



2022 Diversion and Disposal Report

A summary of solid waste management in the State of Vermont

Prepared by:
Waste Management & Prevention Division
Solid Waste Management Program

October, 2024

Contents

1. Preface	3
1.1 Changes to this report compared to past years:	3
2. Approach: Tracking the Flow of Vermont's Solid Waste.....	4
2.1 Generation	5
2.2 Disposal Activities.....	7
2.2.1 Disposal at Vermont Facilities.....	7
2.2.2 Disposal Occurring Out-of-State	8
2.2.3 Adjusting MSW for Construction & Demolition Debris	9
2.2.4 Approved Use in Vermont Landfills	10
2.3 Diversion Activities	10
2.3.1 Group A – From a Reporting Facility to a Market	11
2.3.2 Group B – Estimate of Direct to Broker or Market (Economic Recycling)	12
2.3.3 Group C – Reported Reuse Activities	13
2.3.4 Group D – Estimated Household Composting.....	13
3. Trends in Solid Waste Generation	16
4. Other Material Management Activities	20
4.1 Hazardous Waste	20
4.2 Mercury Programs	20
4.3 Vermont Electronic Recycling Program.....	22
4.4 Batteries.....	22
4.5 PaintCare.....	23
4.6 Tires.....	24
Appendix A: Household Hazardous Waste Report.....	26
Appendix B: Vermont Biosolids Management Statistics for 2022	29

List of Tables and Figures

Table 1: Status of Vermont Landfills Permitted for Waste Acceptance in 2022.	7
Table 2: In-state and Out-of-State Materials Disposed within Vermont Landfills.	8
Table 3: Solid Waste Sourced in Vermont but Sent for Management Out-of-State.	8
Table 4: Adjustment of MSW Tonnage for Estimated C&D Component.	10
Table 5: Approved Use of Solid Waste Materials Within Vermont Landfill Operations in 2022.	10
Table 6: Summary of Vermont's 2022 Diversion Activities.	14
Table 7: Vermont Municipal Solid Waste Generation, Diversion and Disposal.....	19
Table 8: Summary of Historic Hazardous Waste Collections and Participation.	20
Table 9: Summary of Historic Mercury Collections.....	21
Table 10: Summary of Historic Electronics Collections.	22
Table 11: Summary of Historic Battery Collections.	23
Table 12: Summary of Historic Paint Collections.	24
Table 13: Summary of Recent Tire Collections.	24
Figure 1: 2022 solid waste generated in Vermont.....	7
Figure 2: Destination of MSW Generated in Vermont	9
Figure 3: 2022 Diversion Tonnage by Material Category	15
Figure 4: 2018-2022 Comparison of Materials Marketed Directly from Vermont Solid Waste Facilities	16
Figure 5: Long-term Trends in Waste.	17
Figure 6: Per Capita Waste Generation.	18
Figure 7: Trends in HHW and VSQG Hazardous Waste Collected.	20
Figure 8: Trends in Mercury Bulb Collections.	21
Figure 9: Trends in Mercury Thermostat Collections.....	21
Figure 10: Trends in Electronics Collections.	22
Figure 11: Trends in Battery Collections.	23
Figure 12: Trend in Paint Collections.	24
Figure 13: Trends in Recent Tire Collections.	25

References

- 2018, DSM Environmental Services, Inc., MSW Consultants, Castleton Polling Institute. 2018 Vermont Waste Characterization: Final Report. Prepared for Vermont Department of Environmental Conservation, Solid Waste Management Program.
- 2013, DSM Environmental Services, Inc., Tellus Institute and RLS. System Analysis of the Impact of Act 148 on Solid Waste Management in Vermont: Final Report. Prepared for Vermont Department of Environmental Conservation, Solid Waste Management Program.
- 2002, DSM Environmental Services, Inc., Vermont's Municipal Solid Waste Diversion Rate: 2001; Results of Recycling and Reuse Survey. Final Report. Prepared for Vermont Department of Environmental Conservation, Solid Waste Management Program.

1. Preface

The Waste Management and Prevention Division's Solid Waste Management Program (Program) respectfully submits the Program's annual Diversion and Disposal (D&D) report describing how solid waste was managed in Vermont during the 2022 calendar year. This narrative report summarizes the sources of data used to determine the annual totals and briefly describes notable changes and trends.

Vermont's solid waste disposal and diversion streams are impacted by several solid waste-related laws and policies. The Universal Recycling law of 2012 aims to increase recycling, donation/reuse, and food scrap diversion and convenience by banning the disposal of mandated recyclables, leaf and yard debris, clean wood, and food scraps from the trash and requiring certain types of trash service providers to offer collection services for most of these materials. The 2019 Vermont Material Management Plan (MMP) supports these efforts by requiring outreach and education to businesses and schools about recycling, donation/reuse, food scrap diversion, and Vermont's landfill disposal bans. The Single Use Products law of 2019 prohibits or restricts the use of single-use plastic bags, straws, and stirrers, and the sale and use of expanded polystyrene food and beverage containers. Finally, Vermont's five (5) extended producer responsibility (EPR) programs (see Other Material Management Activities section) provide Vermonters with convenient ways to recycle and safely manage mercury light bulbs, mercury thermostats, paint, batteries, and electronics like TVs, computers, and printers.

1.1 Changes to this report compared to past years:

A big-picture approach to Generation:

In past D&D reports, the Program defined "Generation" as the sum of Municipal Solid Waste (MSW) + Diversion. This left out significant quantities of disposed waste such as construction and demolition (C&D) materials and did not adequately document Vermonters' work to avoid disposal of materials like leaf and yard debris and paint. Beginning with this 2022 D&D report, the Program has expanded "Disposal" and "Diversion" to include some materials that had not previously been tracked within those categories and created a new "Safe Management" category. Materials that had not previously been counted toward Generation tonnage include:

- **Disposal**
 - Construction and demolition debris (C&D).
 - "Approved use" materials used as landfill road base or alternative daily cover.
- **Diversion**
 - Leaf and yard debris and clean wood.
 - Recycled paint collected through PaintCare.
 - Batteries collected through Call2Recycle.
 - Electronics collected through the E-Cycles program.

- **Safe Management**
 - Tires collected by regulated facilities.
 - Household hazardous waste collected at facilities and events.
 - Mercury-containing products.
 - Non-diverted paint collected through PaintCare (i.e. oil-based paint used as fuel or disposal of dried paint).

Other changes to Diversion include:

- Separating reported food residuals into three sub-categories:
 - 1) Food scraps (including composted material and anaerobically digested unpackaged food scraps that went through the depackaging facility).
 - 2) Packaged food that went through the depackaging facility.
 - 3) Food processing residuals (including material sent directly to anaerobic digesters and some composted material).
- Including an on-farm food scrap estimate from the Agency of Agriculture, Farms, and Market’s (AAFAM) 2022 Annual Report on Importation of Food Residuals for Farming. This estimate replaced any tonnage from facilities that reported food scraps going to the on-farm composters included in AAFAM’s report.
- Including diverted film plastic and textiles to “miscellaneous” category of Diversion. Previously, they had been included in the “containers” and “fibers” categories, respectively.
- Using a five-year average of containers processed by TOMRA for the Bottle Bill containers estimate, rather than the 2013 Systems Analysis estimate, which was used through 2021.
- In Figure 4, no longer showing separate bars for the (very small) tonnage of single-stream recycling sent to out-of-state facilities. Instead, estimating the “fibers” and “containers” contained within that “single stream” tonnage and combining it with the “fibers” and “containers” tonnages.
- **Changes to calculating MSW vs. C&D waste streams:**
 - Prior to this report, the final MSW tonnage was calculated by subtracting a “C&D adjustment” based on the 2018 Waste Characterization Study’s hand-sort estimate of C&D contained within MSW. The Program realized that this method under-estimated the amount of C&D in the waste stream (and therefore over-estimated the tonnage of MSW). To more accurately estimate MSW vs. C&D waste, the method used in this report is a two-step process that first uses the 2018 Waste Characterization Study gate survey results to estimate the C&D vs. MSW waste streams and then uses the hand-sort results to estimate the amount of C&D debris remaining in the MSW. This new method is described more thoroughly in section 2.2.3 below.

2. Approach: Tracking the Flow of Vermont’s Solid Waste

“Solid waste” is defined in the Vermont Solid Waste Management Rules and the Vermont Materials Management Plan (MMP) as “any discarded garbage, refuse, or septage, or sludge from a waste treatment plant, water supply plant, or pollution control facility and other discarded material including solid, liquid, semi-solid, or contained gaseous materials resulting from industrial, commercial, mining, or agricultural operations and from community activities but does not include animal manure and absorbent bedding used for soil enrichment; high carbon bulking agents used in composting; or solid or dissolved materials in industrial discharges which are point sources subject to permits under the Water Pollution Control Act.”

The data and information presented within this document are primarily based on reports that certified solid waste facilities across the state are required to submit annually via the ReTRAC™ online reporting system. All certified solid waste facilities are required to provide the Program with detailed information on the flow of solid waste under their management. Facilities include, but are not limited to, transfer

stations, material recovery facilities (MRFs), compost facilities, anaerobic digesters, landfills, and recycling centers. Most of the data in this report are compiled from these certified solid waste facilities. Though there is some quality control maintained over the submitted data, it remains likely that there are inaccuracies in the reporting. On a statewide basis, it is believed that these inaccuracies only have a minor influence on the data compilation.

While certified facilities are required to report materials both entering (“Generation”) and leaving (“Destination”) their facilities, the Program believes the State’s data on the “destination” of materials (e.g. landfilled, composted, or sold to a recycling processor) are the most reliable source of tonnage. With only one landfill operating within the state and a limited number of transfer stations and MRFs that sell directly to markets or reuse materials, the end-use management data aggregated by these types of facilities has the highest likelihood of being consistently and reliably tracked and reproduced from year to year.

Additionally, there is some management of materials that takes place outside of certified solid waste facilities, such as on-farm or at-home composting, the backhauling of recyclables directly from businesses (“direct-to-broker” or “economic recycling”), the recycling of metal from salvage yards, and the reuse and recycling of used furniture, textiles, and other items by second-hand retailers. Because these activities are not reported to the Program, this report relies upon estimates, derived from existing waste composition studies and systems analyses, to complete our assessment of comprehensive solid waste management. When an estimate from another source is used within the report, it is noted and cited.

Even with the estimates, it is almost certain that this approach to tracking the flow of solid waste through the state underrepresents the total amount of solid waste managed within Vermont, especially materials that are diverted from disposal.

Municipal Solid Waste (MSW) is defined in the Vermont Solid Waste Management Rules and MMP as “combined household, commercial, and industrial waste materials generated in a given area.” It is what most people think of as “trash” or “garbage” and typically does not include more specialized waste streams such as construction and demolition (C&D) debris, sludge, contaminated soil, and other materials that are also disposed. In this report, MSW tonnage is estimated because it is not reported precisely. In Vermont, many solid waste facilities accept both MSW and C&D for disposal. While these are separate waste streams, they are often combined at transfer stations and ultimately reported for disposal as “MSW.” Additionally, some C&D material is often present within the MSW stream. Since it is not currently possible to track the MSW and C&D streams separately, in this report, the MSW estimate is an adjusted tonnage that subtracts the portion of reported MSW that was estimated to actually be C&D (see section 2.2.3 below for more details).

There are also some waste streams, such as household hazardous waste (HHW) that require safe management because they are too hazardous or dangerous for standard disposal or diversion streams. Beginning in 2022, these materials are tracked as part of Generation and referred to as “Safe Management” materials. Prior to 2022, they were tracked at the end of the D&D reports, but the tonnage was not included in either Disposal or Diversion estimates.

