

Final Version

Analysis of Vermont's Bottle Bill: Costs, Impacts, and Expansion

Prepared for:

**Beverage Association of Vermont
Vermont Wholesale Beverage Association
Vermont Grocers Association**

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December 2006

1. Executive Summary

In Vermont, policy makers are considering changes to the deposit system beyond the recent ½¢ increase in the handling fee that beverage distributors must pay to retailers and redemption centers. This study evaluates the costs and effectiveness of the program today (Chapter 2) and projects costs and impacts of a possible expansion of the law to include noncarbonated beverages (Chapter 3). This report updates a 1997 study examining the same issues.

Current Bottle Bill (Chapter 2)

The deposit system is expensive, costing \$8.7 million to operate in 2004. This translates into a cost of 3.2¢ per deposit container sold (77¢ per case) or \$490 per ton of material recycled – more than three times the typical cost of a curbside collection program for household recyclables.

Vermont 2004 Deposit Law Costs

Annual Net Operating Cost <i>(net of scrap value earned)</i>	\$8.7 million
Net Cost per Deposit Container Sold	3.2¢
Recycling Cost	\$490/ton

- These figures are based on costs incurred by retailers and redemption centers to redeem bottles and cans, sort them, and store them. The costs also include beverage distributor expenses to collect containers from retailers and redemption centers, pay the handling fee to retailers and redemption centers, transport the materials, and process them for market. Revenues earned from the scrap material are deducted from the costs shown.
- Vermont businesses pay these costs each year to keep the deposit system running. Consumers ultimately fund the costs through higher prices.

The environmental benefit of the deposit law is limited.

- Material recycled through the deposit program represents 2.7 percent of the municipal solid waste generated in Vermont. The vast majority of the waste stream consists of other packaging, products, and wastes (e.g., other bottles and cans, paper and paper products, and organic wastes like food and yard wastes).¹

¹ Information about the composition of Vermont's waste stream can be found at www.anr.state.vt.us/dec/wastediv/solid/pubs/VT%20WASTE%20COMP.pdf.

- The return rate for containers is dropping, although not as quickly as in neighboring states. This suggests that Vermont is experiencing increases in fraudulent redemption (*i.e.*, containers purchased out of state and redeemed in Vermont).

The deposit system is not self-funding.

- Unclaimed deposits and revenue from the sale of scrap cover less than half of the cost of operating the deposit system.
- In fact, unclaimed deposits plus scrap revenue do not even cover the current mandated handling fee of 3.5¢, paid by distributors to retailers and redemption centers for each container redeemed.
- The balance of the cost of the deposit system is borne by Vermont businesses and, ultimately, Vermont consumers.

Raising the handling fee would further increase consumer prices.

- The 3.5¢ handling fee paid to retailers and redemption centers matches the highest handling fee paid in any deposit state (Maine).
- Each ½¢ increase would add an estimated \$1.5 million to consumer prices in Vermont.

Expansion of the Bottle Bill (Chapter 3)

The study examined expanding the scope of the bottle bill from beer and carbonated soft drink containers to all noncarbonated, nonalcoholic beverages including fruit juices and drinks, bottled water, sports drinks, and teas; we assumed milk and dairy products would remain exempt from deposits. We assumed that those beverages in plastic, metal, and glass containers one gallon or smaller would have deposits

Expansion would increase the number of containers with deposits by 40 percent.

- Fruit juices and drinks would account for 44 percent of the new deposit containers followed by bottled water at 34 percent.

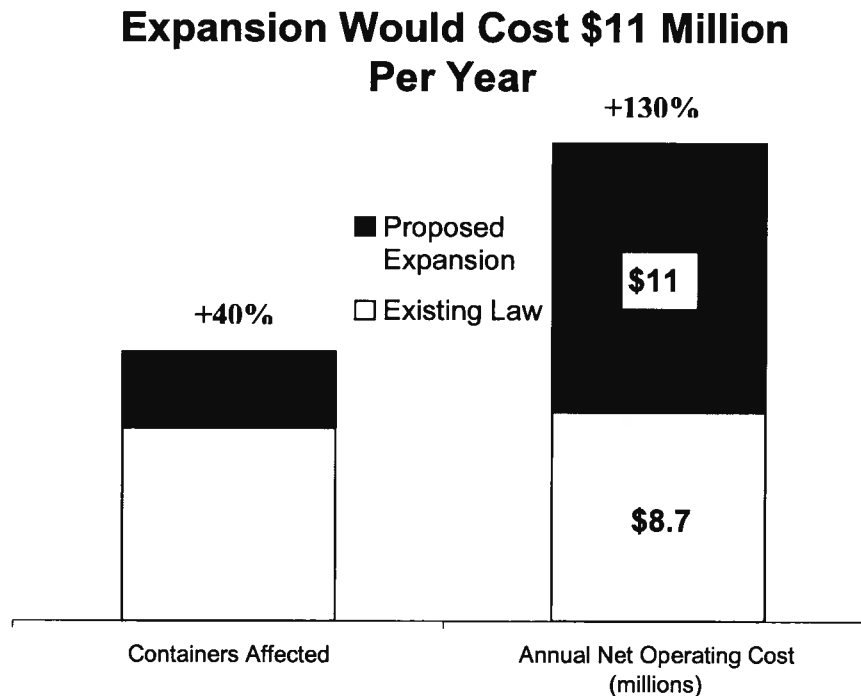
Rather than adding on to the existing law, expansion would require completely new systems to meet the administrative, financial, and operational requirements associated with the redemption of noncarbonated beverage containers.

- The structure of the beer and soft drink industries and their direct-to-store delivery systems enable the deposit law to operate today. Expanding the law to different types of products would lead to a system that would be far more costly, more complicated, and more susceptible to fraud.

- The packaging and brands represented by these noncarbonated products are much more diverse than those currently subject to deposits. This diversity adds complexity and higher costs to all aspects of the deposit system.
- Because of different production and distribution systems, most noncarbonated beverages cannot be traced to a specific distributor. As a result, it is unclear who would be responsible for initiating deposits or for paying refunds and handling fees to retailers and redemption centers that take containers back from consumers.
- Most companies that produce and distribute noncarbonated beverages could not retrieve these containers from Vermont retailers and redemption centers. A new system of trucks, drivers, warehouses, and processing equipment would be required to collect, transport, and prepare these containers for the scrap market. This new system would operate in addition to the current redemption system and other recycling programs already in place in Vermont.

This complexity and redundancy would lead to a costly redemption system. Expansion would add \$11 million to the current \$8.7 million price tag of the deposit program.

- Expansion would increase the number of deposit containers by 40 percent, but increase operating costs by 130 percent (see figure).



