
REPURPOSING WASTED FOOD IN MISSOULA

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ABOUT THE PROGRAM

Questions for Undergraduates Exploring Social Topics (QUEST) is the product of a partnership between the Davidson Honors College at the University of Montana and the Office of the Mayor of Missoula. Teams of students work together over the course of the year to research and design solutions to a specific challenge faced by the Missoula community. Teams create pitch books outlining their proposed solutions which they present for a panel of judges. The prize for the winning team is a paid internship for the city in which the members get to implement their proposal.



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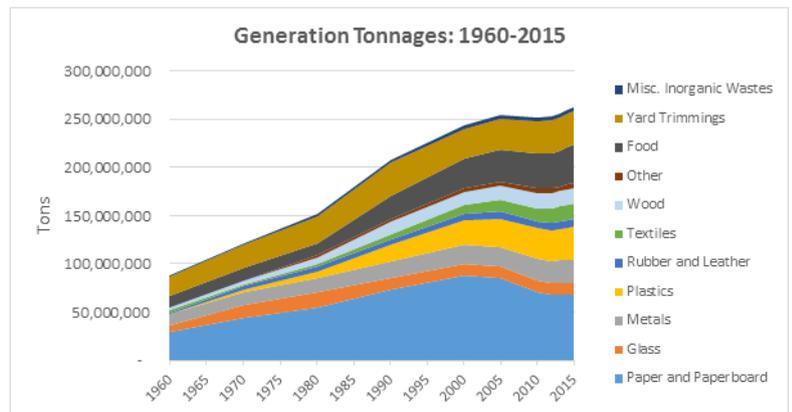
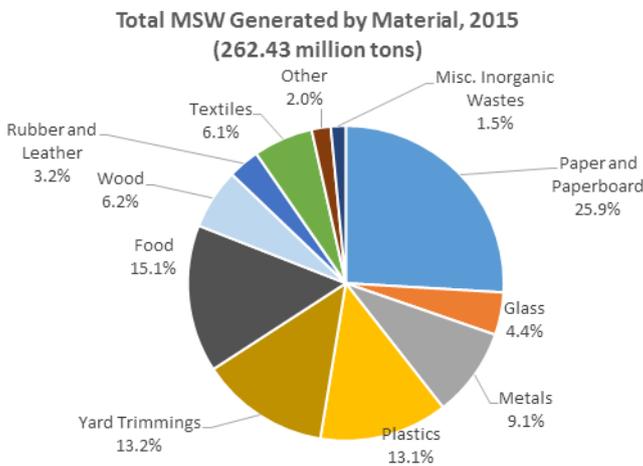
ABSTRACT

Studies have shown that wasted food alone accounts for approximately 15 percent of total municipal solid waste in the United States. With the addition of all other compostable and recyclable materials, the total amount of wasted materials that can be salvaged, repurposed, and redirected from Missoula’s landfill reaches 86.9 percent[4]. Missoula’s ZERO by FIFTY plan attempts to answer the question: How can the City of Missoula reduce waste production by 90 percent by 2050? This proposal addresses wasted food through expanded food redistribution programs and the implementation of city-wide three-bin systems (composting, recycling, and landfill infrastructure, also known as zero-waste stations). This proposal was informed by the United States Environmental Protection Agency’s (EPA’s) food recovery hierarchy (see page 6) and is supported by case studies, interviews, and a pilot project in the Davidson Honors College (DHC) at the University of Montana, which helped determine the effectiveness of three-bin systems. Both food redistribution and three-bin systems are practices that will help Missoula achieve the ZERO by FIFTY goal and build financial stability and social capital for fledgling businesses. With the proper policies, infrastructure, education, and access in place, these programs will yield noticeable change in both advancing Missoula toward its waste-reduction goal and inspiring its citizens to do the same.



