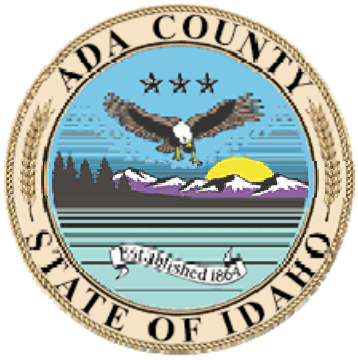
ADA COUNTY
WASTE STREAM ANALYSIS

DECEMBER 2014

GREEN SOLUTIONS



ADA COUNTY
WASTE STREAM ANALYSIS
2014

prepared for

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Boise, Idaho

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TABLE OF CONTENTS

Executive Summary
- Introduction E-1
- Overview of the Methodologies Used E-1
- Results and Conclusions E-2
- Recommendations E-9

I. Introduction
- A. Scope and Objectives 1
- B. Background 1
- C. Contents of this Report 1

II. Characterization of Ada County's Waste Stream
- A. Introduction 3
- B. Overview of Procedures 3
- C. Results, Waste Quantities 9
- D. Results, Waste Composition 11

III. Additional Data
- A. Introduction 21
- B. Amount of Edible Food Wasted 21
- C. Self-Haul Survey 22
- D. Wood, C&D and Special Wastes 22
- E. Results Specific to the City of Boise 25
- F. Converting Results to Self-Haul Categories 27

IV. Conclusions and Recommendations
- A. Conclusions 29
- B. Recommendations 37

Glossary
- Introduction G-1
- A. Waste Generators G-1
- B. Waste Sorting Categories G-1

Appendices

- A. Statistical Certainty of Results
- B. Customer Survey Form

LIST OF TABLES

Executive Summary

E-1 Quantities of Disposed Wastes E-3
E-2 Composition of Disposed Wastes E-6

Section II - Characterization of Ada County's Waste Stream

1 Types of Customers and Wastes Included in the Waste Stream Analysis 4
2 Types of Wastes Disposed at the Ada County Landfill 7
3 Allocation of Samples by Type of Generator 8
4 Monthly and Annual Quantities by Waste Generator 10
5 Waste Composition Results 12

Section III - Additional Data

6 Amount of Edible Food Wasted 21
7 Self-Haul Customer Survey 23
8 Breakdown of Wood, C&D and Special Wastes 24
9 Waste composition Results for the City of Boise 26
10 Conversion to Self-Haul Categories 28

Section IV - Conclusions and Recommendations

11 Weight of Disposed Materials 30
12 Recycling Potential Assessment 31
13 Comparison of Results to Other Studies 34

LIST OF FIGURES

Executive Summary

E-1 Waste Composition Results E-5
E-2 Disposal Trends E-8

Section II - Characterization of Ada County's Waste Stream

1 Waste Composition Results 13
2 Non-Compacted MSW 14
3 Construction and Demolition (C&D) Waste 15
4 Single-Family Waste 16
5 Multi-Family Waste 17
6 Mixed Commercial 18
7 Commercial Roll-Offs 19

Section III - Conclusions and Recommendations

8 Recycling Potential Assessment 32

EXECUTIVE SUMMARY

INTRODUCTION

This report provides the results of a study of the quantity and composition of solid waste (garbage) disposed in Ada County, Idaho during 2013 - 2014. The primary objectives of this study were to:

- provide accurate data on the composition and quantity of disposed materials for evaluating current waste prevention and recycling programs.
- provide data that can be used for planning future programs.

This waste composition study was conducted by the environmental consulting firm of Green Solutions, with assistance provided by URS Corporation, DGB Consulting, Republic Services and Ada County.

OVERVIEW OF THE METHODOLOGIES USED

This study examined mixed municipal solid waste (MSW) disposed at the Ada County Landfill. Mixed municipal solid waste is a term commonly used for general residential and commercial wastes, including the waste collected by garbage haulers and waste delivered directly to disposal sites by the waste generators themselves (self-haul). This study did not examine source-separated materials brought to the landfill (such as wood, tires, electronics and appliances).

The intent of this study was to provide data for the County's entire waste stream, but the design of the sampling and data collection procedures also allowed data to be collected on the quantity and composition of specific types of waste. The types of waste analyzed by this study include:

- **Non-Compacted MSW**: This category includes cash and charge customers (charge customers other than Republic Services) with Non-Compacted MSW loads. This type of waste is typically delivered in cars and pickups by residential customers, or in pickup trucks and larger trucks for non-residential sources.

- **Construction and Demolition (C&D) Wastes**: Includes cash and charge customers (other than Republic Services) with C&D loads. As with the previous category, this waste stream consists of residential and non-residential customers hauling waste that they have generated. For the non-residential customers, this type of waste is frequently construction waste delivered by the contractor that generated the waste.

- **Single-Family**: Consists of waste from single-family homes and mobile home parks (for parks that use individual trash cans), and delivered to the landfill by Republic Services.

- **Multi-Family**: Consists of wastes collected from apartment buildings by Republic Services. This type of waste is generally collected in the same garbage truck with businesses that also use dumpsters for their wastes.

- **Mixed Commercial**: Includes waste from businesses, industries and institutions delivered by Republic Services, typically collected from dumpsters with front-loading garbage trucks.

- **Commercial Roll-Offs**: Includes compacted and non-compacted roll-offs from commercial sources, and delivered to the landfill by Republic Services.

The quantity (tonnage) of solid waste disposed by each type was determined primarily by using data from the County's scalehouse records. Ada County's scalehouse records provide weight and volume figures by type of customer. The general public and private companies using the landfill generally fall into either the cash or charge account categories, and are also categorized by type of waste (Non-Compacted MSW, C&D, Wood, and other recyclable materials). Deliveries by Republic Services are categorized by type of waste (Compacted or Non-Compacted) and source (Boise, four other cities and the unincorporated areas of Ada County). The waste delivered by Republic Services was allocated to the categories used for this study (Single-Family, Multi-Family, Mixed Commercial and Commercial Roll-Offs) based on data provided by Republic Services and on the categories used for the scalehouse records.

The composition of the County's solid waste was determined by randomly selecting and sorting 157 samples of waste at the landfill (see photo of sorting crew). Sampling was conducted for four days each quarter. Each sample was sorted into 77 categories of materials. The Glossary provides additional detail on the definitions used for the categories of materials.

This study was conducted over the course of a year to encompass seasonal variations in the quantities and composition of the County's waste stream. The fieldwork for this study was conducted in November, 2013, and in March, May and July, 2014.

RESULTS AND CONCLUSIONS

Waste Quantities

The waste quantity results are summarized in Table E-1. As shown in Table E-1, the self-haul customers (charge customers other than Republic Services) brought almost

Sorting crew working on a sample, November 7, 2013.

Table E-1
QUANTITIES OF DISPOSED WASTES

Type of Generator	Annual Amounts Tons	Percent
Non-Compacted MSW	22,825	6.2%
Construction and Demolition (C&D)	59,970	16.2%
Self-Haul Subtotal	**82,790**	**22.4%**
Single-Family	142,780	38.6%
Multi-Family	14,750	4.0%
Mixed Commercial	72,000	19.5%
Commercial Roll-Offs	57,310	15.5%
Hauler Subtotal	**286,850**	**77.6%**
Total	**369,640**	**100.0%**

Annual amounts are for the period October 1, 2013 to September 30, 2014, as this period most closely coincides with the period of this study. The amounts shown are for solid wastes only, and do not include source-separated materials such as wood, tires and appliances.

one-quarter (22.4%) of the wastes to the landfill for the one-year period corresponding to the study (October 1, 2013 to September 30, 2014). These customers are often referred to as "self-haul" because they are bringing wastes to the landfill that they (or their household or company) created. Republic Services brought the other three-quarters (77.6%) of the waste to the landfill. Because of the larger loads brought in by Republic Services, they were able to deliver more than three times as much waste (286,850 tons) as self-haul customers (82,790 tons) in only half as many loads (34,270 loads for Republic Services versus 60,100 loads for self-haulers). For specific types of waste generators, Single-Family sources generated the most waste (38.6% of the total) and Commercial sources generated almost as much (35.0% for the combined amounts of Commercial and Commercial Roll-Offs).

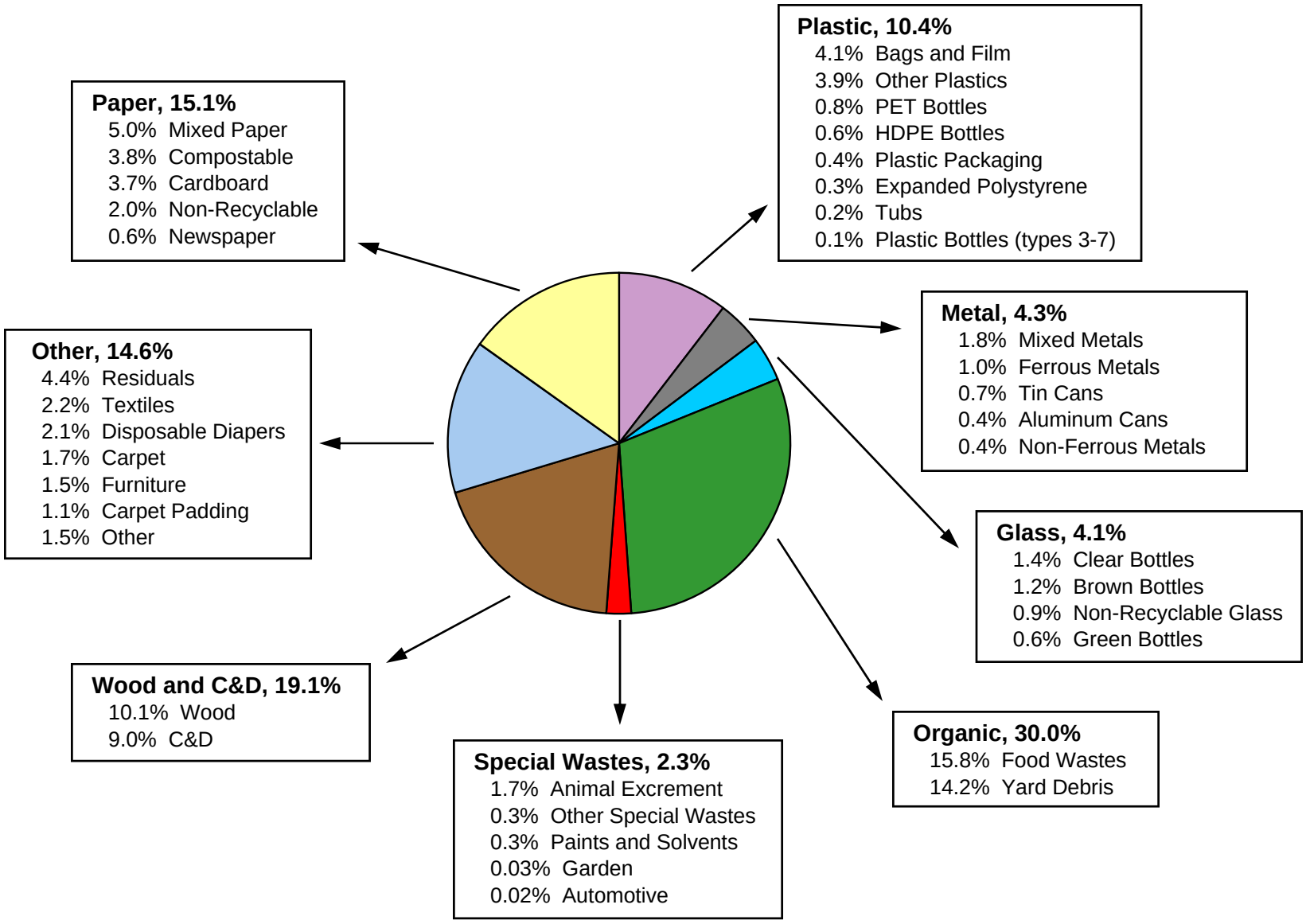
Waste Composition Results

Waste composition results for the entire County are summarized in Figure E-1, and Table E-2 shows the data for each type of waste generator (see also Tables 5, 8 and 12 of the main report for greater detail). For each of the generators, a few noteworthy conclusions can be drawn:

- **Non-Compacted MSW**: The largest categories of materials in this waste stream are:
  - yard debris, 33.4%,
  - wood, 16.3%,
  - furniture, 9.4%,
  - construction and demolition wastes, 5.8%,
  - mixed metals, 4.2%,
  - ferrous metals, 3.7%, and
  - cardboard, 3.5%.

  A significant finding for this waste stream is the large amount of yard debris (33.4%). A review of the results for individual samples shows that 80% of this yard debris was from "pure" loads (loads that were 99-100% yard debris), which could have been easily diverted to a composting facility instead. It's also interesting to note that most of the wood (10.2% out of the total 16.3%) was plywood. At first glance this result may appear anomalous, but plywood was consistently found in this waste stream (the results for individual samples were highly variable, but the quarterly averages only ranged from 6.4% to 13.4%). Finally, the amount of metals in this waste stream (8.2% altogether) is higher than any of the other waste streams. Given the value of this material, it may be worthwhile to explore methods of collecting and recycling the metals.

Figure E-1
WASTE COMPOSITION RESULTS



Note: All figures are percent by weight.

Table E-2
COMPOSITION OF DISPOSED WASTES

Type of Material	Annual Average by Waste Generator						Total Waste Stream
	Non-Comp. MSW	C&D	Single-Family	Multi-Family	Mixed Commercial	Commercial Roll-Offs	
Recyclable Paper	6.3	0.9	8.2	13.4	17.9	10.0	9.3
Compostable Paper	0.2	0.02	3.5	6.8	6.7	5.4	3.8
Non-Recyclable Paper	1.0	0.2	2.2	2.2	3.5	2.1	2.0
Plastic Bottles	0.2	0.01	1.8	3.2	2.3	1.1	1.5
Plastic Bags, Film	1.0	0.2	4.4	4.1	7.7	4.0	4.1
Other Plastics	3.6	2.6	4.5	5.7	4.5	9.0	4.9
Metals	8.2	3.6	4.2	6.2	4.3	3.5	4.3
Food Waste	1.8	0	17.4	21.7	24.1	22.0	15.8
Yard Debris	33.4	8.4	24.2	2.6	3.1	5.0	14.2
Recyclable Glass	0.8	0	5.6	5.7	3.5	0.7	3.2
Other Glass	0.6	1.8	0.2	0.3	0.4	2.6	0.9
Disposable Diapers	0.03	0	4.4	6.3	0.3	0.9	2.1
Textiles	2.4	0.5	3.4	3.6	1.4	1.4	2.2
Furniture	9.4	0.5	1.1	4.8	0	1.4	1.5
Wood Waste	16.3	29.5	1.8	1.7	7.1	14.2	10.1
Construction/Demolition	5.8	39.9	1.4	0.2	3.4	6.2	9.0
Animal Excrement	0	0	3.1	3.6	1.9	0.02	1.7
Other Special Wastes	3.1	0	0.9	0.9	0.2	0.1	0.6
Other Materials	5.8	12.0	7.8	7.2	7.9	10.4	8.8
Totals	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes: All figures are percentages by weight.

- **Construction and Demolition (C&D) Wastes**: The largest categories of materials in this waste stream are:
  - construction and demolition wastes, 39.9%,
  - wood, 29.5%,
  - yard debris, 8.4%,
  - carpet, 7.2%, and
  - carpet padding, 4.2%.

  Most of the other materials in this category are related in some way to construction activities, including paper packaging, plastic products, and window glass, but it's interesting that there is also a significant amount of yard debris (8.4%). As with the previous generator (Non-Compacted MSW), most of this yard debris was contributed by just a few loads (three of the 29 samples had 30% to 91% yard debris). Unlike the previous generator, however, the yard debris found in the samples for this waste stream was mixed with other materials in such a way that would have made it difficult to divert any of this yard debris to a composting facility.

- **Single-Family**: The largest categories of materials in this waste stream are:
  - yard debris, 24.2%,
  - food waste, 17.4%,
  - mixed waste paper, 5.4%,
  - plastic bags and film, 4.4%,
  - disposable diapers, 4.4%, and
  - compostable paper, 3.5%.

  Altogether, organic materials make up almost half of this waste stream (45.1% if compostable paper is included). Although optional and seasonal collection programs are available in some areas of Ada County for yard waste, there remains a significant amount of this material in the waste stream from Single-Family homes. There are also significant quantities of some of the recyclable materials (especially mixed waste paper and cardboard) being disposed despite the widespread availability of curbside recycling carts that should have the capacity to handle these materials.

- **Multi-Family** (apartments): The largest categories of materials in this waste stream are:
  - food waste, 21.7%,
  - mixed waste paper, 8.4%,
  - compostable paper, 6.8%,
  - disposable diapers, 6.3%,

- furniture, 4.8%,
- plastic bags and film, 4.1%,
- other plastics, 4.0%, and
- cardboard, 3.8%.

The percentage of recyclable materials in the Multi-Family waste stream is higher than for single-family homes (there is 20.0% of the "typical" recyclables in Multi-Family wastes versus 12.5% in Single-Family wastes), although the tonnage of recyclable materials disposed is substantially lower due to the smaller overall waste quantities from this type of generator. This is typical of the results for most areas, since recycling programs are more difficult to establish and maintain for apartment buildings than for single-family homes.

- **Mixed Commercial**: The largest categories of materials in this waste stream are:
  - food waste, 24.1%,
  - mixed waste paper, 8.6%,
  - cardboard, 8.5%,
  - plastic bags and film, 7.7%,
  - wood, 7.1%, and
  - compostable paper, 6.7%.

  The Mixed Commercial waste stream contains 22.1% of the materials that are typically collected through recycling programs, indicating that there is a significant amount of opportunity for increasing the recycling by this sector. If all of the materials that could potentially be recycled and composted were diverted from disposal, there would only be 17.2% of this waste stream remaining. It's also worth mentioning that the significant amount of plastic film and bags (7.7%) represents a very large volume since these materials are generally lightweight.

- **Commercial Roll-Offs**: The largest categories of materials in this waste stream are:
  - food waste, 22.0%,
  - wood, 14.2%,
  - other plastics, 7.9%,
  - construction and demolition wastes, 6.2%,
  - compostable paper, 5.4%,
  - yard debris, 5.0%,
  - mixed waste paper, 4.7%,
  - cardboard, 4.5%, and
  - plastic bags and film, 4.0%.

The results for this waste stream reflect the variety of activities and sources that contribute to it, including compactors from grocery stores (food waste) and roll-offs from construction sites (wood waste). Any interest in increasing recycling or composting programs for this type of waste generator would need to address the specific businesses that are included in this category on a case-by-case basis.

