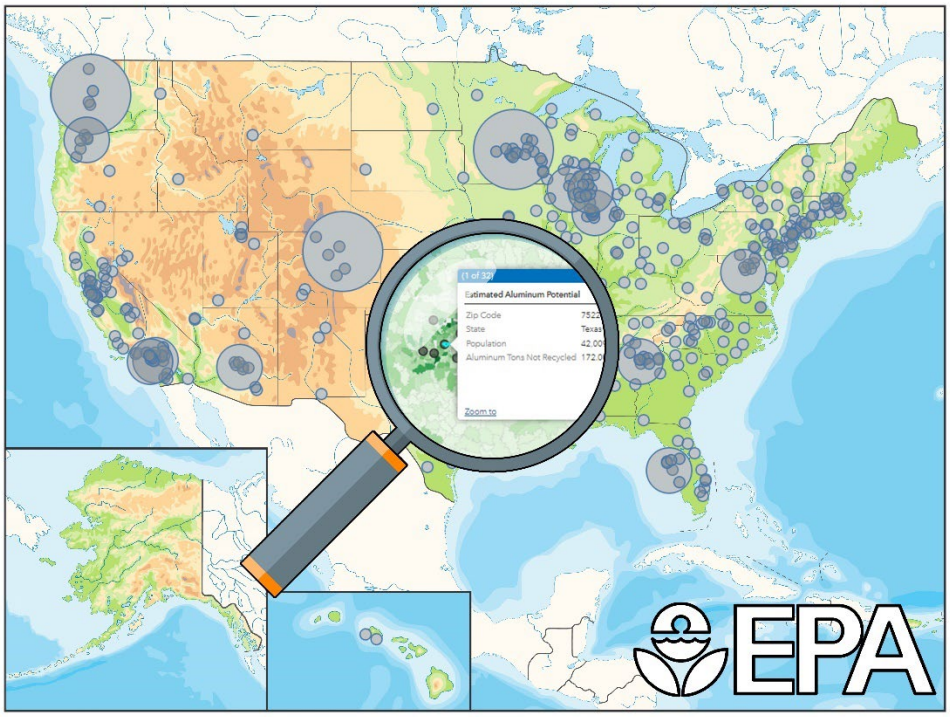
Recycling Infrastructure and Market Opportunities Map: Technical Methodology



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Recycling Infrastructure and Market Opportunities Map: Technical Methodology

Office of Land and Emergency Management

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The contract team was led by Rachel Mak and Cynthia Manson of Industrial Economics, Inc. The map application development was led by Emily Evenden of Industrial Economics, Inc, who was assisted by Kalena Wang and Cole Kroninger, also of Industrial Economics, Inc. Many organizations provided information during the planning phase of this project including the Container Recycling Institute, Environmental Research and Education Foundation, Northeast Recycling Council, Solid Waste Association of North America, Southeast Recycling Development Council, and the Environmental Protection Agency's (EPA) WasteWise Program.

Notice

These data are shared by EPA as an interactive web map application solely as general information on recycling infrastructure and potential market opportunities. Please check sources, scale, accuracy, currentness, and other available information. Mention of trade names or commercial products does not constitute endorsement or recommendation by EPA for use.

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List of Abbreviations, Acronyms, and Initialisms

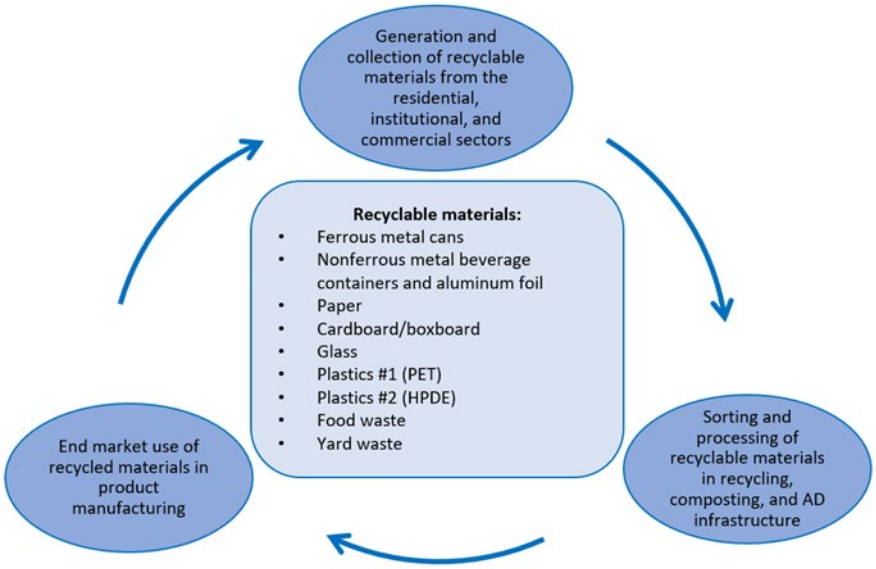
EPA	Environmental Protection Agency
DDRT	Disaster Debris Recovery Tool
GIS	Geographic Information System
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
NAICS	North American Industry Classification System
SMP	State Measurement Program

1. Introduction

The Environmental Protection Agency (EPA) developed the Recycling Infrastructure and Market Opportunities Map to support the National Recycling Goal, National Recycling Strategy, and the Infrastructure Investment and Jobs Act. Before the release of this map, the national recycling sector lacked an accessible, comprehensive resource for understanding opportunities related to material recovery. While several data visualization tools exist within the recycling industry, they are primarily tailored to discrete regions or product sectors and provide limited use for understanding the overall national recycling sector. EPA's Recycling Infrastructure and Market Opportunities Map uncovers opportunities for recycling infrastructure investment and recycling market development by visually presenting data estimates from all phases of the recycling process, including generation, collection, sortation, and end use.

The map can be used to identify infrastructure gaps, facilitate a needs analysis for state or local governments, better understand where funding should be allocated to enhance recycling markets, and connect manufacturers with sources of recycled materials. EPA envisions many types of map users for a variety of purposes, such as cities that seek to visualize the distribution of available recycled material generated by geographic region to inform infrastructure development and expansion sites, rural governments developing or expanding hub-and-spoke collections systems for economies of scale, or circular economy entrepreneurs identifying recycled material feedstocks. This mapping tool could also serve as a useful first step in understanding potential opportunities for building end market product manufacturing facilities in places close to areas of high material generation and recovery (e.g., determining if a glass bottle manufacturing facility should be built in Vermont versus Texas).

Exhibit 1: Scope of Materials, Generators, and End Markets in the Recycling Infrastructure and Market Opportunities Map



The map identifies and displays information on:

- Recycling Infrastructure: locations of material recovery facilities (MRFs), anaerobic digesters, composting facilities and material specific recycling facilities for electronics, glass metals, paper, plastic, textiles, and wood;
- Material Generation and Recycling: estimated generation, recycling, and recycling potential by ZIP code and select materials including aluminum, steel cans, paper, cardboard/boxboard, electronics, food, glass, HDPE bottles, paper, PET bottles, PET other rigid, PP, rigids #3 to #7, textiles, tires, wood, and yard trimmings;
- Recycling Materials Markets: potential primary and secondary end markets for recycled materials;
- Market Factors Affecting Recycling: landfill tipping fees and bottle bill deposit prices; and
- Other Municipal Solid Waste Infrastructure (MSW): landfills and transfer stations.

The material, infrastructure, and end market layers are based on EPA's scope of MSW and focuses on infrastructure with proven, existing technologies to recycle materials at scale as well as known end markets for the recycled products at the national level. Furthermore, the map is a snapshot in time of estimated U.S. recycling quantities, infrastructure, materials markets, and supporting market factors using the most recent and best available data at the time the map was developed (2021-2022). While the data source years range from 2011 to 2021, the majority of data are from 2018-2021. Please refer to the appendix tables for the specific years of data used to create each data layer. EPA does not currently have plans to update the map on a schedule but may adjust and incorporate new data in the future. The data and methods used to develop the map, as well as to calculate estimates of generation, recycling, and recycling potential, are detailed here and in the metadata descriptions of each layer. Up to 2,000 records in the attribute table may be exported to .csv directly from the web map. Complete tabular and GIS datasets are available for direct download at each dataset's respective ArcGIS Online description page.

2. Infrastructure

This data layer provides locations of recycling and other municipal solid waste (MSW) infrastructure in the U.S. The dataset includes 15 different types of infrastructure:

- Material recovery facilities (MRFs).
- Anaerobic digesters.
- Composting facilities.
- Electronics recyclers.
- Glass recycling facilities.
- Glass secondary processors.
- Municipal solid waste landfills.
- Metals recycling facilities.
- Paper recycling facilities.
- Plastic recycling facilities.
- Textile recycling facilities.
- Tire recycling facilities.
- Transfer stations.
- Wood recycling facilities.

- Wood secondary processors.

The data provide facility name, facility address, county, phone, email, website, NAICS code, infrastructure type, and feedstock for each facility. The map relies on data from The Recycling Partnership, Closed Loop Partners, Glass Packaging Institute, and various recycling directories as detailed in Table 1 below. Data on anaerobic digesters and composting facilities were pulled from and managed by EPA's Excess Food Opportunities Map. Metals recycling facilities, tire recycling facilities, MSW landfills, and transfer stations were pulled from and managed by EPA's Disaster Debris Recovery Tool. Information on recycling facilities contained in this map does not constitute endorsement or recommendation by EPA.

View the full recycling infrastructure dataset here. Note that the dataset excludes layers that are directly pulled from EPA's Excess Food Opportunities Map and Disaster Debris Recovery Tool.

Table 1: Summary of Recycling Infrastructure Primary Data Sources

SOURCE	TYPE OF DATA	YEAR OF MOST RECENT DATA
ANAEROBIC DIGESTORS		
EPA's Excess Food Opportunities Map	Facility address, website, and feedstock accepted	2020
COMPOSTING FACILITIES		
EPA's Excess Food Opportunities Map	Facility address, website, and feedstock accepted	2018
RECYCLING FACILITIES		
MRFs: The Recycling Partnership's MRF Map	Facility latitude & longitude, website, and phone number	2021
Electronics: Responsible Recycling "R2" Standard's Map & e-Stewards' Find a Recycler Map	Facility address, phone number, email, website, services offered, and customer types	2021
Glass: Glass Recycling Coalition's Interactive Glass Recycling Map	Facility address and phone number	2017
Metals and tires: EPA's Disaster Debris Recovery Tool	Facility address, latitude & longitude, phone number, and materials recycled/recovered	2020
Paper: ENF's Recycling Directory	Facility address, phone number, website, materials recycled, and customer types	2020-2021
Plastics: Closed Loop Partners' Data Visualization Tool Identifying Opportunities to Recapture Plastic	Facility address, size category, and resins accepted	2020
Textiles: Secondary Materials and Recycled Textiles (SMART)	Facility address, phone number, email, and website	2021
Wood: Reusewood.org	Facility address, phone number, email, website, commodities accepted, and commodities produced	2021
MSW LANDFILLS		
EPA's Disaster Debris Recovery Tool	Facility address, latitude & longitude, and phone number	2020

SOURCE	TYPE OF DATA	YEAR OF MOST RECENT DATA
TRANSFER STATIONS		
EPA's Disaster Debris Recovery Tool	Facility address, latitude & longitude, and phone number	2020
SECONDARY PROCESSORS		
Glass: Glass Packaging Institute's Glass Resource Locator	Facility address, phone number, fax number, and email	2020
Wood: Reusewood.org	Facility address, phone number, email, website, commodities accepted, and commodities produced	2021

3. Estimated Material Generation, Recycling, and Potential by ZIP Code

This dataset provides estimated tons generated and recycled per U.S. ZIP code and by material. It relies on materials management reports and surveys from various states and regions, State Measurement Program (SMP) data, the Ball Corporation's 50 States of Recycling report, EPA's 2018 Wasted Food Report, and the U.S. Census Bureau's American Community Survey dataset. Data sources by material type are detailed in Table 2. See the appendix more details on specific data sources and years of data for electronics, paper, tires, textiles, wood, and yard trimmings.