2.1 Generation

The term “generation” refers to Vermont’s complete solid waste stream. The generation value in this report is calculated based on the summation of the tonnages reported from the final management activities that occur at the statewide scale. In its most simplistic format, generation (in tons) is the sum of three categories of waste (in tons):

Disposal:

- **MSW Disposal**
 - Municipal Solid Waste (MSW) generated in Vermont and disposed within Vermont landfills (Table 2) or sent to out-of-state facilities (Table 3).
- **Other Disposal**
 - Construction and Demolition Debris disposed within Vermont landfills (Table 2) or sent to out-of-state disposal facilities (Table 3).
 - Other Vermont-generated materials disposed within Vermont landfills (Table 2):
 - Asbestos
 - Ash
 - Contaminated Soil
 - Medical Waste
 - Paper Sludge
 - Sewer Grit
 - Sludge
 - Other (includes Vermont MRF residue)
 - “Approved use” material used for road base or alternative daily cover at the NEWSVT landfill (Table 4).
 - Paint that was collected by the PaintCare program and sent for disposal (Section 4.6).

Diversion:

- Reported recycling.
- Economic recycling (estimated from the 2018 Waste Characterization Study).
- Reported food scrap diversion via composting and anaerobic digestion.
- At-home food scrap composting (estimated from the 2018 Waste Characterization Study).
- Reported reuse.
- Food rescue (through the Vermont Food Bank).
- Reported Leaf and yard debris and clean wood diversion.
- At-home leaf and yard debris management (estimated from the 2018 Waste Characterization Study).
- Recycled or reused latex paint collected through PaintCare.
- Batteries collected by Call2Recycle.
- Electronics collected under the E-Cycles program.

Safe Management

- Reported tires.
- Household hazardous waste collected at facilities and events.
- Mercury-containing products collected under the mercury EPR programs.
- Paint collected through PaintCare and sent for energy recovery.

Note that “safe management” is a new category in 2022 and prior to that, Disposal only included MSW (adjusted to exclude C&D, but with a different method than is used in this report). See Preface, above, for a complete list of how the categories differ from past years and see below for details on the three categories of materials.

In 2022, Vermonters generated a total of 791,101 tons of solid waste, including materials within “Disposed,” “Diverted,” and “Safe Management” categories (see Figure 1, below). The disposed material includes 362,595 tons of municipal solid waste (MSW). This tonnage includes both MSW disposed in Vermont and MSW generated in Vermont but disposed out-of-state and is adjusted to

remove construction and demolition (C&D) materials mixed with the MSW (see 2.2.4 below). Because the C&D adjustment was done in a different way than in the 2021 report, the MSW tonnages are not directly comparable. The “Other Disposed” category in Figure 1 is primarily C&D and “approved use” materials, and includes the other materials listed in Table 2.

The Vermont materials management system diverted 247,107 tons of material (see Table 6 for details). This includes material reported by regulated facilities and estimates of diversion activities. This value is not directly comparable to the Diversion tonnage in the 2021 report due to more materials being included in 2022.

2.2 Disposal Activities

2.2.1 Disposal at Vermont Facilities —

In 2022, there was one permitted and operating solid waste landfill within Vermont, the New England Waste Services Vermont (NEWSVT) landfill in Coventry (Table 1). In addition to MSW, the NEWSVT landfill accepted construction and demolition debris (C&D), sludge from wastewater treatment plants, ash, contaminated soil, sewer grit, paper sludge, medical waste, and MRF residue. Except for MSW (which was only from in-state), most of these materials were generated both within Vermont and out-of-state (OOS) (see Table 2). The NEWSVT landfill accepted 85% of the disposed municipal solid waste generated within Vermont. The remaining 15% of Vermont’s disposed municipal solid waste was transported to out-of-state facilities, either directly from the source or through a transfer facility (see Figure 2, Table 3).

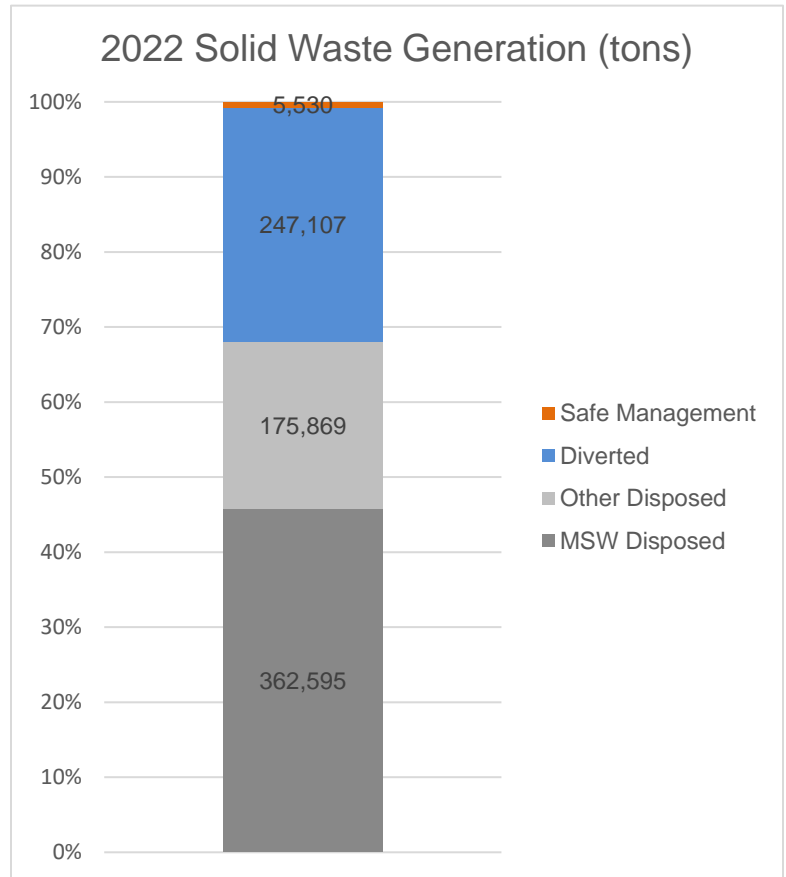


Figure 1: 2022 solid waste generated in Vermont. The 788,713 tons Generated included: 362,595 tons MSW Disposed, 175,869 tons Other Disposed, 247,107 tons Diverted, and 5,530 tons Safe Management.

Table 1: Status of Vermont landfills that were permitted for waste acceptance in 2022.

Solid Waste Landfills	Location	Status	Permitted Fill Rate (tons/year)
New England Waste Services, Vermont (NEWSVT): Phase VI	Coventry	Operating	600,000
Northwest Solid Waste District – Sheldon: Cell 1	Sheldon	Permitted, not operating, no current plans for construction	20,000

Table 2: In-state and Out-of-State (OOS) materials disposed within Vermont landfills in 2022.

	Total Tons	OOS Tons	VT Tons
	(as reported by disposal facilities)		(Total tons minus OOS tons)
MSW	305,826**	—	305,826*
C&D	111,429	7,718	103,711**
Sludge (WWTP)	45,780	33,379	12,401
Asbestos	4,483	3,236	1,247
Ash	547	447	100
Contaminated Soil	31,144	29,634	1,510
Sewer Grit	1,987	1,231	756
Paper Sludge	2,062	—	2,062
Medical Waste	112	—	112
MRF Residue	27,656	27,656	***
Other	8,409	3,815	4,594
TOTAL	539,436	107,115	432,321

* This is the adjusted MSW value that removes C&D material that was estimated to be mixed with MSW. The value that was reported by facilities is shown in Table 4, along with the adjustment calculations.

** This is the adjusted C&D value. The value that was reported by NEWSVT is shown in Table 4, along with the adjustment calculations.

*** Vermont’s in-state MRF residue is included within MSW.

2.2.2 Disposal Occurring Out-of-State — Information about Vermont waste that is disposed out-of-state (OOS) is derived from two sources. Facilities report the quantity of materials that they have sent OOS for final management and some data come from haulers that haul solid waste directly OOS without passing through a reporting Vermont facility. To help gather data and ensure compliance with the statewide collection of the franchise fee (the \$6 per ton fee on Vermont generated waste sent for disposal), an annual independent reviewer is contracted by the Program to collect data from OOS facilities and from haulers that manage Vermont solid waste. The reviewer reports these values annually to the Program and this information is combined with the Vermont facility reports to derive the OOS transport tonnage. In 2022, the amount of Vermont-generated materials that were disposed of OOS (75,986 tons; Table 3) was less than the amount of materials that were generated out-of-state and disposed of in Vermont (107,115 tons; Table 2). The material generated OOS and disposed of in Vermont does not include MSW.

Table 3: Solid waste generated in Vermont but sent for disposal at an Out-of-State facility in 2022.

	Massachusetts	New Hampshire	New York	Total
MSW*	228	22,424	41,205	63,858
C&D*	0	4,940	7,189	12,128
				75,986

* These values are not adjusted to account for reported MSW that is actually C&D. See Table 5 for details.

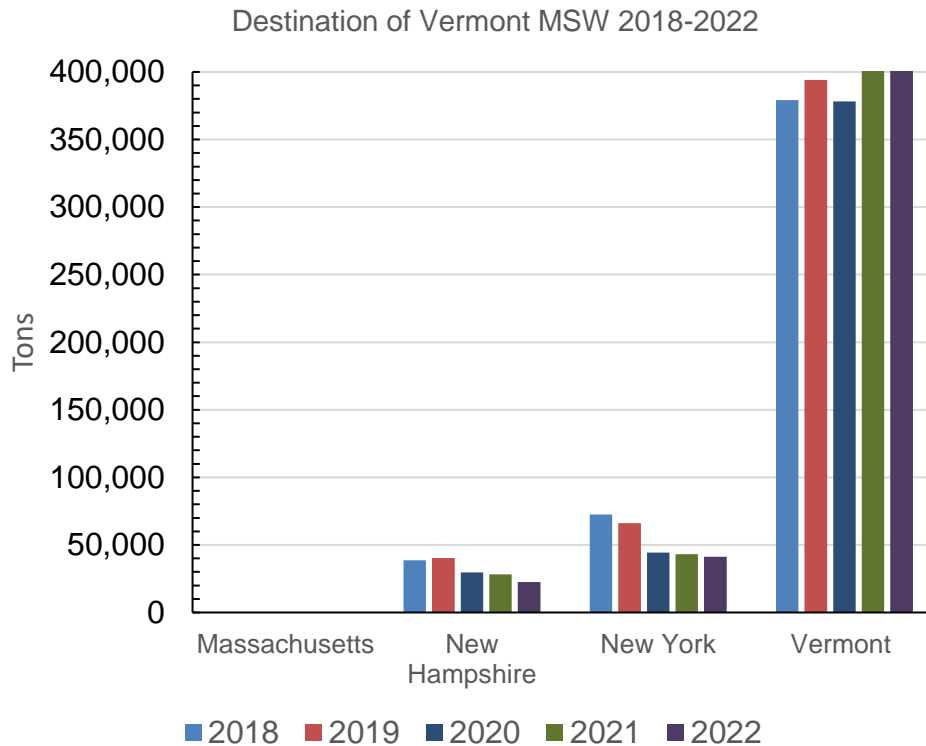


Figure 2: Destination of MSW that was generated in Vermont in 2022 and disposed in- or out-of-state, with recent years for comparison. After Vermont, New York received the largest tonnage of Vermont MSW, followed by New Hampshire. A very small amount of Vermont MSW is exported to Massachusetts.

2.2.3 Adjusting MSW for Construction & Demolition Debris — In-state MSW disposal figures for this report are derived primarily from ReTRAC™ reports submitted by the NEWSVT landfill. NEWSVT typically reports mixed loads of trash from regional Vermont transfer stations as “MSW.” However, in many cases, these facilities accepted and mixed MSW with C&D from their tipping floors and this combined material was hauled to NEWSVT for final disposal. The 2018 Waste Characterization Study prepared for the State by DSM Environmental is used to adjust the reported MSW and C&D tonnage to more accurately reflect the composition of the waste. The Waste Characterization Study used gate surveys at transfer stations and the NEWSVT landfill to estimate what portion of the waste stream is C&D vs. MSW; the 2018 gate survey estimated 16% C&D in the waste stream. Then, the 2018 Waste Characterization Study’s hand sort of MSW materials indicated that an additional 11.1% of reported MSW actually consisted of C&D waste (2018, DSM Environmental, et al.).