- To cover the increased operating costs, the average price of a noncarbonated beverage container would have to increase 10¢, compared to the average cost of 3.2¢ per container under the current law. Adding the 5¢ deposit means a potential price increase for consumers of 15¢ per bottle or can (\$3.60 per case) at the cash register.
- As with the existing law costs, these estimates are based on redemption costs to accept, sort, and store empty containers at retail and redemption locations; collection costs to retrieve the containers; processing costs to prepare the materials for market; and scrap revenue earned.

Environmental benefits of expansion would be limited and would come at an extremely high cost.

- We calculate that the statewide recycling rate would increase by less than 0.4 percent after expansion. This increase would move the state's municipal solid waste diversion rate from an estimated 29.3 percent in 2004 to 29.7 percent.
- The additional material recycled as a result of expansion would be equal to about 10 ounces of packaging per resident per month – about the weight of one Snapple bottle.
- Using expansion to recover this additional material would not be cost effective. The cost per ton to recover the additional containers (those not already recycled today) would be \$4,600. This is 30-times the cost of a typical curbside recycling program (\$150 per ton), which recovers many more materials than those included in the deposit program.

Expansion would compound the problems that Vermont retailers have competing with stores in neighboring states.

- Higher prices for juices, water, teas, and sports drinks would increase the plight of retail businesses in the Connecticut River Valley.
- Per capita grocery sales in Vermont are already 40 percent lower than in New Hampshire, which drains jobs and tax revenues from Vermont.

2. Vermont's Existing Beverage Container Deposit Program

For more than 30 years, Vermont has mandated deposits on beer and carbonated soft drink containers.² Adopted as an anti-litter measure, the so-called bottle bill today is viewed by many as an important part of the state's recycling infrastructure as well. Others see the program as largely duplicating the recycling infrastructure that has developed in households, communities, and businesses over the past 15 years.

Today policy makers and stakeholders are examining changes to the deposit system, including a further increase in handling fees paid to retailers and redemption centers and expansion of the program to include a wide range of noncarbonated beverages. To inform this debate, Northbridge was asked to revise its 1997 analysis of the Vermont deposit law to evaluate the costs and effectiveness of the program today (Chapter 2) and to project costs and impacts of a possible expansion (Chapter 3).

The analysis of the current law is based on beverage sales, return, and cost data collected by Northbridge from Vermont beverage distributors, wholesalers, and retailers. The surveyed firms represented more than 95 percent of the estimated statewide market for carbonated beverages; we extrapolated from the survey respondents to account for the missing portions of the market.

2.1 Performance of Vermont's Bottle Bill

In 2004, the number of beer and soft drink containers returned for refund was 84.5 percent of the number sold. This figure overstates the actual return rate because it includes redeemed containers that were purchased outside of Vermont and brought into the state for a refund.

While fraudulent redemption is difficult to quantify, it is a significant factor. First, it is apparent from the survey data we collected that deposit initiators with territory bordering New Hampshire have significantly higher return rates than others. Second, in other states, sampling of redeemed containers consistently shows a substantial fraction of returns from non-deposit states.³ Based on the data, especially from Massachusetts, we estimate that approximately 10 percent of Vermont returns are from out of state.

Exhibit 2-1

Vermont Redemption - 2004

Deposit Containers Sold	270 million
Containers Redeemed	229 million
Apparent Redemption Rate	84.5%

Does not include liquor bottles, which are also included in the deposit system. Redemptions include an unknown number of containers purchased outside the state and fraudulently redeemed in Vermont

² Vermont's law was subsequently amended to impose deposits on distilled spirits bottles larger than 50 ml, but this study does not consider these bottles.

³ For example, fraud accounts for up to 11% of all returns according to the Massachusetts' State Auditor; 1% to 28% of cans from reverse vending machines according to a 2002 MA Department of Environmental Protection study, and 7% to 31% of cans in Michigan border areas in 1997.

Using this estimate, the true return rate (Vermont containers redeemed divided by Vermont containers sold) would be about 75 percent, a rate that is more consistent with data from other deposit states (see Exhibit 2-2). For our purposes in this analysis, we will generally use the 84.5 percent apparent rate, recognizing that it overstates the true rate because it includes fraudulent redemption.

The 84.5 percent rate represents a drop of only three percentage points from the 88 percent rate Northbridge documented back in 1997. This decline is much less than we expected to see. Other deposit states experienced much more significant declines in their redemption rates during that period (Exhibit 2-2). Only a few deposit states collect and release redemption rate information on an annual basis, but the trends are clearly toward greater declines in those other states.

Vermont's higher rate today likely reflects both the strong environmental commitment of Vermonters and a serious fraud problem. Fraud not only increases the costs and burden of the deposit system, but it is a sign that businesses and consumers in neighboring states benefit from Vermont's bottle bill at the expense of Vermonters. In fact, it is clear that beverage sales and overall retail activity are significantly greater in neighboring New Hampshire, owing at least partially to the deposit law (see Section 3.6).

2.2 Costs of the Current Law

The estimated cost to operate Vermont's deposit container redemption system was more than \$11 million in 2004, but revenue from scrap material sold reduced the net cost to \$8.7 million (Exhibit 2-3). This is the estimated net annual cost to handle returned beer and soft drink containers only; the cost to manage liquor bottles is not included. The \$8.7 million includes:

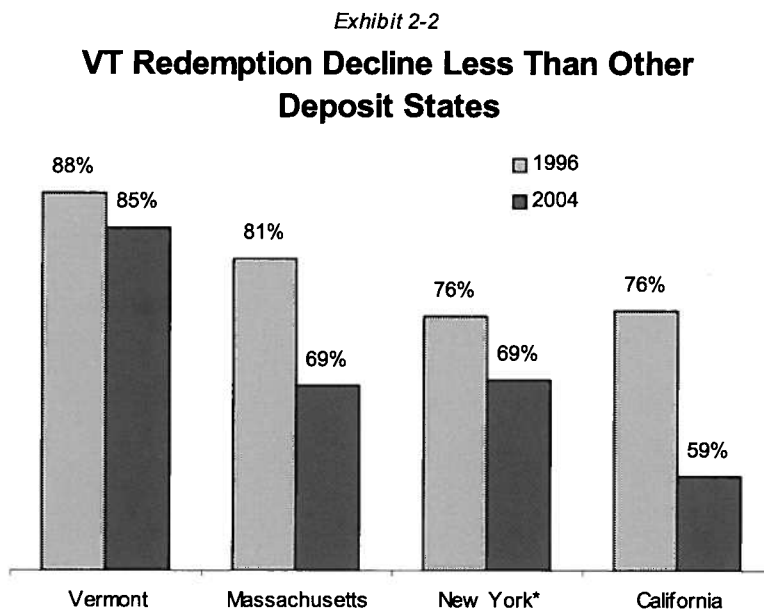


Exhibit 2-3

Vermont Deposit Law Costs

Annual Net Operating Cost <i>(net of scrap value earned)</i>	\$8.7 million
Net Cost per Deposit Container Sold	3.2¢
Recycling Cost	\$490/ton

Does not include the cost to manage liquor bottles which are also included in the deposit system

- Costs incurred by retailers and redemption centers where bottles and cans are returned for refund. Major cost elements are labor for handling and sorting containers, space costs (rent, utilities, insurance), and costs to lease and maintain reverse vending machines.
- Costs to beverage distributors that collect redeemed containers from retailers and redemption centers. The largest cost incurred by beverage distributors is the mandated handling fee paid to retailers and redemption centers to help offset their operating costs.⁴
- Distributors also pay for labor and equipment to pick up the materials, transport them, and process them for sale. The companies may also pay a third party to provide some or all of these services.
- Revenues from the sale of the commodities (aluminum, glass, and PET plastic) were deducted from these costs. Scrap revenues have been at comparatively high levels recently, helping to keep the net cost of the program down.

