Iowa State Park Recycling Research Study

2012

Land Quality Bureau - Financial and Business Assistance Section

ACKNOWLEDGEMENTS

The Department of Natural Resources' Land Quality Bureau, Financial and Business Assistance Section and the State Parks Bureau would like to thank those persons providing assistance in making this study possible.

Shelley Codner, Iowa Waste Exchange (IWE) representative for developing waste sort protocols, coordinating and leading the waste sorts at participating State Park campgrounds;

Staff at Iowa State Parks for their participation in the study and providing critical waste management and guest camping information;

Backbone State Park
Clear Lake State Park
George Wyth State Park
Gull Point State Park
Lake Anita State Park
Lake Manawa State Park
Ledges State Park
Rock Creek State Park

Staff and members of the Iowa Green Veterans – AmeriCorps Program for providing coordination and waste sort assistance;

Fred Kesten and Ben Kvigne also of the Iowa Waste Exchange for providing waste sort assistance;

Friends of Iowa State Parks volunteers and other volunteers for their interest and for providing waste sort assistance; and

Margo Underwood of Underwood Consulting for conducting interviews with State Park staff, solid waste haulers and recycling centers, and for collecting and compiling waste management and waste sort data. The study concluded with Underwood Consulting providing recommendations on the economic and operational viability of offering recycling services to campground guests and visitors to Iowa's State Parks.

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Executive Summary

Background

The Department of Natural Resources' mission of "Leading Iowans in caring for our natural resources" provides the framework within which the Iowa State Park Recycling Research Study was conducted. Recycling at home and in places of business is becoming common for most Iowans but recycling is not available in any form at most Iowa State Parks. The Iowa State Park Recycling Research Study was undertaken to determine the amount of solid waste generated, primarily by campground guests, and how much of this waste is locally recyclable. The study also looked at existing solid waste hauling contracts and the location of area recycling centers. Based on data collected, recommendations are made regarding the economic and operational viability of implementing recycling in the eight (8) state parks participating in the study.

The Financial and Business Assistance (FABA) Section of the Land Quality Bureau took the lead on this study to determine the amount of solid waste generated in select Iowa State Parks, focusing on campground areas. It is hoped the information contained in this report will also assist County Parks, private campgrounds and resorts and other park providers in looking at implementing recycling programs.

Through meetings with Parks Bureau staff, the following state parks were selected to participate in the study.

Backbone State Park
Clear Lake State Park
George Wyth State Park
Gull Point State Park
Lake Anita State Park
Lake Manawa State Park
Ledges State Park
Rock Creek State Park

FABA Section staff, Shelly Codner (IWE) and Iowa Green Veterans - AmeriCorps staff developed the methodology, coordinating volunteers and other logistics necessary for conducting eight solid waste sorts. A Request for Proposals was issued resulting in a contract with Underwood Consulting to research current park solid waste management methods, existing solid waste hauling contracts, recycling opportunities in the area surrounding each park, and to compile the data resulting from the solid waste sorts. Underwood Consulting has provided the recommendations contained herein regarding initiating recycling in those State Parks participating in the Iowa State Park Recycling Research Study.

Conclusions and Recommendations

Based on results of the solid waste sorts, guest camping days report figures, and interviews with parks staff, solid waste haulers and recycling center managers, Underwood Consulting provides the following:

1. **Recommended changes to existing solid waste hauling contracts:**
   - Develop an introductory paragraph to include in all state parks' solid waste hauling contracts which spotlights the IDNR's mission of conserving natural resources through the establishment of sustainable waste reduction and recycling programs in Iowa's state parks. Include recycling goals/expectations in the contract.
   - Develop and include recycling container, type, size, rental (if any) and hauling rates in the specified state parks solid waste and recycling contracts.
   - Include quarterly trash and recycling tonnage and quality report requirements from the waste and recycling hauler (if other than park staff) to the State Park Ranger/Manager in the contracts.
   - Include in-kind contributions of selected hauler in the contract. This may include such things as no recycling processing fees and donated or discounted recycling container delivery or rental fees.
   - In order to leverage the resources available for solid waste and recycling programs available in Iowa's state parks, it is recommend that the Park Rangers/ Managers seek competitive bids for these service contracts.
2. **Specific contract language to include recycling services in existing or new solid waste hauling contracts.**
   - This language will vary based upon the specific campground recycling services provided by the solid waste and recycling hauler. The contract language should include the list of recyclables collected, recycling container rental and pull fees, frequency of collection, recycling processing fees (if any), revenue sharing program (if any) and hauler's recycling transportation fees during campground season and off-season for park office if applicable. In addition, include the donated services by the waste/recycling hauler and recycling processor described in #1.
3. **Estimated costs of implementing recycling collection and processing services**
   - The Ledges State Park's Recycling Pilot Project was very successful in establishing strong public/private partnerships to begin their campground recycling program. The Friends of the Ledges helped raise $10,000 for the recycling trailer; Boone County Recycling Center processed the recyclables at no charge and Park Manager Andy Bartlett transported the recyclables about seven miles to the Recycling Center. State Park costs included Andy's time and gas for three round-trips to the Boone County Recycling Center this summer.
   - Managing costs and building strong public/private partnerships are vital in establishing sustainable recycling programs in the selected state park campgrounds. All recycling processors Underwood Consulting met with indicated they would not charge a recycling processing fee for recyclables collected at these state parks.

- Recycling container costs, transportation costs to the recycling center/processor and education of the campers are the fixed costs to implement a successful and sustainable recycling program. Is it possible to offset these recycling costs with a decrease in the number/size of trash dumpsters in the campgrounds? It is very possible if the recycling center is located within 10 -15 miles of the state park and if the recycling container is donated to the recycling program by a Friends Group, discounted by a waste hauler or received through a grant program. Service costs for a recycling roll-off container are approximately $200-250 per pull.
- Five of the eight state parks are located within 10 -15 miles of the nearest recycling center. These state parks are: Clear Lake, George Wyth, Lake Anita, Lake Manawa and Ledges. Lake Anita and Lake Manawa have active Friends Groups.

4. **Estimated Cost Savings of Implementing Recycling Collection and Processing Services Compared to Existing Disposal Services:**
   - The goal during the first year of the state park recycling programs would be to establish strong recycling public/private partnerships and break even on the recycling program costs. Then in subsequent years the expectation would be to increase the cost savings through increased recycling participation and tonnage collected while decreasing the number of trash dumpsters needed and serviced in the campgrounds. Estimated cost savings will vary by state park and the degree of success of each recycling program.

5. **Recyclables Targeted for Collection:**
   - Which recyclable materials to collect and how they should be collected is dependent on the requirements of the local recycling center. Certain materials can be combined while others must be separated. This will impact signage placed on and around the selected recycling container. Non-redeemable plastic bottles and containers, corrugated cardboard, chipboard, paper, glass bottles and food jars, and tin/metal cans are the most common materials collected.
   - Redeemable beverage cans and bottles can be collected separately and taken to a Redemption Center. Each 5 cent deposit is essentially a donation to the Park.

6. **Recommended Recycling Container Styles and Sizes to Best Meet Needs for State Park Staff, Campers and Recycling Service Providers:**
   - Recycling trailer with six – 1 cubic yard recycling bins for sorted recyclables Serviced on-call.
   - 20-yd roll-off recycling container with compartments for sorted recyclables or commingled recyclables. Serviced on-call.
   - The recycling trailer or roll-off container should be conveniently located in the campground area and have clear signage on the recycling compartments. An informational kiosk with educational information about the recycling program could be placed next to the recycling container or trailer. Campground hosts and naturalists can also provide information to campers about the recycling program. The IDNR's website could list the state parks that have recycling available in the campground areas and reminders could be shared on the Facebook page.

7. **Recommended Trash Disposal Dumpster Size and Frequency of Service with a Recycling Program in Place:**
    - The recommended trash disposal dumpsters are 4 or 6 cubic yard containers serviced once/week during the summer months. Food waste and compostable materials make up a large part of the waste stream and during the warm summer months will require weekly collection.

Summary Comments:

The State Park Recycling Research Study indicates that it is practical and economically feasible to implement successful recycling programs in selected state park campgrounds, especially where strong public/private partnerships have been established. Recycling programs in the state park campgrounds conserves Iowa' s natural resources and reinforces the public's recycling habits away from home. It's a win-win for the environment and for all Iowans.

