

The Real Truth About the U.S. Plastics Recycling Rate

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BEYOND PLASTICS

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The Last
Beach Cleanup

Facts and Figures: 2021 U.S. Plastics Recycling Rate

The United States Environmental Protection Agency (U.S. EPA) hasn't reported U.S. recycling rates since 2020 when they estimated the [2018 plastic recycling rate to be 8.7%](#).² The EPA did not publish an update for 2019 as expected in November 2021. In the absence of updated EPA figures, the plastics and products industries are still promoting recycling as an effective solution to plastic waste and pollution. Although the plastics industry reported [a significant drop in the recycling](#)³ of post-consumer plastic waste in April 2022, they blamed the decrease on COVID instead of admitting that plastic waste exports (which are counted as recycled without any proof) had significantly declined due to import restrictions by countries trying to protect their environment from America's plastic trash. Even when the plastics industry's own data shows a serious decline, they [continue to claim that plastic recycling will work someday if consumers just try harder to recycle](#).⁴

To be clear, the high recycling rates of post-consumer paper, cardboard, and metals prove that recycling can be an effective way to reclaim valuable natural material resources. The problem lies not with the concept or process of recycling but with the material itself – it is **plastic** recycling that has always failed. Even when millions of tons of waste plastic were still being exported to China each year, plastics recycling never managed to reach 10%. Despite the stark failure of plastics recycling, the plastics, packaging, and products industries have waged a decades-long misinformation campaign [to perpetuate the myth that plastic is recyclable](#).⁵

We can't be fooled any longer by illusory "circular economy of plastics" schemes promoted by companies and the trade associations, consultants, and NGOs that they fund. We must use sound science, credible data, and economic facts to adopt legitimate plastic waste and pollution reduction strategies to make real progress at serious scale now.

Based on the facts detailed below, the current 2021 U.S. plastic recycling rate is estimated to be between 5 and 6%. Factoring in additional losses that aren't measured, such as plastic waste collected under the pretense of "recycling" that are burned, instead, the U.S.'s true plastic recycling rate may be even lower. For example, plastic waste collected for "recycling" is sent to cement kilns and burned in [Boise, Idaho](#)⁶ and [Salt Lake City, Utah](#).⁷

The relentless focus on the future potential for recycling to reduce plastic waste and pollution flies in the face of the hard facts:

- Plastic waste generation is increasing in the U.S., up from 60 pounds per person per year in 1980 to 218 pounds per person in 2018 ([per EPA data](#))⁸ – a 263% total increase (roughly 15% per year),
- Not one single type of plastic food service item, [including the polypropylene cups lids that Starbucks touts as recyclable](#),⁹ has [ever been recyclable](#)¹⁰ per the FTC Green Guide legal definition,
- Toxicity risks in recycled plastic prohibit ["the vast majority of plastic products and packaging produced"](#) from being recycled into food grade packaging,¹¹
- [The expansion of virgin plastic production](#) is keeping the prices of high-quality new plastics low in comparison to higher cost recycled plastic,¹² and
- ["Advanced" chemical recycling fails](#) in recycling post-consumer mixed plastic waste due to insurmountable contamination, environmental, and economic barriers.¹³

Looking at the full picture, plastic recycling has never lived up to the promises made by the plastics and products industries, and it never will. These facts show that the only thing the plastics and products companies have successfully recycled are [their failed promises on plastic recycling](#).¹⁴

The paltry 5-6% U.S. plastic recycling rate in 2021 should be a wake-up call to the false promise that plastic recycling is a credible solution to plastic waste and pollution. It's time to implement real solutions, particularly the reduction of single-use plastic food service items that have the highest likelihood of polluting our environment.

A Brief History of U.S. Plastic Waste, Exports and Recycling Rates

We've seen promises, goals, ambitions, and aims to [increase plastic recycling](#)¹⁵ and [reduce the number of plastic bags they hand out](#)¹⁶ repeated by the plastic and product companies, their trade organizations, and the NGOs they fund for the past 30 years. In 1992, the [American Plastics Council](#) (now part of the American Chemistry Council) pledged to increase recycling of rigid plastic containers to 25% by 1995.¹⁷ However, when [they failed to meet that promise](#) in 1996, it was quietly and conveniently forgotten.¹⁸

