

**████████ Community School District**

## **Cafeteria Waste Audit Results**

**May 22, 2017**

The name of the participating school district has been removed from this report pending approval to publish.

**Iowa Waste Reduction Center**



**University of Northern Iowa**

Food waste is a growing issue with many negative implications including social concerns, environmental consequences, and significant economic effects. Social concerns with food waste can be tied to food insecurity. In Iowa, according to Feeding America 1 in 5 children does not have enough food to eat. Environmentally, food waste in landfills contributes to global climate change as the methane emissions generated from food waste are very efficient at trapping heat in Earth's atmosphere. Economically, food that is never eaten costs the United States economy \$165 billion while \$750 million is spent to landfill food waste according the Natural Resources Defense Council. The U.S. Environmental Protection Agency (EPA) estimates that in the United States alone, 35 million tons of food are tossed each year. Clearly, there are better uses for food that can reduce societal pressures of feeding the hungry, environmental degradation caused by food disposed in landfills, and costs associated with growing food that never gets eaten and ends up in the landfill.

### **Community School District Cafeteria Waste Audit**

The Iowa Waste Reduction Center (IWRC) in collaboration with the Iowa Waste Exchange conducted a cafeteria waste audit at the Community School District (CSD) on April 18, 2017 in northeast, Iowa. The cafeteria waste audit included both food waste from the kitchen (prep waste) as well as student tray waste for both breakfast and lunch. Student tray waste was separated into five main categories and weighed. Categories included the following:

- Food waste
- Recyclables - plastic water bottles, juice cups
- Compostables – napkins, paper boats
- Liquids – milk, juice
- Trash - milk cartons, chip bags, flexible plastics that are not recyclable

### **Food Management**

serves fresh fruit and vegetables daily and every student in the school district receives free breakfast and lunch despite income levels. Due to this fact, almost no students bring lunch from home so cold lunch waste was not measured. Kitchen staff urge students to finish all their juice during breakfast and will send students back to the cafeteria tables to try to eat more food when not much has been eaten.

Uniquely, has a contact that picks up all fruit and vegetable prep waste to feed to animals. Additionally, all plastic, cardboard, and tin are recycled. is commended for their efforts to reduce food waste and other waste streams as well.

### **Results of the Cafeteria Waste Audit**

#### *Kitchen Prep Waste*

As mentioned above, both kitchen prep waste and student tray waste were measured separately. Kitchen waste is the easiest place to start when implementing initiatives to reduce food waste

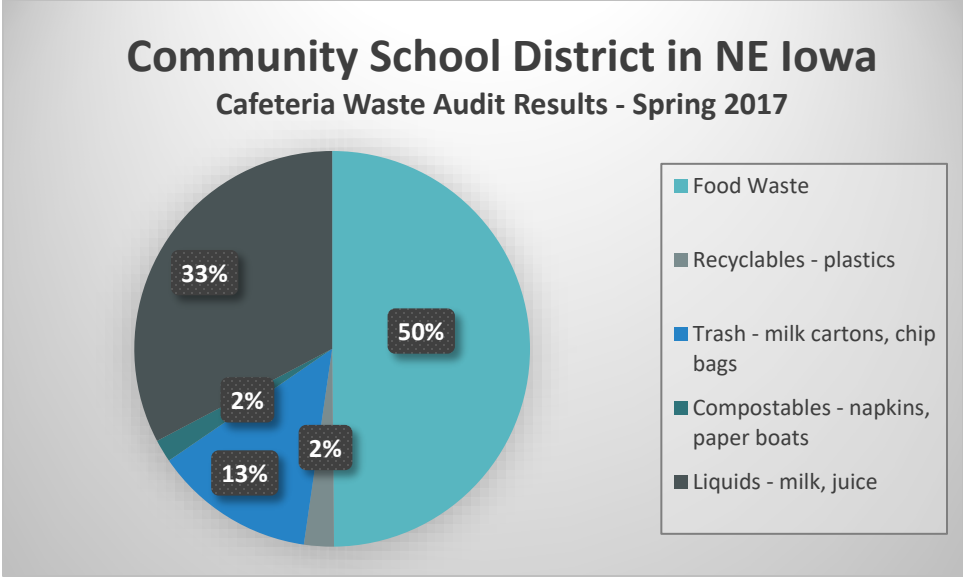
because only kitchen staff will need to be trained. Every school day, fresh fruit and vegetables are prepared for students and every day a local farmer picks up the trimmings to feed to cattle. Laurie Smith noted that the amount of kitchen prep waste diverted from the landfill varies significantly from day to day and on the day of the waste audit, amounts diverted were below average. On the day of the waste audit, prep waste diverted from the landfill included trimmings from fresh pineapple, asparagus and oranges, all of which went to cattle feed. **Total weight of diverted kitchen prep waste on the day of the waste audit was 142.5 pounds.**

*Student Tray Waste*

During the waste audit, students were required to sort tray waste after eating both breakfast and lunch. The table below provides results of the waste audit and measurements of student tray waste after both breakfast and lunch. Additionally, data from the waste audit has been charted and categories of waste measured can be visualized in the pie chart below.

**Community School District in Northeast Iowa  
Cafeteria Waste Audit Results – Student Tray Waste  
Spring 2017**

Category	Breakfast Totals by Weight Per Day	Lunch Totals by Weight Per Day	Totals Per Day
Number of Students/Meals Served	144	672	816 meals served
Food Waste	7.4 lbs. per day	111.2 lbs.	118.6 lbs
Recyclables - plastics	1.4 lbs per day	4.4 lbs	5.8 lbs
Trash - milk cartons, chip bags	3.4 lbs per day	27.9 lbs	31.3 lbs
Compostables - napkins, paper products	0.4 lbs per day	4.0 lbs	4.4 lbs
Liquids - milk, juice	16 lbs per day	61.8 lbs	77.8 lbs



**Extrapolation of Waste Audit Data**

By extrapolating food waste data, the school district can estimate how much is generated yearly and will provide the district with the opportunity to set reduction goals of food waste generation rates. Additionally, implementing cost-effective, simple reduction strategies and techniques can be analyzed by conducting further waste audits to gauge the effectiveness of these strategies. Techniques and strategies to reduce food waste are recommended further below in this report. Extrapolation of data is listed in the table below and figures have been rounded.

### Community School District Extrapolation of Food Waste Data

Category	Breakfast	Lunch	Total
Food waste generated daily per student	0.05 lbs.	0.17 lbs.	0.15 lbs. per day
Food waste generated yearly per student	9 lbs.	30 lbs.	40 lbs. per year
Food waste generated yearly by ██████████	1,332 lbs. or 0.6 tons	20,016 lbs. or 10 tons	21,348 lbs. or 11 tons

**Cost of Disposal**

The city sends waste to the Winneshiek County Landfill where tipping fees are \$67.00 per ton. Food waste from the school that is currently landfilled costs \$737 to dispose every year. Preventing and reducing food waste will reduce disposal costs as well as environmental impacts of food waste in landfills. Food waste in landfills generates methane which is 20-25 times more

potent than carbon dioxide. Methane is a strong greenhouse gas that contributes to global climate change by trapping heat in Earth's atmosphere. Landfills in the United States are the third largest source of methane generated by humans and accounts for 24 percent of all methane emissions.

### **Greenhouse Gas Emissions Generated by [REDACTED]**

Utilizing the EPA's WARM (Waste Reduction Model) model, food waste from [REDACTED] in the landfill currently generates eight metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) yearly. It would take 207 tree seedlings grown for ten years to sequester these emissions yearly or it would take 7.6 acres of forest one year to sequester these emissions yearly according to EPA's Greenhouse Gas Equivalencies Calculator. Additionally, eight MTCO<sub>2</sub>E is equivalent to the following:

- Carbon dioxide emission from 900 gallons of gasoline consumed.
- Carbon dioxide emissions from 8,537 pounds of coal burned
- Carbon dioxide emissions from 18.5 barrels of oil consumed
- Greenhouse gas emissions from 19,173 miles driven by an average passenger vehicle

The Iowa Waste Reduction Center and the University of Northern Iowa are equal opportunity employers and providers.

The school district landfills 593 pounds of food waste weekly. By setting a goal to reduce food waste, the district can seek strategies and techniques that would help reach this goal. For example, a food waste reduction goal of 20% would divert 118.6 pounds weekly from the landfill, that's one day worth of food waste weekly. There are simple, cost-effective strategies that once implemented, can help prevent and reduce food waste.

#### *Donation*

During the cafeteria waste audit, 25 unopened servings of milk were rescued from the garbage during breakfast and lunch. One way to reduce wasted food is if the district supplies students with a "donation" table for items that have not been opened such as milk, chips, condiment packages, and whole fruits. Reuse of these food items will help reduce food waste by offering them to athletes after school, other students and staff still hungry during meals, or by donating them to a local food pantry. The Bill Emerson Good Samaritan Food Donation Act provides liability protection to organizations that donate food in good faith to a non-profit agency. A summary of the Bill Emerson Good Samaritan Food Donation Act can be found on the IWRC's website.

The school district has the option to donate left-over edible food to pantries, soup kitchens, and food banks in the local area. Some organizations may even accept prepared foods but may require freezing prior to drop-off or pick-up. Below is a list of organizations that accept food donations. Please contact them to find out exactly what food items they accept.

#### Community Support

Phone: 563-605-1313

Note: Open Tuesdays from 2:00-5:00

Northeast Iowa Community Action  
Phone: 563-864-3363  
Note: Open Thursdays and Fridays 8:00-11:30

Clayton County Food Shelf  
100 W, Hill Street  
St. Olaf, IA 52072  
Phone: 563-783-7794

Allamakee County Food Shelf  
1125 W. Main Lot 39  
Waukon, IA 52172  
Phone: 563-568-4992  
Note: Open Thursday from 9:00-1:00

### *Composting*

If the CSD would like to start a food waste composting project, the IWRC can help with both proper maintenance and technical assistance of composting operations to keep the pile active and can also help with Iowa regulations. If composting the district's food waste on-site, there are no requirements except proper siting of the composting operation. Alternatively, if there is interest in composting food waste off-site, there are simple regulations to follow if less than two tons of food waste are composted per week. A summary of this regulation, called the Permit-by-Rule, is available on the IWRC's website. Please contact Jenny Trent at the IWRC if composting food waste is an interest of the district at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.

### *In-School Strategies to Prevent and Reduce Food Waste*

During the cafeteria waste audit, milk and juice waste were measured at 33% of the total waste stream and contribute significantly to costs associated with trash disposal. Providing a donation table for unopened juice and milk will help reduce this amount as will providing a bucket for students to pour out opened and unfinished milk and juice. This can then be sent down the drain rather than end up in the landfill.

Strategies that will help prevent and reduce food waste within the schools includes the following:

- Analyze the most common foods being thrown away and find a solution to prevent these items from ending up in the trash. For example, a recipe not well received by students can be changed to entice students to eat.
- Repurpose food items into new recipes. For example, stale bread can be turned into croutons or burgers can be turned into chili or soup.
- Schedule recess before lunch to increase appetites and calmness.
- Allow students to help plan the menu and give menu items jazzy names. For example, carrots can be called "X-ray vision carrots," or call broccoli "Tiny Tasty Treetops."

