

2013



# Mills Creek Report Card





# Firelands Coastal Tributaries Watersheds

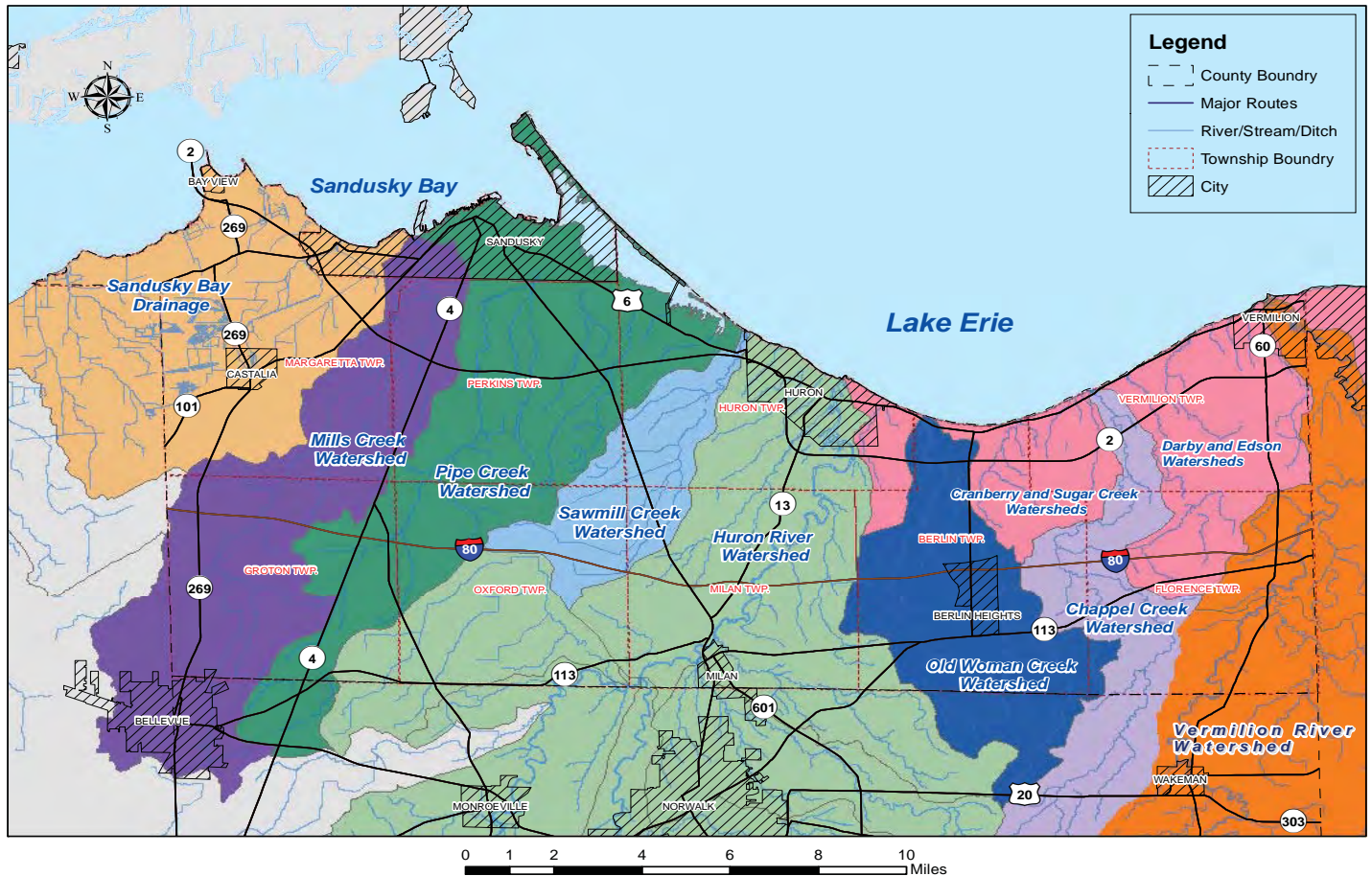
Erie County is unique because most of its drainage includes small streams that empty directly into the Sandusky Bay and Lake Erie. As you travel across the county, you will cross small drainage areas called "watersheds" that define where rainfall and snow melt will flow to a stream or tributary. Many of us don't think about where our water came from or where it is going as it passes under a road bridge, but

understanding watershed systems helps us make decisions that keep water clean and keep Lake Erie healthy.

