

New York State Pollution Prevention Institute

RIT | Golisano Institute for
Sustainability

Final Report for:

***New York State Department of
Environmental Conservation***

Impact Study of NYS Bottle Bill Expansion

November 4, 2019

Prepared by:

New York State Pollution Prevention Institute (NYSP2I)

Rochester Institute of Technology

111 Lomb Memorial Drive

Building 78, Room 2000

Rochester, New York 14623-0426

Phone: (585) 475-2872

Fax: (585) 475-5250

E-mail: nysp2i@rit.edu

Website: <http://www.nysp2i.rit.edu>

Disclaimer

This technical report is prepared consistent with the terms and purposes of the Research Agreement between New York State Department of Environmental Conservation (NYSDEC) and Rochester Institute of Technology (RIT) on behalf of the New York State Pollution Prevention Institute (NYSP2I) at the Golisano Institute for Sustainability (GIS) that was effective July 1, 2019, and funded by a grant to RIT from by the Environmental Protection Fund as administered by the NYS Department of Environmental Conservation. All conclusions herein are subject to the research disclaimer of warranty, indemnification, liability limitations, and all other provisions, described in the Research Agreement executed by RIT and NYSDEC (the “Parties”).

RIT, GIS, and NYSP2I cannot endorse any particular product or service. This report is the result of the tests and/or studies conducted and described; it is not to be interpreted as any type of specific endorsement of NYSDEC’s product or service. Further, any opinions, findings, conclusions or recommendations expressed are those of the author(s) and do not necessarily reflect the views of New York State.

This report is intended for NYSDEC’s internal use only. NYSDEC may use the report externally if used in its entirety. Any other use of less than a complete version of this report is allowed only if NYSDEC first obtains the written permission of RIT.

Table of Contents

Disclaimer 2

A. Definitions 4

B. Executive Summary 5

C. Introduction 6

D. Project Objective 8

E. Work Performed and Results 8

 Task 1. Benchmark U.S. bottle bills and other laws covering wine and liquor bottles 9

 Task 2. Identify and review all proposed NYS Bottle Bill expansion legislation from the
 2019 New York State Legislative Session 18

 Task 3. Gather anecdotal information from stakeholders 23

 Task 4. Identify the scope of the potential expansion to wine and liquor bottles 28

 Task 5. Complete a high-level cost / benefit analysis 33

 Task 6. Understand available capacity to use more recycled glass 54

F. Conclusions and Next Steps56

G. Appendix.....58

References58

A. Definitions

There are several key terms representing parts of the bottle bill system and specific stakeholders that are used throughout this report, which are outlined below. Table 1 lists the major stakeholders, along with their definition and several examples of NYS businesses that fall within that category. Table 2 summarizes key terms used in the discussion and analysis of the bottle bill expansion. Additional terms are defined where necessary in their respective sections.

Table 1 - Stakeholders

Legal Term	Definition	Examples
Bottler	<ul style="list-style-type: none"> A person, firm, or corporation who bottles, cans, or otherwise packages beverages to which no other person, firm, or corporation has the right to bottle A person, firm, or corporation who imports filled beverage containers into the U.S. 	<ul style="list-style-type: none"> Weis Vineyards Black Button Distilling Constellation Brands
Deposit Initiator	<ul style="list-style-type: none"> The bottler of containers The distributor of containers if such distributor's container purchase was not, directly or indirectly, from a registered deposit initiator A dealer who sells or offers for sale containers in NYS if the dealer's container purchase was not, directly or indirectly, from a registered deposit initiator An agent acting on behalf of a registered deposit initiator 	<ul style="list-style-type: none"> Bottlers Manufacturers Distributors Weis Vineyards Black Button Distilling Constellation Brands
Distributor	<ul style="list-style-type: none"> Any person, firm, or corporation who engages in the sale or offer for sale of beverages to a dealer 	<ul style="list-style-type: none"> Allied Wine Corp American Wine Wholesalers, LLC Barton Distillers Import Corp Brooklyn Spirits, LLC
3 rd -Party Agent	<ul style="list-style-type: none"> Pickup service providers 	<ul style="list-style-type: none"> TOMRA Envipco Central Recycling Cooperative
Dealer	<ul style="list-style-type: none"> Every person, firm, or corporation who engages in the sale of beverages for off-premises consumption in NYS 	<ul style="list-style-type: none"> Retail Storefronts Century Wines Pinnacle Wine & Liquor Whitehouse Liquor & Wine

Note: Data for stakeholder definitions from (New York State).

Table 2: Key terms and definitions associated with bottle bill functions

Term	Definition
Container Collection	Process whereby dealers and redemption centers receive deposit containers for redemption.
Container Deposit	Financial amount (currently 5-cents) charged per unit on beverage containers eligible for redemption.
Container Pickup	Mandated requirement for Deposit Initiators to pick up bottle bill containers from Dealers and Redemption Centers once redeemed.
Curbside Recycling	Collection of household recyclables by waste transporter
Deposit Logistics	Processes and systems used to move and report on the deposit money from stakeholder to stakeholder.
Handling Fee	Fee (currently 3.5-cents) paid by the Deposit Initiator to the Dealer to help cover operational costs associated with accepting redeemable containers.
Recycling Rate	Percentage of deposit containers recycled through redemption or curbside collection.
Redemption Rate	Percentage of deposit containers returned for deposit.
Unredeemed Deposits	Container deposits not claimed by the consumer within one quarter of the initial purchase date.

Note: Data for bottle bill functions and definitions from (New York State) (New York State Department of Taxation and Finance, 2016) (New York State Department of Environmental Conservation, 2018).

B. Executive Summary

As the foreign markets for recyclable materials have been largely cut off through China's National Sword policy, recycling markets across the United States, including those in New York State have been struggling to sustain themselves. One longstanding challenge that has been exacerbated by this situation is glass recycling. The challenges surrounding glass recycling through single stream curbside and drop off networks in New York State is well documented. One proposed solution to address these challenges and increase recycling of container glass is to divert a portion of glass, in the form of wine and liquor bottles, away from municipal and private recyclers and through the NYS container redemption system instead.

The New York State Pollution Prevention Institute (NYSP2I) at Rochester Institute of Technology (RIT) conducted a study investigating the high level implications that adding wine and liquor bottles to the list of redeemable containers in the NYS Bottle Bill would have.

The study drew upon published research and data sets as well as direct conversations with stakeholders to get an initial sense of what and how components of the recycling system would be affected if this proposal were implemented. The key elements of this study were to:

- Benchmark U.S. bottle bills and other laws covering wine and liquor bottles
- Identify and review all proposed NYS Bottle Bill expansion legislation from the 2019 New York State Legislative Session
- Gather anecdotal information from stakeholders
- Identify the scope of the potential expansion to wine and liquor bottles
- Complete a high level cost /benefit analysis
- Understand available capacity to use more recycled glass

Based on the work performed, NYSP2I identified several key findings, which are grouped into four main categories: general, scope of expansion, cost, and logistical:

General

- Higher deposit amounts on containers correlate with higher redemption rates.
- All three states that include wine and/or liquor bottles in their bottle bills either control the sale of those beverages at retail or allow their sale at grocery and/or convenience stores.
- Feedback on the bottle bill expansion to wine and liquor bottles is generally consistent by stakeholder group: opposed by wine and liquor industry, and supported by recycling industry and non-industry stakeholders.
- Deposit glass is less contaminated than glass collected as part of curbside, single-stream recycling programs, increasing recyclability and marketability of secondary use glass.

Scope of Expansion

- If wine and liquor bottles were added to the NYS Bottle Bill, approximately 4,500 businesses in NY would be affected as either dealers, deposit initiators, or both.

- Based on 2015 sales data of glass wine and liquor bottles in New York, a bottle bill expansion would impact approximately 488M containers.
- There are 164 recyclable handling and recovery facilities (RHRFs/MRFs) in NYS that would be affected by the diversion of wine and liquor bottles from curbside recycling into the redemption system.
- Using existing redemption rate values for containers under the current NYS Bottle Bill, the change in recycling rate of wine and liquor bottles would be approximately a 65% increase.

Cost

- Expanding the bottle bill to include liquor and wine will be costly for the industry
 - New deposit initiators and dealers would experience approximately \$40M in direct costs.
 - New York State would gain approximately \$7M in revenue.
- There is a financial disincentive for deposit initiators and the state to increase container redemption rates.
- Recycling programs would benefit financially from the removal of glass (i.e., wine and liquor bottles) from curbside recycling.

Logistical

- Most reverse vending machines would be able to handle the majority of wine and liquor bottles, but updates would need to be made to RVM software to be able to track containers properly.
- The relatively small and dispersed nature of wine and liquor retail locations may cause cost of third party pick-up services to rise for these customers.
- Estimates indicate that regional glass manufacturers have capacity to use the entire amount of cullet produced from wine and liquor bottles, assuming quality and cost specifications are met.

C. Introduction

Recycling in New York State is primarily conducted through two major avenues – curbside recycling services, where consumer-separated materials from residents and businesses are collected at the point of generation and bottle deposits, where consumers are responsible for returning eligible containers to a store or redemption center in exchange for their deposit on that container (\$0.05) being returned to them. The types of containers eligible for deposit redemption are regulated under New York State’s Returnable Container Act, commonly known as the Bottle Bill. Due to many factors, including the steep decrease in foreign markets for recyclable materials, the recycling system in NYS is facing challenges with material supply/demand, material quality and cost. One proposed solution to these challenges has been to expand the type of materials included under the NYS Bottle Bill to include wine and liquor bottles.

D. Project Objective

The objective of this project is to understand at a high level, based on available information, the implications of expanding the current NYS Bottle Bill to include wine and liquor bottles.

E. Work Performed and Results

To gain a high level understanding of the implications of including wine and liquor bottles as deposit containers in New York State, the following tasks were performed:

- Benchmark U.S. bottle bills and other laws covering wine and liquor bottles
- Identify and review all proposed NYS Bottle Bill expansion legislation from the 2019 New York State Legislative Session
- Gather anecdotal information from stakeholders
- Identify the scope of the potential expansion to wine and liquor bottles
- Complete a high level cost /benefit analysis
- Understand available capacity to use more recycled glass

In the sections below, the work performed and results associated with each of the tasks is summarized. For the purposes of this study, it was assumed that the components of the current NYS Bottle Bill would apply in the same manner to wine and liquor bottles if they were added.

How this assumption applies to different pieces of the analysis is discussed more specifically in the relevant sections below.

Task 1. Benchmark U.S. bottle bills and other laws covering wine and liquor bottles

Task 1 Methods

Existing U.S. bottle bills were benchmarked using data from the Container Recycling Institute (CRI), the EPA, the National Conference of State Legislatures, and information published directly by states with bottle bills. Specific bottle bill components reviewed include which beverages are accepted by which states, redemption rate by state, deposit value by state, the allocation of unredeemed deposits, and glass recycling rates in terms of deposit vs. non-deposit containers. Other types of laws were also benchmarked to understand additional methods used to incentivize container recycling besides bottle bills. To do this, keyword searches were conducted in an effort to both define and identify Extended Producer Responsibility (EPR) mandates and/or Product Stewardship Programs (PSP), and advanced disposal fee programs at the state level. This search included proposed and existing legislation, but excluded any laws or programs outside of the United States. However, some non-U.S. related information and anecdotes were found through the research and were included where appropriate, but information on these programs was not sought out as it was beyond the scope of this study. Through online research, conversations with stakeholders, and review of state liquor laws, the high level distribution system was also summarized and compared for currently-redeemable alcoholic beverage containers (e.g., beer) as well as wine and liquor bottles in New York State. Legal points of sale (i.e., grocery store, liquor store, etc.) were also reviewed for NYS and the states that currently include wine and/or liquor in their deposit systems.

Task 1 Results

Bottle Bills/ Returnable Container Laws

U.S. glass container recycling rates as reported by the EPA and the Container Recycling Institute (CRI) are depicted in Figure 1. In 2015, over 9.1 million tons of glass containers were generated in the U.S.; of that amount, approximately one third were recycled and the remainder were combusted or landfilled (United States Environmental Protection Agency, n.d.). By comparison, the recycling rate for deposit eligible glass containers in 2015 was 60% higher than the rate for

non-deposit glass containers. Similarly, the recycling rate for glass containers in general was 40% higher in states with a bottle bill compared to states without a bottle bill. This strongly suggests that the incorporation of a bottle bill significantly increases glass container recycling rates, which aligns with previously reported findings.

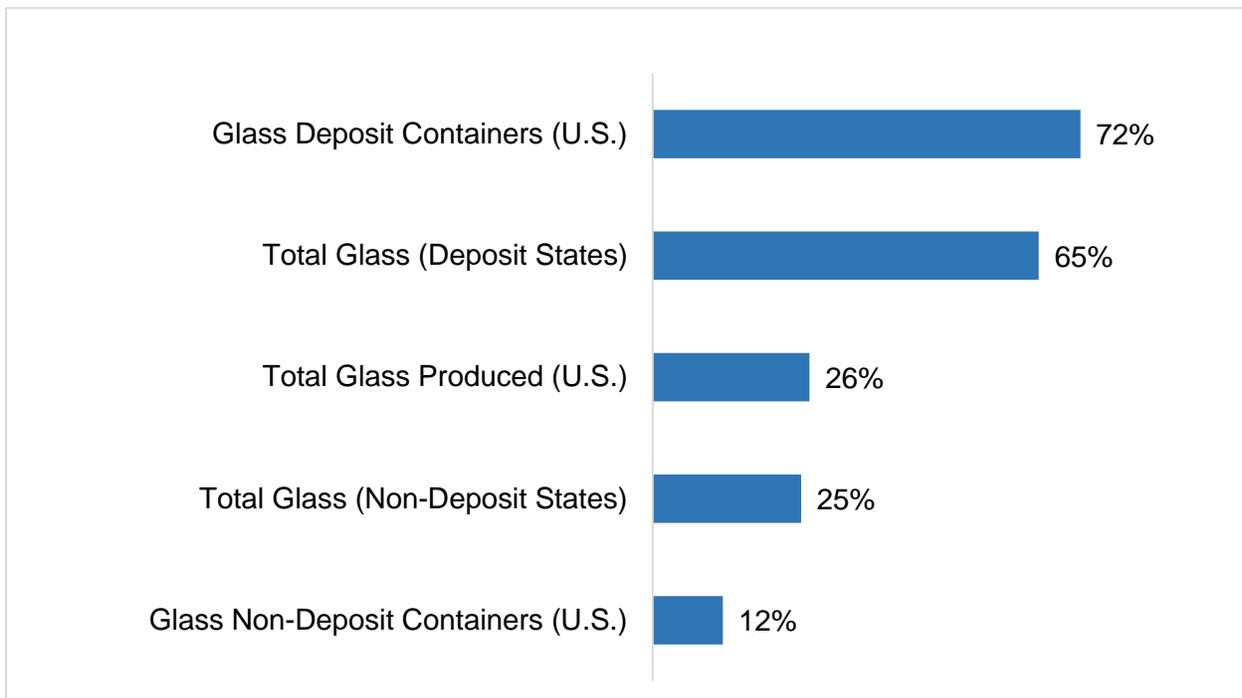


Figure 1 - U.S. Glass Recycling Rates by Category of Glass. Data from (United States Environmental Protection Agency, 2018), (Container Recycling Institute, 2017), and (Container Recycling Institute, 2013).

There are ten states in the U.S. that currently have bottle bills including: California, Connecticut, Hawaii, Iowa, Maine, Massachusetts, Michigan, New York, Oregon, and Vermont (Container Recycling Institute, 2019). Figure 2 shows the ten bottle bill states and the containers that are currently included under each of the respective laws. As shown, each of the ten state's bottle bills includes beer,¹ malt,² and carbonated soft drinks. Eight out of ten states include wine products³, seven out of ten states include bottled water, and four out of ten states include all non-

¹ Beer- any fermented beverages made from malt, wholly or in part, or from any substitute therefor.

