



LOUISIANA **LITTER RESEARCH**

AUGUST 2023

ROADWAY LITTER STUDY

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METHODOLOGY

In statistical studies, a representative sample is taken, studied, and analyzed to draw inferences or make conclusions. Surveying every roadside in Louisiana would be prohibitive. Thus, for the Roadway Litter Study, the Project Team studied representative sample sites, where information was collected to estimate the quantity of litter found on all Louisiana roadways. Working with the Louisiana Department of Transportation and Development (LADOTD) and KLB, the Project Team selected sites within every parish and in all nine LADOTD districts.

Figure 2-1: LADOTD District Map

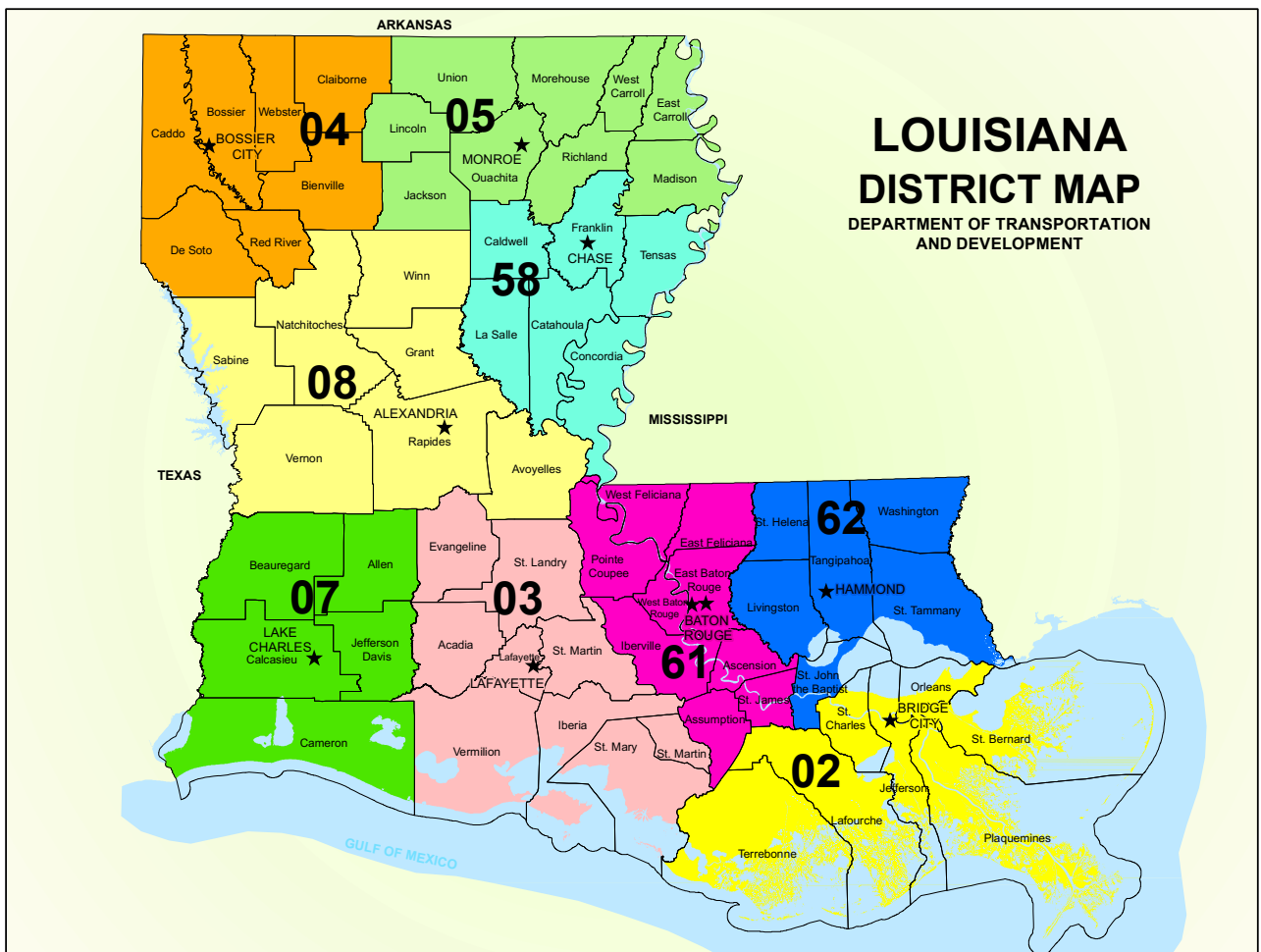
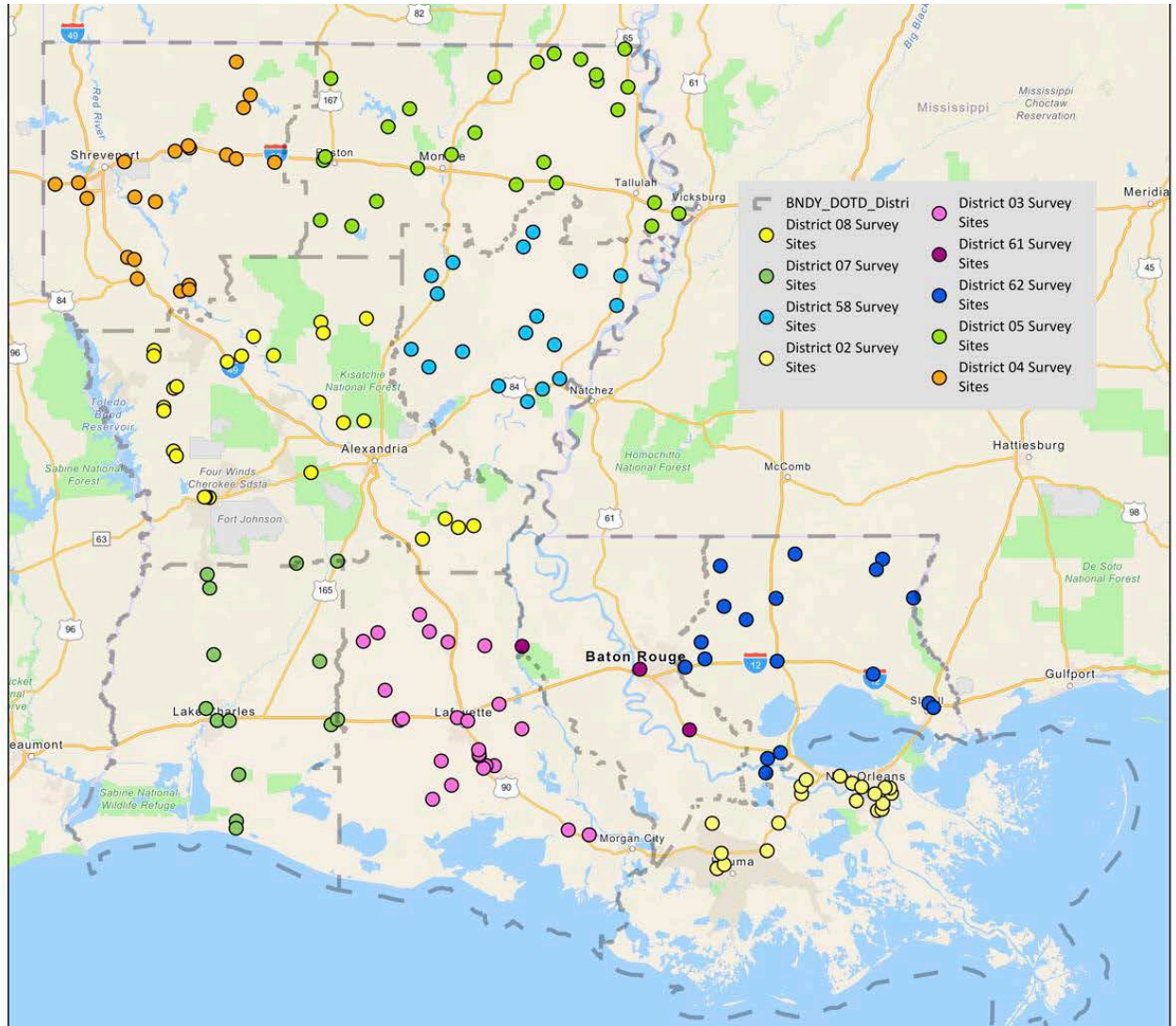


Figure 2-2: Map of Survey Sites



Note: Dots showing GPS coordinates at approximate locations and some bubbles may appear to overlap due to the scale of the graphic and proximity in more populated areas of the state.

Site Selection



In selecting the Roadway Litter Survey sites, the Project Team requested input from LADOTD to identify sites representative of three roadway types: interstates, US highways, and state routes. The Project Team then refined a list of 201 sites, provided by LADOTD, to ensure appropriate representation of rural, suburban, and urban locales. Land-use was also considered in site identification to ensure inclusion of agricultural and developed areas, such as commercial, industrial, and residential zones. 137 sites, all of which met the survey criteria for road type, locale, land use, and statewide distribution, were selected for study.

Data Collections

The survey, conducted between December 9, 2022 and January 9, 2023, collected data on litter category, item, and packaging material at each site. The survey teams adhered to a prescribed protocol, detailed in Appendix A. The survey team sampled litter in an area 300 feet in length by 15 feet in depth. Litter was assessed in the entire survey site by a team member walking the length and width using a “meandering count” — or walking side-to-side for the length of the site. The three transects were 3 feet by 15 feet areas at the start, middle, and end of the larger survey area. Litter items were then classified as either Visible Litter (over four inches in length) or Micro Litter (under four inches). Micro Litter was sampled at three transects within each site and then extrapolated to the size of the entire site.