The Firelands Area coastal tributaries are made up primarily of small creek systems: Cold Creek, Mills Creek, Pipe Creek, Sawmill Creek, Old Woman Creek, and Chappel Creek. These creeks differ greatly in the geology, soil type, water sources, natural habitats, and land use, which makes our

Firelands watersheds an area of great diversity for our residents, tourists, as well as native and migratory wildlife.

The Firelands coastal tributaries are important to the overall health of Lake Erie. Much of the pollutants affecting the Lake come from the watersheds that drain to it. Monitoring helps identify which streams need the most attention to improve water quality.



## What does a watershed program do?

The Firelands Coastal Tributaries Watershed Program is a partnership of local, state, and federal agencies, local businesses and volunteer groups that work together to improve the small streams within the Firelands area.

The partners of this program understand that each small watershed in our area is unique and needs special attention for effective management. Because our tributaries do not combine into larger river systems, they must be treated and managed separately, using a "ground

up" approach. We currently have a state endorsed management plan for the Old Woman Creek Watershed and hope to plan for additional streams in the area to reduce non-point source pollution entering Lake Erie.

This program engages our local community in watershed stewardship activities such as stream monitoring, rain barrel building, restoration projects and in-field agricultural conservation. Clean water means healthy communities. Together we can improve our streams and Lake Erie.

# A system driven by groundwater & storms

When it rains, it drains; and these storm events move pollutants through the watershed. Pollutants, like sediment and nutrients, increase in Mills Creek when it rains similar to other local watersheds. Mills Creek differs from our other local streams because it is also highly influenced by groundwater. The groundwater in Mills Creek helps to keep a more stable base flow (low water flow) in the channel but can potentially show higher concentrations of pollutants in the stream in the absence of rain if the groundwater entering the stream has been contaminated.

## What makes up MillsCreek?

Mills Creek is a 42.4-square-mile watershed made up of many small tributary and drainage ditches. Mills Creek begins in Sandusky and Huron Counties encompassing the City of Bellevue and empties into Sandusky Bay on the west side of Sandusky. The watershed consists of approximately 26% developed land, 67% agricultural land, and 7% natural areas. There is one EPA permitted sewer outflow in the City of Bellevue that discharges into the headwaters of Mills Creek. This watershed is also home to several industrial areas with permitted discharges to the Creek.

Mills Creek is located on the easternmost portion of the Great Black Swamp, a once large wetland system created after Ancient Lake Erie's shoreline receded to its present day location. The soil consists mainly of lake basin clay with a high seasonal water table. As a result, this area is commonly saturated in the spring months and drains slowly where drainage improvements have not been implemented. Mills Creek is also part of a Karst geological region, which is characterized by a series of sinkholes and underground rivers flowing through cracks and cavities in the limestone bedrock. Surface water and groundwater are more connected in Karst regions increasing the potential for flooding and groundwater pollution. Nearly the entire watershed is highly sensitive to groundwater contamination.



Bare ground in winter and little to no natural buffers between field and stream contributes to the degraded water quality in Mills Creek.

### Key features

- Urban centers
- Storm-driven system
- Flooding
- Quarries
- Railway/industry
- Possible Karst area
- Golf courses

