2021 Wichita Litter Study

Wichita State University
Environmental Finance Center

WICHITA LITTER STUDY

Contents

Executive Summary

Litter is a global concern. Through prevention and mitigation strategies, communities around world are working on efforts to reduce the amount of litter that negatively impacts us locally and ultimately ends up in our oceans creating shared environmental pollution. It can be an overwhelming problem that seems to have little or no solution; however, studies show that understanding where litter originates and how it can be prevented has environmental, economic, and social benefits for all communities.

The Wichita Litter Study was designed to capture a snapshot of litter at locations throughout the community to better understand littering behavior and sources of litter in Wichita, and to develop effective strategies for preventing and eliminating litter from the local environment. Project volunteers collected, categorized, and quantified litter found in 12 municipal parks. In total, 1,765 pieces of litter greater than 4" in size were collected and categorized during the collection events, and an additional 30 gallons of smaller materials were collected. Plastic made up 47% of litter data and 75% of the plastic collected was from the food and beverage industry. Data analyses support the hypothesis that where people congregate, more litter is found despite the presence of trash bins.

Litter in Wichita can be reduced and eliminated by understanding that the approach to remediation and prevention is multifaceted. There are a range of opportunities for the city, the business community, nonprofit organizations and individuals to collaborate and innovate to develop successful solutions to reducing litter. Potential actions include increasing waste and recycling containers in high use areas, engaging volunteers already interested in keeping parks clean, developing educational signage and community-wide awareness campaigns, and encouraging residents and businesses to reduce waste by adopting the use of reusable beverage cups and food containers. Ongoing monitoring using the protocols developed for this project will allow the community to identify additional trends, monitor progress, and measure success as recommendations are implemented.

KEY TAKEAWAYS

People → Litter
Where there are people there is litter. Through education, outreach, and access to reusable, ecofriendly items, actions and behaviors can change that will lead to a cleaner, healthier community.

We can start today!
Although eliminating litter can seem daunting, small changes can have big impacts. Proper trash disposal and recycling when possible at home, at work, and at play can reduce litter in Wichita.

Share & Learn
The litter collected is comparable to other studies conducted in the United States. City leaders, business, and community members can learn what policies and programs are working to reduce litter elsewhere and apply those best practices here in Wichita.

Introduction

The Wichita Litter Study seeks to identify and characterize litter quantity and trends in Wichita, Kansas. The following pages provide information about the data collected in the summer of 2021 and potential recommendations to assist future efforts to identify and reduce litter. The data compares litter types and quantities at locations across Wichita. The study provides a baseline for future development of policies, public education and outreach, and on-the-ground projects to reduce litter in the Wichita metro area.

Volunteers at cleanup event by the Arkansas River

It is important to note that this study provides a snapshot of the litter present at 12 locations throughout the City of Wichita at two points in time, approximately six weeks apart, in summer of 2021. The study examines all types and conditions of litter present. Data collected during the study provides insight into the types of litter commonly produced, potential sources, and environmental characteristics that may be linked to amounts of litter present. The Litter Study can be used to draw general conclusions that guide further action to address littering behavior, litter sources, and litter clean-up in areas similar to sites used in the study – municipal parks.

The 2021 Wichita Litter Study is not a comprehensive study of all areas and conditions that exist within the City. It does not, examine litter along highways, in waterways, or on private, commercial, or retail property. Wichita Litter Study is not designed to compare litter between parks due to the varied nature of the sites, and it does not target specific materials or sources at a level of detail needed to derive material- or source-specific policies or programs. It is not a characterization of all litter in Wichita. Instead, this study is a starting point for developing a better understanding of and approach to managing litter.

This Litter Study has the potential to be replicated at other sites in the Wichita area and in other communities. This project builds on similar litter collection projects occurring across the U.S. and can enhance these projects through data sharing.

Background

Approximately, 80% of trash in waterways comes from land-based sources (U.S. Environmental Protection Agency, 2004; Parker, 2019a). Solid waste that is improperly disposed of threatens the health of drinking water, soils where we grow food, wildlife, aquatic ecosystems, public health, and the economy.

Intentional littering, improper disposal, blowing trash, transportation, industrial facilities, and more contribute to the litter that travels from land to our waterways, oftentimes through storm drains and small creeks and tributaries of rivers.

The amount of trash generated by people is increasing (Smith & Nichols, 2019). In the United States, there are approximately 152 pieces of litter per person in the United States (Keep America Beautiful, 2021). Most of the trash that is found during clean-ups and studies is plastic. In the most recent Keep America Beautiful litter study, cigarette butts, which are made of plastics and toxic chemicals, remain the most littered item in the United States, with other plastics consisting of 38.6% of all litter collected (2021).

What is Marine Debris?

"Marine debris is any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes. It may enter directly due to human action, or indirectly when washed out to sea via rivers, streams and storm drains. Marine debris has become one of the most pervasive pollution problems facing the world's oceans and waterways." (EPA, 2004)

According to recent studies, approximately 90% of plastic pollution arrives in the ocean via rivers, industrial and municipal waste, littering, and windblown waste (Murat, 2020). Additionally, light plastic is often windblown out of transportation, landfills, and trash receptacles and gathers near storm drains which carry it to rivers (Murat, 2020). According to the National Centers for Environmental Information (NCEI) Climatology Map, Kansas experienced higher winds during June and July compared with other states in the Midwest. It can be concluded that wind is a factor in the litter found on land; however, the impact of wind on litter will require further study.

Not only does land-based litter have environmental health impacts, but it also has economic impacts. For example, the Pennsylvania Department of Transportation spent over $65 million to remove debris from highways across the state (Burns & McDonnell, 2020). Calculating the community cost of litter can be challenging. Costs are often distributed across city departments and volunteer hours provided by individuals and organizations are difficult to track. Additionally, the costs of remediating the impacts of plastics and metals in soils and waterways can increase total economic impact exponentially (Hamilton, Feit, Muffett, Kelso, Rubright, Bernhardt, Shaeffer, Moon, Morris, & Labbé-Bellas, 2020).

To positively affect the economic, environmental, and health impacts of litter in the U.S., many state, county, and city governments are considering a variety of approaches to reduce the negative impacts of litter. Policy actions include, but are not limited to, fees, incentives, bans, and solid waste and recycling programs, tools, and technologies. Studies are starting to show that single-use plastic or other litter policies can have positive economic, social, and environmental impacts on communities.

Methodology

Land-based litter studies are rare as researchers often focus on areas close to large water bodies, such as the Great Lakes and coastal areas that surround the United States; however, rivers are key in transporting litter from land to the ocean. Although many of the world's largest rivers are responsible for marine debris, research has found that small rivers that flow through urban areas carry most of the waste (Meijer, Emmerik, VanDer Ent, Schmidt, & Lebreton, 2021).

The Wichita Litter Study methodology was developed based on research of other studies conducted in the United States that use citizen scientists to gather, categorize, and count litter.

The study's stratified random sample was based on the six Wichita City Council districts. Two parks within each district were chosen based on the following criteria:
- Land use – recreation facilities such as playground equipment, picnic areas, and athletic fields
- Accessibility for volunteers – ease of parking, minimal dangerous terrain or potential encounters with dangerous wildlife or foliage
- Geographic distribution – parks were located across the city from north to south and east to west

In addition to the above criteria, locations were identified with input from Wichita City Council members, community members, City staff, and organizers of volunteer cleanup events. Twelve (12) parks within the city limits of Wichita were identified and smaller segments of the parks were chosen as the data collection sites. The data collection sites were approximately 35,000 ft^2. This dimension was determined by input from volunteer coordinators who provided insight into how much space volunteers would be able to clean within two hours.

