WEST & RIVERS RHODE RIVERS REPORT CARD

April 2011



MESSAGE THE RIVERKEEPER®

To best relate the status of our rivers' health, we continually improve our Report Card. This version features important new changes.

We have adjusted our sampling locations to provide better coverage for an overall assessment of each river. Also, we are using new analysis protocols developed in collaboration with the Maryland Tributary Assessment Coalition. Rather than pass/fail, several of the indicators are now graded on a scale of 1 to 5.



Sen. Fowler & Chris Trumbauer, West/Rhode Riverkeeper

Our findings are nonetheless familiar. Most indicators still do not make the grade. The worst scores are for water clarity and underwater grasses, due to too much sediment and algae.

To address these problems, in 2010 we constructed two stormwater rain gardens and several shoreline restorations. We also continue to advocate for sensible solutions to stormwater pollution and to enforce existing environmental protections.

There is also new hope. The EPA has begun an ambitious initiative to limit pollution entering the Chesapeake Bay's waterways. The "TMDL" sets pollution load limits and mandates that states and local jurisdictions implement plans to meet those limits. West/Rhode Riverkeeper will be involved with this effort and future efforts to improve our rivers' grades.

METHODOLOGY

Our data was collected by various partners (acknowledged on back page). Indicators were assessed only when a credible data source was available. Data was compared to thresholds established by the Maryland Tributary Assessment Coalition. Scores are reported as the percentage of data meeting attainment. For additional information, see the technical supplement on our web site.

River Health Scale Very Poor Very Good 0 20 40 60 80 100% F D C B A

INDICATOR	West River	Rhode River	GRADE AVG
Water Clarity	30%	30%	D
Dissolved Oxygen	73%	92%	Α-
Nutrients	47%	46%	С
Chlorophyll (algae)	47%	40%	C -
Underwater Grasses	0%	0%	F
Stream Health	No Data	No Data	n/a

Note: Apparent improvement over previous years' scores may be attributable to new analysis method.

SAMPLING LOCATIONS WITHIN OUR WATERSHED



DNR Tidal Stations

NOTE: Space limitations have required the use of acronyms throughout this document. These valuable contributors are referred to often:

- •SERC (Smithsonian Environmental Research Center)
- •DNR (Maryland Department of Natural Resources)



Water clarity is measured using a Secchi disk. The "Secchi depth" is the depth at which the disk is no longer visible.

This year, we assessed water clarity data using a new threshold, which was developed to better reflect the ecological heath of the water body.

Regardless of which assessment method is used, it is clear that we need significant water clarity improvements in order to promote robust underwater grass growth in our rivers.

This image from a NASA satellite shows a large sediment plume stretching from the Susquehanna River to the West and Rhode Rivers after a major rain event. This illustrates the potential for pollution from other parts of the 64,000 square mile Bay watershed to influence our water quality.

WATER CLARITY

Murky water. We have seen the rivers look like part of Willy Wonka's chocolate factory. The culprit is stormwater runoff. When it rains, the rainwater carries dirt and other pollutants into our streams, which flow to our creeks, our rivers, and ultimately the Chesapeake Bay.

This creates a problem because murky water blocks sunlight from penetrating through the water to reach underwater grasses, which need light to grow. Algae and other biological material in the water column also decrease water clarity. Large amounts of sediment have the potential to clog our waterways and change the ecosystem.

Sediment and other suspended material can come from our local area, but can also enter our rivers from other parts of the Bay. During extreme rain events, a sediment plume can stretch from the Susquehanna River to the West and Rhode Rivers.



DISSOLVED OXYGEN

In general, 2010 oxygen levels were better than the previous two years. There were several weeks during the summer that saw depressed levels throughout the West and Rhode Rivers; but overall, oxygen levels were adequate to support aquatic life. This year, oxygen receives the first "A" grade since we began grading indicators in 2009.

The reasons for the improvement are not entirely clear. One contributor may have been the weather patterns, which provided for a rather windy summer. Wind mixing, especially in shallow rivers, can prevent low oxygen conditions from becoming prevalent. Ultimately, we cannot count on the wind to keep our rivers well oxygenated. We need to address the causes of low oxygen such as excess nutrients—if we want to see sustained healthy oxygen levels.





Without enough oxygen in the water, aquatic life can become stressed or die.

Dissolved oxygen levels depend on many factors e.g., warm water can hold less oxygen than cooler water. Warm weather algal blooms can consume the available oxygen, making the summer months the most susceptible times for low oxygen levels.

To help protect against future low oxygen events, we must maximize our efforts to keep oxygen-depleting nutrient pollution out of our rivers.

Although the overall level of oxygen in the rivers was improved this year, many sampling locations did have at least one occurrence of low oxygen at some point. This graphic interpolates the minimum oxygen level for each station.