Our distributor cost estimates are based on data from deposit beverage distributors handling 88 percent of container returns in Vermont. Our redemption cost estimates, however, are much less reliable. We did obtain cost data by surveying supermarket chains and some independent stores, but did not receive responses from our survey of other redemption locations such as beverage depots and independent redemption centers that handle the majority of returns. For this analysis we assumed that redemption costs at these other locations are equal to the 3.5¢ handling fee in effect today.⁵ The overall redemption cost estimates are a weighted average of the supermarket and grocery store costs and the redemption center cost estimate of 3.5¢.

The \$8.7 million cost equals 3.2¢ for each deposit container sold in Vermont in 2004. In other words, to cover the cost of the deposit program, Vermont consumers pay an average of 3.2¢ for each beer or soft drink container they buy – about 77¢ per case.

For another perspective, we related the costs to the total amount of beverage container material recovered through the deposit program. The 2004 cost equals \$490 for each ton of material recovered, which includes containers brought in from outside Vermont. This is a very high recycling cost compared with curbside collection programs, which typically recover materials for around \$150 per ton.⁶ The \$490 per ton cost in Vermont is consistent with deposits programs in neighboring states (*e.g.*, \$520 in Massachusetts and \$410 in New York). Deposit programs are costly because of the level of handling, separation, and sorting required. Recovery programs like curbside or dropoff recycling combine multiple material types together for more efficient handling.

⁴ The mandatory fee is set by law and increased to 3.5¢ per container in 2006. Additional information on the handling fee is provided in section 2.5 below.

⁵ Ongoing research supported by Vermont's Agency of Natural Resources may provide more reliable cost figures for redemption centers; if those data become available, we will incorporate their findings into our analysis and revise our cost estimates.

⁶ National figures suggest curbside costs range from \$100 to \$150 per ton depending on the region and methods employed; curbside collection is more costly in rural areas, so we used the higher end of the range. Dropoff programs which are prevalent in Vermont cost much less per ton.

Finally, it is important to note that the deposit law is not a money-maker for Vermont's beverage industry. Distributors' costs fall into two main categories: paying to collect containers and funding the mandated 3.5¢ handling fee paid to redemption centers and retailers for each return. Distributors have two available revenue sources to offset these costs: the value of scrap material and unclaimed deposits. In 2004, the \$6.9 million mandated liability⁷ for handling fees alone far-exceeded the total revenue available, leaving distributors to pay for the remaining handling fee liability and the collection costs. Ultimately, Vermont consumers bear much of the remaining cost through higher prices. Later, in section 2.5, we discuss the implications of increasing the handling fee further.

2.3 Environmental Impact of the Current Law

Material recovered through the deposit program totaled 17,500 tons in 2004 (Exhibit 2-4) – about 2.7 percent of the municipal solid waste generated in Vermont.⁸ Some of this material was originally purchased outside the state and redeemed illegally in Vermont. Based on research cited earlier (see footnote 3) and our judgment, we estimate fraudulent redemption at about 10 percent of this total. This out of state material is brought into Vermont and then Vermont businesses and consumers pay to handle it.

Redeemed containers represent a higher fraction of the municipal waste stream in Vermont than in neighboring deposit states. This is likely due to higher per-capita beer consumption in Vermont (much of it in glass) and to lower overall waste generation in the state, possibly because the state produces less commercial waste than its neighbors.

2.4 Comparisons to the Previous Study

Northbridge conducted a similar study in 1997 to document the costs and impacts of the deposit law. Since that time:

- The return rate has declined as noted earlier.
- Because of increased sales (and, possibly, increased fraud), the number of containers redeemed has also increased, even though the return rate is lower. Because more containers are being redeemed, the cost to operate the deposit system has grown.

Exhibit 2-4

2004 Vermont Redemptions (tons)

Aluminum	2,000
Glass	14,300
PET	1,200
Total	17,500

Does not include liquor bottles which are also included in the deposit system

⁷ At the higher 3.5¢ handling fee in effect today, the mandated cost to distributors has risen to \$8 million per year.

⁸ Solid Waste Diversion & Disposal Reports for 2004 accessed on DEC's website on April 1, 2006.
<http://www.anr.state.vt.us/dec/wastediv/solid/DandD.htm>

- The cost per container redeemed is lower, however, because distributors' collection systems are more efficient today. This is consistent with trends in other deposit states where industry consolidation and experience with deposit programs permit greater efficiencies over time. Redemption center costs per container should also decrease as redemption volume grows. Research in Massachusetts confirmed this, but we do not have corresponding data for Vermont operations.⁹ It is clear that the recent increase in the handling fee to 3.5¢ will not improve the efficiency of Vermont's redemption centers.
- The weight of material redeemed has grown because of higher sales and returns of glass beer bottles. The amount of aluminum redeemed was virtually unchanged while PET tonnage declined 19 percent.

2.5 Further Increases in Vermont's Handling Fee

Some Vermont redemption centers are seeking an additional increase in the 3.5¢ handling fee, beyond the ½¢ that went into effect in 2006. Prior to 2006, the last increase in handling fees was in 1988. Because beverage distributors pay the handling fee and are already losing money on the deposit law, any increase in the handling fee would likely be passed along to retailers as a wholesale price increase from bottlers and beer wholesalers.

At the 2004 level of returns, each ½¢ increase in the handling fee adds \$1.1 million to the wholesale price of beverages. After the wholesale increase is marked up by retailers, consumers would likely see a price increase of \$1.5 million for each ½¢ change in the handling fee.

For perspective, Vermont's 3.5¢ handling fee matches the highest fees paid in any deposit state in the US. Redemption centers in Maine receive 3.5¢ handling fees for most noncarbonated beverage containers they handle and 3¢ for the rest of the containers they redeem. One rationale for the high fees in Maine is that redemption centers must handle many more diverse container brands, sizes, and materials because of the expanded deposit law in place there. The next highest handling fees are in Massachusetts (2.25¢), New York (2¢), and Connecticut (1.5¢ to 2¢). All other deposit states have handling fees of 1¢ or less and Oregon and Michigan have no handling fee at all.

