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Storm drain screens prevent industrial microplastics from entering local watersheds

Background

In recent years, researchers have documented the presence of **pre-production plastic pellets** (also called nurdles) on shorelines and in tributaries in the Great Lakes region.[1,2] Plastic pellets, typically ellipsoidal or cylindrical in shape and ranging from 1 to 5 mm in size, are the raw material used to make plastic products. Unfortunately, because of their small size and light weight, plastic pellets are easily lost to the environment, contributing to global plastic pollution. The Organization for Economic Cooperation and Development estimates that plastic pellets accounted for 10% of global microplastic emissions by weight in 2019.[3]

Plastic pellets can be lost to the environment at various stages of the plastic supply chain, including production, transportation, and storage. Loss can occur as a single event, spilling a substantial amount directly into the environment. More often, however, it occurs as a subtle, continuous release during the routine operations of the plastic industry. In the case of the latter, if the spilled pellets are not cleaned up promptly and adequately, they can be picked up by rain and snowmelt and washed into the stormwater sewer system, where direct release to the local watershed is likely.

So far, action being taken to prevent plastic pellet loss in Canada and beyond has been largely voluntary, the most prominent example being a global program established by the plastic industry in 1991 called Operation Clean Sweep.[4] However, under the 2021 Canada-Ontario Agreement of Great Lakes Water Quality and Ecosystem Health, the Government of Ontario signified its intention to "consider plastic pollution in… stormwater policies".[5]

Since 2019, the University of Toronto (U of T) Trash Team has been working to address plastic pellet pollution through its Pollution Prevention Project called Operation Sweep the Creek.

Plastic pellets spilled on the properties of plastic companies in Toronto.

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Key Findings

- Previous Operation Sweep the Creek studies found that stormwater is a transport pathway for plastic pellets[6] and storm drain screens are a potential solution for plastic pellet loss.[7]
- Our new study found that the widespread deployment of storm drain screens on the properties of plastic companies is an **effective and practical solution** to prevent plastic pellet loss from the plastic industry.
  - Over the course of a year, 13 storm drain screens deployed across the properties of five plastic companies in Toronto prevented nearly 5.5 million plastic pellets from entering the local watershed.
  - Participating plastic companies reported that maintaining storm drain screens required minimal financial investment and human resource.

Plastic pellets captured a storm drain screens with a 1 mm liner deployed on the properties of plastic companies.

Policy Recommendations

The **Government of Ontario** should:

- Create a regulation under the Environmental Protection Act requiring plastic companies that handle pre-production resin, including pellets, scrap, and powder, to deploy and maintain storm drain screens with a 1 mm liner in all stormwater drains on their properties.
- Offer financial assistance for small- and medium-sized enterprises for the procurement, installation, and maintenance of storm drain screens.

Ontario municipalities should:

- Update their sewer or stormwater bylaws to explicitly list pre-production resin, including pellets, scrap, and powder, as a restricted or prohibited substance.

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