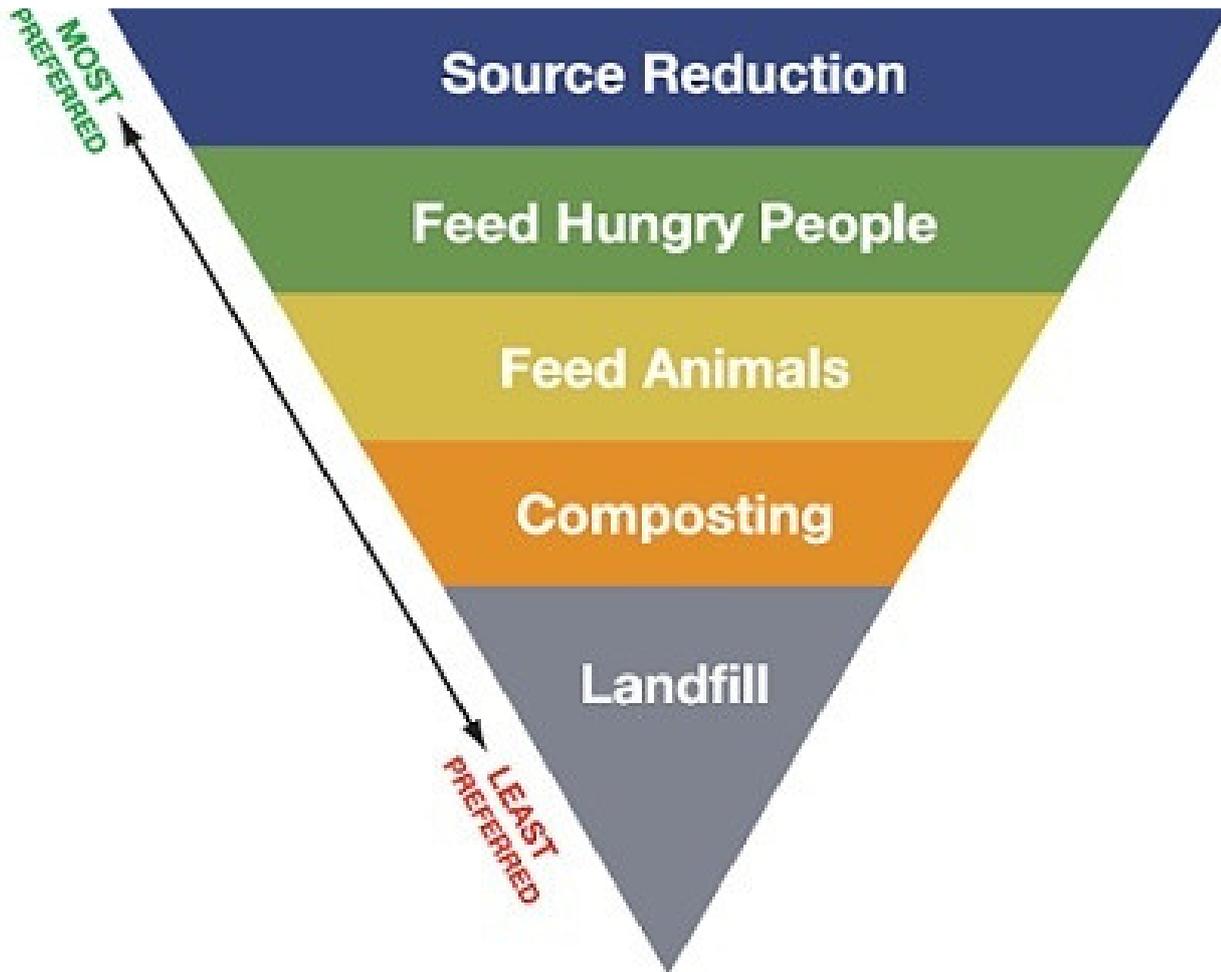
INTRODUCTION

Due to the outstanding amount of wasted food in the US (15.1 percent of all municipal solid waste), this proposal was created with the goal of reducing wasted food in Missoula by redistributing food midstream and implementing a better downstream waste disposal system[6]. Our primary proposal is to expand food redistribution by providing zero-waste consultants to restaurants, grocery stores, and other food-related businesses to help determine a redistribution plan for food before it is wasted. Our secondary proposal is to implement three-bin systems city-wide to help prevent food from households and public venues from entering the landfill. It is important to realize that when dealing with wasted food, solely focusing on reducing the source will have limited effectiveness because post-consumer food waste will always be present in our society. However, wasting food and the negative social implications associated with it are somewhat avoidable through private, commercial, and government action. Much of the infrastructure needed for this proposal is already in place which makes it timely and realistic. This proposal can effectively forge Missoula’s path to zero-waste and lead the state of Montana toward a waste-free future.



[7]

Food Recovery Hierarchy



EPA Food Recovery Hierarchy [8]

"The Food Recovery Hierarchy prioritizes actions organizations can take to prevent and divert wasted food. Each tier of the Food Recovery Hierarchy focuses on different management strategies for your wasted food.

The top levels of the hierarchy are the best ways to prevent and divert wasted food because they create the most benefits for the environment, society and the economy." [9].

RESEARCH METHODOLOGY

Case Studies

This proposal draws inspiration from two major cities:

Fort Collins, CO

After reaching the goal of reducing waste by 50 percent in 2016, Fort Collins committed to the goal of reaching zero-waste by 2030. The original zero-waste goal was set in 1999 and was inspired by the “pay as you throw” program started in 1992[10]. Fort Collins has been collecting data on waste since 1996, which has allowed for waste stream analysis and realistic goal-setting. Data is collected by an ordinance that requires trash collectors to weigh landfill waste and recycling, then report those numbers to the city biannually[11].

