# New Jersey's Single-Use Bag & Straw Ban Will Make a Difference

**By Paul Kinney**

On November 4, 2020, New Jersey enacted P.L. 2020, c. 117[1] to place restrictions or total elimination of the distribution of plastic straws, paper or plastic single-use carryout bags, and polystyrene food service containers. Whether you're a proponent, opponent or indifferent, you may still wonder if the law will have any real impact. Let's take a brief look.

**How big is the plastics problem? Why enact a ban on single-use plastics?**

While many environmental organizations have raised awareness, here are just a few US government cited impacts.

- From US EPA reports, since the creation of plastics in 1960, the US has consumed nearly one billion tons. Of that, the vast majority (about 780 million tons has been sent to landfills, but another 80 million tons (1.6 billion pounds) was simply dumped into the environment.[2] In 2018 alone, over 800,000 tons of US plastic were single-use bags.[8]
- Over 90% of all plastics produced do not biodegrade in nature.[3] Formal studies have shown that:
    - Bisphenol A (BPA), a primary plastic constituent, has been detected in 95% of the US population[4], and
    - 17% of marine species ingesting or entangled by plastics are threatened or near threatened.[5]

**What will NJ's ban do?**

The ban will incrementally implement restrictions on several single use items over the course of the next two and half years, consisting primarily of the following:

- The first component in effect since November 4, 2021, requires establishments to only provide plastic straws upon request.
- The next and most significant component, effective May 4, 2022, prohibits most retailers and restaurants from providing single-use takeout bags, the majority of which are made from plastic and paper.
- By May 4, 2024, the NJ DEP will provisionally prohibit most retailers and restaurants from providing polystyrene foam food containers, typically used for takeout food.

**How much will the ban reduce?**

Once the takeout bag component is implemented, New Jersey will effectively eliminate 2.43 pounds of plastic and 2.91 pounds of paper per person each year. That results in the following annual reductions at the local, county and state. This amounts to a total annual reduction of approximately 1.85 billion bags per year (see this article for the basis of estimate).

| Jurisdiction | US Census Pop. 2020 | Estimated Annual Reduction of Plastic Takeout Bags (Tons) | Estimated Annual Reduction of Paper Takeout Bags (Tons) |
|---|---|---|---|
| Hopewell Township, NJ | 17,491[6] | **19.61** | **25.98** |
| Hopewell Borough, NJ | 1,915[7] | **2.15** | **2.84** |
| Pennington Borough, NJ | 2,531[7] | **2.84** | **3.76** |
| Mercer County, NJ | 387,340 | **434.33** | **575.31** |
| New Jersey State | 9,288,994 | **10,415.9** | **13,796.72** |

**Conclusion**

Assessing the environmental impacts of legislation is often quite difficult given the scarcity of reliable information. Lack of clear and objective data can lead one to conclude the impacts are simply too insignificant to matter, or perhaps lose hope. However, as shown in this article, the annual plastic consumption across the US is near a plateau and may decrease in the near future. More encouraging, the impacts of just this one law in one state will make significant improvements at the local and state levels with benefits felt beyond our borders. Looking forward, we can build on this law to pursue additional reductions at all levels of government and commerce to help improve our quality of life and the health of our environment.

**About the Author**

Paul Kinney is a Hopewell Township, New Jersey resident with a background in software technology. He is also a member of the Hopewell Green Team and an alternate member of the Hopewell Township Environmental Commission. However, this article represents his personal views and does not necessarily imply any endorsement by these organizations.

The remainder of this article provides a more formal basis for the quantification of impacts as well as further exploration of the law and its motivations.

The US EPA and California reports to provide the most credible estimates of the minimum volume of plastic bags consumed in the US in 2018 (see the end notes for the method of estimation[8]). Using these sources, in 2018 the US consumed an average of 2.243 pounds of plastic shopping bags per person, regardless of age - approximately 3.45 shopping/takeout bags per person per week.

