

Burgeoning microplastics pollution prompts regulatory action to protect drinking water in California

WASHINGTON | CORE

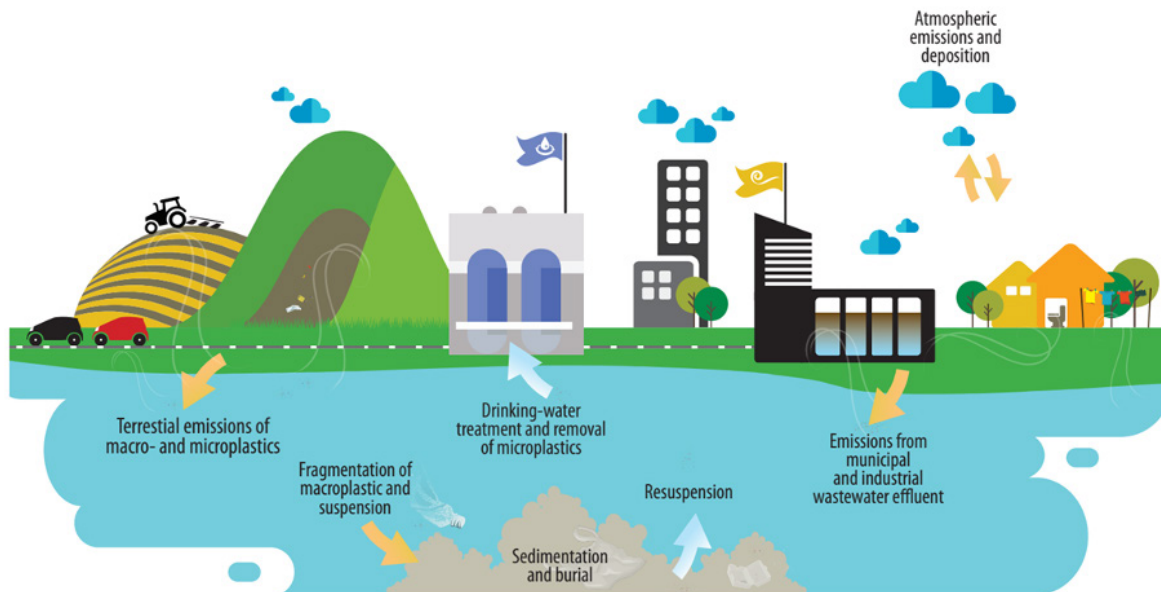


Around the world, governments are struggling with rapidly rising levels of plastic waste due to strong manufacturing demand and inadequate collection and recycling operations. This has led to plastic waste contaminating many natural environments, perhaps most visibly the world's oceans, where huge masses of waste blight coastlines and harm wildlife. In an effort to deal with plastic waste, governments around the world are implementing a variety of regulatory and technology efforts to monitor and reduce buildup.

In addition to controlling visible waste like water bottles, regulators are also increasingly concerned about the spread of tiny microplastic particles, which come from commercial products and the breakdown of larger pieces of plastic waste. In California, studies showing high levels of microplastics pollution prompted the state to take an initial step toward regulation in September 2018 with the enactment of State Bill SB 1422¹ – the California Safe Drinking Water Act: microplastics. The Safe Drinking Water Act requires the California State Water Resource Control Board (SWRCB) to take steps to regulate drinking water supplies to protect public health.

As pictured in Figure 1 below, sources of microplastics are ubiquitous, ranging from clothing, water bottles, and cosmetics, and may be transported into water through air, stormwater, and sewage treatment plants. These particles are consumed not only by marine life, but also by humans, as large quantities of microplastics accumulate in surface waters used for human drinking water supplies.

Figure 1: How plastics and microplastics enter freshwater bodies and potentially reach drinking-water



Source: World Health Organization ⁶

Until recently there had been little concrete regulatory activity on measuring or mitigating microplastics contamination in drinking water, but that changed on June 16, 2020 when the SWRCB adopted a first-of-its-kind formal definition of the dimensions and composition of microplastics particles establishing a foundation for future monitoring and potential regulation.

To better understand the background and development of the SWRCB's definition and its implications, Washington CORE spoke with Dr. Scott Coffin, a scientist in the Division of Drinking Water at the SWRCB.

California's Role in Environmental Regulation

California has emerged as a global leader due to its efforts to define, measure, and regulate microplastics in the environment. California has a long legacy of forward-looking regulatory actions on trash pollution of all kinds, including an effort to reduce trash in waterways through a concept called TMDL (Total Maximum Daily Loads). California also enacted a ban on personal care products containing plastic microbeads in 2015 that led to a similar ban on the federal level, demonstrating the influence of California's regulatory actions on a broad government audience.

The California Safe Drinking Water Act required the SWRCB to adopt a definition of microplastics in drinking water by July 1, 2020. Dr. Coffin, was responsible for writing the draft microplastics definition in March 2020. He states that California's decision to first address microplastics via contamination in drinking water was logical for several reasons. First, the entire population has a vested interest in clean drinking water. Second, it is relatively easy to detect microplastics particles in drinking water as compared to in food. Finally, drinking water is easy to regulate, because all water must be treated before reaching end users.