2.6 Conclusion

Based on the most reliable data available, Vermont's deposit law costs \$8.7 million per year and results in the recovery of 17,500 tons of glass, aluminum, and PET beverage containers. The deposit system is complex and costly because of the way in which containers must be handled and sorted. Recovery of material through community recycling programs is less costly (the cost per ton is less than one-third as much as deposits) because individual bottles and cans do not have to be counted and handled individually. The deposit system also encourages fraudulent redemption of containers purchased out of state and redeemed in Vermont as the deposit provides a windfall to the consumer who never paid it in the first place. Vermont's beverage

⁹ "Commonwealth of Massachusetts Bottle Bill Redemption Fee Study," DSM Environmental Services, for the MA Department of Environmental Protection, July 1999.

distributors are already losing money on the deposit law's operations; any increase in the handling fee they are required to pay to redemption centers and retailers would likely result in corresponding price increases to consumers.

3. Expansion of the Deposit Law

At various times during the deposit law’s history, some legislators and deposit advocates have put forward proposals to expand the scope of the deposit law to include more beverage containers. In response to such a proposal in 1996, Northbridge conducted an economic analysis of the proposed law and estimated its costs and benefits. After considering this and other information, a study committee rejected expansion.

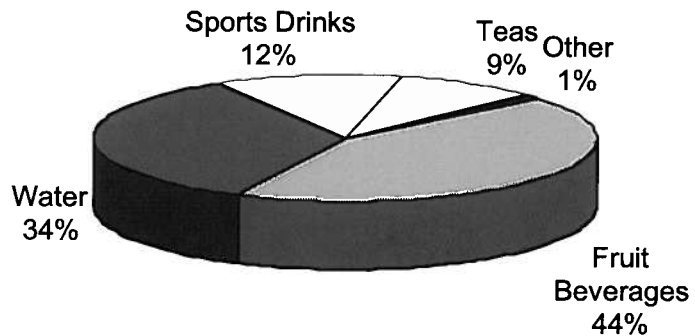
Interested parties on all sides of the issue are again asking questions about the impact of expansion. To assist in the evaluation of expansion, we have updated our previous study, following the same methodology as the 1996 analysis. We have examined the scope, economic impact, and environmental benefits of expansion. The analysis is based on beverage sales data collected by Northbridge from Vermont beverage distributors, wholesalers, retailers, and from selected manufacturers. The surveyed firms represent more than 80 percent of the estimated statewide market for noncarbonated, nonalcoholic beverages; we extrapolated from the survey respondents to account for the missing portions of the market.

3.1 Scope of Expansion

For the purposes of this analysis, we assumed that the law would be expanded to include all nonalcoholic, noncarbonated beverages, except for dairy-based products. The containers affected would be sealed metal, glass, and plastic containers one gallon and smaller. This is consistent with most legislative proposals on this issue and similar to the scope of the Maine expanded deposit law, except that we assumed wine bottles would not be part of expansion in Vermont.

Based on sales data obtained in our surveys, noncarbonated beverage containers would represent about 28 percent of the expanded universe of deposit containers sold in Vermont. The mix of noncarbonated products is summarized in Exhibit 3-1. Fruit beverages (ranging from 100 percent juices to fruit drinks) would account for 44 percent of the containers. The next largest category is water bottles, accounting for another one-third of the total. Sports drinks and teas account for the remaining significant categories. The “other” category includes energy drinks, cocktail mixers, and coffee drinks.

Exhibit 3-1
Beverages Subject to Expansion in Vermont



3.2 Diverse Brands and Packages Add Complications

The packaging and brands represented by these noncarbonated products are much more diverse than those currently subject to deposits. This diversity would add complexity and higher costs to all aspects of the deposit system, from its financial and administrative aspects to the operations side.

3.2.1 Administrative and Finance Issues

Because the grocery industry (for juices, sports drinks, and water) is structured differently from the beer and soda business, an expanded deposit system is much more complicated to administer. The current law affects beer and carbonated soft drinks, both of which are distributed by companies with exclusive franchise rights to distribute products in their territories. Because these franchise territories follow political boundaries, it is relatively simple for these companies to identify the products subject to deposits and properly initiate the deposit, *i.e.*, charge the deposit to the retailer on only those containers sold in the state as required by law.

Similarly, it is a simple matter for retailers and redemption centers to identify the distributors responsible for retrieving empty deposit containers brought to their locations, because only a single franchisee has the rights to sell there. A Brattleboro retailer, therefore, has only a limited number of companies that he must deal with to arrange for the pickup of empties and to remit the required handling fees and refunds.¹⁰

Contrast this current arrangement with the situation after expansion: most of the containers subject to expansion are produced nationally, distributed through regional warehouses and distribution centers, and arrive at retailers' locations on trucks with a wide range of other groceries. Unlike the current system, it is not at all clear where the deposit should first be charged.

The manufacturer of the product cannot initiate the deposit, because the company does not know if a bottle of juice is headed for Vermont or Vienna when it leaves the production facility. A juice bottle leaving a plant in Florida might be transferred to a regional distribution center in Pennsylvania. From that center, containers would go all over the northeast including Vermont. For the distributor to initiate the deposit, he would have to isolate products destined for Vermont from all other products. This, too, is problematic because the distributor does not know how much Vermont stores will order from him, and he is likely to ship products to multiple states on any given truck.

Ultimately, these complications mean that fewer deposits will be initiated than should be because some beverages sold in Vermont will not have been identified as such. Companies (or the state if it were to take on deposit collection responsibilities) would have fewer deposits available to pay refund values and handling fees, driving up the cost of the system.

The more significant financial exposure is on the return side of the equation. We will discuss the operational implications next, but the financial risk stems from the need to identify a responsible

¹⁰ The retailer would work with one Coke bottler, one Pepsi bottler, an Anheuser-Busch distributor, a Miller distributor, and perhaps two or three others.

party for reimbursing retailers and redemption centers for refunds and handling fees. Each container returned by a consumer represents 8.5¢ that is due to the retailer or redemption center – 5¢ to restore the nickel paid to the consumer that returned the container and 3.5¢ of handling fee. Neither the retailer nor the redemption center has a clearly responsible party to turn to for the 8.5¢ payment. The manufacturer has no business relationship with the retailer and is likely located in another state. The distributor has no way of distinguishing bottles and cans he distributed from those of other distributors; if the distributor were to pay the refund and handling fee, he could easily pay out much more than he collected on the deposit products he sold.