- Extend meal times to at least 25 minutes so students have ample time to finish eating.
- Order less food more often so it's easier to manage.
- Inventory foods frequently and move older foods to the front to be used first.
- Always check food deliveries for freshness and store foods at the proper temperatures to extend shelf-life. For example, cucumbers should be stored at 50-55 degrees Fahrenheit while tomatoes can be stored up to 70 degrees Fahrenheit. A great resource for optimal food storage conditions can be found online at the following web address:  
[http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d\\_710.html](http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d_710.html)
- Get students involved in setting a goal to reduce and prevent food waste. Once a week have “Zero Food Waste Day” where students are encouraged to eat everything they’ve selected for lunch. Keep track of progress in reducing food waste by displaying graphs and/or charts in the lunchroom that display accomplishments made every week in reducing the amount of food students throw away.

### Snapshot of Food Waste in Iowa

The IWRC has compiled data from multiple cafeteria waste audits accomplished throughout Iowa at K-12 schools. This data can be found below:

#### Plate Food Waste in K-12 Schools in Iowa Lunch Food Waste 2015 – Present (2017)

School District*	Students Served (per day)	Plate Food Waste Generated Daily (lbs/day)	Plate Food Waste Generated Yearly (lbs [tons]/year)	Plate Food Waste Generated Per Student Per Lunch (lbs/meal)	Food Waste Generated Per Student Per Year (lbs/year)
██████████ CSD	846	239.1	43,038 [22]	0.3	51
██████████ CSD	270	55.6	10,008 [5]	0.2	37
██████████ CSD	1,380	268	48,240 [24]	0.2	35
██████████ CSD	1,200	488.6	87,948 [44]	0.4	73
██████████ Schools	245	132.8	23,904 [12]	0.5	98
██████████ CSD	1,126	311.6	56,088 [28]	0.3	50
██████████ Middle School	256	155.2	27,936 [14]	0.6	109
██████████	672	111.2	20,016 [10]	0.2	30
██████████ CSD	1,075	856	154,080 [77]	0.8	143

CSD = Community School District

\* Names of school districts have been removed pending approval to publish.

### IWRC Assistance

██████ has many options to reduce and divert food waste from the landfill. The IWRC is interested in any strategies and techniques ██████ may implement to reduce and prevent food waste. Please keep us informed if any progress is realized in preventing and reducing food waste.

Schools that are planning on implementing food waste reduction strategies and techniques have the option to join the United States Department of Agriculture's (USDA) Food Waste Challenge or join via participation in the EPA's Food Recovery Challenge. Schools that reduce or divert food waste from landfills are eligible to join and will receive technical assistance to set specific quantitative food waste goals from the U.S. EPA. For more information, visit USDA's website at the following web address:

[https://www.usda.gov/oce/foodwaste/resources/K12\\_schools.html](https://www.usda.gov/oce/foodwaste/resources/K12_schools.html)

Or visit EPA's Food Recovery Challenge webpage at the following web address:

<https://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc>

The IWRC is also seeking residents to track kitchen waste generated in the home. A ToolKit that includes a digital kitchen scale, a reusable lidded soup bowl, a reusable shopping bag, and literature including guides about composting at home, information about tracking food waste in the home, tracking sheets, and a packet of strategies that are easy to implement to help reduce and prevent food waste at home. If you or anyone you know from participating communities is interested in obtaining the ToolKit and providing the IWRC with tracking data, the ToolKit including the scale are yours to keep. Please contact Jenny Trent at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.



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**An Iowa Community School District  
Cafeteria Waste Audit Results  
June 5, 2017**



Food waste is a growing issue with many negative implications including social concerns, environmental consequences, and significant economic effects. Social concerns with food waste can be tied to food insecurity. In Iowa, according to Feeding America 1 in 5 children does not have enough food to eat. Environmentally, food waste in landfills contributes to global climate change as the methane emissions generated from food waste are very efficient at trapping heat in Earth's atmosphere. Economically, food that is never eaten costs the United States economy \$165 billion while \$750 million is spent to landfill food waste according the Natural Resources Defense Council. The U.S. Environmental Protection Agency (EPA) estimates that in the United States alone, 35 million tons of food are tossed each year. Clearly, there are better uses for food that can reduce societal pressures of feeding the hungry, environmental degradation caused by food disposed in landfills, and costs associated with growing food that never gets eaten and ends up in the landfill.

### **School District (CSD) Cafeteria Waste Audit**

The Iowa Waste Reduction Center (IWRC) in collaboration with the Iowa Waste Exchange conducted a cafeteria waste audit at an Iowa Community School District (CSD) from May 1<sup>st</sup> through May 4th, 2017 in southern Iowa. The school district includes four schools: two elementary schools, one middle school, and one high school. Cafeteria waste audits were conducted at each school. The cafeteria waste audit included both food waste from the kitchen as well as student tray waste for both breakfast and lunch. Student tray waste was separated into six main categories and weighed. Categories included the following:

- Food waste
- Recyclables - plastic water bottles, juice cups
- Compostables – napkins, paper boats
- Liquids – milk, juice
- Cold lunch waste
- Trash - milk cartons, chip bags, flexible plastics that are not recyclable

### **CSD Waste Management**

The CSD currently does not recycle. Cardboard, glass, tin, plastic and paper products are disposed in the garbage. Additionally, unopened and uneaten foods and beverages are also tossed in the garbage. During the four day site visit, the CSD food service director stated that a “donation” area would be implemented to reuse leftover and unopened items such as milk, whole fruits, and other items still edible and uneaten.

### **Results of the Cafeteria Waste Audit at the CSD**

#### *Kitchen Prep Waste*

As mentioned above, both kitchen prep waste and student tray waste were measured separately. Kitchen waste is the easiest place to start when implementing initiatives to reduce food waste because only kitchen staff will need to be trained. During the four days that the Iowa Waste Reduction Center conducted waste audits, kitchen prep waste was measured at each of the four

The Iowa Waste Reduction Center and the University of Northern Iowa are equal opportunity employers and providers.

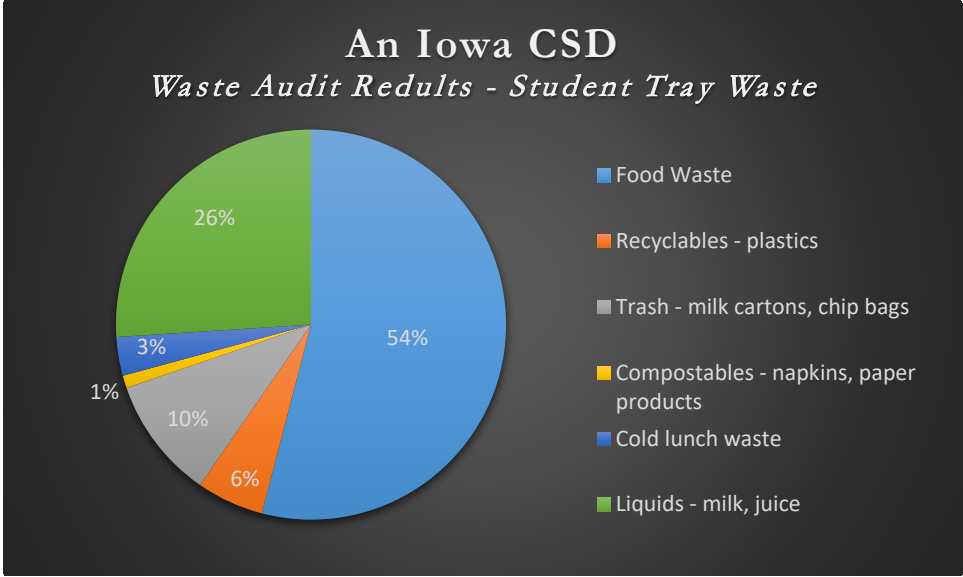
schools. **Total weight of kitchen prep waste on the days of the waste audit was 66.4 pounds.** District-wide, this is the estimate that is wasted per day from the kitchens and includes prep waste and left-over foods that aren't re-served and are disposed in the garbage. Yearly, kitchen food waste can be estimated at 11,952 pounds or 6 tons.

*Student Tray Waste*

During the waste audit, students were required to sort tray waste after eating both breakfast and lunch. The table below provides results of the waste audit and measurements of student tray waste after both breakfast and lunch. Additionally, data from the waste audit has been charted and categories of waste measured can be visualized in the pie chart below.

**An Iowa Community School District  
Cafeteria Waste Audit Results - Student Tray Waste**

Category	High School		Middle School		Elementary		Elementary		Totals Per Day	
	Breakfast Totals	Lunch Totals	Breakfast Totals	Lunch Totals	Breakfast Totals	Lunch Totals	Breakfast Totals	Lunch Totals	Breakfast Totals	Lunch Totals
Number of Students/Meals Served	60	144	59	228	76	224	79	185	274	781
Food Waste	2.4 lbs	58.4 lbs	2.4 lbs	50.2 lbs	4.0 lbs	51.8 lbs	9.0 lbs	50.8 lbs	17.8 lbs	211.2 lbs
Recyclables - plastics	1.4 lbs	3.6 lbs	1.4 lbs	8.2 lbs	1.2 lbs	2.0 lbs	1.6 lbs	4.2 lbs	5.6 lbs	18.0 lbs
Trash - milk cartons, chip bags	1.8 lbs	8.4 lbs	2.8 lbs	6.8 lbs	2.8 lbs	9.2 lbs	2.8 lbs	8.2 lbs	10.2 lbs	32.6 lbs
Compostables - napkins, paper products	0	0	0	1.8 lbs	0.4 lbs	1.4 lbs	0.4 lbs	0.4 lbs	0.8 lbs	3.6 lbs
Cold lunch waste	0	0	0	1.4 lbs	0	5.8 lbs	0	6.4 lbs	0	13.6 lbs
Liquids - milk, juice	3.2 lbs	4.8 lbs	10.2 lbs	14.6 lbs	17.4 lbs	12.8 lbs	21.4 lbs	25.8 lbs	52.2 lbs	58.0 lbs
<b>Total Daily Food Waste = 229 lbs</b>										



**Extrapolation of Waste Audit Data**

By extrapolating food waste data, the CSD can estimate how much is generated yearly and this data will provide the CSD with the opportunity to set reduction goals of food waste generation rates. Additionally, implementing cost-effective, simple reduction strategies and techniques can be analyzed by conducting further waste audits to gauge the effectiveness of these strategies. Techniques and strategies to reduce food waste are recommended further below in this report. Extrapolation of data is listed in the table below and figures have been rounded.

### An Iowa Community School District

Extrapolation of Data – Student Tray Food Waste

Category	Breakfast	Lunch	Total
Food waste generated daily per student	0.06 lbs	0.27 lbs	0.33 lbs
Food waste generated yearly per student	10.8 lbs.	48.6 lbs	59.4 lbs. per year
Food waste generated yearly by The CSD	2,959 lbs. or 1.5 tons	37,956 lbs or 19 tons	40,915 lbs. or 20.5 tons

## **Cost of Disposal**

The community sends waste to the South Central Iowa Solid Waste Agency in Marion County where tipping fees are \$37.00 per ton. Food waste including kitchen waste and student tray waste that is currently landfilled costs \$984 to dispose every year. Preventing and reducing food waste will reduce disposal costs as well as environmental impacts of food waste in landfills. Food waste in landfills generates methane which is 20-25 times more potent than carbon dioxide. Methane is a strong greenhouse gas that contributes to global climate change by trapping heat in Earth's atmosphere. Landfills in the United States are the third largest source of methane generated by humans and accounts for 24 percent of all methane emissions.