Historically, the U.S. EPA has published the "[Advancing Sustainable Materials Management: Facts and Figures Report](#)" with details of the fate of municipal waste annually on November 15th.¹⁹ The most recent data was published by the U.S. EPA in November 2020 for the year of 2018. As shown in Figure 1, from 1980 through 2018, plastic waste generation has increased five-fold in the U.S. from 7.4 to 35.7 million tons per year while the plastic recycling rate has never reached 10%. The peak recycling rate reported by the U.S. EPA was 9.5% in 2014 although that number also counted U.S. exported material as recycled when it was largely burned or dumped. The 9.5% included 2.1 million tons of plastic waste to Non-OECD countries, of which 1.2 million tons were sent to China. Since 2018, the U.S. plastic recycling rate has declined along with declining exports of waste as China and other countries have closed their ports to America's unrecyclable and polluting trash exports.

The U.S. plastic recycling rate peaked at a dismal 9.5% (including exports) and is now in an irreversible decline to eventual insignificance. Plastic waste exports previously counted as "recycled" plastic are decreasing due to import bans by China and Turkey and contamination limits set by countries under the Basel Convention Plastic Waste Amendments. According to the [U.S. Plastic Waste Export data](#)²⁰ shown in Figure 2, total U.S. plastic waste exports decreased from 1.84 million tons (1.7 billion kg) in 2017 to 0.61 million tons (0.56 billion kg) in 2021. The downward trend in plastic waste exports is a positive trend given the harms of plastic waste exports have caused in receiving countries, as documented in [over 100 reports and investigations](#).²¹ The U.S. must take responsibility for managing its own plastic waste.

Figure 1: U.S. EPA Post-Consumer Plastic Waste Generation and Recycling Rate

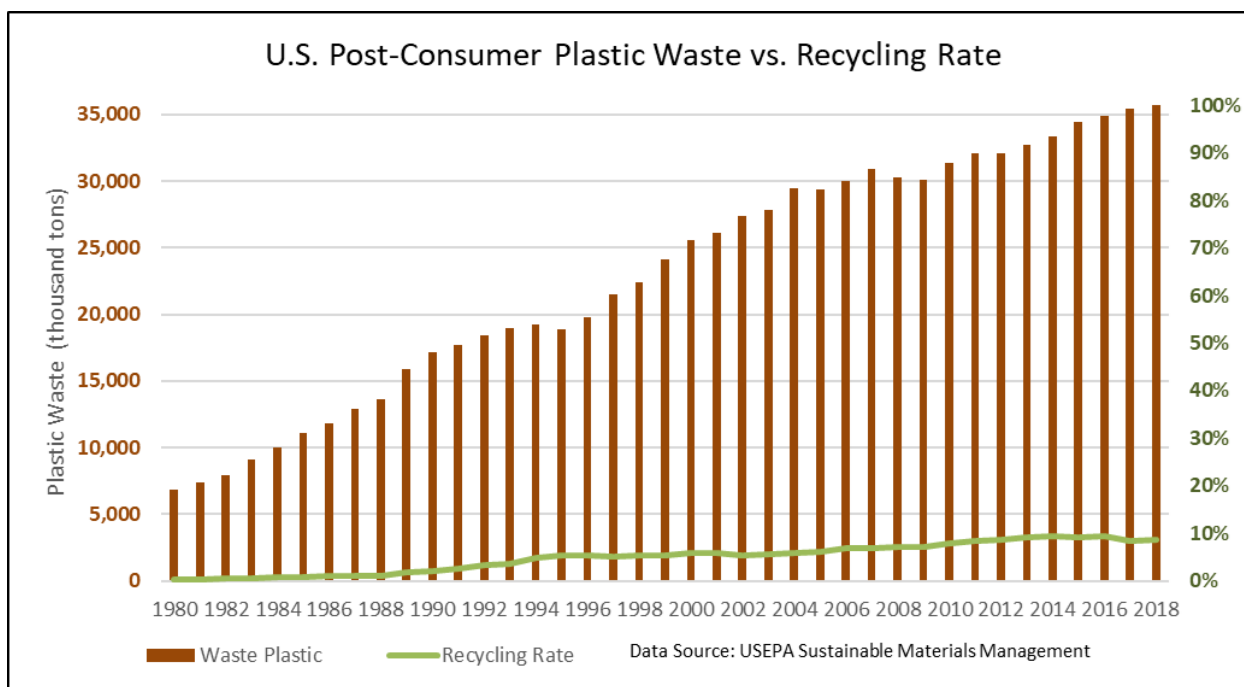
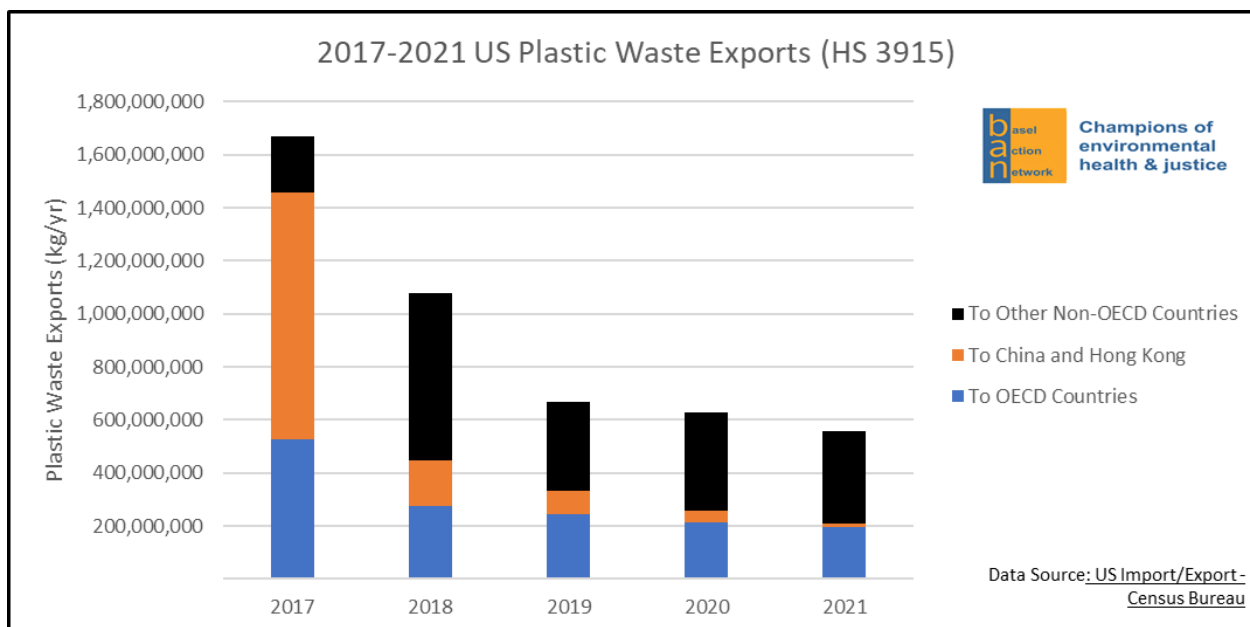