3.2.2 Operational Issues with Redemption and Pickup

The **redemption process** is much more complicated under expansion, not only because of the way in which products are distributed, but also because of the variety of products and containers themselves. For retailers, redemption becomes more problematic because many of the new containers cannot be accommodated in reverse vending machines (RVMs), so stores must revert to the “old-fashioned” method of accepting containers by hand at the customer service counter. At redemption centers, time and space requirements would jump to accommodate the enormous increase in sorting required to separate the brands, materials, and sizes. Consider the following:

- The current law includes only containers made of glass, aluminum, and PET. Expanding the law would bring into the deposit program more of these same materials, but would also add steel cans and several types of plastic bottles (HDPE, LDPE, PS, Other).
- Container sizes range from four ounces for baby juice up to one gallon juice, tea, and water bottles. On a weight basis, the lightest juice container sold weighs about 1/3 of an ounce up to the heaviest glass bottles weighing nearly two pounds.
- Container shapes are much more diverse in the juice and water market. Square or angular bottles cannot be accommodated in RVMs.
- Manufacturers and brands of noncarbonated beverages are far more numerous than those for carbonated soft drinks and beer. Because the deposit system requires separation by brand (for accounting purposes), by material (for recycling purposes), and by size (for weighing and handling purposes), the space and labor required for sorting would be dramatically higher.

A simple way to illustrate the increased complexity of the redemption process is to compare the amount of sorting required today *vs.* after expansion. Under the current law, a typical retailer or redemption center might be required to perform 20 brand and material sorts (two to four container materials for each of several bottlers and beer wholesalers). Additional sorting is required for different sizes of containers as well, but we have simplified the example.

Our Vermont database of noncarbonated beverages subject to expansion indicates that *at least 194 additional sorts* would be required. This number captures only the additional noncarbonated beverage brands and materials included in our survey. This does not reflect additional sorting by size that would be required, nor does it consider additional brands not captured in our survey.

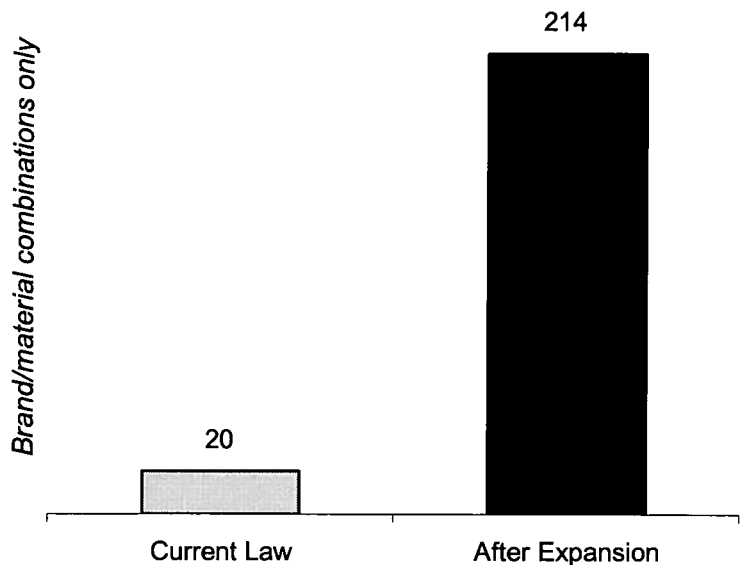
This 10-fold increase in sorting required (Exhibit 3-2) would significantly increase costs and it helps account for the disproportionately higher cost to handle noncarbonated containers compared to bottles and cans covered by the current law. This difference is quantified in Section 3.4 when we estimate incremental costs.

The process of **picking up returned containers** also becomes much more complex because of the greater number of brand owners whose products are dispersed throughout the state at retail and redemption locations. Beer wholesalers and soft drink bottlers provide retail customers with direct-to-store delivery service, placing distributors' vehicles and staff at the retail account once if not several times per week. In many cases, these vehicles backhaul empty containers or, at least, the delivery driver provides a regular point of contact to address problems with pickup and managing empties. This would continue to be the practice for noncarbonated beverages sold by these companies.

Picking up empty containers for brands that are not delivered directly to stores creates a number of complications. In most cases, the beverage producer has no facilities and no staff in the state so he cannot service accounts and pick up empties. The distributor of these beverages has delivery trucks, but has no way of knowing if the product returned to the store came from him originally or from some other distributor. Because of that uncertainty over who sold the product, distributors would not pick up empties because they would be liable for 8.5¢ of refunds and handling fees for products they never sold.

In practice (based on the experience in Maine, at least), the beverage producer or distributor must hire a third-party agent to collect selected brands of products from every redemption location in the state. This would include retailers, redemption centers, and on-premises retailers such as bars, restaurants, hotels, and inns.¹¹ Each third party would collect only the brands and containers specific to his clients, remit the handling fee and refund owed to the redemption site, and then invoice his clients for these charges plus a service fee. We quantify these expenses in Section 3.4.

Exhibit 3-2
Beverage Container Brand and Material Sorts Would Increase At Least Ten-Fold



¹¹ Vermont has more than 2,000 such locations that must be serviced based on surveys compiled by DSM Environmental Services, "Bottle Bill Redemption/Collection Analysis," for the VT DEC, March 2006.

3.3 Environmental Impacts of Expansion

3.3.1 Solid Waste Impact

Expanding the deposit law would increase Vermont's recycling rate by less than 0.4 percent. In other words, Vermont's municipal solid waste diversion rate (estimated at 29.3 percent in 2004) would increase to about 29.7 percent after expansion. This relatively small impact results from the small share of the waste stream represented by these containers, the fact that many of them are already recycled, and the moderately low projected rate of legitimate redemption.

The additional material recycled as a result of expansion would be equivalent to about 10 ounces of packaging per resident per month. Our solid waste impact assumptions follow:

- The bottles and cans containing noncarbonated beverage containers in Vermont in 2004 represented 1.1 percent of the 644,000 tons of municipal solid waste generated.^{12 13} Expanding the deposit program could have only a limited impact on recycling, especially compared to community and business recycling efforts that target a much broader spectrum of the waste stream.
- Many of these noncarbonated beverage containers are already recycled. Actual recycling rates for noncarbonated beverage containers are not available, but the diversion rate for all municipal solid waste is about 30 percent. Since these container materials (PET, HDPE, glass, aluminum, and steel) are widely recognized as recyclable and are already accepted in the vast majority of recycling programs in place in Vermont today, we would expect the containers to be recycled at something higher than a 30 percent rate. To be conservative, however, we have assumed that 30 percent of these containers are already recycled in Vermont.
- We project a true return rate (the rate without counting fraudulent redemption) of 65 percent for the noncarbonated products after expansion.
 - The current (beer and soft drink) redemption rate is less than 85 percent; adjusting for fraud, we estimated earlier that the true redemption rate is 75 percent.
 - The redemption rate for noncarbonated products would be lower than for carbonated products. The reason for the decline is that many consumers will not recognize these containers as redeemable. The best evidence for this comes from California's experience, where expansion resulted in a 13 percentage point drop in the overall redemption rate. The redemption rate for noncarbonated deposit containers in California is substantially less than 50 percent. Also, consumers are much more likely to recycle larger juice and water containers through curbside programs, even if they have deposits. Again this is based on observation of redemption data from California. Presumably, consumers find storing and