Based upon the US Census Bureau's census and Mercer County reports, below were the 2020 consumption volumes of plastic takeout/shopping bags at the local, county and state levels. According to US EPA reports, in 2020 only 8.7% of this plastic was recycled, 75.6% was landfilled, while another 8.7% was dumped into the environment.

| Jurisdiction | US Census Pop. 2020 | 2020 Est. Plastic Shopping/ Takeout Bags Consumed (Lbs.) | 2020 Est. Plastic Shopping/Takeout Bags Consumed (Short Tons) | Est. # Plastic Shopping/Takeout Bags (0.2 oz. / Bag) |
|---|---|---|---|---|
| Hopewell Township, NJ | 17,491[6] | 39,226 | **19.61** | 3,138,070 |
| Hopewell Borough, NJ | 1,915[7] | 4,295 | **2.15** | 343,571 |
| Pennington Borough, NJ | 2,531[7] | 5,676 | **2.84** | 454,088 |
| Mercer County, NJ | 387,340 | 868,661 | **434.33** | 69,492,887 |
| New Jersey State | 9,288,994 | 20,831,795 | **10,415.9** | 1,666,543,624 |

Even though waste paper dumped into the environment is often considered of less negative environmental impact, as we will examine later, the impacts are still significant. Below are the estimated 2020 consumption rates of paper shopping/takeout bags.

| Jurisdiction | US Census Pop. 2020 | 2020 Est. Paper Shopping/ Takeout Bags Consumed (Lbs.) | 2020 Est. Paper Shopping/Takeout Bags Consumed (Short Tons) | Est. # Paper Shopping/ Takeout Bags (2.42 oz. / Bag) |
|---|---|---|---|---|
| Hopewell Township, NJ | 17,491[6] | 51,958 | **25.98** | 343,997 |
| Hopewell Borough, NJ | 1,915[7] | 5,689 | **2.84** | 37,662 |
| Pennington Borough, NJ | 2,531[7] | 7,518 | **3.76** | 49,777 |
| Mercer County, NJ | 387,340 | 1,150,613 | **575.31** | 7,617,854 |
| New Jersey State | 9,288,994 | 27,593,433 | **13,796.72** | 182,687,555 |

Given the above consumption rates, P.L. 2020, c. 117 aims to virtually eliminate these and other sources of plastic (and some paper) waste through a phased implementation timeline. The primarily implementation phases are reflected below, including key regulatory definitions and exemptions.

| Effective Date | Implementation Component |
|---|---|
| November 4, 2020 | Municipalities and counties cannot adopt any regulations on plastic straws, single-use bags or polystyrene foam bags. |
| November 4, 2021 | Food service businesses shall only provide ***single-use plastic straws*** to customers ***upon request***, superseding any municipal or county regulation. |
| May 4, 2022 | No store shall provide or ***sell single-use plastic carryout bags*** to customers, superseding any municipal or county regulation. Customers may bring their own bags. |
| May 4, 2022 | Grocery stores (over 2,500 sq. ft.) shall not provide or sell ***single-use paper carryout bags*** to customers, superseding any municipal or county regulation. |
| May 4, 2022 | No person or food service business shall provide or sell a ***polystyrene foam food service product*** or ***food in a polystyrene foam food service product*** to customers, superseding any municipal or county regulation. |
| May 4, 2022 | The NJ Dept. of Environmental Protection (DEP), ***municipalities***, and "County Environmental Health Act" entities ***can enforce this law and impose penalties to violators of this law***. |

| | |
|---|---|
| May 4, 2024 | Provisional termination of the exemption for the polystyrene foam food service products previously exempted from the (see Exemptions below).[9] |

**Source**: https://www.nj.gov/dep/plastic-ban-law/docs/implementation-timeline-pl2020-c117.pdf

**Definitions[10]:**

- "***Store***" is any *grocery store, convenience store, liquor store, pharmacy, drug store, or other retail establishment*.
- "***Food Service Business***" sells or provides food for consumption on or off the premises, including, but not limited to, establishments such as a *restaurant, café, delicatessen, coffee shop, convenience store, grocery store, vending truck or cart, food truck, movie theater, or business or institutional cafeteria*, including those operated by a government entity.
- "***Grocery Store***" is a self-service *retail establishment that occupies at least 2,500 square feet*, and that sells household foodstuffs for off-site consumption, including but not limited to fresh produce, meat, poultry, fish, deli products, dairy products, canned foods, dry foods, beverages, baked foods, or prepared foods.

