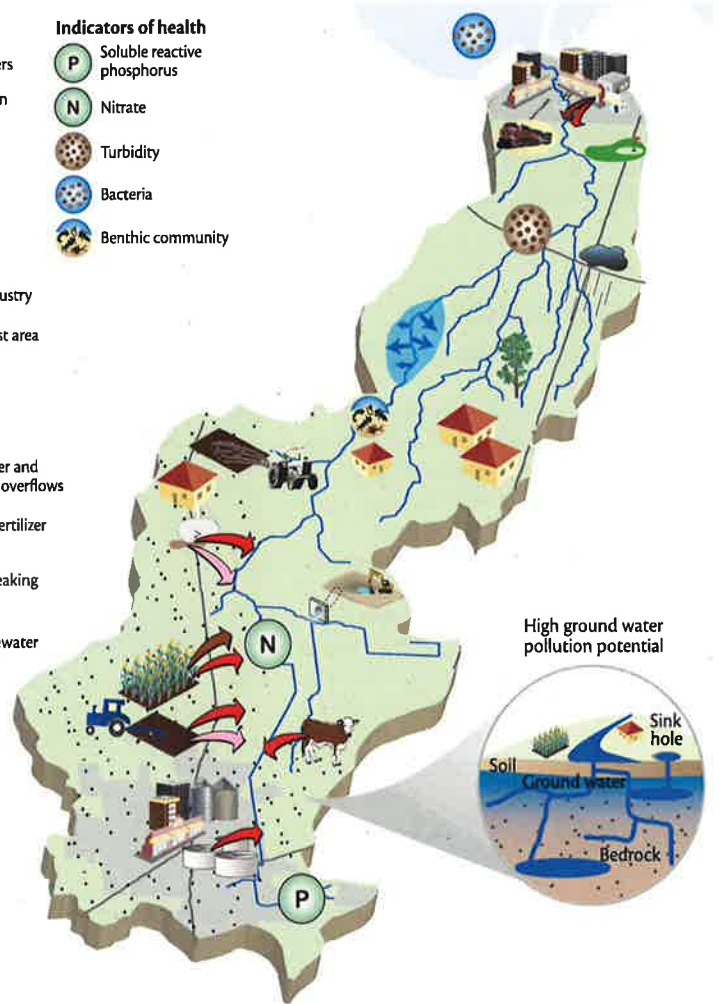


A storm-driven system

When it rains, it drains; and these storm events move pollutants through the watershed. When Mills Creek's flow is low to normal, we often find little nutrient and sediment pollution. However, during and after a storm, the creek will turn light brown from sediment and often carries excess nutrients that contribute to algal blooms in Lake Erie. Storms are more intense and frequent in the spring and fall, leading to higher pollutant concentrations than in the summer.

- Key features**
 - Urban centers
 - Storm-driven system
 - Flooding
 - Quarries
 - Railyard/industry
 - Possible Karst area
 - Golf courses
- Indicators of health**
 - P** Soluble reactive phosphorus
 - N** 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



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:

- erieconserves.org
- wildlife.ohio.dnr.gov/oldwomancreek
- ian.umces.edu
- eriecohealthohio.org

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 Conservation District at 419-626-5211 or bhohman@eriecounty.oh.gov



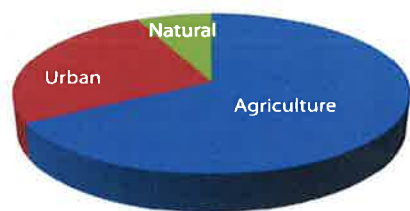
ian.umces.edu
Published: March 2018
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Watershed at a glance

- 42.4-square-mile watershed flows from Bellevue to Sandusky
- Karst geological region, makes this watershed at higher risk for groundwater contamination
- There are several Ohio EPA permitted discharges such as industrial facilities and the Bellevue Water Pollution Control Plant



Current Land Use

Mills Creek Report Card



Collecting Data

Monthly water samples are analyzed by volunteer stream monitors and Old Woman Creek Reserve Staff from April through November. Benthic macroinvertebrate (aquatic worms and insect larvae) sampling is performed in the summer by staff volunteers, and a summer intern. This report card represents a 3 year average of macroinvertebrate sampling. These indicators are combined to develop the overall scores of individual sites and the overall watershed score.

