



MARYLAND

Department of the Environment

**SOLID WASTE MANAGEMENT - RECYCLING
AND SOURCE REDUCTION STUDY GROUP**

FINAL REPORT

July 2013

Prepared for:

The Maryland General Assembly



MARYLAND DEPARTMENT OF THE ENVIRONMENT
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Martin O'Malley, Governor | Anthony G. Brown, Lt. Governor | Robert M. Summers, Ph.D., Secretary





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Martin O'Malley
Governor

Robert M. Summers, Ph.D.
Secretary

Anthony G. Brown
Lieutenant Governor

July 26, 2013

The Honorable Mike V. Miller, Jr., President
Senate of Maryland
State House, H-107
Annapolis MD 21401-1991

The Honorable Michael E. Busch, Speaker
House of Delegates
State House, H-101
Annapolis MD 21401-1991

The Honorable Brian E. Frosh, Chair
Senate Judicial Proceedings Committee
Miller Senate Office Building, 2 East Wing
11 Bladen Street
Annapolis MD 21401-1991

The Honorable Maggie McIntosh, Chair
House Environmental Matters Committee
House Office Building, Room 251
6 Bladen Street
Annapolis, MD 21401-1991

Dear President Miller, Speaker Busch, Chairs Frosh and McIntosh:

As required in Chapter 719 of the Acts of 2010, *Waste Management – Recycling and Source Reduction Study*,” the Department of the Environment shall report to the General Assembly, in accordance with §2-1246 of the State Government Article, the results of a study. The purpose of the study was to conduct a study to evaluate solid waste management processes that reduce the solid waste stream through recycling and source reduction.

If we can provide you with any additional information, please contact me or Mr. Horacio Tablada, Director of the Land Management Administration, at 410-537-3304 or via e-mail at htablada@mde.state.md.us

Sincerely,

Robert M. Summers, Ph.D.
Secretary

Enclosure

cc: Horacio Tablada, Director, Land Management Administration
Heather Barthel, Director, Legislation and Intergovernmental Affairs



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Executive Summary

During calendar year 2011, Maryland Department of the Environment (MDE or “Department”) facilitated a study group to look at several key issues regarding solid waste management and recycling. The study group was formed as directed in HB 982 (Chapter 917) of the 2010 legislative session. The task as set out in the bill was to look at three specific issues: (1) the expansion of recycling efforts in non-residential markets; (2) the feasibility of commodity-specific targets; and (3) long-term funding for solid waste and recycling management in Maryland.

In addition to these three issues, bag recycling, beverage container recycling, and a disposal ban on electronics were included as Study Group discussion points reflecting legislation that was introduced in the 2011 legislative session.

The overall discussions of the study group are presented in this report along with recommendations for actions or further study. In brief, there is much interest in reducing the solid waste stream and realizing economic and environmental gains through expanded efforts in recycling and source reduction. The issues considered by this study group will continue to be addressed in the coming years through additional study, new legislation, and implementation of new laws and policies that will help Maryland achieve a balanced program of solid waste management that produces real -- and measurable -- benefits for all.

Background

Chapter 719, Acts of 2010 entitled “*Solid Waste Management – Recycling and Source Reduction Study*,” effective October 1, 2010, required the Maryland Department of the Environment to conduct a study to evaluate solid waste management processes that reduce the solid waste stream through recycling and source reduction.

MDE created a Study Group and consulted with local government officials, waste haulers, recyclers, environmental groups, academia, State elected officials, and other affected parties including material resource facilities to study: (1) expansion of recycling efforts in non-residential markets; (2) the feasibility of commodity-specific targets; and (3) long-term funding for solid waste and recycling management in Maryland. In addition, in response to legislation introduced during the 2011 Maryland General Assembly session, bag recycling, beverage container recycling and a disposal ban on electronics were included as Study Group discussion points.

An interim report to the General Assembly regarding the Study Group’s activities was submitted on August 23, 2011. This report includes the final recommendations of the Study Group.

Discussion

Expansion of Recycling in Non-residential Markets

Between October 2010 and December 2011, the Study Group met monthly to discuss solid waste and recycling management in Maryland. A number of important themes were apparent throughout the meetings. The Study Group agreed that Maryland's goals for recycling and waste diversion should be increased in order to reduce greenhouse gas (GHG) emissions, save valuable landfill space, save the use of natural resources in the manufacture of new products, recover useful recyclable materials, and save disposal costs. In order to achieve these reductions and savings, it is essential that there be sufficient financial and staff resources to support additional outreach and education efforts by MDE and local governments. Although on its website MDE has information and links to recycling and source reduction resources for non-residential/commercial recycling, due to funding constraints the Department is no longer able to dedicate staff to outreach and education for recycling, source reduction and reuse. Counties report that they have also experienced a reduction in funding for outreach and education efforts.

The Study Group recognized that the non-residential/commercial sector is making efforts to reduce the generation of waste and increase recycling to save money; however, MDE does not have the authority to require reporting of information on recycling and solid waste management by the non-residential/commercial sector. Without this information, the Department does not have accurate tonnages for the volume of waste generated or materials recycled. Industry members indicated that accurate reporting of business recycling efforts would be difficult because of the crossover of haulers into neighboring counties and the potential for double counting of some recycling activities. For these reasons, they did not support mandatory reporting at this time.

The processors of recyclable materials would have the most accurate information on recycling tonnages for the State as a whole, and some processors are voluntarily reporting to the counties on their efforts.

There was discussion regarding multi-family dwellings, including apartments and condominiums, which generate waste very similar to the waste generated in single family dwellings, but are usually owned and/or managed by private entities. Prince George's and Montgomery Counties require multi-family dwellings of a certain size to recycle and report their activities to the County. Collection industry representatives advised that there is a high rate of contamination in collection containers at these locations and a low volume of recyclables collected. Many owners or managers of multi-family dwellings in other counties are not recycling at all. It is clear that there needs to be more waste reduction and recycling education to owners and managers of multi-family dwellings. It was stated that condominiums seem to do better with recycling because there are monthly meetings of the owners, condominium fees to support recycling, and condominiums are usually located in more affluent neighborhoods where there tend to be higher participation rates. This being said, many members of the Study Group

felt that it would be inequitable to require multi-family dwellings to recycle when single family homes are not required to recycle.

Feasibility of Commodity-Specific Markets

Recyclables markets fluctuate with upturns and downturns in the economy. Although there are several challenging materials in the Maryland waste stream, including household hazardous materials, such as gasoline, paints and pesticides, most of these materials are not in the waste stream in sufficiently significant quantities to warrant spending a lot of money to address them and Maryland is too small to influence the markets for these materials. Therefore, it was generally agreed that focus should be placed on recycling more of the recyclables that present less of a challenge, such as electronics, containers, mercury containing products, etc., and those recyclables that represent larger portions of the waste stream, particularly food waste. The expense of additional diversion efforts should be balanced with the potential public health and environmental impacts, since State and county budgets are not limitless. Efforts to attract and maintain recycling industries in Maryland would create jobs and revenue for the State and enhance the existing recycling infrastructure needed to further advance source reduction and recycling activities.

Food scrap donation/reuse and recycling were highlighted as a priority for additional research to determine best management practices, develop outreach and education programs, and establish public/private partnerships to develop composting capacity, since food scraps and other organics make up over 30 percent of the municipal solid waste stream and emphasis is being placed on food waste diversion programs by the U.S. Environmental Protection Agency (EPA). Although there is a need to recover additional volumes of other priority materials that the EPA is promoting, including electronics and paper, food waste is seen as the new frontier in solid waste management. In order to be successful, any effort to increase source reduction and recycling of priority recyclable materials must be accompanied by outreach and education programs targeted toward specific stakeholders.

It was agreed that discussion of increasing the State-wide waste diversion and recycling rate goals from the voluntary 40 percent waste diversion rate and 35 percent recycling rate goals by 2005 was appropriate, in light of the State's GHG emissions reductions goals. Review of the current recyclable materials accepted under the Maryland Recycling Act and the criteria used to determine source reduction credits (waste diversion rate = recycling rate + source reduction credit) would be useful in updating the Department's data analyses for recycling and waste generation rates.

Long Term Funding for Solid Waste and Recycling Management

Long-term funding for solid waste and recycling management is critical in order to enhance and advance source reduction and recycling initiatives. The Department and the counties continue to struggle with funding constraints and businesses with the effects of a sluggish economy. Securing citizen support of fee or tax increases to improve solid waste and recycling services presents challenges. While all stakeholders represented on the Study Group have a desire to reduce waste disposal and increase recycling, there was no general consensus reached on funding mechanisms.

Although there are costs associated with collection and recycling of recyclable materials, these costs may be offset, in whole or part, by recyclable materials revenues and by avoidance of solid waste acceptance facility tipping fees, which currently average \$58 per ton in Maryland. In addition, recycling preserves landfill capacity, conserves natural resources, and reduces GHG emissions.

The Department presented two long-term funding options to the Study Group: (1) permit fees; or (2) tipping fees. Every state in EPA Region 3, as well as New Jersey, has various permit fees and all but Delaware assess impact or tipping fees ranging from \$0.115 to \$8.75 per ton of waste received. Maryland has neither type of fee. In addition, as a result of State budget cuts, MDE's funding for its solid waste and recycling programs has been reduced in recent years. Current funding supports only the Department's core solid waste and recycling activities and there is no funding for new initiatives or enhanced programs in either of these activities. Lastly, the Department receives no federal funding to support these programs.

Permit fees could be assessed for new solid waste acceptance facilities and renewal applications based on the type of permit. In addition to permit fees, annual fees could be assessed on permitted facilities. These fees would support the Department's solid waste and recycling activities. Another option, tipping fees charged on solid waste as it is received at permitted facilities could support MDE's operating costs and provide funding to the counties in the form of grants or loans to assist in properly capping and closing old landfills.

Further consideration of the fee options and the resulting benefits to permitted facilities, such as enhanced technical assistance from MDE, shorter permit turnaround times, and outreach and education aimed at increasing source reduction and recycling in the State is needed. Investigation of regional opportunities for solid waste and recycling that would improve efficiency and be economically feasible should also be considered.

Recommendations

There were many areas in which members of the Study Group were able to reach agreement. Other areas were identified for further study and discussion with stakeholders. The Study Group's recommendations are as follows:

1. Rather than establishing commodity-specific targets, the General Assembly should maintain or increase Maryland's recycling rate requirements (15 percent and 20 percent, based on population), increase the voluntary recycling rate goal from 35 percent to 55 percent by the end of calendar year 2020 and increase Maryland's voluntary waste diversion goal from 40 percent to 60 percent by the end of calendar year 2020. This would be consistent with the recycling and waste diversion goals in the Maryland Climate Action Plan.
2. Recyclable materials processors should be encouraged to voluntarily report annually to the counties on their recycling activities. If after 2014, these outreach and education efforts have not resulted in significant increases in reporting by recyclable materials processors, then MDE should seek legislative authority to compel reporting.

3. Food waste recycling/composting is the next area of opportunity for increasing recycling throughout the State. The General Assembly should support MDE by providing resources dedicated to conducting research on the best management practices for food donation/reuse, recycling, and composting, marketing food waste/recycling, and developing legislation and regulations as necessary.
4. The General Assembly should support efforts by MDE and the Maryland Department of Business and Economic Development to attract and retain recycling industries, including recyclable materials consumers, recyclable materials processors, and manufacturers of recycled products, to the State.
5. MDE should convene a workgroup to review the current Source Reduction Credit with the goal of identifying additional and/or new opportunities for all counties to receive the Source Reduction Credit and determine whether the maximum allowable 5 percent Source Reduction Credit should be modified.
6. MDE should convene a workgroup of stakeholders to thoroughly review the existing list of MRA-mandated recyclable materials and work with MDE staff to ensure definitions are up-to-date and meet today's current recycling opportunities.
7. MDE should convene a workgroup to include stakeholders and members of the General Assembly regarding long term funding for recycling and solid waste management, with attention to factors such as: the degree to which fees would be a financial burden on facilities; the degree to which funds accumulated could be protected from diversion to other uses; the degree of difficulty in reviewing and approving each type of permit application; public health and environmental impacts; size and frequency of fees; enhancement of solid waste and recycling programs; and reductions in permit turnaround times.
8. The General Assembly should provide sustainable funding to MDE for source reduction and recycling outreach and education in an amount sufficient to provide grants to the counties and municipalities for recycling outreach and education across all sectors.

2011 General Assembly Session Discussion Topics and Recommendations

In response to legislation introduced during the 2011 Maryland General Assembly Session, the Department also agreed to discuss carry out bag recycling, beverage container recycling, and a disposal ban on electronics as part of the deliberations of the Study Group. Research was conducted by the Johns Hopkins University and a law school graduate fellow working for MDE on carry out bag and beverage container recycling.

Although there were differing views within the Study Group on bag recycling, it was agreed that further information is needed regarding greenhouse gas emissions from the manufacture of reusable bags, the heavy metals composition of inks and dyes used in manufacturing reusable bags, and data regarding contamination of reusable bags with food borne bacteria.

MDE's research on beverage container deposit laws, along with information provided by members of the Study Group, identified ten states in the U.S. with beverage container deposit laws. The economic impacts of beverage container deposit legislation on local governments and industry varies based on the type of system that is adopted. In addition to a beverage container deposit system, there are several extended producer responsibility initiatives related to beverage containers that may be of interest to the State and counties. The Study Group recommended that the General Assembly consider beverage container and extended producer responsibility initiatives.

Among EPA Region 3 states, Maryland is a leader in electronics recycling. More than 97 percent of the State's population is served by 20 county permanent electronics collection programs, and several electronics recyclers located in the State serve the counties, State government, businesses, and citizens. Since 2005, grants totaling \$806,552 have been awarded to counties and municipalities for eCycling activities, and more than 36,000 tons of electronics have been collected in Maryland since 2001. The counties represented on the Study Group polled their solid waste management facilities to determine if electronics covered under the State Electronics Recycling Program law are entering the facilities. The counties have indicated that their facilities are not seeing large numbers of electronics entering their facilities. It is believed by the Study Group that many businesses and residents are still holding end-of-life electronics in storage because they are unsure how to recycle them and how to secure the data located on them. The Study Group did not recommend an electronics disposal ban at this time. It did recognize that State and county electronics recycling outreach and education targeted toward increasing awareness of locations and methods for reuse and recycling of electronics, as well as ways to address electronics data security should be addressed. Staff and funding resources for this effort are needed.

Conclusion

The Study Group worked diligently to develop a set of recycling recommendations that reflect the common goal of the members to reduce waste disposal and increase recycling of usable materials in the most efficient and economically feasible ways while protecting public health and the environment. Although there was not consensus on all discussion issues, members expressed their willingness to continue to consider all options for improving solid waste management and recycling in Maryland, including funding sources needed to operate successful programs. The Department appreciates the participation and helpful input of the members of the General Assembly who participated in the Study Group and anticipates receiving continued input from all stakeholders in order to move Maryland forward on these important issues.

Introduction

On May 20, 2010, Governor Martin O'Malley signed House Bill 982, entitled *Solid Waste Management – Recycling and Source Reduction Study* (Chapter 719, Acts of 2010). The bill required the Maryland Department of the Environment (“MDE” or “Department”) to study solid waste management processes that reduce the solid waste stream through recycling and source reduction.

MDE formed a Study Group comprised of local government officials, waste haulers, representatives of material resource facilities and other affected stakeholders. (See Appendix B for list of Study Group members and other individuals who participated in meetings of the Study Group.) The bill required the Department to consider the following issues:

- The expansion of recycling into non-residential markets;
- The feasibility of commodity-specific recycling targets; and
- Long-term funding for solid waste and recycling management in Maryland.

In response to legislation introduced during the 2011 Maryland General Assembly Session, the Department also agreed to consider the following topics during meetings of the Study Group:

- Carry out bag recycling (HB 341 – Environment – At-Store Recycling – Plastic Carryout Bags – Delegate Stephen Lafferty; and HB 1034 Clean the Streams and Beautify the Bay Act of 2011 – Delegate Alfred Carr, Jr.)
- Beverage container recycling (HB 389 - Recycling - Bars and Restaurants - Beverage Containers – Delegate Doyle Niemann; and HB 460 - Task Force to Study Required Deposits on Returnable Beverage Containers - Delegate John Olszewski, Jr.)
- Disposal ban on electronics (HB 473 – Environment – Landfills and Incinerators – Disposal of Waste – Delegate Shane Robinson)

The Study Group held monthly meetings during the period from October 2010 through December 2011 to discuss these issues. The Recycling Rate Workgroup, consisting of a subset of Study Group members, met several times in 2011 to consider measures to increase recycling and source reduction. The Workgroup made recommendations to the full Study Group.

The Study Group was assisted by the Johns Hopkins University Fall 2010 Solid Waste Engineering and Management Class, which conducted research on some of the priority tasks identified in House Bill 982 and made a presentation to the Study Group during the December 2010 meeting. A law school graduate fellow employed by the Department conducted research for the Study Group on practices in other states, including assessment of solid waste and recycling fees and carry out bag and beverage container recycling. Several Study Group members provided extensive background and helpful information. The Department also requested information from county solid waste and recycling managers about local government solid waste funding mechanisms and solid waste collection and recycling activities.

An interim report to the General Assembly regarding the Study Group's activities was submitted on August 23, 2011. This report includes the final recommendations of MDE and the Study Group.

Study Group Tasks

Issue: Expansion of Recycling Efforts in Non-residential Markets

Background

Recycling and solid waste collection in the residential sector in Maryland is largely managed through municipal and county governments, which own and/or operate all but one of the municipal solid waste landfills in the State. The counties and Baltimore City are required to report annually to MDE on their jurisdictions' solid waste and recycling activities. Although the counties make an effort to distinguish between waste and recyclables collected from residential, as opposed to commercial businesses, haul routes often contain collections from both sectors. There is no similar structure or reporting requirement for the non-residential/commercial sector, which includes privately owned multi-family dwellings, such as apartments and condominiums, and commercial and industrial businesses. (Note: Apartments and condominiums are residential in nature as they generate the same types of wastes as the single family dwellings; however, they are usually privately owned and managed, and are considered part of the non-residential/commercial sector.) Although some counties may collect solid waste and recycling from the non-residential/commercial sector, and may have knowledge of the volume and types of materials collected, most counties do not, and thus, have no knowledge of these collection activities.

Montgomery and Prince George's Counties regulate recycling in multi-family dwellings. Prince George's County requires owners and licensees of multi-family rental properties with 100 or more units to provide an opportunity for tenants to voluntarily recycle designated recyclable materials. Licensees or owners must submit a plan for the separation and collection of designated recyclable materials to the County for approval and must also submit semi-annual reports on the volume of collected recyclables.

Montgomery County requires all single family residences and properties with 6 or fewer dwelling units served by the County recycling program to recycle mixed paper, co-mingled materials, yard trimmings, Christmas trees, and scrap metal. In addition, the County requires all multi-family properties with 7 or more dwelling units to recycle these same materials. Multi-family properties with 101 or more units must submit a waste reduction and recycling plan to the County that provides for at least a 50% annual reduction, in volume or by weight, of solid waste collected for disposal. The County further requires submission of an annual report on these recycling activities.

Businesses in Montgomery County are also required by law to recycle the same materials as residential households. Medium-sized businesses (100-249 employees) and large businesses (250 or more employees) are required to prepare a waste reduction and recycling plan with a goal

of reducing solid waste disposal by at least 50 percent annually. Small businesses (fewer than 100 employees) and owners of multi-family properties must prepare a similar plan, and upon written request, provide it to the County within 60 days. These businesses must also submit an annual recycling and waste reduction report describing their recycling and waste activities. Furthermore, both multi-family properties and businesses that contract with a recycling collection service must use a County-licensed collection company.

