

## Freshwater Rivers & Streams Module

### Rivers & Streams Water Quality Section

#### DESCRIPTION

This section provides information on the amount of nutrients and sediment at the water quality monitoring stations throughout the watershed that are part of the Chesapeake Bay Program Non-tidal Water Quality Monitoring Program. Water quality monitoring data are provided as annual amounts (loads), loads normalized by watershed size (yields), and trends over time that account for stream flow (flow-normalized). Watershed size and land cover/land use is also provided for each monitoring station.

#### INTENDED USES

- Learn the status of nutrient and sediment levels in streams and rivers in your area of interest.
- Identify changes over time (trends) in nutrient and sediment levels in streams and rivers. Estimated trends can potentially identify changes in water quality due to management actions, or areas where more information is needed.
- Assess progress by determining if nutrient and sediment conditions are improving or degrading.
- Target or prioritize watersheds for restoration efforts.
- Understand important drivers of water quality such as watershed characteristics like size and land-cover/land-use. Larger watersheds typically have streams with higher amounts of nutrients and sediment. Land cover/land use is an important driver of water quality.

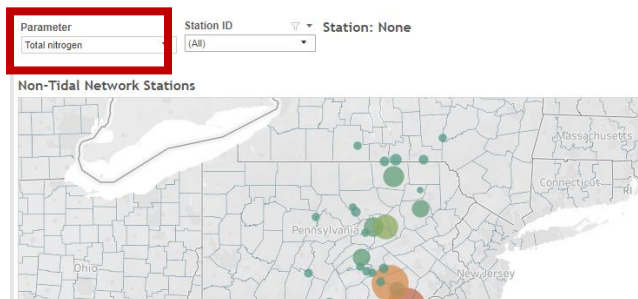
#### VIEWING THE TOOL

Depending on screen resolution, you may need to scroll vertically or horizontally to view the entire tool. Depending on browser, the scrollbars on the right and bottom may be difficult to see until you hover your mouse over them.

You may open the tool in its own window outside of the dashboard by [clicking here](#). You may still need to scroll horizontally to view the entire tool. If you have opened the tool in its own window, you may need to scroll to the bottom of the tool to view the horizontal scrollbar.

#### HOW TO USE THE TOOL

**Choose a parameter of interest** from the drop-down menu. This menu is either above the map or at the top right depending on screen resolution.