Table 2: Summary of Estimated Material Generation, Recycling, and Recycling Potential Primary Data Sources

MATERIAL TYPE	DATA SOURCE	DATA SOURCES YEAR
PET Bottles	Ball Corp's The 50 States of Recycling report	2018
PET Other Rigid		
HDPE Bottles		
PP		
Rigids #3 to 7		
Cardboard/boxboard		
Glass		
Aluminum		
Steel Cans		
Electronics	State Measurement Program (SMP) and public state report review	2014 - 2020
Tires		2014 – 2020
Textiles		2013 – 2020
Wood		2012 – 2020
Yard Trimmings		2011 – 2020
Paper	Public state report review	2011 - 2020
Food	U.S. EPA's 2018 Wasted Food report	2018

Data on quantities generated and recycled at the ZIP code level would be the ideal level of granularity to understand recyling potential, but these data were not available. Instead, quantities generated and recycled by ZIP code were estimated by dividing state reported generation and

recycling quantities by the population for each state and for each material to arrive at state-specific per capita rates. Those per capita rates were then applied to the population of each ZIP code in each corresponding state. By clicking on a ZIP code on the map, the user can see the estimated tons generated and recycled per capita. Estimated recycling potential (equation shown below) for each material is the difference between estimated tons generated and estimated tons recycled. The ZIP codes with the greatest difference in generated and recycled tons have higher estimated recycling potential.

Estimated Potential tons = Estimated Generated tons minus Estimated Recycled tons

This dataset includes 16 recyclable material types:

- Aluminum.
- Cardboard.
- Electronics.
- Food Waste.
- Glass.
- High-density polyethylene (HDPE) Bottles #2.
- Polyethylene terephthalate (PET) Bottles #1.
- Polyethylene terephthalate (PET) Other Rigid #1.
- Polypropylene (PP) Containers #5.
- Rigid Plastics #3 to #7.
- Steel Cans.
- Tires.
- Paper.
- Textiles.
- Yard trimmings.
- Wood.

Note: These are large datasets and will take time to load. Users can only view one dataset at a time because they are heat maps. EPA does not recommend turning on multiple layers at once. Additionally**,** there are certain materials for which data are not available for every state. In these cases, the layer will only populate data in each ZIP code where data are available.

View the full generation maps dataset here.

4. Potential Primary and Secondary End Markets

In the market for recycled materials, there are two types of end markets: primary end markets and secondary end markets. Primary end markets are markets that directly use the end product produced from the recycling process for input in material manufacturing. Secondary end markets are markets that purchase the recycled material as further inputs in product manufacturing. For example, textile recycling facilities produce shredded textile scraps as its end product. Textile mills, which are the primary end market for recycled textile, purchase the shredded textile scraps to produce yarn, thread, and various fabrics with recycled content. Textile product manufacturers, which are the secondary end market of recycled textile, then purchase the yarn, thread, and various fabrics with recycled content to manufacture products, such as mops, curtains, and clothing.

The primary and secondary end market layers rely on data from Dunn & Bradstreet Hoovers 2021 (D&B Hoovers). To identify the industries associated with potential primary and secondary end markets, EPA relied on industry reports (e.g., IBISWorld) that define the potential primary and secondary end markets for recyclable materials. EPA identified the North American Industry Classification System (NAICS) codes for relevant industries, categorized them by material type, and compiled the list of facilities associated with those NAICS codes from D&B Hoovers. These NAICS codes for each category are detailed below. Finally, EPA pulled information from D&B Hoovers for each facility and geocoded facilities using their addresses. Data on food banks, a primary end market for food waste, are directly pulled from and managed by EPA's Excess Food Opportunities Map. The primary and secondary end markets data provide facility name, facility address, phone, website, NAICS code, NAICS description, relevant material type(s), and whether they use multiple material types.

The potential primary recycling end markets dataset provides locations of potential primary recycling end markets in the U.S. for 10 different materials: glass, food waste, paper, organics, leather, plastics, metals, rubber, textiles, and wood. Potential primary end markets are defined as industries that can potentially use recycled material directly in production. View the full potential primary recycling end markets dataset here. Note that the potential primary recycling end markets dataset excludes the food waste end markets (food banks) that are pulled directly from EPA's Excess Food Opportunities Map.

The secondary recycling end markets dataset provides locations of potential secondary recycling end markets in the U.S. for 7 different materials: glass, paper, organics, plastics, metals, textiles, and wood. Potential secondary end markets are industries that can potentially purchase and use the outputs, made with recycled content, from primary end markets. View the full potential secondary recycling end markets dataset here.

4.1 Summary of NAICS Code Categorization into the Primary and Secondary End Markets

Glass

- **Recycling Process Overview:** Post-consumer glass is collected for recycling, sorted by color and type and crushed into "cullet."[1] Glass cullet serves as the end product of the glass recycling process.
- **Primary End Market:** Glass cullet is sold to glass product manufacturers, which re-melt the glass and form it into new products with recycled content.[2] NAICS codes for primary end markets include:
    - 327211 Flat Glass Manufacturing
    - 327212 Other Pressed and Blown Glass and Glassware Manufacturing
    - 327213 Glass Container Manufacturing
- **Total Number of Primary End Market Facilities:** 2,052 facilities
- **Secondary End Market:** NAICS codes for secondary end markets include:
    - 327215 Glass Product Manufacturing Made of Purchased Glass
- **Total Number of Secondary End Market Facilities:** 1,635

[1] Glass Packaging Institute (GPI), 2022. "Glass Container Recycling Loop." https://www.gpi.org/glass-recycling-facts
[2] Roth, 2021. IBISWorld, "Recycling Facilities in the US."

Metals

- **Recycling Process Overview:** Post-consumer metals are collected for recycling, sorted by type (e.g., steel, aluminum, etc.), and crushed and compacted. The crushed and compacted metal serves as the end product of the metals recycling process.
- **Primary End Market:** Crushed and compacted metal is sold to various foundries, rolling and alloying facilities, and iron and steel mills.[3] NAICS codes for primary end markets include:
    - 331318 Other Aluminum Rolling, Drawing, and Extruding
    - 331420 Copper Rolling, Drawing, Extruding, and Alloying
    - 331491 Nonferrous Metal (except Copper and Aluminum) Rolling, Drawing, and Extruding
    - 331524 Aluminum Foundries (except Die-Casting)
    - 331529 Other Nonferrous Metal Foundries (except Die-Casting)
    - 331110 Iron and Steel Mills and Ferroalloy Manufacturing
    - 331314 Secondary Smelting and Alloying of Aluminum
    - 331492 Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)
    - 331511 Iron Foundries
    - 331512 Steel Investment Foundries
    - 331513 Steel Foundries (except Investment)
    - 331523 Nonferrous Metal Die-Casting Foundries
- **Total Number of Primary End Market Facilities:** 7,335 facilities
- **Secondary End Market:** NAICS codes for secondary end markets include:
    - 321991 Manufactured Home (Mobile Home) Manufacturing
    - 331210 Iron and Steel Pipe and Tube Manufacturing from Purchased Steel
    - 331221 Rolled Steel Shape Manufacturing
    - 331222 Steel Wire Drawing
    - 331313 Alumina Refining and Primary Aluminum Production
    - 331315 Aluminum Sheet, Plate, and Foil Manufacturing
    - 331410 Nonferrous Metal (except Aluminum) Smelting and Refining
    - 332111 Iron and Steel Forging
    - 332112 Nonferrous Forging
    - 332114 Custom Roll Forming
    - 332117 Powder Metallurgy Part Manufacturing
    - 332119 Metal Crown, Closure, and Other Metal Stamping (except Automotive)
    - 332215 Metal Kitchen Cookware, Utensil, Cutlery, and Flatware (except Precious) Manufacturing
    - 332216 Saw Blade and Handtool Manufacturing
    - 332311 Prefabricated Metal Building and Component Manufacturing
    - 332312 Fabricated Structural Metal Manufacturing

[3] Roth, 2020. IBISWorld, "Recyclable Material Wholesaling the US."

  - 332313 Plate Work Manufacturing
  - 332321 Metal Window and Door Manufacturing
  - 332322 Sheet Metal Work Manufacturing
  - 332323 Ornamental and Architectural Metal Work Manufacturing
  - 332410 Power Boiler and Heat Exchanger Manufacturing
  - 332420 Metal Tank (Heavy Gauge) Manufacturing
  - 332431 Metal Can Manufacturing
  - 332439 Other Metal Container Manufacturing
  - 332510 Hardware Manufacturing
  - 332613 Spring Manufacturing
  - 332618 Other Fabricated Wire Product Manufacturing
  - 332722 Bolt, Nut, Screw, Rivet, and Washer Manufacturing
  - 332811 Metal Heat Treating
  - 332812 Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers
  - 332813 Electroplating, Plating, Polishing, Anodizing, and Coloring
  - 332911 Industrial Valve Manufacturing
  - 332912 Fluid Power Valve and Hose Fitting Manufacturing
  - 332913 Plumbing Fixture Fitting and Trim Manufacturing
  - 332919 Other Metal Valve and Pipe Fitting Manufacturing
  - 332991 Ball and Roller Bearing Manufacturing
  - 332992 Small Arms Ammunition Manufacturing
  - 332993 Ammunition (except Small Arms) Manufacturing
  - 332994 Small Arms, Ordnance, and Ordnance Accessories Manufacturing
  - 332996 Fabricated Pipe and Pipe Fitting Manufacturing
  - 332999 All Other Miscellaneous Fabricated Metal Product Manufacturing
  - 337124 Metal Household Furniture Manufacturing
  - 337214 Office Furniture (except Wood) Manufacturing
  - 337215 Showcase, Partition, Shelving, and Locker Manufacturing
  - 337910 Mattress Manufacturing
  - 339910 Jewelry and Silverware Manufacturing
  - 339940 Office Supplies (except Paper) Manufacturing
  - 339993 Fastener, Button, Needle, and Pin Manufacturing
  - 339994 Broom, Brush, and Mop Manufacturing
  - 488991 Packing and Crating
- Total Number of Secondary Market Facilities: 68,073

Organics

- **Recycling Process Overview:** Composters and anaerobic digestors and collect and treat organic waste to create compost and digestate, which can be applied to soil in gardening and farming applications. The compost and digestate serve as the end products of the organics recycling process.