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Maryland's General Assembly passed legislation addressing nutrient pollution from residential lawns. The bill establishes better nitrogen and phosphorus standards for fertilizer applications, requires professional applicator certification, and regulates fertilizer sales.

Anne Arundel County's total land area is about 1/3 turf. Nearly 75,000 lbs/yr of total nitrogen and 8,700 lbs/yr of total phosphorus pollution is attributed to turf runoff.

Excess nutrients end up in our waterways. Better fertilizer application regulation will reduce this pollution.

Data from Dr. Tom Jordan of SERC show the concentration of total nitrogen (TN) and total phosphorus (TP) increases steadily as you move upriver.

NUTRIENTS

Controlling nutrient pollution is the key to cleaning up our rivers and the Bay. Nutrients, composed of nitrogen and phosphorus, fuel algal blooms which degrade our water quality.

Excess nitrogen and phosphorus enter our rivers from many sources. In the West and Rhode Rivers, sources include septic systems, stormwater runoff, which includes residential and agriculture runoff, and effluent from the Mayo Wastewater Treatment Plant at the mouth of the Rhode River. Additional nitrogen enters our waterways from atmospheric deposition (entering our rivers directly from air pollution) and natural sources.

Because the West and Rhode are tidal rivers connected to the Bay, nutrients can enter our rivers from faraway sources in other parts of the Bay watershed. The new Chesapeake Bay "TMDL" initiative will limit pollution in all Bay states, and force local jurisdictions, such as Anne Arundel County, to implement plans to reduce nutrient pollution. It is important that this effort be consistent across the Bay area, so that all sources—both local and regional—are addressed.



CHLOROPHYLL (ALGAE)

Microscopic phytoplankton, or algae, are an important part of our natural ecosystem. Many organisms depend on phytoplankton for food. In fact, phytoplankton are the primary food source for oysters, clams, mussels, and many fish, such as menhaden. Using sunlight, algae also produce oxygen through the process of photosynthesis.

The amount of algae in our waterways is measured by determining the concentration of chlorophyll *a*, a green pigment found in most plant life. While algae are a vital part of the ecosystem, problems arise when there is too much of it. This condition is known as an algal bloom, and occurs as the result of too much nutrient (nitrogen and phosphorus) pollution, which acts as fertilizer.

Algal blooms block light from reaching underwater grasses and consume oxygen during the dark of night when they switch from photosynthesis to respiration. When the blooms die off, their decomposition also depletes oxygen. Algal blooms are often the cause of fish kills—they may use up all the available dissolved oxygen in the water, leaving none for other aquatic life.

Reducing the amount of nutrient pollution which enters our waterways is the best way to minimize algal blooms.



Severe algal blooms are usually apparent as discolored water. Often, they may cause the water to appear a dark brown or mahogany color. It is important to take caution with exposure to waters when an algal bloom is occurring. Some algae species can even be toxic to humans.

If you suspect an algal bloom is occurring, please contact West/Rhode Riverkeeper.

You can also report it to the Maryland Department of the Environment: 800.285.8195.



Severe algal blooms can create "dead zones" and result in fish kills, like the one on Bear Neck Creek in 2008. (Photo by Joshua McKerrow, The Capital)



Last summer, West/Rhode Riverkeeper partnered with the DNR to participate in the "Grasses in Classes" program. Students at a local county school raised underwater grasses in their classrooms and planted them in May near the West River Center.

This is a good location because it is in a sheltered area and is near a recently completed living shoreline restoration.

We will monitor this area to see if the grasses survive.

UNDERWATER GRASSES

The State of Maryland sets the restoration goal for underwater grasses in the West and Rhode Rivers at 298 acres. In 2010, once again, there were not any grass beds to map. The last time any significant grass beds were observed was in 2003.

Underwater grasses are an important natural resource which protect shorelines, provide habitat, and improve water quality. We need to reestablish our grass beds if we want to see the West and Rhode Rivers return to being a healthy ecosystem. Many locals remember decades ago when the water was clear and the grasses were thick. We yearn to return to those conditions.

Although the official survey of underwater grasses determined there were no robust grass beds in the West or Rhode Rivers in 2010, we did once again observe horned pondweed during the late spring months. This species has a short life cycle, and dies off in June before the annual aerial survey. Until we improve water clarity in the rivers, we cannot expect to see the return of healthy grass beds containing more robust species such as redhead grass and widgeon grass.



Mark Lewandowski (DNR) assists local students during an underwater grass planting at the West River Center.

STREAM HEALTH

In the past, we have used stream health data collected by the Maryland Department of Natural Resources and Anne Arundel County Department of Public Works. Unfortunately, neither of these agencies conducted any sampling in 2010, and we can therefore not assign a score this year.

Stream health is important because streams feed our creeks and rivers. Human activity can have negative impacts on our streams. Studies have shown a strong correlation between the amount of impervious surface (rooftops, driveways, and roads) and the health of nearby streams.