Data collection, cataloguing, and counting was based on the Environmental Protection Agency's Escaped Trash Assessment Protocol (ETAP) *(See Appendix A)*. Protocol for determining which pieces of litter data should be tallied versus measured volumetrically was determined through research of other litter studies, primarily the Keep America Beautiful 2021 National Litter Study. Each item collected that was larger than four inches was assessed, categorized, and logged with tally marks on the data collection sheet. Items, regardless of material or degradation, that was smaller than four inches were measured volumetrically in 5-quart buckets (i.e., items smaller than 4 inches were not individually categorized).

Data Collection Events

Twenty-four (24) data collection events were conducted in June and July of 2021. Litter data was collected by volunteers who completed training to ensure data quality. Each collection event had a site coordinator that set the boundaries, provided on-site volunteer information, safety instructions, and training for the data collection process. Site coordinators also confirmed that 100% of litter was removed from each site.

Volunteers were recruited through various outreach methods:
- The EFC spoke with multiple community organizations to engage the groups in the study.
- An ad was placed in the internal newsletter at WSU.
- The EFC and the City of Wichita issued a joint press release.
- EFC staff presented the project at the weekly mayoral briefing.
- The Wichita Eagle and local news and radio stations ran stories about the project.
- Information was posted on the EFC website.
- Information about the project was posted on EFC social media channels and was shared on the City's social media channels and among volunteer groups.

Volunteers completed the Volunteer Interest Form and the Data Collection Training Video before participating in a data collection event. The Volunteer Interest Form provided contact information for those interested in participating to study organizers. This form was a method of recruitment as well as a communication tool. Volunteers were required to watch the Data Collection Training Video prior to participating in a data collection event to ensure that all volunteers understood the process of collecting, cataloguing, and counting litter data.

Sixty-seven percent (67%) of people who completed the Volunteer Interest Form completed the Data Training Video and participated in at least one data collection event. Many volunteers participated in more than one event. In total, 70 volunteers from all over the City and its suburbs participated in data collection events. Volunteers were all ages, from young children to senior adults, and were of varying mobility.

Volunteers collected data in pairs. One person gathered data (picked up litter) and assessed it (determined what and how degraded it was) while the other catalogued it (recorded it in the data sheet). After a random amount of time the site coordinator had volunteers switch roles to ensure data quality. As volunteers collected and counted data, the site coordinator followed behind pairs randomly to confirm total collection.

At the conclusion of the event, the site coordinator checked data collection logs for completion and encouraged volunteers to comment about what they encountered while collecting litter data.

Data Summaries

The data gathered and analyzed is a snapshot of litter information in segments of twelve (12) parks within Wichita. *(See Appendix B for complete list of total materials gathered.)* These data do not represent a comprehensive examination of all litter in the city; however, the following analyses can provide a jumping-off point to guide potential strategies to prevent and mitigate litter.

Total Litter Data Collected

In total, 1,765 pieces of litter greater than four inches in size were collected and tallied during the collection events. Additionally, more than 30 gallons of litter less than four inches in size were collected. The majority of litter data in the buckets were cigarette butts, small pieces of foam and plastic, and, during the July collection events, fireworks wrappers and paraphernalia. *(See Appendix C for lists of litter data gathered at each location.)*

Plastic made up forty-seven percent (47%) of litter data tallied with paper at eighteen percent (18%), and other/mixed comprising twenty percent (20%) of litter data. Of the plastic items tallied, seventy-five percent (75%) were food and beverage wrappers or containers. Four percent (4%) of tallied items were from the retail industry (e.g., grocery stores, hardware stores) while twenty-one percent (21%) was from other or unknown sources.
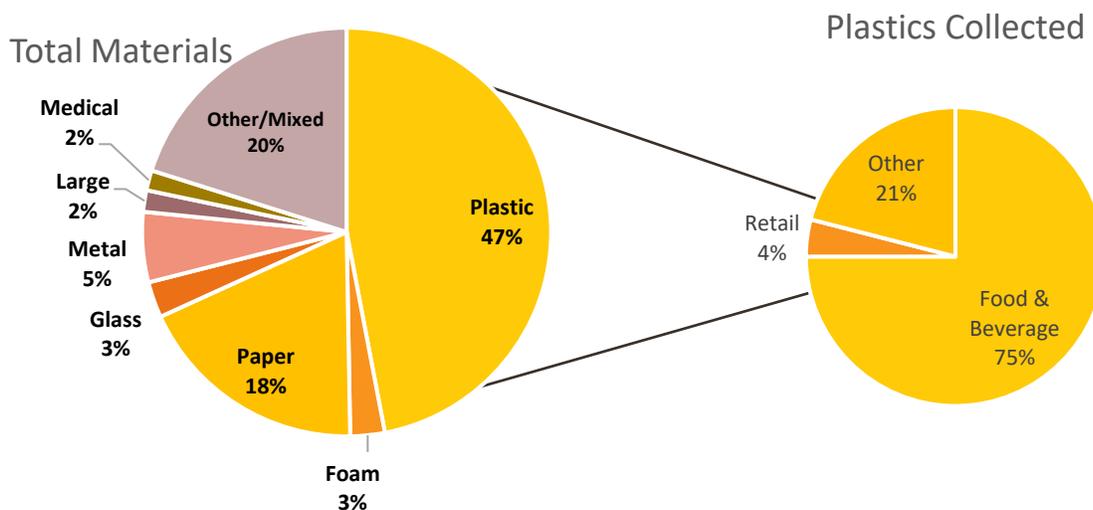
Table 1: Total materials collected, and plastics collected

Forty-nine percent (49%) of tallied litter data were from the food and beverage industry. These items were food wrappers from pre-packaged foods, take-away containers, and restaurant food wrappers.
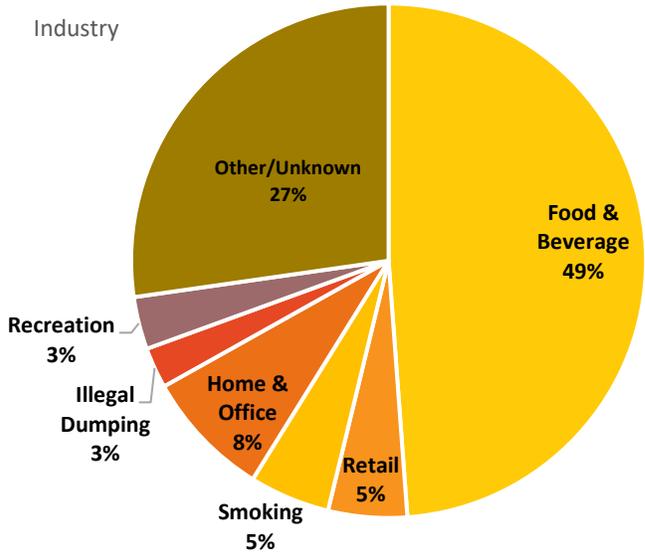
Table 2: Industry of litter collected