- **Total Waste Stream**: Overall, the County's waste stream contains significant amounts of:
    - food waste, 15.8%,
    - yard debris, 14.2%,
    - wood, 10.1%,
    - construction and demolition wastes, 9.0%,
    - mixed waste paper, 5.0%,
    - plastic bags and film, 4.1%,
    - other plastics, 4.0%,
    - compostable paper, 3.8%, and
    - cardboard, 3.7%.

  The County's waste stream contains 12.5% or 46,160 tons per year of material that could be handled through typical recycling programs, plus an additional 33.8% or 124,950 tons per year of organic materials that could be diverted to composting programs. Other types of recycling programs could potentially handle another 33.0%, or 121,820 tons per year, leaving only 20.8% of the wastes from Ada County that would actually need to be handled as a waste. In reality, of course, it is not possible to divert 100% of the recyclable and compostable materials.

RECOMMENDATIONS

The following recommendations are based on the results of this study:

- Measures should be taken to encourage landscapers and homeowners to bring loads of yard debris to composting facilities instead of bringing these to the landfill. Additional collection programs for yard debris are also needed for single-family homes (assuming local composting facilities can handle the additional tonnages).

- Options should be explored for collecting metals at the tipping area of the landfill, such as providing a roll-off that could be used by self-haul customers on a voluntary basis. Even if only a portion of the metals being disposed with Non-Compacted MSW and C&D wastes could be diverted in this way, this approach would likely be cost-effective.

- Single-family residents should be encouraged to recycle more cardboard and mixed waste paper, and possibly also glass (through drop-off programs) and textiles (also through drop-off programs).

- The possibility of a "mixed organics" program (collecting yard debris, food waste and compostable paper) for single-family residents, and possibly also multi-family and commercial customers, should be explored cautiously. Implementing this approach will require processing facilities and markets that can handle this type of material, although if those issues can be resolved then a huge amount of a valuable end-product (compost) could potentially be produced.

- Commercial generators could be encouraged to recycle more, especially for cardboard, mixed waste paper and plastic film. More could also be done by this sector in diverting food waste to alternative and beneficial purposes.

SECTION 1

INTRODUCTION

A. SCOPE AND OBJECTIVES

This report provides the results of a study of the quantity and composition of solid waste (garbage) disposed in Ada County, Idaho during 2013 - 2014. The primary objectives of this study were to:

- provide accurate data on the composition and quantity of disposed materials for evaluating current waste prevention and recycling programs.
- provide data that can be used for planning future programs.

This waste composition study was conducted by the environmental consulting firm of Green Solutions, with assistance provided by URS Corporation and DGB Consulting. Republic Services also provided a substantial amount of assistance for this study by arranging special loads for sampling purposes, providing data on their operations in the county, and assisting with sampling activities at the landfill. In addition, Ada County personnel actively participated in the study by providing data and access to facilities for sampling purposes and for equipment storage between sampling events.

B. BACKGROUND

Ada County operates a landfill northwest of Boise, and most of the waste from the county is brought there. Some waste is brought to a private transfer station operated by Republic Services and taken out of county. A significant amount of waste is also brought to another transfer station operated by Republic Services in Meridian, and this waste is brought to the Ada County Landfill in large transfer trailers. The landfill includes a facility for the disposal of moderate-risk waste (MRW), a wood recycling area, and another area for the separate collection of appliances and e-waste (televisions) for recycling purposes. There is a large amount of potential capacity at the landfill, and it is anticipated to continue to provide disposal capacity for many more decades to come.

C. CONTENTS OF THIS REPORT

The remainder of this report consists of the following sections:

Section 2, Characterization of Ada County's Waste Stream – provides data on the quantity and composition of the County's waste stream.

Section 3, Additional Data – provides data on the breakdown of food waste, the results of a survey of self-haul customers, and the breakdown of three of the waste categories (wood, construction/demolition and special wastes). Also shown in this section are results specifically for the City of Boise and an analysis that converts the Non-Compacted MSW and C&D results to other self-haul categories.

Section 4, Conclusions and Recommendations – provides additional interpretation and analysis of the results, and provides recommendations for possible future steps by Ada County and others.

Glossary – provides definitions for technical terms used throughout the report as well as the definitions used for the sorting categories.

Appendix A, Statistical Certainty of Results – provides data on the confidence intervals associated with the waste composition results.

Appendix B, Customer Survey Form – shows the survey form and instructions used for the customer survey described in Section 3.

SECTION II

CHARACTERIZATION OF ADA COUNTY'S WASTE STREAM

A. INTRODUCTION

This section provides the waste quantity and composition results for the primary types of waste generators and for the county overall.

B. OVERVIEW OF PROCEDURES

This study examined municipal solid waste (MSW) brought for disposal to Ada County's landfill. Municipal solid waste is a term commonly used for general residential and commercial wastes, including the waste collected by garbage haulers and the waste delivered to disposal sites by the waste generators themselves (self-haul). This study did not examine source-separated materials brought to the landfill for recycling (such as wood, appliances, and other materials) or for special disposal (such as asbestos and moderate-risk waste).

Types of Wastes Examined in this Study

The intent of this study was to provide data for the County's entire waste stream, but the design of the study allowed data to be collected on the quantity and composition of waste disposed by different sources as well. An examination of Ada County's solid waste system during the design phase of this study concluded that the most useful breakdown of the County's solid waste was to categorize the self-haul customers according to the categories used by the scalehouse records (Non-Compacted MSW and C&D) and to categorize loads delivered by Republic Services by source and delivery method (Single-Family, Multi-Family, Mixed Commercial and Commercial Roll-Offs). Table 1 illustrates how the accounts used for the scalehouse records were applied to the categories used for this study, and each of the categories is further described below:

- **Non-Compacted MSW**: This category includes cash and charge customers with Non-Compacted MSW loads. Non-compacted loads delivered by Republic Services are not included here but are included in the Commercial Roll-Off category. For residential customers, this type of waste is typically brought to the landfill in cars and pickup trucks and is usually delivered by the homeowner or renter who generated the waste, although in some cases they may be assisting another family member or an acquaintance. For businesses and non-profit organizations, some of which have charge accounts, this type of waste is typically transported to the landfill using a pickup or larger truck.

Table 1
TYPES OF CUSTOMERS AND WASTES INCLUDED IN THE WASTE STREAM ANALYSIS

Type of Customer	Type of Waste	Category for Waste Study						Not Included in Study
		Non-Compacted MSW	C&D	Single-Family	Multi-Family	Mixed Commercial	Commercial Roll=Off	
Cash Customers	Non-Compacted MSW	X						
	C&D		X					
	Wood, Recyclables and Other Materials							X
Non-Hauler Charge Customers	Non-Compacted MSW	X						
	C&D		X					
	Wood, Recyclables and Other Materials							X
Republic Services	Commercial Compacted [1]				X	X		
	Residential Compacted [1]			X				
	Roll-Offs [2]						X	
	City of Boise Commercial				X	X		
	City of Boise Residential			X				
	City of Boise Roll-Offs [3]						X	
	Meridian Transfer Station	X	X	X	X	X	X	

Notes:
1. Includes accounts for collections in four cities (Eagle, Garden City, Star and Meridian) and for unincorporated parts of the county.
2. Includes compacted and non-compacted roll-offs of MSW and C&D from unincorporated parts of the county and from collections in four cities (Eagle, Garden City, Star and Meridian).
3. Includes compacted and non-compacted roll-offs and “urban rubble” from Boise.

- **Construction and Demolition (C&D) Wastes**: Includes cash and charge customers (other than Republic Services) with C&D loads. As with the previous category, this waste stream consists of residential and non-residential customers that are typically hauling waste that they have generated. For non-residential customers, this type of waste is frequently construction waste delivered by the contractor that generated the waste.

- **Single-Family**: Consists of waste from single-family homes and mobile home parks (for parks that use individual trash cans and not dumpsters). To have been counted in this category, the waste must have been delivered to the landfill by Republic Services. This waste is typically collected with side- or rear-loading garbage trucks.

- **Multi-Family**: Consists of wastes collected from apartment buildings by Republic Services. This type of waste is generally collected in the same garbage truck with businesses that also use dumpsters for their wastes. Since mixed loads of apartment and business wastes could not be sampled with any certainty of the source, samples of Multi-Family waste for sorting purposes were primarily taken from special loads collected each quarter by Republic Services for this purpose.

- **Mixed Commercial**: Includes waste from businesses, industries and institutions delivered by Republic Services, typically collected from dumpsters with front-loading garbage trucks.

- **Commercial Roll-Offs**: Includes compacted and non-compacted roll-offs from commercial sources, and delivered to the landfill by Republic Services.

The first two categories shown above are sometimes referred to as self-haul, and other waste composition studies conducted in the Pacific Northwest have used Residential Self-Haul (homeowners and renters) and Non-Residential Self-Haul (contractors and other businesses and organizations) as two of the categories for this type of analysis. For this study, however, with the scalehouse records for self-haul customers being divided by type of waste (Non-Compacted MSW and C&D), it made more sense to use the landfill's breakdown. Data collected during the fieldwork for this study allowed the results of this study to be converted to the self-haul categories used by other studies (see Section III.F).

One type of MSW that is delivered to the landfill in significant amounts is the waste transferred from the Meridian Transfer Station. This waste represents a mixture of every type of waste listed above, so samples taken from the transfer trailers could not have been identified as to the type of waste. Hence, no samples were taken from this source, although the tonnages delivered from the Meridian Transfer Station are included in the waste quantity analysis. Data provided by Republic Services on the

amounts of each type of waste received at the transfer station allowed the transfer station tonnages to be allocated to all of the waste generator categories. If desired, the waste composition data for individual sources could also be applied to the transfer station amounts to calculate the average composition of the trailers' contents.

Waste Quantity Procedures

The quantity (tonnage) of each type of waste disposed at the landfill was determined primarily by using data from the County's scalehouse records. Ada County's scalehouse records provide weight and volume figures by the type of waste and by customer name. The public and private companies using the landfill generally fall into either the cash or charge account categories, and are also categorized by type of waste (Non-Compacted MSW, C&D, Wood, and other recyclable materials). Deliveries by Republic Services are categorized by type of waste (Compacted or Non-Compacted) and according to one of three sources (Boise, a group of four other cities, and the unincorporated areas of Ada County). Table 2 shows the total amounts delivered for each type of waste. Only the wastes shown in the upper portion of Table 2 (compacted waste, C&D and non-compacted wastes) were included in this study.

Tonnages from the scalehouse records were allocated to the types of waste generators used for this study using a variety of methods. For some accounts, the conversion from account names shown in the scalehouse data to categories used in this study were clear based on the type of waste (Non-Compacted MSW and C&D) or based on the name of the account (such as residential collections in Boise and other areas being the same as Single-Family wastes, and the various roll-off categories being the equivalent of Commercial Roll-Offs). Other accounts, however, needed to be adjusted in various ways, and these adjustments were complicated somewhat by a change in scalehouse software that led to a change in the customer categories for the latter five months of the study (May 1 through September 30, 2014). In general, however, the following adjustments were made:

- Accounts that contained a mixture of Multi-Family and Mixed Commercial wastes were allocated based on an estimate provided by Republic Services as to the percentage of Multi-Family waste collected in that account.
- Accounts that contained a mixture of Single-Family, Multi-Family and Mixed Commercial waste were first divided based on truck type (those trucks identified as side-loaders and residential rear loaders were assumed to be Single-Family, while front loaders were assumed to contain both Mixed Commercial and Multi-Family), and then the Mixed Commercial and Multi-Family amounts were allocated based on data from Republic Services.
- The amounts of waste delivered from the Meridian Transfer Station were allocated to the six types of waste based on an estimate from Republic Services as to the relative amounts of each received at their transfer station.

Table 2
TYPES OF WASTES DISPOSED AT THE ADA COUNTY LANDFILL

Type of Waste	Tons per Year	Volume (cubic yards per year)	Annual Number of Transactions
MSW (Solid Waste)			
Compacted Waste	291,673	747,383	30,450
Construction and Demolition (C&D)	54,579	167,550	21,502
Non-Compacted Waste	22,906	181,333	42,037
Subtotal, MSW	369,158	1,096,267	93,989
Other Materials and Wastes			
Animal Mortalities	123	980	318
Asbestos	169	430	25
Christmas Trees	206	1,021	106
Electronics	373	6,339	2,858
Leaves	6,244	27,024	4,555
Mixed Loads	1,936	NA	3,369
Refrigerators, Other Appliances	90	395	373
Roadside Pickup (SILDS)	201	1,177	166
Street Sweepings	16,333	16,733	1,491
Tires	196	1,453	503
Wood	15,284	118,661	21,876
Other	11	133	6
Subtotal, Other Materials	41,656	174,344	36,029
Totals	410,814	1,270,611	130,018

The above figures are for the period October 1, 2013 to September 30, 2014, as this period most closely coincides with the period of this study.

Annual and monthly tonnages for each quarter were determined using these adjustments, and those tonnages were used to determine weighted averages. Weighted averages were used for determining the annual composition figures for each type of waste generator (by combining quarterly data for individual generators) and for determining the annual average for the entire waste stream (i.e., averaging the composition data from all types of generators).

Waste Composition Procedures

The composition of the County's waste stream was determined by randomly selecting and sorting a total of 157 samples of waste at the Ada County Landfill. These samples were allocated between the different types of generators based on the need to examine

certain types in greater detail. The number of samples taken each season is shown in Table 4. Sampling was conducted for four days each quarter. Each sample was sorted into 77 categories of materials, and the Glossary provides additional detail on the definitions used for the categories of materials.

Table 3
ALLOCATION OF SAMPLES BY TYPE OF WASTE

Type of Waste	Nov. 2013	March 2014	May 2014	July 2014	Total Samples	
					Number	Percent
Non-Compacted MSW	7	7	7	7	28	18%
C&D	8	7	7	7	29	19%
Single-Family	6	6	6	6	24	15%
Multi-Family	6	6	6	6	24	15%
Mixed Commercial	6	6	6	6	24	15%
Commercial Roll-Offs	7	7	7	7	28	18%
Totals	**40**	**39**	**39**	**39**	**157**	**100%**

The number of samples for each type met the goals of the study for each quarter. One additional sample was taken for C&D in the November quarter to satisfy the goal of taking a C&D sample specifically from the Meridian area (in other words, the project team almost missed this sample, but a last-minute load on the final day of fieldwork for that quarter was found from that area).

It was important to include the waste delivered from the Meridian Transfer Station in this study because this waste represents a significant portion of the waste disposed at the landfill, but the transfer trailers coming from the transfer station could not be sampled because these included a mixture of all different types of wastes. Treating the transfer trailers as a distinct type of waste also did not make sense. The initial strategy for this study was to spend one day each quarter at this transfer station to sample loads being brought there, but Republic Services offered to assist by diverting select loads from the transfer station to the landfill. Each quarter, Republic Services brought to the landfill three loads that otherwise would have gone to the transfer station:

- single-family
- mixed commercial
- commercial compactor

Bringing these loads to the waste sorting crew at the landfill avoided the need to move the sorting operation to the Meridian Transfer Station, thus avoiding the resulting loss of productivity that would have occurred. In addition, Republic Services ran a special route each quarter to collect a "pure" load of multi-family waste, which is otherwise difficult to sample because this waste is typically mixed with commercial waste that is also collected in dumpsters. To further adjust for not sampling at the Meridian Transfer Station, two self-haul loads (one Non-Compacted MSW and one C&D) were specifically chosen for sampling at the landfill each quarter from the Meridian area. In other words, these samples were chosen in addition to the samples that were chosen through random selection procedures.

C. RESULTS, WASTE QUANTITIES

Table 4 shows the annual and monthly quantities of MSW disposed at the landfill. The annual figures are for a one-year period that corresponds to the period of this study (October 1, 2013 through September 30, 2014). The monthly amounts shown in Table 4 correspond to the sampling periods for this study. This data is very important for the analysis of the composition data. This data allows the calculation of a weighted average for each type of waste, which takes into account the seasonal fluctuations in the quantity and composition. This data also allows the calculation of a weighted average for the county-wide results, which takes into account the relative amounts of each type of waste. Finally, the tonnages shown in Table 4 allow the composition figures to be applied to the county's waste stream to calculate the amount (tonnages) of each material for each type of waste and countywide (see Section IV.A).

As shown in Table 4, the self-haul customers (Non-Compacted MSW and C&D) brought almost one-quarter (22.4%) of the solid wastes to the landfill for the one-year period corresponding to the study (October 1, 2013 to September 30, 2014). Republic Services brought the other three-quarters (77.6%) of the waste to the landfill. Because of the larger loads brought in by Republic Services, they were able to deliver more than three times as much waste (286,850 tons) as self-haul customers (82,790 tons) in only half as many loads (34,270 loads for Republic Services versus 60,100 loads for self-haulers).

Waste disposal rates are often expressed as the total amount of waste disposed divided by the population of the area. Based on the estimated 2014 population for Ada County of 416,464 and a total waste quantity of 369,650 tons per year, Ada County's waste disposal rate is 0.89 tons per person per year. This is the equivalent of 4.9 pounds per person per day or 1,775 pounds per person per year. The national average (based on 2012 figures from the U.S. Environmental Protection Agency) is 2.9 pounds per person per year, but this figure does not include C&D and a few other types of waste.

Table 4
MONTHLY AND ANNUAL QUANTITIES BY WASTE GENERATOR

Type of Waste	Monthly Amounts, Tons				Annual Amounts	
	November, 2013	March, 2014	May, 2014	July, 2014	Total Tons	Percent
Non-Compacted MSW	1,480	1,420	2,510	1,820	22,830	6.2%
C&D	3,080	2,750	7,240	5,060	59,970	16.2%
Self-Haul Subtotal	**4,560**	**4,180**	**9,750**	**6,880**	**82,790**	**22.4%**
Single-Family	10,900	8,080	14,200	11,820	142,780	38.6%
Multi-Family	1,150	1,120	1,220	1,150	14,750	4.0%
Mixed Commercial	5,520	5,340	6,110	5,690	72,000	19.5%
Commercial Roll-Offs	4,340	4,000	4,990	4,810	57,310	15.5%
Hauler Subtotal	**21,910**	**18,540**	**26,520**	**23,470**	**286,850**	**77.6%**
Totals	**26,480**	**22,720**	**36,280**	**30,350**	**369,650**	**100.0%**

The annual amounts shown above are for the period from October 1, 2013 through September 30, 2014, as this period most closely corresponds to the timing of this study. In a similar fashion, the amounts shown for each month are for a four-week period that includes the waste sorting activities. For November, the four-week period is November 1 – 28, 2013; for March it is February 9 to March 8, 2014; for May it is May 1 through May 28, 2014; and for July the dates are July 13 through August 9, 2014.