OR

Chesapeake Bay Program

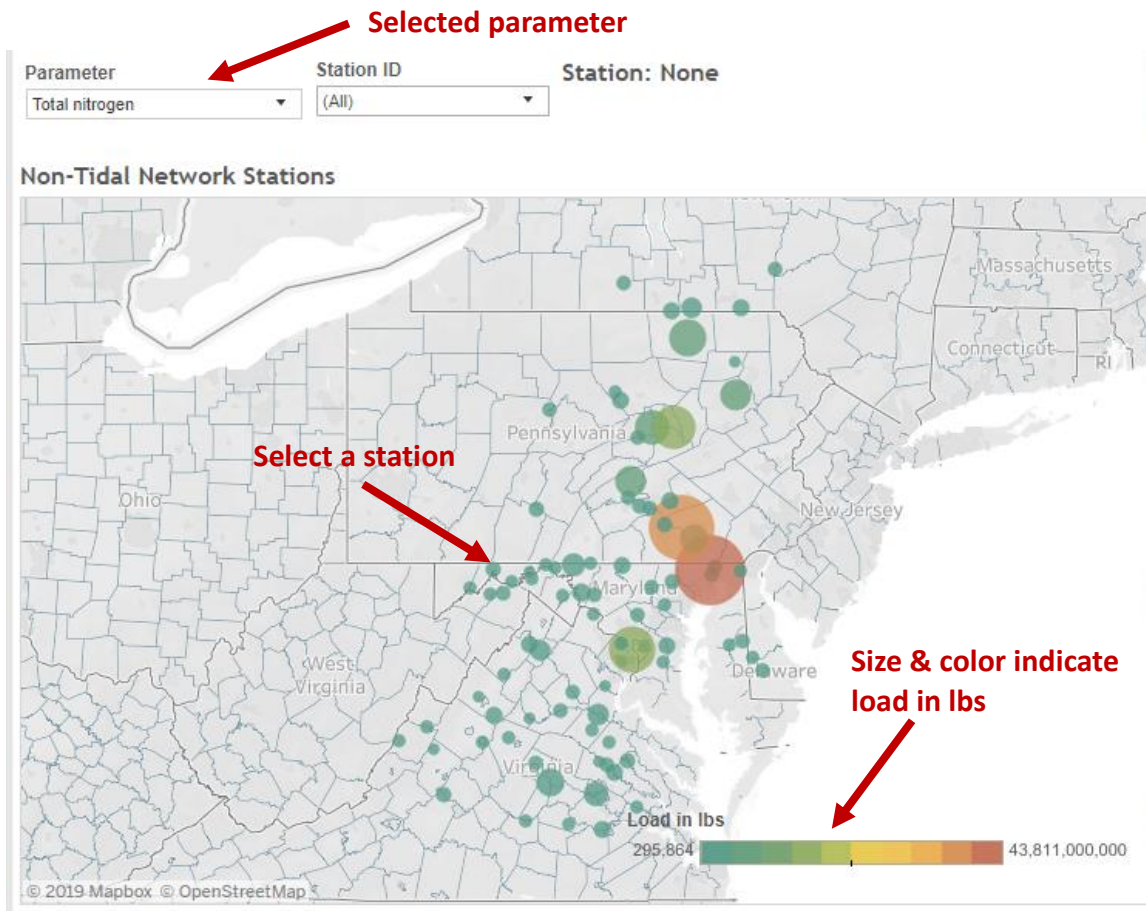
Parameter  
Total nitrogen

Station ID  
(All)

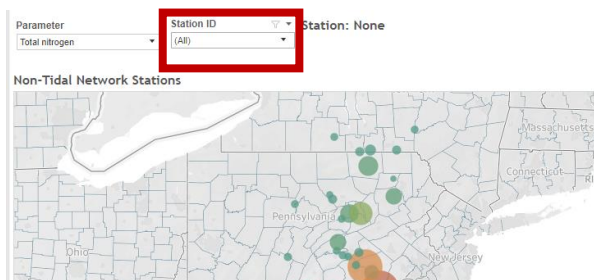
Station: None

Annual Load

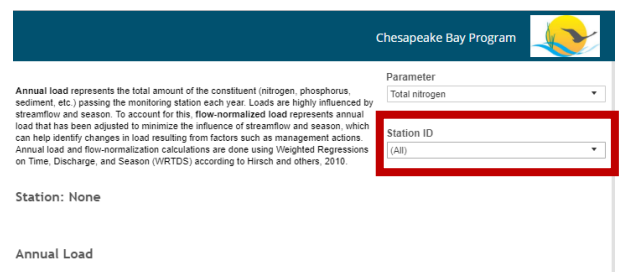
The **main map** displays all water quality monitoring stations. The color and size of the dots represent the quantity of annual load measured in pounds at that station for the parameter you have selected.

