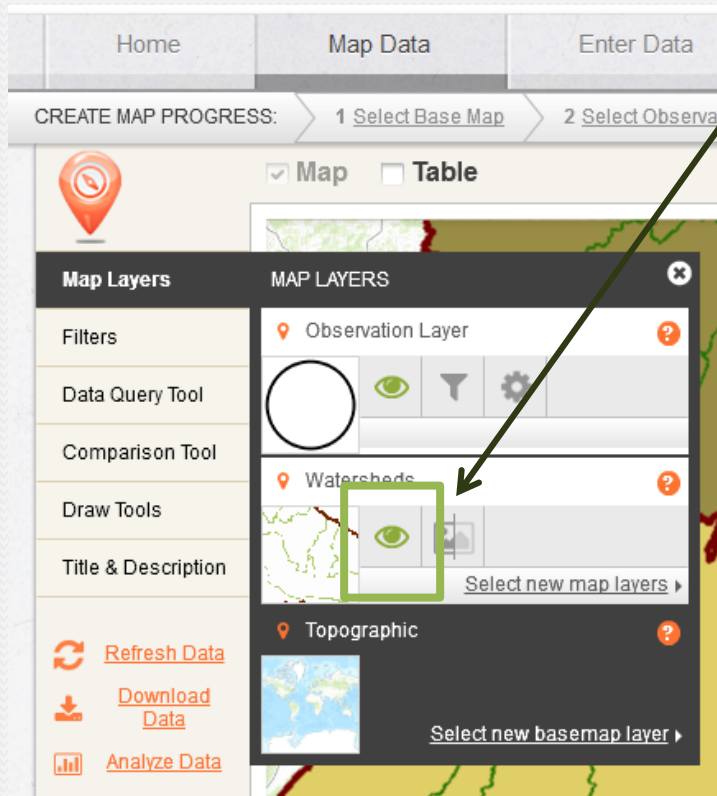
This is how the same map appears when the transparency of the Watersheds layer is set to 50%.

You can see both the base map and the Watersheds layer.



ii. Layer Visibility.

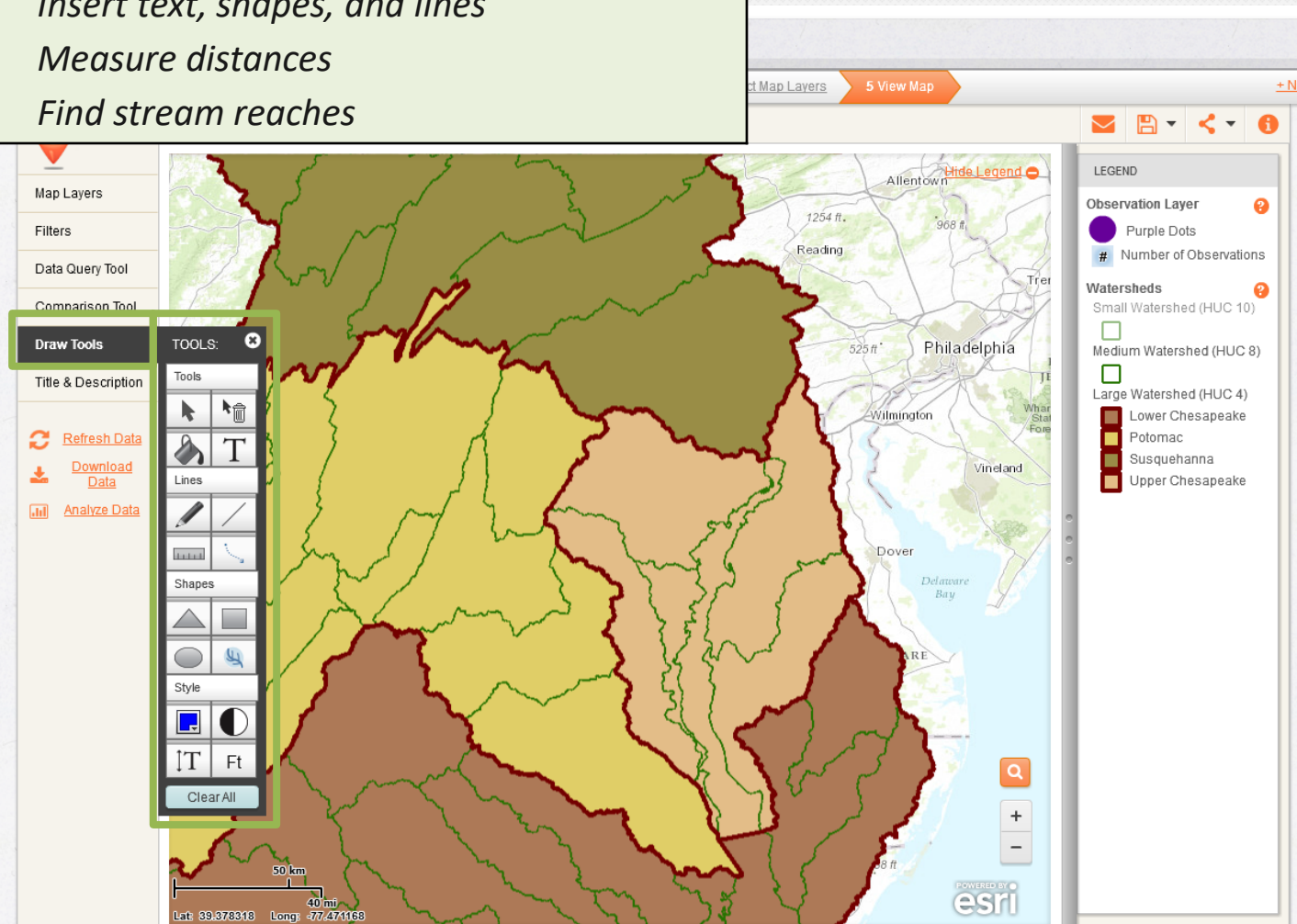
Layer Visibility – the EYE – shows or hides the layer.



b. Draw Tools – Enabling You to Make Your Mark!

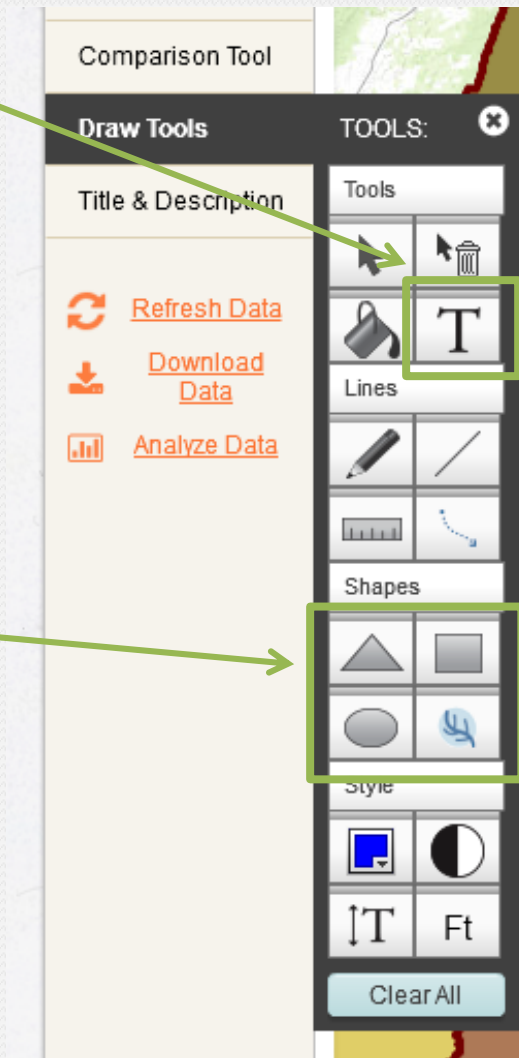
With the “Draw Tools” tab you can:

- Insert text, shapes, and lines
- Measure distances
- Find stream reaches



i. Insert label.