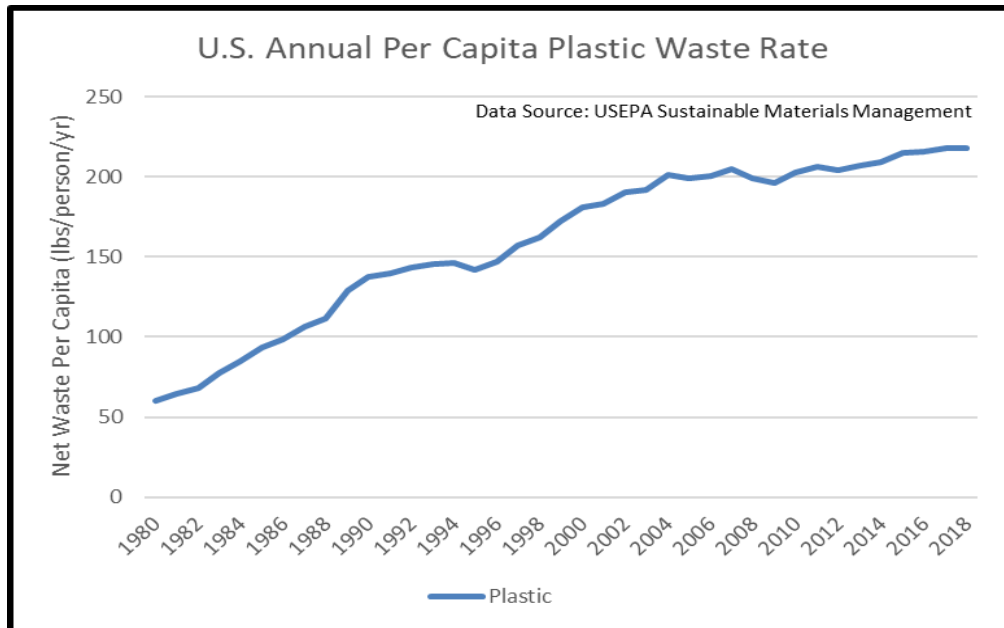
Figure 2: U.S. Plastic Waste Exports (2017-2021)