Recycling is one of the biggest successes Fort Collins has had in the reduction of waste due to the city-owned recycling center located in town. This ease of access allows for low recycling costs and availability for everyone. Another success in Fort Collins is zero-waste education. The City of Fort Collins’ graphic design team has created a visually-appealing and digestible website for citizens to learn about a variety of zero-waste topics. They have also launched various education campaigns including the “save your food” challenge designed to educate people about wasted food. Besides a well-designed website, Fort Collins utilizes social media, advertisements, and presentations among other tactics to educate citizens about zero-waste[12].



City of Fort Collins "Save Your Food" campaign poster [13]

Case Studies

San Francisco, CA

In 2003, San Francisco set a goal to be a zero-waste city by the year 2020. In 2009, they passed a mandatory recycling and composting ordinance that required the entire city to separate compostable, recyclable, and landfill materials using the infrastructure known as three-bin systems. In 2012, just three years after the implementation of three-bin systems, San Francisco reached an 80 percent landfill diversion rate[14].

San Francisco and Recology Inc. (the city's collection service) have a unique long-term ordinance where the city sets and approves the collection rates. The city provides oversight, research and outreach while the service provider develops infrastructure, provides collection, processing, and reporting. To insure success, representatives from the city of San Francisco and Recology meet regularly to oversee performance[15].



San Francisco Three-Bin Systems [16]

Interviews

Throughout the year we also interviewed various members of the Missoula community. What we spoke to them about is outlined below.

EVA ROCKE- Sustainability Director at the University of Montana (UM):

The state of composting and recycling on the UM Campus

TREVOR LOWELL- University of Montana Dining Sustainability Director:

The composting program at UM Dining

CHASE JONES- City of Missoula Energy Conservation and Climate Action Coordinator:

Sustainability in local government

JOSH SLOTNICK- Co-founder of Garden City Harvest & the PEAS Farm, former professor at the University of Montana, and county commissioner:

Composting partnership between UM Dining and the PEAS Farm

SARA MALO & JASON DUFFIN- Garden City Compost Managers:

The state of composting in Missoula

SEAN DOTY- Owner of Missoula Compost Collection LLC.:

Compost collection in Missoula

BETH SCHENK- PhD, MHI, RN-BC, FAAN

Providence-WSU Nurse Scientist/Sustainability Coordinator:

Logistics of composting in large facilities

KASEY RHAN- Communications Specialist in the College of Forestry at UM:

Small scale composting at UM

HONORE DEPEW- Senior Sustainability Specialist for the City of Fort Collins:

The status of zero-waste in Fort Collins, Colorado

SARA RINFRET- Professor of Environmental Policy at UM:

IRB certification

EMI KODAMA- Good Food Store:

Waste reduction in grocery stores

KELLI HESS- Director of Operations at Missoula Food Bank & Community Center:

Food redistribution programs

Three-Bin System Pilot Program

Between January 14th and February 15th 2019, we conducted a three-bin system pilot program in the Davidson Honors College at the University of Montana. For the project we set up two three-bin systems and two two-bin systems (compost and landfill in the bathrooms) and distributed a survey. The purpose of the project was to observe the educational tools needed for success of three bin-systems. The purpose of the survey was to gauge students' and faculty's understanding and response to the three-bin system. By observing contamination trends, we determined that more education surrounding this infrastructure would be needed for successful implementation. The survey demonstrated that people view infrastructure and access as the two main roadblocks to widespread composting and recycling. Overall this pilot solidified our conviction that three-bin systems are successful in diverting waste from the landfill.



One day's waste in the Davidson Honors College. Compost, recycling, and landfill piles appear left to right respectively.

THREE BIN SYSTEM PILOT PROGRAM IMAGES



Signs used for three-bin system pilot program



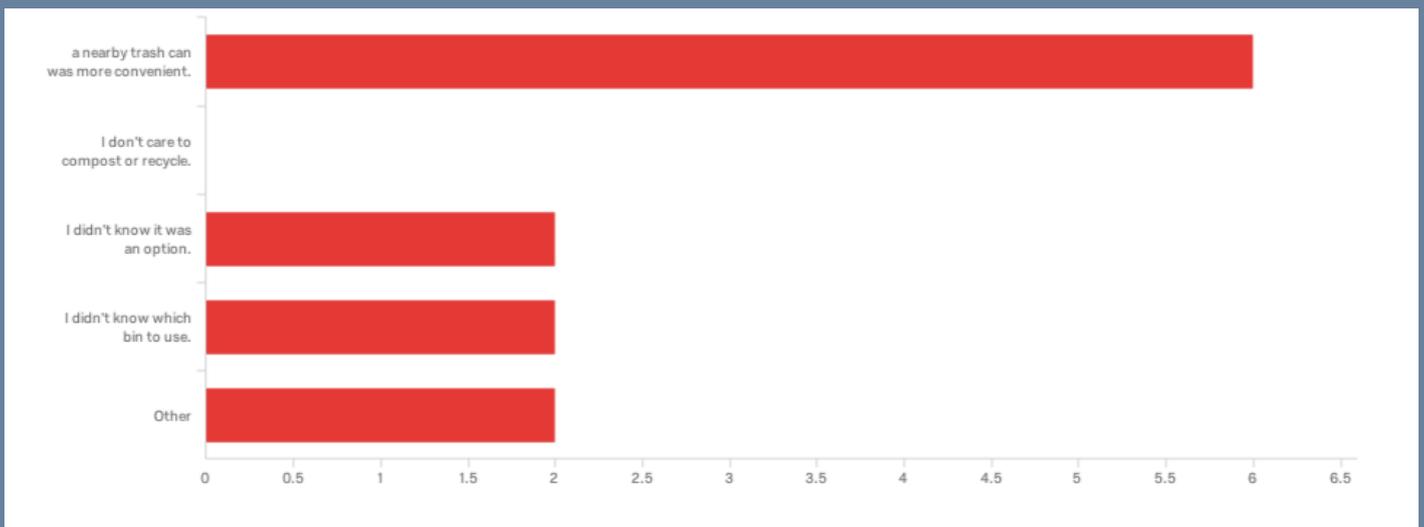
Three-bin system in Davidson Honors College

THREE BIN SYSTEM PILOT PROGRAM SURVEY RESULTS

Which of the following prevents you from using sustainable waste management practices?



