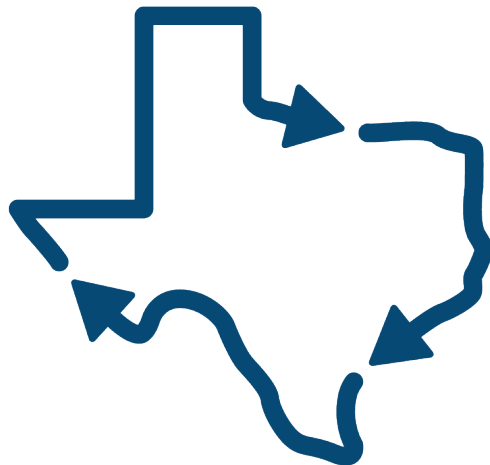


# Texas Recycling Data Initiative

A Collaborative Effort to Measure Recycling: Biennial Report (January 2015)



**TRDI**

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# Texas Recycling Data Initiative

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## Table of Contents

1 - Executive Summary .....	4
2 - Methodology .....	8
3 - Recycled Tons and Recycling Rate .....	12
4 - Economic Impact .....	30
5 - Acknowledgements .....	34

# 1 - EXECUTIVE SUMMARY

## WHAT IS TRDI?

The Texas Recycling Data Initiative (TRDI) is a collaborative effort to measure recycling in the state of Texas. The effort was initiated by a consortium of many stakeholders and is led by the State of Texas Alliance for Recycling (STAR). The goal of TRDI is to quantify the amount of recycling in Texas to examine environmental, economic and policy issues of interest to businesses, citizens and governmental agencies. In addition, TRDI seeks to establish a baseline recycling rate to measure future progress.

## BRIEF HISTORY

In 2010, a group of stakeholders conducted a series of meetings to build the framework for a statewide recycling study. They concluded that since very little statewide data existed, the effort would require a broad survey of Texas recyclers. In 2011, the State of Texas Municipal Solid Waste Management and Resource Recovery Advisory Council (MSWMRRAC) passed a resolution supporting the study. The need for a statewide survey gained greater visibility during the 2011 and 2013 sessions of the Texas Legislature. In response, STAR and the Lone Star Chapter of the Solid Waste Association of North America (TxSWANA) partnered to develop the Statewide Survey Development Stakeholder Group. To build support for a new survey requesting sensitive business data, this diverse consortium of public, private and nonprofit stakeholders recommended a:

- Voluntary approach to data gathering;
- Confidential process to ensure protection of proprietary data; and
- Narrow focus on the most essential data from key business types (mainly processors plus selected end users) that are needed to be as complete as possible while preventing double counting, based on real-world material flows.

TRDI received a strong response to this initial survey. In fact, the survey had one of the highest response rates ever recorded for a state-level, voluntary program managed through the Re-TRAC Connect data management platform.

## PROJECT LEADERSHIP

TRDI is led by STAR and a Steering Committee composed of representatives from across the recycling industry. Steering Committee members are recognized in Section 5 of this report, and their representative organizations are listed below.

American Forest & Paper Association
Carpet America Recovery Effort (CARE)
Carton Council
Construction & Demolition Recycling Association (CDRA)
Cooperative Teamwork and Recycling Assistance (CTRA)
Curbside Value Partnership
Institute of Scrap Recycling Industries — Gulf Coast Chapter and Scrap Tire Chapter
Municipal Solid Waste Management and Resource Recovery Advisory Council (MSWMRRAC)
National Waste and Recycling Association (NWRA)
North American Hazardous Materials Management Association (NAHMMA)
Recycling Council of Texas
Solid Waste Association of North America Lone Star Chapter (TxSWANA)
State of Texas Alliance for Recycling (STAR), including: <ul style="list-style-type: none"><li>o Greater DFW Recycling Alliance,</li><li>o Electronic Resource Recovery Council, and</li><li>o Texas Compost Council</li></ul>
Texas Association of Regional Councils (TARC)
Texas Coal Ash Utilization Group
Texas Commission on Environmental Quality (TCEQ)
Texas Product Stewardship Council
Texas Retailers Association
U.S. Environmental Protection Agency (EPA) Region 6

## METHODOLOGY

TRDI conducted a voluntary, confidential statewide survey of processors and end users of recyclables, systematically reviewing pertinent data available from industry associations and government agencies. This report summarizes the results of this groundbreaking statewide study of recycling in Texas.

A number of states report recycling quantities and rates, but comparing this information across states is notoriously challenging. The EPA published a standardized methodology in 1997 to help alleviate this issue, but even when states explicitly follow these guidelines, comparisons may still be difficult. Readers should keep the following points in mind when comparing TRDI results to other states. The following table was compiled based on Project Team experience and research.

**Table 1.1**  
**Statewide Recycling Rate Study Points to Consider**

<b>POINT TO CONSIDER</b>	<b>TRDI APPROACH</b>	<b>APPROACH FOR SOME OTHER STATES</b>
Definition of Recycling	Developed a methodology based on collecting data on municipal solid waste (MSW) as defined in Texas statute, and select non-MSW streams. Excludes source reduction, energy recovery and reuse.	Some states may include reuse, energy recovery, certain source reduction activities, other conversion technologies or non-MSW material.
Voluntary or Mandatory	Approach was strictly voluntary.	States that mandate local agencies and certain businesses submit recycling data may have a higher response rate.
Double Counting	Systematically focused on specific points in the material value chain to minimize double counting.	While some states take a similar approach, other approaches may not address double counting.
Addressing Data Gaps/Extrapolation	Did not extrapolate; employs conservative estimates only in a few key areas where essential to produce consistent results.	States may use any number of approaches to derive estimates where needed to address data gaps.
Accounting for Residuals	Accounted for residuals at materials recovery facilities (MRFs) and end-use facilities.	Some states may not account for residuals disposed at MRFs and/or at end-use facilities.
Generators Included	Included all types of MSW generators, such as residential homes, commercial businesses and institutions.	Some states report only residentially generated material, and some include certain industrial generators.
Counting Certain High-Volume Industrial Materials	Intentionally excluded industrial material from MSW statistics, but separately reported data on select industrial streams (e.g., metals and coal ash). Also, results may include some incidental quantities of industrial materials.	Some states count certain high-volume industrial materials such as metals, pre-consumer paper or plastic manufacturing scrap.

## RECYCLED TONS AND RECYCLING RATE

### Material Recycled from MSW Sources

As shown in Table 1.2, approximately 6.1 million tons of material from MSW sources was recycled in 2013. The 6.1 million recycled tons shown in the table are based on data collected through the TRDI survey as well as supplemental data received from other sources. The data does not include any extrapolation of tons recycled but only what was documented through the overall TRDI effort. The Project Team would note that, because the TRDI survey employed a rigorous and conservative methodology, and because the survey was voluntary, the actual tons recycled in Texas in 2013 was likely higher than what could be accounted for through the TRDI study.

### Material Recycled from Non-MSW Sources

TRDI identified three select material streams from non-MSW sources to include in the survey, including coal combustion products, non-MSW ferrous and non-ferrous metals, and organic materials. Survey respondents did not consistently report non-MSW organics separately from MSW materials; therefore, some non-MSW organics are included in the MSW number. Table 1.3 provides totals of all of the recycled material documented through the TRDI survey.

### Recycling Rate

An objective of TRDI was to not only measure recycling in Texas but also to develop a baseline MSW recycling rate against which future improvements can be measured. A recycling rate indicates what percentage of waste generated is recycled. Based on the tons of MSW recycled as measured by the TRDI survey, and state disposal data, the baseline MSW recycling rate calculated by TRDI for 2013 is **18.9 percent**.

### Curbside Recycling Analysis

Curbside recycling programs, especially single-stream programs, have become the backbone of residential recycling programs for many communities across Texas. A total of 20 large and local MRFs reported that 554,598 tons of curbside recyclable material was processed in 2013. Of this material, the average residual or contamination rate was 13 percent. The average annual material generated per household is **503 pounds**.

## ECONOMIC IMPACT

As an activity that makes use of locally generated raw material resources, recycling creates jobs and benefits local economies. Section 4 provides TRDI's estimates of employment related to processing MSW materials recycled in Texas. In addition to benefits directly attributable to recycling businesses, economic impact analysis also considers indirect benefits (e.g., jobs created by companies providing the goods and services that recycling businesses need to operate) as well as induced benefits (e.g., jobs created when employees of recycling businesses and their suppliers spend their salaries at local businesses). Including these direct, indirect and induced economic impacts, TRDI estimates that **12,678 Texas jobs** are supported by processing materials recovered from the MSW stream to prepare them for use by recycling manufacturers. Since TRDI's economic impact analysis covers processing activities (but not collection and manufacturing) of the MSW recycling stream (but not non-MSW materials), this estimate is intentionally conservative.

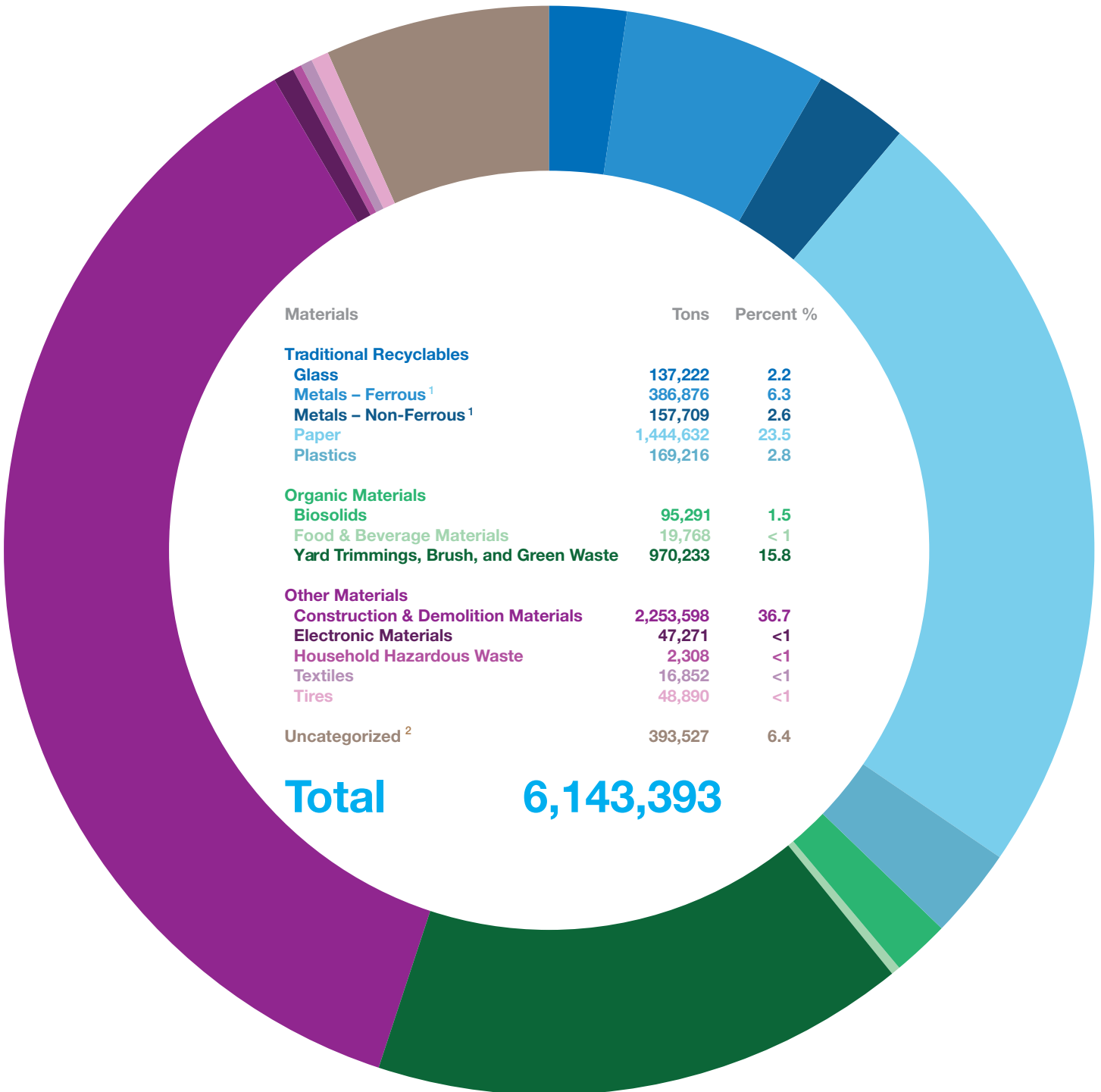
## SUPPLEMENTAL INFORMATION

In lieu of an appendix, supplemental information referenced throughout this report may be found on the TRDI website, [www.recyclingstar.org/cause/trdi](http://www.recyclingstar.org/cause/trdi).

**Table 1.3**  
**Material Recycled from MSW and Non-MSW Sources in 2013**

DESCRIPTION	TONS
Material from MSW Sources	6,143,393
Material from Non-MSW Sources	
Coal Combustion Products	1,789,414
Metals – Ferrous	5,528,665
Metals – Non-Ferrous	458,345
<b>Total</b>	<b>13,919,817</b>

**Table 1.2**  
**Material Recycled from MSW Sources in 2013**



1. The number shown in the table represents the portion of material that is MSW.

2. Includes all materials classified as “Other” by survey respondents. Respondents were required to provide a description. Respondents primarily reported commingled recyclables and commingled organic materials.

# 2 - METHODOLOGY

## OVERVIEW

The TRDI methodology followed important guiding principles intended to maximize participation and produce the highest quality results for the first recycling measurement study in the state of Texas. The principles that guided the development of the TRDI methodology are listed below.

- **Confidential:** Designed to protect the confidentiality of individual responses
- **Collaborative:** Developed using input from a broad range of stakeholders
- **Defensible:** Consistent with accepted industry standards for measuring recycling
- **Straightforward:** Created to be simple while collecting meaningful data
- **Voluntary:** Developed with respect for respondents that participate on a voluntary basis

## CONFIDENTIALITY PLAN

A confidentiality plan protects the proprietary nature of individual responses. A copy of the confidentiality plan can be found on the TRDI website, [www.recyclingstar.org/cause/trdi](http://www.recyclingstar.org/cause/trdi).