General Recommendations

The following steps should be considered when beginning a Campgrounds Recycling Program:

1. Review the Waste Sort Data with the park ranger/park manager, current waste hauler, landfill director, recycling center manager, county conservation naturalist, and Friends of the Park Representatives. Form a Recycling Green Team with these partners and invite a couple of students to participate in developing the new program. Establish recycling goals and benchmarks to include and to help evaluate the program.
2. Review the recyclable materials targeted for recycling collection and determine where the recyclable materials will be processed.
3. Identify the specific recycling container or trailer that will be used to collect the recyclables in the campground area. Used containers and trailers may be available.
4. Review program costs and identify potential in-kind contributions and donations to secure the recycling container or trailer to collect the recyclables, discuss transportation costs to the recycling processor with the waste/recycling hauler. Is it possible to off-set recycling program costs by downsizing number/size of current trash dumpsters in the campgrounds? Seek local sponsorships to support the new recycling program.
5. Identify clear signage for the recycling container. Develop a recycling information station or kiosk next to the recycling container to educate campers about the program.
6. Continue to educate campers throughout the camping season using the IDNR's website, campgrounds reservation system, campground hosts, and Facebook.
7. Share the results with the Recycling Green Team Members, campers and the public.

APPENDICIES

January Through September 2012
Estimated Total Pounds and Total Cubic Yard Generation All Sorted Material

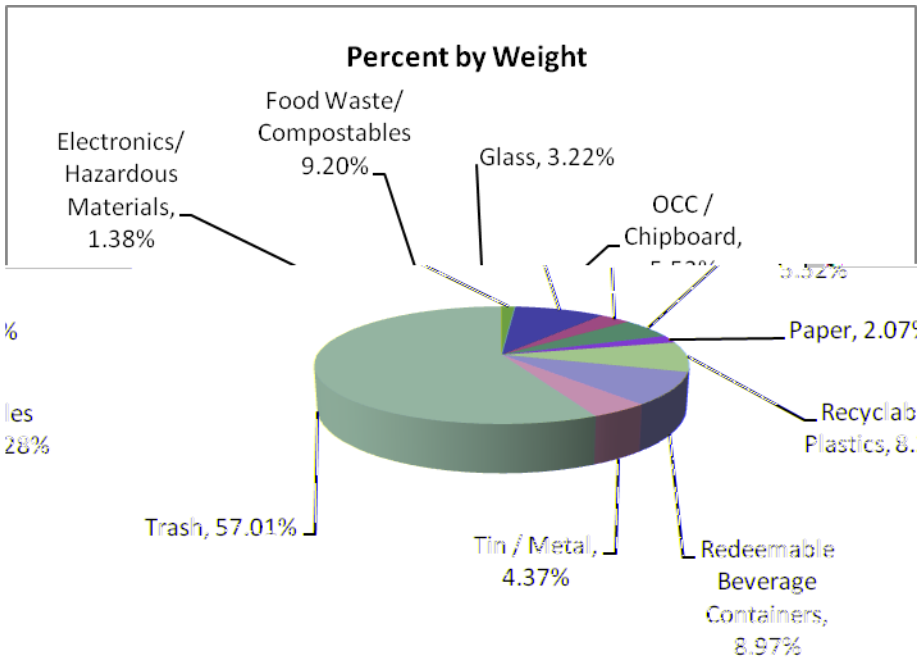
	Total Jan - Sept 2012 Camping Guest Days	Pounds of Trash	Estimated Average Yards^3 of Trash	Pounds of Recyclables	Estimated Average Yards^3 of Recyclables	Pounds of Redeemable Containers	Estimated Average Yards^3 of Redeemable Containers
Backbone	22,821	22,273.3	262.2	9,161.0	196.5	3,502.6	37.9
Clear Lake	28,018	6,918.3	81.4	5,058.1	108.5	319.8	46.5
George Wyth	17,391	14,782.4	174.0	6,327.4	135.7	1,091.6	28.9
Gull Point Complex	19,290	6,759.4	79.6	6,976.8	149.7	3,103.0	32.0
Lake Anita	26,592	12,671.5	149.2	7,846.7	168.3	1,020.6	44.2
Lake Manawa	21,260	12,169.9	143.3	8,246.9	176.9	6,621.6	35.3
Ledges	24,268	12,011.5	141.4	4,523.1	97.0	445.2	40.3
Rock Creek	32,481	13,996.7	164.8	4,359.5	93.5	310.6	53.9

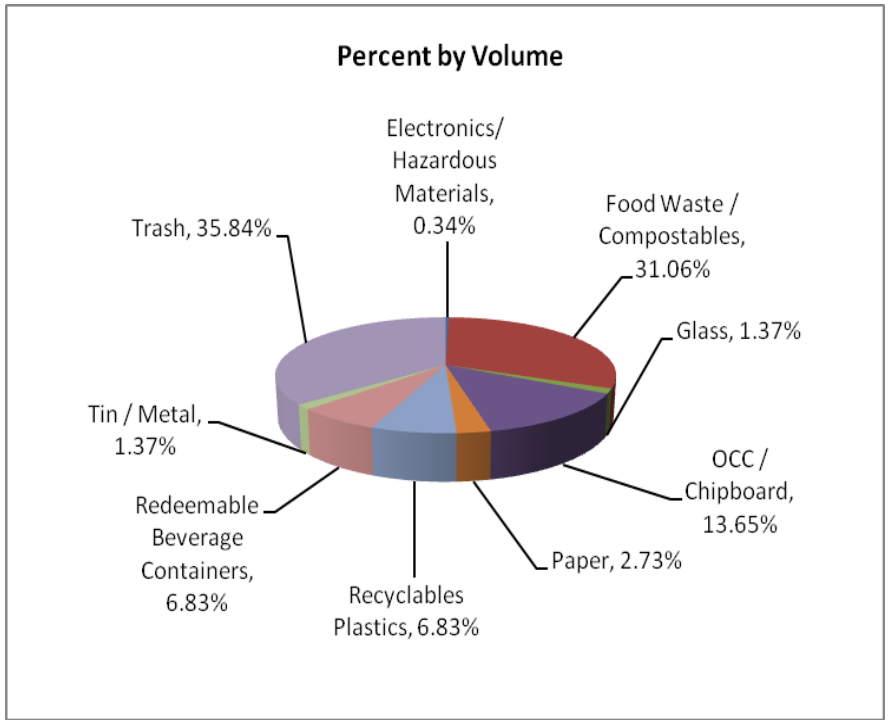
	Total Jan - Sept 2012 Camping Guest Days	Pounds of Food Waste/ Compostables	Estimated Average Yards^3 of Food Waste/Compostables	Pounds of Ewaste/ Hazardous Waste	Estimated Average Yards^3 of Ewaste/ Hazardous Waste
Backbone	22,821	3,592.7	40.2	538.8	4.6
Clear Lake	28,018	9870.5	49.3	375.7	5.7
George Wyth	17,391	4,643.8	30.6	518.0	3.5
Gull Point Complex	19,290	6,403.6	33.9	434.8	3.9
Lake Anita	26,592	5,764.9	46.8	1081.2	5.4
Lake Manawa	21,260	5,011.2	37.4	238.7	4.3
Ledges	24,268	6,555.3	42.7	459.7	4.9
Rock Creek	32,481	4,733.2	57.2	635.0	6.6

Backbone State Park

23-Jul-12 Waste Sort Data

Waste Stream	Weight (lbs)	Percent by Weight	Volume (yd^3)	Percent by Volume
Electronics/Hazardous Materials	9.09	1.38%	0.04	0.34%
Food Waste/Compostable Organics	60.61	9.20%	3.72	31.06%
Glass	21.21	3.22%	0.16	1.37%
OCC/Chipboard	36.36	5.52%	1.64	13.65%
Other	n/a	n/a	n/a	n/a
Paper	13.64	2.07%	0.33	2.73%
Recyclables Plastics	54.55	8.28%	0.82	6.83%
Redeemable Beverage Containers	59.09	8.97%	0.82	6.83%
Tin/Metal	28.79	4.37%	0.16	1.37%
Trash	375.76	57.01%	4.30	35.84%
TOTAL	659.09	100.00%	11.99	100.00%