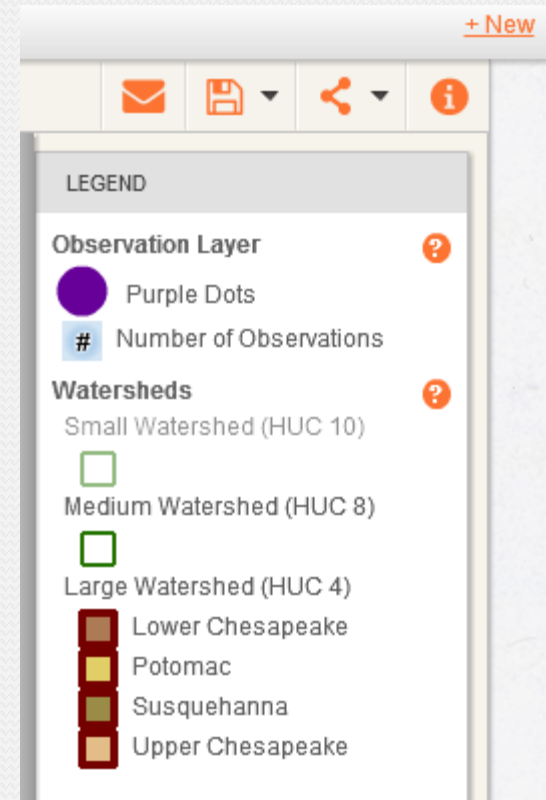
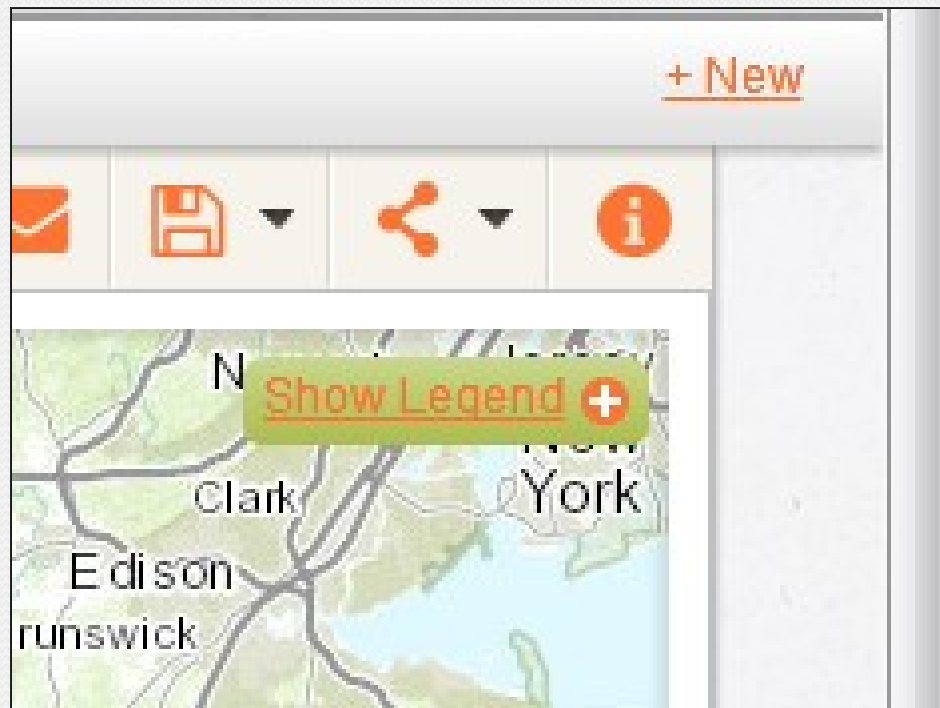
ii. Insert shape.



11. Legend -- the key to knowing what you are seeing

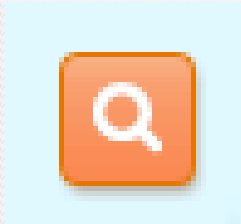
In the top right corner of your map, is a link to show the legend. The legend will list what the symbols and colors mean on your map.

- Click on “**Show Legend**” to view the legend.

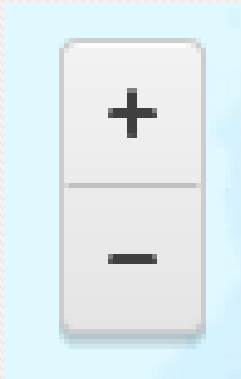


At the bottom right corner, you will see the Search button, represented by a magnifying glass, and the Zoom In and Zoom Out buttons, represented by a plus (+) and minus (-) sign.

12. Search.



12. Zoom In (+) and Zoom Out (-).



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.