## STAKEHOLDER ENGAGEMENT

TRDI is a collaborative effort, and its success depends on input, endorsement, and involvement from a broad range of recycling industry stakeholders, Industry

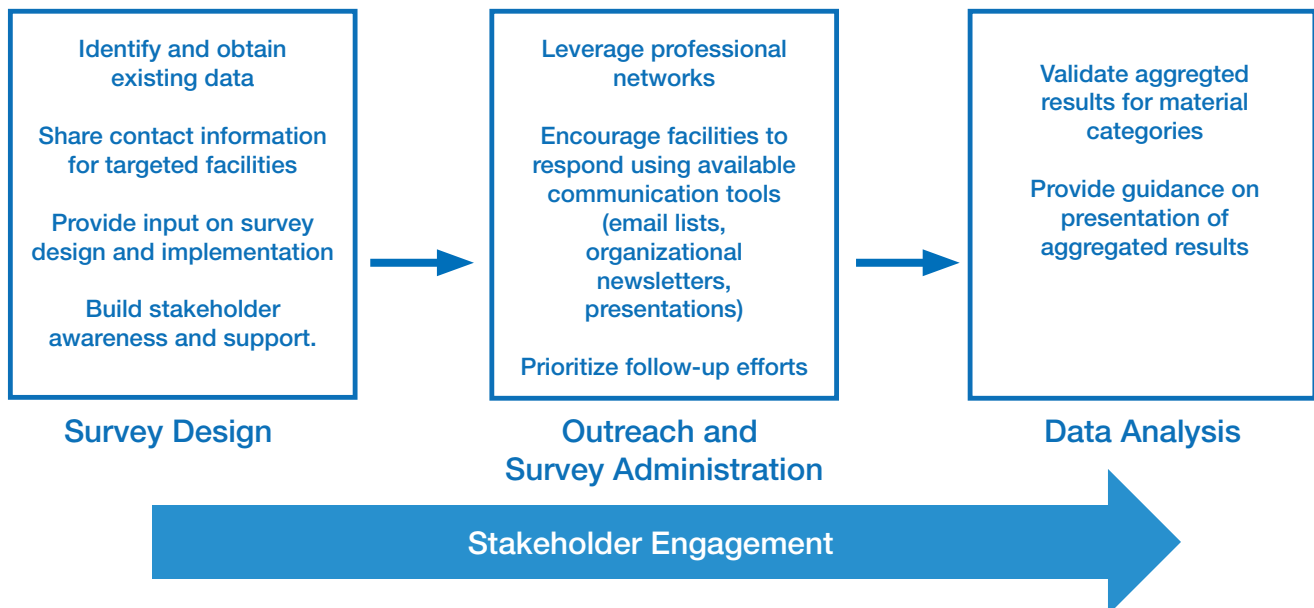
representatives, including Steering Committee members and others, were engaged throughout the TRDI project.

## What is recycling?

TRDI employed a rigorous methodology to ensure that the results are in accordance with widely accepted industry standards for measuring recycling. This is reflected in our focus on MSW, post-consumer recycled materials.

This initial TRDI study focuses on **recycling** in the state of Texas, defined as the series of activities by which material that has reached the end of its current use is processed into material utilized in the production of new products.<sup>1</sup> The study does not cover other effective and commonly used methods to divert material from disposal, such as:

- Source reduction activities like green purchasing or home composting;
- Refurbishment or reuse of products for the originally intended use, such as consumer electronics or clothing;
- Conversion or combustion of materials to fuel or energy;
- Land application of biosolids;
- Land reclamation or beneficial use projects using tire shreds or bales; or
- Disposal or on-site use of material at a landfill for road stabilization or alternative daily cover.





## What materials are included?

The TRDI survey asked respondents to report on 14 types of materials that, if not recycled, would have been considered **municipal solid waste (MSW)**, as opposed to non-MSW materials. According to the Texas Administrative Code, material is considered MSW if it is generated by residential, commercial or institutional sources.<sup>2</sup> Retailers, schools, hospitals, single-family homes, apartment buildings, public parks and sports complexes are all examples of MSW generators. The survey asked respondents to not report material that, if not recycled, would have been considered industrial solid waste, defined as the byproduct of industrial, manufacturing or agricultural processes.<sup>3</sup> TRDI did collect information on select industrial recycled materials based on input from the Steering Committee. These materials are coal combustion by-products, ferrous and non-ferrous scrap metal, and non-MSW organic material. These materials were selected because they are recycled on a large scale, and these recycling activities are quantifiable.

The TRDI survey also asked respondents to report only **post-consumer** recycled materials, as opposed to pre-consumer materials. One example of pre-consumer material is scrap generated in manufacturing facilities, which is commonly reused on-site or sold through well-established industry channels.

In addition, TRDI **excluded any portion of recovered material that is disposed, such as process residuals or contamination**. To accomplish this, TRDI asked processors to report the quantity of material shipped to brokers or end users, and asked end users to report the quantity of recycled material received and used to produce new products. Where necessary, the Project Team applied conservative estimates of typical residual rates to account for disposal at end-use facilities, in consultation with industry representatives.

Table 2.1 lists the material categories for the TRDI survey. Definitions are available on the TRDI website.

## What facilities participated?

The survey asked respondents to identify whether their facility is a processor and/or an end user of recyclable material. The survey also asked respondents to identify the types of processing and end-use activities that occur at their facility, selecting from seven types of standardized **processing activities** and four types of end-use activities, as listed in Table 2.2. In some cases, facilities reported more than one processing and/or **end-use activity**. For definitions of these recycling activities, please refer to the TRDI website.

**Table 2.1  
Material Categories**

TRADITIONAL RECYCLABLES	ORGANIC MATERIALS	OTHER MATERIALS
Glass Metals – Ferrous Metals – Non-Ferrous Paper Plastic	Biosolids (i.e. sludge) Food and Beverage Materials Yard Trimmings, Brush and Green Waste	Construction and Demolition Materials Electronic Materials Household Hazardous Waste Textiles Tires Other (respondent must specify)

**Table 2.2  
Recycling Activities**

PROCESSING ACTIVITIES	END-USE ACTIVITIES
C&D processing Electronics processing Household hazardous waste collection Material recovery Textile processing Tire processing	Compost/mulch production Glass beneficiation Plastics reclamation End product manufacturing, including: <ul style="list-style-type: none"> <li>• Glass containers</li> <li>• Fiberglass</li> <li>• Pulp, paper or paperboard</li> <li>• Metals smelter or melter</li> <li>• Plastics converter</li> <li>• Other (respondent must specify)</li> </ul>

## How is double counting prevented?

With any effort to collect recycling information, it is critical to avoid double counting material. Double counting can occur when material flows from one respondent to another and is reported by multiple entities.

The Project Team employed the following rigorous process to eliminate double counting:

- **Confirmed understanding of the flow of materials in Texas.** The Project Team included experts familiar with recycling markets who, during the stakeholder engagement process, confirmed their understanding of Texas-specific flows for each material included in the survey.
- **Focused analysis on select points in the recycling value chain.** Understanding the flow of materials allowed the Project Team to pinpoint specific facility types in the recycling value chain for each material. For instance, to collect data on recycled paper, the Project Team targeted material recovery facilities (MRFs). In addition, the Project Team targeted paper mills, suppliers and brokers to capture material that does not go through MRFs (i.e., direct-to-mill material).
- **Asked respondents to report material shipped to other Texas-based processors rather than an end user.** If a respondent indicated that it shipped material to other processors, the survey required the respondent to list the processors. After the close of data collection, the Project Team conducted a comprehensive double-counting review using this information and removed all material that was reported by multiple entities.

## What is the reporting period?

The TRDI survey asked respondents to provide data for **January 1 through December 31 of 2013**. In the event that data for this reporting period was not available from a particular facility, respondents provided data for an alternate 12-month period. Several respondents provided data for the state's fiscal year of Sept. 1, 2012, through Aug. 31, 2013.

## How are imports and exports taken into account?

The intent of the TRDI survey is **to capture recycled materials generated in Texas**. To account for material generated in Texas that is transported outside of Texas for processing or end use (i.e., exported), the Project Team identified key facilities outside of Texas to include in the survey. These facilities are primarily in surrounding states, including Oklahoma, Arkansas and Louisiana, plus a small number of facilities in other states. The Project Team did not target facilities outside of the United States to participate in the survey, but it did review export and

import data available through the U.S. Census Bureau, specifically for ferrous and non-ferrous metals.

To account for material generated outside of Texas that is transported to Texas for processing or end use (i.e., imported), the Project Team asked respondents to indicate on the survey the percentage of reported materials generated outside of Texas. These materials were excluded from the TRDI data.

## What are the reporting units?

In completing the survey, respondents could select from the following available reporting units: tons (preferred), pounds, compacted cubic yards, uncompacted cubic yards, gallons, tires, or other (must specify). The Project Team converted all reported units to tons.

## IDENTIFYING TARGETED FACILITIES

The Project Team gathered information from a variety of sources to compile the list of facilities targeted for the survey. It undertook significant efforts to verify and refine the list during the survey process. Many facilities were discovered that 1) had consolidated locations, 2) had discontinued operations, 3) did not meet the description of a facility targeted for the survey, 4) were not operational during the reporting period, 5) had been sold to another responding company, and/or 6) had duplicate records from multiple lists. Following are the key sources used to identify facilities.

### Regulatory Sources

The Texas Commission on Environmental Quality (TCEQ) maintains records and publishes an annual report listing MSW landfills and processing facilities that are permitted and registered.<sup>4</sup> The Project Team included the following types of such facilities in the TRDI survey.

- **Composting facilities:** All permitted and registered composting facilities were included in the TRDI survey.
- **Recycling & Recovery facilities:** All permitted and registered Recycling & Recovery facilities were included in the TRDI survey.
- **Landfills reporting diversion:** All MSW landfills are required to provide an annual report to TCEQ covering the types and quantities of waste disposed or processed at the facility. Many landfills divert material from disposal and report the quantities of diversion in the annual report. The Project Team surveyed all landfills that reported more than 100 tons of diverted material in their FY 2013 annual report. This list of landfills includes many landfills that operate on-site composting facilities.

Certain recycling facilities are not required to obtain a permit or registration but must only provide notification of intent to operate a recycling or composting facility. TCEQ provided a list of these facilities to include in the survey.

It is important to note that, while TCEQ maintains records of permitted and registered recycling facilities and requires certain facilities to submit notification, these records cannot be considered a comprehensive list of recycling facilities in the state of Texas. There are factors that allow certain facilities to be exempt from permitting, registration and notification. To compile a comprehensive list of targeted facilities, as well as to obtain contact information for facilities identified through regulatory sources, the Project Team relied on industry experience, the Steering Committee, and the supplementary sources of data described in this section.

Although scrap metal processing facilities were not targeted to participate in the TRDI survey, the Project Team also referenced the Department of Public Safety (DPS) list of active Metals Recycling Entities (MREs).

## Trade Organizations

The Project Team gathered available facility lists and contact information from trade organizations.

- Construction & Demolition Recycling Association (CDRA) — Provided a list of Texas members.
- Electronic Resource Recovery Council (ERRC) — Provided a list of all Texas-based facilities that have completed the E-Stewards and R2 certifications.
- Texas Compost Council (TCC) — Provided a membership list.
- Lone Star Chapter of the Solid Waste Association of North America (TxSWANA) — Cross-referenced the TRDI list with membership list.
- National Waste and Recycling Association (NWRA) — Cross-referenced the TRDI list with membership list.
- North American Hazardous Materials Management Association (NAHMMA) — Provided a list of household hazardous waste (HHW) programs in Texas.
- American Forest and Paper Association (AF&PA) — Provided a list of members involved in paper stock processing and an estimate of recovered paper consumption by Texas mills.
- Association of Postconsumer Plastics Recyclers (APR) — Provided information on plastic reclaiming facilities and material flows in and near Texas.
- Glass Packaging Institute (GPI) — Provided a list of members in Texas.
- STAR membership list, including glass container manufacturers and glass beneficiation facilities.
- Rubber Manufacturers Association (RMA) — Provided a list of key tire processors in Texas.

## Councils of Government

Some Texas Councils of Government (COGs) have compiled lists of recyclers or companies involved in recycling. The Project Team requested that COGs provide any available lists of facilities as well as contact information.

## Other Sources

In addition to the sources listed above, the Project Team consulted publicly available facility information and lists identified through web-based search. The Project Team also referenced professional contacts for individual Project Team members and Steering Committee members.

## SURVEY ADMINISTRATION

### Pre-Survey Outreach

The Steering Committee and Project Team raised awareness and informed potential respondents about TRDI prior to the release of the survey. Individual Steering Committee members communicated within their professional networks to increase awareness about the upcoming survey and encourage members of their respective organizations to respond. In addition, the Project Team conducted outreach with trade organizations as part of the stakeholder engagement process. TRDI was also the subject of a keynote presentation at the STAR Summit in October 2014, one week prior to release of the survey. [Sara Nichols of STAR wrote an article in the June 2014 issue of Resource Recycling magazine](#) describing TRDI and the upcoming survey.<sup>5</sup> This article is posted on the TRDI website.

### Distribution and Follow-Up

The TRDI survey was developed using the Re-TRAC Connect™ online platform, and the Project Team distributed the link to the survey via email.<sup>6</sup> All targeted respondents with valid email addresses received an initial survey notice, including survey link, during the week of Oct. 15, 2014. Many more respondents received emails after they were obtained as part of telephone outreach. The survey deadline was Nov. 21, 2014. During the five-week survey period, potential respondents received an average of one follow-up communication per week, by phone and/or email.

When Project Team members made follow-up calls to potential respondents, the purpose was to 1) identify the appropriate point of contact for that facility, and 2) secure an oral commitment to complete the survey. Once the Project Team received an oral commitment for a facility to complete the survey, the focus of future follow-up calls shifted to reminding the potential respondent of the survey deadline.

In certain cases, respondents expressed unwillingness or inability to log into Re-TRAC Connect to complete the survey. In those cases, Project Team members collected data over the phone or via a brief email questionnaire. When respondents submitted surveys, a lead Project Team member reviewed each submitted survey to verify and ask for clarification as needed on any reported information.

# 3 - RECYCLED TONS AND RECYCLING RATE

## TOTAL RECYCLED FROM MSW SOURCES IN 2013

As shown in Table 3.1, approximately 6.1 million tons of Texas material was recycled in 2013.

The 6.1 million Texas-recycled tons are based on data collected through the TRDI survey as well as supplemental data received from other sources. The data does not include any extrapolation of tons recycled but only what was documented through the overall TRDI effort.