Table 4 shows calculations for adjusted MSW and C&D tonnages with a two-part process: 1) an initial “gate survey” adjustment of MSW + C&D reported by NEWSVT, using the 16% C&D gate survey results; and 2) an “MSW hand sort” adjustment of both the MSW disposed at NEWSVT and the MSW disposed OOS to account for the C&D material in the MSW, using the 11.1% C&D from the hand sort. The initial 16% gate adjustment is not needed for Vermont materials disposed out-of-state, because the C&D and MSW are already reported separately. The “gate survey” and “MSW hand sort” adjustments of NEWSVT figures gives 362,595 estimated tons MSW (compared to the 465,054 tons of reported MSW) and 122,928 tons C&D (compared to the 20,470 tons of reported C&D).

Table 4: Adjustment of 2022 MSW tonnage for estimated C&D component.

	Reported Tonnages	C&D “Gate Survey” adjustment (16% of reported MSW + C&D)	C&D in MSW “Hand Sort” adjustment (11.1% of reported MSW)	Adjusted MSW Tonnage	Adjusted C&D Tonnage
Vermont MSW In-state Disposal	401,195.86	409,536.91 – 65,525.57 = 344,011.18		344,011.18 – 38,185.24 = 305,826	
Vermont C&D In-state Disposal	8,341.05	409,536.91 x 0.16 = 65,525.57	344,011.18 x 0.111 = 38,185.24		65,525.57 + 38,185.24 = 103,711
In-state Total	409,536.91				
Vermont MSW Out-of-State Disposal	63,857.65	*		63,857.65 – 7,088.40 = 56,769	
Vermont C&D Out-of-State Disposal	12,128.41	*	63,857.65 * 0.111 = 7,088.40		12,128.41 + 7,088.40 = 19,217
Out-of-State Total	75,986.06				
Totals	485,523			362,595	122,928

* This “gate survey” adjustment is not necessary for Vermont material disposed out-of-state because MSW and C&D are already reported separately.

2.2.4 Approved Use in Vermont Landfills — In addition to the disposal of waste within Vermont landfills, there are several material types that are approved by the Program for use in landfill operations (Table 5). These materials are used in place of raw materials for daily cover and road base within the lined cell, and their ultimate end use is within the airspace of the landfill. Materials that are considered “approved use” are not included in MSW Disposal or Diversion tonnages. However, beginning in this report, approved use materials are considered “Other Disposal” and are included in the full Generation tonnage since they are ultimately placed in landfills and deserve inclusion in the D&D Report data. Note, as in the past, the Program still considers these “approved use” materials exempt from the statewide \$6/ton franchise fee and do not count toward daily or annual tonnage limits at the landfill.

Table 5: Approved use of solid waste materials within Vermont landfill operations in 2022.

Material	Use	Total Tons
Paper Sludge	Landfill Alternative Daily Cover	366
Contaminated Soils (non-hazardous)	Landfill Alternative Daily Cover	22,184
Sludge – cut with soil	Landfill Alternative Daily Cover	2,120
Processed C&D	Landfill Road Base	4,248
Sawdust	Landfill Road Base	1,058
Total		29,976

2.3 Diversion Activities

Materials are diverted from disposal through a variety of pathways. While the Program has reliable reporting systems in place for some components of these diversion pathways, others are not directly

reported and require approximation. Broadly, there are four principal avenues of material diversion that are accounted for in this report (Table 6):

2.3.1 Group A – From a Reporting Facility to a Market/End Use

As with the disposal data, most of the state’s diversion data comes from regulated facilities that self-report the flow of diverted materials. Within Vermont, there are two large material recovery facilities (MRFs) that manage the majority of diverted recyclable materials. These facilities collect, sort, and process materials for distribution to recycling markets. As permitted solid waste facilities, they report quarterly to the Program. Additionally, some materials that are collected by transfer stations and recycling centers do not require further separation and can be sold or hauled directly by the collection facility to market. One hundred thirteen (113) facilities reported recycling or reusing some type of material directly to a market in 2022.

Recyclables—The “fibers” category includes all types of paper and cardboard. The “containers” category includes plastics, glass, aluminum, and steel. In past years, some recyclable materials were sent out-of-state as “single stream” recycling and this tonnage was listed separately in the Diversion Table 6 and Figure 4. Beginning in this report, the tonnage of single stream material that was sent to out-of-state recycling facilities was added to the fibers and containers categories in the Diversion table 6 and Figures 3 and 4 by first estimating the tonnage of fibers and containers contained within the single-stream material. This change was made because the full single-stream tonnage was an over-estimate since it included contaminants that were removed at the out-of-state MRFs. To better account for the actual diverted material, the single stream tonnage that was sent out of state was adjusted using the percentage of containers and fibers from the two Vermont MRFs.

The “scrap metal” category only includes material from reporting solid waste facilities. Even though certified salvage yards recycle thousands of tons of scrap metal annually from C&D, automobiles, equipment, etc., they are not required to report recycling tonnage to the Program. Therefore, recycling activities for scrap metal and cars from certified scrap yards are not tracked here.

Food Residuals—beginning in this report, food residuals are reported in three sub-categories: 1) food scraps (which were predominately composted); 2) depackaged food that went through the depackaging facility (which was then predominately anaerobically digested); 3) food processing residuals (which were predominately anaerobically digested). The reason for this change from a single food scrap value is that a depackaging facility began operating in Vermont in 2021. That facility is capable of separating heavily packaged food waste from its packaging, and also receives some food processing residuals. There are also two (2) anaerobic digesters regulated by the Program that began accepting food processing residuals (particularly from food manufacturers) and depackager slurry in 2021.

Food processing residuals is not a well-defined category of food waste or “food residuals” and typically includes mostly liquid food waste like off-spec and leftover beverage waste, dairy manufacturing wastes, and rinse water mixed with food processing wastes. However, some food processing residuals can also include solids like coffee grounds, bakery waste, meat scraps, and other food residuals. Because food processing residuals are difficult to define and are often liquid materials, the tonnage of anaerobically digested food processing residuals was discounted to an estimated 15% of its total. Since the depackaged material includes significant portions of liquid food processing residuals, the tonnage of food scraps and packaged food entering the depackaging facility was used in this report rather than the tonnage of outgoing slurry. For this report, the 2021 food scrap data were recalculated to match the new 2022 categories and methods.

In 2022, there were ten (10) compost facilities within the State that were certified by the Program to process food scraps, food processing residuals, and/or leaf and yard debris and other organic materials.

This is a smaller number than in recent years because, as of 2021, Vermont law changed to place oversight of on-farm composting under the jurisdiction of the Vermont Agency of Agriculture, Food, and Markets (AAFM), provided the farm imports less than 2,000 cubic yards of food residuals or food processing residuals annually; and the finished compost is principally used on the farm; or the composting occurs on a small farm that manages poultry. In 2022, eleven (11) on-farm compost operations that fell under this AAFM jurisdiction processed food scraps. A portion of the food scrap diversion estimate in this report came from the tonnage that on-farm composters reported in the AAFM 2022 Annual Report on Importation of Food Residuals for Farming. These data were used instead of reported tonnage from any solid waste facilities that sent food scraps to one of these on-farm composters.

Construction and Demolition (C&D)—Historically, C&D materials were excluded from the materials tracked in the Diversion tonnages. These materials are difficult to track due to the significant reuse of materials occurring outside of the Solid Waste system. However, in late 2013, the State’s first dedicated C&D recycling facility opened, and several other solid waste facilities have since adopted more active separation programs to collect, divert, and market various C&D materials. In July of 2014, the Vermont Legislature passed Act 175 which mandated the recycling of architectural waste, a subset of construction and demolition waste (i.e. scrap metal, asphalt shingles, clean wood, drywall, plywood, and oriented strand-board) for commercial and multi-unit residential building projects that produce over 40 cubic yards of architectural waste and that are within 20 miles of a C&D recycling facility. C&D recycling markets have fluctuated significantly since 2014 and architectural waste facilities have adjusted by altering the types and volumes of materials that they divert versus send for disposal. In addition, the amount of C&D generated varies year to year, driven by the economy and local development patterns. As explained earlier in this report, C&D can be difficult to track and distinguish from other waste types as it is commonly mixed in loads of MSW, which may cause misreporting.

2.3.2 Group B – Estimate of Direct to Broker/Market Recycling (Economic Recycling)

In some cases, the recovery of materials occurs directly between business entities and brokers, thereby bypassing a reporting Vermont solid waste facility. For example, a supermarket may sell and ship large quantities of cardboard directly to a broker, instead of hiring a solid waste hauler, because it makes economic sense for a business of this scale to sell its recyclables directly. In the 2018 Vermont Waste Characterization Study (2018, DSM Environmental et al.), a survey of Vermont employers and manufacturing facilities identified and estimated the amount of recyclable materials that were either backhauled or sold directly to a broker by the business sector. By extrapolating this survey, the study estimated the tonnage of fibers, containers, and scrap metal delivered directly to a broker or market in 2018. Because economic recycling has been shown to be a significant contributor to the diversion of materials, estimates have been included in the annual Vermont Diversion and Disposal Report since the completion of the first estimate of economic recycling in a 2001 study (2001, DSM Environmental).

Bottle Bill Containers—The other category of material types sent directly to a broker without passing through a Vermont certified solid waste facility is beverage containers collected and processed through the Vermont Bottle Bill for distribution to market. As Vermont redemption centers are not considered solid waste facilities, they are not required to report annual tonnages on this important diversion activity. In the past, D&D reports used an estimated 17,480 tons of Bottle Bill containers in diversion figures, which was from the 2013 System’s Analysis (Table 40; 2013, DSM Environmental). In this report, that estimate was replaced by a five-year average of containers processed by TOMRA, the company that hauls the majority of Vermont bottle bill containers. TOMRA provided these data to ANR-DEC voluntarily. The main reason this tonnage is so much lower than the 2013 Systems Analysis estimate is that the proportion of heavier glass bottles has decreased while lighter aluminum cans have grown in use over time.

2.3.3 Group C – Reported Reuse Activities

There are numerous reuse, resale, and repair businesses throughout Vermont; however, the diversity of material reused across the State makes estimates of this activity difficult, highly variable, and inaccurate. For that reason, this report is limited to listing reuse totals derived from solid waste facility reporting. In other words, only materials collected at permitted solid waste facilities for the purpose of reuse are captured. As an example, the reuse figures listed in this report includes materials and items such as intact building materials like cabinets and used clothing. Reported reuse does not capture the vast majority of materials that are taken from the point of generation (residences, businesses, etc.) directly to a reuse or salvage store, re-purposed at the point of generation, or exchanged through yard sales, Front Porch Forum, Buy Nothing groups, etc., as these activities are difficult to track or estimate.

2.3.4 Group D – Estimated Household Composting

Significant diversion of food waste and leaf and yard waste occurs at home without material being handled by a solid waste facility. Home composting of both food waste and leaf and yard waste is anticipated to significantly contribute to the state's long-term diversion goals. In 2018, DSM Environmental et al. estimated the amount of food waste diverted annually by each Vermont household through an analysis of a representative, statewide survey. They estimated that 58% of Vermont households annually compost (or feed animals) an average of 367 pounds of food waste per household. A similar 2001 study evaluated Chittenden County household leaf and yard waste diversion through home composting (2002, DSM Environmental). This survey estimated that 250 pounds of yard waste was composted by 39% of the surveyed households. These estimates, derived from these survey results, are the current best estimates available for calculating a rough value of the tonnage diverted by home composting. With the implementation of Vermont's Universal Recycling law that focused on diversion of both food waste and leaf and yard waste, home composting is likely to continue increasing as a diversion tool and these estimates will have to be revised as studies and data are available.

Miscellaneous

Miscellaneous refers to diverted materials that do not fit into other categories. This category includes: film plastics, agricultural plastic film, propane tanks, gas cylinders, maple tubing, textiles (such as clothing), and items like foam, toner cartridges, and corks.