To improve our stream health, we must increase the buffer areas near our streams and restore sections of streams which have been badly damaged. Working with farmers and other landowners to plant trees and natural vegetation along stream corridors will help protect our nontidal waterways.

In 2012, Anne Arundel County plans to begin a comprehensive watershed survey for the West and Rhode Rivers. As part of its Clean Water Act obligations, the county conducts such surveys for each watershed in its jurisdiction. The resulting data will be used to help the county meet its pollution reduction goals in accordance with its Clean Water Act MS4 permits.





Anne Arundel County is fortunate to have the Watershed Stewardship Academy, an initiative of the Department of Public Works and Arlington Echo Outdoor Education Center.

Community leaders, called "Master Watershed Stewards," are trained to reduce the negative impacts of stormwater runoff in Anne Arundel County.

WSA members implement numerous projects to restore our streams and improve our waterways. To apply to the program, visit: http://www.arlingtonecho.org/ education/watershedstewards-academy.html

Directing a stream through rigid infrastructure can cause negative impacts downstream. During heavy rain, the high velocity of channelized water can erode streambanks and contribute sediment to our creeks and rivers downstream.

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OTHER RIVER HEALTH INDICATORS

CLAMS • RESEARCH IN FOCUS

A team of undergraduate engineering students from George Mason University, led by W/RR Board Member Dr. George Donohue, has been researching potential restoration actions to improve water clarity in the West and Rhode Rivers.

The GMU students also have been working with scientists from the Virginia Institute of Marine Science and SERC. They looked at several alternative actions to decrease turbidity and stimulate growth of underwater vegetation: addition of oysters, or soft-shell clams, and constructing living shoreline restoration sites.

The shellfish act as water filters, while the living shoreline restoration prevents runoff from entering the water. The resulting reduction of sediment and nutrients would allow increased sunlight to penetrate the water column, potentially stimulating underwater grass growth. Using a computer model they developed, the students were able to plug in water quality monitoring data and other physical data to simulate the dynamic interaction between these alternatives and the nutrients and sediment entering the rivers.

Results predict that soft shell clams, *Mya arenaria*, have the greatest potential to improve water clarity in our rivers (see graphic). While attempts at oyster restoration are well known, large-scale addition of native clams has not been tried. West/Rhode Riverkeeper hopes to use these results to begin a pilot project to test the feasibility and effectiveness of placement of clams in the rivers.



This graphic shows the projected increase in water clarity (Secchi depth) relative to the investment in three restoration actions: the addition of soft-shell clams, oysters, and living shorelines. According to the model, soft-shell clams provide the greatest benefit related to cost.

BACTERIA

The main public health risk from swimming and water contact is infection from waterborne bacteria. West/Rhode Riverkeeper conducts a bacteria sampling program with Anne Arundel Community College, collecting samples weekly between Memorial Day and Labor Day.

Again this year, our data show a disturbing trend—all but three of the sampling stations had at least one sample above the EPA limit for safe swimming. Sites near population centers had the highest levels. One site



(near Holly Hills, Rhode River) had bacteria levels above the EPA limit for almost half (6 of 14) of the samples.

Bacteria come from a variety of sources, including failing septic systems, sewer overflows/leaks, pet waste, and livestock. Significant rainfalls can carry this bacteria into our waterways. The Anne Arundel County Health Department advises that after a rainfall, all Anne Arundel County beaches are under a no swimming/no direct water contact advisory for 48 hours, due to predicted elevated bacteria levels from rainwater runoff and increased health risks.

For more information on human health risks relating to our rivers, visit http://www.westrhoderiverkeeper.org/images/stories/programs/safe-to-swim.pdf

Our Homework

This is our third Report Card, and we are still not making the grade. While the scores reflect the condition of our rivers, in a way we are really grading ourselves as a society. Our policies and actions are allowing our rivers to exist in poor condition. What must we do to improve?

Much as No Child Left Behind was designed to ensure all students have a chance to succeed, the Clean Water Act was enacted to make certain that no waterway was given up for dead. But nearly 40 years after its passage, we haven't achieved its goal. That's why it is important now to rally behind the EPA's new push to implement a Bay-wide TMDL or "Total Maximum Daily Load." Mandating strict pollution limits for all jurisdictions, and strenuously enforcing those limits, is necessary if we want to see real improvement.





RIVERKEEPER,[®] INC. 4800 Atwell Road • Suite 6 Shady Side, MD 20764 www.westrhoderiverkeeper.org 410.867.7171 West/Rhode Riverkeeper works to protect families and communities by stopping pollution. We strive for healthy and safe rivers and streams. We work together with communities to enforce environmental law, promote restoration, and advocate for better environmental policy.

Join West/Rhode Riverkeeper in protecting the right of our families and communities to enjoy clean and safe water.



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Protecting families and communities by stopping pollution