² Malt beverages- includes any beverage obtained by the alcoholic fermentation or infusion or decoction of barley, malt, hops, or other wholesome grain or cereal and water including, but not limited to, ale, stout, or malt liquor.

³ Wine products- means a beverage containing wine to which is added concentrated or un-concentrated juice, flavoring material, water, citric acid, sugar, and carbon dioxide, and containing not more than 6% alcohol by volume, to which nothing other than such wine has been added to increase the alcoholic content of such beverage

alcoholic beverage containers—except for those containing dairy—as redeemable containers. Three states include liquor and two include wine. In Figure 2, the states are displayed in order of increasing redemption rate⁴, with the lowest percentage on the left (i.e., Connecticut), and the highest on the right (i.e., Michigan). The year that each bottle bill was established is noted in parentheses in the axis labels (e.g., the bottle bill program in Connecticut was established in 1978).

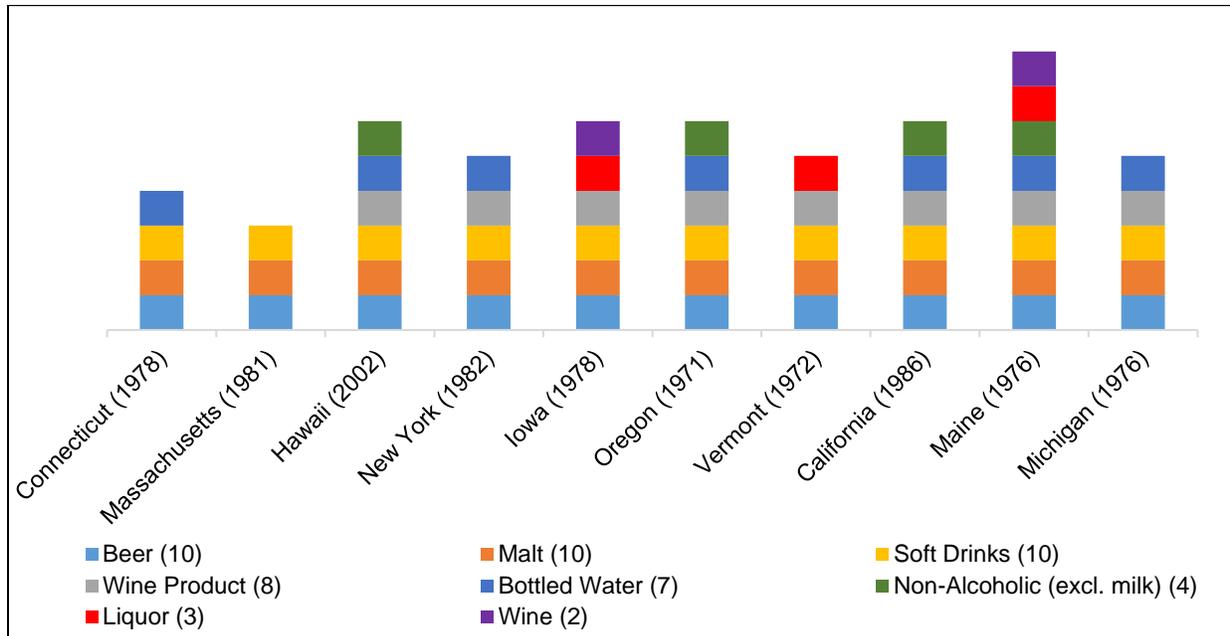


Figure 2 – Redeemable (Bottle Bill) Containers Accepted by State.

Data from (California Environmental Protection Agency, Department of Resources Recycling and Recovery, 2019), (Connecticut Department of Energy & Environmental Protection, 2019), (Container Recycling Institute, 2016), (Container Recycling Institute, 2019).

Redemption rate and the deposit values by state are shown in Figure 3. Half of the bottle bill states—Connecticut, Massachusetts, Hawaii, New York, and Iowa—have one set deposit amount of five cents per container. These same states report redemption rates that range from 50% to 65%. In contrast, four states—Oregon, Vermont, California, and Maine—have variable deposit amounts ranging from two cents to a maximum of fifteen cents based on the container type. These same states report higher redemption rates ranging from 73% to 84%. Finally, one state, Michigan, maintains a set deposit value of ten (10) cents per container and reports the highest

⁴ Redemption rate – the percentage of redeemable containers that are returned for a deposit

redemption rate of 89%. These findings suggest that higher deposit values result in higher redemption rates, which also aligns with previous findings reported by the Container Recycling Institute (CRI) (Collins, 2019).

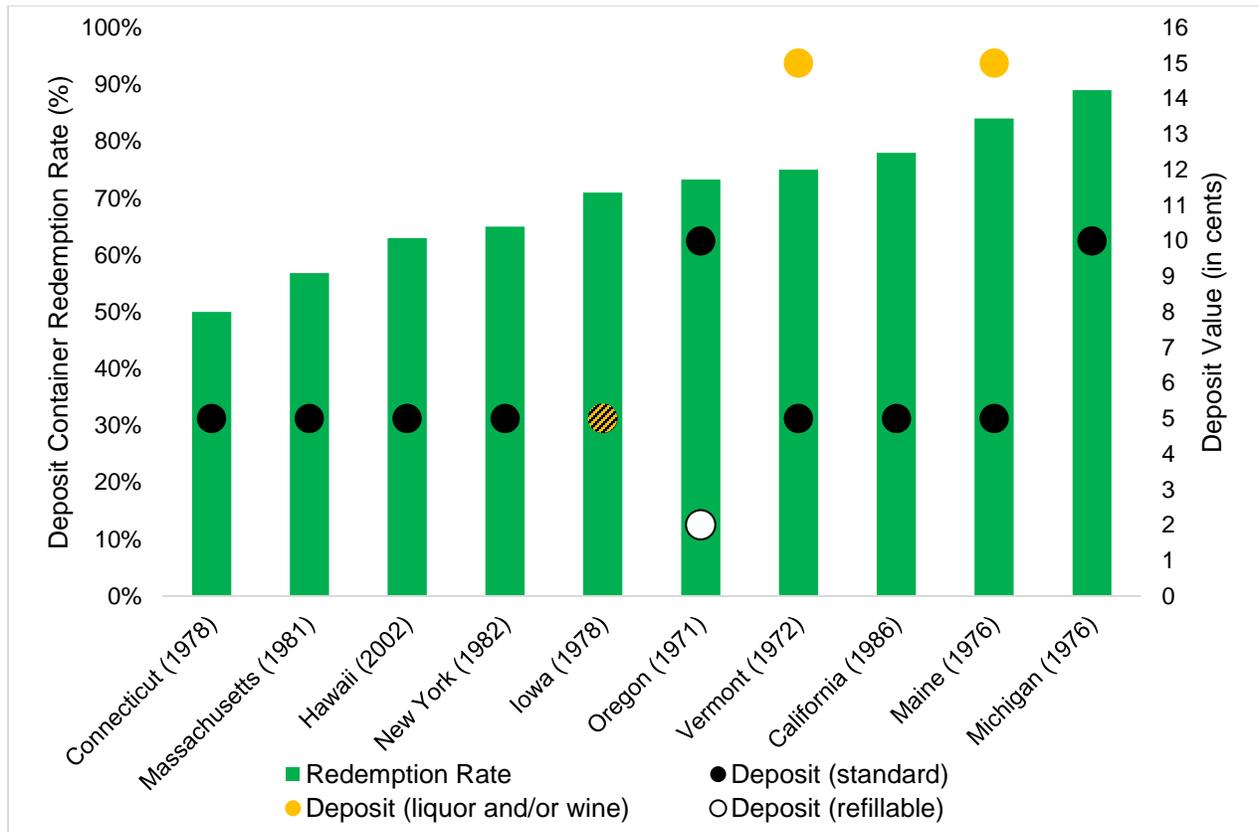


Figure 3 – Redemption Rate and Deposit Values by State.
Data from (Container Recycling Institute, 2019).

Figure 4 shows the allocation of unredeemed deposits. Connecticut and Massachusetts allocate 100% of unredeemed deposits to the state general fund. Conversely, Iowa, Maine, Oregon, and Vermont allocate 100% of unredeemed deposits to distributors and/or bottlers. Michigan and New York take a slightly different approach- each state divides the value of unredeemed deposits between the state and either retailers or distributors. In the case of the former, Michigan allocates 75% of unredeemed deposits to state environmental programs and 25% to retailers. In the case of the latter, New York allocates 80% of unredeemed deposits to the state general fund and environmental protection fund, and 20% to distributors (Container Recycling Institute, 2019). The

two states that allocate the unredeemed deposits exclusively to the state general fund (Connecticut and Massachusetts) have the lowest redemption rate and include the least number of container types in the program. In contrast, Maine also allocates unredeemed deposits to the state but has the second highest redemption rate at 84% and includes the most beverages in the program. Therefore, it is not apparent from these findings if the allocation of unredeemed deposits impacts the redemption rates of each of the programs.

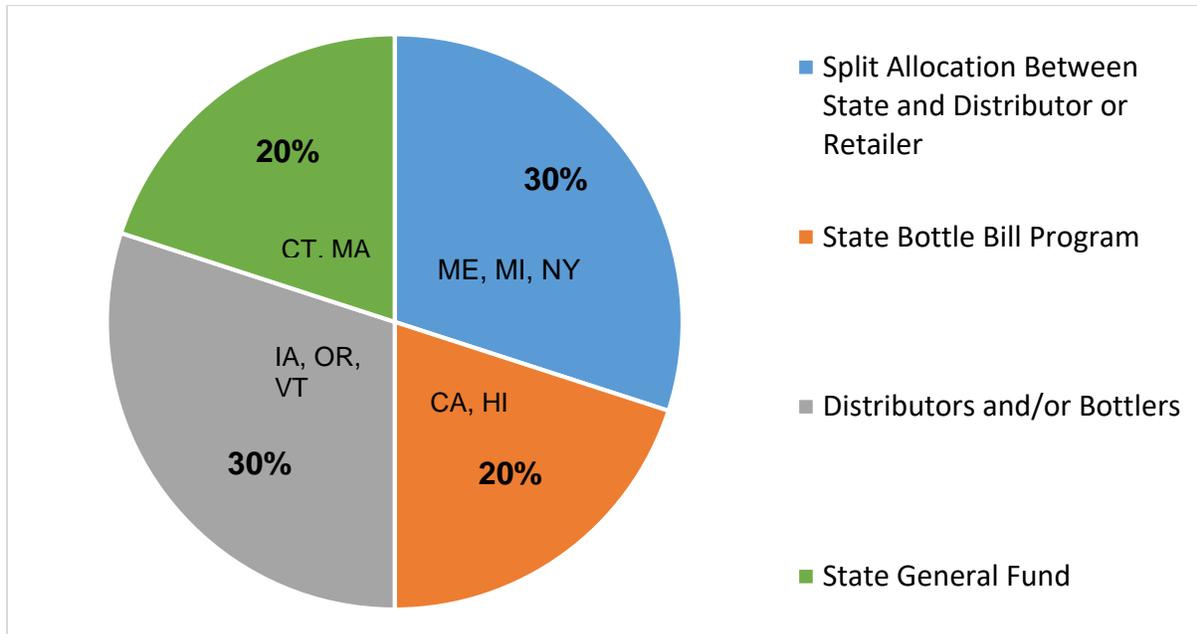


Figure 4 – Percent Allocation of Total Unredeemed Deposits from 10 Bottle Bill States. Data from (United States Environmental Protection Agency, 2018), (Container Recycling Institute, 2017), (Container Recycling Institute, 2013).

Alternative (Non-Bottle Bill) Legislative Approaches

There are other mechanisms, besides bottle bills, that are used to increase recycling rates. One is through the use of a concept known as Extended Producer Responsibility (EPR). Whereas bottle bills—which are sometimes considered to be a form of EPR—put the responsibility for material recovery, treatment, and disposal on multiple stakeholders, EPR focuses accountability for recovery of material on the manufacturer of the product. Under EPR programs, manufacturers are mandated to take primary financial responsibility for the end of life management of the products they produce. Specifically, this means shifting the financial and management responsibility to the producer and away from the public. By tying financial burden of disposal directly to the manufacturers of a product, EPR programs are also meant to improve

environmental impacts of a product lifecycle by encouraging producers to find alternatives to traditional disposal, such as reuse, or designing for easier recycling.

Advocates of EPR cite the following rationales for its adoption:

- Higher recycling rates have been demonstrated for the products that are covered
- In the EU, the package recycling rate went from 47% in 1998 (prior to EPR adoption) to 65% in 2012 (The European Organization for Packaging and the Environment (EUROPEN))
- The EPR program in British Columbia, Canada covers glass, plastic, metal, paper, and other types of packaging material. The industry-run recycling organization, Recycle BC, recovers approximately 78% of all packaging in the province and, of that amount, 87% is recycled (Valiante, 2019) (Ma, 2019)
- Potentially lower costs for municipal recyclers, as difficult to recycle items are removed from their programs
- Increased accountability for end of life packaging material management, as manufacturers may be more incentivized to find solutions to reduce costs and ultimately environmental impacts associated with packaging (OECD, n.d.)
- Increased material feedstock facilitates closed-loop manufacturing

Also known as Product Stewardship Programs, many states use EPR programs for products like e-waste, paint, batteries, fluorescent lighting, mercury thermostats, and appliances containing refrigerants. New York has adopted EPR programs for e-waste, rechargeable batteries, and mercury thermostats but not for more general consumer product waste like beverage containers (New York State Department of Environmental Conservation, n.d.). At present, Connecticut was identified to be working toward an EPR program that would include most common consumer recyclables (i.e., glass, boxboard, metal cans, PET) (Connecticut Department of Energy & Environmental Protection, 2016). In California, recently introduced legislation (2019) proposes EPR for single-use plastic products (California Product Stewardship Council, 2019). Hawaii proposed a zero waste plan in 2009 that highlights the role and necessity of EPR but it has yet to be fully implemented (County of Hawai'i Department of Environmental Management, n.d.) (Hawaii Department of Health, n.d.). New York State has no such initiatives for beverage containers or

any other consumer recyclables (New York State Department of Environmental Conservation, n.d.).

In addition to variation in the number and types of products subject to EPR across states, there is also variation in the operation of an EPR program. The two most common ways differ in terms of what entity is running the program. In one scenario, manufacturers run the program and contract transporters and recyclers to recover material. In the second scenario, municipalities run a recycling program and submit bills to a stewardship organization developed by the manufacturers (Connecticut Department of Energy & Environmental Protection, 2019). The benefit of the former is that manufacturers are in control—they own the responsibility of collection, separation, segregation, and marketing of recyclables. In this case, there is increased incentive to control costs and identify solutions to packaging challenges at end of life. The benefit of the latter is the ability to leverage existing infrastructure. However, there are a number of challenges with municipally controlled programs: reduced incentive to control costs, impacts of contamination are unknown, and marketing of recyclables remains the responsibility of the municipality.

Another approach being used by some states includes recycled content laws that require a minimum amount of post-consumer content. For example, Oregon requires that glass containers have 50% recycled content and California requires that glass containers must have 35% recycled content (Spendelow & Gast, 2019).

Advanced disposal fees are another method of supporting material recovery and waste diversion. Used in Hawaii, the glass advance disposal fee program requires manufacturers, importers, and distributors of certain glass containers to pay 1.5-cents per unit. The fees raised are intended to pay for county glass container collection programs. Examples of containers subject to the advance disposal fee include milk, oils, sauces, and condiments (State of Hawaii, n.d.). Although deposit beverage containers—including wine and liquor—are not subject to the advance disposal fee, they are subject to a “deposit beverage container fee” which is payable by beverage distributors (State of Hawaii, n.d.), (State of Hawaii, n.d.). The beverage container fee in Hawaii is comparable to the handling fee assessed to Deposit Initiators in New York State.