**Exemptions[11]:**

The following products are **exempt until May 4, 2024** unless otherwise extended by the DEP:

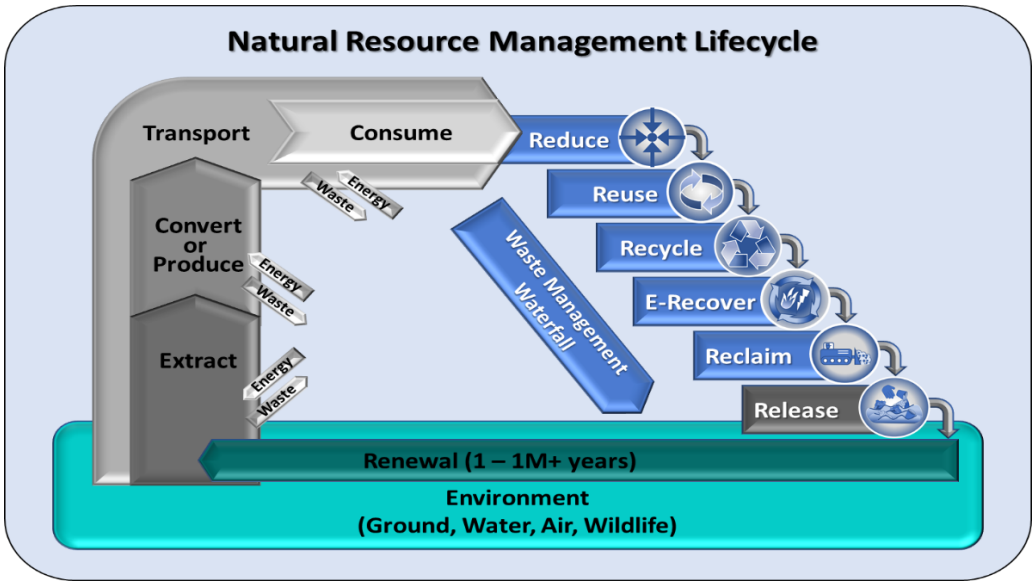
- Disposable, long-handled ultra-large crude carriers when required and used for thick drinks.
- Portion *cups of two ounces or less*, if used *for hot foods or foods requiring lids*.
- *Meat and fish trays for raw or butchered meat, including poultry, or fish* that is sold from a refrigerator or similar retail appliance.
- Any food product *pre-packaged by the manufacturer with a polystyrene foam* food service product.
- Any other polystyrene foam food service product as determined necessary by the DEP.

As for the law's motivations, the text of the legislation itself provides many, including the following:

- …"approximately ***one third of all plastics produced are single-use plastics***…"
- …"***plastics released in the environment do not biodegrade***, but instead break down into smaller pieces, known as microplastics," … "which means ***microplastics and associated pollutants can move into the food chain***"

**Beyond reduction of plastic/paper consumption, what other environmental improvements will this law make?**

To grasp the entire scope of impact we must consider the full lifecycle of virtually any natural resource utilized for economic benefit in our society. The Natural Resource Management Lifecycle provides an end-to-end view of all phases involved in converting natural resources to consumable products as well as all currently implemented disposal methods.

