

EMPLOYMENT TRENDS IN NORTH CAROLINA'S RECYCLING INDUSTRY – 2015



**North Carolina Department of Environmental Quality
Division of Environmental Assistance and Customer Service
Recycling Business Assistance Center**

**Pat McCrory
Governor**

**Donald R. Van der Vaart
Secretary**

Employment Trends in North Carolina's Recycling Industry -- 2015

Report Author: Sherry Yarkosky

Recycling Business Assistance Center
Division of Environmental Assistance and Customer Service
North Carolina Department of Environmental Quality
1639 Mail Service Center
Raleigh, NC 27699-1639
Telephone: (877) 623-6748

Ted Bush, Director
Division of Environmental Assistance and Customer Service

Scott Mouw, Chief
Recycling and Materials Management Section

EMPLOYMENT TRENDS IN NORTH CAROLINA’S RECYCLING INDUSTRY – 2015

Executive Summary

This report presents findings from an employment study of recycling businesses in North Carolina in 2015. More than 690 private sector recycling businesses were surveyed and researched for employment data. The major findings include:

- There are currently more than 16,200 direct private sector recycling-related jobs in North Carolina.
- Private sector recycling jobs have decreased 4.3 percent since 2013. The decrease from the 2013 recycling job count is due in part to statistical adjustments regarding key facilities and the lingering effects of low value commodity markets.
- Total estimated annual payroll for North Carolina recycling businesses is \$664 million.
- Fifty-two percent of recycling businesses surveyed anticipate creating more jobs during the next two years.
- Forty-six recycling businesses reported spending \$3.49 million in equipment, facilities and land investments from 2014-15.
- Sixty-two percent of recycling businesses surveyed plan on investing \$21.5 million in equipment, facilities or land in the next two years.
- Thirty-two percent of businesses surveyed report manufacturing a product using a combined 2,285,737 tons of recycled materials.
- Recycling businesses target a wide variety of recyclables for collection, processing or use in manufacturing. No single commodity dominates the state’s recycling economy.

Background

From September 2015 through May 2016, the Recycling Business Assistance Center (RBAC) in the N.C. Division of Environmental Assistance and Customer Service conducted a recycling business jobs survey to determine a current estimate of private sector recycling-related employment in North Carolina. The study was a follow-up to previous studies conducted in 1994, 2000, 2004, 2008, 2010 and 2013.

Methodology

For this study, a recycling business was defined as a company involved in the recovery, reuse or remanufacture of materials. This includes activities such as collection, processing, manufacturing, reuse or composting of post-consumer or post-industrial materials. A recycling-related employee was defined as an employee who dedicates any time to recycling-related activities or whose position would not exist without the recycling component of the business. To avoid overestimating full-time employment, businesses were asked to calculate the full-time equivalency of a part-time employee by dividing the part-time employee’s average weekly hours by 40.

Study Bounds

Since the goal of the research was to accurately quantify the number of private sector recycling-related jobs in North Carolina, only material flows and jobs that occur within the state borders were considered. The study only included direct economic impacts and excluded indirect or induced measurements. Therefore, businesses such as recycling equipment manufacturers and distributors were excluded.

Data Collection

Primary Data. The state's Recycling Business Assistance Center, or RBAC, maintains a free, online Recycling Markets Directory, or RMD, of recycling companies that collect, transport, broker, process or remanufacture recovered materials in North Carolina. This directory provides essential links between businesses, industries and local governments searching for markets for recyclables and the companies that accept the materials for recovery. While the RMD includes national markets in addition to North Carolina-based markets, only North Carolina companies were surveyed for this study (in addition to the North Carolina-based locations of national companies). At the time of this study, there were 693 North Carolina-based recycling businesses listed in the RMD, a figure down from a high of more than 700 companies, reflecting business challenges facing the recycling industry in the past two years.

Every recycling business or organization in North Carolina listed in the RMD with an email address received the online recycling business survey. The primary data sample included 636 North Carolina-based recycling business operations with email addresses. The remaining 57 RMD businesses without email addresses were placed on a list to obtain employment data by direct contact to the business or through a secondary data source.

Business Survey Design. Survey Monkey™ was the online survey tool used for the study. Questions from previous recycling employment studies were modified for integration into the online survey tool. In addition to recycling employment questions, the survey also included recycling tonnages, recyclable materials, investment projections and hourly wage questions. Recycling businesses with e-mail addresses received an e-mail including instructions, a password and a company identification number to ensure respondent confidentiality.

Business Survey Implementation. All 636 recycling businesses with email addresses received an email invitation on October 26, 2015 to participate in the online 2015 Recycling Business Employment Study update. Companies that did not respond to the initial web-based survey invitation were sent three additional e-mail notices before the survey was closed on November 20, 2015.