The Department calculates State-wide and individual county recycling and waste diversion rates. The waste diversion rate is composed of the recycling rate, plus up to a 5 percent source reduction credit that counties may earn through activities designed to reduce the amount of waste entering the waste stream. Currently, MDE sends a recyclable materials processor form to known recyclers who process materials collected in Maryland for submission to the county in which the materials originated. The counties rely on the processors to voluntarily provide information regarding the recyclable materials collected in their jurisdictions. Some counties, primarily the smaller more rural counties, do not have sufficient resources to pursue processors that do not voluntarily report. In addition, neither MDE, nor the counties have authority to require a recyclable materials processor to report to the Department on its recycling activities.

Although MDE has information and provides links to non-residential/commercial recycling and source reduction resources on its website, funding constraints have required elimination of the Department's recycling outreach and education program. It is widely understood that a proper recycling outreach and education program is vital to ensuring that the public understands the benefits of source reduction, reuse, and recycling and how to manage recyclable materials.

Discussion Summary

Summaries of the discussions regarding topics related to expansion of recycling efforts in non-residential markets follow:

Apartment and Condominium Recycling (HB 179 – Environment – Recycling – Apartment Buildings and Condominiums)

There was significant discussion of recycling at apartment and condominium buildings during Study Group meetings. There was general agreement that this sector should be doing more to further source reduction and recycling in Maryland. House Bill 179, proposed during the 2011 General Assembly Session, was passed by the House, but received an unfavorable report in the Senate. One of the major concerns during the deliberations on the bill, which was shared by the Study Group, related to enforcement of the legislation, should it pass.

During the general discussion regarding recycling in multi-family dwellings it was suggested that in Prince George's County there may only be a cursory recycling effort by the owners of these facilities. Collection industry representatives noted a high rate of contamination in collection containers at these locations and collection of a low volume of recyclable items. Others suggested the need for more waste reduction and recycling education in multi-family dwellings and a lack of social pressure to recycle in these locations. It was stated that condominiums seem to recycle

more and this was attributed to monthly meetings of the owners, the assessment of condominium fees to support recycling, and the location of condominiums in more affluent neighborhoods, where participation rates tend to be higher.

Members expressed concerns that it may be inequitable to require apartment and condominium recycling when single family homes are not required to recycle. Concerns were expressed about a lack of local government resources to support recycling at multi-family properties.

These issues were resolved with enactment of House Bill 1 (Chapter 192) of the 2012 General Assembly, which requires owners or managers of apartment and condominium buildings with 10 or more units to provide recycling services to residents and authorizes enforcement by local governments.

Business Reporting on Solid Waste and Recycling Activities

There was significant discussion during various meetings by the Study Group regarding the feasibility of businesses reporting on their solid waste and recycling activities. It is generally acknowledged that businesses are probably doing more recycling than is reported. However, industry members were not in favor of mandatory reporting of business recycling efforts. In addition, members expressed concern that there may be double counting of some recycling activities due to the crossover of haulers into neighboring counties, though some counties, such as Montgomery County, require businesses and collection companies to report on the amount of waste and recyclable materials generated and collected. The Department explained that it makes every effort in reviewing recycling reports by the counties to remove double counting as it is discovered. To clarify the Department's usage of the term "commercial recycling," the Study Group recommended that MDE define the term to describe non-residential and non-governmental recycling programs.

The members generally agree that the recyclable materials processors would have the most accurate information for the State as a whole on recycling tonnages. However, it will be difficult to ensure accurate reporting of business efforts by county. Discussions included the idea of reporting a State-wide recycling rate for industry along with county-by-county recycling rates for the residential sector (with an overall State-wide residential recycling rate). It was mentioned that "residential" and "commercial" should be better defined by the Study Group. Apartments and condominiums are residential in nature, but are managed by commercial entities and their waste is usually collected by commercial waste haulers. For county reporting purposes, MDE counts apartments and condominiums as the residential sector because of the type of waste and recyclables generated.

Study Group members also expressed concern that the commercial sector may consider information about their waste and recycling activities to be confidential due to competitive business interests. Confidentiality could likely be secured if the information were reported to MDE. Members also felt that it is important that the commercial sector report what is recycled, what is residual to the recycling process, and what happens to the recyclables. Many have expressed concern that although recyclable materials processors accept materials for recycling, it is not known what ultimately happens to the recyclables. For example, it may not be known

whether glass containers are actually returned to glass container manufacturers for reuse in making new glass containers, which is regarded as the highest form of recycling, or if the glass containers are being utilized in road making, which is still recycling, but perhaps not the best use of the material. The Study Group determined that any reporting by the commercial/business sector should be done voluntarily at first, to give these entities time to adjust to reporting, then mandate reporting if voluntary reporting is not successful.

Some county members stated that without a mandatory reporting requirement, the counties will be unable to compel businesses to report their recycling activities or report them accurately. Some industry members stated that requiring recycling reporting by businesses would be a burden and would take time away from their core businesses. It was also mentioned that access to information about recyclables that leave the State is not always available. There are two categories of businesses from which information is needed in order to improve the information regarding waste diversion in Maryland: recyclable materials processors and businesses that generate waste and recyclables. Both waste generation and recycling tonnages are needed for determining more accurate waste diversion rates.

Outreach and Education to the Business Sector

It is widely accepted that outreach and education is necessary for improving waste diversion and recycling rates for all sectors. Funding for outreach and education is frequently one of the first things cut from State and county budgets, and government members of the Study Group confirmed that resources for outreach and education are scarce. All members agreed that outreach and education to the business sector will provide the most “bang for the buck” and that partnerships with businesses, utilities, MVA, and others could help with funding this effort.

It was also mentioned that publication of the efforts of businesses that are excelling in waste diversion and recycling activities can be helpful in encouraging other businesses to do the same. For example, Allegany County is considering publicizing companies’ recycling rates to help inform citizens and incentivize reporting and increased recycling.

Challenging Recyclables Markets

Markets for recyclables fluctuate with upturns and downturns in the economy. Although the Study Group identified several challenging materials, including household hazardous materials, such as gasoline, paints, batteries, and pesticides, some members expressed the view that most of these materials are not in the waste stream in sufficiently significant quantities to warrant spending a lot of money to address them. Additionally, Maryland may be too small to influence the markets for these materials. Organics waste management, particularly food scraps, was frequently mentioned as an important initiative for the State due to its large percentage of the waste stream.

It was generally agreed that focus should be placed on recycling more of the recyclables that comprise larger portions of the waste stream and present fewer challenges, such as food waste, electronics and containers. It was recognized by the members that additional research regarding best management practices for food reuse/donation and composting in Maryland is needed. Securing funding and staff resources for this work at the State level is challenging at

this time. Product stewardship initiatives for paints, batteries and pesticides may be a solution for these materials, but will require legislation. It was suggested that the Maryland Department of Business and Economic Development should explore an initiative to attract and develop the recycling industry in Maryland.

Recommendations

1. Recycling in apartments and condominiums should be strongly encouraged with appropriate outreach and education, but not mandated at the State-wide level. (House Bill 1 (Chapter 192) of the 2012 General Assembly was enacted and requires owners or managers of apartment and condominium buildings with 10 or more units to provide recycling services to residents and authorizes enforcement by local governments.)
2. Recyclable materials processors should be encouraged to voluntarily report annually to the counties on their recycling activities. These reports should include information regarding the final disposition (reuse, recycling, disposal, etc.) of the recyclable materials they collect. The Department should have discussions with stakeholders regarding whether some recyclable materials should be reported on a State-wide basis rather than on a county-by-county basis. If after 2014, these outreach and education efforts have not resulted in significant increases in reporting by recyclable materials processors, then MDE should seek legislative authority to require reporting.
3. The General Assembly should support efforts by the Department and the counties to increase reporting by the non-residential/commercial business sector, in general, through outreach and education. The Study Group did not recommend requiring reporting by the non-residential/commercial business sector at this time.
4. The General Assembly should provide funding and staff resources to MDE for technical support to the counties for the purpose of waste diversion and recycling outreach and education to the non-residential/commercial sectors. Solid waste and recycling haulers should support these efforts by promoting recycling as a way to reduce the costs of disposal.
5. The Study Group strongly believes that food waste donation/reuse and composting is critical to reducing waste disposal in the State. The General Assembly should support MDE by providing resources dedicated to conducting extensive research on the best management practices for food donation/reuse and composting and developing legislation and regulations as necessary. This research should be conducted in conjunction with the study group that will be created in 2012 as a result of the passage of House Bill 817 of 2011, entitled "*Environment – Composting.*"
6. The General Assembly should support MDE's continued consideration of product stewardship, particularly for hard to manage recyclables.
7. Although it is agreed that this is a resource issue for MDE, it is recommended that The Recycling Market Directory at www.mdrecycles.org should be expanded and updated on a more frequent basis to provide information regarding recycling resources to businesses and the public.

8. The General Assembly should support efforts to attract and retain recycling industries, including recyclable materials consumers, recyclable materials processors, and manufacturers of recycled products, to the State. The Maryland Department of Business and Economic Development (DBED) should play a role with MDE in this effort, by reinstating the recycling position within DBED.
9. The General Assembly should support the development of incentives to encourage non-residential/commercial entities to increase their source reduction and recycling activities.

Issue: Feasibility of Commodity-Specific Targets

Background

Commodity-specific waste reduction/recycling targets are presumed to be source reduction or recycling targets required for certain priority recyclable materials. For example, in the First Reader of 2010 House Bill 982, there was a provision that would have required MDE to “establish a commodity-based solid waste reduction through recycling goal, by weight, for the State that requires: (i) a 70 percent reduction for aluminum; (ii) a 50 percent reduction for glass; (iii) a 60 percent reduction for paper; and (iv) a 50 percent reduction for polyethylene terephthalate.” The Johns Hopkins University research confirmed that there are no commodity-specific waste reduction/recycling targets in EPA Region 3, which includes Delaware, West Virginia, Pennsylvania, Virginia, Washington, DC, and Maryland. Without extensive research, it was not possible for MDE to determine if there are localities in the U.S. that have commodity-specific waste reduction/recycling targets or if they work. In addition, there was no readily available definition found for “commodity-specific waste reduction/recycling target.”

Some of MDE’s priority materials (mirroring EPA’s current priorities) include electronics, food waste, mercury containing products, and paper. Developing specific recycling targets or rates for these materials is not an MDE priority at this time. However, the Department recognizes that there should be consideration of increasing the overall waste diversion and recycling targets for the State, in light of the State’s GHG emissions reductions goals.

Discussion Summary

Neither the Study Group nor MDE was familiar with commodity-specific waste reduction/recycling targets. However, it was agreed that there are high priority materials that could be targeted for additional outreach and education and funding or programs to increase their removal from the waste stream. These materials include: electronics, food waste, mercury-containing products, such as compact fluorescent lights, and paper. Other materials that should be considered for increased diversion from the waste stream include batteries and pharmaceuticals. The expense of these additional diversion efforts should be balanced with the potential public health and environmental impacts of not increasing these efforts. In addition, it was agreed that discussion of increasing the waste diversion and recycling rate goals from the voluntary 40 percent waste diversion rate goal by 2005 was appropriate. A Recycling Rate

Workgroup (Workgroup), composed of members of the Study Group, was created for this purpose.

The Workgroup met in July, August, October, and November 2011 and had additional discussions through phone calls and emails. Its discussions focused on recycling and waste diversion rates for counties and did not address recycling by State agencies, due to recent legislation (2009 House Bill 595 entitled “*State Government – Recycling Program – Aluminum, Glass, Paper, and Plastic*”) that requires State agencies to recycle paper, plastic, aluminum, and glass.

The Workgroup was unanimous in its desire to continue with voluntary recycling and waste diversion goals, similar to Senate Joint Resolution 6 passed in 2000. The counties indicated that the State, as a whole, was able to meet and exceed the 2005 waste diversion goal of 40 percent, and felt that they could meet increased goals voluntarily, with additional emphasis and resources for outreach and education and the growth of the food waste composting industry. They were also unanimous in their desire not to change the required 15 and 20 percent recycling requirements in the Environment Article §9-505 (a) (18) and (19). MDE is now tracking GHG reductions through recycling and source reduction as part of the Maryland Climate Action Plan. It is hoped that significant GHG reductions through recycling more priority materials can be achieved. The Department explained that as part of the Maryland Climate Action Plan to reduce GHG emissions, it has developed goals to increase the State recycling goal to 55 percent and the State waste diversion rate to 60 percent by 2020, and that it desired to make the goals of the Workgroup the same. Workgroup members agreed. This issue was resolved with enactment of House Bill 929 (Chapter 692) of the 2012 General Assembly, which increases the required county recycling rates to 20 and 35 percent respectively, and the State recycling goal to 55 percent and the State waste diversion rate to 60 percent by 2020.

Discussions by the Workgroup also included the need for a review of the Department’s current criteria for source reduction credits and materials counted under the Maryland Recycling Act, the desire of many counties to encourage and provide food scrap collection and recycling services to their residents and businesses, the need for increased recycling reporting annually by businesses, and further investigation of product stewardship. The Workgroup’s recommendations are included below. These recommendations were presented during the Study Group meeting of November 10, 2011 and were received positively.

Food waste composting was a topic of discussions during several meetings of the Study Group and the Workgroup. It is generally agreed that all stakeholders, including government, businesses, and the public, need to do more food waste reduction, donation, and composting. It is clear that MDE and MDA need to work together to conduct research and develop clear guidance for those wishing to engage in food waste composting to prevent nuisances and public health hazards. Funding and staff for this effort is very limited, however. MDE convened a composting study group beginning in early 2012.

Any effort to increase source reduction and recycling of priority recyclable materials must be accompanied by outreach and education programs targeted toward specific stakeholders. These programs must be developed at both the State and county levels and are essential to

affecting business and public waste and recycling behaviors. However, staff and funding resources would be limited for this work without additional assistance.

Recommendations

1. Food waste recycling/composting is the next area of opportunity for increasing recycling throughout the State. Future MDE workgroups as may be required by the General Assembly should consider permitting, licensing, market development, transportation, etc. to improve food waste recycling/composting opportunities in the State.
2. Rather than establishing commodity-specific targets, the General Assembly should maintain Maryland's recycling rate requirements (15 percent and 20 percent, based on population) and increase the voluntary recycling rate goal from the current goal of 35 percent to 55 percent by the end of calendar year 2020. The Department supports an increase in the minimum mandatory levels for recycling. House Bill 929 of 2012 increased the required county recycling rates to 20 and 35 percent, based on pollution, as well as increased the voluntary recycling rate goal to 55 percent by 2020.
3. Rather than establishing commodity-specific targets, the General Assembly should increase Maryland's voluntary waste diversion goal from the current goal of 40 percent to 60 percent by the end of calendar year 2020. House Bill 929 of 2012 increased the voluntary waste diversion rate to 60 percent by 2020.
4. MDE should convene a workgroup to review the current Source Reduction Credit with the goal of identifying additional and/or new opportunities for all counties to receive the Source Reduction Credit and determine whether the maximum allowable 5 percent Source Reduction Credit should be modified.
5. MDE should convene a workgroup of stakeholders to thoroughly review the existing list of MRA-mandated recyclable materials and work with MDE staff to ensure definitions are up-to-date and meet today's current recycling opportunities. Discussion regarding the State-wide versus county-by-county reporting by recycling processors should be included.
6. The General Assembly should support MDE's continued consideration of product stewardship, particularly for hard to manage recyclables.
7. Recyclable materials processors should be encouraged to voluntarily report annually to the counties on their recycling activities. These reports should include information regarding the final disposition (reuse, recycling, disposal, etc.) of the recyclable materials they collect. The Department should have discussions with stakeholders regarding whether some recyclable materials should be reported on a State-wide basis rather than on a county-by-county basis. If after 2014, these outreach and education efforts have not resulted in significant increases in reporting by recyclable materials processors, then MDE should seek legislative authority to compel reporting. Industry members have expressed concern regarding maintaining the confidentiality of the information provided in their annual reports. Consideration of inclusion of a confidentiality provision in this legislation would be essential.

8. The General Assembly should support creation of authority for all counties that do not have the authority and that need it, to develop regional programs, collect materials, and dedicate funding for solid waste and recycling programs.

Issue: Long-Term Funding for Solid Waste and Recycling Management

Background

Long-term funding for solid waste and recycling management is critical in order to enhance and advance source reduction and recycling initiatives. The Department and the counties continue to struggle with funding constraints and businesses with the economic downturn. In addition, the citizens of Maryland are not likely to support fee or tax increases in order to improve solid waste and recycling services. Many do not understand that although there may be a cost associated with collection and recycling of recyclable materials, these costs may be offset by recycling revenues and by avoidance of solid waste acceptance facility tipping fees, which currently average \$58 per ton in Maryland. In addition, recycling preserves natural resources and landfill capacity and reduces GHG emissions.

In order to learn more about the counties' solid waste and recycling programs, MDE conducted a survey of county solid waste and recycling coordinators, including information about funding for county programs. Sixteen (16) of the State's 24 counties (includes Baltimore City) responded to the survey. None of the counties are identified because some requested that they not be identified. In reviewing the survey results it was clear that each county operates differently and that these differences would make it difficult to develop "one size fits all" recommendations regarding funding.

The Department also researched the current solid waste permit and tipping fee requirements in EPA Region 3 states and New Jersey. Every state surveyed assesses various permit fees and all but Delaware assess impact or tipping fees ranging from \$0.115 to \$8.75 per ton of waste received. Maryland has neither type of fee.

As a result of State funding constraints, funding for MDE's solid waste and recycling programs has been reduced in recent years. In FY2012, the Solid Waste Program and the Waste Diversion and Utilization Program, combined, have been appropriated approximately \$1.9 million in General and Special Funds to support solid waste and recycling activities. This does not include scrap tire licensing and cleanups, confined animal feeding operations, or coal combustion by-products activities. The Special Fund sources include: State Recycling Trust Fund which consists of electronics manufacturer registration funds, telephone directory and newsprint publisher recycling incentive fees, and mercury auto switch recovery fees; Clean Water Fund Sewage Sludge Utilization fees and penalties; and the Used Tire Cleanup and Recycling Fund, which consists of the \$0.80 per tire fees for tires sold in the State. The Department receives no federal funding for its solid waste and recycling activities. There is no funding for new or enhanced solid waste or recycling initiatives. The current funding supports only the Department's core solid waste and recycling activities.

The Department conducted research regarding beverage container deposit legislation throughout the U.S. Ten states – California, Connecticut, Hawaii, Iowa, Maine, Massachusetts,

Michigan, New York, Oregon, and Vermont – currently have beverage container deposit laws. California and Hawaii use the escheats, or unredeemed deposits, for the redemption centers only, while Michigan uses the escheats for cleanup of contaminated sites and pollution prevention activities.

In Maryland, beverage container deposit legislation has been introduced several times since 1973, without success. This is largely because the counties and municipalities receive some revenue from the sale of recyclable materials and retailers have objected to container deposits due to the space required to store the containers and vector hazards that may be associated with the container storage. Two beverage container bills were introduced in 2011: House Bill 389 entitled “*Recycling – Bars and Restaurants – Beverage Containers*,” and House Bill 460 entitled “*Task Force to Study Required Deposits on Returnable Beverage Containers*.” Sponsors of the legislation agreed that the Department should include the subject of beverage container deposits in the Study Group discussions. Further information about the Department’s research findings and beverage container deposit laws is discussed below in the section entitled, “Issue: Beverage Container Deposits.”

The Department has been approached by the Product Stewardship Institute and Nestle Waters North America regarding an extended producer responsibility (EPR) initiative for packaging and printed paper. Nestle Waters North America and its consultant carefully chose a limited number of states to discuss this initiative. Maryland was chosen because it does not have a beverage container deposit law, has general success in recycling, and because it already has some producer responsibility laws, including electronics recycling and mercury auto switch recovery. The initiative would include a recycling goal for packaging and printed paper with clear performance standards to increase collection of these items. The initiative would be paid for by manufacturing partners that would manage the collection and recycling of packaging and printed paper. The partners are expected to develop model legislation for EPR in calendar year 2012.

