

Study examines plastic bag bans at consumer recycling sites

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University at Buffalo researchers published a journal article quantifying the unintended consequences of New York State's Plastic Bag Waste Reduction Law and ways to address those consequences.

The aim of the study, which states that reducing society's reliance on [single-use plastics](#) has clear environmental benefits, is to examine and help improve [recycling](#) efforts.

Described in Waste Management, "Impact of Plastic Bag Bans on Retail Return Polyethylene Film Recycling Contamination Rates and Speciation" details the composition of retail return recycling streams before and after the implementation of New York's plastic bag ban, which state lawmakers approved in 2019.

Before the ban, the most common post-consumer film returned for recycling was grocery and retail bags. However, retail return recycling depots, often located in grocery store entrances, also allow customers to drop off other polyethylene-based film-materials (PE). In fact, the New York State bag ban requires stores to continue collecting these materials even though they can no longer distribute plastic bags.

John Atkinson, Ph.D., the Scott and Coleen Stevens Chair in Engineering Sustainability at UB, along with Jenna Meert and Austin Izzo, both graduate students in environmental and water resources engineering, collaborated with two Western New York grocery stores to sort and quantify returned materials before and after the plastic bag ban.

With the plastic bag ban in effect, researchers found contamination rates increased 1.4 to 2.8 times. This increase adds to transportation costs and complicates the process of reclaiming these recycled materials.

"As more states implement bag bans, there may be consequences for post-consumer PE films recycling. If the amount of material available for recycling decreases and becomes more contaminated, it may not remain economical to recycle these remaining PE films. Increasing PE capture rates and decreasing contamination post-bag ban requires education about retail return programs and/or implementation of

innovative collection methods," says Atkinson, an associate professor in the Department of Civil, Structural and Environmental Engineering.

Retail return recycling streams become contaminated due to several factors, and researchers categorized these contaminants. In addition to obvious problematic items—such as stray food or liquids—non-PE plastic materials, vacuum storage bags, beverage rings and other items contaminate PE films during the retail return recycling process.

"This is a much-needed study to examine the impact of plastic bag bans on polyethylene film recycling contamination rates," says Amit Goyal, Ph.D., SUNY Distinguished Professor and Empire Innovation Professor in the Department of Chemical and Biological Engineering.

The study is part of a multidisciplinary project directed by Goyal and sponsored by the New York's Environmental Protection Fund and the New York Department of Environmental Conservation (NYDEC).

"Another part of this multidisciplinary project focuses on using human behavioral science and outreach/education initiatives to help develop initiatives to address miseducation and eventually reduce contamination," says Goyal.

On average, miseducation about which materials are allowed in retail recycling drop-offs—and which ones are not—accounted for 87% of the total contamination. In other words, people deposit incorrect or unacceptable [plastic](#) items.

Helping people learn more about this particular recycling process should be part of any policy on [plastic bags](#), Atkinson says.

"This work highlights that future bag bans should include provisions that expand education around what is allowed in retail return streams, along

with new signage and strategic bin placement to maintain, or even improve, the quality and, potentially, volume of these streams—even in the face of a bag ban," he says.

Atkinson's research does not conclude that bag bans are problematic—efforts to reduce consumption of single use plastics, especially hard-to-recycle materials like films, are essential. Rather, findings suggest that increased retail return film contamination is an overlooked consequence of these environmentally motivated efforts.

More information: Jenna Meert et al, Impact of plastic bag bans on retail return polyethylene film recycling contamination rates and speciation, *Waste Management* (2021). [DOI: 10.1016/j.wasman.2021.08.043](https://doi.org/10.1016/j.wasman.2021.08.043)

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