Additionally, recycling cardboard, plastic, paper, and tin will help reduce disposal costs. Providing a bucket for students to dump unfinished milk and juice and pouring it down the drain will also help reduce costs associated with disposal. All cafeteria waste measured including items that can be recycled, liquids, trash, and food is estimated to weigh 490 pounds per day or 88,200 pounds or 44 tons yearly. Disposal of all waste generated by the CSD costs approximately \$1,631.70 per school year. Costs for disposal could be spent on recycling rather than landfilling.

There are three local companies in the community that offers recycling services. Please contact any one of the following to inquire about pick-up recycling.

1. Amos Redemption  
641-203-7025
2. Darrah Garbage Disposal  
641-774-5852
3. Waste Management  
Cardboard recycling pick-up only  
641-774-2450

## **Greenhouse Gas Emissions Generated by the CSD**

Greenhouse gases includes carbon dioxide, methane, nitrous oxide, and fluorinated gases. Each gases potency at trapping heat in earth's atmosphere varies. Methane is especially powerful at trapping heat in earth's atmosphere when compared to carbon dioxide and methane is generated by food waste in landfills. The measure, metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) basically expresses each greenhouse gases heat trapping potency compared to the potency of carbon dioxide, thus the term metric tons of carbon dioxide *equivalent*. Therefore, food waste in a landfill (generates methane) will have a higher MTCO<sub>2</sub>E than an activity such as transportation in a car, or burning gasoline in a car because this activity primarily generates carbon dioxide, not methane.

Utilizing the EPA's WARM (Waste Reduction Model) model, food waste from the CSD in the landfill currently generates 15 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) yearly. It

would take 389 tree seedlings grown for ten years to sequester these emissions or it would take 14.2 acres of forest one year to sequester these emissions according to EPA's Greenhouse Gas Equivalencies Calculator. Additionally, 15 MTCO<sub>2</sub>E is equivalent to the following:

- Carbon dioxide emission from 1,688 gallons of gasoline consumed.
- Carbon dioxide emissions from 16,006 pounds of coal burned
- Carbon dioxide emissions from 34.7 barrels of oil consumed
- Greenhouse gas emissions from 35,950 miles driven by an average passenger vehicle

An alternative scenario is composting the food waste generated by the CSD. This would generate -3 MTCO<sub>2</sub>E. The negative number indicates that the compost creates a "sink" or "storage" for greenhouse gases.

### **Strategies and Techniques to Reduce Food Waste**

The CSD landfills 1,145 pounds of food waste weekly. By setting a goal to reduce food waste, the CSD can seek strategies and techniques that would help reach this goal. For example, a food waste reduction goal of 10% would divert 114.5 pounds weekly from the landfill. There are simple, cost-effective strategies that once implemented, can help prevent and reduce food waste.

#### *Donation*

During the cafeteria waste audit at the CSD, unopened servings of milk and juice, fruit, and yogurt were rescued from the garbage during breakfast and lunch. One way to reduce wasted food is to provide a "donation" table for items that have not been opened such as milk, chips, condiment packages, and whole fruits. Use of these food items will help reduce food waste by donating these items to a non-profit agency that feeds the hungry or other students and staff or athletes after school. The Bill Emerson Good Samaritan Food Donation Act provides liability protection to organizations that donate food in good faith to a non-profit agency. A summary of the Bill Emerson Good Samaritan Food Donation Act can be found on the IWRC's website. The following are counts of items that were unopened and uneaten that were rescued from the garbage:

- 43 milks
- 25 juices
- 18 apples
- 43 oranges
- 26 bananas

The CSD has the option to donate left-over edible food to pantries, soup kitchens, and food banks in the local area. Some organizations may even accept prepared foods but may require freezing prior to drop-off or pick-up. Below is a list of organizations that accept food donations. Please contact them to find out exactly what food items they accept and when.

Food Bank of Iowa  
2220 E. 17<sup>th</sup> Street  
Des Moines, IA 50316

Note: The Food Bank of Iowa has a mobile pantry that visits Iowa community from 4:00 – 6:00 at the Iowa community First United Methodist Church at 923 Roland Ave.

South Central Iowa Community Action Program  
117 S Grand  
PO Box 276  
Chariton, IA 50049  
Contact: Jonnica Wertz  
Phone: 641-774-5323  
Email: [lucasco@iowatelecom.net](mailto:lucasco@iowatelecom.net)

Helping Hand  
110 West Main St.  
Knoxville, IA 50138  
Phone: 641-842-6933

Jesus' Right Hand  
413 West Street  
New Virginia, IA 50210  
Phone: 641-449-3377

Iowa community CROP Hunger Walk  
Contact: Jill Naylor  
Phone: 641-774-2131

### *Composting*

If the CSD would like to start a food waste composting project, the IWRC can help with both proper maintenance and technical assistance of composting operations to keep the pile active and can also help comply with Iowa regulations if applicable. If composting the district's food waste on-site, there are no regulatory requirements except proper siting of the composting operation. Alternatively, if the CSD is interested in composting food waste off-site, there are simple regulations to follow if less than two tons of food waste are composted per week. Please contact Jenny Trent at the IWRC if composting food waste is an interest of the district at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.

### *In-School Strategies to Prevent and Reduce Food Waste*

During the cafeteria waste audit, milk and juice waste were measured at 26% of the total waste stream and contribute significantly to the CSD's trash disposal. Providing a donation table for unopened juice and milk will help reduce this amount as will providing a bucket for students to



pour out opened and unfinished milk and juice. This can then be sent down the drain rather than end up in the landfill.

Strategies that will help prevent and reduce food waste within the schools includes the following:

- Analyze the most common foods being thrown away and find a solution to prevent these items from ending up in the trash. For example, a recipe not well received by students can be changed to entice students to eat.
- Repurpose food items into new recipes. For example, stale bread can be turned into croutons or burgers can be turned into chili or soup.
- Schedule recess before lunch to increase appetites and calmness.
- Allow students to help plan the menu and give menu items jazzy names. For example, carrots can be called “X-ray vision carrots,” or call broccoli “Tiny Tasty Treetops.”
- Extend meal times to at least 25 minutes so students have ample time to finish eating.
- Order less food more often so it’s easier to manage.
- Inventory foods frequently and move older foods to the front to be used first.
- Always check food deliveries for freshness and store foods at the proper temperatures to extend shelf-life. For example, cucumbers should be stored at 50-55 degrees Fahrenheit while tomatoes can be stored up to 70 degrees Fahrenheit. A great resource for optimal food storage conditions can be found online at the following web address:  
[http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d\\_710.html](http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d_710.html)
- Get students involved in setting a goal to reduce and prevent food waste. Once a week have “Zero Food Waste Day” where students are encouraged to eat everything they’ve selected for lunch. Keep track of progress in reducing food waste by displaying graphs and/or charts in the lunchroom that showcase accomplishments made every week in reducing the amount of food students throw away.

### **Snapshot of Food Waste in Iowa**

The IWRC has compiled data from multiple cafeteria waste audits accomplished throughout Iowa at K-12 schools. This data can be found in the table at the top of the next page:

**Plate Food Waste in K-12 Schools in Iowa**  
**Lunch Food Waste**  
**2015 – Present (2017)**

School Districts in Iowa*	Students Served (per day)	Plate Food Waste Generated Daily (lbs/day)	Plate Food Waste Generated Yearly (lbs [tons]/year)	Plate Food Waste Generated Per Student Per Lunch (lbs/meal)	Food Waste Generated Per Student Per Year (lbs/year)
CSD	781	211.2	30,016 [19]	0.3	49
CSD	846	239.1	43,038 [22]	0.3	51
CSD	270	55.6	10,008 [5]	0.2	37
CSD	1,380	268	48,240 [24]	0.2	35
CSD	1,200	488.6	87,948 [44]	0.4	73
CSD	245	132.8	23,904 [12]	0.5	98
CSD	1,126	311.6	56,088 [28]	0.3	50
Middle School	256	155.2	27,936 [14]	0.6	109
CSD	1,075	856	154,080 [77]	0.8	143

CSD = Community School District

\* Names of school districts have been removed due to lack of permission to publish results

**IWRC Assistance**

The CSD has many options to reduce and divert food waste from the landfill. The IWRC is interested in any strategies and techniques the CSD may implement to reduce and prevent food waste. Please keep us informed if any progress is realized in preventing and reducing food waste.

Schools that are planning on implementing food waste reduction strategies and techniques have the option to join the United States Department of Agriculture’s (USDA) Food Waste Challenge or join via participation in the EPA’s Food Recovery Challenge. Schools that reduce or divert food waste from landfills are eligible to join and will receive technical assistance to set specific quantitative food waste goals from the U.S. EPA. For more information, visit USDA’s website at the following web address:

[https://www.usda.gov/oce/foodwaste/resources/K12\\_schools.html](https://www.usda.gov/oce/foodwaste/resources/K12_schools.html)

Or visit EPA’s Food Recovery Challenge webpage at the following web address:

<https://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc>

The IWRC is also seeking residents in Iowa to track kitchen waste generated in the home. A ToolKit that includes a digital kitchen scale, a reusable lidded soup bowl, a reusable shopping bag, and literature including guides about composting at home, information about tracking food waste in the home, tracking sheets, and a packet of strategies that are easy to implement to help reduce and prevent food waste at home. If you or anyone you know from Iowa is interested in

obtaining the ToolKit and providing the IWRC with tracking data, the ToolKit including the scale are yours to keep. Please contact Jenny Trent at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.

*This material is based upon work supported under a grant by the Rural Utilities Service, United States Department of Agriculture. Any opinions, findings, and conclusions or recommendations expressed in this material are solely the responsibility of the authors and do not necessarily represent the official views of the Rural Utilities Service.*



# **Nursing Home Waste Audit Report**

## **Northeast Iowa**

### **September 22, 2017**

The name of the participating nursing home has been removed from this report pending approval to publish.



Food waste is a growing issue with many negative implications including social concerns, environmental consequences, and significant economic effects. Social concerns with food waste can be tied to food insecurity. In Iowa, according to Feeding America 1 in 5 children does not have enough food to eat. Environmentally, food waste in landfills contributes to global climate change as the methane emissions generated from food waste are very efficient at trapping heat in Earth's atmosphere. Economically, food that is never eaten costs the United States economy \$165 billion while \$750 million is spent to landfill food waste according the Natural Resources Defense Council. The U.S. Environmental Protection Agency (EPA) estimates that in the United States alone, 35 million tons of food are tossed each year. Clearly, there are better uses for food that can reduce societal pressures of feeding the hungry, environmental degradation caused by food disposed in landfills, and costs associated with growing food that never gets eaten and ends up in the landfill.

████████████████████ in ██████████

The Director of Dietary Services at the ██████████ of ██████████ took advantage of the services provided by the Food Waste Reduction Assistance Project for Iowa Rural Communities and requested a waste audit be conducted at the facility. The ██████████ ██████████ in ██████████ is a nursing home that has 54 residents. Residents are served breakfast, lunch, and dinner 365 days a year. A comprehensive waste audit was conducted on August 11, 2017 and included kitchen waste (both prep waste and food thrown away that has expired or met the policy of one reheat), and post-consumer food waste for breakfast, lunch, and dinner.