In 2004, the Department proposed two different funding mechanisms for solid waste and recycling programs: (1) assessment of facility permit fees; and (2) assessment of solid waste tipping fees. These ideas were vetted with county solid waste and recycling managers, as well as the solid waste and recycling hauling industries. All but one municipal solid waste landfill in Maryland is county-owned and operated. Concerns were raised by the counties that permit fees would be a burden to taxpayers and may encourage private industry to become more involved in managing county wastes and recyclable materials. In addition, the counties already charge tipping fees for waste disposal and county representatives expressed the concern that adding a State tipping fee may cause solid waste and recycling haulers to take their wastes out of State, thus reducing revenues to the counties for their programs. The counties also expressed concern that haulers would pass these costs on to their citizens. No further proposals were made by the Department prior to the passage of House Bill 982 of the 2011 General Assembly.

Discussion Summary

Throughout the Study Group’s deliberations, discussions often turned to the need for additional funding in order to advance source reduction and recycling initiatives and enhance current programs. There is no question that all sectors represented within the Study Group have

a desire to reduce waste disposal and increase recycling. The difficulty in expanding these activities beyond current programs is the inability to reach agreement on how to fund them.

The Department explained that the funding for the Solid Waste Program and the Waste Diversion and Utilization Program was recently adjusted due to the reorganization of the Land Management Administration. It was stated that the Programs' recycling and solid waste activities are funded with General Funds and some special funds, including the Used Tire Cleanup and Recycling Fund, the State Recycling Trust Fund, and the Clean Water Fund. (The Sewage Sludge Utilization Fund was recently combined with the Department's Clean Water Fund).

Use of the Solid Waste Program's Coal Combustion By-Products (CCB) Fund is restricted to CCB activities and is not expected to remain a sustainable source of funding over the long term because the CCB generators are exploring new ways to recycle these materials and generators are not charged a fee for recycling CCBs. Consequently, the revenue from CCBs is expected to be reduced significantly over the next 5 to 10 years. General Funds continue to dwindle and the Used Tire Cleanup and Recycling Fund (Tire Fund) has given several million dollars in funding to the State General Fund. In addition, the Tire Fund has received hundreds of thousands of dollars less in revenue over the past three years due to fewer new tire purchases as a result of the poor economy. The Waste Diversion and Utilization Program attempts to reserve funding in the State Recycling Trust Fund for electronics recycling grants to counties and municipalities, but has recently been required to use it for Departmental costs due to budget shortfalls.

The counties expressed concern that their outreach budgets have been cut and that there continues to be a need for outreach and education regarding recycling and waste reduction. Other counties said that their capital projects budgets have been cut or postponed and that initiatives, such as food waste composting, which would reduce solid waste disposal costs, may not have funding to proceed. Some counties also stated that their recyclable materials revenues go back to the county General Fund and are not directed to solid waste and recycling operations. At least one county that was charging a per-ton recycling fee has seen that revenue lost by haulers taking their recyclables out of the county to a location where there are no recycling tipping fees. Nearly every county has a different funding mechanism for solid waste and recycling activities.

There was discussion regarding the need to properly cap and close old landfills in the State. Some of these landfills were never permitted, some are old town dumps, some have uncertain locations, and some have methane gas, groundwater contamination, and/or soil contamination. Although some counties are investigating mining old landfills for recyclable materials to seek some revenue and potentially relieve those counties of some liabilities associated with the landfills, the costs of mining may not outweigh the benefits to the counties.

The Department proposed two different fee structures in order to seek long term funding for its solid waste and recycling programs: 1) permit fees; and 2) tipping fees. Permit fees would be charged for new and renewal applications for solid waste acceptance facilities, based on the type of permit, and there would be annual fees on permitted facilities. These fees would

be used to pay for the Solid Waste Program and Waste Diversion and Utilization Program operating costs for solid waste permitting and enforcement and recycling program activities.

Tipping fees would be charged on solid waste as it is received at permitted facilities. The tipping fee proposal would go toward Solid Waste Program and Waste Diversion and Utilization Program operating costs (as mentioned for permit fees), and would include some funds to the counties in the form of grants or loans to assist in properly capping and closing old landfills, with an administrative fee for the Department's oversight of the grant or loan program. Some counties expressed concern that not all counties have old improperly closed landfills and that they would not benefit from the tipping fees. Others were opposed to the Department's administrative fee and were concerned that the Special Fund that would house the fees would not be secure from cuts by the legislature. One county said that the counties could charge higher tipping fees now to cover the costs of their old landfill capping and closures, but that this could force haulers to leave the county or these fees would be passed on to residents who use the hauling services. In addition, some of the counties advised that volumes of solid waste are not predictable and therefore the tipping fees would be difficult to accurately anticipate in their budgets. Although it was mentioned that tipping fees could be subject to fraud at the scales, this is already a risk for solid waste acceptance facilities. Some counties also stated that they need outreach and education funding more than money for landfill closure and capping.

Permit fees were generally perceived as more predictable and could be built into a budget, and seemingly a more preferable option to the Study Group. The Study Group members indicated that they may be supportive of the idea of permit fees if further discussions could better define the benefits of these fees to the permitted facilities, such as enhanced technical assistance from MDE, shorter permit turnaround times, and other benefits, which might include outreach and education aimed at increasing source reduction and recycling in the State. In addition, there was a desire for further discussion of the categories for the various permit fees. The factors that should be considered in further discussions on fees should include: the degree to which fees would be a financial burden on facilities, the degree to which funds accumulated could be protected from diversion to other uses, the degree of difficulty in reviewing and approving each type of permit application, public health and environmental impacts, size and frequency of fees, enhancement of solid waste and recycling programs, and reductions in permit turnaround times.

The Study Group was receptive to learning more about the initiative for extended producer responsibility for packaging and printed paper being proposed by Nestle Waters North America. Members are also receptive to investigation of regional opportunities for solid waste and recycling that would improve efficiency and be economically feasible.

Recommendations

1. The Study Group did not reach consensus regarding tipping fees or permit fees as long term funding mechanisms for solid waste and recycling. MDE should convene a workgroup including stakeholders and members of the General Assembly regarding long term funding, with attention to factors discussed by the Study Group. These factors include the degree to which fees would be a financial burden on facilities, the degree to which funds accumulated could be protected from diversion to other uses, the degree of difficulty in reviewing and approving each type of permit application, public health and environmental impacts, size and

frequency of fees, enhancement of solid waste and recycling programs, and reductions in permit turnaround times.

2. The General Assembly should carefully review the beverage container deposit research conducted by the Department, and consider other alternative beverage container recycling options, such as product stewardship or EPR.
3. The General Assembly should provide funding support for regional partnerships with state and local governments, businesses and nonprofit organizations that would increase efficiency and share financial resources while advancing source reduction and recycling initiatives.
4. The General Assembly should encourage the Maryland Department of Business and Economic Development (DBED) to provide financial and technical assistance to the recycling industries, including recyclable materials consumers, recyclable materials processors, and manufacturers of recycled products, in locating in Maryland and in expanding recycling businesses already located in the State. This assistance could include dedicated staff to seek recycling industries and/or tax credits or other financial incentives for the recycling industry. DBED should work closely with MDE in these efforts.
5. The General Assembly should provide sustainable funding to MDE for source reduction and recycling outreach and education in an amount sufficient to provide grants to the counties and municipalities for recycling outreach and education across all sectors.

Issues Requested For Study Group Discussion

Issue: Bag Recycling

Background

During the 2011 General Assembly session, two bills concerning bag recycling were introduced: House Bill 341 entitled “*Environment – At-Store Recycling – Plastic Carryout Bags*” and House Bill 1034 entitled “*Clean the Streams and Beatify the Bay Act of 2011.*” The Department agreed to address the issue of bag recycling during the Study Group’s discussions and conducted research regarding bag recycling, which is summarized below.

Several states and dozens of localities have addressed plastic bag waste and litter with legislation. Bag bills have generally taken three forms. From the strongest to weakest level of control, they are:

1. Bans: Although some localities have imposed outright bans on single-use plastic bags, there are currently no State-wide bans on plastic bags. Localities that have bag bans include Outer Banks, NC; In California: San Francisco, Malibu, Fairfax, Manhattan Beach, Palo Alto, Los Angeles, Santa Monica, Calabasas, Long Beach, Marin County, San Jose, Santa Cruz County, Santa Clara County; Telluride, CO; Westport, CT; Counties of Kaua’i and Maui, HI; and Edmonds, WA.

2. Fees: Some localities, including Washington, DC and Montgomery County, MD, have imposed a flat tax on each single-use bag the consumer receives at the register. Some bag fees cover paper bags in addition to plastic, to encourage substitution of reusable bags rather than paper bags. The fees are typically retained in part by the retailer and in part by the state, to be used for litter cleanup or recycling. There are currently no state-wide bag fees.
3. Take-back programs: Some legislation requires providers of single-use plastic bags to allow customers to return bags to the store. Unlike fees and bans, mandatory take-back bills do not aim to reduce the use of plastic bags and thus are more welcomed by the plastics industry. Generally, the bills require retailers to ensure the collected bags are actually recycled. Still, states with mandatory take-back programs seem to have persistently low recycling rates for plastic bags. This is the only type of bag bill enacted State-wide. The states of Delaware, California, New York, and Rhode Island and at least seven localities, including Tucson, AZ, Chicago, IL, Red Bank, NJ, San Juan Capistrano, CA, Baltimore City, MD, and Madison, WI have instituted mandatory take-back programs.

According to EPA's 2010 Municipal Solid Waste in the United States Report, plastic bags and sacks are a very small portion of the MSW stream by weight, at 0.3 percent in 2010, or just 2.48 percent of all plastic generated. Bag bills, therefore, tend to be justified mainly for their litter reduction and aesthetic benefits. In a study conducted by Keep Iowa Beautiful in 2010, bags were determined to be only 0.6 percent of roadside litter, however, according to the Ocean Conservancy, 2010 International Coastal Cleanup Report, around Washington, DC streams' bags constituted up to 45 percent of litter. Bags can blow into storm drains and waterways, where they may tear into small pieces that could be ingested by animals, and they can be very visible when they are snagged on trees and fences.

Discussion Summary

Study Group members agreed that plastic bags are a very small, but visible, portion of the waste stream and that the concern with them is largely that they are a ubiquitous litter problem. They present concerns related to stormwater and water quality in general and trash impaired water bodies are being regulated by the Department in jurisdictions under the Total Maximum Daily Load (TMDL) standards for trash. A TMDL establishes the amount of a pollutant that a waterbody can assimilate without exceeding its water quality standard for that pollutant. TMDLs provide scientific standards for water quality based controls to reduce pollution from both point and nonpoint sources to restore and maintain the State's water quality.

A Bag Recycling Discussion Points document (See Appendix B.) was distributed to the Study Group in order to identify some of the issues that needed research and/or discussion in order to address the legislature's concerns. It was noted that Baltimore City has a mandatory plastic bag take-back law that requires a supermarket, convenience store, or restaurant that offers plastic bags to take them back. If the food retailer does not offer plastic bags, it does not have to accept them for return. Each food dealer must make reusable bags available for purchase. Members expressed concern that perhaps bags that are collected are not being recycled and that the cost of the collection and recycling program for the bags is not worth the effort. It was learned that Baltimore City has provided guidance to the food retailers on where the bags can be recycled. It was noted

by several members that residents can put plastic bags in their recycling bins and that these bags may become contaminated in single stream recycling. An outreach and education campaign is necessary in order to ensure that residents understand contamination issues and the importance of recycling plastic bags so that they do not become unsightly litter. Several members also indicated that it is expensive to remove plastic bags from yard waste collections but that the plastic must be removed because it will not compost with the organics.

The members generally agreed that the use of reusable bags instead of plastic or paper bags saves natural resources. They also agreed that citizens should be encouraged to reuse and recycle paper and plastic bags wherever possible. Because there have been studies regarding the potential public health concerns related to the use of reusable bags, including reports of high levels of bacteria in reused bags and high metals levels in some new bags, the Study Group determined that more research needs to be conducted to evaluate all the positive and negative aspects of each package choice.

Recommendations

1. MDE should conduct additional research to evaluate all the positive and negative aspects of paper, plastic, and reusable shopping bags.
2. Outreach and education programs should be developed and implemented related to the importance of recycling plastic and paper bags using currently available recycling infrastructure, as well as the importance of using safe, reusable bags. Partnerships with retailers, bag manufacturers, and local governments should be sought in order to fund the outreach and education programs.

Issue: Beverage Container Recycling

Background

During the 2011 General Assembly session, two bills concerning beverage container recycling were introduced: House Bill 389 entitled “*Recycling – Bars and Restaurants – Beverage Containers*” and House Bill 460 entitled “*Task Force to Study Required Deposits on Returnable Beverage Containers.*” The Department agreed to address the issue of beverage container recycling during the Study Group’s discussions and conducted research regarding beverage container recycling (See Appendix C for the full report), which is summarized below.

Ten U.S. states currently have so-called “bottle bills” in effect: California, Connecticut, Hawaii, Iowa, Maine, Massachusetts, Michigan, New York, Oregon, and Vermont. (See Appendix I for details for each of the existing programs.) Proposals to repeal existing bottle bills and to adopt new bottle bills are common, though these proposals rarely result in new legislation. The only bottle bill that has been repealed was Delaware’s, and Hawaii is the only State to implement a new bottle bill since the 1980’s. However, most bottle bill states have passed amendments expanding or updating their bills in the past ten years.

There are two main types of beverage container/bottle bills: 1) traditional bottle bills where payments are made to private industry, such as retailers, from consumers; and 2) bills

where the State (such as Hawaii and California) funds redemption centers and the processor purchases the materials from the redemption centers. The second system is generally cheaper because the redemption centers do not sort the materials for the processors. However, it is difficult to compare costs between the states.

Beverage containers are generally a larger portion of litter than they are of the solid waste stream. This is one reason that bottle bills have passed despite the fact that beverage containers are a small part of the MSW stream (about 4 percent). Bottles are also larger than other prevalent types of litter, such as cigarette butts, and may be more visible. Studies identifying the proportion of beverage containers in litter have been conducted in over a dozen states and nationally. Results vary widely, and differences in the dates of the studies make comparison across states difficult. A nationwide study conducted by Keep American Beautiful entitled “2009 National Visible Litter Survey and Cost Survey” counted beverage containers at only 2.9 percent of all litter and 14.5 percent of litter larger than 4 inches.

Deposit programs are generally regarded as successful in reducing littering of beverage containers. However, these reductions cannot be definitively traced to bottle bills. EPA’s “Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006” national survey showed that beverage container litter has decreased by 74 percent across the nation as a whole since 1969. This may be because of changes in social attitudes or increases in curbside recycling availability. It would be difficult to isolate the impacts of these historical changes from those of a bottle bill.

Recycling rates for beverage containers are generally significantly higher in deposit states than in states with only curbside or drop off programs. According to a 2002 report by Businesses and Environmentalists Allied for Recycling (BEAR), Understanding Beverage Container Recovery, the capture and participation rate for curbside programs is generally around 50 percent. The actual recycling rate is lower, since most states have less than 100 percent availability of curbside programs. Maryland recycles 42.9 percent of its beverage containers through a combination of curbside and drop-off recycling. Deposit systems have an average recovery rate of around 80 percent.

A bottle bill in Maryland may increase the recycling rate of beverage containers in Maryland from 42.9 percent to 75-90 percent, which is the mid-range redemption rate for existing bottle bills. However, the impact on Maryland’s overall recycling rate would be a modest increase, from 1-2 percentage points. This does not include indirect impacts the program may have on recycling behavior. For example, outreach efforts undertaken as part of the implementation of a bottle bill may increase awareness of recycling programs in general, which could lead to an increase in recycling of non-beverage items. In addition, the cash incentive provided by a bottle bill may capture the attention of people who would not recycle for purely environmental reasons, increasing their awareness of recycling in general. Conversely, if people no longer use curbside or drop-off recycling programs for beverage containers, they may feel use of those programs for other items is no longer worth the effort.

As a result of a bottle bill, Maryland could avoid between 164,000 and 241,000 MTCO_{2e} additional greenhouse gas emissions annually. This avoidance would support the Maryland

Climate Action Plan's goal of reducing GHG emissions by 25 percent by 2020 and MDE's goals to increase the State-wide recycling rate to 55 percent and the waste diversion rate to 60 percent by 2020.

The costs of collecting and processing containers under a deposit program will vary by program design and it would be speculative for the Department to estimate the potential costs and revenues of an undetermined system. However, assuming Maryland had high-volume redemption centers and distributors and had an 80 percent redemption rate, based on a scrap value of \$0.89 per ton of containers, approximately \$28.9 million may be available for collection and processing of almost 200,000 tons of beverage containers (based on 2009 Maryland data). If container returns were disproportionate to container sales in Maryland with respect to material type, this figure could change significantly.

Unredeemed deposits, or escheats, are often used in bottle bill states to offset the net costs of collecting and processing beverage containers under a bottle deposit system. Payments can be made to redemption centers (or retailers) to cover some costs of counting, sorting, and storing containers and transacting the redemptions. Payments can also be made to distributors (or processors) to cover their costs of retrieving empty containers and marketing the material for recycling. It is assumed that the estimated unredeemed deposits in Maryland at 80 percent redemption and a 5 cent deposit may be approximately \$41 million, enough to cover the handling and processing costs that exceed scrap value. Again, this is only speculative since it is not known what type of deposit system may be considered in Maryland.

A major concern expressed by opponents of beverage container deposits is fraudulent redemption. Fraudulent redemption occurs when large quantities of containers purchased in states without bottle bills are transported to bottle bill states for redemption. It is costly for the bottle bill state because it reduces the amount of unredeemed deposits, or in states without escheat provisions, the amount of unredeemed deposits kept by the distributor. Michigan and Iowa consistently have the highest redemption rates, but are also the most geographically isolated from other bottle bill states, suggesting that fraud may occur more often in states that have many non-bottle bill neighbors. With the repeal of Delaware's bill, Maryland would have four neighbor-states (plus Washington, DC) without bottle bills.

Another concern with beverage container deposits is residual product in containers and attraction of vermin. Most of the existing bottle bills require retailers to accept, sort, and store returned containers on site until distributors retrieve them. While states generally allow retailers to refuse containers with significant amounts of liquid or other materials, they do not allow retailers to require that bottles be rinsed. This has drawn criticism because residue in stored containers can draw vermin to retail stores and create public health hazards.

Breakage of glass beverage containers during collection and processing to the point that they are no longer valuable for recycling is a major concern for the glass industry. In deposit systems, breakage rarely results in the materials becoming unfit for recycling, while in single stream systems, breakage is a pervasive problem. The Container Recycling Institute, in its 2009 report "*Understanding Economic and Environmental Impacts of Single Stream Collection Systems*," states that in single stream systems, it has been estimated that 40 percent of all glass ends up in landfills, 20 percent is very small pieces reused only once for things like road

pavement, and only 40 percent is recycled into other containers. The report further states that in deposit systems, almost no glass ends up in landfills and 98 percent is recycled into other containers. Reverse vending machines are equipped to accept glass bottles without breaking them. In addition, bottle bills generally allow redemption centers to refuse broken bottles, providing an incentive for the consumer to keep bottles whole. Further, contamination of paper or other materials by broken glass is avoided by having a separate system for beverage containers. As a result, breakage is much less of a problem in deposit programs.