**Table 3.1**  
**Material Recycled from MSW Sources in 2013**

Materials	Tons	Percent %
<b>Traditional Recyclables</b>		
Glass	137,222	2.2
Metals – Ferrous <sup>1</sup>	386,876	6.3
Metals – Non-Ferrous <sup>1</sup>	157,709	2.6
Paper	1,444,632	23.5
Plastics	169,216	2.8
<b>Organic Materials</b>		
Biosolids	95,291	1.5
Food & Beverage Materials	19,768	< 1
Yard Trimmings, Brush, and Green Waste	970,233	15.8
<b>Other Materials</b>		
Construction & Demolition Materials	2,253,598	36.7
Electronic Materials	47,271	< 1
Household Hazardous Waste	2,308	< 1
Textiles	16,852	< 1
Tires	48,890	< 1
<b>Uncategorized<sup>2</sup></b>	<b>393,527</b>	<b>6.4</b>

**Total 6,143,393**

1. The number shown in the table represents the portion of material that is MSW.

2. Includes all materials classified as “Other” by survey respondents. Respondents were required to provide a description. Respondents primarily reported commingled recyclables and commingled organic materials.

## TOTAL MATERIAL RECYCLED INCLUDING NON-MSW SOURCES

TRDI identified select material streams from non-MSW sources to include in the survey, including coal combustion products, non-MSW ferrous and non-ferrous metals, and organic materials. Survey respondents did not consistently report non-MSW organics separately; therefore, non-MSW organics are included in the MSW number. Table 3.2 below totals all of the recycled material documented through the TRDI survey. The remainder of this section provides a detailed discussion of the data reported in Table 3.1 and 3.2.

**Table 3.2**  
**Material Recycled from MSW and Non-MSW Sources in 2013**

DESCRIPTION	TONS
Material from MSW Sources	6,143,393
Material from Non-MSW Sources	
Coal Combustion Products	1,789,414
Metals – Ferrous	5,528,665
Metals – Non-Ferrous	458,345
<b>Total</b>	<b>13,919,817</b>

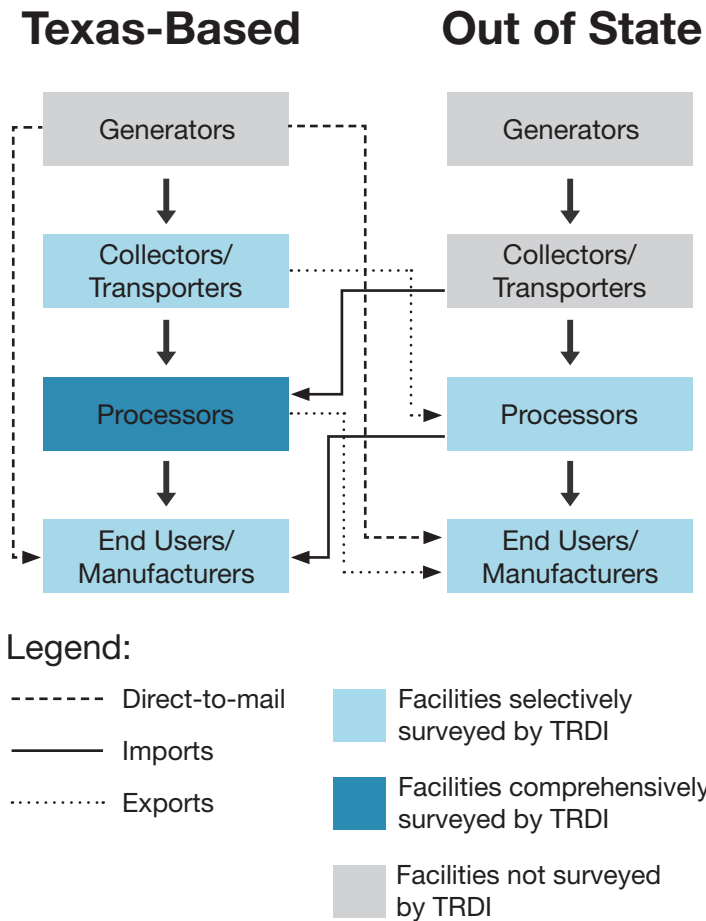
## RECYCLED MATERIAL VALUE CHAIN

Figure 3.1 is a conceptual illustration of the recycled material flows analyzed by TRDI. The Project Team’s intent was to measure the quantity of material generated in Texas that ultimately is recycled, whether inside or outside of Texas. To measure this, the Project Team focused primarily on surveying Texas-based processors and, for certain materials, end users. In addition, the Project Team collected data on recycled HHW from HHW collection facilities. Last, the Project Team identified key out-of-state processors and end users to participate in the survey to capture material that is transported out of state that would have otherwise been missed.

### Generators

Generators of MSW recyclables include residential homes (such as single-family dwellings and apartment buildings), businesses (such as restaurants, office parks and retail stores) and institutions (such as hospitals, universities and government facilities). As discussed in Section 2, the focus of TRDI is to collect data on materials that, if not recycled, would have been considered MSW. Therefore, non-MSW materials, such as industrially generated waste, were not included in the survey.

**Figure 3.1**  
**Recycled Material Value Chain**



### Collectors/Transporters

The recycling industry in Texas has a dynamic collection infrastructure that includes hundreds of private and public enterprises providing collection and hauling services such as: residential recyclables from municipal curbside and drop-off recycling programs; paper from office buildings; and metals from auto shops and commercial facilities. It also includes large retailers and grocery stores that bale material, mostly cardboard, and transport it directly to end users.

For efficiency and to prevent double-counting in measuring Texas recycling, the Project Team primarily focused on gathering data from processors, not collectors/transporters. However, in collaboration with industry stakeholders, the Project Team determined that Texas-based HHW collection facilities (rather than processors) would be the best sources of data on HHW recycled. Therefore, for the HHW material category, the Project Team surveyed collection facilities rather than processors.

### Texas-Based Processors

As reflected in Figure 3.1, Texas-based processors were a key focus of the TRDI survey effort. Processors of recyclables (such as MRFs, C&D MRFs, electronics processing facilities, textile processing facilities, and tire

processing facilities) focus on disassembling, sorting, shredding, baling and/or otherwise preparing recycled materials to be sold to end users. While some recyclables may be exported to processing facilities in neighboring states, the vast majority of Texas-generated recyclables are shipped to facilities within the state. The survey asked respondents to identify the percentage of their processed material that was imported from outside of Texas.

MRFs processing traditional recyclables — glass, metals, paper and plastic — were a significant source of data for this study. The Project Team identified and targeted 25 large, commercial MRFs to participate in the survey. These facilities process large quantities of material through long-term processing agreements with municipalities as well as commercial accounts. **Of these 25 top-priority MRFs, 22 responded to the TRDI survey. For the three unresponsive facilities, the Project Team was able to obtain partial data from major customer cities. Therefore, the data presented in this report includes either complete or partial data for all of the large, commercial MRFs in the state of Texas.** In addition to large, commercial MRFs, there were seven small, local MRFs that responded to the TRDI survey, representing approximately 40 percent of the local MRFs surveyed by the Project Team.

### Texas-Based End Users

Although large quantities of Texas-generated recyclables are shipped to other states or countries for use in manufacturing, the state is home to several important end users. These include: two glass container manufacturing plants, two fiberglass insulation plants, several paper or paperboard mills, five steel mills, dozens of small foundries and smelters consuming ferrous or non-ferrous scrap, and a variety of plastics converters. Texas is also home to two glass beneficiation facilities, several plastics reclamation facilities and a large number of compost and mulch production facilities. These three categories are sometimes classified as processors in recycling studies (and are included in TRDI's processing employment estimates in Section 4), but were defined as end users in the TRDI survey because it helped to simplify responses in the online form. End users were included in the survey primarily to capture material that does not flow through a processing facility but comes in directly from generators. In some cases, end-user responses also helped to validate recycling quantities based on processor responses alone.

### Out-of-State Processors

As reflected in Figure 3.1, a relatively small quantity of material that is generated in Texas is transported outside of Texas to be processed. Therefore the Project Team, in coordination with stakeholders, identified key out-of-state processing facilities to participate in the survey.

### Out-of-State End Users

There are several key end users outside of Texas that source recyclables generated in Texas. Therefore the

key out-of-state end users and manufacturers to participate in the survey.

## CURBSIDE RECYCLING ANALYSIS

Curbside recycling programs, especially single-stream programs, have become the backbone of residential recycling programs for many communities across Texas. Because of this, the Project Team included survey questions in order to gather information specific to these programs. Specifically, the Project Team asked respondents to identify how much material processed at their facility came from curbside recycling programs, what is the residual or contamination rate for the material, and how many households generated the material.

A total of 20 large and local MRFs provided details concerning quantities of curbside collected materials. They reported that 554,598 tons of curbside recyclable material was processed in 2013. Of this material, the average residual or contamination rate was 13 percent. This tonnage is generated by at least 900,000 households in Texas; however, it should be noted that several of the facilities were not able to provide information on the number of households, so this figure is understated. The average annual material generated per household is 503 pounds (note that this is based on only 12 of the reporting facilities)

The TRDI survey also asked respondents to report, if possible, the percentage of households using bags, bins or carts for set-out. This data was not widely reported by responding MRFs, so the Project Team is not able to report any average figures. However, based on facilities that did report this information, there is a trend toward using carts for curbside collection. This trend is consistent with other similar Texas studies, such as the Regional Recycling Rate Benchmarking Study for the North Central Texas Council of Governments (NCTCOG).<sup>13</sup> This study found cities with cart-based programs have higher annual pounds per household than programs using bins or bags for collection.

## RECYCLING RATE

An objective of TRDI was to not only measure recycling in Texas but also to develop a baseline MSW recycling rate against which future improvements can be measured. A recycling rate indicates what percentage of waste generated is recycled and is typically calculated using the formula in Figure 3.2.

To calculate a recycling rate, the Project Team determined the tons of MSW disposed during the survey time period of Jan. 1 through Dec. 31, 2013. TCEQ requires MSW landfills to submit annual and quarterly reports of tons disposed according to the state's fiscal year of Sept. 1 through Aug. 31. Using this data provided by TCEQ, the Project Team calculated average monthly disposal for the FY 2013, the first quarter of 2014, and the second quarter of 2014. The

Project Team combined the average monthly disposal numbers from the applicable months to estimate tons disposed in calendar year 2013.

It should be noted that the disposal numbers reported by MSW landfills in Texas include non-hazardous industrial waste as well as tons imported from out of state, but the Project Team was able to exclude these streams from the estimate shown in Table 3.3.

Based on the tons of recycling measured by the TRDI survey, the baseline recycling rate calculated by TRDI for 2013 is 18.9 percent, as shown in Figure 3.2. Many states have developed statewide recycling rates that can be compared to this rate calculated by TRDI; however, it is critical to consider potential methodology differences, as summarized in Table 1.1 of this report, when comparing recycling rates across states. In addition to differences in study methodology, there are many other reasons that recycling rates will differ from state to state, including economic variables (e.g. relative cost of disposal) and regulatory factors (i.e. legislative mandates related to recycling).

**Figure 3.2**  
**2013 TRDI Recycling Rate**

$$\text{Total Recycled} / (\text{Total Recycled} + \text{Total Disposed}) = \% \text{ Recycling Rate}$$

$$\frac{\text{Total Recycled } 6,143,393 \text{ tons}}{\text{Total Recycled } 6,143,393 \text{ tons} + \text{Total Disposed } 26,380,522 \text{ tons}} = 18.9\% \text{ Recycling Rate}$$

**Table 3.3**  
**Estimated MSW Disposed — Jan. 1-Dec. 31, 2013**

TIME PERIOD	MONTHLY TONS	NUMBER OF MONTHS	TOTAL TONS
Jan. 1 – Aug. 31, 2013	2,326,700	8	18,613,600 <sup>1</sup>
Sep. 1 – Nov. 30, 2013	1,956,283	3	5,868,849 <sup>2</sup>
Dec. 1 – Dec. 31, 2013	1,898,073	1	1,898,073 <sup>3</sup>
<b>Total</b>	<b>N/A</b>	<b>12</b>	<b>26,380,522</b>

1. Source: Municipal Solid Waste in Texas: A Year in Review, FY 2013 Data Summary and Analysis  
2. Source: TCEQ quarterly reports, Q1 FY 2014  
3. Source: TCEQ quarterly reports, Q2 FY 2014

## MATERIAL SUMMARIES

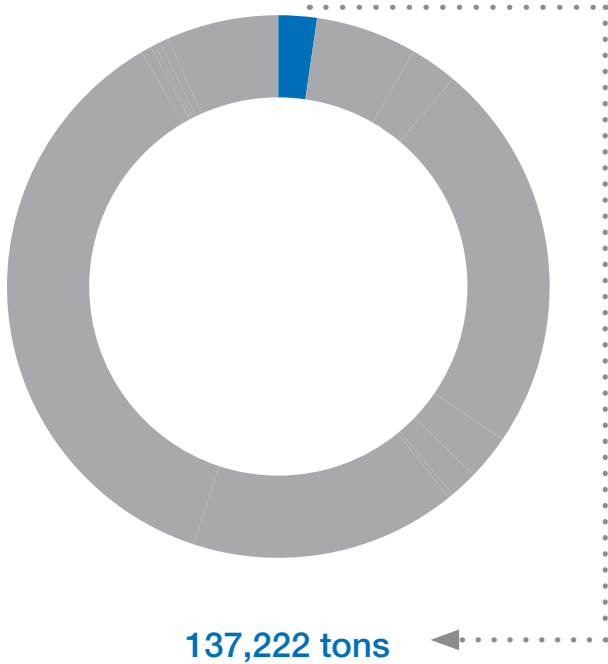
The following sections provide material-by-material scorecards of the tons documented through TRDI and the relative quality of data received. For each material, the Project Team has included:

- **Total Tons:** Includes tons reported through the TRDI survey and tons reported through supplemental data sources. Pie chart quantities are consistent with the information provided in Table 3.1.
- **The Story:** Provides a summary of the major material flows and the types of facilities targeted for the TRDI survey.
- **TRDI Survey Data:** Includes the number of tons reported through the TRDI survey, the number and types of facilities represented, and a discussion of quality of data received and potential remaining data gaps.
- **Supplemental Data:** Includes the number of tons documented through supplemental data sources and the number of facilities represented.

For each material category, the Project Team provides the number of facilities that did not respond to the survey. Based on the number of unresponsive facilities, the quality of data received, and the possibility for remaining data gaps, the Project Team assigned each material category a relative confidence level of Strong or Moderate.