The source reduction of plastic waste through light-weighting of plastic packaging that's been [touted by the plastics industry as another way to reduce plastic waste](#)²² [has also been a failure](#).²³ Figure 3 shows the increase in per capita plastic waste generation over the same timeframe, from about 60 lbs per person per year in 1980 to 218 lbs per person per year in 2018. Plastic waste generation per person has grown in the U.S. because many new types of single-use plastics are served to consumers. Some of the plastic products were falsely marketed as being recyclable, spurring deceptive advertising lawsuits won against major brands

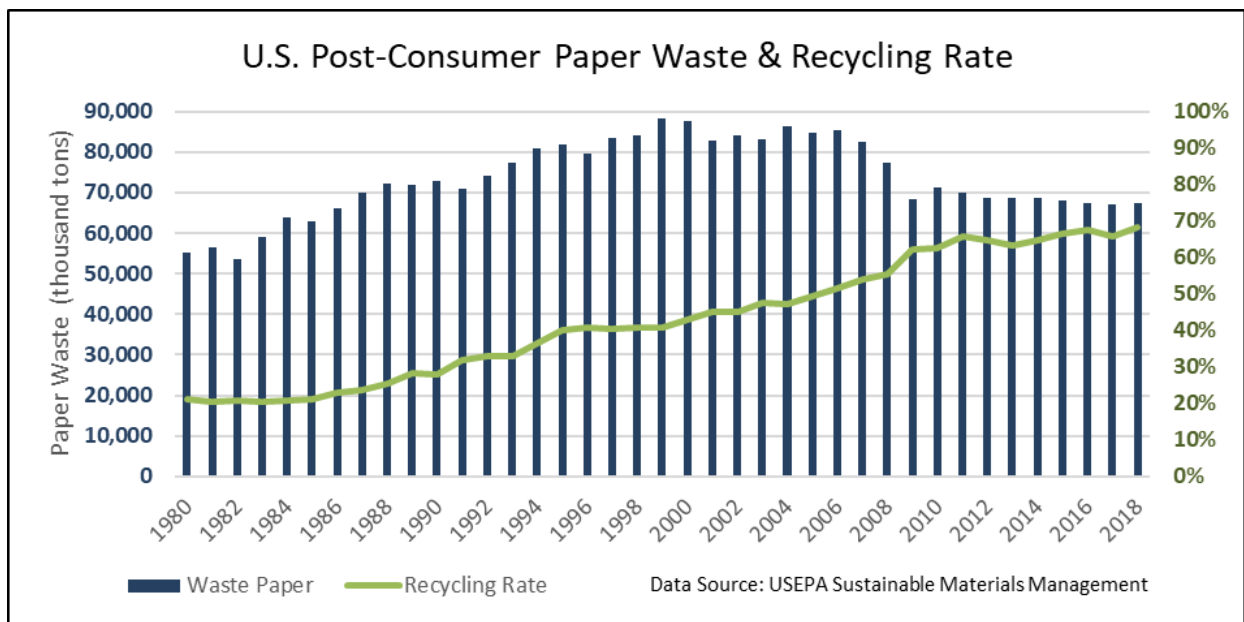
including [Keurig](#)²⁴ and [eight major product companies](#).²⁵ [Plastic has replaced other packaging materials](#) (paper, metal, glass) that are truthfully recyclable, giving consumers no choice but to buy products packaged in plastic waste.²⁶

Figure 3: U.S. EPA Plastic Waste Generation Per Capita



It is worth contrasting the failure of plastic recycling with the success of paper recycling over the same timeframe. As shown in Figure 4, the U.S. paper recycling rate increased from 21.3% in 1980 to 68.2% in 2018.

Figure 4: U.S. EPA Paper Waste Generation & Recycling Rate Data



Estimation of 2021 U.S. Plastic Waste and Recycling Rates

There are two key factors in estimating the U.S. plastic recycling rate:

- A. Weight of total plastic waste generated (million tons per year)
- B. Weight of plastic waste recycled (million tons per year)

The plastic recycling rate (%) equals the recycled weight (B) divided by the total waste generated (A).