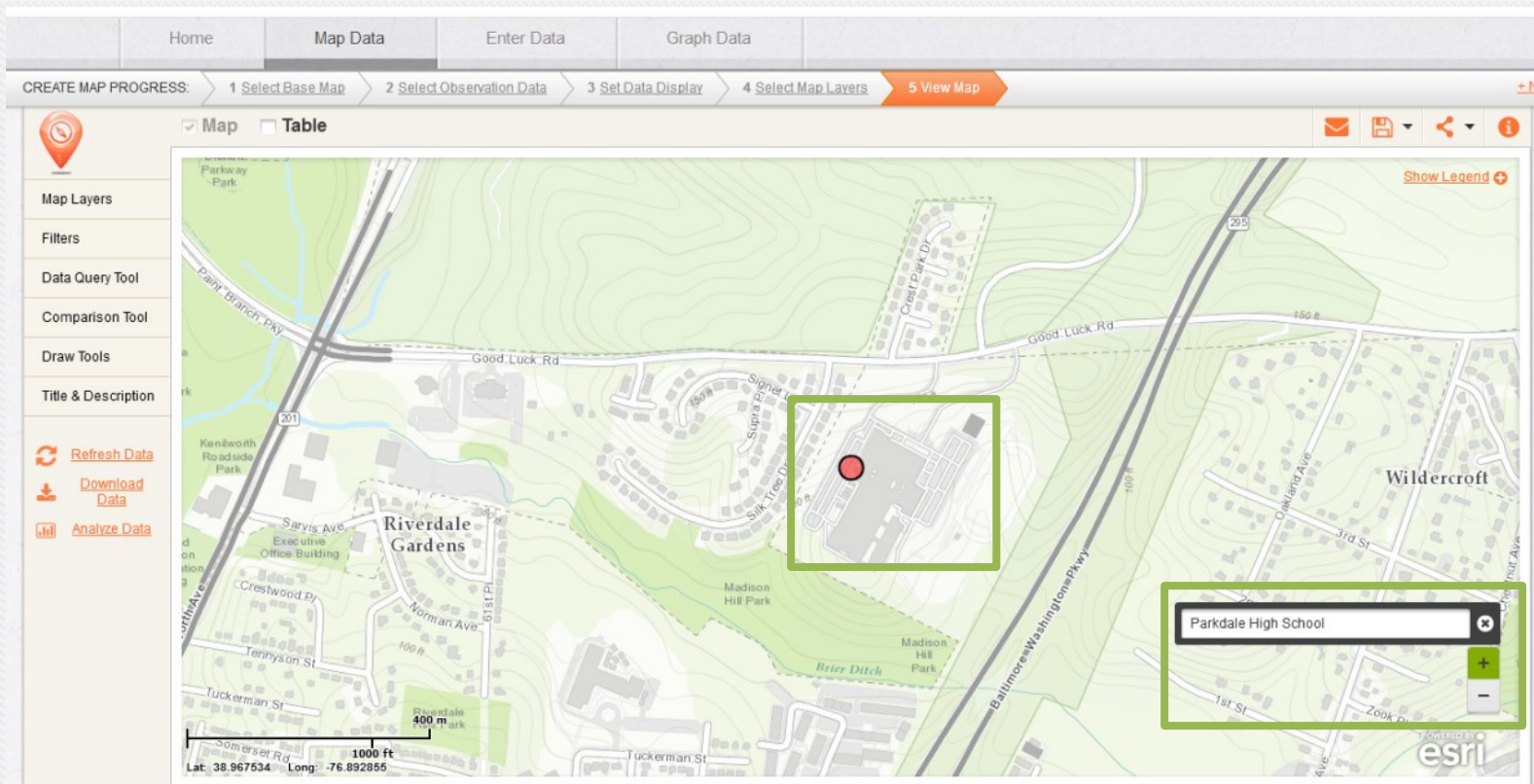
Explore Your Watershed

- 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

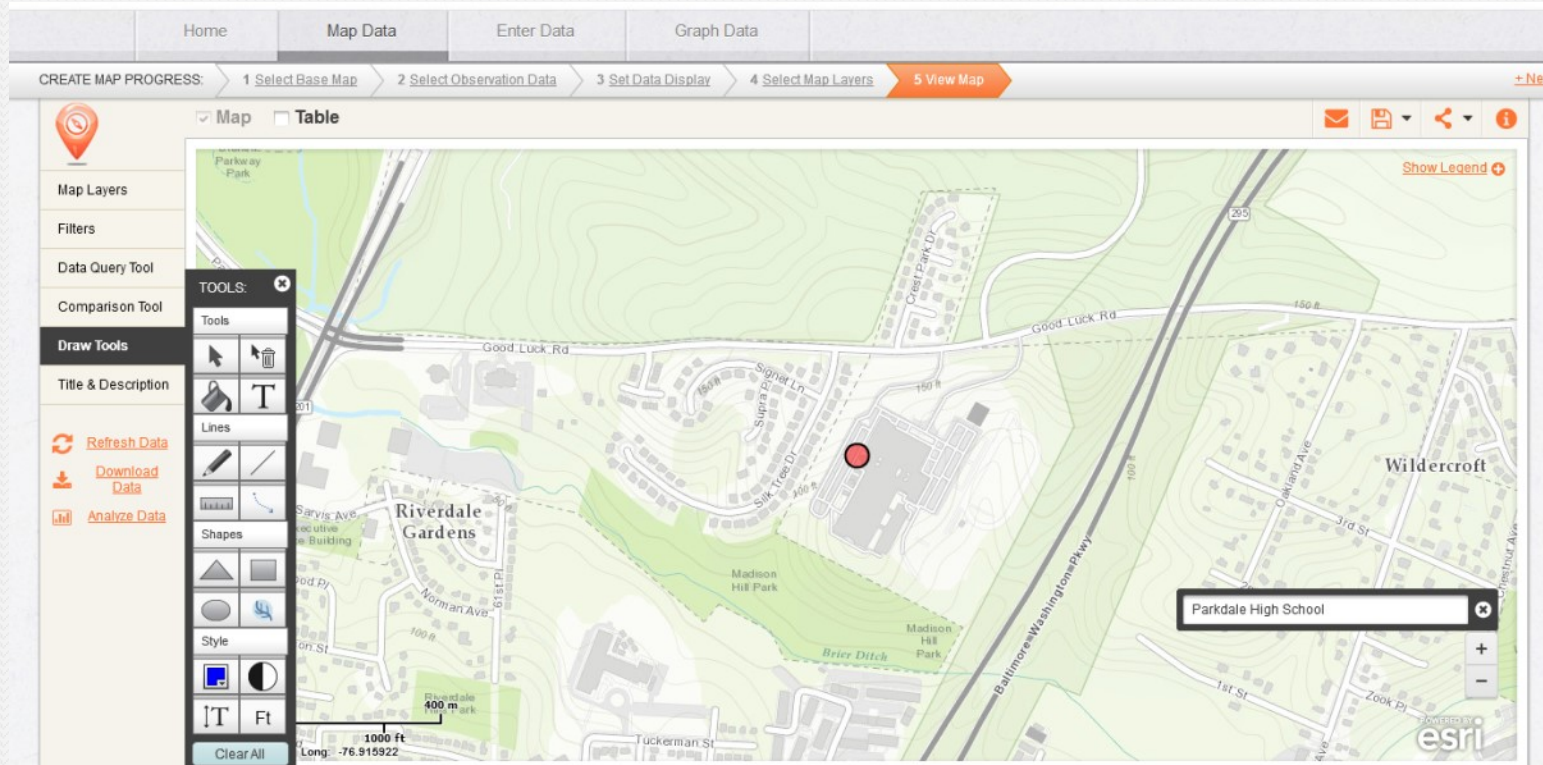


1. Locate Your School

- a. Search for your school by clicking on the Search button (the magnifying glass) in the lower right corner. Put in the address or name of your school. The location will appear as a red dot.
- b. Zoom in (the + button) until you can see the outline of your school.

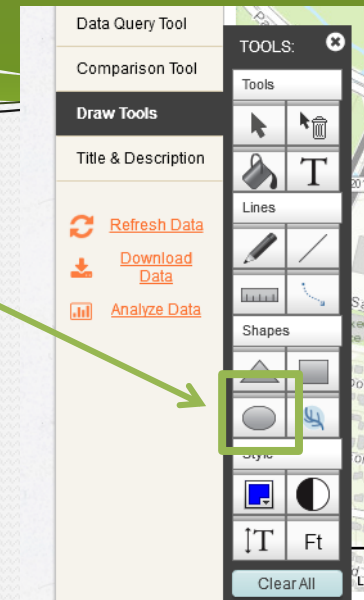


- c. Create a Label and Place Marker for your school using the Draw Tools tab. The label and marker you create will remain on the map as you explore the different data layers and zoom in and out.
- d. Instructions on how to create a Label and Place Marker are on the next slide.



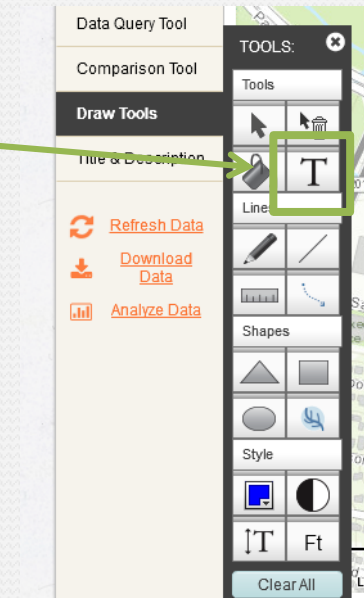
e. Click on the “**Circle**” shape tool.

- i. Press down on the map where you want the symbol to be to select the center of the circle, then drag and let go to finish.

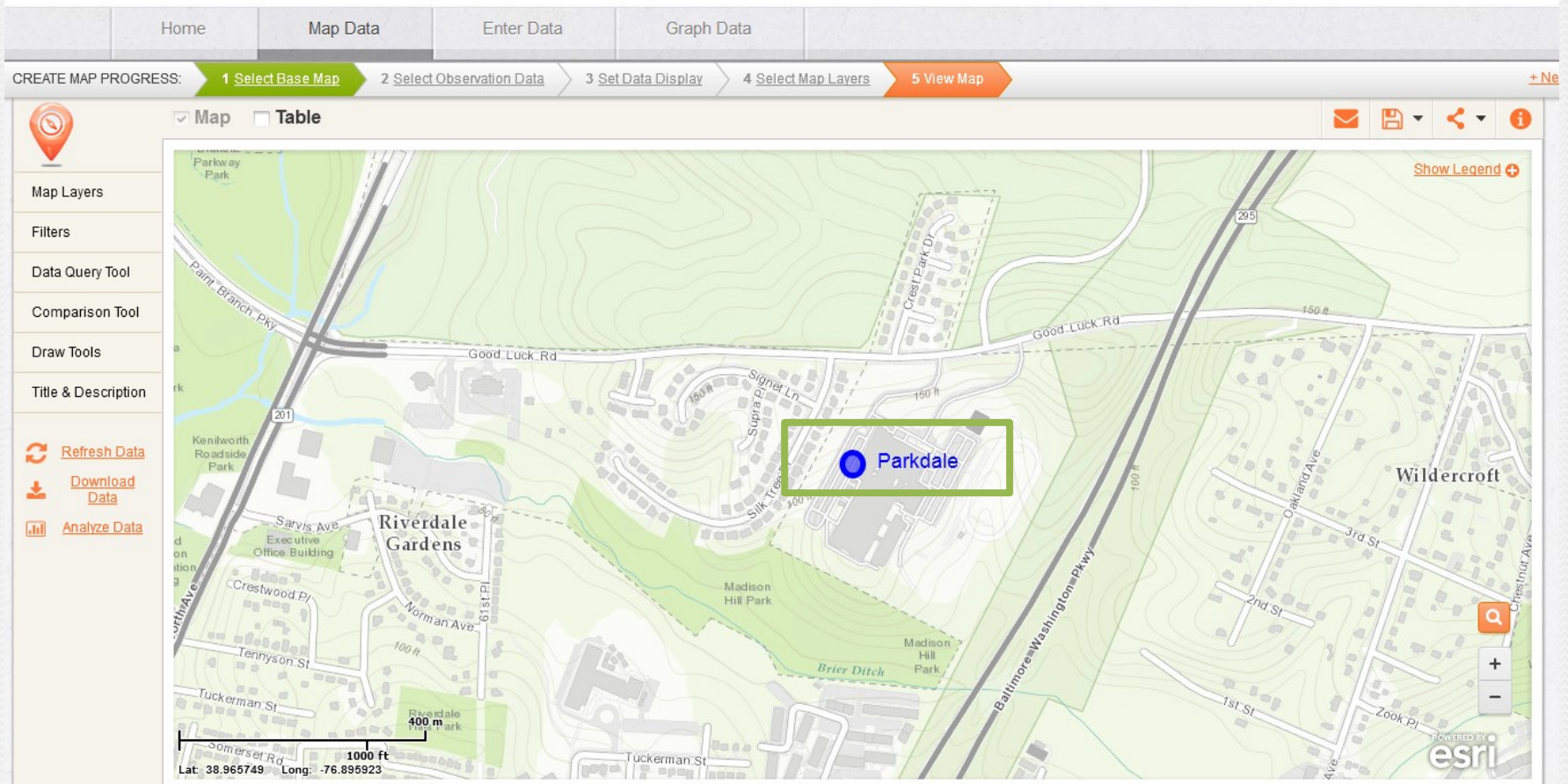


f. Click on the “**Add Label**” tool.