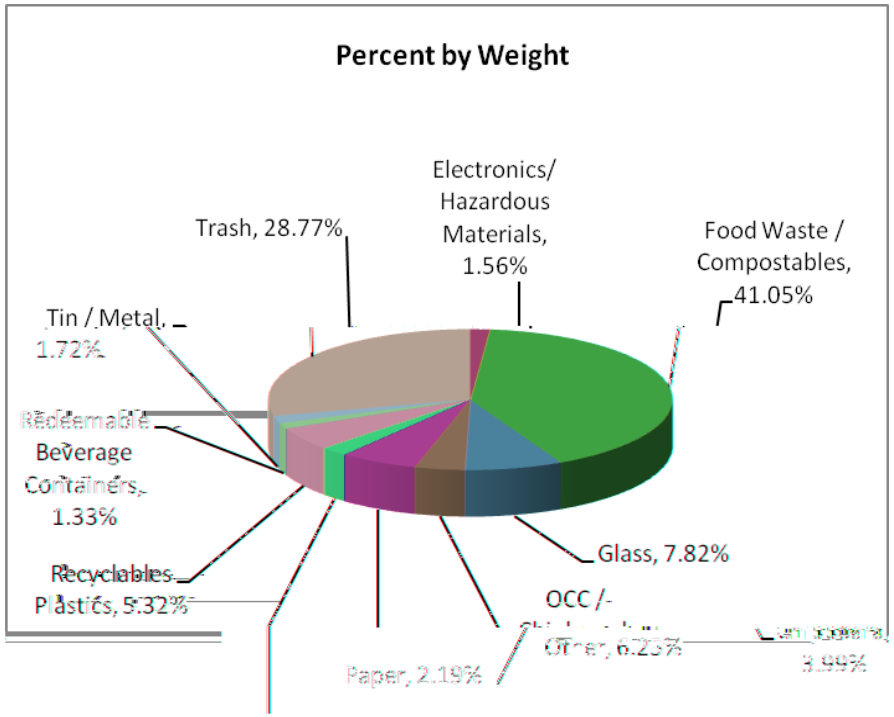


Clear Lake State Park

July 16,2012

Waste Sort Data

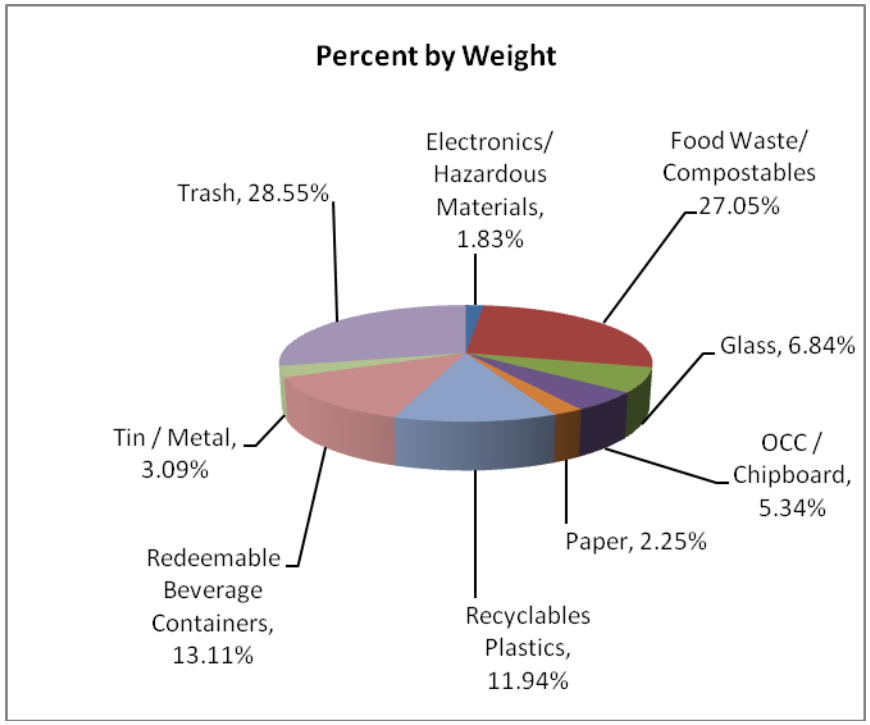
Waste Stream	Weight (lbs)	Percent by Weight	Volume (yd^3)	Percent by Volume
Electronics/ Hazardous Materials	17.74	1.56%	0.16	1.32%
Food Waste / Compostable Organics	466.08	41.05%	2.88	23.92%
Glass	88.78	7.82%	0.24	1.99%
OCC / Chipboard	45.29	3.99%	1.32	10.96%
Other	71.00	6.25%	0.36	2.99%
Paper	24.86	2.19%	0.24	1.99%
Recyclables Plastics	60.38	5.32%	1.56	12.96%
Redeemable Beverage Containers	15.10	1.33%	0.48	3.99%
Tin / Metal	19.53	1.72%	0.36	2.99%
Trash	326.68	28.77%	4.43	36.88%
TOTAL	1135.44	100.00%	12.03	100.00%

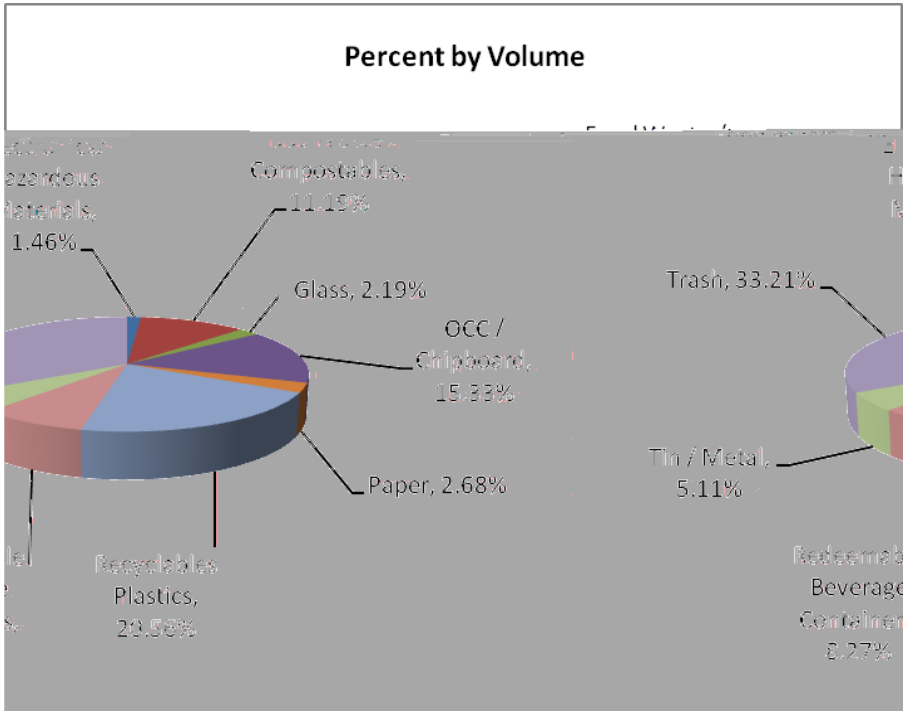


George Wyth State Park

6-Sep-11 Waste Sort Data

Waste Stream	Weight (lbs)	Percent by Weight	Volume(yd^3)	Percent by Volume
Electronics/Hazardous Materials	14	2%	0.13	2%
Food Waste/Compostable Organics	125.5	17%	1.00	13%
Glass	60	8%	0.25	3%
OCC/Chipboard	39	5%	1.38	17%
Paper	16	2%	0.13	2%
Plastic bottles/containers	40	5%	1.00	13%
Redeemable Beverage Containers	29.5	4%	1.00	13%
Tin/Metal	16	2%	0.13	2%
Trash	399.5	54%	3.00	38%
TOTAL	739.50	100.00%	8.00	100.00%

