



2024 Vermont Materials Management Plan

Effective Date:

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1 Introduction

In the five years since the last (2019) Materials Management Plan was written, much has changed both globally and locally that has impacted Vermont's waste stream:

- a) the COVID-19 pandemic led to both an increase in certain wastes, such as beverage and food containers, and a temporary decrease in overall waste;
- b) the Single-Use Products law and the full food scrap ban from the Universal Recycling law went into effect on July 1, 2020;
- c) Vermont created and approved its first Climate Action Plan in 2021;
- d) Vermont passed the Environmental Justice law in 2022;
- e) Vermont implemented a product ban in 2023 on food packaging and other products with intentionally-added PFAS (per- and poly fluoroalkyl substances; see section 1.4.1);
- f) Vermont passed a Household Hazardous Waste Extended Producer Responsibility law in 2023;
- g) commodity values continue to fluctuate due to long-term implications of China's 2018 ban on certain solid wastes and strict limits to contamination in recyclables;
- h) landfill disposal capacity in the New England region continues to decrease;
- i) emergent contaminants like PFAS and microplastics have connected seemingly disparate topics like packaging design and land application of compost or digestate; and
- j) historic flooding of July 2023 reminded us of the importance of waste management infrastructure and the impacts of climate change.

With all these new opportunities and challenges in mind, it is imperative that Vermont not only move forward with reducing waste and decreasing dependence on landfilling through improved recycling and composting, but also pursue ways to reduce greenhouse gas emissions, improve the resiliency of our communities, consider equitability of environmental benefits and burdens, and shift our culture toward a more circular economy.

The purpose of the 2024 Materials Management Plan (MMP or Plan) is to provide a framework for the State and its citizens to feasibly prevent waste from being generated, reduce the toxicity and environmental impacts of our waste stream, and expand reuse, recycling, and composting efforts to attain Vermont's statewide goals.

The MMP outlines actions that both the Agency of Natural Resources (ANR) and Solid Waste Management Entities (SWMEs) will take to reduce the amount and toxicity of solid waste in Vermont. SWMEs—including solid waste districts, alliances, and independent towns—will complete actions outlined in their Solid Waste Implementation Plans (SWIPs) that must conform with this MMP.

1.1 Statutory Authority

Act 78 of 1987—one of Vermont's most significant solid waste laws—established the requirement under 10 V.S.A. §6604, that “the Secretary [of the Agency of Natural Resources] shall publish and adopt, after notice and public hearing..., a solid waste management plan which sets forth a comprehensive statewide strategy for the management of waste...” Statute also requires this solid waste plan be revised at least once every five years.

The first State Solid Waste Management Plan was adopted in 1989, revised in 2001, and then readopted in 2006. In 2007, a legislative mandate required ANR to evaluate the effectiveness of the plan and to develop a new vision for materials management. A group of stakeholders, the Solid Waste Working Group (SWWG), was tasked with evaluating and compiling a list of recommendations to accomplish State solid waste goals. The SWWG's 2009 report to the Legislature was a driving force behind the passage of Vermont's Universal Recycling law (Act 148 of 2012) and the 2014 Plan was named the "Materials Management Plan" (MMP), as it laid out a "sustainable materials management" (SMM) vision.

The 2024 MMP maintains the general sustainable materials management direction and actions laid out by the 2014 Plan. ANR will continue to evaluate and prioritize environmentally, socially, and economically sustainable materials management strategies that can reduce waste and its impact from production through end-of-life. Previous state solid waste plans and historic reports can be found on ANR/DEC's Solid Waste Program website.¹

1.2 Plan Priorities and Goals

As required by statute, the 2024 MMP requirements for ANR and SWMEs were created to address following priorities established in 10 V.S.A. §6604(a)(1):

- a) the greatest feasible reduction in the amount of waste generated;
- b) sustainable materials management;
- c) the reuse and closed-loop recycling of waste to reduce to the greatest extent feasible the volume remaining for processing and disposal;
- d) the reduction of the State's reliance on waste disposal to the greatest extent feasible;
- e) the creation of an integrated waste management system that promotes energy conservation, reduces greenhouse gas emissions, and limits adverse environmental impacts; and
- f) waste processing to reduce the volume or toxicity of the waste stream.

Based on these priorities and other, more recent, legislative priorities like the Environmental Justice law (Act 154 of 2022), the goals of the 2024 MMP, are as follows:

1. **Maximize overall waste reduction and minimize disposal.** Why? To use less energy, emit fewer greenhouse gases, consume fewer resources, and create less material that needs to be managed and disposed of properly.

What is Sustainable Materials Management?

The [US EPA defines SMM](#) as: "a systematic approach to using and reusing materials more productively over their entire life cycles. It represents a change in how our society thinks about the use of natural resources and environmental protection. By examining how materials are used throughout their life cycle, an SMM approach seeks to:

- Use materials in the most productive way with an emphasis on using less.
- Reduce toxic chemicals and environmental impacts throughout the material life cycle.
- Assure we have sufficient resources to meet today's needs and those of the future."

¹ VTANR, Waste Management & Prevention Division, Solid Waste Management Program, Publications and Reports. dec.vermont.gov/waste-management/solid/publications-and-reports

2. **Promote sustainable materials management.** Why? To encourage the circulation of resources in the economy that can save energy, reduce greenhouse gas emissions, reduce the use of raw materials, and conserve resources for the future.
3. **Reduce toxicity of waste and the quantity of toxic products used.** Why? To reduce the toxicity of the waste stream and to protect public and environmental health.
4. **Reduce greenhouse gas emissions through better materials management and promote climate change resilience.** Why? To reduce the effects of materials management on climate change and build a more environmentally sustainable and resilient Vermont.
5. **Promote equity, accessibility, and environmental justice.** Why? Vermont's natural resources are held in trust for everyone and should be a source of inspiration and enjoyment for all. ANR is committed to ensuring that everyone living in and visiting Vermont has meaningful access and equal opportunity to participate in Agency programs, services, and activities.

Implementation of this plan is carried out primarily by the ANR, Department of Environmental Conservation Solid Waste Program, which consists of three sections: Certifications; Compliance; and Materials Management. As a regulatory agency, ANR is tasked with implementing many waste-related laws and has rule-making authority. Under Act 78 of 1987, municipalities were given responsibility for solid waste planning and management and must adopt and implement "Solid Waste Implementation Plans" ("SWIPs") in accordance with the current Vermont Materials Management Plan (MMP). Part of the vision of Act 78 was the formation of regional districts or planning units for the collection, management, disposal, reduction, and recycling of waste, which are represented by the [Solid Waste Management Entities](#) (or SWMEs) that we have today.

1.3 Vermont's Waste

According to 10 V.S.A. § 6604(a)(1)(B) "The [State's solid management waste] plan shall promote...the greatest feasible reduction in the amount of waste generated." The overall generation of waste reflects all materials that Vermonters use and discard—whether through disposal in the trash or through alternatives that divert materials from the trash, such as reuse, recycling, and composting. Tracking disposal, diversion, and waste generation over time is important as these trends reflect both cultural values and habits and the infrastructure and innovation necessary for diversion of particular materials.

1.3.1 Disposal

While waste reduction is the goal, Vermont has always needed disposal capacity for waste materials that cannot be reduced, reused, recycled, or composted. In Vermont, waste disposal is tracked annually through required reporting by regulated facilities. The amount of Vermont waste that is disposed out-of-state is tracked less precisely, as out-of-state facilities that accept Vermont waste do not report directly to ANR. However, all solid waste haulers are required to report and remit to the Vermont Tax department all franchise tax revenues for Vermont waste

that is disposed out-of-state. For more than a decade, ANR has used a contractor to review and audit haulers and facilities both in and out-of-state to ensure the franchise tax is being paid.

Since the passage of Act 78 in 1987, progress has been made in establishing modern lined landfills. While nearly every community once had its own unlined landfill, all have now closed and currently only the New England Waste Services of Vermont (“NEWSVT”) landfill in Coventry is operating. NEWSVT is a large, double-lined, landfill that handles approximately 80% of the state’s solid waste. This landfill is permitted to accept up to 600,000 tons of solid waste per year. In 2022, it accepted a total of 539,436 tons of waste, with 432,321 tons from Vermont, including 401,196 tons of municipal solid waste (MSW), plus construction and demolition debris (C&D), sludge, asbestos, ash, contaminated soil, sewer grit, and paper sludge. The landfill also accepted 107,115 tons from out-of-state, which included residue from material recovery facilities (MRF), C&D, sludge, asbestos, ash, contaminated soil, and sewer grit; the landfill is not permitted to accept out-of-state MSW. The landfill also uses contaminated soils and other materials, including processed C&D, sawdust, and sludge mixed with soil, for “acceptable uses” as alternative daily cover and for road base material. The NEWSVT landfill captures most of their methane landfill gas, which is used to produce electricity. More information on the disposition of Vermont’s waste can be found in the Agency’s annual [Diversion and Disposal Reports](#).

As stated above in Section 1.2, under Act 78, municipalities were given responsibility for solid waste planning and management and part of the vision was the formation of regional districts for the collection, management, disposal, reduction, and recycling of waste. Millions of dollars were spent by the State and municipalities on regional landfill siting and design. However, none of these proposed facilities are operating today. Generally, this is due to the costs and required economies of scale associated with running modern landfills, as documented in this [2021 Report on Landfill Operation in the State](#)².

While regional landfills have struggled to be economically viable, having in-state disposal capacity certainly benefits the state, as demonstrated by the July 2023 flooding. The NEWSVT landfill reported receiving approximately 20,000 tons of waste from these floods. The Agency is aware that additional flood debris was disposed of out-of-state, but the exact amount is unknown.

Currently, the NEWSVT landfill is estimated to have less than 20 years of operating capacity remaining. While the state will need more disposal capacity in the future, this requires a broader view of materials management that does not unintentionally support disposal over waste reduction and diversion. As this [2008 life cycle assessment modeling study from Massachusetts](#)³ concludes, source reduction, recycling, and composting are the most beneficial materials management options.

² Report on Landfill Operation in the State. Completed as Required by 2019 Act 69. Vermont Agency of Natural Resources, Department of Environmental Conservation. 2021.

³ Assessment of Materials Management Options for the Massachusetts Solid Waste Master Plan Review. Massachusetts Department of Environmental Protection. 2008.

While siting additional landfills would provide more disposal options for Vermont's waste, the Agency is not aware of any projects currently being planned. Some may advocate for a state-owned landfill or incinerator, as exists in some other states. A state-owned landfill would, in effect, bear all the liability for the waste facility, while the profits would be held by the private contractor hired to operate it. Waste incinerators produce significant air emissions, and the ash still requires landfill disposal capacity. Traditionally, waste incinerators require huge upfront capital to build, requiring long-term contracts for large volumes of waste to ensure the debt can be repaid. This is partly the reason a waste incinerator that was proposed in Rutland in the 1980s failed and why no new incinerators are being proposed in Vermont or other New England states. Vermont's annual disposed waste is low enough to present a significant economic challenge for the formation of both waste incinerators and regional landfills. For context, Vermont disposed of approximately 400,000 tons of MSW in 2021 while neighboring Massachusetts disposed of approximately 4,000,000 tons of MSW in 2019.

Regionally, a 2021 Northeast Waste Management Officials Association (NEWMOA) report on [Solid Waste Disposal Capacity](#)⁴ showed that disposal capacity in the Northeast is constricting, with 23% of the region's waste being managed by landfills that will reach their currently-permitted capacity within the next 5 years. Some northeast states are already using rail transport for waste disposal in states like Ohio, Pennsylvania, and Virginia. While rail transport could be a future option for Vermont waste, it would likely be costly, subject to disruptions, and challenging to regulate given the federal exemptions for rail operations.

Over the next 5 years, ANR plans to initiate a stakeholder process for Vermont disposal capacity of the future. Whatever the path, the state must not waiver in its efforts to reduce, repair, reuse, recycle, compost, and safely manage waste and materials for the benefit of human health and the environment.

1.3.2 Waste Composition Study

As required by statute, every five years ANR conducts a waste composition study in which contractors hired by ANR systematically sort through samples of trash (municipal solid waste) at key facilities throughout the state and categorize every item to determine what Vermonters throw away. Full methods can be found in the [2023 Waste Composition Study Report](#)⁵. These studies provide detailed snapshots of what Vermonters throw in the trash and allow us to assess trends in disposal patterns at five-year intervals. It is worth noting, however, that factors other than disposal patterns also affect waste composition results. For example, light-weighting of materials means that a single cardboard box or a single plastic bottle in 2023 may weigh less than the equivalent item in previous years. Similarly, decreases in one part of the waste stream have an impact on other parts. For example, as paper and cardboard are increasingly recycled, heavier food scraps and organics inherently become a larger portion of the remaining waste stream.

⁴ Solid Waste Disposal Capacity in the Northeast. Northeast Waste Management Officials Association. 2021.

⁵ 2023 Waste Composition Study Report. Prepared for the Vermont Department of Environmental Conservation by MSW Consultants. 2024.

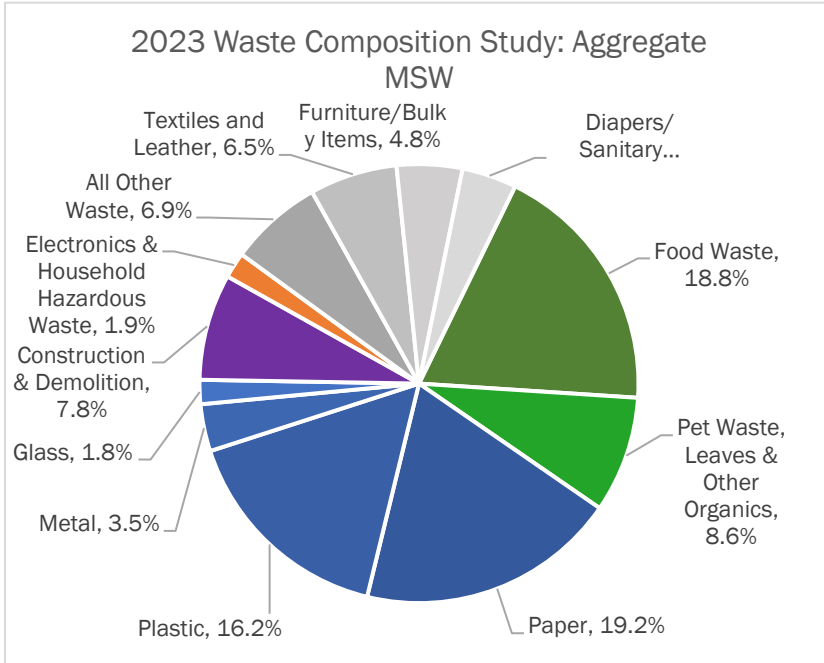


FIGURE 1: 2023 WASTE COMPOSITION STUDY RESULTS OF AGGREGATE MSW (378,042 TONS) SORT.

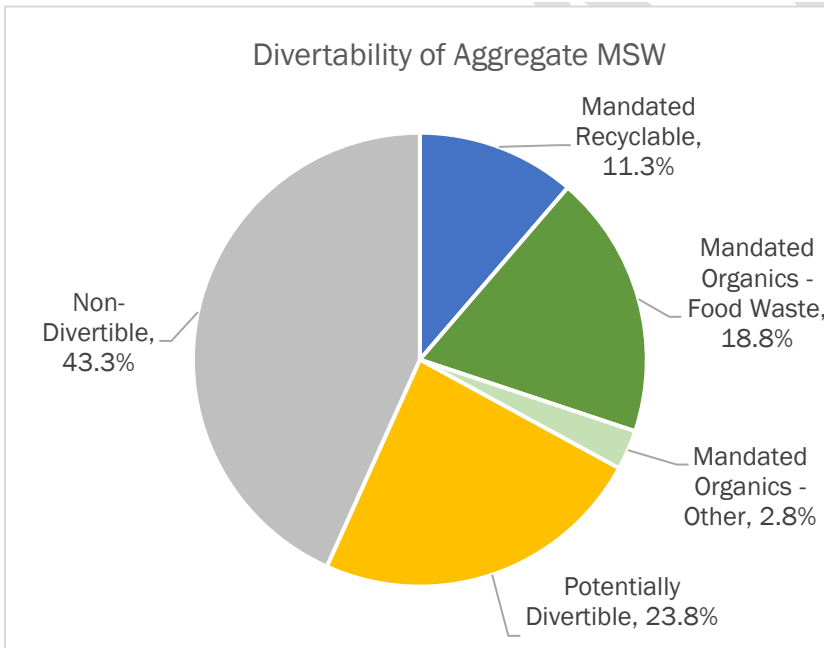


FIGURE 2: 2023 WASTE COMPOSITION STUDY AGGREGATE MSW CATEGORIZED BY DIVERTIBILITY.

Results from the most recent 2023 Waste Composition Study demonstrate:

a) As shown in figure 1, by weight, the largest single categories of municipal solid waste (MSW) were paper (19.2%), food waste (18.8%), and plastic (16.2%). It should be noted that food waste is a generally “wet” and heavy material and that disposed paper can become wet, and therefore heavier, than it would have been.

b) As shown in Figure 2, 43% of the material disposed in MSW was non-divertible trash. However, more than a quarter of the MSW could (and should) have been diverted through mixed recycling, food waste, and leaf and yard debris streams. The remaining 24% was potentially divertible items, such as mattresses, textiles, electronics, and appliances.

c) Overall, the relative proportions of various materials in the aggregate MSW waste stream is quite similar to that found in the [2018 Waste Characterization Study](#)⁶.

d) One notable change is the increase in plastic, from 13% in 2018 to 16.2% in 2023. This predominance of plastic would be even more notable if measured by volume instead of by weight.

e) There was also a decrease in construction and demolition (C&D) debris in the MSW, from 11% in 2018 to 7.8% in 2023. However, this only represents the C&D mixed in with the MSW

⁶ 2018 Waste Characterization Study. Prepared for the Vermont Department of Environmental Conservation by DSM Environmental. 2018.

waste stream, and does not include the separate C&D waste stream, which is still a significant portion of waste.

See Markets and Facilities (Section 2) for more Waste Composition study results for individual materials.