- i. Click where you want to place the text.



Example



2. Watersheds Layer

The Watersheds layer displays the Chesapeake Bay Watershed on your map. It also displays the sub-watersheds within the larger Chesapeake Bay Watershed.

Add the “Watersheds” layer to your map.

- A. Click on “**Select Map Layers**”
- B. Check the “**Watersheds**” layer box to add it to your map.
- C. Click “**Next**” to view your map.

The screenshot shows the 'Select Map Layers' step of the 'CREATE MAP' process. The interface is divided into several sections:

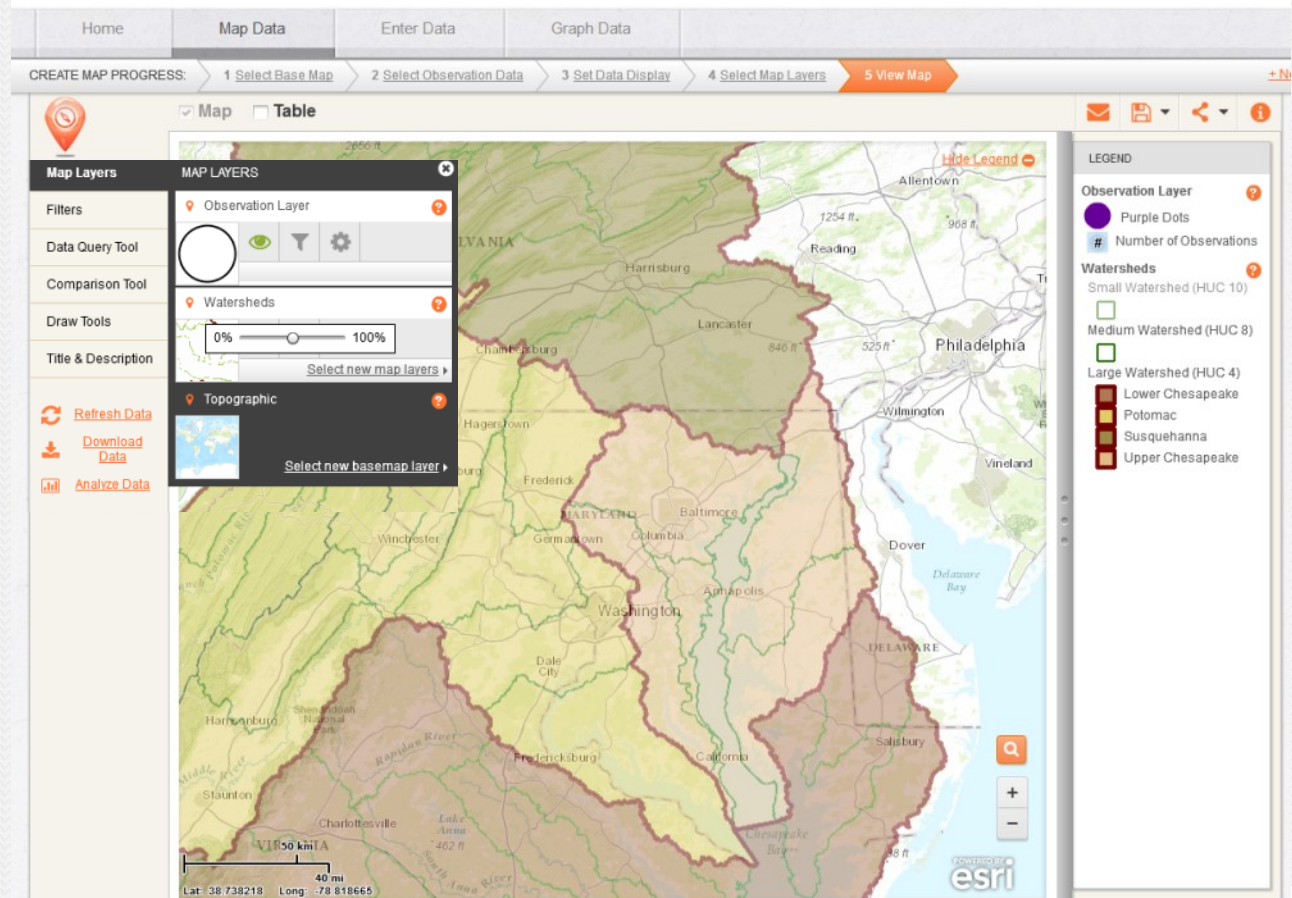
- Boundaries:** Contains 'County Boundaries' and 'MBSS Catchments'. The 'Watersheds' layer is highlighted with a green box and has an 'Added' status with a green checkmark.
- Physical Geography:** Contains 'Elevation' and 'Rivers & Streams'.
- Maryland Environment:** Contains 'Physiographic Provinces'.
- SELECTED LAYERS:** Shows 'Watersheds' as the top layer and 'Select bottom layer' as the bottom layer.
- INCLUDED LAYERS:** Shows 'Observation Layer' with a description: 'Participant Water Quality Data: This data comes from schools, ri...'
- BASE MAP:** Shows 'BASE MAP' with a description: 'This map includes a view of terrain with an overlay of forested and built...'
- SELECTED MAP VIEW:** Displays a map preview showing the Chesapeake Bay Watershed boundaries.

At the bottom, there are 'Previous' and 'NEXT' buttons.



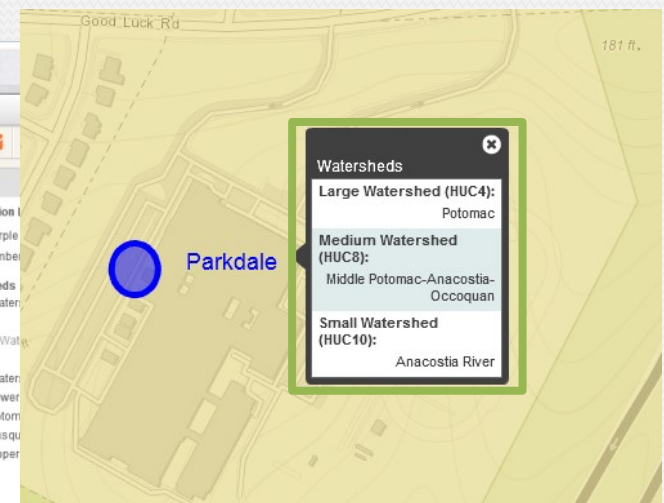
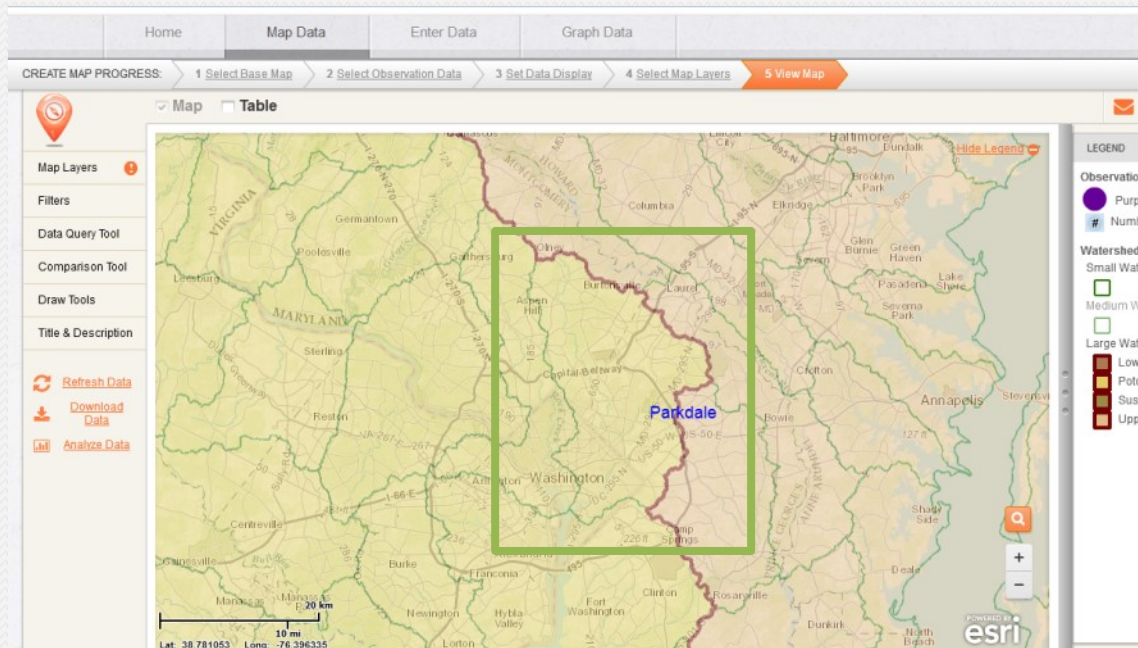
D. Adjust the **Transparency** settings to the **Watersheds** layer so you can see the map underneath.

