Research and education sustain recycling in Kirkwood, Missouri

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Since 2018, over 100 local governments have ceased collecting recyclables due to dramatically increasing costs. What happened in 2018 to create this predicament for municipal recycling programs? Let's take a step back and review.

For most of the 21st century, China was the leading destination for U.S. recyclables. Multiple factors contributed to this, including:

- The growing need for metal, paper, and plastics in China's expanding manufacturing industry
- Lax environmental regulations and cheap labor associated with that manufacturing in China

Sorters removing contaminants from recyclables

- Inexpensive transportation of recyclable materials to China—using containers that would previously return to China empty after delivering new products to the United States

China was the top importer of U.S. fiber recyclables, annually buying over six million tons. Additionally, U.S. recyclers sold almost 80% of plastics to China.

However, in 2018, China introduced the "National Sword" that required recyclable materials entering their country to meet a stringent contamination level of only 0.5%. Contamination can refer to a number of materials that are not allowed in recycling commodities:

- Recyclable materials that are dirty such as glass jars that still contain food.
- Materials that could be recyclable but are not accepted by the local recycling facility. Plastic bags are a good example of a material that is technically recyclable, but often not included in recycling programs.
- Materials that are not recyclable at all and are trash—such as garden hoses, diapers, and foam.

In the U.S., up to 25% of the recyclables that cities send to recycling facilities are considered "contamination." The recycling facility must remove and dispose of this "contamination" before recyclables can be sold as a commodity. This is expensive and recycling facilities typically pass these costs on to their customers.

The processing system at the recycling facility can remove much of the obvious contamination (like garden hoses and diapers), but some contaminants still make it through. For example, plastic bags become entwined in other materials. Processing can reduce contamination significantly, but not down to 0.5% as required by the National Sword.

The impact of the National Sword on U.S. recycling programs was swift and severe. Until 2018, many cities received revenue from their recyclables, which offset some of the costs associated with collecting them. Now, cities pay to have someone process their recyclables and struggle to continue this service. Kirkwood, Mo., is one such city.

A community of approximately 28,000 located outside of St. Louis, Kirkwood began their curbside recycling program in 2010. The City collects commingled recyclables in a cart and contracts with a private recycling facility to process and market the recyclables after processing. Historically, the recycling facility paid Kirkwood approximately $15 per ton for their recyclables.

Kirkwood's recycling facility operator closed their doors in October 2018 because of the National Sword. Kirkwood could only find one other recycling facility to accept their commingled recyclables and now Kirkwood pays the new facility approximately $100 per ton to process and market their recyclables. This fee applies to both the "good" recycling that is collected, as well as the contaminants in recyclables. In order to minimize the fees paid to the third-party recycling processor, Kirkwood wanted to minimize contamination in their recyclables.

In November 2019, Kirkwood's Public Services Department in conjunction with a grant from the St. Louis County Department of Public Health designed an education campaign with SCS Engineers and EESI to decrease contamination and unnecessary fees associated with their curbside recycling program: ***Let's Recycle Right to keep recyclables clean and our community green!***

The first step in the campaign was to understand the amounts and types of contamination mixed in with the recyclables in the recycling carts. SCS and EESI sorted through each recycling route, which indicated 15% of what residents place in the green recycling cart really needed to be thrown away. This contamination percentage is below the national average, but some Kirkwood recycling routes did show higher contamination rates—up to 25%.

Plastics were one of the primary culprits of contamination. The Kirkwood recycling program accepts rigid plastic containers with the numbers 1 through 5 and number 7 on the bottom. Plastic number 6 is Styrofoam, which Kirkwood does not accept.

The SCS and EESI sort showed very little Styrofoam in recycling carts. However, the sort found many "other plastics," such as toys and plant containers in their recycling. Another problem was non-rigid plastics marked as #1-5 or #7. These might be plastic magazine sleeves or shopping bags. Even though these are "acceptable" plastic numbers, they are not rigid containers. There-

fore, Kirkwood considers them contaminants in their recycling program.

Once Kirkwood knew where residents struggled to recycle correctly, they introduced an education campaign to help residents better understand how to correctly recycle. Kirkwood launched *Waste Wizard* and *Recycle Quest* on their website and the ***Kirkwood Recycles*** app.

Waste Wizard allows residents to enter the name of a material and learn if it is trash, recyclable, or should be managed as yard debris, bulky waste, or household hazardous waste.

Kirkwood complimented *Waste Wizard* with an online game called *Recycle Quest. Recycle Quest* presents the player with a series of materials to "drag" into the correct management category before proceeding to the next material. An incorrect choice requires the player to choose again. *Recycle Quest* rewards the player with a selection of virtual items to construct a personalized virtual park after completing the level.

Some of the materials that players commonly thought were recyclable but are considered trash in the Kirkwood recycling program included:

- Plastic flowerpots
- Cardboard cans, such as stacked potato chip containers
- Paper coffee cups
- Paper towels
- Aluminum foil
- Pet food bags
- Plastic coffee pods

Recycle Quest and the Kirkwood, Missouri skyline


Common plastic contaminants

Kirkwood highlighted these materials as *not* recyclable in newsletters and direct mail and used Facebook, Twitter, and Instagram to educate residents about what they can and cannot recycle based on the results of the waste sort and data collected from *Waste Wizard* and *Recycle Quest*. Kirkwood also used these social media platforms to inform residents about the importance of recycling correctly and promoted the Kirkwood Recycles mobile app, *Waste Wizard*, and *Recycle Quest*.

In August 2020, SCS and EESI conducted the second waste sort of Kirkwood's recycling routes. Kirkwood's educational efforts decreased the overall curbside contamination rate from 15 to 6% between November 2019 and September 2020.

In addition, in September 2020, no recycling route had a contamination rate greater than 8% whereas the maximum route contamination rate in the November 2019 sort was approximately 25%. Beyond reducing contamination, there is now increased awareness of the curbside recycling program provided by Kirkwood. The amount of recyclables diverted from the landfill since the City fully implemented the "Clean/Green "campaign in March 2020 is 4% higher than the same time-period in 2019. The City of Kirkwood achieved its goal: to sustain recycling by collecting cleaner recyclables.

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