1.3.3 Diversion and Waste Reduction

Tracking diversion, while just as important as tracking disposal, is more challenging because it not only includes recycling and composting data from regulated facilities, but also activities that ANR does not receive reports on, such as back-yard composting, sales from reuse stores, farm-based animal feed and composting, or when a retailer or manufacturer “back hauls” cardboard and other materials for recycling out-of-state. The overall goal is always to generate less waste, both by disposing less and diverting more and, most importantly, by having less material to manage in the first place.

Vermont’s Universal Recycling law: In 2012, Vermont’s legislature unanimously passed the Universal Recycling law (adopted as Act 148) designed to reduce waste and increase recycling and organics diversion through disposal bans and convenience standards that require statewide collection of certain materials at the curb and at drop-off facilities. The law incentivizes reduction and diversion through variable rate pricing, or “pay-as-you-throw,” and encourages investments in recycling and organics collection and management. Implementation of the law was phased in over more than a decade, allowing time to establish collection services and expand processing facilities for managing these materials.

With few exceptions, the law is effective in establishing recycling services at the curb and at transfer stations wherever trash collection is offered. It also established food scrap drop-off and seasonal leaf and yard debris collection at over 100 transfer stations. It reinvigorated food donations in the state and incentivizes businesses and institutions to reduce food waste simply because they must prioritize separating it from the trash due to the statewide food waste disposal ban. In February 2023, [UVM published results of a recent survey⁷](#) that found an impressive 85% of Vermonters report that they are composting their food scraps.

⁷ Impact of Vermont’s Food Waste Ban on Residents and Food Businesses. Belarmino et al. University of Vermont. 2023.

Diversion & Reduction Goals: The data on how Vermonters generate and manage our waste are both encouraging and sobering. Through the waste composition studies and our annual [Diversion and Disposal \(D&D\) Reports](#), ANR is able to estimate the amount of recyclables, food scraps, and other materials that are diverted from the waste stream versus those disposed of in the trash. Using the most current 2023 Waste Composition data and 2022 D&D data, we have a statewide recycling “recovery rate” of 72.1% of mandated recyclables (paper, cardboard, glass bottles and jars, plastics #1 and #2, and steel and aluminum cans). This is the same as the recycling recovery rate of 72% calculated after the 2018 Waste Composition study. Similarly, for the first time, we now have a food scrap recovery rate, calculated as around 53%. A food scrap recovery rate was not calculated in the 2018 study. Clearly, Vermonters are working hard to keep their recyclables and food scraps out of the trash.

What is the Recycling Recovery Rate?

The recycling recovery rate is the percentage of “blue bin recyclables” (paper, cardboard, steel, aluminum, glass, and plastics #1, 2, and 5) that were actually recycled (data from regulated solid waste facilities) out of all recyclable materials generated by Vermonters, which is the sum of materials that were recycled + materials that could have been recycled but were thrown in the trash (data from Waste Composition Study).

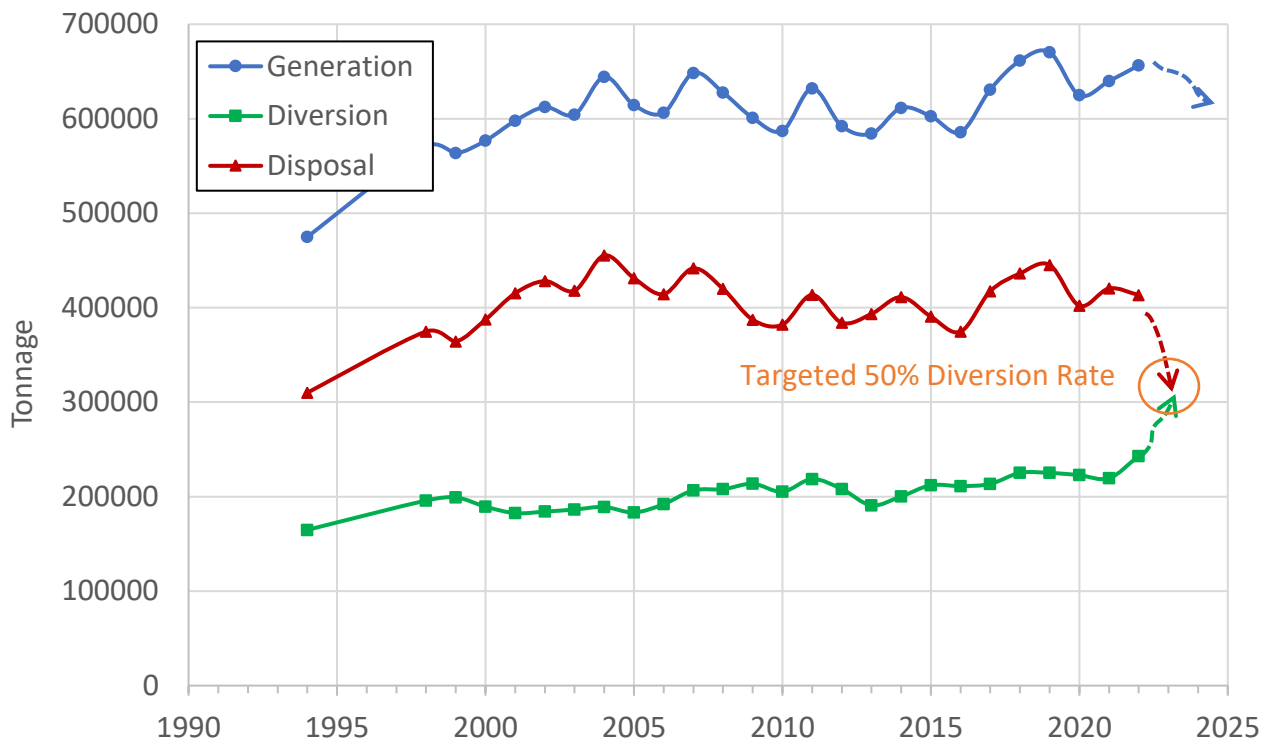
$$\text{Recovery rate} = \frac{\text{Recycled}}{\text{Recyclable}} \times 100$$


FIGURE 3: TRENDS IN WASTE GENERATION, DIVERSION, AND DISPOSAL.

In both the 2014 and 2019 MMPs, we had goals of reducing disposal of MSW by 25% and increasing diversion to 50% within the plan term. These are admirable goals, and achieving significant decreases in disposal and increases in diversion are necessary. However, in the last 10 years, the Agency’s best data, shown in Figure 3, above, has not demonstrated significant progress toward either goal. Instead, since ANR began tracking diversion and disposal data in 1998, we have only once had three consecutive years of disposing less than

What are Disposal and Diversion?

Disposal of MSW includes everything that Vermonters throw in the “regular trash.” It does not include construction and demolition debris or other materials that are landfilled like contaminated soil or sludge.

Diversion rate is the percentage of materials that Vermonters divert from disposal (i.e. an estimate of everything that Vermonters produce as waste but keep out of the trash by recycling, composting, reusing, etc.) out of all waste materials generated by Vermonters (MSW that was disposed + material that was diverted).

$$\text{Diversion rate} = \frac{\text{Diverted}}{\text{Generated}} \times 100$$

A 50% diversion rate means that, of all the waste generated by Vermonters, half of the material would be kept out of the trash.

the year before—in 2007-2009. The biggest decrease in disposal in a single year was 10%, in 2020. Both of these periods of “low waste” corresponded with periods of economic recession. Overall, between 2018 and 2022, we have seen a 5% decrease in disposal but, between 2013 and 2022, we have not seen a decrease in waste disposal, but a 5% increase. This suggests that, despite relatively high recovery rates of recyclables and food scraps, general trends toward increased consumption may have a larger impact on waste generation.

Similarly, we are not progressing toward meeting the goal of increased diversion. Instead, the tonnage of material that we estimate as being diverted from the landfill has remained surprisingly consistent over time and the diversion rate, for as long as we have calculated it, has never reached above 37%. That said, while ANR calculates the diversion rate each year, this is an incomplete estimate because there are many instances of diversion that we do not have data for. Interestingly, some SWMEs that have

collected more data than is possible at a state-wide level (such as by conducting extensive phone-interviews of businesses that back-haul recyclable material or divert material in other ways than through facilities that report to ANR) have quantified diversion rates over 50%.

While the state of Vermont produces relatively small amounts of waste compared to neighboring states with larger populations, more work is needed to improve waste reduction, recycling, and composting systems. As the upcoming Challenges in Materials Management (1.4) and Markets and Facilities Assessment (2) sections detail, reducing waste and increasing recycling must look upstream to the products and materials we consume and must acknowledge some of the unavoidable waste that may be required to meet other societal goals (new housing, for example). Together, wasting less, disposing less, and diverting more will conserve natural resources, reduce greenhouse gas emissions, and decrease the need for additional landfill capacity, which have been state goals since even before the passage of Act 78.

2019 Goal:

Decrease disposal by 25% from 2018 to 2024.

Progress: 5% decrease in disposal from 2018 to 2022, but 5% increase in disposal from 2013 to 2022.

2019 Goal:

Increase diversion from 35% to 50%.

Progress: No significant increase.

1.4 Challenges in Materials Management

1.4.1 Emerging Contaminants

PFAS: In recent years, increasing research and knowledge about per- and poly fluoroalkyl substances (PFAS), has resulted in challenges that intersect many aspects of materials management, such as the land application of biosolids, compost, and landfill leachate management. PFAS are a large family of fluorinated chemicals used for decades in industrial processes, firefighting foams, and consumer products, and are now found across the globe in water sources, landfill leachate, and residual materials like sludges and biosolids. PFAS are termed “forever chemicals” due to their resistance to degradation, persistence in the environment, and bioaccumulation in nature. Toxicological studies have indicated health concerns associated with exposures to PFAS. As a result, our understanding of PFAS and the risks they pose is rapidly evolving and ANR continues to assess and update rules and standards. In 2021, the Vermont legislature passed restrictions on PFAS in a variety of products ([Act 36](#)), including a ban on the manufacturing, sale, and distribution of food packages containing PFAS, which went into effect July 1, 2023. In 2022, DEC’s Solid Waste Program issued a permit to Casella Waste Management to pilot an on-site PFAS pre-treatment system to reduce the amount of PFAS in leachate from the NEWSVT landfill. As of April 2024, permits for air emission and pre-treatment are being reviewed by DEC’s Air Quality and Climate Control Division and the Watershed Management Division.

Microplastics: Microplastics are characterized as plastic particles less than 5mm in size. Microplastic contamination is becoming an increasing concern in drinking water, wastewater, soil/land/air, solid waste, recycling, and organic materials recycling processes, and technologies such as composting, anaerobic digestion, and, most recently, from depackaging machines. In 2019, the Universal Recycling Stakeholder Group expressed the need to more fully understand microplastic contamination in organics management. [Act 170 of 2022](#) set a moratorium on new food waste depackaging facilities in Vermont until the Agency adopts rules. It also required the establishment of a depackaging stakeholder group, multiple reports on the transportation of food waste, and a study of microplastics and PFAS in food packaging. Also in 2022, an interdisciplinary team at the University of Vermont conducted a literature review entitled “Microplastics in Composts, Digestates & Food Wastes⁸,” which highlighted the need for more research on the extent and impacts of microplastic contamination. This report acknowledged that there are no organics processing technologies that entirely eliminate the risk of plastic contamination in the finished compost or digestate and that there are methodological limitations to the measurement of microplastics in these substances.

1.4.2 Climate Resiliency and Natural Disasters

The historic floods of July and August 2023 underscored the role that waste management infrastructure plays during a natural disaster, both at the height of the disaster and during the long-term recovery process. After the July 2023 floods, the State’s Disaster Debris

⁸ Microplastics in Composts, Digestate and Food Wastes. A New Comprehensive Review of Scientific Literature Finds that Microplastics are a Systematic Challenge in Organics Recycling Porterfield, K.K.; Hobson, S.A.; Neher, D.A.; Niles, M.T.; Roy, E.D., Journal of Environmental Quality. 2022.

Management contractor was deployed in 17 municipalities that opted into a Memorandum of Understanding (MOU) with the State to assist with flood debris removal once local resources were unable to meet the demand. The U.S. EPA assisted with the collection and safe disposal of flood-related hazardous materials. ANR and SWMEs were involved, to various extents, with both of these processes and other types of assistance to flood-impacted communities. SWMEs with existing HHW collection vehicles and facilities were able to mobilize and help some of the worst-impacted communities, which is evidence of these SWME and state-supported investments paying off. In some instances, waste management facilities were directly impacted by the floods, showing the importance for siting transfer stations and other waste facilities outside of flood plains.

1.4.3 Black Bears

Conflicts between humans and black bears have increased in Vermont over the last several years. Development has led to habitat fragmentation bringing bears and humans into closer proximity. Common problem attractants that may draw bears into human-occupied spaces, include bird seed, chickens, and honeybees. However, improperly or insufficiently managed trash and food scraps have contributed significantly to this problem. Since 2020, bears accessing garbage and/or food scraps make up 50% of the bear incident reports submitted by the public to the Vermont Fish and Wildlife Department (FWD). Effective secure storage options for garbage and food scraps are a critical component of preventing conflicts between people and bears. DEC is working collaboratively with FWD to educate the public on how to manage trash and food scraps with bears in mind and what to do if a bear gets into trash or food scraps. DEC and FWD are also exploring how to increase the use of bear-resistant trash containers.

1.5 Climate Change

There are many connections between materials management and climate change, including direct and indirect greenhouse gas emissions (GHGs). Sources of direct emissions include trucks hauling waste, landfills releasing methane as organic materials decompose, and the release of hydrofluorocarbons (HFCs) when refrigerants from waste appliances and junk cars are not properly managed. There are also less obvious sources of GHG, such as those related to the electricity required for product manufacturing and ecosystem disruptions from resource extraction. Many opportunities exist within materials management for reducing GHG emissions, such as through: the use of efficient energy sources and equipment at waste, recycling, composting, and digestion facilities; electrification of vehicles or equipment; landfill gas collection; composting or anaerobically digesting organic material (rather than landfilling); manufacturing products with recycled materials rather than raw materials; supporting recycling markets; and by reducing resource consumption through a culture that promotes reuse, repair, and general waste prevention through producing, shipping, and using fewer consumer goods in the first place.

In 2020, the Vermont legislature passed the Global Warming Solutions Act ([Act 153](#)), which set legally-binding emission reduction requirements for 2025, 2030, and 2050 and created a Climate Council tasked with drafting the state's first Climate Action Plan (CAP). The Climate Action Plan outlines strategies for reductions in greenhouse gas emissions, long-term

opportunities for carbon sequestration, and other initiatives related to climate change mitigation and resilience in Vermont communities and natural systems.

In the initial 2021 CAP, one Action was assigned to the Solid Waste Program: “expand infrastructure and educational programs around community and backyard composting and recycling.” The Program’s work on implementing the Universal Recycling law’s recycling and composting mandates addresses this Action through grants, education, outreach, complaint response, load spot checks, and direct site visits to large waste generators. Many past and ongoing reduction and recycling initiatives work toward climate goals as well, including: the funding of composting and recycling infrastructure; the funding of Master Composter trainings and the Vermont Organics Recycling Summit; and media campaigns, such as *Recycle Like You Live Here* and *Scrap Food Waste*.

Beyond the single Action assigned in the Vermont CAP, there are additional opportunities for reducing the impact and emissions of Vermont’s waste management infrastructure, such as through transitioning to electric equipment. The NEWSVT landfill in Coventry and the closed Moretown landfill have landfill gas-to-energy systems that collect methane from the landfills and combust that landfill gas to produce energy. Reducing the amount of organic material in the landfill was a primary driver behind the landfill ban on food scraps and other organic material in the Universal Recycling law, and continued outreach and education efforts help Vermonters understand the importance of reducing food waste and keeping food scraps out of the trash. Opportunities also exist for increasing the resiliency of Vermont’s waste management infrastructure, as was highlighted when the July 2023 floods directly impacted a few waste facilities (see Challenges in Waste Management section 1.4.2 above).

1.6 Equity, Accessibility, and Environmental Justice

All individuals produce waste, and waste reduction and sustainable waste or “materials” management have many benefits, such as conserved resources, improved air and water quality, reduced reliance on raw materials, and decreased greenhouse gas emissions. However, individual access to information and services for waste reduction, recycling, and safe management can be hindered by barriers such as geography, socio-economic restrictions, English language proficiency, physical disabilities, and situational disabilities. Consequently, some Vermonters may toss recyclables, food scraps, or even household hazardous waste into the trash due to lack of services or knowledge. Additionally, the burdens of waste disposal facilities may not impact all Vermonters equally. For example, in some parts of the United States, there are communities that have multiple disposal facilities or disposal facilities located in areas that already have other polluting industries that can present environmental burdens such as odors, truck traffic, and impacts to water quality.

Issues of equity (the consistent and systematic fair, just, and impartial treatment of all individuals as defined by [Executive Order 13985: Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government](#)) and accessibility related to environmental benefits, environmental burdens, and cumulative impacts are connected to both environmental justice and civil rights. The [ANR Office of Civil Rights and Environmental Justice](#) supports and advances ANR’s commitment to “ensuring that everyone living in and visiting Vermont has meaningful access and equal opportunity to participate in

Agency programs, services, and activities.” In 2022, the State of Vermont passed the [Vermont Environmental Justice Law](#) – Act 154 – to establish a State Environmental Justice Policy and implementation steps. The implementation of this policy requires: (1) creating and adopting community engagement plans, (2) directing investments with environmental benefits proportionately to environmental justice focus populations, and (3) considering cumulative environmental burdens when making decisions. In consultation with the Environmental Justice Advisory Council and Interagency Committee beginning in 2023, ANR is developing guidance to support environmental benefits accounting. ANR will also develop a community engagement plan, create a state environmental justice mapping tool, and engage in future rulemaking regarding cumulative burdens. The VT DEC Solid Waste Management Program will follow this process as it unfolds across ANR and DEC.

Environmental Justice is also a priority at the federal level through initiatives such as [Justice40](#), which mandates that “at least 40% of benefits of certain federal programs must flow to disadvantaged communities,” which are defined by the [Federal Climate and Economic Justice Screening Tool](#) as “those that are marginalized, underserved, and overburdened.”