D. RESULTS, WASTE COMPOSITION

Table 5 shows the annual averages for each generator and for the entire County. The results for the entire County are illustrated in Figure 1, and the results for each generator are illustrated in Figures 2 through 7. As can be seen in Table 5, there are marked differences in the waste streams of the different types of waste generators. A few highlights of these differences include:

- **Non-Compacted MSW**: The results for this source reflect the fact that special projects and bulky objects are one of the primary reasons for this customer to bring wastes to the landfill (at least for residential customers in this category, see Section III.D and Table 7). This is indicated by the large amount of furniture, wood and construction wastes. There is also a large amount of yard debris, due in part to the fact that many of the landscapers are included in this category.

- **Construction and Demolition (C&D) Wastes**: This waste stream consists of over 80% wood, carpet and padding, and specific types of construction wastes, and of course most of the other materials are related in some way to construction activities, including the paper (packaging), plastics (various construction materials), and the non-recyclable glass (windows). It's interesting to note that no special wastes were found in this waste stream, indicating that contractors and homeowners are doing an excellent job of keeping potentially-toxic products out of the C&D wastes in Ada County.

- **Single-Family**: This waste stream contains large amounts of food waste and yard debris, leading to a waste stream that is almost half organics (45.1% with the addition of compostable paper).

- **Multi-Family**: The Multi-Family waste stream is similar to Single-Family waste but contains less yard debris and more recyclables, diapers, furniture and food waste, all of which are typical for this waste stream.

- **Mixed Commercial**: This waste stream (and Commercial Roll-Offs) contains a substantial amount of food waste due to commercial customers such as restaurants and grocery stores.

- **Commercial Roll-Offs**: The results for this waste stream reflect the variety of different activities and sources that contribute to it, such as roll-offs from construction sites (wood waste), compactors from grocery stores (food waste), and roll-offs from landscaping clean-up projects (yard debris).

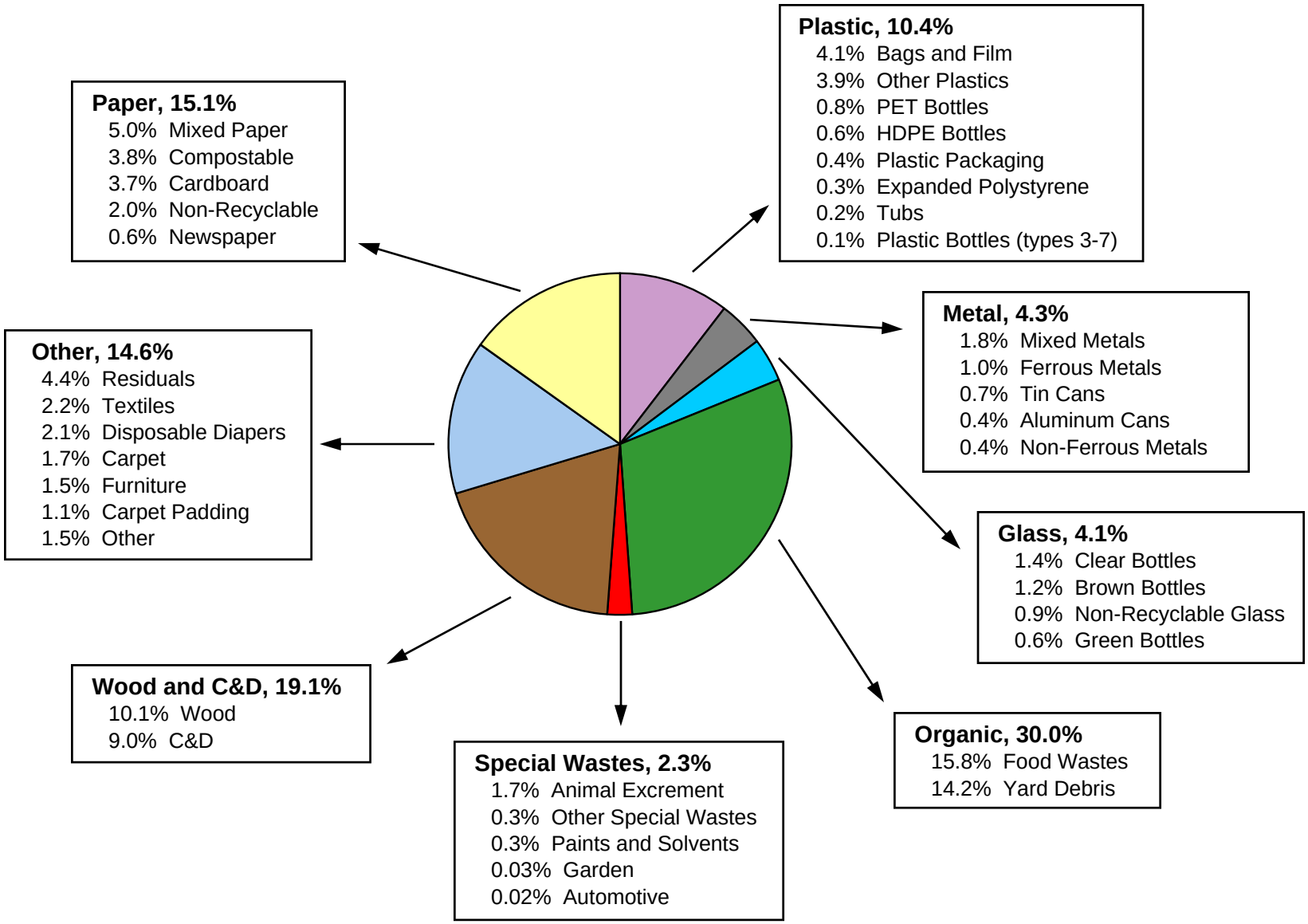
It should be noted that the figures shown in Table 5 have a specific degree of error associated with them. As with all sampling and survey procedures, a certain degree of error is unavoidable but quantifiable (see Appendix A for more details).

Table 5
WASTE COMPOSITION RESULTS

		Non-Comp MSW	C&D	Single-Family	Multi-Family	Mixed Commercial	Commercial Roll-Offs	Average for Entire County
PAPER	Newspaper	0.01%	0.00%	0.73%	1.18%	0.84%	0.79%	0.62%
	Cardboard	3.53%	0.70%	2.12%	3.82%	8.47%	4.53%	3.65%
	Mixed Waste Paper	2.77%	0.22%	5.37%	8.37%	8.60%	4.68%	5.02%
	Compostable	0.21%	0.02%	3.51%	6.77%	6.74%	5.40%	3.79%
	Non-Recyclable Paper	0.96%	0.21%	2.17%	2.18%	3.49%	2.14%	2.03%
	Paper Subtotal	**7.48%**	**1.15%**	**13.90%**	**22.31%**	**28.14%**	**17.55%**	**15.11%**
PLASTIC	PET Bottles	0.10%	0.01%	0.95%	1.96%	1.35%	0.51%	0.80%
	HDPE Bottles	0.09%	0.00%	0.76%	1.11%	0.88%	0.59%	0.61%
	Bottles 3-7	0.00%	0.00%	0.10%	0.08%	0.05%	0.03%	0.06%
	Tubs	0.01%	0.00%	0.25%	0.36%	0.22%	0.13%	0.17%
	Bags and Film	1.04%	0.21%	4.38%	4.08%	7.74%	3.95%	4.07%
	Plastic Packaging	0.16%	0.00%	0.42%	0.85%	0.55%	0.74%	0.42%
	Other Plastics	3.25%	2.50%	3.38%	4.01%	3.23%	7.92%	3.93%
	Expanded Polystyrene	0.14%	0.08%	0.44%	0.48%	0.47%	0.24%	0.34%
	Plastic Subtotal	**4.79%**	**2.81%**	**10.68%**	**12.94%**	**14.48%**	**14.11%**	**10.40%**
METAL	Aluminum Cans	0.05%	0.05%	0.62%	0.91%	0.53%	0.31%	0.44%
	Tin Cans	0.04%	0.00%	1.15%	1.40%	0.61%	0.52%	0.70%
	Mixed Metals	4.20%	2.21%	1.44%	2.26%	1.50%	1.57%	1.80%
	Ferrous Metals	3.72%	1.01%	0.66%	1.26%	1.20%	0.53%	1.01%
	Non-Ferrous Metals	0.16%	0.28%	0.29%	0.36%	0.45%	0.59%	0.36%
	Metal Subtotal	**8.16%**	**3.55%**	**4.17%**	**6.20%**	**4.28%**	**3.51%**	**4.32%**
ORGANICS	Food Waste	1.77%	0.00%	17.39%	21.69%	24.09%	21.96%	15.79%
	Yard Debris	33.44%	8.35%	24.16%	2.57%	3.05%	4.99%	14.22%
	Organics Subtotal	**35.20%**	**8.35%**	**41.55%**	**24.27%**	**27.14%**	**26.95%**	**30.01%**
GLASS	Clear Bottles	0.13%	0.00%	2.35%	2.62%	1.41%	0.41%	1.36%
	Brown Bottles	0.04%	0.00%	1.95%	2.22%	1.88%	0.07%	1.22%
	Green Bottles	0.60%	0.00%	1.32%	0.81%	0.18%	0.17%	0.64%
	Non-Recyclable Glass	0.62%	1.84%	0.23%	0.26%	0.37%	2.60%	0.91%
	Glass Subtotal	**1.40%**	**1.84%**	**5.85%**	**5.91%**	**3.83%**	**3.26%**	**4.13%**
OTHER WASTES	E-Waste	0.00%	0.00%	0.00%	0.42%	0.00%	0.79%	0.14%
	Other Electronics	0.06%	0.00%	0.01%	0.35%	0.19%	0.00%	0.06%
	Tires	0.00%	0.00%	0.00%	0.73%	0.07%	0.00%	0.04%
	Rubber	0.13%	0.00%	0.15%	0.23%	0.90%	0.36%	0.31%
	Diapers	0.03%	0.00%	4.38%	6.28%	0.32%	0.87%	2.14%
	Textiles	2.37%	0.45%	3.40%	3.62%	1.42%	1.44%	2.18%
	Carpet	2.91%	7.15%	0.23%	0.00%	0.98%	0.47%	1.69%
	Carpet Padding	1.87%	4.22%	0.00%	0.00%	0.42%	1.42%	1.10%
	Furniture	9.44%	0.48%	1.09%	4.81%	0.00%	1.43%	1.50%
	Ash, Dust	0.02%	0.00%	0.08%	0.13%	0.08%	0.05%	0.06%
	Miscellaneous Organics	0.05%	0.00%	0.31%	0.36%	0.16%	0.16%	0.19%
	Miscellaneous Inorganics	0.31%	0.00%	0.26%	0.54%	0.33%	3.34%	0.72%
	Residuals	0.46%	0.63%	6.76%	4.48%	4.78%	3.80%	4.44%
	Other Waste Subtotal	**17.66%**	**12.92%**	**16.68%**	**21.94%**	**9.63%**	**14.12%**	**14.57%**
WOOD and C&D	Wood	16.32%	29.48%	1.77%	1.69%	7.06%	14.22%	10.12%
	C&D	5.84%	39.90%	1.37%	0.21%	3.44%	6.20%	9.00%
	Wood, C&D Subtotal	**22.16%**	**69.37%**	**3.14%**	**1.90%**	**10.50%**	**20.42%**	**19.12%**
SPECIAL WASTES	Paints and Solvents	0.00%	0.00%	0.69%	0.02%	0.00%	0.00%	0.27%
	Automotive	0.18%	0.00%	0.02%	0.01%	0.00%	0.00%	0.02%
	Garden	0.00%	0.00%	0.07%	0.00%	0.00%	0.00%	0.03%
	Other	2.96%	0.00%	3.25%	4.50%	2.01%	0.08%	2.02%
	Actual Hazardous Wastes	0.08%	0.00%	0.14%	0.08%	0.02%	0.03%	0.07%
	Special Waste Subtotal	**3.14%**	**0.00%**	**4.03%**	**4.54%**	**2.01%**	**0.08%**	**2.33%**
TOTALS		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Pounds of Samples Sorted:	5,686	5,800	4,756	4,388	4,485	5,017	30,131
	Number of Samples Sorted:	28	29	24	24	24	28	157

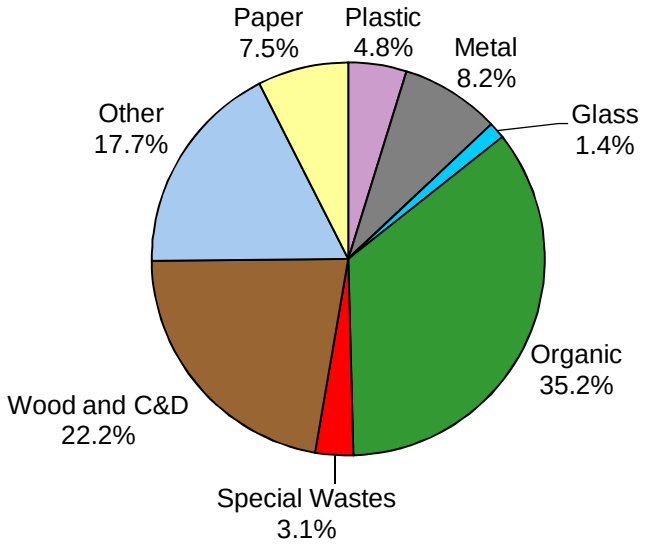
Notes: All figures are percent by weight (except for the bottom two rows).

Figure 1
WASTE COMPOSITION RESULTS



Note: All figures are percent by weight.

Figure 2
NON-COMPACTED MSW



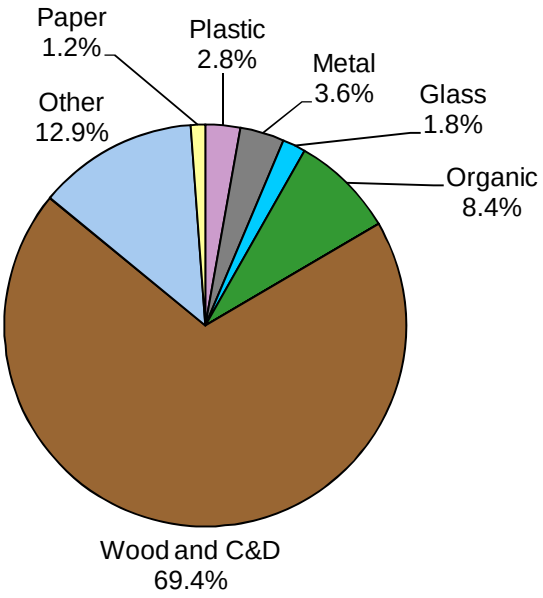
SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.01%
	Cardboard	3.5%
	Mixed Waste Paper	2.8%
	Compostable Paper	0.2%
	Non-Recyclable Paper	1.0%
	Paper Subtotal	7.5%
PLASTIC	Plastic Bottles	0.2%
	Film and Bags	1.0%
	Other Plastic	3.6%
	Plastic Subtotal	4.8%
METAL	Aluminum Cans	0.1%
	Tin Cans	0.0%
	Other Metals	8.1%
	Metal Subtotal	8.2%
GLASS	Glass Bottles	0.8%
	Other Glass	0.6%
	Glass Subtotal	1.4%

WOOD, C&D	Wood	16.3%
	Construction, Demolition	5.8%
	Wood, C&D Subtotal	22.2%
SPECIAL WASTES	Animal Excrement	0.0%
	Other Special Wastes	3.1%
	Special Waste Subtotal	3.1%
ORGANIC	Food Waste	1.8%
	Yard Debris	33.4%
	Organic Subtotal	35.2%
OTHER	Disposable Diapers	0.03%
	Textiles	2.4%
	Carpet and Padding	4.8%
	Miscellaneous (1)	10.5%
	Other Subtotal	17.7%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 3
CONSTRUCTION AND DEMOLITION (C&D) WASTES

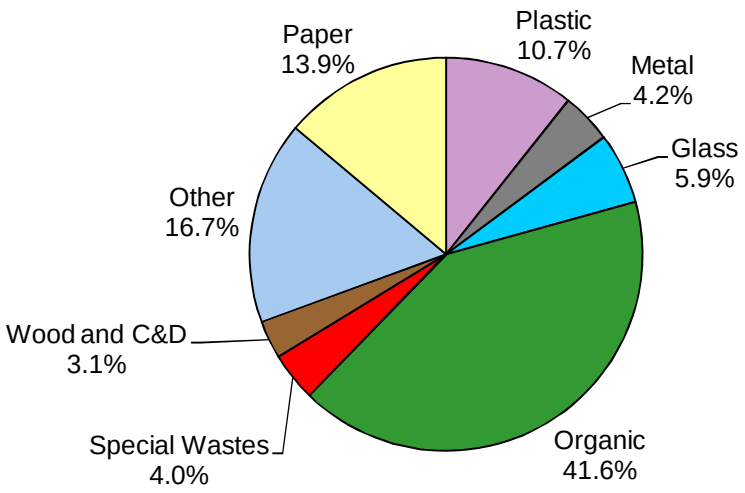


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.0%
	Cardboard	0.7%
	Mixed Waste Paper	0.2%
	Compostable Paper	0.0%
	Non-Recyclable Paper	0.2%
	Paper Subtotal	1.2%
PLASTIC	Plastic Bottles	0.0%
	Film and Bags	0.2%
	Other Plastic	2.6%
	Plastic Subtotal	2.8%
METAL	Aluminum Cans	0.1%
	Tin Cans	0.0%
	Other Metals	3.5%
	Metal Subtotal	3.6%
GLASS	Glass Bottles	0.0%
	Other Glass	1.8%
	Glass Subtotal	1.8%
WOOD, C&D	Wood	29.5%
	Construction, Demolition	39.9%
	Wood, C&D Subtotal	69.4%
SPECIAL WASTES	Animal Excrement	0.0%
	Other Special Wastes	0.0%
	Special Waste Subtotal	0.0%
ORGANIC	Food Waste	0.0%
	Yard Debris	8.4%
	Organic Subtotal	8.4%
OTHER	Disposable Diapers	0.0%
	Textiles	0.4%
	Carpet and Padding	11.4%
	Miscellaneous (1)	1.1%
	Other Subtotal	12.9%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 4
SINGLE - FAMILY WASTE