Categories, Items, and Packaging Material

The field crew members identified the litter category, specific item, and the packaging materials. Details for each category, the corresponding items, and the packaging material are shown in Table 2-1. Visible Litter was grouped into 10 categories, and Micro Litter was grouped into 11, including tobacco. Crews identified 93 distinct Visible Litter items and 68 distinct Micro Litter items. Crew members also identified packaging materials, such as metal, plastic, polystyrene, paper, glass, composite, and others, as well as brand names when visible. Finally, the crew members noted conditions that may contribute to the presence of litter, such as land use, traffic signs, and drainage features. Upon completing the data collection, the Project Team conducted tabulations and statistical analyses to quantify and characterize roadway litter.

Table 2-1: Summary Categories, Items, and Packaging Material

Category	Item	Material
Bags	Fast-food, retail, trash, and leaves	paper, plastic, cloth
Beverage Containers	Beer, soda, sports, energy, water, wine/liquor, juice, tea	metal, plastic, glass, composite
Construction Debris	Shingles, lumber/wood, electrical, drywall, foam insulation, industrial rags, tarps	metal, plastic, polystyrene foam, composite, wood
Cups and Lids	Cups for hot or cold drinks, lids straws, wrappers	paper, plastic, polystyrene foam
Fast-Food	Boxes, clamshells, trays, plates, utensils, napkins, utensils, napkins	composite, paper, foil, plastic, polystyrene
Home Food Containers	Food jars, cans, bottles, and lids	composite, glass, metal, plastic, polystyrene foam
Household Items	Clothing, hygiene items, appliances and packaging of items used at home	composite, cloth, metal, plastic, polystyrene foam,
Paper	Non-food/beverage paper, e.g., newspapers, magazines, flyers, lottery tickets, business, school, receipts, packaging, paperboard, corrugated boxes	paper
Snack Wrappers	Sweet snacks (candy, cakes), salty snacks (chips, crackers), gum	paper, plastic, composite
Tobacco	Cigarette or cigar butts, lighters, matches, boxes, wrapping, pouches and other packaging. Each was separately classified	tobacco, plastic, metal, composite
Vehicle Debris	Automobile parts from accidents, car maintenance debris, tires and tire debris	tire, rubber, metal

AGGREGATE LITTER

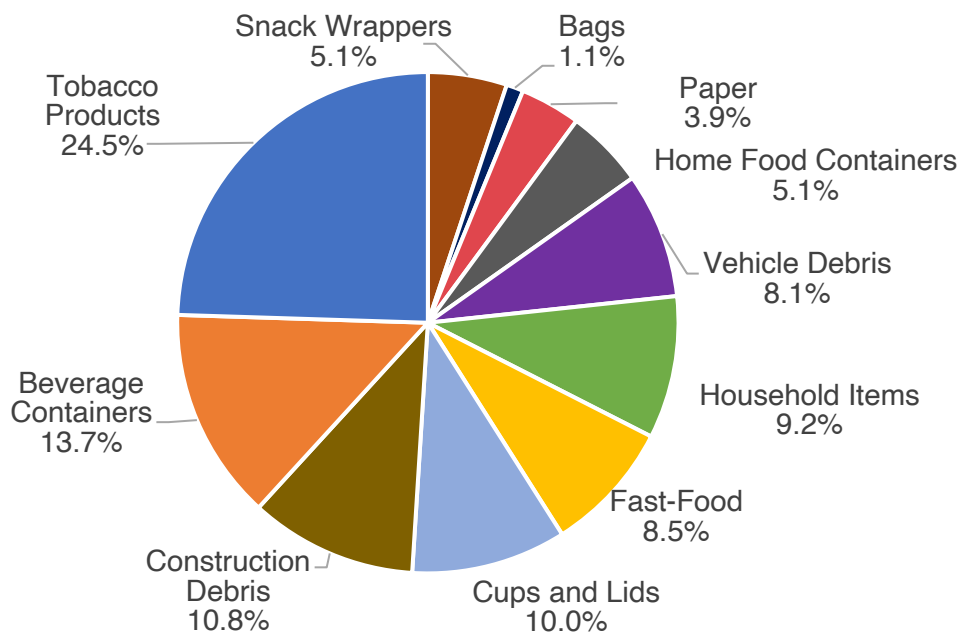
There are approximately 143.8 million pieces of litter on Louisiana roadways including visible and micro litter combined. This section contains details about aggregate litter by category, item, and packaging material. Figures and tables provide additional details on aggregate litter. The next section will share information specific to visible and micro litter separately.

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PIECES OF LITTER

Aggregate Litter By Category

Tobacco products was the most prevalent type of Aggregate Litter (24.5%), followed by beverage containers (13.7%) and construction debris (10.8%). Figure 2-3 shows the Aggregate Litter by category.

Figure 2-3: Aggregate Litter by Category



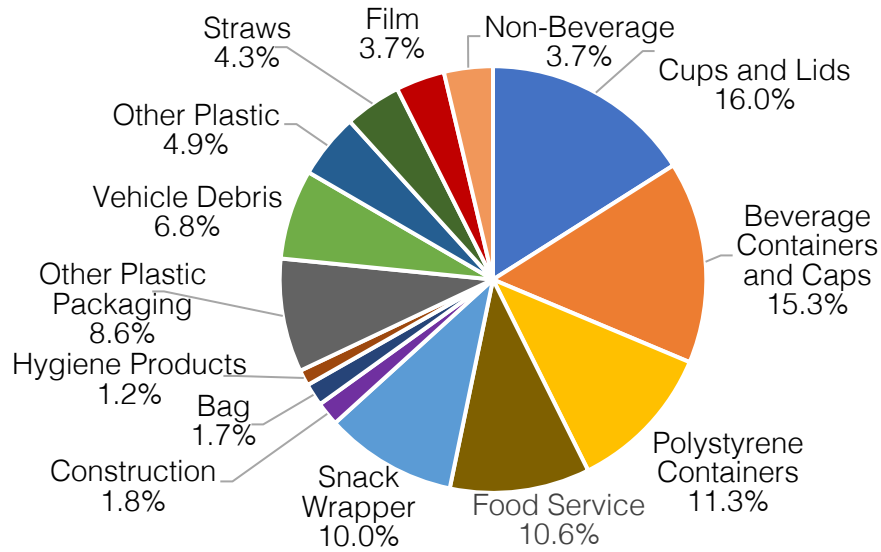
The top three Aggregate Litter items were cigarette butts, plastic beverage containers and cup pieces, and plastic fast-food pieces. Cigarette butts (21%) were the most common item of litter. Plastic beverage containers and cups account for 13.8 percent, followed by plastic fast food items at 7.2 percent. Table 2-2 shows the top aggregate litter items found during the field research.

Table 2-2: Aggregate Litter by Item

Aggregate Litter
Tobacco Products – Cigarette Butts
Plastic Beverage Containers and Cups
Plastic Fast Food
Plastic Home Items
Plastic Other – Includes Construction and Vehicles
Plastic Packaging
Metal Other – Includes Construction and Vehicles
Paper Fast Food
Plastic Snack Wrappers
Metal Beverage Containers

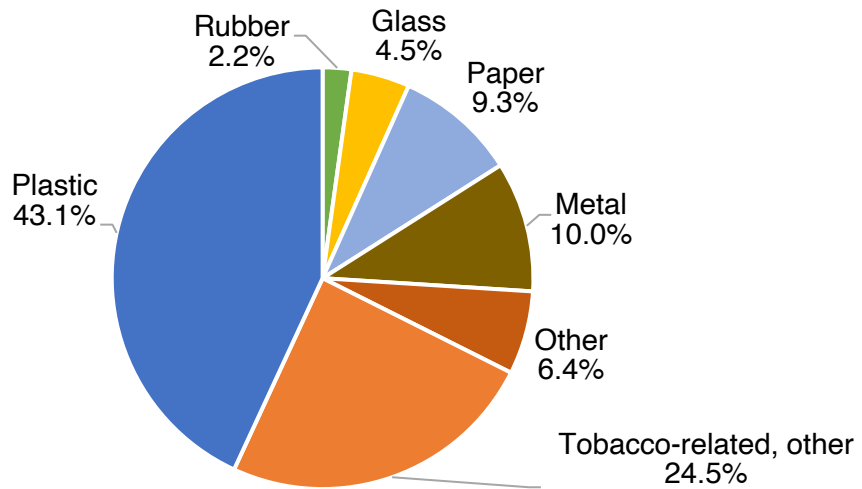
A significant amount and variety of plastic items are littered. Over 61.9 million plastic items were found on Louisiana roadways. Plastic water bottles were the most common Visible Litter, found at 80 percent of all surveyed sites. Figure 2-5 shares details on the top 14 plastic items.

Figure 2-5: Aggregate Litter Plastic Items



The top three Aggregate Litter packaging materials are plastic (43.1%), tobacco products (24.5%), and metal (10%). Figure 2-4 displays Aggregate Litter by packaging materials.