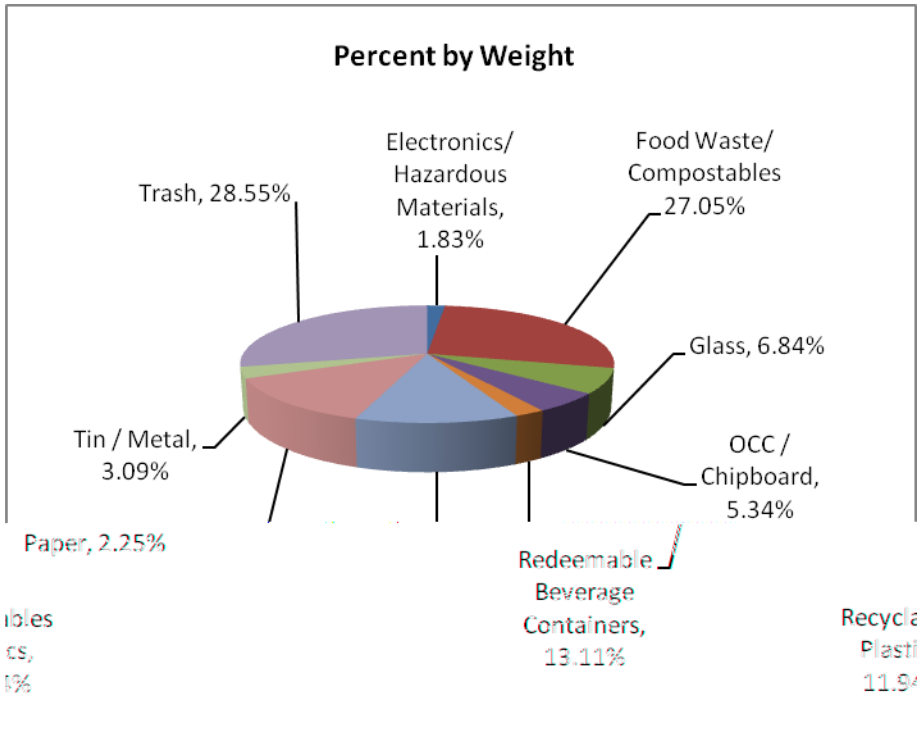


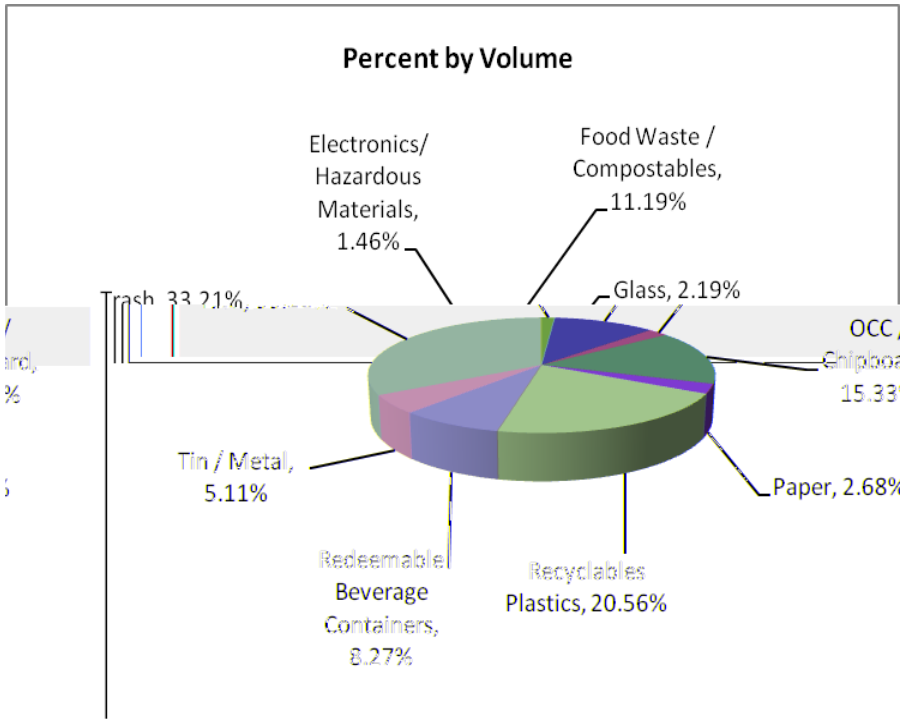


Gull Point State Park

9-Jul-12 Waste Sort Data

Waste Stream	Weight (lbs)	Percent by Weight	Volume(yd^3)	Percent by Volume
Electronics/Hazardous Materials	11.00	1.83%	0.12	1.46%
Food Waste/Compostable Organics	162.00	27.05%	0.92	11.19%
Glass	41.00	6.84%	0.18	2.19%
OCC/Chipboard	32.00	5.34%	1.26	15.33%
Other	n/a	n/a	n/a	n/a
Paper	13.50	2.25%	0.22	2.68%
Recyclables Plastics	71.50	11.94%	1.69	20.56%
Redeemable Beverage Containers	78.50	13.11%	0.68	8.27%
Tin/Metal	18.50	3.09%	0.42	5.11%
Trash	171.00	28.55%	2.73	33.21%
TOTAL	599.00	100.00%	8.22	100.00%



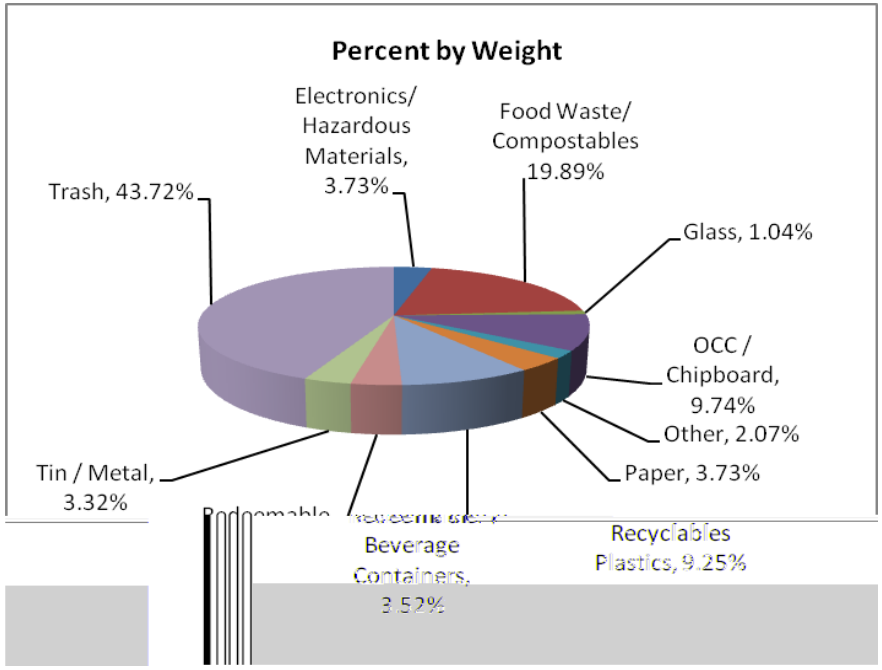


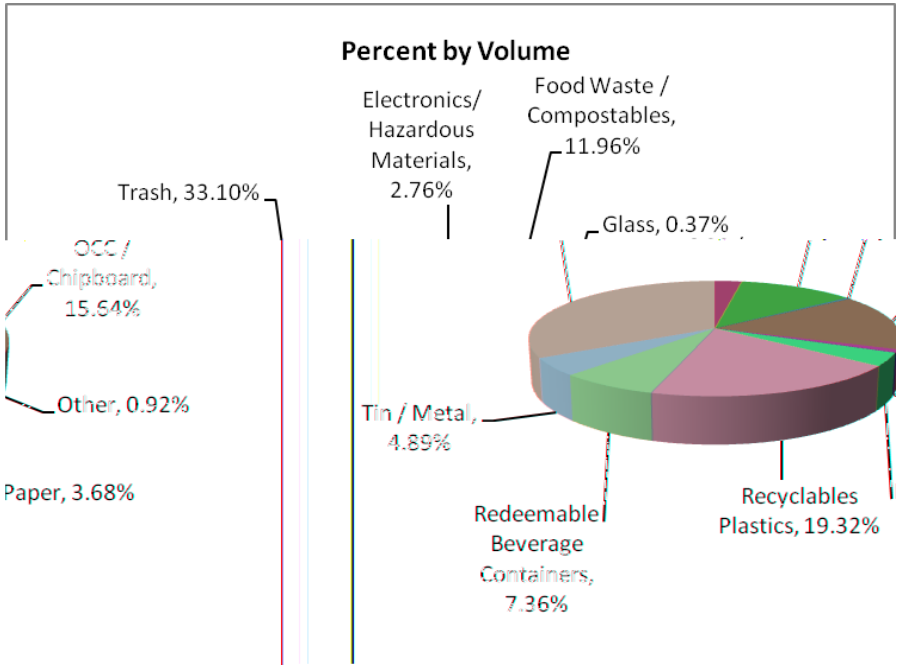
Lake Anita State Park

July 2,2012

Waste Sort Data

Waste Stream	Weight (lbs)	Percent by Weight	Volume(yd^3)	Percent by Volume
Electronics/ Hazardous Materials	26.59	3.73%	0.30	2.76%
Food Waste/ Compostable Organics	141.78	19.89%	1.30	11.96%
Glass	7.39	1.04%	0.04	0.37%
OCC/Chipboard	69.42	9.74%	1.69	15.64%
Other	14.76	2.07%	0.10	0.92%
Paper	26.59	3.73%	0.40	3.68%
Recyclables Plastics	65.94	9.25%	2.09	19.32%
Redeemable Beverage Containers	25.10	3.52%	0.80	7.36%
Tin/Metal	23.64	3.32%	0.53	4.89%
Trash	311.64	43.72%	3.59	33.10%
TOTAL	712.85	100.00%	10.84	100.00%