While there is general consensus on the approximate amount of plastic waste recycled by the U.S., scientists and waste engineering experts believe that the U.S. EPA is significantly under-reporting the total amount of plastic waste generated per year.

Corrections to the U.S. EPA's Estimated Plastic Waste Generation Rate

In the 2020 report by the [U.S. National Academies of Sciences, Engineering and Medicine](#)²⁷ and in [previous reports by waste engineering experts](#),²⁸ the U.S.'s plastic waste generation is estimated to be significantly higher than that reported by the U.S. EPA. Instead of a plastic waste generation rate of 34.9 million tons as reported by the U.S. EPA in 2016, the experts report that the actual plastic waste generation rate is about 46.2 million tons (42 million metric tonnes) per year.

The experts raise an important point: Recycling reported by the U.S. EPA assesses the material collected for reprocessing in the U.S., rather than the final conversion into new materials. The plastic recycling process itself wastes a significant amount of the collected plastic material. Facts provided by the beverage and plastics industry prove that 30 to 36% of the collected polyethylene terephthalate (PET) bottles are wasted in the recycling process. For example, [the new state-of-the-art PET plastic recycling facility opened by CarbonLite in 2020 has a material loss of 36%](#).²⁹ The new PET bottle recycling facility opening in [Mexico in 2022 by Coca-Cola and ALPLA](#) will waste 30% of the incoming PET bottle material.³⁰ The 2018 [National Association for PET Container Resources \(NAPCOR\) report](#) on PET beverage bottle recycling stated that about a third of the bottle material collected is thrown out due to contamination and process losses.³¹

Tables 1 and 2 show the 2021 estimates of plastic recycling rates for the U.S. EPA and the National Academies of Sciences, Engineering, and Medicine waste generation rate scenarios, respectively.

Table 1: U.S. Plastic Waste & Recycling Rate Estimation Based on U.S. EPA Waste Data

Plastic Waste (million tons)	2018 (EPA Data)	2021 Estimate	Notes
Total Plastic Waste	35.7 (100%)	40.1 (100%)	Assumes 4% increase in plastic waste generation per year (bottled water sales increased by 4.2% in 2020). ³²
Total Recycled	3.1 (8.7%)	2.4 (6%)	Consistent with 4.8 billion pounds of plastic waste claimed as recycled by the plastic recycling industry. ³³
Exported	1.5 (4.2%)	0.6 (1.5%)	Data Source: US Trade Info ³⁴
Domestic Recycled	1.6 (4.5%)	1.8 (4.5%)	2018: By subtraction (Total – Export) 2021: Assumes 5% annual increase in U.S. domestic plastic recycling
Landfilled	27.0 (75.6%)	32.1 (80%)	2021: Waste not recycled or incinerated
Incinerated	5.6 (15.8%)	5.6 (14%)	Assumes no increase in incineration of plastic waste since incinerators have shut down since 2018 . ³⁵

Table 2: U.S. Plastic Waste & Recycling Rate Estimation Based on NASEM Waste Data

Plastic Waste (million tons)	2018 (EPA Data)	2021 Estimate	Notes
Total Plastic Waste	35.7 (100%)	51.0 (100%)	National Academies of Sciences estimate of 46.2 million tons/yr in 2016 . ³⁶ Assumes 4% increase in plastic waste generation per year (bottled water sales increased 4.2% in 2020). ³⁷
Total Recycled	3.1 (8.7%)	2.4 (5%) (rounded up from 4.8%)	Consistent with 4.8 billion pounds of plastic waste claimed as recycled by the plastic recycling industry. ³⁸
Exported	1.5 (4.2%)	0.6 (1.2%)	Data Source: US Trade Info ³⁹
Domestic Recycled	1.6 (4.5%)	1.8 (3.6%)	2018: By subtraction (Total – Export) 2021: Assumes 5% annual increase in U.S. domestic plastic recycling
Landfilled	27.0 (75.6%)	43.0 (84%)	2021: Waste not recycled or incinerated
Incinerated	5.6 (15.8%)	5.6 (11%)	Assumes no increase in incineration of plastic waste since incinerators have shut down since 2018 . ⁴⁰

Proven Solutions to Reduce Plastic Waste and Pollution

The estimated 5 to 6% U.S. domestic plastic recycling rate in 2021 should be a wake-up call to stop pretending that plastics recycling is a viable solution to plastic waste and pollution. It's time to implement real solutions, including bans on single-use plastics, water refill stations, and reusable container programs for food and beverage service.

