



**ALLIANCE of CLIMATE  
and ENVIRONMENTAL  
STEWARDS**

# **ACHIEVING ZERO WASTE REPORT**

**Considerations & Options for Developing a Waste Plan  
Developed for Greater Newburyport and Selected  
Communities**

**APRIL 20, 2022.**

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## **1. Acknowledgements**

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Helena Staunch (researcher), Sharon Kishida (advisor),  
Stacey Macmillan (editor), and Tom Szabo (editor)**

### **Project Coordinator and Writer - Sophie Giedraitis**

As a member of the ACES Youth Corps, NECC student Sophie is keen on sharing with others the impact waste has upon her local communities and beyond and means to which communities are working to achieve zero-waste.

### **Stacey Macmillan (editor)**

As part of an ACES project team, ACES Advisor Stacey is supporting efforts to increase composting across Newburyport, and thereby reduce the City's overall waste."

### **Tom Szabo (editor)**

A member of the NBPT Waste Stream Task Force, Tom is proactive about sharing the benefits of Composting as a major contribution to reducing waste and the challenges of methane gas.

### **Sharon Kishida (advisor)**

A former regional solid waste recycling coordinator at MASS DEP, Sharon worked with a variety of Essex County towns and communities in an effort to reduce the cost of waste and recycling and raise awareness to address waste conflicts and challenges.

### **Helena Staunch (researcher)**

As an ACES Youth Corps member, Triton Sr Helena, has contributed to the interaction of officials and ACES allies to receive information on community actions regarding waste management.

# ACHIEVING ZERO WASTE REPORT

## Considerations & Options for Local Communities

### 1. Approach

This report has been developed by an ACES project team in support of its overall Waste Reduction Initiative. The purpose is to support community leaders with a comprehensive overview of the state of waste that is and will be impacting each community. The intention is to foster a future perspective on the actual steps needed to **Be Bold About Achieving “ZERO WASTE”**. Definitions of Zero Waste vary and can be found [here](#). This report focuses on the greater Newburyport area and is intended to help local leaders gather data needed to develop waste reduction plans.

This research was primarily completed by Sophie Giedraitis with support from Helena Staunch for community insights.

### 2. Executive Summary

The axiom “Think Globally, Work Locally, Act Personally” applies succinctly to what must happen for our communities to be on a path to “Achieve Zero Waste”. The volume of waste is increasing while the capacity for disposal of waste is decreasing in many locations. A paradigm shift to a circular materials economy is needed. For this necessary and overdue shift to occur here in the U.S., change needs to start at the state and local levels. The reduction of waste in a manner that will put a community on the path to achieving zero waste is a complex process. It begins with a community defining what Zero Waste means within the context of their planning and operations. With that overall goal, a community must then establish a process of reviewing and clarifying the variety of relevant categories of waste.

This report provides information on a variety of factors - from supportive incentives to State Goals/Strategies - that a community needs to consider when developing its overall plans, programs, and practices to make progress. “Achieving Zero Waste” will involve determined leadership to guide a community to make the changes needed. There may be more opportunities for innovation, collaboration, and regional solutions uncovered as community leaders evaluate their options for the future.

## **4. The World's Major Waste Challenges**

**Waste is dramatically increasing. We are not headed toward Zero Waste.**

**Overview:** Every year, globally, we dump a massive 2.12 billion tons of waste on the planet. If all this waste was put on trucks it would go around the world 24 times. Global annual waste generation is projected to increase 70% between 2018 and 2050 unless major changes take place. Given the waste generation and resource use currently underway globally, we have already pushed 75% above what the Earth can sustain in the long run with regard to resource extraction and absorption of waste.

### **Effects Of Waste Dumping That Can Impact the Overall Health of Our Planet:**

- **Pollution of soil:** Waste can leak hazardous chemicals into the soil and from there into our food.
- **Air pollution:** The burning of waste at landfills releases toxic substances into the air, including extremely poisonous dioxin.
- **Pollution of oceans:** 13 million tons of plastic end up in the world's oceans each year. If we keep dumping plastic in the oceans, by 2050 there will be more plastic than fish in the sea.
- **Pollution of groundwater:** 280 billion tons of groundwater is being polluted every year - that's 9000 tons every second.

### **Effects Of Hazardous Waste on the Health of All Species Globally**

Hazardous waste interferes with hormones and causes cancer, reproductive problems, birth defects, and damage to the DNA of humans and animals as it accumulates in tissues and builds up over time. In a study of human chemical contamination [Can we determine when was the study? This is more compelling if it's a recent study showing lasting effects from decades ago], DDT and PCBs (two dangerous chemicals banned decades ago) were found in 99% of the people tested.

In terms of wildlife, hazardous waste seeps into the soil where it affects plants' natural growing process. It also kills off insects such as bees that help preserve the fertility of plant life faster than they are able to reproduce. A major impact of hazardous waste is its ability to soak through the soil and enter underground aquifers and contaminate water.

**Please see Appendix A for additional details about global waste.**

## **5. North America Waste Challenges**

### **Overview**

A report by the United States Public Interest Research Group Education Fund (U.S. PIRG) finds it is time to transform our waste process because its effects are too dire to ignore—resource depletion, climate change, environmental degradation, and public health threats.

According to a study by Columbia University, Americans trash seven pounds of material per person every single day—that's 2,555 pounds of material per American every year.

A staggering 90% of all raw materials extracted in the U.S. are ultimately dumped into landfills or burned in incinerators. Those materials should be reused to make new products, but because they're destroyed, more and more natural resources are extracted every day.

This one-way system of destructive extraction, consumption, and disposal is polluting our air, contaminating our drinking water, choking our oceans, and wasting our natural resources.

### **A Shift in Thinking**

A solution to America's trash problem requires a paradigm shift in how we, as a country, think about waste. For that shift to happen, we need to examine the parts of the system that we do not see every day.

We can start by looking at what the system incentivizes. Producers make more money when consumers buy new goods instead of fixing old ones. Some consumers pay the same amount for trash pick-up no matter how much garbage they leave on the curb. And profits for waste haulers and landfill operators increase when the amount of garbage they collect goes up. (U.S.PIRG)



The alternative to this costly, wasteful and destructive linear system is a **circular material economy—one that produces zero waste conserves natural resources and limits pollution and global warming emissions.**

The U.S. already has the tools it needs to make this urgent transition. We can make recycling and composting easier than throwing things in the garbage, and ban the sale of single-use items that are not easily recyclable. We can encourage producers to make products built to last, and use recycled materials in production. We can price goods to reflect the environmental and public health impacts of their production.

These strategies work. The city of San Francisco, for example, now diverts 80% of materials from landfills and incinerators thanks to its “Zero Waste by 2020” program. In Germany, because of policies like the ones outlined above, residents now recycle or compost 87% of discarded materials.

**For this necessary and overdue shift to occur here in the U.S., change needs to start at the state and local levels.** It can even start on your street, with the barrels you drag to the curb on trash day. It’s time to reduce, to reuse, to recycle—and to cement this aspirational slogan into policy.

**Please see Appendix B for additional details about national waste.**



## 6. Specific Waste Considerations for Massachusetts

An updated Massachusetts 2030 Solid Waste Master Plan has been issued, providing direction about what needs to be addressed in the state. While there has been a variety of criticisms of the plan not being aggressive enough from environmental leaders and organizations, it is what exists for benchmarks and actions needed.