Most of the tallied data was fully intact or partially intact. Twenty percent (20%) of collected data was heavily degraded or fouled, meaning that it was broken, rusted, and/or deteriorating. Examples of these items include:
- glass beverage bottles that were broken but still held together by the label,
- foam or plastic cups that were cracked or broken but still identifiable as a cup, and
- paper or cloth that was torn.
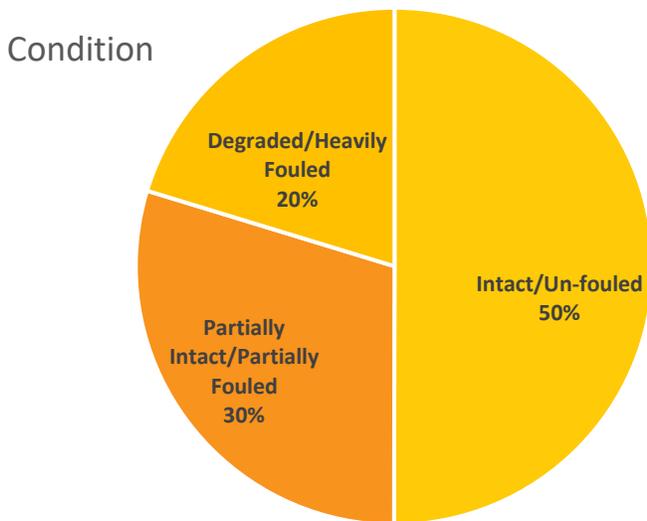
Table 3: Condition of litter collected

Between the first and second collection events, approximately six (6) weeks, there was an overall net increase in both tallied litter data (larger than four inches) and volume litter data (smaller than four inches); however, some parks had increases in litter while others had decreases.

The nine percent (9%) increase in tallied litter is attributed to increases in plastic, foam and paper data. Common factors among the parks with increases were related to land use. The parks with overall increases had walking/biking paths, parking lots, and playground equipment.

Volume data increased by fourteen percent (14%) between the first and second data collection events. Much of the increase was due to firework paraphernalia. The common factors among the parks with increases in volume data have walking/biking trails, parking lots, and close proximately to busy streets.

While common factors are considered, there is no statistical relationship between the increases in overall data collected and land use.

Statistical Analyses

Analyses support the claim that areas where people congregate have higher quantities of litter. Trash bins, parking lots, and pavilion/picnic areas are variables used to identify "high-use" recreational areas (Keep America Beautiful, 2009). Correlations between these variables are observed in the Wichita Litter Study.

- There is a positive relationship ($r=0.84$, $p=.05$) between the presence of parking lots and trash cans which indicates that it is likely that if a data collection site was near a parking lot, trash cans were also present.
- Additionally, there is a relationship ($r=0.53$, $p=.10$) between the presence of a pavilion/picnic area and the presence of a trash can indicating that there are likely trash bins near pavilions/picnic areas. Volunteer observations confirm that at most locations with a pavilion/picnic area, at least one trash bin was present.

What is a correlation and a *p-value*?

A correlation coefficient indicates that a relationship exists between two variables. The closer the "r" value is to 1, the stronger the relationship.

The *p-value* is a statistical measure of probability that the observed difference could have happened by chance. A *p-value* less than the targeted level indicates that the relationship is not due to chance; thus, has statistical significance. A smaller *p-value* shows less likelihood that the result is due to chance.

Trash Bins

Because trash bins can be an indicator of a "high-use" area, it is observed that the presence of trash bin positively correlates (*r=0.58, p=0.05)* with the amount of trash at a location, indicating that locations with trash bins had greater amount of both large and small litter collected.

Trash bin at a data collection site

People are often the leading sources of litter (Burns & McDonnell, 2020) despite the presence of trash or recycling receptacles (Keep America Beautiful, 2009). It is likely, that the improper disposal of trash at gathering areas was the cause of large amounts of litter data collected despite the presence of trash bins. For example, two data collection events at sites that included a picnic pavilion had the greatest amount of volume litter data collected, at almost two full buckets (5 quarts per bucket) per event. Most of the volume data collected included water balloons and cigarette butts at one location, and fireworks remnants and broken glass at the other location.

There is a negative relationship (*r=-0.25, p=.10)* between the change in number of trash cans present at each location and the change in total litter data collected and tallied, and a stronger negative relationship (*r=-0.58, p=0.05)* between the amount of smaller litter collected and the change in the number of trash cans at each location. This indicates that a reduction in the number of trash cans present was a contributing factor to an increase in all litter data.

Parking Lots

Another measure of "high-use" areas are parking lots. Considering that most people in Wichita travel by personal vehicle, parking lots at municipal parks are commonplace.

There is a positive relationship (*r=0.51, p=.10)* between the total amount of data tallied and the presence of a parking lot, indicating that data collection sites with a parking lot nearby or within the site had higher levels of tallied litter.

Volunteers collecting data in South Riverside Park

Recommendations

Efforts to prevent and mitigate litter in our community can range from simple, low-cost approaches to broader investments in prevention campaigns and capital to keep litter from ending up on the ground, then entering our rivers and streams. Everyone in the community has a role to play in reducing litter. The following recommendations offer opportunities for the City of Wichita, businesses, organizations, and community volunteers to be part of the solution.

Community Engagement

Many of the volunteers who participated in data collection events indicated a desire to be more involved and engaged in keeping Wichita clean. Volunteers said that they would be willing to talk with City staff, coordinate events and schedules, and work collaboratively with the community to keep litter out of the city. Engagement with individuals and community groups can include a variety of approaches.

Volunteers with collected litter data at South Riverside Park

Short-term:

- Engage with volunteer group coordinators and formalize coordination between them to facilitate volunteer clean-up events. Coordinators indicated the desire to be a part of a City organized volunteer program for keeping Wichita clean.
- Encourage community members to "plog", "plalk", and "plike": an activity started in Sweden to encourage people to pick up litter as they jog, walk, and bike. "Plogging", "plalking", and "pliking", whether in organized groups or individually, can help keep parks clean and encourage community pride.

Mid-term:

- Develop collaborations and partnerships with businesses, community organizations, city and county agencies that support education and awareness of the impacts of litter on our community, state, nation, and planet.
- Encourage schools to include litter education and awareness in their science and civic lessons. There are many environmental education resources available, so there is no need to invent something new. Due to the number of cigarette butts and vaping related litter found during the study, existing school campaigns targeted for non-smoking/non-vaping could include environmental impacts alongside health impacts.
- Develop recognition programs or friendly competitions to engage individuals, neighborhoods, businesses, and/or schools to get the message out about reducing litter.

Long-term:

- Create a public messaging campaign that connects people to community values. Signs, public service announcements, and support from local businesses and industry can foster a sentiment of community and ownership.
  - See Bridging the Gap and Operation Brightside in Kansas City for examples of volunteer and tool sharing programs
  - Harness the spirit surrounding the Wichita Flag and incorporate it into signage and messaging

Waste and Recycling Containers

Understanding that "high-use" areas will have both trash bins and greater amounts of litter and that reducing the number of trash bins will result in a greater amount of litter, using both strategically placed trash and recycling bins with educational signage can decrease the litter found at gathering areas.

Short-term:
- Identify high use areas to ensure that trash/recycling bins are adequately spaced and can handle the amount of trash that may accumulate at that location.
- Reposition existing trash/recycling bins to locations that are heavily littered and place in locations that are easily noticed and accessible.
- Adjust trash collection schedules to avoid the overflow of trash onto the surrounding ground. Trash on the ground increases littering, sometimes 2-3 times more (Keep America Beautiful, 2009).
- Add cigarette butt receptacles near pavilions and in other high use areas.