- **Primary End Market:** Compost and digestate are sold to businesses that apply the compost and digestate to soil directly, such as landscaping services. NAICS codes for primary end markets include:
    - 561730 Landscaping Services
- **Total Number of Primary End Market Facilities:** 140,198 facilities
- **Secondary End Market:** Not included.

Paper

- **Recycling Process Overview:** Post-consumer paper is collected, sorted by type (e.g., newsprint, office paper, corrugated cardboard, etc.), and baled. The baled paper serves as the end product of the paper recycling process.
- **Primary End Market:** Paper mills use the baled paper as an input by shredding and pulping it to create new paper products with recycled content.[4] NAICS codes for primary end markets include:
    - 322110 Pulp Mills
    - 322121 Paper (except Newsprint) Mills
    - 322122 Newsprint Mills
    - 322130 Paperboard Mills
- **Total Number of Primary End Market Facilities:** 2,956 facilities
- **Secondary End Market:** NAICS codes for secondary end markets include:
    - 115112 Soil Preparation, Planting, and Cultivating
    - 712130 Zoos and Botanical Gardens
- **Total Number of Secondary End Market Facilities**: 6,244 facilities

Plastics

- **Recycling Process Overview:** Post-consumer plastics are collected, sorted by type, and processed into pellets, chips, flakes, or some other form. The plastic pellets, chips and flakes serve as the end product of the plastics recycling process.
- **Primary End Market:** Recycled plastics in the form of pellets, chips, flakes, etc. are sold to plastic product manufacturers, who use these as inputs in manufacturing for products such as plastic pipes and parts and plastic bottles.[5] NAICS codes for primary end markets include:
    - 314110 Carpet and Rug Mills
    - 325212 Synthetic Rubber Manufacturing
    - 325220 Artificial and Synthetic Fibers and Filaments Manufacturing
    - 326111 Plastics Bag and Pouch Manufacturing
    - 326112 Plastics Packaging Film and Sheet (including Laminated) Manufacturing
    - 326113 Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing

[4] Roth, 2021. IBISWorld, "Recycling Facilities in the US."
[5] Roth, 2020. IBISWorld, "Recyclable Material Wholesaling the US."

  - 326121 Unlaminated Plastics Profile Shape Manufacturing
  - 326122 Plastics Pipe and Pipe Fitting Manufacturing
  - 326130 Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing
  - 326140 Polystyrene Foam Product Manufacturing
  - 326150 Urethane and Other Foam Product (except Polystyrene) Manufacturing
  - 326160 Plastics Bottle Manufacturing
  - 326220 Rubber and Plastics Hoses and Belting Manufacturing
- **Total Number of Primary End Market Facilities:** 5,547 facilities
- **Secondary End Market:** NAICS codes for secondary end markets include:
  - 321991 Manufactured Home (Mobile Home) Manufacturing
  - 326191 Plastics Plumbing Fixture Manufacturing
  - 326199 All Other Plastics Product Manufacturing
  - 337125 Household Furniture (except Wood and Metal) Manufacturing
  - 337214 Office Furniture (except Wood) Manufacturing
  - 337215 Showcase, Partition, Shelving, and Locker Manufacturing
  - 337920 Blind and Shade Manufacturing
  - 339940 Office Supplies (except Paper) Manufacturing
  - 339993 Fastener, Button, Needle, and Pin Manufacturing
  - 339994 Broom, Brush, and Mop Manufacturing
  - 488991 Packing and Crating
  - 561910 Packaging and Labeling Services
- **Total Number of Secondary End Market Facilities:** 21,226 facilities

Leather

- **Recycling Process Overview:** Post-consumer leather is collected, shredded into smaller scrap pieces, and reprocessed with other chemical binders to create "bonded" or "regenerated" leather.[6] This bonded or regenerated leather serves as the end product of the leather recycling process.
- **Primary End Market:** Bonded and regenerated leather are sold to leather product manufacturers, such as leather bag or footwear manufacturers. NAICS codes for primary end markets include:
  - 316210 Footwear Manufacturing
  - 316992 Women's Handbag and Purse Manufacturing
  - 316998 All Other Leather Good and Allied Product Manufacturing
- **Total Number of Primary End Market Facilities:** 3,884 facilities
- **Secondary End Market:** Not included

Rubber

[6] Kiley, 2021. BTOD, "What is Bonded Leather? Pros and Cons of This Leather Alternative." https://www.btod.com/blog/what-is-bonded-leather/

- **Recycling Process Overview:** Post-consumer rubber is collected and then shredded into smaller pieces of rubber.[7] The shredded rubber serves as the end product of the rubber recycling process.
- **Primary End Market:** Shredded rubber is sold to rubber product manufacturers who use the shredded rubber as inputs in manufacturing for products such as rubber hoses, asphalt, etc.[8] NAICS codes for primary end markets include:
    - 324121 Asphalt Paving Mixture and Block Manufacturing
    - 324122 Asphalt Shingle and Coating Materials Manufacturing
    - 326220 Rubber and Plastics Hoses and Belting Manufacturing
    - 326291 Rubber Product Manufacturing for Mechanical Use
    - 326299 All Other Rubber Product Manufacturing
- **Total Number of Primary End Market Facilities:** 4,339 facilities
- **Secondary End Market:** Not included

Textiles

- **Recycling Process Overview:** Post-consumer textiles are collected and shredded into smaller scrap pieces and fiber.[9] The scrap pieces and fiber serve as the end product of the textile recycling process.
- **Primary End Market:** Textile scraps and fiber are sold to textile mills, which process the materials to produce products such as yard, thread, or fabric with recycled content.[10] NAICS codes for primary end markets include:
    - 313110 Fiber, Yarn, and Thread Mills
    - 313210 Broadwoven Fabric Mills
    - 313220 Narrow Fabric Mills and Schiffli Machine Embroidery
    - 313230 Nonwoven Fabric Mills
    - 313240 Knit Fabric Mills
- **Total Number of Primary End Market Facilities:** 6,097 facilities
- **Secondary End Market:** NAICS codes for secondary end markets include:
    - 313310 Textile and Fabric Finishing Mills
    - 313320 Fabric Coating Mills
    - 314110 Carpet and Rug Mills
    - 314120 Curtain and Linen Mills
    - 314910 Textile Bag and Canvas Mills
    - 314994 Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills
    - 314999 All Other Miscellaneous Textile Product Mills
    - 315110 Hosiery and Sock Mills
    - 315190 Other Apparel Knitting Mills

[7] GMT, 2022. "A Brief Guide on the Rubber Recycling Process." https://www.gmtrubber.com/a-brief-guide-on-the-rubber-recycling-process/
[8] Roth, 2020. IBISWorld, "Recyclable Material Wholesaling the US."
[9] Secondary Materials and Recycled Textiles (SMART), 2012. "Textile Recycling Fact Sheet." https://www.smartasn.org/SMARTASN/assets/File/resources/Textile_Recycling_Fact_Sheet.pdf
[10] Secondary Materials and Recycled Textiles (SMART), 2012. "Textile Recycling Fact Sheet." https://www.smartasn.org/SMARTASN/assets/File/resources/Textile_Recycling_Fact_Sheet.pdf

  - 315210 Cut and Sew Apparel Contractors
  - 315220 Men's and Boys' Cut and Sew Apparel Manufacturing
  - 315240 Women's, Girls', and Infants' Cut and Sew Apparel Manufacturing
  - 315280 Other Cut and Sew Apparel Manufacturing
  - 315990 Apparel Accessories and Other Apparel Manufacturing
  - 323113 Commercial Screen Printing
  - 337121 Upholstered Household Furniture Manufacturing
  - 337910 Mattress Manufacturing
  - 339994 Broom, Brush, and Mop Manufacturing
- **Total Number of Secondary End Market Facilities:** 39,999

Wood

- **Recycling Process Overview:** Post-consumer wood is collected and sorted by type, based on whether it can be reused directly or processed into pulp. The wood is then processed into chips, pellets, or other forms that can be used as inputs in wood products.[11]
- **Primary End Market:** Recycled wood is used by wood product manufacturers and by pulp mills (IBISWorld 2020) to produce products such as paper or wood boards. NAICS codes for primary end markets include:
  - 321211 Hardwood Veneer and Plywood Manufacturing
  - 321212 Softwood Veneer and Plywood Manufacturing
  - 321213 Engineered Wood Member (except Truss) Manufacturing
  - 322110 Pulp Mills
  - 322121 Paper (except Newsprint) Mills
- **Total Number of Primary End Market Facilities:** 2,701 facilities
- **Secondary End Market:** NAICS codes for secondary end markets include:
  - 321214 Truss Manufacturing
  - 321219 Reconstituted Wood Product Manufacturing
  - 321911 Wood Window and Door Manufacturing
  - 321912 Cut Stock, Resawing Lumber, and Planing
  - 321918 Other Millwork (including Flooring)
  - 321920 Wood Container and Pallet Manufacturing
  - 321991 Manufactured Home (Mobile Home) Manufacturing
  - 321992 Prefabricated Wood Building Manufacturing
  - 321999 All Other Miscellaneous Wood Product Manufacturing
  - 337110 Wood Kitchen Cabinet and Countertop Manufacturing
  - 337121 Upholstered Household Furniture Manufacturing
  - 337122 Nonupholstered Wood Household Furniture Manufacturing
  - 337127 Institutional Furniture Manufacturing
  - 337211 Wood Office Furniture Manufacturing
  - 337212 Custom Architectural Woodwork and Millwork Manufacturing

[11] RecyclingInside, 2022. "Wood Recycling." https://recyclinginside.com/wood-recycling/

- 337215 Showcase, Partition, Shelving, and Locker Manufacturing
- 337910 Mattress Manufacturing
- 337920 Blind and Shade Manufacturing
- 339994 Broom, Brush, and Mop Manufacturing
- 488991 Packing and Crating

Total Number of Secondary End Market Facilities: 55,648 facilities

5. Market Factors

5.1 Bottle Bills

The bottle bill layer is sourced from the Container Recycling Institute's Bottle Bill Resource Guide.[12] The term "bottle bill" is also known as a "container deposit law." A container deposit law requires a minimum refundable deposit on beverage containers in order to ensure a high rate of recycling or reuse. For each state, EPA provides information on whether the state has a bottle bill, the deposit prices for aluminum, glass, and PET, and notes on the materials accepted. States that do not have bottle bills are grayed out in the layer.

View the full market factors dataset here.