If there was a time you could have used the three-bin systems but didn't, it was because:



RECOMMENDATIONS

As a means of combating wasted food in Missoula, we recommend the city expand food redistribution programs between food banks and food-related businesses and implement three-bin systems in both the public and private sector.



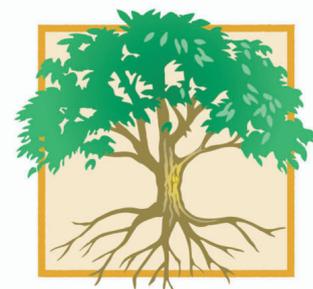
Food Redistribution

Our primary recommendation is the redistribution of food through providing food-related businesses with zero-waste consultants. The role of zero-waste consultants will be to help businesses reduce wasted food in a cost-effective way. For the purpose of this proposal, food-related businesses can be defined as any business that makes and/or sells food. Food redistribution is already prevalent in Missoula; according to Kelly Hess at Missoula Food Bank & Community Center, all but one grocery store donates unsellable food to the food bank. Additionally, several restaurants participate in what's known as the Food Circle program, a food rescue program at the food bank, however there is need for more participation[18]. Another option for food redistribution is giving food that is no longer safe for human consumption to animals at local farms, something that is done at the Good Food Store[19]. By applying the principles of the Food Recovery Hierarchy (see page 6), wasted food can be reduced while simultaneously benefiting animals and people. Below are specific steps for the implementation of food redistribution programs.



missoula food bank
& community center

[20]



GOOD
FOOD

STORE

[21]

Food Redistribution Action Plan

POLICY

- Create an ordinance that requires food-related businesses to reduce wasted food by 90 percent by 2050

EDUCATION

- Provide zero-waste consultants to help businesses formulate a zero-waste action plan and determine the logistics of the chosen plan:

Potential Zero-Waste Consultants:

- Volunteers (AmeriCorps, Energy Corps, etc.)
- Hired city employees
- Partnership between the City of Missoula and consulting firm

INFRASTRUCTURE

- Infrastructure will depend on each business' specific plan:

Options for reducing wasted food in food-related businesses:

- Donate to food banks or other similar organizations (feed hungry people)
- Donate food that is unsafe for human consumption to animals (feed animals)
- Three-bin system implementation (compost, see page 17)[22]

ACCESS

- Missoula Food Bank & Community Center provides volunteers and transportation to collect donations; this responsibility would not fall on food-related businesses, allowing equal access to all willing participants.



Three-Bin Systems

A three-bin system is a waste redistribution station containing a compost, recycle, and landfill bin. This proposal focuses on the composting aspect of three-bin systems because this infrastructure effectively addresses wasted food, and recycling is already established in Missoula, though could be greatly improved. Furthermore, according to Sean Doty of Missoula Compost Collection LLC. and Jason Duffin of Garden City Compost, there is potential to widely expand municipal composting infrastructure [24][25]. The first step in implementing three-bin systems is conducting a municipal waste stream analysis, followed by smaller steps outlined below.