<https://www.mass.gov/doc/draft-2030-solid-waste-master-plan/download>

### A. Highlights of the MA 2030 Solid Waste Master Plan

#### Overall Future Goals

- 2030: Reduce waste disposal by 1.7 million tons annually from a 2018 baseline of 5.7 million tons to 4 million tons by 2030, a 30% reduction in tons.
- 2050: Reduce waste disposal by 90% to 5.1 million tons by 2050.
- Improve the availability of household hazardous waste collection programs.

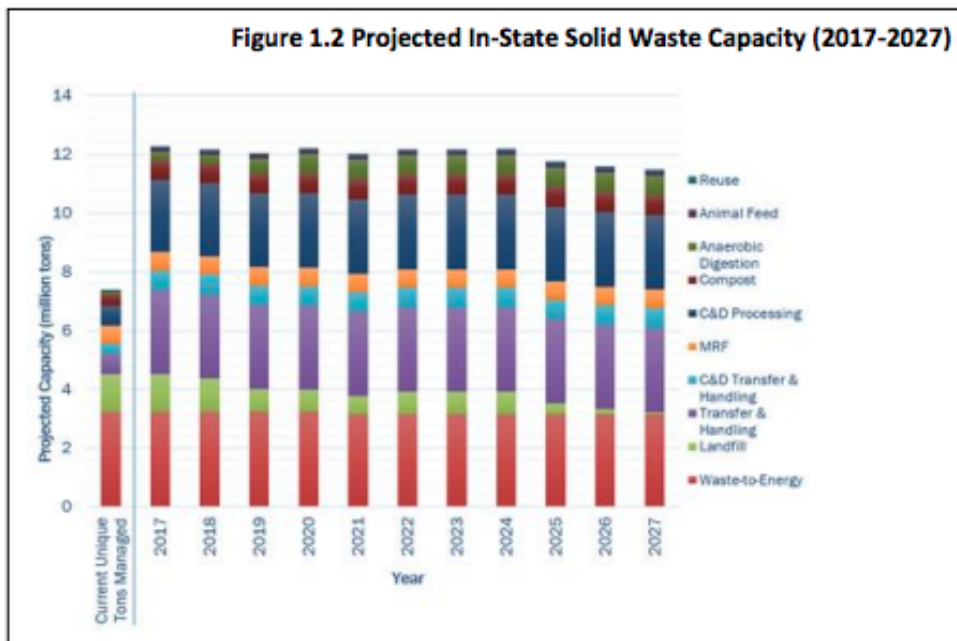
#### Waste Goals by Category

The table below lists the Master Plan goals by type of waste.

Solid Waste	Organic Waste	Construction Waste	Residential Waste	Commercial Waste
Safely and sustainably manage in-state disposal facilities and address waste management capacity challenges and shortfalls.	Reduce the disposal of food and other organic materials by an additional 500,000 tons annually by 2030, based on 2018 the baseline of 280,000 tons of food waste reduction.	Reducing disposal of construction and demolition materials by 260,000 tons by 2030, more than double the current C&D recycling tonnage.	Increase the quality of and reduce contamination in residential recycling streams and reduce the disposal of residential waste through source reduction, reuse,	Reduce the disposal of other targeted materials from businesses and institutions that aren't banned from disposals such as furniture and office equipment and reduce waste the ban failed

			recycling, and composting.	loads from 25% to 10% by 2030.
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A review of the details of this graph reveals that the capacity to accept waste is expected to continue to decline over the next 5 years. It is anticipated that this will continue into the future.



## B. Strategies to Achieve State Goals

Many of the strategies the Master Plan sets out to achieve waste reduction goals indicate support for municipal actions, including a number that Newburyport and each city should consider.

Type	Goals	Strategies
<b>Organics Waste Reduction</b>	Reduce the disposal of food and other organic materials by an additional	Medium Generators (½-1 ton): Drive increased food waste reduction to ½ ton

	500,000 tons annually by 2030, based on a 2018 baseline of 280,000 tons of food waste reduction.	<p>per week by 2022.</p> <p>Small Businesses and residents (&lt;½ ton per week): Foster further development of community and drop-off composting programs.</p> <p>Conduct a stakeholder process by 2030 on whether or not to ban all organic waste by disposal by 2050.</p>
<b>Residential Waste Reduction</b>	Increase the quality of and reduce contamination in residential recycling streams and reduce the disposal of residential waste through source reduction, reuse, recycling, and composting.	<p>Implement new bans on textiles and mattresses with grant and assistant programs.</p> <p>Implement the development of producer responsibility approaches for materials that are difficult and expensive to manage (ex: paint, electronics, and carpeting). (See Residential Waste Below For Additional Strategies).</p>
<b>Commercial Waste Reduction</b>	Reduce the disposal of other targeted materials from businesses and institutions that aren't banned from disposals such as furniture and office equipment from 25% to 10% by 2030.	<p>Complete 200 waste ban inspections including 10,000 loads of trash annually.</p> <p>Continue to utilize third-party inspection data to inform inspections and outreach.</p> <p>Implement new bans for food waste, mattresses, and textiles.</p>

<p><b>Construction and Demolition Waste Materials Reduction</b></p>	<p>Reduce disposal of construction and demolition materials by 260,000 tons by 2030, more than double the current C&amp;D recycling tonnage.</p> <p>This involves a significant shift to more recycling of such materials.</p>	<p>Work with stakeholders to implement an action plan to drive a diversion of C&amp;D materials from disposal.</p> <p>Continue the Source Separation Pilot Project Initiative to generate case studies for posting on the RecyclingWorks website.</p> <p>Promote Source Separated diversion programs such as ceiling tiles and other alternative collection systems.</p> <p>Establish minimum performance standards for waste ban compliance by C&amp;D processing facilities and transfer stations and provide financial investments.</p> <ul style="list-style-type: none"> <li>• Expand existing wood markets and foster new market alternatives.</li> </ul>
<p><b>Source Reduction/Capacity Management</b></p>	<p>Develop policies and programs that work to extend the lifespan of products through reuse manufacturing.</p>	<p>Create a strategic reduction and reuse action plan that accesses the best opportunities to expand product lifespans, identify barriers, provides data,</p>

## C. Additional Considerations - State Support Programs to Reduce Residential Waste

Listed below are the variety of different incentives and grants that Massachusetts offers to manage residential waste. These programs provide funding and payments to Massachusetts communities and organizations that are able to divert materials from ending up in landfills. The programs also offer incentives and knowledge on how to reduce waste.

### Incentives and Grants

Type	Information
Sustainable Materials Recovery Program	<u>Offers</u> funding to Massachusetts cities, towns, and organizations to divert materials from the solid waste stream through reuse, recycling, and composting programs, and to decrease the toxicity of the waste stream through household hazardous waste (HHW) diversion and use of environmentally preferred products.
Recycling Dividends Program	Provides <u>payments</u> to qualifying municipalities that have implemented specific waste reduction, reuse, and recycling programs.
Pay As You Throw Program/Save-Money-and Reduce Trash Program Funds.	Residents <u>purchase</u> pre-printed bags for disposal of trash, paying directly for the amount of solid waste they generate.
Municipal Assistance Coordinators	Provide <u>technical</u> assistance about recycling and waste management for towns and cities. Large cities often require residents to purchase special trash bags or stickers so that they pay separately for every bag of trash. Or people may have to sign up for a certain level of waste collection service, which limits how much garbage they can set out on the curb.
Recycle Smart MA Program	Raises awareness about what materials

	should and should; not be placed in a recycling bin.
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Please see Appendix C for additional details about Massachusetts waste.

