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Learning from PFAS: Why Michigan Must Act Early on Microplastic Pollution

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EXECUTIVE SUMMARY

Michigan can leverage lessons learned from its costly experience with PFAS contamination to proactively address microplastic pollution. Waiting for contamination to reach severe levels before implementing regulations leads to high remediation expenses predominantly funded by taxpayer dollars. Taking early precautionary action can help the state safeguard its Great Lakes ecosystem, public health, and economy.

KEY FINDINGS

- Michigan's experience with PFAS contamination and policy implementation provides a warning about the dangers of microplastics: delayed action on persistent contaminants can cause widespread pollution that increases future treatment and remediation costs
- Early investment in research and monitoring is critical for science-based policy: statewide monitoring and research can identify major sources and exposure pathways, improve standardized testing, and provide the evidence needed to develop effective regulations
- Prevention should accompany monitoring: reducing microplastic releases at their sources, such as from industrial discharge, intentionally added, and single-use plastics, can help prevent contamination

BACKGROUND

Microplastics (MPs), defined as small plastic particles ranging in size from 1 to 5000 µm[1], have attracted significant interest in the field of environmental research and public health due to their widespread distribution, transport, and the possible ecological consequences of their release into the environment.[2] Once microplastics are in the environment, they may enter the human body through a variety of exposure routes such as ingestion, inhalation, and direct skin contact, thus potentially threatening human health.[3] Despite their widespread occurrence and the public health impacts, national regulations surrounding microplastics remain limited. The only federal regulation surrounding microplastics is the Microbead-Free Waters Act of 2015, which banned the use of microbeads in rinse-off cosmetics, including toothpaste.[4] In 2022, California became the first (and only state to date) to mandate testing requirements for MPs in drinking water.[5]

The early history of the contamination of per- and polyfluoroalkyl substances (PFAS) is similar to the history of microplastics. Like microplastics, PFAS resist natural breakdown and persist in the environment. Because of the useful properties of PFAS for industrial applications, manufacturing and other industries used PFAS extensively and a common disposal practice was releasing them into wastewater. Only after substantial contamination had already occurred did regulators take action, which led to high remediation costs (from taxpayer dollars) and serious public health issues that impacted Michigan residents. Particularly in Michigan, delays in taking action had tremendous impacts on communities and drinking water supplies throughout the state, necessitating hundreds of millions of dollars for a public health response, monitoring, and remediation.[6,7]

Thus, this experience has placed Michigan in an advantageous position to use the lessons learned from PFAS contamination to be proactive, before microplastic contamination becomes another costly and damaging environmental and human health problem. Furthermore, there are three pending Senate Bills (503, 504, 505) in the state that aim to ban intentionally added microbeads, establish statewide microplastic testing in drinking water, and to develop a statewide microplastic research and monitoring plan that would strengthen the state's efforts to combat microplastic pollution.

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COMPARING MICROPLASTICS AND PFAS AND THE NEED FOR MICHIGAN TO ACT EARLY

Ten years after PFAS was first discovered in Michigan's water supply in 2010, the state became a leader on PFAS regulation. In 2020, maximum contamination limits (MCLs) were established for seven of the most prevalent PFAS, and today, the state has one of the strictest PFAS regulations for drinking water in the nation. Michigan's Department of Environment, Great Lakes, and Energy (EGLE) through the Michigan PFAS Action Response Team (MPART) has also developed a Geographic Information System.[8] The tool is publicly available and shows PFAS monitoring sites and areas of interest across the state. However, there is a chance that the state's expensive PFAS trajectory (which includes research and policy recommendations followed by remediation efforts once standards are set) will be repeated if policymakers do not act on microplastics. There are numerous parallels between PFAS and microplastics in particular that should not be disregarded and should expedite action:

- Environmental persistence and widespread pollution with an increasingly rapid use
- Scientifically challenging to remove and expensive to remediate
- Unclear estimation of the extent of contamination and its dangers to public health
- Inconsistent monitoring and characterization
- Limited regulations



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Michigan's proximity to the Great Lakes means it has a responsibility to be at the forefront of environmental monitoring and regulations. Approximately 22 million pounds of plastic end up in the Great Lakes every year.[9] Researchers have found microplastics in all five of the Great Lakes which is the main source of drinking water for more than 40 million people. Furthermore, protecting water quality from microplastics is not only important from a public health lens but also to maintain the economy. The Great Lakes brings in billions for the state through tourism, shipping, and fishing industries, which depend heavily on maintaining a safe and clean water supply and infrastructure.[10] Furthermore, studies show that every dollar dedicated to research in the Great Lakes provides a three dollar return on investment.[11]

POLICY RECOMMENDATIONS

Regulate industrial effluent

Industrial effluent is a major pathway through which microplastics enter Michigan's drinking water sources. While wastewater treatment removes many larger particles, large quantities of microplastics can remain in treated effluent that is released into surface water, or are concentrated in biosolids that are applied to agricultural land as fertilizer. This allows microplastics to evade existing treatment processes and to enter the environment. The state's experience with PFAS demonstrated that waiting to regulate persistent contaminants can result in widespread environmental contamination and costly remediation. Rather than repeating this pattern, Michigan should proactively monitor and regulate microplastics in industrial discharges before contamination becomes more difficult and expensive to manage. Early action would help protect the state's drinking water, ecosystems, public health, and economy.



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Invest in increased microplastics research across the state

Michigan should invest in statewide research and monitoring to determine where microplastics are entering the environment, how they move through Michigan's water, soil, and atmosphere, and where human exposure is most likely. We must turn our attention to encouraging fundamental research that can help improve our understanding of microplastic transport and impacts, the efficiency of testing, and capture. Investing in research would provide policymakers with the evidence needed to identify priority sources, evaluate interventions, and develop effective regulations before contamination gets uncontrollably widespread.

Curb single-use plastic consumption

Since the number of microplastics found in the environment is directly correlated to everyday plastic usage, the most effective way to reduce microplastics is to curb plastic production and consumption. Policies that reduce unnecessary single-use plastics, expand reuse and refill systems, and incentivize alternatives can decrease the amount of plastic waste available, waste that fragments into microplastics over time. This has been done in states such as New York where plastic straw usage has been restricted since 2021 (New York City) and single-use polystyrene (commonly known as styrofoam) has been banned since 2022.[12,13]

CONCLUSION

As Michigan's experience with PFAS contamination has shown, decades of environmental harms and billions of dollars in monitoring, treatment, and remediation expenses can result from waiting too long for complete scientific assurances before regulating persistent chemicals in the environment. Thus, Michigan's lengthy cleanup and remediation efforts with PFAS should serve as a warning to address microplastics as soon as possible. Although there are still many unanswered questions regarding the long-term health effects of microplastics, a precautionary approach is warranted due to their persistence, extensive distribution, and growing detection in Michigan's food, water, soils, and ecosystem. Early research investment can assist shaping science-based policies before the problem is irreversible. Additionally, with more funding, the state can work to create a statewide plan that combines public education, monitoring, research, and prevention in the fight against microplastics before it is too late.

ENDNOTES

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