Three-Bin System Action Plan

POLICY

- Conduct a waste stream analysis and develop a method of continual evaluation
- Write a memorandum of understanding with Republic Services that will include:
 - Tiered landfill collection with three bin size options, each increasing in price by 100 percent [27]
 - Every landfill bin will come with a recycling bin
 - Have compost collection services provide a discount for those who purchase the smallest size landfill bin
- Write a policy requiring three-bin systems in public places and eventually in the private sector

EDUCATION

- Educate Missoula citizens about wasted food by means of public meetings and hearings, Public Service Announcements (PSAs), Pamphlets, etc.
 - Expand K-12 zero-waste education
 - Ensure the City of Missoula's website includes information about wasted food
- Provide clear and consistent signage on three-bin systems
 - Color code three-bin systems
- Educate Missoula citizens about compost safety
 - Due to the partnership between Garden City Compost and the Wastewater Treatment Plant there have been concerns about using biosolid-based compost for food production. According to studies testing pharmaceutical concentration in compost, the final product is safe to use for growing food [28]

INFRASTRUCTURE

- Expand Missoula compost collection service
 - Missoula Compost Collection LLC. and Soil Cycle
- Provide zero-waste consultants for the implementation of three-bin systems
 - Help businesses and households determine the logistics of three-bin system implementation

ACCESS

- Make three-bin systems available in all public and private settings
- Allow customers to select waste collection services to maintain a competitive market

SAMPLE TIMELINE

Action	Timeframe	Impacts
<ul style="list-style-type: none"> • Conduct a waste-stream analysis • Create an ordinance requiring food-related businesses to reduce wasted food by 90 percent by 2015 • Write a memorandum of understanding between Republic Services and the City of Missoula 	<p>2020-2022</p>	<ul style="list-style-type: none"> • Provides a means of tracking the progress of the ZERO-by-FIFTY goal • Ensures the reduction of wasted food in businesses and provides a solid foundation for the ZERO-by-FIFTY plan • Establishes the role of landfill services within the zero-waste movement and creates a legal partnership between the city and Republic Services
<ul style="list-style-type: none"> • Provide zero-waste consultants to food-related businesses • Develop monetary incentive program for businesses and residencies to use composting services 	<p>2021-2024</p>	<ul style="list-style-type: none"> • Provides the necessary zero-waste education and maintains a consistent approach to zero-waste across Missoula businesses • Reduces cost of additional utilities, maintains equity across social classes, and encourages the practice of composting

Action	Timeframe	Impacts
<ul style="list-style-type: none">• Write a policy requiring three-bin systems in public places• Provide zero-waste consultants to non-food-related businesses	2024-2029	<ul style="list-style-type: none">• Sets an example for Missoula citizens and exposes the new infrastructure while reducing waste from the public sector• Expands zero-waste education and access to all businesses
<ul style="list-style-type: none">• Write a policy requiring three-bin systems in private sectors	2030-2035	<ul style="list-style-type: none">• Expands public infrastructure to private locations and further increases diversion rates



REMAINING QUESTIONS

The following are questions that The City must answer for effective implementation of this proposal. We have included our suggested course of action, but it is ultimately up to The City to decide these details.



[30]

1. Will the zero-waste consultants be employed by the city or a private company?

This is up to the city to decide, see page 15 for our proposed options.

2. Will the businesses be required to pay for zero-waste infrastructure? (Ex: three bin system collection)

Food redistribution with the Missoula Food Bank & Community Center is free, however the goal of this proposal is to eventually include composting and recycling infrastructure

in a utility package. The additional cost will be absorbed with the reduction of wasted food.

3. What will the partnership between landfill collection services and compost collection services look like?

Our intention with this proposal is for Republic Services and compost collection services to remain separate entities that work together to incentivize sustainable waste practices.

4. How will the city pay for three-bin systems in public places, and who will be in charge of collection?

We envision the the additional fees be built into The City budget and the City employ a compost collection service to collect from public places.

5. How will a competitive market be maintained in composting collection?

Collection services determine the rate of their service allowing consumers to decide which company to use.

6. Who will be in charge of zero-waste education?

We suggest The City make a curriculum outlining who is in charge of zero-waste education and in what capacity. Some examples of who would take a portion of the responsibility include zero-waste consultants, businesses, non-profits, teachers, and the City.

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