Adjust the transparency to **50%** to start.



E. Click on your school's location to find out what watershed you are in. A popup should appear.

- What watershed are you in?
- Explore the watershed boundaries. What do they mean?
- In this example, Parkdale High School is in the Anacostia River Watershed. This means that, when it rains, all the rain water in this area will flow down slope and eventually make its way into the Anacostia River, carrying any trash and pollutants with it.



3. Rivers and Streams Layer

Now you will observe the Rivers and Streams layer on your map. This layer will show you streams in your watershed. You will be able to locate and determine your local stream.

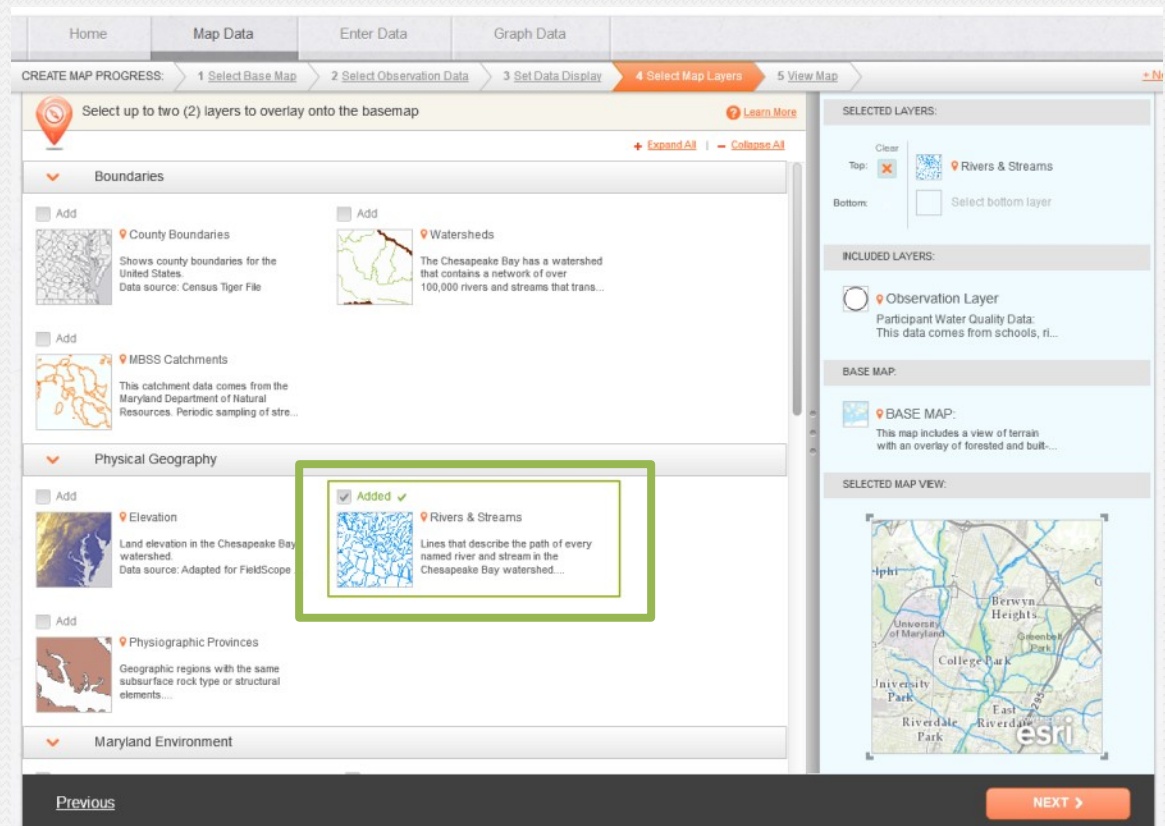
Add the “**Rivers and Streams**” layer to your map.

A. Click on “**Select Map Layers**”

B. Uncheck the “**Watersheds**” layer box to remove it from your map.

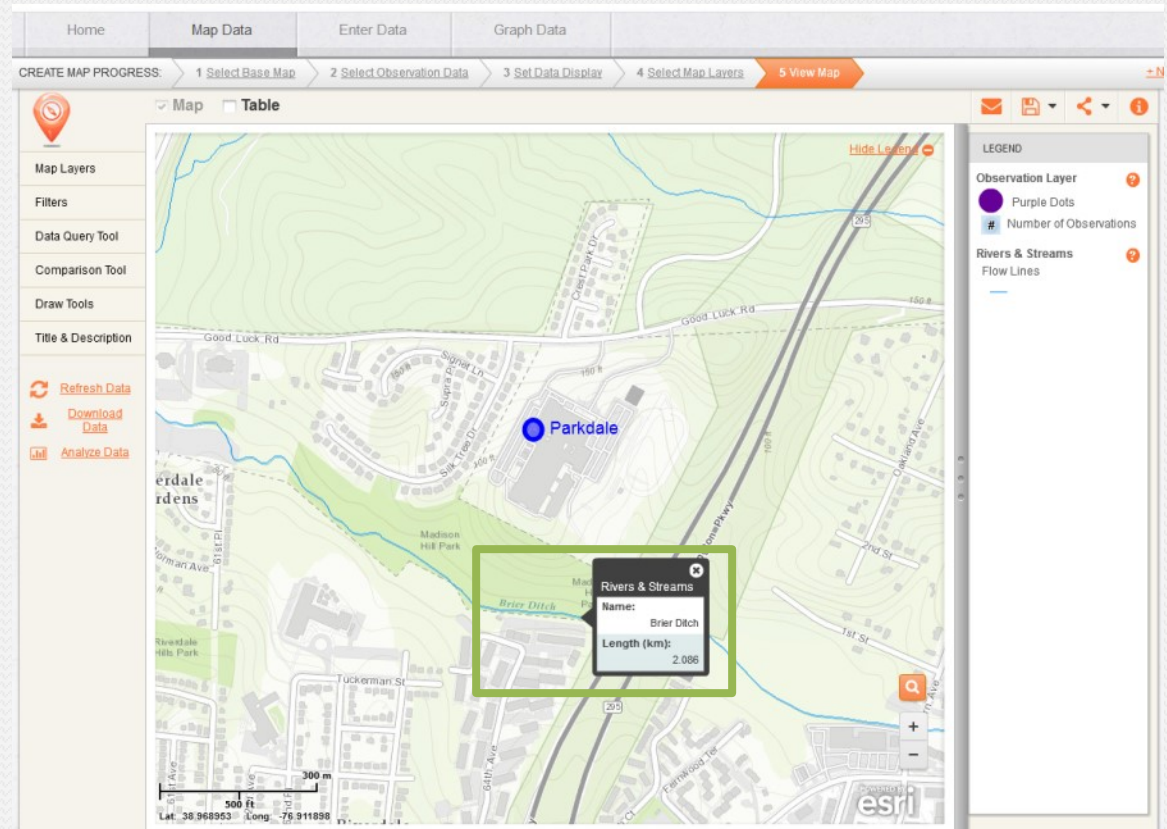
C. Check the “**Rivers and Streams**” layer box to add it to your map.