### Indicators of health

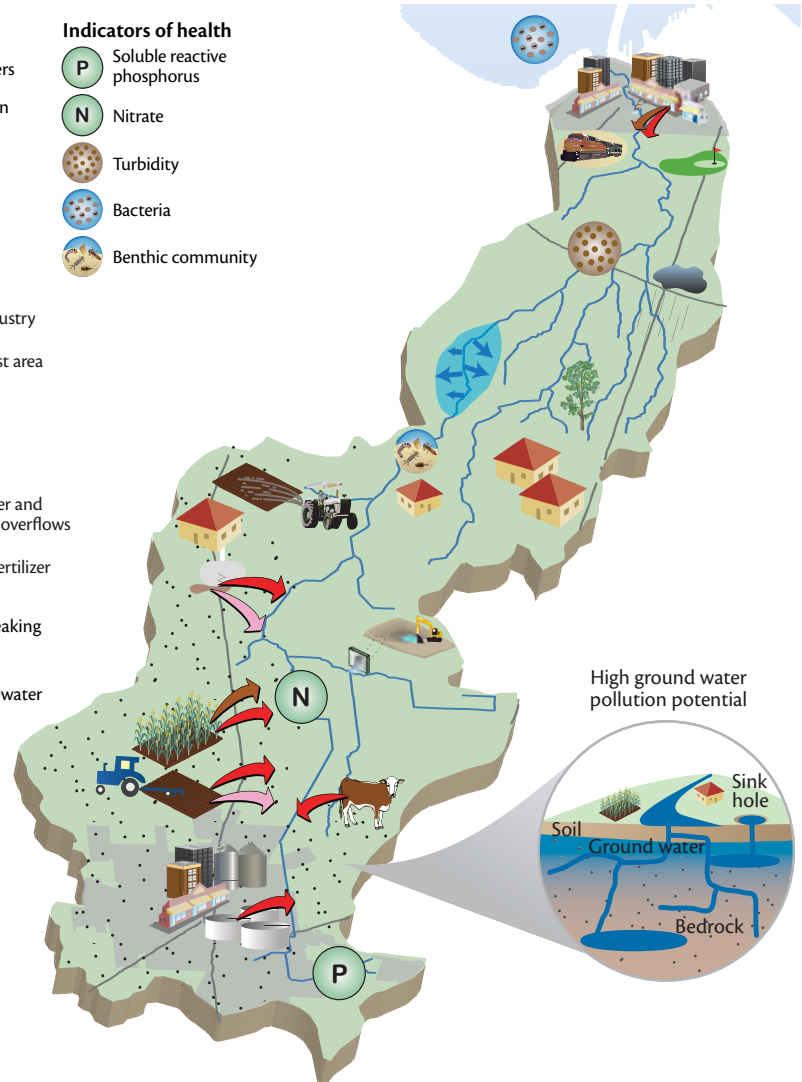
- Soluble reactive phosphorus
- Nitrate
- Turbidity
- Bacteria
- Benthic community

### Pollution Sources

- Urban stormwater and combined sewer overflows
- Manure/sludge fertilizer application
- Broken and/or leaking septic systems
- Municipal wastewater treatment plant
- Row-crop agriculture
- Animal agriculture

### Types of inputs

- Nutrients
- Sediments
- Bacteria



## Key drivers

Mills Creek's water quality is affected by many types of land uses, such as urban development, agricultural row-crop and livestock farms, commercial and industrial areas, and limestone quarries. The drainage of this watershed has been heavily modified including the use of tile, open ditch and sinkholes to carry excess stormwater from development and farm fields. This combined with Karst geology increases the transportability of pollutants through the watershed. Only 30% of the stream

maintains a buffer of natural vegetation; reducing the stream's ability to effectively handle the excessive flush of pollutants from rain events. This watershed also has the lowest adoption of conservation tillage in the county.

Municipal waste water from the City of Bellevue and several home sewage treatment systems also contribute to sediment, nutrient, and bacterial pollutants in the watershed.



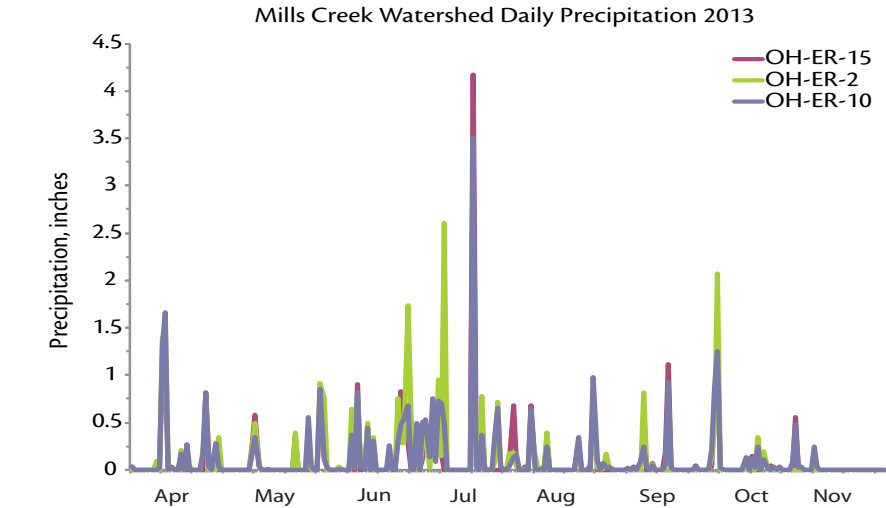
# Wet year with several storms

2013 was a very wet year. During the sampling period (April to November), records show the number of “wet days” for daily rain events was 10 days or greater for every month except May and November. In addition to the wet days, the total number of storms producing rainfall greater than 3/4 inch from April to November was 17. The months for the highest amount of wet days and significant storm events was June and July.