MDE has been approached by the Product Stewardship Institute and Nestle Waters North America regarding an extended producer responsibility (EPR) initiative for packaging and printed paper in which the manufacturing partners would manage the collection and recycling of these materials. Although more information about the proposed system is essential moving forward, this initiative may provide a viable option to a beverage container deposit system in Maryland that could increase recovery of beverage containers, and paper, another high priority recyclable material for the State.

Reverse vending machines (RVM) allow the redemption process to occur with fewer staff and shorter wait times. In a manual redemption system, the consumer brings containers to a staff member who counts or weighs the containers. Some states establish uniform refund amounts per pound and require consumers to accept this amount when redeeming in bulk. Staff must calculate the refund and issue cash to the consumer in addition to sorting, crushing, and storing containers by hand.

In an RVM system, the consumer places containers, one-by-one, into a hole in the front of the machine. In some cases, there is a separate machine for each material type, but the newer RVMs can accept glass, plastic, and metal cans in the same machine. The RVM scans the UPC code on the container or detects the material of the container to ensure it is eligible for redemption. Some machines automatically crush or shred the containers for easier storage. Machines that accept glass have cushioning to avoid breakage as the bottle moves through the machine. The RVM counts the containers and prints a receipt for the consumer, who exchanges the receipt for cash in the store or center. The containers drop into bins housed in cabinets in the bottom or to the side of the machine.

Envipco, an American RVM company, reports that newer machines can process up to 45 containers per minute and can hold up to 975 cans, 250 plastic bottles, or 200 intact glass bottles. Smaller, slower versions are available for retailers with space or money constraints. RVMs reduce the handling costs to retailers or redemption centers with high volumes of containers. As a result, they are used mainly at large retailers like supermarkets or large redemption centers. RVMs cost between \$10,000 and \$25,000. The Vermont Agency of Natural Resources Solid Waste Program, in its 2007 report entitled "*The Costs of Beverage Container Redemption in Vermont*," showed that retail stores with RVMs had between 1 and 4 machines and the cost to lease and operate the machines was between \$217 and \$1,012 per month.

Discussion Summary

A Beverage Container Recycling Discussion Points document was distributed to aide in discussions. Some members opposed the inclusion of a beverage container deposit system

during the discussions of the Study Group as it would distract from the tasks in House Bill 982> However, MDE explained that it had agreed to discuss the topic during the Study Group meetings. Some members advised that there are national statistics available regarding beverage containers and that there are no states moving forward with bottle deposits. It was stated that Delaware repealed its beverage container deposit because aluminum cans were not included in their deposit law and the container return rate and overall recycling rate in the state were low. Also, the State replaced the beverage container deposit system with a mandatory universal single-stream residential and commercial recycling system capable of capturing these materials.

It was requested that there should be an objective, balanced, independent review of beverage container information to determine what type of bill might work in Maryland. If there are certain sectors, such as bars and restaurants, that may need a different strategy to increase collections and recycling, then that information should also be gathered. Several members provided valuable information for review by MDE's post graduate fellow. This research is included in Appendix C.

The Department mentioned that RVMs may be introduced in some Maryland schools in the near future. The Pepsi Dream Machine has generated interest amongst some county recycling coordinators and MDE has provided information to State agencies, which are now required by law to recycle glass, plastic, aluminum, and paper.

It was also discussed that Delegate Maggie McIntosh, Chairman of the House Environmental Matters Committee, had directed stakeholders in a meeting in March 2011 to develop a pilot on beverage container recycling in Baltimore City to see how it would work. Several members stated that this project has not moved forward. However, it was suggested that beverage container recycling needs to be conducted in a variety of environments, including away from home recycling, such as at events, festivals, stadiums, etc., to see the best ways for it to work. This should be voluntary at this time and it was agreed that outreach and education is essential to the success of these programs.

There was general agreement that there should be increased recovery and recycling of beverage containers in Maryland. However, since beverage containers make up a small percentage of the waste stream, and food and paper make up most of the waste stream, more attention should be placed on those materials. Members agreed that MDE should continue to participate in the discussions with Nestle Waters North America regarding its extended producer responsibility initiative and keep the Study Group, and particularly its legislative members, informed of the discussions.

Some members stated that unless beverage containers are made into other beverage containers (reuse) they are not truly being recycled. It was suggested that in public space recycling for events, the requestor should be required to have a recycling plan before being issued a permit to have the event in order to hold people accountable for recycling the containers generated at the event.

Recommendations

1. The General Assembly should review MDE's research on beverage container deposits and keep updated on MDE's discussions concerning beverage container recycling alternatives, such as product stewardship or extended producer responsibility.
2. Stakeholder partnerships aimed at increasing recovery and recycling of beverage containers in the State should be sought by MDE.
3. MDE should continue to participate in discussions regarding product stewardship and extended producer responsibility, keeping the Study Group's members informed as appropriate.
4. Public events should be encouraged to provide containers and services for collection and recycling of beverage containers. This could include a requirement in an event permit to provide recycling.

Issue: Electronics Disposal Ban

Background

During the 2011 General Assembly session, House Bill 473 entitled "*Environment – Landfills and Incinerators – Disposal of Waste*" was introduced. The Department agreed to address the issue of an electronics disposal ban during the Study Group's discussions.

Maryland's electronics recycling (eCycling) activities began in earnest in 2001 with the EPA Region 3 Pilot Project, the kickoff for which was held in Harford County. Many of Maryland's counties enthusiastically began voluntarily holding periodic eCycling collection events for their residents and some established permanent collection facilities for electronics. In 2005, the Maryland General Assembly passed the third eCycling law in the U.S. (House Bill 575 entitled "*Environment - State-wide Computer Recycling Pilot Program*"). This law required manufacturers of an average of more than 1,000 computers (defined as desktop or laptop computers and computer monitors) in the previous three years that sell or offer for sale computers, to register and pay an annual \$5,000 fee to MDE. If a manufacturer implemented a computer takeback program acceptable to the Department in following years, it would be eligible for a reduced annual fee of \$500. The law provides that the registration fees can be used by MDE to provide eCycling grants to counties and municipalities.

In 2007, Maryland's eCycling law was amended by the General Assembly through House Bill 488 entitled "*Environment – State-wide Electronics Recycling Program*"). The scope of the law was expanded to include televisions and other video display devices, some definitions were clarified, an enforcement provision against retailers selling or offering covered electronic display devices was added, and the initial registration fee was increased to \$10,000. At this time, 82 electronics manufacturers are registered with MDE, 24 manufacturers have approved takeback programs, 5 other takeback programs are pending, and MDE is evaluating enforcement actions against non-compliant manufacturers. Grants totaling \$806,552 have been awarded to counties and municipalities for eCycling activities since 2005 and more than 36,000 tons of electronics

have been collected in Maryland since 2001. Over 97 percent of the State's population is served by the 20 county permanent electronics collection programs.

Discussion Summary

County members conducted a survey of their solid waste acceptance facilities to determine if there are electronics showing up in the waste stream and what extent of the waste stream they comprise. The counties reported that they find electronics infrequently and that they comprise a very small portion of the waste stream coming into their facilities. Often the counties do not advertise their electronics recycling programs for fear of them being overwhelmed with products, yet there continues to be a large response by citizens who drop off used electronics at permanent collection facilities or during eCycling events.

Members generally believe that electronics are not being disposed, but are being held in basements and garages of homes or by businesses because people still are not sure where to recycle them and because they are concerned about security of data on computer hard drives. Some members expressed concern that a ban on disposal of cathode ray tubes (CRTs) in landfills could result in illegal disposal of these materials. Members were also concerned that if there is no ban and CRT markets on the East Coast are weak, then people may start disposing CRTs rather than seeking to recycle them. The Study Group advised that they would prefer an outreach and education campaign regarding the need for proper reuse and recycling of electronics rather than a ban on disposal of electronics.

The Department advised that there are discussions regarding an emergency regulation in California regarding cathode ray tube (CRT) disposal. Due to insufficient markets for CRT glass for electronics recyclers in California, the State of California is proposing to temporarily allow (two years) disposal of CRTs until new technologies are developed for managing CRT glass. The Study Group members were not aware of insufficient recycling markets for CRTs in Maryland.

The Department was contacted by the Consumer Electronics Association and The Artemis Group recently on behalf of small electronics manufacturers that feel that the current electronics recycling registration fees are too high when these entities either do not manufacture large numbers of covered electronic devices or sell large numbers of these devices in Maryland. A large number of the current noncompliant electronics manufacturers in Maryland may be small businesses.

The Department suggested the following changes to the State's eCycling law to the Study Group:

- Authority for MDE to handle enforcement against retailers, instead of the Comptroller. This is a lesser priority for the Comptroller, so transferring this authority to MDE could increase enforcement against noncompliant retailers.
- Penalties against retailers should be increased so that there is more of a deterrent for retailers selling unregistered electronics brands. The maximum penalty currently is only \$5,000 (10 violations at \$500 each).

- Take back programs should be required to certify to the returner that they have destroyed the data on the computers they accept from Maryland residents. This may encourage more Maryland residents to use take back programs. Concern about data security is likely part of the reason why there are still a lot of electronics stored in basements and garages.
- There should be relief for small businesses which must pay multiple types of state electronics recycling fees. Maryland could develop a procedure to request a waiver or reduction in the initial registration fee tied to an annual request for such a waiver or reduction and with clear criteria. Or, Maryland could follow Wisconsin's framework for these fees, which relies on sales data. Wisconsin's population is close to that of Maryland (MD 5,699,478 and WI 5,654,774 estimate 7/1/2009) and their universe of covered products is similar to Maryland's. Wisconsin's system is as follows:
 - >250 covered products sold per year in MD = \$5,000 per year
 - 25-249 covered products sold per year in MD = \$1,250 per year
 - <25 covered products sold per year in MD = \$0 per year
- State agency eCycling contracts should be required to be awarded to eCyclers that are R2 or E-Stewards certified. In addition, State agencies should be required to purchase EPEAT certified electronics (just computers right now, but other products are being certified).

There was no opposition expressed by the Study Group for these changes.

Recommendations

1. The General Assembly should not consider a ban on electronics disposal in Maryland at this time. Current infrastructure and capacity for recycling of electronics in and near Maryland is adequate for handling these materials.
2. Electronics recycling outreach and education targeted toward increasing awareness of locations and methods for reuse and recycling of electronics and ways to address electronics data security should be implemented. Support from the General Assembly for this activity would be needed.

Johns Hopkins University

Research

Dr. Hedy Alavi, Assistant Dean for International Programs at the Whiting School of Engineering at Johns Hopkins University, offered to have his Solid Waste Engineering and Management class of 23 students conduct research on some of the Study Group's priority discussion topics. The students only had one month to do the research but provided thoughtful ideas and information on those topics in a report to the Study Group. The students were represented by Molly Finn, who provided an overview of the class' *"Research Report for the Maryland Department of Environment: Recycling in Non-Residential Markets, Commodity-Specific Targets, and Long-Term Funding"* during the December 2010 Study Group meeting.

Ms. Finn explained that the class researched the best ways to educate and reach out to the non-residential sector, strategies for capturing recycling data, evaluation of the feasibility of commodity-specific targets for glass and plastic and for paper and cardboard, and funding sources for recycling. Their research showed that although there are states that require recycling, there are no states with mandatory commodity specific targets. The class made several recommendations, based on their research, including:

- MDE should develop a marketing/communications/outreach plan identifying the right mix of tools, including social media, to reach a wide range of audiences. MDE should consider updating/revising its recycling website to be more user friendly. MDE should consider what motivates the various audiences to change and provide concise, clear messages targeted to those specific audiences.
- Recycling education programs should be “participatory ventures” involving active input of various stakeholders, including businesses, environmental groups, and contractors. Depending on the current status of county recycling programs, MDE should consider providing information directly to stakeholders or through local governments. Businesses should be encouraged to recycle more and be given tools to implement new recycling programs.
- MDE should establish the purpose of gathering non-residential solid waste and recycling data and the data necessary for this purpose, the businesses that would need to report, an online data reporting system, standardized forms for tracking data, and tools for assisting the counties in collecting data. Reporting should be required for businesses or there should be incentives for business reporting.
- Single stream recycling cuts collection costs and increases recycling. However, it was acknowledged that not all areas of the State will be able to implement single stream recycling due to locations of recycling markets and the costs of getting the recyclables to the markets. Targeting specific commodities will be difficult to implement in Maryland when many counties are, or are considering, utilizing single stream recycling collection.
- Imposition of a State-wide tipping fee, or other tax on solid waste disposal, to fund recycling would encourage decreased disposal and increased recycling. Implementation of Pay-As-You-Throw programs would also encourage waste reduction because recycling is typically free with these programs. The class also recommended a bottle deposit program to increase the State’s recycling budget.

University Recycling Activities

During the November 2010 meeting of the Study Group Mr. Richard Abraham, Solid Waste and Recycling Specialist for Johns Hopkins University, gave an overview of the JHU recycling program. He explained that JHU is looking toward sustainability with a goal to reduce greenhouse gas (GHG) emissions by 50 percent by 2025. Mr. Abraham stated that 2 percent growth will equal a 25 percent increase in GHG emissions at the school. Some of the GHG savings activities occurring at JHU and associated campuses and buildings include: converting T12 to T8 fluorescent lights and reducing the number of incandescent lights; using solar panels in buildings; using reflective film on sunny buildings; increasing the use of recycled paper to 90 percent (the university used 55 percent recycled paper in 2009); increasing recycling of mixed paper, cardboard, and

fluorescents, and composting more food. Mr. Abraham advised that cardboard is the most profitable recyclable and that the campus has a drop off point for recyclables that is open to all citizens. The campus is encouraging food waste composting and the cafes are doing well with this project. Electronics recycling is also conducted on the campuses.

APPENDIX A
Recycling and Source Reduction Study Group
Members and Other Attendees

Members

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Other Attendees

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Doyle Niemann
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APPENDIX B

BAG RECYCLING DISCUSSION POINTS

Prepared by Kaley Laleker
Maryland Department of the Environment

Bag Bill Research

Background and Types of Bag Bills

Several states and dozens of localities have addressed plastic bag waste and litter with legislation. Bag bills have taken three forms. From the strongest to weakest level of control, they are:

Bans: Some localities have imposed outright bans on single-use plastic bags. There are currently no state-wide bans on plastic bags.¹

Fees: A flat tax is imposed on each single-use bag the consumer receives at the register. Some bag fees cover paper bags in addition to plastic, to encourage substitution of reusable bags rather than paper bags. The fees are typically retained in part by the retailer and in part by the State, to be used for litter cleanup or recycling. There are currently no state-wide bag fees in the U.S.²

Take-back programs: Some bills require providers of single-use plastic bags to allow customers to return bags to the store. Unlike fees and bans, mandatory take-back bills do not aim to reduce the use of plastic bags and thus are more welcomed by the plastics industry. Generally, the bills require retailers to ensure the collected bags are actually recycled. Still, states with mandatory take-back programs seem to have persistently low recycling rates for plastic bags. This is the only type of bag bill enacted state-wide in the U.S. Four states and least seven localities have instituted mandatory take-back programs. In other locations, some retailers accept bags voluntarily.³

Plastic bags are a very small portion of the MSW stream by weight, at 0.3% in 2009.⁴ Bag bills therefore tend to be justified mainly for their litter reduction and aesthetic benefits. Bag bills have been popular in coastal areas, where scenic preservation may be more valuable and threats to water quality are more pronounced. Bags were determined in one study to be only 0.6% of roadside litter.⁵ However, around DC streams they were found to constitute up to 45% of litter and in the 2010 International Coastal Cleanup they were 6.3% of litter found in the U.S.⁶ Flimsy bags can blow into storm drains and waterways, where they tear into small pieces that are ingested by animals. They can also trap animals: during the International Coastal Cleanup, marine wildlife was found tangled in plastic bags more than any

¹ Examples: Outer Banks, NC; In California: San Francisco, Malibu, Fairfax, Manhattan Beach, Palo Alto, Los Angeles, Santa Monica, Calabasas, Long Beach, Marin County, San Jose, Santa Cruz County, Santa Clara County; Telluride, CO (and 10 cent fee on paper bags); Westport, CT; Counties of Kaua'i and Maui, HI; Edmonds, WA.

² D.C. and Montgomery County, MD.

³ Examples: Delaware; California; New York; Rhode Island; Tucson, AZ; Chicago, IL; Red Bank, NJ; San Juan Capistrano, CA; Baltimore City, MD; Madison, WI.

EPA, Municipal Solid Waste in the United States, Facts and Figures (2009) 90
<http://www.epa.gov/osw/nonhaz/municipal/pubs/msw2009rpt.pdf>.

Keep Iowa Beautiful, 2001 Roadside Litter Study (2001)
<http://www.keeptowabebautiful.com/pdfs/research/2001roadsidelitterstudy.pdf>

⁶; Ocean Conservancy, International Coastal Cleanup Report 11 (2010)

http://act.oceanconservancy.org/images/2010ICCRptRelease_pressPhotos/2010_ICC_Report.pdf. Percentages are by quantity.

other item, except fishing line/nets.⁷ Plastic bags are also very visible in urban areas as well, where they become snagged on trees and fences.

The cost of litter removal has caused some municipalities to adopt bag bills. San Francisco passed a ban after determining that the city spends \$8.5M annually on plastic bag litter alone (17 cents per bag). For California as a whole, the figure was \$25M.⁸

Aside from litter concerns, plastic bags that end up in improper recycling channels can increase the cost of recycling by snagging in machinery. One recycler estimated that plastic bags coming from curbside bins produce 20-30% of its labor costs while constituting a tiny proportion of incoming materials.⁹ Bag bills address this problem by establishing a separate collection point for bags or eliminating their use altogether.

Paper bags are generally thought to cause less of a litter problem and are more frequently recycled. However, plastic bags require less energy and fewer GHG emissions to manufacture and take up less space in landfills. Neither type of bags is substantially biodegradable in landfill conditions. For this reason, some bag bills aimed at reducing plastic bags also target paper bags to avoid shifting consumption to equally problematic materials.

Recap of Recent Maryland Bag Bills:

The following bag bills were introduced in 2011:

HB 341 – Would require stores over 1000 square feet that provide plastic carryout bags to provide a carryout bag collection bin for recycling of bags. Bags must display a phrase encouraging return of bags to the store. Stores must have reusable bags available for purchase. Stores were not explicitly required to recycle the collected bags.

HB 1034/ SB 602 – Would require stores to impose a 5 cent fee for each disposable bag given to customers. One cent would be kept by stores without a “Customer Bag Credit Program,” two cents would be kept by stores with such a program. The rest of the funds would go to administration of the program, then to the Chesapeake Bay Trust for grants for preservation, restoration, public education projects. Exempt are meat or newspaper bags, pharmacy bags, farmer’s markets, and roadside stands.

Mandatory Take-backs

Plastic bags are cheaply made from virgin material at about 1 to 2 cents per bag. For bags to be recycled, they must first be transported and baled. Perhaps because of these economics, very few plastic bags are currently recycled (1-3%). Of these, most are not used to make plastic bags. Instead, over half of all available plastic bags are sold to a single company, where they are used in composite lumber for decking.¹⁰ Under mandatory take-back laws, consumers may bring bags back to the retailer and the

⁷ Id. At 15.

⁸ Californians Against Waste, The Problem of Plastic Bags, http://www.cawrecycles.org/issues/plastic_campaign/plastic_bags/problem

⁹ SP Recycling Corp., Plastic Bags and the MRF (2010) http://www.aorr.org/events/forum_2009_presentations/Chris%20Thomas%20-%20AOR%20Forum%202010%20Presentation.pdf

¹⁰ Central Virginia Waste Management Authority, Reduce, Reuse, Recycle: Some Local Retailers That Accept Plastic Bags for Recycling, <http://www.cvwma.com/storage/File/Plastic%20Bag%20Recycling%20Trex.pdf>

retailer contracts with a third party for pickup of the bags. In order to prevent stores from simply disposing of the collected bags, any mandatory take-back bill should require that the retailer ensure recycling of the bags.