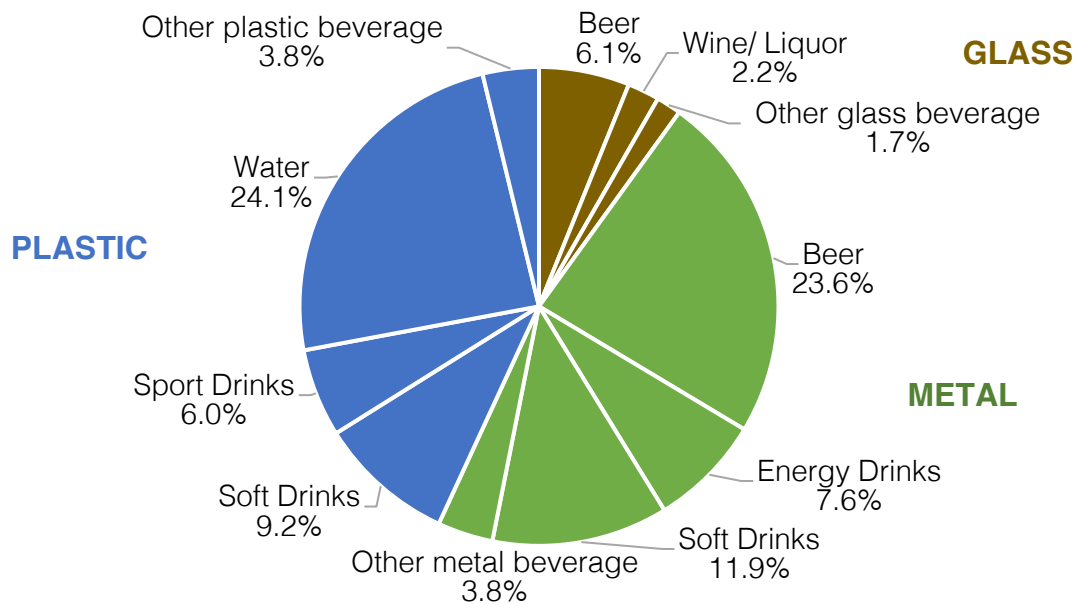
Figure 2-4: Aggregate Litter by Packaging Material



Note: For purposes of this figure, items were grouped, such as water, soft drink, milk, tea, liquor, coffee, and sports drinks. The "Other plastic packaging" represents items previously identified as other packaging and peanuts composing less than 1.5%.

Figure 2-6 shows the composition of beverage containers by packaging material, with plastic water representing the largest percentage (24.1%) of beverage containers. Aluminum beer cans (23.6%) were the second most prevalent.

Figure 2-6: Aggregate Composition of Beverage Containers in Visible Litter



Note: The "Other" for each packaging material consists of any items accounting for under 3%.

DIFFERENCES AND SIMILARITIES IN VISIBLE LITTER AND MICRO LITTER OBSERVATIONS

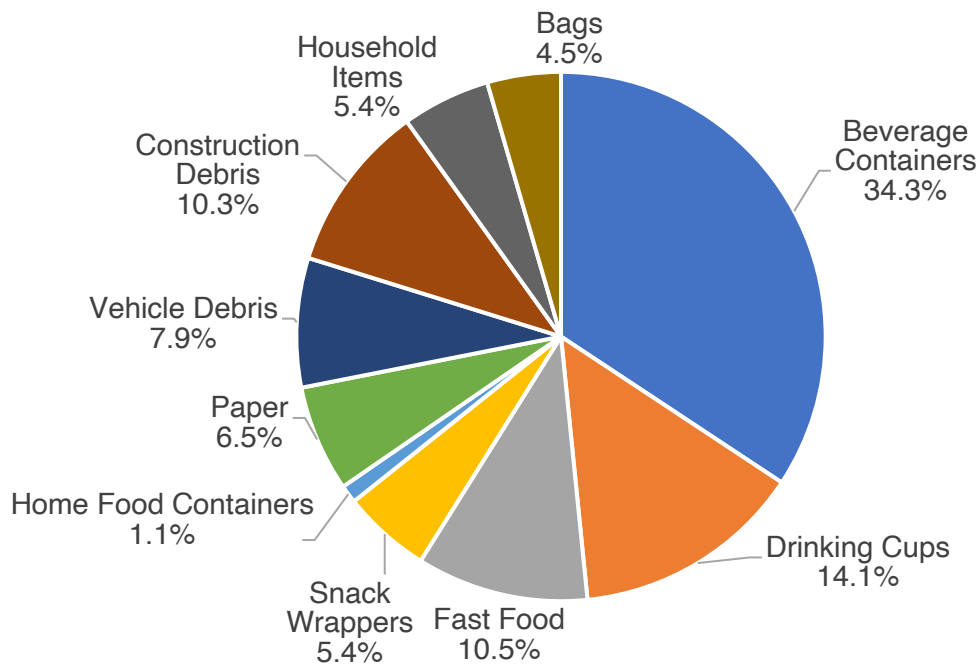
This section summarizes the character and details of the Visible Litter and Micro Litter found at the survey sites and provides details on the Visible Litter, as identified using a "meandering count" at three tri-sections within each site. Additional information on litter categories, litter items, and packaging materials provide a comprehensive view of litter found along the roadways in the state.

Categories of Visible Litter

The Visible Litter was grouped into 10 categories, as shown in Table 2-1. The most commonly found category of Visible Litter was beverage containers (34.3%), including beer, soda, sports, energy, water, wine and liquor, juice, and tea containers. The second highest Visible Litter category was drinking cups

(14.1%), including cups for hot or cold drinks, lids, straws, and wrappers. The third most common Visible Litter category was fast food packaging (10.5%), including boxes, clamshells, trays, plates, utensils, and napkins. Figure 2-7 shows Visible Litter percentages by categories.

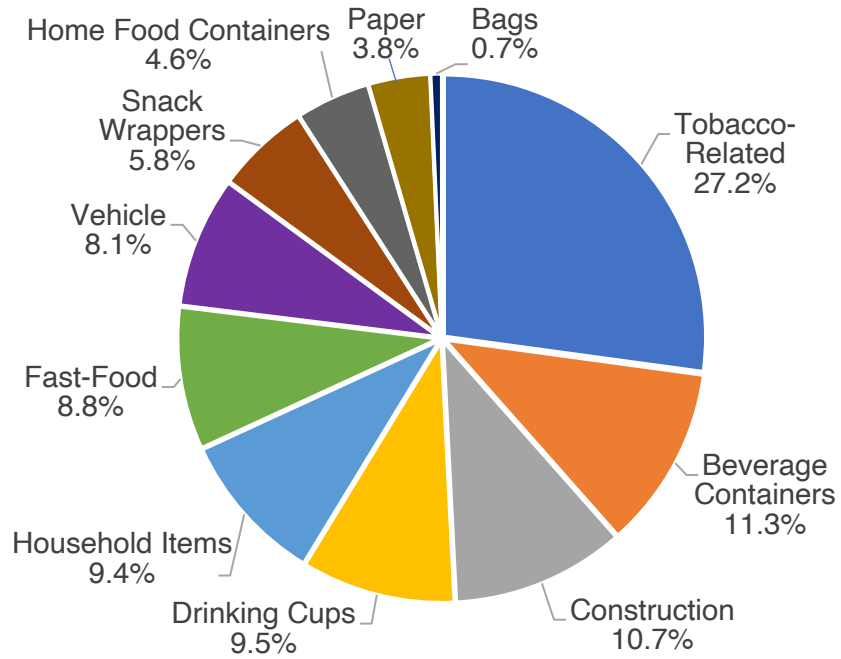
Figure 2-7: Visible Litter by Category



Categories of Micro Litter

Micro Litter was grouped into 11 categories, as shown in Table 2-1. The most prevalent Micro Litter category was tobacco products (27.1%), primarily cigarette butts. The second most common was beverage containers (11.3%), mainly broken glass or shredded pieces of metal, followed by construction debris (10.7%). Figure 2-8 presents Micro Litter percentages by categories.

Figure 2-8: Micro Litter by Category



Visible Litter Items

The Project Team identified 93 types of Visible Litter items. The top 10 Visible Litter items comprised 45.2% of all Visible Litter. Plastic water bottles, identified at 8.2% of the survey sites, were the most frequently found Visible Litter item. The second most commonly identified item was beer cans (8.0%), followed by tire debris (4.6%) and soft drink cans (4%). The top ten Visible Litter items are shown in Figure 2-9. Appendix 5 lists all Visible Litter items.



Micro Litter Items

The Project Team identified 68 types of Micro Litter items. The most prevalent item was cigarette butts (21%). Statistical tests showed a mild correlation (0.26) between the number of cigarette butts littered at a given site and the amount of Visible Litter at the same location. Forty-one percent of all sites with higher-than-average Visible Litter also had a higher-than-average number of cigarette butts. The second most prevalent Micro Litter item was polystyrene container pieces (4.9%), which were usually broken ice chest pieces and polystyrene cup pieces (4.9%). Polystyrene foam ice chests, in varying sizes, were widely found across the state. The top ten Micro Litter items are shown in Figure 2-10.