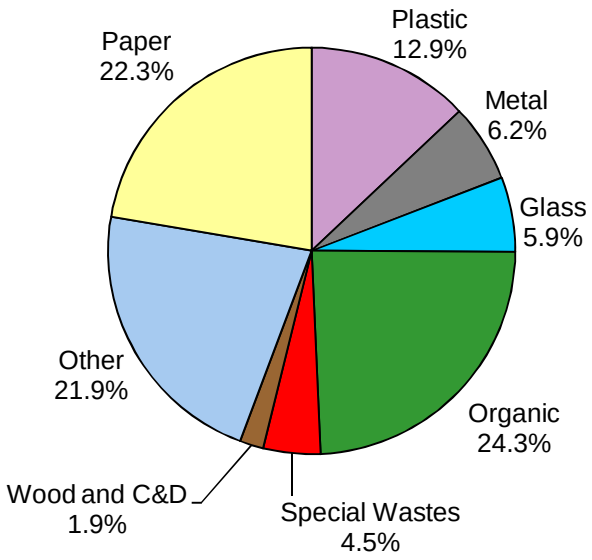


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.7%
	Cardboard	2.1%
	Mixed Waste Paper	5.4%
	Compostable Paper	3.5%
	Non-Recyclable Paper	2.2%
	Paper Subtotal	13.9%
PLASTIC	Plastic Bottles	1.8%
	Film and Bags	4.4%
	Other Plastic	4.5%
	Plastic Subtotal	10.7%
METAL	Aluminum Cans	0.6%
	Tin Cans	1.2%
	Other Metals	2.4%
	Metal Subtotal	4.2%
GLASS	Glass Bottles	5.6%
	Other Glass	0.2%
	Glass Subtotal	5.9%
WOOD, C&D	Wood	1.8%
	Construction, Demolition	1.4%
	Wood, C&D Subtotal	3.1%
SPECIAL WASTES	Animal Excrement	3.1%
	Other Special Wastes	0.9%
	Special Waste Subtotal	4.0%
ORGANIC	Food Waste	17.4%
	Yard Debris	24.2%
	Organic Subtotal	41.6%
OTHER	Disposable Diapers	4.4%
	Textiles	3.4%
	Carpet and Padding	0.2%
	Miscellaneous (1)	8.7%
	Other Subtotal	16.7%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 5
MULTI - FAMILY WASTE

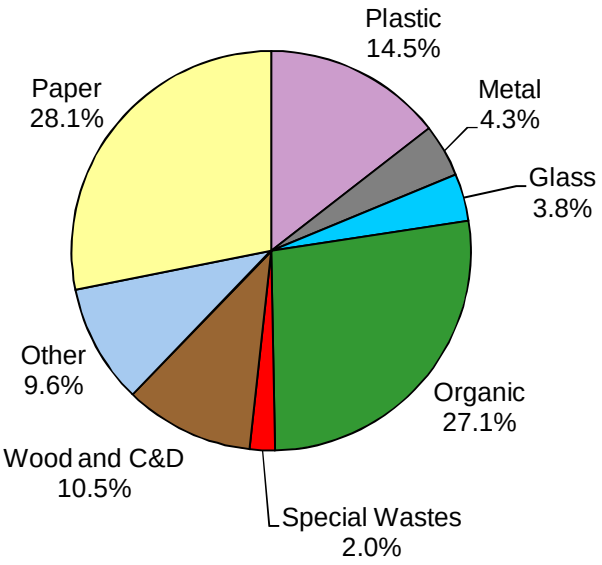


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	1.2%
	Cardboard	3.8%
	Mixed Waste Paper	8.4%
	Compostable Paper	6.8%
	Non-Recyclable Paper	2.2%
	Paper Subtotal	22.3%
PLASTIC	Plastic Bottles	3.2%
	Film and Bags	4.1%
	Other Plastic	5.7%
	Plastic Subtotal	12.9%
METAL	Aluminum Cans	0.9%
	Tin Cans	1.4%
	Other Metals	3.9%
	Metal Subtotal	6.2%
GLASS	Glass Bottles	5.7%
	Other Glass	0.3%
	Glass Subtotal	5.9%
WOOD, C&D	Wood	1.7%
	Construction, Demolition	0.2%
	Wood, C&D Subtotal	1.9%
SPECIAL WASTES	Animal Excrement	3.6%
	Other Special Wastes	1.0%
	Special Waste Subtotal	4.5%
ORGANIC	Food Waste	21.7%
	Yard Debris	2.6%
	Organic Subtotal	24.3%
OTHER	Disposable Diapers	6.3%
	Textiles	3.6%
	Carpet and Padding	0.0%
	Miscellaneous (1)	12.0%
	Other Subtotal	21.9%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 6
MIXED COMMERCIAL

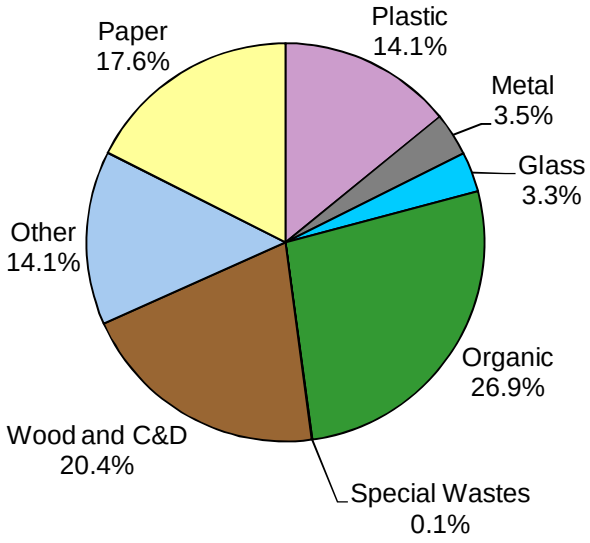


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.8%
	Cardboard	8.5%
	Mixed Waste Paper	8.6%
	Compostable Paper	6.7%
	Non-Recyclable Paper	3.5%
	Paper Subtotal	28.1%
PLASTIC	Plastic Bottles	2.3%
	Film and Bags	7.7%
	Other Plastic	4.5%
	Plastic Subtotal	14.5%
METAL	Aluminum Cans	0.5%
	Tin Cans	0.6%
	Other Metals	3.1%
	Metal Subtotal	4.3%
GLASS	Glass Bottles	3.5%
	Other Glass	0.4%
	Glass Subtotal	3.8%
WOOD, C&D	Wood	7.1%
	Construction, Demolition	3.4%
	Wood, C&D Subtotal	10.5%
SPECIAL WASTES	Animal Excrement	1.9%
	Other Special Wastes	0.2%
	Special Waste Subtotal	2.0%
ORGANIC	Food Waste	24.1%
	Yard Debris	3.1%
	Organic Subtotal	27.1%
OTHER	Disposable Diapers	0.3%
	Textiles	1.4%
	Carpet and Padding	1.4%
	Miscellaneous (1)	6.5%
	Other Subtotal	9.6%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 7
COMMERCIAL ROLL-OFFS



SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.8%
	Cardboard	4.5%
	Mixed Waste Paper	4.7%
	Compostable Paper	5.4%
	Non-Recyclable Paper	2.1%
	Paper Subtotal	17.6%
PLASTIC	Plastic Bottles	1.1%
	Film and Bags	4.0%
	Other Plastic	9.0%
	Plastic Subtotal	14.1%
METAL	Aluminum Cans	0.3%
	Tin Cans	0.5%
	Other Metals	2.7%
	Metal Subtotal	3.5%
GLASS	Glass Bottles	0.7%
	Other Glass	2.6%
	Glass Subtotal	3.3%
WOOD, C&D	Wood	14.2%
	Construction, Demolition	6.2%
	Wood, C&D Subtotal	20.4%
SPECIAL WASTES	Animal Excrement	0.0%
	Other Special Wastes	0.1%
	Special Waste Subtotal	0.1%
ORGANIC	Food Waste	22.0%
	Yard Debris	5.0%
	Organic Subtotal	26.9%
OTHER	Disposable Diapers	0.9%
	Textiles	1.4%
	Carpet and Padding	1.9%
	Miscellaneous (1)	9.9%
	Other Subtotal	14.1%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

ADDITIONAL DATA

A. INTRODUCTION

This section contains additional information collected during the fieldwork for this study.

B. AMOUNT OF EDIBLE FOOD WASTED

A substantial amount of the food produced and sold in the United States is not actually consumed, but spoils or is otherwise wasted before it can be eaten. Some estimates put the amount of wasted food as high as 40%, including losses on farms and ranches, in food processing plants, in the distribution chain, and in restaurants and homes. This issue has gained national attention recently, and for this reason the food waste found in this study was divided into "edible food" (what could have been eaten at one point) and food scraps. Table 6 shows the results of this analysis.

Food waste found during the sorting process was counted as edible food if it was still in the original packaging and was unopened or only partially consumed (see Glossary for more details). Food that met these criteria was counted as edible food

Table 6
AMOUNT OF EDIBLE FOOD WASTED

Type of Waste	All Food Waste, Percent of Waste Stream [1]	Percent of Food that was Edible	Annual Tons of Edible Food Disposed [2]
Non-Compacted MSW	1.7%	11.7%	47
C&D	0%	0%	0
Single-Family	17.4%	36.8%	9,141
Multi-Family	21.7%	41.0%	1,313
Mixed Commercial	24.1%	20.4%	3,539
Commercial Roll-Offs	22.0%	28.6%	3,597
Totals	15.8%		17,637

Notes:
1. From Table 5.
2. Based on the tonnages shown in Table 4.

regardless of the condition of the food when it was found in the waste samples. Food scraps that been removed and discarded as part of the food preparation process (such as apple peels or fat and bones cut away from meat products) were not included in the edible food category.

C. SELF-HAUL SURVEY

One of the initial goals for this project was to collect additional information on the reasons for self-haul customers using the landfill. This task was not included in the final scope of this project, but Green Solutions chose to conduct a survey nonetheless. A draft survey form was tested in the first quarter of fieldwork (November 2013), further refined based on the results of the second quarter (March 2014), and then the resulting survey form was used in the third and fourth quarters (May and July, 2014). The final survey form and survey instructions are shown in Appendix B.

The results of the survey are shown in Table 7. The survey information was collected from all types of self-haul customers (cash and charge customers with either C&D or Non-Compacted MSW loads) that were bringing wastes to the landfill tipping area. For non-residential customers (including contractors, other businesses and non-profits), information was only collected on the type of waste, the approximate age, gender and city of origin. For the city of origin, this was intended to be the source of the load for both non-residential and residential customers. Residential customers were asked additional questions about whether they have collection at home (which is not shown in Table 7), how often they go to the landfill and the reasons for their visit. In theory, the response to the question about collection at home should have been 100% "yes," since garbage collection services are mandatory in Ada County, but there was one customer that stated they had recently moved into a new home and yet to begin garbage collection services.

The survey form used in the first two quarters asked whether the waste was from a home, apartment or business, and then later the question about apartments was folded into the residential self-haul category. It's interesting to note, however, that only two of the customers, out of a total of 234 surveyed in the first two quarters, were from apartments.

D. WOOD, C&D AND SPECIAL WASTES

Additional data on the breakdown of wood, construction/demolition, and special wastes is shown in Table 8. Most of this data does not have the same level of statistical certainty as the primary categories of materials due to the lower quantities and greater variability of these materials in the waste stream, but this data may still be useful for future planning activities focused on these types of wastes.

Table 7
SELF-HAUL CUSTOMER SURVEY

Survey Question	Number of Responses				Totals	Percent
	Nov	March	May	July		
Non-Residential Customers						
Type of Waste;						
Non-Compacted MSW	17	44	55	33	149	58%
C&D	11	28	43	26	108	42%
Age Group;						
18-30	8	18	19	8	53	21%
31-54	15	37	61	44	157	61%
55 and over	5	17	18	7	47	18%
Gender;						
Female	1	6	2	2	11	4%
Male	27	66	96	57	246	96%
City of Origin; *						
Boise	18	40	72	41	171	68%
Eagle	4	15	16	6	41	16%
Garden City	3	5	3	1	12	5%
Meridian	4	8	2	7	21	8%
Star			1	1	2	1%
Unincorporated Ada County			2		2	1%
Other County		2		1	3	1%
Residential Customers						
Type of Waste;						
Non-Compacted MSW	26	66	89	46	227	80%
C&D	10	26	10	9	55	20%
Age Group;						
18-30	7	19	8	6	40	14%
31-54	20	56	54	31	161	56%
55 and over	6	19	38	22	85	30%
Gender;						
Female	4	6	7	6	23	8%
Male	32	87	93	53	265	91%
City of Origin;						
Boise	17	69	73	46	205	71%
Eagle	10	14	8	5	37	13%
Garden City	3	1	3	1	8	3%
Kuna	1	1			2	1%
Meridian	2	2	9	2	15	5%
Star		4	3	1	8	3%
Unincorporated Ada County	3		2	2	7	2%
Other County		2	2	2	6	2%
Amount of Landfill Use:						
Once per Week	3	8	4	1	16	6%
Once per Month	4	12	19	10	45	16%
3-4 Times per Year	14	30	19	18	81	28%
1-2 Times per Year	14	44	58	30	146	51%
Reason for Visit; *						
Bulky Object	NA	NA	25	16	41	25%
Special Project			73	43	116	70%
Missed Pickup			1		1	1%
Personal Preference			4	1	5	3%
Other Reason			2		2	1%

* A few responses that were allowed for other cities and for reasons for visiting the landfill are not shown here because no survey participants chose those responses (see survey form in Appendix B for more information).

Table 8
BREAKDOWN OF WOOD, C&D AND SPECIAL WASTES

	Non-Comp MSW	C&D	Single-Family	Multi-Family	Mixed Commercial	Commercial Roll-Offs	Average for Entire County
WOOD WASTE							
Dimension Lumber	4.9%	9.2%	0.5%	0.4%	1.4%	3.5%	2.8%
Pallets, Crates	0.7%	0%	0%	0.3%	1.3%	0.5%	0.4%
Treated Wood	0.2%	0.1%	0.02%	0%	0.2%	0%	0.1%
Roofing	0%	4.8%	0%	0%	0%	0%	0.8%
Contaminated	0%	3.1%	0.4%	0.3%	0.6%	3.4%	1.3%
Stumps, Other Bulky Wood	0%	0.2%	0.2%	0%	0%	0%	0.1%
Plywood	10.2%	11.5%	0.4%	0.6%	3.2%	6.5%	4.3%
Wood Products	0.1%	0.7%	0.1%	0.2%	0.4%	0.4%	0.3%
Other Wood	0.2%	0%	0.1%	0%	0%	0%	0.1%
Total Wood Waste	**16.3%**	**29.5%**	**1.8%**	**1.7%**	**7.1%**	**14.2%**	**10.1%**
CONSTRUCTION AND DEMOLITION (C&D) WASTE							
Ceramics, Porcelain, China	0.5%	3.8%	0.2%	0%	0%	0.1%	0.7%
Rocks, Bricks	0.4%	0.6%	0.1%	0.01%	0.3%	0%	0.2%
Concrete	2.9%	4.9%	0.1%	0%	0%	1.1%	1.2%
Soil, Dirt, Fines	0.5%	0.8%	0.7%	0.2%	2.2%	0%	0.9%
Gypsum Board	1.3%	8.7%	0.1%	0%	0.6%	3.5%	2.2%
Fiberglass Insulation	0.1%	0.2%	0%	0%	0%	1.5%	0.3%
Other Fiberglass	0%	0.04%	0%	0.003%	0.3%	0%	0.1%
Roofing	0.1%	20.9%	0.1%	0%	0%	0%	3.4%
Asphalt	0%	0%	0%	0%	0%	0%	0%
Other C&D	0.01%	0.1%	0.2%	0%	0.1%	0%	0.1%
Total C&D Waste	**5.8%**	**39.9%**	**1.4%**	**0.2%**	**3.4%**	**6.2%**	**9.0%**
SPECIAL WASTES							
Paints and Solvents;							
Latex Paint	0%	0%	0.6%	0.002%	0%	0%	0.2%
Oil-Based Paint	0%	0%	0.04%	0%	0%	0%	0.02%
Solvents	0%	0%	0.01%	0.02%	0%	0%	0.003%
Automotive Wastes;							
Motor Oil, Other Oils	0%	0%	0%	0%	0%	0%	0%
Oil Filters	0.10%	0%	0.02%	0%	0%	0%	0.01%
Gasoline, Fuel Oil	0%	0%	0%	0.01%	0%	0%	0.0005%
Antifreeze	0.08%	0%	0%	0%	0%	0%	0.005%
Other Auto Maintenance	0%	0%	0%	0%	0%	0%	0%
Batteries, Car	0%	0%	0%	0%	0%	0%	0%
Home and Garden;							
Pesticides, Herbicides	0%	0%	0.004%	0%	0%	0%	0.001%
Fertilizer w/Pest. and Herb.	0%	0%	0.07%	0%	0%	0%	0.03%
Fertilizer w/o Pest., Herb.	0.002%	0%	0%	0%	0%	0%	0.0001%
Other;							
Adhesives, Glues	0%	0%	0.05%	0.05%	0.02%	0%	0.03%
Cleaners, Corrosives	0.01%	0%	0.02%	0.06%	0%	0%	0.01%
Medical Wastes	0%	0%	0.004%	0.01%	0.10%	0.005%	0.02%
Household Batteries	0.02%	0%	0.08%	0.10%	0.03%	0.01%	0.05%
Animal Excrement	0%	0%	3.1%	3.6%	1.86%	0.02%	1.7%
Animal Carcasses	2.9%	0%	0%	0.7%	0%	0%	0.2%
Gas Cylinders	0%	0%	0%	0%	0%	0%	0%
Other Special Wastes	0%	0%	0%	0%	0%	0.03%	0.01%
Actual Hazardous Waste	**0.08%**	**0%**	**0.14%**	**0.08%**	**0.02%**	**0.03%**	**0.07%**
Total Special Waste	**3.1%**	**0.0%**	**4.0%**	**4.5%**	**2.0%**	**0.1%**	**2.3%**

Notes: All figures are percentages by weight.

E. RESULTS SPECIFIC TO THE CITY OF BOISE

During the course of the fieldwork for this study, careful attention was paid to the numbers of samples taken from various sources. One of the factors monitored was the number of samples of Single-Family waste from Boise versus the rest of Ada County, in order to ensure that a representative amount (about half of the samples) was taken from Boise. As a result, 12 of the 24 samples for Single-Family waste were from Boise, which is a sufficient number of samples to allow this data to be shown separately. Other categories were not so closely monitored for the Boise-County allocation, with the expectation that random selection would achieve a representative sampling of the county's and city's waste streams. As it turns out, however, about half of the Mixed Commercial samples (14 out of 24) were taken from Boise as well. Other types of generators actually fared about the same, but for various reasons extracting data just for Boise for the other types of generators is not reliable. Hence, only the data for Single-Family and Mixed Commercial categories for Boise is shown in Table 9.