¹² Generation and diversion figures from Solid Waste Diversion & Disposal Reports for 2004 accessed on DEC's website on April 1, 2006. <http://www.anr.state.vt.us/dec/wastediv/solid/DandD.htm>

¹³ The weight of beverage containers was computed from Northbridge's data on beverages sold in Vermont in 2004 and container weight data compiled by Northbridge from beverage and container industry surveys.

redeeming the larger, bulkier containers too inconvenient and recycle them at home instead.¹⁴

- Our 65 percent estimate is based on the current, true return rate of 75 percent as of 2004 adjusted for the expected lower rate for noncarbonated beverage containers.
- The incremental recycling impact of expansion would therefore be the difference between recovering 65 percent of the noncarbonated beverage containers and the estimated current rate of 30 percent. The incremental 2,400 tons equals 0.37 percent of the municipal waste generated in Vermont or just over 10 ounces of packaging per resident per month.

We project that fraudulent redemption would add another 20 percentage points to the return rate. This is based on our judgment and experience with fraud in other deposit states. Maine's published redemption rate in 1994 (five years after expansion) was 98.4 percent; this rate combined carbonated and noncarbonated beverages. At this time, other northeastern states had redemption rates of 76 percent (New York) to 81 percent (Massachusetts) for carbonated beverages only. Further, individual companies were reporting redemption rates of 100 percent to 250 percent for brands of juices and waters sold in Maine. While it is not possible to compute the magnitude of fraud for noncarbonated containers alone, the problem was clearly much more severe than for beer and soda.

For the purposes of estimating expansion costs, we have assumed that 85 percent of noncarbonated containers sold would be redeemed – 65 percent of those purchased in Vermont plus 20 percent from outside the state. Even at that level, redemption would still be well below the 100+ percent rates still experienced by many distributors of noncarbonated products under the Maine law.

3.3.2 Litter Impact

Expansion's effect on litter in Vermont would be similarly modest. While no comprehensive Vermont survey data exist, noncarbonated beverage containers typically comprise about 1.3 percent of litter.¹⁵ Even if expansion could rid the state of all noncarbonated beverage container litter, the impact on the state's litter problem would be almost unnoticeable, since more than 98 percent of litter would remain unaffected. Expanding the bottle bill would not provide any savings for litter control programs, either, since these programs would have to continue to address all the remaining items on roadsides and in public places.

3.3.3 Other Environmental Impacts

Though it was beyond the scope of our analysis to quantify these impacts, the additional material recovery resulting from expansion would provide incremental benefits because of reduced reliance on primary materials to make new bottles, cans, and other products. Use of recovered

¹⁴ Maine has not published redemption rate data since 1994. When Maine's law was expanded in 1990, fraud was so rampant that most observers viewed the data as unreliable.

¹⁵ "Sweating the Litter Things," Steven Stein, *Resource Recycling*, May 2005. A recent study from Georgia determined that noncarbonated beverages accounted for one percent of litter, but the report has not yet been published.

inputs saves energy, reduces greenhouse gas emissions, and provides other benefits. These benefits are offset, however, by the additional energy and resources required to transport the redeemed containers to redemption centers and to collect them. This is especially significant for a costly and inefficient system like the expanded bottle bill, which would require many new trucks and routes to retrieve relative small amounts of material from thousands of sites across the state.

3.4 Costs of Expansion

Expanding the deposit law would cost \$11 million per year in new operating costs for retailers, redemption centers, beverage distributors, and beverage manufacturers. The expansion alone would cost 130 percent more than the existing law, despite adding only 40 percent more containers to the deposit system.

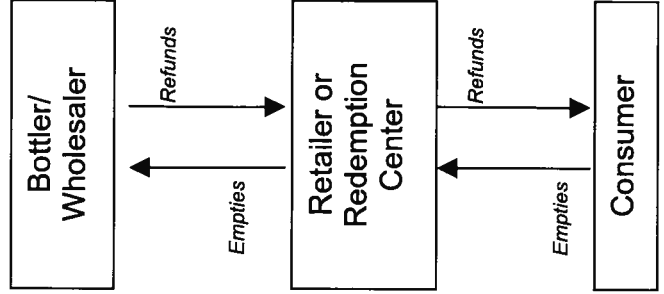
3.4.1 Implementing a New Redemption System

The redemption system in place today could not accommodate the containers subject to expansion. The system would be much more complex than the current program, as described in Section 3.2 and illustrated in the diagrams on the following page.

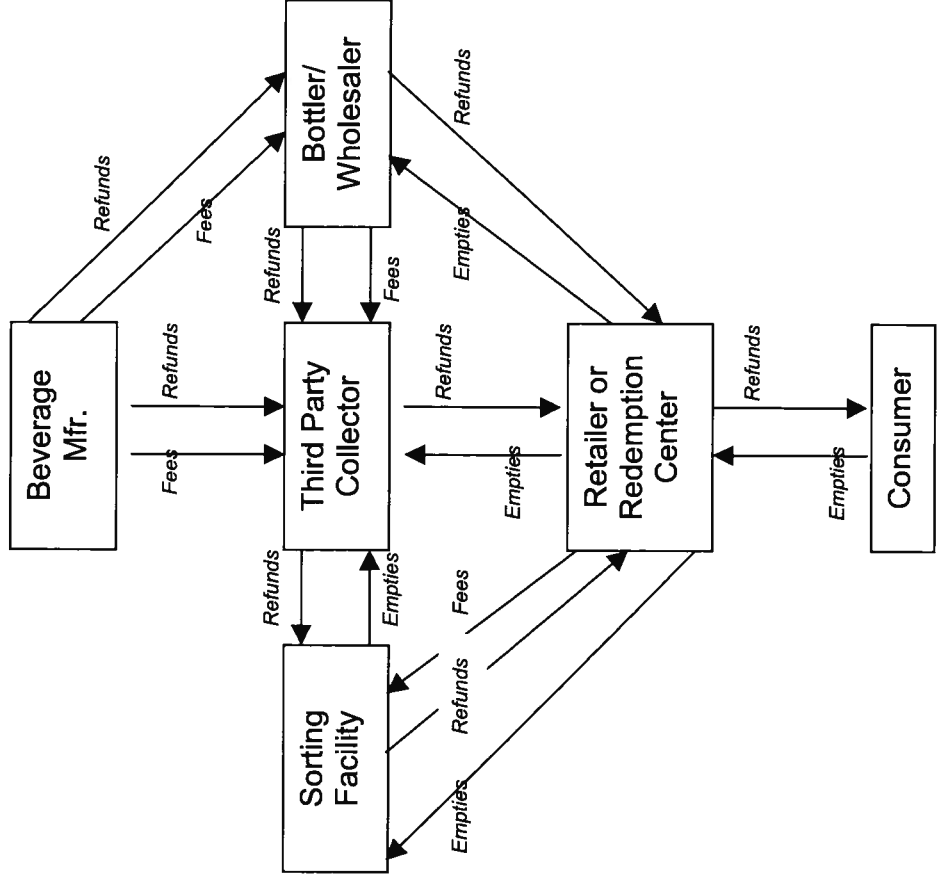
- Compared to the relatively simple system in place today, the inclusion of many more products and manufacturers after expansion would greatly complicate the administration and operation of the bottle bill.
- At beverage stores and retailers without reverse vending (*i.e.*, where most empties are returned in Vermont), the amount of sorting and space dedicated to sorting and storage would increase dramatically. As noted earlier, a ten-fold increase in sorting requirements should be expected. In some cases, containers might be transferred from stores to separate sorting facilities, adding to the cost.
- In food stores that use RVMs, many of the expansion containers would have to be redeemed manually, requiring increases in labor, space, and maintenance.
 - Larger glass and PET bottles could not be handled through current RVMs, nor could HDPE, LDPE, or steel. The low volume of these new material types would not be sufficient to warrant retailer investment in new RVMs.
 - One supermarket chain that does business in both Massachusetts and Maine handles 95 percent of its returns through RVMs in Massachusetts. In Maine, which has an expanded bottle bill, only 46 percent of its returns go through the machines – the rest are handled manually.
- Expansion would require distributors and manufacturers not currently subject to the deposit law to hire third parties to collect and process containers. Since these companies do not have distribution systems, all of these services would have to be contracted out.