D. Click “**Next**” to view your map.



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

- Click on any stream to view more information.
- What streams are closest to your school? How far away are they? (Use the Measure Tool)
- What do you think the quality of the stream is? Why?



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.

- A. Click on “Select Map Layers”
- B. Uncheck the “Rivers and Streams” layer box to remove it from your map.
- C. Check the “Land Cover” layer box to add it to your map.
- D. Click “Next” to view your map.

** Remember to adjust the transparency settings, if needed.*

The screenshot shows the 'Select Map Layers' step in a map creation process. The top navigation bar includes 'Home', 'Map Data', 'Enter Data', 'Graph Data', and 'View Map'. The 'Map Data' tab is active, and the '4 Select Map Layers' step is highlighted in the progress bar. The main area displays a grid of map layers with checkboxes. The 'Land Cover' layer is checked and highlighted with a green box. The 'Rivers and Streams' layer is unchecked. The 'Next' button is visible at the bottom right.

Home | Map Data | Enter Data | Graph Data | View Map

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

Select up to two (2) layers to overlay onto the basemap [Learn More](#)

[Expand All](#) | [Collapse All](#)

☐ Add Forest Buffers
Forested areas within 100 foot buffer of a stream or waterbody.

☐ Add Sea-Level Affecting Marshes Model
In order to better understand the impacts sea level rise may have on Maryland's coastal marsh system, the...

☐ Add Historical Shorelines
This data layer shows shoreline position at several points in time, dating from 1841 to 1998 covering the coast...

☐ Add Hydrology
Water features for the State of Maryland.

☒ Added Land Cover
The physical material at the surface of the earth (includes grass, asphalt, trees, bare ground, water)...

☐ Add Impermeability
The percentage of land area that is unable to absorb rainfall.
Data source: MRLC National Land Cov...

☐ Add Impervious Surfaces
Areas that are completely impervious to water versus those where at least some water soaks in...

☐ Add Sea Level Rise Vulnerability
The purpose of this map service is to show inundation areas of Maryland's coastal counties in the event of sea l...

☐ Add Stream Health
This map service contains data on the health of Maryland streams as well as stream sampling locations.

☐ Add Stream Reaches
Stream reaches are portions of a stream selected for monitoring. This data layer represents the locations of...

SELECTED LAYERS:

Clear

Top: ☒ Land Cover

Bottom: ☐ Select bottom layer

INCLUDED LAYERS:

☐ Observation Layer
Participant Water Quality Data:
This data comes from schools, ri...

BASE MAP:

☒ BASE MAP:
This map includes a view of terrain with an overlay of forested and built...

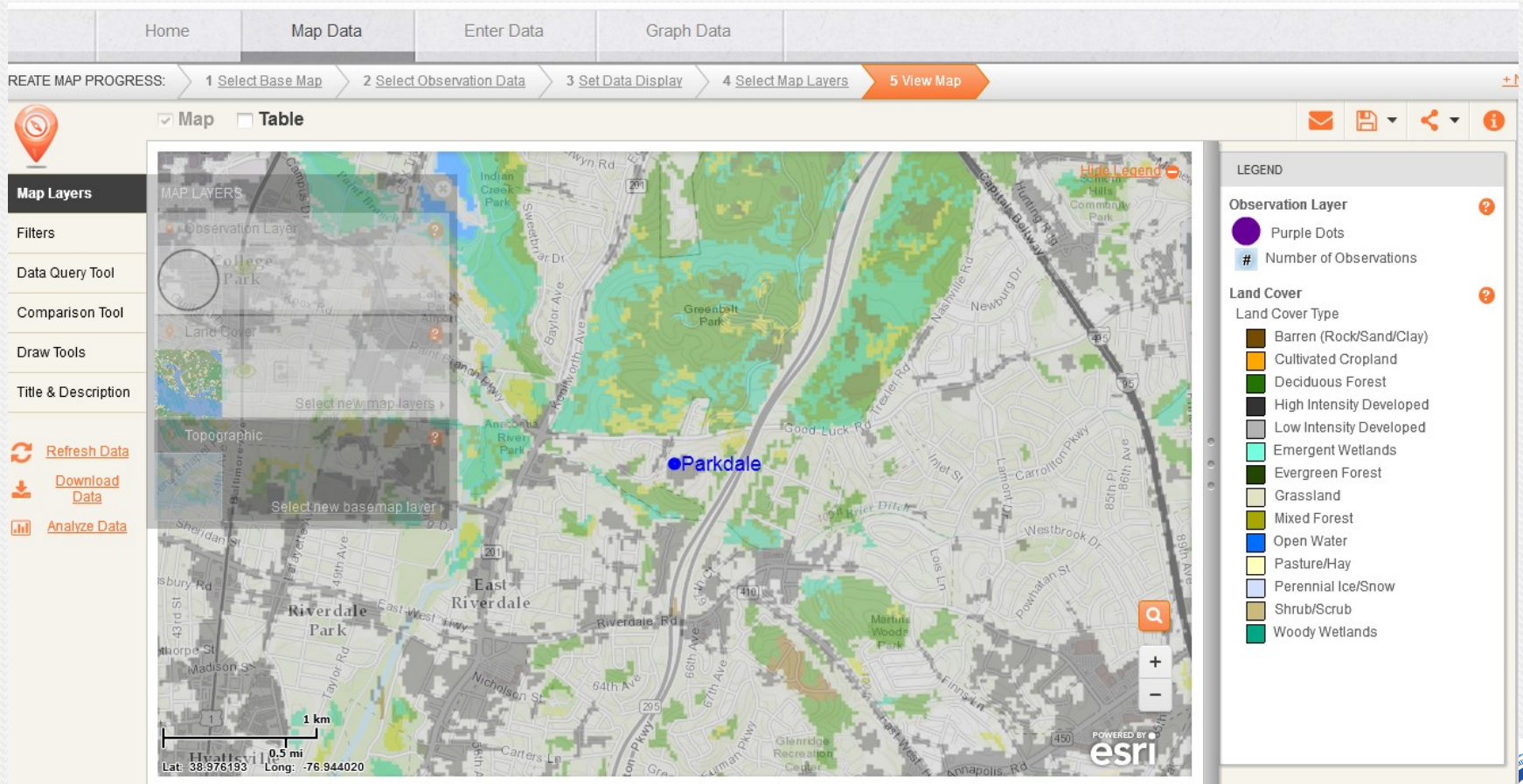
SELECTED MAP VIEW:

POWERED BY esri

Previous [NEXT](#)



E. Click on any location to see what the land cover type is. Refer to the legend.



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.

Add the **Impervious Surfaces** layer to your map.

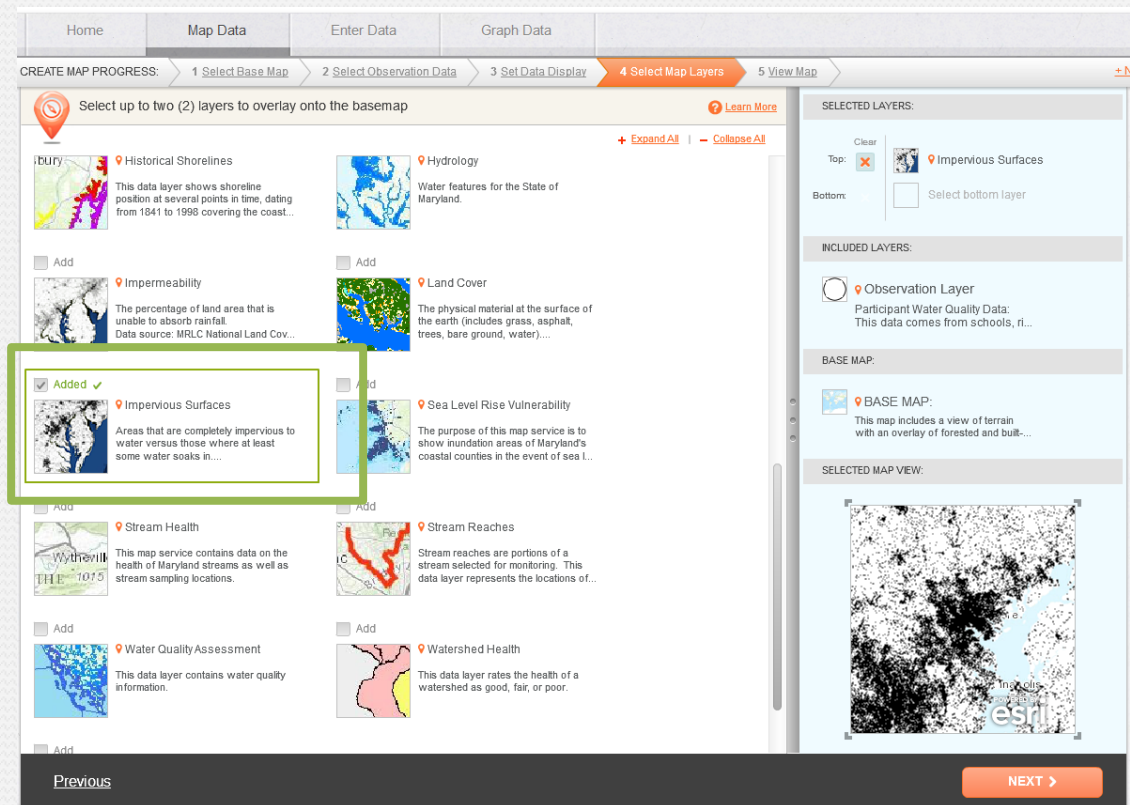
A. Click on “**Select Map Layers**”