Mills Creek is influenced by both groundwater and storm water discharges. As we continue to monitor this creek we hope rainfall data will help us determine the mode of transport of pollutants (surface or groundwater), so we can develop the best strategies to reduce them.

## How does this affect the water quality of Mills Creek?

Overall, Mills Creek scored a 14%, F, which is considered very poor health, and was primarily due to very poor nutrient scores at all sites. Station scores for the Water Quality Index did not show a significant improvement suggesting polluted run-off enters the stream at several locations in the watershed. If pollutants occurred mainly in the headwaters, scores would improve closer to the Bay.



Daily rainfall totals from the COCORAHs stations within the Mills Creek watershed.

All stations failed, receiving a 0% score for nitrate. Phosphorus also failed at all stations with the highest 3 stations only receiving a 13%. These nutrients are easily carried through run-off and groundwater discharge and have had high concentrations recorded over previous years. Because of the high exchange of surface and groundwater in this stream, it

is difficult to identify the source of these pollutants at this time. More sites will be added in 2014.

Turbidity received 33%, D- overall, and improved significantly from headwater (Strecker Rd, 13%) to Mills Creek Golf Course, 43%. This suggests higher sediment loading occurs in the upper watershed.



Nitrate



Soluble Reactive Phosphorus



Turbidity



Bacteria



Benthic Community



Vital Signs Indicators

## Monitoring in Mills Creek

Monthly water samples are analyzed for these parameters from April through November by the Volunteer Stream Monitoring Program. Future monitoring will include benthic macroinvertebrates (aquatic worms and insect larvae) and an increase in the frequency and number of samples.

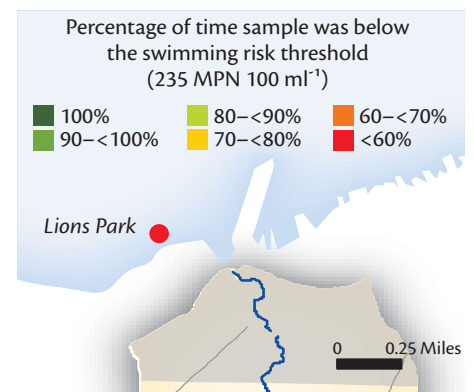
The aim of this report card is to provide a transparent, timely, and geographically detailed assessment of water quality for Mills Creek in 2013. Scores are determined by comparing three indicators (nitrate, soluble reactive phosphorus, and turbidity) to scientifically derived ecological thresholds or goals. These three indicators are combined into one overarching Water Quality Index, which is presented as the site or watershed grade. Vital Signs Indicators (dissolved oxygen, water temperature, pH, and ammonia) are considered basic diagnostic indicators that are not included in the Water Quality Index. If one or more of the vital signs do not score well it is an indication of a serious problem in the creek.

## Bacteria, an indicator of human safety

Determining if recreational areas are safe for swimming is accomplished by measuring certain bacteria as an indicator. These bacteria serve as a surrogate for the presence of pathogens which may cause illness in humans. Bacteria in the water come from a variety of sources, including untreated municipal waste, failing septic systems, pet waste, and livestock, often after heavy rainfall.

In Mills Creek, indicator bacteria are measured by the Erie County Health Department at Lions Park (see map) three

to four times weekly. In 2013, Lions Park, received a 51% score meaning the risk of getting sick while swimming occurred half of the recreational season. Although this site is not directly located at the mouth of Mills Creek, this small stream does contribute to the overall condition of the Bay. The rate of failure is consistent with an increase in the number of storms during the sampling period. Because our streams are storm driven the increase in rain events increase the potential of pollutants arriving at our beaches.




# Mills Creek 2013 Report Card

Sandusky Bay

## **F** Mills Creek

Mills Creek scored a 14% for 2013. This grade is considered very poor. Nutrient scores in Mills Creek were very poor with soluble reactive phosphorus receiving a 9% and nitrate receiving a 0%. Turbidity received a slightly better score of 33%; however, is still considered poor stream health.

### Nitrogen, Phosphorus, & Turbidity a Concern for Stream Health

All sites received failing scores for **N** **P**  failed at Strecker Rd then improved slightly from a D+ at Miller Rd and Strub Rd to a C- at Mills Golf Course.