The figures shown for Boise in Table 9 are not as reliable as the county-wide averages due to the smaller numbers of samples sorted only for Boise. Hence, there should not be too much reliance placed on the apparent differences in the figures, and small differences should be assumed to be within the degree of error, but the data can still be examined for trends. Some of the trends that can be observed:

- There appears to be less recyclable paper and recyclable plastics in Boise's Single-Family waste stream. This could mean that less of these materials are being generated, but this could also be the result of greater access to recycling or participation in recycling programs.

- On the other hand, there is a greater amount of yard debris in Boise's Single-Family waste stream, indicating that Boise residents need more opportunities for composting (or this could mean that residents in less-urban areas can use other alternatives for yard debris more easily, or that they are generating less to begin with).

It should also be kept in mind that the figures shown in the first four columns of Table 9 (and in many of the other tables in this report) are percentages, and a significant change in the percentage of one material can affect the apparent amount of other materials. For example, a larger amount of yard debris could decrease the percentages of other materials since the sum of all materials cannot exceed 100%. Unfortunately, the reverse could also be true, where a decrease in the other materials could cause the yard debris figure to appear higher. A type of "reality check" can be conducted on these figures by converting them to weight figures based on the number of residents. This has been done in the last column in Table 9 for the Single-Family waste stream. A similar approach could be taken for the Mixed Commercial figures, but better data would be

Table 9
WASTE COMPOSITION RESULTS FOR THE CITY OF BOISE

		Mixed Commercial		Single-Family Residential		Single-Family Waste, lb/person/yr	
		Boise Only	County Average	Boise Only	County Average	Boise Only	County Average
PAPER	Newspaper	1.10%	0.84%	0.41%	0.73%	3.5	5.5
	Cardboard	9.08%	8.47%	1.75%	2.12%	14.9	15.8
	Mixed Waste Paper	8.46%	8.60%	4.51%	5.37%	38.4	40.0
	Compostable	7.70%	6.74%	3.27%	3.51%	27.9	26.1
	Non-Recyclable Paper	3.56%	3.49%	2.03%	2.17%	17.3	16.2
	Paper Subtotal	**29.91%**	**28.14%**	**11.97%**	**13.90%**	**101.9**	**103.5**
PLASTIC	PET Bottles	1.19%	1.35%	0.82%	0.95%	7.0	7.1
	HDPE Bottles	1.02%	0.88%	0.46%	0.76%	3.9	5.7
	Bottles 3-7	0.03%	0.05%	0.09%	0.10%	0.8	0.8
	Tubs	0.20%	0.22%	0.22%	0.25%	1.9	1.9
	Bags and Film	7.63%	7.74%	4.08%	4.38%	34.7	32.6
	Plastic Packaging	0.47%	0.55%	0.33%	0.42%	2.8	3.1
	Other Plastics	3.58%	3.23%	3.33%	3.38%	28.3	25.2
	Expanded Polystyrene	0.63%	0.47%	0.41%	0.44%	3.5	3.3
	Plastic Subtotal	**14.75%**	**14.48%**	**9.74%**	**10.68%**	**83.0**	**79.5**
METAL	Aluminum Cans	0.70%	0.53%	0.56%	0.62%	4.7	4.6
	Tin Cans	0.65%	0.61%	1.12%	1.15%	9.5	8.6
	Mixed Metals	2.06%	1.50%	1.07%	1.44%	9.1	10.8
	Ferrous Metals	1.74%	1.20%	0.20%	0.66%	1.7	4.9
	Non-Ferrous Metals	0.13%	0.45%	0.28%	0.29%	2.4	2.2
	Metal Subtotal	**5.28%**	**4.28%**	**3.22%**	**4.17%**	27.5	31.0
ORGANICS	Food Waste	19.42%	24.09%	16.28%	17.39%	138.6	129.5
	Yard Debris	3.00%	3.05%	29.51%	24.16%	251.3	179.9
	Organics Subtotal	**22.42%**	**27.14%**	**45.79%**	**41.55%**	**389.9**	**309.3**
GLASS	Clear Bottles	1.94%	1.41%	1.88%	2.35%	16.0	17.5
	Brown Bottles	2.89%	1.88%	1.89%	1.95%	16.1	14.5
	Green Bottles	0.23%	0.18%	0.92%	1.32%	7.8	9.9
	Non-Recyclable Glass	0.49%	0.37%	0.21%	0.23%	1.8	1.7
	Glass Subtotal	**5.56%**	**3.83%**	**4.90%**	**5.85%**	**41.7**	**43.6**
OTHER	E-Waste	0.00%	0.00%	0.00%	0.00%	0.0	0.0
WASTES	Other Electronics	0.23%	0.19%	0.01%	0.01%	0.1	0.1
	Tires	0.21%	0.07%	0.00%	0.00%	0.0	0.0
	Rubber	1.14%	0.90%	0.13%	0.15%	1.1	1.1
	Diapers	0.35%	0.32%	5.03%	4.38%	42.9	32.6
	Textiles	1.91%	1.42%	3.17%	3.40%	27.0	25.3
	Carpet	1.47%	0.98%	0.46%	0.23%	3.9	1.7
	Carpet Padding	0.63%	0.42%	0.00%	0.00%	0.0	0.0
	Furniture	0.00%	0.00%	0.00%	1.09%	0.0	8.1
	Ash, Dust	0.03%	0.08%	0.08%	0.08%	0.7	0.6
	Miscellaneous Organics	0.16%	0.16%	0.45%	0.31%	3.8	2.3
	Miscellaneous Inorganics	0.43%	0.33%	0.35%	0.26%	3.0	1.9
	Residuals	4.52%	4.78%	6.66%	6.76%	56.7	50.3
	Other Waste Subtotal	**11.08%**	**9.63%**	**16.34%**	**16.68%**	**139.1**	**124.2**
WOOD	Wood	7.56%	7.06%	1.55%	1.77%	13.2	13.2
and C&D	C&D	1.16%	3.44%	1.73%	1.37%	14.7	10.2
	Wood, C&D Subtotal	**8.72%**	**10.50%**	**3.28%**	**3.14%**	**28.0**	**23.4**
SPECIAL	Paints and Solvents	0.00%	0.00%	0.68%	0.69%	5.8	5.1
WASTES	Automotive	0.00%	0.00%	0.00%	0.02%	0.0	0.2
	Garden	0.00%	0.00%	0.14%	0.07%	1.2	0.5
	Other	2.28%	2.01%	3.94%	3.25%	33.5	24.2
	Actual Hazardous Wastes	0.00%	0.02%	0.23%	0.14%	2.0	1.0
	Special Waste Subtotal	**2.28%**	**2.01%**	**4.76%**	**4.03%**	40.5	30.0
TOTALS		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**851.6**	**744.5**
	Pounds of Samples Sorted:	2,739	4,485	2,353	4,756		
	Number of Samples Sorted:	14	24	12	24		

Notes: All figures are percent by weight (except for the bottom two rows).

needed on employment levels. Plus, the types and amounts of commercial wastes vary widely between different types of businesses, so the results would be less meaningful.

The conversion of the Single-Family percentage figures to weight figures in Table 9 was accomplished using 2010 census data and the waste quantity results from this study. The 2010 census shows 205,671 people in the City of Boise and 392,365 residents for Ada County (or 177,808 and 383,563 people, respectively, after adjusting for the number of residents living in multi-family units). The waste quantity analysis conducted for this project shows a total of 142,783 tons of Single-Family waste disposed for the entire county, of which 75,709 tons is from Boise.

F. CONVERTING RESULTS TO SELF-HAUL CATEGORIES

The primary results of this study are expressed according to the categories used for the scalehouse records at the landfill. For self-haul customers, this means that the primary results are categorized by either Non-Compacted MSW or C&D. Many other studies in the northwestern U.S. have instead categorized these types of customers as either "residential self-haul" or "non-residential self-haul." In other words, one method categorizes these customers based on the type of waste and the other is based on the source of the waste (residential or non-residential). Data collected during the course of the study allows the results to be converted from the primary categories to the other two self-haul categories, and these results are shown in Table 10. This data is provided primarily to facilitate comparisons with other studies.

The original categories used for this study, Non-Compacted MSW and C&D, are very similar to the self-haul categories and so the results for the categories are similar. Customers with Non-Compacted MSW are often coming from residential sources, and 75% of these samples were simply transferred to the residential self-haul category. Customers with C&D are often from non-residential sources, so most of the samples for this category (69%) were directly transferred to the non-residential self-haul category. Only 16 samples (28%) out of the total 57 samples for Non-Compacted MSW and C&D were converted to the "other" self-haul category.

Table 10
CONVERSION TO SELF-HAUL CATEGORIES

		Original Categories		Self-Haul Categories	
		Non-Comp MSW	C&D	Residential Self-Haul	Non-Residential Self-Haul
PAPER	Newspaper	0.01%	0.00%	0.01%	0.00%
	Cardboard	3.53%	0.70%	3.10%	1.17%
	Mixed Waste Paper	2.77%	0.22%	2.38%	0.06%
	Compostable	0.21%	0.02%	0.13%	0.08%
	Non-Recyclable Paper	0.96%	0.21%	0.18%	1.01%
	Paper Subtotal	**7.48%**	**1.15%**	**5.79%**	**2.32%**
PLASTIC	PET Bottles	0.10%	0.01%	0.04%	0.09%
	HDPE Bottles	0.09%	0.00%	0.08%	0.00%
	Bottles 3-7	0.00%	0.00%	0.00%	0.00%
	Tubs	0.01%	0.00%	0.01%	0.01%
	Bags and Film	1.04%	0.21%	0.66%	0.68%
	Plastic Packaging	0.16%	0.00%	0.27%	0.00%
	Other Plastics	3.25%	2.50%	4.00%	1.26%
	Expanded Polystyrene	0.14%	0.08%	0.15%	0.08%
	Plastic Subtotal	**4.79%**	**2.81%**	**5.20%**	**2.12%**
METAL	Aluminum Cans	0.05%	0.05%	0.05%	0.05%
	Tin Cans	0.04%	0.00%	0.04%	0.00%
	Mixed Metals	4.20%	2.21%	4.66%	1.46%
	Ferrous Metals	3.72%	1.01%	5.06%	1.39%
	Non-Ferrous Metals	0.16%	0.28%	0.27%	0.19%
	Metal Subtotal	**8.16%**	**3.55%**	**10.09%**	**3.09%**
ORGANICS	Food Waste	1.77%	0.00%	1.58%	0.04%
	Yard Debris	33.44%	8.35%	23.38%	19.60%
	Organics Subtotal	**35.20%**	**8.35%**	**24.96%**	**19.64%**
GLASS	Clear Bottles	0.13%	0.00%	0.12%	0.02%
	Brown Bottles	0.04%	0.00%	0.03%	0.01%
	Green Bottles	0.60%	0.00%	0.00%	0.48%
	Non-Recyclable Glass	0.62%	1.84%	0.78%	1.98%
	Glass Subtotal	**1.40%**	**1.84%**	**0.93%**	**2.49%**
OTHER	E-Waste	0.00%	0.00%	0.00%	0.00%
WASTES	Other Electronics	0.06%	0.00%	0.05%	0.00%
	Tires	0.00%	0.00%	0.00%	0.00%
	Rubber	0.13%	0.00%	0.11%	0.00%
	Diapers	0.03%	0.00%	0.02%	0.00%
	Textiles	2.37%	0.45%	2.68%	0.07%
	Carpet	2.91%	7.15%	6.89%	2.84%
	Carpet Padding	1.87%	4.22%	4.13%	1.60%
	Furniture	9.44%	0.48%	9.27%	0.17%
	Ash, Dust	0.02%	0.00%	0.01%	0.00%
	Miscellaneous Organics	0.05%	0.00%	0.05%	0.00%
	Miscellaneous Inorganics	0.31%	0.00%	0.26%	0.00%
	Residuals	0.46%	0.63%	0.28%	0.66%
	Other Waste Subtotal	**17.66%**	**12.92%**	23.76%	5.35%
WOOD	Wood	16.32%	29.48%	17.43%	29.56%
and C&D	C&D	5.84%	39.90%	9.39%	35.43%
	Wood, C&D Subtotal	**22.16%**	**69.37%**	**26.83%**	**64.99%**
SPECIAL	Paints and Solvents	0.00%	0.00%	0.00%	0.00%
WASTES	Automotive	0.18%	0.00%	0.14%	0.00%
	Garden	0.00%	0.00%	0.00%	0.00%
	Other	2.96%	0.00%	2.30%	0.00%
	Actual Hazardous Wastes	0.08%	0.00%	0.06%	0.00%
	Special Waste Subtotal	**3.14%**	**0.00%**	**2.44%**	**0.00%**
TOTALS		**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Pounds of Samples Sorted:	5,686	5,800	6,026	5,459
	Number of Samples Sorted:	28	29	30	27

Notes: All figures are percent by weight (except for the bottom two rows).

SECTION IV

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Weight of Materials Disposed

The waste quantity and composition results can be combined to show the total weight of disposed materials. Table 11 provides this information for the six waste generators and for the County's entire waste stream.

Recycling Potential Assessment

One of the key reasons for conducting a study such as this is to determine how much of the disposed materials could be recycled. In addition to examining "typical" recyclable materials (those materials that are typically collected through residential curbside and commercial recycling programs), other materials can also be examined, such as organics and materials that can be recycled through special programs. This data provides important information for planning new or expanded recycling and composting programs.

Table 12 and Figure 8 show the amounts of recyclable materials remaining in the waste stream of each generator. Materials have been grouped into three categories for this analysis:

- **Typical Recyclables**: these are the materials typically collected by curbside and commercial programs. The list of materials for this group is based on Republic Services' recycling guidelines.

- **Organics**: these are the materials typically collected through "expanded organics" collection programs, such as used in the Seattle and Portland areas.

- **Other Recyclables**: the third group is materials that could potentially be recycled through existing or new recycling programs, including materials that:
  - are recycled currently through programs that are conducted separately from municipal and hauler-based programs (such as textiles and plastic bags);
  - are being recycled to a limited extent currently through a few specialized programs (such as concrete); and
  - are being diverted to applications that do not meet the definition of recycling (such as wood converted to hog fuel).

Table 11
WEIGHT OF DISPOSED MATERIALS

		Non-Comp MSW	C&D	Single-Family	Multi-Family	Mixed Commercial	Commercial Roll-Offs	Totals for Entire County
PAPER	Newspaper	2	0	1,050	170	610	460	2,280
	Cardboard	800	420	3,020	560	6,100	2,600	13,510
	Mixed Waste Paper	630	130	7,670	1,230	6,190	2,680	18,540
	Compostable	50	10	5,010	1,000	4,860	3,100	14,020
	Non-Recyclable Paper	220	120	3,100	320	2,510	1,230	7,500
	Paper Subtotal	**1,710**	**690**	**19,850**	**3,290**	**20,260**	**10,060**	**55,860**
PLASTIC	PET Bottles	20	10	1,350	290	970	290	2,940
	HDPE Bottles	20	0	1,090	160	630	340	2,240
	Bottles 3-7	0	0	140	10	40	20	210
	Tubs	3	0	360	50	160	80	650
	Bags and Film	240	130	6,260	600	5,570	2,260	15,060
	Plastic Packaging	40	0	590	130	390	420	1,570
	Other Plastics	740	1,500	4,830	590	2,330	4,540	14,530
	Expanded Polystyrene	30	50	620	70	340	140	1,250
	Plastic Subtotal	**1,090**	**1,680**	**15,250**	**1,910**	**10,430**	**8,090**	**38,440**
METAL	Aluminum Cans	10	30	890	130	380	180	1,620
	Tin Cans	10	0	1,650	210	440	300	2,600
	Mixed Metals	960	1,320	2,060	330	1,080	900	6,660
	Ferrous Metals	850	610	940	190	860	300	3,750
	Non-Ferrous Metals	40	170	420	50	320	340	1,330
	Metal Subtotal	**1,860**	**2,130**	**5,950**	**910**	**3,080**	**2,010**	**15,960**
ORGANICS	Food Waste	400	0	24,830	3,200	17,340	12,580	58,360
	Yard Debris	7,630	5,010	34,500	380	2,200	2,860	52,570
	Organics Subtotal	**8,040**	**5,010**	**59,330**	**3,580**	**19,540**	**15,440**	**110,930**
GLASS	Clear Bottles	30	0	3,360	390	1,010	230	5,020
	Brown Bottles	10	0	2,780	330	1,350	40	4,510
	Green Bottles	140	0	1,890	120	130	100	2,370
	Non-Recyclable Glass	140	1,100	330	40	260	1,490	3,370
	Glass Subtotal	**320**	**1,100**	**8,350**	**870**	**2,750**	**1,870**	**15,270**
OTHER WASTES	E-Waste	0	0	0	60	0	450	510
	Other Electronics	10	0	20	50	130	0	220
	Tires	0	0	0	110	50	0	160
	Rubber	30	0	210	30	650	210	1,130
	Diapers	10	0	6,260	930	230	500	7,920
	Textiles	540	270	4,860	530	1,020	830	8,050
	Carpet	660	4,290	330	0	710	270	6,260
	Carpet Padding	430	2,530	0	0	300	810	4,070
	Furniture	2,150	290	1,560	710	0	820	5,530
	Ash, Dust	4	0	110	20	60	30	220
	Miscellaneous Organics	10	0	450	50	110	90	720
	Miscellaneous Inorganics	70	0	370	80	240	1,920	2,670
	Residuals	100	380	9,650	660	3,440	2,180	16,410
	Other Waste Subtotal	**4,030**	**7,750**	**23,820**	**3,240**	**6,940**	**8,090**	**53,860**
WOOD and C&D	Wood	3,720	17,680	2,520	250	5,080	8,150	37,410
	C&D	1,330	23,920	1,960	30	2,480	3,550	33,280
	Wood, C&D Subtotal	**5,060**	**41,600**	**4,490**	**280**	**7,560**	**11,700**	**70,690**
SPECIAL WASTES	Paints and Solvents	0	0	990	3	0	0	990
	Automotive	40	0	30	2	0	0	70
	Garden	0	0	100	0	0	0	100
	Other	670	0	4,640	660	1,450	40	7,460
	Actual Hazardous Wastes	20	0	200	10	10	20	260
	Special Waste Subtotal	**720**	**0**	**5,750**	**670**	**1,450**	**40**	**8,630**
TOTALS		**22,830**	**59,970**	**142,780**	**14,750**	**72,010**	**57,310**	**369,640**