Figure 2-9: Top 10 Visible Litter Items

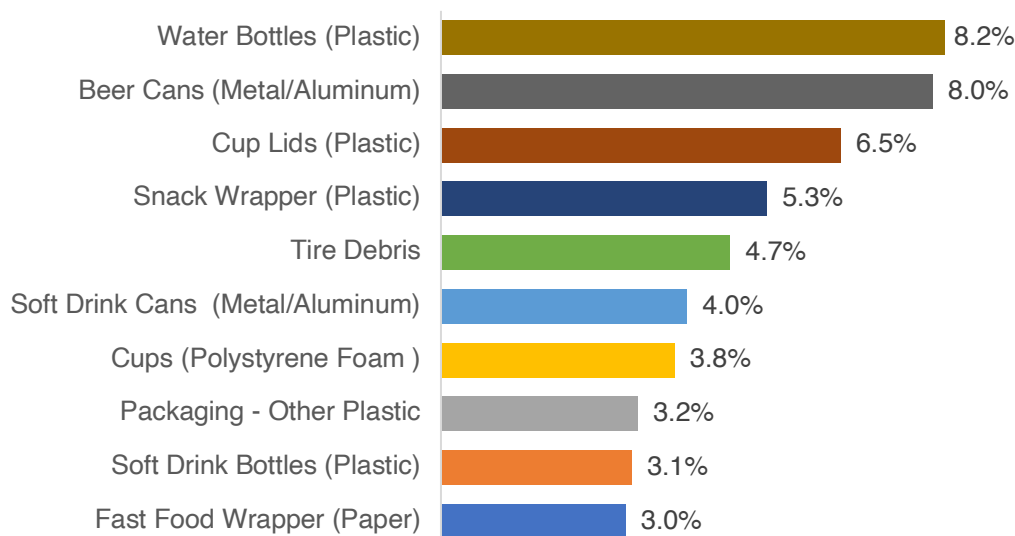
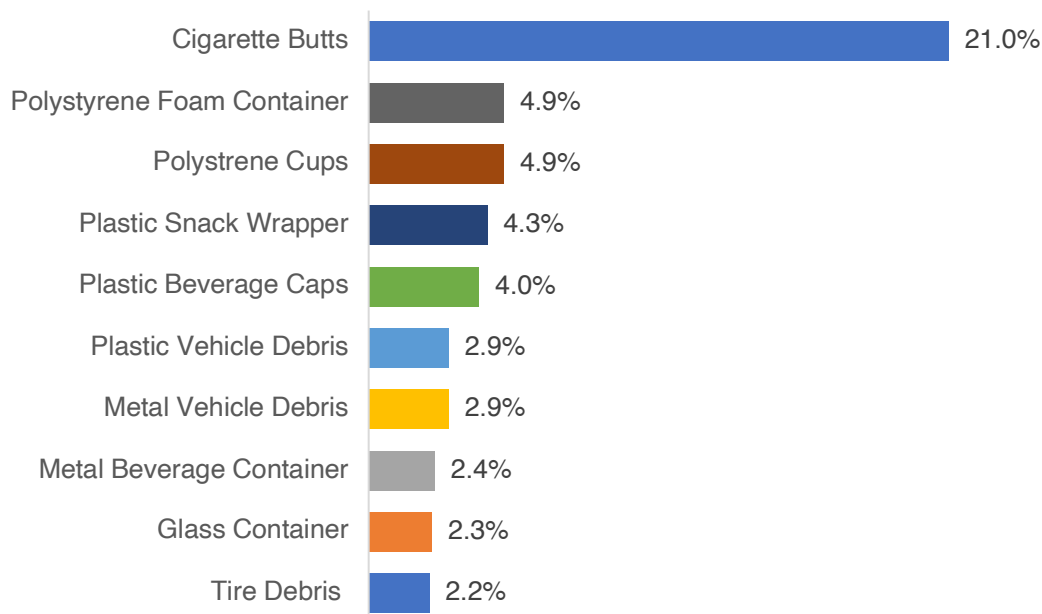


Figure 2-10: Top 10 Micro Litter Items

Packaging Materials for Visible Litter

Plastic (49.3%) was the most significant and pervasive Visible Litter packaging material. Metal (20.7%), predominantly aluminum beverage cans, was the second most common packaging material found at the survey sites, followed by paper (15.8%). Figure 2-11 shows the breakdown of Visible Litter by packaging material type.

Packaging Materials for Micro Litter

Tobacco products — including several different materials, such as plastic, paper, and organics — was the most prevalent Micro Litter packaging material (30%). The second most prevalent was plastic (28%), followed by paper (16%) and rubber (15%). Figure 2-12 shows the breakdown of Micro Litter by Packaging material type.

Figure 2-11: Visible Litter by Packaging Material

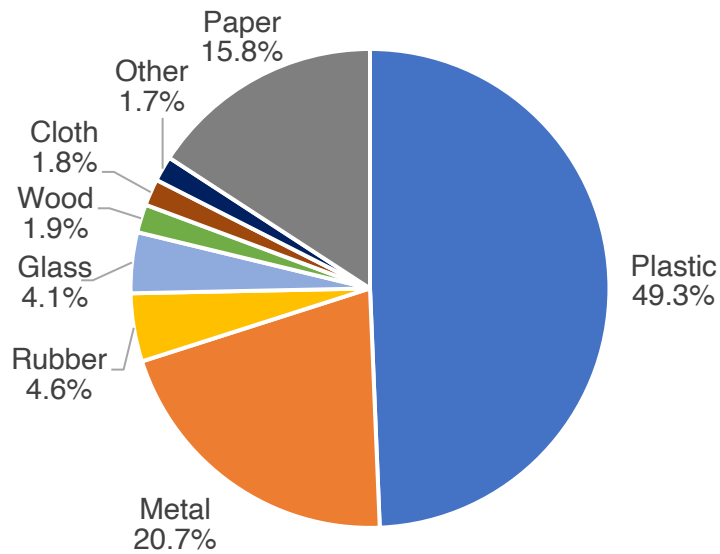
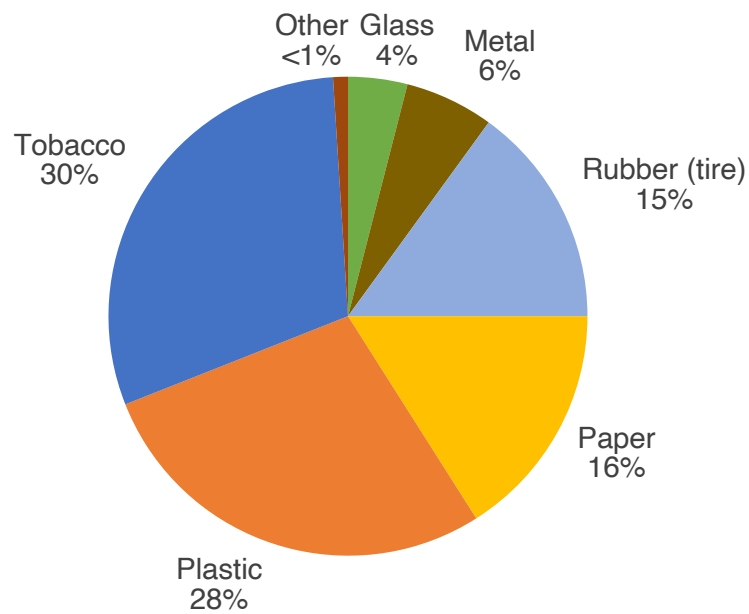


Figure 2-12: Micro Litter by Packaging Material



HIGHLIGHTS SPECIFIC LOCATION AND INDICATORS

This section highlights an analysis of specific locations and indicators that may be useful in addressing litter issues and challenges. The first subsection is an analysis of litter per LADOTD districts and three different roadway types. This section also shares information on litter sources and details a brand analysis of the items found during the study. The last part of the section focuses on waste management issues, such as the presence of recyclable packaging materials among litter, which may assist in identifying strategies to reduce litter. A subsection on proximity indicators provides insight into connections between land uses, facilities, and other factors that may impact the presence of litter. Finally, this section provides details relevant to making recommendations on litter prevention.

Roadway Type

Based on statistical analysis, littering patterns were similar on all three roadway types included in this study, as shown in Table 2-3. Interstates were the most littered type of roadway, with an average of 10,178 pieces of litter per mile. While interstates represent only 5.7 percent of all road types in Louisiana, they tend to experience heavier traffic volume than others, which may result in higher litter rates.



Table 2-3: Total Aggregate Litter by Mile and Roadway Type

Roadway Type	Average # Items Per Mile	Road Miles within State	% of Total Litter Items Per Mile	Total # Litter Items
Interstates	10,178	944	38%	9,604,551
US Highways	7,697	2,285	29%	17,585,224
State Routes	8,811	13,244	33%	116,683,356
Total	-	16,472	100%	143,873,132

Table 2-4 provides Aggregate Litter averages by category across the three roadway types Interstates (IH), US Highways (US), and State Routes (SR). The correlation data suggest differences in littering tendencies, depending on the litter category and roadway type. A t-test conducted about correlations is provided in Appendix 7. For Aggregate Litter across all roadway types, the tobacco category was the most prevalent type of litter. The next highest category was litter associated with beverage cups, with a pattern similar across all roadway types. Household items and beverage cups were third and fourth highest and were both significantly less common on US highways. The fifth most prevalent type of litter was construction debris, which was substantially more common on interstates than on highways and state routes.

Table 2-4: Aggregate Litter Averages by Road Type and Category

Category/Road Type	Aggregate Litter Averages per Site		
	IH	US	SR
Bags	58.7	39.7	40.4
Beverage Containers	63.6	71.0	65.1
Beverage Cups	57.6	39.5	54.1
Construction Debris	78.0	29.5	33.0
Fast Food	46.6	38.5	48.7
Home Food Container	2.7	5.8	2.6
Household Items	57.9	26.2	69.0
Paper	14.7	31.8	20.6
Snack Wrappers	29.9	24.6	31.1
Tobacco	140.5	110.0	119.7
Vehicle Debris	28.1	11.1	26.2

Table 2-5 shows the average for Visible and Micro Litter across roadway types. The correlation data suggest differences in littering tendencies. For Visible Litter, beverage containers were the most littered item. Home food containers were the least littered. For Micro Litter, a littering pattern is less apparent, although there were similarities in Micro Litter prevalence across all road types. Beverage containers were the most prevalent type of Micro Litter across all road types. Bags and construction debris were significantly more common along interstates.

Table 2-5: Visible and Micro Litter Averages by Road Type and Category

Category/Road Type	Visible Litter Averages			Micro Litter Averages		
	IH	US	SR	IH	US	SR
Bags	2.2	2.2	2.3	56.5	37.5	38.1
Beverage Containers	15.2	19.9	15.4	48.4	51.1	49.7
Beverage Cups	5.8	8	6.7	51.8	31.5	47.4
Construction Debris	6.2	4.1	5.5	71.8	25.4	27.5
Fast Food	6.9	4.3	5.3	39.7	34.2	43.4
Home Food Container	0.6	0.5	0.5	2.1	5.3	2.1
Household Items	3.0	2.3	2.9	54.9	23.9	66.1
Paper	4.8	2.7	2.9	9.9	29.1	17.7
Snack Wrappers	2.5	2.4	3.2	27.4	22.2	27.9
Tobacco	*	*	*	140.5	110.0	119.7
Vehicle Debris	8.5	1.7	3.6	19.6	9.4	22.6

Note: Tobacco is Micro Litter and not included under Visible Litter.