2 Markets and Facilities Assessment

Statute requires that the Materials Management Plan include the following:

- a) an assessment of the feasibility and cost of diverting specific material categories defined as “**marketable recyclables, leaf and yard waste residuals, food residuals, construction and demolition residuals, household hazardous waste**, and other categories that the Secretary identifies that may be diverted to meet the waste reduction priorities of the Plan.”;
- b) a survey of existing and potential markets for the above materials;
- c) methods to reduce and remove material from the waste stream including **organics, textiles, and construction and demolition debris**;
- d) methods to separate, collect, recycle, treat or dispose of wastes that create environmental health, safety or management problems including **tires, batteries, obsolete electronic equipment, and unregulated hazardous waste**;
- e) **assurance of recycling** and prevention of incineration or disposal of marketable recyclables;
- f) an **assessment of facilities and programs** necessary at the State, regional, or local level to achieve the priorities identified in this Plan.

2.1 Recyclables

Background: In 2015, Vermont’s Universal Recycling law banned landfill disposal of “mandated recyclable(s)” defined as “aluminum and steel cans; aluminum foil and aluminum pie plates; glass bottles and jars from foods and beverages; polyethylene terephthalate (PET) plastic bottles or jugs; high density polyethylene (HDPE) plastic bottles and jugs; corrugated

cardboard; white and colored paper; newspaper; magazines; catalogues; paper mail and envelopes; boxboard; and paper bags.” Whether through single-stream “blue bin” recycling at curbside or drop-off, or through dual-stream and source-separated recycling drop-off programs in regions like the Northeast Kingdom and Northwestern Vermont, recycling haulers and facilities in Vermont must collect all the above-mentioned materials.

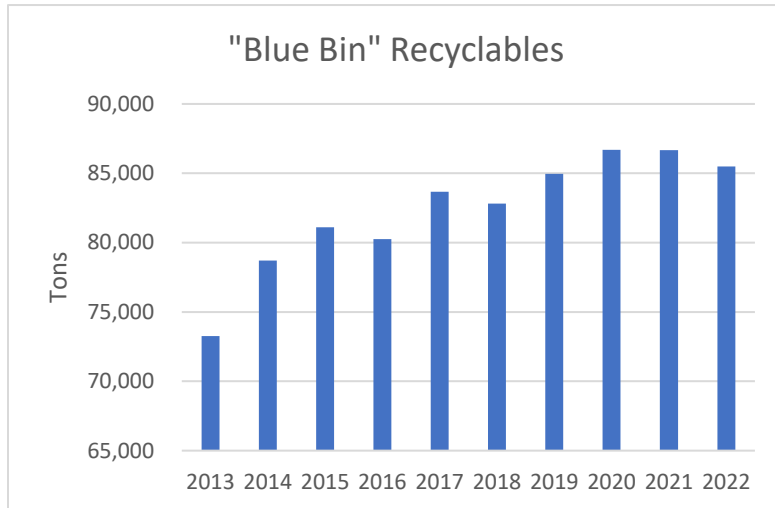


FIGURE 4: PAPER, CARDBOARD, PLASTIC CONTAINERS, GLASS BOTTLES AND JARS, AND ALUMINUM AND STEEL CANS RECYCLED BY VERMONT FACILITIES 2013-2022.

Vermonters regularly recycle, as evidenced by a strong statewide recovery rate of 71.1% from the 2023 Waste Composition Study. The amount of mandated recyclables in the Vermont municipal solid waste stream was 11.3% in the 2023 Study, which is an insignificant decrease from the 12.2% found in the 2018 study. Recyclables have increased notably since transfer stations were required to accept recyclables in 2014 and recyclables were banned from the trash in 2015. Over the last several years, recycling by weight has largely remained stable. This is a positive trend, considering that packaging is now up to 20% lighter than in the past, which means that the overall quantity of recycled items has actually increased.

Collection Infrastructure: After decades of recycling investments by both the public and private sectors, Vermont—with a few exceptions—generally has the recycling collection and processing facilities needed to process its recyclables for end markets. The Northeast Kingdom (NEK) is one of these exceptions, as the region currently lacks a single-stream recycling tipping floor facility for commercial haulers. Haulers of trash are required by law to offer collection of mandated recyclables and most mandated recyclables that are picked up curbside are collected via single stream totes and dumpsters. The NEK region does have significant recycling centers for source-separated recycling and a source-separated recycling aggregation facility in Lyndonville.

Most recycling from Vermont is processed by two single-stream material recovery facilities (MRFs) in Williston and Rutland; the rest is processed at smaller facilities like those in Georgia, Brattleboro, Lyndonville, Middlebury, Stowe, and Bennington, or sent to recycling facilities out-of-State. Recent shifts in global market availability have necessitated improved processing of materials to produce higher-quality outputs for use in the manufacture of new products. In 2023, Casella added several robots to the Rutland MRF to improve material sorting. Also, the Chittenden Solid Waste District (CSWD) is planning to build a new MRF to replace its Williston MRF, built in the 1990s, that has outgrown its space. CSWD’s new MRF would both increase its capacity and provide higher-quality sorted materials.

In addition to the recycling stream that goes through regulated facilities, there is some management of recyclables that occurs directly between business entities and brokers, thereby bypassing a reporting Vermont solid waste facility. In the 2018 and 2023 Waste Composition Studies, the contractors surveyed Vermont employers and manufacturing facilities to identify and estimate the amount of recyclable materials that were either backhauled or sold directly to a broker by the business sector.

Recycling values, like those of other commodities, fluctuate with the market. China's 2017 National Sword policy effectively banned imports of recycling from the U.S. and other countries because of high contamination rates. This led to a global downturn in recycling commodity values, resulting in significant recycling costs that caused some communities around the U.S. to stop recycling. It also helped lead to new policies like Packaging and Printed Paper Extended Producer Responsibility (EPR) laws in four U.S. states (California, Colorado, Maine, and Oregon), as well as significant federal funding for recycling investments that have not received this level of attention since the 1990s. The COVID-19 pandemic in 2020 added new challenges as the global economy slowed, causing supply-chain issues. In 2021, most recycling markets started to come back, particularly paper markets fueled by the increase in cardboard needed to accommodate the surge in online shopping. However, in 2023, markets have declined again and Vermont recycling costs remain relatively high for haulers, businesses, municipalities, and many residents.

It remains to be seen how recycling markets will change as the long-term effects of the pandemic unfold; demand for goods has lowered as consumers continue to spend more on services. Trucking distance can also play a big role in recycling cost-effectiveness, and national trucking costs have significantly increased due to firmer regulation and tracking of trucker hours and a lack of truck drivers entering this career field. A few bright spots related to recycling markets include: the states that are beginning to implement Packaging EPR; post-consumer recycled content legislation that can help improve demand for recycled commodities; some beverage companies using refill/reuse models; and brand commitments to use post-recycled content.

2.1.1 Paper (mixed paper, boxboard, cardboard)

Diversion Status: By weight, paper fibers are the largest single category in the recycling stream, with cardboard and mixed paper making up over 60% by weight of Vermont's recyclables. In 2022, cardboard made up 57% (46,898 tons) of the fibers recycled through facilities, newspaper was 23% (18,773 tons), and mixed paper was 20% (15,916 tons). The direct-to-broker survey in the 2023 Waste Composition Study estimated that an additional 14,608 tons of cardboard and other paper were recycled outside of regulated facilities in 2023 (9,447 tons verified from survey respondents and 6,451 tons estimated from entities that responded to the 2018 Waste Composition Study survey but not to the 2023 survey). The 2023 Waste Composition Study found 7.4% (28,224 tons) recyclable paper and cardboard in the Vermont municipal solid waste stream, by weight, which is a continued (if slight) decrease in recyclable paper from 16.7% of residential waste in 2002 to 8.6% in 2017.

Markets: Cardboard is frequently the most valuable recyclable paper from consumers, and mixed paper has struggled for years with low prices. Of the recyclables Vermonters produce,

mixed paper was one of the most-impacted by international markets and China's policies, in particular. Prior to 2018, China was importing about 50% of all U.S. recycled mixed paper⁹. Since China stopped accepting raw recycling commodities (commonly referred to as "China Sword"), much of that pre-processing has moved to domestic North American facilities that have either expanded or been built to use both cardboard ("old cardboard containers" or "OCC") and mixed paper.

In 2022, the majority of Vermont's recycled cardboard and mixed paper, including that collected and baled by the Williston and Rutland MRFs, Canusa Hershman (a recycling collector and processor in St. Albans), the Northeast Kingdom Waste Management District (NEKWMD), and the Northwest Vermont Solid Waste District (NWSWD), was sent to Kruger, which is based in Montreal, Canada or West Rock, which is based out of Georgia. WestRock has a mill in Sheldon Springs, Vermont, where recycled paper is made into food-grade box board.

2.1.2 Glass

Diversion Status: In 2022, nearly 12,000 tons of glass bottles and jars were reported as recycled by Vermont Facilities. Additional glass bottles were recycled through the Bottle Bill redemption system, however ANR does not regularly receive this data. The 2023 Waste Composition Study found 1% (3,777 tons) recyclable glass bottles and jars in the Vermont municipal solid waste stream, by weight, which is very similar to 2018 (1.4%).

Markets: Glass continues to struggle with low to no value in the recycling system. Bottle bill glass has slightly better values but both systems obtain more value from aluminum and plastic #1 PET containers. In 2022, food and beverage container glass collected at the Rutland and Williston MRFs and at smaller facilities such as the Northeast Kingdom Waste Management District were sent to facilities such as Whitcomb's quarry in Colchester, Patriot Recycling in Massachusetts, Strategic Materials in North Carolina, and 2M Resources in Canada to be used in aggregates, abrasives, and potentially fiberglass insulation. CSWD invested in glass processing equipment at their Williston MRF to meet DEC's processed glass aggregate (PGA) standard and construction specifications. ANR, VTrans, CSWD, and UVM continue to meet to review testing methods for PGA that are both simple and effective and to test PGA's engineering properties as "sand borrow" material for road construction projects. Other emerging markets for glass are:

- A. Foam glass aggregate (FGA) – glass is ground into powder and heated and chemically treated to reform as pumice-like rock material that is lightweight, insulative, and has positive compressive strength for construction uses. Glavel is a Vermont company that creates a foam glass aggregate from recycled glass for use in building and construction projects. Their manufacturing facility in Essex uses recycled glass powder from Quebec as feedstock.
- B. Pozzolan – glass is ground into a powder used in concrete that reduces the amount of cement needed and makes a stronger mix. This greatly reduces the greenhouse gas emissions from energy intensive concrete production.

⁹ July 2018 Webinar by Waste Management Inc.

- C. Mound sand – glass is ground into specific “mound sand” specifications for onsite wastewater septic systems. If this material can meet the specifications, it could offset the need for costly specialized sand imports.

2.1.3 Metal (Aluminum and Steel)

Diversion Status: Aluminum and steel tend to have more resilient values in the recycling system, but are a small component of the overall “blue bin” recycling, at 2.5%. In 2022, just over 2,500 tons of steel and aluminum cans were sent for recycling from Vermont facilities. Additional aluminum beverage cans were collected through the Bottle Bill redemption system, however ANR does not regularly receive this data. The 2023 Waste Composition Study found 1.4% (5,026 tons) recyclable aluminum and steel containers in the Vermont municipal solid waste stream, by weight, which is very similar to 2018 (1.2%).

Markets: In 2022, Vermont’s mandated aluminum and steel recyclables collected by the Williston and Rutland MRFS and numerous smaller facilities were primarily sent to Constellium Metal in Alabama, N.H Kelman in New York, and Triple M Metal in Canada. In addition, there are many locations throughout Vermont that accept scrap metal of all types.

2.1.4 Plastics

Diversion Status: In 2022, a little more than 6,000 tons of plastic containers and film were sent for recycling from Vermont facilities. Of these, 37% was #2 HDPE, 33% was #1 PET (the two plastics that are banned from disposal in Vermont), 8% was #4 LDPE (mostly film, like plastic bags, pallet wrap, etc.), 1% was #5 PP, and the remaining 20% was mixed plastics (primarily #3-7). Additional plastic beverage containers were collected through the Bottle Bill redemption system. The 2023 Waste Composition Study found 1.5% (5,695 tons) recyclable #1 and 2 plastic containers in the Vermont municipal solid waste stream, by weight, which is down slightly from 2018 (2.1%). Plastic retail bags were down from 0.5% in 2018 to 0.1% (299 tons) in 2023, which is notable given the Single Use Products law’s plastic bag ban, which went into effect in 2020.

Markets: In 2022, Vermont’s plastics were sent to many processing facilities in the U.S. and Canada. Plastics collected and processed by the Williston and Rutland MRFs, Canusa Hershman, and numerous smaller facilities were sent to processors including KW Plastics in Alabama, Tabb Packaging Solutions in Michigan, Envision Plastics in North Carolina, BACH Polymers in Maryland, and Haycore Canada, and Soleno Recycling in Canada.

From 2020 to 2022, representatives from DEC participated in a workgroup of state recycling officials that developed model legislation to establish minimum requirements for post-consumer recycled content in plastic products and packaging. This model bill would require producers of covered plastic products and packaging to use a specified amount of minimum post-consumer recycled content, phased in over time. The covered plastic packaging and products include film bags, single-use containers used for food, beverages, household cleaning, and personal care products, and rigid plastic containers. Although this legislation has yet to be introduced in Vermont, creating domestic markets for recycled materials will help sustain recycling and retain recycling jobs in the U.S. and Vermont.

2.2 Organics

Background: Vermont’s Universal Recycling (UR) law banned disposal of food scraps, leaf and yard debris, and clean wood, often generalized with the term “organics.” According to the U.S. EPA, food and food scraps are the second largest single component of waste that is landfilled, after paper and paperboard.¹⁰ That is also true for Vermont, where food waste made up 18.8% of the Vermont municipal solid waste stream, by weight, according to the 2023 Vermont Waste Composition Study, and paper made up 19.2%.

Keeping organics out of the trash saves landfill space and significantly reduces the production of methane gas—a greenhouse gas that is 28 times more damaging than carbon dioxide.¹¹ Using EPA’s Waste Reduction Model (WARM), DEC estimates that composting all of Vermont’s food waste would reduce greenhouse gas emissions equal to taking over 7,000 vehicles off the road each year. Reducing food waste overall, however, is an even more impactful climate solution¹² and saves natural resources invested in growing, packaging, distributing, processing, storing, and selling food. Organic materials themselves are also valuable natural resources with uses such as food for people and animals, energy generation through anaerobic digesters, and the use of compost as a fertilizer, stormwater filtration mechanism, and erosion stabilizer.

In 2022, the Vermont Legislature required ANR to convene a stakeholder group to determine the proper management of packaged organic material in Vermont (Act 170). The stakeholder group was tasked with making recommendations on: (1) whether the organics management hierarchy should apply to each generator of organic waste, (2) whether ANR should modify its policy regarding the source separation of food waste, and (3) the proper use of depackaging facilities in the management of organic waste. The group’s [report of recommendations](#) can be found on the DEC website.

Challenges related to organics collection and management in Vermont also include bears and emerging contaminants like PFAS and microplastics (see Challenges in Materials Management section 1.4).

Collection Infrastructure:

Food & Food Scraps: All facilities that collect trash are required to also collect food scraps. In 2022, 129 regulated facilities reported collection of food scraps, including transfer stations, recycling centers, and compost facilities. Since passage of the Universal Recycling law in 2012, the number of haulers offering food scrap collection services has more than tripled from approximately 12 to 38. This includes haulers that specialize in food scrap collection as well as haulers that offer trash, recycling and now food scrap collection. A depackaging facility started

¹⁰ US EPA, *Advancing Sustainable Materials Management: 2018 Fact Sheet*, (Dec. 2020), fig. 4, page 8,

https://www.epa.gov/sites/default/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf

¹¹ US EPA, Overview of Greenhouse Gasses: <https://www.epa.gov/ghgemissions/overview-greenhouse-gases#methane>

operating in Vermont in 2021, which is capable of separating heavily packaged food waste from its packaging. The resulting food waste materials are mostly sent for anaerobic digestion and some is sent for composting in Vermont.

In 2023, Vermont has eleven (11) food scrap composting facilities that are certified by DEC, operate year-round, and process organics like food scraps and leaf and yard debris. Four (4) anaerobic digesters, two of which are not in operation yet, are permitted by DEC to accept liquified food scraps, such as from the depackaging facility and food manufacturers. As of new legislation in 2021 (10 V.S.A. § 6001(22)(H)), the Agency of Agriculture, Food, and Markets (AAFM) has regulatory oversight of on-farm composting operations that use most of the finished compost on their farm and/or raise chickens. In 2023, twelve (12) on-farm compost facilities collect and compost food scraps and are regulated by AAFM. Some of these facilities had previously been certified by DEC. Spent grain, whey and other food-manufacturing-byproducts are commonly fed to animals at farms throughout the state. Vermont also has numerous on-farm digesters, some of which accept food-processing byproducts from dairy, brewing, and other food manufacturing processes to produce electricity and heat.

The Vermont Foodbank has helped decrease the disposal of edible food through their Retail Store Program, which rescues food from stores and distributes to their network of over 200 Vermont food shelves and meal sites. The Foodbank reports that most major grocery stores are participating and regularly donating excess food.

Leaf and Yard Debris and Clean Wood: Every location that collects trash is also required to seasonally collect leaf and yard debris and each SWME must ensure that a clean wood collection location exists within their region, such as at a stump dump or transfer station. Most leaf and yard debris that is brought to Vermont facilities is used as mulch, animal bedding, composted, or left to decompose naturally onsite. Clean wood is either chipped into mulch or compost feedstock, left to decompose, openly burned (DEC Air Quality permits burn sites), used as fuel, such as in wood stoves, or chipped for heat/power at locations like the McNeil Power Plant in Burlington.

Diversion Status: Although the full food scrap ban went into effect for all Vermonters in 2020, the impacts of the ban are difficult to determine due to other coinciding factors, namely related to the COVID-19 pandemic. While many composting facilities noted an increase in food scraps after the ban, the amount of food scraps reported as passing through regulated facilities decreased due to the pandemic impacts on restaurants, schools, and other food establishments. The depackaging facility that began operating in 2021 also shifted material to anaerobic digestion; some food scraps had previously been going to compost facilities and some of the packaged food and food processing residuals had previously been landfilled.