Mid-term:

Add recycling bins to increase capacity and options, as many recyclables were collected during the study. Recycling bins should always be paired with trashcans and include simple signage to illustrate which materials should be recycled. Limiting items to only cans and bottles and installing bins with restrictive openings designed for those containers only can help capture most materials while reducing contamination.

Solid Waste Management

Proper management of solid waste is critical for environmental health and can positively impact economic health. Policies, programs, and community outreach that encourages proper disposal of solid waste can reduce source water and soil contamination, improve economic efficiency by identifying where to apply resources, and lead to an aesthetically pleasing and environmentally healthy community.

Short-term:
- Continue to support and build the annual Ark River Cleanup event. Growth could include larger areas for the annual cleanup and more frequent cleanup events along the Arkansas River. The City of Wichita has partnered with community groups for many years to clean up the areas along the Arkansas River. From 2005-2019, volunteers have cleaned up over 34 tons of litter from the banks of the Ark River!

Long-term:
- Research and identify how the City could implement polystyrene recycling services.
- Apply to get the Hefty Orange Bag Recycling program in Wichita.
- Consider adopting a local bottle bill or working with legislators to develop a statewide program to include refundable deposits on glass, aluminum, and plastic containers.

Landscaping & Maintenance

Strategic landscaping and ongoing maintenance of landscaped areas can reduce litter in public spaces by encouraging people to properly dispose of their trash to keep the area clean. Established social norms can be influential in an individual's decision whether to litter (Schultz, 2009). Landscaped areas that bring a spirit of pride to the community can encourage environmentally friendly behaviors.

Short-term:
- Include provisions in mowing/landscaping contracts for litter collection and disposal prior to mowing.

Long-term:
- Increase landscaping in areas, where it makes sense, that experience increased litter. Landscaped areas attract less littering (Keep America Beautiful, 2009).
- Consider installing landscaping elements that also assist with stormwater management infrastructure.

Educational signage

Instructional signage, or "prompts," that explicitly describes a desired behavior can be an effective way to promote that behavior (McKenzie Mohr & Smith, 1999). Posting prompts where littering activity is likely to occur and including a positive behavior messaging can further encourage desired behavior.

Example of signage intended to reduce cigarette butt litter. (Source: KU Center for Sustainability)

Short-term:
- Post prompts that encourage proper disposal of trash and recyclables in areas that are often heavily littered, particularly in areas with pavilions/picnic areas and/or athletic fields and near parking lots.
- Include signage specific to cigarette butts to link the common practice of tossing butts on the ground with littering behavior. Disposing of cigarette butts on the ground is considered one of the last socially acceptable forms of littering. Campaigns and signage should be designed to shift that norm and promote more responsible practices.

Mid- to long-term
- Develop a coordinated campaign across the City to establish social norms that encourage keeping litter off the ground (e.g., "your neighbors keep this area clean", "keep our community clean")

Example of positive anti-littering message from Washington DC

Business Outreach

Many of the pieces of litter data collected were labeled with store or brand names. Reaching out to restaurants, convenience stores, grocery stores, and gas stations to brainstorm solutions can have positive impacts across the city. Understanding barriers and challenges and collaborating on solutions could reduce litter.

Short- to long-term:

- Develop a collaboration with restaurants to increase the use of reusable takeaway containers and cups. Options could include incentives to encourage restaurants to use more reusable options.
- Encourage restaurants to incentivize their customers to use reusable cups and takeaway containers.

Policy

Enacting policy takes time, research, and consideration. Litter studies, such as the Wichita Litter Study and litter prevention program evaluation studies, can be used to gain an understanding of potential policies that can be effective at reducing litter in Wichita.

- Social and economic studies can inform the City of the social and economic impacts of single-use plastic bans and fees.
- Consider a fee or ban on single-use plastics. Many states have a variety of plastics legislation that range from full bans to fees on businesses and/or customers that use single-use plastic bags or straws. Some results have shown a decrease in single-use plastic consumption. Implementation of single-use plastic bans and fees can have inequitable impacts on low-income and differently abled community members.
- Consider adopting a tobacco-free park policy to reduce the impact of cigarette-butt litter in parks. In 2019 the Public Health Law Center released resources specific to Kansas, including a summary of tobacco-free park policies.

Conclusion

The Wichita Litter Study provides a starting point to better understand littering behavior and sources of litter in Wichita. Findings from the study are similar to national studies, with plastics making up a large percentage (47%) of litter collected. Plastic food and beverage containers and wrappers and cigarette butts were commonly found. Because results are comparable to other communities, we can learn what policies and programs are working to reduce litter elsewhere and apply those best practices here in Wichita.

The recommendations provided in this report serve as a menu of options for developing a multifaceted, strategic approach to preventing and eliminating litter from the local environment. Combining adjustments in municipal operations, education and outreach, community engagement, and partnership development can result in successful and innovative solutions to reducing litter for cleaner, healthier Wichita.

Works Cited

Burns & McDonnell. (2020). The cost of litter & illegal dumping in Pennsylvania: A study of nine cities across the commonwealth. *Keep Pennsylvania Beautiful.*

Cowger, W., Gray, A.B., & Schultz, R.C. (2019). Anthropogenic litter cleanups in Iowa riparian areas reveal the importance of near-stream and watershed scale land use. *Environmental Pollution.* 250:981-989.

Hamilton, L.A, Feit, S., Muffett, C., Kelso, M., Malone Rubright, S., Bernhardt, C., Shaeffer, E., Moon, D., Morris, J., & Labbé-Bellas, R. (2019). Plastic & climate: The hidden costs of a plastic planet. Retrieved from: https://www.ciel.org/plasticandclimate/

Hoellein, T.J., Westhoven, M., Lyandres, O., & Cross,J. (2015). Abundance and environmental drivers of anthropogenic litter on 5 Lake Michigan beaches: A study facilitated by citizen science data collection. *Journal of Great Lakes Research.* 41:78-86.

Keep America Beautiful. (2009). Littering behavior in America: Results of a national study. *Keep America Beautiful.* Retrieved from: https://kab.org/wp-content/uploads/2019/10/NewsInfo_Research_LitteringBehaviorinAmerica_2009Report_Final.pdf

Keep America Beautiful. (2021). Keep America beautiful 2020 national litter study summary report. *Keep America Beautiful.* Retrieved from: https://kab.org/litter-study/

Lazcano, R.F., Vincent, A.E.S., Hoellein, T.J. (2020). Trash Dance: Anthropogenic Litter and Organic Matter Co-Accumulate on Urban Beaches. *Geosciences.* 10(9):335. https://doi.org/10.3390/geosciences10090335

Meijer, L.J.J., Van Emmerik, T., Van Der Ent, R., Schmidt, C., & Lebreton, L. (2021). More than 1000 rivers account for 80% of global riverine plastic emissions into the ocean. *ScienceAdvances.* 7(18). DOI:10.1126/sciadv.aaz5803

McKenzie Mohr, D. & Smith, D. (1999). Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing (2nd ed.). *New Society Publishers.*

Merran, J. (2019). The beach and beyond. *Ocean Conservancy.* Retrieved from: https://oceanconservancy.org/wp-content/uploads/2019/09/Final-2019-ICC-Report.pdf

Nichols, W. & Smith, N. (2019). Waste generation and recycling indices. *Verisk Maplecroft*. Retrieved from: https://www.maplecroft.com/insights/analysis/us-tops-list-of-countries-fuelling-the-mounting-waste-crisis/