B. Uncheck the “**Land Cover**” layer box to remove it from your map.

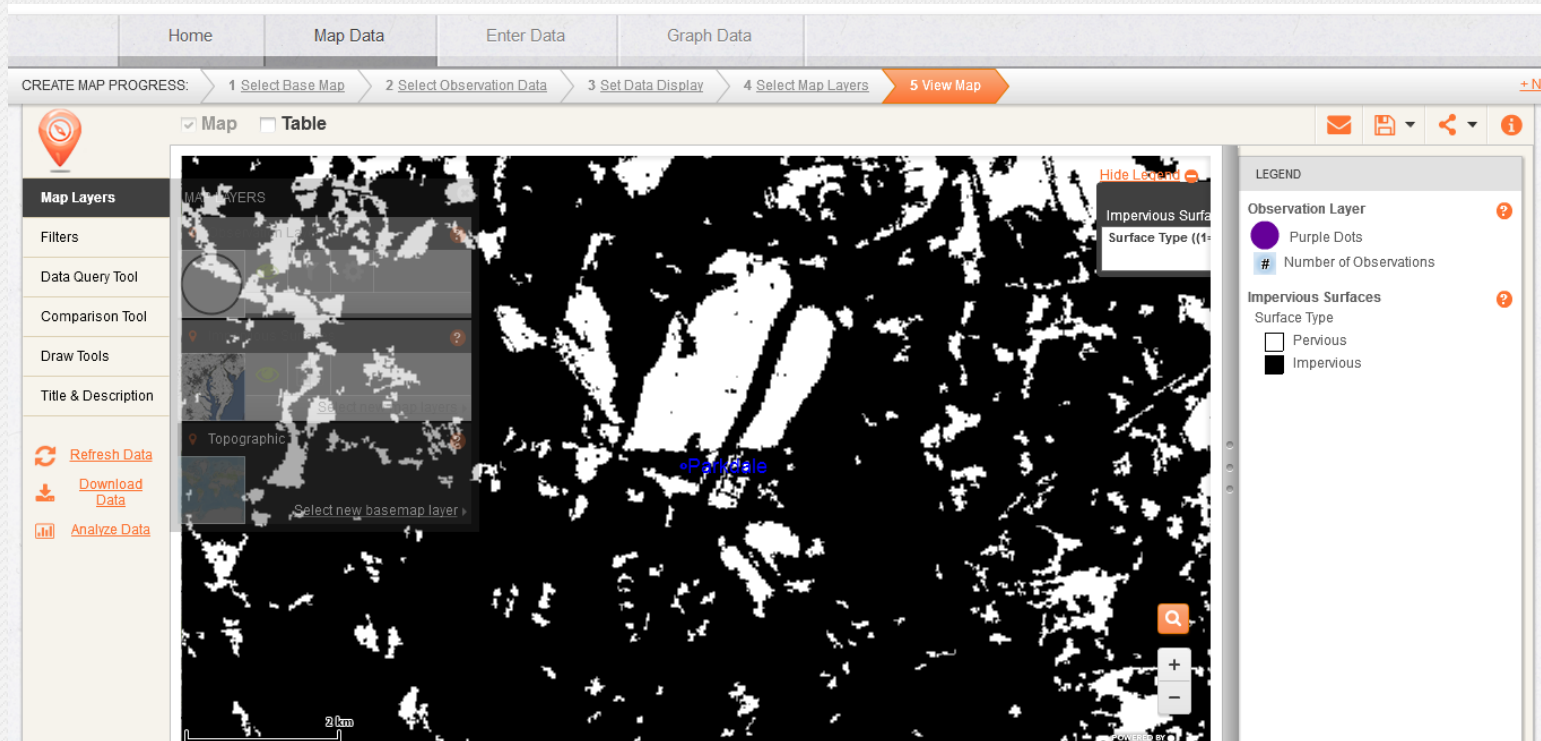
C. Check the “**Impervious Surfaces**” layer box to add it to your map.

D. Click “**Next**” to view your map.

** Remember to adjust the transparency settings, if needed.*



- i. Generally, where do you find the greatest amount of impervious surfaces?
- ii. How do you think the stream health is affected by the types of land cover and the amount of impervious surfaces in your watershed?

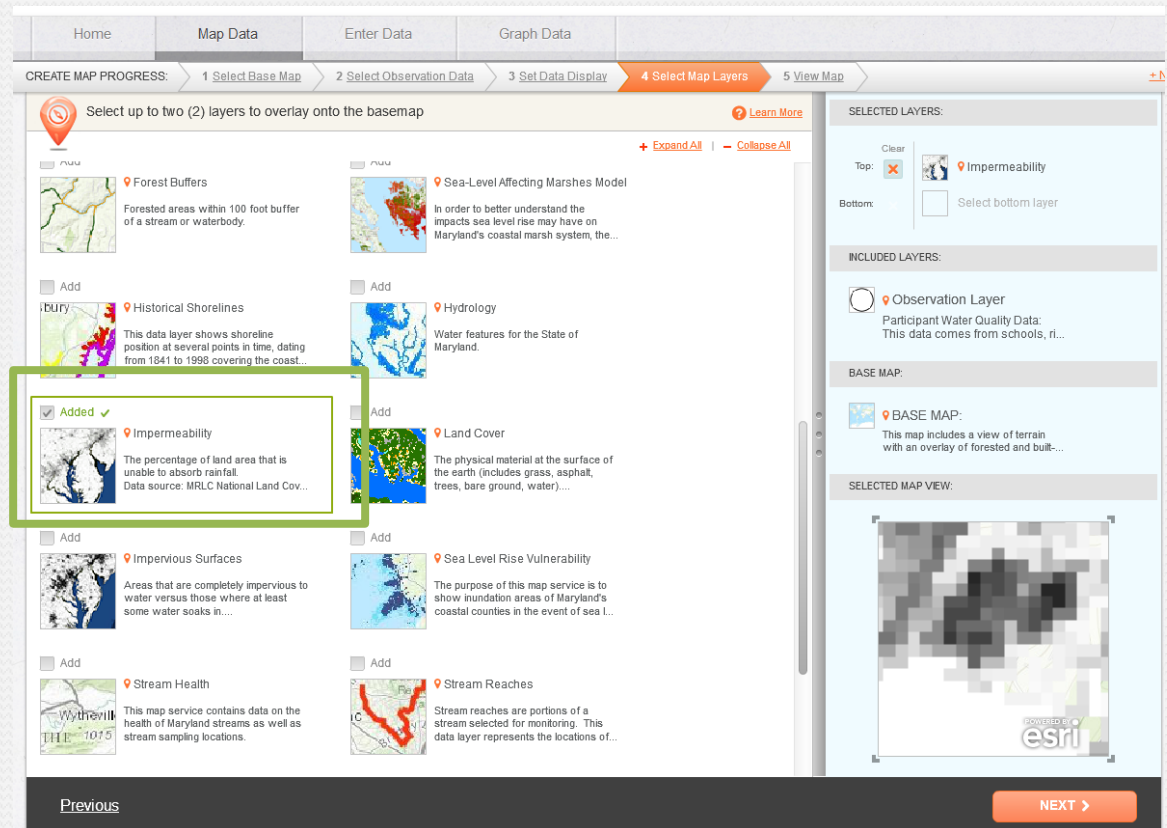


6. Impermeability Layer

Now you will observe Impermeability layer on your map. This layer shows the percentage of land area that is unable to absorb rainfall. You will be able to see the percent of impervious surfaces in specific locations.