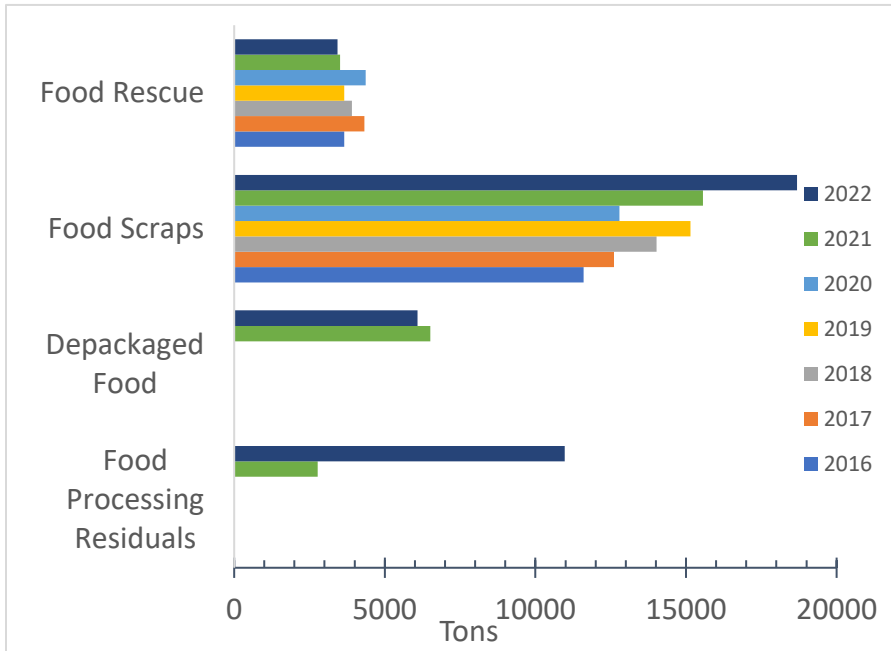


FIGURE 5: VERMONT FOOD WASTE FROM 2016-2022 INCLUDING FOOD RESCUE (VERMONT FOOD BANK), FOOD SCRAPS, DEPACKAGED FOOD, AND FOOD PROCESSING RESIDUALS.

In 2022, Vermont facilities processed 18,681 tons of food scraps, primarily through compost facilities (some went through the depackaging facility to an anaerobic digester). An additional 6,088 tons of packaged food went through the depackaging facility to an anaerobic digester. Vermont facilities also processed approximately 10,972 tons of food processing residuals; the majority of these were sent directly from food or beverage manufacturers to anaerobic digesters. Vermont facilities reported 4,695 tons of leaf and yard debris and 3,840 tons of clean wood.

The 2023 Waste Composition

Study found 18.8% food waste (71,112 tons), 1.2% (4,489 tons) leaf and yard debris, and 1.6% (6,235 tons) clean wood in the Vermont municipal solid waste stream, by weight. While this was not a significant change in percentage food waste from the 19.4% found in the 2018 study, the total estimated tonnage of food waste in the trash decreased by 13% from the 81,627 tons in 2018.

UVM’s 2023 [Impact of Vermont’s Food Waste Ban on Residents and food Businesses Report](#) found that, after the full food scrap ban, Vermonters increased the amount of food scraps they kept out of the trash and that 85% of Vermonters compost at least some of their food scraps. Similarly, the 2023 Waste Composition Study’s residential [food scrap questionnaire found that 64% of Vermont households](#) say they separate some of or all of their food waste, such as with backyard composting, drop off, pick-up service, or feeding animals. UVM’s study also found that 61% of Vermonters feel a “moral obligation” to keep food scraps out of the landfill.

The Vermont Foodbank helps retailers set up systems where staff set aside food for donation instead of putting it in the trash. From 2014 to 2017, food donation to the Foodbank almost tripled, in large part due to the Universal Recycling law. However, with the exception of 2020, which saw a rise in food donation due to the COVID19 pandemic, the amount of rescued food has declined since the peak in 2017 (Figure 4, above). According to the VT Foodbank, many factors may be contributing to this decrease in donated food including supply chain challenges, actual reductions in surplus food, and an increase in secondary markets like Aldi’s or Ocean State Job Lot that sell overstock items or liquidation centers that sell past-date items or products with damaged packaging.

Markets: Composting and anaerobic digestion are the most common methods of diverting food scraps and other organics from the waste stream. However, food processing residuals registered with the Vermont Agency of Agriculture Food and Markets (VAAFMM) as an animal feed, are also a common and cost competitive method of food waste recovery, especially for high fat/protein food manufacturing materials.

The anaerobic digestion of food scraps has grown in- and out-of-State. In addition to heat and power from biogas, anaerobic digestion creates liquid and solid digestate that can be used as fertilizer for farm fields.

Registration with the Vermont Agency of Agriculture, Food and Markets is required prior to marketing or distributing food residual material as a commercial animal feed, and before marketing compost derived from food scraps for sale as a fertilizer or soil amendment.

2.3 Construction and Demolition Debris (C&D)

Background: The Architectural Waste law ([Act 175](#)) was passed in 2014 with the goal of increasing diversion of C&D materials. The law requires the recycling or reuse of six C&D materials - metal, clean wood, asphalt shingles, drywall, oriented-strand board, and plywood - from building projects of two or more units that generate 40 cubic yards or more of architectural waste and are within 20 miles of a C&D recycling facility. Additionally, [Act 250](#), Vermont's land use and development law, requires that applicants submit a Construction Waste Management Plan for projects involving more than 5,000 square feet of construction and/or demolition.

Collection Infrastructure: Although C&D materials make up a significant segment of the waste stream, reuse and recycling is often hindered by a lack of convenient and cost-effective C&D recycling facilities. Currently, two Vermont facilities accept loads of architectural waste, but both are in Chittenden County. Beyond the material that passes through certified solid waste facilities, C&D materials are diverted from disposal through a variety of building salvage, reuse, and antique stores that look for quality used building materials, fixtures, and appliances. The McNeil Generating Station in Burlington also diverts clean wood from disposal by burning it to produce electricity.

Diversion Status: In 2022, 85,234 tons of C&D waste materials were disposed in the NEWSVT landfill, and an additional estimated 1,311 tons were diverted for recycling. This continues a trend since 2016 of decreasing C&D material passing through Vermont facilities for recycling. The 2023 Waste Composition Study found 7.8% (29,646 tons) of C&D material in the Vermont municipal solid waste stream, by weight, which is down from 11.1% (46,823 tons) in 2018. The 2023 Waste Composition Study also conducted a visual composition analysis of the C&D stream, which found 1.1% (1,151 tons) cardboard, 25% (27,365 tons) asphalt shingles, 15% (17,116 tons) painted/treated wood, 6.1% (6,511 tons) clean drywall, 6.5% (6,940 tons) special waste like mattresses and appliances, and 4.5% (4,791 tons) clean wood. Overall, the 2023 Waste Composition study estimates that C&D makes up 23.7% of the aggregate (C&D plus MSW) disposed waste stream, by weight.

Markets: Construction & demolition materials frequently have a low recycling market value and require sorting, and often chipping or grinding, before being marketable. Deconstruction can yield the most salvageable, reusable, and recyclable materials but is costly in both labor and time compared to demolition. A 2016 [Report on Architectural Waste Recycling](#)¹³ gives more detail on C&D collection infrastructure and markets.

PFAS used in building products continues to impact the recycling of those products when they become waste materials. Recycled asphalt shingles (RAS) have been tested and found to contain PFAS; this new data, plus the poor performance of RAS in hot mix asphalt roads (bituminous concrete) has led to limited markets for these materials. VTrans is exploring a project that could potentially utilize RAS as a binder material in road subbase. Myers C&D Recycling facility has ceased separating shingles for recycling and has also struggled to establish routine wood recycling markets for waste dimensional lumber, plywood, and oriented strand board (OSB). This has led to larger portions of this facility's materials being landfilled or, at best, used in landfill road base projects, which the state does not consider "recycling." As a result, the 2019 MMP requirement that each SWME have asphalt shingle collection options within their region was lifted by ANR and has not been brought back in this MMP.

Similarly, the market for recycled gypsum is currently limited; C&D waste recyclers do not want drywall in incoming mixed material loads as the drywall becomes pulverized and tends to devalue the quality of all recyclables. Landfills do not want drywall in the waste stream as the gypsum, when wetted in an anaerobic environment, creates toxic, odorous, and corrosive hydrogen sulfide gas. For these reasons, northeast States often want to expand and strengthen drywall recycling markets.

2.4 Household Hazardous Waste (HHW), Very Small Quantity Generator (VSQG) Hazardous Waste and Universal Waste

Background: The U.S. EPA describes household hazardous waste (HHW) as leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients that pose a threat to the environment and public health. These chemicals are costly to collect and manage separately from municipal solid waste. Such products include automotive fluids, batteries, household chemicals, paint, and electronic products with hazardous components.

Vermont Solid Waste Rules define HHW as "waste that would be subject to regulation as hazardous waste if it were not from households" (6-201 Definitions). Although HHW is exempt from state and federal regulation as hazardous waste, Vermont statute requires ANR to address the volume and toxicity of the waste stream. Vermont municipalities with State funding support have worked to collect HHW and Very Small Quantity Generator (VSQG) waste for more than 30 years. Occasionally, legislation has been passed aimed at reducing the production of toxic products and materials, such as the bans on PFAS in products like food

¹³ Report to the Vermont Legislature on 10 V.S.A. §6605m Architectural Waste Recycling. 2016.

packaging and banning the sale of four-foot fluorescent mercury-containing lamps (see Challenges in Materials Management section).

Very Small Quantity Generator (VSQG) hazardous waste is hazardous waste from a business, municipality, or other non-household entity that generates less than 220 pounds of hazardous waste per month. Hazardous waste collected from VSQGs must be managed under Vermont Hazardous Waste Management Regulations (VHWMR) and therefore should be segregated from HHW.¹⁴ If VSQG waste is co-mingled with HHW, then all waste is managed as hazardous waste and the exemption for HHW management may not be used. Universal Waste refers to any of the following hazardous wastes that are handled under streamlined provisions to facilitate proper management: batteries, pesticides, thermostats, PCB-containing fluorescent light ballasts, fluorescent lamps, mercury-containing devices, cathode ray tubes (CRTs) and oil-based paint collected under the paint stewardship program.

Collection Infrastructure: Since 1992, SWMEs have been required to include provisions in their SWIPs for the collection and management of “unregulated hazardous waste,” which includes both HHW and VSQG waste. The MMP requires SWMEs to hold a minimum number of HHW collection events per year or provide access to a permanent HHW collection facility. To help offset costs of HHW collections, ANR has provided annual grants based on population of the region served and the number of member towns in districts or alliances. SWMEs also regularly and historically obtain some reimbursement for the costs of managing pesticides (Class A, B, and C) registered with the Vermont Agency of Agriculture, Farms, and Markets.

A 2017 HHW stakeholder group composed of solid waste districts, towns and alliances, haulers, trade associations, state representatives, hazardous waste contractors, and environmental non-profits all agreed that a network of shared regional facilities coupled with possible rural collection events was the best option to serve Vermonters. As a result, in the 2019 and 2024 MMPs, ANR continues to allow SWMEs to avoid costly 1-day HHW collection events by operating seasonal permanent HHW collection facilities a minimum of 1-day per week May-October, which is a minimum of 26 days of operation over those 6 months. This not only allows SWMEs with HHW facilities to stop hosting costly collection events, but also provides residents and small businesses more convenient access to services. Additionally, ANR has supported regional facilities by providing two rounds of HHW infrastructure grants during the 2019 MMP period that helped establish or upgrade five (5) regional HHW facilities. As of 2023, there are now eight (8) permanent regional HHW facilities in: Addison County, Bennington County, Chittenden County, Northeast Kingdom (seasonal), Northwestern Vermont, Rutland County, Windham County, and Windsor County (seasonal), and one proposed in Washington County.

ANR is considering how best to ensure that every region of Vermont has equitable, convenient, and cost-effective HHW and VSQG waste services. The July 2023 flood demonstrated a need for facilities in regions that currently only offer one-day collection events.

¹⁴ Vermont Agency of Natural Resources, *Hazardous Waste Management Program: Regulations & Statutes*, (2013), <http://www.anr.state.vt.us/dec/wastediv/rcra/regs.htm>, and Subchapter 9: Universal Waste Management Standards, http://www.anr.state.vt.us/dec/wastediv/rcra/hazregs/VHWMR_Sub9.pdf.

Convenience: Regional HHW facilities are currently more convenient than 2 days per year of HHW collection events. Roughly 70% of Vermont's population is currently served a minimum of 26 days per year by these permanent regional facilities, while the remainder of the State is served by 31 single-day collection events operated by a hazardous waste contractor hired by the SWMEs and two independent town HHW facilities that serve the towns' residents on two days per year.

Cost: Based on ANR's analysis (see figures below), HHW events cost, on average, almost twice as much per household served as HHW facilities. On the high side, events can cost over three (3) times more than regional facilities and, on the low side, one-and-a-half times more. (Note: these costs do not include facility construction).

- I. Event SWMEs average cost is \$197.81/household per year (2022 data).
 - a. HIGH \$509.32/household and LOW \$71.48/household.
- II. Facility SWMEs average cost is \$107.22/household per year (2022 data)
 - a. HIGH \$147.30/household and LOW \$45.72/household.

Participation: Based on ANR's analysis, HHW facilities have slightly higher participation rates than events, meaning slightly more people use them.

- I. Event SWMEs have an annual average household participation rate of 7% (2022 data).
 - a. HIGH 14% and LOW of 2%.
- II. Facility SWMEs have an annual average household participation rate of 8% (2022 data).
 - a. HIGH 20%* and LOW 2%. *CSWD and Addison HHW facilities are the exception, with high participation rates at these well-established facilities.

HHW EPR Law (Act 58 of 2023): Act 58 was signed by the Governor in June 2023 and will require manufacturers of some of the most toxic forms of solid waste to assist with covering the costs for managing those wastes at their end-of-life.

Implementation of the HHW Extended Producer Responsibility (EPR) Law will begin with a manufacturer stewardship organization registration in early 2025 and a collection plan to be implemented sometime in 2026. ANR's initial implementation includes developing guidance, a website, and hosting stakeholder meetings. ANR will be responsible for ensuring compliance of all covered manufacturers and their products under this new law.

Diversion Status: In 2022, 689.5 tons of HHW/VSQG hazardous waste were collected by SWMEs, which was down from 983.5 tons in 2021. By weight, oil and latex based paints are the most common products collected at HHW facilities and events. The 2023 Waste Composition Study estimated that 0.7% (2,469 tons), of the Vermont municipal solid waste stream, by weight, was HHW. While strong efforts have been made to keep HHW/VSQG hazardous waste out of the waste stream, the slight increase of HHW in the trash from the 0.4% HHW found in the 2018 study and the fact that there was three and a half times more HHW in the trash in 2023 than was collected in 2022, shows there is still room for improvement. Since this waste poses such serious risks to human health and the environment, it is imperative that the goal continue to be zero HHW disposal.

In 2022, the statewide participation rate at HHW facilities and events was 6%, with SWMEs serving between 0.5% to 20% of households in a region annually. SWMEs with permanent HHW facilities tend to have higher participation rates than those with only two yearly HHW collection events. Considering the frequency with which HHW needs to be disposed of and the accessibility of collection programs, 14% is generally considered a successful participation rate goal. Because of the hazardous characteristics of HHW/VSQG Hazardous Waste, there is a need to both reduce use of HHW and increase participation in order to prevent hazardous materials from being disposed of in the landfill or through other improper disposal methods, such as down the drain.

Markets: A shrinking pool of service providers (HW contractors) willing to operate one day collection events coupled with both labor and supply chain shortages has led to increased costs for SWMEs using one-day collection events. In addition, processing costs for all materials collected have increased since 2020.

Due to their hazardous characteristics, HHW waste materials have limited market demand. One success is the statewide collection of latex paint, where most of this paint is re-blended into new paint through the Vermont Paint Stewardship Program (discussed below in section 2.5.4). HHW markets are predominantly associated with material that has value as fuel, such as used oil or oil-based paint, but most HHW is costly to handle, transport, and process for recycling or safe disposal. Hazardous waste contractors and processors are paid for the removal and handling of HHW. Hazardous waste processing facilities charge the contractors a fee based upon the type of material and whether it can be processed for another use. In the case of used motor oil, there is a market to re-blend this fuel and reuse it for various applications. For other materials such as certain pesticides, the only option is for the waste to be disposed of in a hazardous waste landfill or hazardous waste incinerator.

The highest priority, as with most waste materials, is prevention and waste reduction. ANR is developing a statewide marketing campaign designed to both reduce purchase and use of toxic household hazardous products and encourage the safe drop-off management of HHW at HHW facilities and events. ANR is encouraged that the HHW EPR law includes provisions for waste reduction in the education and outreach requirements of the stewardship organization(s).

2.5 Product Stewardship and Extended Producer Responsibility

Background: Product Stewardship programs are designed to manage a product and/or its packaging throughout its entire life cycle, including at its end-of-life, to both minimize its health, safety, environmental, and social impacts, and maximize economic benefits. Product Stewardship programs share the cost of collection, recycling, and safe materials management of specific products between manufacturers and consumers, often alleviating financial burdens on municipalities and taxpayers.

Extended producer responsibility (EPR) is a mandatory type of product stewardship that requires manufacturers to be accountable for the end-of-life (post-consumer) management of their products. The intent of all EPR and product stewardship programs is to incentivize a shift in the waste management system from one subsidized by the taxpayer to one that places greater emphasis on producers and consumers to drive environmentally sound product design, waste reduction, and recycling.

Vermont has both voluntary product stewardship programs and mandatory EPR programs. EPR in Vermont has historically targeted products with hazardous components. Products with existing Vermont EPR laws include: mercury-containing (fluorescent) lamps and thermostats, mercury-containing automobile switches, electronics (TVs, computers, printers, and peripherals), primary batteries, paint, and now “covered household hazardous products.” Vermont’s beverage container redemption program is an example of product stewardship for a non-hazardous product—beverage containers—and it is the longest-running type of program in the state, at more than 50 years old. Vermont also has voluntary product stewardship programs led by manufacturers for some rechargeable batteries.