Table 6: Summary of Vermont's 2022 diversion activities.

(in tons)	Fibers	Containers	C&D	Scrap Metal*	Food Waste	Leaf & Yard, Clean Wood	Foodbank Food Rescue	EPR programs	Miscellaneous
A- Reporting Facility to Market	68,772	16,318	1,311	15,278	22,017 [▲] 6,088 [■] 10,973 [♦]	4,695, 3,840		1,254 ^{▲▲} 109 ^{■■} 365 ^{♦♦}	753
B- Estimate of Direct to Broker/ Market (Economic Recycling)	20,707 [†]	10,066 ^{**} 2,686 [†]		1,616 [†]	2,552 [†]				1,159 [†]
C- Reported Reuse Activities	409	5	46				3,430 [‡]		47
D- Estimated Household Composting					36,083 [†]	16,528 [§]			
TOTALS	89,888	29,074	1,357	16,894	77,713	25,063	3,430	1,728	1959
A + B + C + D = 247,107									

* Does not include material from certified salvage yards.

▲Denotes food scraps collected for composting.

■Denotes food scraps and packaged organics processed at the Depackaging facility and sent predominantly for anaerobic digestion.

♦Denotes food processing residuals sent for predominantly anaerobic digestion and some composting. Note this figure has been discounted to 15% of its total reported figure to be conservative.

▲▲Denotes material collected under the E-Cycles program.

■■Denotes batteries collected through Call2Recycle.

♦♦Denotes paint collected through PaintCare.

† Denotes a diversion estimate derived from the 2018 Vermont Waste Characterization Report (2018, DSM Environmental). See above descriptions of the diversion groups for details.

** Denotes an estimate of Bottle Bill containers diverted as derived from TOMRA data averaged over 5 years.

‡ Denotes annual food rescue or food donation tonnages provided by the Vermont Foodbank.

§ Denotes a leaf and yard waste diversion estimate derived from the Vermont's Municipal Solid Waste Diversion Rate 2001 study (2002, DSM Environmental). See above descriptions of the diversion groups for details.

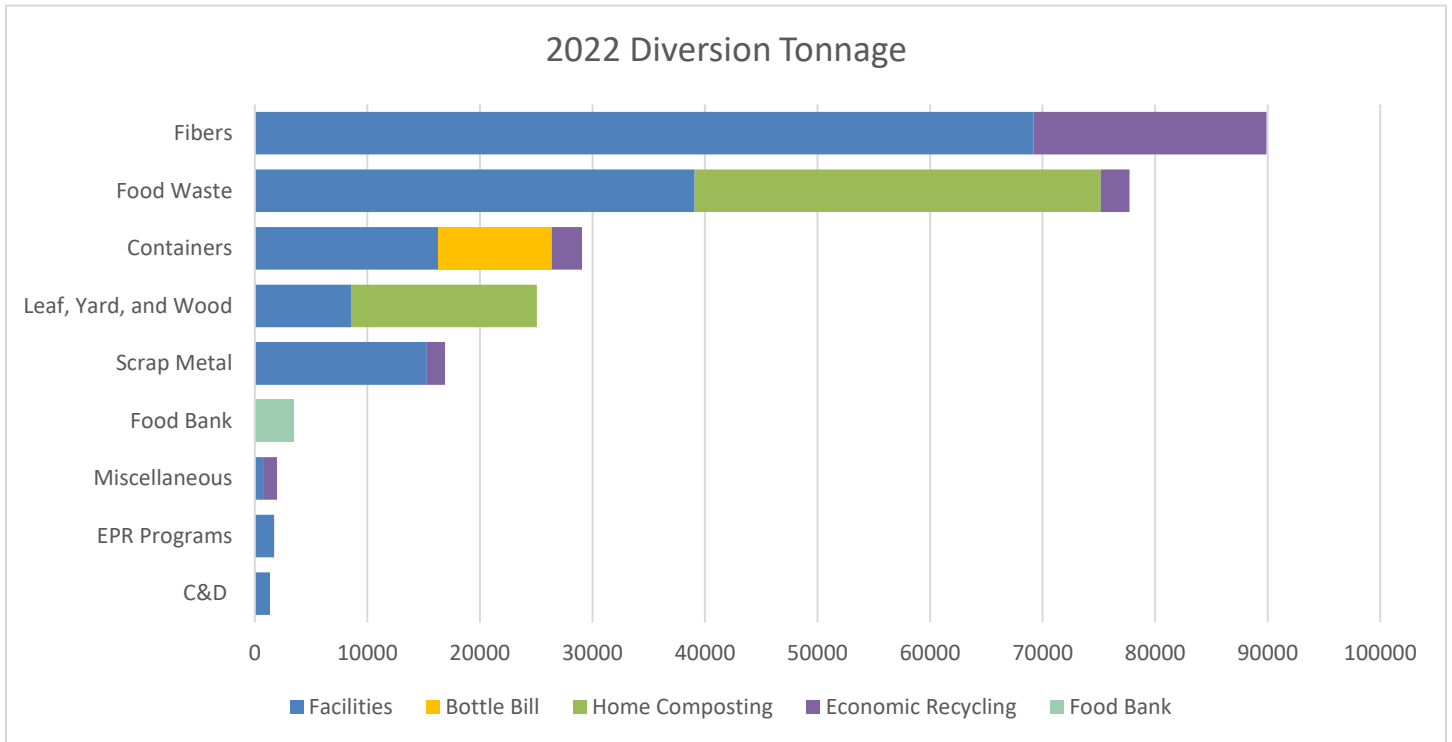


Figure 3: 2022 Diversion tonnage by material category, including data from reporting facilities (blue), estimates from the 2018 Waste Characterization Study (purple for economic recycling and green for home composting), and other sources, including Bottle Bill (yellow), and food rescue through the Vermont Food Bank (teal), ordered from greatest to least tonnage. The diversion categories with the five greatest tonnages are fibers; food waste; containers; leaf, yard, and clean wood; and scrap metal. The category with the lowest diversion tonnage is C&D.

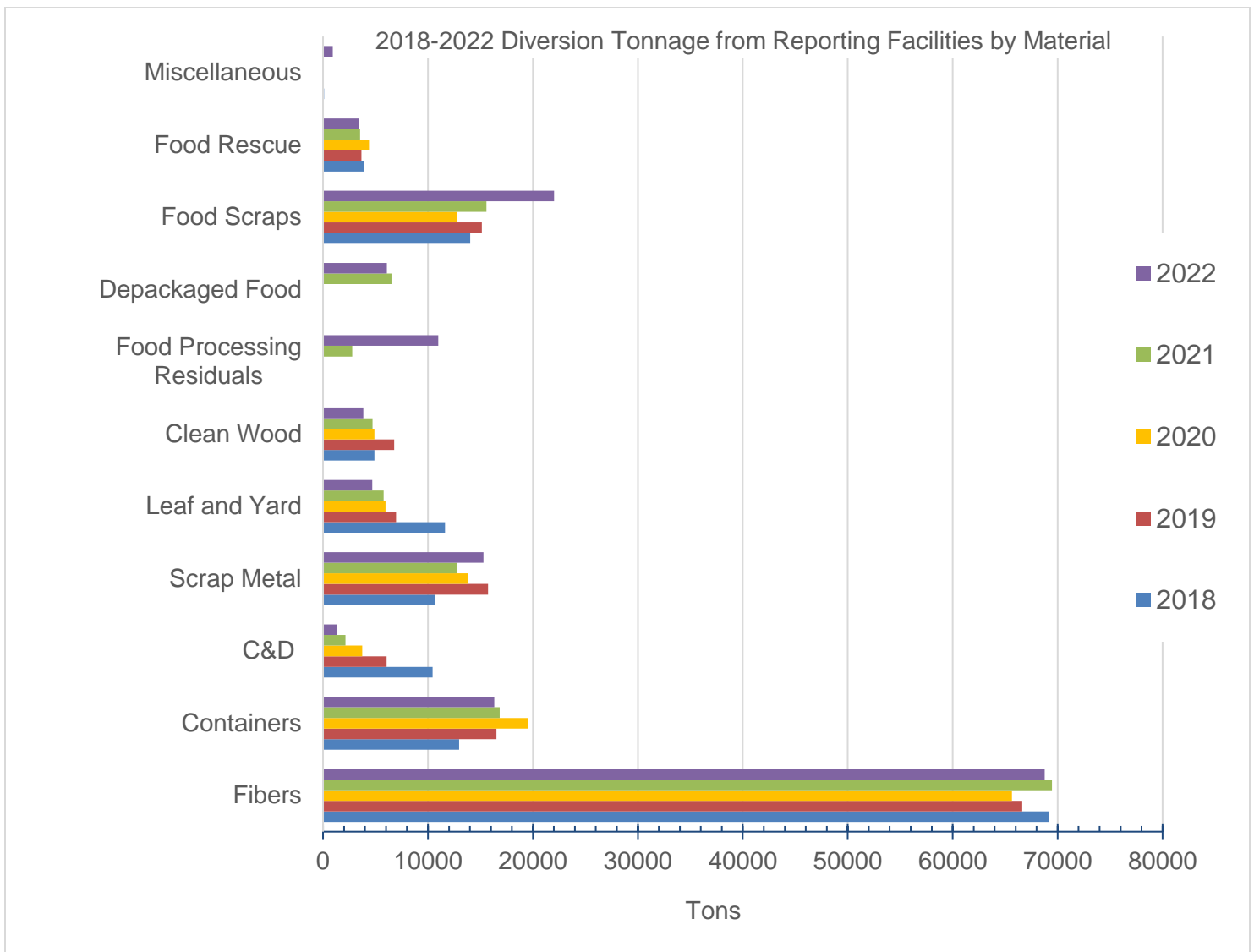


Figure 4: 2018-2022 comparison of materials marketed directly from Vermont solid waste facilities (Group A from Table 6 and Food Rescue) over the last five years (2018 to 2022).

Figure 4 displays the tonnage of diverted materials sold or donated (in the case of rescued food) to market year-to-year. Data for Extended Producer Responsibility Programs are in section 4. Comparing diversion tonnages by material type helps the Program consider the impacts of programs, policies, and market conditions on recycling/composting/food rescue activity in Vermont. Food waste collection has increased dramatically, including general food scraps as well as food processing residuals and depackaged, which were not collected in the same way prior to 2021. In contrast, collection of C&D material for diversion has consistently decreased over the last five years. Trends for other diverted materials are less consistent.

3. Trends in Solid Waste Generation

This report calculates waste generation using this previously stated formula:

$$\text{Generation} = \text{Disposal (MSW + Other Disposal)} + \text{Diversion} + \text{Safe Management}$$

A diversion rate is a way of comparing the relative tonnage of disposed versus diverted materials. In past years, the Program has calculated a diversion rate out of waste Generation (calculated as adjusted MSW + estimated Diversion), which has consistently led to an average diversion rate of ~34%. Calculating a 2022 diversion rate using the same method of as adjusted MSW + estimated Diversion

gives a rate of 41%. However, this apparent increase in diversion rate is mainly due to the changes in methods: the 2022 adjusted MSW tonnage is lower, due to the new C&D adjustment, and the Diversion tonnage is higher due to more materials being included (most notably, depackaged food, food processing residuals, leaf and yard debris, and clean wood). Although the resultant 41% diversion rate is notably higher than the 34% average diversion rate of the previous 10 years, it is still lower than the 2019 MMP goal of a 50% diversion rate by 2024. Moreover, using the full Generation total (including “Other Disposal” and “Safe Management”) gives a diversion rate of 31%. There are no long-term trends in Diversion, Disposal, or Generation (Figure 5). While this figure is an under-representation of the complete material management tonnages for the state, it does represent the components that the Solid Waste Program can accurately and consistently track year to year for meaningful comparisons (with the understanding of the changes in the 2022 data compared to past years).