District Analysis

LADOTD Districts were used as one of the criteria in determining survey site location. The average Visible Litter was comparable across all LADOTD districts. As shown in Figure 2-13, the average amount of Visible Litter was lowest in District 58, the Chase area, and highest in District 4, the Shreveport-Bossier City metropolitan area.

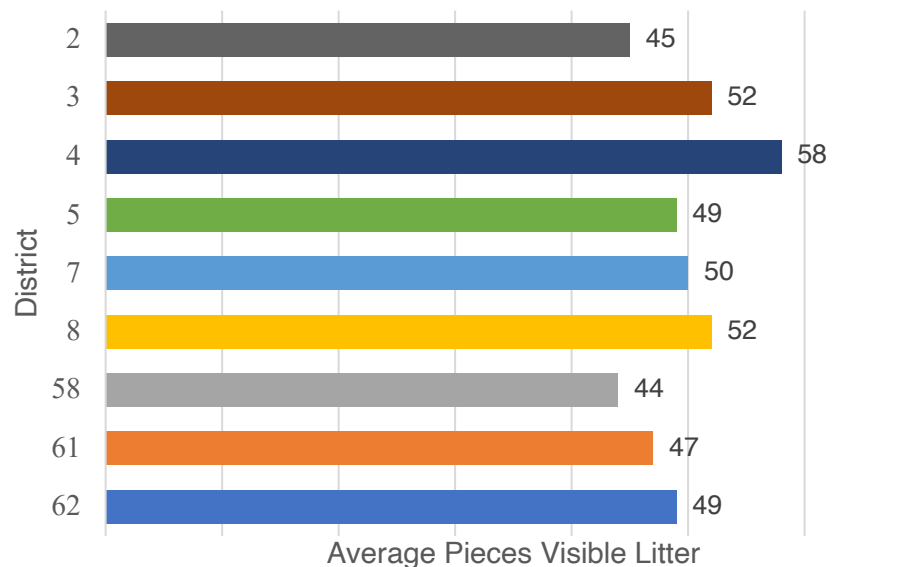
Figure 2-13: Average Visible Litter Pieces Per Site by District

Table 2-6 shows the top ten most littered sites based on Aggregate Litter counts. These sites had substantial amounts of Micro Litter; however, several sites had higher amounts of Visible Litter than Micro Litter. The three highest Aggregate Litter sites were located in District 62, the Hammond Area. These sites had substantial amounts of polystyrene pieces and mowed litter conditions. But District 62 also had one of the cleanest sites on I-59. Table 2-7 shows the top ten least littered sites for comparison.

Table 2-6: Top Ten Most Littered Sites Based on Aggregate Litter

Most Littered	Parish	District	Roadway
1	Livingston	62	US 190
2	Washington	62	LA 21
3	E. Baton Rouge	61	US 61
4	Orleans	2	I-10
5	Livingston	62	I-12
6	Avoyelles	8	LA 115
7	Bossier	4	I-20
8	Union	5	US 167
9	Livingston	62	LA 1024
10	Concordia	58	US 84

Table 2-7: Top Ten Least Littered Sites Based on Aggregate Litter

Least Littered	Parish	District	Roadway
1	St. Bernard	2	LA 46
2	St. Mary	3	LA 70
3	Vermilion	3	LA 14
4	Vernon	8	LA 117
5	Desoto	4	I-49
6	St. Mary	3	US 90
7	Tangipahoa	62	I-55
8	West Feliciana	61	US 61
9	Terrebonne	2	LA 24
10	Rapides	8	LA 28 West

District 4 had two sites in the top ten for Visible Litter (Table 2-8) and one in the top ten for Micro Litter (Table 2-9). At the site identified with the highest amount of Visible Litter, the survey team commented on both the extreme litter condition within and also noted litter in an adjacent drainage area outside the survey site. Most of the highest littered sites were either along roadways with high traffic volume or larger populated areas, although a couple of sites in more rural areas had high litter counts and visible signs of dumping.

Table 2-8: Sites with the Highest Amount of Visible Litter

Litter Rank	Parish	District	Roadway
1	Bossier	4	I-20
2	Lincoln	5	US 80
3	Avoyelles	8	LA 115
4	Allen	7	US 165
5	Jefferson	2	LA 18
6	Bossier	4	US 71
7	Acadia	3	US 90
8	Washington	62	LA 21
9	Orleans	2	I-10
10	East Baton Rouge	61	LA 67

Table 2-9: Sites with the Highest Amount of Micro Litter

Micro Litter Rank	Parish	District	Roadway
1	Livingston	62	US 190
2	Washington	62	LA 21
3	East Baton Rouge	61	US 61
4	Orleans	2	I-10
5	Livingston	62	I-12
6	Avoyelles	8	LA 115
7	Union	5	US 167
8	Livingston	62	LA 1024
9	Bossier	4	I-20
10	Concordia	58	US 84

Litter Source Estimates

Without witnessing littering, determining the exact sources of litter can be difficult. However, based on site conditions and guidelines developed and refined over time, identifying the likely sources of litter is possible. The litter source may be determined based on context clues such as:

- 1) types, amounts, conditions, and locations of littered items
- 2) proximity to specific land uses, e.g., solid waste facilities, convenience stores, and fast-food establishments
- 3) roadway type, e.g., accessibility by pedestrians

At each site, the team documented surrounding land uses and indicators that might identify litter sources. In addition, mapping software was used to analyze the dynamics of each site further to determine any additional factors that could influence the types and amounts of littered items.

The Project Team categorized litter sources into the following groups:

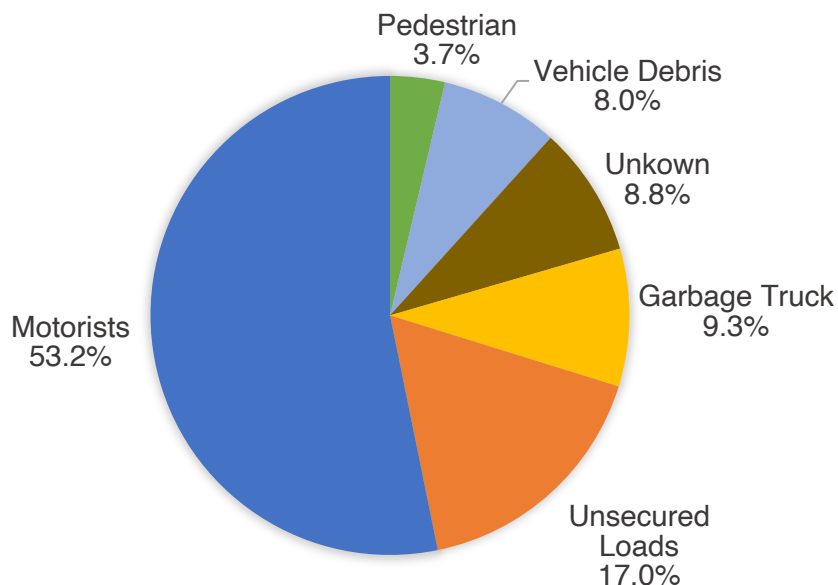
- **Motorists:** drivers and passengers who discard trash improperly from vehicles
- **Pedestrians:** walking individuals who improperly discard trash
- **Improperly Secured Loads:** pickup trucks or construction vehicles with inadequately secured loads
- **Garbage Trucks:** vehicles designed to transport trash or vehicles carrying garbage to designated facilities
- **Vehicle Debris:** tire tread, auto parts, or vehicle accident debris
- **Unknown:** other items that cannot be reasonably determined.

The Project Team determined through litter analysis that the leading litter sources were motorists (53.2%), unsecured loads (17%), and garbage trucks (9.3%).



Figure 2-14 provides more detail. Although pedestrians typically account for one of the top three sources of littering in studies, only 3.7 percent of litter was attributed to pedestrians in this survey, likely due to minimal pedestrian accessibility along the surveyed roadways.

Figure 2-14: Top Sources of Litter



Brand Name Analysis

The survey members documented brand names when possible. During the field survey, 132 unique products were identified by brand name. Since the purpose of identifying brand names was just to identify trends, products within the same category were combined.

Figure 2-15 shows the most commonly identified brand names. The three most prevalent brand names were beer containers including Bud Light, Busch, and Miller. Coca-Cola and McDonald's were also in the top five. This brand data correlates with the survey findings of beverage containers and fast food being among the most prevalent categories of litter.