Vermont’s product stewardship and EPR programs are effective largely due to numerous convenient collection locations throughout the State, the dedicated collection efforts by stewardship organizations, SWMEs, private facilities, and retailers, and direct outreach to consumers by the stewardship organizations, SWMEs, and DEC. ANR will continue to evaluate EPR and product stewardship programs that reduce costs for Vermonters and can help reduce both toxicity and volume of waste.

2.5.1 Batteries

Batteries contain valuable materials such as nickel, iron, lead, steel, zinc, and cadmium that can be reclaimed through recycling, thereby reducing the need to mine for raw materials. In landfills, batteries can potentially release harmful hazardous materials like mercury and lead, and lithium-ion batteries have caused dangerous fires when they are damaged.

In 2014, Vermont enacted the nation’s first EPR law for single-use household batteries. The Primary Battery Stewardship Law ([Act 139](#)) requires that any battery producers selling primary batteries in Vermont must participate in an approved stewardship plan that provides free collection and recycling of primary batteries for consumers. Call2Recycle implements a collection and recycling stewardship plan on behalf of battery producers and is responsible for safety trainings for collection locations and education and outreach to promote household battery recycling awareness. While not included in the law, rechargeable batteries are currently collected and recycled through a voluntary product stewardship program also operated by Call2Recycle.

Collection Infrastructure: Call2Recycle offers over 150 safe and convenient battery recycling locations for single-use and rechargeable batteries throughout Vermont, mainly at retail locations and solid waste facilities. Call2Recycle supplies collection locations with bags for individual batteries and shipping boxes with fire retardant liners. In 2023, in response to increasing occurrences of fires at solid waste facilities across the U.S. caused by damaged and defective lithium-ion batteries, DEC purchased and distributed over 160 battery safety kits

to both public and private solid waste facilities. The kits included fire shield blankets, gloves, and packaging to handle and mail back damaged or defective batteries for recycling. DEC partnered with Call2Recycle to provide safety trainings on the battery collection safety kits.

Diversion Status: Vermonters buy over 10 million batteries a year and, in 2022, Vermonters recycled over 217,000 lbs. of primary and rechargeable batteries. Collection of both primary and rechargeable batteries has increased dramatically since the EPR program began, with a 4,374% increase in primary battery collection from 2015 to 2022. The collection increase has been less dramatic with rechargeable batteries, which represent less than half of the total collection each year and have had an 85% increase since 2015. The 2023 Waste Composition Study found 0.1% (251 tons) of primary batteries and less than 0.1% (1 ton) of rechargeable batteries in the Vermont municipal solid waste stream, by weight, which is similar to the 0.1% (246 tons) of primary batteries and less than 0.1% (6 tons) of rechargeable batteries found in 2018.

Markets: Batteries collected for recycling are first sorted by type and chemistry, then processed to reclaim valuable metals. Common examples of products made with materials from recycled batteries include new batteries, as well as rubber, paint, and cement additives.

Battery recycling markets are expected to grow rapidly within the next decade in response to the increasing use of lithium-ion batteries and increasing popularity of electric vehicles and renewable energy storage systems.

2.5.2 Electronics

Electronic waste is one of the fastest growing components of the waste stream worldwide. Electronic devices can contain toxic materials (including lead, mercury, and chromium) that should be managed responsibly as well as precious metals (such as gold) that should be recovered and recycled.

Starting in 2011, the [Vermont E-Cycles statute](#) established a manufacturer-funded electronic waste (“e-waste”) collection and recycling program, which provides free collection and recycling of computers, monitors, televisions, printers and computer peripherals (“covered products”) to households, charities, school districts, and businesses that employ 10 or fewer individuals (covered entities). In addition to E-cycles materials, Vermont’s landfill disposal ban includes personal electronics such as digital assistants and music players; electronic game consoles; fax machines; telephones; answering machines; videocassette recorders; digital versatile disc players; digital converter boxes; stereo equipment; and power supply cords (as used to charge electronic devices).

Collection Infrastructure: Throughout Vermont, covered entities can drop off up to 7 covered products at one time free of charge at over 100 collection locations around the state. Collection locations are offered at municipal and private solid waste facilities and some electronics retailers. Vermont contracts with the National Center for Electronics Recycling (NCER) to implement the E-cycles program and bills electronics manufacturers for these costs. NCER’s contracted recyclers provide collection and storage materials for collection locations. Recyclers must comply with U.S. EPA R2 or e-Stewards Standards.

Diversion Status: Collection of covered electronics by the E-Cycles program has been decreasing by weight since 2016. This is primarily due to the changes in technology leading to lighter devices, such as flat-screen televisions and computer monitors compared to older cathode-ray-tube televisions and monitors. In 2022, the E-Cycles program collected 1,254 tons of electronics. The 2023 Waste Composition Study found less than 1% (105 tons) of covered electronic devices in Vermont municipal solid waste stream, by weight, which is considerably less than 1,631 tons of covered electronics found in 2018.

Markets: At processing facilities, e-waste is first disassembled to collect bulk ferrous and non-ferrous metals, glass, plastic, and other raw materials. The remaining material is processed through shredders that use magnets to recover ferrous metals and eddy current systems to recover non-ferrous metals.

2.5.3 Mercury-Containing Products:

Mercury is a persistent and toxic pollutant that bioaccumulates in the environment and poses a serious threat to humans and wildlife. In 1998, Vermont's legislature passed a law regulating the sale and disposal of mercury-added products; the legislation was expanded in 2005 and 2008 to include requirements for labeling and restrictions on the sale of certain products (see a [summary of Vermont's mercury statutes and regulations](#)). Vermont's Mercury product EPR program requires manufactures to establish collection for mercury-added products including general purpose mercury-containing bulbs, contractor and consumer-generated mercury thermostats, mercury thermometers, and mercury-containing auto-switches.

As of January 1, 2024, Vermont bans the sale of general-purpose mercury-containing bulbs, including compact fluorescent lightbulbs, four-foot (4') linear lamps, and twist-lock base compact fluorescent bulbs. Light-emitting diode (LED) replacements for fluorescent lamps do not contain mercury and are more energy-efficient and cost competitive.

Collection Infrastructure: Vermont residents, small businesses, and institutions (such as schools) can recycle general purpose mercury-containing bulbs at no cost at over 140 retail locations and solid waste collection facilities across the state. Mercury thermostats are collected at over 130 collection sites around the state and come with a \$5.00 rebate. Manufacturers provide collection containers and storage boxes that collection sites mail back to the contracted recycler. Other mercury-containing products do not have manufacturer-supported recycling but must still be disposed of properly through a municipal Household Hazardous Waste collection facility or event.

Diversion Status: Because many mercury-containing products have been replaced by non-toxic alternatives, the amount of mercury collected through the EPR program for auto switches and thermostats has generally been decreasing over the last 5 years. Collection of mercury-containing bulbs has been more consistent and is expected to remain high in 2023 and 2024 before decreasing due to the mercury-containing bulb sales ban. In 2022, the Vermont mercury program collected 200,002 lbs. of mercury-containing bulbs. The 2023 Waste Composition Study found less than 0.1% (7 tons) of mercury-containing bulbs in the

Vermont municipal solid waste stream, by weight, which is less than the 21 tons of bulbs found in 2018.

Markets: Captured Mercury is refined and processed at recycling facilities for future suitable uses.

2.5.4 Paint

Paint is a mixture of resins, solvents, additives, and pigments. The two primary types of paint are latex (water-based) and oil. Oil paints are hazardous, flammable, and give off large amounts of volatile organic compounds (VOCs) that contribute to air pollution and can cause health problems after long-term exposure. Older paints may also contain harmful heavy metals, such as lead and mercury. Latex paint is not as harmful to human health and the environment, if handled properly.

In 2013, the Vermont Legislature passed the Paint Product Stewardship Act ([Act 58 of 2013](#)) to promote the proper management and recycling of paint. This legislation made manufacturers responsible for collecting and managing leftover architectural paint (both oil and latex) through a stewardship organization funded through advanced consumer fees (ACFs) paid on new paint at the point of purchase.

Collection Infrastructure: Since 2014, PaintCare is the stewardship organization for the American Coatings Association and has implemented the stewardship program for paint manufacturers in Vermont. PaintCare offers convenient oil and latex paint recycling at over 80 year-round and 50 seasonal/event locations throughout the state at participating paint retailers, recycling centers, and hazardous waste facilities and collection events.

Diversion Status: Collection of paint through PaintCare has remained fairly steady since 2015. The paint recovery rate, or the percent of recycled paint compared to paint sold during the same period, has reached a program high of 13% in 2022 and a low of 9% in 2020. The Vermont Paint Care program collected 120,388 gallons of paint in 2022. The 2023 Waste Composition Study found 0.2% (644 tons) of paint in the Vermont municipal solid waste stream, by weight, which is more than the 0.1% (389 tons) of paint found in 2018.

Markets: Latex paint that is collected for recycling is sorted by color, filtered, and re-blended into new paint such as with Chittenden Solid Waste District's Local Color paint recycling program. Oil-based paints can be processed for fuel blending. Of the paint collected in 2022, 79% of latex paint and 11% of oil-based paint was recycled into re-blended paint, 0% of latex paint and 89% of oil-based paint was sent for energy recovery (fuel blending), and 21% of latex paint and 0% of oil-based paint was disposed of as it was not sufficient-enough quality for recycling.

2.5.5 Beverage Containers ("Bottle Bill")

Originally passed by the Vermont legislature in 1972, Vermont's [Beverage Container and Redemption Law](#) ("the Bottle Bill") began as a litter law intended to clean up Vermont's roadsides and recreation areas. Over the years, the Bottle Bill evolved into a successful

recycling program. Beverage containers covered by the Bottle Bill include beer, wine coolers, other malt beverages, pre-mixed spirits cocktails, carbonated non-alcoholic beverages, liquor, and spirits.

Collection Infrastructure: Retailers are required to take back and redeem any beverage container they sell unless they have received an exemption from ANR. Certified Redemption Centers are required to take back all clean, unbroken, empty containers marked with the Vermont 5¢ or 15¢ refund message from products sold in Vermont.

Diversion Status: There was a 71.6% redemption of all beverage containers covered under the Vermont Bottle Bill (liquor and non-liquor) in 2022, which was down from 76% in 2021. Also, in 2022, 3.819 million dollars of unclaimed deposits went to Vermont’s Clean Water Fund to assist with clean water projects across the state. The 2023 Waste Composition Study found that bottles and cans eligible for redemption under the current Bottle Bill made up 0.8% (3,058 tons) of the Vermont municipal solid waste stream, by weight, which is similar to the 0.7% (2,775 tons) of Bottle Bill containers found in 2018. Overall tonnage of containers redeemed under the Bottle Bill has decreased compared to historic values, largely due to a shift in predominance from glass bottles to aluminum cans.

Markets: Beverage manufacturers (or their contractors) collect and recycle empty redeemable containers, primarily selling to processors. Because the aluminum, plastic, and glass bottles and cans collected through the redemption system are sorted by type from the start, the materials are often cleaner and less contaminated than the same materials that go through the mixed recycling system. In some cases, this means the material can have more value and, potentially, be put to higher uses.

2.6 Textiles (Used Clothing)

Background: From a materials management perspective, textiles are any clothing or household textile, like sheets, towels, or curtains. Historically, textiles have been a difficult to recycle material, due to lack of collection infrastructure and markets. However, this waste stream has grown significantly in recent years and will continue to remain significant as long as manufacturers produce “fast fashion” clothing (i.e., abundant low quality, cheap clothing).

Collection Infrastructure: In 2015, DEC organized a stakeholder group on textiles, which determined that Vermont had been losing some convenient and affordable textile reuse/recycling options, especially in rural areas. To increase convenient access to textile recycling in Vermont, SWMEs are required to ensure that there is, at minimum, one textile collection location within their region. This collection location can include local thrift stores or a clothing swap event, many of which also accept rag-quality textiles.

In addition to efforts put forth by SWMEs, community organizations, and thrift store donation programs, there has been a growing presence of for-profit clothing recycling companies offering clothing collection bins throughout the state. Many communities now partner with clothing recycling companies to host clothing collection bins at transfer stations, recycling centers, and other locations.

Diversion Status: In 2022, nearly 200 tons of textiles were reported as reused or recycled by Vermont facilities. However, this is only a subset of all textiles reused or recycled in Vermont, as many textiles go through large retailers, like GoodWill and Salvation Army, or are reused locally through second-hand stores, clothing swaps, and platforms like Front Porch Forum, local Buy Nothing groups, Facebook marketplace, and online resale sites like Depop and Poshmark. The 2023 Waste Composition Study found that textiles made up 6.5% (24,413 tons) of the Vermont municipal solid waste stream, by weight, which is an increase from the 4.2% (17,830 tons) of textiles found in 2018.

Markets: Textiles collected from clothing donation boxes and unsold items from Vermont thrift stores are often sent to textile grading facilities, where materials are sorted based on quality. As with any recycling process, some material that is not suitable for reuse or recycling is likely disposed. According to textile recyclers such as Goodwill and Apparel Impact, upwards of 85% of textile donations are reuse quality, and the remaining 15% are processed into rags.

While Vermont has seen some increase in convenient clothing recycling options in the past few years, domestic and global textile recycling options are limited, and reuse options are hampered by the lower quality of clothing and textiles being produced.

2.7 Tires

Background: Tires have been banned from landfill disposal since 1992 ([10 V.S.A. § 6621a](#)), primarily because waste tires create problems when landfilled. Tires do not compress and can trap methane gas, causing them to eventually “float” to the surface and disrupt the landfill as they move.

A [2016 report from the Tire Stakeholder Group](#)¹⁵ identified three primary areas of concern: legacy scrap tire piles, ongoing illegal dumping of scrap tires, and lack of tire recycling options. A 2012 statewide survey identified 62 scrap tire piles containing an estimated 417,000-458,000 problem tires. Illegal scrap tire piles trap water and become breeding grounds for mosquitos, which may carry diseases such as Eastern Equine Encephalitis and West Nile Virus. Large piles of tires can trap heat and become fire hazards; if tire piles catch fire, the melted rubber generates oil and other toxic run-off that can pollute surface and groundwater.

Collection Infrastructure: The vast majority of Vermont’s scrap tires are managed through tire retailers and auto shops that accept scrap tires for a fee, typically when new tires are purchased. A smaller portion are accepted for a fee by solid waste facilities, both public and private. As part of the 2016 Tire Stakeholder Group Report, two large Vermont tire dealers anecdotally reported that 90-95% of customers purchasing replacement tires choose to leave their scrap tires and pay tire disposal fees. There are currently five (5) permitted and specialized tire collection facilities and three (3) haulers that are permitted specifically to transport scrap tires in Vermont.

¹⁵ Report to the Vermont Legislature on Problem Scrap Tire Piles. Tire Stakeholder Group Report. 2016.

Diversion Status: An estimated 625,000 scrap tires are generated each year in Vermont. The 2023 Waste Composition Study found that tires made up 0.3% (1,171 tons) of the Vermont municipal solid waste stream, by weight, which is similar to the 0.2% (986 tons) of tires found in 2018. A small percentage of scrap tires are believed to be disposed of through illegal dumping. In 2022, over 4,500 tons of tires were collected by Vermont facilities; the largest amount in the last 5 years. ANR believes that most Vermont tires are legitimately managed, but the issues identified by the stakeholder group such as high costs of managing tires, lack of recycling markets, and ongoing legacy tire pile issues continue to be a concern.

Markets: The market for scrap tires is volatile and greatly influenced by economic factors, energy prices, and political circumstances outside of Vermont and, increasingly, outside of the U.S. Due to rubber chemistry, complex tire construction, and proprietary formulations, very little of a scrap tire can be recycled into a new tire. Instead, most of Vermont's tires are used to make tire-derived fuel, which is primarily used in cement kilns and pulp and paper manufacturing in Maine, New York, and Quebec. Some tires are also processed into tire derived aggregates or tire reclaimed products like gym floor/playground mats. Manufacturing both tire derived fuel and tire derived aggregates starts with shredding, chipping, or grinding the tires and steel is often reclaimed and recycled in this process. Establishing a producer responsibility program for tires—as discussed by the 2015 Tire Stakeholder Group—would likely help with increasing proper management, reducing legacy tire piles, and bolster effective tire recycling markets.

2.8 Biosolids, Sludge, Septage, and Residuals

Background: Wastewater sludges and biosolids, septage, short paper fiber, wood ash, and solids produced by drinking water treatment facilities are all categorized as residual materials. These residual materials are non-hazardous materials that are managed at certified solid waste facilities, such as landfills and wastewater treatment facilities (WWTFs), or may be beneficially reused, via land application, as a soil amendment.

Wastewater sludge is the solid or semi-solid byproduct produced by a WWTF during treatment and is regulated by the U.S. EPA's Code of Federal Regulations (40 CFR Part 503) and the Vermont Solid Waste Management Rules (Rules). Septage is the partially-treated material removed from an on-site septic system or holding tank. Additional residual materials regulated in Vermont are short paper fiber, the byproduct of the paper making/recycling process, and wood ash, the byproduct of burning clean, untreated wood by large generator facilities.

Through a Solid Waste Management Facility Certification or ANR approval (See A-1 ANR Strategy – Rules, Procedures, Policy, and Guidance), residual materials may be beneficially reused after meeting treatment and/or pollutant standards. For example, prior to being recycled as biosolids, sludge must be treated in a process to reduce pathogenic content and vector attraction and meet pollutants standards for metals and other contaminants established in the Rules. All land application must be approved by ANR.

Residuals Management Infrastructure: Throughout Vermont, 96 wastewater treatment facilities produce sludge as a byproduct of wastewater treatment processes. Wastewater sludge treated to biosolids standards or septage can be recycled to agricultural lands or remediation sites as a soil nutrient source if it meets the requirements of 40 CFR Part 503 and the Rules. ANR developed technical guidance and implemented a solid waste certification for all facilities producing biosolids or operating land application sites of biosolids or stabilized septage. Land application sites must be certified as solid waste facilities and meet the siting and operating criteria established in the Rules. Certifications for land application sites also include specific operating conditions for reducing potential impacts to environmental and human health. Solid waste certifications are administered by the DEC Residuals Management and Emerging Contaminants Program. While all sludge generators must routinely collect and analyze samples of residual materials, facilities operating under a solid waste certification have more extensive monitoring requirements, including routine sampling and analysis of soil and groundwater at land application sites. Managers of land application facilities must also calculate appropriate application rates based on agronomic data and manage fields in accordance with required agricultural practices established by the Vermont Agency of Agriculture, Food & Markets (AAFM).