Bans on single-use plastics: Single-use plastic items are made of low-value material that makes them widely available but economically impractical to collect and recycle. Legislative action to restrict single-use plastic bag distribution has resulted in a reduction of plastic bag pollution around the world. Bans on other single use plastics in food service applications have been adopted by the [European Union](#),⁴¹ [California](#),⁴² [County of Los Angeles](#),⁴³ and many other governments, as detailed by the [Plastics Policy Inventory](#) compiled by the Duke Nicholas Institute.⁴⁴ These bans should be expanded across the world as part of the [United Nations \(U.N.\) Global Treaty to end plastic pollution](#).⁴⁵

Proof that bans and fees work to reduce plastic waste and pollution around the world:

- [United Kingdom and Ireland](#):⁴⁶ According to a 25-year study from the United Kingdom government's Center for Environment, Fisheries and Aquaculture Science, there are significantly fewer plastic bags on the seafloor after European countries introduced bag fees. The study was based on 39 independent scientific surveys of the distribution and abundance of marine litter between 1992 and 2017. Sales of single-use carrier bags [dropped by 95%](#) in one year in main supermarkets since the introduction of the 5p charge.⁴⁷
- [Australia](#): After major supermarkets banned plastic bags in 2019, their usage fell by 80% across the nation.⁴⁸
- [Suffolk County, New York](#): The number of bags found polluting shorelines fell steeply in the first year after a 5-cent bag fee was enacted.⁴⁹
- [Austin, Texas](#):⁵⁰ The Austin Resource Recovery study found that the Single-Use Bag Ordinance was successful in reducing the amount of plastic bag litter in the city. Austin Parks Foundation reported a 90% reduction in plastic bag litter in the first six months after the ordinance had been passed. (Unfortunately, Austin's and other local bag ordinances in Texas have since been nullified due to a [Texas Supreme Court decision](#)).⁵¹
- [San Jose, California](#): Plastic bag litter decreased by 89% in the storm drain system, 60% in creeks and rivers, and 59% in city streets just one to two years after a single-use plastic bag ban took effect.⁵²

Water refilling stations: A proven strategy to cut plastic beverage bottle waste and pollution is to make it easy for people to use fewer disposable bottles by providing public water refilling stations.

Cities and their water agencies benefit from installing water stations which offer a filling function in addition to a drinking fountain, providing residents with free sources of high-quality drinking water and leading to a reduction in plastic waste. For example, the Eastern Municipal Water District in Southern California has [installed nearly 120 water filling stations](#) at schools and popular community facilities.⁵³ The successful use of 21 hydration stations at [the Los Angeles Convention Center](#) has stopped the waste of 150,000 plastic water bottles and led to a ban on single-use plastic bottles throughout the facility to celebrate Earth Day, 22 April.⁵⁴

Every airport, train station, bus station, public building, and public space should install water refill stations. Water filling stations provide free, high quality drinking water to the public, without any of the downsides of single-use plastic waste and pollution.

Reusable container programs for food and beverage service: [As detailed by Upstream Solutions](#), the science shows that reuse clearly beats single-use in the environmental metrics on which they've been compared: Greenhouse gas emissions (GHG), water consumption, resource extraction, waste generation, litter generation, and plastic pollution.⁵⁵ Companies like Costa Coffee in the U.K., who have listened to consumers and accepted the science and economic benefits of reuse, are now offering reusable cup programs that reward consumers with a [free beverage after just four purchases](#).⁵⁶

At Roz's cafe at Bennington College, students and staff are only served coffee and tea if they provide their own reusable cups – there are no single-use beverage cups available. There is a small shelf where cups purchased from local garage sales are kept in the cafe if a customer has forgotten to bring their mug or is visiting. The customer is expected to wash that mug and return it. Bringing your own reusable cup has become second nature on this college campus.

What Are We Waiting For?

[Another half dump truck full of U.S. plastic waste has entered the ocean in the ten minutes](#) it's taken you to read this report.⁵⁷ Proven solutions that will reduce U.S. plastic waste and pollution already exist and can be swiftly enacted. The success of single-use plastic bans, water refilling stations, and reusable food and dishware can be extended nationwide.