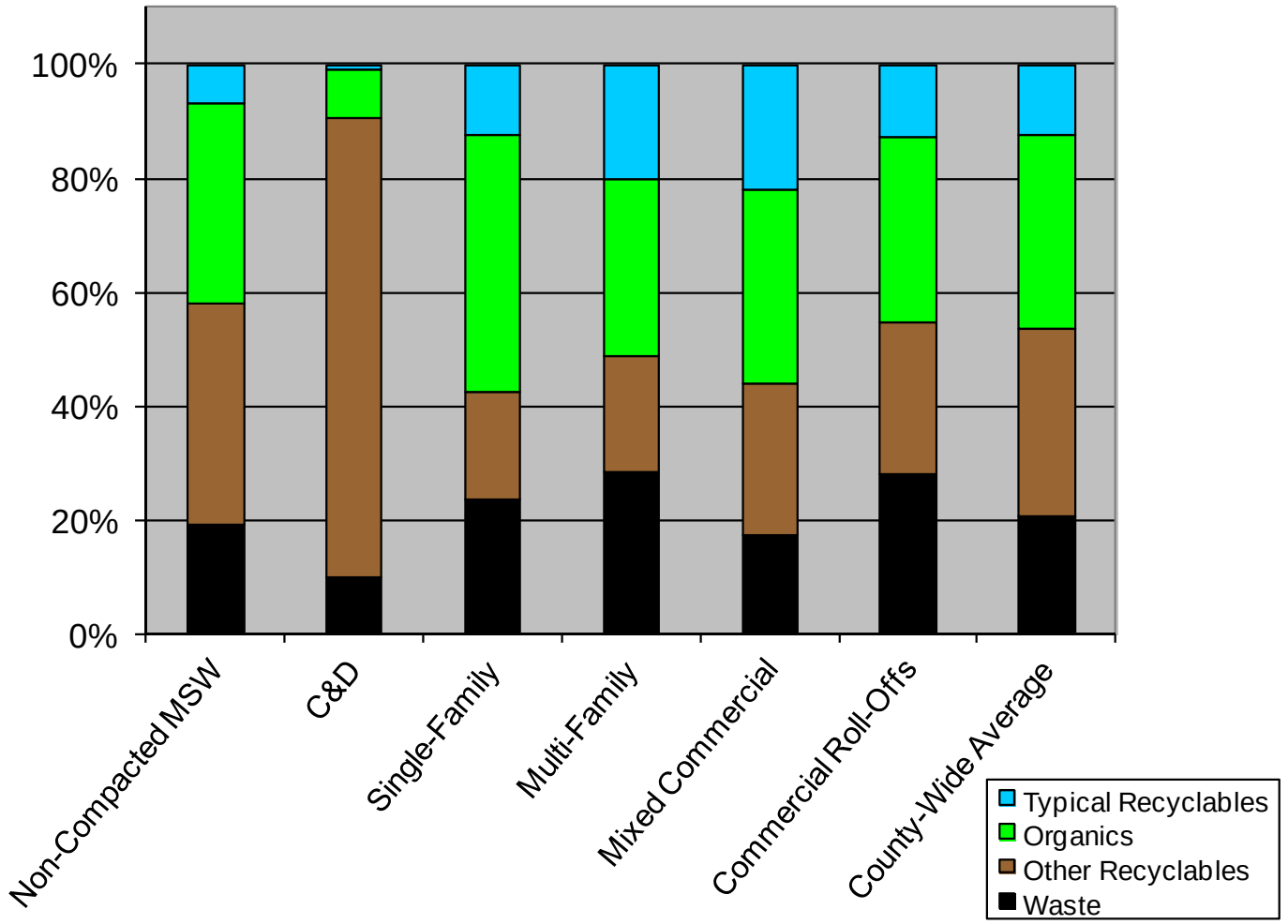
Notes: All figures are tons per year.

Table 12
RECYCLING POTENTIAL ASSESSMENT

	Non-Comp MSW		C&D		Single-Family		Multi-Family		Mixed Commercial		Commercial Roll-Offs		Totals for Entire County	
	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY
Typical Recyclables:														
Newspaper	0.0%	2	0.0%	0	0.7%	1,050	1.2%	170	0.8%	610	0.8%	460	0.6%	2,280
Cardboard	3.5%	800	0.7%	420	2.1%	3,020	3.8%	560	8.5%	6,100	4.5%	2,600	3.7%	13,510
Mixed Waste Paper	2.8%	630	0.2%	130	5.4%	7,670	8.4%	1,230	8.6%	6,190	4.7%	2,680	5.0%	18,540
PET Bottles	0.1%	20	0.0%	10	0.9%	1,350	2.0%	290	1.3%	970	0.5%	290	0.8%	2,940
HDPE Bottles	0.1%	20	0.0%	0	0.8%	1,090	1.1%	160	0.9%	630	0.6%	340	0.6%	2,240
Bottles 3-7	0.0%	0	0.0%	0	0.1%	140	0.1%	10	0.1%	40	0.0%	20	0.1%	210
Tubs	0.0%	3	0.0%	0	0.3%	360	0.4%	50	0.2%	160	0.1%	80	0.2%	650
Plastic Packaging	0.2%	40	0.0%	0	0.4%	590	0.8%	130	0.5%	390	0.7%	420	0.4%	1,570
Aluminum Cans	0.1%	10	0.1%	30	0.6%	890	0.9%	130	0.5%	380	0.3%	180	0.4%	1,620
Tin Cans	0.0%	10	0.0%	0	1.2%	1,650	1.4%	210	0.6%	440	0.5%	300	0.7%	2,600
Subtotal	**6.8%**	**1,535**	**1.0%**	**590**	**12.5%**	**17,810**	**20.0%**	**2,940**	**22.1%**	**15,910**	**12.8%**	**7,370**	**12.5%**	**46,160**
Organics														
Compostable Paper	0.2%	50	0.0%	10	3.5%	5,010	6.8%	1,000	6.7%	4,860	5.4%	3,100	3.8%	14,020
Food Waste	1.8%	400	0.0%	0	17.4%	24,830	21.7%	3,200	24.1%	17,340	22.0%	12,580	15.8%	58,360
Yard Debris	33.4%	7,630	8.4%	5,010	24.2%	34,500	2.6%	380	3.1%	2,200	5.0%	2,860	14.2%	52,570
Subtotal	**35.4%**	**8,080**	**8.4%**	**5,020**	**45.1%**	**64,340**	**31.0%**	**4,580**	**33.9%**	**24,400**	**32.4%**	**18,540**	**33.8%**	**124,950**
Other Recyclables														
Plastic Bags and Film	1.0%	240	0.2%	130	4.4%	6,260	4.1%	600	7.7%	5,570	4.0%	2,260	4.1%	15,060
Expanded Polystyrene	0.1%	30	0.1%	50	0.4%	620	0.5%	70	0.5%	340	0.2%	140	0.3%	1,250
Mixed Metals	4.2%	960	2.2%	1,320	1.4%	2,060	2.3%	330	1.5%	1,080	1.6%	900	1.8%	6,660
Ferrous Metals	3.7%	850	1.0%	610	0.7%	940	1.3%	190	1.2%	860	0.5%	300	1.0%	3,750
Non-Ferrous Metals	0.2%	40	0.3%	170	0.3%	420	0.4%	50	0.4%	320	0.6%	340	0.4%	1,330
Glass Bottles	0.8%	180	0.0%	0	5.6%	8,030	5.7%	840	3.5%	2,490	0.7%	370	3.2%	11,900
E-Waste	0.0%	0	0.0%	0	0.0%	0	0.4%	60	0.0%	0	0.8%	450	0.1%	510
Other Electronics	0.1%	10	0.0%	0	0.0%	20	0.3%	50	0.2%	130	0.0%	0	0.1%	220
Tires	0.0%	0	0.0%	0	0.0%	0	0.7%	110	0.1%	50	0.0%	0	0.0%	160
Textiles	2.4%	540	0.4%	270	3.4%	4,860	3.6%	530	1.4%	1,020	1.4%	830	2.2%	8,050
Carpet	2.9%	660	7.1%	4,290	0.2%	330	0.0%	0	1.0%	710	0.5%	270	1.7%	6,260
Carpet Padding	1.9%	430	4.2%	2,530	0.0%	0	0.0%	0	0.4%	300	1.4%	810	1.1%	4,070
Dimension Lumber	4.9%	1,110	9.2%	5,520	0.5%	780	0.4%	50	1.4%	1,010	3.5%	2,010	2.8%	10,480
Pallets, Crates	0.7%	150	0.0%	0	0.0%	0	0.3%	40	1.3%	960	0.5%	260	0.4%	1,410
Roofing, Wood	0.0%	0	4.8%	2,850	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.8%	2,850
Stumps, Bulky Wood	0.0%	0	0.2%	120	0.2%	220	0.0%	0	0.0%	0	0.0%	0	0.1%	340
Plywood	10.2%	2,330	11.5%	6,880	0.4%	550	0.6%	80	3.2%	2,300	6.5%	3,700	4.3%	15,840
Ceramics, Porcelain	0.5%	120	3.8%	2,270	0.2%	220	0.0%	0	0.0%	0	0.1%	40	0.7%	2,650
Rocks, Bricks	0.4%	100	0.6%	350	0.1%	90	0.0%	0	0.3%	190	0.0%	0	0.2%	740
Concrete	2.9%	660	4.9%	2,920	0.1%	170	0.0%	0	0.0%	0	1.1%	650	1.2%	4,400
Soil, Dirt, Fines	0.5%	110	0.8%	460	0.7%	1,000	0.2%	30	2.2%	1,560	0.0%	0	0.9%	3,160
Gypsum Board	1.3%	290	8.7%	5,190	0.1%	100	0.0%	0	0.6%	440	3.5%	2,020	2.2%	8,050
Roofing (Asphalt)	0.1%	30	20.9%	12,550	0.1%	100	0.0%	0	0.0%	0	0.0%	0	3.4%	12,680
Subtotal	**38.8%**	**8,850**	**80.8%**	**48,470**	**18.7%**	**26,760**	**20.6%**	**3,040**	**26.9%**	**19,350**	**26.8%**	**15,360**	**33.0%**	**121,820**
Other Materials (Wastes)	**19.1%**	**4,365**	**9.8%**	**5,890**	**23.7%**	**33,870**	**28.3%**	**4,190**	**17.2%**	**12,350**	**28.0%**	**16,040**	**20.8%**	**76,710**
Total Waste Stream		**22,830**		**59,970**		**142,780**		**14,750**		**72,010**		**57,310**		**369,640**

TPY = Tons per year.

Figure 8
RECYCLING POTENTIAL ASSESSMENT



Comparison of Results to Other Areas

The waste composition results from this study can be compared to other studies, although firm conclusions about the differences observed from this comparison can be difficult to reach. Table 13 compares the county-wide averages for Ada County to the results of a recent study conducted by Green Solutions for Thurston County, Washington and to a statewide study for Oregon. These studies are the "best fit" of the available studies for a comparison to Ada County, but there are still significant differences that are created by the different demographics as well as different climates and other local conditions. Other nearby areas (Montana, Wyoming and Utah) were researched for comparable data but none was found.

Ada County's results could also be compared to national waste composition data, but the national data is calculated in a very different manner. The national data is calculated using a "materials flow" approach, where waste disposal amounts are projected based on production data and assumptions about consumption of products and materials. Perhaps more importantly, the national data purposely excludes C&D wastes, which makes up a major part of the Ada County waste stream. The national data also does not include land clearing debris and agricultural wastes, portions of which may be ending up in the Ada County Landfill.

Waste Composition Conclusions

There are distinct differences in the waste streams of the different types of waste generators (see Tables 5, 8 and 12). For each of the generators, a few noteworthy conclusions can be drawn:

- **Non-Compacted MSW**: The largest categories of materials in this waste stream are:
  - yard debris, 33.4%,
  - wood, 16.3%,
  - furniture, 9.4%,
  - construction and demolition wastes, 5.8%,
  - mixed metals, 4.2%,
  - ferrous metals, 3.7%, and
  - cardboard, 3.5%.

  A significant finding for this waste stream is the large amount of yard debris (33.4%). A review of the results for individual samples shows that 80% of this yard debris was from "pure" loads (loads that were 99-100% yard debris), which could have been easily diverted to a composting facility instead. It's also interesting to note that most of the wood (10.2% out of the total 16.3%) was plywood. At first glance this result may appear anomalous, but plywood was

Table 13
COMPARISON OF RESULTS TO OTHER STUDIES

		Thurston County, 2014	Oregon State, 2009	Ada County
PAPER	Newspaper	0.46%	0.86%	0.62%
	Cardboard	3.33%	3.26%	3.65%
	Mixed Waste Paper	5.29%	4.94%	5.02%
	Compostable	3.84%	5.40%	3.79%
	Non-Recyclable Paper	2.68%	2.53%	2.03%
	Paper Subtotal	**15.61%**	**16.99%**	**15.11%**
PLASTIC	All Plastic Bottles	1.34%	0.91%	1.46%
	Tubs	0.28%	0.47%	0.17%
	Bags and Film	4.98%	4.83%	4.07%
	Plastic Packaging	1.64%	0.53%	0.42%
	Other Plastics	2.70%	4.04%	3.93%
	Expanded Polystyrene	0.67%	0.79%	0.34%
	Plastic Subtotal	**11.61%**	**11.57%**	**10.40%**
METAL	Aluminum Cans	0.36%	0.12%	0.44%
	Tin Cans	0.65%	0.68%	0.70%
	Mixed Metals	2.18%	2.86%	1.80%
	Ferrous Metals	1.28%	2.00%	1.01%
	Non-Ferrous Metals	0.42%	0.27%	0.36%
	Metal Subtotal	**4.88%**	**5.93%**	**4.32%**
ORGANICS	Food Waste	16.87%	16.99%	15.79%
	Yard Debris	3.16%	5.59%	14.22%
	Organics Subtotal	**20.03%**	**22.58%**	**30.01%**
GLASS	Recyclable Glass Bottles	2.75%	1.16%	3.22%
	Non-Recyclable Glass	1.42%	0.79%	0.91%
	Glass Subtotal	**4.17%**	**1.95%**	**4.13%**
OTHER WASTES	E-Waste	0.01%	0.18%	0.14%
	Other Electronics	0.12%	0.84%	0.06%
	Tires	0.14%	0.18%	0.04%
	Rubber	0.58%	0.53%	0.31%
	Diapers	2.79%	2.76%	2.14%
	Textiles	3.61%	3.72%	2.18%
	Carpet and Padding	4.49%	2.71%	2.79%
	Furniture and Mattresses	2.64%	1.69%	1.50%
	Ash, Dust	0.43%	NA	0.06%
	Miscellaneous and Residuals	9.03%	3.38%	5.35%
	Other Waste Subtotal	**23.84%**	**16.01%**	**14.57%**
WOOD and C&D	Wood	9.36%	11.51%	10.12%
	C&D	7.28%	9.14%	9.00%
	Wood, C&D Subtotal	**16.6%**	**20.6%**	**19.12%**
SPECIAL	**Special Waste Subtotal**	**3.23%**	**4.32%**	**2.33%**
		100.0%	100.0%	100.0%

Note: All figures are percentages by weight.

consistently founds in this waste stream (the results for individual samples were highly variable, but the quarterly averages only ranged from 6.4% to 13.4%). Finally, the amount of metals in this waste stream (8.2% altogether) is higher than any of the other waste streams. Given the value of this material, it may be worthwhile to explore methods of collecting and recycling the metals.

- **Construction and Demolition (C&D) Wastes**: The largest categories of materials in this waste stream are:
  - construction and demolition wastes, 39.9%,
  - wood, 29.5%,
  - yard debris, 8.4%,
  - carpet, 7.2%, and
  - carpet padding, 4.2%.

  Most of the other materials in this category are related in some way to construction activities, including paper packaging, plastic products, and window glass, but it's interesting that there is also a significant amount of yard debris (8.4%). As with the previous generator (Non-Compacted MSW), most of this yard debris was contributed by just a few loads (three of the 29 samples had 30% to 91% yard debris). Unlike the previous generator, however, the yard debris found in the samples for this waste stream was mixed with other materials in such a way that would have made it difficult to divert any of this yard debris to a composting facility.

- **Single-Family**: The largest categories of materials in this waste stream are:
  - yard debris, 24.2%,
  - food waste, 17.4%,
  - mixed waste paper, 5.4%,
  - plastic bags and film, 4.4%,
  - disposable diapers, 4.4%, and
  - compostable paper, 3.5%.

  Altogether, organic materials make up almost half of this waste stream (45.1% if compostable paper is included). Although optional and seasonal collection programs are available in some areas of Ada County for yard waste, there remains a significant amount of this material in the waste stream from Single-Family homes. There are also significant quantities of some of the recyclable materials (especially mixed waste paper and cardboard) being disposed despite the widespread availability of curbside recycling carts that should have the capacity to handle these materials.

- **Multi-Family** (apartments): The largest categories of materials in this waste stream are:
  - food waste, 21.7%,
  - mixed waste paper, 8.4%,
  - compostable paper, 6.8%,
  - disposable diapers, 6.3%,
  - furniture, 4.8%,
  - plastic bags and film, 4.1%,
  - other plastics, 4.0%, and
  - cardboard, 3.8%.

  The percentage of recyclable materials in the Multi-Family waste stream is higher than for Single-Family wastes (there is 20.0% of the "typical" recyclables in Multi-Family wastes versus 12.5% in Single-Family wastes), although the tonnage of recyclable materials disposed is substantially lower due to the smaller overall waste quantities from this type of generator. This is typical of the results for most areas, since recycling programs are more difficult to establish and maintain for apartment buildings than for single-family homes.

- **Mixed Commercial**: The largest categories of materials in this waste stream are:
  - food waste, 24.1%,
  - mixed waste paper, 8.6%,
  - cardboard, 8.5%,
  - plastic bags and film, 7.7%,
  - wood, 7.1%, and
  - compostable paper, 6.7%.

  The Mixed Commercial waste stream contains 22.1% of the materials that are typically collected through recycling programs, indicating that there is a significant amount of opportunity for increasing the recycling by this sector. If all of the materials that could potentially be recycled and composted were diverted from disposal, there would only be 17.2% of this waste stream remaining. It's also worth mentioning that the significant amount of plastic film and bags (7.7%) represents a very large volume since these materials are generally lightweight.

- **Commercial Roll-Offs**: The largest categories of materials in this waste stream are:
  - food waste, 22.0%,
  - wood, 14.2%,
  - other plastics, 7.9%,

- construction and demolition wastes, 6.2%,
- compostable paper, 5.4%,
- yard debris, 5.0%,
- mixed waste paper, 4.7%,
- cardboard, 4.5%, and
- plastic bags and film, 4.0%.

The results for this waste stream reflect the variety of activities and sources that contribute to it, including compactors from grocery stores (food waste) and roll-offs from construction sites (wood waste). Any interest in increasing recycling or composting programs for this type of waste generator would need to address the specific businesses that are included in this category on a case-by-case basis.