Summary of Distribution System

In the United States, alcoholic beverages are distributed through what is known as the three-tier system, generally comprised of (1) manufacturers/suppliers, (2) wholesalers, and (3) retailers (Figure 6) (Park Street Imports, LLC, 2019). Entities operating within each tier require a specific license to operate, and are responsible for certain duties to carry out the system of checks and balances that the three tier system was designed to be. For example, Tier 1 entities (manufacturers) sell to licensed importers, distributors and control boards, Tier 2 entities work with federal and state governments and are responsible for ensuring that state and federal excise taxes are collected correctly, and are the only group allowed to sell to licensed retailers. Licensed retailers (Tier 3) sell beverages directly to consumers, and are responsible for ensuring state sales taxes are properly paid, and alcohol is only sold to those of legal age.



Figure 5: Diagram of U.S. three tier system for alcohol distribution

(Park Street Imports, LLC, 2019)

Within this overarching three-tiered system, individual states are responsible for regulating the sale and distribution of alcohol within their own states. The way in which states do this falls into one of two broad categories: licensing and control. In licensing states, the state issues licenses to the entities that will manufacture and sell alcoholic beverages, while in control states, the state is involved in the actual distribution and/or sales of some or all alcoholic beverages (New York State Liquor Authority, 2019). The majority of the states, including New York, have chosen to regulate the sale of alcohol through licensing, however there are seventeen control states in the

U.S., with varying nuances surrounding what alcoholic beverages they control and how. It is estimated that the U.S. has over 200 different regulatory frameworks for alcoholic beverage companies to comply with (Park Street Imports, LLC, 2019). Most states operating under a control model control only the sale of distilled spirits at the wholesale level, but in some cases wine and beer sales are also controlled by the state at wholesale and/or retail levels through government agencies themselves, or government operated stores or designated agents (National Alcohol Beverage Control Association (NABCA), 2019). According to the National Alcohol Beverage Control Association, control jurisdictions represent approximately 23% of distilled spirits sales and a significantly smaller percentage of beer and wine sales in the United States.

Because retail locations for redeemable beverage containers are required to accept these containers, another important aspect to the distribution system for alcoholic beverages in the context of a bottle bill is the beverage point of sale. Individual states differ in where they allow beer, wine and spirits to be sold, and that isn't necessarily consistent with whether the state is a licensing or control state. In New York State, the alcoholic beverage control law dictates that beer is allowed to be sold in grocery stores, but that is not the case for wine and liquor, meaning the network of retail locations that would be required to accept wine and liquor bottles for return would be separate from the existing network currently accepting redeemable containers (New York State Legislature, n.d.). Table 3 shows a summary of allowable points of sale, type of state (control vs. license) as well as which alcoholic beverage containers are included in the respective bottle bills. As was stated previously, Vermont, Iowa and Maine are the only three states currently accepting wine and/or liquor bottles in their redemption systems, which is why they are shown in Table 3 alongside New York State for comparison purposes. All three of these states (VT, IA, ME) control the sale of spirits at Tier 2 (wholesale/distribution), while VT and ME also control spirits sales at Tier 3 (retail) as well. None of the three states control sales of beer or wine at any tier of the distribution system. These findings do not seem to correlate with whether or not the state allows the sale of these alcoholic beverages at grocery and/or convenience store locations vs. dedicated wine/spirits stores. As shown in Table 3, Iowa and Maine both allow sales of beer wine and spirits at grocery and/or convenience store locations while Vermont only does so for beer and wine.

Table 3: summary of relevant liquor laws by state

State	Feature	Beer	Wine	Spirits	Notes
NY	Included in bottle bill	✓			
	State controlled sales				
	Sale allowed at grocery or convenience stores	✓			
VT	Included in bottle bill	✓		✓	State controls spirit sales at wholesale/distribution (tier 2) and retail (tier 3)
	State controlled sales			✓	
	Sale allowed at grocery or convenience stores	✓	✓		
IA	Included in bottle bill	✓	✓	✓	State controls spirits at wholesale/distribution (tier 2) only
	State controlled sales			✓	
	Sale allowed at grocery or convenience stores	✓	✓	✓	
ME	Included in bottle bill	✓	✓	✓	State controls spirit sales at wholesale/distribution (tier 2) and retail (tier 3)
	State controlled sales			✓	
	Sale allowed at grocery or convenience stores	✓	✓	✓	

Note: Data from (StateLiquorLaws.com, 2019) and (National Alcohol Beverage Control Association (NABCA), 2019).

Task 2. Identify and review all proposed NYS Bottle Bill expansion legislation from the 2019 New York State Legislative Session

Task 2 Methods

To accomplish this task, a search was first conducted on the New York State Senate and Assembly websites in order to identify all proposed NYS Bottle Bill expansion legislation from the 2019 New York State Legislative Session (The New York State Senate, n.d.). Included under “expansion” are amendments that:

- Expand the types of containers eligible for deposit (e.g., glass wine bottles)
- Expand the types of beverages eligible for deposit containers (e.g., wine and liquor)
- Change the handling fee associated with accepting container redemptions
- Address fraud prevention
- Address exemptions
- Provide financial incentives

This process produced 6 results, listed in Table 4 below:

Table 4 - Proposed NYS Bottle Bill Legislation - 2019

Bill	Date Bill Introduced
A2660 / S5085	January 24, 2019 / April 8, 2019
A7388 / S860	April 29, 2019 / January 9, 2019
A5028 / S2129	February 6, 2019 / April 22, 2019
A3473	January 29, 2019
S2828	January 29, 2019
A6057	February 26, 2019

After identifying all bottle bill related legislation proposed in the 2019 legislative session, each document was analyzed separately. Specifically, the underlying priority of each proposed bill, as well as the specific amendments related to those priorities, was identified and summarized.

Task 2 Results

High-level Summary of Proposed Bills

A number of bills related to the NYS Bottle Bill were introduced in the New York State Assembly and Senate between January and April of 2019. In general, the bills address two priorities:

- Increase the number of beverage container types eligible for the container deposit program
- Improve the container deposit redemption process for all stakeholders

Specific amendments related to the first priority include:

- Add wine, liquor, distilled spirits, cider, and wine products to the list of deposit beverage containers
- Phase in:
 - Noncarbonated soft drinks, fruit and vegetable juices with less than 100% juice, coffee, and tea
 - Carbonated fruit beverages

There are 33 specific provisions related to the second priority, which fall into the following eight categories:

- Redemption
- Fraud Prevention



- Reimbursement to Dealers
- Deposit Initiators
- Exemptions
- Tax Credits
- Post-Consumer Content
- Rules

Detailed Summary of Proposed Bills

A05028 / S02129

- Introduced in Assembly on February 6, 2019, this bill is meant to improve the NYS Bottle Bill by expanding the number of beverages eligible for a 5-cent deposit and redemption – AND– to improve the redemption process
- Specific amendments include the following:
 - Beverage Containers Accepted
 - Wine, liquor, distilled spirits, and cider
 - Beverage Containers to be Phased In
 - Noncarbonated: Soft drinks, fruit and vegetable juices with less than 100% fruit or vegetable juice, coffee and tea
 - Carbonated: Fruit beverages
 - Reverse Vending Machines
 - Allow for the use of alternative technology for container redemption
 - Reverse vending machines may be audited by the State
 - Define “state-specific UPC code”
 - A product code and label unique to New York and states with a (compatible) bottle bill
 - Redemption
 - Dealers must clearly post an expiration date for redemption receipts
 - Dealers must redeem full refund value on receipt in absence of a posted expiration date
 - Increase the allowable distance from a dealer to a redemption center from ½ mile to 1 mile; this applies to dealers that limit the number of containers accepted per visit, per redeemer, per day



- Deposit Initiators
 - Deposit initiators and distributors must collect redeemed containers in a timely manner and at reasonable times (as regulated); failure to do so is a violation
 - Increase handling fee paid to dealer or redemption center operator to 5-cents per container
 - Deposit initiators may require dealers to move or load pallets, skids, bags, and/or containers of containers by, e.g., forklift when dealer has appropriate equipment and staff available
- Re-Count Provision
 - A re-count can be requested in the event of a discrepancy between the count of the dealer or redemption center and the deposit initiator
- Post-Consumer Content Requirements
 - Glass beverage containers: $\geq 35\%$ (*by 1/1/2022*)
 - Aluminum beverage containers: $\geq 35\%$ (*by 1/1/2025*)
 - PET beverage containers: $\geq 25\%$ (*by 1/1/2030*)
 - Content requirements may be reduced or waived based on technical feasibility
- Refund Value Account
 - Service charges on withdrawals should not exceed the maximum authorized by the State
 - Until 4/1/2025, deposit initiators using state-specific UPC codes can pay the State 75% instead of 80% of the quarterly outstanding refund account balance. This only applies to the refund value attributable to containers with state-specific UPC codes. The remaining 25% account balance is the property of the deposit initiator and can be withdrawn.
- Redemption Fraud
 - Bottlers can use state-specific UPC codes
 - No later than 10/1/2024 the commissioner of taxation and finance will submit a report to the Governor and the Legislature detailing the effectiveness of state-specific UPC codes on fraud.

- Deposit initiators will report on the use of state-specific UPC codes in terms of percentage of products covered, methods used to prevent fraud, and labeling changes.
- Rules and Regulations
 - The commissioner can establish rules and regulations under three additional sections: 27-1007, 27-1011, and 27-1012.
- Amendment Expiration
 - As of 4/1/2021, the city of New York, Nassau county, and Suffolk county will no longer be entitled to retain 25% of fines and penalties collected as a result of enforcement of section 27-1005 (beverage containers can be sold only if the deposit has been collected by a deposit initiator).

A02660 / S05085

- Introduced in Assembly on January 24, 2019 and in Senate on April 8, 2019, this bill is meant to improve the NYS Bottle Bill by streamlining the deposit reimbursement process for large volume dealers.
 - Distributors may or may not reimburse dealers for the deposit value when dealers purchase less than 100,000 cases per year
 - Distributors must reimburse dealers for the deposit value when dealers purchase 100,000 or more cases per year

S00860* / A07388**

- Introduced in Senate on January 9, 2019, and in Assembly on April 29, 2019, this bill is meant to provide exemptions from mandatory acceptance of containers based on business footprint and licensure.
 - Places of business less than 2,000 square feet
 - Places of business less than 5,000 square feet AND licensed under agriculture and markets law AND located not in a city of 1M+ population
 - All other places of business are mandated to accept containers

*The Senate bill was read twice and ordered printed, and when printed to be committed to the Committee on Environmental Conservation

**The Assembly bill was read once and referred to the Committee on Environmental Conservation, past where it did not advance.

A03473

- Introduced in Assembly on January 29, 2019, this bill provides a tax credit for bottling, packaging, and labeling expenses of wineries, breweries, and distilleries.
 - Breweries producing 65M gallons or less of beer per year, wineries, and distilleries are eligible for a tax credit equal to the amount spent on bottling, packaging, and labeling
 - Tax credit can be applied up to the minimum fixed tax amount as given in Section 210, subdivision 1, paragraph d of the tax code (e.g., \$25 for NY receipts up to \$100,000).
 - Amount of credit that can't be deducted in a given tax year can be carried over for deduction from future tax year liability.

S02828

- Introduced in Assembly on January 29, 2019, this bill adds cider to the list of returnable beverage containers.
 - “Cider” is defined in Article 1, section 3, paragraph 7-b of the Alcoholic Beverage Control (ABC) law

While several of the six proposed bills drafted and proposed during the 2019 NYS Legislative Session gained traction, none of them moved through committees to be passed into law this year.

Task 3. Gather anecdotal information from stakeholders**Task 3 Methods**

Positions and input on the potential for including wine and liquor bottles as deposit items in the NYS Bottle Bill were gathered in several ways: by finding and summarizing publicly posted positions, through personal communication with stakeholders, and through feedback and discussions had at stakeholder forums. Since publicly posted positions were all in response to a proposed bill, and there was no proposed bill that included *only* the addition of wine and liquor bottles, these positions were in most cases not specific to the sole prospect of adding wine and liquor bottles to the list of redeemable containers. Rather, they were in reaction to all of the components of the respective proposal. Through this method, NYSP2I identified the positions of 67 individual organizations to bill A5028/S02129, one component of which was to include wine

and liquor bottles as redeemable containers (a more detailed summary of bill A5028/S02129, as well as the other related bills can be found in Task 2 Results section above). To supplement these publicly-available findings, NYSP2I also compiled a list of relevant stakeholders (e.g., beverage industry associations, municipal recyclers, glass product manufacturers, etc.) and conducted focused outreach to many of the organizations identified, both to gather data and information they were willing to make available, and to understand their general positions on the potential for adding wine and liquor bottles to the NYS Bottle Bill. While NYSP2I did not receive any official stances from these organizations (again because there was no specific proposal to react to), the general stances by stakeholder group, including major concerns and/or points of support, were summarized. NYSP2I also supported NYSDEC in hosting a series of three Glass Recycling Stakeholder Meetings in Albany, New York City, and Rochester NY, throughout August and September 2019. The list of invitees included beverage industry, municipal, and government representatives, as well as environmental and advocacy groups, manufacturers, and private businesses. This group of meetings was meant to foster discussion among stakeholders around potential solutions for addressing glass recycling challenges. While NYS Bottle Bill expansion to wine and liquor was not the sole focus of these discussions, the topic was discussed at each meeting and NYSP2I was able to gather more stakeholder input on the subject through these forums. In the summary below, feedback from stakeholders is split into two categories – feedback on previously proposed bills to expand the NYS Bottle Bill (which included but were not limited to including wine and liquor bottles), and feedback on the concept of including just wine and liquor bottles in an expanded NYS Bottle Bill (which was not associated with a proposed bill).

Task 3 Results

Publicly-posted Feedback on Proposed Bills

Each of the publicly posted positions that were identified by NYSP2I were to Assembly bill 05028 and Senate bill 02129 (A05208/S02129), the components of which are summarized under Section E, Task 2 above. The majority of the entities that provided public positions to bill A05208/S02129 were non-industry entities (60%), while the remaining 40% were some type of industry association or business. As is displayed in Figure 6, the vast majority of both non-industry and recycling industry stakeholders communicated support of the bill in their publicly posted memos. The

majority of beverage industry stakeholders communicated opposition. Looking closer at Figure 6, it is clear that within these broad categories (non-industry, recycling industry, beverage industry), the positions of each subgroup are fairly consistent based on the dataset available. For example, all of the redemption centers that provided public positions were in support of the bill while the reverse is true of the beverage industry associations.

