What is a watershed report card?

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

The report card is one product of that partnership to communicate findings of stream, wetland and beach health sampling to our residents.

The aim of this report card is to provide a transparent, timely, and geographically detailed assessment of water quality for Mills Creek in 2014.

Grades 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 combined with the average macroinvertebrate score for the watershed to create an overall 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.

Firelands Coastal Tributaries Watersheds

Many coastal communities, such as the northern areas of the Firelands, are unique because the drainage of the coast is divided into a collection of 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 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 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.

Although these tributaries are small, they play a very important role in the overall health of Lake Erie. They serve as nursery habitat for fish, vital “stop-over” sites for migrating birds, drinking water, recreation opportunities, and more. Even though most of Lake Erie’s water comes from the upper Great Lakes, most of the pollutants come from the watersheds that drain into it. Monitoring helps identify which streams need the most attention to improve water quality.
A storm-driven system

When it rains, it drains; and these storm events move pollutants through the watershed. When Pipe 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 being laden with 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.

What makes up Pipe Creek?
Pipe Creek is a 48.5-square-mile watershed made up of three main streams: Pipe Creek, Hemminger Ditch, and Plum Brook. Pipe Creek begins in Huron County east of Bellevue and empties into East Sandusky Bay near the Cedar Point Causeway. The lake shoreline is a mix of coastal marsh and heavily altered land use for shipping, boating, and erosion control. The watershed consists of approximately 41% developed land, 39% agricultural land, and 20% natural areas. Land use has changed drastically in the past 15 years with the conversion of 9,250 acres of agricultural land to residential and commercial purposes.

A key feature of Pipe Creek is the wetlands in both the creek and East Sandusky Bay

Pipe Creek is 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. The unique geology of Pipe Creek makes it ideal for limestone quarry operations, but at a higher risk for potential groundwater pollution.

Loss of habitat from filling the floodplain has negatively impacted Pipe Creek

Key drivers
Pipe 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. Large amounts of polluted run-off enter the stream in the upper rural portion of the watershed. However, aging infrastructure in older developments with combined sanitary and storm sewer systems adds sediment, nutrient, and bacterial pollution in the urbanized areas of the watershed. Heavier storms and loss of natural stream and wetland habitat have also reduced the stream’s ability to effectively handle the excessive flush of pollutants from rain events.

Increasing landowner stewardship to hold back, slow down, or soak in stormwater and reduce polluted run-off would greatly improve the condition of Pipe Creek.
Mixed Year of Wet and Dry Months

The amount of rainfall observed in 2014 during the sampling period from April to November, did not always follow the average climate pattern for the area. The season started off with fairly normal rainfall in the spring, and experienced below average rainfall amounts in the summer months. The beginning of fall was very wet but ended drier than average.

The total number of storms near or greater than 1” recorded during the sampling period was 14; however, only one of those storms occurred close to a sampling event influencing the results. Of the storms recorded, 1/2 occurred during spring. The average number of “wet days” for daily records was 16 during the sampling period.

Pipe Creek, like many watersheds, is a storm-driven system, water quality responds to storm activity in the year. The lack of storm events sampled did not result in improvements in water quality suggesting not all pollutants are storm driven in this creek.

Pipe Creek Daily Precipitation Data 2014

Monitors in Pipe Creek

Monthly water samples are analyzed by volunteer stream monitors and Old Woman Creek Reserve Staff from April through November. Annual benthic macroinvertebrate (aquatic worms and insect larvae) sampling and identification is performed in the summer by staff, volunteers, with the assistance of a summer research intern.

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. 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.

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.

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 failing septic systems, pet waste, and livestock, often after heavy rainfall.

In Pipe Creek, there are two Bay sites (see map) where indicator bacteria are measured by the Erie County Health Department three to four times weekly. In 2014, Battery Park, received a 100% score meaning there was no risk of getting sick while swimming. The Pipe Creek Canoe Launch site, on the other hand, received a 76% score meaning a health risk was present during 1/4th the swimming season. This site is located at the mouth of Pipe Creek and was most likely lower because of a higher potential of influence of pollutants that come directly from the watershed.
Pipe Creek 2014 Report Card

Nitrogen and Turbidity a Concern for Stream Health

The creek received another overall failing grade for N with all sites failing individually except Oakland Cemetery which received a B. This suggests nitrogen inputs are occurring throughout the mainstem with the creek unable to filter it out. The Oakland site is the only non-mainstem site.

Also continues to be an issue throughout the watershed with grades ranging from C to F. Strecker and Harris Roads were the lowest scoring sites, where adequate stream buffers are lacking adjacent to agricultural fields.

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.

ND No Data (ND) is a designation used for areas where there is either insufficient or no data to give a grade on desired health levels.
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.

Conservation education at Perkins and Sandusky Schools

A project called iEvolve (Inquiry and Engagement to Invigorate and Optimize Learning for Everyone) with STEM (Science Technology Engineering and Math) began at Perkins and Sandusky Schools in 2012 with the opportunity to combine citizen research with classroom learning. Students in various grades embarked on exploration into the world of pollinators, frog communities, water quality, and sustainable gardening.

Our local city schools and Bowling Green have partnered with Erie Soil and Water Conservation District, Toledo Zoo, Sea Grant Stone Laboratory, and the Toledo MetroParks to foster a love of science and discovery at an early age while providing valuable real world research than can be used locally and shared globally.

In 2014, two rain gardens were installed at Meadowlawn and Venice Heights School and a perimeter pollinator garden addition to the vegetable community garden at Osborne School. Students are currently studying how soils differ in these gardens compared to high trafficked turf lawns and what role they play in reducing runoff and improving the environment.

Trees reduce stormwater in the urban community

We often think of trees simply as shade and a place for the birds and squirrels to inhabit. In fact, urban forests play a vital role in more than just habitat and a cool escape from the summer sun. Trees act as mini-reservoirs, controlling runoff at the source. The leaves, branches and bark intercept rainfall reducing run-off and erosion because the water never impacts the ground. Roots increase water storage and enhance rainfall to soak into the surrounding soil.

In 2014, the City of Sandusky Tree Commission and the Erie Soil and Water Conservation District worked together to help record the street trees in the community to establish their value and help manage their important resource. Discovered in the survey, Sandusky’s 6,000+ street trees prevent over 10.5 million gallons of rainfall from reaching the ground annually. This diverts the amount of stormwater entering their combined sewer system and helps reduce the amount of untreated sewage discharging into Sandusky Bay. As Sandusky works to better stormwater management, trees will continue to serve the community in more ways than one.
You can help!

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

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  oldwomancreek.org
ian.umces.edu  eriecohealthohio.org

Join our volunteers to get involved in many opportunities at Pipe 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.

Available Opportunities:
• Stream monitoring
• Invasive plant removal
• Habitat restoration
• Litter clean-ups

Build a rain barrel for your home! Workshops offered every year April, May and June. Call the Erie SWCD for dates.

Initial report card analysis and design in collaboration with the University of Maryland Center for Environmental Science’s Integration & Application Network

Financial support for this publication was provided fully or in part by a grant under the Federal Coastal Zone Management Act, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, Silver Spring, MD
Pipe Creek Report Card

Join Us!
Saturday, April 11th
10:00 am
Mr. Smiths Coffee House
140 Columbus Ave
Sandusky, Ohio

Ask questions, get answers about what's in our water!

Erie Soil and Water Conservation District
2900 Columbus Ave, Rm 131
Sandusky Ohio 44870