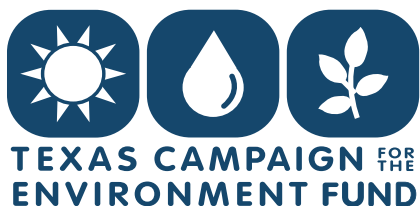


The background of the entire page is a photograph of food and organic waste, including banana peels, vegetable scraps, and other food debris, which is partially covered by a semi-transparent yellow-orange overlay.

FOOD & ORGANICS DIVERSION IN NORTH TEXAS

Texas Campaign for the Environment Fund



2020 Report

FOOD & ORGANICS DIVERSION IN NORTH TEXAS EXECUTIVE SUMMARY



The Problem is Global and Local

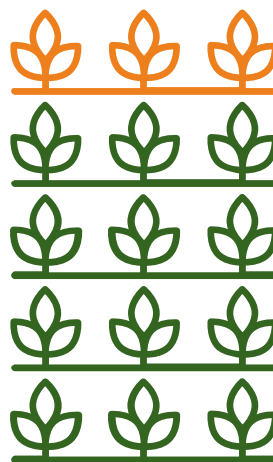
Food waste, the main component of organic waste in our cities, is a significant driver of the climate crisis and represents a loss of valuable resources that could otherwise be used to feed people, animals, and regenerate soil. In the U.S., the equivalent of about one-fifth of all U.S. croplands, agricultural water use, and farming fertilizers is consumed to grow the over 60 million tons of food that is wasted.¹ Organic waste in landfills is also a major source of landfill-related environmental and human health harms.

Wasted food represents a double loss: not only are enormous land, water, fossil fuel, and other resources wasted, but harmful emissions are also created to produce that food. It's estimated that just food scraps decomposing in U.S. landfills produce 23% of U.S. methane pollution. Project Drawdown estimates that a 50–75% reduction in global food waste by 2050 could save up to 18.8 gigatons of CO₂ equivalent emissions. For comparison, global CO₂ emissions from fossil fuels was estimated to reach 36.6 gigatons in 2019.²

Organic Waste in North Texas

Organic waste is a significant environmental problem in North Texas, accounting for an estimated 44% of waste from single-family residences in the region.³ In this report we show how organic waste is related to economic and racial inequities in the area through landfill siting and food insecurity. We estimate that North Texas businesses and residents throw away approximately 2.3 million tons of food into the landfill annually. Much of that wasted food could help feed the over one million food insecure individuals in North Texas.⁴ We mapped the locations of active landfills in North Texas and determined that many solid waste landfills are located in communities of color that are also low wealth and food insecure. This means that North Texas's food waste, which is the largest single component

of landfill waste, is discarded in communities of color and low wealth communities. These communities lack access to healthy food and suffer the consequences of landfill traffic and pollution. Many of these areas also contain other polluting facilities and suffer from poor air quality.



One-fifth of all U.S. croplands, agricultural water use, and farming fertilizers is consumed to grow 60 million tons of food that is wasted annually.

The Coronavirus Pandemic has moreover reinforced the need for systemic solutions to our food distribution system as economic hardships expose more North Texans to food insecurity. The inelasticity of our food supply chain intensified food insecurity and food waste issues. Indeed, once the shutdown closed restaurants, hotels, cafeterias at schools, and other food venues, agricultural producers destroyed tens of millions of pounds of fresh food they had no means to distribute.⁵ While local organizations have worked diligently to provide healthy food to food insecure communities, the scope of the problem will require systemic solutions enacted by local governments to make communities more resilient against food insecurity both during times of crisis and during normal times. Diverting food waste can help address these problems by reducing landfill waste, improving the availability of food donations, and supporting a regenerative economy by providing compost for community gardens and local agriculture.

Composting & Food Donations

For municipalities, effective food waste diversion solutions include providing residential curbside pickup for composting and requiring commercial food enterprises to keep unused food out of the landfill by preventing, donating, or composting it. These solutions provide a pathway to eliminating nearly a quarter of landfill waste. Compost not only reduces methane gas emissions, but it also adds nutrients to our depleted soils, making them more productive, increases soil's capacity for sequestering carbon, and conserves water.

North Texas is home to some major composting facilities that can process a wide range of organic materials, and provide larger scale solutions to the problem of food and organic waste generation in commercial and industrial settings.

While many cities in North Texas have programs to compost yard waste and brush, none has implemented a city-wide food waste diversion policy. Fort Worth and Denton have taken small steps to implement diversion programs for some of these materials. The City of Dallas has committed to exploring a food waste diversion ordinance in its 2020 climate plan, however the city has discussed implementing a similar policy for several years now, and its future timeline is unclear.

Small businesses including Recycle Revolution, Turn Compost, and Cowboy Compost have attempted to provide options for commercial



Organic waste from a Dallas grocery store collected by Recycle Revolution for composting.

and residential organics diversion but regional participation remains relatively low.

Local nonprofits such as Harvest Project Food Rescue, The Oak Cliff Veggie Project, and North Texas Food Bank provide food to thousands of families each year, but additional resources are needed to feed North Texas's food insecure



A Harvest Project June distribution for food insecure families in predominantly latino West Dallas.

households and a citywide organics program could free up additional unused food for donations. Austin allows food businesses to count food donations towards compliance with the city's requirement to keep food out of landfill waste. A similar law in Massachusetts led to a 22% increase in food donations statewide.

San Antonio and Austin are leading the Lone Star State in implementing food waste diversion programs.^{6,7} Both cities offer curbside organics collection for single-family residential customers. Austin moreover requires food enterprises to keep food out of the landfill by reducing, donating, or composting leftover food. San Antonio and Austin's organics management strategies represent models that DFW cities could look to for creating local diversion policies.

Mapping the Disparities of Food Waste in North Texas

Studies have shown that landfills and other polluting facilities are more often sited in low-income and minority communities in the U.S.⁸ Indeed, one of the earliest studies demonstrating environmental racism, a 1983 report by sociologist Robert D. Bullard, found that municipal and private landfills in Houston were overwhelmingly built in Black communities.⁹ We mapped racial, economic, and food access disparities surrounding North Texas landfill sites to show that the region is no exception.

An overwhelming majority of the region's trash (and food waste) is dumped on communities of color. The three largest landfills by annual trash volume—those that receive around 1 million tons or more including Dallas, Lewisville, and Ferris—are located in majority communities of color. The largest landfill in the region, the McCommas Bluff Landfill that serves the City of Dallas, is located in a census tract with a population that is 99% Black and Latino.

Southern Dallas, which is predominantly Black and Hispanic, is known for insufficient access to

In North Texas, the majority of food waste and other discards are disposed of in communities of color and communities with low access to healthy food.