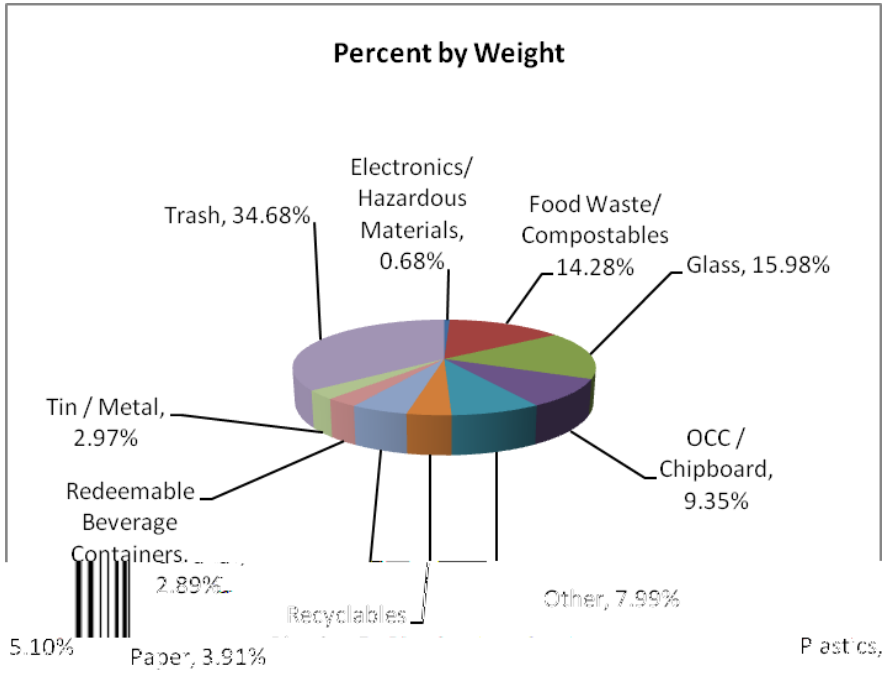


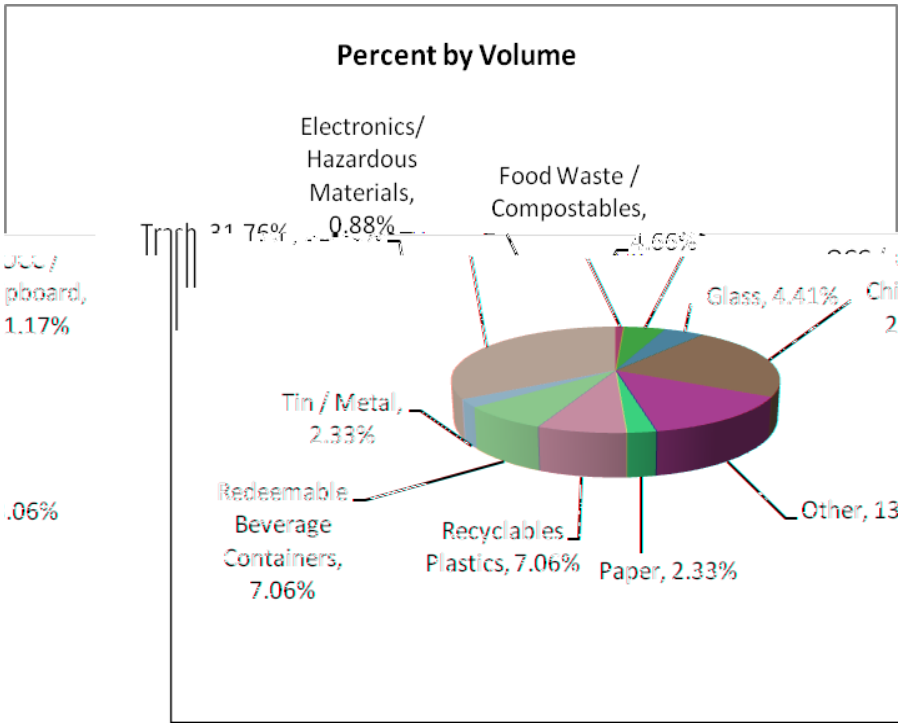


Lake Manawa State Park

18-Jun-12 Waste Sort Data

Waste Stream	Weight (lbs)	Percent by Weight	Volume(yd^3)	Percent by Volume
Electronics/Hazardous Materials	5.31	0.68%	0.09	0.88%
Food Waste/Compostable Organics	111.49	14.28%	0.47	4.66%
Redeemable Glass Bottles	124.76	15.98%	0.45	4.41%
OCC/Chipboard	73.00	9.35%	2.15	21.17%
Other	62.38	7.99%	1.33	13.06%
Paper	30.53	3.91%	0.24	2.33%
Recyclables Plastics (1-7)	39.82	5.10%	0.72	7.06%
Redeemable Beverage Containers	22.56	2.89%	0.72	7.06%
Tin/Metal	23.20	2.97%	0.24	2.33%
Trash	270.76	34.68%	3.23	31.76%
Non Redeemable Beverage Cont.	16.93	2.17%	0.54	5.28%
TOTAL	780.74	100.00%	10.18	100.00%

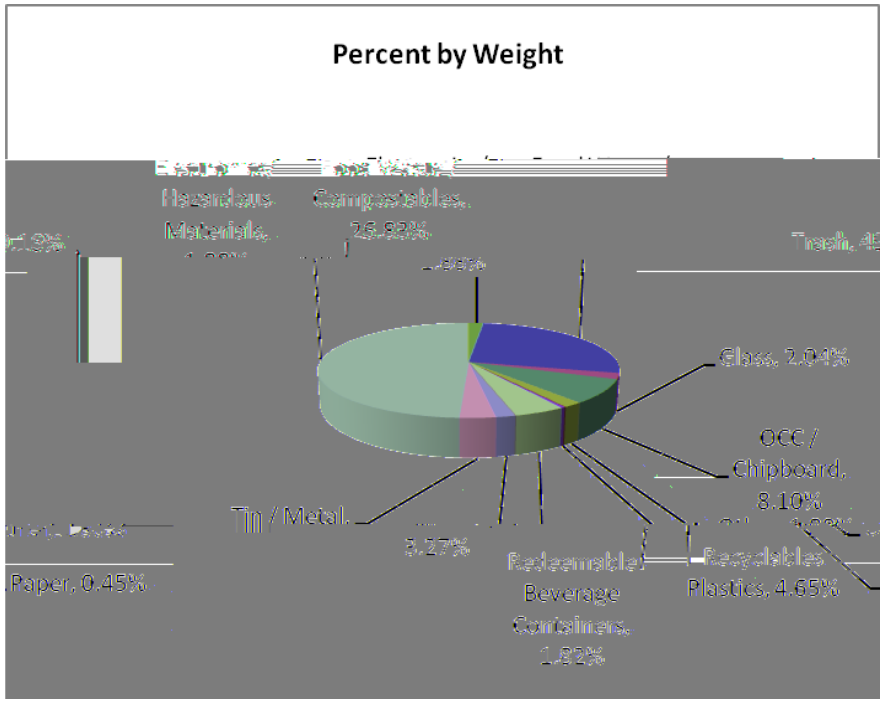


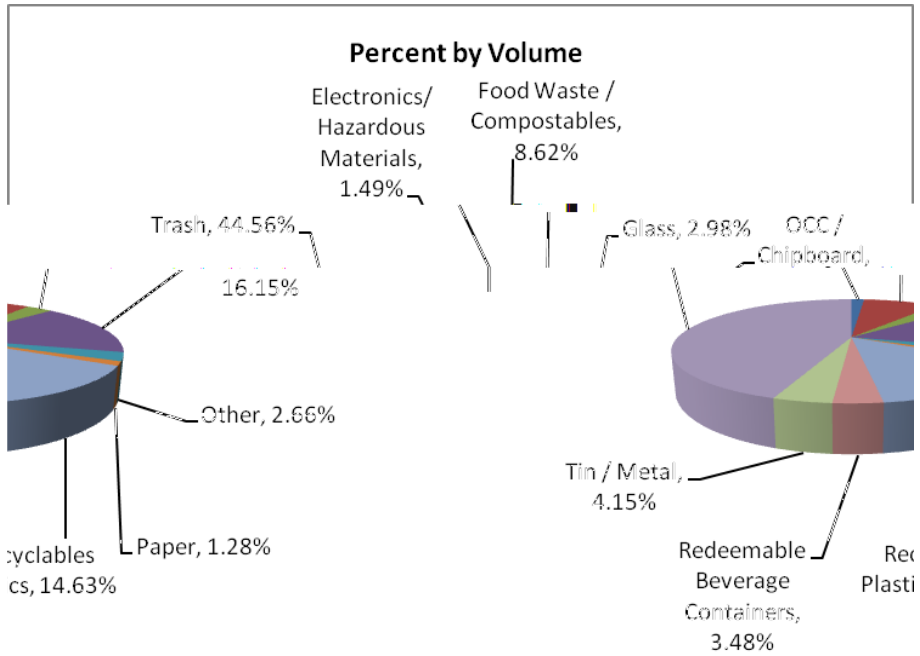


Ledges State Park

25-Jun-12 Waste Sort Data

Waste Stream	Weight (lbs)	Percent by Weight	Volume(yd^3)	Percent by Volume
Electronics/Hazardous Materials	12.35	1.88%	0.16	1.49%
Food Waste/Compostable Organics	176.12	26.83%	0.94	8.62%
Redeemable Glass Bottles	13.42	2.04%	0.32	2.98%
OCC/Chipboard	53.16	8.10%	1.76	16.15%
Other	11.81	1.80%	0.29	2.66%
Paper	2.95	0.45%	0.14	1.28%
Recyclables Plastics (1-7)	30.51	4.65%	1.59	14.63%
Redeemable Beverage Containers	11.96	1.82%	0.38	3.48%
Tin/Metal	21.48	3.27%	0.45	4.15%
Trash	322.71	49.16%	4.86	44.56%
TOTAL	656.47	100.00%	10.89	100.00%