Limited data available in mandatory take-back laws suggests that these programs do not seem to substantially increase the recycling rate for plastic bags. Recycling is not mandatory for consumers, who may reuse bags for other things or simply forget to bring used bags back to the store. Most programs require retailers to recycle the collected bags, but appear to have no reliable method for enforcing that requirement. This is because retailers must self-report the number of bags collected, and it may be difficult to detect underreporting of this number. Stores may wish to report that few or no bags were returned to avoid having to contract for separate pickup of returned bags, instead disposing of the bags in the garbage.

Below are the experiences of some representative take-back programs in several states and localities.

California

California's At-Store Recycling Program mandates that "stores" provide plastic bag recycling bins and ensure that the collected bags are recycled. Stores must also provide for sale reusable bags and complete reporting requirements on bag collection and recycling. Manufacturers of bags must provide educational materials to the stores. A "store" is a retailer that provides plastic bags and (1) has a licensed pharmacy and 10,000 sq ft of retail space generating sales tax, or (2) is a supermarket selling food and bringing in \$2M gross annually.¹¹

Adopted in 2006, California's is the oldest State-wide take-back law in the country. Still, participation in the program is poor. Only 3% of plastic carryout bags were recycled in 2009. The plastic bag recycling rate has remained relatively stagnant, with rates of 2% in 2007 and 2008. Regulated stores must submit reports with the weight of bags purchased and collected, which forms the basis of the recycling rate data.¹²

Baltimore City

Baltimore City's 2010 Plastic Bag Reduction Program requires food retailers to register and provide plastic bag recycling in order to continue providing plastic bags. Plastic bags are only to be given out upon request, and they are to include a phrase encouraging recycling. Recycling bins must be placed in the store, and retailers must arrange for periodic collection of the bags for recycling. The City provides the names of two companies that will contract with retailers to pick up plastic bags. One of the companies, Eco-poise, will provide pickup for a flat fee of \$20, \$30 or \$40 per month, depending on how frequently retailers want collection service.¹³

¹¹ California At-Store Recycling Program: Plastic Carryout Bags, <http://www.calrecycle.ca.gov/Plastics/AtStore/default.htm>; California At-Store Recycling Program, Compliance Assistance: Frequently Asked Questions, <http://www.calrecycle.ca.gov/Plastics/AtStore/FAQs.htm>

¹² California 2009 State-wide Recycling Rate for Plastic Carryout Bags, <http://www.calrecycle.ca.gov/Plastics/AtStore/AnnualRate/2009Rate.htm>.

¹³ Eco-Poise, Plastic Bag Reduction Program, http://eco-poise.com/yahoo_site_admin1/assets/docs/Plastic_Bag_Reduction_Program_Sign_Up.282234715.pdf; Baltimore Office of Sustainability, Resource Center, <http://www.baltimoresustainability.org/resources/index.aspx>

Rhode Island

Rhode Island's plastic bag recycling program began in 2005. It requires retailers to provide barrels for collection of plastic bags. Covered retailers are those that sell over \$8M of goods or food annually in Rhode Island and those that have a store with over 10,000 square feet of retail space. The retailers must, at their own expense, empty bins and ensure delivery of the bags to a recycling facility. In practice, the Rhode Island Resource Recovery Corporation (a statutorily created landfill management and recycling company) collects bags from stores. The bags are then baled and sold to Trex, a company that turns the bags into composite lumber for decking. Retailers must submit records of the quantity of bags collected and where they went for recycling.¹⁴

Chicago

Chicago's plastic bag recycling ordinance took effect in December 2008. Retailers that provide plastic bags are covered if food or prescription drugs make up at least 25% of their gross sales. The ordinance is otherwise similar to other mandatory take-back programs, and retailers are required to arrange for recycling of all bags they collect.

The program's success has been limited. In 2007, before the ordinance, there was an estimated 610,000 pounds of plastic film collected through municipal residential recycling and another 2.1M pounds collected in the private sector. This constituted only 2-3% of all plastic film generated. In 2010, after the ordinance, around 1M pounds of plastic bags were returned to stores for recycling. It is unclear whether this represents a displacement of residential recycling or additional recycling. Regardless, the increase in the recycling rate for plastic film would be minimal.

Further, twenty-nine percent of the stores reported that they recycled no bags. In the first two years of the program, small retailers had some problems implementing the ordinance. Smaller stores, collecting as little as one pound of bags, had trouble finding haulers to pick up the tiny quantity of materials. As of 2010, the area had only one drop-off facility for businesses and it was outside the city. Many stores reported that they received no returns from customers and 90% of all material came from five companies. The 2010 report suggests adding a minimum store size to the ordinance to alleviate the burden on some small stores that contribute very little to bag recycling. It cost an average of \$229 per store to implement the program.¹⁵

Madison, WI

Madison's program is notable in that it bans disposal of plastic bags in the garbage. Further, consumers return bags to one of ten city-operated drop-offs rather than to a retailer. At the time the ordinance was enacted, only 1% of plastic bags were recycled.¹⁶

¹⁴ Rhode Island Resource Recovery Corporation, Plastic Bag Recycling, <http://www.rirrc.org/resident/plastic-bag-recycling/>; 23 Rhode Island General Laws 18.11, Promotion of Paper Bag Usage; Angel, Wendy, Waste Age, "RI Debuts State-wide Plastic Bag Recycling Program," available at <http://waste360.com/news/RI-plastic-bag-recycling>

¹⁵ City of Chicago Department of the Environment, 2010 Annual Plastic Bag Recycling Report Update, http://www.cityofchicago.org/content/dam/city/depts/doe/general/RecyclingAndWasteMgmt_PDFs/PlasticBagMailing2010/2010PlasticBagReport.pdf; City of Chicago Department of the Environment, Chicago Waste Diversion Study (2010) http://www.cityofchicago.org/content/dam/city/depts/doe/general/RecyclingAndWasteMgmt_PDFs/WasteAndDiversionStudy/WasteDiversionStudyReport2.pdf

¹⁶ Bag Monster, "Plastic Bag Recycling Now Required in Madison," Sept. 9, 2009, <http://www.bagmonster.com/2009/09/plastic-bag-recycling-now-required-in-madison.html>

Bag Fees

Fees are the middle ground among the three bag bill types. Still, unlike outright bans and take-backs, there has not been significant state or local interest outside of the DC area. Many localities do not have independent taxing authority and must defer to state legislatures that may be hesitant to approve a new tax.

Seattle Bag Fee (Rejected)

A plastic bag fee ordinance was passed in Seattle in 2008, but was then rejected in a 2009 referendum. The ordinance would have levied a fee of 20 cents per bag – quite high compared to the 5 cent fee in the other laws. The proceeds would be kept by small retailers (those with gross annual sales under \$1M). For larger stores, five cents would be kept by the retailer, and the rest would be used by the city for recycling and environmental education programs. American Chemistry Council opposed the fee.¹⁷

DC Bag Fee

The DC bag fee bill (Anacostia River Cleanup and Protection Act) was passed in 2009 and began implementation in 2010. The bill's purpose was primarily to address litter and related water quality issues. It came in the wake of a 2008 report by the Anacostia Watershed Society showing a large incidence of trash in and around the Anacostia and its tributary streams. Plastic bags were over 20% of Anacostia shoreline litter and over 45% of litter at tributary streams. They were the most common type of trash at the streams and the third most common at the river shoreline (behind food wrappers and bottles and cans). As required under the Federal Clean Water Act, DC and Maryland have both listed the Anacostia as impaired by trash for water quality purposes. Eighty-three percent of the watershed is in Maryland.¹⁸

The Act requires businesses selling food or alcohol to charge the consumer 5 cents for each “disposable carryout bag” provided. A disposable carryout bag is any paper or plastic single-use bag used to carry purchases. Plastic bags used in the supermarket to wrap meat, fruits and vegetables, prepared food, or flowers are not included, nor are pharmacy bags, dry cleaning bags, newspaper bags, paper carryout food bags from restaurants, or packages of bags such as garbage bags.¹⁹

Disposable carryout bags must display a phrase encouraging recycling and must be recyclable. Certain bags previously provided in DC were therefore eliminated altogether, such as opaque black liquor store bags, which were not recyclable. Paper bags must be made of at least 40% recycled material. All retail establishments retain one cent of the fee, while retailers offering a carryout bag credit program retain an additional one cent of the fee. These fees are tax-exempt and do not count as revenue. A carryout bag credit program must provide the customer a 5 cent credit for each reusable bag brought to carry purchases, must be displayed at the register, and must appear itemized on the customer's receipt.

The remaining portion of the fee goes to the Anacostia River Cleanup and Protection Fund. The Act establishes an extensive priority list for uses of the Fund. Some top uses are (1) a public education campaign on trash and public health, (2) provision of reusable bags with special focus on seniors and low-income people, (3) installation of storm drain screens and trash traps, and (4) monitoring of pollution

¹⁷ Yarow, Jay, Business Insider, “Seattle Rejects Its Plastic Bag Tax,” Aug. 19, 2009, <http://www.businessinsider.com/seattle-rejects-its-plastic-bag-tax-2009-8>

¹⁸ Anacostia Watershed Society, Anacostia Watershed Trash Reduction Plan (2008), http://ddoe.dc.gov/ddoe/lib/ddoe/2009.01.29_Trash_Report_1.pdf

¹⁹ Anacostia River Cleanup and Protection Act of 2009, DC St. §8-102.01, available at http://green.dc.gov/green/lib/green/pdfs/Bag_Law.pdf.

indices. In 2010, the District Department of the Environment, CVS, Giant Foods, and the Anacostia Watershed Society provided reusable bags for distribution at schools, churches, and various organizations that serve elderly or low-income people.

A 2011 survey concluded that the fee was quite successful in reducing use of disposable carryout bags. The majority of businesses reported at least a 50% reduction in bag consumption, while 78% of individuals polled reported a reduction in their own bag consumption as a result of the fee. Most business owners (58%) stated that the fee had no impact on their business, while 20% said it benefitted their business and only 12% said it harmed their business. Some business owners reported benefits from the reduction in bag costs and litter, while others noted that customers complained about the fee or what it is used for. Revenue for the first year of the program was much lower than expected because of the drop in usage, at around \$2M as opposed to an expected \$3.5M. In the first month of the program, bags provided by covered retailers dropped sharply from a previous average of 22.5M bags per month to only 3M bags.²⁰

Montgomery County Bag Fee

Montgomery County's bag tax was passed in May 2011 and will go into effect January, 2012. It is the first of its kind in Maryland. It was meant to address litter concerns and water quality problems in the Anacostia and Potomac Rivers. Degradation of property values and the cost to taxpayers of litter removal were also cited. The revenue from the tax will be deposited into a fund to be used for stormwater management. The bill is otherwise similar to DC's bag fee, except that Montgomery County will tax paper and plastic bags coming from all "retail establishments." This includes stores that sell only non-food items. The original bill did not permit retailers to keep any of the tax, but later a 1 cent allowance for retailers was added, as it was thought necessary to procure cooperation.

The fiscal statement conservatively estimates that bag usage will drop by 50% in the first year. This drop in usage would build in subsequent years. As such, the expected revenue from the tax will be fairly low, peaking at around \$1M and dropping to less than \$500,000 within a few years. Net revenue (including administrative costs) would be lower, dropping to \$216,000 in 2017. However, the bill is expected to decrease the \$3.3M spent annually on litter removal and prevention.²¹

Bag Bans

Outright bans have been established in some localities, mainly in parts of California and North Carolina. In 2007 San Francisco banned distribution of non-biodegradable plastic bags by large supermarkets (over \$2M gross annual sales) and chain pharmacies. Covered stores can distribute paper bags with 40% recycled content, biodegradable bags, or reusable bags. Small retailers and large retailers selling neither

²⁰ Alice Ferguson Foundation, Study of U.S. Capitol's Plastic Bag Fee Indicates Behavioral Change and Positive Support, Feb. 23 2011, http://www.fergusonfoundation.org/trash_initiative/pressrelease_022311.pdf; Washington Post, "DC Bag Tax Nets 2M," Jan 5, 2011, <http://voices.washingtonpost.com/local-breaking-news/dc/dc-bag-tax-nets-2m.html>

²¹ Montgomery County Council Bill 8-11 (2011), http://www.montgomerycountymd.gov/content/council/pdf/bill/2011/20110503_8-11A.pdf; Laris, Michael, The Washington Post, "Montgomery County Council Passes 5 Cent Bag Tax," http://www.washingtonpost.com/local/politics/montgomery-county-council-passes-5-cent-bag-tax/2011/05/03/AFepREjF_story.html; Montgomery County Transportation, Infrastructure, Energy, and the Environment Committee, Agenda April 4, 2011, http://www.montgomerycountymd.gov/content/council/pdf/agenda/cm/2011/110404/20110404_TE1.pdf

food nor pharmaceuticals are free to continue distributing plastic bags.²² Critics of this and similar bans argue that the use of paper and biodegradable bags should not be encouraged on par with reusable bags. Biodegradable bags still take energy to produce, come at up to triple the cost, may exacerbate or not address litter problems, and can cause problems when improperly placed in the conventional plastic bag recycling system. Paper bags are heavy, take up more landfill space, and produce GHG emissions to manufacture and recycle. In Telluride, Colorado, plastic bags are banned and paper bags are distributed only at a fee of 10 cents per bag, 5 of which goes to the Town. The Town's share of the fee goes to a public education campaign, funding of reusable carryout bags, and community cleanup events.²³

Conclusions

While plastic bags are small contributors to waste, they are larger contributors to litter and create problems for conventional recycling systems. Only the weakest of the bag restrictions, the mandatory take-back, has been embraced on a state-wide level. These programs are relatively cheap for stores to implement and may garner less resistance than the others, but have been largely ineffective in producing substantial increases in recycling of plastic bags. In addition, enforcement or analysis of success may be difficult because there are so many regulated parties and recycling figures are mainly self-reported. Further, some argue that a program should focus on reduction of plastic bags rather than recycling. Much of the recycled material goes to make non-recyclable products. Mandatory take-backs provide no incentive to consumers other than convenience, so litterers of plastic bags may not participate.

Bag taxes appear to have been successful in Washington DC in drastically reducing the amount of bags distributed. The majority of retailers (78%) reported a positive or neutral impact on their business. Finally, bag taxes can provide a funding source to address litter cleanup or to aid low-income people with the switch to reusable bags. However, bag taxes do not appear to be significant revenue generators in the long run, because of steep reductions in plastic or paper bag use.

Bag bans have passed mainly in smaller coastal localities. Some have been criticized for targeting only part of the problem by omitting smaller retailers. In addition, they may encourage other single-use bag types that come with their own environmental issues. At least one locality has combined a ban with a tax on paper bags, which may be a better way to channel consumers to reusable rather than paper bags.

²² San Francisco Department of the Environment, Plastic Bag Ban, http://www.sfenvironment.org/our_programs/interests.html?ssi=2&ti=6&ii=142

²³ Town of Telluride, Ordinance 1340 (2010), available at <http://www.telluride-co.gov/Modules/ShowDocument.aspx?documentid=2473>

APPENDIX C

BEVERAGE CONTAINER DEPOSIT LEGISLATION IN THE UNITED STATES AND POTENTIAL FOR A MARYLAND DEPOSIT SYSTEM

NOVEMBER, 2011

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Overview of Current Bottle Bill Programs

Ten U.S. States currently have bottle bills in effect. Table 1 (attachment) provides details for each of the existing programs.

States Considering Repealing or Adopting Bottle Bills

Proposals to repeal existing bottle bills and to adopt new bottle bills are common, though these proposals rarely get far. The only bottle bill to be repealed was Delaware's, and with the exception of Hawaii, there has not been a new bottle bill since the 1980's. However, most bottle bill states have passed amendments expanding or updating their bills in the past ten years.

Delaware

The Delaware bottle bill, originally enacted in 1982, was repealed in 2010²⁴. In its place, Delaware established a universal recycling system, which will require all municipal and commercial waste collectors to pick up single stream recycling from residences and businesses. Pickup from single family homes, bars, and restaurants will begin in September 2011. Pickup from apartments and businesses will follow in 2013 and 2014.

In addition, a temporary recycling fee will be imposed on retailers who sell beverages previously covered under the bottle bill. The fee of 4 cents per container will go to the Delaware Recycling Fund, which will fund low interest loans and grants for single stream recycling start-up costs. The fee will be eliminated no later than December 1, 2014.

The repeal of Delaware's bottle bill came in response to the state's lagging overall recycling rate. Landfill expansions had produced recent increases in fees charged to waste haulers of almost 1/3. In his 2009 veto of an earlier repeal, Governor Markell noted the shortfalls of the bottle bill but called for an alternative. The following were advanced as rationales for repealing the bottle bill:

- Redemption rates had been poor, with an estimated return of only 1/3 of glass bottles and "very few" plastic bottles.²⁵
- Unlike other bottle bills, metal cans were not included in the program, even though they comprised half of all beverage containers sold in the state.²⁶
- The program was costly for retailers to administer. Some proponents of the repeal reported problems with retailers refusing to redeem containers.
- A lack of accountability in the bill made it difficult to track its effectiveness.
- Unredeemed deposits were kept by distributors rather than being used for recycling programs.

Vermont

In 2010, there were simultaneously bills to expand the bottle bill to additional beverage types and to eliminate it in favor of an expanded producer responsibility system.

²⁴ S 234.

²⁵ Governor's Veto Message, House Bill 201, July 20, 2009, <http://governor.delaware.gov/news/2009/07july/20090720-veto.shtml>.

²⁶ State Environmental Resource Center, Issue: Beverage Container Recycling, <http://www.serconline.org/bottlebill/stateactivity.html>.

H 696 would have required manufacturers to pay into a fund to cover the costs of recycling or disposing of the containers, according to type and volume of the packaging.²⁷ Some support for an updated version of the bill to be introduced in the future remains.

Rationales for implementing the EPR system in lieu of the bottle bill were the bottle bill's high cost to distributors and retailers, the inefficiency of having parallel systems for collection of the same material, and stagnating overall recycling rates. Vermont's handling fees are among the highest of the bottle bill states. EPR can eliminate the necessity of sorting bottles by distributor, which lowers costs to retailers. Also, it typically does not require distributors to pick up their empty bottles.

Iowa

A bill introduced in February 2011 would have eliminated the bottle bill in favor of mandatory universal single stream recycling by waste collectors (similar to Delaware).²⁸ A temporary 4 cent fee imposed on retailers for each container sold would have contributed to a fund to assist with the establishment of universal recycling. Littering fines would be increased and tighter goals for landfill reduction would be established. The primary rationales advanced for eliminating the bottle bill were its cost and that the initial bill did not contemplate development of curbside recycling, which is now available to over half of Iowans.

States Considering Adoption of Bottle Bills

In 2011, bottle bills were introduced in Oklahoma, Colorado, Texas, Kansas, South Carolina, Tennessee, Minnesota, New Mexico, North Carolina, Washington, Indiana, and West Virginia. Except for the New Mexico and Colorado bills, all bills were referred to committee and no action was taken before the end of the session. In New Mexico and Colorado, committees voted to postpone indefinitely. A Nevada bill that was originally a bottle deposit program was revised into a study bill and passed in July 2011. The study will explore the possibility of including deposits on paper and plastic grocery bags, in addition to the traditional bottle bill items.