### **Food Management Practices**

Currently, the ██████████ recycles grease, metal, cardboard, and plastic. Strategies are already in place to reduce food waste at the facility as well. Foods are repurposed into new recipes. In an interview with the daily cook, it was noted that fresh fruits such as left-over blueberries are mixed into muffins or pancakes or put on top of desserts the following day. Left-over meats are cooked into soups and stews while left-over baked potatoes are made into French fries the following day. Additionally, the daily cook noted that a cognizant effort is made to prevent food waste by preparing just enough food so not much is left-over after each meal. Also noted during the on-site assistance was a sign on the walk-in cooler that provided instructions detailing a "first-in, first-out" policy. The sign stated, "Left over cold food will be covered in a storage container, labeled, dated, and stored immediately following meal service. Left over hot food will be cooled to 41 degrees. FIFO, First – In – First – Out." This sign provides guidance to prevent food waste by utilizing older foods first.

### **Waste Audit Results**

During the waste audit at the ██████████, both kitchen food waste and post-consumer food waste were measured as were recyclables including metal and plastics. On the day of the waste audit, kitchen waste included vegetable trimmings, and left-over prepared foods that had already met the one time re-heat policy. Additionally, post-consumer food waste was measured for breakfast, lunch, and dinner. Plastic and metal that is recycled was also measured and was predominately made up of gallon size beverage containers and metal cans. The Director

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of Dietary Services was not interested in measuring compostables because cloth napkins are used rather than paper napkins and trash was also not measured because of low volume. **Metals weighed 10 pounds while plastics weighed 1.4 pounds** and both are recycled. Most of the waste from the facility that is disposed in the landfill is food waste. The following table displays results of the measured food waste.

<b>Waste Audit Results</b>					
<b>August, 2017</b>					
<b>Item</b>	<b>Kitchen Waste</b>	<b>Breakfast</b>	<b>Lunch</b>	<b>Dinner</b>	<b>Daily Total</b>
<b>Food Waste</b>	17.6 pounds	1.4 pounds	9.2 pounds	9.8 pounds	38 pounds

### **Extrapolation of Waste Audit Data**

By extrapolating food waste data, the [REDACTED] can estimate how much is generated yearly and this data will provide the facility with the opportunity to set reduction goals. Additionally, implementing cost-effective, simple reduction strategies and techniques can be analyzed by conducting further waste audits to gauge the effectiveness of these strategies. Techniques and strategies to reduce food waste are recommended further below in this report. Extrapolation of data is listed in the table below and figures have been rounded.

<b>Category</b>	<b>Kitchen waste</b>	<b>Breakfast</b>	<b>Lunch</b>	<b>Dinner</b>	<b>Total</b>
<b>Food waste generated daily per resident</b>	n/a	0.03 lbs.	0.2 lbs.	0.2 lbs.	0.4 lbs.
<b>Food waste generated yearly per resident</b>	n/a	10 lbs.	62 lbs.	66 lbs.	138 lbs.
<b>Food waste generated yearly by the Good Samaritan Society</b>	6,424 pounds or 3 tons	511 lbs.	3,358 lbs. or 2 tons	3,577 lbs. or 2 tons	13,870 lbs. or 7 tons

### **Cost of Disposal**

Trash from the City of [REDACTED] ends up at the Winneshiek County Landfill where tipping fees are \$67.00 per ton. Food waste from the [REDACTED] that is currently landfilled costs \$470 to dispose every year. Preventing and reducing food waste will reduce disposal costs as well as environmental impacts associated with food waste in landfills. Food waste in landfills

generates methane, which is 20-25 more potent than carbon dioxide. Methane is a strong greenhouse gas that contributes to global climate change by trapping heat in Earth's atmosphere. Landfills in the United States are the second largest source of industrial methane and accounts for 20 percent of methane emissions in 2014 according to the U.S. Environmental Protection Agency.

## **Greenhouse Gas Emissions Generated by [REDACTED] in [REDACTED]**

Utilizing the EPA's WARM (Waste Reduction Model) model, food waste from the [REDACTED] [REDACTED] in the landfill currently generates five metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) yearly. **It would take 130 tree seedlings grown for ten years to sequester these emissions yearly or it would take 5.9 acres of forest one year to sequester these emissions** according to EPA's Greenhouse Gas Equivalencies Calculator. Additionally, five MTCO<sub>2</sub>E is equivalent to the following:

- Greenhouse gas emissions from 12,255 miles driven by an average passenger vehicle
- One average passenger vehicle driven for one year
- CO<sub>2</sub> emissions from 563 gallons of gasoline consumed
- CO<sub>2</sub> emissions from 5,470 pounds of coal burned
- CO<sub>2</sub> emissions from 11.6 barrels of oil consumed
- CO<sub>2</sub> emissions from 204 propane cylinders used for home barbeques

## **Strategies and Techniques to Reduce Food Waste**

The [REDACTED] landfills 267 pounds of food waste weekly. By setting a goal to reduce food waste, the [REDACTED] can seek strategies and techniques that would help reach this goal. For example, a food waste reduction goal of 20% would divert 53 pounds weekly from the landfill. There are simple, cost-effective strategies that once implemented, can help prevent and reduce food waste.

### *Feeding Animals*

Feeding animals is a great practice to keep food waste out of the landfill. [REDACTED] Community School District has forged a partnership with a local farmer who picks up the school's pre-consumer fruit and vegetable trimmings to feed animals. The school is able to divert more than 140 pounds of food waste daily through this partnership. If the [REDACTED] is interested in finding out more or obtaining contact information for the farmer, please contact [REDACTED], the school's Food Service Manager.

### *Donation*

Donating excess left-over food is a great option to reduce food waste at the facility. The Bill Emerson Good Samaritan Food Donation Act provides liability protection to organizations that donate food in good faith to a non-profit agency. A summary of the Bill Emerson Good Samaritan Food Donation Act can be found on the IWRC's website.

The [REDACTED] may have the option to donate left-over edible food to pantries, soup kitchens, and food banks in the local area. Some organizations may even accept prepared foods but may require freezing prior to drop-off or pick-up. Below is a list of organizations that accept food donations. Please contact them to find out exactly what food items they accept.

#### Community Support

Phone: 563-605-1313

Note: Open Tuesdays from 2:00-5:00

#### Northeast Iowa Community Action

Phone: 563-864-3363

Note: Open Thursdays and Fridays 8:00-11:30

#### Clayton County Food Shelf

100 W, Hill Street

St. Olaf, IA 52072

Phone: 563-783-7794

#### Allamakee County Food Shelf

1125 W. Main Lot 39

Waukon, IA 52172

Phone: 563-568-4992

Note: Open Thursday from 9:00-1:00

#### *Composting*

If the [REDACTED] would like to start a food waste composting project, the IWRC can help with both proper maintenance and technical assistance of composting operations to keep the pile active and can also help with Iowa regulations. If composting food waste on-site, there are no requirements except proper siting of the composting operation. Alternatively, if the facility is interested in composting food waste off-site, there are simple regulations to follow if less than two tons of food waste are composted per week. A summary of this regulation, called the Permit-by-Rule, can be found on the IWRC's website. Please contact Jenny Trent at the IWRC if composting food waste is an interest of the district at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.

#### *Strategies to Prevent and Reduce Food Waste*

There are many simple, cost-effective techniques and strategies to help prevent and reduce food waste at the institutional level. Additionally, preventing and reducing food waste may save money. These strategies are listed below:

- Repurpose more foods into new recipes.
- Increase the variety of foods residents can select.



- Offer various meal sizes to match residents' appetites.
- Rather than pre-plating foods, allow residents to select foods after viewing the options available to them and add touches that make foods look appealing.
- Minimize overproduction of foods.
- Allow residents to help plan the menu and possibly help prepare the foods.
- Order less food more often to reduce spoilage and inspect all food deliveries for freshness
- Achieve optimal shelf life by storing foods properly. A good resource to optimal food storage conditions can be found at the following link offered by [www.engineeringtoolbox.com](http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d_710.html): [http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d\\_710.html](http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d_710.html)

### *Tracking Pre-consumer Food Waste*

Tracking and recording pre-consumer food waste generated in the kitchen is a technique that will provide insight into reasons for disposal and simple solutions to prevent and reduce waste. This type of food waste is made up of fruit and vegetable trimmings, foods that have spoiled or expired, and left-over prepared foods that are disposed in the trash.

Start by purchasing a small luggage or fish scale. These are relatively inexpensive and can be purchased for \$7 - \$20. Set up a tracking station near the garbage can where foods are thrown away. The tracking station will include the scale, a bucket with a handle, and tracking sheets to record the information. Next you will need to train staff on the method of tracking, how to weight the foods (taring the bucket weight) and use the scale, and the information that needs to be recorded. When foods are going to be disposed in the garbage, require staff to weigh the food and record the reason for disposal, the weight of the food, date of disposal, and the person's name. Continue to track pre-consumer food waste for a couple weeks to a few months.

Once every week or two weeks, analyze the top disposed items and the reasons for disposal with all staff that work in the kitchen. Brainstorm simple ways to reduce or prevent the waste. Sometimes it's as simple as changing a recipe that's not well received, preparing less food, or ordering foods more frequently so that maintaining freshness is easier. Involving staff creates awareness and interest into preventing and reducing food waste.

### **IWRC Assistance**

The Iowa Waste Reduction Center is interested in efforts made by the [REDACTED] in preventing and reducing food waste. Please keep us informed if any progress is realized in preventing and reducing food waste. A brochure has been created by the IWRC specifically for this project and can be viewed and/or shared. This brochure can be found on the IWRC's website. If the [REDACTED] would like additional assistance to prevent and reduce food waste, please contact Jenny Trent at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or (319) 273-6584.

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**Waste Audit Results**  
**Community School District**  
**Southern Iowa**

The name of the K-12 school district has been removed due to lack of permission to publish report.

WASTE AUDIT REPORT – SEPTEMBER 2017  
JENNIFER TRENT

Food waste is a growing issue with many negative implications including social concerns, environmental consequences, and significant economic effects. Social concerns with food waste can be tied to food insecurity. In Iowa, according to Feeding America 1 in 5 children does not have enough food to eat. Environmentally, food waste in landfills contributes to global climate change as the methane emissions generated from food waste are very efficient at trapping heat in Earth's atmosphere. Economically, food that is never eaten costs the United States economy \$165 billion while \$750 million is spent to landfill food waste according the Natural Resources Defense Council. The U.S. Environmental Protection Agency (EPA) estimates that in the United States alone, 35 million tons of food are tossed each year. Clearly, there are better uses for food that can reduce societal pressures of feeding the hungry, environmental degradation caused by food disposed in landfills, and costs associated with growing food that never gets eaten and ends up in the landfill.