- **Total Waste Stream**: Overall, the County's waste stream contains significant amounts of:
  - food waste, 15.8%,
  - yard debris, 14.2%,
  - wood, 10.1%,
  - construction and demolition wastes, 9.0%,
  - mixed waste paper, 5.0%,
  - plastic bags and film, 4.1%,
  - other plastics, 4.0%,
  - compostable paper, 3.8%, and
  - cardboard, 3.7%.

  The County's waste stream contains 12.5% or 46,160 tons per year of material that could be handled through typical recycling programs, plus an additional 33.8% or 124,950 tons per year of organic materials that could be diverted to composting programs. Other types of recycling programs could potentially handle another 33.0%, or 121,820 tons per year, leaving only 20.8% of the wastes from Ada County that would actually need to be handled as a waste. In reality, of course, it is not possible to divert 100% of the recyclable and compostable materials.

B. RECOMMENDATIONS

The following recommendations are based on the results of this study:

- Measures should be taken to encourage landscapers and homeowners to bring loads of yard debris to composting facilities instead of bringing those to the landfill. Additional collection programs for yard debris are also needed for single-family homes (assuming local composting facilities can handle the additional tonnages).

- Options should be explored for collecting metals at the tipping area of the landfill, such as providing a roll-off that could be used by self-haul customers on a voluntary basis. Even if only a portion of the metals being disposed with Non-Compacted MSW and C&D wastes could be diverted in this way, this approach would likely be cost-effective.

- Single-family residents should be encouraged to recycle more cardboard and mixed waste paper, and possibly also glass (if the local facility can market it) and textiles (through drop-off programs). Currently glass recycling options (drop-off sites and curbside collection on a subscription basis) are only available in Boise and Eagle.

- The possibility of a "mixed organics" program (collecting yard debris, food waste and compostable paper) for single-family residents, and possibly also multi-family and commercial customers, should be explored cautiously. Implementing this approach will require processing facilities and markets that can handle this type of material, although if those issues can be resolved then a huge amount of a valuable end-product (compost) could potentially be produced.

- Commercial generators could be encouraged to recycle more, especially for cardboard, mixed waste paper and plastic film. More could also be done by this sector in diverting food waste to alternative and beneficial purposes.

GLOSSARY

INTRODUCTION

This glossary defines the types of generators and waste sorting categories used for the 2013-2014 Ada County Waste Stream Analysis, and includes two sets of definitions:

a) Definitions for waste generator types, and

b) Definitions for waste sorting categories, which are shown below in the same order as they appear on the waste sorting form.

A. WASTE GENERATORS

For the purposes of this study, wastes disposed at the Ada County landfill were categorized into one of six sources.

Non-Compacted MSW: Cash and charge customers (other than Republic Services) with non-compacted MSW loads.

Construction and Demolition (C&D): Cash and charge customers (other than Republic Services) with C&D loads.

Single-Family Homes: waste originating from single-family homes and mobile home parks. To be counted in this category, the waste must have been delivered to the landfill by Republic Services. This waste is typically collected with side- or rear-loading garbage trucks.

Multi-Family: wastes collected from apartment buildings.

Mixed Commercial: waste from businesses, industries and institutions delivered by Republic Services, typically collected with front-loading garbage trucks.

Commercial Roll-Offs: compacted and non-compacted roll-offs from commercial sources, delivered by Republic Services.

B. WASTE SORTING CATEGORIES

PAPER

Newspaper: printed groundwood newsprint, including glossy ads and Sunday edition magazines that are delivered with the newspaper (unless these were found separately during sorting).

Cardboard: unwaxed kraft paper corrugated containers and boxes, unless poly- or foil-laminated. Note that this category did **not** include brown kraft paper bags.

Mixed Waste Paper: high- and low-grade recyclable papers, including colored papers, phone books, office paper, notebook or other lined paper, envelopes with plastic windows, non-corrugated paperboard, frozen food packaging, carbonless copy paper, egg cartons, magazines, and junk mail.

Compostable Paper: non-recyclable papers that could be composted, such as paper towels, plates, cups, pizza boxes, waxed paper, and waxed cardboard.

Non-Recyclable Paper: contaminated papers and non-recyclable types of papers such as carbon paper, tissues, laminated paper, paper packaging with metal or plastic parts, hardcover books, milk cartons and similar gable-top containers (such as orange juice cartons), and juice drink boxes.

PLASTIC

PET Bottles: polyethylene terephthalate (PET) bottles, including soda, oil, liquor and other types of bottles. No attempt was made to remove base cups, caps, or wrappers. The SPI code for PET is 1.

HDPE Bottles: high density polyethylene (HDPE) milk, juice, detergent, and other bottles. Did not include bottles for motor oil and other toxic materials. The SPI code for HDPE is 2.

Bottles Types 3 - 7: all bottles that were not PET or HDPE, where the neck of the container was narrower than the body. Included SPI codes 3 - 7.

Tubs: plastic containers of all resin types that were as wide as or wider at the top than at the bottom.

Film and Bags: all plastic packaging films and bags. To be counted in this category, the material must have been flexible (i.e., could be bent without making a noise) and relatively clean (recoverable).

Plastic Packaging: plastic packaging accepted by the curbside recycling program (besides tubs and bottles), including frozen food trays and clamshells.

Other Plastics: finished plastic products such as toys, toothbrushes, vinyl hose and shower curtains, including non-C&D fiberglass resin products and materials (see also "fiberglass insulation" and "other fiberglass" under C&D Wastes, below). Also included non-recyclable plastic packaging, such as shipping materials and other plastic items which were not finished consumer products, including thermoplastics and thermosetting plastics used for packaging. Included bottles for motor oil and other toxic materials.

Expanded Polystyrene: packaging and finished products made of expanded polystyrene. The SPI code for polystyrene (PS) is 6.

METAL

Aluminum Cans: aluminum beverage cans.

Tin Cans: tin-coated steel food containers. This category included bi-metal beverage cans, but not paint cans or other types of cans.

Mixed Metals/Materials: large and small appliances (including "white goods"), motors, insulated wire and finished products containing a mixture of metals and/or other materials, but which were greater than 50% metal. Included aerosol cans where less than 25% of the weight was the contents (for cans with contents greater than 25% by weight, the can was categorized by the contents).

Ferrous Metals: products and pieces made from metal to which a magnet adhered (but including stainless steel), and which were not significantly contaminated with other metals or materials (in the latter case, the item was instead included under "mixed metals/materials"). This category included paint cans and other non-food cans.

Non-Ferrous Metals: metallic products and pieces not derived from iron (i.e., to which a magnet does not adhere) and which were not significantly contaminated with other metals or materials (in the latter case, the item was included under "mixed metals/materials"). Included aluminum foil and food trays.

SPECIAL WASTES

Latex Paint: water-based paints.

Oil-Based Paint: solvent-based paints.

Solvents: included chlorinated or flammable solvents, paint strippers, solvents contaminated with other products such as paints, degreasers, other cleaners if the primary ingredient was a solvent, and alcohols such as methanol and isopropanol. Alcoholic beverages intended for human consumption were included under "food waste" or categorized based on the type of container if empty.

Adhesives and Glues: glues and adhesives of various sorts, including rubber cement, wood putty, glazing and spackling compounds, caulking compounds, grout, and joint fillers.

Cleaners and Corrosives: various acids and bases whose primary purpose was to clean surfaces, unclog drains, and perform other functions.

Medical Waste: wastes related to medical activities, including syringes, tubing, bandages, medicine, and other wastes, and not restricted to just those wastes regulated as pathogenic or infectious.

Motor Oil, Other: used or new lubricating oils, primarily those used in cars but possibly also including other materials with similar characteristics.

Oil Filters: used filters such as those used in cars but including similar filters from other applications.

Gasoline and Fuel Oil: gasoline, diesel fuel and light fuel oils, such as those used for home heating.

Antifreeze: automobile and other antifreeze mixtures based on ethylene or propylene glycol, also brake and other fluids if glycol-based.

Other Automotive Maintenance: other products used for automobile maintenance, generally of a non-hazardous nature, such as car wax, polishes, autobody fillers, etc.

Car Batteries: car, motorcycle, and other lead-acid batteries used for motorized vehicles.

Household Batteries: batteries of various sizes and types, as commonly used in households.

Gas Cylinders: pressurized gas cylinders with the contents making up more than 25% of the total weight (if less than 25% or empty, the gas cylinders was counted as metal).

Pesticides and Herbicides: included poisons whose purpose is to discourage or kill pests, weeds or microorganisms. Fungicides and wood preservatives, such as pentachlorophenol, were also included in this category.

Fertilizers with Pesticides/Herbicides: fertilizers that contain weed killer or other ingredients designed to eliminate weeds and/or pests.

Fertilizers without Pesticides/Herbicides: fertilizers without herbicide or pesticide additives.

Animal Excrement: feces and associated wastes from animals, such as bags of kitty litter.

Animal Carcasses: carcasses of small animals and pieces of larger animals unless the item was the result of food preparation. Deer carcasses were included in this category.

Other Hazardous and Special Waste: problem wastes that did not fall into one of the above categories, such as asbestos-containing wastes (if this was the primary hazard associated with the waste), gunpowder, other unspent ammunition, and radioactive materials.

ORGANICS

Edible Food: all food, such as vegetables, fruits, breads, meats, pastas, that appeared to be edible or that appeared to have been edible when discarded. For this category, foods with small blemishes were still considered edible, but scraps of food already removed from the edible portion (such as apple peels and the ends of romaine lettuce) were not counted here. A reasonable attempt was made to separate the food from any packaging, but if that was not possible then the item was be placed in whichever category appeared to represent greater than 50% of the weight.

Inedible Food: all other food not included in the previous category, including coffee filters and tea bags. A reasonable attempt was made to separate the food from any packaging, but if that was not possible then the item was placed in whichever category appeared to represent greater than 50% of the weight.

Yard and Garden: grass clippings, leaves and weeds, and prunings four inches or less in diameter.

GLASS

Clear Glass Containers: bottles and jars that were clear in color.

Brown Glass Containers: bottles and jars that were brown in color.

Green Glass Containers: bottles and jars that were green in color. Blue glass containers were included here.

Non-Recyclable Glass: window glass, light bulbs, glassware, mirrors, and other glass that was not recyclable. Ceramics (plates and knickknacks) were not included here but were placed under "miscellaneous inorganics" (see below).

OTHER WASTES

E-Wastes: television sets and computer monitors. Actual items found were noted.

Other Electronics: other products that contained circuit boards and electronic components (as a significant portion of the product), such as radios and similar products. Actual items found were noted.

Tires: vehicle tires of all types, including bicycle tires and including rims if attached.

Rubber Products: finished products and scrap materials made of rubber, such as bath mats, inner tubes, rubber hose, latex gloves, and foam rubber (except carpet padding, see below).

Disposable Diapers: disposable diapers, feminine hygiene products, and protective undergarments for adults.

Textiles: cloth, clothing, leather, rope, tennis shoes, and rubberized cloth.

Carpet: pieces of carpet in any condition.

Carpet Padding: foam rubber and other materials used as padding under carpets.

Furniture and Mattresses: furniture and mattresses made of various materials and in any condition.

Ash and Dust: fireplace, burn barrel or firepit ash, as well as bags of vacuum cleaner dust.

Miscellaneous Organics: miscellaneous organic materials that could be sorted out of the sample but that did not fit into another category, such as wax.

Miscellaneous Inorganics: miscellaneous inorganic materials that could be sorted out of the sample but that did not fit into another category, such as ceramic products.

Residuals: mixed waste remaining on the sorting table after all the materials that could practicably be removed had been sorted out. This material consisted primarily of small pieces of various types of paper and plastic, but also contained small pieces of broken glass and other materials.

WOOD WASTES

Dimension Lumber: wood commonly used in construction for framing and related uses, including 2x4's and 2x6's.

Pallets: partial or whole pallets and similar shipping containers.

Treated Wood: wood treated with preservatives such as creosote, including dimension lumber if treated. Did not include painted or varnished wood. This category may have also included some plywood (especially "marine plywood") and other wood.

Roofing: wood that was commonly used for roofing of buildings, such as cedar shingles or shakes. Note that roofing made from non-wood materials was classified under other categories (see "roofing wastes" under C&D, below).

Contaminated Wood: wood contaminated with other wastes in such a way that it could not easily be separated, but consisting primarily (over 50%) of wood. Examples included wood with sheetrock nailed to it or with tiles glued to it.

Stumps and Other Bulky Wood: stumps of trees and shrubs, with the adhering soil (if any), and other natural woods, such as logs and branches, in excess of four inches in diameter.

Plywood / Particle Board / Fiberboard: wood products built up of two or more veneer sheets glued or cemented together under pressure, or made up of fibers of various substances (but typically made from wood chips) pressed together to form large sheets or boards.

Wood Products: goods and products fabricated primarily (over 50% by weight) from wood, including toys, household items, and similar goods. Did not include furniture.

Other Wood Waste: other types of wood that did not fit into the above categories.

CONSTRUCTION AND DEMOLITION (C&D) WASTES

Ceramics, Porcelain, and China: used toilets and sinks. Non-C&D ceramics, such as plates and other dishes, were categorized under "miscellaneous inorganics."

Rocks and Brick: rock, gravel, and bricks of various types and sizes.

Concrete: cement (mixed or unmixed), concrete blocks, and similar wastes.

Soil, Dirt, and Non-Distinct Fines: this category included soil, sand, dirt and similar materials, where those could be recovered separately from the fines measured as part of the normal sorting procedure.

Gypsum Board: used or new gypsum wallboard, sheetrock or drywall present in recoverable amounts or pieces (generally any piece larger than two inches square can be recovered from the sample).

Fiberglass Insulation: did not include other types of insulation or other fiberglass products.

Other Fiberglass: durable, large products such as shower stalls and bathtubs. Small, non-C&D objects were categorized with "other plastic products".

Roofing Waste: asphalt and fiberglass shingles, tar paper, and similar wastes from demolition or installation of roofs. Did not include cedar shingle or shakes (see wood subcategory, "roofing wood").

Asphalt: asphalt paving materials and pieces of asphalt pavement.

Other C&D: C&D materials that were not included in the above categories.

APPENDIX A

STATISTICAL CERTAINTY OF RESULTS

APPENDIX A

STATISTICAL CERTAINTY OF RESULTS

A. INTRODUCTION

This appendix shows the confidence intervals associated with the waste composition results.

B. METHODOLOGY

For this type of study, statistical certainty can be expressed using confidence intervals. Confidence intervals are the range of values for which one can be confident (to a given degree, such as 90% confident) that the true value falls within. The confidence limits are sometimes shown as a "+ or – value", such as 5% newspaper +/- 1%. For this study, a confidence interval of 90% was used, so that in this example one can be 90% confident that the true value for newspaper falls between 4% and 6%.

The calculation of confidence intervals for this study is complicated slightly by the use of weighted averages. The calculation of confidence intervals for weighted averages begins with calculating standard deviations for each material for each generator and for each season. The standard deviation is then converted to the standard error of the mean (SEM) by dividing the standard deviation by the square root of the number of samples. Once the SEM has been determined for each material, each season and each waste generator, it can be manipulated in the same way as the composition figures by using weighted averages as appropriate for the data being combined. The SEM's can then be multiplied by a factor of 1.64 and then added or subtracted from the average composition values to derive the upper and lower confidence limits, respectively. The factor of 1.64 is determined by the choice of a 90% confidence interval.

C. RESULTS

Table A-1 shows the confidence limits associated with the composition results for each generator and for the entire County.

Table A-1
CONFIDENCE LIMITS BY TYPE OF GENERATOR

		Non-Compacted MSW			C&D			Single-Family		
		Average	LCL	UCL	Average	LCL	UCL	Average	LCL	UCL
PAPER	Newspaper	0.01%	0.00%	0.02%	0.00%	0.00%	0.00%	0.73%	0.26%	1.21%
	Cardboard	3.53%	0.75%	6.30%	0.70%	0.01%	1.40%	2.12%	1.06%	3.18%
	Mixed Waste Paper	2.77%	0.00%	6.44%	0.22%	0.00%	0.56%	5.37%	3.95%	6.80%
	Compostable	0.21%	0.01%	0.41%	0.02%	0.00%	0.05%	3.51%	2.50%	4.52%
	Non-Recyclable Paper	0.96%	0.00%	2.33%	0.21%	0.00%	0.45%	2.17%	1.68%	2.66%
	Paper Subtotal	**7.48%**	**1.15%**	**13.80%**	**1.15%**	**0.06%**	**2.25%**	**13.90%**	**10.97%**	**16.83%**
PLASTIC	PET Bottles	0.10%	0.00%	0.22%	0.01%	0.00%	0.04%	0.95%	0.56%	1.33%
	HDPE Bottles	0.09%	0.00%	0.19%	0.00%	0.00%	0.00%	0.76%	0.36%	1.17%
	Bottles 3-7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%	0.02%	0.18%
	Tubs	0.01%	0.00%	0.04%	0.00%	0.00%	0.00%	0.25%	0.14%	0.36%
	Bags and Film	1.04%	0.06%	2.03%	0.21%	0.00%	0.42%	4.38%	3.32%	5.44%
	Plastic Packaging	0.16%	0.00%	0.39%	0.00%	0.00%	0.00%	0.42%	0.24%	0.59%
	Other Plastics	3.25%	1.16%	5.33%	2.50%	0.00%	5.71%	3.38%	2.23%	4.53%
	Expanded Polystyrene	0.14%	0.00%	0.29%	0.08%	0.00%	0.16%	0.44%	0.29%	0.59%
	Plastic Subtotal	**4.79%**	**1.92%**	**7.67%**	**2.81%**	**0.00%**	**6.15%**	**10.68%**	**8.09%**	**13.27%**
METAL	Aluminum Cans	0.05%	0.00%	0.12%	0.05%	0.00%	0.13%	0.62%	0.40%	0.84%
	Tin Cans	0.04%	0.00%	0.10%	0.00%	0.00%	0.00%	1.15%	0.67%	1.64%
	Mixed Metals	4.20%	0.00%	9.02%	2.21%	0.23%	4.19%	1.44%	0.39%	2.50%
	Ferrous Metals	3.72%	0.25%	7.18%	1.01%	0.00%	2.04%	0.66%	0.05%	1.27%
	Non-Ferrous Metals	0.16%	0.00%	0.37%	0.28%	0.00%	0.59%	0.29%	0.17%	0.42%
	Metal Subtotal	**8.16%**	**0.46%**	**15.87%**	**3.55%**	**1.12%**	**5.98%**	**4.17%**	**2.76%**	**5.58%**
ORGANICS	Food Waste	1.77%	0.00%	4.12%	0.00%	0.00%	0.00%	17.39%	13.76%	21.02%
	Yard Debris	33.44%	10.16%	56.71%	8.35%	0.00%	18.26%	24.16%	12.72%	35.59%
	Org. Subtotal	**35.20%**	**12.00%**	**58.41%**	**8.35%**	**0.00%**	**18.26%**	**41.55%**	**31.45%**	**51.65%**
GLASS	Clear Bottles	0.13%	0.00%	0.30%	0.00%	0.00%	0.00%	2.35%	1.33%	3.37%
	Brown Bottles	0.04%	0.00%	0.11%	0.00%	0.00%	0.00%	1.95%	0.68%	3.21%
	Green Bottles	0.60%	0.00%	1.52%	0.00%	0.00%	0.00%	1.32%	0.54%	2.11%
	Non-Recyclable Glass	0.62%	0.00%	1.50%	1.84%	0.00%	4.58%	0.23%	0.09%	0.37%
	Glass Subtotal	**1.40%**	**0.00%**	**3.27%**	**1.84%**	**0.00%**	**4.58%**	**5.85%**	**3.80%**	**7.90%**
OTHER	E-Waste	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WASTES	Other Electronics	0.06%	0.00%	0.15%	0.00%	0.00%	0.00%	0.01%	0.00%	0.04%
	Tires	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Rubber	0.13%	0.00%	0.33%	0.00%	0.00%	0.00%	0.15%	0.02%	0.28%
	Diapers	0.03%	0.00%	0.07%	0.00%	0.00%	0.00%	4.38%	1.95%	6.81%
	Textiles	2.37%	0.00%	4.86%	0.45%	0.00%	1.01%	3.40%	1.94%	4.87%
	Carpet	2.91%	0.00%	6.25%	7.15%	0.06%	14.24%	0.23%	0.00%	0.57%
	Carpet Padding	1.87%	0.00%	4.49%	4.22%	0.00%	8.71%	0.00%	0.00%	0.00%
	Furniture	9.44%	0.00%	22.24%	0.48%	0.00%	1.20%	1.09%	0.00%	2.73%
	Ash, Dust	0.02%	0.00%	0.05%	0.00%	0.00%	0.00%	0.08%	0.00%	0.17%
	Misc. Org.	0.05%	0.00%	0.11%	0.00%	0.00%	0.00%	0.31%	0.02%	0.61%
	Misc. Inorg.	0.31%	0.00%	0.79%	0.00%	0.00%	0.00%	0.26%	0.02%	0.50%
	Residuals	0.46%	0.00%	0.98%	0.63%	0.00%	1.57%	6.76%	5.30%	8.22%
	Other Waste Subtotal	**17.66%**	**3.56%**	**31.76%**	**12.92%**	**0.91%**	**24.94%**	**16.68%**	**12.88%**	**20.48%**
WOOD	Wood	16.32%	3.44%	29.20%	29.48%	10.95%	48.00%	1.77%	0.02%	3.52%
and C&D	C&D	5.84%	0.22%	11.46%	39.90%	17.23%	62.56%	1.37%	0.00%	2.93%
SPECIAL	Special Waste	3.14%	0.00%	7.79%	0.00%	0.00%	0.00%	4.03%	1.06%	7.00%