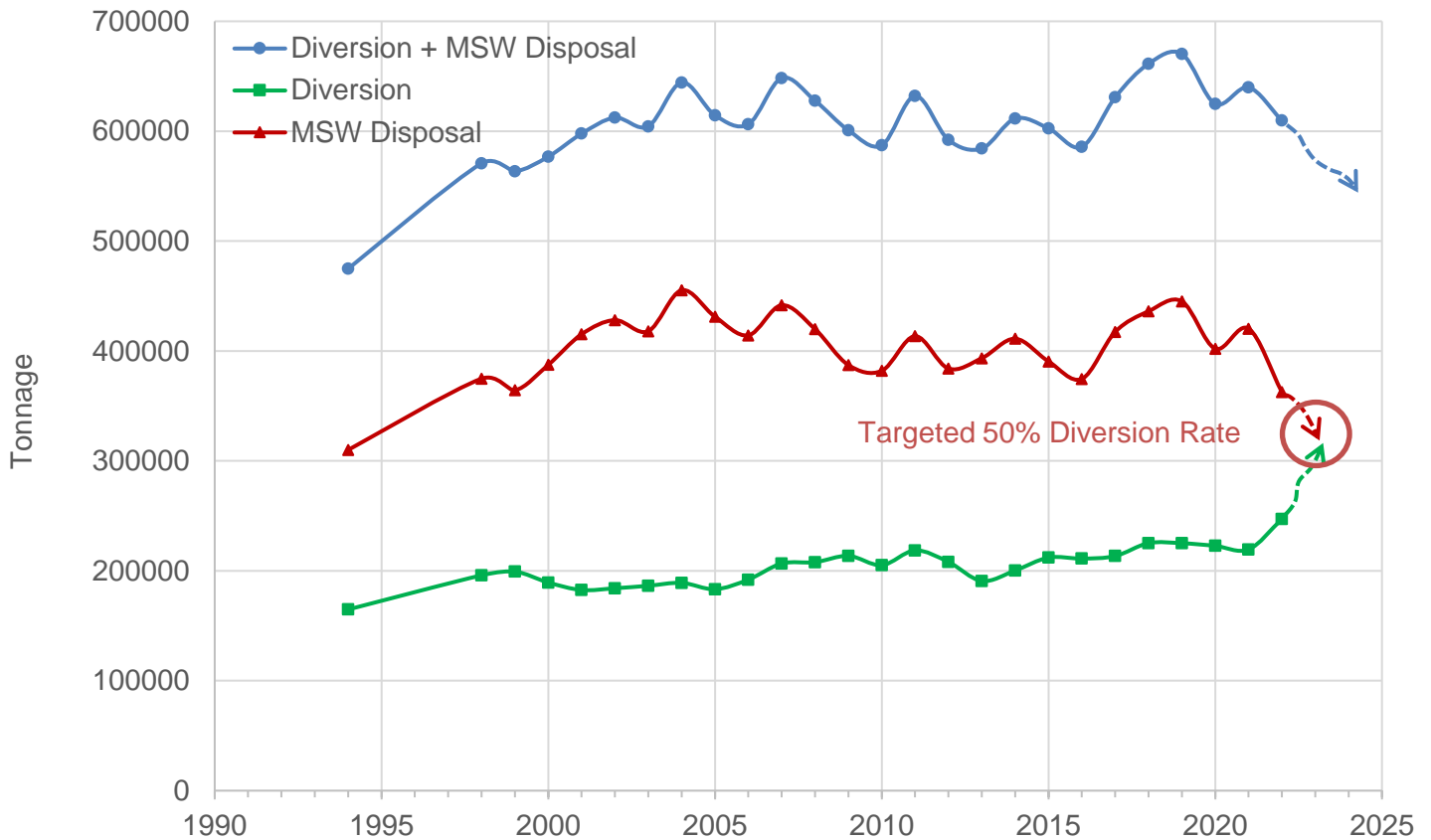


Figure 5: Long-term trends in waste partial Generation (top line), Diversion (bottom line), and MSW Disposal (middle line) and projections of the targeted diversion rate goal of 50% from the 2019 Vermont Materials Management Plan. To be consistent with past years, the Generation line is only the sum of MSW Disposal + Diversion and does not include Other Disposal or Safe Management tonnage.

The disposal goal within the 2019 MMP is to reduce the disposal of municipal solid waste (MSW) to 1,000 lbs./person/year. In 2022, Vermonters’ MSW disposal averaged 1,121 lbs./person/year, which is difficult to compare to the 1,302 lbs./person/year in 2021 due to the difference in how MSW was adjusted to account for C&D material in the waste stream. There are also no long-term trends in the per capita Disposal and Diversion data (Figure 6).

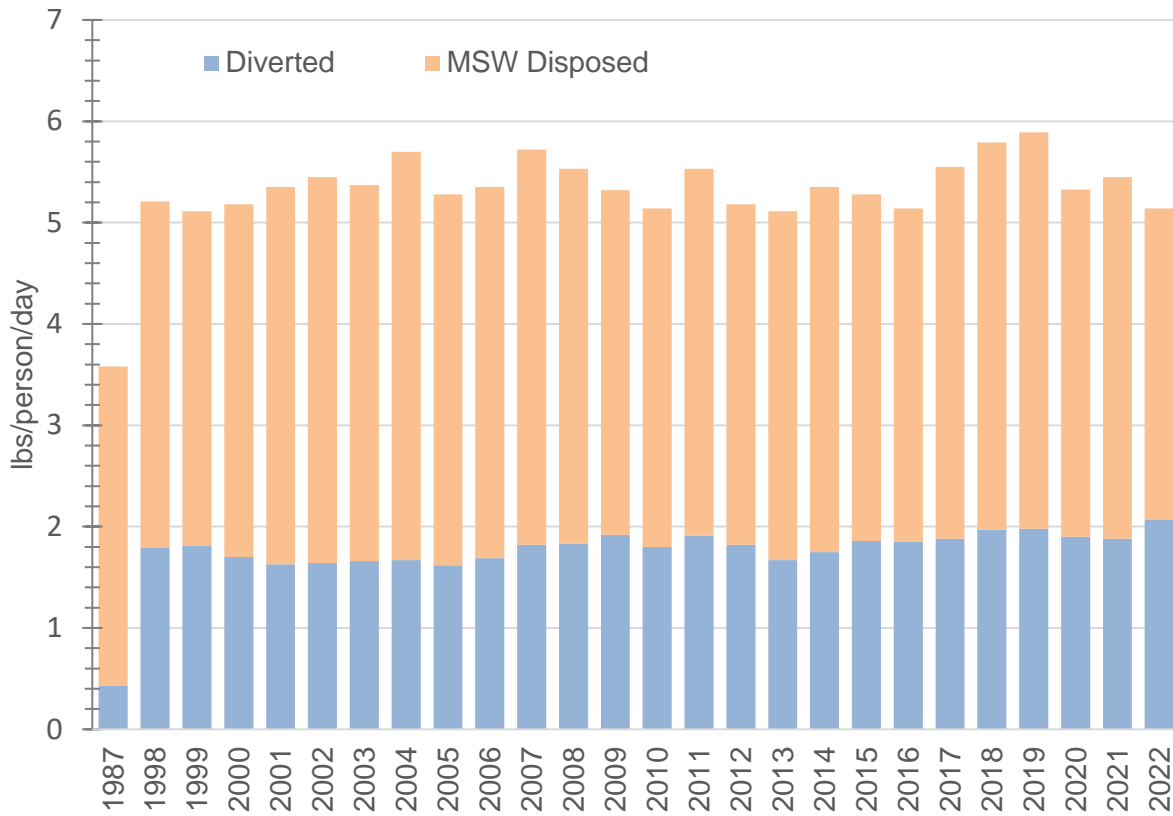


Figure 6: Pounds of waste generated per person per day (MSW Disposal + Diversion) by Vermonters.

Table 7: Vermont municipal solid waste Generation, Diversion and Disposal. Includes tonnages, per capita breakdowns and percentage rates.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*
Generation	613,517	592,981	566,042	552,297	597,254	557,302	584,235	611,472	602,617	585,789	630,851	661,385	670,348	624,869	639,835	791,101
Diversion	171,818	173,024	178,796	170,326	183,737	173,258	190,797	200,272	212,065	211,152	213,449	225,219	225,122	222,769	219,501	247,107
MSW Disposal	441,699	419,957	387,246	381,971	413,517	384,044	393,438	411,200	390,552	374,637	417,402	436,166	445,226	402,100	420,334	362,595
Other Disposal																175,869
Safe Management																5,530
Population [1]	621,254	621,270	621,750	625,741	626,592	625,953	626,630	626,562	626,042	624,594	623,657	626,299	623,989	643,077	645,570	647,064
Per Capita MSW Generation (Tons/Year)	0.99	0.95	0.91	0.88	0.95	0.89	0.93	1.0	0.96	0.94	1.01	1.08	1.08	0.97	0.99	0.94**
(Pounds/Day)	5.41	5.23	4.99	4.84	5.22	4.88	5.11	5.35	5.27	5.14	5.54	5.89	5.88	5.30	5.43	5.16**
Per Capita MSW Diversion (Tons/Year)	0.28	0.28	0.29	0.27	0.29	0.28	0.30	0.32	0.34	0.34	0.34	0.38	0.36	0.35	0.34	0.38
(Pounds/Day)	1.52	1.53	1.58	1.49	1.61	1.52	1.67	1.75	1.86	1.85	1.88	2.08	1.97	1.90	1.86	2.09
Per Capita MSW Disposal (Tons/Year)	0.71	0.68	0.62	0.61	0.66	0.61	0.63	0.66	0.62	0.60	0.67	0.70	0.71	0.62	0.65	0.56
(Pounds/Day)	3.90	3.70	3.41	3.34	3.62	3.36	3.44	3.60	3.41	3.29	3.67	3.82	3.91	3.40	3.57	3.07
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Generation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%**
Diversion	28%	29%	32%	31%	31%	31%	33%	33%	35%	36%	34%	34%	34%	36%	34%	41%
Disposal	72%	71%	68%	69%	69%	69%	67%	67%	65%	64%	66%	66%	66%	64%	66%	59%

[1] Population Estimate, Vermont. US Census: <http://census.gov>

*See preface for changes made to Generation, Diversion, and Disposal calculations compared to past years.

** In 2022, this is a partial Generation of Diversion + MSW Disposal rather than complete Generation that also includes Other Disposal and Safe Management.

4. Other Materials Management Activities

Note these materials were not included in disposal or diversion tonnages prior to 2022.

4.1 Hazardous Waste

Household hazardous waste (HHW) and very small quantity generator hazardous waste (VSQG; formerly “conditionally exempt generator (CEG)”) is collected and managed at several full-time HHW facilities in the state and at numerous one-day collection events (95 in 2022) hosted by municipalities throughout the year. Information on the materials collected over the course of the year is reported through the ReTRAC™ online reporting system similar to the solid waste facility reporting, as described earlier. These data are summarized in an annual HHW Survey Results report (Appendix A). A total of 690 tons of combined HHW and VSQG materials were collected in 2022, a notable decrease from the 984 tons collected in 2021 (Table 8). It is important to note that the values reported within the HHW Survey Results only reflect material collected at HHW facilities and events. These numbers do not capture the HHW that is collected through extended producer responsibility programs as reported upon below.