## 7. Regional Current Situation and Trends

The Mass Solid Waste & Recycling Surveys for 2020 include a spreadsheet with significant detail about the volume of waste for all Massachusetts communities.

This link downloads the original Microsoft excel sheet:

<https://www.mass.gov/doc/2020-municipal-solid-waste-recycling-survey-responses/d>

This spreadsheet was based on community responses; the following communities in our area did not report information: Essex, Georgetown, Groveland, Newbury, Rowley, Salisbury, and West Newbury.

A few key data points about north shore communities that did report information:

- All of the reporting towns have enforced mandatory recycling programs and have hosted a hazardous waste collection event in 2020.
- Only Salem has dedicated mandatory recycling personnel.
- Only Marblehead and Newburyport have a compost bin distribution program.
- Gloucester and Salem have a PaySMART program.
- Only Marblehead and Newburyport report compost bin distribution programs.

This worksheet provides additional detail on the waste generated by selected communities in the North Shore:

<https://1drv.ms/x/s!Altp7v68WV6wh3QhZZJ0xD4WI0jl?e=d4Xto3>

### Waste Practices for Newburyport and Other Selected Communities

<u>Community</u>	Service/Program
Newburyport	Highlights from Worksheet

Newburyport has curbside trash pickup. The town also has a drop-off location for food waste curbside food waste pick up is available via private companies such as Black Earth Compost. Municipality buildings, schools, and business waste pickup services. Recycling is collected bi-weekly and is enforced and mandatory, carts for recycling are provided. Newburyport's solid waste program is funded by property tax, apart from curbside composting which is paid for individually by those residents who choose to participate.

### **Key Considerations from Website**

Newburyport's city services include a curbside pickup of solid waste and recyclable waste. The town's drop-off recycling facility is Colby Lane Farm. Newburyport's organic waste services include Black Earth Compost (at private cost, as noted above). A guide to composting exists on the City website:

[https://www.cityofnewburyport.com/sites/g/files/vyhlf7106/f/pages/final\\_guide\\_compost\\_for\\_a\\_healthier\\_newburyport.pdf](https://www.cityofnewburyport.com/sites/g/files/vyhlf7106/f/pages/final_guide_compost_for_a_healthier_newburyport.pdf)

### **Key Considerations from Previous Reports and Plans**

A conversation with a Black Earth Compost executive, revealed the following key considerations:

- They are a small Northshore business that provides composting services to local NBPT households and businesses plus other communities.
- participation they have recorded
- There are cost tiers based on the number of participating households in a community - he believes NBPT should be able to achieve 1000 households
- The biggest driver of participation is where a community offers participants a rebate based on the costs saved by reducing the volume of trash.

[Black Earth Compost notes - Stacey.docx - Google Docs](#)

	<p>A task team, in support of the Toward Zero Waste campaign, developed a proposal to increase participation in Composting in July 2020. It included:</p> <ul style="list-style-type: none"> <li>● A minimal cost approach for Phase One. The campaign would be managed by volunteers and any funding needed would be secured through available state grants. There would be a degree of City resource needed to update the City website with information from the awareness campaign.</li> <li>● Acknowledgement that if the program is successful and we are able to significantly increase the number of residents regularly composting residential organic waste, we believe the City could save as much as \$17,000 in annual disposal fee costs.</li> <li>● For the sake of completeness and in an effort to lay the groundwork for future success, portions of this plan reference additional actions, policies and information that should be considered as and when budgets allow in order to effectively incentivize composting in the long-term. This is the link to the complete proposal:</li> </ul> <p><a href="#">Proposal to Increase Composting 9 July 2020.docx - Google Docs</a></p>
<p><b>Amesbury</b></p>	<p><b>Highlights from Worksheet</b></p> <p>Amesbury currently has both municipal buildings and school trash and recycling services but they do not have a food waste service system. Additionally, Amesbury doesn't have a PAYT/SMART program or non-resident trash and recycling service established. The town has enforced mandatory recycling and supplies carts for recycling, which are picked up on a bi-weekly basis. Its solid waste program is funded by property tax.</p>



	<p><b>Key Considerations from Website</b></p> <p>City Services</p> <p>Recycling Services Include</p> <ul style="list-style-type: none"> <li>● Municipal Buildings Trash and Recycling Services.</li> <li>● School trash and trash recycling services.</li> <li>● Business trash and recycling services.</li> <li>● Solid waste program is funded by property tax.</li> </ul> <p><a href="http://amesburyma.gov">Recycling, Waste, and Compost   Amesbury, MA (amesburyma.gov)</a></p>
<p><b>Beverly</b></p>	<p><b>Highlights from Worksheet</b></p> <p>Beverly has a PAYT/SMART program that, together with property taxes, funds the solid waste program. Recycling is mandated and is collected weekly.</p> <p><b>Key Considerations from Website:</b></p> <p>Beverly allows dual-stream recycling, meaning glass and plastic can be recycled together, and cardboard and paper can be recycled together. Styrofoam isn't to be recycled, but events have been hosted for people to drop off styrofoam to be recycled. Curbside composting is available per enrollment. Citizens can leave one bulk item to be properly disposed of per week. Beverly encourages citizens to recycle/ donate, and is "committed to sustainability." They use JRM Hauling and Recycling and provide an FAQ page on their website that lists ways to dispose of items properly. They have a 2 32-gallon barrel limit per person for trash and have a trash fee of \$100.</p> <p><a href="http://beverlyma.gov">Trash &amp; Recycling   Beverly, MA (beverlyma.gov)</a></p>
<p><b>Gloucester</b></p>	<p><b>Highlights from Worksheet</b></p> <p>Gloucester has a PAYT/SMART waste service and enforces mandatory recycling. They have weekly curbside waste pick-up but do not provide recycling carts.</p>

	<p>Gloucester has both municipal buildings and school trash recycling services but does not have business trash or recycling service. Gloucester doesn't have a food waste service system.</p> <p><b>Key Considerations From Website</b></p> <p>Gloucester offers single-stream recycling services that are mandatory. Material such as yard waste and leaves may not be recycled but can be taken to a Compost Facility on Dogtown Road. Trash bags that are disposed of may not weigh over 50lbs. Recycling drop-off programs include a scrap metal program, an automotive recycling program, and mercury and fluorescent light bulb program. Additionally, the town participates in its own Household Hazardous Waste Day</p> <p><a href="http://gloucester-ma.gov">Trash &amp; Recycling   Gloucester, MA - Official Website (gloucester-ma.gov)</a></p>
<p><b>Haverhill</b></p>	<p><b>Highlights from Worksheet</b></p> <p>Haverhill provides a drop-off and curbside recycling service. Recycling is collected weekly. Recycling is mandated and solid waste is funded by the property tax.</p> <p><b>Key Considerations from Website:</b></p> <p>Haverhill encourages citizens to recycle/ donate. There is easy access to lists of what you can recycle and how to properly dispose of select items (charges fees for bulk items, waste oil) on their website. Haverhill partners with TREC. They host events for hazardous waste disposal and refer to third-party disposers as well. Recycle Smart's "encyclopedia" is available on their website as well. It is \$45 per year.</p> <p><a href="http://cityofhaverhill.com">Welcome to Haverhill, MA (cityofhaverhill.com)</a></p>