**TRDI received a strong response to this initial survey. In fact, the survey had one of the highest response rates ever recorded for a state-level, voluntary program managed through the Re-TRAC Connect data management platform.**

## Glass



137,222 tons

**Confidence: Strong**

### The Story

Much of the recycled glass in Texas flows through commercial and local MRFs to a small number of glass beneficiation facilities, which provide secondary processing to further prepare the material for end users. While most recycled glass in Texas flows through MRFs, some (mainly commercial window and plate glass) flows directly from generators to beneficiation facilities. To obtain a complete understanding of the quantity of glass recycled in Texas, the Project Team surveyed MRFs, glass beneficiation facilities (secondary processors), and end product manufacturing facilities (including two container and three fiberglass insulation plants).

---

### TRDI Survey Data: 137,222 tons

#### Facilities Responding: 39 total facilities, including:

- 25 commercial MRFs (includes 3 MRFs with partial data)
- 10 landfills, local MRFs and transfer/collection stations
- 4 end-use facilities, including glass beneficiation and end product manufacturing facilities

As previously mentioned, the Project Team obtained data from 25 large, commercial MRFs in Texas (including three facilities with partial data), with only a small number of small, local MRFs not responding to the survey (17 facilities). Large commercial MRFs process material via long-term processing agreements with municipalities as well as commercial accounts. Therefore, the glass survey data presented above represents the vast majority of Texas glass that was recycled through MRFs in 2013.

The Project Team also received responses from four of six glass end users. Based on discussions with industry representatives, where necessary the Project Team assumed a glass beneficiation residual rate of 20 percent. Based on these responses, the Project Team determined that the vast majority of Texas recycled glass flows were captured.

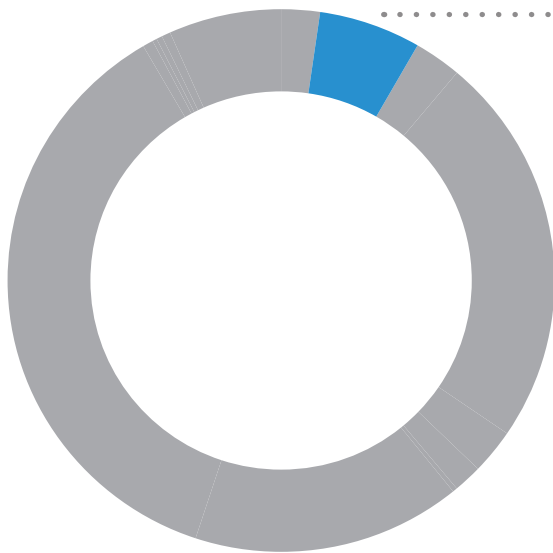
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### Supplemental Data: None

The Project Team relied on the TRDI survey to collect all data related to glass and did not identify available supplemental sources of statewide data covering Texas.



## Metals – Ferrous



**386,876 tons estimated from MSW sources**  
(5,915,541 tons from all sources)

**Confidence: Strong**

### The Story

Ferrous scrap is generated from a wide variety of sources and includes auto bodies, appliances, industrial equipment, and other discarded parts and products, as well as relatively small quantities of steel cans that are used as packaging. While steel cans are likely to be processed at MRFs, most other ferrous scrap is collected by one of the state's 655 registered scrap metal processors (as of December 2013). Many of these processors are small and may sell their material to a small number of larger processors. Ferrous scrap flows to one of five steel mills in Texas or to one of numerous small foundries in the state. Significant quantities are also shipped to consumers in other states or countries.

Due to the availability of existing government data sources, the complexity of material flows, and the significant confidentiality concerns in the scrap metal industry, the Project Team used a combination of TRDI survey data and supplemental data to estimate the total amount of ferrous metal recycled.

### TRDI Survey Data: 99,270 tons

Facilities Responding: 83 total facilities, including:

- 39 landfills
- 25 commercial MRFs (includes 3 MRFs with partial data)
- 4 local MRFs and transfer stations
- 10 C&D processing facilities
- 4 electronics processors
- 1 HHW collection facility

Most of the ferrous metals reported through the survey came from responsive commercial and local MRFs, with some material also reported by other facility types. The Project Team obtained data from 25 large commercial MRFs in Texas (including three facilities with partial data). Large commercial MRFs process material via long-term processing agreements with municipalities as well as commercial accounts. However, most ferrous metals are processed by scrap metal processing facilities, which the Project Team determined were not feasible to comprehensively survey. Consequently, supplemental data was used.

### Supplemental Data: 5,816,271 tons

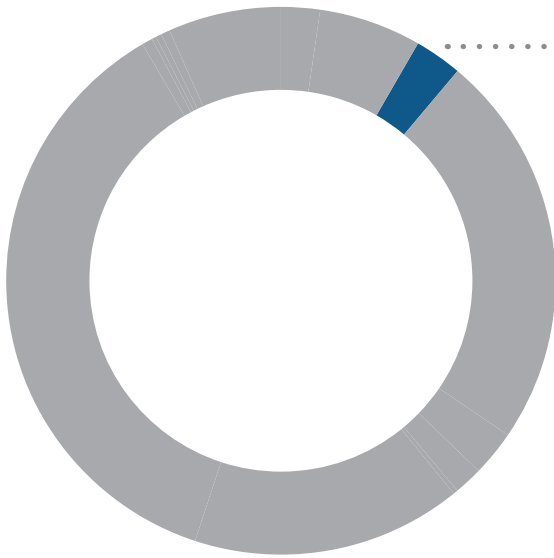
Facilities Represented in Data

- 5 steel mills
- 655 registered scrap metal processing facilities
- Steel foundries

Based on existing data obtained by the Project Team from the U.S. Geological Survey (USGS) and the U.S. Census Bureau (USCB) and interviews with numerous ferrous metal processors, the total quantity of Texas-generated ferrous scrap recycled in 2013 was estimated to be 5,915,541 tons. However, this estimate includes material that does not meet the definition of MSW used in this study. To calculate the portion of this total that should

be considered MSW, the Project Team divided the EPA's most recent estimate for ferrous metal MSW recycled (5.55 million tons<sup>7</sup>) by the Institute for Scrap Recycling Industries' (ISRI) most recent estimate for all ferrous scrap processed (84.9 million tons<sup>8</sup>). Using this methodology, the Project Team considered 6.54 percent of total recycled ferrous scrap, or 386,876 tons, to be recycled MSW as defined in this study. Therefore, 287,606 tons of recycled ferrous metals from the MSW stream were not accounted for through the TRDI survey and were added to the tons reported through the survey for a total of 386,876 tons from the MSW stream.

## Metals – Non-Ferrous



157,709 tons from MSW sources  
(616,054 tons from all sources)

### The Story

Non-ferrous scrap is generated from a wide variety of sources and includes industrial equipment, miscellaneous parts and products, and aluminum cans and other packaging. While aluminum cans are likely to be processed at MRFs, most other non-ferrous scrap is collected by one of the state's 655 registered scrap metal processors. Most of these processors are small and may sell their material to larger processors. Small amounts of non-ferrous scrap are consumed by processors in Texas, but the vast majority is shipped to consumers in other states or countries.

Due to the complexity of material flows and the significant confidentiality concerns in the scrap metal industry, the Project Team developed an alternative survey approach in which Steering Committee representatives independently interviewed more than 20 large scrap metal processors, end users and others involved in the Texas scrap metal recycling industry.

**Confidence: Strong**

### TRDI Survey Data: 616,054 tons

#### Facilities Responding: 69 total facilities, including:

- 25 commercial MRFs (includes 3 MRFs with partial data)
- 18 non-ferrous processors (aggregated by industry representative and provided to TRDI)
- 11 C&D processing facilities
- 8 landfills
- 3 local MRFs
- 3 electronics processors
- 1 HHW collection facility

Based on industry interviews, the Project Team was able to estimate the total amount of non-ferrous metal recycled by the 18 largest non-ferrous processors. Based on this, the Project Team estimated that 616,054 tons of Texas-generated non-ferrous scrap was recycled in 2013, including copper, nickel, aluminum, lead, zinc, tin, and stainless steel. However, this number includes non-MSW scrap. Of this amount, TRDI estimates that 25.6 percent, or 157,709 tons, can be considered recycled municipal solid waste as defined in this study. To calculate this percentage, the Project Team divided the EPA's most recent estimate for non-ferrous metal MSW recycled<sup>9</sup> by the Institute for Scrap Recycling Industries' (ISRI) most recent estimate for all non-ferrous scrap processed<sup>10</sup>.

### Supplemental Data: None

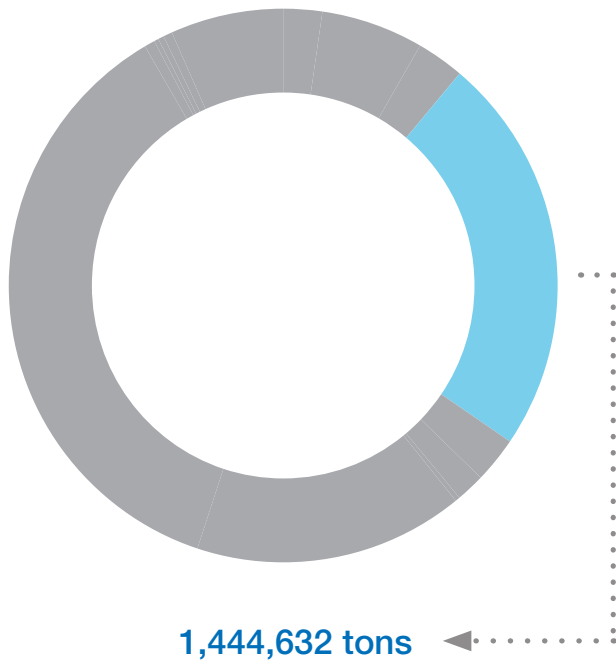
The Project Team relied heavily on information provided by several large processors as well as data collected through the TRDI survey. Similar to the ferrous metals methodology, the Project Team also considered data on nonferrous exports and imports from the U.S. Census Bureau, but no other useful third party existing data sources covering Texas were available.

## Paper

### The Story

Recycled paper – including newspaper, cardboard, office paper, and food cartons – is generated from residences through curbside and drop-off recycling programs, and from commercial paper recycling service providers. Most is processed at MRFs and/or paper stock dealers in Texas. Significant amounts (mainly cardboard) are also recovered and baled at large retailers and grocery stores, which are often shipped directly to mills or brokers. Recovered paper flows are extremely complex. Paper and paperboard mills located in Texas consume recovered paper that they receive from both in-state and out-of-state suppliers. Significant quantities of recovered paper are sent from Texas to other states or exported to other countries, including Mexico and overseas from ports in Texas and California. An unknown portion of paper exported from Texas originated in other states. And many paper manufacturers operate collection and/or processing activities in Texas, while many others rely on brokers to procure supply.

To collect data on recycled paper in Texas, TRDI first considered MRFs and incidental amounts of paper reported by other facility types. The Project Team added significant quantities of direct-to-mill material reported by paper mills and supply companies in Texas and nearby states.



1,444,632 tons

**Confidence: Moderate**

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### TRDI Survey Data: 1,444,632 tons

**Facilities Responding: 60 total facilities, including:**

- 25 commercial MRFs (includes 3 MRFs with partial data)
- 16 landfills and transfer/collection stations
- 9 paper mills and mill-affiliated supply operations in Texas, Oklahoma and Louisiana
- 5 paper-only MRFs and paper stock dealers
- 5 local MRFs

As previously mentioned, the Project Team obtained data from all 25 large, commercial MRFs in the state of Texas (including three facilities with partial data). Large commercial MRFs process material via long-term processing agreements with municipalities as well as commercial accounts. Therefore, the TRDI numbers represent a comprehensive understanding of the quantity of paper flowing through MRFs in the state. There was also a strong response from several mills and affiliated recovered paper supply operations in Texas and surrounding states. However, there were more than six key companies that operate mills and/or supply operations in Texas and surrounding states that were unresponsive. Moreover, significant quantities of recovered paper may be handled by brokers or other firms that were not identified as specifically operating in Texas. Therefore, the reported tons for paper are likely understated.

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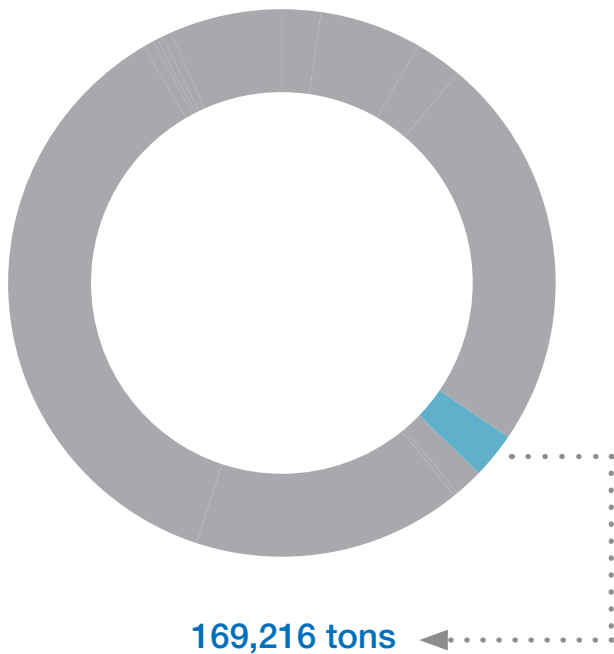
### Supplemental Data: None

The Project Team relied on the TRDI survey to collect all data related to paper and did not identify available supplemental sources of statewide data covering Texas. However, export data from the U.S. Census Bureau and recovered paper consumption data for Texas mills from the American Forest & Paper Association were compiled and considered.

## Plastic

### The Story

Much of the recycled plastic in Texas flows through commercial and local MRFs. In addition, there is a small number of plastic reclamation facilities, which provide secondary processing for recycled plastic to further prepare the material for end users. Recycled plastic flows are very complex. Many reclaimers handle a mix of pre- and post-consumer material, and significant quantities of material flow into and out of Texas, including flows between reclaimers, which often also act as converters (i.e., manufacturers). Therefore, to collect data on the amount of Texas plastic recycled, the Project Team focused on surveying MRFs.