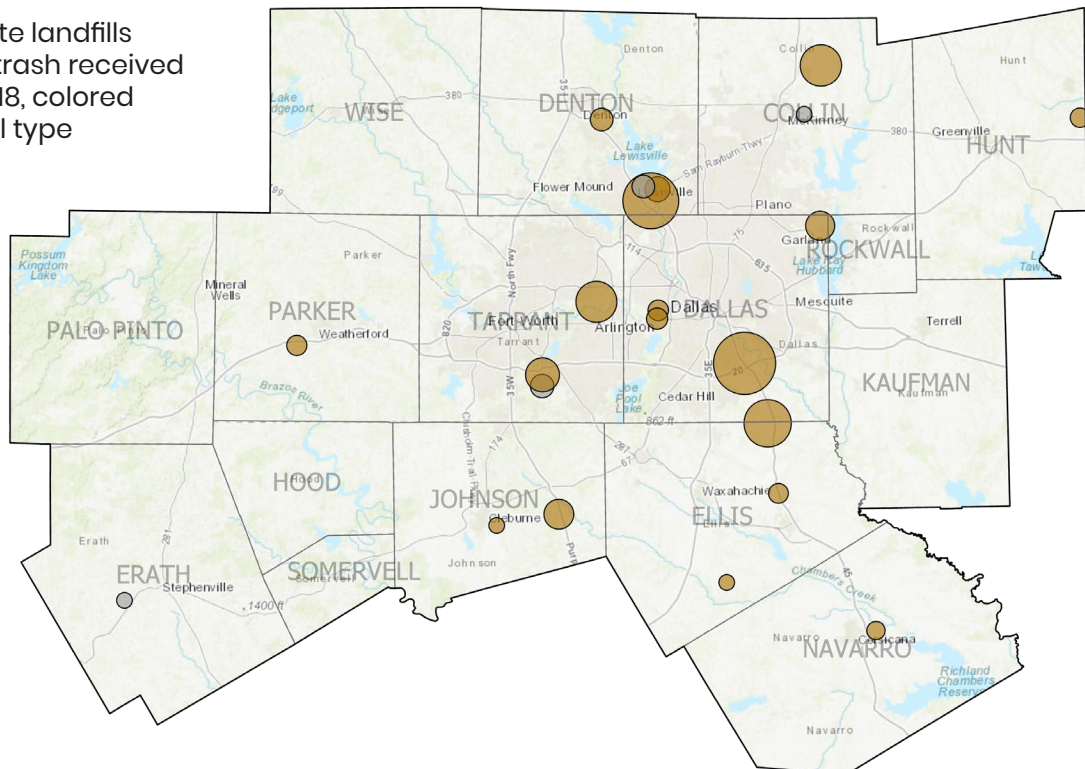
healthy food.¹⁰ The area around the McCommas Bluff landfill in southern Dallas is one of the worst census tracts for food access in the region, with about 75% of residents qualifying as both low income and living more than one mile away from a supermarket or grocery store. The second largest landfill in the region, located in Ferris (Ellis County), also straddles two census tracts that have a relatively high share of low income and low food access residents, 23% and 57% respectively, compared to statewide averages. Regionwide, many landfills are located in areas with relatively higher shares of low income residents and residents who live more than one mile away from food.

Waste Facilities and Annual Trash Intake in North Texas Region

Municipal solid waste landfills sized according to trash received in calendar year 2018, colored according to landfill type

MSW Type 1
C&D Type 4

○ ≤ 250,000 tons
○ 500,000 tons
○ 1,000,000 tons
○ 1,800,000 tons

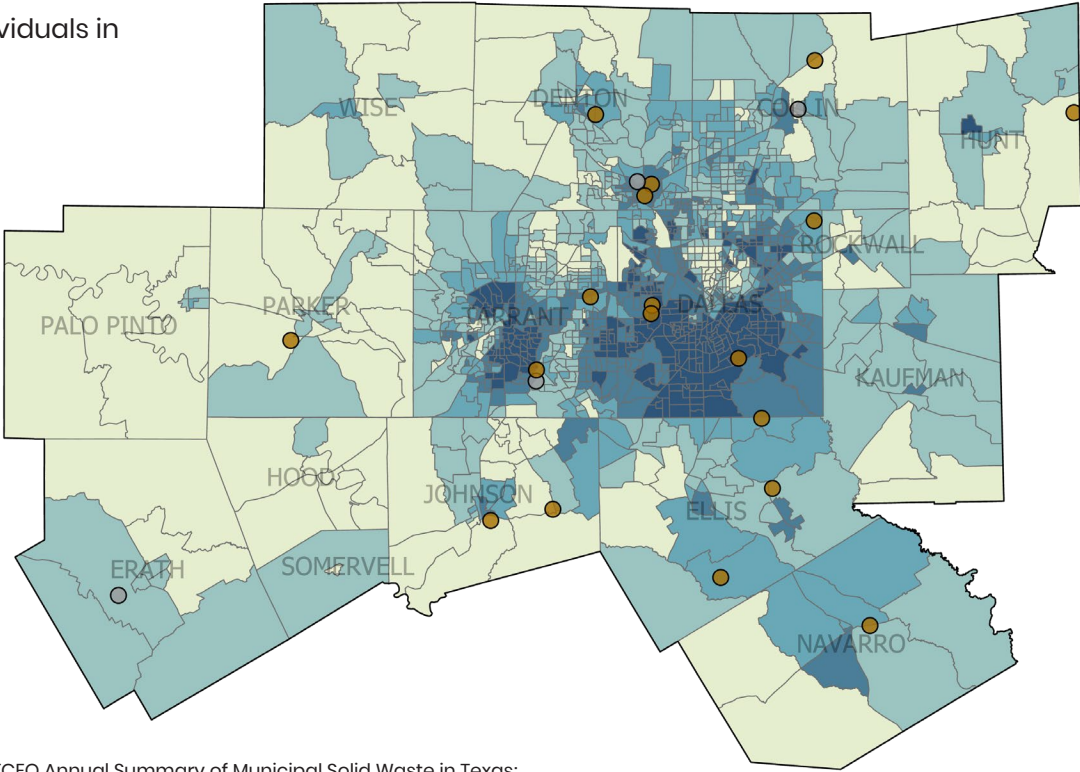


Primary map data source: Texas Commission on Environmental Quality Annual Summary of Municipal Solid Waste in Texas

Outsized Impact of Waste Facilities on Communities of Color

Share of non-white individuals in each US census tract

- ≤ 20%
 - 20% – 40%
 - 40% – 60%
 - 60% – 80%
 - ≥ 80%
- MSW Type 1 landfill
- C&D Type 4 landfill

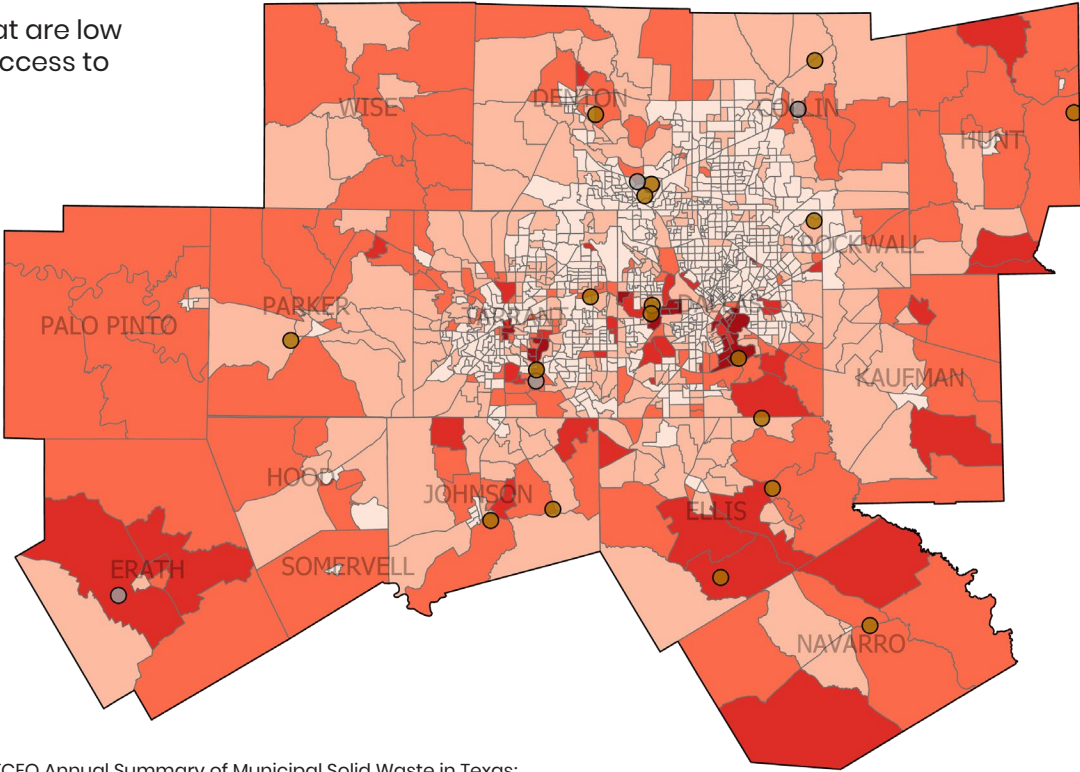


Primary map data sources: TCEQ Annual Summary of Municipal Solid Waste in Texas; US Census Bureau 2018 Five-Year Census Tracts B03002 Race and Ethnicity.