### **Community School District (CSD) Cafeteria Waste Audit**

The Iowa Waste Reduction Center (IWRC) in collaboration with the Iowa Waste Exchange conducted a cafeteria waste audit at [REDACTED] from December 6-8, 2017 in southern, Iowa. The school district includes three schools: one elementary school, one middle school, and one high school. Cafeteria waste audits were conducted at each school. The cafeteria waste audit included both food waste from the kitchen as well as student tray waste for lunch. Waste was separated into eight main categories and weighed. Categories included the following:

- Food prep waste
- Post-consumer waste
- Recyclables - plastic water bottles, juice cups
- Compostables – napkins, paper boats
- Beverage containers
- Liquids – milk, juice
- Cold lunch waste
- Trash - milk cartons, chip bags, flexible plastics that are not recyclable

An additional meeting with the school district was held September 11, 2017 to discuss diversion of food waste through composting. The purpose of the meeting was to discuss options for composting the school's food waste off-site with a partnership between the city and the school district. The plan is to utilize the city's yard waste composting site as the location for composting the school district's food waste. The main benefit of the location is the reliable carbon source of yard waste to aid in food waste composting. If the school moves forward with this plan, there are regulations that apply. More information about composting is further down in this report.

The Iowa Waste Reduction Center and the University of Northern Iowa are equal opportunity employers and providers.

## Results of the Waste Sorts

Food is prepared for the elementary and middle school in one kitchen located at the elementary and middle school building while food for high school students is prepared at the high school. Below are the results from the waste sort and a chart displaying percentages of waste in each category.

### Waste Sort Results

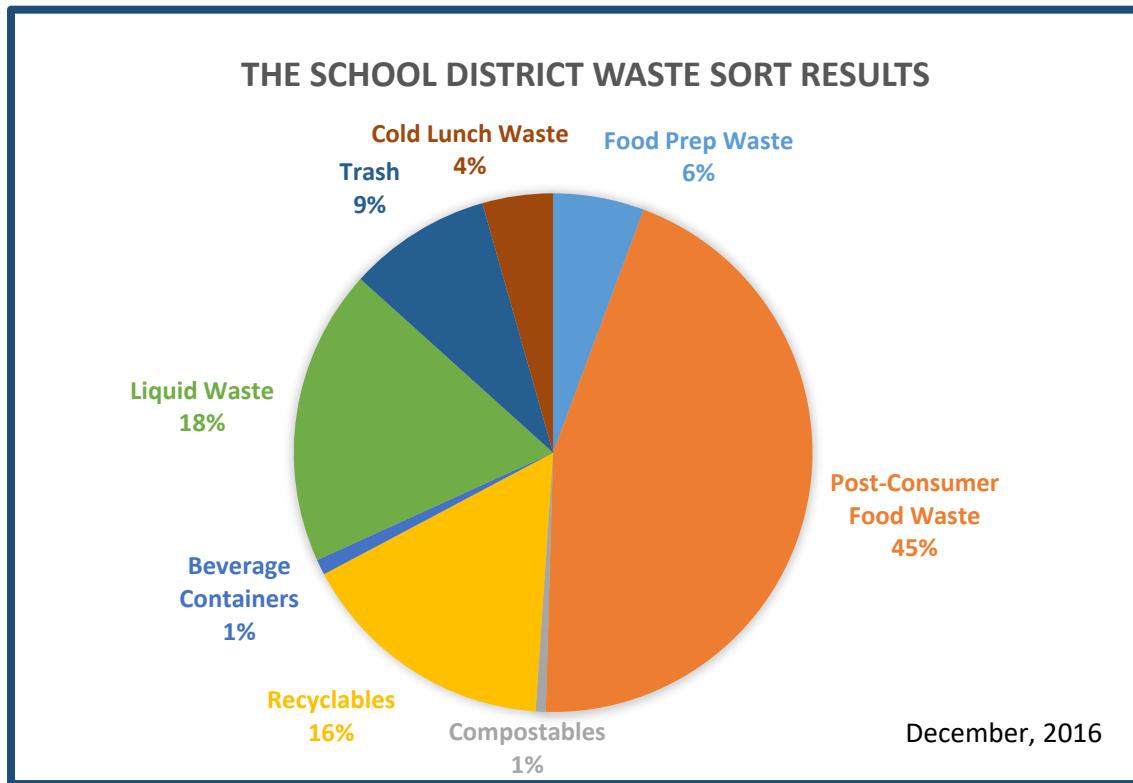
#### *Post-Consumer Waste Audit Results*

Students from the school district generate an average of 239.13 pounds of food waste daily for **845 lunches served**. This food waste has traditionally been sent to the landfill. Extrapolating the data, **the school district generates 43,043 pounds or 21.5 tons** of post-consumer food waste yearly. Further analyses of the data indicates that **each student wastes an average of 0.28 pounds of food waste during lunch daily and 51 pounds of food waste yearly**.

#### *Kitchen Waste Audit Results*

Kitchen waste includes fruit and vegetable trimmings, prepared foods, and expired foods. The daily average of kitchen waste for the district is 30.33 pounds. Extrapolation of the data suggests the district throws away 5,459 pounds or 2.7 tons of kitchen food waste yearly.

<b>██████████ School District</b>			
<b>Waste Audit Results for Lunch – Dec. 2016</b>			
<b>Category</b>	<b>Elementary and Middle Schools</b>	<b>High School</b>	<b>District Total</b>
<b>Food Prep Waste</b>	25.33 lbs.	5 lbs.	30.33 lbs.
<b>Post-Consumer Waste</b>	170.63 lbs.	68.5 lbs.	239.13 lbs.
<b>Compostables</b>	2.17 lbs.	1.17 lbs.	3.34 lbs.
<b>Recyclables</b>	59.5 lbs.	26.83 lbs.	86.33 lbs.
<b>Beverage Containers</b>	3.33 lbs.	1.83 lbs.	5.16 lbs.
<b>Liquid Waste</b>	85 lbs.	13.67 lbs.	98.67 lbs.
<b>Trash</b>	36.67 lbs.	11 lbs.	47.67 lbs.
<b>Cold Lunch Waste</b>	22.17 lbs.	1.33 lbs.	23.5 lbs.
<b>Total</b>	404.8 lbs.	129.33 lbs.	534.13 lbs.



### Cost of Disposal

The cost to dispose food waste generated by the district in the Ottumwa Wapello County Landfill is \$57 per ton. At this rate, both post-consumer and kitchen food waste the school district's food waste costs, \$1,225.50 yearly. Successful efforts to prevent and reduce food waste will reduce costs associated with disposal.

### Greenhouse Gas Emissions Generated by Food Waste in Landfills

Greenhouse gases includes carbon dioxide, methane, nitrous oxide, and fluorinated gases. Each gases potency at trapping heat in earth's atmosphere varies. Methane is especially powerful at trapping heat in earth's atmosphere when compared to carbon dioxide and methane is generated by food waste in landfills. The measure, metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) basically expresses each greenhouse gases heat trapping potency compared to the potency of carbon dioxide, thus the term metric tons of carbon dioxide *equivalent*.

Utilizing the EPA's WARM (Waste Reduction Model) model, both kitchen food waste and post-consumer food waste from the school district in the landfill generates 13 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) yearly. It would take 337 tree seedlings grown for ten years to sequester these emissions or it would take 15.3 acres of forest one year to sequester these emissions according to EPA's Greenhouse Gas Equivalencies Calculator. Additionally, 13 MTCO<sub>2</sub>E is equivalent to the following:

- Carbon dioxide emission from 1,463 gallons of gasoline consumed.
- Carbon dioxide emissions from 14,223 pounds of coal burned

- Carbon dioxide emissions from 30.1 barrels of oil consumed
- Greenhouse gas emissions from 31,863 miles driven by an average passenger vehicle

An alternative scenario is composting the food waste generated by the school district. Methane is generated by food waste in landfills under anaerobic conditions. Composting, on the other hand is done under aerobic conditions and this process generates carbon dioxide. Both are considered greenhouse gases, however carbon dioxide is far less potent than methane at trapping heat in Earth's atmosphere.

### **Strategies and Techniques to Reduce Food Waste**

The school district landfills 1,347 pounds of food waste weekly. By setting a goal to reduce food waste, the district can seek strategies and techniques that would help reach this goal. For example, a food waste reduction goal of 10% would divert 134.73 pounds weekly from the landfill. There are simple, cost-effective strategies that once implemented, can help prevent and reduce food waste but can also help feed hungry people, reduce greenhouse gases, and save money.

#### *Food Donation*

The Bill Emerson Good Samaritan Food Donation Act provides liability protection to organizations that donate food in good faith to a non-profit agency. A summary of the Bill Emerson Good Samaritan Food Donation Act can be found on the IWRC's website.

Excess edible food can be donated locally to reduce food waste in the schools while easing hunger in the community. Additionally, left-over edible foods can be shared with students and staff. For more information about the types of food donations accepted, please contact each entity directly.

#### **Davis County Lord's Cupboard**

107 N Davis St.  
Bloomfield, IA 52537  
Phone: 641-664-2487

#### **Food Bank of Southern Iowa**

705 West main St.  
Ottumwa, IA 52501  
Phone: 641-682-3403

#### *Composting*

Composting the district's food waste off-site has some regulatory requirements that must be met. The delegating authority for Iowa regulations association with organics composting is the Iowa Department of Natural Resources and the contact for organics composting is Susan Johnson who can be reached at (515) 725-8317 or susan.johnson@dnr.iowa.gov. The school district has forged a partnership with the city to begin composting the school district's food waste off-site at the city's yard waste composting site which has a reliable source of carbon.

Currently, the school district will be utilizing a regulatory exemption from permitting called the permit-by-rule. Although no permit will be required, the district must still comply with requirements under the permit-by-rule. A summary of the permit-by-rule requirements can be found on the IWRC's website. Below is a brief listing of permit-by-rule requirements.

- Food waste must weigh less than two tons per week.
- The Iowa DNR must be notified in writing prior to commencing operation of food waste composting.
- The composting site must have permanent signage.
- An annual report must be submitted to the Iowa DNR by July 31<sup>st</sup>.
- The site must be selected based on requirements listed in the regulation.
- Nuisance laws always apply

Food waste composting is an art and a science. The school district and the city will need to properly manage the composting operation to keep the pile active. The success of food waste composting depends on many variables. Moisture, air, temperature, types of feedstocks, carbon to nitrogen ratios, and bulk density are all very important considerations. Jenny Trent at the Iowa Waste Reduction Center can provide assistance with both regulatory compliance and the technical aspects of proper maintenance of food waste composting operations. Please contact Jenny if assistance is needed at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or (319) 273-6584.