<p><b>Marblehead</b></p>	<p><b>Highlights from Worksheet</b></p> <p>Marblehead provides drop-off and curbside recycling services, which are collected weekly. They also have a drop-off food waste option; curbside food waste pick-up is available through private companies like Black Earth Compost. They provide non-residential trash and recycling services funded by the property tax. Their Transfer Station access fee is \$80. Recycling is mandated.</p> <p><b>Key Considerations from Website</b></p> <p><b>Marblehead's Transfer Station</b></p> <ul style="list-style-type: none"> <li>- "Materials (trash &amp; recycling) brought to the site at Woodfin Terrace are temporarily stored there until they are "transferred" to licensed locations for disposal or reprocessing."</li> <li>- Free composting</li> </ul> <p>They are connected to Recycle Smart, and have a single-stream curbside recycling system. Fees vary depending on trash or recycling service.</p> <p><a href="#">Recycling   Marblehead MA</a></p>
<p><b>Newbury</b></p>	<p><b>Worksheet-Did not report</b></p> <p><b>Key Considerations from Website</b></p> <p>Newbury has entered into a partnership with G.Mello Disposal Corp. to manage the town's transfer station. The town's residential pickup is set to be changed to a Pay-As-You-Throw program.</p> <p><a href="#">Newbury Transfer Station   G Mello Disposal Corp.</a></p>
<p><b>Salem</b></p>	<p><b>Highlights from Worksheet</b></p> <p>Salem's solid waste program is funded by a combination of PAYT/SMART revenue, property tax, and an annual fee. Salem provides curbside trash and recycling services</p>

	<p>which are collected bi-weekly. Their food waste service type is a drop-off system. Recycling is mandatory.</p> <p><b>Key Considerations from Website</b></p> <p>Salem has a <b>Greensalem site</b></p> <ul style="list-style-type: none"> <li>- Single-stream curbside recycling</li> <li>- Curbside compost</li> <li>- Waste reduction</li> <li>- Plastic bag-free</li> </ul> <p>Their Terracycle System aids in recycling typically non-recyclable things.</p> <p>The trash fee is \$20 per month.</p> <p><a href="#">Recycling and Trash   City of Salem MA</a></p>
<b>Salisbury</b>	<p><b>Worksheet - Did not report</b></p> <p><b>Key Considerations From Website</b></p> <p>Residents are responsible for the <u>removal</u> of trash and recycling at their own expense. Drop off recycling for residents cost \$25 per pass. The drop-off location is located at Old Country Road (off RT1-A) and Recycles yard waste (leaves, grass, brush, etc) and Christmas trees. The town of Salisbury includes a Hazardous Waste Collection Day. Some approved Waste Management Haulers include Wolpert Disposal: 99B Lafayette Road who offers to <u>recycle</u> for \$36/Quarter and residential curbside pickup for \$90.</p> <p><a href="#">Trash &amp; Recycling   Salisbury MA</a></p>
<b>West Newbury</b>	<b>Worksheet - Did not report</b>

	<p><b>Key Considerations from Website</b></p> <ul style="list-style-type: none"> <li>● Holds a hazardous waste collection day.</li> <li>● One 65-gallon wheeled cart for trash and one 65-gallon cart for recycling will be provided to each household free of charge.</li> <li>● Doesn't have a PAY/SMART program.</li> <li>● Automated curbside waste pickup reduces operating costs, increases rates of recycling, and reduces rates of injuries among employees.</li> </ul> <p><a href="http://www.wnewbury.org">Trash and Recycling   Town of West Newbury MA (wnewbury.org)</a></p>
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## **8. Recommendations for Addressing Waste Reduction**

There are a variety of ways to reduce waste. One category that has increasing focus is an organic waste given its negative impacts as noted below:

- Composting of Organic Waste
  - Require composting (organic waste) disposal for all businesses, city offices, apartment complexes, and institutions as well as residents.
  - Provide compost containers to all residents and provide the pickup of organic waste along with the pickup of trash as a city service, similar to Hamilton.
  - Reasons for keeping food waste out of landfills
    - In Massachusetts, a waste ban on commercial organic materials went into effect on October 1, 2014, and applies to all businesses and institutions disposing of one ton or more of food waste per week. A new state waste law will reduce this to a ½ ton threshold. This could include larger apartment complexes.
    - A major reason for keeping food waste out of the landfill is that food waste generates methane, a potent greenhouse gas, making landfills the third-largest source of climate-damaging emissions in the United States.! There is also a legal justification because, in Massachusetts, a waste ban on commercial organic materials

went into effect on October 1, 2014, and applies to all businesses and institutions disposing of one ton or more of food waste per week

- A new state waste law will reduce this to a ½ ton threshold. This could include larger apartment complexes and businesses in each community. If we think about it, in effect, a city could be considered an institution because we collectively generate many tons of food
- Addressing Solid Waste (non-organic, non-recyclable)
  - Re-evaluate and establish a PAYT Program (pay as you throw) in which trash excess over a limit is paid for by the bag (special PAYT bags). Trash that fits in the standard cart is still picked up free curbside.
  - Decrease trash curbside pickup weekly to biweekly.
  - Standardize waste cart sizes for all residents - standard cart size makes for easier pickup by trucks.
  - Consider reducing cart size to 64/65G or 32/34G
- Develop and provide educational programs and materials to present the realities of why changes are needed.
- Consider methods to measure present waste disposal, generation by type, and user category so progress can be monitored and reported on.

## **9. Options or Alternatives to Address Unsustainable Practices**

University and College Practices often lead to changes in waste as it is viewed from all perspectives - health, safety, economics, and environmental.

**See Appendix D for additional details about options to consider**

## **10. Worksheet for Setting Goals and Strategies for A Community**

The following worksheet has been developed for a community to capture their specific goals and strategies with consideration for the established State Goals and Strategies. The worksheet is intended to begin the process that will eventually lead to the development of an overall waste management plan of action.

Threshold questions a community may want to consider include: Do you have a current or previous waste management plan?

- If so, what goals have you already set and how are you progressing against those goals?
- Is your community designated as a “green” city/town? What practices and policies currently in place support this designation? What practices, policies or existing circumstances are at odds with this designation?
- What is the makeup of your waste by type? e.g. solid waste %, recyclable waste %, organic waste %, etc
- What is the volume of waste by source - residential, private commercial, public facilities?
- What has been the rate of increase/decrease in the volume of waste over the past 5 years?
- What are the projections for an increase/decrease in volume for the next 5 years if you did not make any change to current waste management practices?
- By what percentage have waste management costs increased/decreased over the past 5 years?
- What is the projected cost for waste management for the next 5 years?
- What percentage of the overall city budget is made up of waste management costs today? On future projections?
- What changes have been made to waste management policy and practices in the past 5 years and what has been the impact?
- Where are the greatest opportunities for waste reduction by volume and cost?
- What waste management proposals were considered and decided against in recent years? Which, if any, should be reconsidered?