5.2 Average Landfill Tipping Fees

Landfill tipping fees are sourced from the annual Environmental Research & Education Foundation (EREF) Analysis of MSW Landfill Tipping Fees 2020 report.[13] A landfill tipping fee is the amount charged per ton for disposal at a landfill. A single tipping fee is reported for each state. Note that the information included in this map is a snapshot of landfill tipping fees in 2020, and tipping fees are expected to fluctuate over time.

View the full market factors dataset here.

6. Limitations and Future Research Needs

This section summarizes limitations associated with the map and methodology as well as recommendations for future improvements. One of the objectives of the National Recycling Strategy is to standardize measurement and increase data collection, and EPA will seek to update and improve this map in the future as the Agency and its partners work towards meeting this objective. Map and methodology limitations include the following:

1. Estimated material generation, recycling, and potential. The data to support the development of the material generation, recycling, and potential material layers for this study were very limited.

[12] Container Recycling Institute, 2021. "Redemption Rates and Other Features of 10 U.S. State Deposit Programs," https://www.bottlebill.org/images/PDF/Bottle%20Bill%2010%20states_Summary%201.11.21.pdf

[13] Environmental Research & Education Foundation, 2021. Analysis of MSW Landfill Tipping Fees: 2020. Analysis of MSW Landfill Tipping Fees: 2020 (PDF) - Environmental Research & Education Foundation (erefdn.org)

a. **Geographic Resolution**: Data on generation, recycling, and landfilling were only available at the state-level; therefore, geographic resolution of the generation, recycling, and potential map layers is limited to state-level estimates that are distributed across the state to ZIP codes by population. These data limit the use of the map as a tool for assessing local opportunities or siting decisions; however, this mapping tool could serve as a useful first step in understanding potential opportunities for enhancing or renovating existing recycling markets, or for expanding recycling infrastructure in places close to potential demand (e.g., determining whether recycling investment is needed in Vermont versus Texas).

b. **Snapshot in Time**. This map was developed using the best available data at the time of development and will not be updated regularly. Users of the maps should take that into consideration in deciding how they use the map. The data source years range from 2011 to 2021.

c. **Years of Data Sources:** While EPA used the most recent data available to estimate generation, recycling, and potential, some of the data are dated. EPA used the Ball Corporation's *The 50 States of Recycling Report* (2018) to estimate material generation, recycling, and potential for PET bottles, PET other rigid, HDPE bottles, PP, rigids #3 to 7, carboard/boxboard, glass, aluminum, and steel cans. For the remaining material types, including electronics, paper, tires, wood, textiles, and yard trimmings, the map uses data from state reports and the State Measurement Program data reported to EPA from years 2011-2021. The appendix details the specific data sources and the year of the data used in each state.

d. **Completeness:** For many states, data were unavailable to estimate generation, recycling, and potential for electronics,[14] paper, tires,[15] wood, textiles, and yard trimmings.

e. **Calculation Assumptions:** As detailed in the appendix tables, to estimate eneration, recycling, and potential for electronics, paper, tires, wood, textiles, and yard trimmings, the map uses the best available data from state reports and the State Data Measurement Program (SMP) reported to EPA. In some cases, the values come directly from the state reports and SMP data, but many calculations must be done to estimate the values. For example, to estimate the tons of MSW that are textiles in Virginia, EPA uses data on total MSW that was landfilled in Virginia from a 2020 Annual Solid Waste Report (8.5 million tons) and applies the percentage of MSW that was estimated to be textiles (4.8%) from a 2013-2014 waste characterization report on Prince William County.

[14] The national average for estimated electronics generated per capita (tons/person/year), 0.023, was available from the *Global E-Waste Statistics Partnership*. EPA chose not to apply the national average to states or ZIP codes by population because a national average may not represent the average per capita generation in each state very well.

[15] The national average for estimated tires generated per capita (tons/person/year), 0.016, was available from the U.S. Tire Manufacturers Association, *2019 U.S. Scrap Tire Management Summary*. EPA chose not to apply the national average to states or ZIP codes by population because a national average may not represent the average per capita generation in each state very well.

This calculation makes two assumptions. The first is that the MSW composition has not changed over time. The second is that the MSW composition in Prince William County would be the same across other counties in Virginia. These are reasonable assumptions considering the gaps in available data; however, EPA cautions users that the accuracy of estimates rests on these types of assumptions.

2. **Infrastructure.** Access to detailed data on infrastructure capacity and throughput at facilities was limited. This lack of available data limits a user's ability to prioritize or target local opportunities beyond an initial high-level review. Therefore, once general opportunities for expanding recycling infrastructure and recycling end markets are identified through this map, users are expected to conduct more specific analyses of local market conditions, such as identifying location-specific recycling ordinances and investigating specific end market facilities and recycling infrastructure services to clarify the opportunities and recycling market dynamics.
3. **Potential Primary and Secondary End Markets.** Data from D&B Hoovers 2021 were used to identify locations of and commodities used at typical recycling end market businesses and facilities. Data on which facilities are accepting and using recycling commodities as manufacturing inputs were not available.

To improve the map going forward, better data are needed. More comprehensive data on the quantities of specific materials generated, recycled, and landfilled are needed and at a finer geographic resolution (i.e., counties or ZIP codes rather than state level). Data on throughput and materials accepted at MRFs and other recycling infrastructure are also needed. Lastly, data on which primary and secondary end market facilities are accepting and using recycled commodities as manufacturing inputs are needed. Furthermore, there are additional data layers that may be useful to add to the map in the future, including landfill material bans, potential container deposit programs, rail infrastructure, and source separation material programs.

7. Appendix

Appendix Table 1. Summary of Estimated Electronics Generation, Recycling, and Recycling Potential Primary Data Sources

State	Annual Electronics Landfilled (tons)	Annual Electronics Recovered (tons)	Annual Electronics Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Alabama	961	145	1,106	4,876,256	2019 2018	SMP data reported to EPA SMP data reported to EPA	Annual recovered is from 2018 SMP data. Annual landfilled is from 2019 SMP data. Annual generated is annual recovered plus annual landfilled.
Arkansas	Not available	8,555	Not available	3,001,345	2017	Arkansas Department of Environmental Quality, *State of Recycling in Arkansas Report 2017*, https://www.adeq.state.ar.us/poa/recycling/pdfs/report_state_of_recycling_2017.pdf	Annual recovered is from the source document.
California	385,678	100,000	485,678	38,600,000	2014	California Department of Resources Recycling and Recovery, *State of Recycling in California*, https://www2.calrecycle.ca.gov/Publications/Download/1194?opt=dln	Annual landfilled is total MSW disposed from 2019 SMP data (42,853,147) times 0.9%, which is the percentage of overall disposed waste that is electronics. Annual recovered is from the source document.

State	Annual Electronics Landfilled (tons)	Annual Electronics Recovered (tons)	Annual Electronics Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
							Annual generated is annual recovered plus annual landfilled.
Colorado	Not available	13,995	Not available	5,610,000	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
Delaware	Not available	1,763	Not available	957,248	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
Illinois	Not available	7,350	Not available	12,670,000	2019	Illinois Environmental Protection Program, *Electronics Recycling Program: 2019 Collection Summary Report*, https://www2.illinois.gov/epa/topics/waste-management/electronics-recycling/Documents/IEPA%202019%20E-Waste%20Summary%20Collection%20Report.pdf	Annual recovered is from the source document.
Indiana	Not available	32,809	Not available	6,666,000	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
Kentucky	Not available	2,496	Not available	4,452,000	2017	Commonwealth of Kentucky Department of Environmental Protection Division of Waste Management, *Fiscal Year 2018 Annual Report*, https://eec.ky.gov/Environmental-Protection/Waste/Annual%20Reports/DWM%20Annual%20Report%20for%202018.pdf	Annual recovered is from the source document.
Maine	Not available	3,646	Not available	1,339,000	2018	Maine Department of Environmental Protection, Maine Solid Waste Generation and Disposal Capacity Report for Calendar Years 2018 & 2019,	Annual recovered is from the source document.

State	Annual Electronics Landfilled (tons)	Annual Electronics Recovered (tons)	Annual Electronics Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
						https://www.nrcm.org/wp-content/uploads/2021/02/DEPwastereport2021.pdf	
Maryland	Not available	9,777	Not available	6,003,000	2016	Maryland Department of the Environment, *Maryland Solid Waste Management and Diversion Report 2017 (Calendar Year 2016 Data)*, https://mde.maryland.gov/programs/LAND/SolidWaste/Documents/MSWMR%20%2717.pdf	Annual recovered is from source document (9,358.38 + 419.04).
Massachusetts	Not available	24,436	Not available	7,029,917	2020	Massachusetts Department of Environmental Protection, *Municipal Solid Waste & Recycling Survey Responses*, https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns#municipal-solid-waste-&-recycling-data-	Annual recovered is from source document.
Michigan	Not available	6,980	Not available	9,965,000	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
Minnesota	Not available	11,599	Not available	5,563,000	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
Montana	Not available	66,710	Not available	1,051,000	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
Nevada	Not available	1,890	Not available	2,972,000	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
New Jersey	Not available	38,129	Not available	8,879,000	2019	New Jersey Department of Environmental Protection, *Materials Trends 2001-2019,*	Annual recovered is from source document.

State	Annual Electronics Landfilled (tons)	Annual Electronics Recovered (tons)	Annual Electronics Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
						https://www.nj.gov/dep/dshw/recycling/stat_links/material_trends.pdf?2018	
North Carolina	Not available	11,736	Not available	10,490,000	2019	North Carolina Department of Environmental Quality, *Annual Report to the North Carolina General Assembly*, https://deq.nc.gov/media/18733/download	Annual recovered is from source document.
Ohio	Not available	19,090	Not available	11,660,000	2019	SMP data reported to EPA	Annual recovered is from the SMP data.
Pennsylvania	Not available	39,396	Not available	12,780,000	2016	Pennsylvania Department of Environmental Protection, *2016 Recycling Report*, https://files.dep.state.pa.us/Waste/Recycling/RecyclingPortalFiles/Documents/2016_Recycling_Report.pdf	Annual recovered is from source document.
Rhode Island	Not available	2,707	Not available	1,057,231	2019	SMP data reported to EPA	Annual recovered is from SMP data.
South Carolina	Not available	11,436	Not available	5,149,000	2019	South Carolina Department of Health and Environmental Control, *South Carolina Solid Waste Management Annual Report 2019*, https://scdhec.gov/sites/default/files/media/document/2019%20SC%20Solid%20Waste%20Management%20Annual%20Report%20OR-1988_4.pdf	Annual recovered is from the source document.
Texas	Not available	8,998	Not available	29,145,505	2020	Texas Commission on Environmental Quality, *Program Report on Texas Recycles Computers and Texas Recycles Televisions,* https://www.tceq.texas.gov/assets/public/comm_exec/pubs/sfr/099-20.pdf	Annual recovered is from the source document.