Diversion Status: The decision to recycle or dispose of residual materials is made by the municipalities, industrial facilities, or companies managing the materials, and is based on factors including economics, capacity, geography, type of facilities (storage and treatment), and the mission of waste managers and generators. On average 11,000 to 12,000 dry tons of wastewater sludge is managed per year in Vermont and, over the last few years, approximately 65% of the sludge was beneficially reused as biosolids in Vermont or in neighboring states or provinces.

With nearly 55% of Vermont residences on septic systems, between 40 and 45 million gallons of septage is pumped from Vermont septic tanks each year. The vast majority of septage is hauled to WWTFs for disposal, but not all WWTFs have the necessary infrastructure to receive and treat septage and, those that do, have limited capacity. Furthermore, many rural Vermont communities are not served by a WWTF or a WWTF that accepts septage. Although the practice has dramatically declined in recent years, historically, land applying stabilized septage through a Solid Waste Management Facility Certification has relieved some of the capacity limitations at WWTFs for treating septage and provided a more local solution for septage management in rural areas of the State.

Markets: Markets for residual materials are primarily driven by regulations, economics, disposal capacities, and concerns relating to emerging contaminants. Residual materials typically contain PFAS (see section 1.4.1 Emerging Contaminants), which is not removed by current wastewater treatment processes. For this reason, ANR requires PFAS testing of beneficially reused residual materials, as well as soils and groundwater at certified land application sites via the Solid Waste Rules. In addition, ANR has developed an interim strategy to reduce risk associated with PFAS in land applied residuals. The strategy employs PFAS screening standards for residual materials that are based on Vermont soil background levels. The Agency of Transportation has also adopted the same screening standards for manufactured topsoil use in its Standards for Specifications for Construction. ANR continues to assess residuals management data while researching sludge and septage disposal capacities,

contaminant presence, fate and transport, emerging technologies, and pollution prevention strategies to inform decisions and rulemaking processes.

3 ANR Strategies and Actions

ANR employs a variety of strategies to work toward the MMP goals.

During the five-year MMP term, ANR will complete actions within each of the seven strategies listed below. These actions were created to provide Vermonters with better information and convenience to reduce, reuse, recycle, compost, and safely dispose of as much of their materials as possible.

A-1 ANR Strategy – Rules, Procedures, Policies, and Guidance

A-1.1 – Solid Waste Management Rules:

To ensure that the Solid Waste Management Rules stay current ANR will:

- A. Continually maintain and evaluate the need for rule revisions for changes such as waste management technologies, permitting/regulatory efficiencies and clarity, emerging contaminants, climate resiliency and disaster preparedness needs such as flooding, and environmental justice considerations in light of Act 154 implementation.

Annual Documentation:

1. Post any updated Solid Waste Management Rules on the Solid Waste Program web page.

A-1.2 – Solid-Waste Related Guidance, Policies, and Procedures:

To help regulated communities and all Vermonters understand Vermont’s waste-related laws and regulations, and know what options exist and how to be compliant, ANR will:

- A. Develop official procedures, policies, guidance, or best management practices on solid waste-related topics as needed, such as:
 - i. New statutory requirements.
 - ii. Emergent topics (e.g. flood debris management, PFAS, disposal capacity, etc.).
- B. Include relevant groups of people in the process, such as by convening stakeholder groups or soliciting feedback.
- C. As needed, provide plain language versions of guidance, policies, and procedures for regulated communities such as haulers, facilities, or other specific audiences.

Annual Documentation:

1. Post any final documents on Solid Waste Program website.

A-2 ANR Strategy – Permitting

A-2.1 – Solid Waste Facility Certifications

To ensure that solid waste facilities are sited and operated in accordance with the Solid Waste Management Rules, ANR will:

- A. Issue or deny Solid Waste Facility applications for certifications, following Permit Expediting Program (PEP) standards.

Annual Documentation:

1. List number of facility permits issued.
2. Confirm that permitting process followed PEP standards.

A-2.2 – Solid Waste Hauler Permits

To ensure that solid waste haulers are permitted and operating in accordance with Solid Waste Management Rules, ANR will:

- A. Issue permits to Solid Waste Haulers.

Annual Documentation:

1. List number of hauler permits issued.

A-3 ANR Strategy – Compliance

A-3.1 – Solid Waste Facility and Hauler Compliance

To ensure that solid waste facilities and haulers comply with State solid waste laws, the Solid Waste Management Rules, Universal Recycling law, landfill bans, and collection requirements for mandated recyclables, leaf and yard debris, and food scraps, ANR will:

- A. Conduct routine inspections prioritizing facilities with certifications that are due for renewal, larger capacity facilities, and facilities that have not been inspected recently.
- B. Respond to complaints of non-compliance.

Annual Documentation:

1. List number of facility inspections.
2. List number of resolved NOAVs and complaints.

A-3.2 – Waste Generator Compliance

To ensure that Vermont waste generators like businesses and institutions are in compliance with State solid waste laws and rules, including the Universal Recycling law, landfill bans, the Single-Use Products law, and other applicable laws, rules, and regulations, ANR will:

- A. Respond to complaints and evidence of non-compliance such as those found during Business Outreach visits and facility spot checks.
- B. Conduct periodic spot-checks (at least once per year) for disposal of banned items in solid waste brought in by generators and haulers at transfer stations and landfills.

Annual Documentation:

1. List number of resolved complaints or alleged violations.

2. List number of spot checks.

A-3.3 – Extended Producer Responsibility (EPR) Program Compliance

To ensure compliance with EPR programs, ANR will:

- A. Ensure manufacturers participate in an approved stewardship plan for the EPR material and enforce stop sale requirements of covered products, as outlined in statute, for manufacturers that fail to participate in an approved plan.

Annual Documentation:

1. List number of resolved alleged violations.

A-3.4 – SWIP Compliance

To ensure that Solid Waste Management Entities have adopted and are fully implementing their Solid Waste Management Plans in conformance with this MMP (so that all Vermonters have access to the same minimum services and information), ANR will:

- A. Review and approve Solid Waste Implementation Plans (SWIPs).
- B. Complete annual review of SWIP Reports, notifying SWMEs of actions necessary to complete requirements when progress is insufficient.

Annual Documentation:

1. List number of resolved alleged violations.
2. Year 0: send SWIP approval letters.
3. Years 1-5: send SWIP Report completion letters.

A-4 ANR Strategy – Outreach

A-4.1 – MMP Publicity

To ensure Vermonters are aware of and have access to the Materials Management Plan, ANR will:

- A. Post the MMP on the Solid Waste Program’s website within a month of adoption.
- B. Submit a press release announcing new MMP within two months of adoption.

Annual Documentation:

1. List date of press release and news outlets that published it.

A-4.2 – Waste Reduction

To publicly demonstrate ANR’s commitment to waste reduction and to proactively work toward the MMP waste reduction goals, ANR will:

- A. Dependent on available funding and internal approval, conduct two media campaigns on priority topics related to waste reduction (such as reuse, repair, food waste reduction, etc.)
- B. Dependent on available funding and internal approval, conduct a community-based social marketing project on a specific waste reduction topic.

Annual Documentation:

1. Years 1 and 3; date and results of any waste reduction media campaigns.

2. Date and summary of any community-based social marketing project, as applicable.

A-4.3 – Equity and Accessibility

To ensure that all Vermonters have equal access to information and to minimize barriers to information access, ANR will evaluate its communications in light of best practices for equity and accessibility and:

- A. Follow guidance from the Vermont Environmental Justice Law.
- B. Follow the ANR Language Access Plan.
- C. Follow the Chief Marketing Office Communications Best Practices.
- D. Attend trainings on topics such as accessible web design, plain language, accessible graphic design, etc.

Annual Documentation:

1. List of trainings attended.

A-4.4 – Solid Waste Program Website

To share solid waste and recycling information and documents, ANR will:

- A. Maintain up-to-date plain-language information on the Program’s website related to:
 - i. Solid waste laws
 - ii. Solid waste facilities and haulers
 - iii. Waste reduction, including waste reduction at events
 - iv. Recycling
 - v. Food scrap management
 - vi. EPR programs
 - vii. Management of landfill-banned and dangerous or otherwise difficult to manage materials.
- B. Create a searchable A-Z guide that lists statewide management options for various materials. The list will contain, at minimum, information on how to manage, recycle, or divert all [state disposal](#) banned items in addition to information on how to manage all of the categories and key words in the A-Z Waste and Recycling Guide Minimum Requirements document.
- C. Maintain a webpage of resources for SWMEs including:
 - i. SWIP-related guidance documents.
 - ii. Accessible communications best practices.
- D. At least once within the MMP term—ANR will review all Solid Waste Program web pages and revise them as needed.

Annual Documentation:

1. List website performance indicators for key pages, such as VTrecycles.com and the A-Z guide.

A-4.5 – Outreach Materials

To help Vermonters learn about solid waste related laws, initiatives, and other topics, ANR will:

- A. Maintain plain language handouts and other outreach materials, including creating new materials, as needed, and updating existing materials, as needed.
- B. Share outreach materials with SWMEs.

Annual Documentation:

1. Post new outreach materials on Solid Waste Program website.

A-4.6 – General Outreach

To spread the word about waste-related topics and initiatives, ANR will:

- A. Dependent on funding and approval conduct public media outreach, such as paid and unpaid advertisements, social media posts, press releases, and articles. Whenever possible, ANR will strive to develop consistent statewide messaging with stakeholders, including consistency with the Northeast and other U.S. states. Topics covered within the MMP term will be chosen based on Waste Composition study results, Diversion and Disposal Report results, recommendations from working groups, and other sources and may include:
 - i. Waste reduction.
 - ii. Recycling and organics diversion requirements.
 - iii. Reduction in use of hazardous products and encouraging proper disposal.
 - iv. Construction and demolition waste reduction, reuse, and proper disposal.
 - v. Extended producer responsibility programs (EPR).
 - vi. Best practices for preventing bear issues with solid waste.
 - vii. Buying and producing products and packaging with post-consumer recycled content (PCR).
 - viii. Other emerging topics.
- B. ANR will provide SWMEs regular examples of digital outreach content that could be used to meet their digital outreach requirements.

Annual Documentation:

1. List date, topic, and number of campaigns.
2. List number of press releases and articles published.
3. Provide social media key performance indicators.

A-4.7 – Direct Business and Institution Outreach

To ensure businesses and institutions (hospitals, nursing homes, colleges, correctional facilities, and other large waste generators), and their industry groups and associations are aware of and in compliance with the Universal Recycling law and other applicable solid waste-related laws, and understand the importance of waste reduction and diversion, ANR will:

- A. Conduct direct outreach in person or via phone or email on (as applicable):
 - i. Waste reduction.
 - ii. Disposal ban information.
 - iii. How to recycle correctly.
 - iv. How to separate food scraps for composting.
 - v. Food donation.
 - vi. How to reduce and safely manage hazardous waste.
 - vii. Single-Use Products law.
 - viii. Collection options available from Vermont's EPR Programs for electronics, paint, batteries, mercury containing bulbs and thermostats, and covered HHW.
- B. ANR will conduct outreach (including following up on complaints) to at least 250 entities during the MMP term.

Annual Documentation:

1. List entities contacted during the MMP term.

A-4.8 – School Outreach

To ensure all K-12 public and private schools are aware of and in compliance with the Universal Recycling law and other applicable waste-related laws; that schools understand state disposal bans and how to reduce waste, reuse, recycle, compost, donate, and safely manage materials responsibly, including hazardous materials; and that waste reduction and diversion programs are being implemented effectively, ANR will:

- A. Annually contact the Agency of Education, Principals' Association, and Superintendents' Association to ensure schools have information on waste reduction, recycling, organics diversion, and landfill ban disposal requirements.
- B. Give presentations at school-related conferences.

Annual Documentation:

1. List presentations given at school-related conferences or events.

A-4.9 – State Building Outreach

To ensure all State buildings are in compliance with the Universal Recycling law and other applicable solid waste-related laws, ANR will:

- A. Annually, contact a minimum of two state Agencies and the corresponding Buildings and General Services regional contacts and provide guidance and training on:
 - i. Waste reduction
 - ii. How to recycle and manage food scraps more effectively in State owned and leased properties.
 - iii. Proper management of special waste such as batteries, mercury-containing lamps, electronics, and paint.

Annual Documentation:

1. List Agencies contacted.

A-5 ANR Strategy – Technical Assistance and Collaborations**A-5.1 – Markets, Policy, and Emerging Solutions to Waste Challenges**

To improve markets for recyclables, organics, textiles, tires, construction and demolition waste, and other priority materials, and to ensure that ANR is aware of and considering new technology, policies, and other emerging solutions related to challenges in solid waste management, ANR will:

- A. Explore supporting markets for specific materials based on their tonnage, toxicity, or difficulty managing at end-of-life (such as past and current work with processed glass aggregate, recycled asphalt shingles, and tires).
- B. Participate in local, regional, and national discussions about materials management.

- C. As time allows, participate in local, regional, and national discussions related to topics such as:
 - i. Disposal technologies, waste treatment processes, and facility siting,
 - ii. Recycling/diversion markets and emerging technologies/processes,
 - iii. Extended producer responsibility and post-consumer recycled content policies,
 - iv. Policies such as product bans, mandated collection programs, and disposal bans.
- D. Share information with stakeholders when pertinent.

Annual Documentation:

1. Summarize current market trends, updates, policy, and emerging solutions related to priority materials and topics.

A-5.2 – Disaster Preparedness

To help to protect human health and the environment during a declared state of emergency from a disaster such as floods, fires, or storms and other emergencies, ANR will:

- A. Appoint a Solid Waste Management Program staff person who will assist the State Emergency Operations Center, Department of Public Safety-Vermont Emergency Management Division, and the Department of Buildings and General Services with oversight of state disaster debris contractor, which can help municipalities manage debris from disasters.
- B. Collaborate between the DEC Solid Waste Management Program, Hazardous Materials Program, and Spills Management Program to explore the need to utilize the U.S. EPA for temporary Hazardous Materials Collection Site and safe disposal services for municipalities impacted by disasters.
- C. Help SWMEs prepare disaster debris plans, that could include FEMA disaster debris monitoring protocols, by providing a plan template and offering training in collaboration with Vermont Emergency Management and potentially FEMA.

Annual Documentation:

1. List disaster preparedness staff person on program website.
2. Notification to SWMEs of any Hazardous Materials Collection Site.
3. Notification to SWMEs of any disaster debris training.

A-5.3 – Infrastructure

To help support the infrastructure required for meeting waste reduction and recycling goals, and to help manage difficult to manage and hazardous materials, ANR will:

- A. Conduct an annual Needs Assessment survey for SWMEs and municipalities to inform potential DEC grants and other priorities.

Annual Documentation:

1. Summarize results of Needs Assessment.

A-5.4 – Construction and Demolition Debris

To encourage the recycling of Construction and Demolition (C&D) Debris, ANR will:

- A. Review Construction Site Waste Reduction Plans for Act 250 projects that involve the construction and/or demolition of buildings that are 5,000 square feet or more in size.
 - i. Conduct site visits, when appropriate and staff have time available.

- ii. Share reviewed plans with SWMES, as appropriate.
 - iii. Consider collaborative improvements with the Act 250 Program, such as conducting follow-up inspections to confirm plans are put into action or requirement documentation that plans were followed.
- B. Evaluate Vermont’s Architectural Waste law (Act 175) to determine areas where Agency staff time could improve diversion and recycling of discarded drywall, metal, asphalt shingles, clean wood, plywood, and oriented strand board derived from construction and demolition projects.

Annual Documentation:

1. Number of Act 250 plans reviewed.

A-5.5 – Networks and Collaborations

To support organizations and initiatives in Vermont that are working toward MMP goals, ANR will:

- A. Coordinate or participate in networks and working groups:
 - i. Reduce/Reuse network.
 - ii. SWME School Outreach Group.
 - iii. SWME Recycling Coordinators Group.
 - iv. Vermont Hazardous Waste Network Group.
- B. Host meetings:
 - i. Once in the MMP term, ANR will host or participate in a statewide meeting or a series of regional meetings that connect SWMEs with organizations that work with food recovery / food donation to identify and address gaps in the top end of VT’s food scrap hierarchy.
 - ii. Annually, work with SWMEs and other stakeholders to organize a meeting on residuals management and recycling in Vermont. The meetings will educate and promote the exchange of information to improve safe and effective management and reuse opportunities for residuals and to share information on emerging contaminants like PFAS.
 - iii. Collaborate with SWMEs to hold a minimum of 8 regional meetings with haulers and stakeholders during the MMP term to discuss state solid waste requirements and MMP goals.

Annual Documentation:

1. Summarize key activities of network groups or task forces.
2. List topics, locations, and dates of meetings hosted.
3. List date, location, and number of participants events hosted.

A-5.6 – Technical Assistance and Trainings

To increase knowledge of topics related to the Solid Waste Management Rules, solid waste-related laws, and MMP goals, ANR will:

- A. Organize trainings, such as:
 - i. Webinars for SWMEs on topics such as SWIP reporting, outreach expectations and tips, social media strategies, website accessibility, etc.
 - ii. Transfer station operator training video.
 - iii. Compost Operator Trainings.

- iv. HHW Operator Trainings.
- B. Organize technical assistance programs such as:
 - i. Master Composter course.
 - ii. Compost Technical Assistance.
 - iii. Vermont Organics Recycling Summit.