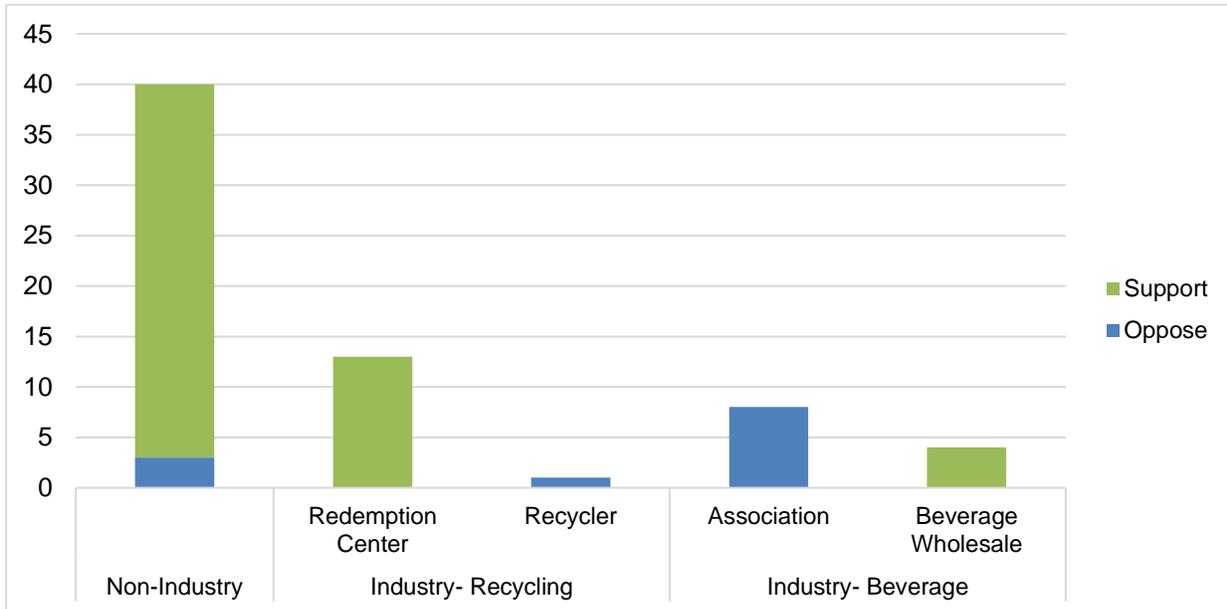


Figure 6: Summary of Publicly Posted Positions to Bills A5028/S02129 by Stakeholder Group. Data from publicly posted memos - Appendix A.

Anecdotal Feedback on Wine and Liquor Inclusion in Bottle Bill by Stakeholder Group

The input gathered via personal communication and stakeholder meeting discussions supported the general trends communicated through publicly posted position memos. The trends identified are summarized below by stakeholder group. **The summaries included below represent the broad themes as a stakeholder group, not necessarily that of any one individual organization or of NYSP2I.**

- Wine and Liquor Industry Representatives – Oppose
 - This would pose a significant financial burden on small wineries, distilleries and wine and spirits retailers that many businesses could not financially withstand.
 - The wine and liquor industries are one of the most regulated industries already, adding additional costs to their business model is unfair. Over 50% of the cost of spirits already go to pay a fee or tax.



- Many of the wine and liquor businesses are small independently owned businesses and would have to individually navigate the process of setting up and maintaining container return systems. They would not benefit from economies of scale across multiple locations in the way that grocery stores or convenience store chains can currently.
- Cost of square-footage required to manage container returns varies drastically around the state and would unfairly burden dealers in urban locations. Many locations simply do not have the extra space to accommodate storing containers.
- The increased cost of operations would be passed on to the consumer in the form of higher prices.
- There are issues with fraud in the current system. If these issues aren't addressed before the bottle bill is expanded, the fraud will also expand.
- Bottle bills were first conceived before curbside recycling was widespread, and to address litter problems. Now that most U.S. families have access to curbside recycling, and wine and liquor bottles are not a major component of litter, these containers shouldn't be added to the NYS Bottle Bill.
- Material Recovery Facilities (MRFs)/ Recyclers – Support
 - Glass recovery at MRFs, especially those receiving material from single-stream recovery is difficult, and taxing on the recycling equipment. Glass at MRFs is usually so contaminated with other materials it has no secondary use besides daily cover at a landfill.
 - Sending more glass through the redemption process and keeping it out of MRFs would benefit many MRFs by:
 - lowering operational costs associated with managing glass
 - improving quality and therefore value of other recovered materials that are often contaminated by glass fines
 - Glass recovery is often subsidized by the revenue from recovered fibers, plastics and metals. Therefore:
 - Removing more glass from the MRF process would help MRFs manage costs.
 - If other plastic and metal containers were included in addition to wine and liquor bottles, MRFs are not convinced that the lowered costs from less glass would outweigh the loss of revenue from less plastics and metals. That is, MRFs support the inclusion of most any glass container in the bottle bill, but not containers of other materials.
- Glass Product Manufacturers – Support
 - Broadly there is a use for more glass cullet, but with the caveat that it must be supplied at a competitive price and specified quality.



- Glass cullet used in container manufacturing keeps energy costs down and extends furnace life.
- A main limiting factor to using more recycled glass is price.
 - Glass processed through the redemption system as opposed to MRFs is of higher quality and typically lower cost due to the more limited processing that has to happen to get it to required specifications.
- Redemption Centers – Support
 - Increasing the number of types of redeemable containers would allow redemption centers to accept larger volumes of materials, and receive the handling fees associated with the additional containers. It would be an opportunity for business expansion.
 - If wine and liquor bottles are included in the bottle bill in the future, the handling fee for these containers should be reevaluated and potentially raised.
 - Due to the wide variety of micro and craft and imported wines and liquors, it will be important to have locations, such as redemption centers, which are not limited in the type of container they accept.
 - As opposed to MRF glass, a very high percentage of glass that is recovered through the redemption process is used again in product manufacturing. Adding wine and liquor bottles to the list of redeemable containers will increase the recycling rate of this material.
- 3rd Party Pick up Agents – Support
 - Most wine and liquor containers would physically fit through existing reverse vending machines, but there would need to be updates to the programming to track the materials properly.
 - Because of the large number of small and medium sized wine and liquor businesses, pick up agents would have a larger number of pick up points with potentially smaller than average volumes of material to pick up. To account for this, pick up agents would need to set their prices to cover any inefficiencies. This may cause financial burdens for small rural wine/liquor retail locations.
 - Systems for consolidating material would be beneficial for the pick-up process to increase the efficiency of the pick-up and keep costs down.
 - There would likely be an adjustment period for 3rd party pick up agents to absorb the additional material into their systems.
- Environmental Organizations – Support
 - Inclusion of wine and liquor bottles in the NYS Bottle Bill will benefit municipal recycling programs, reduce litter, increase recycling rates, and decrease consumer confusion.

- Many environmental organizations would like to see other containers beyond wine and liquor bottles included as well.
 - There is consumer confusion about which containers are redeemable. Including more containers in the NYS Bottle Bill will decrease confusion.
 - Bottle bills have shown to increase recycling rates for the containers that are covered.
 - Municipal recycling programs are struggling to handle glass at their facilities. Wine and liquor bottles are almost exclusively glass, and would help ease burdens on municipal recycling systems if removed.
- Other states have implemented wine and liquor deposits and have seen increased recycling rates because of it.

Task 4. Identify the scope of the potential expansion to wine and liquor bottles

Task 4 Methods

In order to understand the effect of an expansion of the NYS Bottle Bill to include wine and liquor bottles, it is important to estimate the number of businesses, quantity of glass containers, and number of recycling facilities potentially impacted by a bottle bill. For purposes of this analysis, NYSP2I assumed that the structure of the current NYS Bottle Bill would remain the same, and wine and liquor would simply be added to the definition of a “beverage” in the law.

NYSP2I leveraged partners that had access to relevant data to perform this analysis. The New York State Liquor Authority (SLA), through the State’s Office of Information Technology Services, provided NYSP2I with a list of active liquor licenses for both on-premises and off-premises sale, distribution, or manufacturing of wine or liquor in New York. Information about building size and sales volume were not readily available to the SLA and therefore were not included in this analysis.

NYSP2I identified the total number of businesses affected from this list, utilizing the license description to discriminate between affected and non-affected businesses. License types included in the total are shown below in Table 5.

Table 5. Wine and Liquor License Types Included in Bottle Bill Expansion

Wholesale or Retail	Type	Class	Description
Retail	L	222	LIQUOR STORE
	W	322	WINE STORE
	RS	130	ROADSIDE FARM MARKET
Wholesale	WW	303	WHOLESALE WINE
	LL	203	WHOLESALE LIQUOR
	WA	305	WINERY / FARM WINERY RETAIL
Wholesale - Manufacturing	FW	302	FARM WINERY
	DD	207	FARM DISTILLER "D"
	DW	301	WINERY
	DA	206	DISTILLER "A-1"
	MW	307	MICRO WINERY
	DB	205	DISTILLER "B-1"
	DB	202	DISTILLER "B"
	DC	204	DISTILLER "C"
	FP	306	TEMPORARY WINERY/FARM WINERY
	DA	201	DISTILLER "A"

Note: Data from (New York State Liquor Authority, 2019)

An estimate of wine and liquor containers covered came from New York State container data provided by CRI (The Container Recycling Institute, 2017). This report contains estimated sales, recycling and wasting data by container and packaging types for 2015. CRI draws from many different sources to compile this report including the Beverage Marketing Corporation, the US Environmental Protection Agency, and personal communication with appropriate state personnel, among others. In communications with CRI, there is an updated version of the report to be published before the end of 2019. At the time of writing this report, the latest data was not available for purchase. It was noted during this study that the number of containers reported by the CRI through sales data are higher than the number that were reported to be sold to the Department of Taxation and Finance. Why this is the case was not investigated as part of this project.

Another piece considered in the scope of a potential bottle bill expansion was the number of recycling facilities that would be affected by the removal of wine and liquor bottle glass from their systems. To identify this number, NYSP21 obtained a dataset of the 2016 annual reporting data for all permitted New York State recyclables handling and recovery facilities (RHRFs). Although RHRFs are technically a type of material recovery facility (MRF), they are more commonly referred

to as MRFs. Registered and permitted RHRFs are required to report the type and amount of material received, and recovered. Using this information NYSP2I identified all the RHRFs that reported receiving and/or recovering or transferring glass. RHRFs do not report any further granularity about the type of container glass received or recovered, so it was assumed that wine and liquor bottles would be present in any mixed glass reported. There are over 30 unique categories of material that RHRFs reported receiving in 2016. NYSP2I assumed the following categories to include container glass and therefore wine and liquor bottles: commingled containers, single stream, and container glass.

NYSP2I, with the help of NYSDEC also investigated whether there were any federal and/or NYS laws that would present a conflict to an expansion of the NYS Bottle Bill to include wine and liquor bottles. To complete this, NYSDEC staff spoke with personnel at the State Liquor Authority, and consulted provisions of the NYS Alcoholic Beverage Control Law, publicly posted stakeholder position papers, and the website of the Alcohol and Tobacco Tax and Trade Bureau of the U.S. Department of Treasury. While this examination resulted in several findings, there may be additional laws that should be considered as this was not an exhaustive search.

Task 4 Results

Businesses Affected

If the NYS Bottle Bill were to include wine and liquor bottles as redeemable containers, businesses may be affected in two main ways – by becoming either deposit initiators or dealers. As defined in the Section A, dealers would constitute retail locations which sell wine, liquor, or both for off-premises consumption. Deposit initiators are usually bottlers or distributors, but can also include dealers who did not directly purchase product from a deposit initiator. In this case, the deposit initiators are identified in Table 6 as wholesale or wholesale – manufacturing.

As shown in Table 6, as of August, 2019 when the SLA report was generated, there were 4,510 active licenses of wine and liquor businesses that would be either deposit initiators or dealers. Among this list, there are 72 instances in which the same location holds more than one license,

(i.e., a winery holding both a farm winery and a winery license). Note that the totals shown in Table 6 are an indicator of the licenses, not of the number of businesses.

It is important to note that the way the licenses are structured, there is no distinction between wholesalers and manufacturers or retailers, which can act as deposit initiators as well as dealers. Without access to this level of detail, Table 6 does not fully represent all initiators or dealers. Additionally, there would be some number of businesses located outside of New York State that act as deposit initiators, but would not be required to have a New York State license. Therefore, these businesses are not included on the list of New York licensees nor included in the total counts provided in Table 6.

Table 6. Wine and Liquor License Types with License Count Included in Bottle Bill Expansion

Wholesale or Retail	Type	Class	Description	License Total
Retail	L	222	LIQUOR STORE	3,284
	W	322	WINE STORE	61
	RS	130	ROADSIDE FARM MARKET	8
Retail Total				3,353
Wholesale	WW	303	WHOLESALE WINE	249
	LL	203	WHOLESALE LIQUOR	173
	WA	305	WINERY / FARM WINERY RETAIL	10
Wholesale Total				432
Wholesale - Manufacturing	FW	302	FARM WINERY	362
	DD	207	FARM DISTILLER "D"	146
	DW	301	WINERY	97
	DA	206	DISTILLER "A-1"	63
	MW	307	MICRO WINERY	23
	DB	205	DISTILLER "B-1"	15
	DB	202	DISTILLER "B"	6
	DC	204	DISTILLER "C"	6
	FP	306	TEMPORARY WINERY/FARM WINERY	6
	DA	201	DISTILLER "A"	1
Wholesale - Manufacturing Total				725
Grand Total				4,510

Note: Data from (New York State Liquor Authority, 2019)

Containers Affected

According to the CRI’s 2015 Beverage Market Data Analysis, there were approximately 354M glass wine and 134M glass liquor bottles sold in New York State in 2015; summarized in Table 7 (Container Recycling Institute, 2017). Although this data is a few years out of date, it is an indicator of the scale and types of containers that would be covered under a bottle bill expansion to wine and liquor bottles. There is no data describing the breakdown of sales between on-premises and off-premises purchases. That being said, according to the State Liquor Authority’s list of active licenses, approximately 13% of all licenses for wine and or liquor sales are for off-premises use. If each license had equivalent sales volume, off-premises sales would account for 63.4M eligible containers (New York State Liquor Authority, 2019).

Table 7. NY 2015 Beverage Sales by Beverage Type

Beverage Type	Glass Bottle Units Sold	Weight of Units Sold (tons)
Wine	354,279,555	219,129
Spirits (Liquor)	133,642,273	95,912
Total	487,921,829	315,041

Note: Data from (The Container Recycling Institute, 2017)

Recycling Facilities Affected

Based on 2016 annual reporting to the NYSDEC, there are 206 Recyclable Handling and Recovery Facilities (RHRFs) in New York State handling curbside recyclables, 164 of which, or 79%, handle container glass. It was therefore assumed that there are 164 RHRFs in NYS that would be affected by the removal of a portion of curbside container glass in the form of wine and liquor bottles. Of the 164 RHRFs identified, 97 of them simply transfer materials to other RHRFs, while the remaining 67 do some level of material recovery and/or processing. Based on the amount of materials received, recovered, and/or transferred, some RHRFs would be affected more than others. Additional detail on this can be found in the NYSP21 report on the Current State of Glass Recycling.

Federal and State Laws that May Impact a Bottle Bill Expansion

Existing Federal and New York State laws could impact an expansion of the bottle bill to include wine and liquor bottles. On the state level, some provisions of the NYS Alcoholic Beverage Control Law (ABCL) would likely need to be amended to allow wine and liquor “package stores,”

which sell wine and/or liquor at retail, to accept empty returnable containers from redeemers, pay the refund value/deposit amount to redeemers of empty wine or liquor bottles, and store the empty containers. These “package stores” are licensees with a “seven day license to sell liquor at retail for consumption off the premises” pursuant to ABCL § 63 or a “seven day license to sell wine at retail for consumption off the premises” pursuant to ABCL § 79. Licensees are limited as to what they are allowed to do and cannot be engaged in any other business on the licensed premises, except for the activities specifically listed in the applicable statutory provision. Specifically, Section 63(4) for retail stores selling liquor and Section 79(3) for retail stores selling wine, would need to be amended to list all the activities these stores would be required to perform under the Bottle Bill.

Additionally, there are restrictions on the types of services a manufacturer or wholesaler may render to any person licensed under the ABCL. Therefore, ABCL § 101(1)(c) would also likely need to be amended to make it clear that manufacturers and/or wholesalers are allowed to provide services to these package stores, as required under the Bottle Bill, picking up empty wine and liquor bottles and paying the refund value/deposit amounts and applicable handling fees amounts. With respect to federal laws, at least one trade group noted that if state-specific labeling was made mandatory, there could be potential conflicts with federal labeling requirements for distilled spirits, as required by the Alcohol and Tobacco Tax and Trade Bureau of the U.S. Department of Treasury.