Dr. Scott Coffin, Division of Drinking Water, California State Water Resource Control Board

Evolution of the Definition

According to Dr. Coffin, the SWRCB used a slightly modified version of the European Chemical Agency's (ECA)

2019 definition of microplastics to develop its proposed definition for drinking water. The ECA definition was geared toward intentionally added microplastics in products and focused on ecological effects. It only considered two dimensions, and a minimum size of one micrometer.

The SWRCB received 27 comments from industry and environmental stakeholders on the definition, resulting in two revisions. The first revision expanded the size requirements of a particle to three dimensions to reduce ambiguity, and the second reduced the lower size limit of microplastics dimensions from 1 micrometer to 1 nanometer².

This revised definition that the SWRCB adopted in June is as follows:

“Solid polymeric materials to which chemical additives or other substances may have been added, which are particles which have at least three dimensions that are greater than 1 nanometer and less than 5,000 micrometers (μm)³. Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded.”

The adopted definition came under criticism for its broadness from industry groups such as the American Chemistry Council, the California Manufacturers and Technology Association, and the Personal Care Products Council. These organizations urged the SWRCB to consider changes such as excluding biodegradable and soluble plastics, which they argue pose less of a health risk. They also pushed to raise the lower size limit to 20 micrometers based on current testing technology limitations.

Dr. Coffin defended the inclusion of nano-particles in the SWRCB's definition, explaining that although research on health effects of microplastics ingestion is limited, smaller particles are more likely to be toxic to humans than larger microplastics because they have a higher ability to interfere with important cellular processes, and reach sensitive organs, such as the brain³. Dr. Coffin expressed his hope that including nanometer-scale particles in the definition of microplastics will make such particles easier to regulate if found to be detrimental to human health⁴.

He also argued that definitions for emerging contaminants with highly uncertain compositions and health impacts should be aspirational and therefore unbound by current measurement method limitations, especially since promising research is ongoing globally on technological advances to enable nano-scale measurement.

The SWRCB's action is also intended to ensure its microplastics definition aligns closely with the non-drinking water definitions of microplastics around the world, all of which are inclusive of nano-range particles. This includes definitions from the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), and the ECA. Ultimately, most microplastics end up in oceans as marine debris, which is a global issue requiring close coordination of mitigation efforts.

Next Steps

Dr. Coffin emphasized that the SWRCB will host another public workshop and conduct a peer review process to determine whether the definition needs additional revision before its finalization in spring 2021. This process will reflect newly discovered research results on the toxicity, occurrence, and behavior of microplastics, on which scientists are currently publishing roughly three papers per day. If certain types of particles are eventually deemed to be benign toward humans, they may be excluded from further iterations of the SWRCB's definition in the future.

By July 2021 the SWRCB is obligated to adopt a standard methodology to measure microplastics in drinking water. Following this, they will adopt requirements for four years of testing and public reporting of microplastics in drinking water by water utilities, and accredit qualified laboratories to analyze microplastics levels, as required by the California Safe Drinking Water Act⁵.

Depending on the results of this trial reporting period, monitoring and reporting mandates for microplastics in drinking water could potentially be imposed under the California Safe Drinking Water Act, and, in wastewater, under California Waste Discharge Requirements or federal National Pollution Discharge Elimination System permits. California may also elect to introduce additional regulations on waste production and pollution, including regulation by the California Department of Toxic Substances Control on the manufacturing of certain plastic products if they are found to be harmful to human health.

Dr. Coffin stressed that many outside domestic and international government entities are closely watching California's progress on this issue, so any decisions that the SWRCB makes could ultimately have ramifications across the globe. More populous states, such as New York, may soon follow California's lead to begin regulating microplastics. Additional legislation related to safer drinking water could also emerge at the federal level in the future.

Author: Chris Wood, Senior Analyst

Endnotes

- 1 https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1422
- 2 https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/dfntn_jun3.pdf
- 3 https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/docs/stffrprt_jun3.pdf
- 4 <https://www.youtube.com/watch?v=WeSwUinbnks&feature=youtu.be&t=2057+>
- 5 https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1422
- 6 "Microplastics in drinking-water". World Health Organization. (2019): 12 [Online] Available at <https://apps.who.int/iris/bitstream/handle/10665/326499/9789241516198-eng.pdf?ua=1> [accessed: 02 September 2020].

WASHINGTON | CORE

Washington CORE is an independent consulting and research firm providing strategic research analysis and advisory services. By leveraging in-depth research capabilities coupled with extensive international networks in both public and private sectors, we deliver clarity and insight to prepare our clients for success in an ever-changing global landscape.

Established in 1995, Washington CORE has grown into one of the premier independent consulting firms in the greater Washington DC area. The co-founders, Chiyo Kobayashi and Kiyoshi Nakasaka, have combined global business experience with strong policy and market entry strategy backgrounds to lay a foundation for the firm. Over the years Washington CORE has been transforming itself from a research think tank to a global strategy consulting firm.

Please find out more information at wcore.com.