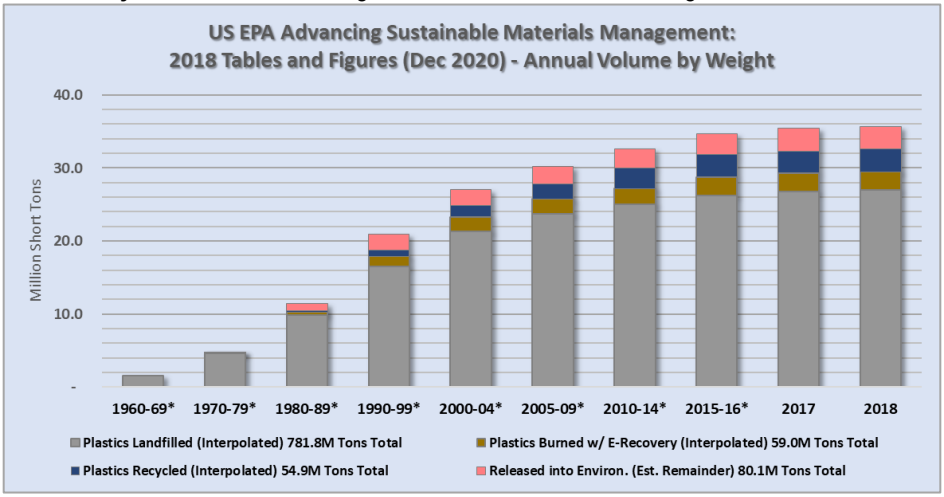



At each phase in lifecycle to transform raw materials into usable feed stocks or products involves many energy-intensive and waste generating processes. At the time of this article there were no available studies to quantify the negative environmental impacts of these pre-consumption activities, but we must consider them very significant (including carbon emissions and toxic wastes ejected into both air and water).

We are most familiar with the 3-Rs of Reduce-Reuse-Recycle, methods promoted to us as consumers to minimize waste. Indeed, the ban is primarily a Reduce action. But we tend not to pay as close attention to the remaining less attractive 3-Rs of Recover-Reclaim-Release, which nevertheless apply in a comprehensive lifecycle view of resource management and account for the vast majority of all how waste is handled.

- The Recover (or E-Recover) method burns waste similar to coal-burning plants to recover useful energy (formally termed by EPA as "combust with energy recovery"). While the volume of plastic waste can be reduced by as much as 85%, and the US EPA indicates that 99% of ash is captured[12], the resulting fly and bottom ash from these incinerators is toxic and requires special landfills and at least decades of continuous monitoring to prevent groundwater contamination. Still, in 2018 only 7.0% of plastic waste recovered through this method.
- Reclaim (for reclamation) refers to the common practice of disposing of waste in landfills, where the majority of municipal and plastic waste is sent. However, the only known means of plastic decomposition requires UV light – not possible in a landfill. Plastic does not biodegrade, so remains a permanent environmental risk even when placed in landfills. To date, there are no scalable methods for converting plastics into biodegradable materials.
- Plastic released (or dumped into the environment) is roughly equivalent to the amount of recycled plastic, according to the EPA data from 1960 to 2018, as illustrated below. In both 2017 and 2018, the amount of plastic released into the environment was 3.1 and 3.12 million short tons respectively. To put this in perspective, the weight of plastic waste dumped into the environment by the US alone ***for each of these years*** equates to dumping 5 full ultra-large crude carrier (ULCC) tankers of crude oil[13] directly into the oceans.

**Summary of US EPA Advancing Sustainable Materials Management: 1960 - 2018**




| EPA Reporting Year | 1960-69 | 1970-79 | 1980-89 | 1990-99 | 2000-04 | 2005-09 | 2010-14 | 2015-16 | 2017 | 2018 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Plastics Generated (Interpolated) Million Tons | 15.20 | 46.69 | 114.65 | 209.19 | 135.41 | 150.94 | 163.16 | 69.43 | 35.41 | 35.68 | 975.75 |
| Plastics Recycled (Interpolated) Million Tons | - | 0.1 | 1.8 | 8.7 | 8.0 | 10.3 | 13.7 | 6.2 | 3.0 | 3.1 | 54.91 |
| Plastics Burned w/ E-Recovery (Interpolated) Million Tons | - | 0.4 | 4.1 | 13.4 | 10.1 | 10.2 | 10.8 | 5.0 | 2.5 | 2.5 | 58.99 |
| Plastics Landfilled (Interpolated) Million Tons | 15.2 | 46.0 | 98.7 | 165.6 | 106.4 | 118.6 | 125.2 | 52.5 | 26.8 | 27.0 | 781.78 |
| Released into Environ. (Est. Remainder) Million Tons | - | 0.3 | 10.1 | 21.5 | 10.9 | 11.9 | 13.5 | 5.8 | 3.1 | 3.1 | 80.08 |

**Source Data**: https://www.epa.gov/sites/default/files/2021-01/documents/2018_tables_and_figures_dec_2020_fnl_508.pdf
*Amounts for unreported years were estimated by interpolating the average yearly change between reported years.