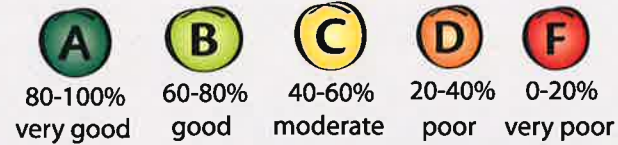
Indicators of stream health

- N Nitrogen**, monitored as *nitrate*, is found in fertilizer and untreated waste. In excess, this chemical can lead to algal blooms.
- P Phosphorus**, monitored as *soluble reactive phosphorus*, is found in fertilizer and untreated waste. In excess, this chemical can lead to algal blooms.
- Turbidity** is a measure of cloudiness of the water typically caused by sediment-laden runoff. Excessive sediment in the water can clog fish gills, and cover macroinvertebrate habitat and fish eggs.
- Benthic macroinvertebrates** are aquatic organisms with no backbone and are visible to the naked eye. Some are very intolerant to pollution, therefore make great indicators of water health.
- Vital Sign Indicators** are a collection of *pH, temperature, dissolved oxygen, and ammonia*. Like our blood pressure, these parameters can identify if a serious problem is present.

Indicator of human safety

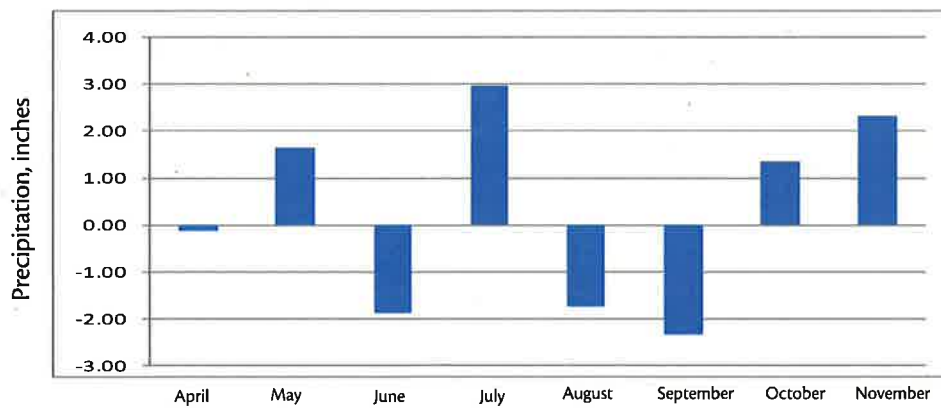
- Bacteria**, measured as *E. coli*, are microorganisms commonly found in untreated waste. Many bacteria are harmful to human health and can restrict our drinking and recreational water uses.

What do these grades mean?



Weather during our sampling period

How rainfall differed from the monthly norm in 2017 (Collected from 3 COCORAHs stations in Mills Creek)



Number of days with rainfall totals greater than 3/4"
13

Number of sampling events impacted by storms
1

Largest storm event: Total inches in 48 hour period before november sampling.
2.91