Outsized Impact of Waste Facilities on Low-Income Communities in Food Deserts

Share of households that are low income and have low access to supermarkets (> 1 mi)

- ≤ 5.97%
 - 5.97% – 23.67%
 - 23.67% – 41.37%
 - 41.37% – 59.06%
 - ≥ 59.06%
- MSW Type 1 landfill
- C&D Type 4 landfill



Primary map data sources: TCEQ Annual Summary of Municipal Solid Waste in Texas; USDA Food Access Research Atlas Data Download 2015

All Additional Map Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Limitations and Best Practices

Some shortfalls to existing organics diversion programs include contamination of the compost stream and a lack of enforcement and data tracking. San Antonio reported a 25% rejection rate in their residential composting collection for F.Y. 2019, which was down from a previous rate of 39%, indicating that these programs take time to implement and that it is important to educate residents.¹¹ Austin does not require food enterprises to report on the amount of waste they divert, which has made tracking the impact of their commercial program difficult.

One of the biggest limitations is contamination from plastic packaging, which has become ubiquitous in food retail and is difficult to keep out of commercial and residential food waste. Solutions to plastic pollution exist further upstream in the product production cycle and require more than municipal policies and programs.

These limitations should not stop cities from pursuing solutions to food waste that minimize the impact of organics on waste facilities, but should instead help drive conversations about effective program development. Austin's and San Antonio's programs offer pathways to organic waste diversion that other cities can improve on through better enforcement and diversion tracking for the commercial sector. Compost generated from organics diversion can be used to help local community gardens and other growing initiatives in food deserts. In addition, a city-wide policy requiring food businesses to divert organic waste could allow for a more systemic approach for donating food to food insecure households and support the efforts of food donation nonprofit organizations.

Looking outside of Texas for successful models, San Francisco requires all residents and businesses to separate recyclable and organic waste from the waste stream and is a leader in overall waste reduction in the U.S.¹² ¹³ The city followed a number of strategies to make its organics program successful that are instructive, including extensive education and outreach programs, banning plastic to-go containers and silverware, implementing

financial incentives through a pay-as-you-throw system, requiring all properties to participate in food composting programs, and investing in state-of-the-art composting infrastructure.^{14 15}

Addressing organic waste will require systemic changes to how we approach waste management.

A growing number of states are also taking initiative on commercial food waste diversion. Massachusetts, Vermont, Connecticut, New York, California and Rhode Island have passed or implemented statewide commercial organic waste laws in the last decade that prevent large food enterprises from disposing of food in the landfill waste stream. Support from the state could help increase the chances for successful food waste diversion programs at the city level in North Texas. In addition, policy changes at the State Capitol would be necessary to enact municipal bans on single-use plastic containers and silverware in order to reduce potential contamination.

Addressing organic waste will require systemic changes to how we approach waste management in North Texas and beyond. In order to reuse and recycle the vast majority of materials that end up in landfills, we must transition from an economy based on the wasteful path of producing-consuming-disposing to a more circular economy where we reduce waste all along the supply chain.

In North Texas, the majority of food waste and other discards are disposed of in communities of color and communities with low access to healthy food. It is clear that food waste is an environmental justice issue in a region where 1 in 5 children live in food insecure households. In order to address organic waste, solutions must take into account these inequities.

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1. The Problem is Global and Local: Landfill Pollution and Climate Change

Food waste, the main component of organic waste, is a significant driver of the climate crisis and represents a loss of valuable resources that could otherwise be used to feed people and animals, as well as regenerate soil. Organic waste in landfills is also a major source of landfill-related environmental and human health harms. By addressing organic waste through municipal policies and programs, we can make significant progress on reducing its climate impacts and landfill pollution.

Food waste in North Texas is an environmental justice issue. Our analysis shows that landfills in the region are disproportionately located in communities of color and low-income communities that have low access to nutritious food. The vast amount of food wasted in North Texas is therefore dumped on communities that lack sufficient access to healthy food.

Landfill Pollution from Organic Waste

Organic waste consisting of easily compostable food scraps, brush, yard waste, wood, and soiled paper accounts for about 30% of the waste in municipal solid waste landfills. As it decomposes in landfills, organic waste generates high levels of methane gas emissions, a flammable and potent greenhouse gas that is up to 86 times more potent than carbon dioxide in warming the planet. Landfills account for about 16% of methane pollution in the U.S.¹⁶ In addition to the climate impact of landfills, pollution is a major concern for communities near landfills. Landfill-related impacts on neighborhoods include leachate leaking into ground and surface water, air quality issues from pungent odors and volatile organic compounds, noise pollution, and frequent reports of illness and quality of life issues.¹⁷

The Double Loss of Food Waste

Food waste alone is the single biggest component of municipal waste streams, accounting for 22% of landfilled waste in the U.S.¹⁸ However, the impact of food waste far exceeds the environmental footprint of landfills. Wasted food represents a double loss: not only are enormous land, water, fossil fuel, and

other resources wasted, but harmful emissions are also created to produce that food. A full accounting of the environmental impact of food waste must address this double loss.

In the United States, approximately 40% of all food produced is ultimately wasted every year. Incredible amounts of invaluable resources are squandered to produce food that is ultimately wasted. The equivalent of about one-fifth of all U.S. croplands, agricultural water use, and farming fertilizers is consumed to grow the over 60 million tons of food that is wasted.¹⁹ In total, U.S. businesses and residents spend an estimated \$218 billion or 1% of the U.S. GDP on producing food that goes uneaten.²⁰

Yet, as the U.S. wastes a staggering amount of food, over 37 million individuals live in food insecure households.²¹

Wasted food represents a double loss: not only are enormous land, water, fossil fuel, and other resources wasted, but harmful emissions are also created to produce that food

Food and Climate

Food waste is a major contributor to the climate crisis. Globally, food production accounts for roughly 30% of climate emissions, and most countries waste around 30% of food produced. In the United States, we emit the equivalent annual greenhouse emissions of 37 million cars to produce food that is ultimately wasted.²² And it's estimated that just food scraps decomposing in U.S. landfills produce the equivalent emissions of 3.4 million cars and 23% of U.S. methane emissions.²³ Project Drawdown estimates that a 50-75% reduction in global food waste by 2050 could save up to 18.8 gigatons of carbon dioxide equivalent emissions (CO₂e).²⁴ Moreover, reducing food waste could also prevent the deforestation required to create additional farmland, saving around 75 gigatons of CO₂-equivalent emissions. For comparison, global CO₂ emissions from fossil fuels was projected to reach 36.6 gigatons in 2019.²⁵

Coronavirus Pandemic Exacerbates Food Waste Problem

The Coronavirus Pandemic has moreover reinforced the need for systemic solutions to our food distribution system as economic hardships expose more North Texans to food insecurity. The inelasticity of our food supply chain intensified food insecurity and food waste issues. Indeed, once the shutdown closed restaurants, hotels, cafeterias at schools, and other food venues, agricultural producers destroyed tens of millions of pounds of fresh food they had no means to distribute.²⁶ Furthermore, food insecure individuals are more vulnerable to the pandemic as diet-related diseases increase the risk of severe illness from COVID-19.²⁷

Organic Waste is a Texas-sized problem in North Texas

Organic waste is a global problem, but there is much that can be done to address it right here in North Texas. We estimate that North Texas businesses and residents throw away approximately 2.3 million tons of food into the landfill annually.²⁸ The problem is spread across a wide range of sources, including the hospitality and restaurant industry, food distributors and groceries, and residents. Addressing the food waste problem in the region will require shifting DFW toward a more circular economy based around reducing, reusing, and repurposing the majority of waste. Eliminating food waste in municipal landfills using strategies to divert unused food is a key component of that transition.

There are 1 million food insecure individuals in North Texas, out of a population of around 7.6 million, and nearly 400,000 in Dallas County alone, which has a food insecurity rate of 15.1% compared to 11.5% nationally.²⁹ 1 in 5 children, moreover, live in food insecure households in North Texas. Diverting food, especially healthy produce, represents an inroad for aiding food insecure individuals, although it would not resolve systemic causes of poverty.