169,216 tons

**Confidence: Strong**

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### TRDI Survey Data: 169,216 tons

#### Facilities Responding: 36 total facilities, including

- 25 commercial MRFs (includes 3 partial responses)
- 7 local MRFs
- 2 plastics reclamation facilities
- 2 landfills

The Project Team obtained data from 25 large, commercial MRFs in the state of Texas (including three facilities with partial data), with only a small number of small, local MRFs not responding to the survey (17 facilities). Large commercial MRFs process material via long-term processing agreements with municipalities as well as commercial accounts. Therefore, the plastic data presented in this report represents the vast majority of the plastic that is recycled through MRFs in the state.

The Project Team did survey plastic reclamation facilities; however, lower priority was placed on these facilities since the Project Team determined these facilities primarily process pre-consumer material. There were 10 unresponsive plastic reclamation facilities.

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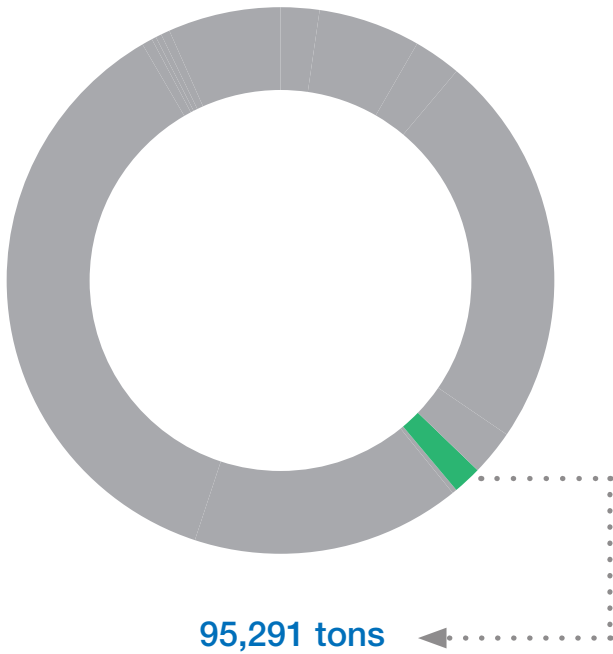
### Supplemental Data: None

The Project Team relied on the TRDI survey to collect all data related to plastic and did not identify available supplemental sources of statewide data covering Texas.

## Biosolids

### The Story

Wastewater biosolids are managed in a variety of ways in Texas, including landfill disposal as well as composting. Biosolids may be combined with yard trimmings, brush, green waste or other bulking agents to produce nutrient-rich compost. To collect data for biosolids, the Project Team focused on surveying compost/mulch production facilities.



**Confidence: Strong**

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### TRDI Survey Data: 95,291 tons

**Facilities Responding: 7 total facilities, including**

- 6 compost/mulch production facilities
- 1 landfill-based compost/mulch production facility

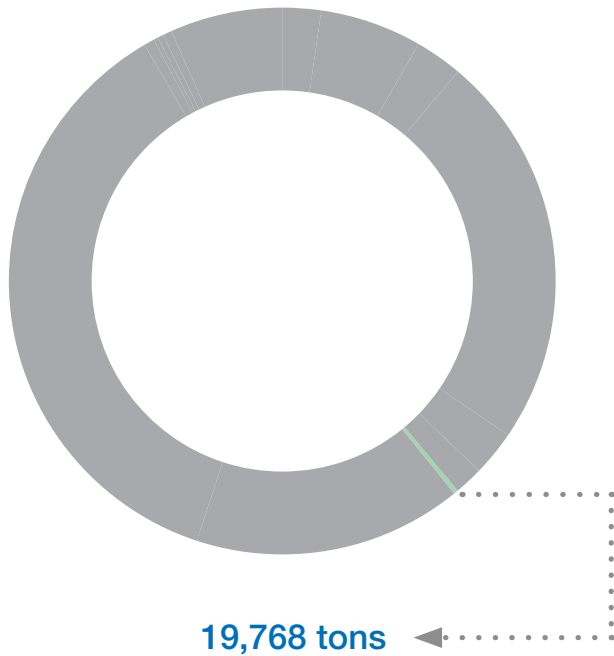
The 7 responsive facilities are among the largest municipal composters of biosolids in Texas. Conducting a comprehensive survey of compost/mulch production facilities in Texas is a significant challenge. There is a large number of relatively small facilities, many of which are exempt from regulatory authorizations (e.g., notification, registration or permit). Obtaining the cooperation of these small facilities, which may have limited knowledge of TRDI, is very difficult. There were 81 compost/mulch production facilities that did not respond to the TRDI survey. The Project Team expects that very few of these facilities, if any, process biosolids.

---

### Supplemental Data: None

The Project Team relied on the TRDI survey to collect all data related to biosolids and did not identify available supplemental sources of statewide data covering Texas.

## Food and Beverage Materials



19,768 tons

**Confidence: Strong**

### The Story

The primary method to divert discarded food and beverage materials from disposal is through composting. Select municipalities in Texas have developed curbside programs to divert food scraps generated from households. In addition, select food service establishments have developed programs to divert this material. In some cases, agricultural operations and food product manufacturers may divert pre-consumer food and beverage materials via composting. The Project Team asked that compost/mulch production facilities report this material separately in order to distinguish between MSW and non-MSW material. However, many compost/mulch production facilities were not able to separately report non-MSW materials; therefore, the total number of food and beverage materials reported above does include some non-MSW material.

---

**TRDI Survey Data: 19,768 tons**

**Facilities Responding: 6 compost/mulch production facilities**

The responsive facilities represent most of the key compost/mulch production facilities in Texas that compost food and beverage materials. In fact, the Project Team identified only two unresponsive facilities known to compost food and beverage material.

As previously discussed under “Biosolids,” conducting a comprehensive survey of compost/mulch production facilities in Texas is a significant challenge. There were 81 compost/mulch production facilities that did not respond to the TRDI survey. However, the Project Team expects that very few of these facilities, if any, compost food and beverage materials.

---

**Supplemental Data: None**

The Project Team relied on the TRDI survey to collect all data related to food and beverage materials and did not identify available supplemental sources of statewide data covering Texas.

## Yard Trimmings, Brush and Green Waste



970,233 tons

**Confidence: Moderate**

### The Story

Municipal curbside collection programs, landscape companies, land clearing operations and other entities are generators of yard trimmings, brush and green waste. The primary means of recycling these materials is the production of mulch and compost. Therefore, the Project Team surveyed compost/mulch production facilities to collect data for this material type.

---

### TRDI Survey Data: 970,233 tons

**Facilities Responding: 60 total facilities, including:**

- 30 compost/mulch production facilities
- 30 landfill-based compost/mulch production facilities

The 30 responsive compost/mulch production facilities are among the largest facilities in Texas. Conducting a comprehensive survey of compost/mulch production facilities in Texas is a significant challenge. There is a large number of relatively small facilities, many of which are exempt from regulatory authorizations (e.g., notification, registration or permit). Obtaining the cooperation of these very small facilities, which may have limited knowledge of TRDI, is very difficult. There were 81 compost/mulch production facilities that did not respond to the TRDI survey.

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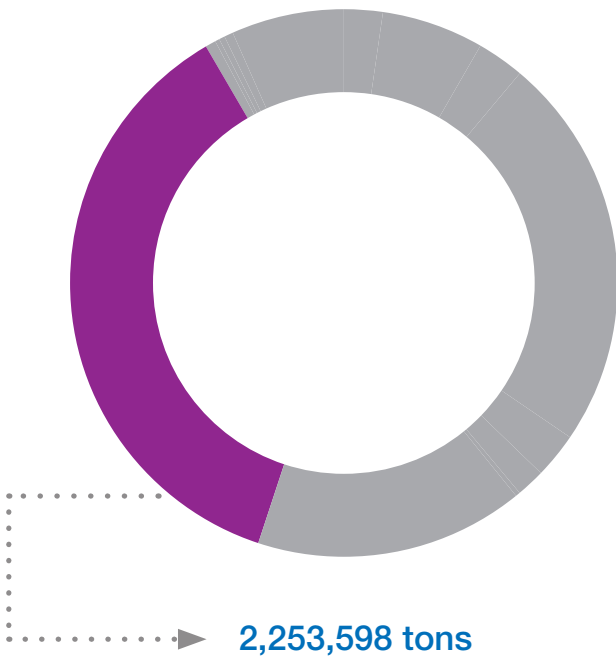
### Supplemental Data: None

The Project Team relied on the TRDI survey to collect all data related to yard trimmings, brush and green waste and did not identify available supplemental sources of statewide data covering Texas.

## Construction and Demolition Materials

### The Story

C&D materials are generated by new construction, demolition and renovation of residential and commercial buildings. C&D material is primarily processed at facilities that specialize in handling commingled materials generated from these projects. In addition, some landfills have developed on-site recycling operations for this material. To collect data for C&D recycling, the Project Team focused on surveying C&D processing facilities and landfills.



**Confidence: Moderate**

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### TRDI Survey Data: 2,253,598 tons

#### Facilities Responding: 18 total facilities, including:

- 11 C&D processing facilities
- 7 landfills and transfer stations

The 18 responsive facilities include many of the larger C&D processing facilities in Texas, as well as recycling activity across different geographic regions. There were 46 unresponsive facilities (representing 33 companies) that did not respond to the TRDI survey, some of which are known by the Project Team to process significant tonnage. Because of the number of key facilities outstanding for this material type, the reported tons for C&D materials is likely understated.

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### Supplemental Data: None

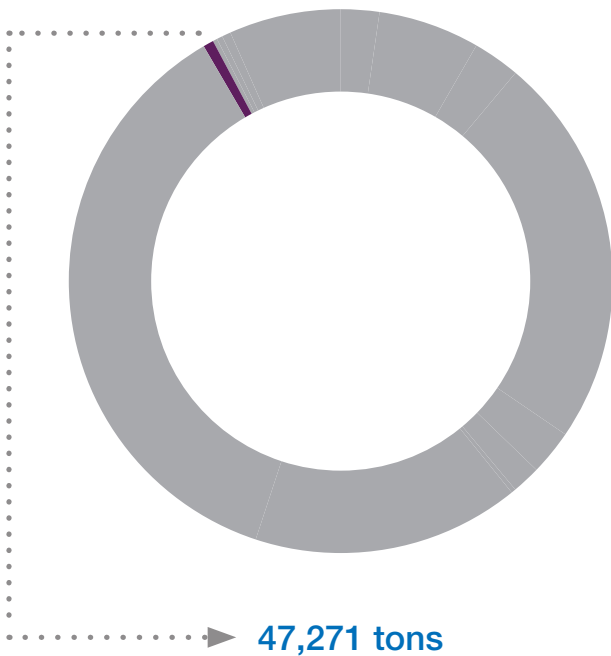
The Project Team relied on the TRDI survey to collect all data related to construction and demolition materials and did not identify available supplemental sources of statewide data covering Texas.



# Electronic Materials

## The Story

Electronics materials are processed by facilities that deconstruct, shred, sort, bale and/or otherwise prepare electronics materials to be sold to end users, brokers or exporters. While there are many facilities that actively process electronic materials for recycling, many electronics are refurbished or reused (which was not covered by TRDI). In addition, electronics processors will frequently buy and sell materials to other electronics processors or other processors (such as plastics reclaimers or scrap metal processing facilities). The Project Team focused on surveying electronics processors and was vigilant to prevent double counting for this material. In addition, the Project Team identified available supplemental data available through TCEQ. All tons for this category were reported in aggregate and not broken down into constituent commodities, such as plastic and metal.



**Confidence: Moderate**

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## TRDI Survey Data: 27,405 tons

**Facilities Responding: 29 total facilities, including:**

- 17 landfills and municipal collection programs
- 12 electronics processing facilities

There were many strategic and large electronics processing facilities that responded to the TRDI survey. However, there were inherent challenges to collecting data from electronics processors. For instance, the total number of facilities was relatively large. In addition, many electronics processing facilities in Texas are part of national or multinational corporations that require corporate-level approval for the release of any data. Many companies were not able to participate because they were unable to obtain corporate approval. There were 83 unresponsive electronics processors. It should be noted that many of these facilities may focus significant efforts on reuse/refurbishment and have minimal recycling data to report.

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## Supplemental Data: 19,866 tons

**Facilities Represented in Data: 70 total facilities, including:**

- 36 computer manufacturers
- 34 television manufacturers

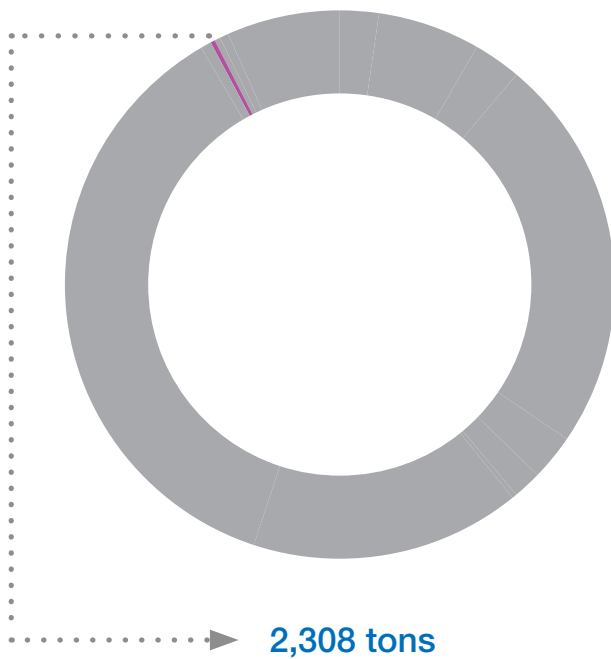
The Project Team incorporated data from the Texas Recycles Computers Program. Specifically, this program requires that manufacturers of computers (including desktop and notebook computers, as well as monitors) provide free and convenient recycling options for the products they sell in and into Texas. Manufacturers reported recycling 11,349 tons of electronics in 2013.<sup>11</sup>

The Texas Recycles TVs Program is very similar to the Texas Recycles Computers Program in that it requires manufacturers of televisions to provide recycling options for the products they sell in or into Texas. Manufacturers and retailers reported recycling 8,517 tons of electronics in 2013.<sup>12</sup>

# Household Hazardous Waste

## The Story

Management of HHW in Texas is primarily handled by local governments. To collect HHW data, the Project Team focused on surveying HHW collection facilities, most of which are owned and operated by local governments. It should be noted that a significant amount of material collected through HHW collection facilities is reused or appropriately disposed. Combined with the relatively low quantities of material generated, this is a reason that the quantity of material recycled in this category is relatively low compared to other categories.



