

Investigating the Impact of River pH Levels on Water Drinkability

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Abstract

The purpose of our project is to see if there is a safer and easier way to source drinking water into our homes. We compared the pH of the Ottawa River, tap water from our classroom, and Lake Erie to see which best fit the safe drinking water standard and how Lake Erie affects the Ottawa River. We believed that the pH of Lake Erie would reflect the pH of the Ottawa River, as it flows into it. We were incorrect, however, due to our experiment. Since the river had safe drinking water, since it was not affected by the pH of Lake Erie, we could have reliable drinking water for the residents of Ottawa Hills.

Research Question With Additional Questions

- How will the pH levels of Lake Erie affect the pH levels of tap water and river water?
- Is tap water safe to drink?
- How does the water from Lake Erie flow into the Ottawa River?
- Could the Ottawa River be a source of tap water?

Introduction

This project answers the question: How will the pH levels of Lake Erie affect the pH levels of tap water and river water? It will explore the pH levels of Lake Erie on certain days and how tap water and water from the Ottawa River relate to it. More questions to explore in this report include: 1) tap water safe to drink? How does the water from Lake Erie flow into the Ottawa River? Could the Ottawa River be a source of tap water? With our research, we have hypothesized that if the pH of Lake Erie water rises, the tap and river water pH will also rise because they are both sourced from the river.

Water quality is a critical environmental and public health issue. The pH level plays a key role in water safety and ecosystem health. The pH of Lake Erie fluctuates due to factors including pollution, climate change, and industrial activities. In this project, we will explore these risks.

Lake Erie, one of the five Great Lakes, is a significant source of fresh water for millions in the United States, including our home, Ottawa Hills, Ohio. Due to many factors, the quality of the Ottawa River has become a concern. Lake Erie connects to the Ottawa River and supplies tap water for Ottawa Hills residents and many surrounding cities. So, we explore the question of pH in our water.

The pH of water measures its acidity, ranging from 0 (highly acidic) to 14 (highly alkaline), with 7 as neutral. According to the US Environmental Protection Agency (EPA), the ideal pH range for drinking water is between 6.5 and 8.5. Changes in pH can be caused by various natural factors as well as human intervention. Our research will reflect how the pH of our water compares to this.

Given the Ottawa River's potential role as a water source, it is necessary to analyze whether its pH aligns with safe drinking water standards. If Lake Erie's pH rises due to other factors, there is a possibility that the Ottawa River and tap water pH levels will also be affected. In conclusion, this experiment seeks to address the question: How will the pH levels of Lake Erie affect the pH levels of tap water and river water? By examining existing studies on water chemistry and our collection of data, this study aims to determine whether changes in Lake Erie's pH have a measurable impact on the Ottawa River.

Research Methods

We got our results from the Ottawa River, the tap water from our classroom, and D+ KG's pH kits. At the time of research, the Ottawa River was cold and partially frozen.

We used the Hydrosphere Globe Protocol, specifically the pH. Our Lake Erie results were found at [GLERL NOAA](#).

Carrying Out Investigations

Describe the GLOBE protocols and NASA assets actually used. Describes data collection activities including discussions of the specific locations at a site where data sampling occurred. Describes the specifics about the data (e.g., the kinds of data, amounts of data). Describes the steps for data collection (e.g., frequency of sampling or measurement activities, the protocols used, the role of each team member in collecting data, etc.).



GLOBE Badges

Data Scientist

The report includes an in-depth analysis of students' own data as well as other data sources. Students discuss limitations of the data, make references to their past, present, or future events, or use data to answer questions or solve problems in the represented system. Considers data from other sources or data available from other databases.

Results

Analyzing Data

The figures show that the pH of Lake Erie does not directly correlate with the pH of local water sources, tap water, and the Ottawa River. The data shows that the pH of Lake Erie is consistently around 8.3. Our findings suggest that the pH of the Ottawa River is consistently between 6 and 7. The pH of the tap water is consistently around 8. This may be because the water is not directly sourced from Lake Erie, as the Ottawa River is sourced from the Mississippi River watershed. The tap water, however, is sourced from Lake Erie. The pH does not align with the water from Lake Erie. The data also concludes that temperature does not affect the water's pH, as the temperature fluctuates in all data tested, but the pH does not fluctuate. Our hypothesis was not supported. We predicted that if the pH of Lake Erie water rises, the tap and river water's pH will also rise because they are both sourced from the river, however, this was not supported. In the analysis, the pH of the water sources was all different and did not correlate with each other. The experiment was intended to test the water quality by measuring the pH of different water sources to determine the best source for drinking water. The experiment was performed accurately. Uncertainties in the project may include the pH of other areas of the river.

pH of Lake Erie vs. Date

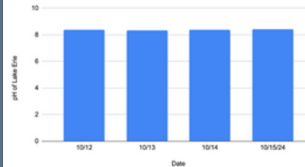


Figure #1

pH of Ottawa River and pH of Tap Water

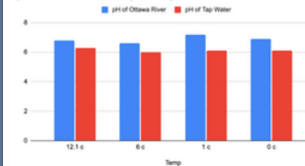
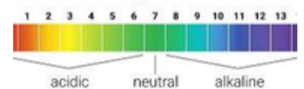


Figure #2

Conclusions

With the overall average of our pH data coming out to 6.875 from the river and the standard for safe drinking water being anywhere within 6.5 and 8.5, we can safely conclude that our Ottawa River could be a much simpler water source for us. Lake Erie's pH levels are around 8.3, nearing unsafe drinking water. Since the river is closer and healthier, it would be safer and easier for the residents of Ottawa Hills to get their drinking water from the river.

The pH scale



Discussion

As we have concluded that the river water is safer and closer, the next step would be to find a way to source the river water into our homes, schools, and workplaces. We can also see from our research that the pH of Lake Erie does not affect the pH of the Ottawa River, so if there is ever any virus in the Lake again, like in August of 2014 when toxins bloomed in the Lake and prevented us from drinking our water.

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