Comparison of Current Redemption System With the System After Expansion

Schematic of Current System



Schematic of Expanded Deposit System



3.4.2 Costs of the New Redemption System

Annual operating costs for the expanded portion of the law only would be about \$11 million. If we were to spread the \$11 million cost across all the noncarbonated beverage containers sold in Vermont, the average bottle or can would cost consumers at least 10¢ more. This 10¢ average price increase to cover operating costs compares with a 3.2¢ cost per container under the current law reported in Chapter 2.

Adding in the 5¢ deposit charged at the time of purchase, consumers would see an average price increase at checkout of 15¢ per container or \$3.60 per case. This price increase assumes that all costs of the system are passed through to beverage consumers. In fact it is likely that the higher costs for retailers and others would be passed along through higher prices for a range of products, not just for beverages. Also, the deposit portion of the increase would be refundable, but in practice many consumers will choose not to redeem containers because of the expense and time involved.

These operating costs include the cost to redeem containers at stores or redemption centers plus costs to collect the containers from these locations, transport them, and process the material for sale.

- *Redemption costs.* Redemption costs at stores and redemption centers account for the majority of the \$11 million annual compliance cost. For stores and redemption centers, the average cost to handle an empty, noncarbonated container is higher than the cost to handle carbonated containers subject to deposits today. The reasons, explained earlier, include more sorting, more space, and more labor to accept and count containers from consumers. Cost estimates are based on data from actual operations in Maine supermarkets (high-end estimate) and from a cost modeling exercise performed by Northbridge using information from Oregon retailers (low-end estimate). For this analysis we used the mid-point between these two cost estimates.
- *Collection costs.* Costs to collect and process containers vary widely depending on the types of containers involved:
 - Products delivered directly to stores. Soft drink bottlers and beer wholesalers already deliver products directly to stores and already have infrastructure to handle returns. The collection costs for noncarbonated products distributed by these companies are based on the companies' costs under the current deposit law.
 - Remaining products. Third parties, hired by the beverage manufacturers, would handle the remaining products. Costs are based on a 2002 survey of beverage manufacturer fees paid to third party haulers in Maine.
 - In either case, the collection agent would be responsible for paying the 3.5¢ handling fee to the retailer or redemption center. The handling fee transfers some of the cost from the retailer or redemption center to the beverage distributor or manufacturer.

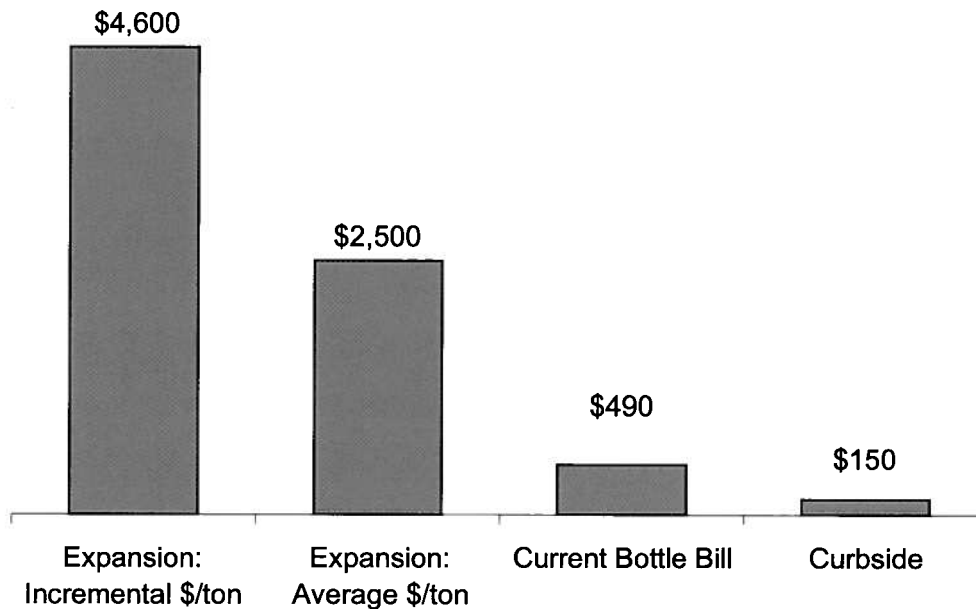
- *Processing costs and scrap value.* The only significant scrap revenue available would be from the sale of PET and HDPE plastics. Glass would likely impose a cost on companies since it is expensive to transport and markets are limited in New England, especially for green glass. We assumed that any scrap revenue earned would be used to offset costs to process the materials once they are collected. We therefore did not include any additional processing costs in our estimate.

3.4.3 Recycling Costs

Expanding the bottle bill would be an extremely costly, inefficient way to increase recycling in Vermont. Because some of these containers are already being recycled, the expansion would result in an additional 2,400 tons of material being recovered (section 3.3) at a cost of \$11 million per year. The resulting incremental cost of \$4,600 per ton of material is far beyond the cost of any other recycling program (Exhibit 3-4).