Mills Creek 2017 Report Card

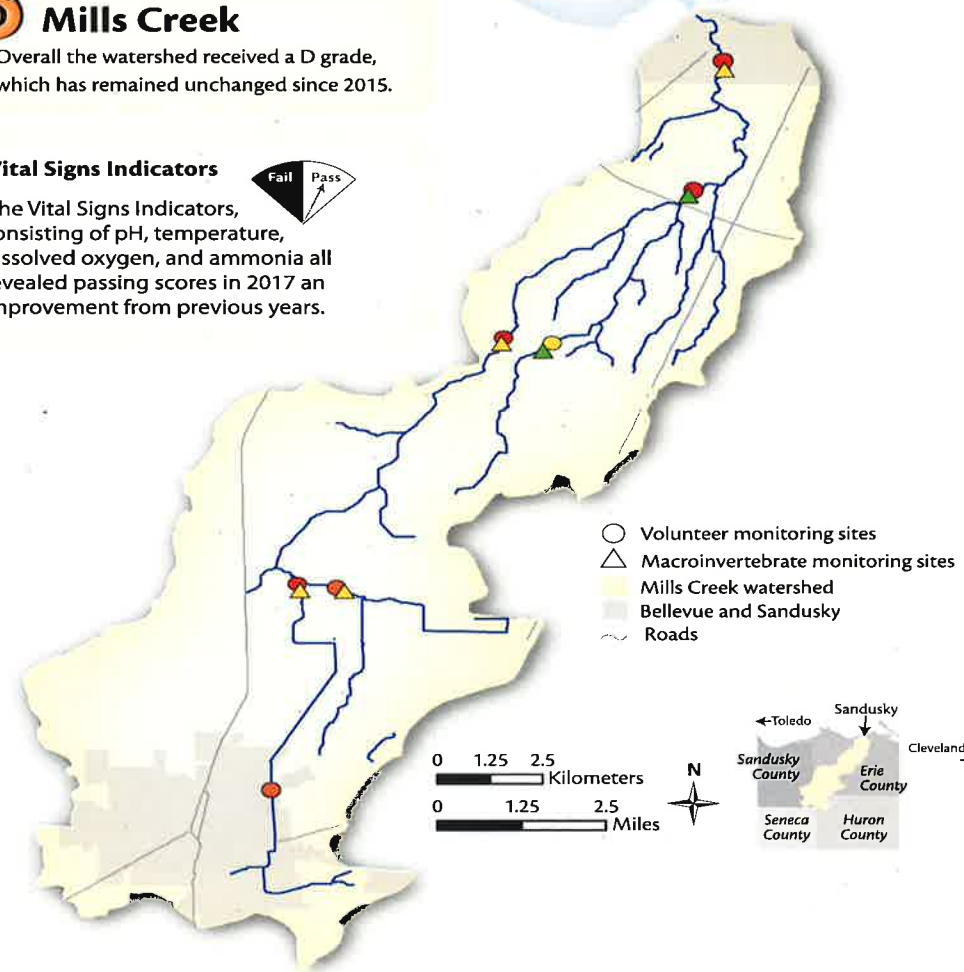


D Mills Creek

Overall the watershed received a D grade, which has remained unchanged since 2015.

Vital Signs Indicators

The Vital Signs Indicators, consisting of pH, temperature, dissolved oxygen, and ammonia all revealed passing scores in 2017 an improvement from previous years.



Indicator	2013	2014	2015	2016	2017
N Nitrate	F	F	F	F	F
P SR Phosphorus	F	D	D	D-	D-
Turbidity	D-	C-	C	D	C
Benthic Macroinvertebrate	ND	B-	C+	C+	C

2017 Beach health and safety

In Mills Creek, indicator bacteria are measured by the Erie County Health Department at Lions Park (see map) three to four times weekly. In 2017, Lions Park received a 95% score, an improvement from 2016, meaning nearly the entire swimming season presented low risk of illness from contact with water. Although this site is not directly located at the mouth of Mills Creek, this small stream does contribute to the overall condition of Sandusky Bay.

Percentage of time sample was below the swimming risk threshold (235 MPN 100 ml⁻¹)



Working together for clean water



Lion's Park Bioretention with water quality monitoring station in Sandusky Ohio partially funded through GLRI.

Sandusky embraces greener stormwater management

The City of Sandusky has continued their commitment as a coastal community to reduce polluted run-off and promote green infrastructure. Recent renovations at Lions Park, on the west side of the city, included the installation of several bioretentions to treat stormwater from the parking lot before it enters Sandusky Bay.

This project also includes monitoring of nutrients through these systems to evaluate specifications for the design of bioretentions in Ohio. This project, funded through the Ohio Water Development Authority, includes Erie Conservation District and The Ohio State University.

New Permit means less phosphorus for Mills Creek

In 2016, the Ohio EPA issued a new NPDES permit that lessens the amount of phosphorus the Bellevue Waste Water Treatment Plant (WWTP) can discharge into Mills Creek. Treatment of municipal waste became a prominent feature in protecting surface water in the USA in the mid 70s with the Clean Water Act. Today with Lake Erie's Algal blooms the State of Ohio has tightened the requirements on discharges containing phosphorus like WWTPs. This along with regulations on fertilizer and manure application are challenging but necessary steps needed to improve Lake Erie.



The Bellevue Water Pollution Control Center treats over a million gallons of waste per day helping reduce pollutants to Mills Creek.

You can help!

WHAT YOU CAN DO	WHAT CAN BE REDUCED
Leave woody vegetation along a stream or ditch	N P Turbidity
Remember to inspect and pump out your septic system every 3-5 years	N P Turbidity Bacteria
Ask your community for more Green Infrastructure	N P Turbidity Bacteria
Follow the "4Rs" of fertilizer use: Right source, Right amount, Right place, Right time	N P
Don't leave your field bare, plant cover crops!	N P Turbidity
Plant a rain garden or install a rain barrel at home	N P Turbidity
Stockpile and spread manure correctly	N P Bacteria
Pick up pet waste	N P Bacteria