Analyzing and Addressing Particle Pollution In Northwestern Indiana

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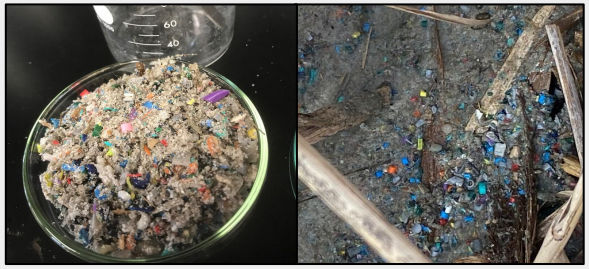
Lake George Microplastics

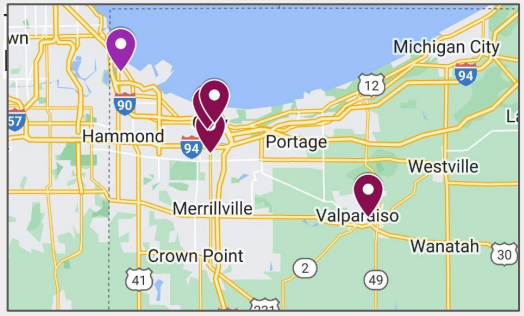


(Left) Blue Lid Sample Plastic (Right) Outfall Sediment Collection Site

- PolyJohn: a Hammond company that processes polyethylene slabs to manufacture portable toilets
- On July 7, 2020 a concerned citizen sent a letter to the US EPA and IDEM. IDEM inspected PolyJohn on July 21 and found that violations had occurred.
- The company PolyJohn was found negligent for the mismanagement of plastic waste pollution of Lake George
- PolyJohn was fined $11,360 in 2021 for the violation and only $400 in 2022
- In comparison to previous years, results showed a drastic escalation of microplastic at all points of testing

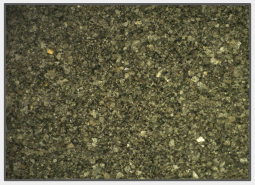
Sample ID	Volume processed (mL)	Mass MP pollution (g)	Number of MP/100 mL or 30 g (dry mass)
Marsh water 1	100	15.530	123,680
Marsh water 2	100	13.459	411,440
Lake George	200	0.367	570
Lake George	100	1.123	1200
Outfall 1	100	1.288	29,040
Outfall 2	100	0.624	8560
Sediment marsh	30 g	3.678	42,380
Sediment outfall	30 g	2.321	16,820

Figure 1. Data Collected From All Lake George Samples



Particulate Matter (PM)

A mixture of solid and liquid particles found within the air



<0.149 mm IUN RDS Sample at 20x Magnification

PM occurs in a variety of sizes which are concern to human health

Particulate Matter can carry a variety of contaminants

- Some plastics and road dust elements are small enough to be considered PM

- Manufactured materials of plastic never truly go away

-Can be breathed in and create health related issues

Roto Powder Sized Between 0.20mm to 0.80 mm

(Left) Gary, IN Steel Mill (Right) Gary, IN Factory

Localized Road Dust Sediment (RDS) Samples

(Left) Collection of Sample (Right) Microbeads Within RDS

- RDS, an accumulation of particulate matter on the street surface, can indicate what pollutants are present in an area due to the settling of atmospheric and anthropogenic particles on the surface of roads
- RDS samples used in this experiment were collected from areas near pollution sources
- A number of methods were used to process and analyze the samples, such as infrared spectroscopy, X-ray fluorescence and microscopy
- Contaminants that may be of concern, such as lead and arsenic, were found within the RDS samples
- Data could provide reliable, public air quality information when compared to air quality monitors

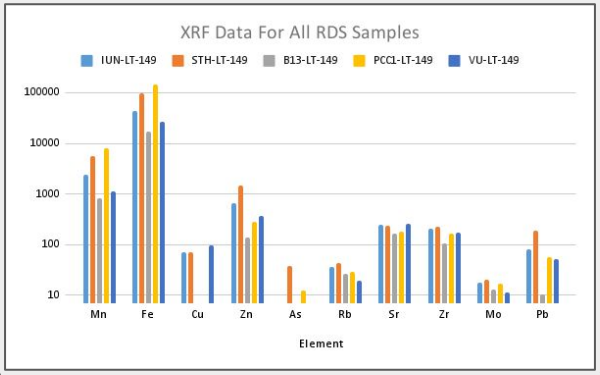


Figure 2. XRF Data of All RDS Industry Samples

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