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January 28, 2023

RE: Senate Bill 405 Hearing

Dear Senate Committee,

Thank you for providing me with the opportunity to submit testimony. I am Dr. Chelsea Rochman, an Assistant Professor in Marine and Freshwater Ecology at the University of Toronto. I have been researching the issue of microplastic pollution (plastic waste <5 mm in size) for more than 15 years. Specifically, I research the sources, fate and effects of microplastic pollution in the environment. My research demonstrates that microplastics are ubiquitous in the environment, including in seafood. It demonstrates that microplastics are associated with a cocktail of toxicants, including 78% of those we currently consider priority pollutants under the US EPA. It also demonstrates that microplastics can be toxic to fish and invertebrates.

Directly relevant to microfibers, my laboratory collaborated with the Ocean Conservancy and the Department of Fisheries and Oceans Canada to assess the sources, effects and solutions of microfiber pollution. **Our first study**, led by student Hayley McIlwraith (McIlwraith et al., 2019), confirmed that washing machines are a source of microfiber pollution to aquatic ecosystems and demonstrated the effectiveness of filters for preventing microfiber pollution. We found that fibers diverted an average of 87% of microfibers (by count) from washing machine effluents when filters were applied. **In a follow-up study**, led by Dr. Lisa Erdle (who was working on her PhD at the time), worked with a community on Lake Huron to deploy washing machine filters in nearly 100 homes (10% of the buildings connected to the local wastewater treatment plant (WWTP)). Here, we quantified the total amount of microfibers diverted from washing machine effluent and the amount of microfibers entering Lake Huron from WWTPs before and during deployment of washing machine filters. In this study, we diverted up to 2M microfibers per week from Lake Huron and significantly reduced the amount of microfibers leaving the WWTPs and polluting the Great Lakes (Erdle et al., 2021). **Lastly,** Dr. Erdle conducted a study to look at the toxicity of microfibers (cotton and polyester) to aquatic organisms. Here, we found that chironomids (a very important link in the food web) were negatively affected, in the form of delayed development, from exposure to both cotton and polyester microfibers – demonstrating that both plastic and cotton microfibers are aquatic pollution (Erdle et al., *in review*).

Synthetic microfibers are just one of many types of micoplastic pollution; however, **microfibers are one of the most common types of microplastic pollution that we find in the environment.** They are ubiquitous; they are found in samples from headwater streams, rivers, soils, lakes, sediments, ocean water, the deep-sea, wildlife, arctic sea ice, seafood and table salt. In our own samples from the Laurentian Great Lakes, we sometimes find more than 100 microfibers in an individual fish. Such widespread exposure raises concerns about effects to wildlife and human health.

Microfibers, like other microplastics, can alter feeding behavior, energy budgets, and survival of individual animals. Still, we have much to understand about the effects of microfibers in the environment. Microfibers have a distinct shape from other microplastics, they are made out of many (and different) material types (e.g., nylon, polyester, acrylic, rayon) and may be associated with a unique suite of

chemicals from manufacturing. Microfibers may be a source of their innate chemicals to wildlife and/or their shape may cause effects that differ from other microplastics.

Although there are other sources of anthropogenic microfibers to the environment (e.g., cigarette filters), many studies have demonstrated that clothing made from synthetic textiles (e.g. polyester, acrylic, polypropylene, polyamide and polyethylene) shed microfibers in the wash – thus contributing to the growing accumulation of microplastics in nature. Researchers show that shedding varies between washing cycles, fabrics and materials, and that some garments can shed thousands of microfibers during a single wash. When microfibers shed in the washing machine, they are transmitted into the effluent that travels to waste water treatment plants (WWTPs). While most of the microfibers will be captured in the sewage sludge, many fibers will be released directly to the aquatic environment in the final effluent. We estimate that WWTPs in the United States discharge billions of these microfibers into natural waterways in a single day. Furthermore, where sewage sludge is applied to land as fertilizer, microfibers may reach surface waters via soil erosion or storm water runoff.

Today, I want to relay to you that there is enough scientific evidence regarding the contamination, persistence and fate of microfibers (in addition to evidence regarding the efficacy of this solution) to support the addition of filters to washing machines. Clothing is a source of microfibers to the environment, and thus attention to this source is warranted now while we work to understand what other sources might also deserve attention.

I see Senate Bill 405 as an opportunity for Oregon to take leadership to mitigate microfiber pollution at the source – preventing microfibers from entering our watersheds will help protect local water quality, wildlife, and resources used by people, including maintaining safe seafood and drinking water.

Thus, I support Senate Bill 405 because it is informed by scientific evidence and can reduce the source of microfibers, preventing them from entering our watersheds and traveling through critical habitat for wildlife and our reservoirs for clean drinking water and seafood.

I respectfully ask for your aye vote. Thank you for your time.

Sincerely,

Chelsea M. Rochman
Assistant Professor