Figure 2-15: Most Common Brand Names of Roadway Litter

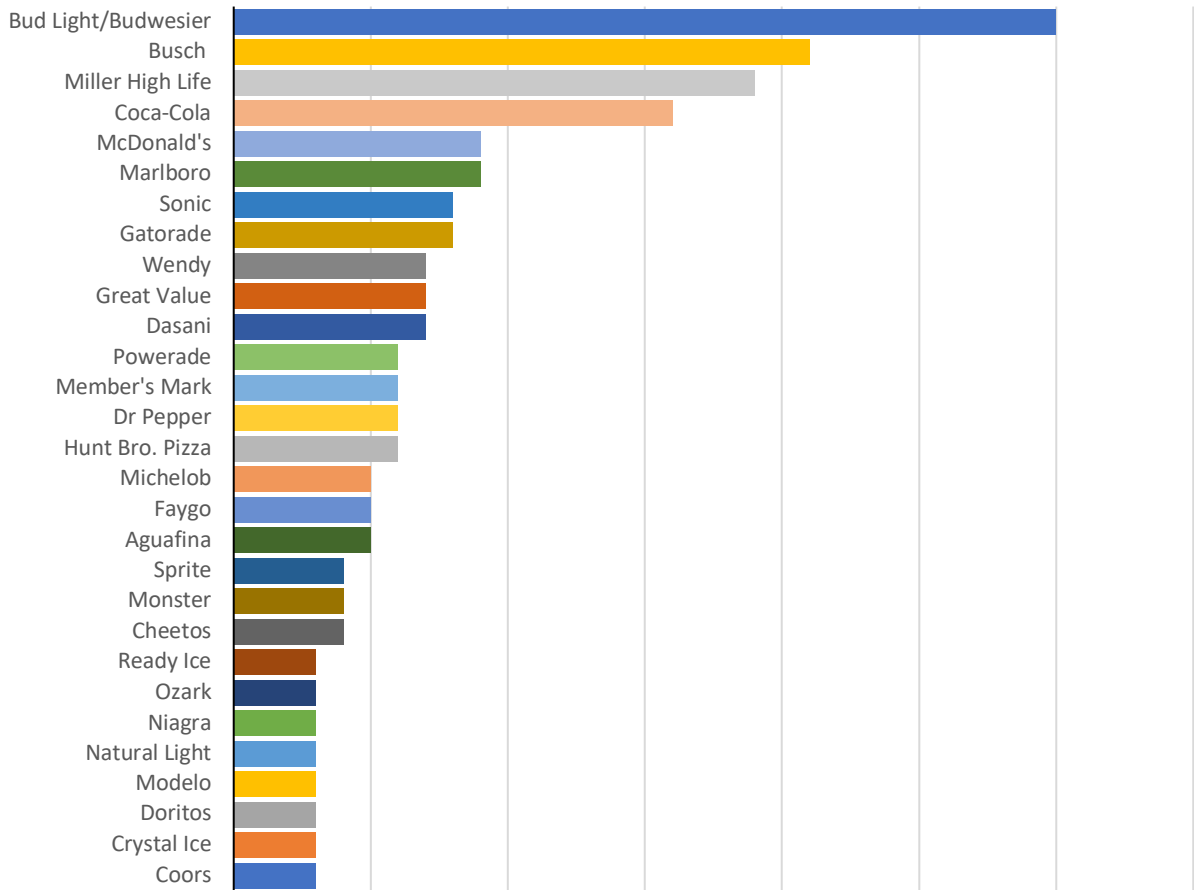


Table 2-9 lists the companies correlated with the brand names found on litter at the survey sites. The company and brand name relationship were confirmed on the company or brands' websites.

Table 2-9: Company and Brand Name Relationship

Company	Brand
AB InBev	Budweiser, Busch, Michelob, Modelo, Natural Light
Coca-Cola	Coca-Cola, Dasani, Monster, Powerade, Sprite
PepsiCo	Aquafina, Gatorade, Doritos, Cheetos
Niagara Bottling	Niagara, Member's Mark (Sam's), Great Value (Walmart)

Recyclables within Litter Items

Nearly 42 percent of all Visible Litter were composed of recyclable packaging materials like metal, plastic containers, and paper products. Determining which Micro Litter items could be recyclable was more complex. For example, cigarette butts may be recycled, but only under specific conditions.

Proximity Indicator Correlations to Litter Condition

At each survey site, team members recorded proximity indicator(s). The 14 proximity indicators that may influence littering behavior or the accumulation of litter include:

- Beautification
- Businesses/Commercial
- Churches
- Convenience Stores
- Drainage Ditches
- Fast Food Establishments
- Fields/Wooded
- Railroad
- Residential
- Solid Waste Facilities (Transfer Station and Landfills)
- Schools
- Traffic Signs/Signals
- Vacant Lot
- Utility Substations

Correlation analyses were conducted to determine whether an indicator and the quantity indicators were associated with the amount of litter found at survey sites. For each of the 14 indicators, correlation analyses were run in relation to Visible Litter, Micro Litter, and Aggregate Litter (Litter + Micro Litter).

In addition, the Project Team analyzed the ten litter categories, considering whether the pattern or extent of littered items — when proximity indicators are present — is comparable to the extent of the litter when such indicators are absent. A positive correlation might suggest that more litter exists in the presence of the given indicator. However, the statistical significance of that correlation must be considered in light of the number of cases under consideration and the chosen level of significance. Detailed proximity indicators charts are provided in Appendix 6.

Based on the statistical analysis, the following results are reported:

- Beautification efforts reduce litter. Less litter was found near sites with trees, shrubs, plantings, and similar enhancements. Sites without beautification efforts had approximately 38 percent more litter than beautified sites.
- Bags and all Micro Litter are likely to be located near convenience stores.
- Beverage containers are frequently found near drainage ditches and utilities.
- Beverage containers, beverage cups, fast food items, and bags are often found close to solid waste facilities.
- Beverage cups are likely to be located in proximity to fast food establishments.
- Fast food items are more likely near businesses and commercial enterprises.

ROADWAY LITTER SURVEY KEY FINDINGS

- There are approximately 143.8 million pieces of litter on Louisiana roadways.

143.8
MILLION
PIECES OF LITTER

- Littering patterns, including the number of littered items and locations, are similar on interstates, highways, and state routes.

- Interstates are the most littered type of roadway, with an average of 10,178 pieces of litter per mile.



- The most prevalent Aggregate Litter (Visible + Micro) categories are tobacco products (24.5%), beverage containers (13.7%), and construction debris (10.8%). Appendix 2 provides detail on categories, items, and packaging materials, including Aggregate Litter counts for items.



- The top three Aggregate Litter packaging materials are plastic, tobacco, and metal. The highest percentage of Aggregate Litter by packaging material is plastic (43.1%), followed by tobacco-products other (24.5%) and metal (10%).

- A significant amount and variety of plastic items are littered. Over 61.9 million plastic items were found on Louisiana roadways. The top three Aggregate Litter items are cigarette butts (21%), plastic beverage containers and cup pieces (13.8%), and plastic fast-food pieces (7.2%).

- Plastic water bottles are the most common Visible Litter item. Plastic water bottles were found at 80 percent of all surveyed sites. Plastic water bottles were also the most prevalent single item of Visible Litter and make up the largest share (24.1%) of the beverage container category.



- The leading litter sources are motorists, unsecured loads, and garbage trucks. Motorists (53.2%) and unsecured loads (17%) are the leading sources of litter. The third-highest source of litter is garbage trucks (9.3%).



- Many littered items could be recycled. Nearly 42 percent of Visible Litter contains recyclable packaging materials like metal, plastic containers, and paper products.



- Beautification efforts reduce litter. Sites without beautification efforts have approximately 38 percent more litter than beautified sites.
- Visible Litter is comparable across all LADOTD districts. The average number of Visible Litter items is highest in District 4, Bossier. District 58, the Chase area, has the lowest number of litter items.
- Brand name litter items are most often beverage containers and fast-food products. The most common brand names found at the 137 survey sites, in order of prevalence, were Bud Light, Busch, Miller High Life, Coca-Cola, and McDonald's.



RECOMMENDATIONS

- Develop improved litter removal systems including procedures and practices including frequency of litter collection depending on conditions along roadways, eliminating the accumulation of litter, which may lead to increased littering behavior and the accountability for the litter removal.
- Develop new systems to ensure litter removal prior to mowing roadsides to help reduce the creation Micro Litter from mowing.
- Encourage beautification. Sites that were not beautified had an average of 38 percent more Visible Litter than beautified sites.
- Create litter prevention messaging for fast-food and beverages at points of sale, including restaurants and convenience stores.
- Encourage the enforcement of litter laws, including for uncovered loads.
- Expand Adopt-a-Road or adoption programs to removal and raise awareness of litter issues.
- Expand youth litter education programs.
- Support expansion of KLB affiliation with new affiliate options, such as community and university affiliates, that can encourage litter prevention rather than litter remediation.



- Identify consistent funding for ongoing statewide litter programs



- Identify best practices and evaluate waste collection and hauling infrastructures, expand effective residential and commercial waste processing, and reduce escaping litter from vehicles.

- Promote the recycling of beverage containers.



- Continue the “Let it Shine” campaign to expand public awareness about impacts of litter.



- Conduct statewide research every 5 to 10 years to evaluate litter abatement strategies, and conduct periodic litter assessments with communities and businesses to determine if litter programs are decreasing litter or littering behavior.

APPENDIX 1: VISIBLE LITTER SURVEY PROTOCOL

The methodology used for the 2023 Louisiana Litter Survey is based on the research method used in many statistically-based litter surveys.

Conducting the Litter Survey

Each survey team was composed of two people. Upon arriving at the site, the crew safely parked their vehicle away from traffic and barriers. They turned on emergency flashers and placed a traffic cone at the back of the car. Team members wore appropriate clothing for the weather and safety, such as safety boots and fluorescent traffic vests to increase visibility. Survey times were scheduled to avoid surveying at dusk, before sunrise, or in low-light conditions. Weather conditions were consistently monitored.



At each site, one team member measured the site with a measuring wheel, with the optimal site size of 300 feet long and 15 feet deep, or approximately 4,500 square feet. The first member used highway paint to mark each site's beginning, mid-point, and end. The width of each site was measured from 1 foot inside the curb or the start of the pavement, towards the outer edge of the site, up to a width of 15 feet, and marked to indicate the boundary. The second team member photographed the site, including the beginning, mid-point, and end, plus any other photos the team deemed beneficial to document conditions or specific litter items.

Litter Classification

For the Louisiana Litter Survey, litter was classified as Visible Litter (\geq four inches) and Micro Litter ($<$ four inches). This breakdown helps define and clarify the extent to which litter item size is a factor in evaluating resultant data. Visible Litter was characterized using 93 items for Visible Litter and 68 items for Micro Litter, which were subsequently rolled into 11 major categories. These categories will allow comparison to litter in other areas in future litter surveys in



Louisiana. One member used a “meandering count” of Visible Litter, recording item count, packaging material, and brand names. The second team member conducted the “cross-section sub-count” at the three marked locations. The data from these three transects were then extrapolated to each site's total area.

Proximity Indicator and Litter Sources Count

The ambient site information was recorded on the appropriate form at each site, describing the site number, size, and proximity. The team recorded conditions, such as traffic signals or signs, and land use type, such as fast food, convenience stores, and residential or commercial. The last step was agreeing on and recording a subjective visual rating of Clean to Extremely Littered using the Likert Scale.

