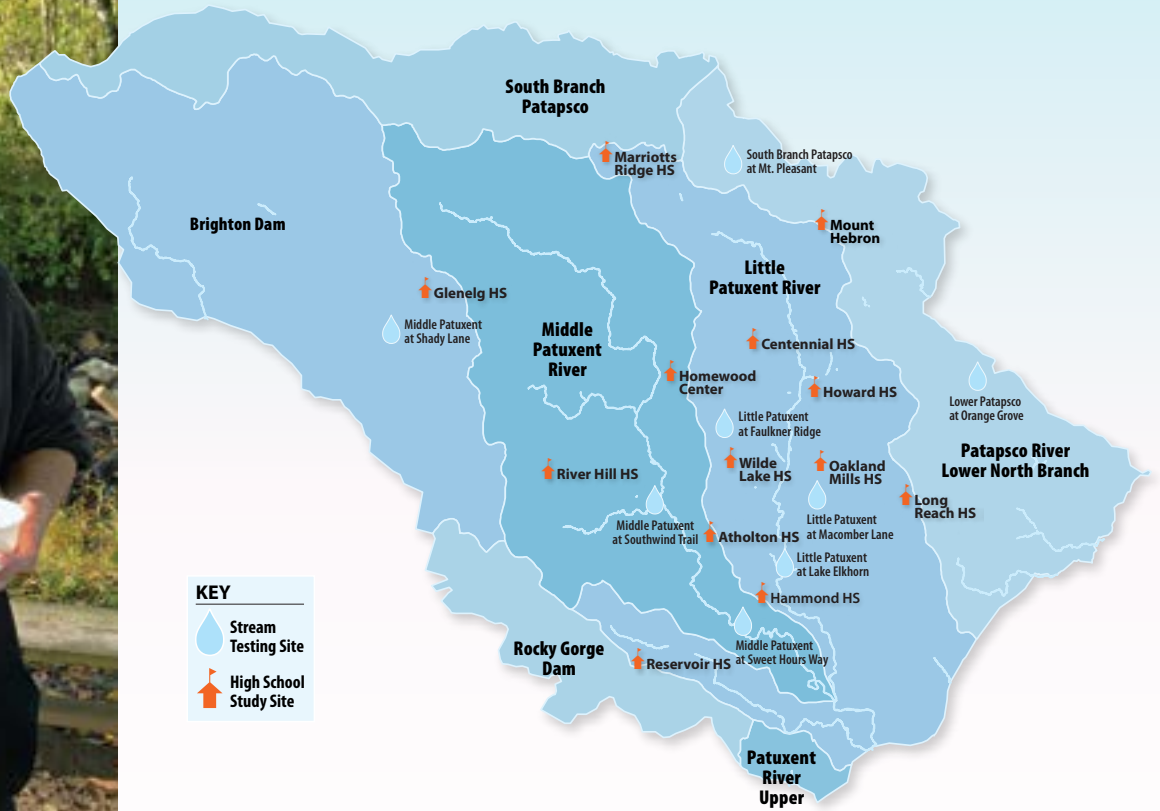




# Student Scientists in Action



**KEY**

-  Stream Testing Site
-  High School Study Site

## ABOUT THE PROGRAM

The [Watershed Report Card program](#) was designed to provide a systemic opportunity for Howard County Public School 9th grade students to participate in a Meaningful Watershed Educational Experience (MWEE). Despite the obvious difficulties with virtual learning due to the pandemic, this year all students had access to data collected at their local stream. Some students went directly to the streams to collect data, while others viewed videos created specifically to capture the data and the experience. Please see the introduction to the program with a HCPSS Science

teacher talking to her students as they were set to embark on a [video stream](#) field experience. This year, more than 5,000 Earth Space Science students and Biology students participated in this project. This experience provides an opportunity for students to engage in an authentic and meaningful exploration of their local watershed. Students have been collecting data at these stream sites for several years. [View](#) the data collected by our students since 2016 on the Chesapeake Commons Water Reporter map.

**2020 STREAM GRADE: C+**

### STREAMS

- Significant erosion along stream banks throughout the county
- High nitrate values found in many streams
- Adding a native plant buffer along streams would improve stream quality

## STREAM QUALITY OF STREAMS STUDIED

South Branch Patapsco at Mt. Pleasant	<div style="width: 100%; height: 10px; background-color: #c00000; color: white; text-align: center; font-weight: bold;">POOR</div>	Little Patuxent at Faulkner Ridge	<div style="width: 100%; height: 10px; background-color: #c00000; color: white; text-align: center; font-weight: bold;">POOR</div>
Patapsco River at Orange Grove	<div style="width: 100%; height: 10px; background-color: #808000; color: white; text-align: center; font-weight: bold;">MODERATE</div>	Middle Patuxent at Shady Lane	<div style="width: 100%; height: 10px; background-color: #808000; color: white; text-align: center; font-weight: bold;">MODERATE</div>
Little Patuxent at Lake Elkhorn	<div style="width: 100%; height: 10px; background-color: #c00000; color: white; text-align: center; font-weight: bold;">POOR</div>	Middle Patuxent at Southwind Trail	<div style="width: 100%; height: 10px; background-color: #808000; color: white; text-align: center; font-weight: bold;">MODERATE</div>
Little Patuxent at Macomber Lane	<div style="width: 100%; height: 10px; background-color: #c00000; color: white; text-align: center; font-weight: bold;">POOR</div>	Middle Patuxent at Sweet Hours Way	<div style="width: 100%; height: 10px; background-color: #c00000; color: white; text-align: center; font-weight: bold;">POOR</div>