State	Annual Electronics Landfilled (tons)	Annual Electronics Recovered (tons)	Annual Electronics Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Vermont	Not available	2,300	Not available	625,216	2015	Vermont Department of Environmental Conservation, Vermont e-cycles Website, https://dec.vermont.gov/waste-management/solid/product-stewardship/electronics	Annual recovered is from the source document.
Virginia	Not available	7,081	Not available	8,631,393	2020	Virginia Department of Environmental Quality, *Virginia Annual Recycling Summary Report, Calendar Year 2020*, https://www.deq.virginia.gov/home/showpublisheddocument/12688/637750630967270000	Annual recovered is from the source document.
Washington	Not available	17,813	Not available	7,524,000	2018	Department of Ecology State of Washington, *Waste Generation and Recovery Data (2018),* https://ecology.wa.gov/Research-Data/Data-resources/Solid-waste-recycling-data	Annual recovered is from the source document.
Wisconsin	Not available	4,675	Not available	5,879,284	2020	Wisconsin Department of Natural Resources, *Recyclable Materials Collected by Wisconsin Responsible Units*, https://dnr.wisconsin.gov/sites/default/files/topic/Recycling/TableRUcollection2020.pdf	Annual recovered is from source document

Appendix Table 2. Summary of Estimated Paper Generation, Recycling, and Recycling Potential Primary Data Sources

State --- **Included Types of Paper**	**Annual Paper Landfilled (tons)**	**Annual Paper Recovered (tons)**	**Annual Paper Generated (tons)**	**Geographic Population**	**Year of Data**	**Source**	**Notes on Data Sources and Calculations**
Arkansas --- Includes magazines, newsprint, and office paper.	Not available	35,983	Not available	3,001,345	2017	Arkansas Department of Environmental Quality, *State of Recycling in Arkansas Report 2017*, https://www.adeq.state.ar.us/poa/recycling/pdfs/report_state_of_recycling_2017.pdf	Annual recovered is from the source document.
Colorado --- Includes paper.	Not available	92,200	Not available	5,773,714	2020	Colorado Department of Public Health & Environment, *2020 Colorado Recycling Totals*, https://cdphe.colorado.gov/colorado-recycling-totals	Annual recovered is from the source document.
Florida --- Includes newspapers and office paper.	1,048,233	175,333	1,223,566	21,538,187	2020	Florida Department of Environmental Protection, *2020 Solid Waste Management Report*, https://floridadep.gov/sites/default/files/2020_MSW_Composition_Chart_and_Table-2.pdf	Annual landfilled equals annual generated minus annual recovered. Annual recovered is from the source document. Annual generated is from the source document.
Illinois --- Includes newsprint, high grade office paper, magazines/catalogs, mixed paper (recyclable), compostable paper, and other.	1,370,720	604,800	1,975,520	12,859,995	2015	Illinois Recycling Association, *Illinois Commodity/Waste Generation Characterization Study Update*, https://www.illinoisrecycles.org/wp-content/uploads/2014/10/2015-Waste-Characterization-Update-FINAL.pdf	Annual landfilled is from the source document. Annual recovered is from the source document. Annual generated equals annual landfilled plus annual recovered.
Massachusetts ---	91,656	36,510	128,166	7,029,917	2020	Massachusetts Department of Environmental Protection, *2020*	Annual landfilled equals annual total MSW disposed

State --- Included Types of Paper	Annual Paper Landfilled (tons)	Annual Paper Recovered (tons)	Annual Paper Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Includes newspaper and mixed paper.					2011	*Municipal Solid Waste & Recycling Survey Responses*, https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns (mudata20.xlsx) Massachusetts Department of Environmental Protection, *Massachusetts Waste Characterization Data Material Category Profiles*, https://www.mass.gov/files/documents/2016/08/oc/wcsmater.pdf	from the 2020 analysis (1,553,486.18) times 5.9%, which is the percentage of total MSW disposed that is estimated to be paper from the 2011 analysis. Annual recovered is from the 2020 source document. Annual generated equals annual landfilled plus annual recovered.
Michigan --- Includes mixed (magazines, phonebooks, office, glossy, boxboard), newsprint, and corrugated.	1,833,000	444,000	2,277,000	9,928,300	2016	West Michigan Sustainable Business Forum, *Economic Impact Potential and Characterization of Municipal Solid Waste in Michigan 2016*, https://www.michigan.gov/documents/deq/480236-14_WMSBF_waste_characterization_report_521920_7.PDF	Annual landfilled is from the source document. Annual recovered is from the source document. Annual generated equals annual landfilled plus annual recovered.
Minnesota --- Includes newsprint, high grade office paper, magazines/catalogs, mixed paper (recyclable), compostable paper, phone books, non-recyclable paper;	552,588	951,287	1,503,875	5,640,000	2018 2013	SMP data reported to EPA Minnesota Pollution Control Agency, *2013 Statewide Waste Characterization*, https://www.pca.state.mn.us/sites/default/files/w-sw1-60.pdf	Annual landfilled equals MSW disposed from 2018 SMP data (2,939,300) times 18.8% which is the percentage of total MSW disposed from the 2013 analysis that is paper (including the categories as described in the first column). Annual recovered is from 2018 SMP data for paper-fiber and paperboard recycled.

State --- **Included Types of Paper**	**Annual Paper Landfilled (tons)**	**Annual Paper Recovered (tons)**	**Annual Paper Generated (tons)**	**Geographic Population**	**Year of Data**	**Source**	**Notes on Data Sources and Calculations**
Report also includes gable top/aseptic containers/cartons, OCC and kraft bags, and boxboard, but they are excluded from the estimates here.							Annual generated equals annual landfilled plus annual recovered.
New Jersey --- Includes mixed office paper, newspaper, and office paper/magazines/junk mail.	Not available	636,420	Not available	8,879,000	2019	New Jersey Department of Environmental Protection, *Materials Trends 2001-2019,* https://www.nj.gov/dep/dshw/recycling/stat_links/material_trends.pdf?2018	Annual recovered is from the source document.
Oklahoma --- Includes white paper, books, and newspaper.	Not available	2,074	Not available	3,926,000	2016	State of Oklahoma, Annual Report Oklahoma *State Recycling and Recycled Materials Procurement Act Fiscal Year 2016*, https://www.recycleok.org/wp-content/uploads/2012/03/State-Recycling-Annual-Report-2016.pdf	Annual recovered is from the source document.

State --- **Included Types of Paper**	**Annual Paper Landfilled (tons)**	**Annual Paper Recovered (tons)**	**Annual Paper Generated (tons)**	**Geographic Population**	**Year of Data**	**Source**	**Notes on Data Sources and Calculations**
Pennsylvania --- Includes magazines/catalogs, newsprint/newspaper, mixed/other paper grades, office paper, and phone books.	Not available	560,899	Not available	12,780,000	2016	Pennsylvania Department of Environmental Protection, https://files.dep.state.pa.us/Waste/Recycling/RecyclingPortalFiles/Documents/2016_Recycling_Report.pdf	Annual recovered is from the source document.
South Carolina --- Includes magazines, mixed paper, newspaper and inserts, office paper, and phone books.	Not available	52,315	Not available	5,148,714	2019	South Carolina Department of Health and Environmental Control, *South Carolina Solid Waste Management Annual Report 2019,* https://scdhec.gov/sites/default/files/media/document/2019%20SC%20Solid%20Waste%20Management%20Annual%20Report%20OR-1988_4.pdf	Annual recovered is from the source document.
Washington --- Includes high grade paper, mixed paper, and newspaper.	347,633	379,749	727,382	7,524,000	2015-2016 2018	State of Washington Department of Ecology, *2015-2016 Washington Statewide Waste Characterization Study*, https://apps.ecology.wa.gov/publications/documents/1607032.pdf Department of Ecology State of Washington, *Waste Generation and Recovery Data (2018),* https://ecology.wa.gov/Research-Data/Data-resources/Solid-waste-recycling-data	Annual landfilled is from the 2015-2016 source document; paper products disposed (351,210) minus carboard/kraft paper products disposed (3,577). Annual recovered is from the 2018 source document. Annual generated equals annual landfilled plus annual recovered.

State --- **Included Types of Paper**	**Annual Paper Landfilled (tons)**	**Annual Paper Recovered (tons)**	**Annual Paper Generated (tons)**	**Geographic Population**	**Year of Data**	**Source**	**Notes on Data Sources and Calculations**
Wisconsin --- Includes newsprint, high grade office paper, magazines/catalogs, mixed paper-recyclable, and other paper.	477,800	154,147	631,947	5,879,284	2020 2020-2021	Wisconsin Department of Natural Resources, *Recyclable Materials Collected by Wisconsin Responsible Units*, https://dnr.wisconsin.gov/sites/default/files/topic/Recycling/TableRUcollection2020.pdf Wisconsin Department of Natural Resources, *2020-2021 Wisconsin Statewide Waste Characterization Study*, https://widnr.widencollective.com/portals/9locxp5m/SolidWasteinWisconsinLandfills	Annual landfilled is from the 2020-2021 source document. Annual recovered is from the 2020 source document. Annual generated equals annual landfilled plus annual recovered.

Appendix Table 3. Summary of Estimated Tires Generation, Recycling, and Recycling Potential Primary Data Sources

State	Annual Tires Landfilled (tons)	Annual Tires Recovered (tons)	Annual Tires Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Alabama	Not available	201	339,169	4,876,256	2019	SMP data reported to EPA	Annual recovered and generated is from the SMP data.
Arkansas	Not available	15,416	Not available	3,001,345	2017	Arkansas Department of Environmental Quality, *State of Recycling in Arkansas Report 2017*, https://www.adeq.state.ar.us/poa/recycling/pdfs/report_state_of_recycling_2017.pdf	Annual recovered is from the source document.
California	Not available	191,197	Not available	38,600,000	2014	California Department of Resources Recycling and Recovery, *California Waste Tire Market Report: 2019*, https://www2.calrecycle.ca.gov/Publications/Details/1691	Annual recovered is from the source document.
Colorado	Not available	24,406	343,659	5,610,000	2019	SMP data reported to EPA	Annual recovered and generated is from the SMP data.
Kentucky	Not available	7,679	Not available	4,461,000	2018	Commonwealth of Kentucky Department of Environmental Protection Division of Waste Management, *Fiscal Year 2018 Annual Report*, https://eec.ky.gov/Environmental-Protection/Waste/Annual%20Reports/DWM%20Annual%20Report%20for%202018.pdf	Annual recovered is from the source document.
Michigan	Not available	51,118	Not available	10,077,331	2020	Michigan Department of the Environment, *2020 Scrap Tire Market Development Study*,	Annual recovered is from the source document; total (82,638.32) minus those used

State	Annual Tires Landfilled (tons)	Annual Tires Recovered (tons)	Annual Tires Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
						https://www.michigan.gov/documents/egle/EGLE-MMD-PART-169-SCRAP-TIRE-2020-END-USE-REPORT_728503_7.pdf	for tire derived fuel (31,520.68).
Minnesota	Not available	24,463	228,537	5,563,000	2019	SMP data reported to EPA	Annual recovered and generated are from the SMP data.
Nevada	Not available	5,957	215,084	2,972,000	2019	SMP data reported to EPA	Annual recovered and generated are from the SMP data.
New Jersey	Not available	62,070	Not available	8,879,000	2019	New Jersey Department of Environmental Protection, *Materials Trends 2001-2019*, https://www.nj.gov/dep/dshw/recycling/stat_links/material_trends.pdf?2018	Annual recovered is from the source document.
North Carolina	Not available	48,621	Not available	10,490,000	2019	North Carolina Department of Environmental Quality, *Annual Report to the North Carolina General Assembly*, https://deq.nc.gov/media/18733/download	Annual recovered is from the source document and equals the sum of tires used as crumb rubber (27,991.05), re-used or re-capped (8,162.43), for other purposes (12,467.08)
Ohio	Not available	187,372	1,078,342	11,660,000	2019	SMP data reported to EPA	Annual recovered and generated are from the SMP data.