<b>MA State Goals/Strategies</b>	<b>Community Goals/Strategies</b>
<b>1A. ) OVERALL 2030: Reduce waste disposal by 1.7 million tons annually from a 2018 baseline of 5.7 million tons to 4 million tons by 2030, a 30% reduction in tons.</b>	<b>[Community's overall goal for 2030]</b>
<b>1B.) OVERALL 2050: Reduce waste disposal by 90% to 10.1 million tons by 2050.</b>	

1.) Implement new bans on textiles and matrices with grant and assistant programs. Implement the development of producer responsibility approaches for materials that are difficult and expensive to manage (ex: paint, electronics, and carpeting).

1.) Complete 200 waste ban inspections including 10,000 loads of trash annually. Continue to utilize third-party inspection data to inform inspections and outreach. Implement new bans for food waste, mattresses, and textiles.

2.) ORGANIC WASTE: Reduce the disposal of food and other organic materials by an additional 500,000 tons annually by 2030, based on a 2018 baseline of 280,000 tons of food waste reduction.

2.) Medium Generators (½-1 ton): Drive increased food waste reduction to ½ ton per week by 2022.

2) Small Businesses and residents (<½ ton per week): Foster further development of community and drop-off composting programs. Conduct a stakeholder process about organic waste by disposal by 2030.

**3.) CONSTRUCTION & DEMOLITION WASTE: Reduce disposal of construction and demolition materials by 260,000 tons by 2030, more than double current C&D recycling tonnage.**

3.) Work with stakeholders to implement an action plan to increase construction and demolition diversion.

3.) Continue the Source Separation Pilot Project Initiative to generate case studies for posting on the RecyclingWorks website.



3.) Promote Source Separated diversion programs such as ceiling tiles and other alternative collection systems.

3.) Establish minimum performance standards for waste ban compliance by C&D processing facilities and transfer stations and provide financial investments.

3.) Expand existing wood markets and foster new market alternatives.

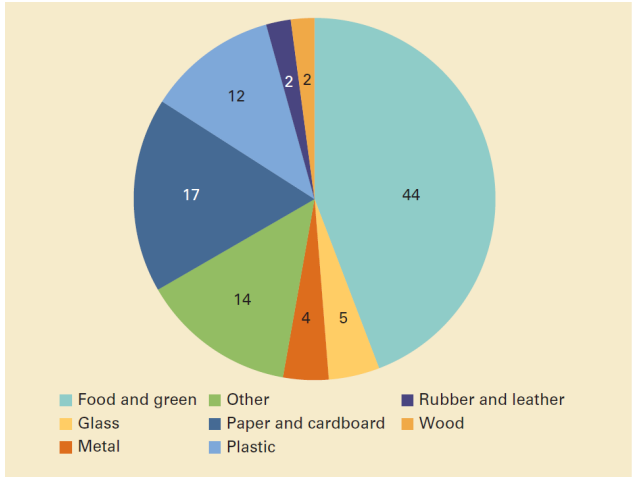
**4.) STATE GOAL: -SOURCE REDUCTION/CAPACITY MANAGEMENT: Develop policies and programs that work to extend the lifespan of products through reuse and manufacturing.**

SR/CM STRATEGIES: Create a strategic reduction and reuse action plan that accesses the best opportunities to expand product lifespans, identify barriers, provide data,

## 11. APPENDICES

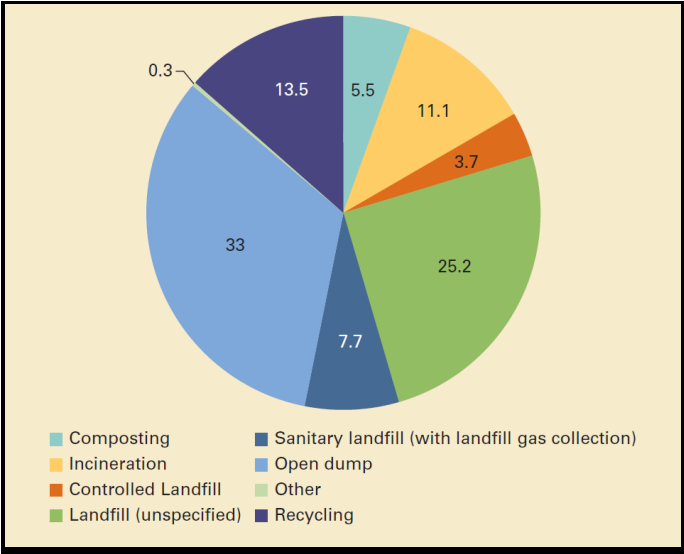
### APPENDIX A. Global Waste Information

**Global Waste Composition Description (below):** The waste category of food and green (44%), paper and cardboard(17%), and plastic (12%), make up nearly 73% of all waste (measured by weight) types disposed of globally.



**Global Treatment and Disposal of Waste Description (below):** The processes of open dumping (33%), landfills (25.2%), and recycling (13.5%) make up 71.7% of the total global ways waste is being disposed of globally.

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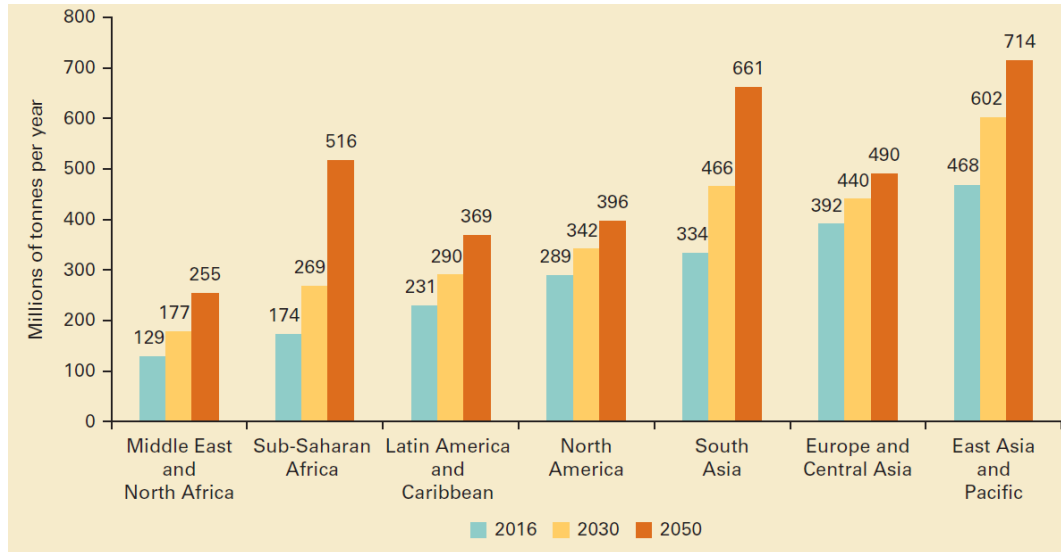
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## World's Major Sources of Waste

Source	Typical waste generators	Types of solid wastes
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g., bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes.).
Industrial	Light and heavy manufacturing, fabrication, construction sites, power and chemical plants.	Housekeeping wastes, packaging, food wastes, construction and demolition materials, hazardous wastes, ashes, special wastes.
Commercial	Stores, hotels, restaurants, markets, office buildings, etc.	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes.
Institutional	Schools, hospitals, prisons, government centers.	Same as commercial.
Construction and demolition	New construction sites, road repair, renovation sites, demolition of buildings	Wood, steel, concrete, dirt, etc.
Municipal services	Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants.	Street sweepings; landscape and tree trimmings; general wastes from parks, beaches, and other recreational areas; sludge.
Process (manufacturing, etc.)	Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing.	Industrial process wastes, scrap materials, off-specification products, slay, tailings.
Agriculture	Crops, orchards, vineyards, dairies, feedlots, farms.	Spoiled food wastes, agricultural wastes, hazardous wastes (e.g., pesticides).