Add the **Impermeability** layer to your map.

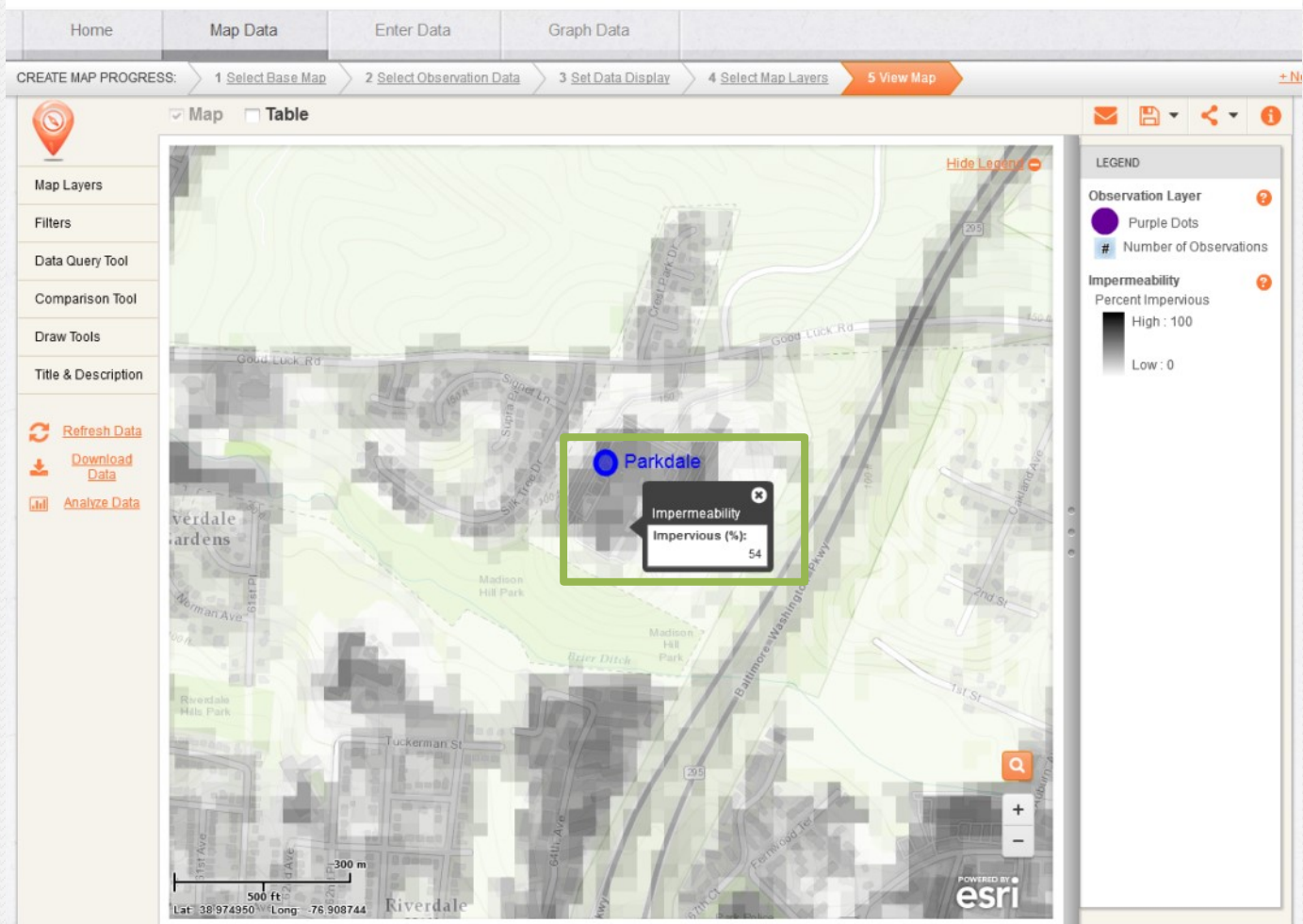
- A. Click on “**Select Map Layers**”
- B. Uncheck the “**Impervious Surfaces**” layer box to remove it from your map.
- C. Check the “**Impermeability**” layer box to add it to your map.
- D. Click “**Next**” to view your map.



* Remember to adjust the transparency settings, if needed.



- Click on any location to see the percent impervious.

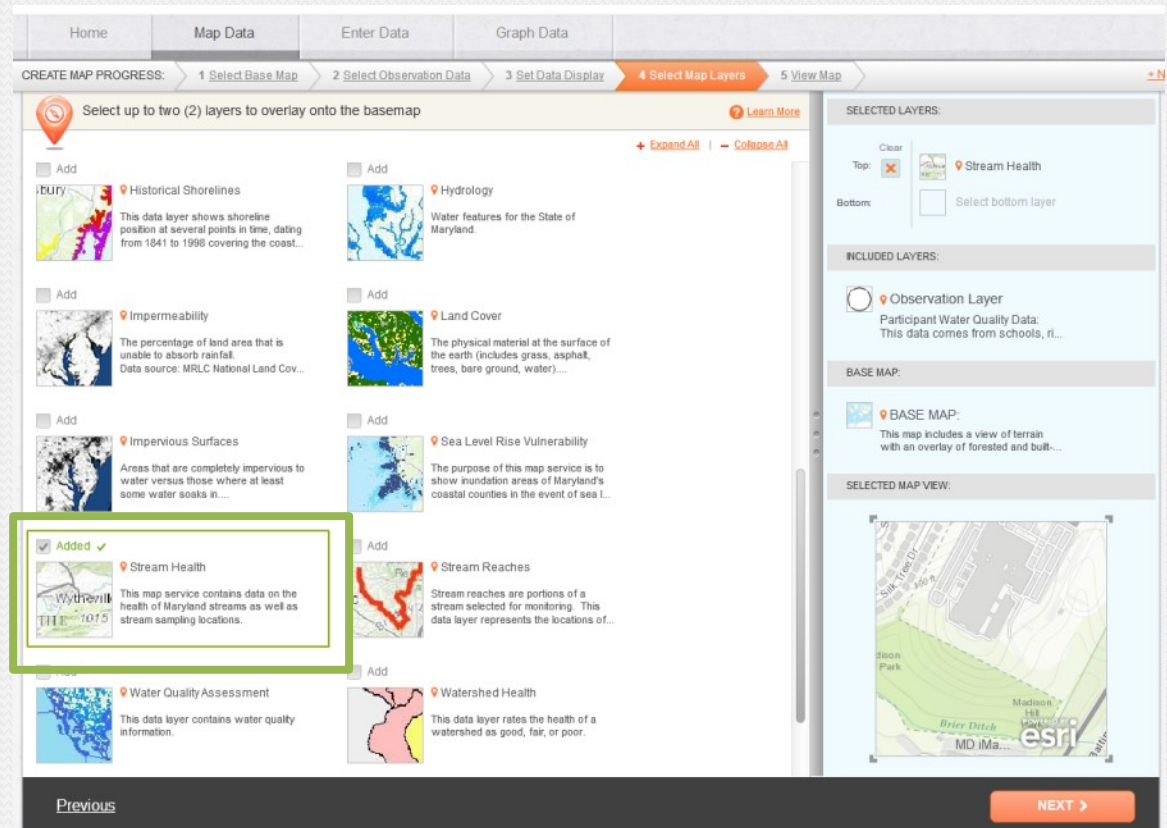


7. Stream Health Layer

Now you will observe Stream Health on your map. This layer shows the results of stream sampling done by the Maryland Department of Natural Resources.

Add the **Stream Health** layer to your map.

- A. Click on “**Select Map Layers**”
- B. Uncheck the “**Impermeability**” layer box to remove it from your map.
- C. Check the “**Stream Health**” layer box to add it to your map.
- D. Click “**Next**” to view your map.



* Remember to adjust the transparency settings, if needed.



- i. What do you observe?
1. Is there any data for your local stream?