**Confidence: Moderate**

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## TRDI Survey Data: 2,308 tons

### Facilities Responding: 20 total facilities, including:

- 17 HHW collection facilities
- 2 commercial MRFs
- 1 landfill

The Project Team identified 19 HHW collection facilities that did not respond to the TRDI survey. Some of these facilities are known to handle large quantities of material.

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## Supplemental Data: None

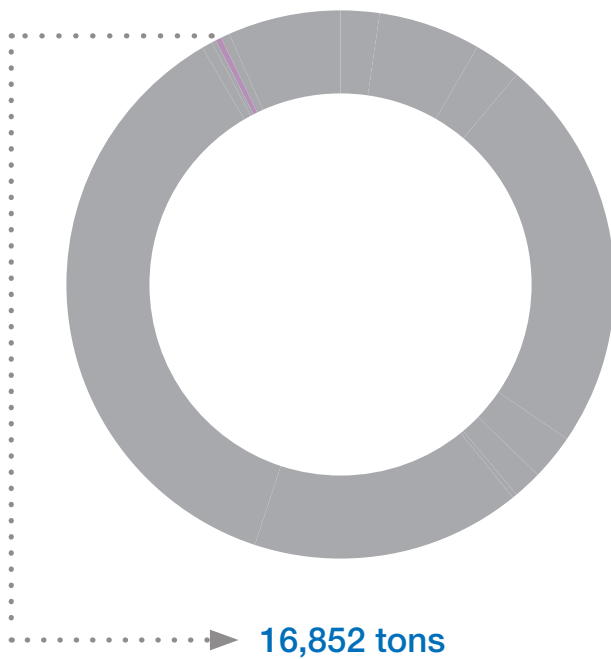
The Project Team relied on the TRDI survey to collect all data related to HHW and did not identify available supplemental sources of statewide data covering Texas.

## Textiles

### The Story

Textile recycling includes materials such as clothing, footwear, linens and carpet. According to Project Team research, the vast majority of discarded clothing, footwear and linens is donated or otherwise reused. Therefore, the primary material recycled in this category is carpet.

Recycled carpet must be recovered directly by a collector that specializes in recycling carpet. Carpet cannot be commingled with other C&D materials and sorted at C&D processing facility. To collect data on recycled carpet, the Project Team worked with Carpet America Recovery Effort (CARE), a carpet recycling trade organization that aggregates data from carpet collectors in Texas. In addition, the Project Team, along with industry representatives, contacted carpet manufacturing facilities outside of Texas to gather information on direct-to-mill material.



**Confidence: Strong**

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### TRDI Survey Data: 16,852 tons

#### Facilities Responding:

- 3 end product manufacturers (outside of Texas)
- 80 percent of carpet collectors in Texas

CARE collects data from carpet recyclers in Texas and provided information collected from companies that represent 80 percent of the companies in Texas. In addition, the Project Team received direct-to-mill information from three large carpet manufacturers. Therefore, the numbers presented above include a very complete understanding of carpet recycling in Texas.

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### Supplemental Data: None

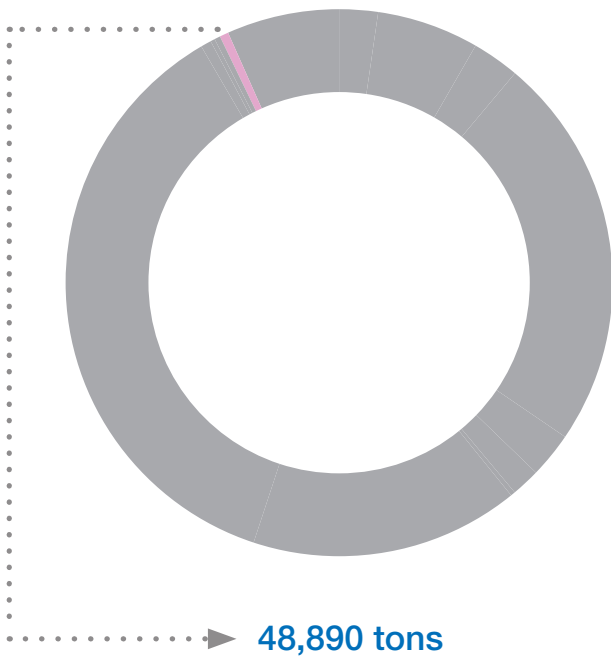
The Project Team relied on the TRDI survey to collect all data related to textiles and did not identify available supplemental sources of statewide data covering Texas.

## Tires

### The Story

TCEQ regulates the collection, processing, storage, recycling and disposal of approximately 22 million scrap tires annually, in addition to tires stored in stockpiles which may enter the stream at irregular rates. There are many options to divert scrap tires from disposal, including land reclamation projects using tires, beneficial use projects, pyrolysis, and production and use of tire-derived fuel. Although these are acceptable forms of tire management and diversion, they are not considered recycling for the purposes of this study.

The Project Team focused on surveying tire processing facilities to gather information on tire recycling in Texas, along with supplemental information from TCEQ.



**Confidence: Strong**

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### TRDI Survey Data: 27,081 tons

#### Facilities Responding: 33 total facilities, including:

- 31 landfills and transfer/collection stations
- 2 tire processing facilities

The Project Team did not obtain a strong survey response from tire processing facilities. There were seven relatively large tire processing facilities that did not respond. However, the Project Team was able to develop a statewide estimate based on supplemental data.

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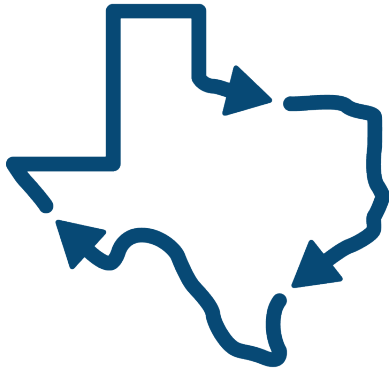
### Supplemental Data: 21,209 tons

#### Facilities Represented in Data:

- 53 scrap tire processors/facilities

Under the TCEQ's Scrap Tire Program, registered scrap tire facilities and processors must submit an annual report to TCEQ with the total number of tires that they dispose, recycle or beneficially reuse. Based on information provided in this report, there were an estimated total of 48,890 tons of tires recycled in Texas in 2013 into crumb rubber which, in turn, was used to produce a variety of products. Therefore, approximately 21,209 tons of tires were unaccounted for in the TRDI survey.

## Coal Combustion Products



### The Story

There are approximately 20 coal-fired power generation facilities in Texas that generate 13 million tons of coal combustion products annually, including fly ash, bottom ash and flue gas desulphurization material. These materials are recycled and used to manufacture a variety of products, including cement, wallboard and other construction materials (i.e., aggregates).

Material marketers handle material generated by power generation facilities. Marketers have processing systems and testing in place to prepare the coal combustion products to be used in manufacturing. Material marketers were targeted for participation in the TRDI survey.

1,789,414 tons

**Confidence: Moderate**

---

**TRDI Survey Data: 1,789,414 tons**

Facilities Responding: 3 material marketers

Approximately half of the material marketers that are active in Texas responded to the TRDI survey.

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**Supplemental Data: None**

The Project Team relied on the TRDI survey to collect all data related to coal combustion products and did not identify available supplemental sources of statewide data covering Texas.

# 4 - ECONOMIC IMPACT

## OVERVIEW

As an activity that makes use of locally generated raw material resources, recycling creates jobs and benefits local economies. This section provides TRDI’s estimates of employment related to processing MSW materials recycled in Texas. Since TRDI’s economic impact analysis covers processing activities (but not collection and manufacturing) of the MSW recycling stream (but not non-MSW materials) the corresponding employment estimates are **intentionally conservative**.

To provide a complete picture, as shown in Table 4.1, this section also describes the results of two other recent recycling economic impact studies that covered a broader scope of scrap materials, industry segments and/or geographic areas than TRDI. In addition to benefits directly attributable to recycling businesses, economic impact analysis also considers indirect benefits (e.g., jobs created by companies providing the goods and services that recycling businesses need to operate) as well as induced benefits (e.g., jobs created when employees of recycling businesses and their suppliers spend their salaries at local businesses). While the specific methods and definitions vary in these economic impact studies, together they clearly illustrate the real and tangible economic benefits

that the recycling industry contributes to the state of Texas and its communities.

**Analysts measure the economic benefits of recycling collection, processing, and end use in a variety of ways, but most agree that the processing sector – the engine that converts “waste” into valuable manufacturing feedstock – provides the clearest benefits.**

## TRDI ANALYZES STATEWIDE PROCESSOR IMPACTS FOR MSW ONLY

While this TRDI study focused primarily on quantifying the amount of MSW recycled in Texas, survey respondents were also asked to report the number of people employed at their facilities. Based on TRDI survey responses and the number of estimated facilities in Texas, the Project Team projected the total amount of direct, statewide employment at recycling processing facilities. The Project Team used conservative assumptions regarding typical jobs per facility for different types of processors (compost producers and glass beneficiators were included as processors for this analysis) and only focused on the MSW portion of processing facilities (specifically for metals).

**Table 4.1**

**Coverage and Employment Results of Recent Recycling Industry Economic Impact Analysis Studies**

STUDY	TYPES OF MATERIALS COVERED		RECYCLING STAGES COVERED			TOTAL NUMBER OF DIRECT, INDIRECT AND INDUCED JOBS
	MSW	Non-MSW	Collection	Processing	Manufacturing	
TRDI	✓			✓		12,678
ISRI	✓	✓		✓		43,710
H-GAs	✓	✓	✓	✓	✓	16,766

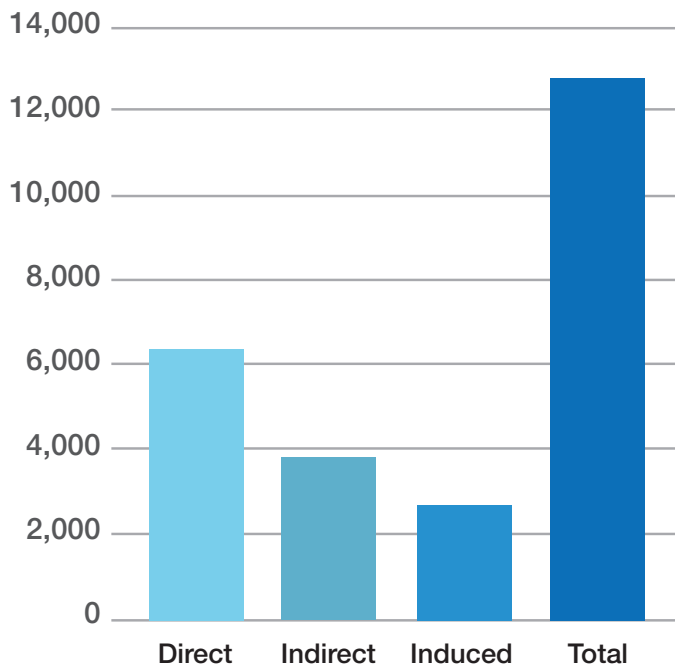
As shown in Figure 4.1, TRDI estimates a total of 6,216 direct jobs. Including indirect and induced impacts (using multipliers developed for the H-GAC study), TRDI found that at least 12,678 jobs are supported by Texas MSW recycling processors.

**ISRI STUDY ANALYZES STATEWIDE PROCESSOR IMPACTS INCLUDING NON-MSW SCRAP**

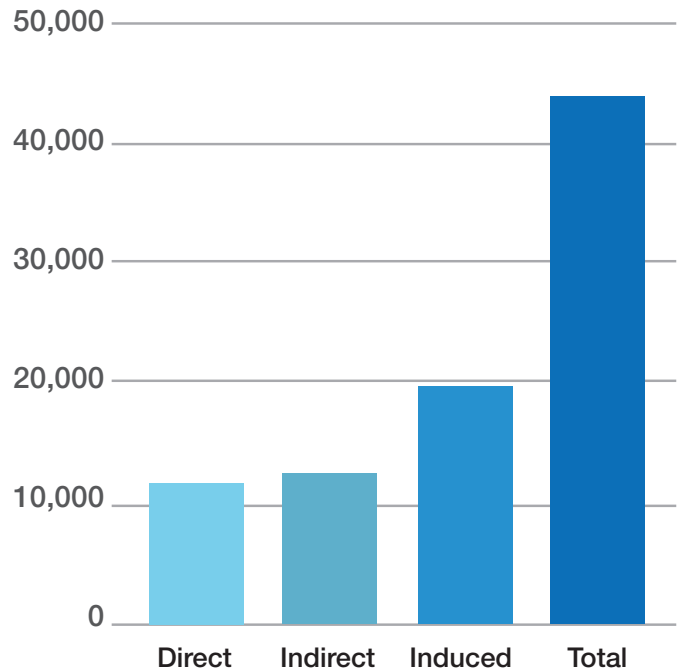
In 2014, the Institute for Scrap Recycling Industries (ISRI) completed a recycling economic impact study covering the entire U.S., as well as individual states.<sup>14</sup> The study found that 11,665 people are directly employed at Texas-

based firms that purchase, process and broker scrap materials to be manufactured into new products, and that these firms have a combined payroll of \$867 million and directly contribute more than \$3 billion to the Texas economy. The study covered many materials included in the TRDI study (e.g. metals, paper, electronics, rubber, plastics, glass and textiles). Accounting for indirect and induced impacts, the ISRI study found that Texas recycling firms are responsible for a total of 43,710 jobs paying over \$2.6 billion in wages and contributing over \$8.8 billion to the Texas state economy, while generating \$342.8 million in tax revenues for Texas and its local governments.

