

Western Lake Erie Report Card

Frequently Asked Questions

*Prepared by the University of Maryland Center For Environmental Science
August 2020*

Frequently Asked Questions

1st Western Lake Erie Report Card

General

What is the Western Lake Erie Report Card?

The Western Lake Erie Report Card provides a transparent and geographically detailed assessment of the health of the Western Lake Erie basin and watershed in 2018, translated into “A” through “F” letter grades like a school report card. This is the first report card on the ecological health of Western Lake Erie and its watershed. It is a product of the University of Maryland Center for Environmental Science funded by the City of Toledo, Ohio; Lucas County, Ohio; and the City of Oregon, Ohio through the Lake Erie Foundation.

What is the Western Lake Erie basin?

The “Western Basin” in this report card, includes everything west of Sandusky Bay in Ohio and Point Pelee in Ontario. This is the shallowest basin of Lake Erie. The seven major tributaries that flow into the western basin include the Detroit River, Huron River (MI), Swan Creek, River Raisin, Ottawa River, Maumee River, and Portage River. Numerous other tributaries contribute to this portion of the lake but these are the largest inputs.

What area is included in the Western Lake Erie report card?

In addition to assessing the lake basin itself, this report card also looked at the health of Western Lake Erie’s watershed, which includes areas of Ohio, Indiana, Michigan, and Ontario. Major cities included in this area are Detroit, Michigan; Fort Wayne, Indiana; Toledo, Ohio; and London, Ontario.

What are the key take home messages?

Overall, the Western Lake Erie watershed and basin were in moderate condition in 2018. This means that some ecological indicators met objectives and others did not. There was a mix of good and poor scores throughout the region. In terms of harmful algal blooms, 2018 was an unusual year with an early bloom onset and strong westerly winds that resulted in the bloom being pushed offshore into the islands region to the east. Western Lake Erie has suffered from chronic water quality issues stemming from large-scale industry, population growth, and intensive increased agricultural land use. Restoration, management, and cooperation are needed to improve conditions for the ecosystem and society.

Why develop a Western Lake Erie Report Card?

The report card serves primarily as a communication tool to provide a transparent, timely, and geographically detailed assessment of the health of the Western Lake Erie and its watershed in a given year to the public and a wide variety of stakeholders with grades that are easy to understand. This report card evaluates both the lake and the watershed.

Why is the University of Maryland Center for Environmental Science involved in creating the report card?

University of Maryland Center for Environmental Science has been publishing report cards globally since 2006, and has created a process for creating report cards that result in inclusive, accepted, geographically detailed, and defensible report card results. Ecosystem health report cards synthesize data from various sources, distilling the key messages into an image-rich format that is easily accessible to a wide audience. The inclusive development process engages stakeholders and creates a shared vision for the future. The University of Maryland Center for Environmental Science has created report cards with local partners for Chesapeake Bay, Long Island Sound, Mississippi River, Guanabara Bay (Brazil), Orinoco River (Colombia), and Moreton Bay (Australia), among others.

What is the Report Card Process?

The report card process consists of five key steps: conceptualize the system, choose indicators, determine thresholds (or goals), calculate scores and grades, and communicate results. Each step involves local agencies, organizations, and individuals from varying backgrounds (stakeholders) to ensure that the resulting score is reflective of real conditions.

Ecological Health

How was Western Lake Erie condition in 2018?

The overall health of the western Lake Erie basin and watershed was moderate in 2018, meaning that many parts of the system are vulnerable to further ecological degradation.

What indicators in the report card were driving the report card scores down?

In the lake, indicators with poor or very poor scores were total phosphorus, dissolved phosphorus, nitrate+nitrite, chlorophyll a, and emerald shiner. In the watershed, indicators with poor scores were total phosphorus, dissolved phosphorus, total nitrogen, nitrate+nitrite, and fish consumption.

What indicators in the report card were bringing the report card scores up?