NOAA. (2021). Why is marine debris a problem? *NOAA Marine Debris Program.* Retrieved from: https://marinedebris.noaa.gov/discover-marine-debris/why-marine-debris-problem

Parker, L. (2019a). Beach cleanups are missing millions of pieces of plastic. *National Geographic.* Retrieved from: https://www.nationalgeographic.com/environment/article/beach-cleanups-missing-millions-of-plastic-pieces

Parker, L. (2019b). Plastic food packaging was most common beach trash in 2018. *National Geographic.* Retrieved from: https://www.nationalgeographic.com/environment/article/plastic-food-packaging-top-trash-global-beach-cleanup-2018#close

Register, K. (2007). Turning the tide on trash: A learning guide on marine debris. *National Oceanic and Atmospheric Administration.* Retrieved from: https://marinedebris.noaa.gov/sites/default/files/publications-files/2015_TurningTideonTrash_HiRes_Final.pdf

Schultz, P.W. (2009). Littering behavior in America. *Keep America Beautiful.* Prepared by Action Research.

Suner, M. (2020). Ways that plastic gets into the ocean. *Fair Planet.* Retrieved from: https://www.fairplanet.org/story/ways-that-plastic-gets-into-the-ocean/

Uhrin, A.V., Lippiatt, S., Herring, C.E., Dettloff, K., Bimrose, K., & Butler-Minor, C. (2020). Temporal trends and potential drivers of stranded marine debris on beaches within two us national marine sanctuaries using citizen science data. *Frontiers in Environmental Science.* doi: 10.3389/fenvs.2020.604927

U.S. Environmental Protection Agency. (2004). Report to Congress: impacts and control of combined sewer overflows and sanitary sewer overflows. Retrieved from: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=30006O5F.PDF

U.S. Environmental Protection Agency. (2021). Learn about aquatic trash: Impacts of aquatic trash. Retrieved from: https://www.epa.gov/trash-free-waters/learn-about-aquatic-trash#1

Appendix A

Field Data Card   Date _____   Name _____   Site/Segment #_____

Instructions: Mark 1 tally point for each item under the appropriate column describing item condition. Add notes where possible. More detailed definitions for each item category can be found in the Reference Sheet. Thank you for your efforts!

	Item List	Item condition			Item Notes: Identifying features: Brand, Language, Event, etc. *Please add more info on back of sheet if necessary.*
		Intact/ Un-fouled	Partially Intact/ Partially Fouled	Degraded/ Heavily Fouled	
PLASTIC	Beverage Bottles				
	Straws & Stirrers				
	Six-Pack Rings				
	Food Wrappers & Snack Bags				
	Food & Drink Pouches				
	Cups				
	Lids				
	Utensils				
	Plates & Bowls				
	Clamshells				
	Grocery & Retail Bags				
	Other Plastic				
FOAM	Cups				
	Plates & Bowls				
	Clamshells				
PAPER	Cardboard				
	Bags				
	Newspaper, Receipts, & Office Paper				
	Cups				
	Beverage & Food Cartons				
	Other Paper				
GLASS	Bottles, Jars & Containers				
	Other Glass				
METAL	Bottles, Cans & Containers				
	Other Metal				
OTHER	Automotive: Tires				
	Automotive: Other Vehicle Related				
	Chemical, Paint & Other Hazardous	*Record information in volume section*			
	Batteries & Electronics				
	Building Materials				
	Bulky Items: Furniture & Carpet				
	Bulky Items: White Goods & Appliances				
	Fishing: Hooks & Lures				
	Fishing: Nets, Rope & Traps				
	Lighters – *larger than 4"*				
	Medical Waste, Sharps, & Biohazardous				
	Medical Supplies *includes disposable masks*				
	Textiles, Clothing & Shoes				
	Tobacco: Cigarettes & Cannabis				
	Tobacco: E-Cigarettes & Vaping				
	Toiletries/ Personal Hygiene				
	Toys: Balloons				
	Toys: Balls, Sporting Equipment & Other				
	Whole Bags of Trash				
	Write in				
	Write in				
	Write in				
	Write in				
	Write in				
	Write in				
	Write in				

This field data card is adapted from the EPA ETAP Data Card.

ADDITIONAL NOTES

Instructions: Use this side for additional item notes for each category. Thank you for your efforts!

	Item	Item Notes Identifying features: Brand, Language, Event, etc.
PLASTIC		
PLASTIC		
PLASTIC		
PLASTIC		
FOAM		
FOAM		
PAPER		
PAPER		
PAPER		
PAPER		
GLASS		
GLASS		
METAL		
METAL		
OTHER		
OTHER		
OTHER		
OTHER		
OTHER		
OTHER		

This field data card is adapted from the EPA ETAP Data Card.

Volume Collection

Field Data Card   Date _____   Name _____   Site/Segment #_____

Instructions: Mark the container volume, the number of containers filled, and any notes associated with volumetric measurements. Thank you for your efforts!

Volume Measurements		
Container Volume	**Number of containers**	**Container Notes**
5 quarts		

Hazardous Waste Volume Estimates		
Container Volume	**Number of containers**	**Container Notes**

When to categorize an item volumetrically.

- If an item of any material is smaller than 4" (average size of an adult's palm)
- Tangles of string, line, etc.
- Clumps of indeterminate objects
- Cigarette butts
- Bottle caps/tabs

If an item fits in this box, it goes into the volume container.

4"

4"
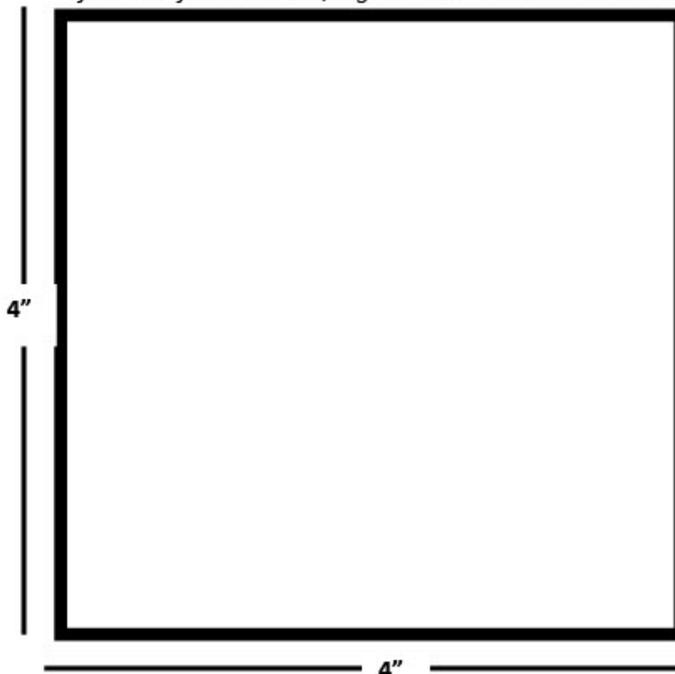
This field data card is adapted from the EPA ETAP Data Card.