The Colorado bill, HB 11-1247, was unique in that it would have contributed 40% of the unredeemed deposits to K-12 education. Criticism of the bill centered on the potential for fraud, damage to existing recycling programs, and high costs to business owners. Though the bill did not explicitly provide for state-specific labeling, it permitted regulations that would specify additional labeling requirements. The bill's sponsor claimed that state-specific labeling requirements could eliminate fraud, while opponents maintained such requirements would be unconstitutional (*see infra* section III.A for related legal challenges). Opponents also argued that any contribution to education would in practice be eliminated due to fraud and high costs of administration.²⁹

Benefits and Effectiveness of Deposit Programs

Redemption Rates

Recycling rates for beverage containers are generally significantly higher in deposit states than in states with only curbside or drop off programs. However, it is not clear that bottle bill states have higher rates

²⁷ H 696. The bill was referred to committee and no further action was taken.

²⁸ S.F. 249. The bill was referred to committee and no further action was taken.

²⁹ HB 11-1247; The Colorado Independent, "Seinfeld episode kills bottle bill brought by kids," Feb 24, 2011, available at <http://coloradoindependent.com/76444/seinfeld-episode-kills-bottle-bill-brought-by-kids>.

of overall recycling. In 2006, the U.S. had an overall recycling rate of 32.5%.³⁰ The average for bottle bill states was very similar, at 32.39%. Four of the ten bottle bill states fell below the national rate.

Beverages Included

A California study showed that inclusion of an additional type of beverage container in the deposit program caused an increase in the recycling rate for that container from 12% to 17% in the first year.³¹ Several states have added water and other noncarbonated beverages to their programs recently in response to growing market share of these beverages. Exclusion of key beverage or container types likely harms overall participation in the program. For example, Delaware's program, which was estimated to have one of the lowest redemption rates before its repeal, excluded aluminum cans.

Deposit Amounts

Programs with higher deposit amounts may have greater rates of redemption, but may also be more attractive forums for fraud. Michigan, which has consistently had the highest redemption rate, at times over 100%, has the highest overall deposit amount of 10 cents (though two states have higher amounts for liquor bottles). California's beverage recycling program is a useful illustration of the impact of deposit amount on the redemption rate, since its refund amount has been increased four times since the program was created in 1986. In a study matching historical refund amounts with redemption rates, a pattern emerged in which the redemption rate increased in the two or three years after a refund increase, followed by a leveling or even decreasing redemption rate. After the 2007 increase in refund amount, the redemption rate rose sharply from 67 to 82%, before leveling in 2010.³² This suggests that periodic increases in deposit amount may be necessary to preserve existing incentives in the face of inflation.

Primary Place of Redemption

Bottle bill states differ in whether redemption occurs primarily at retailers or certified redemption centers (*see* Table 1). Many states' bills require retailers to accept containers unless there is a certified redemption center nearby, ensuring that consumers will never have to drive more than a few miles from the original purchase place to redeem the deposit. However, there are large disparities in the number of redemption centers in existence. Though the place of redemption does not seem to impact redemption rates consistently, it likely impacts the cost of the program (*see infra* section V.A). In a 2008 survey, residents of Hawaii were asked where they would prefer to return containers. Thirty-three percent reported that they would prefer the certified redemption center where they currently take containers, while 29% reported they would rather redeem at a retailer.³³

Litter Reduction

Beverage containers are generally a larger portion of litter than they are of the solid waste stream. This is one reason that bottle bills have passed despite the fact that beverage containers are a small part of the MSW stream (about 4%). Bottles are also larger than other prevalent types of litter, such as cigarette

³⁰ EPA, *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006 1* (2007), available at <http://www.epa.gov/osw/nonhaz/municipal/pubs/msw06.pdf>.

³¹ California Beverage Container Recycling & Litter Reduction Study 16 (2003)

<http://www.calrecycle.ca.gov/BevContainer/Publications/UCStudy2003.pdf> [hereinafter California Study].

³² Calendar Year 2010 Report Beverage Container Sales, Returns, Redemption, Recycling Rates 7 (2011), available at <http://www.calrecycle.ca.gov/Publications/Recycling/2011019.pdf>.

³³ State of Hawaii Department of Health, *Tracking Participation In and Attitudes Toward the HI-5*

Deposit Beverage Container Recycling Program 40 (2008), available at

http://www.hi5deposit.com/support/HI5_2008SurveyReport.pdf [hereinafter Hawaii Attitudes Survey].

butts, and may be more visible. Studies identifying the proportion of beverage containers in litter have been conducted in over a dozen states and nationally. Results vary widely, and differences in the dates of studies make comparison across states difficult.

By weight and size, beverage containers appear to be significant contributors to litter. A 2004 Ohio study found that beverage containers were 27% by weight of all litter. Other studies looked at the number of “large items” or items greater than 4 inches in size. Of these, beverage containers were found to be 9-24%.³⁴

In terms of the number of all items, the figures for beverage containers are lower. A 2009 nationwide study counted beverage containers at only 2.9% of all litter (14.5% of litter larger than 4 inches).³⁵

Deposit programs are generally regarded as successful in reducing littering of beverage containers. The following are examples of beverage container litter reductions reported in bottle bill states:

- Oregon: Beverage containers as a percentage of all roadside litter dropped from 40% to 6% since the 1971 bottle bill was enacted;³⁶
- Massachusetts: Of litter found at clean-up events around the state in 2009, deposit containers were less likely to be found relative to their market share, while non-deposit containers were more likely to be found;³⁷
- New York: Litter was disproportionately composed of beverage containers that were not included in the deposit program;³⁸
- Hawaii: The percent of litter made up of glass, metal, plastic beverage containers has decreased from 14.5% in 2004 to 5.7% in 2008;³⁹

A 2009 Florida review of the literature found that bottle bills reduce beverage container litter by an average of 55-75%.⁴⁰

However, these reductions cannot be definitively traced to bottle bills. A national survey showed that beverage container litter has decreased by 74% across the nation as a whole since 1969.⁴¹ This may be because of changes in social attitudes or increases in curbside recycling availability. It would be difficult to isolate the impacts of these historical changes from those of a bottle bill.

Further, another study showed that of three Northeast states, one with a bottle bill (Vermont) had the highest number of littered beverage containers per mile of roadway at 130. This exceeded the numbers for New Hampshire (no bottle bill) and Maine (bottle bill).⁴²

³⁴ University of Florida Bureau of Economic and Business Research, Analysis of a Florida Beverage Container Deposit Refund System 18 (2011) [hereinafter Florida Report].

³⁵ Keep American Beautiful, 2009 National Visible Litter Survey and Cost Survey 3-12 (2009), available at http://www.kab.org/site/DocServer/Final_KAB_Report_9-18-09.pdf?docID=4561 [hereinafter KAB Report].

³⁶ Oregon Liquor Control Commission, Bottle Bill & Redemption Center Info, http://www.oregon.gov/OLCC/bottle_bill.shtml

³⁷ Massachusetts Department of Environmental Protection, Beverage Containers in Litter & Public Waste Receptacles, <http://www.mass.gov/dep/recycle/reduce/fs/litter.htm>

³⁸ New York Public Interest Group, Buried in Bottles: A Survey of Beverage Containers in New York Litter (2008), available at <http://www.bottlebill.org/assets/pdfs/campaigns/newyork/2008-NYLitterSurvey.pdf>

³⁹ Hawaii Department of Health, Report to the 25th Legislature, Deposit Beverage Container Program 7 (2010), available at <http://www.hi5deposit.com/support/2010ReportToLeg.pdf> [hereinafter Hawaii Report]

⁴⁰ Florida Report at 19.

⁴¹ KAB Report at ES-7.

⁴² Adjusted for population, traffic levels, recent rainfall and temperatures, and proximity to heavily populated areas. American Beverage Association, Northeast 2010 Litter Survey (2010), available at <http://www.wecandobettervt.com/wp-content/uploads/2011/07/2010-Northeast-Litter-Survey-Final-Report.pdf>

Deposit Systems and Curbside Recycling Programs

Deposit systems have higher rates of recovery for beverage containers than do curbside programs. According to a report by Businesses and Environmentalists Allied for Recycling (BEAR), the capture and participation rate for curbside programs is generally around 50%.⁴³ The actual recycling rate is lower, since most states have less than 100% availability of curbside programs. Maryland recycles 42.9% of its beverage containers through a combination of curbside and drop-off recycling. Deposit systems have an average recovery rate of around 80%. Bottle bills produce better quality materials, better target the 32% of beverage containers consumed away from home, and encourage people to pick up containers that have already been littered. Beverage container production has trended toward single-use PET containers, and away from aluminum containers. Since PET bottles are more frequently consumed outside the home, bottle bills will continue to capture a significant portion of the beverage container stream that evades curbside pickup.⁴⁴

Estimated Benefits to Maryland of Instituting a Bottle Deposit Program

Increase in Recycling Rate

A bottle bill would likely significantly increase the recycling rate of beverage containers in Maryland from 42.9% to 75-90%, which is the mid-range redemption rate for existing bottle bills. The impact on Maryland's overall recycling rate would be a modest increase, from 1-2 percentage points.⁴⁵ This does not include indirect impacts the program may have on recycling behavior. For example, outreach efforts undertaken as part of the implementation of a bottle bill may increase awareness of recycling programs in general, which could lead to an increase in recycling of non-beverage items. In addition, the cash incentive provided by a bottle bill may capture the attention of people who would not recycle for purely environmental reasons, increasing their awareness of recycling in general. Conversely, if people no longer use curbside or drop-off recycling programs for beverage containers, they may feel use of those programs for other items is no longer worth the effort.

GHG Emissions Reductions & Energy Savings

As a result of a bottle bill, Maryland could avoid between 164,000 and 241,000 MTCO₂e additional greenhouse gas emissions annually.⁴⁶

The avoided GHG emissions were calculated using the EPA WARM Model. The 2009 total sales of beverage containers in Maryland were estimated to be 249,616 tons. The proportion of beverage containers made from each material (glass, PET, HPDE, and aluminum) was available for 2006 data. It was assumed that these proportions remained steady, and the 2006 proportions were multiplied by the total 2009 sales to obtain estimated 2009 tonnages for beverage containers of each material. The status quo assumed a current beverage container recycling rate of 42.9% for each material. For the bottle bill redemption scenarios, the redemption rate was assumed to equal the recycling rate. The lower end of the

⁴³ Businesses and Environmentalists Allied for Recycling, *Understanding Beverage Container Recovery* 2-19 (2002), available at <http://thecorr.org/Bear.pdf> [hereinafter BEAR Report].

⁴⁴ *Id.* at 2-5.

⁴⁵ Assumes that beverage containers are 4.17% of the MSW stream, that the current EPA recycling rate is 34.1%, and that total MSW tonnage is 5,984,311. See MDE Department of Waste Management, *Information Regarding Bottle Bills*, October 29, 2010.

⁴⁶ EPA WARM Model; CM Consulting, *Quantifying Potential Impacts of a Bottle Bill in the State of Maryland, USA 5* (2010) (providing the breakdown by materials for 2006); MDE Department of Waste Management, *Information Regarding Bottle Bills*, October 29, 2010 (providing the 2009 total beverage container tonnage and the status quo beverage container recycling rate).

range represents 75% redemption and the higher end represents 90% redemption. The following are the tonnages entered into the EPA Warm Model:

Table 2: Estimated Beverage Container Recycling and Landfilling Scenarios for Maryland, tons

	Glass	PET	HPDE	Aluminum
2009 beverage sales (estimate)	163105	58215	1615	26880
Currently Recycled	69972	24974	693	11532
Currently Landfilled	93133	33241	922	15349
Recycled 75% redemption	122329	43662	1212	20160
Landfilled 75% redemption	40776	14554	404	6720
Recycled 90% redemption	146794	52394	1454	24192
Landfilled 90% redemption	16310	5822	162	2688

When aluminum cans are created from recycled material there is a 95% energy savings relative to disposing of the container and constructing a new one from virgin material. For glass, the savings is 30%, and for plastic, the savings is 70%.⁴⁷

Costs of Beverage Container Recycling Programs

The overall cost of a bottle deposit system can be estimated by netting the values of the following costs and benefits:

Table 3: Costs & Benefits of Bottle Deposits

Costs	Benefits
Handling cost to retailers or redemption centers	Added scrap value – because of increased quantity and quality of materials Reduction in hauling costs to curbside programs Reduction in landfill and collection costs for garbage Reduction in litter pickup costs Environmental benefits (avoided GHG emissions, ecosystem and public health benefits, etc.)
Collection, processing, and labeling costs to distributors	
Program administration and outreach	
Cost to consumers to redeem containers (travel, time)	
Lost sales to retailers	

In addition to these, there are two impacts of bottle bills that do not constitute costs or benefits to the state as a whole but which are significant for their redistributive effect. The first item is the unredeemed deposits, which operate as a transfer from the consumer to the state (or whoever the statute has designated as the recipient of these funds). The second item is the scrap value previously captured by counties operating recycling programs that would be diverted to the collector of scrap value under the program (either the distributor or the redemption center, depending on program design).

Three states have published estimates of the total net costs of their deposit systems and two non-bottle bill states have projected the costs of a proposed program. Comparison across states is of limited usefulness because of significant differences in the method of calculation. However, the cost studies can provide an idea of a potential range of costs and the burdens to each party involved.

⁴⁷ California Department of Conservation, Six-Month Report of Beverage Container Recycling & Significant Carbon Reductions 6 (2007).

California

The California system differs from traditional deposit programs and has been recognized as having lower costs per container than the other systems.⁴⁸ In California, the State receives and distributes all money through a fund. The manufacturers pay a processing fee to the State. The distributors pay a separate redemption value to the State, and charge that value to the retailer, who passes it on to the consumer. The consumer takes the empties to recyclers, which are usually redemption centers. The recycler pays the consumer the redemption value and sells the containers to a processor. The State pays the redemption value and a processing payment to the processor, who passes it on to the recycler. In this system, the manufacturer and distributor can avoid picking up their empty containers and the retailer avoids sorting, storing and (usually) redeeming containers.

A California study showed that the costs per ton of recycling glass, aluminum and plastic are greater when the collection point is a retailer as opposed to a redemption center.⁴⁹ It also concluded that overall costs are likely to be much higher for traditional deposit programs like Oregon's, because of the increased need to sort and the cost to small retailers of redeeming deposits. In 2011, Oregon amended its bottle bill to provide for a pilot program that will establish large redemption centers.

California was the only bottle bill state that reported a net benefit (\$57M in 2003) of the program over what would occur if it were to be repealed. This figure took into account the transportation costs to recycle extra materials, the scrap value of extra materials, and the decrease in landfilling caused by the diversion of more containers, but it did not take into account environmental benefits or costs to the state of administering the program.⁵⁰

Hawaii is the only other state to have a system where deposit amounts are paid into and repaid from a state fund and redemption largely occurs outside retail stores.

Michigan

A 2000 estimate of costs and benefits including several categories of environmental benefits reported total costs of \$94M in excess of benefits.⁵¹ The study is useful in illustrating which parties bear the greatest costs and reap the greatest benefits from a bottle deposit system. Retailers incurred the greatest cost, as sorting and redeeming costs far exceeded the 25% of unredeemed deposits they receive under the program. Costs to distributors also exceeded benefits to distributors by \$35M, mainly because of collection and processing costs. Residents benefitted overall from the environmental effects of increased recycling and the State benefitted from litter reduction and the escheats, which were used for other environmental programs.

Vermont

A 2007 report projected that the net cost of the program in 2007 would be \$5.6M. That estimate omits environmental benefits and costs to consumers of returning containers, assumes costs to retailers are equal to the handling fee, and counts unredeemed deposits as revenue.

⁴⁸ BEAR Report at 3-1.

⁴⁹ California Study at 19.

⁵⁰ Id. at 50.

⁵¹ Stutz, John and Carrie Gilbert, Michigan Bottle Bill, A Final Report to Michigan Great Lakes Protection Fund 11 (2000), available at <http://www.deq.state.mi.us/documents/deq-water-greatlakes-protection-michiganbottle.pdf> [hereinafter Michigan Report].

It costs the average redemption center or retailer 3.4 cents per container to redeem, sort, and store the containers (3 cent weighted average). However, it was estimated that if distributors used co-mingling agreements to achieve the maximum possible reduction in sorting, handling costs would be reduced by 0.3 cents per container.⁵² The cost to distributors to collect empty bottles was 1.5 cents per container when the distributor collected the containers itself and 1 cent when a third party collected them.

Rhode Island

The Rhode Island study attempted to project the net costs of a plan to institute a bottle bill with state-run redemption centers. The plan would also require restaurant and bar recycling. The Rhode Island study is perhaps more complete than some of the others because it includes consumer transportation costs, reduced litter collection costs, avoided refuse collection and disposal, carbon savings, ecosystem and public health benefits, and lost retail sales, in addition to the handling, processing, and scrap values. The total net cost of the program was estimated to be \$23M annually.⁵³

Washington

The Washington study looked at three bottle bill scenarios: retail redemption; redemption centers; and a third-party organization. The third-party organization model would create a private, nonprofit organization that would administer the program for member distributors. It may operate something like a co-mingling agreement, except with ultimate responsibility for collection and processing of containers sold by its members. The study found that costs of administering the program are very dependent on program design, ranging from \$59M to \$148M. The redemption center and third party organization scenarios both produced a net gain for the State, while retail redemption produced a net cost of up to \$57M. The study took into account various environmental benefits and counted unredeemed deposits as revenue.⁵⁴

Florida

The Florida report is a simple projection of some of the basic costs and benefits of a deposit system. The benefits were made up of litter and landfill savings, scrap value, and a reduction in dead weight loss (each dollar of unredeemed deposits was assumed to be used for reducing or preventing the increase of taxes). Costs were the handling costs and the costs to the individual to return the containers. Other environmental benefits and costs to distributors or manufacturers were omitted. Using this model, any deposit amount between 1 and 5 cents would produce a net benefit. The value of that benefit varied widely depending on deposit amount, with a maximum of \$203M and a minimum of \$21M.⁵⁵

⁵² Vermont Agency of Natural Resources Solid Waste Program, *The Costs of Beverage Container Redemption in Vermont 7* (2007), available at http://www.anr.state.vt.us/dec/wastediv/solid/Bottle_Bill/DSMReportJune2007.pdf [hereinafter Vermont Report].

⁵³ Rhode Island Resource Recovery Corporation, *Analysis of Beverage Container System Options to Increase Municipal Recycling in Rhode Island 23* (2009) [hereinafter Rhode Island Report].

⁵⁴ City of Tacoma Solid Waste Management, *Economic and Environmental Benefits of a Beverage Container Recovery System in the State of Washington 46* (2005), available at <http://www.productstewardship.net/PDFs/productsAppendixAWashingtonBottleBillReport.pdf>

⁵⁵ Florida Report at 12.

Market Value of Beverage Container Materials

In 2010, the average scrap value for three materials likely to be included in a bottle bill were as follows:⁵⁶

Table 4: Scrap Values by Material

	Glass	Aluminum	Plastic
Value per container (cents)	0.63	2.48	1.23
Value per Ton (\$)	23.94	1453.28	361.13

Using the scrap values above and the proportion of glass, aluminum, and plastic beverage containers among those beverage containers sold in Maryland, the weighted average scrap value in Maryland would be 1.61 cents per container.

Estimated Costs of a Bottle Bill in Maryland

The costs of collecting and processing containers under a deposit program will vary by program design, as discussed above. Major costs can be separated into handling costs, which are borne by the retailer or redemption center, and processing costs, which fall on the party responsible for collecting the empty containers from the place of redemption and arranging for their recycling. In traditional systems, this will be the distributor, while in California or Hawaii, this is a third party (called a processor in California). California, which uses mainly high-volume redemption centers, has calculated its handling costs at 1.5 cents per container. Vermont has calculated its handling costs at around 3 cents per container. Processing costs are sensitive to changes in fuel price, so available estimates can quickly become outdated. However, Vermont estimated in 2007 that processing costs were about 1 cent per container when a co-mingling agreement is used and 1.5 cents when the distributor collects the containers itself.⁵⁷

Assuming Maryland had high-volume redemption centers and distributors efficiently used comingling agreements, the cost to collect beverage containers under a bottle bill would be around .89 cents in excess of scrap value per container.⁵⁸ At an 80% redemption rate, this would total around \$28.9M for collection and processing of almost 200,000 tons of beverage containers.⁵⁹ If container returns were disproportionate to container sales in Maryland with respect to material type, this figure could change significantly.

