



Land Use and the Chesapeake Bay

Virginia GeoInquiry Collection

SCIENCE

Target Audience – MS and HS Science

Time required – 15 minutes

Activity	Explore the effects of land use on water quality in the Chesapeake Bay.
Virginia Standards of Learning	<p>SCI 6.8– Investigate and understand that land and water have roles in watershed systems.</p> <ul style="list-style-type: none">c) The Chesapeake Bay is an estuary that has many important functions; andd) natural processes, human activities, and biotic and abiotic factors influence the health of a watershed system. <p>ES.8 Investigate and understand that freshwater resources influence and are influenced by geologic process and activities of humans</p> <ul style="list-style-type: none">e) stream processes and dynamics impact the major watershed systems in Virginia including the Chesapeake Bay and its tributaries.
Learning Outcomes	<p>Students will be able to</p> <ul style="list-style-type: none">• Describe the location and size of the Chesapeake Bay.• Predict the influence of several factors, impervious surfaces, volume of water, vegetation and cropland, on water quality in the Bay.• Apply scientific and engineering practices by interpreting, analyzing and evaluating data.

MAP URL: [Virginia GeoInquiry/6](https://arcg.is/1K0K5S) <https://arcg.is/1K0K5S>

Engage

Where is the Chesapeake Bay region?

- ➔ Click the link above to launch the map.
- ? How many states are included in the Chesapeake Bay watershed? (*six, plus the District of Columbia*)
- ? Which states in the watershed do not border the Chesapeake Bay? (*New York, Pennsylvania, Delaware, West Virginia*)
- ➔ With the Details button underlined, click the button, Show Contents of Map (Content). Uncheck the Chesapeake Bay Watershed by State layer.
- ➔ Click on Bookmarks and choose Marker 1: Havre de Grace, and then read the Map Note. (*See Tooltip next page*)
- ? What river flows into the Chesapeake Bay here? (*Susquehanna*)
- ? Why do you think this river is important to the Chesapeake Bay? (*largest source of freshwater runoff*)

Explore

How big is the Chesapeake Bay?

- ➔ Use the measure tool to measure across the mouth of the river near Marker 1. (*See ToolTip on next page*)
- ? How far is it from shore to shore at this part of the Chesapeake Bay? (*~one mile*)
- ➔ Turn off the USA Topo layer.
- ➔ Click on Bookmarks and choose the Mouth of the Bay bookmark.
- ? How far is it across the mouth of the Chesapeake Bay between markers 2 and 3? (*~13 miles*)
- ? How far is the distance using the Chesapeake Bay Bridge tunnel? (*~16 miles*)
- ? What is the water area of the Chesapeake Bay? Hint: measure tool, area. (*~3,769 sq. miles*)
- ? How do you think the size of the Bay would affect its ability to disperse pollutants? (*smaller bodies of water are less likely to disperse pollutants*)

Explain

How does landcover vary throughout the region?

- ➔ Turn on the World Imagery (Clarity) layer. Use the bookmarks to zoom to each marker.
- ➔ Toggle between the USA Topo map and the Imagery. Note: the topo map is not as recent as the imagery.
- ? What do you observe at each of the markers? (*Marker 1: large settlement on the western bank of the river, farms along the Bay; Marker 2: sandy shore and buildings with paved lots; Marker 3: north/south highway, open land to the south, farms to the north*)
- As a general rule, natural bodies of water do not follow straight lines.
- ? What is the body of water near marker 3? (*Virginia Inside Passage*) What do you think is its purpose? (*create a shorter route and shelter ships from ocean*)

Elaborate

How does land use affect runoff into the Bay?

- Turn on the Chesapeake Bay Land Cover layer. Click on the layer's name and select the legend symbol. Examine the land cover at the markers and at other locations of your choice
- Water cannot pass through an impervious surface such as cement and asphalt.
- ? How do you think impervious surfaces affect drainage? (*water cannot percolate, flows into nearby streams*)
- ? How would barren land affect runoff into the Chesapeake Bay? (*increase runoff, vegetation prevents erosion*)

Evaluate

Why are sustainable farming practices important?

- ➔ Have only the Chesapeake Bay Watershed by State layer turned on. Click on each state and examine the pop-ups.
- ? Which land use is predominant in most states? (*forests*) Second most prominent? (*cultivated cropland*)
- ? How could cultivated cropland affect the Bay? (*runoff from fertilizers, herbicides, pesticides, etc.*)
- ➔ Turn on the % Cultivated Land by County and Virginia Rivers layers, and turn off all other layers.
- ? How would the location of the cultivated areas affect plans to clean the Bay? (*areas away from the Bay do not directly observe the effects of their actions*)

SEARCH BOX

- In the place name search box, type the place's name.
- Click the magnifying glass.
- The map will zoom to the location (you can zoom in and out as needed.)

IDENTIFY A MAP FEATURE

- Click a feature on the map, and a pop-up window will open with information.
- Links and images in the pop-up are often clickable.
- An arrow icon in the upper right of the window indicates that multiple features are available.
- Click the arrow to scroll through the features.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to U.S. public, private, and home schools as a part of the White House ConnectED Initiative. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://connected.esri.com>.

THEN TRY THIS . . .

- ▲ Research sources of runoff into the Chesapeake Bay. Create a Story Map to communicate information and suggest possible solutions.

Learn more about Virginia's people and places in the *Atlas of Virginia*. 3rd edition.

Send feedback to: vageoinquiries@gmail.com

Additional materials at <https://php/radford.edu/~vga>



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