**Figure 4.1**  
TRDI Estimate of Jobs Associated with Processing MSW Scrap in Texas



**Figure 4.2**  
ISRI Estimates of Jobs Attributable to Texas Firms that Purchase, Process and Broker MSW and Non-MSW Scrap Materials (Source: ISRI)

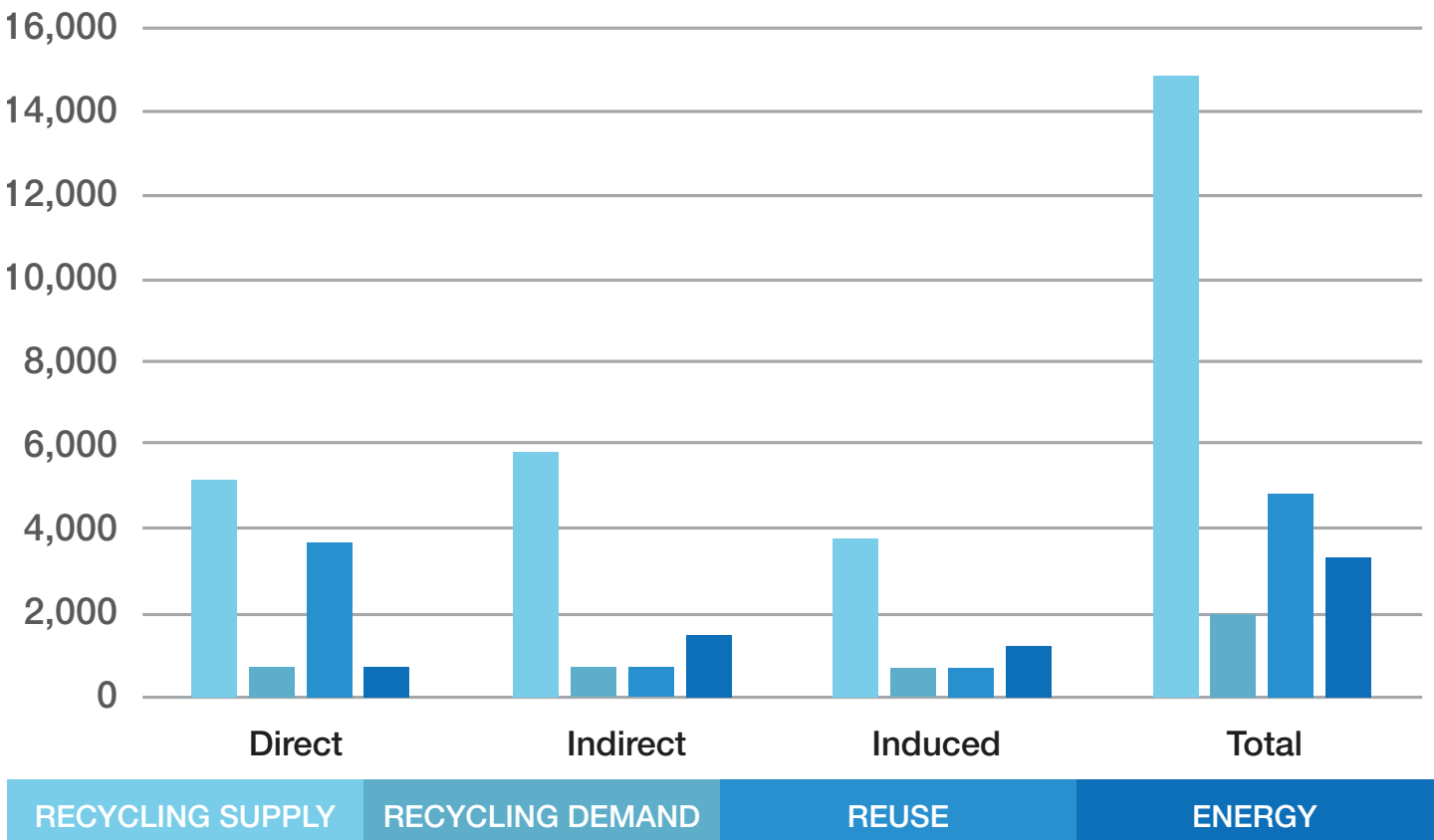


## H-GAC STUDY ANALYZES IMPACTS OF A BROADER RANGE OF RECYCLING-RELATED INDUSTRY SECTORS FOR MSW AND NON-MSW MATERIALS

In 2013, the Houston-Galveston Area Council (H-GAC) completed a recycling economic impact study<sup>15</sup> that, while covering only one region of Texas, analyzed a broader range of recycling-related businesses than TRDI or ISRI. The Houston-Galveston region includes 13 counties with a total population of 6.5 million, about a quarter of the state's total population. The study found that firms involved in the supply of recyclables (e.g., collectors and processors) directly employ 5,186 people, and that firms on the demand side (e.g., manufacturers using recycled feedstock to make new products) employ 744 people. All told, when indirect and induced impacts are considered for both the supply and demand side, the recycling industry is responsible for 16,766 jobs with a payroll of over \$1 billion, and with a total contribution to the Houston-Galveston regional economy of over \$1.8 billion.

The study also analyzed two related industries. It found that the reuse and remanufacturing industry directly employs 3,704 people and that, when indirect and induced impacts are included, this industry is responsible for 4,784 jobs with a payroll of over \$154 million, with a total contribution of over \$238 million to the regional economy. And the study found that firms involved in recovering energy from waste directly employ 625 people, and when indirect and induced impacts are included, this industry is responsible for a total of 3,327 jobs with a payroll of over \$285 million and with a contribution of \$632 million to the regional economy.

**Figure 4.3**  
**Estimates of Jobs Attributable to Regional Recycling, Reuse and Energy Recovery Firms in the Houston-Galveston Region (Source: H-GAC)**





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# 5 - ACKNOWLEDGEMENTS

## PROGRAM MANAGER

The Program Manager for TRDI is Maia Corbitt, the executive director of the State of Texas Alliance for Recycling (STAR). Ms. Corbitt is the primary coordinator for the TRDI project and Steering Committee.

Maia Corbitt, Executive Director  
 State of Texas Alliance for Recycling  
 (512) 828-6409  
 info@recyclingstar.org

## STEERING COMMITTEE MEMBERS

The Steering Committee for TRDI consists of a group of representatives from across the recycling industry that is responsible for providing technical advising, support and direction for TRDI. These members should be commended for spending significant time and effort contributing to the success of this study. The names of participating Steering Committee members are listed below.

MEMBER	ORGANIZATION(S) REPRESENTED
Lisa K. Anderson	National Waste and Recycling Association (NWRA)
Tom Baker	Recycling Council of Texas Institute of Scrap Recycling Industries (ISRI) Gulf Coast Chapter
Karen Bandhauer	Curbside Value Partnership
Diane Barnes	Texas Commission on Environmental Quality (TCEQ)
Renee Bellew	U.S. EPA Region 6
Leonard Cherry	Construction & Demolition Recycling Association (CDRA)
H.C. Clark	Municipal Solid Waste Management and Resource Recovery Advisory Council (MSWMRRAC)
Maia Corbitt	State of Texas Alliance for Recycling (STAR)
Jim Frey	Carton Council
Thomas Holland	Carpet America Recovery Effort (CARE) Texas Product Stewardship Council (STAR Council)
Donald Hardee	North American Hazardous Materials Management Association (NAHMMA)
Brian Hawkinson	American Forest & Paper Association (AF&PA)
Rachel Hering	Cooperative Teamwork and Recycling Assistance (CTRA)
Angelika Kluna	Electronic Resource Recovery Council (ERRC, STAR Council)
Jimmy Lambert	Texas Coal Ash Utilization Group
Carter Mayfield	Grease Trap/Cooking Oils
Richard McHale	Lone Star Chapter of the Solid Waste Association of North America (TxSWANA)
Cheryl Mergo	Texas Association of Regional Councils (TARC)
Ronnie Volkening	Texas Retailers Association
Risa Weinberger	Texas Compost Council (STAR Council)
Jerry Woosley	Institute of Scrap Recycling Industries (ISRI) Scrap Tire Chapter

## PROJECT TEAM

Scott Pasternak of Burns & McDonnell led the Project Team for TRDI. The Project Team was responsible for developing and conducting the TRDI 2013 survey, analyzing reported information and developing this report. The Project Team also included consultants Katie Wussow and Ed Boisson, Emerge Knowledge, developers of Re-TRAC Connect, and student interns from Texas State University and the University of Texas at Austin.

Scott Pasternak, Senior Project Manager  
Burns & McDonnell  
(512) 872-7141  
spasternak@burnsmcd.com

## CONTRIBUTORS

TRDI would like to recognize the individuals and organizations that contributed financially to the project. The funding for TRDI was provided by a variety of stakeholders from across the recycling industry, reflecting the collaborative nature of the project.

### CONTRIBUTORS

#### Over \$10,000

TxSWANA  
STAR  
Curbside Value Partnership

#### \$5,000-\$10,000

American Forest & Paper Association  
Carton Council  
Construction & Demolition Recycling Association  
RecycleBank  
Recycling Council of Texas  
Society of the Plastics Industry  
Texas Coal Ash Utilization Group

#### \$500-\$4,999

American Beverage Association  
Aldrich Family  
Call2Recycle  
Cooperative Teamwork & Recycling Assistance  
Glass Packaging Institute  
Risa Weinberger & Associates, Inc.  
Steel Recycling Institute  
Texas Association of Regional Councils  
Texas Beverage Association

## PARTICIPANTS

TRDI would like to acknowledge all facilities that provided information for this study. Their participation and cooperation made this study a success.

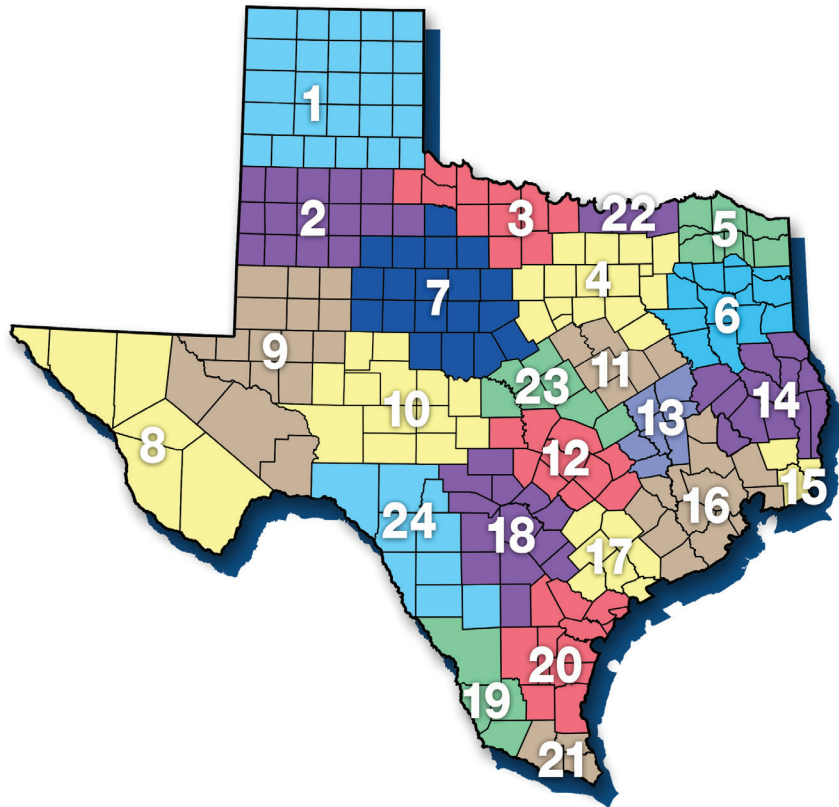
This section includes a partial list of facilities that responded to the survey.

It should be noted that the list on this section does not constitute a complete listing of facilities that responded to the survey, only those that specifically opted to be acknowledged.

More than half of participants chose not to be acknowledged within this report. The respondents that chose to be acknowledged had the ability to choose the information that is shared here. The information for each facility is shown in the following format.

The list on the next page is organized by Council of Government region. The intent of this organization is for readers of this report to be able to identify recycling facilities in their region.

# Texas Councils of Government



Region Name	Number	Abbreviation
Alamo Area Council of Governments	18	AACOG
Ark-Tex Council of Governments	5	ARK-TEX
Brazos Valley Council of Governments	13	BVCOG
Capital Area Council of Governments	12	CAPCOG
Central Texas Council of Governments	23	CTCOG
Coastal Bend Council of Governments	20	CBCOG
Concho Valley Council of Governments	10	CVCOG
Deep East Texas Council of Governments	14	DETCOG
East Texas Council of Governments	6	ETCOG
Golden Crescent Regional Planning Commission	17	GCRPC
Heart of Texas Council of Governments	11	HOTCOG
Houston-Galveston Area Council	16	H-GAC
Lower Rio Grande Valley Development Council	21	LRGVDC
Middle Rio Grande Development Council	24	MRGDC
Nortex Regional Planning Commission	3	NORTEX
North Central Texas Council of Governments	4	NCTCOG
Panhandle Regional Planning Commission	1	PRPC
Permian Basin Regional Planning Commission	9	PBRPC
Rio Grande Council of Governments	8	RGCOG
South East Texas Regional Planning Commission	15	SETRPC
South Plains Association of Governments	2	SPAG
South Texas Development Council	19	STDC
Texoma Council of Governments	22	TEXOMA
West Central Texas Council of Governments	7	WCTCOG

## Legend

- F:** Facility
  - O:** Owner/Operator
  - R:** Recycling Activities
  - L:** Location
  - P:** Point of Contact
- 

### Alamo Area Council of Governments

- F:** ACCO Waste Paper of San Antonio
- O:** Republic Services
- R:** Material Recovery
- L:** 400 Probandt St., San Antonio, TX 78204

- F:** Advanced Technology Recycling
- O:** B & K Technology Solutions Inc./Advanced Technology Recycling
- R:** Electronics Processing, Scrap Metal Processing
- L:** 5914 Business Park, San Antonio, TX 78218

- F:** Bitters Brush Recycling Center
- O:** City of San Antonio
- P:** Jackie Carr, Solid Waste District Manager
- R:** Household Hazardous Waste Collection, Compost/Mulch Production
- L:** 1800 E. Bitters Road, San Antonio, TX 78216  
[www.sanantonio.gov/swmd/Brush/BrushRecyclingCenters.aspx](http://www.sanantonio.gov/swmd/Brush/BrushRecyclingCenters.aspx)

- F:** CLi360 Inc.
- P:** Angelika Kluna, President
- R:** Electronics Processing
- L:** 7417 Reindeer Trail, San Antonio, TX 78328  
[www.CLi360.com](http://www.CLi360.com)

- F:** Culebra HHW Drop-Off Center
- O:** City of San Antonio
- P:** Jackie Carr, Solid Waste District Manager
- R:** Electronics Processing, Household Hazardous Waste Collection
- L:** 7030 Culebra, San Antonio, TX 78328  
[www.sanantonio.gov/swmd/HHW/HHWDropOffs.aspx](http://www.sanantonio.gov/swmd/HHW/HHWDropOffs.aspx)