State	Annual Tires Landfilled (tons)	Annual Tires Recovered (tons)	Annual Tires Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Rhode Island	Not available	1,375	44,332	1,057,000	2019	SMP data reported to EPA	Annual recovered and generated are from the SMP data.
South Carolina	Not available	45,687	Not available	5,149,000	2019	South Carolina Department of Health and Environmental Control, *South Carolina Solid Waste Management Annual Report 2019*, https://scdhec.gov/sites/default/files/media/document/2019%20SC%20Solid%20Waste%20Management%20Annual%20Report%20OR-1988_4.pdf	Annual recovered are from the source document.
Texas	Not available	7,847	Not available	29,145,505	2020	Texas Commission on Environmental Quality, *Municipal Solid Waste in Texas: A Year in Review—2020 Data Summary and Analysis,* https://www.tceq.texas.gov/downloads/permitting/waste-permits/publications/187-21.pdf	Annual recovered is from the source document.
Virginia	Not available	61,627	Not available	8,631,393	2020	Virginia Department of Environmental Quality, *Virginia Annual Recycling Summary Report, Calendar Year 2020*, https://www.deq.virginia.gov/home/showpublisheddocument/12688/637750630967270000	Annual recovered is from the source document.
Washington	Not available	29,292	Not available	7,524,000	2018	State of Washington Department of Ecology, *Waste Generation and Recovery Data (2018)*, https://ecology.wa.gov/Research-Data/Data-resources/Solid-waste-recycling-data	Annual recovered is from the source document; tires recovered (36,289.17) minus tires burned for energy (6,997.29).

State	Annual Tires Landfilled (tons)	Annual Tires Recovered (tons)	Annual Tires Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Wisconsin	Not available	7,900	Not available	5,879,284	2020	Wisconsin Department of Natural Resources, *Recyclable Materials Collected by Wisconsin Responsible Units*, https://dnr.wisconsin.gov/sites/default/files/topic/Recycling/TableRUcollection2020.pdf	Annual recovered is from the source document.

Appendix Table 4. Summary of Estimated Textiles Generation, Recycling, and Recycling Potential Primary Data Sources

State	Annual Textiles Landfilled (tons)	Annual Textiles Recovered (tons)	Annual Textiles Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Arkansas	Not available	9,724	Not available	3,001,345	2017	Arkansas Department of Energy & Environment, *State of Recycling in Arkansas Report*, https://www.adeq.state.ar.us/poa/recycling/state.aspx	Annual recovered is from source document.
Colorado	478,853	15,642	494,495	5,531,000	2018 2018 2018	Colorado Department of Public Health & Environment, *Waste Composition of Municipal Solid Waste Disposal* https://cdphe.colorado.gov/swreports Colorado Department of Public Health & Environment, *Solid Waste User Fee Volume Report 2018* https://cdphe.colorado.gov/swreports Colorado Department of Public Health & Environment *FY2019 Annual Report to the Colorado General Assembly: Status of the Solid Waste Management Program in Colorado* https://cdphe.colorado.gov/swreports	Annual landfilled equals total MSW disposed (8,867,646) times 5.4%, which is the percentage of MSW disposed that is textiles in 2018 report. Annual recovered is from 2018 source document. Annual generated is annual landfilled plus annual recovered.
Delaware	49,458	4,189	53,647	949,495	2019 2018 2016	SMP data reported to EPA SMP data reported to EPA Delaware Solid Waste Authority, *Statewide Waste Characterization Study, FY 2016*, https://dswa.com/wp-content/uploads/2017/02/Final-Report-DSWA-Waste-Characterization-FY-2016-January-2017.pdf	Annual landfilled equals total MSW disposed from 2019 SMP data (951,120) times 5.2%, which is the percentage of MSW disposed that is textiles from the 2016 analysis. Annual recovered is from 2018 SMP data.

State	Annual Textiles Landfilled (tons)	Annual Textiles Recovered (tons)	Annual Textiles Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
							Annual generated is annual landfilled plus annual recovered.
Florida	1,138,906	62,104	1,201,010	21,538,187	2020	*2020 Florida Municipal Solid Waste Collected*, https://floridadep.gov/sites/default/files/2020_MSW_Composition_Chart_and_Table-2.pdf	Annual landfilled is annual generated minus annual recovered. Annual recovered is from the source document. Annual generated is from the source document.
Illinois	433,630	126,700	560,330	12,860,000	2015	Illinois Recycling Association, *Illinois Commodity/Waste Generation and Characterization Study Update*, https://www.illinoisrecycles.org/wp-content/uploads/2014/10/2015-Waste-Characterization-Update-FINAL.pdf	Annual landfilled is from the source document (Clothing + Other Textiles; 244,360 + 189,270). Annual recovered is from the source document (Clothing + Other Textiles; 117,800 +8,900). Annual generated is annual landfilled plus annual recovered.
Maine	Not available	4,028	Not available	1,339,000	2018	Maine Department of Environmental Protection, *Maine Solid Waste Generation and Disposal Capacity Report for Calendar Years 2018 & 2019*, https://www.nrcm.org/wp-content/uploads/2021/02/DEPwastereport2021.pdf	Annual recovered is half of the total textiles recycled in 2018 and 2019 combined (8,055.83).

State	Annual Textiles Landfilled (tons)	Annual Textiles Recovered (tons)	Annual Textiles Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Massachusetts	76,121	6,959	83,079	7,029,917	2020 2016	Massachusetts Department of Environmental Protection, *Recycling & Solid Waste Data for Massachusetts Cities & Towns (mudata20.xlsx)*, https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns#municipal-solid-waste-&-recycling-data- *Massachusetts Waste Characterization Data Material Category Profiles*, https://www.mass.gov/files/documents/2016/08/oc/wcsmater.pdf	Annual landfilled is trash disposal (1,553,486; the sum of column AW) times 4.9%, which is the percentage of MSW disposed that is textiles from the 2016 analysis. Annual recovered is from source document (the sum of column BM). Annual generated is annual landfilled plus annual recovered.
Michigan	Not available	4,371	Not Available	9,965,000	2019	Michigan EGLE Recycling Reporting, *Fiscal Year 2020 Report*, https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Reports/FY2020-Rpt-Part_175-Recycling.pdf?rev=bf78e535c1984b188cc1944e664aeef5&hash=8E14509EF63AD4E436F46774FF115EF7	Annual recovered is from source document.
Minnesota	138,149	12,581	150,730	5,527,000	2018 2013	SMP data reported to EPA Minnesota Pollution Control Agency, *2013 Statewide Waste Characterization*, https://www.pca.state.mn.us/sites/default/files/w-sw1-60.pdf	Annual landfilled equals total MSW disposed from 2018 SMP data (2,939,300) times 4.7%, which is the percentage of MSW disposed that is textiles from the 2013 analysis. Annual recovered is 9,836 from the residential sector + 2,745 from the

State	Annual Textiles Landfilled (tons)	Annual Textiles Recovered (tons)	Annual Textiles Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
							commercial/institutional/industrial sector from 2018 SMP data. Annual generated equals annual landfilled plus annual recovered.
Nevada	108,753	983	109,736	3,080,000	2019 2018	SMP data reported to EPA Washoe County, *Two Season Waste Composition and Characterization Analysis, Final Report* https://www.washoecounty.gov/health/files/ehs/waste-management/WC_2_Season_Report_2018-07.pdf	Annual landfilled equals total MSW disposed from SMP data (3,107,238) times 3.5%, which is the percentage of MSW disposed that is textiles from the 2018 report. Annual recovered is from source document. Annual generated equals annual landfilled plus annual recovered.
New Jersey	Not available	13,478	Not available	8,879,000	2019	New Jersey Department of Environmental Protection*, Material Trends 2001-2019*, https://www.nj.gov/dep/dshw/recycling/statlinks/material_trends.pdf?2018	Annual recovered is from source document.
North Carolina	733,715	2,336	736,051	10,160,000	2018 2017	SMP data reported to EPA Orange County Solid Waste Management, *Orange County Waste Composition Study June 2017,* http://www.co.orange.nc.us/DocumentCenter/View/2826/2017-Orange-County-Waste-Characterization-Study-Final-Report-PDF	Annual landfilled equals total MSW disposed from SMP data (13,843,687) times 5.3%, which is the percentage of MSW disposed that is textiles from the 2017 report.

State	Annual Textiles Landfilled (tons)	Annual Textiles Recovered (tons)	Annual Textiles Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
							Annual recovered is from SMP data reported to EPA. Annual generated equals annual landfilled plus annual recovered.
Ohio	Not available	42,179	Not available	11,680,000	2018	SMP data reported to EPA	Annual recovered is from SMP data reported to EPA.
Pennsylvania	Not available	17,783	Not available	12,780,000	2016	Pennsylvania Department of Environmental Protection, *2016 Recycling Report*, https://files.dep.state.pa.us/Waste/Recycling/RecyclingPortalFiles/Documents/2016_Recycling_Report.pdf	Annual recovered is from the source document (residential + commercial; 3,082.58 + 14,699.96).
South Carolina	Not available	2,889	Not available	5,084,000	2018	SMP data reported to EPA	Annual recovered is from SMP data reported to EPA.
Vermont	Not available	369.6	Not available	624,344	2017	Vermont Department of Environmental Conservation, *2019 Vermont Materials Management Plan: Reducing Solid Waste & Increasing Recycling and Composting*, https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/Universal-Recycling/2019-PRELIM-DRAFT-MMP-4.2019-tracked%20changes.pdf	Annual recovered is from 2017 source document.