Unresponsive businesses and the 57 RMD businesses without email addresses were placed on a list to obtain data through the secondary data source or to obtain employment by direct phone calls to the businesses. Other survey questions were not addressed during this data collection effort.

Secondary Data: Recycling Employment. The secondary source of data used for this study was the N.C. Department of Commerce, Division of Employment Security (DES) database. In prior studies, the government agency compiling the secondary data was called the N.C. Employment Security Commission (ESC). The DES database lists company names, North American Industry Classification System, or NAICS code classifications, employment, and addresses for North Carolina businesses as reported in the second quarter of 2015. Additionally, the DES database included average quarterly wages that were integrated into the analysis, enabling a more robust average recycling business wage to be calculated in the 2015 study.

Once the overall employment number was obtained for each business, industry experts in RBAC estimated the percentage of recycling-related employees.

Additional Data. While the RMD is a great resource for identifying recycling-related businesses, it does not include all recycling companies in the state. Not every recycling business in the state has chosen to list its business in the directory. Some business may not be aware that the RMD exists and RBAC staff may not be aware of every recycling business in the state. Finally, some manufacturers who rely on recycled feedstocks may not self-list in the RMD because they already have established supplies of materials and do not need the directory listing to help source additional recycled commodities. With access to the DES database, there was an opportunity to query other recycling companies not listed in the RMD, such as recycled-material dependent manufacturers, and to gather additional employment and wage data for the study.

The DES dataset included NAICS codes for each business listing. As there is no general classification number for the recycling industry, the DES database was queried for a number of classification codes used by various recycling-related sectors. The NAICS codes used in the study include: 423930 (Recyclable Material Merchant Wholesalers), 562920 (Materials Recovery Facilities), 321920 (Container and Pallet Manufacturing), 562111 (Waste Haulers), and 562212 (Solid Waste Landfill). A general query for “recycling” or “recycle” in the company name field was also performed. Businesses identified were checked against RMD companies to avoid double-counting. Based on industry input and staff experience with the two sectors, it was assumed that 10 percent of total employment for NAICS codes 562111 (Waste Haulers) and 562212 (Solid Waste Landfill), and 66 percent employment of NAICS code 321920 (Container and Pallet Manufacturing) was dedicated to recycling.

From staff contact and interaction, 27 additional recycled-content manufacturing companies and other recycling businesses not listed in the RMD were included in the study. Many of these businesses were featured in previous publications, “Recycling Means Business” and “Made in N.C.,” written by RBAC staff in 2005 and 2007. Employment data for these companies was obtained through phone calls and emails to the businesses or the DES database. To avoid overestimating recycling employment data, industry experts in RBAC estimated the percentage of recycling-related employees.

Recycling Business Survey Results

Like the 2013 employment study, the 2015 recycling employment update made a significant effort to obtain real employment data from primary and secondary sources instead of extrapolating data to estimate a statewide recycling employment figure. The primary study sample included 693 North Carolina businesses listed in the RMD. Of the 693 businesses listed in the RMD, 636 businesses received the online survey. Of the 693 businesses receiving the online survey, 99 businesses, or 14 percent, responded to the survey. For the remaining 537 RMD businesses not responding to the survey or businesses without email addresses, employment data was obtained through the DES database and through direct contact to the businesses. Employment data could not be found for only 31 of the 693 North Carolina RMD businesses. The total response rate for North Carolina RMD businesses employment data was 95.5 percent.

As previously discussed, additional recycling employment data was included for recycling-related businesses not listed in the RMD. Since the DES database includes NAICS codes for each business listing, several recycling-related NAICS codes were queried including the following: 423930 (Recyclable Material Merchant Wholesalers), 562920 (Materials Recovery Facilities), 321920 (Container and Pallet Manufacturing), 562111 (Waste Haulers), and 562212 (Solid Waste Landfill).

A general query in the DES database for “recycling” or “recycle” in the company name field was also made and included in the analysis. Twenty-seven additional recycled-content manufacturing companies and other recycling businesses not listed in the RMD were also included in the study. Based on data collected from the RMD business survey and combining data from additional sources, more than 16,200 people are estimated to be working in North Carolina jobs directly related to recycling. See Table 2 for the breakdown of total recycling employment data.

