CWWA INFO-SHEET
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MICROPLASTICS IN DRINKING WATER

PREPARED BY CWWA DRINKING WATER QUALITY COMMITTEE

Purpose of this Info-Sheet

This information sheet was prepared by the CWWA Drinking Water Quality Committee to address growing concerns about the potential for microplastics in drinking water. This sheet is intended to provide general information to CWWA members, while also referencing more detailed sources of information that will help members and their associated utilities prepare their own responses to questions about microplastics they may encounter from their customers, municipal leaders, political leaders, media, and other concerned stakeholders.

Microplastics are derived from the breakdown of larger plastic material. The use of plastics is ubiquitous worldwide and, as such, microplastics are being detected across all environments. There is growing interest in the drinking water industry in North America and globally regarding the presence of microplastics in drinking water and their potential impact on human health and, in turn, municipal water treatment.

Background on Microplatics

Microplastics are tiny plastic particles, less than 5 millimetres in size, that originate either from products manufactured at microscopic scales or from the breakdown of larger plastic debris. These particles are typically categorized as primary microplastics, such as microbeads and industrial pellets, or secondary microplastics, which form as larger plastics fragment over time.

Microplastics have now been detected in oceans, rivers, lakes, groundwater, and even treated drinking water systems. They enter these environments through stormwater runoff, wastewater effluent, atmospheric deposition, industrial discharges, and the gradual degradation of littered plastics. Wastewater treatment plants capture many particles, but cannot fully remove the smallest microplastics, allowing them to pass into receiving waters. Additional sources include tire wear particles, synthetic textile fibres released during laundry, and fragments from packaging and consumer goods.

Health Threats from Microplastics

Once in aquatic systems, microplastics persist for long periods due to their resistance to natural degradation. These particles can be ingested by a wide range of organisms, enabling them to move through food webs and accumulate in biological tissues. Research on human health impacts is ongoing, with concerns focused on inflammation, oxidative stress, and the potential transport of chemicals or pathogens.

For drinking water specifically, current evidence does not show confirmed health impacts from consuming microplastics, but the science is still emerging, and global health agencies emphasize the need for continued monitoring and research.

Are there Guidelines and Regulations for Microplastics in Drinking Water?

There are currently no regulations for microplastics in drinking water in Canada or elsewhere in the world.

In 2019 the World Health Organization (WHO) started its investigation on the health effects of microplastics in drinking water with the California Water Board following shortly after in 2021. The WHO performed a conservative exposure scenario for each known toxic compound commonly found in plastic and discovered that, even when representing high chemical concentrations and absorbance rates, the health concerns still fell into the minimal range.

The WHO states that there is currently not enough evidence to recommend routine microplastic monitoring and sampling. In 2021, the Government of California filed a bill requiring a standard definition of microplastics, a standard methodology for microplastic testing in drinking water, and a four-year study of microplastics in California's drinking water. In the Fall of 2023, the California Water Board initiated their 4-year study, requiring 30 water providers to monitor their supply for microplastics. The process will move in two stages with completion anticipated in Fall 2028.

As of May 2025, both the WHO and California Water Board have determined that there is insufficient evidence on the health impacts of microplastics in drinking water to warrant monitoring regulations. Additional follow-up reviews by the California Water Board are anticipated following completion of each of the two phases of their on-going study.

Health Canada continues to monitor the science around microplastics. Health Canada has not initiated the development of guidelines for microplastics in drinking water because there are insufficient information and evidence to develop a health-based guideline at this time and standardized sampling and analytical methods are not yet established. Additionally, the federal government issued a 'Science Assessment of Plastic Pollution' in 2020 and continues to look at opportunities to reduce plastics in the general environment. An updated state of the science report is expected to be developed accordingly, although the timeline is not yet confirmed.

Water Quality Monitoring

Microplastics are ubiquitous in the environment and have been detected in a broad range of concentrations in marine water, wastewater, fresh water, food, air and drinking-water (both bottled and tap water). These ecosystem-focused studies often use diverse sampling methods and are driven largely by academic and environmental research rather than regulatory requirements. Monitoring of microplastics in drinking water systems is not widely practiced, with significant gaps in standardized sampling, detection limits, and laboratory methods. Currently, the absence of standardized sampling and analysis also makes comparison of results between studies challenging. The European Union, via the European Commission, is supporting the ongoing development of standard methodology for sampling, analysis and reporting microplastics in drinking water. However, as noted, there is currently insufficient evidence on the health impacts of microplastics in drinking water to warrant monitoring regulations.

Municipal Water Treatment

The WHO recommends the continued prioritization of removing known harmful microbial pathogens and chemicals from drinking water and suggests that maximizing particulate matter removal from drinking water will also, in turn, minimize the potential concentration of microplastics. Per the 2019 WHO report (see link below): Drinking water treatment has proven effective in removing far more particles of smaller size and at far higher concentrations than those of microplastics.

For surface waters, conventional treatment, when optimized to produce treated water of low turbidity, can remove particles smaller than a micrometre. Advanced treatment can remove even smaller particles; for example, nanofiltration membranes can remove particles >0.001 µm while ultrafiltration membranes can remove particles >0.01 µm. In groundwater applications, for which these treatment processes are not typical, it is expected that microplastics will be less prevalent due to the natural protection of those water sources.

Additional Sources of Information on Microplastics

Our understanding of sampling, analysis and monitoring methodology for microplastics, as well as the environmental and health effects associated with microplastics, continues to evolve. To stay up-to-date, note the publication date of reference materials and be sure to reference the most up-to-date versions.

- Science assessment of plastic pollution - Canada.ca
- WHO Microplastics in drinking-water
- Microplastics Drinking Water | California State Water Resources Control Board
- Frontiers | Microplastics in ecosystems: ecotoxicological threats and strategies for mitigation and governance

What Water Utilities Can Do:

As the science around microplastics continues to evolve, there are several steps that water utilities in Canada may want to consider. These include:

- Understand the issue: Become familiar with the current state of the science around microplastics in drinking water and the aquatic environment in the various sources cited above.
- Share accurate information: Be prepared to answer questions from customers and municipal leaders, politicians, and other stakeholders on microplastics. This may include preparing media briefs.
- Optimize your water treatment processes: Continue to prioritize the removal of microorganisms and chemicals in drinking water that pose a public health concern. Promote strong control measures and optimize water treatment processes for particle removal and microbial safety, which will incidentally improve the removal of microplastic particles. Note that routine monitoring of microplastics in drinking water is not recommended at this time.
- Advocate for the reduction of plastic use and stronger product stewardship: The best way to reduce the presence of microplastics in our environment is to reduce our use and reliance on plastics. Individual consumers can make personal decisions to reduce their use of plastics.Meanwhile, federal, provincial/territorial and municipal governments need to address the growing reliance on plastics and make the manufacturers and sellers more responsible for the waste, before it enters the environment.

What CWWA Drinking Water Quality Committee is Doing:

- Monitoring the issue of microplastics in drinking water as it continues to evolve - including guidelines in other jurisdictions, sampling and analytical methods, occurrence in water and the environment, and water treatment considerations
- Communicating routinely with Health Canada experts on this topic
- Providing current information and reference to additional sources of information to our membership to enhance understanding of microplastics and provide support in communicating this topic to stakeholders