This net cost estimate omits costs unrelated to the collection and processing of containers. Other costs and benefits are heavily dependent on factors specific to the state, such as beverage market characteristics and geographic area, so extrapolation from other states' data is more difficult. However, below are some examples of these costs and benefits as reported by other states.

Transportation by consumers: 1.6 cents per container (RI); \$3.67M total (VT). Note however that transportation costs to consumers could be virtually eliminated with appropriate siting of redemption centers or with retailer redemption.

Litter and landfill savings: .44 cents per container combined (FL); \$3.5M for decreased disposal costs (WA); \$1.8M for decreased garbage collection (WA); \$1.3M for decreased garbage collection (RI); \$870,000 in decreased disposal (RI); \$2.6M for litter reduction (MI).

⁵⁶ Based on prices from California Department of Resources Recycling and Recovery and Strategic Materials, Inc., cited in Florida Report at 7. Glass price excludes mixed glass, which has a lower value but is less prevalent in deposit systems.

⁵⁷ Vermont Report at 8.

⁵⁸ 1.61 cents – 1.5 cents – 1 cent = -.89 cents

⁵⁹ Using 2009 total beverage sales of 249,816 tons, converted into containers with container/ton estimates for each material type.

Reduction in pickup costs for curbside programs: \$4M (WA).

Other environmental benefits: \$20.9M (WA); \$2.8M (RI); \$38M (MI). Studies have included GHG emissions reductions, public health benefits from reduced litter (avoided glass injuries), avoided acidification and eutrophication, and avoided human toxicity.

Reduction in beverage sales: economists have disagreed about the magnitude of this cost. Some argue that beverage sales will essentially remain unchanged, since the increase in beverage price will be small and uniform across substitutes. Other states have estimated the cost at \$12.5 – 100M, depending on whether the state borders bottle bill states and the size of the beverage market.⁶⁰

There are a variety of ways that unredeemed deposits can be used to offset the net costs of collecting and processing beverage containers under a bottle deposit system. Payments can be made to redemption centers (or retailers) to cover some costs of counting, sorting, and storing containers and transacting the redemptions. Payments can also be made to distributors (or processors) to cover their costs of retrieving empty containers and marketing the material for recycling. The estimated unredeemed deposits in Maryland at 80% redemption and a 5 cent deposit are \$40,773,817. This would be enough to entirely cover the handling and processing costs that exceed scrap value. Neither of these payments would impact the overall net cost of the program, but would reapportion the financial burden of recycling beverage containers away from retailers or distributors.

Cost Effectiveness of a Bottle Bill vs. Expanded Curbside Recycling

Deposit systems and curbside recycling programs are not mutually exclusive.⁶¹ Still, parties to bottle bill deliberations in several states have raised the question of whether resources would be better spent expanding existing curbside recycling or implementing a new bottle bill. With residential curbside availability of over 80% in Maryland, it may be that improving on the existing infrastructure yields better per-dollar environmental benefits than a new regime targeted solely to beverage containers.

In 2009, a report was created for the Rhode Island legislature to answer a similar question. The report compared the cost-effectiveness of a plan to expand curbside and drop-off programs with a plan to implement a bottle bill.⁶² Rhode Island had an existing beverage container recovery rate of 39% (similar to Maryland's 42.9%) through a combination of curbside and drop-off recycling. The expanded recycling plan would improve the existing MRF to allow it to process single stream material and reduce material losses. It would also provide curbside recycling to 100,000 additional multi-family households and convert to single stream in municipalities with curbside recycling. Bars and restaurants would be required to recycle beverage containers. The solid waste rate structures would be changed to pay-as-you-throw. Sixty-four gallon recycling carts would be provided to households with curbside recycling. Finally, an educational campaign would be funded to encourage participation. The bottle bill proposal would be similar to California's system in that the deposits would be collected by the state and the refunds dispensed by the state. However, redemption centers would be publicly operated.

⁶⁰ Florida Study at 4 (arguing that any impact on beverage consumption will be near zero); Rhode Island Report at 15 (providing a rough estimate based on research done by University of Kentucky).

⁶¹ American Beverage Association, R.W. Beck 2008 ABA Community Survey 2.3 (2009) (showing that bottle bill states had higher rates of curbside availability than other states – 80.8% average among bottle bill states versus 73% national average); James E. McCarthy, *Bottle Bills and Curbside Recycling: Are They Compatible?*, CRS Report 93-114 (1993) (stating that bottle bills and curbside recycling can feasibly coexist and that bottle bills are unlikely to significantly inhibit financial viability of curbside programs.)

⁶² Rhode Island Report.

The Rhode Island report found that the expanded curbside and drop-off system would produce a greater increase in recycling tonnage than the bottle bill (27 and 11%, respectively) and would cost less (net cost of \$250 and \$1050 per ton, respectively). However, the authors were more equivocal in drawing conclusions about the better course of action. The report warned that neither system was economically sustainable without identifying some dedicated funding source. Moreover, while the expanded curbside system is cheaper overall, the bottle bill has a built-in funding stream in the form of unredeemed deposits. Applying unredeemed deposits against the net cost of the bottle bill yielded a remaining cost slightly less than that of the expanded curbside program. So, it may in practice be more difficult to fund the curbside plan. Finally, the bottle bill was projected to have a substantial impact on litter (reduction of 9% and \$267,000 in annual litter pickup), while the expanded curbside program would have no appreciable litter reduction.

Rhode Island has a much smaller beverage market than does Maryland, with about 15% of the beverage sales. Higher volumes of beverages can actually reduce the per ton costs for bottle bills because increased economies of scale can support the use of RVMs and larger, more efficient redemption centers.

The 2002 Businesses and Environmentalists Allied for Recycling Report, *Understanding Beverage Container Recovery*, calculated net costs per beverage container for deposit, curbside, and drop-off systems.⁶³ Below is a table showing average capture rate and cost for each method of beverage container recovery. Note that a well-designed deposit system that uses RVMs or avoids retail redemption may actually be cheaper per beverage container than a curbside program.

Table 5: Costs and Capture Rate for Beverage Container Recycling Programs

	Deposit	Deposit with RVM	California Deposit	Curbside	Drop-off
Cost (per container)	2.67	1.13	.55	1.72	.30
Participation & Capture rate	78%			50%	10%

Potential Problems With Deposit-Return Systems

Fraud

Fraudulent redemption occurs when large quantities of containers purchased in states without bottle bills are transported to bottle bill states for redemption. It is costly for the bottle bill state because it reduces the amount of escheats, or in states without escheat provisions, the amount of unredeemed deposits kept by the distributor. Michigan and Iowa consistently have the highest redemption rates, but are also the most geographically isolated from other bottle bill states, suggesting that fraud may occur more often in states that have many non-bottle bill neighbors. With the repeal of Delaware's bill, Maryland would have four neighbor-states (plus DC) without bottle bills.

Michigan

Michigan appears to have had the most severe problems with redemption fraud. A 2000 estimate placed the amount of fraud at around \$10M annually (out of \$387M in total returned deposits).⁶⁴ This would produce a total cost of \$12.99M to the system as a whole because of extra sorting and processing of the out-of-state bottles. The exact amount of fraud was impossible to determine because the original bill

⁶³ BEAR Report at 2-19, 3-2. Uses data from 1999.

⁶⁴ Michigan Report at 12.

provided no way to identify containers from other states. Redemption rates over 100% were reported in 1992 and Michigan has the highest average redemption rate (97.27%).

In 2007, an 18-month fraud investigation culminated in the arrest of 13 people. The investigation was initiated to determine why unredeemed deposits had dropped sharply after 2001, despite increasing beverage sales. Two Ohio scrap yards were buying cans at above market prices, crushing them to look like they had gone through RVMs, and bagging them in unique Michigan redemption bags. Then, a group of Michigan retailers would take the bags and collect deposit refunds from the distributors who came to retrieve the containers. The retailers tampered with RVM readouts to report that the containers had been returned by consumers, when in fact they had not. Retailers and the two scrap yards split the refund money. The retailers were charged with maintaining a continuing criminal enterprise and fraud, both felonies.⁶⁵

In 2008, Michigan passed legislation to address redemption fraud.⁶⁶ In counties near the borders, RVMs must be outfitted with technology that can detect a state-specific marking on containers. Containers without the marking may no longer be sold in Michigan by manufacturers selling over 500,000 cases or for products that have been severely over-redeemed. Because these changes did not become fully effective until this year, information about the success of these interventions is unavailable.

State specific markings may be the only way to detect or eliminate fraud, but these requirements have been repeatedly subject to challenge in court. In addition to Michigan, New York attempted a similar requirement in its 2009 revisions. The International Bottled Water Association and others sued, challenging the UPC code requirement and other provisions. The State did not defend the UPC code requirement, and the court ultimately issued a permanent injunction with respect to that portion of the amendment.⁶⁷

This year, the American Beverage Association sued to enjoin Michigan from implementing its state-specific marking requirement. Similar to the New York challenge, the American Beverage Association claimed that the requirement violated the Commerce Clause by placing an unreasonable burden on interstate commerce. Beverage companies would be required to manufacture a separate product (or at least a separate label) for use in only one state. The issue has not yet been resolved.⁶⁸

Maine

The Maine Department of Agriculture created a report attempting to measure fraudulent redemption. However, the study failed to provide an estimate because surveying of retailers yielded insufficient or unreliable results (unreasonably high or low instances of fraudulent redemption reported).⁶⁹ This

⁶⁵ AR November 2007 Recycling and Waste News, "Operation Can Scam," Nov. 2007, <http://www.americanrecycler.com/1107/operation.shtml>

⁶⁶ Beverage Container Redemption Antifraud Act and Reverse Vending Machine Antifraud Act, Public Acts 387 and 388.

⁶⁷ New York State Department of Environmental Conservation, Litigation Updates for IBWA, et al v. Paterson, et al, <http://www.dec.ny.gov/chemical/57774.html>.

⁶⁸ The lower court granted summary judgment to the State on the issue of whether the amendment per se violates the Commerce Clause, but declined to order summary judgment on the ultimate issue, which requires a balancing test. On September 13, 2011, the Sixth Circuit Court of Appeals accepted an appeal of the summary judgment issued on the per se determination. That appeal will proceed before the rest of the case is resolved. American Beverage Ass'n v. Snyder, Case No. 11-2097 (W.D. Mich. 2011), <http://www.sixthcircuitappellateblog.com/recent-cases/state-specific-labels-subject-to-constitutional-challenge/>.

⁶⁹ Response to Chapter 40 Resolve, To Estimate the Annual Value of Uncollected Bottle Deposits, Fraud and Total Costs under Maine's Bottle Bill (2006), available at <http://www.bottlebill.org/assets/pdfs/legis/usa/ME-redemption.pdf>.

highlights the problems of many states in detecting fraudulent redemption, since containers are usually identical regardless of the state in which they originate. The 2006 report indicated that there were no controls in the original bill to prevent redemption of out-of-state containers and that RVMs were not currently outfitted with technology that could discriminate among different states' containers.

In 2009 the law was amended to provide additional requirements for bulk redeemers. Redeemers of 2500 or more containers at a time must provide a name, address, and license plate number to the redemption center. The information is kept by the State for 12 months. Maine is currently prosecuting at least one fraudulent redeemer who received \$10k in deposits for out of state containers.⁷⁰

Vermin

Most of the existing bottle bills require retailers to accept, sort, and store returned containers on site until distributors retrieve them. While states generally allow retailers to refuse containers with significant amounts of liquid or other materials, they do not allow retailers to require that bottles be rinsed. This has drawn criticism from some who believe beverage residue in stored containers will draw vermin to retail stores and create health problems.

The problem could be mitigated by requiring redemption at off-site redemption centers where containers can be stored farther from food products or by adopting a system where containers need not be sorted or stored for long periods of time. For example, co-mingling agreements between multiple distributors can allow distributors to contract with a third party who collects bottles belonging to all distributors at once.

Breakage

Glass beverage containers can break during collection and processing to the point that they are no longer valuable for recycling. In deposit systems, breakage rarely results in the materials becoming unfit for recycling, while in single stream systems, breakage is a pervasive problem. In single stream systems, 40% of all glass ends up in landfills, 20% is very small pieces reused only once for things like road pavement, and only 40% is recycled into other containers. In deposit systems, almost no glass ends up in landfills and 98% is recycled into other containers.⁷¹ RVMs are equipped to accept glass bottles without breaking them. In addition, bottle bills generally allow redemption centers to refuse broken bottles, providing an incentive for the consumer to keep bottles whole. Further, contamination of paper or other materials by broken glass is avoided by having a separate system for beverage containers. As a result, breakage is much less of a problem in deposit programs.

Conclusions & Program Design Considerations

Integration with Maryland's Existing Recycling Programs

Most Marylanders have access to curbside recycling, and others have access to county drop-off locations. Critics of bottle bills have cited "duplicated logistics" as a major inefficiency created by instituting bottle bills in places that already have curbside recycling.⁷² The question arises whether counties should continue curbside pickup of beverage containers when a bottle bill is enacted.

⁷⁰ Maine Public Broadcasting Network, "Trial Opens for Kittery Couple Accused of Bottle Redemption Fraud," Aug 16, 2011, available at

<http://www.mpbn.net/News/MaineNewsArchive/tabid/181/ctl/ViewItem/mid/3475/ItemId/17634/Default.aspx>.

⁷¹ Container Recycling Institute, Understanding Economic and Environmental Impacts of Single Stream Collection Systems 11 (2009), available at <http://www.container-recycling.org/assets/pdfs/reports/2009-SingleStream.pdf>.

⁷² European, Better Rules for a Better Environment: Modern Beverage Container Policy.

In states with bottle bills, a small but significant percentage of beverage containers continue to be captured by curbside programs. For example, in California, 20% of all glass beverage containers returned for recycling were captured through curbside recycling. Ten percent of returned PET beverage containers and 4% of returned aluminum beverage containers were captured through curbside programs.⁷³ Sixty-eight percent of containers are consumed at home, where the effort required to recycle curbside is much less than the effort to redeem containers. A 5 cent deposit may not be incentive enough for some people to store, transport, and redeem containers that can be recycled curbside. If curbside programs stopped collecting these containers, there is a risk that some containers consumed at home would be discarded rather than redeemed.

Counties or municipalities that collect curbside recycling could redeem beverage containers themselves. Since the deposit amount is greater than the scrap value, counties could receive more per container than they would without the bottle bill (though the number of beverage containers collected will be greatly decreased). Existing routes likely would not change regardless of whether beverage container pickup is discontinued. For these reasons, it may be advantageous for curbside recyclers to continue to pick up beverage containers. A review of some curbside programs in bottle bill states reveals that generally beverage containers continue to be accepted.

States with deposit programs can use revenue from unredeemed deposits to replace some of the scrap value lost by counties, municipalities, or private services that do curbside pickup. At least two states, California and Hawaii, use a portion of the unredeemed deposits to make payments to counties and support curbside programs.⁷⁴ In California, it was estimated that elimination of the deposit program would actually create a loss to curbside programs of \$30-40M.⁷⁵ This accounts for the diversion of scrap value from curbside programs, payments made to curbside programs out of unredeemed deposits, and the changes in hauling/processing costs to curbside programs.

Redemption Centers

Siting and Certification Process

Channeling redemption centers to proper sites is important to ensuring participation in the program and to reducing costs. Redemption centers should be sited to minimize extra driving distance by consumers and maximize volume at each center.

Three existing bottle bills require all retailers to accept beverage containers, regardless of whether there is a nearby redemption center. As discussed above, forced redemption by all retailers can be inefficient for several reasons. It is costly for small retailers to store and sort containers because of limited space and staff. Small retailers will likely have low volumes of returns, since people generally would bring back their containers to stores from which they were purchased. Low volume operations yield higher per-container costs for handling, since RVMs are generally not used and other economies of scale are not captured. Finally, there is likely some increase in mileage for distributors or processors who pick up containers from each retailer rather than from a regional redemption center.

The other states have a combination of both redemption centers and retailers, where retailers must accept containers only when there is no redemption center within a specified area. In practice, some of these states have mostly redemption centers and others have mostly retail redemption (*See* Table 1 to compare

⁷³ California Department of Resources Recycling and Recovery, Calendar Year 2010 Report of Beverage Container Sales, Returns, Redemption, & Recycling Rates 8 (2011), *available at* <http://www.calrecycle.ca.gov/Publications/Recycling/2011019.pdf>.

⁷⁴ Hawaii Report at 8.

⁷⁵ California Study at 38.

the number of redemption centers in each state). Currently, control of siting of redemption centers is very weak among bottle bill states. A few states (Oregon, Maine) consider location in a convenience determination when deciding whether to issue a certification for a new center. To get optimal quantity and location of redemption centers, it may be necessary for Maryland to have some involvement in the siting of redemption centers. To ensure there are enough redemption centers, a handling fee may need to be paid out of escheats or as a separate charge to distributors. This will be necessary where average scrap values are lower than handling costs. In Maryland, the weighted average scrap value would be around 1.61 cents per container, which is very close to the lower end of handling costs reported by other states. In pockets of low population density where RVMs are not used, it is very likely that redemption centers would fail to enter the market without a handling fee. However, a flat handling fee with no controls on siting may encourage over-entry in high-density areas. In that case, the State may need to consider location in certifying centers, or structure handling fees differently.⁷⁶

Redemption centers may be standalone operations or part of existing businesses. For example, in bottle bill states, redemption centers have located in: shopping malls; Goodwill stores; community colleges; churches; park & rides; air force bases; parks; liquor stores; senior centers; and auto parts stores. Hawaii also has a mobile center that can be driven to special events or schools and is equipped with RVMs. In California, some standalone centers are small kiosks.

Setup Costs and Handling Fees

Hawaii funds the setup of certain redemption centers through grants from its bottle bill fund. The grants for 2008 ranged from \$72,000 to \$311,000 for each redemption center.⁷⁷ The Rhode Island report contemplated the setup of 50 state-run centers with an annual operating cost of \$165,000 per year for each. In addition, it was estimated that the additional startup costs in the first year for establishing the centers would be \$3.1M, or \$62,000 per center.⁷⁸

Table 1 shows the amount and origin of handling fees for each bottle bill state. The handling fees of 0-4 cents per container would likely barely cover the costs to redeem each container (estimated at 1.5-3 cents per container). Startup expenses would have to come out of scrap values or from state grants.

Reverse Vending Machines

Reverse vending machines allow the redemption process to occur with fewer staff and shorter wait times. In a manual redemption system, the consumer brings containers to a staff member who counts or weighs the containers. Some states establish uniform refund amounts per pound and require consumers to accept this amount when redeeming in bulk. Staff must calculate the refund and issue cash to the consumer in addition to sorting, crushing, and storing containers by hand. In an RVM system, the consumer places containers, one-by-one, into a hole in the front of the machine. In some cases, there is a separate machine for each material type, but the newer RVMs can accept glass, plastic, and metal cans in the same machine. The RVM scans the UPC code on the bottle or detects the material of the container to ensure it is eligible for redemption. Some machines automatically crush or shred the containers for easier storage. Machines that accept glass have cushioning to avoid breakage as the bottle moves through the machine. The RVM counts the containers and prints a receipt for the consumer, who exchanges the receipt for cash in the store or center. The containers drop into bins housed in cabinets in the bottom or to the side of the machine. Newer machines can process up to 45 containers per minute and can hold up to 975 cans, 250

⁷⁶ The Florida cost projection study suggests a handling fee where the total fee increases with volume, but the per-container fee decreases with volume. Florida Report at 15.