Annual Documentation:

1. List trainings offered, including topic and date, and number of attendees if available.

A-6 ANR Strategy – Grant Funding

A-6.1 – Grants

Contingent upon availability of funds and internal approval, ANR may disburse from the Solid Waste Management Assistance Fund for grants and contracts for the purpose of enhancing solid waste management in the State in accordance with this Plan, such as:

- A. Issue Solid Waste Implementation Plan funding to SWMEs.
- B. Using data from annual SWME infrastructure needs assessments, issue grants that help meet MMP goals such as projects that:
 - i. Improve sustainable materials management such as projects that can increase recycling, composting, and waste diversion through efficiency, capacity, safety, accessibility, convenience, cost-effectiveness, and climate mitigation and resiliency.
 - ii. Improve access to Household Hazardous Waste facility services so services are available to more people, more frequently than 2 times per year.
- C. Issue contracts in furtherance of the MMP goals and implementation of the Solid Waste Management Rules, such as education and trainings, studies, technical assistance services, testing, site management, and more.
- D. Adjust grant RFP requirements and scoring in light of federal or state environmental justice policies or procedures that may be established.

Annual Documentation:

1. List grant recipients, contracts awarded, amounts awarded, and connections to Environmental Justice and climate mitigation and resiliency, if any.

A-7 ANR Strategy – Data and Reports

A-7.1 – Diversion and Disposal Reports

To track flow of materials through regulated solid waste facilities and participation in EPR programs, ANR will:

- A. Compile annual Diversion and Disposal reports including:
 - i. Number of tons of MSW, organics, recyclables, C&D, and other materials reported by regulated facilities, including Vermont materials disposed out-of-state and out-of-state materials disposed in Vermont.
 - ii. Amount of HHW collected and participation rate for HHW facilities and events.
 - iii. Annual collection amounts per EPR program.

Annual Documentation:

1. Post report on DEC web page.

A-7.2 – Legislative Reports

To provide summaries of solid-waste-related programs, initiatives, data, or other topics as requested by the Vermont Legislature, ANR will:

1. Complete reports to the Legislature including:
 - a. Biennial Report
 - b. Other reports, as required.

Annual Documentation:

1. Post reports on DEC web page.

A-7.3 – Disposal Capacity Stakeholder Process

To explore opportunities for ongoing in-state disposal capacity, ANR plans to initiate a stakeholder process for Vermont disposal capacity of the future. Whatever the path, the state must not waiver in its efforts to reduce, repair, reuse, recycle, compost, and safely manage waste and materials for the benefit of human health and the environment.

1. Beginning in year 1 of the MMP term, ANR will organize a representative group of stakeholders from public and private solid waste managers and other interested parties to explore opportunities for ongoing in-state disposal capacity. This work will likely result in a report which could become part of a Biennial Report on Solid Waste to the Legislature.

Annual Documentation:

1. Post results of stakeholder process or report on DEC web page.

4 SWME Requirements

4.1 Solid Waste Implementation Plan and Approval Process

State law requires that municipalities manage solid waste within their jurisdiction in conformance with the State Solid Waste Management Plan (now referred to as the Materials Management Plan or “MMP”). Each municipality, either as part of Solid Waste District, part of an alliance or group of towns, or an individual town, must adopt a Solid Waste Implementation Plan (SWIP) that is in conformance with the MMP. All solid waste districts, alliances, and independent towns, are collectively referred to as Solid Waste Management Entities (SWMEs).

SWIPs must address all requirements outlined in 24 V.S.A. § 2202a, which are listed below. Existing SWIPs, adopted in conformance with the 2019 State Materials Management Plan, will have to be revised to conform to this 2024 MMP.

To make the SWIP drafting process as easy as possible, ANR created a **SWIP Template** that requires no specific expertise to fill out. ANR Solid Waste Program staff are available to guide and assist SWMEs with SWIP drafting.

4.1.1 Minimum SWIP requirements:

- A. SWME Strategies and Actions.** SWIPs must address how each required SWME action is/will be completed during the SWIP term. SWIPs that adequately address the SWME actions are considered to be implementing the priorities of this MMP, as further outlined by 10 V.S.A. § 6604(a)(1). SWME strategies and actions include all the requirements from 24 V.S.A. § 2202a.
- B. Solid Waste Facility Siting Criteria.** SWIPs must describe the siting criteria that will apply to solid waste facilities which may be proposed by any public or private entity in the SWME region. As required by 10 V.S.A. §6605(c), siting criteria shall not be less stringent than the criteria in Vermont Solid Waste Management Rules.
- C. Specify the Facilities that are Included in the SWIP and Describe How Proposed Facilities will be Reviewed for Inclusion.** Ensure all solid waste facilities operating in the SWME region, including wastewater treatment facilities, are listed in the SWIP. Explain the process and standards to be used to determine if newly proposed solid waste facilities would be included in the SWIP. The process may reference siting criteria and existing zoning ordinances, may require a host town agreement, or may defer to requirements in the Vermont Solid Waste Management Rules for some or all types of solid waste facilities. The standard(s) for being included in the SWIP should be clear.
- D. Public Participation in the SWIP Approval Process.** Describe the process to be used to ensure public participation in the development and implementation of the SWIP. The local community should be notified of opportunities to participate in the SWIP development and implementation. In accordance with state statute, SWMEs must hold at least two public meetings on the draft SWIP.
- E. Ordinances.** Include copies of any solid waste related ordinances with the SWIP.
- F. Conformance with Other Plans.** Demonstrate that the SWIP is in conformance with any regional plan adopted in accordance with 24 V.S.A Chapter 117. Demonstration may be in the form of a letter from the applicable regional planning commission regarding conformance of the solid waste implementation plan with the regional plan(s), copies of pertinent sections of the regional plan(s), or other documentation that proves conformance.
- G. SWIP Reports.** All SWMEs must submit an annual SWIP Report and demonstrate completion of all required actions via ReTRAC by April 1st. ANR will provide SWIP Reporting Guidance.

4.1.2 SWIP Approval Process:

- A. SWMEs must submit a draft SWIP to ANR by July 1, 2025 that is in conformance with the 2024 MMP.
- B. Solid Waste Program staff will review the SWIP and send a letter outlining any unmet requirements.
- C. SWMEs are responsible for submitting revised SWIPs within 30 days to address unmet requirements.
- D. If the revised SWIP completely addresses all comments in the letter, ANR will recommend it for pre-approval. If the revised SWIP does not address all the comments, a follow-up review letter will be sent and the SWME will have another 30 days to address all comments in a subsequent revision.

- E. Once a draft SWIP is recommended by ANR for pre-approval, the SWME must hold two public hearings in its region on the draft SWIP.
- F. Upon completion of two public hearings and provided that no changes were made to the pre-approved SWIP, the SWME Board of Supervisors, Select Board, or City Council may adopt the draft SWIP, which can then move toward full approval by ANR.
- G. The following must be provided by the SWME as proof that public meetings were held in order to move toward final approval:
 - a. dates of at least two public meetings that were held by the SWME on the draft SWIP, and
 - b. a summary of the meetings.
- H. If no changes were recommended on the draft SWIP at the public meetings, then it can move forward for final approval from ANR. The ANR, DEC, Waste Management and Prevention Division Director will provide final approval of SWIPs via an ANR approval letter. If the draft SWIP is revised in any way, ANR will need to review the changes before moving it forward for final approval.

Possible Enforcement Actions:

SWMEs that have not adopted or implemented a SWIP in conformance with the MMP face consequences that may include:

- a) An enforcement action pursuant to 10 V.S.A. Chapter 201 or 211,
- b) The loss of grant eligibility,
- c) Preclusion to secure solid waste management facility certification, and
- d) A requirement to manage all materials (MSW, recycling, etc.) out of State.

5 SWME Strategies and Actions

S-1 SWME Strategy: Data and Reporting

S-1.1 – Disposal and Diversion Reporting

- A. **Disposal rate:** To track progress with state waste reduction goals, SWMEs must report their disposal rate in SWIP years one and five.
 - i. SWMEs may use the method in the [ANR Data Guidance](#) to calculate their disposal rate or another method approved by ANR.
 - ii. Disposal rate reports must be based on calendar year data.
- B. **Diversion rate:** SWMEs are not required to report diversion rates to ANR; however, it is strongly recommended that SWMEs track their diversion efforts to determine the success of their programs and services.

Documentation in Annual SWIP Report:

1. First (1st) Year SWIP Report: report year 1 annual per person per year disposal rate.
2. Fifth (5th) Year SWIP Report: report year 5 annual per person per year disposal rate

S-2 SWME Strategy: Outreach

S-2.1 – Accessible Communications

To ensure that all Vermonters have equal access to information and to minimize barriers to information access, SWMEs must critically evaluate their communications in light of best practices for accessibility including:

- A. Year one: attend ANR training OR another training (approved by ANR) on topics such as accessible web design, plain language, accessible graphic design, public outreach and/or engagement, etc.
- B. Years 2-5: review ANR accessible communications best practices.

Documentation in Annual SWIP Report:

1. Year 1: List training taken by SWME staff.
2. Years 2-5: Confirm review of accessible communications best practices.

S-2.2 – SWME Materials Management Website

To ensure community members have access to local waste, recycling, and materials management information including state laws; disposal bans; how to reduce, reuse, recycle, donate, compost, and safely dispose of unwanted materials; and local hauler services; by the end of year 1, each SWME must develop and annually maintain a website with:

- A. **SWIP:** to ensure community members are aware of and can access the SWIP, each SWME must—within one month of their SWIP approval—post their approved SWIP on their website.
- B. **A-Z Waste and Recycling Guide:** maintain an A-Z guide that lists regional management options for various materials. The A-Z guide must remain accurate throughout the SWIP term.
 - i. A-Z website link must be easily found from the SWME website within 2 clicks or fewer from the home page.
 - ii. The A-Z Guide must contain, at a minimum, information on how to manage, recycle, or divert all regional recycling and safe disposal options for all of the categories and key words in the [A-Z Waste and Recycling Guide Minimum Requirements document](#).
 - iii. Each entry must include contact information, as appropriate, such as address and telephone number for the collection location(s) OR a direct link to a webpage where the contact information can be found.
 - iv. Entries for [disposal-banned](#) materials must indicate that the material is banned by state law from disposal in the trash.
 - v. Entries for items that are accepted as part of an EPR program must link to information on the EPR program.
 - vi. Entries for items that can be recycled only through special collection must clearly explain that the collection of these materials is separate from curbside, or blue-bin, recycling.
- C. **Hauler Services List:** establish and maintain an up-to-date Hauler Services List with the contact information for trash, recycling, and food scrap pickup services offered by all known commercial solid waste haulers operating within the SWME region.
 - i. **Waste Reduction for Events Resources:** maintain a web page that encourages waste reduction at events such as bin signs, options for bin rental or loan,

haulers for recycling and food scrap collection at events, and tips for successful diversion at events (can link to ANR web page for the tips).

Documentation in Annual SWIP Report:

1. Year 1, provide links to:
 - a. SWIP;
 - b. Updated A-Z Waste and Recycling guide;
 - c. Hauler Services List.
2. Years 2-5: Describe any significant website updates or changes.

S-2.3 – Digital Outreach

To build awareness of waste management topics and services provided by SWMEs and those available within their region, each SWME must conduct annual outreach on at least two digital platforms such as Front Porch Forum, social media, electronic newsletters, etc. SWMEs may use existing ANR content or create their own. This requirement is separate from maintaining a materials management website.

- A. Annual digital outreach must include at least two forms of outreach per year on each of the following topics:
 - i. The A-Z Guide and disposal bans.
 - ii. Waste reduction and diversion.
 - iii. Household hazardous waste reduction and proper disposal.
 - iv. Extended Producer Responsibility programs (i.e. batteries, E-cycles, mercury-containing products, paint, HHW EPR).

Documentation in Annual SWIP Report:

1. Describe the two digital outreach methods used per SWIP year, including platforms used for each topic covered.

S-2.4 – Print Outreach

To reach community members who do not use digital modes of communication, each SWME must conduct at least one annual outreach in printed documents, such as press releases, newsletters, post cards, letters to editor/articles/ads in local newspapers. SWMEs must:

- A. Year 1: Issue one press release about their SWIP to local newspapers or other media outlets within two months of SWIP approval.
- B. Years 2-5: Issue one printed outreach per year related to the main MMP goals and/or ANR or SWME initiatives related to materials management. Press releases could also be completed in partnership with ANR. Mailings can count but are not required. HHW event mailings or advertisements and press releases announcing grant receipt do not count toward this requirement.

Documentation in Annual SWIP Report:

1. Year 1: provide a copy of the SWIP press release along with the date released and list of newspapers where it was sent.
2. Years 2-5: provide copy of press release along with topic, date released, and list of newspapers where it was sent OR copy of print outreach along with topic, date of release, and number of recipients.

S-2.5 – Municipality and Facility Connections

To further develop relationships with their local municipalities and to better understand local challenges and opportunities related to the movement of waste, SWMEs must conduct outreach to solid waste facilities, town offices, and public libraries. SWMEs must:

- A. Within the SWIP term: SWMEs must conduct an in-person visit to each solid waste facility included in the SWIP.
- B. Each year: for each municipality within the SWME region, SWMEs must reach out to the town office and public library (as applicable). Outreach may be conducted in-person, via phone, or via email and must include:
 - i. Introduction of the SWME and their role in the community.
 - ii. Updates on any materials management-related laws, events, or initiatives.
 - iii. For town offices: Discussion of collection plan for disaster debris and disaster-related Hazardous materials (see also C7 – Collection of Disaster Debris and Disaster-related HHW).

Documentation in Annual SWIP Report:

1. Provide a list of solid waste facilities, town offices, and libraries contacted.

S-2.6 – School Outreach

To ensure all K-12 public and private schools are aware of the Universal Recycling law, state disposal bans; and how to reduce waste, reuse, repurpose, recycle, compost, donate, and safely manage materials responsibly; and that waste reduction and diversion programs are being implemented effectively, SWMEs must:

- A. Conduct **in-person outreach and assistance to K-12 public and private school administrators and/or facilities and food service staff at a minimum of 10% or 2 schools (whichever is greater)** within their jurisdiction each year, ensuring that at least 50% of the schools are reached by the end of the SWIP term. SWMEs should prioritize outreach to schools that have not yet been visited. For SWMEs with fewer than 10 schools, outreach should occur on an annual basis to at least 2 schools per year, with re-visits to schools if all schools in the jurisdiction are reached early in the SWIP term.
- B. The outreach to each school must focus on school-wide waste reduction and diversion programs covering, at minimum:
 - i. Disposal ban information.
 - ii. How to recycle correctly.
 - iii. How to separate food scraps for composting or anaerobic digestion.
 - iv. How to reduce wasted food and donate (such as through the use of share table) what is appropriate.
 - v. How to safely manage hazardous waste.
 - vi. Collection options available from Vermont's Extended Producer Responsibility Programs for HHW, electronics, paint, batteries, mercury-containing bulbs and thermostats.
- C. Initial outreach must be in-person, but phone calls may be conducted as follow-up if SWME is not able to reach school administrators or relevant staff in-person.
- D. To keep track of their school outreach, SWMEs may use the ANR tracking spreadsheet template or another system of their own that meets ANR approval.

- E. Outreach to teachers and students is encouraged but is not required, although SWMEs may find it useful to talk to science, art, and shop teachers about proper management and disposal of hazardous materials.
- F. One of the primary roles of a SWME is waste reduction, diversion, and hazard reduction outreach and assistance. If a school is not in compliance with the Universal Recycling law or other waste-related laws, and assistance is not effective, SWMEs are encouraged to request follow-up assistance from ANR.

Documentation in Annual SWIP Report:

1. Provide a spreadsheet or other document including:
 - a. List of schools and person contacted;
 - b. Dates visited/contacted;
 - c. Status of recycling and food scrap diversion programs.
2. Describe outreach efforts, including notable successes or challenges.

S-2.7 – Business Outreach

To ensure businesses and institutions (hospitals, nursing homes, colleges, correctional facilities, and other large waste generators) understand the requirements of the Universal Recycling law, state disposal bans, how to reduce waste, reuse, recycle, compost, donate, and safely manage materials responsibly; and that waste reduction and diversion programs are being implemented effectively, SWMEs must:

- A. SWMEs must conduct business outreach and education either **in person or via phone** to at **least 2% or 20 businesses/institutions (whichever is greater)** within their jurisdiction each year.
 - i. The number of businesses in a SWME region may be estimated by the Department of Labor list (provided by ANR in Year 1 of the MMP term), or a SWME may use a different method that meets ANR approval.
 - ii. For SWMEs with fewer than 20 businesses, all businesses must receive outreach at least twice during the SWIP term. SWMEs must provide business outreach and education on a continual basis to ensure the effectiveness of waste reduction programs. SWMEs should prioritize outreach to businesses that have not yet been contacted or visited or those whose status is not yet known.
- B. The business outreach and education to each entity must cover, at minimum:
 - i. Disposal ban information.
 - ii. How to recycle correctly.
 - iii. How to separate food scraps for animal feed and/or composting or anaerobic digestion.
 - iv. How to reduce wasted food and donate what is appropriate.
 - v. Single-Use Products law.
 - vi. Resources for safely managing hazardous waste.
 - vii. Collection options available from Vermont’s Extended Producer Responsibility Programs for HHW, electronics, paint, batteries, mercury containing bulbs and thermostats.
- C. To keep track of their business outreach, SWMEs may use the ANR tracking spreadsheet template or another system of their own that meets ANR approval.

- D. One of the primary roles of a SWME is outreach and assistance. If a business is not in compliance with the Universal Recycling law or other waste-related laws, and assistance is not effective, SWMEs are encouraged to request follow-up from ANR.

Documentation in Annual SWIP Report:

1. Provide a spreadsheet or other document including:
 - a. List of businesses and person contacted;
 - b. Dates visited/contacted;
 - c. Status of recycling and food scrap diversion programs;
 - d. Interaction type (in person or phone).
2. Describe outreach efforts, including notable successes or challenges.

S-3 SWME Strategy: Collection Infrastructure

S-3.1 – Variable Rate Pricing

To encourage waste reduction, SWMEs must:

- A. Implement a variable rate pricing system that charges for the collection of municipal solid waste from a residential customer for disposal based on the volume or weight of the waste collected. SWMEs may elect to establish licensing or registration programs to accomplish this requirement and can refer to the [Variable Rate Pricing Guide](#) for more information.

Documentation in Annual SWIP Report:

1. Year 1: explain the method used to ensure haulers and facilities are charging residents for trash based on volume or weight.
2. Years 2-5: provide any updates and/or instances of hauler or facility non-compliance.