- F:** Nelson Road Brush Recycling Center
- O:** City of San Antonio
- P:** Jackie Carr, Solid Waste District Manager
- R:** Compost/Mulch Production
- L:** 8963 Nelson Road, San Antonio, TX 78252  
[www.sanantonio.gov/swmd/Brush/BrushRecyclingCenters.aspx](http://www.sanantonio.gov/swmd/Brush/BrushRecyclingCenters.aspx)

### Ark-Tex Council of Governments

- F:** Texarkana Water Utilities — Compost Division
- R:** Compost/Mulch Production
- L:** 4000 S. State Line Ave., Texarkana, TX 75501

### Capital Area Council of Governments

- F:** Austin Wood Recycling
- P:** Jerome Alder, President
- R:** Compost/Mulch Production
- L:** 9201 Farm to Market Road 812, Austin, TX 78719

- F:** Balcones Resources
- P:** Kerry Getter, CEO
- R:** Material Recovery
- L:** 9301 Johnny Morris Road, Austin, TX 78744

- F:** City of Austin, Austin Resource Recovery
- R:** Household Hazardous Waste Collection
- L:** 2514 Business Center Drive, Austin, TX 78744  
[www.austinrecycles.com](http://www.austinrecycles.com)

- F:** Ecology Action of Texas
- P:** Joaquin Mariel, Executive Director
- R:** Material Recovery
- L:** 707 E. Ninth St., Austin, TX 78701  
[www.ecology-action.org](http://www.ecology-action.org)

- F:** Hornsby Bend Biosolids Management Plant
- O:** City of Austin
- R:** Compost/Mulch Production
- L:** 2210 Farm to Market Road 973, Austin, TX 78725

- F:** Kinser Ranch, LLC
- P:** Al Kinser, Owner
- R:** Compost/Mulch Production
- L:** 10701 Kinser Lane, Austin, TX 78736  
[www.Kinserranch.com](http://www.Kinserranch.com)

- F:** Organics by Gosh
- P:** Philip Gosh
- R:** Compost/Mulch Production
- L:** 13602 Farm to Market Road 969, Austin, TX 78724

- F:** Progressive Waste Solutions
- P:** Steve Shannon, Municipal Market Manager
- R:** C&D Processing, Material Recovery
- L:** 9904 Farm to Market Road 812, Austin, TX 78652

- F:** Resale Resource Corporation
- P:** Mark Praus, EQHS Manager
- R:** Electronics Processing
- L:** 10200 McKalla Place, Suite 200, Austin, TX 78758  
[www.resaleresource.net](http://www.resaleresource.net)

- F:** San Marcos HHW
- O:** City of San Marcos
- P:** Amy Kirwin, Solid Waste Coordinator
- R:** Household Hazardous Waste Collection
- L:** 630 E. Hopkins St., San Marcos, TX 78666

- F:** Williamson County Recycle Center
- O:** PA-Jer Co.
- P:** Jerry Tidwell
- R:** Household Hazardous Waste Collection, Scrap Metal Processing
- L:** 495 County Road 156, Georgetown, TX 78626  
[www.mytexashhw.com](http://www.mytexashhw.com)

- F:** Wilco Recycling
- O:** Roundtable Recycling LLC
- R:** Material Recovery
- L:** 9801 Chandler Road, Taylor, TX 76574  
[www.wilcorecycling.com](http://www.wilcorecycling.com)

## Coastal Bend Council of Governments

**F:** Corpus Christi Recyclery  
**O:** Republic Services  
**R:** Material Recovery  
**L:** 4414 Agnes St., Corpus Christi, TX 78405

## Houston-Galveston Area Council

**F:** Reterra Plastics LLC  
**P:** Jason Ball, President  
**R:** Plastics Reclamation  
**L:** 2103 Lyons Ave., Houston, TX 77020

**F:** Birch Plastics  
**P:** Brandon Clary, Vice President  
**R:** Plastics Reclamation  
**L:** 5957 South Loop East, Houston, TX 77033

**F:** CompuCycle Inc.  
**P:** Clive Hess, Executive Vice President  
**R:** Electronics Processing, Material Recovery, Scrap Metal Processing  
**L:** 7700 Kempwood Drive, Houston, TX 77055

**F:** Crawford — Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing, Scrap Metal Processing, Other Processing — Asphalt Shingles  
**L:** 6019 Crawford Road, Houston, TX 77041  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** Fort Bend County Recycling Center  
**O:** Fort Bend County  
**P:** Jose Ramirez Jr., Recycling/HHW Coordinator  
**R:** Household Hazardous Waste Collection  
**L:** 1200 Blume Road, Rosenberg, TX 77471

**F:** Hitchcock — Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing, Scrap Metal Processing, Tire Processing, Other Processing — Asphalt Shingles  
**L:** 5502 Texas 6, Hitchcock, TX 77563  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** Holmes - Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing, Scrap Metal Processing, Other Processing — Asphalt Shingles  
**L:** 4601 Holmes Road, Houston, TX 77033  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** Houston Resource Renewal Center  
**O:** Republic Services  
**R:** Material Recovery  
**L:** 5757 Oates Road, Houston, TX 77078

**F:** Katy Hockley — Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing  
**L:** Katy Hockley Road, Cypress, TX 77433  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** Koeblen — Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing  
**L:** 6400 Koeblen Road, Richmond, TX 77469  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** McHard — Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing, Scrap Metal Processing, Tire Processing, Other Processing — Asphalt Shingles  
**L:** Farm to Market Road 521, Fresno, TX 77545  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** Montgomery County Precinct 3 Recycling Facility  
**O:** Montgomery County Precinct 3  
**P:** Justin Fausek, Facility Coordinator  
**R:** Electronics Processing, Household Hazardous Waste Collection, Material Recovery, Scrap Metal Processing  
**L:** 1122 Pruitt Road, Spring, TX 77380  
[www.precinct3.org/recycling](http://www.precinct3.org/recycling)

**F:** Nature's Way Resources  
**P:** John Ferguson  
**R:** Compost/Mulch Production  
**L:** 101 Sherbrook Circle, Conroe, TX 77385

**F:** Pinafore — Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing  
**L:** 909 Pinafore Lane, Houston, TX 77039  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** Riley Fuzzel — Cherry Companies  
**P:** Leonard Cherry  
**R:** C&D Processing  
**L:** 5810 Riley Fuzzel Road, Spring, TX 77386  
[www.cherrycompanies.com](http://www.cherrycompanies.com)

**F:** The Ground Up  
**P:** Luis Chamorro, Operations  
**R:** Compost/Mulch Production  
**L:** 9945 Windfern Road, Houston, TX 77064  
[www.thegroundup.com](http://www.thegroundup.com)

**F:** We CAN Recycle Inc.  
**O:** WCRI  
**R:** Material Recovery  
**L:** 723 N. Drennan St., Houston, TX 77003  
[www.wecanrecycle.org](http://www.wecanrecycle.org)

## Lower Rio Grande Valley Development Council

**F:** City of McAllen Recycling Center  
**O:** City of McAllen  
**P:** Roberto Trevino Jr., Renewable Resources Manager  
**R:** Material Recovery  
**L:** 4101 N. Bentsen Road, McAllen, TX 78504

## North Central Texas Council of Governments

**F:** Argus Connection  
**O:** Argus Partners LLC  
**R:** Electronics Processing  
**L:** 1111 W. North Carrier Parkway, Grand Prairie, TX 75050

**F:** Balcones Resources Inc.  
**P:** Kerry Getter  
**R:** Material Recovery  
**L:** 13921 Senlac Drive, Farmer's Branch, TX 75234

**F:** City of Arlington  
**P:** Lorrie Anderle, Recycling Coordinator  
**R:** Household Hazardous Waste Collection  
**L:** 101 W. Abram St., Arlington, TX 76010

**F:** City of Denton Beneficial Reuse  
**P:** Gayla Wright, Beneficial Reuse Manager  
**R:** Compost/Mulch Production  
**L:** 1100 S. Mayhill Road, Denton, TX 76208  
[www.cityofdenton.com/dyno](http://www.cityofdenton.com/dyno)

**F:** City of Lewisville Residential Convenience Center  
**O:** City of Lewisville  
**R:** Electronics Processing, Household Hazardous Waste Collection, Scrap Metal Processing, Other Processing — Motor Oil, Cooking Oil, Lead Acid Batteries  
**L:** 330 W. Jones St., Lewisville, TX 75057

**F:** Community Waste Disposal  
**P:** Greg Roemer, President  
**R:** Household Hazardous Waste Collection, Material Recovery  
**L:** 2010 California Crossing Road, Dallas, TX 75220

**F:** Cowtown Excavating Company (Texas Recycled Concrete)  
**P:** Dennis W. Hall  
**R:** C&D Processing, End Product Manufacturing  
**L:** 10031 Hicks Field Road, Fort Worth, TX 76179

**F:** Dlubak Glass  
**P:** Tom Lassetter, Plant Manager  
**R:** Glass Beneficiation  
**L:** 400 Mushroom Road, Waxahachie, TX 75165

**F:** ECS Refining LLC  
**R:** Electronics Processing  
**L:** 1515 Big Town Blvd., Mesquite, TX 75149

**F:** Innovative Electronics Recycling LLC  
**O:** Mike Hinsey/Chase Hinsey  
**P:** Chase Hinsey  
**R:** Electronics Processing  
**L:** 404 Commerce St., Azle, TX 76020

**F:** North Texas Recycling Complex  
**O:** Republic Services  
**R:** Material Recovery  
**L:** 6200 Elliott Reeder Road, Fort Worth, TX 76117

**F:** Plano Material Recovery Facility  
**O:** Republic Services  
**R:** Material Recovery  
**L:** 4200 14th St., Plano, TX 75074

**F:** Pratt Recycling  
**O:** Pratt Industries  
**P:** John Dunlap, Manager  
**R:** Material Recovery  
**L:** 1401 S. Mayhill Road, Denton, TX 76208

**F:** Rock-Tenn  
**P:** Gregg King  
**R:** End Product Manufacturing (Pulp, Paper or Paperboard)  
**L:** 201 Fran Way, Dallas, TX 75203

**F:** Smurfit Kappa North America Recycling  
**O:** Smurfit Kappa Orange County/Smurfit Kappa North America Recycling  
**P:** Marty Rusk, Vice President  
**R:** Material Recovery, End Product Manufacturing  
**L:** 18601 Lyndon B. Johnson Freeway, Mesquite, TX 75150  
[www.smurfitkappa.com](http://www.smurfitkappa.com)

**F:** Techway Services Inc.  
**O:** Cathi Coan  
**R:** Electronics Processing, Material Recovery, Scrap Metal Processing  
**L:** 12280 Valley Branch Lane, Dallas, TX 75234  
[www.techwayservices.com](http://www.techwayservices.com)

**F:** Tellus Texas  
**O:** Tellus Technology Inc.  
**P:** Sanford Ewing, CEO  
**R:** Tire Processing  
**L:** 5000 Sterilite Drive, Ennis, TX 75119  
[www.tellustechinc.com](http://www.tellustechinc.com)

**F:** Texas Pure Products  
**O:** City of Plano  
**P:** Sherrian Jones, Operations and Marketing Manager  
**R:** Compost/Mulch Production  
**L:** 3820 Sam Rayburn Highway, Melissa, TX 75454  
[www.texaspureproducts.com](http://www.texaspureproducts.com)

## Panhandle Regional Planning Commission

**F:** Amarillo Recyclery  
**O:** Republic Services  
**R:** Material Recovery  
**L:** 803 N. Garfield St., Amarillo, TX 79107

## Permian Basin Regional Planning Commission

**F:** State Rubber & Environmental Solutions LLC  
**R:** Tire Processing  
**L:** County Road 220-O, Denver City, TX 79323

## Rio Grande Council of Governments

**F:** Tres Pesetas Inc.  
**R:** Tire Processing  
**L:** 4999 Oleary Drive, El Paso, TX 79938

## South East Texas Regional Planning Commission

**F:** Plessala Enterprises LLC  
**P:** Evelyn Plessala, President  
**R:** Other Processing — Green Waste and Asphalt Shingles,  
Compost/Mulch Production, End Product Manufacturing  
**L:** 5846 Farm to Market Road 105, Orange, TX 77630

## South Plains Association of Governments

**F:** American Fibers  
**P:** Ruben Lopez, Purchasing Director  
**R:** Material Recovery  
**L:** 2002 Weber Drive, Lubbock, TX 79404

**F:** City of Lubbock Recycling  
**O:** City of Lubbock  
**P:** Penny Morin  
**R:** Household Hazardous Waste Collection  
**L:** 1631 84th St., Lubbock, TX 79423  
[www.mylubbock.us/departamental-websites/departments/solid-waste-management/home](http://www.mylubbock.us/departamental-websites/departments/solid-waste-management/home)

## South Texas Development Council

**F:** City of Laredo Material Recovery Facility  
**O:** City of Laredo/First Recycling  
**P:** Sylvia Garza, Recycling Program Coordinator  
**R:** Material Recovery  
**L:** 6912 Highway 359, Laredo, TX 78044  
[www.laredosolidwaste.com](http://www.laredosolidwaste.com)

## Out of State

**F:** Pratt Recycling — Shreveport MRF  
**O:** Pratt Industries/Pratt Recycling  
**P:** Joe Cliburn, Plant Manager  
**R:** Material Recovery  
**L:** 10451 Richard Pratt Drive, Caspiana, LA 71115  
[www.prattindustries.com/locations-and-contacts](http://www.prattindustries.com/locations-and-contacts)



## Citations

- <sup>1</sup> National Recycling Coalition.
- <sup>2</sup> 30 TAC, Chapter 330, Subchapter A.
- <sup>3</sup> 30 TAC, Chapter 335, Subchapter A.
- <sup>4</sup> *Municipal Solid Waste in Texas: A Year In Review, FY 2013 Data Summary and Analysis*, October 2014, Texas Commission on Environmental Quality.
- <sup>5</sup> Nichols, Sara, "Rounding Up Recycling Data," *Resource Recycling* magazine, June 2014.
- <sup>6</sup> Re-TRAC Connect was developed by Emerge Knowledge Design Inc.
- <sup>7</sup> "Municipal Solid Waste in the United States: Facts and Figures (2012)." U.S. Environmental Protection Agency Available online at [www.epa.gov/epawaste/nonhaz/municipal/msw99.htm](http://www.epa.gov/epawaste/nonhaz/municipal/msw99.htm).
- <sup>8</sup> "The ISRI Scrap Yearbook 2014." Institute for Scrap Recycling Industries Inc. 2014.
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