Table 8: Summary of historic hazardous waste collections and participation.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total HHW and VSQG tons	467	460	525	452	899	1,069	865	906	935	788	984	690
% Participating VT Households	7%	9%	7%	7%	6%	8%	10%	9%	11%	7%	8%	6%
Pounds Collected per Household (avg.)	47	34	62	102	131	86	60	60	55	80	88	60

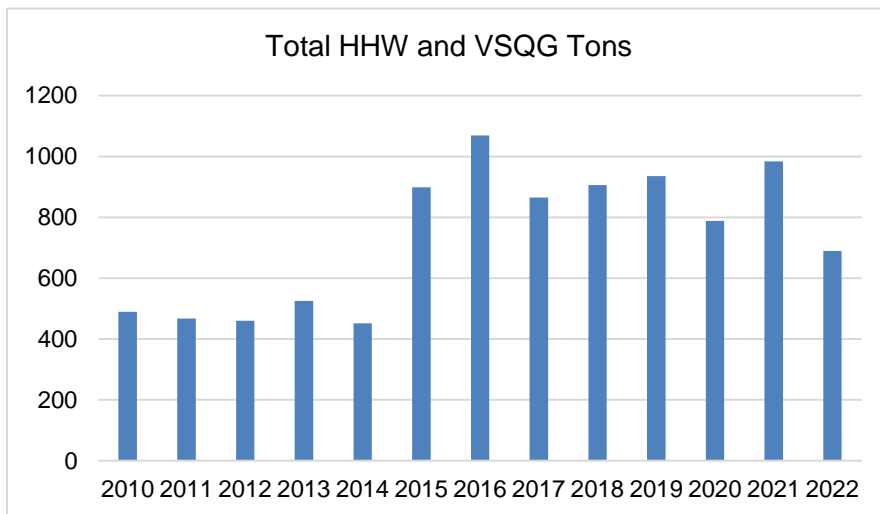


Figure 7: Trends in HHW and VSQG hazardous waste collected.

4.2 Mercury Programs

In 2007, Act 149 banned the knowing disposal of products containing mercury within Vermont landfills. Extended Producer Responsibility (EPR) programs for collection and recycling of mercury were established for thermostats in 2008 (after a successful pilot program in 2007), and for most general-use mercury-containing bulbs (also referred to as “lamps”) in 2012. Mercury-containing thermostats are collected and reported on by the Thermostat Recycling Corporation to the State of

Vermont. This program collected 9.5 pounds of mercury in 2022 from 1,396 thermostats. Mercury-containing lamps that are covered by the EPR program are collected, recycled, and reported on by the National Electrical Manufacturers Association (NEMA). During 2022, NEMA collected and recycled 1.95 pounds of mercury from 200,002 mercury-containing bulbs. In addition, mercury-containing bulbs that are not covered by the program are collected by HHW events and facilities and are accounted for in HHW tonnage.

Table 9: Summary of historic mercury collections.

	2014	2015	2016	2017	2018	2019	2020	2021	2021
# Mercury Bulbs	205,155	233,820	191,060	158,079	209,400	186,652	144,751	159,750	200,002
# Mercury Thermostats	2,169	2,000	2,246	2,468	2,369	2,069	1,897	1,846	1,396

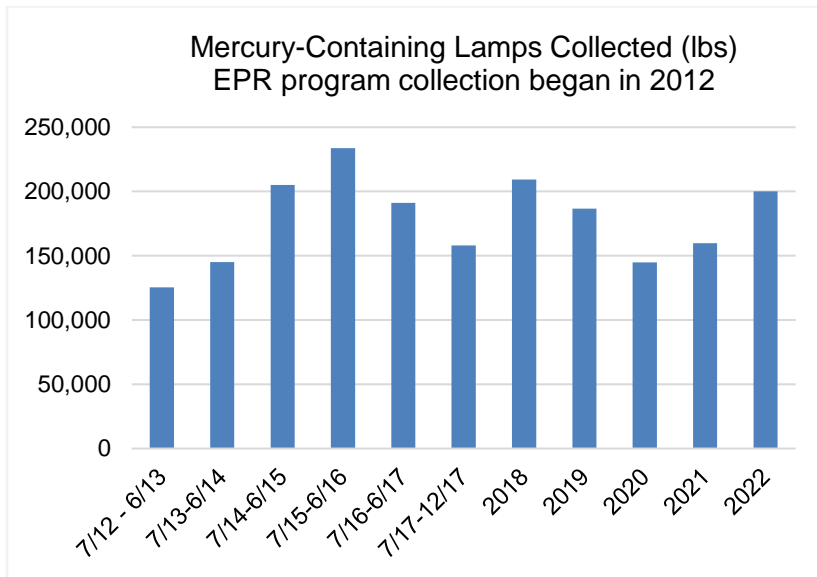


Figure 8: Trends in mercury bulb collections.

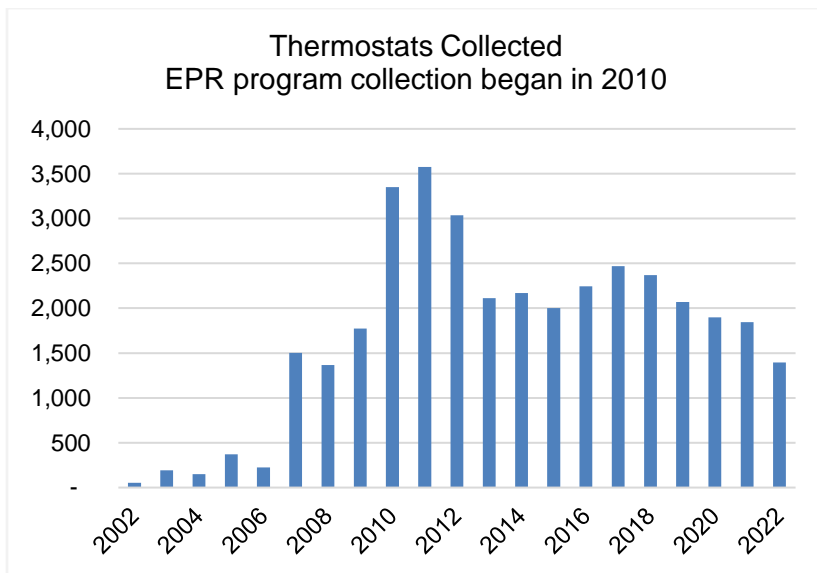


Figure 9: Trends in mercury thermostat collections.

4.3 Vermont Electronics Recycling Program

The Vermont Electronics Recycling Program (E-cycles) was first implemented in July of 2011. This program provides no-cost electronic device recycling for covered entities and devices. During the 2022 collection period, 2,508,042 lbs of e-waste were collected. The decrease in tonnage over time is due, in part, to the fact that many types of covered electronics are now typically lighter than they once were (flat-screen monitor versus cathode-ray tube monitor, for example).

Table 10: Summary of historic electronics collections.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Lbs Electronics	4,888,400	4,897,778	4,814,188	4,312,381	3,685,448	3,460,051	3,028,996	2,955,501	2,508,042

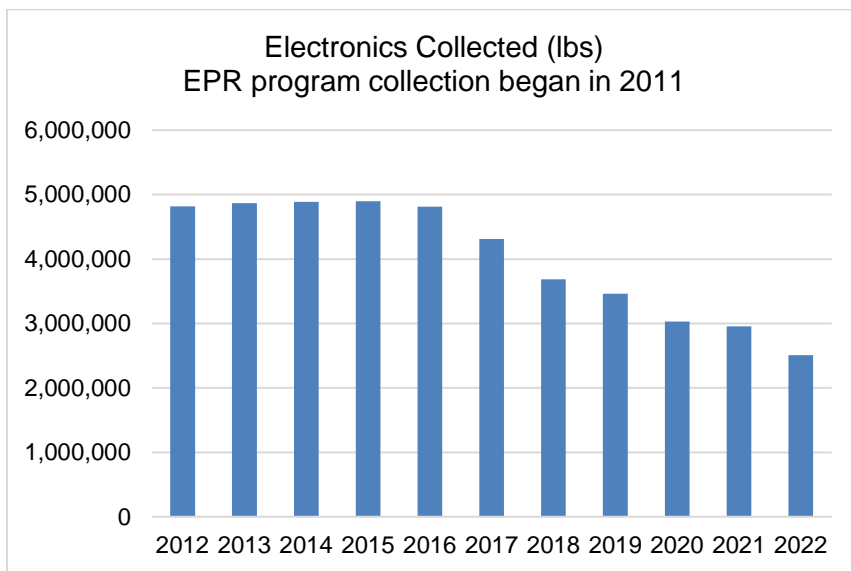


Figure 10: Trends in electronics collections.

4.4 Batteries

In 2014, Vermont became the first state to require manufacturers to fund collection and recycling of single-use batteries, with the passage of the Vermont Primary Battery Stewardship Law. The law requires producers of primary batteries sold in Vermont to register with Vermont Department of Environmental Conservation (DEC) and provide a stewardship plan to manage the proper recycling and/or disposal of primary batteries sold in Vermont. A Primary Battery is a non-rechargeable battery weighing two kilograms or less, including alkaline, carbon-zinc, and lithium metal batteries. Producers may choose to submit an individual stewardship plan or participate in a shared stewardship plan. Currently, most producers that sell in Vermont are under a shared stewardship plan implemented by the stewardship organization Call2Recycle.

Call2Recycle implements both the primary (non-rechargeable) battery stewardship program mandated by Vermont law and the manufacturer-led voluntary rechargeable battery collection program. This allows for both types of batteries to be collected at no cost to consumers in Vermont at convenient locations throughout the state. There are over 100 collection sites available in Vermont for battery recycling, which offers 98% of Vermont residents and businesses access to a collection site

within 10 miles of their home or business. The stewardship program is funded by battery producers who pay fees based upon their Vermont battery sales.

During the 2022 collection year, Call2Recycle collected 217,215 pounds of batteries (149,884 lbs primary and 67,331 lbs rechargeable). This is the highest collection amount to date, although it is a less than 1% increase from 2021.

Table 11: Summary of historic battery collections.

	2015	2016	2017	2018	2019	2020	2021	2022
Lbs Primary Batteries	3,350	64,366	81,381	94,424	113,451	101,275	148,340	149,884
Lbs Rechargeable Batteries	36,477	52,617	52,238	51,677	53,426	45,122	68,424	67,331

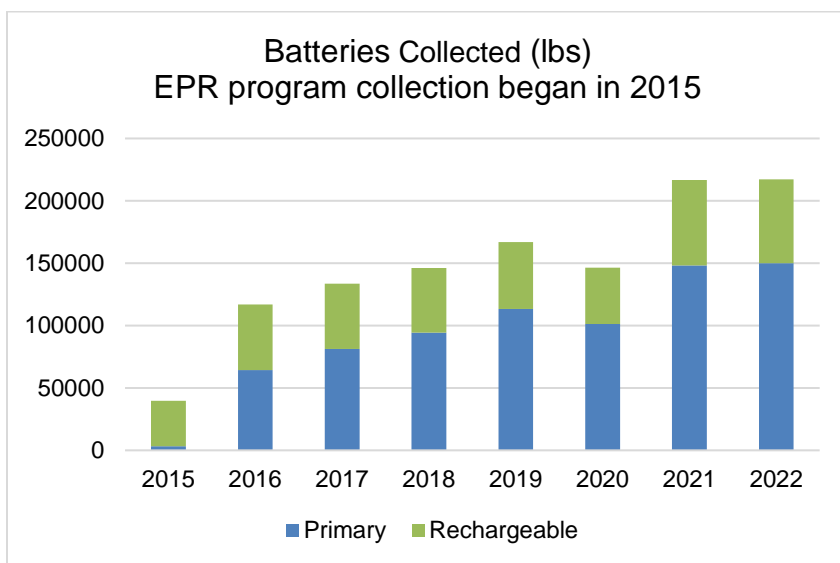


Figure 11: Trends in battery collections.

4.5 PaintCare

In May of 2013, the Vermont Legislature passed paint product stewardship legislation (Act 58) that establishes free paint collection sites at retailers and permitted solid waste facilities across the State. This program is funded by a fee consumers pay on each container of paint sold in Vermont. This program is implemented by the PaintCare stewardship organization, which worked with the Solid Waste Program in 2013 to develop the final Vermont Paint Stewardship Program Plan. The program officially launched on May 1, 2014. An annual report is due to the Program by October of each year, with a reporting period of July 1-June 30th. During this fourth collection period, July 1, 2021 to June 30, 2022, 120,388 gallons were collected. This is an 8% increase from the previous year, and a significant increase over the average annual collection of 60,000 gallons that occurred in years prior to implementation of the PaintCare program. 76% of the paint collected that year was latex paint, and 23% of the latex paint was unusable and sent to landfill. The rest of the paint collected was recycled, reused, or used as fuel.

Table 12: Summary of historic paint collections.