- Moisture test – To check if the compost pile has enough moisture, grab a handful of compost and squeeze it. If the water pours out of the compost in a stream, the compost is too wet. If the compost feels dry and no water can be squeezed out, you need to water the compost. If a trickle, but not a stream of water is squeezed out, the compost is probably moist enough. Moisture should be between 40% - 60%.
- Aeration – A big myth about composting is that stirring the compost provides adequate aeration. While it's true that stirring compost will add oxygen to the pile, the oxygen quickly dissipates and does not remain in the pile. Aeration is provided by having the correct particle sized materials in the pile. If the pile is mostly very fine particles, you will be lacking in oxygen and can have odor issues and compaction problems. A mix of coarse material such as wood chips, and fine material such as sawdust at correct ratios will provide air spaces within the pile so food waste can easily break down.
- Temperature – The temperature of the compost pile will fluctuate as it matures. The hottest temperatures are achieved when fresh nitrogen is introduced into the pile. Reaching temperatures between 131° and 170° Fahrenheit for three consecutive days will kill weed seeds and pathogens.
- Mixing – Mixing is an important part of composting and helps redistribute materials and fluff materials up. Mixing will help pull the cooler outside material into the middle of the pile where heat is generally greater so that breakdown is evenly achieved.
- C:N Ratio - The ideal carbon to nitrogen ratio for composting is 25-30:1. Each feedstock has its own carbon to nitrogen ratio. When combining feedstocks, you will need to estimate how much carbon is needed to maintain this ratio. For example, wood chips have a carbon to nitrogen ratio of 500:1 while food waste has a carbon to nitrogen ratio of

20:1. So, when adding wood chips to food waste, you will need to know how much to add to maintain the 30:1 ratio. To calculate the C:N ratio of combined feedstocks, follow this simple equations.

$$\frac{(\text{carbon value of feedstock A} \times \text{weight of feedstock A}) + (\text{carbon value of feedstock B} \times \text{weight of feedstock B})}{(\text{weight of feedstock A} + \text{weight of feedstock B})}$$

If you have the following:

Feedstock A = Food waste at 2000 pounds (c:n ratio 20:1)

Feedstock B = Wood chips at 50 pounds (c:n ratio 400:1)

$$\frac{(20 \times 2000) + (400 \times 50)}{2000 + 50}$$

$$\frac{40,000 + 20,000}{2050}$$

C:N ratio of wood chips and food waste = 29:1

- Bulk density – Bulk density is a measure of pore spaces within the compost pile. Bulk density is easily measured using a luggage or fish scale, a handled 5-gallon bucket, and water. The ideal bulk density range is 800-1000 lbs./yd<sup>3</sup>. Once below 800 lbs./cubic yard, the pile may not heat up or hold heat and this indicates you have too much porosity and particles that are too big in the pile. Bulk density measurements above 1000 lbs./cubic yard indicates a lack of aeration and possible compaction and could cause odor issues and/or temperatures that are too hot and could cause fires. Directions to measure bulk density can be found on the United States Composting Council's website at the following link: <http://compostingcouncil.org/wp/wp-content/uploads/2015/09/7-Moisture-Bulk-Density-Field-Exercise-2015.pdf>

### *In-School Strategies to Prevent and Reduce Food Waste*

Strategies that will help prevent and reduce food waste within the schools includes the following:

- Analyze the most common foods being thrown away and find a solution to prevent these items from ending up in the trash. For example, a recipe not well received by students can be changed to entice students to eat.
- Repurpose food items into new recipes. For example, stale bread can be turned into croutons or burgers can be turned into chili or soup.
- Schedule recess before lunch to increase appetites and calmness.
- Allow students to help plan the menu and give menu items jazzy names. For example, carrots can be called "X-ray vision carrots," or call broccoli "Tiny Tasty Treetops."
- Extend meal times to at least 25 minutes so students have ample time to finish eating.
- Order less food more often so it's easier to manage.
- Inventory foods frequently and move older foods to the front to be used first.
- Always check food deliveries for freshness and store foods at the proper temperatures to extend shelf-life. For example, cucumbers should be stored at 50-55 degrees Fahrenheit



while tomatoes can be stored up to 70 degrees Fahrenheit. A great resource for optimal food storage conditions can be found online at the following web address:

[http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d\\_710.html](http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d_710.html)

- Get students involved in setting a goal to reduce and prevent food waste. Once a week have “Zero Food Waste Day” where students are encouraged to eat everything they’ve selected for lunch. Keep track of progress in reducing food waste by displaying graphs and/or charts in the lunchroom that showcase accomplishments made every week in reducing the amount of food students throw away.

### **IWRC Assistance**

The school district has many options to reduce and divert food waste from the landfill. The IWRC is interested in any strategies and techniques the school district may implement to reduce and prevent food waste. Please keep us informed if any progress is realized in preventing and reducing food waste.

Schools that are planning on implementing food waste reduction strategies and techniques have the option to join the United States Department of Agriculture’s (USDA) Food Waste Challenge or join via participation in the EPA’s Food Recovery Challenge. Schools that reduce or divert food waste from landfills are eligible to join and will receive technical assistance to set specific quantitative food waste goals from the U.S. EPA. For more information, visit USDA’s website at the following web address:

[https://www.usda.gov/oce/foodwaste/resources/K12\\_schools.html](https://www.usda.gov/oce/foodwaste/resources/K12_schools.html)

Or visit EPA’s Food Recovery Challenge webpage at the following web address:

<https://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc>

Please contact Jenny if additional assistance is needed at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or (319) 273-6584.

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**University Commons**

**Waste Audit Report**

**Southern Iowa**

**November 7, 2017**

The name of the participating university has been removed throughout this report due to a lack of permission to publish.

Food waste is a growing issue with many negative implications including social concerns, environmental consequences, and significant economic effects. Social concerns with food waste can be tied to food insecurity. In Iowa, according to Feeding America 1 in 5 children does not have enough food to eat. Environmentally, food waste in landfills contributes to greenhouse gas production and the methane emissions generated from food waste are very efficient at trapping heat in Earth's atmosphere. Economically, food that is never eaten costs the United States economy \$165 billion while \$750 million is spent to landfill food waste according to the Natural Resources Defense Council. The U.S. Environmental Protection Agency (EPA) estimates that in the United States alone, 35 million tons of food are tossed each year. Clearly, there are better uses for food that can reduce societal pressures of feeding the hungry, environmental degradation caused by food disposed in landfills, and costs associated with growing food that never gets eaten and ends up in the landfill.

Available data that details food waste generation rates nationally at colleges and universities is extremely limited. A 2002 report prepared for the Massachusetts Department of Environmental Protection by Draper and Lennon, Inc. details food waste generation rates at institutions, commercial entities, and industries in Massachusetts including colleges and universities. The report is titled, "Identification, Characterization, and Mapping of Food Waste and Food Waste Generators in Massachusetts and can be found as **Attachment A**. Additionally, BSR prepared a report in 2012 for the Grocery Manufacturers Association and the Food Marketing Institute and states that residential universities serve an average of 405 meals per student every year and food waste accounts for 0.35 pounds per student per meal served. Extrapolated data indicates residential universities generate 1,598,940,000 pounds or 799,470 tons of food waste nationally per year. Delving further into non-residential community colleges, the amount of food waste is the same per student per meal, 0.35 pounds, however at non-residential community colleges, only 180 meals are served per student per year and these smaller institutions generate 253,108,800 pounds or 126,554 tons of food waste nationally per year. Yearly, each residential university student tosses 142 pounds of food waste while non-residential community college students toss 63 pounds.

### **The University Waste Audit Results**

The champion for the city and sustainability coordinator for the university, set up a waste audit through the Iowa Rural Communities Food Waste Reduction Project.

A waste audit was conducted on October 25, 2017 at the university's student dining center, the commons. Post-consumer food waste from students' plates was measured along with beverages and compostables. Food waste from the kitchen was also measured. Kitchen waste was separated into two categories; prepared foods that got tossed after each meal, and fruit and vegetable trimmings. The dining center has a hot line during meal times which closes in-between meals and much of the food left-over at the end of the meal is tossed in the garbage. A cold line remains open all day for continuous dining until 9:00 pm. All food is self-served as are beverages. The dining center does not use trays but plates, bowls, and cups instead.

The Iowa Waste Reduction Center and the University of Northern Iowa are equal opportunity employers and providers.

Additionally, condiments are dispensed into compostable paper cups out of large pump-style containers.

The waste audit began at 6:00 am and concluded at 8:15 pm. Tables were set up for students to place plates, bowls, and cups after dining. Items left-over after dining were sorted by Jenny Trent from the Iowa Waste Reduction Center (IWRC), the university’s sustainability coordinator, and several students who volunteered to assist. Items were sorted into correct bins and included food waste, liquids, and paper products like napkins and condiment cups. Very little, if any plastic is used in the dining center as part of meals so recyclables were not measured. Very little trash was also generated as a result of dining and was not measured. At the end of each meal, prepared foods from the hot line are thrown in the garbage. Prior to disposal, prepared foods after each meal were weighed also. Results of the waste audit at the university can be seen in the tables below. The first table depicts post-consumer waste from students’ plates after dining while the second table displays pre-consumer food waste from the kitchen.

The University Commons  
Post-Consumer Food Waste  
October 25, 2017

<b>Meal</b>	<b>Post-Consumer Food Waste</b>	<b>Compostables</b>	<b>Liquid Waste</b>	<b>Number of Students Served</b>
Breakfast	9.8 lbs.	too light to weigh	12 lbs.	89
Lunch	58.4 lbs.	too light to weigh	52 lbs.	327
Dinner	72 lbs.	too light to weigh	66 lbs.	395
<b>Daily Total</b>	<b>140.2 lbs.</b>	<b>8.8 lbs.</b>	<b>130 lbs.</b>	<b>811 students</b>

The University Commons  
Pre-Consumer Kitchen Food Waste  
October 25, 2017

Meal	Prep Waste - Trimmings	Prepared Foods
Breakfast	18.2 lbs.(trimmings)	3.4 lbs.
Lunch	0.8 lbs. (egg shells)	22.8 lbs.
Dinner	2.2 lbs. (coffee grounds) 8.4 lbs. (left-over liquid coffee)	58.5 lbs.
<b>Daily Total</b>	<b>29.6 lbs.</b>	<b>84.7 lbs.</b>

*Extrapolating the Data – Post-Consumer Food Waste*

Daily, students and staff that dine at the university toss an average of 140 pounds of food waste from the commons. The university’s commons is also open on weekends to cater to students that live on campus. Extrapolating the data, **27,479 pounds or 14 tons of post-consumer food waste is tossed yearly** (two semesters totaling 196 days including weekends) from the commons at the university.

Further exploring the data, **students at the university generate an average of 0.17 pounds of food waste per day**, which is far below the national average of 0.35 pounds per day. **Yearly, each student tosses an average of 33.3 pounds per school year.**

*Extrapolating the Data – Pre-Consumer Kitchen Food Waste*

Food waste from the kitchen was also measured during the waste audit. Fruit and vegetable trimmings, expired food, and prepared foods that were tossed during the day were all measured. Since the dining center is self-served, most prepared foods that remain after each meal are thrown in the garbage.

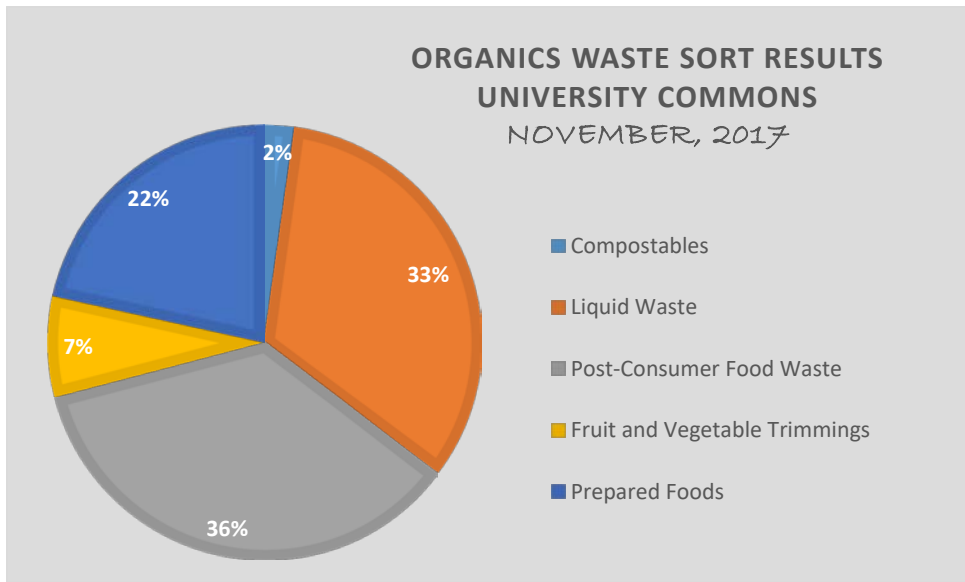
While 29.6 pounds of food waste was from peeling and trimming fruit and vegetables, another 84.7 pounds of food waste consisted of left-over edible foods from both the hot line and cold lines at the end of breakfast, lunch, and dinner. Extrapolating the data, it is estimated that prepared foods that are thrown away exceeds 16,600 pounds per year (two semesters totaling 196 days) or 8 tons. Fruit and vegetable trimmings generated yearly in the common’s kitchen equals approximately 5,800 pounds or nearly three tons.