S-3.2 – HHW Collection Facilities and Events

To ensure community members have convenient access to safely dispose of Household Hazardous Waste (HHW) and Very Small Quantity Generator (VSQG) hazardous waste (previously defined as Conditionally Exempt Generator hazardous waste (CEG)), SWMEs must provide access to one of the following:

- A. A permanent HHW/VSQG collection facility defined within this MMP as a facility that is open at least one day per week, at minimum from May through October (ANR may consider approving requests for alternative operating days and seasonal openings and closures of permanent facilities when necessary).
 - i. Due to increased user convenience, lower costs per participant, and slightly higher participation rates for regional HHW facilities, SWMEs that provide access to a permanent HHW collection facility in their region are exempt from the requirement to offer all towns at least one annual collection event within 20 road-miles.

OR

- B. A minimum of two (2) HHW/VSQG hazardous waste collection events per year. SWMEs utilizing collection events must at minimum offer at least one HHW and VSQG collection event scheduled in the spring and one in the fall and events must operate for a minimum of four (4) hours.

- i. SWMEs that only offer collection events or operate HHW facilities with operating hours similar to collection events must annually provide each of its towns with access to at least one collection event (or to a facility) within 20 road-miles; meaning a maximum distance of 20 road-miles from any point in the town.
- ii. If a SWME provides additional events above the minimum requirement, waivers to the minimum duration for each event may be considered by ANR.
- iii. To meet this 20 road-mile convenience requirement, certain regions may need to hold more than two collection events each year.

Sharing Facilities or Events: SWMEs are encouraged to share access to events and facilities, provided a signed agreement confirming access by the SWME's community members is obtained; and provided that a facility or event is within 20 road-miles from any point in a town that would be using that facility or event.

Documentation in Annual SWIP Report:

1. Provide the HHW facility address and seasonal operating schedule, including days operating and hours of operation, **OR** the dates of the HHW events.
2. Provide the number of participants, the household participation rate, and the amount of HHW/VSQG hazardous waste collected in HHW ReTRAC report.

S-3.3 – Collection of Landfill/Disposal-Banned and Dangerous Materials

To ensure that all Vermonters have year-round collection options for landfill-banned and dangerous materials, SWMEs must:

- A. Demonstrate that year-round collection options exist in their region (within SWME boundary OR within 20 miles of an Independent Town) for the following landfill/disposal banned materials: **batteries, mercury containing lamps, mercury thermostats, gas cylinders as defined in Vermont's HHW EPR law 10 V.S.A. §7181, electronics, paint, tires, used oil, and appliances (including discarded refrigerators, washing machines, clothes dryers, ranges, water heaters, dishwashers, freezers, air conditioners, and dehumidifiers).**
- B. Collection locations can be privately or publicly owned, such as auto parts stores collecting used oil, or hardware stores collecting paint and fluorescent lamps. However, if the only collection location for a required material closes or reaches maximum capacity for collection during the SWIP term, the SWME must provide a collection option for its region.
- C. All collection locations must be open at least one weekday and one weekend day per week.

Documentation in Annual SWIP Report:

1. Confirm that this requirement is met.
2. Describe any changes in collection options from the previous year.

S-3.4 – Disaster Debris Plan

To ensure all Vermont towns are prepared to manage disaster-related debris, like HHW, hazardous waste, trash/MSW, and construction and demolition (C&D) debris, during and after

a disaster such as a flood, fire, storm, or other emergency, SWMEs must, by the end of Year 1 of the SWIP term:

- A. **Submit a Disaster Debris Plan:** work with each municipality to create a Disaster Debris Plan (“Plan”) for the management of disaster-related trash, C&D debris, and hazardous debris. The Plan must use the ANR Template, must cover all municipalities in the SWME region, and must include, at minimum:
 - a. **Municipal Disaster Debris Contacts:** Contact each municipality and obtain contact information for the emergency personnel who would be the point-of-contact for coordinating temporary disaster-related hazardous materials storage in that municipality. Referring to your local emergency management director is recommended.
 - b. **Disaster Hazardous Materials Staging Areas:** identify appropriate "Disaster Hazardous Material Staging Areas" (DHMSA) within the SWME region for the temporary storage of disaster-related hazardous materials and dangerous wastes. DHMSAs must be located:
 - i. On publicly owned land.
 - ii. Within either each municipality (which is recommended) or at minimum, one for the whole SWME region.
 - c. **Trash and C&D Disaster Debris Management:** This may include the identity of certified public and/or private solid waste transfer facilities that could be used for disaster trash and C&D debris management.
 - d. **Clean Wood/Vegetative/Inert Debris Management Sites:** list the locations of clean wood/vegetative/inert debris sites as required below in S-3.5.
 - i. S-3.5 is not due until Year four of the SWIP term. Re-submit the Plan after year four, if necessary.
- NOTE: Attending training by ANR and/or Vermont Emergency Management (VEM) is recommended. See ANR Action A-5.2 above for more details.
- NOTE: For communities wishing to pursue FEMA reimbursement: trash/MSW/C&D disaster debris management destination locations (like transfer stations, landfills, categorical disposal/recycling facilities like stump dumps and wood waste management sites must be certified, be out of a flood zone, have controlled access, and follow other debris tracking methods to ensure FEMA reimbursement requirements can be met.
- NOTE: During the historic flooding of July, 2023 the State of Vermont Department of Public Safety, Vermont Emergency Management Division, the Department of Buildings and General Services, and the Department of Environmental Conservation, Solid Waste Management Program engaged a statewide debris contractor to assist towns with collection and disposal of disaster related debris when the capacity of local and regional resources were exceeded. Communities with a sound disaster debris plan may respond more quickly from a disaster, getting debris removed and properly managed or disposed of so that impacted residents and businesses have life return to normal in less time.
- NOTE: during the historic flooding of July 2023 the State of Vermont ANR, Department of Environmental Conservation, Solid Waste Management, Spills, and Hazardous Materials Programs engaged the U.S. EPA’s hazardous materials contractor assistance to provide both a temporary hazardous materials collection site in Middlesex Vermont and to provide direct pick-ups of hazardous materials from town staging areas. See ANR Actions section for more details.

Documentation in Annual SWIP Report:

1. Year 1 only: provide Disaster Debris Plan with:
 - a. List of emergency personnel in each municipality within SWME region
 - b. Locations of temporary “Disaster Hazardous Materials Staging Areas.”
 - c. Trash and C&D Disaster Management.
 - d. Locations of clean wood/vegetative/inert debris management sites.
2. Year 4 only: Re-submit Plan if there are updates to the clean wood/vegetative/inert debris management sites per S-3.5.

S-3.5 – Clean Wood and Inert Debris Management Sites

To ensure Vermonters have access to management sites for clean wood (“wood waste”) and other inert debris during normal times and after a disaster, such as a flood, fire, storm, or other emergency, SWMEs must:

- A. By the end of Year 4, identify at least one location within the SWME region to site and permit a categorical disposal or storage/transfer area (“stump dump”) that can be used to manage both normal clean wood and disaster-related clean wood/vegetative debris and other inert debris including: clean silt, soils, and gravel, brick and concrete, branches, trees, stumps, and wood that is untreated and free from paint, staining, is not odorous or otherwise suspected of contamination.
 - i. SWMEs may share access to categorical disposal areas. The municipalities sharing access must provide a signed letter or agreement that documents this shared access.
 - ii. Clean Wood and Inert Debris Management Sites should be adequate in size and operate frequently enough to meet the needs of the municipality(ies) they serve.
 - iii. Having a permitted categorical disposal area for disaster debris management in every municipality within a SWME is recommended, but not required.

Documentation in Annual SWIP Report:

1. Year 4: list location of the permitted categorical disposal facility or other facility in the SWME region where clean wood and inert debris can be managed.

S-3.6 – Collection of Textiles

To ensure community members have access to textile reuse and recycling centers where used clothing and textiles can be donated, SWMEs must:

- A. Annually ensure that at least one collection location exists within their region (within SWME boundary OR within 20 miles of an Independent Town). Textile reuse/recycling locations can be either privately or publicly owned.
- B. If the only collection location closes or ceases collection during the SWIP term, then the SWME is responsible for providing a collection option for its residents. Collection of rag-quality (unwearable) items is encouraged but not required.
- C. Collection locations can also be shared amongst SWMEs so long as the facility is within the same county or SWME region. SWMEs must list where to donate and reuse/recycle “clothing/textiles” in their A-Z Guides.

Documentation in Annual SWIP Report:

1. Confirm that textile collection is available.
2. Describe any changes in collection options from the previous year.

S-4 SWME Strategy: Residuals Management

S-4.2 – Residuals Management Meetings

To reduce pollutants in wastewater and septic systems that can hinder the reuse and recycling of biosolids and to increase awareness of topics of concern, like PFAS and other emerging contaminants, each SWME must:

- A. Attend the annual virtual ANR meeting on residuals management each year during the SWIP term. ANR Residuals Program staff will organize the meetings.

Documentation in Annual SWIP Report:

1. Confirm meeting attendance.

6 Glossary of Terms

DISCLAIMER - The Glossary of Terms does not provide legal definitions of all terms. Instead, the intent is to provide consistent definitions of key words used in this Plan so that all readers have the same understanding of these terms as used in the context of this Plan.

Anaerobic Digestion: means the controlled anaerobic decomposition of organic food residuals, manure, animal feed waste, other natural organic waste materials inside a containment structure or vessel, generally resulting in the production of methane-rich gas. The initials “AD” may refer to the process of anaerobic digestion or the built system where anaerobic digestion takes place, also known as a digester.

Biogas: gas produced by the breakdown of organic material in the absence of oxygen.

Biosolids: primarily organic materials recovered from the wastewater treatment process and sewage sludge, both of which have been treated and shown to meet the standards such that it can be managed through beneficial use. Beneficial use includes land application or further treatment to produce compost or similar products. Disposal includes dewatering followed by landfilling or incineration.

Clean Wood: has the same definition as “wood waste” in state statute and means trees, untreated wood, and other natural woody debris, including tree stumps, brush and limbs, root mats, and logs.

Conditionally Exempt Generator (CEG): a generator of hazardous waste that is conditionally exempted from certain provisions of the Vermont Hazardous Waste Management Regulations.

Composting: the controlled biological decomposition of organic matter through active management to produce a stable, humus-rich material.

Construction and Demolition (C&D) Debris: means waste derived from the construction or demolition of buildings, roadways or structures including but not limited to clean wood, treated or painted wood, plaster, sheetrock, roofing paper and shingles, insulation, glass, stone, soil, flooring materials, brick, masonry, mortar, incidental metal, furniture and mattresses. This waste does not include asbestos waste, regulated hazardous waste, hazardous waste generated by households, hazardous waste from conditionally exempt generators, or any material banned from landfill disposal under 10 V.S.A. §6621a.

Disposal: the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or onto any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any ground or surface waters.

Diversion Rate: the measurement of the amount of waste diverted (by composting, reusing, and recycling materials), divided by the sum of waste diverted and waste disposed (at disposal facilities, landfills and incinerators). Materials used for alternative daily cover at landfills do not constitute materials diverted from the landfill.

That is calculated by using the following equation:

$$\text{Rate (\%)} = \frac{\text{Diversion} \times 100}{\text{tons diverted} + \text{disposed} + \text{landfilled} + \text{incinerated}} = \frac{\text{tons reused} + \text{composted} + \text{recycled}}{\text{tons reused} + \text{composted} + \text{recycled} + \text{landfilled} + \text{incinerated}} \times 100$$

Energy recovery (as it relates to the Food Recovery Hierarchy): Energy recovery as it relates to the food residual hierarchy does not include disposal by incineration, waste-to-energy incineration, or other such processes.

Extended Producer Responsibility (EPR): a mandatory type of product stewardship that includes, at a minimum, the requirement that the producer's responsibility for their product extends to post-consumer management of that product and its packaging. There are two related features of EPR policy: (1) shifting financial and management responsibility, with government oversight, upstream to the producer and away from the public sector; and (2) providing incentives to producers to incorporate environmental considerations in the design of their products and packaging.

Food Scraps/Residuals: source-separated and uncontaminated material that is derived from processing and discarding of food and that is recyclable; may include pre-consumer and post-consumer food scraps but does not necessarily include meat and meat-related products when the food residuals are composted by a resident on site.

Household Hazardous Waste (HHW): any waste from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas) that would be subject to regulation as hazardous wastes if it were not from households. Examples of HHW include paint, cleaners, oils, batteries, and pesticides. Because they contain potentially hazardous ingredients, these wastes require special management.

Leaf and Yard Debris: source-separated compostable, untreated vegetative matter, including grass clippings, leaves, kraft paper bags, and brush, which is free from non-compostable materials. It does not include such materials as pre-consumer and post-consumer food residuals, food processing residuals, or soiled paper.

Mandated Recyclable: any of the following source separated materials: aluminum and steel cans; aluminum foil and aluminum pie plates; glass bottles and jars from foods and beverages; polyethylene terephthalate (PET) plastic bottles or jugs; high density polyethylene (HDPE) plastic bottles and jugs; corrugated cardboard; white and colored paper; newspaper; magazine; catalogues; paper mail and envelopes; boxboard; and paper bags.

Management Facilities: Facilities that are permitted by ANR to accept materials for recycling, processing, or disposal.

Materials Management: the lifecycle of materials as they trace their course through the economy, from raw material extraction to product manufacture, transport, use, source reduction, reuse, recycling, and disposal. (USEPA www.epa.gov/statelocalclimate/state/topics/waste-mgmt.html).

Municipal Solid Waste (MSW): combined household, commercial, and industrial waste materials generated in a given area.

Organic Materials: materials of a biological origin such as paper and cardboard, food, yard and garden waste, animal waste, biosolids and septage. For this MMP, biosolids and septage are discussed separately from other organic materials. Animal waste is not a subject addressed in this MMP.

Per Person Disposal Rate: the average amount of waste disposed (landfilled or incinerated) per person in a given year. Or, when expressed as an equation:

$$\text{Per Person Disposal Rate} = \frac{\text{total tons landfilled} + \text{total tons incinerated}}{\text{total population of that town or district or state (may be adjusted for seasonal population)}}$$

PFAS: per- and polyfluoroalkyl substances (PFAS) are a large family of fluorinated chemicals manufactured for decades and used in many industrial, commercial and consumer products. PFAS are termed “forever chemicals” due to their resistance to degradation, persistence in the environment, and potential to bioaccumulate. Because of their widespread use and their persistence in nature, PFAS are found across the globe in the blood of people and animals, in water, air and soil, and in many products and waste materials.

Plan Term: the period of time by which the Materials Management Plan designates the earliest and latest possible date at which a performance standard must be completed. This term is scheduled for a 5-year period beginning on the date of adoption.

Product Stewardship: the act of minimizing health, safety, environmental, and social impacts of a product and its packaging, and maximizing economic benefits of a product and its

packaging throughout all lifecycle stages. The producer of the product has the greatest ability to minimize adverse impacts, but other stakeholders, such as suppliers, retailers, and consumers, also play a role. Product stewardship can be either voluntary or required by law.

Recyclable Materials: solid waste which may be reclaimed and/or processed so that they may be used in the production of materials or products.

Recycling: the process of utilizing product residuals, packaging, or food scraps for the production of materials or products but does not include processing solid waste to produce energy or fuel products.

Recycling Rate: the percentage of material recycled compared divided by the sum of recycled and disposed material, multiplied by 100. Or, when expressed as a formula:

$$\text{Recycling Rate (\%)} = \frac{\text{tons of materials recycled}}{(\text{tons of materials recycled} + \text{tons of waste disposed})} \times 100$$

ReTRAC: a database used to manage all diversion and disposal reports for the State of Vermont. Data can be tracked and reports run based upon facility, material, or region.

Reuse: use of a material or product more than once before it is recycled or discarded as solid waste.

Septage: the liquid and solid materials pumped from a septic tank or cesspool during cleaning.

Sludge: any untreated solid, semisolid, or liquid generated from a municipal, commercial, or industrial wastewater treatment plant or process, water supply treatment plant, air pollution control facility, or any other such waste having similar characteristics and effects.

Solid Waste (SW): 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 or solid or dissolved materials in industrial discharges which are point sources subject to permits under the Water Pollution Control Act. Solid waste that is also hazardous waste is subject to further regulation under the Vermont Hazardous Waste Management Regulations.

Solid Waste Implementation Plan (SWIP): that plan which is adopted to be consistent with the State Materials Management Plan (MMP). This plan must include all the elements required for consistency with the MMP and an applicable regional plan and shall be approved by the Secretary. This implementation plan is the basis for state certification of facilities.

Solid Waste Management: activities that result in the storage, transportation, transfer, treatment of solid waste or recyclable material, or disposal of solid waste.

Solid Waste Management Entity (SWME): a term used to reference a town or groups of towns that have unified as a district, group, or alliance in order to share financial and human resources dedicated to managing the solid waste generated by organizations and residents residing within the particular town or group of towns.

SWIP Term: the term in which a Solid Waste Implementation Plan (SWIP) is approved by ANR until the time a new SWIP is approved following the adoption of a new MMP (referred to as a “solid waste management plan” by statute) or a revised SWIP is approved by ANR.

Transfer Station: a solid waste management facility where solid waste is collected, aggregated, sorted, stored, and/or processed for the purpose of subsequent transfer to another solid waste management facility for further processing, treatment, transfer, or disposal.

Universal Waste: establishes alternative management standards for certain hazardous wastes in order to streamline the management process. Examples of Universal Wastes are batteries, pesticides, thermostats, PCB-containing fluorescent light ballasts, lamps, mercury-containing devices, paint, and cathode ray tubes.

Variable Rate Pricing (or Unit Based Pricing or Pay As You Throw): Charging a tiered or variable fee based on the volume or weight of the solid waste collected.

Waste: a material that is discarded or is being accumulated, stored, or physically, chemically, or biologically treated prior to being discarded, or has served its original intended use or is a manufacturing or mining by-product, and is normally discarded.

Waste Prevention: actions or choices that prevent the generation of waste. Waste prevention involves altering the design, manufacture, purchase, or use of products and materials to reduce the amount and toxicity of what gets thrown away.

Waste Reduction: waste reduction combines the efforts of waste prevention, reuse, composting, and recycling practices.