2. Mapping the Disparities of Food Waste in North Texas

Studies have shown that landfills and other polluting facilities are more often sited in low-income and minority communities in the U.S.^{30 31} Indeed, one of the earliest studies demonstrating environmental racism, a 1983 report by sociologist Robert D. Bullard, found that municipal and private landfills in Houston were overwhelmingly built in Black communities.³² We mapped racial, economic, and food access disparities surrounding North Texas landfill sites to show that the region is no exception.

An overwhelming majority of the region's trash (and food waste) is dumped on communities of color. The three largest landfills by annual trash volume—those that receive around 1 million tons or more including Dallas, Lewisville, and Ferris—are located in majority communities of color. The largest landfill in the region, the McCommas Bluff Landfill that serves the City of Dallas, is located in a census tract with a population that is 99% Black and Latino.

Southern Dallas, which is predominantly Black

and Latino / Hispanic, is known for insufficient access to healthy food.³³ The area around the McCommas Bluff landfill in southern Dallas is one of the worst census tracts for food access in the region, with about 75% of residents qualifying as both low income and living more than one mile away from a supermarket or grocery store. The second largest landfill in the region, located in Ferris (Ellis County), also straddles two census tracts that have a relatively high share of low income and low food access residents, 23% and 57% respectively, compared to statewide averages. Regionwide, many landfills are located in areas with relatively higher shares of low income residents and residents who live more than one mile away from food.

As a result of the inequities of landfill siting and historic redlining, the region's wasted food is discarded in minority communities that currently lack access to sufficient healthy food.³⁴ In order to address organic waste, solutions in the North Texas region must take into account these inequities. In addition to environmental benefits, food waste diversion policies can address food access issues in part by maximizing the diversion of food discards still suitable for consumption. However, the deeper causes of food insecurity related to poverty and problems in our global food system require solutions beyond the municipal level.

Waste Facilities and Annual Trash Intake in North Texas Region

Municipal solid waste landfills sized according to trash received in calendar year 2018, colored according to landfill type

MSW Type 1

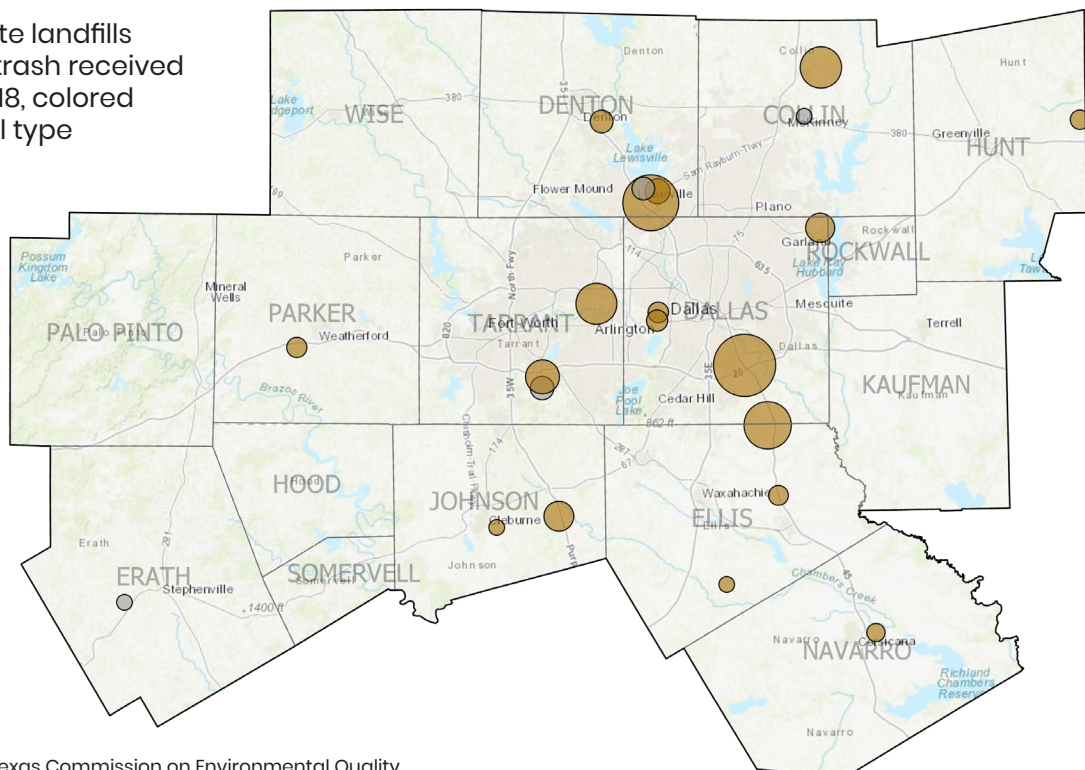
C&D Type 4

○ ≤ 250,000 tons

○ 500,000 tons

○ 1,000,000 tons

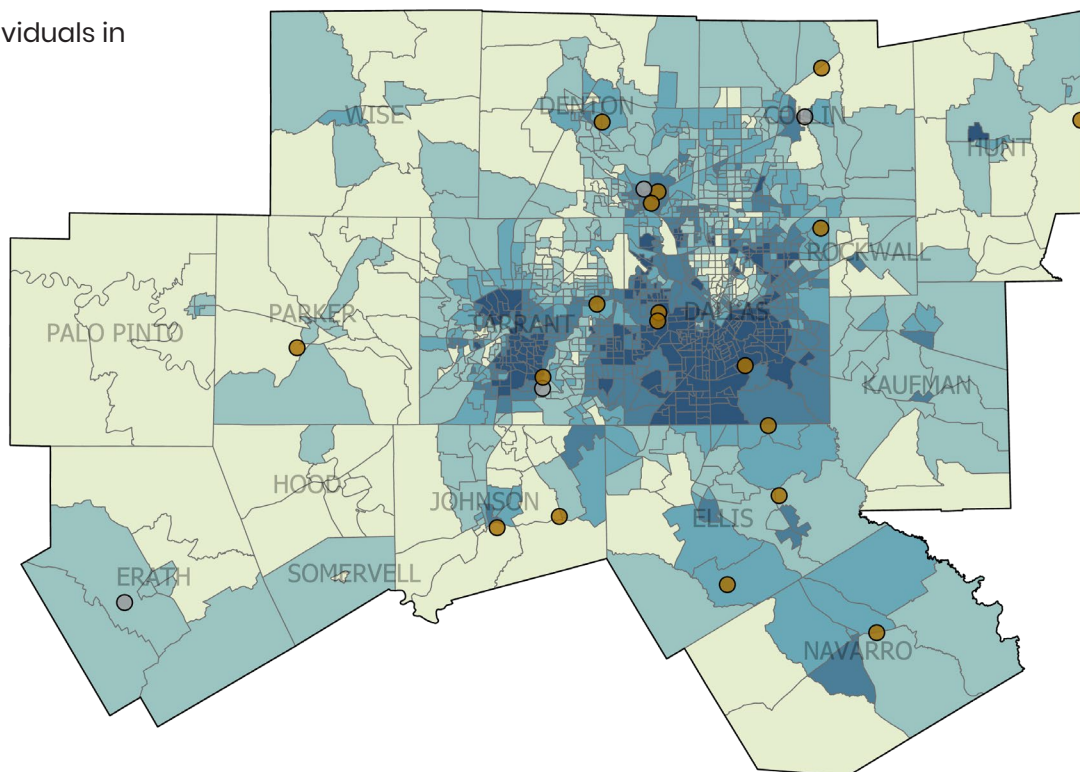
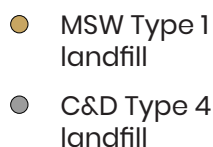
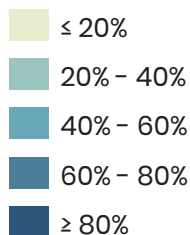
○ 1,800,000 tons



Primary map data source: Texas Commission on Environmental Quality Annual Summary of Municipal Solid Waste in Texas