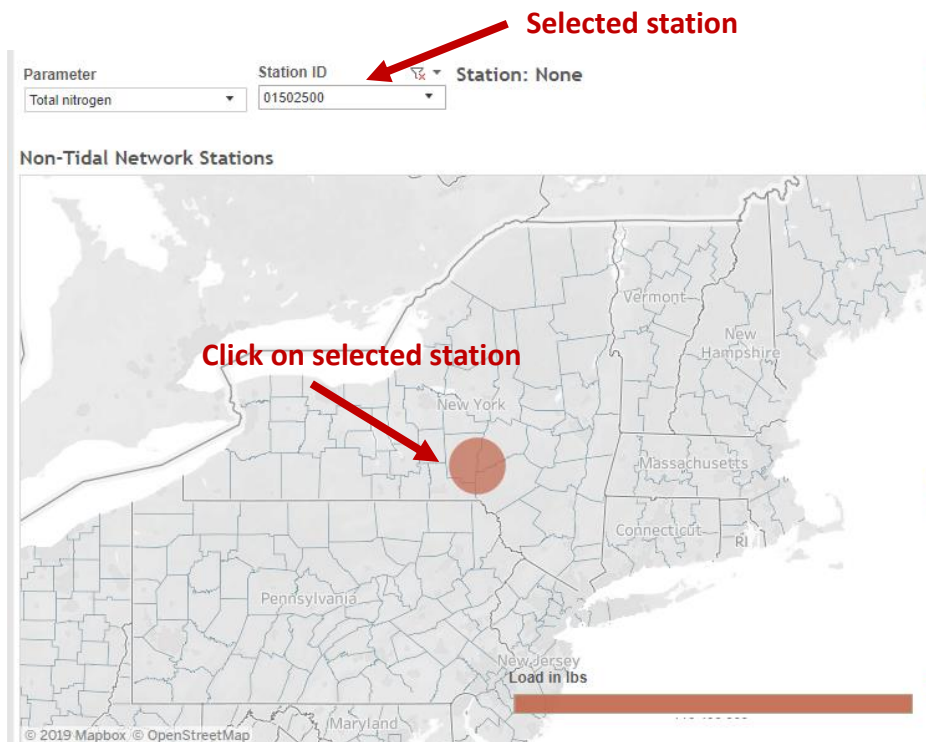


You can also select a station by using the drop-down Station ID menu. If you use this option, you will need to click on the station dot on the map to pull up content.



OR

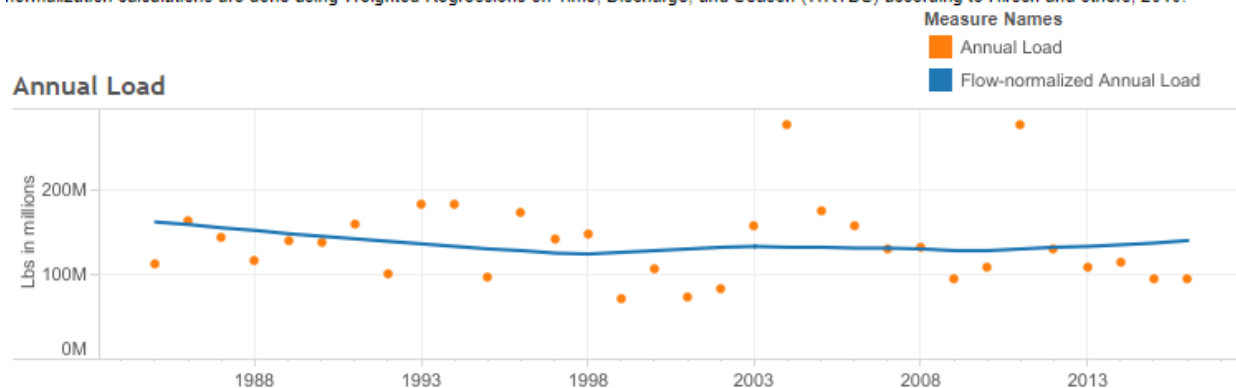




Once you have selected a station, the remainder of the tool will populate information about that particular station. The upper right panels provide information on **annual loads, long-term (if available) and short-term trends, and average 5-year and 10-year yields (lbs/acre)**. The lower panels display a **map of the watershed** that drains to the monitoring station you have selected, and **land-cover information** for that particular watershed.

**Annual loads:** The upper graph represents annual amounts of the selected parameter (loads) over the entire time period the station has been actively monitored. Orange dots represent annual measured loads, and the blue line represents flow-normalized annual loads.

Annual load represents the total amount of the constituent (nitrogen, phosphorus, sediment, etc.) passing the monitoring station each year. Loads are highly influenced by streamflow and season. To account for this, **flow-normalized load** represents annual load that has been adjusted to minimize the influence of streamflow and season, which can help identify changes in load resulting from factors such as management actions. Annual load and flow-normalization calculations are done using **Weighted Regressions on Time, Discharge, and Season (WRTDS)** according to Hirsch and others, 2010.