### Vital Signs Indicators

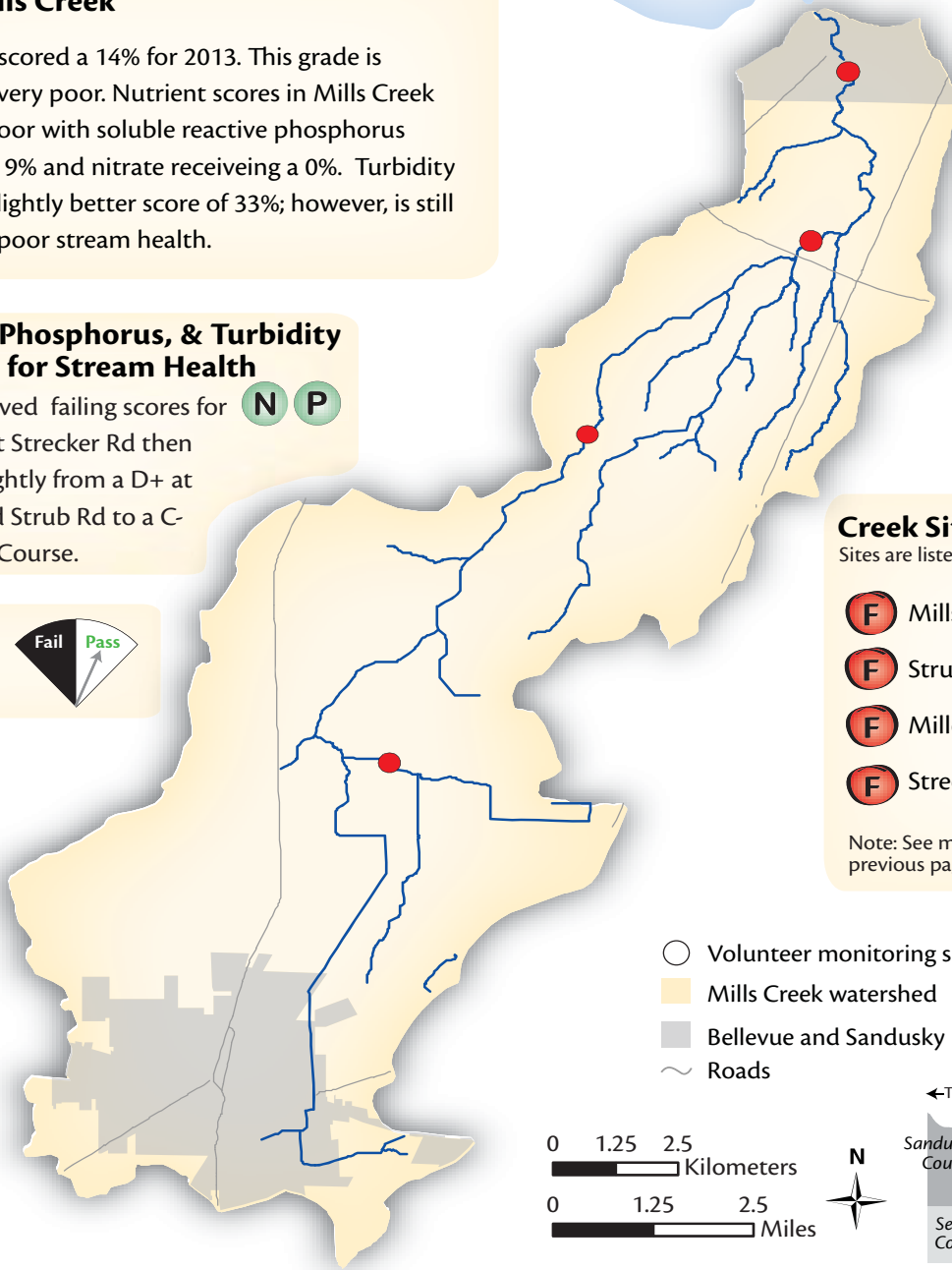


### Creek Sites

Sites are listed from north to south.

- F** Mills Creek Golf Course
- F** Strub Rd
- F** Miller Rd
- F** Strecker Rd

Note: See more information on previous page.



## What do these grades mean?

- A** 80–100%: All water quality indicators meet desired levels. Quality of water in these locations tends to be very good, most often leading to preferred habitat conditions for aquatic life.
- B** 60–80%: Most water quality indicators meet desired levels. Quality of water in these locations tends to be good, often leading to acceptable habitat conditions for aquatic life.
- C** 40–60%: There is a mix of good and poor levels of water quality indicators. Quality of water in these locations tends to be fair, leading to sufficient habitat conditions for aquatic life.