## **The Future - Projected waste generation, by region (millions of tons/year)**

**Description (below):** While North America sees a lower rate of increasing waste going forward, the planet is being overburdened. East Asia and Pacific regions are expected to produce the most waste globally within the scope of 23% while the Middle East and North Africa have the least generated amount at 6%. The fastest-growing waste-producing regions are currently Sub-Saharan Africa, South Asia, and the Middle East, and North Africa, where waste production is expected to triple in these regions by 2050.



### Link Between Income and Waste Production:

Higher and upper-middle-class countries rely on controlled landfills or more stringently operated facilities for their treatment/disposal of waste while lower-income countries utilize open dumping as their primary source of waste management.

## Specific Dangers/Effects of Waste Materials

### Hazardous Waste

Overview: **Hazardous** waste is defined as waste that possesses substantial or potential threats to public health and/or the environment because it is toxic, infectious, radioactive, or flammable. It is calculated that 13 tons of hazardous waste is produced every second globally. In just one generation, the production of man-made chemicals has increased by 40,000% from 1 million to 400 million tons. Research has shown that up to 700 man-made chemicals have been found in humans that are not supposed to be there.

### Major Types:

Type	Found In	Dangers/Effects
Chemical Manufacturing	DDT and PCBs,	
Medical Waste	Pathological waste, human blood, and blood products,	Though 85% of the <u>waste</u> health care facilities

	contaminated sharps, isolation waste, infectious agents.	generate is considered non- hazardous, regulations such as The Resource Conservation and Recovery Act is established to make sure that medical waste is properly disposed of in the right containers and taken away by the right vendors.
<b>Electronic Waste</b>	Tv, computer monitors, printers, scanners, cables, circuit boards, etc.	Electronics contain materials such as lead, mercury, arsenic, and cadmium, substances that can cause neurological damage.
<b>Agricultural Products(fertilizers and pesticides)</b>	<u>Carbamate</u> , Organophosphate, Organochlorine Insecticide, Pyrethroid, Sulfonylurea Herbicides, Biopesticide, Organophosphate	Pesticides have been linked to the increased death rates of bees, bats, and frogs. More concerningly, certain chemicals such as the weed killer atrazine have been shown to cause mutations in animals such as turning <u>male tadpoles</u> into females. Fertilizers runoff created from storms and wind causes a runoff of fertilizers that enters aquatic systems and creates an excessive amount of <u>algae blooms</u> from the components of nitrogen and phosphorus found in fertilizers.
<b>Mining of Steel and Gold</b>	<u>Chemicals Used To Extract Materials:</u> Cyanide, cadmium, lead, arsenic, selenium, mercury, PCBs, PHAHs	<b>Gold:</b> Every 4 seconds, gold mining produces the weight of the Eiffel Tower in waste. Cyanide used to extract gold is a very toxic chemical that mines use

		<p>several tons of to extract gold and destroy the land.</p> <p><b>Steel:</b> Steel production produces 145 billion tons of wastewater annually.</p>
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## Effects Of Hazardous Waste On Health

**Plastic: Overview:** It is estimated that one garbage truck of [plastic](#) is dumped into our oceans every single minute. By 2050, not only is it estimated to be two garbage trucks filled with trash estimated to be dumped into the oceans every minute but our oceans are estimated to be filled with more trash than fish. Research has been done on plastic ingestion for 555 species of marine and estuary fish. [Results](#) have found that out of the fish population 386 species or nearly two-thirds have ingested plastic.

BPA (Bisphenol A):

-A major chemical used to create plastics.

-Heat, repeated washing, acidity, and alkalinity cause the BPA in plastics to leach into our food and beverages. We further can ingest groundwater from the BPA that contaminates groundwater from all of the plastic sitting in landfills and the BPA within the fish we eat that has previously ingested all of the plastic floating around in the ocean.

-The manufacturing of plastic also produces toxic chemicals many of which are carcinogenic or neurotoxic such as vinyl chloride, from PVC; dioxins and benzene, from polystyrene; and formaldehyde, from polycarbonates.

### **Types Of Plastic**

<b><u>Types</u> Of Plastic</b>	<b>Found In</b>	<b>Safety Level</b>
<b>HDPE (High-Density Polyethylene)</b>	Milk and juice boxes, detergent bottles, shampoo bottles, grocery bags, and cereal box liners.	Considered safe but has been shown to leach estrogenic chemicals.
<b>PET(polyethylene terephthalate):</b>	Commercially sold water bottles, soft drink bottles, sports drink bottles, and condiment bottles (like ketchup).	While it is generally considered a "safe" plastic and does not contain BPA, in the presence of heat it can leach antimony, a toxic metalloid, into food and beverages, which can cause vomiting, diarrhea, and stomach ulcers.
<b>PVC: polyvinyl chloride</b>	Plumbing pipes, clear food packaging, shrink wrap, plastic children's toys, tablecloths, vinyl flooring, children's play mats, and blister packs (such as for medicines).	Contains a phthalate called DEHP, which can cause male traits to <u>become more feminized</u> .

<b>LDPE: low-density polyethylene</b>	Dry cleaning bags, bread bags, newspaper bags, produce bags, and garbage bags, as well as "paper" milk cartons and hot/cold beverage cups.	Does not contain BPA, but as with most plastics, it can leach estrogenic chemicals.
<b>PP: polypropylene</b>	Yogurt containers, deli food containers, and winter clothing insulation.	Has a high heat tolerance and as such, does not seem to leach many of the chemicals other plastics do.
<b>PS: polystyrene</b>	Known as Styrofoam, is used for cups, plates, take-out containers, supermarket meat trays, and packing peanuts.	Can leach styrene, a suspected carcinogen, especially in the presence of heat (which makes hot coffee in a Styrofoam container an unwise choice).
<b>Outgassing</b>	is Defined as the release of trapped gas or vapor. In products that contain plastic, volatile organic compounds (VOCs) are evaporating into the air around us. These VOCs include aldehydes, alcohols, plasticizers, and alkanes.	<u>Short Term Symptoms:</u> dizziness, nausea, allergies, skin/eye/nose/throat irritations, and asthma.  <u>Long Term Symptoms:</u> Cancer and heart disease