Exhibit 3-4

Recycling Costs Per Ton



- Even if we average the \$11 million cost over all of the material that would be recovered (including that already recovered through existing recycling programs), the cost to recycle these noncarbonated beverage containers through a deposit system is still \$2,500 per ton.
- Expansion is significantly more expensive than the existing bottle bill, which recycles material at \$490 per ton.
- Curbside programs recycle a wide range of material, typically for less than \$150 per ton.

3.5 Further Discussion of Expansion and Fraudulent Redemption

Maine's experience proves that fraudulent redemption becomes a much greater problem after expansion. Maine is the only state that has adopted a similar expansion to its deposit law and its fraud problem grew significantly after it did so. The last year in which Maine reported a statewide redemption figure was 1994 and the rate was 98 percent. Many individual juice and water companies have experienced redemption rates well above 100 percent, with some as high as 250 percent. Expansion simply creates new opportunities and incentives for fraud that do not exist now.

None of Vermont's border states imposes deposits on noncarbonated beverage containers. Today, Vermont's fraud problem comes largely from containers purchased in New Hampshire. After expansion, fraudulent returns would come from all neighboring states as well as Connecticut and other states from which large numbers of tourists come to Vermont.

One contributing factor to the fraud problem is that virtually all expansion products would be labeled with the refund value. Even if redemption centers had an incentive to monitor fraud, the nationwide labeling would make it virtually impossible to tell a container sold in Vermont from one sold elsewhere. Noncarbonated products are typically sold and distributed for national or international markets. This is unlike beer and carbonated soft drinks, which are often bottled and distributed regionally. This different production system makes it likely that these products would all say "VT 5¢;" in fact, nearly every noncarbonated container for sale in the country now has a "ME 5¢" label for the Maine program as well as the California CRV designation and "HI 5¢."

Even without the labeling issue, though, protecting against out of state redemption is virtually impossible. Roughly 90 percent of returns in Vermont are done manually (*i.e.*, not through RVMs) so no bar code or similar mechanism would prevent fraud. Also, by rejecting a container, the redemption center would be foregoing its 3.5¢ handling fee. Between the industry structure, lack of state-specific distribution, redemption infrastructure, and the financial incentives, it appears clear to us that expansion in Vermont would lead to the same kind of high illegal redemption rates experienced in Maine.

3.6 Other Economic Impacts

Expansion would have broader economic impacts beyond direct costs to operate the program. Imposing deposits on products drives retail business out of state as consumers shift purchases to border states. Quantitative studies and anecdotal research confirm the loss of sales in deposit states.

A University of Kentucky study isolated the impact of deposits on food store sales. The research showed that food store sales in deposit state border counties were 4.6 percent lower than those in other states, adjusting for other factors that varied across state lines. Their research only

examined the impact from deposits on carbonated products, so the sales losses would be greater if more beverages were included.¹⁶

Expansion would weaken the already depressed state of Vermont's retail economy along the New Hampshire border. A recent study concluded, "...the sales tax, bottle deposit law and Act 250 have led to a hollowing out of Vermont's retail sector along the Connecticut River."¹⁷ Per capita retail sales in Vermont counties along the River are 28 percent lower than in New Hampshire. Focusing on food and beverage stores only, where the impact of deposits is most pronounced,¹⁸ Vermont retail sales are 40 percent lower than New Hampshire's. While the deposit law cannot be blamed for the entire difference, it certainly has played a role in the migration of retail business out of Vermont. The shift has been especially pronounced when examining the average size of food stores along the border. Based on 2002 Census data, the average border county food store in New Hampshire has twice the sales of the average store on the Vermont side. The lower cost, wider-selection supermarkets have left Vermont behind.

Expansion would exacerbate the current cost and convenience problems associated with the deposit law and continue to widen the discrepancy between retail businesses on the two sides of the Connecticut River. Since retailers would have to make further modifications to their stores and add even more staff to handle empties, the cost of doing business in Vermont would continue to mount. Meanwhile, consumers would be able to avoid an average price increase of 15¢ per noncarbonated beverage container by shopping in New Hampshire. Expansion would result in an even weaker Vermont retail economy.

3.7 Wine Bottles

Though we did not analyze wine, including those bottles in the deposit system would add greatly to its cost and complexity. Experience of the Department of Liquor Control with distilled spirits redemption suggest that costs to collect the large, heavy containers are several times higher than under the current bottle bill. Furthermore, the colored glass used to make most wine bottles has limited or even negative market value given limited demand for it. In Maine, the only state besides Iowa with deposits on wine bottles, wine distributors must open each case of wine and hand place a deposit sticker on each individual bottle before shipping the case to a retailer. These stickers often fall off wet wine bottles and retailers cannot identify the distributor responsible for collecting the empty bottle. Finally, Vermont law now permits out-of-state wineries to ship wine directly to consumers and retailers in Vermont, which means that no in-state entity would be responsible for redeeming these bottles.

¹⁶ University of Kentucky Center for Business and Economic Research, "The Economic Impact of a Container Deposit Program in Kentucky," March 1999.

¹⁷ "Taxes, Public Policies, and Retailing: The Impact of Thirty-Five Years of Choices Along the Connecticut River," Northern Economic Consulting, Inc., Westford, VT, January 5, 2006.

¹⁸ Since Vermont's sales tax does not apply to food, more of the sales difference between the states can be attributed to the deposit law.

3.8 Conclusion

Expanding Vermont's bottle bill would dramatically change the deposit program that has been in place for nearly 35 years. The expense of operating the deposit system, already quite high under current law, would increase by 130 percent, while the number of containers affected would only increase by 40 percent. Vermont consumers would ultimately fund the more than \$11 million in additional costs needed to operate the new redemption system. Most of those costs would be borne by food stores and redemption centers facing ten-fold increases in the amount of sorting required to keep all of the brands and containers of juices, waters, and teas separate. Those stores that have invested in reverse vending machines would need to add more machines and would need to open redemption service areas to handle the many containers that could not be redeemed through the machines. The result would be higher costs for retailers and higher prices and longer waiting times for consumers.

As an environmental policy, expanding Vermont's deposit bill would be largely ineffective. The additional material recycled as a result of expansion amounts to less than 0.4 percent of the state's waste stream or about 10 ounces of beverage container material per resident per month. And while Vermont-specific data are not available, noncarbonated beverage containers of all types typically account for just over one percent of all litter; expansion would do nothing to affect the other 98+ percent of the problem.

A high cost system with limited environmental benefit would be burdensome to Vermont businesses and consumers. Expansion would also compound two economic problems of the current bottle bill. The first is lost retail business to bordering states, especially New Hampshire. Expansion would add one more nail to the coffin of Vermont retail businesses along the Connecticut River as consumers find one more reason to shop in tax-free, deposit-free New Hampshire. Second, expansion would greatly increase the fraud that already occurs in the deposit system, where containers not purchased in Vermont are redeemed here. Expansion would make fraudulent redemption both easier and more profitable as demonstrated by Maine's experience over the past 16 years.