APPENDIX 2: SITE LOCATIONS

Site	Parish	City	District	Road	GPS Coordinates
1	Acadia	Rayne	3	I-10	30.243329, -92.310874
2	Acadia	Rayne	3	US 90	30.2307599, -92.3258767
3	Acadia	Mowata	3	LA 13	30.363501, -92.397638
4	Allen	Oakdale	7	US 165	30.8982, -92.6235
5	Ascension	Sorrento	61	I-10	30.1699167, -90.8719132
6	Ascension	Gonzales	61	US 61	30.2190654, -90.8910235
7	Ascension	Gonzales	61	I-10	30.1775643, -90.8902926
8	Assumption	Napoleonville	61	LA 70	30.001488, -91.059032
9	Avoyelles	Moreauville	8	LA 1	31.043438, -91.968229
10	Avoyelles	Mansura	8	LA 115	31.0721944, -92.1025642
11	Avoyelles	Mansura	8	LA 107	31.0384929, -92.0433126
12	Beauregard	Ragley	7	US 190	30.5104, -93.2214
13	Beauregard	DeRidder	7	LA 394	30.7848469, -93.2408207
14	Beauregard	DeRidder	7	LA 112	30.8430, -93.2521
15	Bossier	Bossier City	4	I-20	32.53438, -93.65167
16	Bossier	Bossier City	4	US 71	32.3920166, -93.6033481
17	Bossier	Elm Grove	4	LA 157	32.37115, -93.50283
18	Caddo	Shreveport	4	I-20	32.45096, -93.86457
19	Caddo	Greenwood	4	US-80	32.443018, -93.985652
20	Caddo	Shreveport	4	LA 525	32.38868, -93.82586
21	Calcasieu	Lake Charles	7	I-10 EB ramp	30.2355, -93.2042
22	Calcasieu	Lake Charles	7	US 90	30.2342,

Site	Parish	City	District	Road	GPS Coordinates
					-93.1459
23	Calcasieu	Westlake	7	LA 378	30.2846976, -93.2501741
24	Caldwell	Grayson	58	LA 126	32.0707, -92.17079
25	Cameron	Cameron	7	LA 27	29.8100557, -93.1380386
26	Catahoula	Jonesville	58	US 84	31.61812, -91.84684
27	Claiborne	Haynesville	4	US 79	32.9393824, -93.1149777
28	Concordia	Ferriday	58	US 84	31.6082, -91.63814
29	Concordia	Ferriday	58	US 425	31.6483518, -91.5532369
30	Concordia	Jonesville	58	LA 129	31.55403, -91.70764
31	Desoto	Holly	4	I-49	32.14636, -93.63567
32	Desoto	Mansfield	4	US 84	32.05741, -93.59000
33	East Baton Rouge	Baton Rouge	61	I-12	30.4210985, -91.0816628
34	East Baton Rouge	Zachary	61	US 61	30.638845, -91.243800
35	East Baton Rouge	Baker	61	LA 67	30.611319, -91.116977
36	East Carroll	Lake Providence	5	LA 134	32.745670, -91.272426
37	East Feliciana	Ethel	61	LA 955	30.7959624, -91.1243875
38	East Feliciana	Jackson	61	US 61	30.6934481, -91.2690029
39	Evangeline	Elton	3	US 190	30.4813794, -92.7089297
40	Evangeline	Ville Platte	3	US 167	30.678246, -92.230630
41	Franklin	Winnsboro	58	LA 577	32.24698, -91.68072
42	Franklin	Winnsboro	58	US 425	32.18906, -91.72764
43	Franklin	Sicily Island	58	US 425	31.905, -91.66196
44	Grant	Rock Hill	8	US 71	31.466281,

Site	Parish	City	District	Road	GPS Coordinates
					-92.5932646
45	Iberia	New Iberia	3	US 90	30.035092, -91.921280
46	Iberia	New Iberia	3	LA 182	30.046863, -91.866855
47	Iberia	New Iberia	3	LA 88	30.048461, -91.9064291
48	Iberville	Grosse Tete	61	I-10	30.417128, -91.440246
49	Jackson	Quitman	5	US 167	32.297637, -92.707461
50	Jefferson	Metairie	2	I-10	30.000614, -90.199387
51	Jefferson	Metairie	2	US 61	29.973457, -90.142876
52	Jefferson	Marrero	2	LA 18	29.900696, -90.120123
53	Jefferson Davis	Jennings	7	I-10	30.2392124, -92.6192619
54	Jefferson Davis	Jennings	7	LA 102	30.2181974, -92.6549288
55	Jefferson Davis	Welsh	7	US 90	30.231596, -92.859845
56	Lafayette	Lafayette	3	I-10	30.2477189, -92.045879
57	Lafayette	Broussard	3	US 90	30.114358, -91.943214
58	Lafayette	Lafayette	3	LA 94	30.2337601, -91.9957626
59	Lafourche	Des Allemands	2	US 90	29.8065483, -90.4971954
60	Lasalle	Trout	58	US 84	31.69621, -92.18409
61	Lasalle	Olla	58	LA 459	31.76184, -92.02098
62	Lincoln	Ruston	5	I-20	32.540677, -92.691980
63	Lincoln	Ruston	5	US 80	32.507846, -92.692678
64	Lincoln	Ruston	5	LA 544	32.5552042, -92.6846009
65	Livingston	Denham Springs	62	I-12	30.4578065, -90.9457461
66	Livingston	Walker	62	US 190	30.4919032,

Site	Parish	City	District	Road	GPS Coordinates
					-90.8513853
67	Livingston	Walker	62	LA 1024	30.5613739, -90.869499
68	Madison	Tallulah	5	I-20	32.322950, -90.977706
69	Morehouse	Bastrop	5	US 425	32.8769411, -91.8655795
70	Morehouse	Bonita	5	US 165	32.9377773, -91.6610543
71	Natchitoches	Natchitoches	8	US 71	31.8213259, -93.030208
72	Natchitoches	Natchitoches	8	LA 6	31.7256234, -93.1621182
73	Natchitoches	Natchitoches	8	LA 1	31.7359635, -93.080261
74	Orleans	New Orleans	2	US 90	30.0054261, -90.0358825
75	Orleans	New Orleans	2	I-10	29.959394, -90.096707
76	Orleans	New Orleans	2	LA 428	29.929808, -90.032139
77	Ouachita	West Monroe	5	I-20	32.510277, -92.238156
78	Ouachita	Monroe	5	US 165	32.56512, -92.0746958
79	Ouachita	Collinston	5	LA 134	32.65495, -91.9375628
80	Plaquemines	Belle Chasse	2	LA 23	29.8649237, -89.9992974
81	Pointe Coupee	Livonia	61	US 190	30.55471, -91.55358
82	Rapides	Cheneyville	8	US 71	30.989504, -92.214927
83	Rapides	Lecompte	8	LA 3170	31.183315, -92.416323
84	Rapides	Boyce	8	LA 28 West	31.261871, -92.748984
85	Red River	Coushatta	4	US-71	32.0338895, -93.3395224
86	Richland	Delhi	5	I-20	32.449486, -91.568298
87	Richland	Rayville	5	US 425	32.441710, -91.760681
88	Sabine	Many	8	US 171	31.53145, -93.46184

Site	Parish	City	District	Road	GPS Coordinates
89	Sabine	Zwolle	8	US 171	31.6068263, -93.5679922
90	St. Bernard	Chalmette	2	LA 47	29.953846, -89.958277
91	St. Bernard	Chalmette	2	LA 46	29.930380, -89.952467
92	St. Charles	Luling	2	I-310	29.927702, -90.386117
93	St. Helena	Greensburg	62	LA 10	30.876546, -90.777399
94	St. James	Garyville	61	I-10	30.124022, -90.690197
95	St. James	Gramercy	61	US 61	30.0749348, -90.7033068
96	St. John the Baptist	Laplace	62	I-10	30.102551, -90.488438
97	St. John the Baptist	Reserve	62	US 61	30.077280, -90.549809
98	St. John the Baptist	Edgard	62	LA 3127	30.016019, -90.5588457
99	St. Landry	Opelousas	3	I-49	30.5878629, -92.0483239
100	St. Landry	Port Barre	3	US 190	30.547260, -91.913352
101	St. Landry	Opelousas	3	LA 749	30.565398, -92.089197
102	St. Martin	Breaux Bridge	3	I-10	30.2922425, -91.9249425
103	St. Martin	Breaux Bridge	3	LA 347	30.303528, -91.844692
104	St. Martin	Broussard	3	US 90	30.0862046, -91.9396484
105	St. Mary	Franklin	3	US 90	29.776614, -91.510701
106	St. Mary	Morgan City	3	LA 70	29.725022, -91.183410
107	St. Mary	Franklin	3	LA 182	29.7575215, -91.4088063
108	St. Tammany	Slidell	62	I-10	30.289500, -89.747845
109	St. Tammany	Slidell	62	US 11	30.307028, -89.771986
110	St. Tammany	Mandeville	62	LA 59	30.4188676, -90.0406445
111	Tangipahoa	Hammond	62	I-12	30.4793685,