Outsized Impact of Waste Facilities on Communities of Color

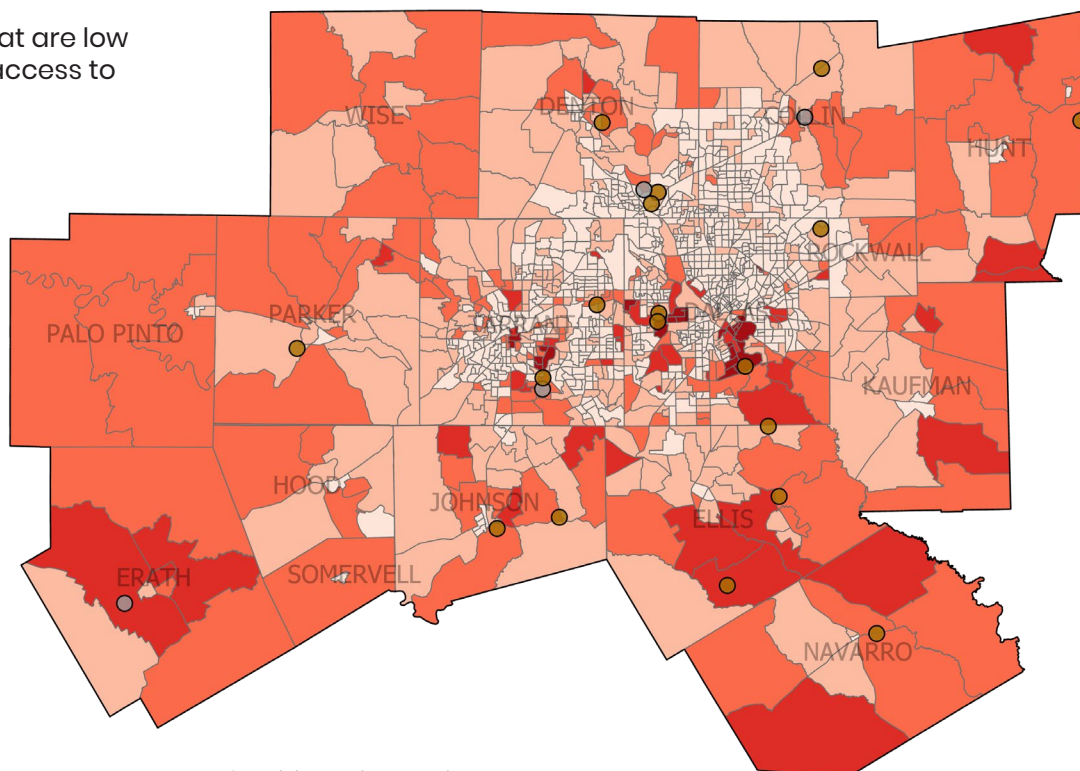
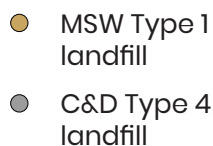
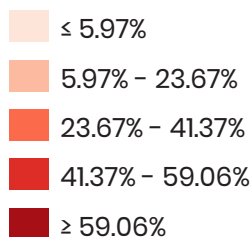
Share of non-white individuals in each US census tract



Primary map data sources: TCEQ Annual Summary of Municipal Solid Waste in Texas;
US Census Bureau 2018 Five-Year Census Tracts B03002 Race and Ethnicity.

Outsized Impact of Waste Facilities on Low-Income Communities in Food Deserts

Share of households that are low income and have low access to supermarkets (> 1 mi)



Primary map data sources: TCEQ Annual Summary of Municipal Solid Waste in Texas;
USDA Food Access Research Atlas Data Download 2015

All Additional Map Sources: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

3. Repurposing Organic Waste: Composting and Food Rescue

Organic waste consists of compostable organic materials, such as yard waste, brush, food scraps, food soiled paper, and woodchips. In general, municipalities distinguish between yard waste and food waste in their operations.³⁵ **Yard waste** includes garden and lawn clippings. **Food waste** includes unused food still safe for human consumption, food safe for animal consumption, and wasted food that is inedible but can still be composted.

Addressing food waste in particular will require 1) better practices in restaurants, food distributors, hotels, home kitchens, and so on to prevent food from going uneaten and 2) better practices on the disposal end to repurpose as much wasted food as possible into beneficial soil amendments.

Composting: Small and Large Scale

For composting, organic waste is classified as nitrogen-rich “green” materials (such as food waste and lawn clippings) and carbon-rich “brown” materials (such as dry leaves, branches, and woodchips). Individuals doing “backyard composting” often avoid composting fats, oils, and meats due to pest and odor problems. In Texas, commercial composting facilities can accept “vegetative” food waste—including fruit and vegetable scraps, coffee grounds, and egg shells—without obtaining a permit or providing notification, while facilities composting fats, oils, and meats are required to submit notification to the state regulator. Clean wood and certain paper products are also compostable.³⁶

North Texas is home to some major composting facilities that can process a wide range of “green” and “brown” materials that cannot be processed in home composting facilities. These facilities provide larger scale solutions to the problem of food and organic waste generation in commercial and industrial settings. Some of the largest facilities include: Texas Pure Products, Organix Composting, and Champion Waste and Recycling Services.

Food waste is categorized into residential food waste and commercial pre-consumer and post-consumer food waste. Residential food waste is generated in apartments and homes, and can be diverted through residential

curbside composting pickups. Implementation would require educating residents about using composting services.



Champion Waste composting food waste at their North Texas facility. Photo credit: Champion Waste & Recycline Services

On the commercial side, **pre-consumer food waste** is food that has not yet been in contact with the consumer, such as food waste generated by food distributors and grocery stores and in restaurant kitchens during food preparation. **Post-consumer food waste** is uneaten food that has been in contact with consumers, such as at restaurants and public events. Commercial composting facilities who contract with businesses to pick up post-consumer waste are required to go through a lengthier permitting process to accept it. Each year restaurants waste between 22 and 33 billion pounds of food, and supermarkets and other food retailers waste as much as 43 billion pounds or 10% of the U.S. food supply.³⁷



Pre-consumer food waste is sometimes described as any food waste that hasn't been plated or had a fork stuck into it. Post-consumer food waste has the added challenge of plastic waste

Graphics Credit: TCE Fund, Cassidy Keener

Composting: A Solutionary Dirt

Commercial and municipal composters create a number of products, including mulch from brush and yard waste. Their most environmentally beneficial product is what most people generally call “compost”: a soil amendment created from combining mulch with microorganisms and nitrogen rich organic waste such as food waste.



Texas Pure's composting operation in Melissa, TX. Photo credit: Texas Pure Products

When composted as opposed to landfilled, decomposing food waste generates less methane gas. Compost not only reduces methane gas emissions, but it also adds nutrients to our depleted soils—making them more productive—, increases soil's capacity for sequestering carbon, protects against diseases, reduces soil erosion, and conserves water. The Intergovernmental Panel on Climate Change recommends increasing the organic matter content of soil as an important aspect of sustainable land management for mitigating climate change.³⁸ For the clay and loam soil types that predominate much of the Dallas Fort Worth Metroplex, compost helps prevent soil erosion in particular.³⁹

Composting also supports local food production by potentially providing nutrient-rich soil for community gardens and local agriculture. A major cause of food-related emissions and the high price of healthy foods comes from transporting food over large

distances from where it's grown to where it's consumed. Localized food production can help address both problems.

A secondary benefit of compost is that it reduces the need for synthetic fertilizer, saving the carbon emissions generated in their production.⁴⁰ The ammonia used to produce nitrogen fertilizer is often derived from natural gas, further adding to the carbon footprint of synthetic fertilizers.⁴¹ Using nitrogen-based synthetic fertilizers in soil can cause nitrogen to leak into our waterways, resulting in large-scale fish kills. Production and use of synthetic fertilizers also releases nitrogen oxide into our atmosphere, which is 300 times more potent than carbon dioxide at warming the planet and can last in the atmosphere for over a century.⁴²

⁴³ Over 80% of human-generated nitrous oxide emissions come from land use.⁴⁴

Food Donations

According to the EPA food waste diversion hierarchy, after food waste prevention, recovering unused food to feed the hungry is the most effective solution to food waste. However, a significant barrier to food waste diversion through donation is the misconception among food enterprises that they could be held liable for any donation recipients who become ill after consumption. In fact, donations made in good faith to a nonprofit are protected by federal law through the Bill Emerson Food Donation Act and state law in Texas through the Good Faith Donor Act.^{45 46}

Over one-third of food discards from grocery stores and distributions in U.S. cities could be donated.