*Extrapolating the Data – All Waste*

Combining all the food waste generated at the commons at the university including food waste from students’ trays and both prepared foods and fruit and vegetable trimmings that are tossed, it

can be estimated that the commons at the university generates 251.5 pounds daily or 49,294 pounds yearly, which equals about 25 tons.

Compostables and liquid waste was also measured during the waste audit. All waste measured is organic waste and can be composted. All waste measured including compostables, liquids, and pre and post-consumer food waste weighed 393 pounds on the day of the audit. When extrapolated, 77,087 pounds or 38.5 tons of organic waste from the commons is landfilled. Below is a chart that displays percentages of each waste stream that was measured.



### Cost of Disposal

Yearly, all measured organic waste generated by the university's commons equals an average of 393 pounds daily including compostable paper products, liquids, and both pre and post-consumer food waste. Yearly, that figure jumps to 77,087 pounds or 38.5 tons. Trash from the university ends up at the Wayne Ringgold Decatur Sanitary Landfill. Tipping fees are \$58.50 per ton at the landfill where the university's trash ends up. Yearly the cost to dispose organic waste generated by the commons equals \$2,223.

### Greenhouse Gas Emissions

Both pre and post-consumer food waste generated at the commons at the university equals approximately 25 tons per school year. Utilizing the Environmental Protection Agency's (EPA) WARM (Waste Reduction Model) model, food waste from the university's commons that ends up in the landfill generates fourteen metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) yearly. It would take 363 tree seedlings grown for ten years to sequester these emissions or it would take 16.5 acres of forest one year to sequester these emissions according to EPA's Greenhouse Gas Equivalencies Calculator. Additionally, fourteen MTCO<sub>2</sub>E is equivalent to the following:

- Carbon dioxide emission from 1,575 gallons of gasoline consumed.
- Carbon dioxide emissions from 15,317 pounds of coal burned
- Carbon dioxide emissions from 32.4 barrels of oil consumed
- Carbon dioxide emissions from 572 propane cylinders used for home grilling
- Greenhouse gas emissions from 34,314 miles driven by an average passenger vehicle
- Greenhouse gas emissions from 3 passenger vehicles driven for one year

### **Strategies and Techniques to Prevent and Reduce Food Waste**

According to the U.S. Census Bureau (American Community Survey 2015 5-year estimates) 23% of residents in the city are living in poverty while the median household income is \$32,277, which is 61% lower than Iowa's median household income. Much of the food waste that is tossed at the university is edible food that can be donated.

#### *Donation*

During the waste audit at the university, most of the hot line prepared foods that were still edible were tossed in the garbage. To help combat hunger in the community, reduce disposal costs, and lower greenhouse gases generated by food waste in the landfill, donation is an option to use left-over edible food. One method that works at another institution in Iowa is to purchase a refrigerator for foods that are still edible and keep edible foods in the refrigerator for staff and/or students to help themselves. Similarly, a restaurant in India put an outdoor refrigerator outside the restaurant and filled it with left-over edible foods that are free to local people struggling with food insecurity.

The Food Bank of Iowa covers more than 40 counties in Iowa to help feed food insecure people including those in Decatur County. Located in Des Moines, the Food Bank of Iowa accepts donations and may be able to help find donation opportunities in the local area. For more information, contact the Food Bank of Iowa at (515) 564-0330. Additionally, there are some organizations in the local area that may accept food donations and these are listed below. Finally, the Bill Emerson Good Samaritan Food Donation Act provides liability protection to organizations that donate food in good faith to a non-profit agency that gives the food away. A summary of the Bill Emerson Good Samaritan Food Donation Act can be found on the IWRC's website.

#### **Funshine Center**

Phone: (641)784-7505

#### **The Local Food Pantry**

Phone: (641) 784-4762

#### **Blessed Oaks Youth Christian Center**

200 W Main

Kellerton, IA 50133

Phone: (641) 414-5243

## **Humeston Senior Meal Site**

Community Center

N Eaton Ave

Humeston IA 50123

Phone: (641)877-9521

### *Composting*

If the university would like to start a food waste composting project, the IWRC can help with both proper maintenance and technical assistance of composting operations to keep the pile active and can also help with Iowa regulations. If composting the university's food waste on-site, there are no requirements except proper siting of the composting operation and making sure nuisance laws are followed. Alternatively, if the university is interested in composting food waste off-site, there are simple regulations to follow if less than two tons of food waste are composted per week. A summary of this regulation, called the Permit-by-Rule, is listed as **Attachment C**. Please contact Jenny Trent at the IWRC if composting food waste is an interest at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.

### *Strategies to Prevent and Reduce Food Waste at the University*

There are some simple strategies that faculty, staff, and students can implement to prevent and reduce wasted food and these are listed below.

- Analyze the most common foods being thrown away and find a solution to prevent these items from ending up in the trash. For example, a recipe not well received by students can be changed to entice students to eat.
- Know what is tossed by tracking food waste. Set up tracking stations in the kitchen with a scale where staff can record the type of food being tossed, the reason for disposal, and the amount of food being thrown away. Then analyze the top disposed items and hold staff meetings to brainstorm ideas to prevent food waste. Tracking sheets can be found as **Attachment D**.
- Repurpose prepared food items into new recipes. For example, left-over biscuits from breakfast can be turned into slider buns, casseroles or bread pudding.
- Order less food more often so it's easier to manage.
- Present food in individual portions rather than portions for 20 or 30 students. For example, serve individual slices of pizza rather than offering a whole pizza.
- Stock recyclable to-go containers that are easily accessible for students to take left-overs with them.
- Inventory foods frequently and move older foods to the front to be used first.
- Always check food deliveries for freshness and store foods at the proper temperatures to extend shelf-life. For example, cucumbers should be stored at 50-55 degrees Fahrenheit while tomatoes can be stored up to 70 degrees Fahrenheit. A great resource for optimal food storage conditions can be found online at the following web address:  
[http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d\\_710.html](http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d_710.html)



- Get students involved in setting a goal to reduce and prevent food waste. Once a week have “Zero Food Waste Day” where students are encouraged to eat everything they’ve selected.
- Create a sustainable task force to address food waste on campus in dining halls and residence halls.
- Develop and create posters that lists social, environmental, and economic implications of food waste and hang them in areas of high visibility where dining occurs.

There are many strategies that can be utilized to reduce and prevent food waste at the university. Colleges and universities that are planning on implementing food waste reduction strategies and techniques have the option to join the USDA’s Food Waste Challenge or join via participation in the EPA Food Recovery Challenge. Colleges and universities that reduce or divert food waste from landfills are eligible to join and will receive technical assistance to set specific quantitative food-waste goals from the EPA. For more information, visit USDA’s website at the following we address:

<https://www.usda.gov/oce/foodwaste/Challenge/index.htm>

Or visit EPA’s Food Recovery Challenge at the following web address:

<https://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc>

The IWRC also offers assistance in training kitchen staff, students, and any other staff interested in reducing food waste. This includes training for tracking kitchen food waste by weighing and measuring items being disposed and implementing strategies to reduce that amount. If the university would like additional assistance, please contact Jenny Trent at the IWRC with any questions or requests for assistance regarding food waste at 319-273-6584 or

[Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu)

*This material is based upon work supported under a grant by the Rural Utilities Service, United States Department of Agriculture. Any opinions, findings, and conclusions or recommendations expressed in this material are solely the responsibility of the authors and do not necessarily represent the official views of the Rural Utilities Service.*

**████████ Community Schools**  
**Cafeteria Waste Audit Results**  
**November 30, 2017**

School district name has been removed pending approval to publish.

Food waste is a growing issue with many negative implications including social concerns, environmental consequences, and significant economic effects. Social concerns with food waste can be tied to food insecurity. In Iowa, according to Feeding America 1 in 5 children does not have enough food to eat. Environmentally, food waste in landfills contributes to global climate change as the methane emissions generated from food waste are very efficient at trapping heat in Earth's atmosphere. Economically, food that is never eaten costs the United States economy \$165 billion while \$750 million is spent to landfill food waste according the Natural Resources Defense Council. The U.S. Environmental Protection Agency (EPA) estimates that in the United States alone, 35 million tons of food are tossed each year. Clearly, there are better uses for food that can reduce societal pressures of feeding the hungry, environmental degradation caused by food disposed in landfills, and costs associated with growing food that never gets eaten and ends up in the landfill.

### **Community Schools Cafeteria Waste Audit**

The Iowa Waste Reduction Center (IWRC) conducted a cafeteria waste audit at Community Schools on October 24, 2017 in , Iowa. The cafeteria waste audit included student tray waste and was separated into five main categories and weighed. Categories included the following:

- Food waste
- Recyclables - plastic water bottles, juice cups
- Compostables – napkins, paper boats
- Liquids – milk, juice
- Trash - milk cartons, chip bags, flexible plastics that are not recyclable

### **Community Schools Waste Management**

Community Schools recycles cardboard and tin cans. Students are required to sort waste from trays after breakfast and lunch, which helps divert both food and liquids from the landfill. Students dump leftover milk and juice in a large bucket and staff dump this down the drain. Additionally, unopened and uneaten foods and beverages are set aside by students after meals to be reused.

### **Results of the Cafeteria Waste Audit at Community Schools**

#### *Student Tray Waste*

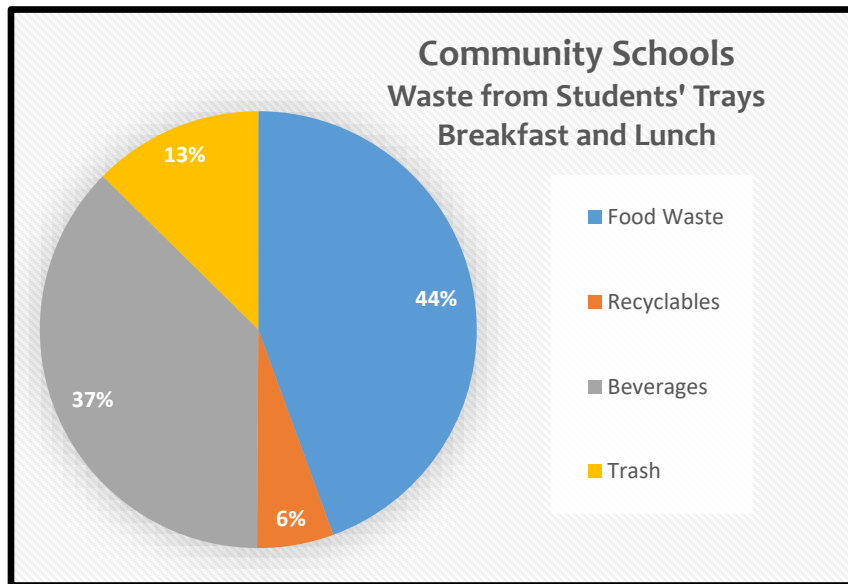
The tables below provides results of the waste audit and measurements of student tray waste after both breakfast and lunch. Additionally, data from the waste audit has been charted and categories of waste measured can be visualized in the pie chart below.