Task 5. Complete a high-level cost / benefit analysis

Task 5 Methods and Results

Basic Parameters and Key Data

In order to conduct a cost/benefit analysis of expanding the NYS Bottle Bill to include glass wine and liquor bottles, it is important to identify relevant stakeholders as well as potential currency and container flows. The Definitions section at the beginning of this report outlines the key terminology and definitions. There are several key terms representing parts of the bottle bill system and specific stakeholders that are used throughout this report, which are outlined below. Table 1 lists the major stakeholders, along with their definition and several examples of NYS businesses that fall within that category. Table 2 summarizes key terms used in the discussion

and analysis of the bottle bill expansion. Additional terms are defined where necessary in their respective sections.

Table 1 includes the legal terminology used for relevant stakeholders, and Table 2 lists explanations of key functions within the container deposit process. The additional data points needed to estimate direct costs and benefits related to an expanded bottle bill are outlined in Table 8 and Table 9, and include beverage sales and estimated recycling rates for liquor and wine bottles (see Table 8), as well as estimated recycling rates for glass deposit vs. non-deposit containers, current container deposit values, handling fees, and container collection costs (see Table 9).

Table 8: Sales and Recycling Rates for Liquor and Wine in NYS - 2015

	Sales (2015)	Estimated Existing Recycling (2015)		
	Units	Units	Tons	%
Liquor	133,642,273	15,737,687	11,295	12
Wine	354,279,555	41,719,889	25,805	12

Note: Data from (The Container Recycling Institute, 2017)

Table 9: Current Deposit Container Recycling Rates + Fees

Description	Value
Average Recycling Rate (glass deposit containers)	75%
Average Recycling Rate (glass non-deposit containers)	12%
Overall Redemption Rate	65%
Deposit Value (per unit)	\$0.05
Handling Fee (per unit)	\$0.035
Container Collection Fee (*estimated average cost per unit)	\$0.01*
Deposit Logistics Fee (estimated cost per unit)	\$0.01*
Unredeemed Deposits kept by NYS	80%
Unredeemed Deposits kept by Deposit Initiator	20%

Note: Data from (The Container Recycling Institute, 2017), (Container Recycling Institute, 2016), (New York State), (Riegle, Kelly, & O'Neal, 2019).

Direct Costs to Beverage Industry: Overview

This section provides an overview of the calculated costs by major stakeholder group. The next section provides more detail on these costs.

There are two categories of costs and two primary stakeholder groups in the beverage industry that would face direct costs as a result of an expanded NYS Bottle Bill. The relevant cost categories are (1) ongoing (i.e., costs that stakeholders will be impacted by in perpetuity), and (2) upfront (i.e., one-time expenses associated with becoming compliant with the requirements of an expanded NYS Bottle Bill). The main stakeholders include Deposit Initiators, and Dealers. Although bottlers are not always Deposit Initiators, they are included in the Deposit Initiator section because they would incur some costs regardless of whether or not they are also a Deposit Initiator.

The cost factors needed to understand the *ongoing* economic consequences of an expanded NYS Bottle Bill are summarized in Table 10. These include the number of deposit containers sold, handling fees, container collection and pick up fees, deposit value, labor, redemption rate, and allocation of escheats from unredeemed deposit containers.

The cost factors needed to understand the *upfront* economic consequences of an expanded NYS Bottle Bill are summarized in Table 11. These include operational systems required to accept, pay, redeem, track, and report on bottle deposits, as well as bottle labeling requirements. Due to the unavailability of data required to quantify them, upfront costs have not been calculated. They have nevertheless been included because they are relevant to key stakeholders impacted by the addition of glass wine and liquor containers to the NYS Bottle Bill.

Table 10 – NYS Bottle Bill Expansion Cost Factors (Ongoing)

Description	Stakeholder(s) Impacted	Wine	Liquor	Notes
Bottles Sold (2015 sales units)	All	354,279,555	133,642,273	Sales data is specific to wine and liquor packaged in glass containers and sold in New York State in 2015.
Handling Fee (\$ per unit)	Deposit Initiators Dealers	0.035	0.035	N/A

Container Collection Cost (\$ per unit)	Deposit Initiators	0.01	0.01	N/A
Container Pickup Cost (\$ per unit)	Dealers	0.01	0.01	N/A
Deposit Value (\$ per unit)	Deposit Initiators New York State Consumers	0.05	0.05	N/A
Labor (\$ per unit)	Dealer	0.074	0.074	Calculated using hourly minimum wage rates, minimum hours of redemption required per day by law, number of dealers, and proportion of wine and liquor sales.
Redemption Rate (NYS overall)	Deposit Initiators Dealers New York State	65%	65%	Redemption rate is for all deposit containers (i.e., glass, plastic, aluminum) in New York State for the year 2017.
Unredeemed Deposits to Deposit Initiator	Deposit Initiators	20%	20%	Deposit Initiators are entitled to 20% of unredeemed deposits.
Unredeemed Deposits to NYS	New York State	80%	80%	NYS is entitled to 80% of unredeemed deposits.

Note: Data from (The Container Recycling Institute, 2017), (New York State), (Riegle, Kelly, & O'Neal, 2019), (New York State, n.d.), (New York State Liquor Authority, 2019).

Table 11 - NYS Bottle Bill Expansion Cost Factors (Upfront)

Description	Stakeholder(s) Impacted	Notes
Label update	Bottler	Deposit containers must meet requirements stipulated in the NYS Bottle Bill, such as indicating the refund value and the words "New York" or the letters "NY". Some proposed NYS Bottle Bill amendments also require an NYS-specific UPC code and/or include an incentive to use an NYS-specific UPC code.
Deposit logistics	Dealer	Dealers are required to put into place systems and pay transaction costs related to: <ul style="list-style-type: none"> • Paying and tracking deposit values for each container purchased for resale • Collecting and tracking deposit values paid by consumers • Refunding and tracking deposits for redeemed deposit containers

Deposit logistics	Deposit Initiator	Deposit initiators are required to put into place systems, and pay transaction costs, related to: <ul style="list-style-type: none"> • Collecting and tracking deposit values paid by distributors and/or dealers • Maintaining a separate bank account for deposit values • Reporting deposits paid and redeemed on a quarterly basis • Transferring 80% of unredeemed deposits to NYS on a quarterly basis
--------------------------	-------------------	--

Note: Data from (New York State)

Of the cost factors described in Table 10, there are 5 that are most relevant: container pickup fees, container collection fees, handling fees, labor, and unredeemed deposits. Table 12 provides a summary of these 5 cost factors by stakeholder assuming that the current deposit container redemption rate of 65% would apply for wine and liquor bottles.

Table 12 - NYS Bottle Bill Expansion Costs (Ongoing) by Stakeholder with 65% Redemption Rate

Stakeholder	Description	FEES (\$/cont.)	REVENUE (\$/cont.)	Wine (2015 sales)	Liquor (2015 sales)	Sub-Total (2015 sales)
Deposit Initiator	Handling fee	(0.035)		(8,059,860)	(3,040,362)	(11,100,222)
	Container pickup	(0.01)		(2,302,817)	(868,675)	(3,171,492)
	Unredeemed deposits - 20%		0.05	1,239,978	467,748	1,707,726
Deposit Initiator Total:						(12,563,987)
Dealer	Handling fee		0.035	8,059,860	3,040,362	11,100,222
	Container collection	(0.01)		(2,302,817)	(868,675)	(3,171,492)
	Labor	(0.074)		(26,187,339)	(9,878,457)	(36,065,796)
Dealer Total:						(28,137,066)
New York State	Unredeemed deposits - 80%		0.05	4,959,914	1,870,992	6,830,906
New York State Total:						6,830,906
Industry Total:						(40,701,053)

Note: Data for fees and revenue from (New York State), and data for sales from (The Container Recycling Institute, 2017).

Because the ongoing costs associated with an expanded NYS Bottle Bill are incurred on a per unit basis, the redemption rate directly impacts total cost to stakeholders. For this reason, Table

13 shows estimated ongoing costs based on four different redemption rates. The 12% rate corresponds to the current estimated recycling rate for glass wine and liquor bottles nationally. The 65% rate is the baseline used in the initial cost analysis in Table 12. The 75% rate corresponds to the current estimated recycling rate for deposit containers (this rate represents the percentage of deposit containers that are either redeemed or disposed of via curbside recycling). The fourth scenario assumes the best case scenario of a 100% redemption rate.

Table 13 - NYS Bottle Bill Expansion Costs (Ongoing) by Stakeholder and Redemption Rate

Stakeholder	Redemption Rate			
	12%	65%	75%	100%
Deposit Initiator	\$1,658,934	(\$12,563,987)	(\$15,247,557)	(\$21,956,482)
Dealer	(\$34,602,031)	(\$28,137,066)	(\$26,917,262)	(\$23,867,750)
New York State	\$17,174,848	\$6,830,906	\$4,879,218	\$0

Note: Data for redemption rates from (Container Recycling Institute, 2017), (Container Recycling Institute, n.d.), data for number of containers sold from (The Container Recycling Institute, 2017).

At each redemption rate, the proportion of the cost impact changes for each stakeholder. As the redemption rate increases, the Deposit Initiator's cost increases and the Dealer's cost decreases. New York State's revenue from unredeemed containers decreases as the redemption rate increases. These trends, also depicted in Figure 7 highlight two things. First, the cost impact of an expanded NYS Bottle Bill varies significantly between stakeholders. Second, there is a financial disincentive from the perspective of 2 of the 3 stakeholders included in Table 13, Deposit Initiators and New York State, to increase redemption rates. Dealers stand to gain incrementally as redemption rates increase, but their costs are still substantial. It has been shown that recycling rates increase for containers that are eligible for deposit. However, it remains that the underlying framework of the bottle bill financially disincentives two main stakeholder groups from increasing redemption rates.

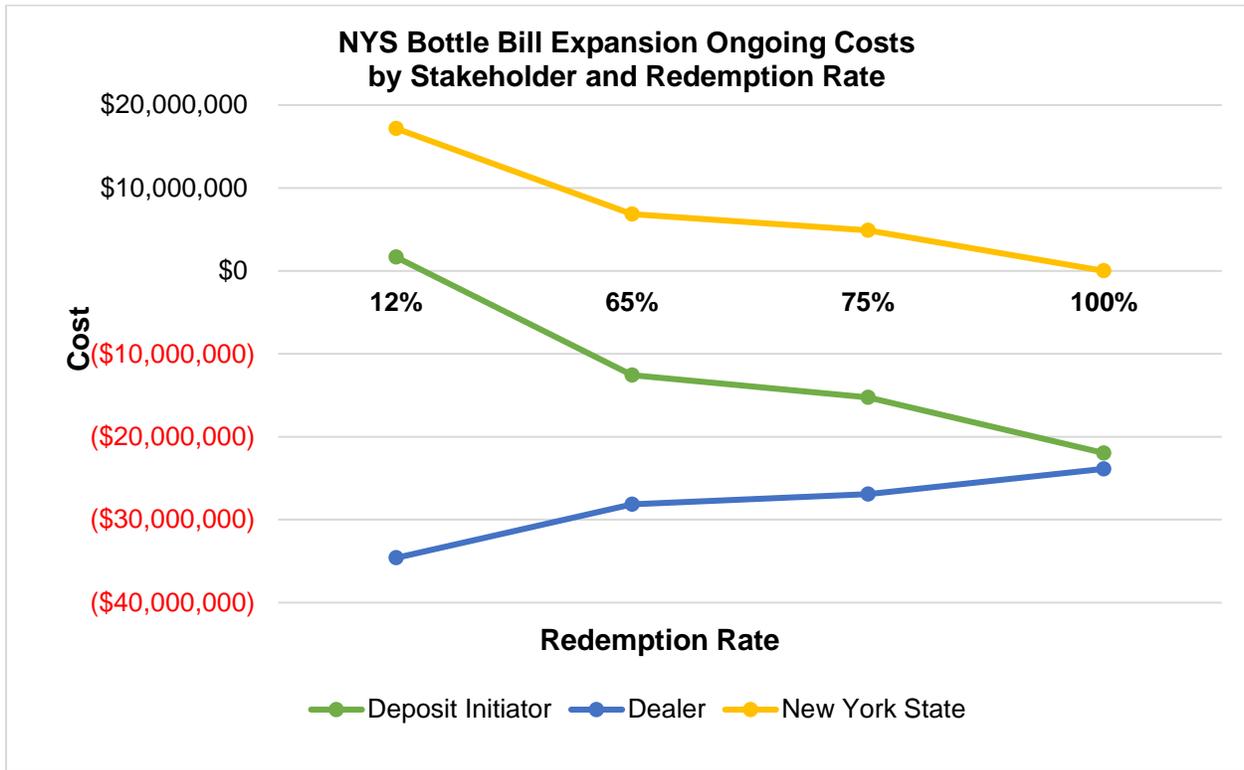


Figure 7 - NYS Bottle Bill Expansion Ongoing Costs by Stakeholder and Redemption Rate. (Container Recycling Institute, 2017), (Container Recycling Institute, n.d.), data for number of containers sold from (The Container Recycling Institute, 2017).

Direct Costs & Benefits to Beverage Industry by Stakeholder

This section explains in more detail, and provides context for, the specific costs and benefits, to Deposit Initiators and Dealers should glass wine and liquor bottles be added to the NYS Bottle Bill.

Deposit Initiators

Ongoing Costs

Deposit Initiators would be faced with two main sources of increased, ongoing costs: deposit container handling fees and deposit container pickup fees.

Deposit Initiators are currently required to pay a 3.5-cent handling fee for each deposit-eligible container that they produce and that is returned for deposit redemption (no fee is paid for unredeemed containers) (New York State). This fee is payable to the Dealer or Redemption Center redeeming the containers and is meant to cover the cost of collecting, sorting, and

packaging empty beverage containers prior to collection by the Deposit Initiator (New York State). Table 14 shows estimated annual handling fees by four redemption rates, 12%, 65%, 75%, and 100%. These rates correspond to the estimated recycling rate for non-deposit containers (12%), the overall deposit container redemption rate in NYS (65%), the average recycling rate for deposit containers in NYS (75%), and the hypothetical scenario in which all deposit containers are returned for redemption (100%). (The Container Recycling Institute, 2017) (Container Recycling Institute, 2016).

Table 14 - Estimated Deposit Container Handling Fees by Redemption Rate

		Bottles Sold	12% Redemption	65% Redemption	75% Redemption	100% Redemption	
Deposit Initiator \$	Wine	354,279,555	\$1,487,974	\$8,059,860	\$9,299,838	\$12,399,784	Dealer -OR- Redemption Center \$
	Liquor	133,642,273	\$561,298	\$3,040,362	\$3,508,110	\$4,677,480	
	TOTAL	487,921,828	\$2,049,272	\$11,100,222	\$12,807,948	\$17,077,264	

Note: Data from for redemption rates from (Container Recycling Institute, 2017), (Container Recycling Institute, n.d.), data for number of containers sold from (The Container Recycling Institute, 2017).

Deposit Initiators are also responsible for devising and maintaining a retrieval system for empty returned containers prior to the sale of containers in New York State. This can be accomplished through a 3rd Party Agent, or it can be done by the Deposit Initiator directly. When a 3rd Party Agent is engaged to manage returned deposit container pickup, the Deposit Initiator is not directly involved in the collection process. Instead, the 3rd Party Pickup Agent (e.g., TOMRA, Envipco), manages the process and charges the Deposit Initiator a fee. Pickup fees are dependent on factors including distance, size, and container volume but, on average, they are estimated at approximately 1-cent per container as shown in Table 15 (Riegle, Kelly, & O'Neal, 2019). Due to the lack of available and relevant data, the cost associated with self-managed pickup costs was not included in the analysis of container pickup fees. Although a self-managed pickup process likely includes many of the same functionalities as 3rd party pickup processes (e.g., trucks, fuel, labor, boxes), the cost is a factor of things like container volume, required frequency of pickup, distance of Dealer locations from Deposit Initiator, and number of Dealers requiring container pickup, all of which may vary widely across Dealers and was not accessible information for this study.