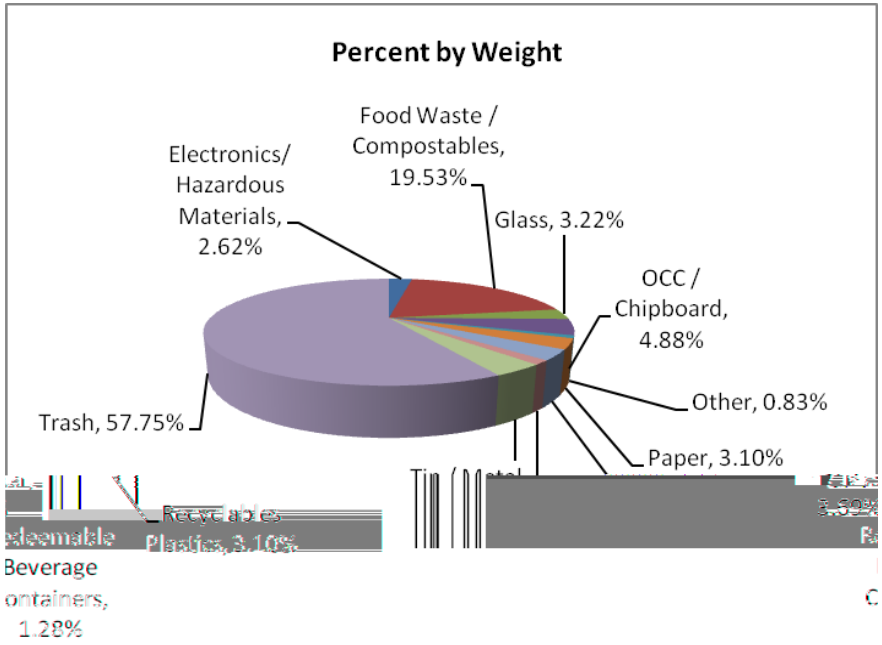


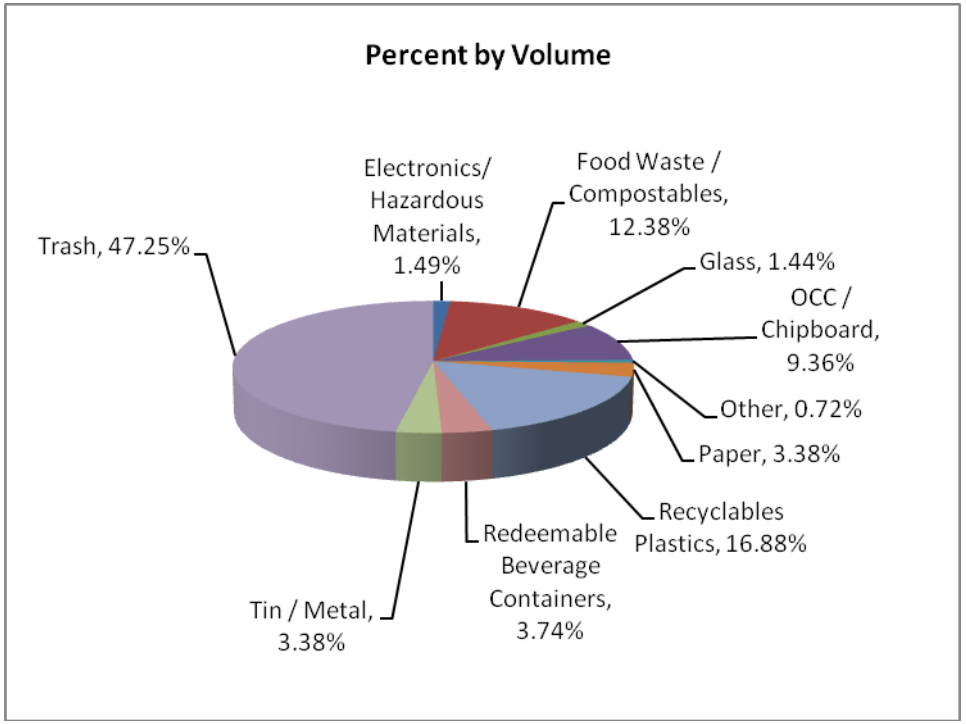


Rock Creek State Park

June 26,2012 Waste Sort Data

Waste Stream	Weight (lbs)	Percent by Weight	Volume(yd^3)	Percent by Volume
Electronics/Hazardous Materials/Universal	29.11	2.62%	0.24	1.49%
Food Waste/Compostable	216.98	19.53%	1.97	12.38%
Glass	35.76	3.22%	0.23	1.44%
OCC/Chipboard	54.23	4.88%	1.49	9.36%
Other	9.24	0.83%	0.11	0.72%
Paper	34.43	3.10%	0.54	3.38%
Recyclables Plastics	34.43	3.10%	2.68	16.88%
Redeemable Beverage Containers	14.24	1.28%	0.59	3.74%
Tin/Metal	41.00	3.69%	0.54	3.38%
Trash	641.64	57.75%	7.50	47.25%
TOTAL	1111.06	100.00%	15.89	100.00%





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Performing a Waste Sort

Prepared by Iowa Department of Natural Resources
Financial and Business Assistance
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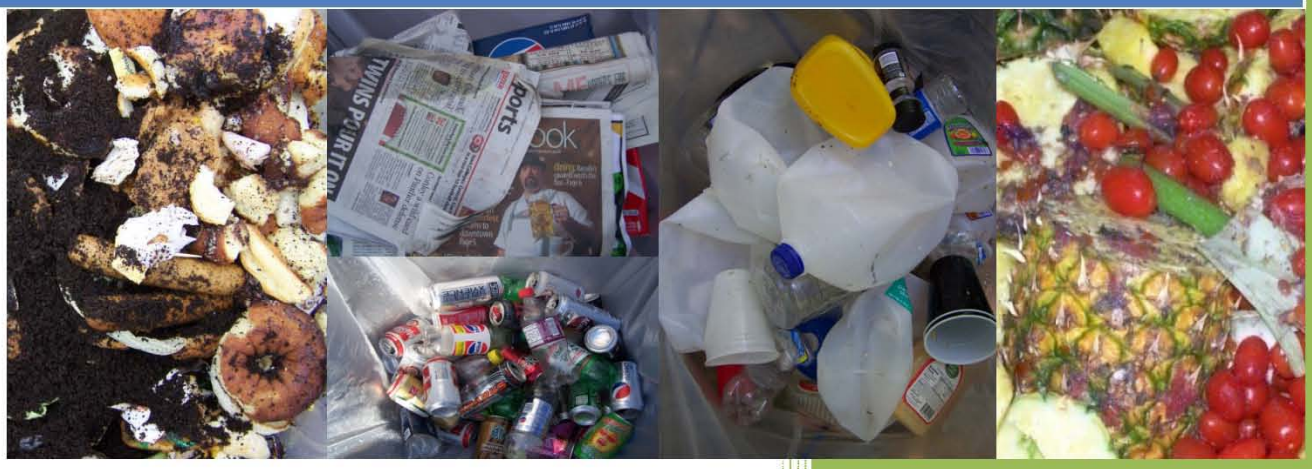

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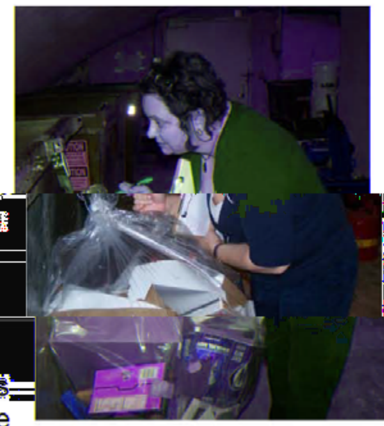
CONTENTS

I. INTRODUCTION

A. What is a Waste Sort?



A waste sort is a process of hand-sorting onsite waste in order to quantify the amount and type of solid waste generated by businesses, organizations and municipalities to determine how much waste is ultimately ending up in the landfill. Data from waste sort events assists in identifying current waste practices and the feasibility of implementing commodity specific waste reduction, recycling and education programs.