It's time to recognize the truth and accept what the credible facts and science tell us: plastic recycling is neither a safe nor realistic solution to reducing plastic waste and pollution in the United States.

ABOUT THE AUTHORS

The Last Beach Cleanup leads catalytic initiatives to move from awareness on plastic pollution to wide-scale action and achievement. We collaborate with diverse stakeholders who share the goal of ending plastic pollution: local and national governments, non-governmental organizations (NGOs), socially responsible investors (SRIs), individuals and others. <https://www.lastbeachcleanup.org>

Beyond Plastics is a nationwide project based at Bennington College in Vermont that pairs the wisdom and experience of environmental policy experts with the energy and creativity of community leaders and activists to build a vibrant and effective anti-plastics movement. Our mission is to end plastic pollution by being a catalyst for change at every level of our society. We use our deep policy and advocacy expertise to build a well-informed, effective movement seeking to achieve the institutional, economic, and societal changes needed to save our planet, and ourselves, from the plastic pollution crisis. <https://www.beyondplastics.org>

REFERENCES

- ¹ USEPA, "[Advancing Sustainable Materials Management: 2018 Tables and Figures](#)," November 2020.
- ² USEPA, "[Advancing Sustainable Materials Management: 2018 Tables and Figures](#)," November 2020.
- ³ Association of Plastic Recyclers, [2020 U.S. Post-Consumer Plastic Recycling Dashboard](#).
- ⁴ Plastics News, "[COVID-19 impacts post-consumer plastic recycling](#)," April 22, 2022.
- ⁵ PBS Frontline, "[Plastic Wars](#)," March 31, 2020.
- ⁶ Reuters, "[THE RECYCLING MYTH: BIG OIL'S SOLUTION FOR PLASTIC WASTE LITTERED WITH FAILURE](#)," July 29, 2021.
- ⁷ Utah Business, "[Where Exactly Is Your Recycling Going?](#)", January 16, 2020.
- ⁸ USEPA, "[Advancing Sustainable Materials Management: 2018 Tables and Figures](#)," November 2020.
- ⁹ Starbucks, "[Starbucks Strawless Lids Now Available Across the U.S. and Canada](#)," September 10, 2020.
- ¹⁰ [The Last Beach Cleanup website](#) and Greenpeace, "[Circular Claims Fall Flat](#)," February 2020.
- ¹¹ Stina Consulting, "[2021: Assessing the State of Food Grade Recycled Resin in Canada & the United States](#)," October 2021.
- ¹² HuffPost, "[How Fossil Fuel Companies Are Killing Plastic Recycling](#)," September 30, 2019.
- ¹³ Reuters, "[THE RECYCLING MYTH: BIG OIL'S SOLUTION FOR PLASTIC WASTE LITTERED WITH FAILURE](#)," July 29, 2021.
- ¹⁴ South China Morning Post, "[False promise of disposable plastic recycling obscures firms' role in global waste crisis](#)," March 18, 2021.
- ¹⁵ Ellen MacArthur Foundation, [The Global Commitment](#).
- ¹⁶ Walmart, "[Walmart Sets Goal to Reduce its Global Plastic Shopping Bag Waste by One-Third](#)," September 24, 2008.
- ¹⁷ Plastics News, "[APC RETREATS FROM GOAL TO RECYCLE 25%](#)," March 25, 1996.
- ¹⁸ Plastics News, "[APC RETREATS FROM GOAL TO RECYCLE 25%](#)," March 25, 1996.
- ¹⁹ USEPA, "[Advancing Sustainable Materials Management: 2018 Tables and Figures](#)," November 2020.
- ²⁰ U.S. Census Bureau, U.S. [Trade Online](#).
- ²¹ The Last Beach Cleanup, "[Plastic Waste Exports: Summary of Reports Proving Harms](#)."
- ²² Plastics Today, "[Water market taps into lightweight plastic bottles](#)," March 15, 2017.
- ²³ Plastic Soup Foundation, [Lightweight Plastic Packaging](#).
- ²⁴ Top Class Actions, "[Keurig Class Action Settled For \\$10M, Ending Recyclability Claims](#)," March 3, 2022.
- ²⁵ Wall Street Journal, "[TerraCycle Partners Including Coca-Cola, P&G to Change Recycling Labels After Settling Lawsuit](#)," November 15, 2021.
- ²⁶ Resource Recycling, "[Data Corner: The evolving ton over 25 years](#)," January 27, 2019.
- ²⁷ National Academies of Sciences, Engineering, and Medicine. 2022. [Reckoning with the U.S. Role in Global Ocean Plastic Waste](#). Washington, DC: The National Academies Press. <https://doi.org/10.17226/26132>.
- ²⁸ Law, et. al., "[The United States' contribution of plastic waste to land and ocean](#)," October 30, 2020.
- ²⁹ Waste Management World, "[CarbonLITE Opens 'World's Largest' Bottle-to-Bottle Recycling Plant in Pennsylvania](#)," October 23, 2020.
- ³⁰ Recycling Today, "[Alpla, Coca-Cola FEMSA invest \\$60M in Mexican PET recycling plant](#)," January 31, 2022.

