



COVID-19 Wastewater Monitoring in Michigan



How do we interpret this data?

To view Michigan's COVID-19 wastewater monitoring data, visit the State of Michigan Wastewater [data dashboard](#).

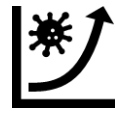
By reviewing this document, viewers will learn how to interpret this data and better understand COVID-19 wastewater monitoring and how it can be used.



Detection of N1 and N2 Genes

This project tests wastewater samples for the **N1 and N2 genes** that are present in the SARS-CoV-2 virus. These genes are unique to the SARS-CoV-2 virus, so detection of either gene means the virus is present in the sample.

Testing for the E gene of the SARS-CoV-2 virus was also done during the Fall 2020 pilot project but was discontinued after it was found to be less reliable. Positive E gene detections may be included in the total number of samples with virus detected, but will not be displayed on the graph.



Data Presentation

Viruses can multiply exponentially, which can result in a wide range of values when displaying laboratory results. To remain consistent with current scientific standards for the presentation of microbial wastewater results, it is recommended that wastewater concentration data be presented on a logarithmic (log) scale. \log_{10} has been commonly used in science for hundreds of years because of the ease of calculations. A log scale displays data over a wide range of values in a concise way and allows variations within a potential wide range of results to remain visible.

Therefore, data for N1 and N2 genes for this project will be presented on a **log scale**. This will be shown on the graph's y-axis as "Number of gene copies per 100mL (logarithmic scale)". When viewing data on a log scale, please note that the largest numbers presented could be tens, hundreds, or thousands of times larger than the smallest numbers.



The Detection of N1 and N2 Genes graph, as shown above, provides wastewater surveillance data for that specific sample site. The number of N1 and N2 gene copies per 100 mL (log scale) for each date sampled will be displayed, along with a minimum detection limit. By hovering the cursor over each data point, a popup box with a date interval and the number of N1 and N2 genes detected will appear. The first date shown is the date of sample collection.



COVID-19 Wastewater Monitoring in Michigan



How do we interpret this data?



Detection Limit

All PCR-based laboratory testing methods have a lower detection limit, which is the lowest value for the test that will result in a positive virus detection. Most tests conducted for this project have a **variable detection limit**, meaning the lower limit changes each time the test is run.

A variable detection limit:

- Occurs due to the fact that the sample volume varies with each test, and the lower detection limit is directly based on the sample volume.
- Is more reflective of the lab method used for this project.
- Does not distort the difference between positive results and non-detect results.

A variable detection limit (light grey line on graph) is not shown as a straight line across at one specific value. Instead, this line fluctuates.

- Any value shown above the detection limit is considered a **positive detection** of SARS-CoV-2 in the wastewater sample.
- When the value for the N1 and N2 genes is the same as the detection limit, this indicates a **non-detect** or **negative** result.

While there are other options for displaying a lower detection limit, including using an average of all limits or the lowest limit for the testing runs displayed, these formats require recalculations each time additional results are added and can distort the value that corresponds to a non-detect result.



Data Interpretation

Results can show the **presence** of infected individuals in the community and **infection trends** over time. A significant increase in the amount of virus detected over time can show that cases may be increasing in a community and should be reviewed with clinical case data.

Trends can be classified by:

- Duration—short-term or sustained
- Direction—increase, decrease, or plateau

If a virus **is detected** in wastewater:

- At least one person in the sampled community is shedding the virus. The average amount or potential range of virus shed by infected or ill individuals is not known at this time.

If a virus **is not detected** in wastewater:

- It could mean there is no virus in the sampled community **OR**
- The concentration of the virus in the sample is below the level that can be detected by the test.



Caution When Viewing Data

COVID-19 wastewater surveillance is a new field. The science continues to evolve, but there are currently limitations to consider when viewing the data for this project:

- Monitor and observe trends instead of looking at individual data points
- Most data are not yet normalized to account for factors that may affect the amount of virus in samples, such as flow rate and population size
- Cannot compare data across sample sites
- Cannot determine the total number of infected persons in a community or the percent of the population that is infected
- Shedding rate and shedding duration in feces are currently unknown for symptomatic and asymptomatic individuals
- Public health decisions should not be made solely on wastewater data and instead should be used in addition to clinical case data



For More Information:

Visit the [State of Michigan website](#) on COVID-19 wastewater surveillance

Visit the [EGLE website](#) on the MI wastewater pilot project

Visit the [CDC National Wastewater Surveillance System website](#) on wastewater efforts across the country



COVID-19 Wastewater Monitoring in Michigan



Changes to Project Labs & Sites

Wastewater monitoring in Michigan has greatly evolved since some labs began testing in April 2020. There have been a number of changes that have resulted in sampling sites being tested by different labs over time. The project dashboard will display the current project and lab doing testing for a site, as well as the county the site is located in. Sites that are no longer being actively sampled will remain on the dashboard but will not show any additional results.