B. Why Perform a Waste Sort?

The objective of a waste sort is dependent on the goals of the business, organization or municipality. These objectives may include:

- Collecting baseline data regarding the amount and type of waste and recyclables going to the landfill.
- Measuring the overall effectiveness of purchasing, waste management and recycling programs that currently exist.
- Identifying opportunities for improving in-house purchasing, recycling and recycling education programs.
- Identifying opportunities to reduce front-end waste th… associated with purchasing raw materials… us reducing costs.

Measuring, documenting and implementing improvement… to current waste management and recycling systems not only enhances and preserves our natural resources but could potentially reduce costs asso…ciated with material purchases and the logistics of waste pickup and hauling.

II. PRE-SORT PLANNING

A. Logistics

Work with your waste hauling company, custodial staff an…d/or other stakeholders… review transportation logistics and det…ermine how many days worth of waste you will be sorting.

Regardless if you are sorting one day's trash or one week's trash, it is important that your sample represent a "typical" cycle. For example, if your business or production plant is on shut-down for holidays or maintenance a typical waste cycle will not be represented by the trash collected because a number of people would be absent. If you are sorting one week's worth of trash, it is not necessary to "hold" trash during the week as it can be sorted and recorded daily.

If custodial or other staff members are responsible for collecting the waste and delivering it to a dumpster, work with them in consolidating the waste facility wide and delivering it to the preselected sorting location. If all waste is delivered directly to the onsite dumpster, work with the waste hauling company to determine how many times per week they pick up. This information will assist in determining how many days worth of waste you will be sorting and the best day of the week to perform the sort. You can extrapolate those data to determine annual estimates with regard to the various commodities. Once you have discussed the logistics, set a date and time for your sorting event and begin recruiting sorting team members/volunteers as soon as possible. In addition, it is advisable to remind sorting team members a few days before the event. If utilizing volunteers see the *Volunteer Management* section of this document.

B. Determining Duration

In determining how long the waste sort will take and the nu ber of sorting team memb and/or volunteers that will needed you should contact s members and stakeholders t handle the garbage at y location to assess the volu that will be produced during time period (in cubic yards). addition, you can observe wa collection for a similar perioc time and estimate the app ximate amount (in cubic yards) of waste that will be sort A good rule of thumb is the 2-2-2 rule – two trained sort and two cubic yards of waste material will t approximately two hours to sort, weigh and record. A you have obtained an estimate regarding the amoun material that will be sorted, you can then determine h many sorting team members/volunteers will be nee and the approximate amount of time the sort will take.

C. Determining Sorting Location

Working with all staff members and other stakeholders, determine the size of area that will be needed for the sort and determine a location to perform the sort. If smaller quantities will be sorted a large indoor room might be ideal. If large quantities of waste will be sorted, a large, flat area such as a parking garage or shipping and receiving area is preferred. The area selected should be an open area in order to expedite clean up after the sort is completed. It is advisable to sort in a sheltered area to provide cover from adverse weather, but outdoor areas can be utilized. If you hold your sort in an outdoor area you will want to be cognizant of the weather. When scheduling a date for your sorting event you might also consider scheduling a "rain-date" in case of inclement weather. In the outdoor scenario you will also want to be cognizant of wind issues including but not limited to putting up a wind fence to collect renegade trash and designating individuals on the sorting team to be responsible for picking up stray litter. In addition and depending on the type of trash and the number of volunteers utilized the process could generate noise levels that may be disruptive to others, so you will want to use a location that is far enough away as to not disturb other staff members.

D. Determining Waste Streams to be Sorted

Determining how materials will be categorized and sorted is dependent upon varying factors including:

- What recycling services and facilities are available in your area?
- What commodities can be picked up from your location?
- If commodities cannot be picked up onsite, can they be delivered by staff members?
- Is delivery of commodities cost effective?

Contact companies in your area that provide recycling services and determine not only what materials they will accept but subsequently how they should be sorted. For example, some recycling

companies collect chipboard/wetboard (cracker boxes, tissue boxes, paper towel rolls) with corrugated cardboard while others may accept chipboard/wetboard with newspaper/white paper/office paper. Some areas may provide single-stream recycling services and therefore you would only need one container for all recyclables. Plastic containers are numbered 1-7, but all facilities may not accept all plastics. If composting is available in your area or if you are determining the feasibility of onsite composting, you will also want to have a separate container for food waste/organic materials. In addition, you will want to have one container specifically allocated for materials that cannot be recycled and must be thrown in the trash. In some cases, confidential information may be found. If this happens contact your human resources department or other responsible party and make them aware that this type of information was found in the trash. Waste sorting categories might include but are not limited to the following:

CARDBOARD

- OCC (Old corrugated cardboard)
- Chipboard (paper towel rolls, tissue boxes)

GLASS

- Clear
- Blue
- Brown
- Green
- Other

METALS

- Aluminum
- Ferrous (tin cans)
- Non Ferrous (aluminum cans)

ORGANIC MATERIALS

- Food Waste
- Animal Waste
- Compostable paper products (napkins, paper towels)

PLASTICS

- #1 Plastics
- #2 Plastics
- #3 Plastics
- #4 Plastics
- #5 Plastics
- #6 Plastics
- #7 Plastics

PAPER

- White paper

Colored paper (including manila folders and envelopes)
Mixed paper
Magazines
Books

REDEEMABLE BEVERAGE CONTAINERS

Plastic
Aluminum
Glass

WOOD

Untreated (no chemical preservatives)
Treated (treated with chemical preservatives i.e. landscape timbers, piling)

III. SUPPLIES

In preparing for your sorting event, the following supplies are suggested.

Sorting containers – Generally 35-55 gallon, one for each category.

Bags – 35-55 gallon size depending on containers used. While using bags slightly increases the amount of waste generated, it makes weighing much less difficult, assists in expediting the cleanup process and eliminates the need to rinse out every container following the event.

Signage – Place one sign on each container indicating the commodity the container has been designated for.

Tape – To hang signs on containers.

Sorting Table – To eliminate continuous bending and promote ergonomics a table should be used.

Plastic Sheeting – If sorting takes place indoors it is advisable to place plastic on the floor. In addition, it is advised to place plastic on your sorting table regardless of the venue. Although it produces a small amount of waste, it makes cleanup much easier and much more sanitary.

Litter Grabbers – If sorting in an outdoor venue, these are used to pick-up renegade waste. In addition, if you are sorting from the dumpster, litter grabbers assist in reaching the bags at the bottom of the container and eliminate the need to climb into the dumpster to obtain waste materials.

Clipboard/Paper/Pens – Used in documenting weights and volumes of sorted materials.

Wet Wipes/Hand Sanitizer – These items allow members of the sort team to cleanup in the interim if a restroom or sink area is not available.

Scale – Used to weigh sorted waste. The scale used will be dependent on the amount of material you are sorting. In many cases a fishing scale or a bathroom scale may be used. In other cases a platform scale may need to be obtained.

IV. SAFETY

Throughout the waste sorting process the following safety procedures should be followed and provided to participants:

1. No eating, smoking, or drinking during sorting activities. Food and liquids should be away from the sorting area. If the event lasts over a meal period, hands and faces should be washed before eating or drinking.

2. The following safety equipment should be onsite and utilized by sorting participants:

   First Aid Kit

   Nitrile Gloves – Plan on at least two pair for each participant.

   Eye Protection/Safety Glasses – Optional, depending on your budget. You can also request that sorters that wish to have eye protection bring their own safety glasses/goggles.

   Tyvek Suits/Aprons – Optional, depending on budget. You can also request that sorters that wish to have Tyvek or an apron bring their own. In addition, sorters should be made aware that they should wear garbage appropriate clothing and comfortable shoes.

3. Although hazardous materials should not be found in the waste stream, in the event that they are present these materials should be set aside and handled in accordance with EPA and DNR guidelines. For more information with regard to handling of hazardous materials contact the Iowa Department of Natural Resources or your Iowa Waste Exchange Area Resource Specialist.

4. Due to the potential presence of glass, needles and other sharp objects, sorters should only grab what they can see and should never use their hands to dig down through the waste. Use a rake, small shovel or litter grabber to pull/push the material to the side and continue sorting. Sort from the top down.

