Microplastic Pollution: A Survey of Wastewater Effluent in the Lake Champlain Basin

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Microplastics are a growing concern due to their ubiquity in our environment. They are particularly problematic in freshwater systems, where they can be ingested by aquatic organisms and affect their health and behavior. This study aims to understand the extent of microplastic pollution in wastewater effluent from Lake Champlain Basin wastewater treatment plants (WWTPs).

Wastewater Treatment Plant (WWTP)

The Wastewater Treatment Plant (WWTP) is a critical component of any water management system. It processes wastewater to reduce pollution and harmful substances, ensuring a cleaner, healthier environment. By focusing on microplastics, this study contributes to our understanding of pollution sources and potential environmental impacts.

Hypotheses

- The most common type of WWTP's microplastic would be pellets/beads.
- Larger particles would be more common during higher flow events.
- The most common type of WWTP's microplastic would be pellets/beads.

Results

- Flow rates were assessed at the pump before and after collection. A new beaker was used at each pump, and flow rates at Plattsburgh's River LaChute River were captured in 1 mm sieve.
- Particles per day emitted at WWTP in Plattsburgh, St Albans, Burlington, and Ticonderoga. Based on studies, 3,844 particles per day are entering the Lake Champlain Watershed.
- Fluctuations in flow rates at the WWTP were noted, with higher flow rates associated with increased microplastic particulate loadings.

Discussion

- Current estimates of microplastic pollution are based on WWTP data. Further, the extent of microplastic pollution in wastewater effluent could be underestimated as microplastics are not completely captured in typical WWTP processing.
- Microplastics typically are small (125 µm) and降至 medium (355 µm)-sized, as compared to larger (1 mm) wipers.
- Rarely would small microplastic particles be captured by typical WWTP processing without tertiary treatment (Dav et al. 2016).
- Most of the microplastics studied were small (125 µm) and medium (250 µm) size.

Acknowledgements

- Special thanks to the staff and scientists at the Plattsburgh WWTP, specifically Dave Powell, for providing access to WWTP microplastic samples.
- Many thanks to the staff and scientists at the Plattsburgh WWTP, specifically Dave Powell, Kris Gushlaw, and William Ellsworth, Brian Willett (St. Albans), Mike Porter (Ticonderoga), and Matt Dow (Burlington). Many thanks to the staff and scientists at the Plattsburgh WWTP, specifically Dave Powell, Kris Gushlaw, and William Ellsworth, Brian Willett (St. Albans), Mike Porter (Ticonderoga), and Matt Dow (Burlington).

Conservation Implications and Suggestions

Plastics in consumer products are not completely captured in typical WWTP processing. There is a need for greater attention to the full extent of microplastic pollution and their environmental impacts.

Literature Cited

- Browne et al. (2011) noted that microplastics are a growing concern and their presence in WWTP effluent has implications for the environment.
- Garreau et al. (2015) noted that microplastics are a growing concern and their presence in WWTP effluent has implications for the environment.
- Mason et al. (2016) supports that flow rate was not associated with microplastic particulate type in WWTP post-treatment effluent.

Microplastics can be ingested by aquatic organisms and affect their health and behavior. This study contributes to our understanding of pollution sources and potential environmental impacts.

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