State	Annual Textiles Landfilled (tons)	Annual Textiles Recovered (tons)	Annual Textiles Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Virginia	408,814	32,154	440,968	8,631,393	2020 2020 2013-2014	Virginia Department of Environmental Quality *Virginia Annual Recycling Summary Report 2020*, https://www.deq.virginia.gov/home/showpublisheddocument/12688/637750630967270000 *2021 Annual Solid Waste Report*, https://www.deq.virginia.gov/home/showpublisheddocument/9500 Prince William County, Virginia, *Waste Composition Study Summary of 2013-2014 Results*, http://gbbinc.com/wp-content/uploads/2013/10/PWC-Waste-Characterization-Final-Report.pdf	Annual landfilled equals MSW landfilled onsite (8,516,968) times 4.8%, which is the percentage of MSW disposed that is textiles from the 2013-2014 report. Annual recovered is from 2020 source document. Annual generated is annual landfilled plus annual recovered.
Washington	315,801	37,921	353,723	7,524,000	2018 2018 2015-2016	Washington Department of Ecology, *Solid waste & recycling data*, https://ecology.wa.gov/Research-Data/Data-resources/Solid-waste-recycling-data Washington Department of Ecology, *Solid waste disposal data by facility*, https://ecology.wa.gov/Asset-Collections/Doc-Assets/Solid-waste/Solid-waste-recycling-data/Disposal-by-facility-2018 *2015-2016 Statewide Waste Characterization Study*, https://apps.ecology.wa.gov/publications/documents/1607032.pdf	Annual landfilled is from multiplying the annual reported MSW landfilled tonnage (8,535,174) by the percentage of textiles in landfilled waste from the 2015-2016 source (2% from organic textiles and 1.7% from synthetic textiles). Annual recovered is from 2018 source document. Annual generated equals annual landfilled plus annual recovered.

Appendix Table 5. Summary of Estimated Wood Generation, Recycling, and Recycling Potential Primary Data Sources

State	Annual Wood Landfilled (tons)	Annual Wood Recovered (tons)	Annual Wood Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Colorado	1,088,517	89,828	1,178,345	5,759,000	2019 2016	SMP data reported to EPA Larimer County and SloanAzquezMcAfee, *2016 Waste Composition and Characterization Analysis,* https://www.larimer.org/sites/default/files/uploads/2017/wastesort.pdf	Annual landfilled equals annual total MSW disposed from SMP data (6,115,262) times 17.8%, which is the percentage of total MSW disposed that is estimated to be wood from the 2016 analysis. Annual recovered is the recycling per capita rate from SMP data times the state population. Annual generated equals annual landfilled plus annual recovered.
Delaware	77,468	19,221	96,689	973,764	2019 2016	SMP data reported to EPA Delaware Solid Waste Authority *Statewide Waste Characterization Study, FY 2016*, https://dswa.com/wp-content/uploads/2017/02/Final-Report-DSWA-Waste-Characterization-FY-2016-January-2017.pdf	Annual landfilled equals annual total MSW disposed from SMP data (1,191,808) times 6.5%, which is the percentage of total MSW disposed that is estimated to be wood from the 2016 analysis. Annual recovered is the recycling per capita rate from SMP data times the state population. Annual generated equals annual landfilled plus annual recovered.

State	Annual Wood Landfilled (tons)	Annual Wood Recovered (tons)	Annual Wood Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Indiana	505,280	185,627	690,907	6,732,000	2019 2012	SMP data submitted to EPA Harvey Abramowitz and Yu Sun, *Municipal Solid Waste Characterization Study for Indiana,* https://www.in.gov/idem/recycle/resources/recycling-infrastructure-and-economics-study/	Annual landfilled equals annual total MSW disposed from SMP data (6,701,323) times 7.54%, which is the percentage of total MSW disposed that is estimated to be wood from the 2012 analysis. Annual recovered is the recycling per capita rate from SMP data times the state population. Annual generated equals annual landfilled plus annual recovered.
Massachusetts	Not available	7,488	Not available	7,029,917	2020	Massachusetts Department of Environmental Protection, *2020 Municipal Solid Waste & Recycling Survey Responses (mudata20.xlsx),* https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns#municipal-solid-waste-&-recycling-data-	Annual recovered is from the 2020 source document.
Minnesota	105,091	57,165	162,256	5,640,000	2019 2019 2013	Minnesota Pollution Control Agency, Report on 2019 SCORE Programs, https://www.pca.state.mn.us/waste/report-2019-score-programs SMP data reported to EPA Minnesota Pollution Control Agency, *2013 Statewide Waste Characterization*,	Annual landfilled equals annual total MSW disposed from the Report on 2019 SCORE Programs (1,843,698) times 5.7%, which is from the 2013 analysis. Annual recovered is the recycling per capita rate from SMP data times the state population.

State	Annual Wood Landfilled (tons)	Annual Wood Recovered (tons)	Annual Wood Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
						https://www.pca.state.mn.us/sites/default/files/w-sw1-60.pdf	Annual generated equals annual landfilled plus annual recovered.
Nevada	146,040	8,505	154,545	3,080,000	2019 2018	SMP data reported to EPA Washoe County, *Two Season Waste Composition and Characterization Analysis, Final Report* https://www.washoecounty.gov/health/files/ehs/waste-management/WC_2_Season_Report_2018-07.pdf	Annual landfilled equals annual total MSW disposed from SMP data (3,107,238) times 4.7%, which is the percentage of total MSW disposed that is estimated to be clean wood plus treated/painted wood from the 2018 analysis. Annual recovered is the recycling per capita rate from SMP data times the state population. Annual generated equals annual landfilled plus annual recovered.
New Jersey	Not available	178,976	Not available	8,879,000	2019	State of New Jersey Department of Environment Protection, *Materials Trends 2000 thru 2015,* https://www.nj.gov/dep/dshw/recycling/stat_links/material_trends.pdf?2018	Annual recovered is from the source document.
North Carolina	359,936	24,485	384,421	10,490,000	2019 2017	SMP data reported to EPA Orange County Solid Waste Management, *Orange County Waste Composition Study* http://www.co.orange.nc.us/DocumentCenter/View/2826/2017-Orange-County-Waste-Characterization-Study-Final-Report-PDF	Annual landfilled equals annual total MSW disposed from SMP data (13,843,687) times 2.6%, which is the percentage of total MSW disposed that is estimated to be wood pallets, wood lumber and painted/treated wood from the 2017 analysis.

State	Annual Wood Landfilled (tons)	Annual Wood Recovered (tons)	Annual Wood Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
							Annual recovered is the recycling per capita rate from SMP data times the state population. Annual generated equals annual landfilled plus annual recovered.
Ohio	Not available	429,421	Not available	11,690,000	2019	SMP data reported to EPA	Annual recovered is the recycling per capita rate estimated from SMP data times the state population.
Rhode Island	54,117	1,479	55,596	1,059,000	2019 2015	SMP data reported to EPA Rhode Island Resource Recovery Corporation, *Rhode Island Solid Waste Characterization Study,* https://www.rirrc.org/sites/default/files/2017-02/Waste%20Characterization%20Study%202015.pdf	Annual landfilled equals annual total MSW disposed from SMP data (832,575) times 6.5%, which is the percentage of total MSW disposed that is estimated to be treated wood from the 2015 analysis. Annual recovered is the recycling per capita rate from SMP data times the state population. Annual generated equals annual landfilled plus annual recovered.
South Carolina	Not available	37,931	Not available	5,149,000	2019	South Carolina Department of Health and Environmental Control, *South Carolina Solid Waste Management Annual Report,* https://scdhec.gov/sites/default/files/media/document/2019%20SC%20Solid%20Waste%20Management%20Annual%20Report%20OR-1988_4.pdf	Annual recovered is the estimate of wood packaging from the source document.

State	Annual Wood Landfilled (tons)	Annual Wood Recovered (tons)	Annual Wood Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Virginia	229,958	289,235	519,193	8,631,393	2020 2020 2013-2014	Virginia Department of Environmental Quality, *Virginia Annual Recycling Summary Report,* https://www.deq.virginia.gov/home/showpublisheddocument/12688/637750630967270000 Virginia Department of Environmental Quality, *2021 Annual Solid Waste Report for CY2020,* https://www.deq.virginia.gov/home/showpublisheddocument/9500 Prince William County, Virginia Solid Waste Division, *Waste Composition Study Summary of 2013-2014 Results*, http://gbbinc.com/wp-content/uploads/2013/10/PWC-Waste-Characterization-Final-Report.pdf	Annual landfilled equals annual total MSW disposed from *2021 Annual Solid Waste Report* (8,516,968) times 2.7%, which is the percentage of total MSW disposed that is estimated to be wood from the 2013-2014 analysis. Annual recovered is the estimated tons of waste wood from the 2020 *Recycling Summary Report.* Annual generated equals annual landfilled plus annual recovered.
Washington	562,462	17,035	579,497	7,524,000	2018 2015-2016	State of Washington Department of Ecology, *Solid waste & recycling data*, https://ecology.wa.gov/Research-Data/Data-resources/Solid-waste-recycling-data State of Washington Department of Ecology, *2015-2016 Washington Statewide Waste Characterization Study*, https://apps.ecology.wa.gov/publications/documents/1607032.pdf	Annual landfilled is the tons estimated to be wood from the 2015-2016 analysis. Annual recovered is the estimated tons of waste wood minus the amount burned for energy, both from the 2018 analysis. Annual generated equals annual landfilled plus annual recovered.

Appendix Table 6. Summary of Estimated Yard Trimmings Generation, Recycling, and Recycling Potential Primary Data Sources

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Alabama	116,699	21,560	138,229	4,888,000	2019 2018 2012	SMP data reported to EPA SMP data reported to EPA Alabama Department of Environmental Management, *Economic Impact of Recycling in Alabama and Opportunities for Growth*, http://adem.alabama.gov/programs/land/landforms/CompleteEconomicsOfRecyclingAlabamaReport.pdf	Annual landfilled equals total MSW disposed from 2019 SMP data (4,961,200) times 2.4%, which is the percentage of total MSW disposed that is estimated to be yard trimmings from the 2012 analysis. Annual recovered is from 2018 SMP data reported to EPA. Annual generated equals annual landfilled plus annual recovered.
Arkansas	Not available	130,786	Not available	3,001,345	2017	Arkansas Department of Environmental Quality, *2017 State of Recycling in Arkansas*, https://www.adeq.state.ar.us/poa/recycling/state.aspx	Annual recovered is from the source document.
Colorado	733,831	243,404	977,235	5,773,714	2019 2019 2016	Colorado Department of Public Health & Environment, 2020 Colorado Recycling Totals, https://cdphe.colorado.gov/colorado-recycling-totals Colorado Department of Public Health & Environment, *2020 Annual Report to the Colorado General Assembly: Status of the Solid Waste Management Program in Colorado*, https://cdphe.colorado.gov/swreports Larimer County and SloanAzquezMcAfee, *2016 Waste Composition and*	Annual landfilled equals total MSW disposed in 2019 (6,115,262 tons) times the percentage of waste composition that is yard waste (11.9%) from the 2016 analysis. Annual recovered equals yard trimmings/wood (mulch) recycled (114,115 tons) plus yard trimmings/wood composted (129,289 tons) from the 2019 source document. Annual generated equals annual landfilled plus annual recovered.

