CLEAN VIRGINIA WATERWAYS
Of Longwood University

REPORT

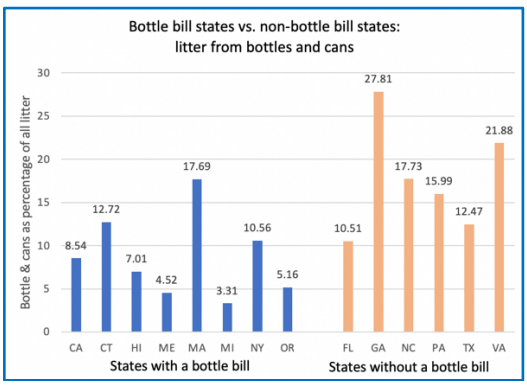
Littered Bottles and Cans: Higher in Virginia Than in States with Bottle Bills

Summary
Clean Virginia Waterways of Longwood University found that plastic bottles, glass bottles, and aluminum cans are approximately two and half times more frequently littered in Virginia (a state without a bottle bill) than in states with bottle bills.

About Bottle Bills
In the 1970s, to combat litter and increase recycling, Oregon, Vermont, Michigan, Maine, Iowa, and Connecticut adopted container deposit bills, popularly known as "bottle bills." Later, Massachusetts, New York, California and Hawai'i also passed bottle bills.[i] Delaware had a bottle bill, but then replaced it with an alternative program. Bottle bills rely on deposits to incentivize consumers and retailers to participate in order to increase recycling, reduce energy use and greenhouse gas emissions, as well as decrease litter. Customers pay a deposit when they purchase a beverage, then return the empty bottle or can to redeem the deposits at the point of purchase or redemption center. States vary on the type of beverages that are covered and the amount of the deposits.[ii]

This study compared 2019 International Coastal Cleanup (ICC) data between states with bottle bills with states that do not have bottle bills.

Bottles and Cans in Aggregate
In Virginia, a state without a bottle bill, bottles and cans accounted for nearly 22% of all litter recorded by volunteers in the 2019 ICC in Virginia. In contrast, in states with container deposit bills, bottles and cans accounted for 8.69%, on average, of the total debris recorded.



Plastic bottles
Plastic bottles accounted for 11.49% of all the litter recorded in the 2019 ICC in Virginia. In states with bottle bills, plastic bottles account for smaller percentages: from 1.99% to 8.27%. On average, states with bottle bills had 3.93% of the litter made up of plastic bottles, compared to 8.64% for the states that do not have a bottle bill.

Beverage Cans
Likewise, beverage cans are more frequently littered in states without bottle bills than in states with bottle bills according to 2019 ICC data. Bottle-bill states had anywhere from 0.79% to 5.47% of their litter made up of beverage cans – for an average of 2.51%. But in states with no bottle bills, cans accounted for 3.05% to 10.11% -- for an average of 5.88% of the litter. In Virginia, beverage cans accounted for 6.66% of all recorded litter.

Glass Bottles
Glass bottles accounted for 3.73% of all the litter recorded in the 2019 ICC in Virginia. In states with bottle bills, glass bottles accounted for 2.25% of all littered items on average.

Rank of Bottles and Cans
Another way to see the difference in the frequency of littered items between states is to look at the Top Ten lists produced by ICC data. In states with bottle bills, bottles and cans consistently were found littered less frequently, and often were not in the Top Ten list. But in Virginia, plastic bottles, glass bottles and beverage cans were all in the Top Ten list of litter items in 2019. In fact, plastic bottles were the second most frequently-found type of litter in Virginia right after cigarette butts.

Top Ten Items, 2019 ICC in Virginia

1	Cigarette Butts	14.87%
2	Beverage Bottles (Plastic)	11.48%
3	Grocery Bags (Plastic)	10.38%
4	Food Wrappers (candy, chips, etc.)	10.20%
5	Beverage Cans	6.66%
6	Other Plastic Bags	5.36%
7	Bottle Caps (Plastic)	5.25%
8	Cups & plates (Plastic & foam)	4.41%
9	Beverage Bottles (Glass)	3.72%
10	Straws, Stirrers	3.23%

Plastic bottles were on all but one (Oregon) of the Top Ten lists of the states examined in this report. But in states without bottle bills, plastic bottles were ranked higher–they averaged about 3rd place of the Top Ten. In states with bottle bills, plastic bottles averaged in 6th place.

Beverage cans averaged in 5th place for states without bottle bills, and in 10th place for states that have bottle bills in place. The rank of glass bottles between the two kinds of states was closer; glass bottles ranked 11th in states with bottle bills, and 9th in states without bottle bills.