With over 800,000 individuals living in food insecure households in North Texas, expanded programs to divert edible food to nonprofits that serve these people are in great need.⁴⁷ It is not just a question of getting food on the table—many Dallas County zip codes lack access to healthy and nutritious foods. And Black and Latino residents as well as low-income residents

are disproportionately affected by the uneven distribution of healthy food resources.⁴⁸

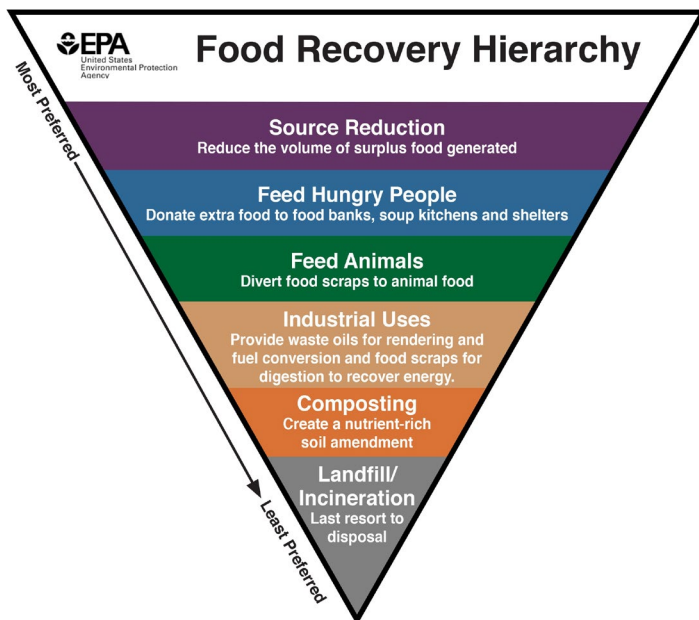
A Natural Resources Defense Council (NRDC) study estimated that over one-third of food discards from grocery stores and distributors in U.S. cities could be donated instead.⁴⁹ One reason for this is grocery stores generate a large volume of pre-consumer food waste—food untouched by a customer—compared to restaurants where a majority of food waste is post-consumer and therefore not suitable for donation.

This tracks with the experience of North Texas food donation nonprofits such as Harvest Project Food Rescue that work with grocery food distributors to divert large quantities of food discards that would otherwise go to waste. However, the resources required to get

available food would be significant. In their study on the City of Denver, for example, the NRDC estimated it would cost \$6.2 million per year to maximize food diversion for donations.⁵⁰ These findings indicate that maximizing food rescue necessitates municipal policy solutions.

The Coronavirus Pandemic has moreover reinforced the need for systemic solutions to our food distribution system as economic hardships expose more North Texans to food insecurity. The inelasticity of our food supply chain intensified food insecurity and food waste issues. Indeed, once the shutdown closed restaurants, hotels, cafeterias at schools, and other food venues, agricultural producers destroyed tens of millions of pounds of fresh food they had no means to distribute.⁵¹ Harvest Project Food Rescues, which serves 10,000 families a month in North Texas in normal times, saw produce distributions triple at the start of the pandemic.⁵² Cities in the U.S. with existing food donation infrastructure were positioned to respond quickly to the increased demand for food donations due to the pandemic.⁵³

The organic waste problem is an environmental justice issue, and solutions must work to address food insecurity as they minimize the environmental impacts of waste. While local organizations have worked diligently to provide healthy food to food insecure communities, the scope of the problem will require systemic solutions enacted by local governments to make communities more resilient against food insecurity both during times of crisis and during normal times. Municipal policies requiring food businesses to keep food out of their landfill trash have been demonstrated to increase the availability of edible food for nonprofits serving food insecure populations. In Massachusetts, for example, a statewide ban on large food enterprises putting food waste into the landfill led to a 22% increase in food donations statewide.⁵⁴ Increased education on the safety and legality of food donations will also be necessary, and it is important that municipal policy creation include substantial engagement with food-related nonprofits and businesses.



EPA Food Recovery Hierarchy indicating that landfilling food waste is a "last resort" for disposal.

even a majority of food that could be donated to food insecure households well exceed the capacity of existing nonprofits. While the NRDC found that there is incredible potential for diverting food discards for donation across the restaurant, grocery retail, and other food services sectors (including university cafeterias and hospitals), they estimated the annual costs of scaling up food donations—including labor, transportation, storage, and distribution—to maximize the diversion of

4. Where We're at: Organics Diversion in North Texas

Organic waste is a major area of opportunity to reduce waste in the region, as municipalities increasingly recognize. However, progress on organics diversion is uneven with most municipal organic programs limited to brush and yard waste collections. Food waste diversion policies and programs in the area remain inadequate as the majority of wasted food ends up in North Texas landfills. We estimate that the North Texas region landfilled about 2.3 million tons of food waste in 2017. In the City of Dallas, 30% of the residential landfill waste is made of compostable food scraps and yard waste; in Fort Worth, about 30% of the residential waste it landfills are food scraps.

What is more troubling is that local data on organic waste is out of date and not well tracked. Dallas and Fort Worth, for example, last conducted waste characterization studies showing the percentage of yard, food, and other recyclable waste going into the landfill back in 2014. In 2018, consulting firm Burns and McDonnell conducted a limited study of the regional composition for residential waste for the North Central Texas Council of Governments, finding that an estimated 44% of household waste was compostable organics. However, according to the study's authors, their data cannot be used to calculate the tonnage of organics or other materials in individual city waste streams and is instead intended to provide a "snapshot" of the regional waste composition.⁵⁵

Yard Waste and Brush Collection

Many cities in North Texas have programs that help single-family dwellers divert yard clippings and brush waste. These collection programs help divert a great deal of "green" waste and provide feedstocks for area composting and mulching facilities. For example, Fort Worth has a brush and yard waste recycling program that diverts tens of thousands of tons of materials to produce mulch every year.⁵⁶ However, while these programs capture an important category of organic waste, these are by no means comprehensive in addressing the majority of compostable material. Despite

having separate collections for bulk trash and brush, Fort Worth has reported that up to 70% of bulk trash consists of recyclable organics that could be diverted.

Frisco, Richardson, Plano, McKinney, and Allen all send their yard waste collections to Texas Pure in Melissa, TX for reprocessing. In 2019 those five cities diverted over 49,000 tons of yard waste.

Dallas, however, continues to comingle brush and bulk trash in its monthly collection. The city estimates that 40–60% of the brush/bulk collection is compostable organic waste, and nearly all of it is buried in the McCommas Bluff Landfill.⁵⁷ Dallas officials estimate that up to 90,000 tons of organic material are wasted due to the city's failure to provide a separate collection program for brush and yard waste.

In June 2019, Dallas City Council voted to implement minor changes to its bulk and brush collection policy but has yet to pass an ordinance mandating their separation. This is one easy step that could increase the city's overall waste diversion rate from its current rate of around 20% to 30%.⁵⁸

Current Regional Progress on Food Waste

While many cities have programs to compost yard waste and brush, food waste is a different story. In terms of progress, the cities of Fort Worth and Denton have taken small steps by implementing minor diversion programs. The City of Dallas has made a future food waste



Recycle Revolution unloading food waste at its composting site. Photo credit: Recycle Revolution.

diversion ordinance an action item in its 2020 climate plan, however it is unclear how soon the city will get to implementing such a plan as they have experienced delays addressing such a policy over the last several years.