**Community Schools**  
**Cafeteria Waste Audit Results - Student Tray Waste**

Breakfast					
Number of Students Served	Compostables	Food Waste	Recyclables	Beverages	Trash
96 lbs.	0 lbs.	6.6 lbs.	3.6 lbs.	13.2 lbs.	2.6 lbs.

Lunch					
Number of Students Served	Compostables	Food Waste	Recyclables	Beverages	Trash
233	1.2 lbs.	42 lbs.	2.6 lbs.	27.6 lbs.	11.2 lbs.

Breakfast and Lunch Combined					
Number of Students Served	Compostables	Food Waste	Recyclables	Beverages	Trash
319	1.2 lbs.	48.6 lbs.	6.2 lbs.	40.8 lbs.	13.8 lbs.



## Extrapolation of Waste Audit Data

By extrapolating food waste data, ██████ Community Schools can estimate how much is generated yearly and this data will provide ██████ Community Schools with the opportunity to set reduction goals of food waste generation rates. Additionally, implementing cost-effective, simple reduction strategies and techniques can be analyzed by conducting further waste audits to gauge the effectiveness of these strategies. Techniques and strategies to reduce food waste are recommended further below in this report. Extrapolation of data is listed in the table below.

### ████████ Community Schools Extrapolation of Data – Student Tray Food Waste

Category	Breakfast	Lunch	Total
Food waste generated daily per student	0.07 lbs.	0.18 lbs.	0.15 lbs.
Food waste generated yearly per student	12.4 lbs.	32.4 lbs.	44.8 lbs.
Food waste generated yearly by ██████ Community Schools	1,188 lbs. or 0.6 tons	7,560 lbs. or 3.8 tons	8,748 lbs. or 4.4 tons

## Cost of Disposal

All measured waste that is generated by ██████ Community Schools and is sent to the landfill equals an average of 69.8 pounds daily including compostables, food waste, recyclables, and trash. Yearly estimates indicate the district generates 12,564 pounds or 6 tons (based on 180 days per school year) of landfilled waste generated by students during breakfast and lunch. Trash from the district ends up at the Wayne Ringgold Decatur Sanitary Landfill. Tipping fees are \$58.50 per ton at the landfill and yearly the cost to dispose of student tray waste equals approximately \$367.50. Putting recycling containers in the cafeteria for students to dispose of plastic and paper products will help reduce disposal costs.

## Greenhouse Gas Emissions Generated by ██████ Community Schools

Greenhouse gases include carbon dioxide, methane, nitrous oxide, and fluorinated gases. Each gas's potency at trapping heat in earth's atmosphere varies. Methane is especially powerful at trapping heat in earth's atmosphere when compared to carbon dioxide and methane is generated by food waste in landfills. The measure, metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) basically expresses each greenhouse gas's heat trapping potency compared to the potency of carbon dioxide, thus the term metric tons of carbon dioxide *equivalent*. Therefore, food waste in

a landfill (generates methane) will have a higher MTCO<sub>2</sub>E than an activity such as transportation in a car, or burning gasoline in a car because this activity primarily generates carbon dioxide, not methane.

Utilizing the EPA's WARM (Waste Reduction Model) model, food waste from [REDACTED] Community Schools in the landfill currently generates 3 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>E) yearly. It would take 78 tree seedlings grown for ten years to sequester these emissions or it would take 3.5 acres of forest one year to sequester these emissions according to EPA's Greenhouse Gas Equivalencies Calculator. Additionally, 3 MTCO<sub>2</sub>E is equivalent to the following:

- Carbon dioxide emission from 338 gallons of gasoline consumed.
- Carbon dioxide emissions from 3,282 pounds of coal burned
- Carbon dioxide emissions from 6.9 barrels of oil consumed
- Greenhouse gas emissions from 7,353 miles driven by an average passenger vehicle

An alternative scenario is composting the food waste generated by [REDACTED] Community Schools. This would generate -1 MTCO<sub>2</sub>E. The negative number indicates that the compost creates a "sink" or "storage" for greenhouse gases.

### **Strategies and Techniques to Reduce Food Waste**

[REDACTED] Community Schools landfills 243 pounds of food waste weekly. By setting a goal to reduce food waste, [REDACTED] Community Schools can seek strategies and techniques that would help reach this goal. For example, a food waste reduction goal of 10% would divert 24.3 pounds weekly from the landfill. There are simple, cost-effective strategies that once implemented, can help prevent and reduce food waste.

#### *Donation*

One way to reduce wasted food is to provide a "donation" table for items that have not been opened such as milk, chips, condiment packages, and whole fruits. Use of these food items will help reduce food waste by donating these items to a non-profit agency that feeds the hungry or other students and staff or athletes after school. The Bill Emerson Good Samaritan Food Donation Act provides liability protection to organizations that donate food in good faith to a non-profit agency. A summary of the Bill Emerson Good Samaritan Food Donation Act can be found on the IWRC's website.

[REDACTED] Community Schools has the option to donate left-over edible food to pantries, soup kitchens, and food banks in the local area. Some organizations may even accept prepared foods but may require freezing prior to drop-off or pick-up. Below is a list of organizations that accept food donations. Please contact them to find out exactly what food items they accept and when.

#### **Funshine Center**

Phone: (641)784-7505

#### **Food Pantry**

Phone: (641) 784-4762

**Blessed Oaks Youth Christian Center**

200 W Main

Kellerton, IA 50133

Phone: (641) 414-5243

**Humeston Senior Meal Site**

Community Center

N Eaton Ave

Humeston IA 50123

Phone: (641)877-9521

*Composting*

If [REDACTED] Community Schools would like to start a food waste composting project, the IWRC can help with both proper maintenance and technical assistance of composting operations to keep the pile active and can also help comply with Iowa regulations if applicable. If composting the district's food waste on-site, there are no regulatory requirements except proper siting of the composting operation. Alternatively, if [REDACTED] Community Schools is interested in composting food waste off-site, there are simple regulations to follow if less than two tons of food waste are composted per week. A summary of this regulation, called the Permit-by-Rule, can be found on the IWRC' website. Please contact Jenny Trent at the IWRC if composting food waste is an interest of the district at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.

*In-School Strategies to Prevent and Reduce Food Waste*

During the cafeteria waste audit, food waste accounted for 44% of student tray waste and contribute significantly to [REDACTED] Community School's trash disposal. Simple, cost effective techniques that are easy to implement can help prevent and reduce food waste. Strategies that will help divert food waste from the landfill includes the following:

- Analyze the most common foods being thrown away and find a solution to prevent these items from ending up in the trash. For example, a recipe not well received by students can be changed to entice students to eat.
- Repurpose food items into new recipes. For example, stale bread can be turned into croutons or burgers can be turned into chili or soup.
- Schedule recess before lunch to increase appetites and calmness.
- Allow students to help plan the menu and give menu items jazzy names. For example, carrots can be called "X-ray vision carrots," or call broccoli "Tiny Tasty Treetops."
- Extend meal times to at least 25 minutes so students have ample time to finish eating.
- Order less food more often so it's easier to manage.
- Inventory foods frequently and move older foods to the front to be used first.

- Always check food deliveries for freshness and store foods at the proper temperatures to extend shelf-life. For example, cucumbers should be stored at 50-55 degrees Fahrenheit while tomatoes can be stored up to 70 degrees Fahrenheit. A great resource for optimal food storage conditions can be found online at the following web address:  
[http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d\\_710.html](http://www.engineeringtoolbox.com/fruits-vegetables-storage-conditions-d_710.html)
- Get students involved in setting a goal to reduce and prevent food waste. Once a week have “Zero Food Waste Day” where students are encouraged to eat everything they’ve selected for lunch. Keep track of progress in reducing food waste by displaying graphs and/or charts in the lunchroom that showcase accomplishments made every week in reducing the amount of food students throw away.

**Plate Food Waste in K-12 Schools in Iowa  
Lunch Food Waste  
2015 – Present (2017)**

School District*	Students Served (per day)	Plate Food Waste Generated Daily (lbs/day)	Plate Food Waste Generated Yearly (lbs [tons]/year)	Plate Food Waste Generated Per Student Per Lunch (lbs/meal)	Food Waste Generated Per Student Per Year (lbs/year)
██████████ CSD	781	211.2	30,016 [19]	0.3	49
██████████ CSD	846	239.1	43,038 [22]	0.3	51
██████████ CSD	270	55.6	10,008 [5]	0.2	37
██████████ CSD	1,380	268	48,240 [24]	0.2	35
██████████ CSD	1,200	488.6	87,948 [44]	0.4	73
██████████ Schools	245	132.8	23,904 [12]	0.5	98
██████████ CSD	1,126	311.6	56,088 [28]	0.3	50
██████████ Middle School	256	155.2	27,936 [14]	0.6	109
██████████ CSD	1,075	856	154,080 [77]	0.8	143
██████████ Community Schools	233	42	7,560 [4]	0.2	32

CSD = Community School District

\* School district names have been removed pending approval from districts to publish.

**IWRC Assistance**

██████████ Community Schools has many options to reduce and divert food waste from the landfill. The IWRC is interested in any strategies and techniques ██████████ Community Schools may implement to reduce and prevent food waste. Please keep us informed if any progress is realized in preventing and reducing food waste. A brochure has been created by the IWRC specifically for this project and can be viewed and/or shared. This brochure can be found on the IWRC’s website.



Schools that are planning on implementing food waste reduction strategies and techniques have the option to join the United States Department of Agriculture's (USDA) Food Waste Challenge or join via participation in the EPA's Food Recovery Challenge. Schools that reduce or divert food waste from landfills are eligible to join and will receive technical assistance to set specific quantitative food waste goals from the U.S. EPA. For more information, visit USDA's website at the following web address:

[https://www.usda.gov/oce/foodwaste/resources/K12\\_schools.html](https://www.usda.gov/oce/foodwaste/resources/K12_schools.html)

Or visit EPA's Food Recovery Challenge webpage at the following web address:

<https://www.epa.gov/sustainable-management-food/food-recovery-challenge-frc>

Additional assistance is available to [REDACTED] Community Schools to prevent and reduce food waste. If interested, please contact Jennifer Trent at [Jennifer.trent@uni.edu](mailto:Jennifer.trent@uni.edu) or 319-273-6584.

*This material is based upon work supported under a grant by the Rural Utilities Service, United States Department of Agriculture. Any opinions, findings, and conclusions or recommendations expressed in this material are solely the responsibility of the authors and do not necessarily represent the official views of the Rural Utilities Service.*