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Gallons of Paint	60,000	116,691	108,466	96,109	110,567	115,142	99,838	111,847	120,388

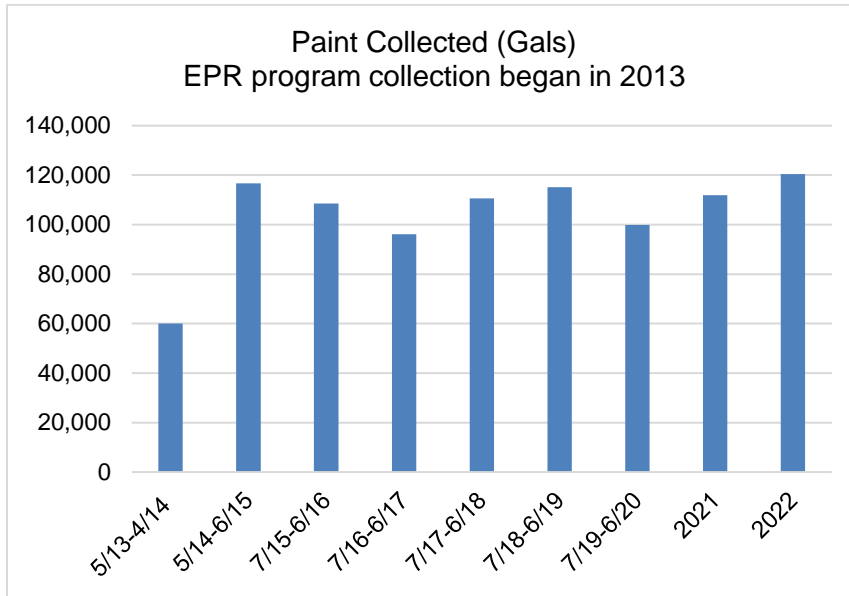


Figure 12: Trend in paint collections.

4.6 Tires

Stockpiling tires is illegal in Vermont and tires have been banned from the landfill since 1992. Currently, there is no state law requiring a tire collection program funded by producers or consumer fees. Most tires that are collected in Vermont are brought out-of-state for processing, primarily as tire-derived-fuel for paper mills and cement kilns, though some are ground and made into new products like curb stops or floor mats. Vermont facilities collected 4,634 tons of tires in 2022, which is 25% higher than was collected in 2021. Tires have not been historically included in the Diversion & Disposal report, although permitted tire collection facilities are required to report the tonnage of tires that pass through their facilities. These numbers do not include the significant amount of tires that are taken back and managed through tire retailers and garages, and also does not include tires that are illegally hauled or dumped.

Table 13: Summary of recent tire collections.

	2016	2017	2018	2019	2020	2021	2022
Tons of Tires	4,315	2,733	4,274	3,878	3,551	3,712	4,634

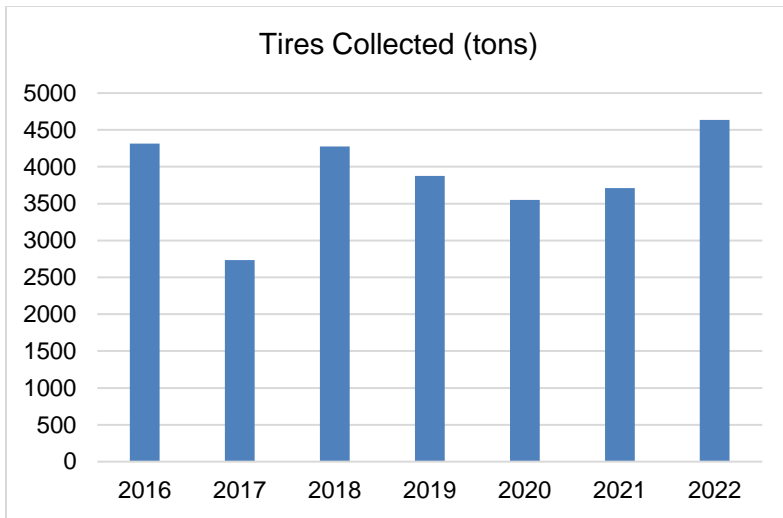


Figure 13: Trends in recent tire collections.

Appendix A: Household Hazardous Waste Report

Summary of 2022 Vermont HHW/VSQG Waste Programs

All Solid Waste Districts and Alliances, in alphabetical order

HHW/VSQG Material Collected (all materials in tons)†	All Solid Waste Districts and Alliances, in alphabetical order																
	Adirondack SWMD	Bennington County Solid Waste Alliance	Central Vermont SWMD	Chittenden SWMD	Lamoille/SWMD	Londonderry Group	Mad River/RMA	Mountain Alliance	Northwest Kingdom WWD	Northwest SWMD	Rutland County SWMD (excludes SWMD)	Solid Waste Alliance	Southern W/W Counties	White River Alliance	Windham SWMD		
1	Acids	0.53	0.30	0.50	2.06	0.26	0.13	0.50	0.05	0.14	0.49	0.01	-	-	0.44	0.38	
2	Aerosols	1.06	1.08	2.95	10.02	1.20	0.85	0.74	0.19	0.54	0.66	5.56	0.30	0.34	0.88	0.70	
3	Bases	0.41	0.50	0.79	2.10	0.39	0.09	0.52	0.01	0.14	0.79	0.14	-	-	0.44	0.71	
4	Fire Extinguishers	-	0.32	-	-	-	-	-	-	-	-	-	-	0.05	-	-	
5	Flammables & Solvents	15.62	3.79	8.72	36.47	8.56	22.48	5.28	1.75	5.63	4.67	4.22	0.96	1.50	2.86	2.15	
6	Glycols (Antifreeze)	1.48	-	-	6.04	-	-	-	-	-	1.00	-	-	-	-	1.25	
7	Oxidizers	0.41	0.05	0.17	0.51	0.14	0.02	0.40	0.08	0.07	-	0.16	0.01	-	0.44	-	
8	Lead Paint Chips & Debris	0.13	-	-	0.17	-	-	-	-	-	-	-	-	-	-	-	
9	Paints – Latex	29.46	4.40	2.35	80.99	-	2.59	-	-	1.48	23.63	-	-	-	-	-	
10	Paints – Oil	12.07	-	6.15	23.28	-	1.26	-	-	0.74	2.72	-	-	-	-	-	
11	Paints – Oil + Latex, Mixed	-	-	-	-	-	-	1.48	-	-	-	17.55	2.04	4.60	-	18.63	
12	Paints – Non-process Resins	7.37	-	8.35	14.81	2.28	-	1.76	0.98	3.32	2.43	0.22	1.25	-	0.74	-	
13	Pesticides	1.66	1.05	3.36	9.38	1.68	0.95	1.66	0.20	0.61	1.97	3.32	0.30	0.74	0.88	1.17	
14	Propane Tanks	2.39	0.54	-	-	-	-	-	0.02	-	-	1.17	-	-	-	-	
15	Reactives	0.04	-	0.002	0.07	-	-	-	-	-	0.18	-	-	-	-	-	
16	Toxics	0.13	0.01	-	0.15	-	-	0.02	-	-	-	-	-	-	-	-	
17	Photo Chemicals	-	-	-	0.23	-	-	-	-	-	0.04	-	-	-	-	-	
18	Waste Oil – Uncontaminated	12.24	-	-	12.34	-	-	-	-	-	5.60	4.17	-	0.83	-	-	
19	Waste Oil – Contaminated	-	-	-	-	-	-	-	-	-	-	-	-	1.25	-	1.91	
20	Waste Oil – Oily Debris	1.44	0.15	0.58	4.02	0.34	-	-	-	0.21	0.39	0.22	-	-	-	-	
21	Waste Oil – Oil Filters	1.69	-	-	1.38	-	-	-	-	-	-	-	-	-	-	-	
22	Oily Water	1.33	-	-	0.68	-	-	0.44	-	0.83	0.05	-	-	-	-	-	
23	Mercury – Fluorescent Tubes	7.92	-	-	18.06	-	-	-	0.02	-	0.51	1.97	-	-	0.00	-	
24	Mercury – Other Lamps	0.09	-	-	-	-	-	-	-	-	1.24	0.13	-	-	0.21	-	
25	Mercury – Added Products	-	0.01	0.004	0.25	-	-	0.02	-	-	-	-	0.00	0.01	0.08	-	
26	Mercury – Elemental	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
27	Mercury – Compounds	-	-	-	-	0.01	-	-	0.00	-	0.04	-	-	0.01	-	-	
28	Primary Batteries	3.80	0.13	-	23.09	-	-	0.08	0.02	-	3.65	1.58	-	-	0.06	-	
29	Rechargeable Batteries	4.25	0.09	-	-	-	-	0.08	-	-	0.73	1.18	-	-	-	-	
30	Lead-Acid Batteries	13.20	0.03	-	2.59	-	-	0.13	-	-	-	1.17	-	-	0.06	-	
31	Other misc. products	0.28	0.29	-	14.23	0.11	1.18	0.15	0.06	0.02	1.32	5.56	-	-	-	-	
Demographics																	
Occupied Households in Area††		14,625	14,572	23,212	69,052	11,944	1,656	5,484	5,237	19,964	21,198	20,750	5,901	14,076	3,714	16,430	
Program Profiles																	
Number of Events Held		0	3	5	6	3	2	1	2	9	6	34	3	0	2	2	
# of households served		2535	613	603	6975	489	149	424	75	808	1696	1430	74	200	182	353	
# of businesses served		106	0	4	580	9	2	9	0	2	565	63	1	9	5	13	
% household participation		17%	4%	3%	10%	4%	9%	8%	1%	4%	8%	7%	1%	1%	5%	2%	
Total HHW/VSQG (tons)		118.96	12.72	33.92	262.90	14.98	29.53	13.24	3.35	13.72	52.09	48.30	4.85	9.34	7.10	26.89	
Total VSQG Collected (tons)		9.68	-	2.90	90.66	1.29	11.80	0.70	-	0.42	0.20	-	-	-	-	0.78	
Total HHW Collected (tons)		109.28	12.72	31.02	172.24	13.69	17.73	12.54	3.35	13.30	51.89	48.30	4.85	9.34	7.10	26.11	
Avg. HHW/per household (tons)		0.04	0.02	0.05	0.02	0.03	0.12	0.03	0.04	0.02	0.03	0.03	0.07	0.05	0.04	0.07	
Avg. VSQG/per business (tons)		0.09	-	0.73	0.16	0.14	5.90	0.08	-	0.21	0.00	-	-	-	-	-	

SEE
VERMONT
TOTALS
FOR EACH
MATERIAL
ON PAGE
2

† All reported materials are converted to tons using VT Solid Waste Program Combined HHW Conversion Factors. See cover page for details.