Notes:
LCL = Lower Confidence Limit for 90% confidence interval.
UCL = Upper Confidence Limit for 90% confidence interval.
All figures are percentages by weight.

Table A-1, continued
CONFIDENCE LIMITS BY TYPE OF GENERATOR

		Multi-Family			Mixed Commercial			Commercial Roll-Offs		
		Average	LCL	UCL	Average	LCL	UCL	Average	LCL	UCL
PAPER	Newspaper	1.18%	0.55%	1.80%	0.84%	0.15%	1.54%	0.79%	0.00%	1.83%
	Cardboard	3.82%	2.63%	5.02%	8.47%	5.25%	11.69%	4.53%	1.84%	7.22%
	Mixed Waste Paper	8.37%	6.43%	10.31%	8.60%	5.58%	11.62%	4.68%	1.68%	7.68%
	Compostable	6.77%	3.67%	9.87%	6.74%	4.18%	9.31%	5.40%	1.56%	9.25%
	Non-Recyclable Paper	2.18%	1.44%	2.91%	3.49%	2.06%	4.91%	2.14%	1.06%	3.22%
	Paper Subtotal	**22.31%**	**17.94%**	**26.69%**	**28.14%**	**22.30%**	**33.98%**	**17.55%**	**9.22%**	**25.89%**
PLASTIC	PET Bottles	1.96%	1.55%	2.38%	1.35%	0.78%	1.91%	0.51%	0.16%	0.87%
	HDPE Bottles	1.11%	0.81%	1.41%	0.88%	0.30%	1.45%	0.59%	0.03%	1.15%
	Bottles 3-7	0.08%	0.01%	0.14%	0.05%	0.00%	0.11%	0.03%	0.00%	0.06%
	Tubs	0.36%	0.27%	0.45%	0.22%	0.09%	0.34%	0.13%	0.02%	0.25%
	Bags and Film	4.08%	3.11%	5.05%	7.74%	5.85%	9.62%	3.95%	1.96%	5.94%
	Plastic Packaging	0.85%	0.40%	1.30%	0.55%	0.30%	0.79%	0.74%	0.21%	1.26%
	Other Plastics	4.01%	2.27%	5.75%	3.23%	2.09%	4.38%	7.92%	1.11%	14.73%
	Expanded Polystyrene	0.48%	0.28%	0.69%	0.47%	0.24%	0.71%	0.24%	0.04%	0.43%
	Plastic Subtotal	**12.94%**	**10.53%**	**15.35%**	**14.48%**	**11.30%**	**17.65%**	**14.11%**	**6.15%**	**22.07%**
METAL	Aluminum Cans	0.91%	0.65%	1.17%	0.53%	0.28%	0.78%	0.31%	0.04%	0.57%
	Tin Cans	1.40%	0.82%	1.98%	0.61%	0.22%	0.99%	0.52%	0.00%	1.07%
	Mixed Metals	2.26%	0.44%	4.08%	1.50%	0.00%	3.19%	1.57%	0.00%	3.39%
	Ferrous Metals	1.26%	0.20%	2.33%	1.20%	0.00%	2.39%	0.53%	0.00%	1.09%
	Non-Ferrous Metals	0.36%	0.17%	0.55%	0.45%	0.00%	0.93%	0.59%	0.00%	1.29%
	Metal Subtotal	**6.20%**	**3.97%**	**8.43%**	**4.28%**	**2.10%**	**6.46%**	**3.51%**	**0.89%**	**6.14%**
ORGANICS	Food Waste	21.69%	16.33%	27.06%	24.09%	16.15%	32.02%	21.96%	7.69%	36.23%
	Yard Debris	2.57%	1.44%	3.70%	3.05%	0.00%	6.54%	4.99%	0.00%	11.76%
	Org. Subtotal	**24.27%**	**18.88%**	**29.65%**	**27.14%**	**18.70%**	**35.58%**	**26.95%**	**10.32%**	**43.57%**
GLASS	Clear Bottles	2.62%	1.26%	3.98%	1.41%	0.47%	2.34%	0.41%	0.10%	0.72%
	Brown Bottles	2.22%	1.11%	3.34%	1.88%	0.13%	3.62%	0.07%	0.00%	0.17%
	Green Bottles	0.81%	0.30%	1.33%	0.18%	0.00%	0.41%	0.17%	0.00%	0.38%
	Non-Recyclable Glass	0.26%	0.07%	0.44%	0.37%	0.04%	0.69%	2.60%	0.00%	6.55%
	Glass Subtotal	**5.91%**	**3.78%**	**8.04%**	**3.83%**	**1.36%**	**6.29%**	**3.26%**	**0.00%**	**7.46%**
OTHER	E-Waste	0.42%	0.00%	1.04%	0.00%	0.00%	0.00%	0.79%	0.00%	1.98%
WASTES	Other Electronics	0.35%	0.00%	0.87%	0.19%	0.00%	0.43%	0.00%	0.00%	0.00%
	Tires	0.73%	0.00%	1.83%	0.07%	0.00%	0.17%	0.00%	0.00%	0.00%
	Rubber	0.23%	0.00%	0.47%	0.90%	0.00%	1.91%	0.36%	0.00%	0.76%
	Diapers	6.28%	3.26%	9.31%	0.32%	0.07%	0.57%	0.87%	0.00%	2.03%
	Textiles	3.62%	1.67%	5.56%	1.42%	0.29%	2.55%	1.44%	0.00%	3.27%
	Carpet	0.00%	0.00%	0.00%	0.98%	0.00%	2.45%	0.47%	0.00%	1.19%
	Carpet Padding	0.00%	0.00%	0.00%	0.42%	0.00%	1.05%	1.42%	0.00%	3.57%
	Furniture	4.81%	0.00%	10.44%	0.00%	0.00%	0.00%	1.43%	0.00%	3.60%
	Ash, Dust	0.13%	0.00%	0.28%	0.08%	0.00%	0.16%	0.05%	0.00%	0.11%
	Misc. Org.	0.36%	0.02%	0.70%	0.16%	0.00%	0.32%	0.16%	0.00%	0.36%
	Misc. Inorg.	0.54%	0.00%	1.12%	0.33%	0.00%	0.74%	3.34%	0.00%	8.04%
	Residuals	4.48%	3.40%	5.56%	4.78%	3.02%	6.53%	3.80%	1.29%	6.30%
	Other Waste Subtotal	**21.94%**	**14.59%**	**29.28%**	**9.63%**	**5.97%**	**13.30%**	**14.12%**	**7.20%**	**21.05%**
WOOD	Wood	1.69%	0.68%	2.69%	7.06%	0.80%	13.31%	14.22%	0.00%	28.67%
and C&D	C&D	0.21%	0.00%	0.50%	3.44%	0.16%	6.72%	6.20%	0.00%	14.20%
SPECIAL	Special Waste	4.54%	1.38%	7.69%	2.01%	0.00%	4.43%	0.08%	0.00%	0.15%

Notes:
LCL = Lower Confidence Limit for 90% confidence interval.
UCL = Upper Confidence Limit for 90% confidence interval.
All figures are percentages by weight.

Table A-1, continued
CONFIDENCE LIMITS BY TYPE OF GENERATOR

		Average for Entire County		
		Average	LCL	UCL
PAPER	Newspaper	0.62%	0.11%	1.12%
	Cardboard	3.65%	1.87%	5.44%
	Mixed Waste Paper	5.02%	3.06%	6.98%
	Compostable	3.79%	2.17%	5.42%
	Non-Recyclable Paper	2.03%	1.24%	2.82%
	Paper Subtotal	**15.11%**	**10.81%**	**19.42%**
PLASTIC	PET Bottles	0.80%	0.45%	1.14%
	HDPE Bottles	0.61%	0.23%	0.98%
	Bottles 3-7	0.06%	0.01%	0.11%
	Tubs	0.17%	0.08%	0.26%
	Bags and Film	4.07%	2.86%	5.29%
	Plastic Packaging	0.42%	0.20%	0.65%
	Other Plastics	3.93%	1.49%	6.37%
	Expanded Polystyrene	0.34%	0.17%	0.50%
	Plastic Subtotal	**10.40%**	**6.73%**	**14.07%**
METAL	Aluminum Cans	0.44%	0.24%	0.64%
	Tin Cans	0.70%	0.33%	1.08%
	Mixed Metals	1.80%	0.09%	3.51%
	Ferrous Metals	1.01%	0.03%	1.99%
	Non-Ferrous Metals	0.36%	0.04%	0.68%
	Metal Subtotal	**4.32%**	**1.98%**	**6.65%**
ORGANICS	Food Waste	15.79%	10.27%	21.31%
	Yard Debris	14.22%	4.99%	23.46%
	Org. Subtotal	**30.01%**	**18.63%**	**41.39%**
GLASS	Clear Bottles	1.36%	0.67%	2.05%
	Brown Bottles	1.22%	0.32%	2.11%
	Green Bottles	0.64%	0.18%	1.10%
	Non-Recyclable Glass	0.91%	0.00%	2.15%
	Glass Subtotal	**4.13%**	**1.56%**	**6.70%**
OTHER	E-Waste	0.14%	0.00%	0.35%
WASTES	Other Electronics	0.06%	0.00%	0.14%
	Tires	0.04%	0.00%	0.11%
	Rubber	0.31%	0.00%	0.64%
	Diapers	2.14%	0.85%	3.43%
	Textiles	2.18%	0.79%	3.57%
	Carpet	1.69%	0.00%	3.58%
	Carpet Padding	1.10%	0.00%	2.45%
	Furniture	1.50%	0.00%	3.60%
	Ash, Dust	0.06%	0.00%	0.13%
	Misc. Org.	0.19%	0.00%	0.39%
	Misc. Inorg.	0.72%	0.00%	1.68%
	Residuals	4.44%	2.92%	5.96%
	Other Waste Subtotal	**14.57%**	**8.21%**	**20.94%**
WOOD	Wood	10.12%	2.14%	18.10%
and C&D	C&D	9.00%	2.49%	15.52%
SPECIAL	Special Waste	2.33%	0.29%	4.38%

Notes:
LCL = Lower Confidence Limit for 90% confidence interval.
UCL = Upper Confidence Limit for 90% confidence interval.
All figures are percentages by weight.

APPENDIX B

CUSTOMER SURVEY FORM

CUSTOMER SURVEY FORM

A. INTRODUCTION

This appendix shows the survey form that was used to collect additional information from the self-haul customers at the Ada County Landfill during the Waste Composition Study. The survey results are discussed in the body of the main report (see Section 3.C), and this appendix addresses only the survey methodology.

B. SURVEY METHODOLOGY

One of the initial goals of this project was to collect additional information on the reasons for self-haul customers using the landfill. Although this task was not officially included in the final scope for this project, Green Solutions chose to implement it nonetheless. A draft survey form was tested in the first quarter of fieldwork (November 2013), further refined in the second quarter (March 2014), and then the final survey form was used in the third and fourth quarters (May and July, 2014). The final survey form is shown on the next page.

This survey was conducted during the sample selection and sorting activities for this project. Hence, the days on which the survey was conducted each quarter were the same days as the other fieldwork for this project, which varied between Monday through Thursday and Wednesday through Saturday (the schedule for the sampling and sorting activities was varied each quarter to encompass weekly variations in waste deliveries). The survey was conducted by the URS staffperson that was already checking with vehicles for sampling purposes, so the survey was easily implemented in this manner. A drawback of this approach, however, is that the schedule for the survey was tied to the daily and weekly schedule for the sorting activities (as opposed to designing an approach for the survey that was based on the traffic patterns for self-haul customers). It is unknown whether this might have had a significant impact on the survey results.

C. CONCLUSIONS

If there is continued interest in researching the reasons for self-haul customers using the landfill, the attached survey form could be used. Ideally, the survey would be administered over the hours and days for the landfill that are representative of the amount of self-haul traffic. The survey should be conducted over several seasons to encompass variations in traffic patterns and the reasons for people visiting the landfill.

CUSTOMER SURVEY FORM - ADA COUNTY WASTE STREAM ANALYSIS

DATE: _____ SURVEYOR: _____ PAGE _____ of _____

AGE GROUPS: 1 = 18 - 30; 2 = 31 - 54; 3 = 55 and up

CITY CODES: 1 - Boise; 2 - Eagle; 3 - Garden City; 4 - Kuna; 5 - Meridian; 6 - Star; 7 - Unincorporated Ada County; 8 - Other County (note in comments); 9 - Other/Unknown

REASON FOR VISIT: BO = bulky object; SP = special project; MP = missed pickup; PP = personal preference; OS = other services (recycling, MRW); O = other reason (explain under comments)

	Self-Haul Vehicles			Source		Customer			For residential customers only: Coll. At Home?		Amount of LF use				Reason for Visit						Suggestions for improvements, other comments, reason for using LF, note if sample is taken
	MSW	C&D	Wood	Res. Self-Haul	Non-Res. Self-Haul	Age	Sex (M/F)	City	Yes	No	once/wk	once/mo	3-4/year	1-2/year	BO	SP	MP	PP	OS	O	
1																					
2																					
3																					
4																					
5																					
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INSTRUCTIONS FOR CUSTOMER SURVEY FORM

A customer survey is being conducted as part of the Ada County Waste Stream Analysis. Although not strictly required by the contract for this project, this survey will aid in the interpretation of the study's results. The purpose of the customer survey for Ada County is two-fold:

- Provide data to convert two of the county's customer types (non-compacted MSW and C&D) to two other categories often used in other studies (residential self-haul and non-residential self-haul).
- Collect data on the reasons for residential customers visiting the landfill (instead of using garbage collection services).

Implicit in the above goals is that only self-haul customers will be surveyed. Drivers of garbage trucks will still be interviewed briefly for sample selection purposes, but their information will not need to be recorded for this survey.

The survey will be conducted by Lindsay Reynolds while she is interviewing drivers for sample selection purposes. Sample selection activities will take precedence over conducting this survey. In addition, customers should not be "forced" to answer the survey questions. If a customer declines to answer questions for any reason, they should simply be allowed to proceed to the tipping area.

The survey is designed to be filled out quickly, and for most of the questions this means placing an "X" in the appropriate column. Other columns require a number, as shown at the top of the form, or an M or F for gender. The following questions are being asked (see also the survey form itself):

1. For self-haul vehicles, note whether the load has been characterized by scalehouse personnel as MSW ("non-compacted MSW"), C&D, or Wood. If there is any question, this information should be shown on the customer's ticket (make sure they don't lose the ticket, they will need it to get out of the landfill). Customers with wood loads should not be at the tipping area, and they should be referred to landfill staff if there is any question about that.

2. The source (residential or non-residential self-haul) should be noted. Put an X in the column for residential self-haul if the load is being brought in by a homeowner or a renter from their home or apartment, including landlords dropping off waste from a rental unit. For a business or contractor dropping off waste that they generated, an X should be put in the column for non-residential self-haul. If it's a mixed load from more than one type of source (such as a contractor that is dropping off waste from his/her home in addition to waste from a jobsite, or from someone with a home-based business that is dropping off waste from both the business and the home), it's okay to place an X in both columns.

3. Customer information should be noted. Age and sex can be noted based on visual appearance, using the numbers 1, 2 or 3 to note the age group that the driver appears to fall within, and M or F for their gender. If there is a passenger and they appear to be in charge, record information for them instead of the driver. The customer should be asked what city the load is from. For non-residential self-haul customers, this would be the jobsite or business location. The codes at the top of the survey form should be used to track the city. If the customer mentions a city not listed there, the code for unincorporated Ada County or other county should be used.

The remaining questions should only be asked of the residential customers, not for contractors or other non-residential customers. Any comments or suggestions that the customer (residential or non-residential) volunteers outside of the survey questions can be noted under Comments.