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- ³¹ NAPCOR, "[Postconsumer PET Recycling Activity in 2018](#)," December 16, 2019.
- ³² Beverage Industry, "[Data shows bottled water remains in high demand among consumers](#)," May 18, 2021.
- ³³ Association of Plastic Recyclers, [2020 U.S. Post-Consumer Plastic Recycling Dashboard](#).
- ³⁴ Basel Action Network, [Plastic Waste Transparency Hub](#).
- ³⁵ Earth Justice Network, "[FACT SHEET: Trash Incinerator Closures 2000-2020](#)."
- ³⁶ National Academies of Sciences, Engineering, and Medicine. 2022. [Reckoning with the U.S. Role in Global Ocean Plastic Waste](#). Washington, DC: The National Academies Press. <https://doi.org/10.17226/26132>.
- ³⁷ Beverage Industry, "[Data shows bottled water remains in high demand among consumers](#)," May 18, 2021.
- ³⁸ Association of Plastic Recyclers, [2020 U.S. Post-Consumer Plastic Recycling Dashboard](#).
- ³⁹ Basel Action Network, [Plastic Waste Transparency Hub](#).
- ⁴⁰ Earth Justice Network, "[FACT SHEET: Trash Incinerator Closures 2000-2020](#)."
- ⁴¹ European Commission, "[Single Use Plastics Directive](#)," July 2019.
- ⁴² CalRecycle, [Sustainable Packaging for the State of California Act of 2018 \(SB 1335\)](#).
- ⁴³ CBS Los Angeles, "[LA County bans single-use plastic at restaurants](#)," April 19, 2022.
- ⁴⁴ Duke Nicholas Institute, [Plastics Policy Inventory](#).
- ⁴⁵ U.N. Environment Programme, "[Historic day in the campaign to beat plastic pollution: Nations commit to develop a legally binding agreement](#)," March 2, 2022.
- ⁴⁶ Maes, et. al., "[Below the surface: Twenty-five years of seafloor litter monitoring in coastal seas of North West Europe \(1992–2017\)](#)," Science of the Total Environment, July 15, 2018.
- ⁴⁷ The Guardian, "[Use of plastic bags in England drops by 59% in a year](#)," July 30, 2020.
- ⁴⁸ Global Citizen, "[Australia Has Reduced Plastic Bag Consumption by 80% Since July](#)," February 28, 2019.
- ⁴⁹ Newsday, "[Suffolk plastic use down by 1.1 billion, report says](#)," March 22, 2019.
- ⁵⁰ Austin Resource Recovery, "[Environmental Effects of the Single Use Bag Ordinance in Austin, Texas](#)," June 10, 2015.
- ⁵¹ The Texas Tribune, "[Texas Supreme Court strikes down Laredo's plastic bag ban, likely ending others](#)," June 22, 2018.
- ⁵² City of San Jose, "[Subject: Bring Your Own Bag Ordinance Implementation Results And Actions To Reduce Eps Foam Food Ware](#)," November 20, 2012.
- ⁵³ Eastern Municipal Water District, [Water Bottle Fill Station Program](#).
- ⁵⁴ Conference and Meetings World, "[Los Angeles Convention Center bans single-use plastic bottles](#)," April 20, 2022.
- ⁵⁵ Upstream Solutions, [Reduce vs. Single-Use: Environment](#).
- ⁵⁶ Edie, "[Costa Coffee to trial plant-based cup lids](#)," April 22, 2022.
- ⁵⁷ Meeting of the Minds, "[7 Ways for Cities to Reduce Plastic Pollution](#)," May 15, 2019.