## **Recent News and Challenges**

**GENEVA Conference:**

<https://www.aces-alliance.org/>

P.O. Box 281, Newburyport, MA 01950

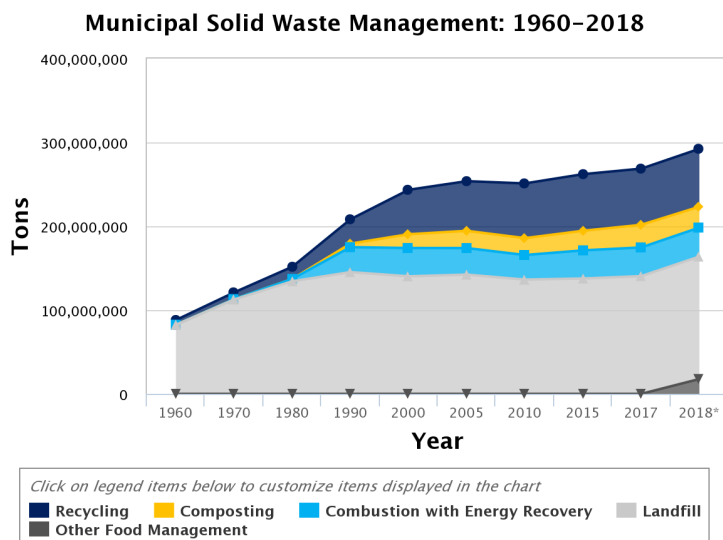


GENEVA(AP) an international conference has taken steps to draw up an agreement that will act to curb plastic pollution and marine litter around the world. The draft of the resolution was presented by Peru and Rwanda and backed by the European Union at the two-day GENEVA conference on September 1-2, 2021 which aims to set up a committee to negotiate the language of a possible accord and is expected to be considered at a U.N Environmental Assembly meeting in February. The agreement could build legislation among more than 120 countries that will aim to restrict or ban single-use plastics. However, some countries are deemed hesitant upon agreeing to the legislation such as Japan prefers a voluntary solution to waste management, and the U.S has resisted calls for a ban on single-use plastics.

## **APPENDIX B - SIGNIFICANT WASTE CONSIDERATIONS - the USA and NORTH AMERICA**

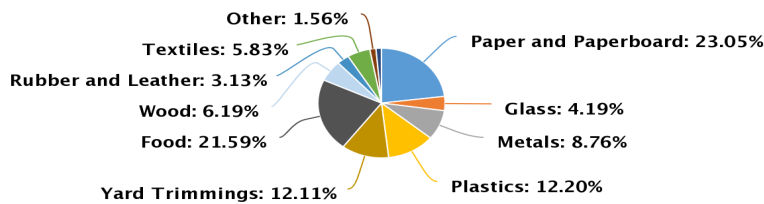
The total generation of solid waste nationally (MSW) in 2018 was 292.4 million tons (U.S. short tons, unless specified) or 4.9 pounds per person per day (together with being 32.2% of the total recycling rates). Of the MSW generated, approximately 69 million tons were recycled and 25 million tons were composted. Additionally, 35 million tons of MSW was combusted with energy recovery(11.8%) while 146 million tons were sent to landfills (50%).

**Municipal Solid Waste details (below):** Composting rose from 2017 to 2018 mainly because EPA enhanced its food measurement methodology to more fully account for all the ways wasted food is managed throughout the food system.



**Total Municipal Waste Generated By Material (Below):** Paper and paperboard currently make up the largest amount of MSW produced at 23.05% of the total waste generation. The generation of food and paper products declined from 87.7 million tons in 2000 to 67.4 million tons in 2018. Food waste encompasses the second largest material category estimated at 63.1 million tons or 21.59% of the total generation in 2018. Yard trimmings make up the third-largest waste production category at 35.4 million tons or 12.1% of the total waste generation.

**Total MSW Generated by Material, 2018**  
292.4 million tons



**\*For more on paper and paperboard waste generation, see Recycling header below**

**\*For more on waste trimming or food waste generation, see Composting or Other Management Methods header below**

## **Recent National Waste Challenges:**

### ***Illinois governor vetoes PFAS incineration ban bill over language concerns***

PFAS (per- and polyfluoroalkyl substances) is a Chemical found in commercial household products(ex: kitchenware, dental floss, cleaning products), workplace utilities (ex: firefighting foam, non-stick products,) have been linked to cause damage to the immune system resulting to diseases like cancer and reduce antibodies reaction to vaccines. When material containing PFAS is disposed of through incineration, the chemicals are likely to escape through air emission and sicken nearby communities. As of August 27, 2021, Illinois governor J.B. Pritzker has vetoed a bill meant to prevent the incineration of PFAS, saying in a letter that the bill's definition of "incineration" was overly broad and would unintentionally prohibit companies from using other types of pollution control devices such as thermal oxidation and inadvertently increase air

pollutants. The Sierra Club and other supporters of the HB390 bill have discussed how stakeholders and lawmakers are working on changes to the legislation that they will reintroduce in the fall.

### ***Raven SR's Inc Announce Its First Waste To Hydrogen Hub***

Republic Services have recently announced its agreement with [Raven SR](#) to process up to 99.9 tons of organic waste per day at the West Contra Costa Sanitary Landfill in Richmond, California, and create up to 20,000 metric tons per year of green hydrogen. Raven plans to sell the hydrogen to commercial fueling stations and to the zero-truck manufacturer Hyzon to create a negative-carbon intensity under the state's low-carbon fuel standard. The site is set to open by the summer of 2022. This agreement is set to aid in California's implementation of SB1338 which has the goal of 75% reduction in organic waste disposal by 2025.

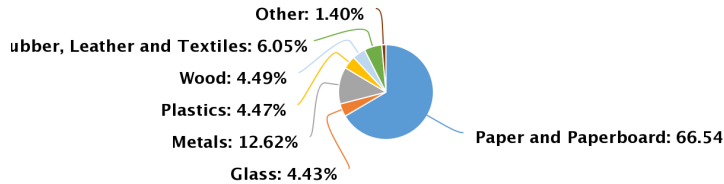
**Organizational Considerations** - City public works directors or heads of sanitation agencies have been forced to adapt their roles and operations over the past two years. It's a sign of the times for a job involving essential public services and frontline workers during the pandemic and is also due to the growing adoption of new systems, technology, and social media to engage residents. (Waste Dive)

## **Alternative Positive Treatments Of Waste**

### **Recycling**

**Below:** Out of 69.1 million tons of the total waste generated nationally in 2018, 66.4% or 45 million tons came from paper and paperboard materials. Metals comprised about 13.1% or 8 million tons while glass, plastic, and wood made up around 4 to 5% or 3 million tons. Specifically, the most recycled products in 2018 were corrugated boxes(32.1 million tons), mixed non-durable paper products(8.8 million tons), major appliances(3.1 million tons), wood packaging (3.1 million tons), glass containers (3 million tons), tires (2.6 million tons), mixed paper containers and packaging (1.8 million tons) and selected consumer electronics (1 million tons).