Table 2: 2015 N.C. Recycling Employment

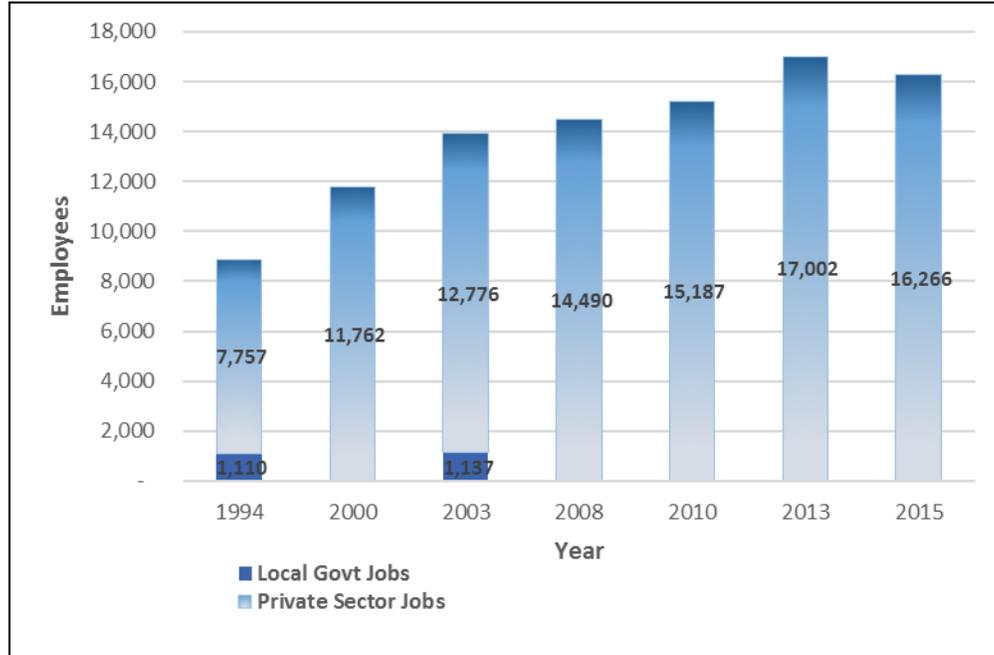
Recycling Business Study Sample	Data Source	FTE-Recycling
RMD Businesses (693)	Survey-Phone calls-DES	12,643
Recycled Content Manufacturers and companies and other recycling businesses not in RMD (27)	Phone calls and DES	1,991
NAICS-562111/562212 (Waste Haulers/Solid Waste Landfill)	DES	230
NAICS-321920 (Pallet Manufacturers)	DES	349
NAICS-423930/562920 (Recyclable Material/Materials Recovery Facilities)	DES	775
"Recycler"/"Recycling" company name title	DES	279
	TOTAL	16,266

Employment Data Comparisons to Prior Studies

The 2015 study was an update to previous studies conducted in 1994, 2000, 2004, 2008, 2010 and 2013. As the following graph indicates, recycling employment declined slightly in 2015. From 2013 to 2015, private sector recycling employment decreased 4.3 percent¹. The 1994 and 2003 analyses included public sector recycling employment, while the 2000, 2008, 2010 and 2013 studies did not to make the study more focused on private sector activity.

¹ In 2015, there was a change in methodology for estimating the number of recycling-related employees for a manufacturer utilizing recycled content material. This change was to correct for an overestimation of recycling employment made in years 2010 and 2013. The more conservative approach of multiplying the percentage of recycled content material used in the manufacturing process to total employment was made instead of counting all of the employees as in prior years. The per cent decrease in employment from 2013 to 2015 was partly attributed by this change.

N.C. Recycling Employment Trend



Additional Recycling Business Survey Data

In addition to employment data, the businesses responding to the online survey also provided information on hourly wages, recyclable materials targeted, tonnages, recycled material products manufactured, investment, and anticipated job creation.

Eighty-one percent of survey respondents reported average hourly wage information. Unlike prior year studies, average quarterly wage data was provided for each business in the DES dataset. Missing or incomplete wage survey data was supplemented with DES quarterly wage data. In addition to the wage data gathered through the online survey, the DES database was mined for quarterly wage data for all of the businesses included in the study sample.

An average hourly wage of \$19.64 was calculated or a total North Carolina recycling business payroll of \$664 million. While the 2015 average wage appears to be a substantial increase over the 2013 wage of \$12.50, comparisons should not be made to studies in prior years because of the incompleteness of the survey wage data collected prior to 2015.

Recycling businesses plan to make additional investments in recycling infrastructure in equipment, facilities, and land investment. Sixty-two percent of businesses responded that they anticipate making additional capital investments and estimate spending \$21.5 million in the next two years.

As a supplement to the investment projection survey question, RBAC staff performed a retroactive analysis of private recycling business capital investment over the 2014-15 study timeframe. Investment data was aggregated from final reports from RBAC's Recycling Business Development Grant program. During the two years analyzed, 46 recycling businesses reported spending a total of \$2.43 million in

private capital investment. The state of NC invested an additional \$1.06 million in grant funds in these projects, for a total capital investment of \$3.49 million. These projects returned approximately 359,000 tons of recyclable material back into the economy and created approximately 86 jobs.

Recycling businesses surveyed anticipate increased employment growth. When asked if the business planned on creating new jobs, 51 businesses, or 52 percent, estimated that 193 new jobs would be created during the next two years.