In the lake, indicators with very good scores were walleye, yellow perch, source water toxin, and recreational toxin. In the watershed, the only indicator with a very good score was source water toxin.

Algal blooms had a good score in 2018; are harmful algal blooms still a problem in Western Lake Erie?

Algal blooms are a significant problem in Western Lake Erie. Conditions are highly variable from year to year, leading to similar variability in bloom severity. Factors that affect the location and severity of blooms include rainfall, water temperature, wind, and nutrient inputs. Warm, wet years produce larger blooms as precipitation washes nutrients into the lake. Early warming can cause blooms earlier in the year, which may result in smaller blooms that last longer. Windy conditions can mix lake waters and move algae around, reducing the overall severity of blooms by diffusing the effects. Future blooms can be diminished by lessening nutrient inputs from, wastewater treatment plants, urban and suburban runoff, failing septic tanks, and runoff from landscapes that use commercial fertilizers and manure. Not all of these inputs contribute the same amount of nutrients across the watershed and continued research is needed to inform the management of these inputs.

How does the report card relate to the algal blooms of Western Lake Erie?

Algal blooms are one of the indicators measured in the report card. The Bloom Severity Index is based on the peak size of the harmful algae bloom over a 30 day period (usually mid-August to mid-September).

If the report card grades improve, will the algal blooms also be improved?

Yes. Algal blooms are caused by nutrient runoff. If nutrients in the watershed are reduced, the nutrient scores and grades will go up. If nutrients in the lake are reduced, then nutrient scores and grades in the lake will go up. With lower nutrient inputs, high grades in both watershed and lake, will produce smaller blooms. In the lake, algal blooms are also directly evaluated with the bloom index indicator.

How does precipitation affect the scores?

Each year's nutrient scores are driven by not only what happens on the landscape in terms of nutrient reduction strategies but also by precipitation events. Precipitation moves nutrients from the landscape into rivers and ultimately the lake. Work will need to be done to determine if the nutrients entering this system in any given year are driven by landscape changes or by wet/dry years. A low nutrient year (high grade) cannot be tied solely to changes in behavior on the landscape. Current research indicates that the small bloom in 2018 is a result of a dry year, hence low nutrient runoff. If changes in behavior on the landscape were the cause, then 2019's

blooms, a wet year, would have also been low. This was not the case (5th largest bloom in 30+ years)

What can the report card tell us about trends over time?

This is the first report card for Western Lake Erie and it does not address trends over time. With subsequent report cards covering additional years, trends can be evaluated. This report card only represents the status of the Western Basin and the watershed in 2018.

Why wasn't Lake St. Clair included in the report card analysis?

Lake St. Clair is an important conduit between Lake Huron and Lake Erie via the St. Clair River (and Thames River) flowing in, and Detroit River flowing out. Covering 430 square miles (1,114 square kilometers), Lake St. Clair is sometimes referred to as the sixth Great Lake. Because indicator data from active monitoring programs were limited and inconsistent, Lake St. Clair was not scored. In the future, Lake St. Clair can be incorporated into the report card with additional monitoring data.

Report Card

How were the report card indicators selected?

Several workshops with stakeholders were convened throughout the project, with the main goal of identifying potential indicators for the report card and how to assign grades. Spatial and temporal resolutions of the indicators were determined to ensure that there was sufficient amount, coverage, and frequency of data for use in the analysis.

Where were the data sourced from?