Appendix B

Group	Item Type	Item condition			Totals	
		Intact/ Un-fouled	Partially Intact/Partially Fouled	Degraded/ Heavily Fouled	Total Found	Percent total by group
Plastic	Bottles & Containers	67	22	5	94	11%
	Straws & Stirrers	76	31	2	109	13%
	Bottle Caps & Tabs	0	2	0	2	0%
	Beverage rings	1	1	0	2	0%
	Food Wrappers & Snack Bags	120	78	43	241	29%
	Food & Drink Pouches	15	6	2	23	3%
	Cups	10	15	6	31	4%
	Lids	43	25	8	76	9%
	Utensils	19	7	8	34	4%
	Plates & Bowls	5	2	0	7	1%
	Clamshells	3	0	0	3	0%
	Grocery & Retail Bags	16	9	12	37	4%
	Small Fragments	0	0	0	0	0%
	Other Plastic	74	53	43	170	21%
	Plastics Total	**449**	**251**	**129**	**829**	**100%**
Foam	Cups	11	13	9	33	69%
	Plates & Bowls	5	0	5	10	21%
	Clamshells	1	0	0	1	2%
	Other Foam	1	0	3	4	8%
	Foam Total	**18**	**13**	**17**	**48**	**100%**
Paper	Cardboard	11	15	11	37	11%
	Bags	7	2	4	13	4%
	Newspaper, Junk Mail, Receipts & Office Paper	23	17	5	45	14%
	Cups	5	1	3	9	3%
	Beverage & Food Cartons	22	8	9	39	12%
	Other Paper	83	60	40	183	56%
	Paper Total	**151**	**103**	**72**	**326**	**100%**
Glass	Bottles, Jars & Containers	14	1	6	21	42%
	Small Fragments & Other Glass	0	2	27	29	58%
	Glass Total	**14**	**3**	**33**	**50**	**100%**
Metal	Bottles, Cans & Containers	33	20	18	71	72%
	Bottle Caps & Tabs	0	0	0	0	0%
	Other Metal	12	12	3	27	28%
	Metal Total	45	32	21	98	

Fishing	Hooks, Lures, & Floats	0	0	0	0	0%
	Traps & Trap Parts	0	0	0	0	0%
	Nets & Ropes (1 tally = 1 foot)	3	0	1	4	100%
	Fishing Line (1 tally = 1 foot)	0	0	0	0	0%
	Tangled Fishing Line Bundles	0	0	0	0	0%
	Other	0	0	0	0	0%
	Fishing Total	3	0	1	4	
Automotiv	Tires	0	0	0	0	0%
	Other	1	1	1	3	100%
	Automotive Total	1	1	1	3	
Smoking	Cigarettes & Cannabis	61	10	10	81	91%
	E-Cigarettes & Vaping	6	0	0	6	7%
	Lighters	1	1	0	2	2%
	Smoking Total	68	11	10	89	
Other	Chemical, Paint & Other Hazardous	0	0	0	0	0%
	Batteries & Electronics	0	1	0	1	0%
	Building Materials	13	9	7	29	9%
	Furniture & Carpet	0	0	1	1	0%
	Appliances	0	0	0	0	0%
	Medical Waste, Sharps, & Biohazardous	3	0	0	3	1%
	Medical Supplies	16	7	4	27	8%
	Textiles, Clothing & Shoes	17	11	7	35	11%
	Toiletries/ Personal Hygiene	1	3	1	5	2%
	Balloons	0	1	10	11	3%
	Toys, Sports, & Rec Equipment	2	1	0	3	1%
	Whole Bags of Mixed Trash	6	1	0	7	2%
	Write in	76	76	76		
	Other Total	134	110	74	318	
Totals		883	524	358	1765	

Appendix C

All Parks

Material Type	Count 1	Count 2	Total	% change
Plastic	394	435	829	10%
Foam	22	26	48	18%
Paper	147	179	326	22%
Glass	37	13	50	-65%
Metal	56	42	98	-25%
Tires	0	0	0	
Large	25	5	30	-80%
Chemicals	1	0	1	-100%
Medical	20	8	28	-60%
Other/Mixed	144	211	355	47%
Total Items Found	846	919	1765	9%
Industry	Count 1	Count 2	Total	% change
Food & Beverage	395	463	858	17%
Retail	52	35	87	-33%
Automotive	2	2	4	0%
Smoking	20	69	89	245%
Home & Office	84	57	141	-32%
Fishing	2	2	4	0%
Illegal Dumping	36	9	45	-75%
Recreation	13	45	58	246%
Other/Unknown	242	237	479	-2%
Total Items Found	846	919	1765	9%
Packaging or Products	Count 1	Count 2	Total	% change
Packaging	300	286	586	-5%
Service Ware	139	174	313	25%
Product	125	118	243	-6%
Unknown	282	341	623	21%
Total Items Found	846	919	1765	9%
Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	394	489	883	24%
Partially Intact/Partially Fouled	252	272	524	8%
Degraded/Heavily Fouled	200	158	358	-21%
Total Items	846	919	1765	9%
Volume Measures	Count 1	Count 2	Total	% change
# of quarts	56.1	64	120.1	14%
# of buckets	11.22	12.8	24.02	14%

Aley Park

Park features: Picnic tables, athletic fields/courts, swimming pool, skate park
Data collection site features: grassy area next to low-density residential area, boundary abuts Seneca Street to the east and Dora Street to the south

Material Type	Count 1	Count 2	Total	% change
Plastic	7	13	20	86%
Foam	0	1	1	
Paper	0	10	10	
Glass	0	0	0	
Metal	5	1	6	-80%
Tires	0	0	0	
Large	2	0	2	-100%
Chemicals	0	0	0	
Medical	0	0	0	
Other/Mixed	31	8	39	-74%
Total Items Found	45	33	78	-27%
Industry	Count 1	Count 2	Total	% change
Food & Beverage	7	13	20	86%
Retail	0	4	4	
Automotive	0	0	0	
Smoking	4	1	5	-75%
Home & Office	2	3	5	50%
Fishing	0	0	0	
Illegal dumping	2	1	3	-50%
Recreation	0	0	0	
Other/ Unknown	30	11	41	-63%
Total Items Found	45	33	78	-27%
Packaging or Products	Count 1	Count 2	Total	% change
Packaging	4	13	17	225%
Service Ware	3	4	7	33%
Product	5	3	8	-40%
Unknown	33	13	46	-61%
Total Items Found	45	33	78	-27%
Item condition	Count 1	Count 2	Total	% change
Intact/ Un-fouled	35	18	53	-49%
Partially Intact/Partially fouled	10	9	19	-10%
Degraded/ Heavily Fouled	0	6	6	
Total Items:	45	33	78	-27%
Volume Measures	Count 1	Count 2	Total	% change
	1	3	4	200%

Brownthrush Park

Park features: playground, athletic fields, picnic area
Data collection site features: grassy area, parking lot, boundary abuts N. Country Acres Ave. on the north

Material Type	Count 1	Count 2	Total	% change
Plastic	13	11	24	-15%
Foam	0	0	0	
Paper	4	9	13	125%
Glass	0	0	0	
Metal	1	3	4	200%
Tires	0	0	0	
Large	10	0	10	-100%
Chemicals	0	0	0	
Medical	1	0	1	-100%
Other/Mixed	5	1	6	-80%
Total Items Found	34	24	58	-29%
Industry	Count 1	Count 2	Total	% change
Food & Beverage	12	10	22	-17%
Retail	1	9	10	800%
Automotive	0	0	0	
Smoking	3	0	3	-100%
Home & Office	4	2	6	-50%
Fishing	0	0	0	
Illegal dumping	10	0	10	-100%
Recreation	0	0	0	
Other/ Unknown	4	3	7	-25%
Total Items Found	34	24	58	-29%
Packaging or Products	Count 1	Count 2	Total	% change
Packaging	6	16	22	167%
Service Ware	7	3	10	-57%
Product	13	2	15	-85%
Unknown	8	3	11	-63%
Total Items Found	34	24	58	-29%
Item condition	Count 1	Count 2	Total	% change
Intact/ Un-fouled	29	1	30	-97%
Partially Intact/Partially fouled	4	15	19	275%
Degraded/ Heavily Fouled	1	8	9	700%
Total Items:	34	24	58	-29%
Volume Measures	Count 1	Count 2	Total	% change
# of quarts	4	7	11	75%