**Trends:** The trends section shows trends in flow-normalized loads over time generated for the station. If a station does not have enough years of data, no trends will be available. For stations with water quality records beginning prior to 1990, Long-Term trends are computed for the entire period of record. Short Term trends are computed for the most recent 10 years. For stations have records beginning after 1990, only the Short-Term trends are computed. Trends are calculated according to Hirsch and others, 2015. Green represents an improving trend, red a degrading trend, and white no trend.

## Trends (Long Term)

		Long Term
1985	2016	Improving

## Trends (Short Term)

		Short Term
2007	2016	Degrading

**Yields:** This section provides the mean yields at the monitoring station. Yield represents the annual load per acre of watershed of the monitoring station selected. Mean yields represent the average annual yield over 5- or 10-year periods. The color represents high, medium or low yields compared to yields at all stations across the watershed.

Yield represents the load at a monitoring station divided by the acres of watershed draining to that station. Mean yield represents the average annual yield over 5- or 10-year periods. This facilitates comparison of loads between monitoring sites with watersheds of different sizes.

## 5-Year mean Yield (2012-2016)

		Total Nitrogen (lbs/acre)
2012	2016	6.250

## 10-Year mean Yield (2007-2016)

		Total Nitrogen (lbs/acre)
2007	2016	7.410

**Color legend**

Yield Color: (yields in pounds per acre)

Lower Yields Medium Yields Higher Yields

**Watershed map:** The map on the lower left panel displays the watershed draining into the monitoring station you have selected. This watershed is also called a catchment.

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Station Catchment Area



## QUICK GUIDE

**Land-cover information:** The table in the bottom right panel provides information on the percent of different types of land covers within the watershed of the monitoring station you have selected. You may have to scroll within this table to view all land-cover types. The vertical scrollbar is on the right side of the table. The total size of the watershed is provided in square miles below the land-cover table.

**Scrollbar**

Catchment Area Land Cover	% Total Area by Type
Barren Land	0.35
Cultivated Crops	10.14
Deciduous Forest	46.32
Developed, High Intensity	0.31
Developed, Low Intensity	1.98
Developed, Medium Intensity	0.80
Developed, Open Space	5.14
Emergent Herbaceous Wetlands	0.39
Evergreen Forest	4.74

National Land Cover Data 2011

Catchment Total Area: 27,090 sq mi

**Watershed size**

Water quality in streams is strongly tied to the land use and land cover of the watershed. The table on the left provides the land cover of the watershed draining into the selected water quality monitoring station. For descriptions of the land cover types, please see the National Land Cover Dataset 2011.

## KEY TERMS

**Non-tidal:** relating to freshwater rivers and streams in the watershed, as opposed to portions of rivers and streams closer to the Bay that are directly influenced by the tidal Chesapeake Bay waters.

**Annual load:** total amount of the parameter of interest (e.g. nitrogen, phosphorus, etc.) passing the monitoring station each year. Loads are highly influenced by the flow of water in the stream and the season. Annual loads are calculated using Weighted Regression on Time, Discharge and Season (WRTDS) according to Hirsch and others, 2010.

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**Flow-normalized load:** flow-normalized loads adjust annual loads to minimize the influence of streamflow and season, which can help identify changes in load resulting from factors such as management actions. Flow-normalized load represents the theoretical annual loads that would have been measured if the streamflow had been the same as the long-term average. Flow-normalized load calculations are done using Weighted Regression on Time, Discharge and Season (WRTDS) according to Hirsch and others, 2010.

**Trend:** changes in loads over time as determined by statistical methods. Trends can be calculated for long-term time periods over the entire history of the monitoring station, or over short-term periods within the last 10 years of the monitoring station's history.

**Yield:** load divided by the size of watershed of the monitoring station in acres.