V. THE DAY OF THE EVENT

A. Setting up the Sorting Area

The first thing you will want to do is set up your sorting area which includes placing plastic sheeting on the floor (if sorting in an indoor area), setting up sorting containers, lining them with bags and attaching signage regarding which designated waste material is being collected in which container as well as setting up and covering sorting table(s).

B. Instruction and Documentation

After the sorting area has been set up, provide sorting team members and/or volunteers with project background, objectives, instructions, safety information and answer any questions they may have. In addition, show team members and/or volunteers where safety equipment and other supplies are located. Once all members have obtained the appropriate safety equipment needed begin sorting waste into corresponding containers. Once all waste has been sorted weigh each bag and document the weights. In addition and because waste fees are generally charged by the number of times the container is emptied rather than the weight of materials, you should also document the volume (cubic yards) of each material – this is generally done by visual observation.

C. Clean up and Debriefing

times have been
n members and/or
regarding the sort

Once all materials have been weighed and weights and vo
documented, clean up the area and thank sorting tea
volunteers for their assistance. In addition obtain feedback
i.e., things that worked, things that could have been
improved and observations made.

VI. POST SORTING ACTIVITIES

A. Data Analysis

Once all data has been collected, you will need to format these data in order to assemble a visible "snapshot" of the wastes produced onsite. In addition,

formatting the data in this manner will assist in reviewing purchasing, recycling and education areas that need to be explored and/or improved. The following provides a detailed example of how to calculate data collected using waste streams that include cardboard, glass, plastics, paper, tin and trash.

B. Calculating Percent by Weight

Waste Stream	Weight of Sorted Material (lbs)	Percent by Weight (Weight of sorted material divided by total weight)
Cardboard	25	20%
Glass	5	4%
Plastics	10	8%
Paper	15	12%
Tin	6	5%
Trash	65	52%
Total	**126**	**100%**

Using the weights above and dividing by the number of days that material was collected you can extrapolate these data to calculate an estimated annual total. When estimating an annual total, be sure to only include days that the building or area is occupied. For example, if you are in a location that is not open on weekends and certain holidays you would want to subtract these days from your total.

365 (total days in the year) – 110 (total days location is closed) = 255.

Using this number and assuming that this waste sort looked at two days worth of trash, we have calculated the estimated annual weight of the commodities below.

Waste Stream	Weight of Sorted Material (lbs)	Weight of Sorted Materials/Days Material was collected	Annual Totals (Daily Weights x 255 Days)
Cardboard	25	12.5	3187.5
Glass	5	2.5	637.5
Plastics	10	5	1275
Paper	15	7.5	1912.5
Tin	6	3	765
Trash	65	32.5	8287.5
Total	**126**	**63**	**16065**

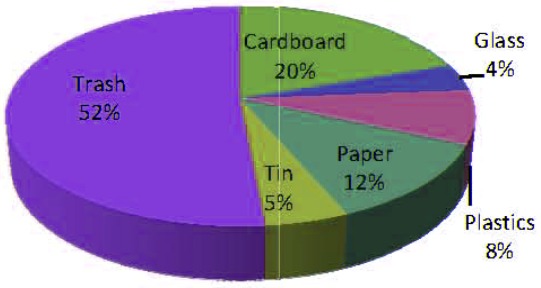
C. Calculating Percent by Volume

If your organization is charged by container pulls as opposed to weight, you will also want to calculate the percent by volume. Estimating the percent by volume for each waste stream is done visually. This can easily be done by counting the number of 55-gallon bags for each waste stream. One 55-gallon bag is equal to .27 cubic yards.

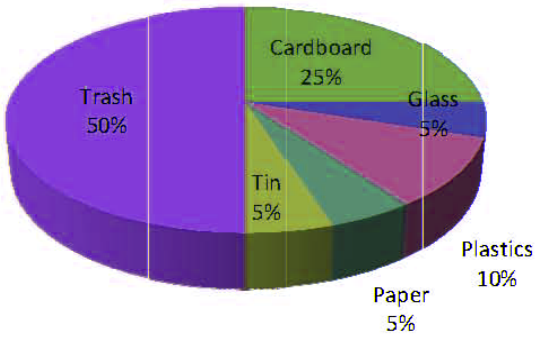
Waste Stream	Percent by Volume
Cardboard	25%
Glass	5%
Plastics	10%
Paper	5%
Tin	5%
Trash	50%
Total	100%

From these spreadsheets, you can create a presentation of the data collected by incorporating them into pie charts. This will provide a visible display regarding the weights and volumes of materials being produced, which will assist in the assessment process. The spreadsheets above are graphically represented below.

Percent by Weight



Percent by Volume



VII. NEXT STEPS

After analyzing the data your business, organization and/or municipality will have a better idea of purchasing, recycling and education programs that warrant additional consideration and further investigation. For example, the data above indicates that a cardboard recycling program might be advantageous both in terms of weight and the amount of volume cardboard is occupying in the

dumpster. By eliminating this volume from going to the landfill you not only reduce your ecological footprint but can quite possibly reduce your waste hauling fees. Keep in mind that if a recycling service is picking up materials from your location there may be a charge assessed. At the very least you can reduce your costs in hauling wastes and transfer those costs into recycling services thus improving your ecological footprint without adversely affecting your overall budget.

When investigating potential recycling programs that can be implemented you will want to contact several recycling service providers and compare the services offered and the fees charged. In addition if you plan on hauling the recyclable materials in-house, you will want to determine the internal costs of doing so including labor and transportation.

VIII. VOLUNTEER MANAGEMENT

A. Recruiting Team Members/Volunteers

Once the date and time of your activity has been scheduled and regardless if you are using internal team members or outside volunteers you must begin recruiting them as soon as possible. You can do this by making connections that count or using your networks. Examples include:

- People you know (other team members, family, friends, neighbors, students)
- Friends of friends
- Create and post flyers

ewspapers, web sites and newsletters.

otions (happiness, anger, fear, passion)

tions and businesses.

your objective and get their support.

- Publicize your waste sort event in ne
- Don't be afraid to "tap" people's emo and invite them to get involved.
- Partner with organizations, associa
- Talk personally with people to "sell"

B. During the Sorting Event

Thank volunteers! Provide volunteers with project background, objectives, instructions, safety information and answer any questions they may have. Take care of all paperwork including having volunteers sign in and provide their contact information. In addition, have them read and sign any liability waivers that might be required. Throughout the event provide positive reinforcement and continued assistance. If people are working together that are not acquainted with each other, take some time for introductions and/or provide name tags to assist the volunteers in getting to know one another. In addition, be a leader –find a place for everyone. For example, perhaps someone would enjoy volunteering but does not particularly want to dig through trash. Find a place for them whether that place is taking photos or documenting results. All volunteers are valuable and as the team leader it is your responsibility to ensure that they have a role and a positive volunteer experience.

C. After the Sorting Event

Thank volunteers again! Give positive reinforcement for a job well done. During the debriefing portion of the day encourage positive reflection i.e. what have they learned from participating, what things could have been improved, what things worked well. In addition send a personal thank you to all volunteers (preferable via email) as well as providing them with a copy of data compiled, links to any news releases issued and/or photos taken pertaining to the event.

IX. FAQs

Q: Should I empty beverage containers that still contain liquids?

A: Yes, beverage containers that still contain liquids should be emptied as they affect the weight of the overall waste composition.

Q: Are food contaminated paper and plastic products recyclable?

A: Paper products such as cardboard and tablewares and plastics such as clam shells that have been contaminated by food materials are no longer recyclable. However, contaminated paper materials can be composted if facilities exist in your area.

Q: Where do foam cups, plates and packaging materials go?

A: Unfortunately, very few recycling programs accept foam materials. Therefore the best option is to reduce consumption of Styrofoam by switching to more eco-friendly items such as reusable cups,

tablewares or packaging media. During a waste sort these items will more than likely need to go into the trash stream.

Q: What do we do if we find hazardous materials in the waste stream?

A: Although hazardous materials should not be found in the waste stream, in the case that they are, set them aside and contact the Iowa Department of Natural Resources or your Iowa Waste Exchange Area Resource Specialist for information regarding proper disposal.

X. Resources

For additional assistance, resources and questions regarding completing a waste sort for your company, business or organization contact the Iowa Department of Natural Resources Financial and Business Assistance (www.iowadnr.gov/FABA) or the Iowa Waste Exchange. The Iowa Waste Exchange is a confidential and non-regulatory program of the Iowa Department of Natural Resources and is managed by Region XII Council of Governments. Area Resource Specialists can offer assistance regarding planning, implementing and calculating data as well as locating recycling services and markets in your area. Learn more about the Iowa Waste Exchange and find your Area Resource Specialist by visiting www.iowadnr.gov/FABA