Chapin Park

Park features: bike/walking trails, dog park, model airplane flying area, playgrounds
Data collection site features: dirt/gravel walking trail, grassy area with trees

Material Type	Count 1	Count 2	Total	% change
Plastic	16	29	45	81%
Foam	1	1	2	0%
Paper	2	1	3	-50%
Glass	1	1	2	0%
Metal	4	3	7	-25%
Tires	0	0	0	
Large	0	0	0	
Chemicals	0	0	0	
Medical	2	1	3	-50%
Other/Mixed	8	3	11	-63%
Total Items Found	34	39	73	15%
Industry	Count 1	Count 2	Total	% change
Food & Beverage	21	19	40	-10%
Retail	1	1	2	0%
Automotive	0	0	0	
Smoking	3	1	4	-67%
Home & Office	5	2	7	-60%
Fishing	1	0	1	-100%
Illegal dumping	0	0	0	
Recreation	0	0	0	
Other/ Unknown	3	16	19	433%
Total Items Found	34	39	73	15%
Packaging or Products	Count 1	Count 2	Total	% change
Packaging	18	14	32	-22%
Service Ware	3	6	9	100%
Product	4	2	6	-50%
Unknown	9	17	26	89%
Total Items Found	34	39	73	15%
Item condition	Count 1	Count 2	Total	% change
Intact/ Un-fouled	17	18	35	6%
Partially Intact/Partially fouled	14	9	23	-36%
Degraded/ Heavily Fouled	3	12	15	300%
Total Items:	34	39	73	15%
Volume Measures	Count 1	Count 2	Total	% change
# of quarts	4.5	9	13.5	100%

Chisholm Creek Park

Park features: shelters, picnic tables, fishing ponds, bike path, nature trails, wild habitat area
Data collection site features: bike trail, walking trail, grassy areas that abut Woodlawn Street on the east and K-96 exit ramp on the north

Material Type	Count 1	Count 2	Total	% change
Plastic	43	25	68	-42%
Foam	4	6	10	50%
Paper	22	18	40	-18%
Glass	0	0	0	
Metal	1	4	5	300%
Tires	0	0	0	
Large	1	0	1	-100%
Chemicals	0	0	0	
Medical	4	2	6	-50%
Other/Mixed	4	10	14	150%
Total Items Found	79	65	144	-18%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	36	31	67	-14%
Retail	18	3	21	-83%
Automotive	0	0	0	
Smoking	0	0	0	
Home & Office	14	7	21	-50%
Fishing	0	0	0	
Illegal dumping	1	1	2	0%
Recreation	0	0	0	
Other/ Unknown	10	23	33	130%
Total Items Found	79	65	144	-18%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	47	19	66	-60%
Service Ware	6	6	12	0%
Product	15	7	22	-53%
Unknown	11	33	44	200%
Total Items Found	79	65	144	-18%

Item condition	Count 1	Count 2	Total	% change
Intact/ Un-fouled	29	5	34	-83%
Partially Intact/Partially fouled	25	28	53	12%
Degraded/ Heavily Fouled	25	32	57	28%
Total Items:	79	65	144	-18%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	4.25	3	7.25	-29%

L.W. Clapp Park

Park features: disc golf course, walking paths
Data collection site features: grassy area between Oliver Street on the east and the walking path on the west, north boundary along a storm drain

Material Type	Count 1	Count 2	Total	% change
Plastic	25	24	49	-4%
Foam	6	1	7	-83%
Paper	2	19	21	850%
Glass	0	1	1	
Metal	1	1	2	0%
Tires	0	0	0	
Large	0	1	1	
Chemicals	0	0	0	
Medical	1	0	1	-100%
Other/Mixed	3	12	15	300%
Total Items Found	38	59	97	55%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	28	18	46	-36%
Retail, Food & Beverage	3	1	4	-67%
Retail	0	0	0	
Automotive	0	2	2	
Smoking	0	2	2	
Home & Office	3	3	6	0%
Fishing	0	0	0	
Illegal Dumping	0	1	1	
Recreation	0	0	0	
Other/Unknown	4	32	36	700%
Total Items Found	38	59	97	55%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	20	16	36	-20%
Service Ware	9	3	12	-67%
Product	3	4	7	33%
Unknown	6	36	42	500%
Total Items Found	38	59	97	55%

Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	10	26	36	160%
Partially Intact/Partially Fouled	23	13	36	-43%
Degraded/Heavily Fouled	5	20	25	300%
Total Items	38	59	97	55%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	6	3	9	-50%

Eastview Park

Park features: playground, courts, cricket/football/soccer/softball, picnic areas, open shelters
Data collection site features: sidewalk, grassy area

Material Type	Count 1	Count 2	Total	% change
Plastic	2	3	5	50%
Foam	0	1	1	
Paper	1	5	6	400%
Glass	0	0	0	
Metal	2	0	2	-100%
Tires	0	0	0	
Large	0	0	0	
Chemicals	0	0	0	
Medical	0	0	0	
Other/Mixed	1	0	1	-100%
Total Items Found	6	9	15	50%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	2	3	5	50%
Retail	0	1	1	
Automotive	0	0	0	
Smoking	0	0	0	
Home & Office	1	0	1	-100%
Fishing	0	0	0	
Illegal Dumping	0	0	0	
Recreation	0	0	0	
Other/Unknown	3	5	8	67%
Total Items Found	6	9	15	50%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	2	3	5	50%
Service Ware	0	1	1	
Product	0	0	0	
Unknown	4	5	9	25%
Total Items Found	6	9	15	50%

Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	3	5	8	67%
Partially Intact/Partially Fouled	3	3	6	0%
Degraded/Heavily Fouled	0	1	1	
Total Items	6	9	15	50%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	2.85	1	3.85	-65%

Harrison Park

Park features: Fishing, dog park, walking path, rugby and softball fields
Data collection site features: walking path, parking lot

Material Type	Count 1	Count 2	Total	% change
Plastic	13	16	29	23%
Foam	0	0	0	
Paper	0	12	12	
Glass	1	0	1	-100%
Metal	3	5	8	67%
Tires	0	0	0	
Large	1	0	1	-100%
Chemicals	0	0	0	
Medical	1	1	2	0%
Other/Mixed	6	23	29	283%
Total Items Found	25	57	82	128%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	14	18	32	29%
Retail	2	1	3	-50%
Automotive	0	0	0	
Smoking	1	3	4	200%
Home & Office	3	6	9	100%
Fishing	0	0	0	
Illegal Dumping	1	0	1	-100%
Recreation	0	14	14	
Other/Unknown	4	15	19	275%
Total Items Found	25	57	82	128%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	12	8	20	-33%
Service Ware	1	8	9	700%
Product	7	20	27	186%
Unknown	5	21	26	320%
Total Items Found	25	57	82	128%

Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	14	21	35	50%
Partially Intact/Partially Fouled	9	34	43	278%
Degraded/Heavily Fouled	2	2	4	0%
Total Items	25	57	82	128%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	1	4	5	300%

McAdams Park

Park features: shelters, picnic areas, playground, athletic fields, walking and biking trails, swimming pool
Data collection site features: grassy area, shelter, picnic area, border along storm drain

Material Type	Count 1	Count 2	Total	% change
Plastic	76	20	96	-74%
Foam	7	0	7	-100%
Paper	40	11	51	-73%
Glass	27	0	27	-100%
Metal	11	1	12	-91%
Tires	0	0	0	
Large	2	2	4	0%
Chemicals	0	0	0	
Medical	3	0	3	-100%
Other/Mixed	18	10	28	-44%
Total Items Found	184	44	228	-76%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	85	14	99	-84%
Retail	12	3	15	-75%
Automotive	0	0	0	
Smoking	0	0	0	
Home & Office	8	2	10	-75%
Fishing	0	0	0	
Illegal Dumping	2	2	4	0%
Recreation	12	0	12	-100%
Other/Unknown	65	23	88	-65%
Total Items Found	184	44	228	-76%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	66	15	81	-77%
Service Ware	31	2	33	-94%
Product	22	4	26	-82%
Unknown	65	23	88	-65%
Total Items Found	184	44	228	-76%

Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	56	39	95	-30%
Partially Intact/Partially Fouled	47	5	52	-89%
Degraded/Heavily Fouled	81	0	81	-100%
Total Items	184	44	228	-76%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	9.5	4	13.5	-58%

Pawnee Prairie Park

Park features: shelters, picnic tables, playground, bike paths, wild habitat, nature trails
Data collection site features: shelter, picnic tables, partial trail, playground

Material Type	Count 1	Count 2	Total	% change
Plastic	79	66	145	-16%
Foam	0	0	0	
Paper	35	22	57	-37%
Glass	4	5	9	25%
Metal	15	14	29	-7%
Tires	0	0	0	
Large	4	2	6	-50%
Chemicals	1	0	1	-100%
Medical	0	0	0	
Other/Mixed	18	36	54	100%
Total Items Found	156	145	301	-7%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	65	52	117	-20%
Retail	11	2	13	-82%
Automotive	0	0	0	
Smoking	2	0	2	-100%
Home & Office	15	16	31	7%
Fishing	0	1	1	
Illegal Dumping	5	3	8	-40%
Recreation	1	17	18	1600%
Other/Unknown	57	54	111	-5%
Total Items Found	156	145	301	-7%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	55	36	91	-35%
Service Ware	20	18	38	-10%
Product	20	34	54	70%
Unknown	61	57	118	-7%
Total Items Found	156	145	301	-7%

Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	68	56	124	-18%
Partially Intact/Partially Fouled	58	45	103	-22%
Degraded/Heavily Fouled	30	44	74	47%
Total Items	156	145	301	-7%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	7	9.5	16.5	36%

Riverview Park

Park features: athletic fields
Data collection site features: part of baseball diamond, asphalt road, storm drain

Material Type	Count 1	Count 2	Total	% change
Plastic	13	8	21	-38%
Foam	1	1	2	0%
Paper	9	3	12	-67%
Glass	0	1	1	
Metal	2	0	2	-100%
Tires	0	0	0	
Large	0	0	0	
Chemicals	0	0	0	
Medical	1	1	2	0%
Other/Mixed	12	18	30	50%
Total Items Found	38	32	70	-16%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	10	8	18	-20%
Retail	0	3	3	
Automotive	1	0	1	-100%
Smoking	0	2	2	
Home & Office	5	3	8	-40%
Fishing	0	0	0	
Illegal Dumping	9	1	10	-89%
Recreation	0	14	14	
Other/Unknown	13	1	14	-92%
Total Items Found	38	32	70	-16%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	5	10	15	100%
Service Ware	5	1	6	-80%
Product	5	3	8	-40%
Unknown	23	18	41	-22%
Total Items Found	38	32	70	-16%

Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	22	13	35	-41%
Partially Intact/Partially Fouled	14	15	29	7%
Degraded/Heavily Fouled	2	4	6	100%
Total Items	38	32	70	-16%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	5	3	8	-40%

Sedgwick County Park

Park features: shelters, biking and walking trails, fishing ponds, playgrounds
Data collection site features: grassy area near retaining wall next to paved walking path next to an entrance to the park

Material Type	Count 1	Count 2	Total	% change
Plastic	18	2	20	-89%
Foam	0	0	0	
Paper	1	0	1	-100%
Glass	1	0	1	-100%
Metal	1	1	2	0%
Tires	0	0	0	
Large	5	0	5	-100%
Chemicals	0	0	0	
Medical	0	0	0	
Other/Mixed	9	2	11	-78%
Total Items Found	35	5	40	-86%

Industry	Count 1	Count 2	Total	% change
Food & Beverage	18	3	21	-83%
Retail	1	0	1	-100%
Automotive	0	0	0	
Smoking	1	1	2	0%
Home & Office	1	1	2	0%
Fishing	0	0	0	
Illegal Dumping	5	0	5	-100%
Recreation	0	0	0	
Other/Unknown	9	0	9	-100%
Total Items Found	35	5	40	-86%

Packaging or Products	Count 1	Count 2	Total	% change
Packaging	19	2	21	-89%
Service Ware	0	1	1	
Product	6	1	7	-83%
Unknown	10	1	11	-90%
Total Items Found	35	5	40	-86%

Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	4	3	7	-25%
Partially Intact/Partially Fouled	6	2	8	-67%
Degraded/Heavily Fouled	25	0	25	-100%
Total Items	35	5	40	-86%

Volume Measures	Count 1	Count 2	Total	% change
# of quarts	3	0.5	3.5	-83%

South Riverside Park

Park features: biking and walking path, picnic tables, tennis courts
Data collection site features: parking lot, grassy area next to the walking path along the river

Material Type	Count 1	Count 2	Total	% change
Plastic	89	218	307	145%
Foam	3	15	18	400%
Paper	31	69	100	123%
Glass	3	5	8	67%
Metal	10	9	19	-10%
Tires	0	0	0	
Large	0	0	0	
Chemicals	0	0	0	
Medical	7	3	10	-57%
Other/Mixed	29	88	117	203%
Total Items Found	172	407	579	137%
Industry	Count 1	Count 2	Total	% change
Food & Beverage	97	274	371	182%
Retail	3	7	10	133%
Automotive	1	0	1	-100%
Smoking	6	59	65	883%
Home & Office	23	12	35	-48%
Fishing	1	1	2	0%
Illegal Dumping	1	0	1	-100%
Recreation	0	0	0	
Other/Unknown	40	54	94	35%
Total Items Found	172	407	579	137%
Packaging or Products	Count 1	Count 2	Total	% change
Packaging	46	134	180	191%
Service Ware	54	121	175	124%
Product	25	38	63	52%
Unknown	47	114	161	143%
Total Items Found	172	407	579	137%
Item Condition	Count 1	Count 2	Total	% change
Intact/Un-fouled	107	284	391	165%
Partially Intact/Partially Fouled	39	94	133	141%
Degraded/Heavily Fouled	26	29	55	12%
Total Items	172	407	579	137%
Volume Measures	Count 1	Count 2	Total	% change
# of quarts	8	17	25	113%