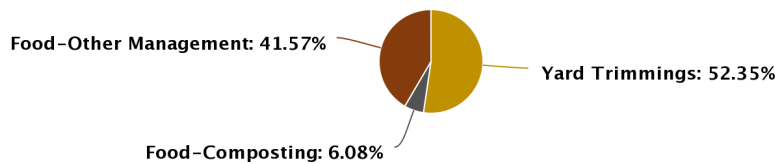
**Total MSW Recycling by Material, 2018**  
69.1 million tons



**Composting or Other Management Method**

**Below:** A total of 25 million tons of waste was composted in 2018. Out of this amount, 52.35% or 22.3 million tons came from yard trimmings, 41.57% or 17.7 million tons from food-other management (animal feed, co-digestion/anaerobic digestion, bio-based materials/biochemical processing, donation, land application, and sewer/wastewater treatment), and 6.08% coming or 2.5 million tons coming from food-composting. The amount of yard trimmings composted within 2018 was set to have a five-fold increase from 1990 when only 4.2 million tons were composted.

**Total MSW Composting and Other Food Management by Material, 2018**  
42.6 million tons



**Diverting Food Waste From Disposal:**

The commercial organics waste ban requires that those who produce one ton or more of food waste per week be diverted that waste from disposal. A way that food waste can be diverted from disposal is to have the

## **APPENDIX C: Significant Waste Considerations-Massachusetts**

### **Solid Waste**

#### **Sub-Category: Commercial Waste Reduction:**

Materials that are considered a form of solid waste include Food material, cardboard, furniture, and other bulky materials. Currently, it is estimated that 1 out of 4 of every trash that mass dep observes at solid waste committees contains significant amounts of materials that are banned from disposal. As stated within in the permits of 16.04 (2)(i), 16.04(3)(a)(10) & 16.05(4)(w), waste disposal facilities must report by next business day any occurrence that causes the operation to change conditions for accepting materials for any emergency condition(s) that will impact the operation, its pollution control(s), or acceptance of incoming waste loads.

### **Construction Waste**

Materials that are considered construction waste include: Wood, cardboard, gypsum, carpet. It's noted how the MassDEP implemented disposal bands on construction materials such as Asphalt Pavement, Brick and Concrete, Wood, Metal, and Clean Gypsum Wallboard. Additionally, since 2017, MassDEP has awarded \$750,000 in grants to six facilities to purchase and install equipment to recover more wood for recycling. Some of the organizations that help manage construction waste include Boston Building Resources (Roxbury MA), EcoBuilding Bargains (Springfield MA), and Restores (Located around the state).

### **Textile Waste**

Currently, 230,000 tons of textiles are disposed of annually by residents and businesses. 95% of textile materials that are thrown out could be reused or recycled. It is estimated that 45% of donated textiles are sold as second-hand apparel either through charitable organizations or for-profit exporters that sell baled clothing to developing countries. Some of the organizations that help to manage textile waste include ERC Wiping Products (Lynn MA), Millbury Textile Recycling (Millbury MA), and Project Repat (Boston). Organizations to donate one's used textiles include SMART

(Secondary Materials and Recycled Textiles), Council for Textile Recycling, and Recycling Works (MA).

## **Additional Considerations for Organic Waste**

**Barriers To Achieving the Mass DEP’s Organic Action Plan Goals as noted in the earlier 2012 Plan are below as they continue to be relevant:**

Type Of Barrier	Challenges	Actions Taken and Ongoing
Data Analysis	Lack of information on organics generations and disposals.	-Conducted studies that detail major generators of food waste. -Access food waste generation data. -Prepare updated assessment of economic benefits, job growth, and investment before and after implementation of the waste ban.
Reducing Waste and Donate Food	Missing opportunities to reduce food waste and donate food.	-Promote waste reduction strategies at school through the Massachusetts Green Team Program.  -Create best management practices through food donations while talking to stakeholders.
Collection Infrastructure	Lack of collection and separation systems within generators.  Insufficient collection services	-Establish technical assistance and grant programs to divert food waste from public colleges/universities, hospitals, and corrections/DHS.

		-Work with regional groups to develop small generator collection groups.
Processing Capacity/Market Development	<p>A need for more entities to accept organics for processing.</p> <p>The need for the development of higher value compost products and uses that increase revenue for processors to drive down overall systems costs.</p>	<p>-Develop anaerobic digestion facilities on state property.</p> <p>-Work with the agricultural sector to introduce additional markets for compost.</p>

## **Hazardous and Toxic Waste**

### **Regulations:**

#### **C-10 CMR 30:**

- Regulation document created to regulate the generation, storage, collection, transport, treatment, disposal, use, reuse, or recycling of hazardous waste in Massachusetts.

#### **Hazardous Waste Generators at Laboratories:**

Optional alternative set of regulations allows Eligible Academic Entities the flexibility to make their own hazardous waste determinations in the laboratory on an on-site treatment, storage, or disposal facility.

- Provides incentives for Eligible Academic Entities to clean out old and expired chemicals that may pose an unnecessary risk, and requires a Laboratory Management Plan (LMP) which is intended to result in safer laboratory practices and increased awareness of hazardous waste management.

#### **Mass DEP Toxics Use Reduction Program**

- Requires Mass companies that use large quantities of specific toxic chemicals to evaluate their operations, plan for pollution prevention, and report on the results each year.

#### **EPA Hazardous Waste ID:**

- Before generating, accumulating, or shipping any toxic waste, you must obtain an ID number.

- If failed to obtain an ID number, you could be fined up to \$1000 per day for generating hazardous waste and waste oil without a valid ID and an additional \$1000 for not providing a valid ID.

Hazardous Waste Facilities Licensed To Treat and Store Hazardous Waste:

**Central and Northeast Mass**

- Safety Kleen Systems Inc (Marlborough, West Brookfield, and Salisbury).
- Murphy's Waste Oil Storage Inc (Woburn).

**Southeast and Western Mass**

- Clean Harbors Of Braintree Inc(Braintree)
- General Electric Company (Pittsfield)

**APPENDIX D: Options to Consider by Communities Seeking more Sustainable Practices in Developing Waste Plans**

**Colleges and Universities - leaders in adopting sustainable practices**

Recycling Cardboard and Paper:

- Material specifications of recycling cardboard only, cardboard mixed with paper, or single-stream (cardboard, papers, or containers.)
- Colleges and universities often save money on disposal fees when collecting cardboard separately.

Diverting Food Waste From Disposal:

- Commercial Organics Waste Ban: Requires businesses and institutions that generate one ton or more of food waste per week to divert that waste from disposal.
- Collecting scraps from prep stations using designated and frequently-emptied containers helps to reduce contamination and prevent pests and odors.
- In self-service cafes and dining facilities, or locations where patrons dispose of their own waste, offering consumers separate receptacles for solid organic waste, liquid waste (such as leftover soft drinks), recyclables (such as cans and bottles), and trash (such as plastic straws or wrappers) helps empower them to become part of the solution to wasted food.



- Track wasted food and make adjustments in their foodservice operations.

#### Diverting Construction and Demolition Waste:

- Make sure the hauler transfers CA and materials that are collected in a mixed dumpster to a permitted C&D processing facility.
- Consider staggering separate collection containers for certain material types that are difficult to manage at C&D processing facilities.

#### Restaurants:

- Estimated that 4-10% of food is wasted before even reaching the table for customers.
- Less than 30% of restaurants recycle bottles: including glass, plastic, and metal/aluminum containers.

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