⁷⁷ Hawaii Report at 10.

⁷⁸ Rhode Island Report at 13.

plastic bottles, or 200 intact glass bottles. Smaller, slower versions are available for retailers with space or money constraints.⁷⁹

RVMs reduce the handling costs to retailers or redemption centers with high volumes of containers. As a result, they are used mainly at large retailers like supermarkets or large redemption centers. In some regions, RVMs are still used infrequently. In Hawaii, only 11 of 103 certified redemption centers had RVMs and a survey showed that only 16% of residents who redeemed containers visited centers with RVMs.⁸⁰ In contrast, New York requires large chain retailers to have at least 3, 4, or 8 RVMs, depending on the square footage of the store.⁸¹ Retailers are responsible for emptying and maintaining the machines under the statute, though some retailers contract with RVM companies for maintenance. Several companies that sell or lease RVMs will also contract with distributors or manufacturers to pick up empty containers from retailers or redemption centers.⁸²

RVMs cost between \$10,000 and \$25,000. The Vermont cost survey from 2007 showed that retail stores with RVMs had between 1 and 4 machines and the cost to lease and operate the machines was between \$217 and \$1012 per month.⁸³

Hawaii used some of the unredeemed deposits to provide a one-time rebate for 50% of the cost of each new RVM installed by the end of 2007.⁸⁴ The total cost of the grant program was \$765,785 for a total of 151 RVMs, or \$5,071 per machine.

Enforcement

Table 1 (attachment) shows the penalties included in each of the existing statutes. In addition, several states have provided consumer complaint systems on their websites in which noncompliant retailers or redemption centers can be reported. Enforcement efforts and costs to the state may be significant. Aside from (mostly civil) penalties listed in the statute, criminal prosecutions for redemption fraud have occurred in several states. Depending on program design, the State may also undertake audits or inspections of retailers, redemption centers, or processors. In California, where redemption centers and processors must submit claims for payment to the state fund, there were 89 compliance audits and over 17,000 inspections completed in 2010.⁸⁵ Enforcement costs to the State may be reduced by structuring the program so that payments are made entirely between private parties, rather than through a state fund. However, any escheat provision will require the state to ensure distributors are reporting accurately their sales and redemption numbers.

⁷⁹ Envipco, an American RVM company, has pictures and descriptions of several lines of machines available on its website at <http://www.envipco.com/recovery-solutions/reverse-vending.php>

⁸⁰ Hawaii Attitudes Survey at 36.

⁸¹ 40,000-60,000 sq ft - 3 RVMs; 65,000-85,000 sq ft - 4 RVMs; 85,000 sq ft and over – 8 RVMs; New York Environmental Conservation Law, §27-1007(1)(b).

⁸² New York DEP, Third-Party Systems and Related Companies, <http://www.dec.ny.gov/chemical/54799.html>

⁸³ Vermont Report at 6.

⁸⁴ Hawaii Report to Legislature at 2.

⁸⁵ Includes recycler, dealer, and processor load inspections. California Beverage Container Recycling and Litter Reduction Program Fact Sheet (2010), <http://www.calrecycle.ca.gov/BevContainer/ProgramInfo/FactSheet.pdf>

Use of Unredeemed Deposits

Table 6: Estimated Quantity of Maryland Unredeemed Deposits

	75% Redemption	80% Redemption	85% Redemption	90% Redemption	95% Redemption
5 cent deposit	\$50,967,271	\$40,773,817	\$30,580,363	\$20,386,909	\$10,193,454
10 cent deposit	\$101,934,542	\$81,547,634	\$61,160,726	\$40,773,817	\$20,386,908

Table 5 above shows unredeemed deposit amounts for several scenarios, with the shaded cells representing the more likely redemption rates given each deposit amount.⁸⁶

Potential Uses of Funds

In seven of the ten bottle bills, the majority or all of the unredeemed deposits go to the state. In Iowa and Oregon, the beverage distributors keep the entirety of the unredeemed deposits and in Vermont distributors keep all unredeemed deposits except for those on liquor bottles, which go to a state liquor control fund. Michigan and New York each keep only a portion of the unredeemed deposits. Twenty-five percent of the Michigan deposits go to retailers to help cover the costs of redeeming, storing, and sorting the containers. Twenty percent of New York deposits are retained by the distributor.

Of the states that obtain the unredeemed deposits, there are two ways of receiving the funds. In most states, the bill contains an escheat provision that requires distributors or manufacturers to pay the amount of unredeemed deposits on a periodic basis to the state. This requires the distributor to maintain and submit reports accounting for the number of containers redeemed versus the number sold. In California and Hawaii, all deposits are paid into a state fund as soon as the container leaves the distributors' hands. The state fund distributes the deposits back to consumers as they redeem containers, and the unredeemed deposits never leave the fund.

In the early 1990's, after several states added escheat provisions, there was a brief flurry of litigation challenging the provisions as unconstitutional takings. However, the challenges were each rejected and New York, Maine, and Connecticut have recently passed amendments containing escheat provisions.

In four of the seven bottle bills in which the state keeps the unredeemed deposits, the money goes to the general fund. In the other three states, the money goes into a fund that is used only for environmental and recycling programs. The following is a list of programs and grants paid from those funds, with the amount paid, where available⁸⁷:

⁸⁶ The 2009 total Maryland beverage container sales of 249,816 tons was converted to containers using proportions of each materials among beverage containers sold in Maryland and a container per ton estimate for each material. See Morawski, Clarissa, *Quantifying Potential Impacts of a Bottle Bill in the State of Maryland, USA 5* (2010); MDE Waste Management Administration, *Information Regarding Bottle Bills* (2010).

⁸⁷ Hawaii figures are over 7 years (2002-2009). California figures are from 2010.

Grants to community conservation corps	CA - \$19.5M
Payments to curbside programs & neighborhood drop-offs	CA - \$15M
Payments to cities & counties	CA - \$10.5M; HI - \$4.5M
Quality Incentive Payment Program (payments to curbside recyclers in exchange for sorting and cleaning materials pursuant to program requirements in order to increase the quality of recycled materials.)	CA - \$10M
Plastic market development (payments to in-state companies that use recycled plastic bottles for manufacturing)	CA - \$10M
Recycling education and public outreach	CA; HI - \$2.1M
Program Administration	CA; HI - \$4.9M
RVM Rebates	HI - \$.62M
Infrastructure improvement grants (payments for new redemption centers)	HI - \$4.4M
Hazardous material pollution prevention education for businesses and the public	MI
Cleanup of contaminated sites within the state	MI

Outreach

California offers recycling starter kits to schools and offices to start beverage recycling programs and runs a toll free informational hotline as well as a website directed to consumers.

Michigan and Hawaii each use part of the unredeemed deposits to fund recycling program outreach and education. In Hawaii, a 2008 survey found that 92% of residents were aware of the program and 77% had redeemed or donated containers. Most people reported hearing of the program in the past year in the newspaper (67%), or on television or radio (22 and 20%, respectively). 82% of respondents reported a positive or neutral opinion of the program.⁸⁸ In the seven year period after the bottle bill was enacted (2002-2009), Hawaii spent \$2.1M on advertising and outreach.⁸⁹

Alternatives: NC Bar and Restaurant Container Recycling

In 2005, North Carolina passed its bar and restaurant container recycling law.⁹⁰ Holders of ABC permits to sell beverages for on-premises consumption must, starting in 2008, recycle all recyclable beverage containers. Permit holders must submit recycling plans to the ABC Commission.

The Glass Packaging Institute reports that glass packaging collected for recycling in the state rose from 45,000 tons/year before the law became effective to 75,000 tons in 2010.⁹¹ It is estimated that glass constitutes 80% of beverage containers consumed on-premise. Before the law became effective, one glass recycler estimated that using glass from in state reduces costs by up to \$30 per ton in transportation costs, but that supply within North Carolina was insufficient to meet need.⁹²

⁸⁸ Hawaii Attitudes Survey at 20.

⁸⁹ Hawaii Report at 8.

⁹⁰ HB 1518 (original bill, passed 2005); HB 267 (amendment, passed 2007).

⁹¹ Glass Packaging Institute, Bar & Restaurant Recycling, <http://www.gpi.org/recycle-glass/barrestaurant-recycling/>

⁹² Container Recycling Institute, Glass Recycling and Bottle Bills, <http://www.container-recycling.org/facts/glass/bbletter.htm>

Counties and municipalities have implemented the law in different ways. While there is no requirement that local governments enforce the law or provide recycling services, it is illegal to dispose of containers that must be recycled under the statute. Five counties (out of 100) provide curbside pickup to bars and restaurants. Fifty-two counties allow bars and restaurants to use county drop-off locations for their recycling. Bars and restaurants in other counties must arrange for recycling with private companies. A county that provides curbside pickup for businesses, including bars and restaurants, estimated that it cost \$55,000 to service 250 businesses in 2005. Another county serving 100 businesses collected 664 tons of recycling in 2005 from bars and restaurants.⁹³ Assuming similar costs and tonnages throughout North Carolina, costs for curbside pickup by counties would be about \$33.13 per ton. Glass prices averaged \$23.94 per ton in 2010.

⁹³ North Carolina Division of Pollution Prevention and Environmental Assistance, Information for Local Governments, <http://www.p2pays.org/BannedMaterials/ABCcontainer/InfoLocalgov.asp>

Table 1: Overview of State Bottle Deposit Programs

Year Enacted	Recent Amendments	Beverages Covered	Containers Covered	Deposit Amt	Redemption Method			Handling Fee		Use of Unredeemed Deposits	Overall Redemption Rate (%)	Redemption Rates by Type	EPA recycling rate**	Net Cost of Program	Enforcement & Penalties	Notes
					Must retailers accept?	No. of non-retail redemption centers	Method of certification/siting of redemption centers	Amount (cents/container)	Who pays							
California	1986 2007 (expanded)	Excludes milk, wine, 100% juice in containers larger than 46 ounces, distilled spirits, infant formula, or vegetable juice in containers larger than 16 ounces	Aluminum, glass, plastic, bimetal	5 cents for 24 ounces and less; 10 cents for larger containers	No, unless in a "convenience zone" and no other supermarket site exists in the zone	2428	RC must submit application for certification; State will deny or grant application based on its determination of whether the RC is likely to operate in conformity with the law and regulations	Variable (equal to difference between cost to recycle and scrap value)	Unredeemed deposits	Remain in State fund (used to fund curbside programs, payments to cities and counties, recycling grants to organizations, administration of the program)	82 (2010)	Aluminum 94% Glass 85% Bimetal 12% PET 68% HDPE 92%	38.9	Net gain of \$57M (2003)	Any person who, with intent to defraud, returns redeemed/out-of-state containers for redemption; submits false claim for payment or handling fee; redeems out-of-state or redeemed containers; fails to report accurate number of containers sold, or fails to make payments is guilty of fraud. If amount of fraud is greater than \$950: imprisonment up to three years and/or fine up to \$25,000 or twice late or unmade payments plus interest. If amount of fraud is less than or equal to \$950: imprisonment up to 6 months and/or fine up to \$1000. Other violations of the statute (non-fraud): guilty of an infraction punishable by fine of \$100 per initial violation and up to \$1000 per subsequent violation per day.	One of two states where distributors pay deposits directly to the state, which then pays recyclers
Connecticut	1978 2009 (expanded & escheat provision)	Beer, carbonated soft drinks, noncarbonated beverages including water and flavored water, but not juice or mineral water	Glass, metal, plastic bottles, cans or jars	5 cents	Yes, unless certified redemption center within 1 mile	23	RCs must register with the State; May serve any persons or certain specified dealers; May choose which containers to accept; No limitation on location.	1.5 for beer, 2 for others	Distributors	Escheat to general fund	60% (estimate from 2004)	24.7		For violations of the statutory obligations of dealers, distributors, and redemption centers: First offense: \$50-\$100 Second offense: \$100-\$200 Third and subsequent offense: \$250-\$500 Fraudulent redemption not addressed in the statute.		

Hawaii	2002	2007 (expanded)	Beer, mixed spirits, mixed wine, all nonalcoholic drinks except milk	Aluminum, bi-metal, glass, plastic under 68 fluid ounces	5 cents	No, unless in high density population areas on Oahu with no nearby redemption centers (small retailers exempt and hardship exemptions available)	103	RCs must have solid waste permits; Must certify with State and recertify every 5 years; RC application must be approved by the state, but reasons for denial are limited to previous violations or outstanding fines; No limitation on location.	2-4 (may change, but must be at least equal to the 1 cent "container fee" charged on each container)	Beverage companies submit to State, which pays out through state fund	Remain in State fund (used for handling fees, administrative costs of the program, recycling education, recyclable market development)	79 (2009)	Aluminum 83% Glass 79% Plastic 73%	24.9	No enforcement provisions in the statute.	One of two states where distributors pay deposits directly to the state, which then pays recyclers
Iowa	1978		All beer, wine, liquor, mineral water, and carbonated soft-drink containers.	All	5 cents	Yes, unless an approved redemption center agrees to accept their containers	63	To exempt retailers from redeeming, there must be an "approved redemption center" agreeing to take those containers; State will approve if it finds that the RC "will provide a convenient service to the dealer's customers"; Application requires inclusion of distance from each dealer the RC will serve, permission from the dealers; Unapproved redemption centers are permissible and require only notification to the State, but do not exempt retailers.	1	Distributors	Retained by distributor	86 (estimate)	33.7	Any person who attempts to collect redemption value on already-redeemed container, makes/possesses a counterfeit label, or redeems a container with a counterfeit label is guilty of a fraudulent practice. Any person violating other sections of the statute (such as the requirement of accepting redemptions, etc.) is guilty of a simple misdemeanor.		
Maine	1976	2003 (escheat provision)	Beer spirits, wine, water, nonalcoholic carbonated or noncarbonated drinks, except milk.	Glass, metal, plastic bottle, can, jar, or other container of 4 liters or less	15 cents for wine and spirits, 5 cents for others	Yes, unless exempted by order approving a redemption center	200-300*	At RCs must be licensed, submit application for approval; State may approve if it "finds that the center will provide a convenient service..."; Must have agreements with local retailers	4 (3.5 if distributor involved in comingling agreement)	Distributors	Escheat to general fund for distributors not operating under co-mingling agreements; otherwise, retained by distributors	Unavailable	31.9	Knowing violation by distributor of obligation to pick up containers: civil violation, up to \$1000 fine. Any other violation of the statute: civil violation, not more than \$100 fine. Each day violation continues is a separate offense. Includes requirement for bulk redeemers to provide name and address. Penalties do not apply to fraudulent redemption(not addressed in the statute) but criminal prosecutions for theft by deception have occurred recently		

Massachusetts	1981		Beer, carbonated soft drinks, and mineral waters	Glass, plastic, aluminum, metal, bi-metal	5 cents	Yes, but redemption centers permitted additionally	85	Any person may establish and RC and may decide which containers to accept; RCs must notify the State 10 days prior to beginning operations and must provide updating information twice annually; No controls on location.	2.25	Distributors	Escheat to general fund	75 (average)	37.2		Bottlers, distributors, redemption centers, or dealers who violate the statute are subject to civil penalty up to \$1000 per violation. Any person that tenders at least 10 cases of 24 containers each not sold in MA for purpose of obtaining refund value or handling fee is subject to a civil penalty of the greater of \$100 for each container or \$25,000 for each tender.
Michigan	1976	2008 (anti-fraud measures)	Soft drinks, carbonated water, beer, mixed wine & spirit drinks	Metal, glass, paper, plastic, under one gallon	10 cents	Yes, up to at least \$25 per person, per day	0	Regional centers for redemption may be established in addition to retail redemption, but none have been established so far; Statute does not include requirements for certification of regional centers	0 (but 25% of unredeemed deposits go to retailers - very low because of high redemption rate)	Unredeemed deposits	75% Escheat (used to fund cleanup of contaminated sites, pollution prevention education); 25% are paid to retailers	96.89 (2008)	20.3	Net cost of \$94M (2000)	Redemption by person who knows or should know containers unredeemable: (a) 25 - 100 unredeemable containers: fine of \$100 (b) 101- 9,999 containers or second offense of (a): misdemeanor up to 93 days in jail and/or \$1000 (c) Second offense of (b): misdemeanor up to 1 year and/or \$2000 (d) 10,000 or more containers: felony up to 5 years and/or \$5000 Plus restitution. Similar penalties for dealers & distributors who accept or pay deposit on unredeemable containers Other violations: \$100 - \$1000
New York	1982	2009 (expanded & escheat provision)	Carbonated soft drinks, water, beer, wine products	Glass, metal, aluminum, steel or plastic bottle, can or jar less than one gallon	5 cents	Yes, but may limit to 72 containers per person, per day only if there is agreement with a redemption center	471*	Free registration; Open to anyone; Registration is a notification to the state of establishment of a RC, not a permit; RCs may choose which containers to accept; No controls on location, other than local land use restrictions.	3.5	Distributors	80% Escheat to general fund, 20% retained by the distributor	66.8 (2007)	35.5		Any person who willfully tenders more than 48 containers for which he knows/should know no deposit was paid in NY is subject to civil penalty of up to \$100 per container or \$25,000 per tender. A distributor who returns container for refund value that the distributor already accepted from a dealer or redemption center is guilty of a misdemeanor, subject to fine of \$500-\$1000 plus twice the amount obtained because of the violation.

															Any other violation of the statute by distributor or deposit initiator: civil penalty up to \$1000 and additional \$1000 for each day violation continues. Other violations of the statute: public nuisance and civil penalty of \$500 and additional \$500 for each day violation continues.
Oregon	1971	2011 (expanded)	All beverages except wine, liquor, milk, baby formula (under expansion to take effect no later than 2018 - previously juices, sport drinks were excluded)	Glass, plastic, metal bottles and cans	5 cents, may be increased to 10 if redemption rate falls below 80% for two consecutive years	Yes, unless redemption center licensed to take back containers in lieu of retailer	2	RC application must be approved by the State; Application will be approved if the State finds that RC "will provide a convenient service to persons for the return of empty beverage containers"; RC must state which retailers it will serve; Applicants must include a map showing the RC and retailers.	0	None	Retained by distributor	75 (2009)	41.1		Distributors who fail to pay redemption value to retailers or pick up the empty containers are liable to retailers for treble the unpaid value and collection costs. Distributors and retailers who violate their obligations to accept, collect, label, or refund containers are guilty of a Class A misdemeanor and the Liquor Control Commission may revoke their licenses. Fraudulent redemption is not addressed specifically in the statute.
Vermont	1972	2006 (increased handling fee)	Beer, mineral waters, mixed wine drinks, soda water and carbonated soft drinks, liquor	Glass, metal, paper, plastic	15 cents for liquor bottles over 50 ml, 5 cents for others	Yes, unless there is a redemption center that serves the public need & state has given approval	100	Any person may establish a RC; May apply for certification of a RC; Must provide the proposed location for the RC.	4 (3.5 if distributor involved in comingling agreement)	Distributors	For 15 cent liquor bottles, go to liquor control fund to administer the program; for others, retained by distributor	84 (2004)	35.7	Net cost of \$5.6M, not including environmental benefits (estimated 2007)	Any person who violates the statute will be fined up to \$1,000 for each violation. (Includes fraudulent redemption as well as retailer/distributor obligations)

* as of 2006, according to Oregon Report on Redemption Centers, available at <http://www.deq.state.or.us/lq/pubs/docs/sw/BBStateCompRedemptionCenters.pdf>

** Maryland data CY2009; all others CY2006 (Connecticut – 2003, Michigan - 2004). Connecticut estimates for beverage recovery rate and recycling rate based on conversation with State environmental representative 2/27/07. From Bottle Bills Information, October 29, 2010.