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
						Characterization Analysis, https://www.larimer.org/sites/default/files/uploads/2017/wastesort.pdf	
Florida	1,980,276	3,780,600	5,760,876	21,538,187	2020	Florida Department of Environmental Protection, *2020 Florida Municipal Solid Waste Collected and Recycled*, https://floridadep.gov/sites/default/files/2020_MSW_Composition_Chart_and_Table-2.pdf	Annual landfilled equals annual generated minus annual recovered. Annual recovered is from the source document. Annual generated is from the source document.
Illinois	375,930	532,200	908,040	12,860,000	2014	Illinois Recycling Association*, Illinois Commodity/Waste Generation and Characterization Study Update*, https://www.illinoisrecycles.org/wp-content/uploads/2014/10/2015-Waste-Characterization-Update-FINAL.pdf	Annual landfilled equals yard waste-compostable (313,860) plus yard waste-woody (62,070) from source document. Annual recovered equals yard waste-compostable (444,300) plus yard waste -woody (87,900) from source document. Annual generated equals yard waste-compostable (758,110) plus yard waste-woody (149,930) from source document.
Maine	2,185	39,162	51,347	1,339,000	2018 2011	Maine Department of Environmental Protection, Maine Solid Waste Generation and Disposal Capacity Report for Calendar Years 2018 and 2019, https://www.nrcm.org/wp-content/uploads/2021/02/DEPwastereport2021.pdf	Annual landfilled equals overall disposal of MSW (823,281) times 1.48%, which is the percentage of total MSW disposed that is estimated to be yard waste from the 2011 analysis. Annual recovered equals 78,324 of yard waste in 2018 and 2019 that was managed through anaerobic digestion

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
						The University of Maine, *2011 Maine Residential Waste Characterization Study*, School of Economics Staff Paper #601, https://umaine.edu/wp-content/uploads/sites/2/2017/04/2011-Maine-Residential-Waste-Characterization-Study.pdf	and composting divided by 2 to get an estimate for one year. Annual generated equals annual landfilled plus annual recovered.
Maryland	339,269	722,021	1,061,290	6,003,000	2018 2016	Maryland Department of the Environment, *Maryland Solid Waste Management and Diversion Report 2019*, https://mde.maryland.gov/programs/LAND/AnalyticsReports/MSWMDR-%202019.pdf Maryland Department of the Environment, Maryland Solid Waste Management and Diversion Report 2017, https://mde.maryland.gov/programs/LAND/SolidWaste/Documents/MSWMR%20%2717.pdf	Annual landfilled equals total MSW accepted (5,561,784) times 6.1%, which is the percentage of MSW disposed that is yard trimmings from the 2016 analysis. Annual recovered equals the portion of compostables (339,103) in 2019 that are yard trimmings (85.3%) according to the 2016 report plus materials accepted by natural wood waste recycling facilities of 432,767. Annual generated equals annual landfilled plus annual recovered.
Massachusetts	94,738	173,912	268,650	7,029,917	2020 2019	Massachusetts department of Environmental Protection, *2020 Municipal Solid Waste & Recycling Survey Responses* (mudata20.xlsx), https://www.mass.gov/lists/recycling-solid-waste-data-for-massachusetts-cities-towns#municipal-solid-waste-&-recycling-data- SMP data reported to EPA Massachusetts Department of Environmental Protection, *Summary of Waste Combustor Class II Recycling*	Annual landfilled equals total MSW disposed from SMP data (3,789,518) times 2.5%, which is the percentage of MSW disposed that is prunings, trimmings, leaves, and grass from the 2019 analysis. Annual recovered is from the 2020 report. Annual generated equals annual landfilled plus annual recovered.

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
						Program Waste Characterization Studies (wxssum19.xlsx), https://www.mass.gov/guides/solid-waste-master-plan#-waste-characterization-&-capacity-studies-	
Michigan	431,427	508,892	940,319	9,984,000	2019 2018 2016	SMP data reported to EPA SMP data reported to EPA Michigan Department of Environmental Quality, *Economic Impact Potential and Characterization of Municipal Solid Waste in Michigan 2016*, https://www.michigan.gov/documents/deq/480236-14_WMSBF_waste_characterization_report_521920_7.PDF	Annual landfilled equals total MSW disposed from SMP data (8,628,543) times 5%, which is the percentage of MSW disposed that is yard waste from the 2016 analysis. Annual recovered is from 2018 SMP data. Annual generated equals annual landfilled plus annual recovered.
Minnesota	78,361	370,583	448,944	5,640,000	2019	Minnesota Pollution Control Agency, *Report on 2019 Score Programs*, https://www.pca.state.mn.us/waste/report-2019-score-programs	Annual landfilled and recovered are from the source document. Annual generated equals annual landfilled plus annual recovered.
Nevada	223,721	118,059	341,781	3,027,000	2019 2018	SMP data reported to EPA SloanVazquezMcAfee Municipal Solid Waste Advisors, *Two Season Waste Composition and Characterization Analysis*, https://www.washoecounty.gov/health/files/ehs/waste-management/WC_2_Season_Report_2018-07.pdf	Annual landfilled equals total MSW disposed from SMP data (3,107,238) times 7.2%, which is the percentage of MSW disposed that is yard waste from the 2018 analysis. Annual recovered is from 2018 SMP data. Annual generated equals annual landfilled plus annual recovered.

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
New Jersey	Not available	1,355,788	Not available	8,879,000	2019	New Jersey Department of Environmental Protection, *Material Trends 2001-2019,* https://www.nj.gov/dep/dshw/recycling/stat_links/material_trends.pdf?2018	Annual recovered equals grass clippings (138,618) plus leaves (648,126) plus brush/tree parts (569,044) from the source document.
North Carolina	221,499	725,879	947,378	10,380,000	2019 2018 2016-2017	SMP data reported to EPA SMP data reported to EPA Orange County Solid Waste Management, Orange County Waste Composition Study, June 2017, http://www.co.orange.nc.us/DocumentCenter/View/2826/2017-Orange-County-Waste-Characterization-Study-Final-Report-PDF	Annual landfilled equals total disposed MSW from 2019 SMP data times 1.6% from the 2016-2017 analysis. Annual recovered is from the 2018 SMP data. Annual generated equals annual landfilled plus annual recovered.
Ohio	Not available	1,357,574	Not available	11,680,000	2018	SMP data reported to EPA	Annual recovered is from the 2018 SMP data.
Pennsylvania	Not available	607,155	Not available	12,780,000	2016	Pennsylvania Department of Environmental Protection, *2016 Recycling Report*, https://files.dep.state.pa.us/Waste/Recycling/RecyclingPortalFiles/Documents/2016_Recycling_Report.pdf	Annual recovered from source document.

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Rhode Island	43,632	37,764	81,395	1,058,000	2019 2018 2015	SMP data reported to EPA SMP data reported to EPA Rhode Island Resource Recovery Corporation, *Rhode Island Solid Waste Characterization Study*, https://www.rirrc.org/sites/default/files/2017-02/Waste%20Characterization%20Sudy%202015.pdf	Annual landfilled equals annual total MSW disposed from SMP data (832,575) times 5.2%, which is the percentage of total municipal and commercial MSW disposed that is estimated to be leaf and yard trimmings. Annual recovered is from 2018 SMP data. Annual generated equals annual landfilled plus annual generated.
South Carolina	Not available	248,599	Not available	5,149,000	2019	South Carolina Department of Health and Environmental Control, *South Carolina Solid Waste Management Annual Report,* https://scdhec.gov/sites/default/files/media/document/2019%20SC%20Solid%20Waste%20Management%20Annual%20Report%20OR-1988_4.pdf	Annual recovered is from the source document.
South Dakota	26,461	65,448	91,909	878,698	2019 2018 2016	SMP data reported to EPA SMP data reported to EPA City of Sioux Falls South Dakota, Solid Waste Management Master Plan, https://siouxfalls.org/public-works/landfill/swm-mp	Annual landfilled equals annual total MSW (678,499) from 2019 SMP data time 3.9% from the 2016 analysis. Annual recovered is from the 2018 SMP data. Annual generated equals annual landfilled plus annual recovered.

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Texas	Not available	534,954	Not available	29,145,505	2020	Texas Commission on Environmental Quality, Municipal Solid Waste in Texas: A Year in Review, 2020 Data Summary and Analysis, https://www.tceq.texas.gov/downloads/permitting/waste-permits/publications/187-21.pdf	Annual recovered is from the source document.
Virginia	1,149,791	596,784	1,746,575	8,631,393	2020 2020 2013-2014	Virginia Department of Environmental Quality, *Virginia Annual Recycling Summary Report,* https://www.deq.virginia.gov/home/showpublisheddocument/12688/637750630967270000 Virginia Department of Environmental Quality, *2021 Annual Solid Waste Report for CY2020,* https://www.deq.virginia.gov/home/showpublisheddocument/9500 Prince William County, Virginia Solid Waste Division, *Waste Composition Study Summary of 2013-2014 Results*, http://gbbinc.com/wp-content/uploads/2013/10/PWC-Waste-Characterization-Final-Report.pdf	Annual landfilled equals annual total MSW disposed from *2021 Annual Solid Waste Report* (8,516,968) times 13.5%, which is the percentage of total MSW disposed that is estimated to be yard waste from the 2013-2014 analysis. Annual recovered is the estimated tons of yard waste from the 2020 *Recycling Summary Report.* Annual generated equals annual landfilled plus annual recovered.

State	Annual Yard Trimmings Landfilled (tons)	Annual Yard Trimmings Recovered (tons)	Annual Yard Trimmings Generated (tons)	Geographic Population	Year of Data	Source	Notes on Data Sources and Calculations
Washington	308,154	721,533	1,029,687	7,524,000	2018 2015-2016	State of Washington Department of Ecology, *Recovered material, collection, and sector data (2018)*, https://ecology.wa.gov/Research-Data/Data-resources/Solid-waste-recycling-data State of Washington Department of Ecology, *2015-2016 Washington Statewide Waste Characterization Study*, https://apps.ecology.wa.gov/publications/documents/1607032.pdf	Annual landfilled is the quantity of yard and garden waste (leaves, grass, and prunings) reported in the 2015-2016 study. Annual recovered is from the 2018 source document. Annual generated equals annual landfilled plus annual recovered.
Wisconsin	88,400	254,085	342,485	5,879,284	2020 2020-2021	Wisconsin Department of Natural Resources, Recyclable Materials Collected by Wisconsin Responsible Units (in tons), https://dnr.wisconsin.gov/sites/default/files/topic/Recycling/TableRUcollection2020.pdf Wisconsin Department of Natural Resources, 2020-2021 Wisconsin Statewide Waste Characterization Study, https://widnr.widencollective.com/portals/9locxp5m/SolidWasteinWisconsinLandfills	Annual landfilled is from the 2020-2021 source document. Annual recovered is from the 2020 source document. Annual generated equals annual landfilled plus annual recovered.