---

[1] The full text of P.L. 2020, c. 117 can be found at https://www.nj.gov/dep/plastic-ban-law/docs/plastic-bag-law-c117.pdf

[2] See the graph and table at the end of this article: 2018 Summary of US EPA Advancing Sustainable Materials Management: 1960 - 2018

[3] US National Library of Medicine National Institutes of Health: Kazumi Hiraga, Ikuo Taniguchi, Shousuke Yoshida, Yoshiharu Kimura, Kohei Oda. Biodegradation of waste PET. "... six polymers (PE, PP, PVC, PET, polyurethane (PUR), and PS)—all of which are petroleum-based and non-degradable—comprise more than 90% of the global total..." https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6831991/

[4] US National Library of Medicine: Vandenburg LN, Hauser R, Marcus M, Olea N, Welshons WV. Human exposure to bisphenol A (BPA) Reprod Toxicol. 2007 Jul 31;24(2):139–177 https://pubmed.ncbi.nlm.nih.gov/17825522/

[5] US National Library of Medicine: S C Gall, R C Thompson. The impact of debris on marine life https://pubmed.ncbi.nlm.nih.gov/25680883/

[6] US Census Bureau, QuickFacts for Hopewell township, New Jersey, Population Census April 1,2020
https://www.census.gov/quickfacts/fact/table/hopewelltownshipmercercountynewjersey,US/POP010220

[7] The US Census Bureau's QuickFacts does not include Hopewell Borough or Pennington Borough. However, Mercer County's public site provides populations:
https://www.mercercounty.org/explore/our-towns/hopewell-borough
https://www.mercercounty.org/explore/our-towns/pennington

[8] The following government sources provide a reasonable basis for estimating annual per capita consumption of both plastic and paper shopping bags. The sources and method of calculation for plastic shopping bags is provided below:

- The Table 22 of the US EPA's December 2020 report "Advancing Sustainable Materials Management: 2018 Tables and Figures" (https://www.epa.gov/sites/default/files/2021-01/documents/2018_tables_and_figures_dec_2020_fnl_508.pdf) provides the most reliable measures for the more general category of plastic "Bags, Wraps and Sacks". While the EPA discontinued measuring plastic "Bags and Sacks" in 2010 , the agency determined that "Bags and Sacks" amounted to 770,000 tons, or 19.59% of the more general "Bags, Wraps and Sacks" category. Applying this conservative percentage (the lowest of all prior reported periods), we can conclude that 822,901 tons of plastic generated in the US in 2018 consisted of just plastic bags and sacks.
- To isolate consumption of just shopping bags, the only available governmental source is California's 2008 Statewide Waste Characterization Study (https://www2.calrecycle.ca.gov/WasteCharacterization/PubExtracts/2009023/Summary.pdf), which was commissioned to measure the types and amounts of materials disposed at the state's solid waste facilities. Page 8 of this study concluded from a sampling of all of California's wastes stream that "44 percent of bags disposed are from grocery stores". This statement is not specific to plastic bags, but if we apply this percentage to EPA's 2018 bags/sacks volume, we can then calculate a conservative estimate that approximately 362,076 tons of US plastic waste in 2018 consisted of shopping bags.
- From the US Census Bureau's report, in 2018 the US population stood at 322,903,030. On that basis, the US consumed an estimated 2.243 pounds of plastic shopping bags per person, regardless of age. Using an estimated weight of 0.2 ounces per average plastic takeout bag, this yields an estimated annual consumption of 179.4 takeout bags per year (3.45 per week) per person.

[9] The NJ Department of Environmental Protection "may extend this exemption for additional periods not to exceed one year upon a written determination that there is no cost-effective and readily available alternative for the item."
https://www.nj.gov/dep/plastic-ban-law/docs/implementation-timeline-pl2020-c117.pdf

[10] Source: https://www.nj.gov/dep/plastic-ban-law/

[11] Source: https://www.nj.gov/dep/plastic-ban-law/

[12] US Environmental Protection Agency, Energy Recovery from the Combustion of Municipal Solid Waste (MSW)
https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw

[13] US Energy Information Administration, Average Freight Rate Assessment https://www.eia.gov/todayinenergy/detail.php?id=17991