Site	Parish	City	District	Road	GPS Coordinates
					-90.5039557
112	Tangipahoa	Amite City	62	I-55	30.468857, -90.481800
113	Tangipahoa	Kentwood	62	LA 38	30.9272443, -90.4122673
114	Tensas	St. Joseph	58	US 65	31.9451565, -91.279643
115	Terrebonne	Gray	2	US 90	29.680498, -90.774658
116	Terrebonne	Houma	2	LA 24	29.634895, -90.758608
117	Terrebonne	Houma	2	LA 311	29.6170693, -90.7920319
118	Union	Bernice	5	US 167	32.873186, -92.656099
119	Vermilion	Maurice	3	US 167	30.067733, -92.124165
120	Vermilion	Abbeville	3	LA 14	29.9643368, -92.0733966
121	Vermilion	Abbeville	3	LA 82	29.9076103, -92.1649071
122	Vernon	Florien	8	US 171	31.35193, -93.41528
123	Vernon	Leesville	8	LA 28	31.160032, -93.242342
124	Vernon	Leesville	8	LA 117	31.17475, -93.25402
125	Washington	Bogalusa	62	LA 21	30.7448305, -89.8460365
126	Washington	Franklinton	62	LA 10	30.866213, -90.0159593
127	Washington	Angie	62	LA 436	30.9060161, -89.9922597
128	Webster	Minden	4	I-20	32.5903065, -93.3364082
129	Webster	Minden	4	LA 528	32.5995275, -93.3429163
130	Webster	Minden	4	US 80	32.5774371, -93.4063015
131	West Baton Rouge	Port Allen	61	I-10	30.4463419, -91.2400742
132	West Baton Rouge	Livonia	61	US 190	30.5547553, -91.5556321
133	West Carroll	Oak Grove	5	LA 585	32.9513152,



Site	Parish	City	District	Road	GPS Coordinates
					-91.4500141
134	West Feliciana	St. Francisville	61	US 61	30.8355512, -91.3851125
135	Winn	Winnfield	8	US 84 East	31.894958, -92.484733
136	Tangipahoa	Hammond	62	I-55	30.49784, -90.50284
137	Bienville	Minden	4	I-20	32.562797, -93.158309

APPENDIX 3: SAMPLE SITE MAP

Comprehensive site maps were assembled for the survey sites to ensure that field crews had all the information needed to identify each site upon arrival at the particular location.

Site Map: 2

Survey Target: US 90	Landmark: Sundance Lane
Parish: Acadia	City: Rayne
GPS Coordinates: 30.2307599,-92.3258767	Google Streets Link: Site 2



KLB Site Map - 2

APPENDIX 4: SUMMARY LITTER DATA

Packaging Material	Items	Visible 4 Inches+	Micro < 4 Inches	Aggregate Count	Percent of Aggregate Count
Glass	Broken Glass Container	24,822	3,219,541	3,244,363	2.3%
	Glass Non-Beverage Jars	2,069	2,464,393	2,466,462	1.7%
	Industrial Glass	2,069	370,087	372,156	0.3%
	Beer Bottles	293,730	-	293,730	0.2%
	Wine/Liquor	103,426	-	103,426	0.1%
	Water	35,165	-	35,165	0.0%
	Coffee	8,274	-	8,274	0.0%
	Soft Drinks	8,274	-	8,274	0.0%
	Milk/Juice	4,137	-	4,137	0.0%
	Subtotal Glass	481,966	6,054,021	6,535,987	4.5%
Metal	Auto/Vehicle Debris	227,538	4,005,707	4,233,245	2.9%
	Metal Beverage Container	-	3,403,514	3,403,514	2.4%
	Foil Materials (Industrial)	26,891	1,351,993	1,378,884	1.0%
	Beer	1,133,548	-	1,133,548	0.8%
	Construction/Demolition Debris	133,936	974,419	1,108,355	0.8%
	Steel Cans	18,617	787,237	805,854	0.6%
	Aluminum Non-Beverage Cans	39,302	543,364	582,666	0.4%
	Soft Drinks	570,911	-	570,911	0.4%
	Fast Food and Food Wrapper/Container	210,989	400,036	611,025	0.4%
	Energy Drinks	366,128	-	366,128	0.3%
	Wine/ Liquor	78,604	-	78,604	0.1%
	Sport Drinks	59,987	-	59,987	0.0%
	Aerosol Cans (Paint, Oils, Etc.)	14,480	14,975	29,455	0.0%
	Container Lids	25,856	-	25,856	0.0%
	Milk/Juice	20,685	-	20,685	0.0%
	Tea	12,411	-	12,411	0.0%
	Coffee	6,206	-	6,206	0.0%
	Water	2,069	-	2,069	0.0%

Packaging Material	Items	Visible 4 Inches+	Micro < 4 Inches	Aggregate Count	Percent of Aggregate Count
Metal Cont.	Subtotal Metal	2,948,158	11,481,245	14,429,403	10.0%
Organic	Food Items (Apple Core, Banana Peel)	12,411	868,527	880,938	0.6%
	Subtotal Organics	12,411	868,527	880,938	0.6%
Paper	Corrugated Box	252,360	2,410,912	2,663,272	1.9%
	Fast Food Wrapper/Container	434,389	1,839,737	2,274,126	1.6%
	Straws/Wrappers (Paper)	57,919	1,123,096	1,181,015	0.8%
	Fast Food Towels/Napkins	326,827	1,031,109	1,357,936	0.9%
	Gum Wrappers		1,155,184	1,155,184	0.8%
	Stationary	248,223	804,350	1,052,573	0.7%
	Paper Bags/Packaging	244,086	727,338	971,424	0.7%
	Receipts	82,741	526,251	608,992	0.4%
	Cups	217,195	342,277	559,472	0.4%
	Bags	142,728	342,277	485,005	0.3%
	Condiment Package	-	308,049	308,049	0.2%
	Food Wrap (Meat Wrap)	53,782	183,974	237,756	0.2%
	Newspaper/Magazine	12,411	158,303	170,714	0.1%
	Paperboard	80,672	29,949	110,621	0.1%
	Lottery Tickets	4,137	70,595	74,732	0.1%
	Gable-top Container	8,274	57,759	66,033	0.0%
	Aseptic Drink Box	14,480	14,975	29,455	0.0%
	Subtotal Paper	2,180,224	11,126,135	13,306,359	9.3%
Plastic	Polystyrene Foam (Ice Chest)	279,250	6,715,042	6,994,292	4.9%
	Polystyrene Cup	531,609	6,458,335	6,989,944	4.9%
	Snack Wrapper	748,805	5,470,010	6,218,815	4.3%
	Beverage Caps	-	5,784,477	5,784,477	4.0%
	Auto/Vehicle Debris	227,537	4,005,708	4,233,245	2.9%
	Other Plastic Packaging	455,075	2,614,139	3,069,214	2.1%
	Industrial Plastic	215,126	2,802,391	3,017,517	2.1%
	Plastic Cup Lids	912,218	2,027,990	2,940,208	2.0%

Packaging Material	Items	Visible 4 Inches+	Micro < 4 Inches	Aggregate Count	Percent of Aggregate Count
Plastic Cont.	Condiment Package	-	2,772,442	2,772,442	1.9%
	Straws	264,771	2,415,190	2,679,961	1.9%
	Plastic Non-Beverage Jars	45,507	1,993,762	2,039,269	1.4%
	Plastic Beverage Containers	-	1,679,295	1,679,295	1.2%
	Polystyrene Clamshell	171,687	1,369,107	1,540,794	1.1%
	Utensil	33,096	1,429,005	1,462,101	1.0%
	Plastic Shrink Wrap	88,946	1,313,487	1,402,433	1.0%
	Water	1,158,370	-	1,158,370	0.8%
	Construction/Demolition Debris	133,938	974,419	1,108,357	0.8%
	Plastic Bags	430,253	631,073	1,061,326	0.7%
	Polystyrene Packing Peanuts	-	939,122	939,122	0.7%
	Polystyrene Fast-Food Plates/Trays	70,330	748,730	819,060	0.6%
	Hygiene Products	148,934	586,149	735,083	0.5%
	Other Plastic Shells/Box	105,495	556,200	661,695	0.5%
	Zipper/Sandwich Bag	57,919	402,175	460,094	0.3%
	Soft Drinks	442,664	-	442,664	0.3%
	Retail Wrap	18,617	404,314	422,931	0.3%
	Non-Polystyrene Packing Peanuts	-	327,302	327,302	0.2%
	Sport Drinks	285,456	-	285,456	0.2%
	Beverage Case	53,782	213,923	267,705	0.2%
	Container Lids	25,857	198,948	224,805	0.2%
	Milk/Juice	84,809	-	84,809	0.1%
	Six-Pack Plastic Ring	10,343	44,924	55,267	0.0%
	Tea	43,439	-	43,439	0.0%
	Wine/ Liquor	31,028	-	31,028	0.0%
	Energy Drinks	18,617	-	18,617	0.0%
Coffee	4,137	-	4,137	0.0%	
	Subtotal Plastic	7,097,615	54,877,659	61,975,274	43.1%

Packaging Material	Items	Visible 4 Inches+	Micro < 4 Inches	Aggregate Count	Percent of Aggregate Count
Rubber	Tire & Rubber Debris	655,721	2,552,101	3,207,822	2.2%
	Subtotal Tire/Rubber	655,721	2,552,101	3,207,822	2.2%
Tobacco	Cigarette Butts	-	30,220,897	30,220,897	21.0%
	Tobacco packaging	-	2,699,708	2,699,708	1.9%
	Cigars: Butts and Tips	-	1,617,258	1,617,258	1.1%
	Cigarette Lighters, Matches	-	402,175	402,175	0.3%
	E-Cigarettes/Vape Cartridges	-	284,518	284,518	0.2%
	Subtotal Tobacco	-	35,224,556	35,224,556	24.5%
Other	Home Articles (electronic, furniture, etc.)	192,372	2,229,077	2,421,449	1.7%
	Construction/Demolition Debris	267,873	1,948,838	2,216,711	1.5%
	Industrial Rags	119,974	1,523,132	1,643,106	1.1%
	Clothing or Clothing	132,385	1,300,652	1,433,037	1.0%
	Foil Drink Pouch	8,274	442,821	451,095	0.3%
	Composite Materials - Other	6,206	141,189	147,395	0.1%
	Subtotal Other	727,084	7,585,709	8,312,793	5.8%
Total		14,103,179	129,769,953	143,873,132	100%

FOR MORE INFORMATION



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