Data were sourced from many places including Ohio Environmental Protection Agency (Ohio EPA), National Oceanic Atmospheric Administration Great Lakes Environmental Research Laboratory (NOAA GLERL), Environment Canada, Ohio State University (OSU), Great Lakes Environmental Database (GLEND), Bowling Green State University (BGSU), University of Toledo (UT), Great Lakes Observing System (GLOS), Lake Erie Yellow Perch Task Group, Lake Erie Walleye Task Group, Ohio Department of Natural Resources (Ohio DNR), National Oceanic Atmospheric Administration (NOAA), Heidelberg University, University of Michigan, LimnoTech, EPA STORET, USGS Michigan, USGS Ohio, USGS Indiana, Purdue University, Indiana Department Environmental Management (IDEM), The Michigan Department of Environment, Great Lakes, and Energy (EGLE), the Provincial (Stream) Water Quality Monitoring Network (PWQMN) in Ontario, and Ontario Benthos Biomonitoring Network through the Ontario Conservation Authorities. All data included in the report card are from 2018.

What indicators were used for calculating lake (basin) health?

The lake basin health indicators were total phosphorus, dissolved phosphorus, total nitrogen, nitrate+nitrite, chlorophyll *a*, bloom index, source toxin, recreational toxin, yellow perch, walleye, and emerald shiner.

What indicators were used for calculating watershed health?

The watershed health indicators were total phosphorus, dissolved phosphorus, total nitrogen, nitrate+nitrite, total suspended solids, fish consumption, source toxin, fish, habitat, and invertebrates.

How were thresholds determined?

Working groups of scientific experts were engaged to determine thresholds for both the Western Lake Erie basin and watershed. Thresholds are based on historical data or target values for each indicator.

How were the scores calculated?

All indicators were assessed through pass/fail criteria or multiple-threshold criteria. Once each indicator was compared to a pass/fail or multiple-threshold scale and assigned a score, it was averaged into a station score. Then, each station score within a sub-region was averaged together to a sub-region score for that indicator. Each overall sub-region score is area-weighted into the overall score. For more detail, see methods document posted on the website (www.lakeeriereportcard.org)

What do the scores mean?

The following rubric describes what the scores and grades mean. For more detail, see methods document posted on the website (www.lakeeriereportcard.org):

A (Very good) (80–100%): All indicators meet objectives. Indicators in these locations tend to be very good, most often leading to preferred conditions.

B (Good) (60–<80%): Most indicators meet objectives. Indicators in these locations tend to be good, often leading to acceptable conditions.

C (Moderate) (40–<60%): Some indicators meet objectives and others do not. Indicators in these locations tend to be moderate, leading to sufficient conditions.

D (Poor) (20–<40%): Few indicators meet objectives. Indicators in these locations tend to be poor, often leading to degraded conditions.

F (Very poor) (0—<20%): Very few or no indicators meet objectives. Indicators in these locations tend to be very poor, often leading to unacceptable conditions.

Insufficient data: There were not enough data to include this indicator or region.

How were the regions determined?

The regions for the Western Lake Erie Report Card were determined by the stakeholders during the workshops, webinars, and follow-up meetings. The lake regions are based on conditions in the lake and professional scientific judgement. There are six regions in the lake, Northwest, Southwest, Maumee, Northeast, Eastern Islands, and Sandusky Bay.

The watershed regions were determined by using the 8-digit HUC watershed boundaries in the US and the tertiary watershed boundaries in Canada. Some of the HUC 8 watersheds were combined for those regions where there were less data. There are thirteen watershed regions, the Upper Thames, Lower Thames, Essex, Detroit, Raisin/Huron, Tiffin, St. Joseph, St. Marys, Upper Maumee, Auglaize, Lower Maumee, Cedar/Portage, and Sandusky.

How did you calculate the overall scores for the Western lake basin and watershed?

Region scores were area-weighted to get the overall score. If a region had a larger area, then it contributed more to the overall score. For more detail, see methods document posted on the website (www.lakeeriereportcard.org)

Is this report card going to continue in the future?

Yes, the report card will be repeated every two years. The University of Maryland Center for Environmental Science will be handing off the report card to the University of Toledo. It is anticipated that the report card will be improved with additional indicators over time and more comprehensive thresholds.

Where can I get more information?

The report card website has detailed information on the methodologies, indicators, and scoring. www.lakeeriereportcard.org.