# SENSITIVE MACROINVERTEBRATE CHART

	<a href="#">Casemaker Caddisfly Video</a>	<a href="#">Mayfly Video</a>	<a href="#">Stonefly Photo</a>	<a href="#">Water Penny Photo</a>	<a href="#">Hellgrammite Video</a>
	Casemaker Caddisflies	Mayflies	Stoneflies	Water Pennies	Hellgrammites
<b>South Branch Patapsco</b> at Mt. Pleasant		◆			
<b>Patapsco River</b> at Orange Grove		◆			◆
<b>Little Patuxent</b> at Lake Elkhorn	◆				
<b>Little Patuxent</b> at Macomber Lane					
<b>Little Patuxent</b> at Faulkner Ridge					
<b>Middle Patuxent</b> at Shady Lane		◆		◆	
<b>Middle Patuxent</b> at Southwind Trail		◆			◆
<b>Middle Patuxent</b> at Sweet Hours Way	◆	◆			◆

Macroinvertebrates are often used in studies to determine the water quality due to their known pollution tolerances, limited mobility and dependence on the land environment around the stream. The sensitive macroinvertebrates are of particular importance because they do not tolerate high levels of pollution. At each stream site, [students searched in riffles](#), runs and pools, under cobbles and leaf matter, and through root wads using D-Nets to find a variety of macroinvertebrates.





## STREAM FEEDBACK

### South Branch Patapsco at Mt. Pleasant

- Eroded areas cause sediment to be picked up by runoff
- A few benthic macroinvertebrates present
- High conductivity values

### Patapsco at Orange Grove

- Stream bank erosion, most notable on south side
- Elevated conductivity levels
- Litter found along stream bank

### Little Patuxent at Lake Elkhorn

- Very high stream banks
- Low dissolved oxygen
- One sensitive macroinvertebrate found

### Little Patuxent at Macomber Lane

- Narrow riparian buffer
- High nitrates
- Extremely low biodiversity score

### Little Patuxent at Faulkner Ridge

- High nitrate values
- Very low biodiversity score
- Some floodplain vegetation

### Middle Patuxent at Shady Lane

- Moderate biodiversity score
- All combinations of velocity and depth present
- Nitrate values exceed acceptable level

### Middle Patuxent at Southwind Trail

- Excellent water clarity
- Many sensitive macroinvertebrates found
- High amounts of floodplain vegetation

### Middle Patuxent at Sweet Hours Way

- Erosion found along stream banks
- High level of nitrates
- Fair macroinvertebrate score

## STREAM RECOMMENDATIONS

### South Branch Patapsco at Mt. Pleasant Homewood & Marriotts Ridge High Schools

Protect stream banks by reinforcing stream bank buffer systems, pick up trash in and near stream.

At schools, students propose planting more native plants and trees as well as installing a rain garden.

### Patapsco at Orange Grove

#### Howard, Long Reach & Mt. Hebron High Schools

Decrease erosion by limiting channel alteration, increase size of the riparian buffer and improve public awareness about litter disposal and recycling.

In the schoolyard, decrease amount impervious surface to limit runoff.

### Little Patuxent at Lake Elkhorn Atholton High School

Increase buffer zone to incorporate more native trees and shrubs to slow the flow of water in the stream.

At school, add more low mow zones as well as expand areas of native plants.

### Little Patuxent at Macomber Lane Oakland Mills High School

Collaborate with Columbia Association to install dog waste stations along stream; provide education on reducing nitrates to the local community through community associations or social media.

### Little Patuxent at Faulkner Ridge Wilde Lake High School

Encourage residents to bag pet waste along pathways and increase riparian buffer system.

Students advocate to add more plant buffers in their schoolyard.

### Middle Patuxent at Shady Lane Glenelg High School

Plant native plants along the stream bed to decrease erosion.

Students recommend adding a rain garden with native plants to slow the flow at school.

### Middle Patuxent at Southwind Trail Centennial and River Hill High Schools

Reduce erosion by planting more trees and other native plants to secure the banks. Pick up litter.

At schools, students suggest adding rain barrels and native plantings to help slow the flow of water to their stream.

### Middle Patuxent at Sweet Hours Way Hammond and Reservoir High Schools

Planting of native plants at the edge of the river to help control stream bank erosion.

Students suggested incorporating rain gardens, native plants and less impervious surfaces in their schoolyard to support their stream health.



PHOTO BY MARK WINTER

**THANK YOU  
TO THE  
FOLLOWING FOR  
CONTRIBUTING  
COUNTLESS HOURS**

HCPSS Earth Space Systems Science and  
Biology Gifted and Talented teachers

Conservancy Volunteer Naturalists

HCPSS Secondary Science Office

**THANK YOU  
TO OUR PARTNERS**