A list of changes is provided below:

- As of April 2024, any site that is are inactive due to changes in site-specific characteristics, public health trends, testing strategies, or shifts in the response of pandemic will have an “INACTIVE” designation after the site name.
- As of Summer 2021, Grand Valley State University’s Department of Cell and Molecular Biology (GVSU CMB) lab is performing the testing for the Kent County Health Department (KCHD) project. KCHD still serves as the lead agency for their local project, and results will be displayed under Kent County Health Department on the dashboard.
- As of Summer 2021, Great Lakes Environmental Center (GLEC) is performing the sample testing for the City of Traverse City’s project. Traverse City still serves as the lead agency for their local project, and the results will be displayed under City of Traverse City on the dashboard.

The table below lists the changes in projects/labs for specific sample sites along with an approximate date of the lab switch. This list will continue being updated as needed.

Site Name	Original Project/Lab	Current Project/Lab	Approx. date of switch
Secchia Hall	Annis Water Resources Institute	Kent County Health Dept. (GVSU CMB Lab)	June 2021
Winter Hall	Annis Water Resources Institute	Kent County Health Dept. (GVSU CMB Lab)	June 2021
Clinton Township Sites 1– 7	Michigan State University—Dr. Rose’s Lab	Oakland University	June 2021
Warren Wastewater Recovery Facility	Michigan State University—Dr. Rose’s Lab	Oakland University	June 2021
Marquette Wastewater Treatment Plant	Michigan State University—Dr. Rose’s Lab	Northern Michigan University	June 2021*
Portage Lake Sewer Authority	Michigan Technological University	White Water Associates, Inc.	June 2021
L’Anse Wastewater Treatment Plant	Michigan Technological University	White Water Associates, Inc.	June 2021
Gogebic-Iron Wastewater Authority	Michigan Technological University	White Water Associates, Inc.	June 2021
Ontonagon Wastewater Treatment Plant	Michigan Technological University	White Water Associates, Inc.	June 2021
Hancock Manhole Lift Station	Michigan Technological University	White Water Associates, Inc.	June 2021

*This site was sampled by both labs during the pilot project. There may be multiple data points displayed during this timeframe. Northern Michigan University will be sampling this site in the new project.



COVID-19 Wastewater Monitoring in Michigan



Changes to Project Labs & Sites

The table below shows the sites that have experienced changes in the lab that is responsible for testing. This list will continue being updated as needed.

Site Name	Original Lab	Current Lab	Approx. date of switch
Lake Linden Lift Station	Michigan Technological University	White Water Associates, Inc.	June 2021
Tamarack Lift Station	Michigan Technological University	White Water Associates, Inc.	June 2021
Grant Township Wastewater Sewage Lagoons	Michigan Technological University	White Water Associates, Inc.	June 2021
Chassell Township Wastewater Sewage Lagoons	Michigan Technological University	White Water Associates, Inc.	June 2021
Baraga Wastewater Sewage Lagoons	Michigan Technological University	White Water Associates, Inc.	June 2021
Wakefield Wastewater Sewage Lagoons	Michigan Technological University	White Water Associates, Inc.	June 2021
Watersmeet Wastewater Sewage Lagoons	Michigan Technological University	White Water Associates, Inc.	June 2021
Bessemer Area Sewer Authority	Michigan Technological University	White Water Associates, Inc.	June 2021
South Range Wastewater Sewage Lagoons	Michigan Technological University	White Water Associates, Inc.	June 2021
Adams Township Wastewater Lagoons Painesdale/Tri-Mountain Lift Station	Michigan Technological University	White Water Associates, Inc.	June 2021
Adams Township Baltic/Atlantic Mine Lift Station	Michigan Technological University	White Water Associates, Inc.	June 2021