Similar Findings

These findings are consistent with a 2018 study that states, *"The proportion of containers found in coastal debris surveys in states with Container Deposit Laws (CDL) was approximately 40% lower than in states without CDL. These results provide strong evidence that fewer beverage containers end up as mismanaged coastal waste in states that provide a cash refund for returned beverage containers."*[iii] In the years after Hawai'i enacted a container deposit law in 2002, littered bottles and cans went from 15.9% of all litter to 6.7%.[iv]

About the Data

Ocean Conservancy's International Coastal Cleanup (ICC) is the largest volunteer effort for the world's ocean and waterways. Thousands of volunteer-led events track the types of trash that are being removed from coasts and inland waterways, providing a global snapshot of the litter and ocean trash problem from year to year. Data are collected on the most commonly found items, including single-use consumer food and beverage items. Data are collected by using paper data forms, or the CleanSwell App for smartphones. All data are entered into the Ocean Conservancy's open-access TIDES database.[v] Clean Virginia Waterways has organized the ICC in Virginia since 1995, and has a 25-year data base of the litter found in Virginia.

This table shows how plastic bottles, glass bottles, and beverage cans rank among all littered items in states with and without bottle bills. It also shows the percentage of all litter that is made up of bottles and cans. Overall, bottles and cans are more frequently found littered in states that do not have bottle bills (container deposit laws) in place. This is a statistically significant difference (P value = 0.01).

States With Bottle Bills:

	Plastic Bottles		Glass Bottles		Beverage Cans		Plastic bottles + glass bottles + cans
State	Rank	Percentage of all recorded trash	Rank	Percentage of all recorded trash	Rank	Percentage of all recorded trash	Percentage of all recorded trash
California	6	3.65	9	2.47	11	2.42	**8.54**
Connecticut	4	5.92	8	3.35	7	3.45	**12.72**
Hawai'i	5	2.53	6	2.48	13	2.00	**7.01**
Maine	6	1.99	13	1.06	9	1.47	**4.52**
Massachusetts	3	8.27	6	3.95	5	5.47	**17.69**
Michigan	8	2.01	25	0.51	16	0.79	**3.31**
New York	5	5.07	9	2.68	8	2.81	**10.56**
Oregon	11	1.99	15	1.52	13	1.65	**5.16**
Averages	**6.00**	**3.93**	**11.38**	**2.25**	**10.25**	**2.51**	**8.69**

States Without Bottle Bills:

	Plastic Bottles		Glass Bottles		Beverage Cans		Plastic bottles + glass bottles + cans
	Rank	Percentage of all recorded trash	Rank	Percentage of all recorded trash	Rank	Percentage of all recorded trash	Percentage of all recorded trash
Florida	6	5.08	9	2.38	7	3.05	**10.51**
Georgia	2	11.83	4	5.87	3	10.11	**27.81**
North Carolina	3	8.75	11	2.93	4	6.05	**17.73**
Pennsylvania	4	7.64	12	2.61	6	5.74	**15.99**
Texas	3	7.04	12	1.78	6	3.65	**12.47**
Virginia	2	11.49	8	3.73	5	6.66	**21.88**
Averages	**3.33**	**8.64**	**9.33**	**3.22**	**5.17**	**5.88**	**17.73**

Data from Ocean Conservancy & CVW

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[ii] Container Recycling Institute. Bottle Bill Resource Guide. Retrieved on 10-23-2020 from http://www.bottlebill.org/

[iii] Schuyler, Q., Hardesty, B. D., Lawson, T. J., Opie, K., & Wilcox, C. 2018. Economic incentives reduce plastic inputs to the ocean. Marine Policy, 96, 250-255. https://www.sciencedirect.com/science/article/abs/pii/S0308597X17305377

[iv] Container Recycling Institute. Hawaii Coastal Cleanup Data and the Bottle Bill 2002-2008. Retrieved on 10-23-2020 from http://www.bottlebill.org/index.php/benefits-of-bottle-bills/hawaii-coastal-cleanup-data-and-the-bottle-bill-2002-2008

[v] Ocean Conservancy. 2020. Trash Information and Data for Education and Solutions (TIDES). 2020. https://www.coastalcleanupdata.org/

CLEAN VIRGINIA WATERWAYS

Founded in 1995, Clean Virginia Waterways of Longwood University is dedicated to decreasing plastic pollution, litter and marine debris through research, cleanup events, and building collaborations. CVW is housed on the Longwood University campus in Farmville, VA and is affiliated with the Ocean Conservancy in Washington D.C. CVW is funded through grants, gifts, sponsorships, and workshop fees.
CVW's reports and research are available on: http://www.longwood.edu/cleanva/publications.html

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