Recycling businesses surveyed were also asked to quantify the tonnage of recyclables collected, processed, brokered and used in manufacturing. Sixty-five percent of businesses responding reported collecting 1,069,223 tons of recyclables. Eighty-three percent of businesses reported processing 1,359,943 tons of recyclables. Twenty-four percent of businesses reported brokering 158,895 tons of recyclables. Thirty-two percent of businesses reported using 2,285,737 tons of recycled material in the manufacture of products. See Table 3 for a summary of recycling tonnages collected, processed, brokered and used in manufacturing.

Table 3: Recycling Tonnages Collected, Processed, Brokered and Used in Manufacturing

Recycling Business Activity	Tons
Recyclables Collected	1,069,223
Recyclables Processed	1,359,943
Recyclables Brokered	158,895
Recyclables Used in Manufactured Products	2,285,737

Recycling businesses target a wide variety of recyclables for collection, processing or use in manufacturing. No single commodity dominates the recycling sector in North Carolina. Surveyed businesses reported targeting the following common recyclable materials: aluminum cans, Polyethylene terephthalate, or PET plastic, High-density polyethylene, or HDPE plastic, other plastic, glass, newspapers, corrugated cardboard, office paper, mixed paper, steel cans, food waste, textiles, metal scrap, electronics, construction and demolition materials and wood material or wood pallets. In addition, surveyed businesses were given the option to provide open-ended responses for other recyclables targeted. Table 4 includes the listing of open-ended responses of “other” recyclables collected, processed or utilized in manufacturing as reported by businesses.

Table 4: “Other Recyclables” Collected, Processed or Utilized

ABS plastics	Plastic Film
Antifreeze	Polypropylene
Asphalt	Polystyrene
Asphalt roofing shingles	Post-industrial scrap
Carpet and carpet pad	Residential scrap metal
Compostable material pertaining to a Level 3 facility	Restaurant grease trap waste
Cotton	Rubber
Cull bricks	Shoes
Fluorescent lamps and ballasts	Soiled paper and biodegradable certified items
Hardware	Solvents (parts washing)
Nylon	Tires
Paint	Used cooking oil
Paper cores	Used motor oil and oil filters

The number of products using recycled material manufactured by North Carolina businesses is diverse and numerous. Twenty-five percent of businesses responding to the survey reported manufacturing a product using recycled materials. Table 5 includes a listing of recycled material products North Carolina businesses reported manufacturing.

Table 5: Manufactured Recycled Material Products List

ABC stone	Paper cores
Asphalt	Plastic repro pellets
Biodiesel	Potting soil
Compost	Polyethylene plastic Sheets
Computers	Recycled liquid asphalt from asphalt shingles
Concrete aggregate	Solid rubber tire wheels
Drain field material made from tires	Steel plates
Glass cullet	Tables and countertops from reclaimed lumber
Hardscape materials	Tire derived fuel
Jewelry and clocks	Topsoil
Mattresses and pet beds	Wood boiler fuel
Mulch and wood chips	Wood pallets

Conclusion

In 2015, an estimated 16,266 private sector recycling-related jobs in the state are involved in the collection, processing, manufacturing, reuse or composting of post-consumer or post-industrial materials. The North Carolina recycling economy declined 4.3 percent compared to 2013 data. The percent decrease from 2013 to 2015 was partly attributed to a methodology change for estimating the number of recycling-related employees for a major manufacturer utilizing recycled content material. This change alone accounted for 63.6 percent of the difference between the 17,002 recycling jobs in 2013 and the 16,266 jobs counted in 2015. The more conservative approach of multiplying the percentage of recycled content material used in the manufacturing process to total employment was made instead of counting all of the employees as in prior years.

The remaining decline can be attributed to the impacts of global economic forces. Low crude oil and natural gas prices in conjunction with slow worldwide economic growth have negatively affected recycling commodity prices. Additional challenges for domestic recyclers, including those in North Carolina, have come from a strong U.S. dollar (slowing material export) and import competition from finished metals. These factors have adversely affected recycling employment growth and are part of a larger economic impact on commodity-oriented business sectors. For example, the Bureau of Labor Statistics has documented a 14 percent decline in petroleum industry employment from the summer of 2014 to the summer of 2016 (see <http://www.bls.gov/iag/tgs/iag211.htm>). Weak metal prices also prevented the anticipated count of more than 200 new recycling jobs at a zinc processing facility in western North Carolina which was idled in late 2015. Going forward, it is clear commodity prices will probably be the most critical factor affecting North Carolina recycling employment.

Although employment decreased in 2015, recycling businesses are optimistic about the future. Survey participants expect to add new jobs and make further investments in recycling infrastructure over the next few years. North Carolina recycling businesses remain strong, diverse and use a large variety of recyclable or discarded materials that become feedstock for a wide variety of products.