†† Household estimates were derived from the US Census Bureau 2020 Decennial Census (data.census.gov) (total population and occupied household units by county subdivision)

All Independent Towns, Shared HHW Events

	HHW/VSQG Material Collected (all materials in tons)†	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 12.5%; transform: rotate(-45deg);">Canaan shared with Lennington</td> <td style="width: 12.5%; transform: rotate(-45deg);">Coventry, shared with Barton, Lowell and Newport City</td> <td style="width: 12.5%; transform: rotate(-45deg);">Fairfax</td> <td style="width: 12.5%; transform: rotate(-45deg);">St. Johnsbury shared with Burke</td> <td style="width: 12.5%; transform: rotate(-45deg);">Greater Upper Valley SMD shared with Hartford</td> <td style="width: 12.5%; transform: rotate(-45deg);">Wilmington</td> <td style="width: 12.5%; transform: rotate(-45deg);">Winhall</td> </tr> </table>							Canaan shared with Lennington	Coventry, shared with Barton, Lowell and Newport City	Fairfax	St. Johnsbury shared with Burke	Greater Upper Valley SMD shared with Hartford	Wilmington	Winhall	VERMONT TOTALS
		Canaan shared with Lennington	Coventry, shared with Barton, Lowell and Newport City	Fairfax	St. Johnsbury shared with Burke	Greater Upper Valley SMD shared with Hartford	Wilmington	Winhall								
1	Acids	0.06	0.05	0.07	0.10	0.63	-	0.14	6.8							
2	Aerosols	0.12	-	0.23	0.33	1.78	0.02	0.27	29.8							
3	Bases	-	0.20	0.07	0.20	0.83	0.03	0.14	8.5							
4	Fire Extinguishers	-	-	-	0.01	-	-	-	0.4							
5	Flammables & Solvents	-	2.20	3.20	0.83	5.38	0.03	2.74	139.0							
6	Glycols (Antifreeze)	-	0.06	-	-	-	-	-	9.8							
7	Oxidizers	-	0.01	0.02	0.12	0.23	0.00	0.14	3.0							
8	Lead Paint Chips & Debris	-	-	-	-	-	-	-	0.3							
9	Paints -- Latex	-	-	-	-	-	-	-	144.9							
10	Paints -- Oil	-	0.35	-	-	-	-	-	46.6							
11	Paints -- Oil + Latex, Mixed	0.40	0.44	-	-	-	1.34	-	46.5							
12	Paints -- Non-process Resins	0.01	0.55	1.00	0.60	4.06	-	0.12	49.8							
13	Pesticides	0.06	0.50	0.45	0.10	3.67	0.06	0.20	34.0							
14	Propane Tanks	-	-	0.08	0.05	0.02	-	-	4.2							
15	Reactives	-	-	-	0.00	0.13	-	-	0.4							
16	Toxics	-	-	-	-	-	-	-	0.3							
17	Photo Chemicals	-	-	-	-	-	-	-	0.3							
18	Waste Oil -- Uncontaminated	0.22	-	-	-	-	-	-	35.4							
19	Waste Oil -- Contaminated	-	-	-	-	-	-	-	3.2							
20	Waste Oil -- Oily Debris	0.63	0.22	-	0.30	-	-	0.21	8.7							
21	Waste Oil -- Oil Filters	-	-	-	-	-	-	-	3.1							
22	Oily Water	-	-	-	-	-	-	-	3.3							
23	Mercury -- Fluorescent Tubes	-	0.04	0.07	-	-	-	0.12	28.7							
24	Mercury -- Other Lamps	-	0.03	-	-	-	-	-	1.7							
25	Mercury -- Added Products	-	0.01	-	-	0.04	-	0.42	0.8							
26	Mercury -- Elemental	-	-	-	-	0.02	-	-	0.0							
27	Mercury -- Compounds	-	-	0.00	0.00	-	-	-	0.1							
28	Primary Batteries	-	0.04	0.10	0.07	-	0.15	-	32.8							
29	Rechargeable Batteries	-	-	-	0.04	-	0.01	-	6.4							
30	Lead-Acid Batteries	-	0.01	-	0.01	-	-	-	17.2							
31	Other misc. products	0.05	-	-	0.03	0.43	0.00	0.02	23.7							
Demographics																
	Occupied Households in Area††	455	3,912	1,890	3,804	12,951	567	496	271,890							
Program Profiles																
	Number of Events Held	4	2	2	2	3	2	2	95							
	# of households served	32	186	250	113	305	20	45	17,557							
	# of businesses served	4	3	-	-	5	-	1	1,381							
	% households served	7%	5%	13%	3%	2%	4%	9%	6%							
Total HHW/VSQG (tons)		1.54	4.70	5.27	2.78	17.20	1.65	4.50	689.5							
	Total VSQG Collected (tons)	-	0.72	-	-	-	-	-	119.2							
	Total HHW Collected (tons)	1.54	3.98	5.27	2.78	17.20	1.65	4.50	570							
	Avg. HHW/per household (tons)	0.05	0.02	0.02	0.02	0.06	0.08	0.10	0.03							
	Avg. VSQG/per business (tons)	-	0.24	-	-	-	-	-	0.09							

† All reported materials are converted to tons using VT Solid Waste Program Combined HHW Conversion Factors. See cover page for details.

†† Household estimates were derived from the US Census Bureau 2020 Decennial Census (data.census.gov) (total population and occupied household units by county subdivision)

Appendix B: Vermont Biosolids Management Statistics for 2022

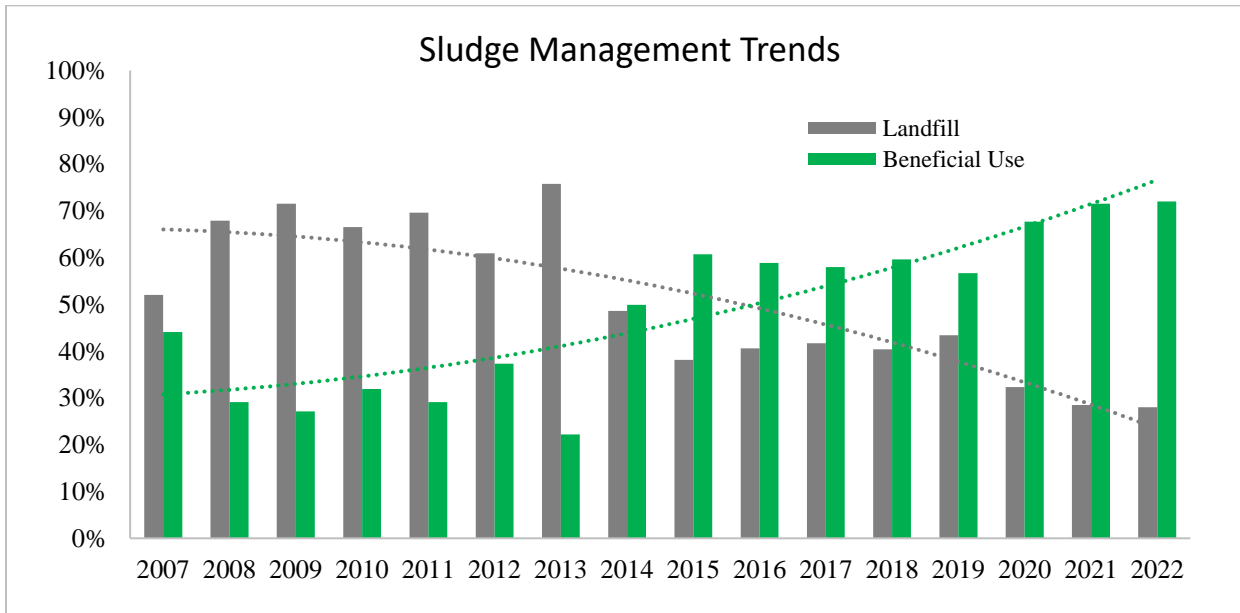


Figure 14: Vermont wastewater sludge management trends from 2007 to 2022 comparing percentages of sludges landfilled (gray bars) versus beneficially used/recycled as biosolids (green bars).

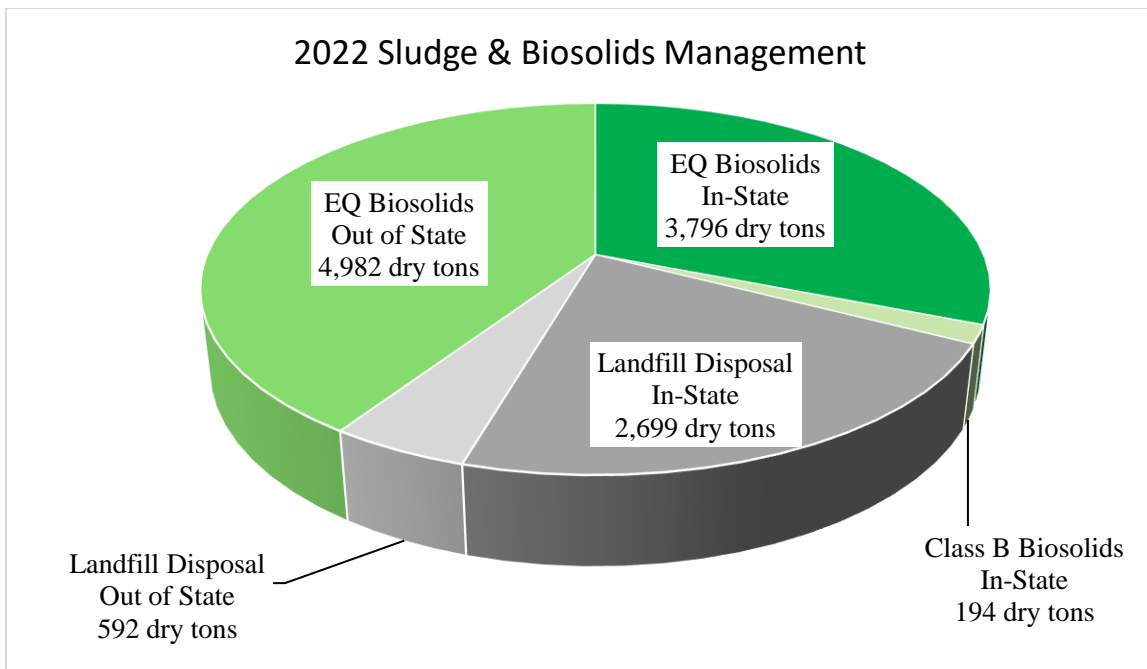


Figure 15: Vermont wastewater sludge management in 2022 showing dry tons of sludge land applied in-state as Class B biosolids (light green), used as Exceptional Quality (EQ) biosolids in-state and out-of-state (green), and landfilled in-state and out-of-state (gray). Nearly 70% of the sludge produced by Vermont wastewater facilities is ultimately recycled as EQ biosolids and used as a soil amendment in Vermont or in neighboring states.

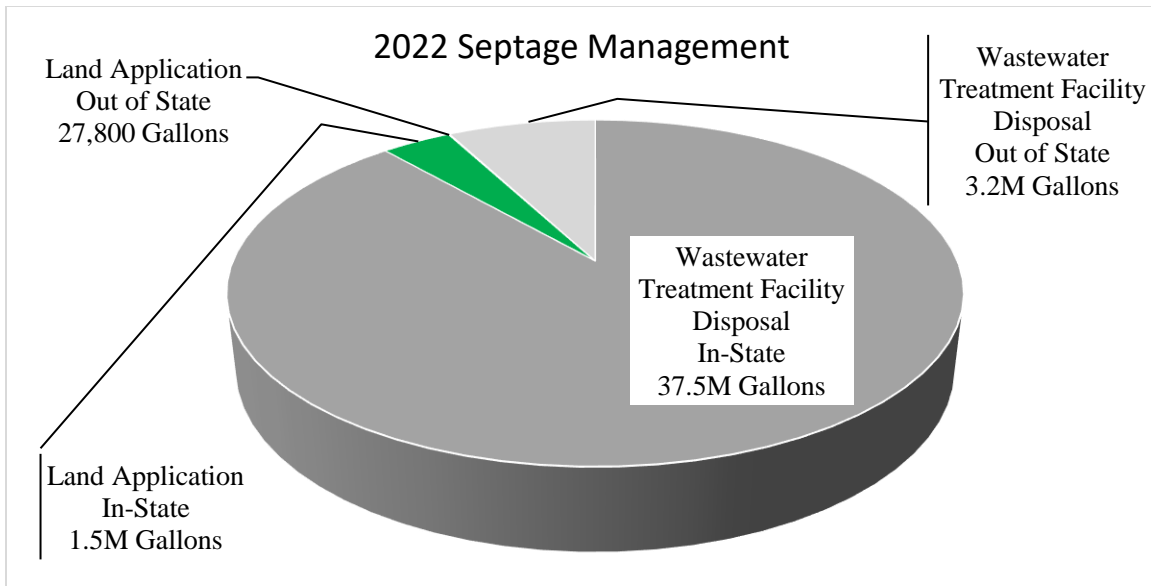


Figure 16: Vermont septage management in 2022 showing gallons of septage land applied (green) and hauled to wastewater facilities (gray) in-state and out-of-state. Over 42 million gallons of septage was managed in 2022. Due to recent declines in land application, 96% of septage produced by Vermont residents was hauled to wastewater treatment facilities for disposal.