In the private sector, a number of composting businesses, including Cowboy Compost in Fort Worth and Turn Compost in Dallas, have emerged on the scene to provide residential and commercial composting services. Another reuse company, Recycle Revolution in Dallas, composts post-consumer food waste from local businesses. Academic institutions such as the University of Texas Dallas and University of Texas Arlington have also taken significant steps to prevent and divert food waste in their campus-run eateries. However, without a regional framework for organics diversion or city-wide programs, most businesses who are interested in composting must seek out their own solutions by contracting with one of the few and often expensive private haulers, if the business is in their service area, or finding a local farm to take their compostables.



Cowboy Compost creating a new compost pile with soiled paper, food waste, and brush. Photo credit: Cowboy Compost



Turn Compost staff working on a compost pile at their site in central Dallas. Photo credit: Turn Compost

At present in North Texas, no city has implemented a commercial organics program requiring food enterprises to keep food waste out of the landfill. In addition, no city provides curbside food scrap composting collection

programs to residents, although the City of Denton recently began allowing vegetable scraps to be deposited in their subscription yard waste bins.

In North Texas, Fort Worth and Denton have implemented limited food waste diversion programs. Fort Worth began a pilot program for a residential composting drop off in April 2019 with 10 drop off locations.⁵⁹ As of December 2019, 777 households had participated in the program diverting over 23.5 tons of food scraps during the first eight months of the program. Based on city projections, residential food waste in 2020 is expected to be about 105,000 tons or 30% of all residential trash.⁶⁰ While this is a step in the right direction and the program is still in its early stages, the drop-off service has not made a significant impact on the city's food waste problem. In their 2017-2037 Comprehensive Solid Waste Management Plan, the city also planned to begin a limited subscription-based curbside composting collection, but has yet to do so as of this reporting.⁶¹ Until Fort Worth adopts a city-wide curbside composting collection, as San Antonio has done, it is unlikely to make significant progress on diverting residential food waste.

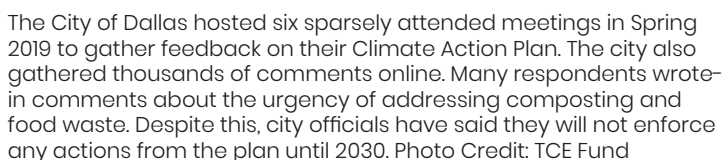
The City of Denton has a limited residential compost service by accepting uncooked vegetative scraps and coffee grounds in their residential yard waste collection bins, which is then composted at the city's Dyno Dirt facility.⁶² It is unclear how widely used the service is or whether the city is tracking food waste

While recent actions from the City of Dallas have shown promising indicators on organics, much remains to be done. In the climate action plan that Dallas City Council passed unanimously in May of 2020, the city called for an ordinance to implement a city-wide organics management plan that would require all food enterprises to keep food waste out of the landfill. The climate plan also stated the city will evaluate the potential for a residential curbside yard and food waste collection.⁶³ However, Dallas's Office of Environmental Quality and Sustainability stated that the climate plan would not implement any mandates for its first six years and enforcement will not begin until 2030. In 2013, Dallas adopted a Zero Waste Plan that proposed creating an organics program

Another troubling development is that the climate action plan indicates that Dallas intends to significantly roll back its prior commitment to robust, long-term waste diversion goals. In its 2013 Zero Waste Plan, Dallas set a goal of diverting 85% of all waste by 2040.⁶⁴ The 2020 climate action plan reduces that goal to 45% diversion by 2040. The City of Dallas further proposed updating its Zero Waste Plan as an action item in its climate plan. However, it has thus far not sought public input on the potential Zero Waste Plan update outside of limited engagement with waste reduction policies at stakeholder meetings for the climate action plan.

Although North Texas cities like Dallas have attempted to implement programs to address food insecurity, none have resulted in a significant reduction in food insecurity rates. Currently, it is primarily the responsibility of local food donation nonprofits to assist food insecure households in the region.⁶⁵ Harvest Project Food Rescue, the Oak Cliff Veggie Project, and North Texas Food Bank, among others, attempt to fill that gap.

Harvest Project Food Rescue, a nonprofit committed zero waste founded in 2014, provides healthy produce to around 10,000 individuals a month, many of whom do not live near a grocery store or have regular access to a car. The organization started in order to work in collaboration with Latino and Black communities in West Dallas and other parts of the metroplex that lacked access to nutritious food. Harvest Project aims to not just address food access, but to provide access to healthy produce and education on nutritious eating. Since the pandemic began, they now serve 2,000 families a week due to increased demand as a result of the economic effects of the virus.



Still, Harvest Project's Founder, Danae Gutierrez, sees the problem as much bigger than the need for food donations. She argues that the food is there, but our broken food system prevents it from getting to those in need and makes healthy foods too expensive: "The way our food system works is adding fuel to the fire of hunger. We have the resources, we're just not using them to feed people." In a similar perspective to the one presented in this report, she says the problem is exacerbated by the fact the U.S. generates large amounts of pollution to grow and transport food and then wastes up to 40% of it.

"The way our food system works is adding fuel to the fire of hunger. We have the resources, we're just not using them to feed people."

**– Danae Gutierrez
Harvest Project Founder**



Photo Credit: The Dallas Morning News.

5. Pulling from the Root: Organic Waste Solutions in Austin and San Antonio

While there are numerous options for individuals to compost in their backyards or apartments, the scope of the food waste problem extends far beyond the realm of individual choice.⁶⁶ Addressing organic waste will require systemic changes to how we approach waste management.

In order to reuse and recycle the vast majority of materials that end up in landfills, we must transition from an economy based on the wasteful path of producing-consuming-disposing to a more circular economy where we reduce waste all along the supply chain. In the DFW region we can implement a zero waste approach to food management at the municipal level by addressing food loss in the residential and commercial sectors--in grocery stores, food distributors, restaurants, hotels, and homes.

Moreover, due to the scope of the commercial food waste problem, relying solely on programs that merely incentivize businesses to divert food waste fails to make significant inroads in diversion rates. Real solutions to DFW's food waste problems must center on providing residents convenient access to composting services at the curb or in their apartment complexes and requiring that food businesses keep all food waste out of the landfill by reducing, donating, or composting unused food.

Yard Waste and Brush Collection

In Texas, San Antonio and Austin have taken the lead in implementing food waste diversion programs. Both cities offer curbside organics collection for single-family residential customers. Austin also passed a commercial food diversion ordinance requiring food enterprises to keep food out of the landfill by reducing, donating, or composting leftover food.

San Antonio's residential organics program began with a limited pilot in 2011 before shifting to a subscription service. The weekly curbside collection services provides a green

cart for residents to deposit yard waste, food scraps, and food soiled papers that will be composted by a private contractor. In 2017 the city extended the service to all residential customers. The transition from subscription-based to city-wide service created a dramatic increase in organics diversion. The tonnage of organic materials in their collection more than doubled from 24,000 tons in 2016 to over 56,600 tons in 2017.⁶⁷ As of 2019, San Antonio's organics program collected 68,000 tons of waste. The success of the program demonstrates the effectiveness of implementing a city-wide curbside collection program over a more limited subscription-based service. As of 2019, the City of Austin offers curbside composting collection to nearly 150,000 homes, about three-quarters of its single-family home customers. The city plans to extend the service to all curbside residential customers in 2020 pending city council approval.⁶⁸

San Antonio and Austin both offer a "Pay-As-You-Throw" system for residential homes to encourage composting and recycling. The program allows residents to choose a smaller sized garbage bin and pay for only the amount of landfill waste that they throw away, with recycling and composting reducing the need for a larger bin. These programs give residents a direct financial incentive to reduce waste. For example, in San Antonio the program can save residents as much as \$144 per year.⁶⁹ Fort Worth and Denton also offer variable trash cart sizes.

The Austin Universal Recycling Ordinance requires all food-permitted businesses to submit a yearly organics diversion plan and provide convenient access to employees to divert organic waste. Businesses decide the diversion method they would prefer, which may include reducing waste generated, donating food to people or animals, composting, or creating alternative diversion programs.⁷⁰ The program used a phased-in approach by first requiring large food enterprises that occupy facilities 15,000 sq ft or larger be in compliance by October 2016 and expanding to all food businesses in October 2018.⁷¹ Austin Resource Recovery, the city's solid waste department, provided education, resources, and tax incentives to businesses to help with implementation.⁷² Unfortunately, Austin does not require businesses to report the amount of waste diverted, and so the effects of the program on diversion rates are difficult to track.