- D** 20–40%: Some or few water quality indicators meet desired levels. Quality of water in these locations tends to be poor, often leading to degraded habitat conditions for aquatic life.
- F** 0–20%: Very few or no water quality indicators meet desired levels. Quality of water in these locations tends to be very poor, most often leading to unacceptable habitat conditions for aquatic life.



# People working together for clean water

To reduce our greatest creek stressors (nutrient and sediment pollution, and habitat loss), we as a community need to work together. Whether you live in the city or on a farm of tens to thousands of acres, each of us has a role to play in reducing the impacts that come from our respective lifestyles. We thank many of our Firelands Area residents and landowners who are already working to improve our soil and water and encourage others to restore and protect Lake Erie. To find out more about how you can help, see the back page of this report card.

## Improving Mills Creek takes the whole watershed community

Agricultural producers in the watershed have begun to implement various conservation practices into their farming operation to protect natural resources and Mills Creek. Since the Conservation Reserve Enhancement Program (CREP) was initiated in the summer of 2000, a total of 69.6 acres (approximately 19,000 linear feet) of grass filter strips now buffer Mills Creek and portions of its tributaries. Additional practices include riparian buffers, escarpments, field windbreaks and wetlands. Even though some effort has been made to improve and protect Mills Creek, success has been very limited, as is evident from the stream score. Additional conservation measures must be taken for significant improvement.

Landowners and agricultural producers throughout the watershed are becoming more aware of the importance of healthier soils and nutrient management, along with the necessity of adopting the concepts of the 4R's (right source, rate, time, and placement of fertilizers) and other practices that demonstrate personal stewardship of the land and water. Suburban homeowners and businesses can also play a significant role by applying fertilizers appropriately, reducing storm run-off, and maintaining their septic system. It's going to require the effort from everyone who lives or works in the Mills Creek watershed to improve this valuable resource.



*Run-off carrying sediment from a farm field directly entering a storm drain in Mills Creek.*









*Grass buffers along farm fields keep sediment and nutrients from entering Mills Creek (right of the photo).*



*Rain barrels help hold back stormwater and reduce combined sewer discharges in our urban areas.*

# You can help!

**N** = nitrogen  
**P** = phosphorus  
 = sediment

WHAT YOU CAN DO	WHO BENEFITS	WHAT'S REDUCED
Leave a natural area along a stream or ditch	Grass or wooded buffers help filter pollutants and reduce flood damage	<b>N</b> <b>P</b> 
Remember to inspect and pump out your septic system every 3–5 years	A properly maintained septic system prevents costly repairs and untreated sewage discharge into our streams	<b>N</b> <b>P</b> 
Help your community develop a plan that supports low impact development	Smart development fosters growth and protects the local resources and character of a community	<b>N</b> <b>P</b> 
Follow the “4Rs” of fertilizer use: <b>R</b> ight source, <b>R</b> ight amount, <b>R</b> ight place, <b>R</b> ight time	The “4Rs” approach promotes the wise use of fertilizer by farmers, residents, and landscapers to reduce costly nutrient loss that pollutes our streams	<b>N</b> <b>P</b>
Plant cover crops	Cover crops build healthy soils that help hold back nutrients and water and increase crop yields	<b>N</b> <b>P</b> 
Plant a rain garden or install a rain barrel	Rain gardens and rain barrels help reduce stormwater runoff and can cut down on landscaping costs	<b>N</b> <b>P</b> 
Install a drainage management system	Managing field drainage reduces nutrient loss while saving water for when your crops need it the most	<b>N</b> <b>P</b>
Properly manage livestock & pet waste	Storing and disposing of animal waste properly reduces nutrients and prevents harmful bacteria from fouling beaches	<b>N</b> <b>P</b>

## Learn more

If you would like to learn more about the development of this report card or watersheds in the Firelands Area visit the following websites:

[eriecleanwater.org](http://eriecleanwater.org)    [oldwomancreek.org](http://oldwomancreek.org)  
[ian.umces.edu](http://ian.umces.edu)        [eriecohealthohio.org](http://eriecohealthohio.org)



Join our volunteers to get involved in many opportunities in Mills Creek.

## Get involved

We could use your help to improve our watershed. If you are interested in being a volunteer, contact Breann Hohman, Watershed Coordinator for the Erie Soil and Water Conservation District at 419-626-5211 or [bhohman@eriecounty.oh.gov](mailto:bhohman@eriecounty.oh.gov).

Available Opportunities:

- Stream monitoring
- Invasive plant removal
- Habitat restoration
- Litter clean-ups



Volunteers help collect water samples for Mills Creek.



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