Table 15 - Estimated Deposit Container Pickup Fees by Redemption Rate

Deposit Initiator		Bottles Sold	12% Redemption	65% Redemption	75% Redemption	100% Redemption	3rd Party Agent
	\$	Wine	354,279,555	\$425,135	\$2,302,817	\$2,657,097	
	Liquor	133,642,273	\$160,371	\$868,675	\$1,002,317	\$1,336,423	
	TOTAL	487,921,828	\$585,506	\$3,171,492	\$3,659,414	\$4,879,218	

Note: Data from for redemption rates from (Container Recycling Institute, 2017), (Container Recycling Institute, n.d.), data for number of containers sold from (The Container Recycling Institute, 2017).

Deposit Initiators pay handling and pickup fees but they are also eligible for indirect revenue from unclaimed deposits. Dealers pay 5-cents per unit for each deposit container purchased from a Deposit Initiator. The deposit value is retained by the Deposit Initiator in a separate bank account until one of two things happen. In the first scenario, the Deposit Initiator repays the 5-cent deposit plus a 3.5-cent handling fee per unit for each deposit container redeemed and returned to the redeeming Dealer. In the second scenario, the number of deposits received by the Deposit Initiator is reconciled with the number of redemptions collected by the Deposit Initiator's Dealers. Whenever fewer containers are redeemed than are sold there is a surplus of paid deposits. Deposit Initiators are entitled to retain 20% of any quarterly deposit surplus value, and the remaining 80% becomes property of New York State. Any value retained by the Deposit Initiator from the quarterly reconciliation serves as a cost offset to the mandated handling and pickup fees. Table 16 shows the hypothetical annual deposit values paid by Dealers to Deposit Initiators by beverage type using 2015 sales data for New York State (The Container Recycling Institute, 2017). Table 17 shows the potential value of retained deposits based on container type and redemption rate. Assuming consistent sales volumes, Table 17 shows how much of the unclaimed deposits would be retained by the Deposit Initiator and how much would become property of New York State.

Table 16 – Hypothetical Value of Deposits Paid Based on 2015 Container Sales Data - 5-cents per Unit

	Bottles Sold	Amount (\$)
Wine	354,279,555	\$17,713,978
Liquor	133,642,273	\$6,682,114
TOTAL	487,921,828	\$24,396,092

Note: Data from data for number of containers sold from (The Container Recycling Institute, 2017).

Table 17 - Unredeemed Deposit Value by Redemption Rate

	Bottles Sold	Unredeemed Container Value			
		12% Redemption	65% Redemption	75% Redemption	100% Redemption
Wine	354,279,555	\$15,588,300	\$6,199,892	\$4,428,494	\$0
Liquor	133,642,273	\$5,880,260	\$2,338,740	\$1,670,528	\$0
TOTAL	487,921,828	\$21,468,560	\$8,538,632	\$6,099,023	\$0

Note: Data from for redemption rates from (Container Recycling Institute, 2017), (Container Recycling Institute, n.d.), data for number of containers sold from (The Container Recycling Institute, 2017).

Table 18 - Indirect Revenue from Unredeemed Deposits by Redemption Rate and Stakeholder

Redemption Rate	Deposit Initiator (20%)	Amount to NYS (80%)	Total
12%	\$4,293,712	\$17,174,848	\$21,468,560
65%	\$1,707,726	\$6,830,906	\$8,538,632
75%	\$1,219,805	\$4,879,218	\$6,099,023

Note: Data from for redemption rates from (Container Recycling Institute, 2017), (Container Recycling Institute, n.d.), data for number of containers sold from (The Container Recycling Institute, 2017), data for allocation of unredeemed deposits from (New York State).

Upfront Costs

Upfront costs that deposit initiators would incur would depend on the type of business (manufacturer, distributor, etc.) that was the deposit initiator. Several upfront costs are described in Table 11. In the cases where the deposit initiator is the bottler of the wine and/or liquor, the bottlers would also be subject to costs associated with universal product codes (UPCs) and labels. In New York State, UPCs are not required by law. However, UPCs that are specific to New York State are used as a means of preventing redemption fraud. Most importantly, Dealers with 10 or more locations are required to use reverse vending machines (RVMs) to process redemptions, but RVMs can only process deposit containers with a UPC. Because Dealers are required to redeem all deposit containers that they sell, products without UPCs would either not be eligible for sale by Dealers with 10 or more locations, or those Dealers would also have to use a manual redemption process in addition to the RVMs. For these reasons, Bottlers of wine and liquor are likely to choose to incur the cost of updating and/or revising the UPCs for products packaged in deposit-eligible containers. Detailed cost information for updating UPCs and related labels is not

readily accessible. Although New York State has product brand labeling requirements, including an annual registration process and related fees, additional brand label registration is only required if there is a change in the brand or trade name, or the class or type of the alcoholic beverage. Additional registration is not required for label modifications such as UPC revisions (State of New York Liquor Authority, 2016).

Unless bottlers are also a deposit initiator, there are no direct economic benefits for Bottlers associated with an expanded NYS Bottle Bill.

Dealers

Dealers would be faced with two main sources of increased, direct cost: deposit processing logistics and deposit container collection.

Ongoing Costs

As a condition of offering for sale beverages bottled in deposit containers, Dealers are required to perform three actions. First, they must pay the deposit value (currently 5-cents) for each container purchased from the Deposit Initiator. Second, Dealers must collect from the consumer the deposit value for each container purchased. Third, the Dealer is required to accept eligible containers for redemption and refund the deposit value for returned containers to the consumer. In the case of the latter, dealers are only required to accept for redemption the brands, varieties, and sizes of deposit containers that they offer for sale. The value of the deposits that would need to be paid by wine and liquor dealers was estimated using sales data.

Deposit Processing Logistics

The first two Dealer requirements (paying the deposit value to the Deposit Initiator and collecting the deposit value from the consumer), are referred to in this report as deposit processing logistics. The transaction costs related to these functions are not readily calculable within the scope of this report. Each of these actions requires a data collection system that can also be used to generate reports and verify redemption obligations based on the specific deposit containers that a given Dealer is required to accept. The level of sophistication in data collection could vary from manual to highly automated and, although some of this functionality may be included in RVM service

agreements for which fees can be estimated, not all required actions can be (e.g., paying the initial deposit and collecting deposits from consumers).

Deposit Container Collection

Dealers are required to establish and maintain a process for collecting deposit containers. They are also responsible for the cost of the collection system (i.e., deposit container collection fees), the cost of labor to facilitate redemption and assist redeemers on a day-to-day basis, and the cost of physical space needed to collect, sort, and store containers prior to pick up by the Deposit Initiator. The collection system can range from a completely manual process to an almost entirely automated one using reverse vending machines (RVMs). Costs associated with the use of RVMs (such as leasing) are estimated at approximately 1-cent per container (Riegle, Kelly, & O’Neal, 2019). Because specific costs are difficult to quantify for manual collection systems, for the purposes of this report deposit container fees are estimated based on the 1-cent estimate as shown in Table 19.

Table 19 - Deposit Container Collection Costs

		Bottles Sold	12% Redemption	65% Redemption	75% Redemption	100% Redemption	
Deposit Initiator \$	Wine	354,279,555	\$425,135	\$2,302,817	\$2,657,097	\$3,542,796	3rd Party Agent \$
	Liquor	133,642,273	\$160,371	\$868,675	\$1,002,317	\$1,336,423	
	TOTAL	487,921,828	\$585,506	\$3,171,492	\$3,659,414	\$4,879,218	

Note: Data from for redemption rates from (Container Recycling Institute, 2017), (Container Recycling Institute, n.d.), data for number of containers sold from (The Container Recycling Institute, 2017).

The collection of containers and redemption of deposits requires labor whether a manual or automated system is used. In the case of a manual process, adequate staff must be made available to facilitate efficient container acceptance and deposit redemption. In the case of an automated process, adequate staff must be made available to empty RVMs, troubleshoot equipment problems encountered by Redeemers, and process deposit redemptions. Under certain exemptions, a dealer is allowed have staff available to accepting returned containers for a minimum of two hours per day. In all other cases a dealer is required to be available anytime they are open except the first and last hour of business (New York State). The two hour per day minimum was used to arrive at a conservative estimate for labor costs, but most businesses would

incur higher costs than what is included in the analysis. Specific total costs are dependent on deposit container sales and redemption volume, but Table 20 provides a lower-end estimate of labor costs, as in most cases a dealer would use more than 2 hours of labor to comply adequately with their requirements (New York State Department of Labor, n.d.) (New York State) (New York State Liquor Authority, 2019).

Table 20 - Estimated Redemption Labor Costs (labor rates effective 12/31/2019)

Location	Labor Rate (\$/hour)	Labor Hours per Day	Cost per Dealer	# of Dealers	Cost per Container (average)	Total Annual Cost to Industry
NYC	\$15.00	2	\$10,950	981	\$0.08	\$10,741,950
Long Island & Westchester	\$13.00	2	\$9,490	205	\$0.08	\$1,945,450
Remainder of NYS	\$11.80	2	\$8,614	2,714	\$0.07	\$23,378,396
TOTAL:				3,900	\$0.07	\$36,065,796

Note: Data for labor rates from (New York State Department of Labor, n.d.), data for labor hours per day from (New York State), and number of Dealers from (New York State Liquor Authority, 2019).

As discussed in Task 4, the number of Dealers impacted by an expanded NYS Bottle Bill was estimated from a list of currently active liquor licenses in New York State (New York State Liquor Authority, 2019). Because Dealers consist primarily of retail locations such as liquor stores and wine stores, the bulk of the licenses held by Dealers fall into the retail license category. However, the legal definition of a Dealer is not retail-specific. Rather, it states that a Dealer is “every person, firm or corporation who engages in the sale of beverages in beverage containers to a consumer for off premises consumption” (New York State). Therefore, in order to derive a more complete and accurate number of Dealers, non-retail licensees authorized to sell wine or liquor for off premises consumption were included in the count. A total of 5 license classes from the wholesale and wholesale-manufacturing categories allow wine and spirit manufacturers to sell directly to the consumer (New York State Liquor Authority, 2019). These include:

- WA-305 Winery / Farm Winery Retail
- FW-302 Farm Winery
- DD-207 Farm Distiller “D”
- MW-307 Micro Winery
- FP-306 Temporary Winery / Farm Winery

Businesses in these license categories can act as both Deposit Initiator and Dealer. As Deposit Initiator these licensees bottle beverages, and as Dealer these licensees sell their bottled beverages for off-premises consumption (New York State). A typical example of this scenario is a vineyard or winery that manufactures wine onsite and also sells bottles of wine directly to consumers onsite, as may occur in any wine store. There is one more license class that allows wholesalers and wholesale manufacturers to sell wine and spirits directly to consumers for off-premises consumption, and that is CM-110 Combined Craft Manufacturer. This license type allows the holder to combine two or more farm manufacturer licenses including FW-302 and DD-207. However, these licenses are not added to the count of Dealers because holders of CM-110 also hold the underlying farm manufacturer license which allows for the sale of wine and spirits for off-premises consumption (New York State Liquor Authority, n.d.).

Economic benefits for Dealers associated with the NYS Bottle Bill come in the form of handling fees for Dealers. As previously discussed, Dealers are entitled to a 3.5-cent handling fee for each returned deposit-eligible container redeemed by the Dealer and collected by the Deposit Initiator (New York State). This fee is paid by the Deposit Initiator and is meant to cover the cost of collecting, sorting, and packaging empty beverage containers prior to collection by the Deposit Initiator (New York State). Table 14 shows estimated annual handling fees by four redemption rates, 12%, 65%, 75%, and 100%. These rates correspond to the estimated recycling rate for non-deposit containers (12%), the overall deposit container redemption rate in NYS (65%), the average recycling rate for deposit containers in NYS (75%), and the best case scenario in which all deposit containers are returned for redemption (The Container Recycling Institute, 2017) (Container Recycling Institute, 2016).

Estimated Loss of Income to Recycling Programs

Private and municipal recyclers generate revenue by selling the materials that they recover through primarily curbside recycling programs, but also drop off programs. These materials include things such as fibers, metal, plastic, and glass. Expanding the existing NYS Bottle Bill to include wine and liquor would divert glass material away from recyclers. In theory, this loss of material would result in a corresponding loss in revenue. However, due to its relatively low value, weight, susceptibility to breakage, and the contamination resulting from single stream material recovery practices, glass costs more to process than it is able to be sold for. In most material

recovery facilities in New York State, the value of non-glass materials subsidize the recovery of glass from single stream collection. From this perspective, the expanded NYS Bottle Bill—as it pertains to wine and liquor only—will not cause a loss of revenue. It would, instead, provide a source of cost reductions and offsets to recyclers. By diverting glass away from private and municipal recovery facilities and recyclers, and into bottle bill redemption streams, collection and processing costs incurred by private and municipal recyclers are likely to decrease in three ways: curbside collection costs, glass scrap processing costs, and avoided disposal costs. This information is summarized in Table 21, Table 22, and Table 23 respectively (The Container Recycling Institute, 2017).

Using average curbside collection costs per ton by pick-up radius and an average curbside recycling rate of 12%, NYSP2I calculated the cost associated with collecting glass wine and liquor bottles. The tonnage was derived using annual sales data (i.e., the number of containers), and the average weight of wine and liquor bottles. Assuming that the current cost of curbside collection as estimated stays constant, and that at least 12% of liquor and wine bottles are returned for deposit redemption, municipal and private recyclers would offset costs by approximately \$7M to \$10M annually, shown in Table 21.

Table 21 - Curbside Collection Costs for Glass by Weight, at 12% Recovery Rate, and Service Area (\$ MM)

	Annual Sales (tons)	Cost by Collection Radius		
		Service Area	30 min radius	30-60 min radius
		Cost	\$187.05/ton	\$278.42/ton
Liquor	95,912		\$2,152,841	\$3,204,458
Wine	219,129		\$4,918,570	\$7,321,188
Total	315,041		\$7,071,410	\$10,525,646

Note: Data for annual sales and container weight from (The Container Recycling Institute, 2017), data for service area cost from (Resource Recycling Systems (RRS), 2014).

According to data from the Container Recycling Institute (CRI), the current market demand for glass does not command a price high enough to cover the processing costs (e.g., equipment maintenance and replacement). Instead, curbside glass processing generates a net loss of \$20/ton (Collins, 2019). Combining this data point with the annual sales of wine and liquor bottled in glass (by weight), and the estimated recycling rate for glass wine and liquor bottles, we can

estimate the cost savings associated with diverting wine and liquor bottles from curbside collection streams (The Container Recycling Institute, 2017). An estimate of avoided glass wine and liquor bottle processing costs is presented in Table 22. Based on a 12% diversion rate from curbside recycling streams, adding wine and liquor bottles to the NYS Bottle Bill would save recycling programs \$756,098 annually.

Table 22 - Avoided Glass Processing Costs at 12% Redemption Rate (\$20 / ton)

	Bottles Sold (MM)	Weight (tons)	Avoided Processing Costs
Liquor	133,642,273	95,912	\$230,189
Wine	354,279,555	219,129	\$525,910
Total Glass	487,921,828	315,041	\$756,098

Note: Data from (The Container Recycling Institute, 2017).