LOCAL PROJECTS

For a More Circular Economy

Community Gardens and Composting in Oak Cliff



Veggie Project community garden class. Photo Credit: The Oak Cliff Veggie Project

The Oak Cliff Veggie Project operates in the primarily Latino and Black Dallas neighborhood of Oak Cliff to provide nutritious food to households with low food access. Although

it provides a monthly food distribution, the organization's Director, Ples Montgomery, has a more ambitious vision for tackling food waste and food insecurity. Like the Harvest Project, with which the Oak Cliff Veggie Project frequently works, their goal is to create a local circular economy. The Veggie Project educates local residents on how to grow their own food and runs community gardens. Ples Montgomery envisions creating a closed loop where the community composts food discards from local residents and institutions, such as schools, and uses this neighborhood-produced compost to supply nutrient-rich soil to community gardens, which would in turn grow healthy food for residents. The Veggie Project's goal of a self-sustaining, local food system could provide a model for other communities in the North Texas area to holistically address food waste and food deserts.

Campus Food: Compost Craig at the University of Texas Dallas



Producing mulch from landscape waste at UTD. Photo credit: UTD Office of Facilities & Economic Development

At the University of Texas Dallas (UTD), a groundskeeper experimented with creating his own version of a self-sufficient system for repurposing organics waste on campus. Craig Lewis, who earned the moniker "Compost Craig," and his team took the initiative to collect and compost the large quantities of organic waste generated from landscaping and other aspects of UTD's rapid expansion. On 4.5 acres on campus, Craig's team composted 100 tons of materials per year from 2010 to 2014 and turned it into soil to use throughout campus. As a part of their operation, Craig's team collected

90 lbs of pre-consumer food scraps each day from two main campus eateries to compost. Compost Craig's goal was to make the university entirely self-sufficient by composting all organic waste internally and generating all of the soil the campus would need, and he came close to achieving that. However, in 2018 his operation was swallowed up by the university's expansion, which needed the space his composting piles occupied.

The University continues to divert food and landscaping waste to be composted offsite by the private waste company Organix Composting, demonstrating what food waste solutions are possible at North Texas's numerous academic institutions. In 2018, UTD began composting post-consumer food waste from the campus dining hall, which increased food waste diversion by over 50% to 100,000 lbs per year. In addition, UTD's student government created an initiative in 2018 to allow students living on campus to participate in the campus' composting program.

6. Where We Need to Be: Charting a Path for DFW

The most successful examples of organics diversion at the municipal level employed city-wide curbside residential composting and mandates that food enterprises keep food waste out of the landfill. San Antonio and Austin's organics management strategies represent models that DFW cities could look to for creating local diversion policies. While brush and yard waste programs are common in North Texas, food waste remains an area of great need and opportunity. Dallas has already shown interest in adopting a commercial food waste diversion ordinance akin to Austin's and San Antonio's and in evaluating a residential curbside compost collection. Nevertheless, until diversion policies become standard across the region, edible and inedible food scraps will continue to be handled sporadically through limited commercial initiatives, almost guaranteeing that the majority of food waste will end up in landfills.

Limitations and Best Practices

Some shortfalls to existing organics diversion programs include contamination of the compost stream and a lack of enforcement and data tracking. In 2019 San Antonio reported a 25% rejection rate in their residential composting collection, which was down from a previous rate of 39%, indicating that these programs take time to implement and that it is important to educate residents.⁷³ Austin does not require food enterprises to report on the amount of waste they divert, which has made tracking the impact of their program difficult.

One of the biggest limitations is contamination from plastic packaging, which has become ubiquitous in food retail and is difficult to keep out of commercial and residential food waste. Solutions to plastic pollution exist further upstream in the product production cycle and require more than municipal policies and programs. Reducing the production and use of difficult-to-recycle and single-use plastic packaging, which makes up 40% of all plastic production, can help reduce contamination in the compost stream.

Best Practices: City Policies

In Texas, Austin's and San Antonio's programs offer pathways to organic waste diversion that other cities can improve on through better enforcement and diversion tracking for the commercial sector. Compost generated from organics diversion can be used to help local community gardens and other growing initiatives in food deserts. In addition, a city-wide policy requiring food businesses to divert organic waste could allow for a more systemic approach for donating food to food insecure households and support the efforts of food donation nonprofit organizations.

Looking outside of Texas, San Francisco was the first city to institute a food scraps and yard waste program in the United States in 1996 and is a leader in overall waste reduction in the U.S.⁷⁴ It diverts 80% of its waste from landfills. To achieve this, the city required all residents and businesses to separate recyclables and organic waste and keep them out of the landfill waste stream.⁷⁵ San Francisco goes beyond Austin's and San Antonio's residential programs by requiring all properties and residents, including apartment residents, have access to composting.

Through its organics program, the city diverts over 250,000 tons of organic waste annually, generating 350 tons of compost soil amendment daily.⁷⁶ One important step San Francisco took was to require restaurants to use compostable or recyclable to-go containers and ware in order to cut down contamination of the organic waste stream by plastic packaging.⁷⁷ The city followed a number of strategies to make the program successful, including extensive education and outreach programs, implementing financial incentives through a pay-as-you-throw system, requiring all properties to participate in food composting programs, and investing in state-of-the-art composting infrastructure.⁷⁸



Best Practices: Solutions Beyond the City & State Level

For commercial organic waste laws at the state level, Texas could look to examples like Massachusetts, which has implemented a statewide ban on landfilling food waste for businesses that dispose of one ton or more of food waste per week in 2014, affecting 2,900 businesses. The ban more than doubled overall food diversion in the state from 110,000 in 2014 to 278,000 in 2018 and led to a 22% increase in food donations. However, Massachusetts's ban focuses only on large food enterprises, reducing the minimum to half a ton per week could expand the rule to an additional 1,800 food businesses that generate around 100,000 tons of food waste per year.⁷⁹

A growing number of states are also taking initiative on commercial food waste diversion. Massachusetts is not alone as an example; Vermont, Connecticut, New York, and Rhode Island have also implemented statewide commercial organic waste laws in the last decade that prevent large food enterprises from disposing of food in the landfill waste stream.⁸⁰ Support from the state could help increase the chances for successful food waste diversion programs at the city level in North Texas. In addition, policy changes at the Texas State Capitol would be necessary to enact municipal bans on single-use plastic containers, silverware, and Styrofoam in order to reduce potential contamination, since city-level policies in this area are currently preempted

Addressing organic waste will require systemic changes to how we approach waste management in North Texas and beyond. In order to reuse and recycle the vast majority of materials that end up in landfills, we must transition from an economy based on the wasteful path of producing-consuming-

disposing to a more circular economy where we reduce waste all along the supply chain.

In North Texas, the majority of food waste and other discards are disposed of in communities of color and communities with low access to healthy food. It is clear that food waste is an environmental justice issue in a region where 1 in 5 children live in food insecure households. In order to address organic waste, solutions must take into account these inequities.

Food Systems

Addressing food waste systemically at the city and regional levels is an important avenue to improve our global and local environments. However, it should be noted that the scope of the food waste problem extends beyond what can be done at the municipal or even state level as North Texas is integrated into a global food system. Preventing food loss and ensuring all individuals have access to nutritious food will also require changes at the food production end, as will reducing the impact of food production on climate change.

In addition, problems in our global food system are increasing the risk of future pandemics like that caused by COVID-19. Destroying natural habitats for agricultural production is increasing human exposure to wild animals and new diseases.⁸¹

Moreover, while food donations represent an important stopgap measure for fighting food insecurity, long-term solutions to food deserts, which disproportionately affect low-income communities and communities of color, will require addressing systemic poverty as well as inequities in the distribution of nutritious food.



Recology's Jepson Prairie Organics composting facility, one of two serving San Francisco, processes 100,000 tons of organic waste annually. Photo credit: Recology.

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