Additional cost savings may take the form of avoided disposal costs. According to a 2017 glass survey report published by NERC that collected data on MRF recycling pre- National Sword, only 54.02% of MRF glass in the northeast United States was sent to a glass processor or glass container manufacturer (Remolador, 2018). The remaining 45.98% of total reported tonnage went to end destinations including use as aggregate, use as road base aggregate, other beneficial use, use as alternative daily cover, and landfill. If we apply this rate, 45.98%, to the annual sales (by weight) of glass wine and liquor containers, and current tipping fee rates for NYS, we can estimate the total potential avoided disposal costs (Environmental Research & Education Foundation, 2017). Table 23 shows avoided disposal costs by redemption rate. If 12% of glass wine and liquor bottles are redeemed, avoided costs are estimated to be approximately \$1.1M compared to \$5.9M for 65% redemption, \$6.8M for 75% redemption, and \$9.1M for 100% redemption.

Table 23 - Avoided Disposal Costs of Glass by Redemption Rate

	Bottles Sold	Weight of Bottles Sold (tons)	% MRF glass to landfill	Tipping Fee (per ton)	Avoided Disposal Costs (12%) Redemption	Avoided Disposal Costs (65%) Redemption	Avoided Disposal Costs (75%) Redemption	Avoided Disposal Costs (100%) Redemption
Wine	354,279,555	219,210	45.98%	\$62.83	\$759,939	\$4,116,335	\$4,749,617	\$6,332,823
Liquor	133,642,273	96,055	45.98%	\$62.83	\$332,996	\$1,803,728	\$2,081,225	\$2,774,966
TOTAL	487,921,828	315,266			\$1,092,935	\$5,920,063	\$6,830,842	\$9,107,789

Note: Data from (The Container Recycling Institute, 2017) and (The Recycling Partnership, 2017).

Possible Necessary Changes to Existing Redemption Collection and Processing Industry

The key stakeholders in the redemption collection and processing industry are Deposit Initiators, Distributors, Dealers, Redemption Centers, and 3rd party agents that process material on behalf of Dealers and Deposit Initiators.

In general, the redemption collection and processing industry would face the following changes:

- Increased demand for services due to an increase in deposit initiators and dealers
 - Increased volume of containers to be processed and collected
 - Addition of many small dealers would increase the number of pick up stops but decrease operational efficiency
- Equipment compatibility due to new sizes and shapes of containers
 - Currently, only 3% of containers can't fit in existing RVMs (Riegler, Kelly, & O'Neal, 2019)
 - This amounts to 14,637,655 containers based on 2015 sales data for New York State (The Container Recycling Institute, 2017)
- Need for greater processing capacity
 - TOMRA's Farmington, NY facility is currently running 20 hours per day (Riegler, Kelly, & O'Neal, 2019)
 - Processing 20 tons/hr of amber glass
 - Processing 17/18 tons/hr of flint glass
- Increased strain on glass crushing equipment due to additional weight and thickness of wine and liquor bottles (Riegler, Kelly, & O'Neal, 2019).
- Required updates to RVM software for new products (Riegler, Kelly, & O'Neal, 2019)
 - Updates to reporting system that compiles and sends information about deposit containers received and deposits refunded to deposit initiators
- Increased consumer demand for redemption centers
 - Redeemers wanting to return containers to one place versus multiple (e.g., Wegmans, liquor store, wine shop)

Impact to Dealers

Among redemption collection and processing stakeholders, dealers may face the greatest impact due to the fact that establishments selling liquor and wine are not currently required to participate in container deposits. Acceptance requirements for these dealers are outlined below.

Reverse Vending Machine (RVM) Acceptance Requirements

RVMs are automated machines that use laser scanners or other technology to read and identify the universal product code (UPC) on containers. These machines are able to determine whether or not a particular container can be redeemed. They also collect information about each container accepted and issue a receipt to redeemers on the spot. This receipt can be exchanged for a cash refund. Depending on the size of a Dealer's place of business, the NYS Bottle Bill may require the use of one or more RVMs; other Dealers may be exempt from the RVM requirement but are still obligated to provide manual redemption services (New York State).

- Businesses with 10+ locations in NYS are required to use RVMs to accept and process deposit containers. The number of RVMs required varies by square footage of the relevant place of business.
 - 40,000 – 60,000 SQ FT
 - 2+ RVMs
 - 60,000 – 85,000 SQ FT
 - 3+ RVMs
 - 85,000+ SQ FT
 - 4+ RVMs
- Those exempt from the RVM requirement include Dealers that:
 - Sell beverage containers of 20 oz or less packaged in quantities fewer than 6
 - Sell beverage containers and devote no more than 5% of its floor space to the display and sale of consumer commodities⁵
 - Obtain a waiver authorizing the use of alternative technology (must be able to determine if containers are redeemable, provide fraud protections, accumulate

⁵ "[Consumer commodities](#)" shall mean the following, however packaged or contained: food, including all material, solid, liquid or mixed, whether simple or compound, used or intended for consumption by human beings or domestic animals normally kept as household pets and all substances or ingredients to be added thereto for any purpose; and napkins, facial tissues, toilet tissues, foil wrapping, plastic wrapping, paper toweling, disposable plates; and detergents, soaps and other cleansing agents; and non-prescription drugs, female hygiene products and toiletries (The New York State Senate, n.d.).

information about containers redeemed, and issue legal tender or receipts that can be exchanged for legal tender)

Non-RVM Acceptance Requirements

- Businesses not subject to RVM requirements that are 40,000+ SQ FT must have:
 - A dedicated redemption area
 - Staff to facilitate efficient acceptance and processing of redemptions
 - At least 1 sign at each public entrance directing consumers to redemption area

Container Acceptance Limits

- Dealers can limit the number of containers accepted per person per day to 72 if...
 - The dealer has a written agreement with a redemption center in the same county and within ½ mile of business AND
 - The dealer provides a 2-hour period per day during which up to 240 containers will be accepted per person, per day AND
 - The dealer’s primary business is the sale of food and beverages for off-premises consumption AND
 - The place of business is less than 10,000 SQ FT

Table 24: Summary of Presumed Required Changes by Stakeholder Group

Stakeholder	Legal Role	Impact
Winery / Distillery	Deposit Initiator	<ul style="list-style-type: none"> • Register as a deposit initiator • Establish process for initiating deposits <ul style="list-style-type: none"> ○ Provide information on all containers eligible for deposit to NYS ○ Record keeping ○ Quarterly reporting ○ Refund value bank account • Collect deposits from distributors / dealers directly or through a 3rd party agent • Pay handling fees on redeemed containers • Update / revise all product labels
Winery / Distillery	Dealer	<ul style="list-style-type: none"> • Establish redemption process, area, and storage
Distributor	Distributor	<ul style="list-style-type: none"> • Logistics / pick up capacity <ul style="list-style-type: none"> ○ Adding hundreds of small locations will increase costs and decrease efficiency due to number of pick up stops, miles travelled, etc.

		<ul style="list-style-type: none"> ○ Adding pick up locations is scalable, but only if loads are $\frac{3}{4}$ or more full (Riegle, Kelly, & O'Neal, 2019) ○ Main impact here would be higher than current fees for new, small scale dealers that might engage TOMRA as pick up agent
3 rd Party Agent (e.g., TOMRA)	N/A	<ul style="list-style-type: none"> ● Reprogram/update software on RVMs to accept different products ● Update databases for RVMs ● Currently unable to process containers over 2L ● Logistics / pick up capacity <ul style="list-style-type: none"> ○ Adding hundreds of small locations will increase costs and decrease efficiency due to number of pick up stops, miles travelled, etc. ○ Adding pick up locations is scalable, but only if loads are $\frac{3}{4}$ or more full ○ Main impact here would be higher than current fees for new, small scale dealers that might engage TOMRA as pick up agent
Liquor Store / Bottle Shop (e.g., Century Liquor & Wines)	Dealer	<ul style="list-style-type: none"> ● Establish redemption process, area, and storage
Liquor Store / Bottle Shop (e.g., Fort Hill Liquor Store)	Dealer	<ul style="list-style-type: none"> ● Establish redemption process, area, and storage
Consumer	Redeemer	<ul style="list-style-type: none"> ● Pay deposit on wine and liquor ● Make multiple redemption stops when returning different types of containers (e.g., wine bottle vs. beer bottle), unless using a redemption center

Change in Recycling Rate and Quality

The change in recycling rate and quality of recovered material is an important part of understanding the cost and benefits associated with a bottle bill. The Container Recycling Institute (2017) report included derived curbside recycling values for glass wine and liquor bottles from aggregated data from across the U.S. The report also included recycling rates for deposit containers (includes deposit and non-deposit returned recycling, e.g., curbside).

Information about the change in quality came from several sources. Relevant data was gathered from two reputable resources, Resource Recycling and Northeast Recycling Council (NERC).

Both organizations conducted surveys to understand the end destination of recycled glass from the perspective of MRFs and glass processing facilities.

Change in Recycling Rate

Container Recycling Institute estimates a recycling rate of 11.8% for all non-deposit glass bottles in New York, including wine and liquor (The Container Recycling Institute, 2017). In the event of a bottle bill, CRI assumed the recycling rate for wine and liquor bottles would match the rate of deposit containers from the Hawaii State Department of Health, which is 75% (The Container Recycling Institute, 2017). As such, the change in recycling rate should roughly match the redemption rate. Using the CRI data this would be a 63% change. As described above, the NYS redemption rate for deposit containers is 65%. Given how close these numbers are to each other, and without more information, it is reasonable to assume the change in recycling rate for liquor and wine bottles should be close to 63% to 65%.

Change in Quality

As described in the above, the expected change in quality is based on a few surveys done of MRFs and glass processing facilities. While neither study is New York State specific, the results should shed light on the general trends that are applicable in New York.

The Northeast Recycling Council survey showed that, from a set of MRFs based in the northeast, which accept from varying input streams, e.g., drop off, single stream, dual stream, etc., 54% of received glass is sent to glass processing, 7.8% used as an aggregate or in a road base, 24% was used as daily cover and 15% was landfilled (Remolador, 2018). As shown in Table 25, the quality of the glass is dependent in large part on the source. Combining results from both datasets, it is reasonable to assume that at most, roughly 1/3 (60% of 54%) of single stream glass coming into MRFs go into glass bottles or fiber glass, 41% is used in low value applications, and the rest is landfilled. With dual stream, the percentages are slightly better with close to 50% turned into usable cullet, 36% used in low value applications, and the remainder landfilled. Based on this data, one could expect the change in quality of recycled wine and liquor bottles to be somewhere between the single and dual stream rates for the baseline and a 98% recovery for glass bottles and fiber glass, 2% to low value applications, and a small remainder sent to landfill.

Table 25. Glass Recycling Destinations from Glass Processing Facilities

Source Stream Type	Destination		
	Glass bottles/fiber glass (usable cullet)	Road base or landfill daily cover (glass fines)	Landfilled (glass fines and non-glass residue)*
Single Stream	60%	19%	21%
Dual Stream	90%	10%	
Deposit	98%	2%	

Data from: (Collins S. , 2012)

* While not stated in the report, it is reasonable to assume that there is still some small fraction of glass fines and/or non-glass residue landfilled from the dual stream and deposit glass source streams.

Task 6. Understand available capacity to use more recycled glass

Task 6 Method

To understand capacity for current users of recycled glass cullet from bottle bill containers, NYSP2I identified and contacted several of the regional glass manufacturers as well as the Glass Manufacturing Industry Council (GMIC) to discuss this topic. Of the six regional glass manufacturers contacted, responses were received from four, as well as GMIC. The information that NYSP2I was able to gather on available capacity on a facility-level was largely anecdotal, as several manufactures were not willing or able to share numbers on their capacity. However, using Container Recycling Institute datasets, and average values for current cullet use in glass container manufacturing, NYSP2I also estimated the theoretical capacity of regional glass container manufacturers to accept additional cullet in current operations. The factors used in this estimation are listed in Table 26. First, NYSP2I applied the NYS redemption rate to the total weight of redeemable glass containers sold to come up with the weight of glass cullet currently available from NYS redeemable glass containers.

- $421,707 \text{ tons} (0.65) = 274,109 \text{ tons}$

It was then assumed that all of this material is being used at regional glass manufacturers currently. By assuming that regional manufacturers are running their facilities with an average of 35% cullet (Gaustad, 2019), and 50% of that cullet is coming from redeemable containers, NYSP2I next calculated the total amount of raw material used for container manufacturing regionally and the unused potential for incorporating more cullet.

- $35\% (50\%) = 17.5\%$

- $(274,109 \text{ tons} (100))/ 17.5 = 1,566,337 \text{ tons}$
- $90\% - 35\% = 55\%$
- $1,566,337 \text{ tons} (0.55) = 861,485 \text{ tons}$

To account for uncertainty, a safety factor of 0.25 was applied to this theoretical capacity.

- $861,485 \text{ tons} - (861,485 \text{ tons} (0.25)) = 646,114 \text{ tons}$

By comparing the total weight of glass wine and liquor bottles sold to this theoretical capacity, NYSP2I was able to estimate whether or not the regional glass manufacturing facilities would have capacity to accept the additional cullet produced from including wine and liquor bottles in the NYS Bottle Bill.

- $315,042 \text{ tons} < 646,114 \text{ tons}$

Table 26: Factors and Assumptions Used in Estimating Theoretical Glass Manufacturing Capacity for Cullet Regionally

Factor/ Assumption	Description
421,707 tons	Weight of redeemable glass container sold annually in NYS
315,042 tons	Weight of glass wine and liquor containers sold annually in NYS
65%	Redemption rate of redeemable containers in NYS
35%	Percent of cullet used by glass manufacturers in U.S. for container manufacturing
17.5%	Percent of cullet used by glass manufacturers sourced from bottle bill (50% of 35%)
90%	Theoretical maximum amount of cullet that could be used for container manufacturing

Data from: (*The Container Recycling Institute, 2017*), (*Gaustad, 2019*)

Task 6 Results

In each of the conversations that NYSP2I had with glass manufacturers, the overarching sentiment was the same— the need and capacity for more glass cullet exists, but with two major caveats: quality and price of the cullet. In fact, the issue of sourcing quality, cost competitive cullet is at the forefront of the glass manufacturing industry’s mind, as evidenced by the recently published study on *Cullet Supply Issues and Technology*. This was a study commissioned by the Glass Manufacturing Industry Council to explore ways in which more post-consumer cullet can be recycled. Though many of the potential solutions outlined were technically oriented, bottle bill

programs were called out as an opportunity to increase glass recycling and provide more cullet to glass manufacturers.

Use of glass cullet can significantly reduce consumption of raw material, extend furnace life and save energy (Glass Packaging Institute, 2019). At the specified quality, glass cullet can be used for up to 90% or more of raw material in new container manufacturing, and is used consistently at these levels in some manufacturing plants in the EU. However, it is rare for glass plants in the U.S., including in the NYS region to use cullet at such high percentages, in fact most are using a percentage closer to 35%. This is simply because there is not enough quality cullet available at competitive prices (Gaustad, 2019).

Although NYSP2I was not able to obtain data on capacity directly from regional glass manufacturers, a theoretical maximum capacity was calculated based on container sales data and industry averages. NYSP2I was able to estimate that the theoretical capacity for regional glass manufacturing facilities to accept more cullet is more than 2X the total weight of cullet that would be produced if all wine and liquor bottles sold in NYS were redeemed through the NYS Bottle Bill. It is important to note that this analysis did not take into account color, quality or cost of the additional cullet, which are critical components to determining whether or not manufacturers would use the additional material if it were available.

F. Conclusions and Next Steps

This study succeeded in outlining high level implications of including wine and liquor bottles in the NYS Bottle Bill. Based on the results of the study, it is clear that including wine and liquor bottles in the NYS Bottle Bill would have widespread, but varied impacts on key stakeholders.

From an environmental standpoint, expanding the number of containers included in the bottle bill would very likely increase recycling rates of these containers, relieve approximately 164 MRFs from a portion of a low value, and difficult to manage material, and provide opportunity for nearly 315,000 tons of additional container glass to make its way through the redemption system where it has a much higher likelihood of being used in new container manufacturing and other higher-use recycling outlets. Initial estimates indicate that from a purely capacity-related standpoint,

regional glass manufacturers have capacity to use the amount of additional cullet that may be made available if wine and liquor bottles were included in the deposit system.

From a beverage industry standpoint, several thousand New York State manufacturers, distributors, and retailers of wine and liquor would incur significant costs by being required to become either a deposit initiator or dealer for the first time. Many of these businesses are small independently run enterprises that would incur these costs individually and not benefit from any economies of scale that larger chain establishments might. It is estimated that the industry would incur over \$40 million dollars in ongoing direct costs, with additional significant upfront costs.

From a logistical standpoint, it seems that many of the reverse vending machines used are flexible enough to be able to accept wine and liquor sized containers. However, because wine and liquor sales are not allowed at grocery or convenience locations, the network of locations for wine and liquor bottle returns, and therefore pick-ups (e.g., wine and spirits stores) are almost entirely separate from the current network where beer, soft drink, and other containers are returned and collected. This would, at least for a transition period, put a strain on 3rd party pick up agents to be able to service this new network of pick up locations. Additionally, it is likely that these smaller more dispersed pick up locations would experience higher prices to account for inefficiency of servicing them.

While the study provided many important initial findings to help gauge the impacts of adding wine and liquor bottles to the NYS Bottle Bill, it should be noted that there are several aspects of this study that warrant further research and consideration before being able to decide whether or not this is the best path forward for NYS, including but not limited to:

- Consumer willingness to return containers to a second set of locations (e.g., wine/liquor stores vs. grocery stores), which could significantly impact redemption rates
- Capacity of 3rd party pick up agents and beneficiaries to transport and clean additional bottle bill glass
- Further research into the feasibility of other (non-bottle bill) options for NYS to increase glass recycling (e.g., EPR, advanced disposal fee, etc.)

- More in-depth cost/benefit analysis that comprehends variability across business type, size and location (rural vs. urban), and whether or not the additional cullet could be cost competitive to raw material
- Investigating the possible underreporting apparent from the discrepancy between Container Recycling Institute Sales data and that of the Department of Taxation and Finance.

G. Appendix

Appendices are included as separate documents to this report.

H. References

- Buklarewicz, P. J., Damas, L., Anthony, R., Flammer, R., Seldman, N., & Liss, G. (2009, March 14). *Zero Waste Implementation Plan for the County of Hawai'i*. Retrieved from https://www.hawaii zerowaste.org/site-content/uploads/3-14-09-Hawaii_Zero_Waste_Plan.doc.pdf
- California Environmental Protection Agency, Department of Resources Recycling and Recovery. (2019, May 10). *Biannual Report of Beverage Container Sales, Returns, Redemption, and Recycling Rates*. Retrieved from <https://www.calrecycle.ca.gov/docs/cr/bevcontainer/rates/biannualrpt/2018julydec.pdf>
- California Product Stewardship Council. (2019). *California Legislation*. Retrieved from <https://www.calpsc.org/legislation>
- Casella. (2019, March 8). *An Expanded Bottle Bill: Another Threat to Recycling*. Retrieved from Casella: <https://www.casella.com/blog/expanded-bottle-bill>
- Collins, S. (2012, February). A Common Theme. *Resource Recycling*.
- Collins, S. V. (2019, July 17). *Bottle Bills - Benefits & Challenges*. Retrieved from Container Recycling Institute: <https://nerc.org/documents/Webinars/Bottle%20Bills--Benefits%20and%20Challenges/Bottle%20Bills%20Overview.pdf>
- Connecticut Department of Energy & Environmental Protection. (2016, December). *What is Producer Stewardship?* Retrieved from Connecticut Department of Energy & Environmental Protection: <https://www.ct.gov/deep/cwp/view.asp?a=2708&q=447190>

- Connecticut Department of Energy & Environmental Protection. (2019). *CT Bottle Bill Redemption Data*. Retrieved from https://www.ct.gov/deep/Lib/deep/reduce_reuse_recycle/bottles/bottle_bill_data_-_thru_Q1_2019.pdf
- Connecticut Department of Energy & Environmental Protection. (2019, May 21). *Packaging Extended Producer Responsibility - An Evolution In Receycling*. Retrieved from Connecticut Department of Energy & Environmental Protection: <http://nyfederation.org/wp-content/uploads/2019/pdf2019/40%20Metzner%20T.pdf>
- Container Recycling Institute. (2013). *Deposit States Have Higher Beverage Container Recycling Rates*. Retrieved from Container Recycling Institute: <http://www.container-recycling.org/images/stories/BUfigures/figure-pngs-new/figure1.png>
- Container Recycling Institute. (2016). Retrieved from Bottle Bill Resource Guide: <http://www.bottlebill.org/assets/pdfs/legis/usa/Hawaii%20Deposit%20Beverage%20Container%20program%20stats%20-%20FY06-FY15%20updated%201816%20Updated%20.pdf>
- Container Recycling Institute. (2017). *U.S. Recycling Rates by Deposit Status, 2015*. Retrieved from Container Recycling Institute: http://www.container-recycling.org/index.php?option=com_content&view=article&id=199&Itemid=1155
- Container Recycling Institute. (2019). *All State Table*. Retrieved from Bottle Bill Resource Guide: <http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/additional-links>
- Container Recycling Institute. (2019, July 19). *Bottle Bills - Benefits and Challenges*.
- Container Recycling Institute. (n.d.). *Iowa*. Retrieved from Bottle Bill Resource Guide: <http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/iowa>
- Container Recycling Institute. (n.d.). *Maine*. Retrieved from Bottel Bill Resource Guide: <http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/maine>
- Container Recycling Institute. (n.d.). *Massachusetts*. Retrieved from Botte Bill Resource Guide: <http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/massachusetts>
- Container Recycling Institute. (n.d.). *Michigan*. Retrieved from Bottle Bill Resource Guide: <http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/michigan>
- Container Recycling Institute. (n.d.). *New York*. Retrieved from Bottle Bill Resource Guide: <http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/new-york>

- Container Recycling Institute. (n.d.). *Oregon*. Retrieved from Bottle Bill Resource Guide:
<http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/oregon>
- Container Recycling Institute. (n.d.). *Vermont*. Retrieved from Bottle Bill Resource Guide:
<http://www.bottlebill.org/index.php/current-and-proposed-laws/usa/vermont>
- Container Recycling Institute; Vermont Public Research Interest Group. (2013, February 28). *A Clean and Green Vermont: A Special Report on the Environmental and Economic Benefits of Vermont's Bottle Bill*. Retrieved from Bottle Bill Resource Guide:
http://www.bottlebill.org/resources/pubs/CRI-VPIRG-A-Clean-and-Green-Vermont_2-28-2013.pdf
- County of Hawai'i Department of Environmental Management. (n.d.). *Zero Waste*. Retrieved from Solid Waste Division & Recycling Section: <https://www.hawaiizerowaste.org/zero-waste/>
- Environmental Research & Education Foundation. (2017, April). *Analysis of MSW Landfill Tipping Fees*. Retrieved from Environmental Research & Education Foundation:
<https://erefnd.org/wp-content/uploads/2017/12/EREF-MSWLF-Tip-Fees-2017.pdf>
- Gaustad, G. (2019, August 15). Presentation at Alfred University. (NYSP2I, Interviewer)
- Glass Packaging Institute. (2019). *Glass Facts*. Retrieved from Glass Packaging Institute:
<http://www.gpi.org/recycling/glass-recycling-facts>
- Hawaii Department of Health. (n.d.). *Hawaii Deposit Beverage Container Statistics*. Retrieved from Bottle Bill Resource Guide:
<http://www.bottlebill.org/assets/pdfs/legis/usa/Hawaii%20Deposit%20Beverage%20Container%20program%20stats%20-%20FY06-FY15%20updated%201816%20Updated%20.pdf>
- Ma, K. (2019, July 31). *Producers Key to Solving Plastic Pollution Problem*. Retrieved from St. Albert TODAY: <https://www.stalberttoday.ca/local-news/producers-key-to-solving-plastic-pollution-problem-1596035>
- National Alcohol Beverage Control Association (NABCA). (2019). *Control State Directory and Info*. Retrieved from National Alcohol Beverage Control Association (NABCA):
<https://www.nabca.org/control-state-directory-and-info>
- New York State. (n.d.). *Article 27 - Collection, Treatment and Disposal of Refuse and Other Solid Waste; Title 10 - Litter and Solid Waste Control*. Retrieved from New York State

Environmental Conservation Law:

https://www.dec.ny.gov/docs/materials_minerals_pdf/rca2017.pdf

New York State Department of Environmental Conservation. (2018, August 8). *Third-Party Systems and Related Companies*. Retrieved from New York State Department of Environmental Conservation: <https://www.dec.ny.gov/chemical/54799.html>

New York State Department of Environmental Conservation. (n.d.). *Product Stewardship*. Retrieved from Department of Environmental Stewardship: <https://www.dec.ny.gov/chemical/66746.html>

New York State Department of Labor. (n.d.). *Minimum Wage*. Retrieved from Department of Labor: <https://www.labor.ny.gov/workerprotection/laborstandards/workprot/minwage.shtm>

New York State Department of Taxation and Finance. (2016, January 11). *Publication 574: New York State Registered Distributors of Liquor and Wine*. Retrieved from New York State Department of Taxation and Finance: https://www.tax.ny.gov/pdf/2016/pubs/alcohol/pub574_116.pdf

New York State Legislature. (n.d.). *Consolidated Laws*. Retrieved from New York State Legislature: <http://public.leginfo.state.ny.us/lawssrch.cgi?NVLWO>:

New York State Liquor Authority. (2014, June 24). *Private Liquor Brand Label Registration Application*. Retrieved from New York State Liquor Authority: <https://sla.ny.gov/system/files/documents/2018/08/brand-label-private-liquor-071714.pdf>

New York State Liquor Authority. (2014, June 24). *Standard Wine Product/Wine Specialty/Low Alcohol Wine Label Registration Application*. Retrieved from New York State Liquor Authority: <https://sla.ny.gov/system/files/documents/2018/08/brand-label-standard-wp-la-ws-062414.pdf>

New York State Liquor Authority. (2019, September). *Alcoholic Beverage Control Law*. Retrieved from <https://sla.ny.gov/alcoholic-beverage-control-law>

New York State Liquor Authority. (2019, July 30). *Liquor Authority Quarterly List of Active Licenses API*. Retrieved from Data.NY.gov: <https://data.ny.gov/Economic-Development/Liquor-Authority-Quarterly-List-of-Active-Licenses/wg8y-fzsj>

New York State Liquor Authority. (2019, August 23). *Standard Liquor Brand Label Registration*. Retrieved from State Liquor Authority:

<https://sla.ny.gov/system/files/documents/2019/08/Brand%20Label%20Application%20Standard%20Liquor%208.23.19-.pdf>

New York State Liquor Authority. (n.d.). *Alcoholic Beverage Manufacturing Licenses*. Retrieved from

https://www.businessexpress.ny.gov/app/answers/cms/a_id/2027/kw/Alcoholic%20Beverage%20Manufacturer%20License

New York State Liquor Authority. (n.d.). *Brand Label Registration*. Retrieved from Liquor Authority: <https://sla.ny.gov/brand-label-registration>

New York State. (n.d.). *Minimum Wage*. Retrieved from Department of Labor:

<https://www.labor.ny.gov/workerprotection/laborstandards/workprot/minwage.shtm>

OECD. (n.d.). *Extended Producer Responsibility*. Retrieved from OECD:

<https://www.oecd.org/env/tools-evaluation/extendedproducerresponsibility.htm>

Park Street Imports, LLC. (2019). *Alcoholic Beverage Industry: Three-Tier System*. Retrieved from Park Street: <https://www.parkstreet.com/wine-spirits-industry-background/>

Remolador, M. A. (2018, October). *Northeast MRF Glass Survey*. Retrieved from Northeast Recycling Council (NERC):

<https://nerc.org/documents/Glass/Northeast%20Recycling%20Council%20-%20MRF%20Glass%20Survey%20Report.pdf>

Resource Recycling Systems (RRS). (2014). *Container Redemption System Optimization Study*.

Riegle, C., Kelly, J., & O'Neal, J. (2019, August 8). TOMRA site visit (Farmington, NY). (A. Labuzetta, & G. Griffin, Interviewers)

Schultz, J. (2018, March 14). *State Beverage Container Laws*. Retrieved from National Conference of State Legislatures: <http://www.ncsl.org/research/environment-and-natural-resources/state-beverage-container-laws.aspx>

Spendelow, P., & Gast, J. (2019, May 10). *Market Development*. Retrieved from Oregon Department of Environmental Quality:

<https://www.oregon.gov/deq/recycling/Documents/recmarkdev.pdf>

State of Hawaii. (n.d.). *F.A.Q. Hawaii Advance Disposal Fee*. Retrieved from Department of Health Solid Hazardous Waste Branch:

<http://health.hawaii.gov/shwb/files/2013/10/glassADFFAQ.pdf>

- State of Hawaii. (n.d.). *Volume 06, Chapter 0321, Section 342G-82*. Retrieved from Hawaii State Legislature: http://www.capitol.hawaii.gov/hrscurrent/Vol06_Ch0321-0344/HRS0342G/HRS_0342G-0082.htm
- State of Hawaii. (n.d.). *Volume 06, Chapter 321, Section 342G-111*. Retrieved from Hawaii State Legislature: http://www.capitol.hawaii.gov/hrscurrent/Vol06_Ch0321-0344/HRS0342G/HRS_0342G-0111.htm
- State of New York Liquor Authority. (2016, April 12). *Brand Label Registration Guidance*. Retrieved from <https://sla.ny.gov/system/files/documents/2018/06/advisory2016-3-brandlabelregistration.pdf>
- StateLiquorLaws.com. (2019). *State Liquor Laws*. Retrieved from <https://www.stateliquorlaws.com/>: <https://www.stateliquorlaws.com/>
- The Container Recycling Institute. (2017). *2015 Beverage Market Data Analysis*.
- The European Organization for Packaging and the Environment (EUROPEN). (n.d.). *Fact Sheet: Extended Producer Responsibility (EPR) For Used Packaging*. Retrieved from EUROPEN: <https://europen-packaging.eu/component/downloads/downloads/1745.html?ptitle=>
- The New York State Senate. (n.d.). *Bills & Laws*. Retrieved from The New York State Senate: <https://www.nysenate.gov/legislation/bills>
- The New York State Senate. (n.d.). *Sec. 214-H Unit Pricing*. Retrieved from New York Agriculture & Markets Law: <https://www.nysenate.gov/legislation/laws/AGM/214-H>
- The Recycling Partnership. (2017). *The 2016 State of Curbside Report*. Retrieved from The Recycling Partnership: <https://therecyclingpartnership.app.box.com/s/i0wvvano7hi3dr3ivqvxv689y4zzo583l2>
- United States Environmental Protection Agency. (2018, July). *Advancing Sustainable Materials Management: 2015 Fact Sheet*. Retrieved from https://www.epa.gov/sites/production/files/2018-07/documents/2015_smm_msw_factsheet_07242018_fnl_508_002.pdf
- United States Environmental Protection Agency. (n.d.). *Containers and Packaging: Product-Specific Data*. Retrieved from United States Environmental Protection Agency: <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/containers-and-packaging-product-specific-data>

United States Environmental Protection Agency. (n.d.). *Containers and Packaging: Product-Specific Data*. Retrieved from <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/containers-and-packaging-product-specific-data>

Valiante, U. (2019, February). *Report: A Vision For A Circular Economy For Plastics In Canada*. Retrieved from Smart Property Institute:
<https://institute.smartprosperity.ca/sites/default/files/report-circulareconomy-february14-final.pdf>