2022 Washington Statewide Litter Study

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Prepared by Cascadia Consulting Group, Inc.
for the Washington State Department of Ecology

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DEPARTMENT OF ECOLOGY
State of Washington

CASCADIA CONSULTING GROUP

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Acknowledgments

To the management and staff in the following facilities and organizations, we thank you for your support and guidance during these challenging times.

- Ecology Youth Corps (EYC)
- Washington State Department of Ecology (Ecology)
- Northwest Regional Office (NWRO), Ecology
- Washington State Department of Fish and Wildlife (DFW)
- Washington State Department of Natural Resources (DNR)
- Washington State Department of Transportation (WSDOT)
- Zero Waste Washington
- Seattle Public Utilities, Clean City Division

Links to Previous Reports

Reports for previous Washington statewide litter generation and composition studies are available on the Washington State Department of Ecology website.

- 2004 Litter Study – Litter Generation and Composition Report
- 1999 Litter Study – Final Report Vol. 1 (Overview and Summary)
- 1999 Litter Study – Final Report Vol. 2 (Litter Generation and Composition)
- 1999 Litter Study – Final Report Vol. 3 (Focus Groups)
- 1999 Litter Study – Final Report Vol. 4 (Telephone Survey)

Glossary

Accumulation rate

The amount of litter that a sampling area receives over a set period of time. In this study, accumulation rates are reported on a yearly basis.

CDL

Construction, Demolition, and Land-clearing materials, such as wood, gypsum board, plastics, metals, and other materials generated from CDL activities.

DNR and DFW lands

Washington State Department of Natural Resources and Department of Fish and Wildlife lands include state-owned recreation areas administered by these state agencies. Public access areas that are part of the public lands administered by state agencies include but are not limited to state lands, state forestlands, lands included in a state forestland pool, and aquatic lands. This study measured litter on high-use areas of land owned by DNR and DFW. Examples of these high-use areas include parking areas, campsites, trails, and permanent restrooms or other buildings.

High-use area

The section within a rest area, state or county park, or DNR or DFW land that generally has visitors every day in the summer. High-use areas are typically equipped with permanent restroom building(s), a parking area, picnic tables, refuse receptacles, ballfields, play areas, campsites, trails, parking lots, beaches, illumination, and other services.

Litter

Litter means all waste material that is illegally thrown or deposited. Litter includes disposable packages or containers and solid waste that is illegally dumped. The definition of litter in Revised Code of Washington (RCW) 70A.200.030 excludes waste from industries such as mining, logging, sawmilling, farming, or manufacturing.

On-off ramps (interchanges)

An on-ramp or off-ramp connects one interstate to another interstate or a different type of roadway. The Washington State Department of Transportation (WSDOT) calls them interchanges.[1] The formal definition is a system of connected roadways with one or more grade separations, allowing traffic between two or more connecting highways or roadways. For simplicity, this report refers to them collectively as on-off ramps.

Rest areas

Rest areas are roadside facilities equipped with permanent restroom building(s), a parking area, picnic tables, refuse receptacles, illumination, and other ancillary services. They typically include potable water and may include traveler information and telephones. This study measured litter in the high-use parts of rest areas located along highways. Examples include parking lots, picnic tables, and permanent restrooms or other buildings. Washington's highway rest areas have 230 acres of high-use areas.

Roadways

Roadways in Washington include all 81,021 miles of public roads, from interstate highways to small neighborhood streets, including land areas within 15 feet of the side of the road—the approximate throwing distance from a moving vehicle. Roadways are the entire width between the right-of-way boundary lines of every publicly maintained travel way when any part is open to the public for motorized vehicular travel. The roadway site types were grouped by type using definitions from WSDOT's highway functional classification system.[2]

- Interstates are freeways, expressways, and divided highways designed for long-distance travel with limited access using on-ramps and off-ramps.
- Arterials are highways and large roadways that are designed for heavy traffic or long trips that connect different areas but that drivers can typically enter from streets and driveways without using an on-ramp.
- Collectors are roads that gather traffic from local roads and funnel them to arterials.
- Local roads are designed to provide direct access to the places we want to be—such as homes and businesses—and not long-distance travel. They are often designed to discourage traffic traveling through other areas.

[1] https://wsdot.wa.gov/publications/manuals/fulltext/M22-01/glossary.pdf
[2] https://wsdot.wa.gov/about/transportation-data/roadway-data/functional-classification

Rural areas

The study adopted the definition of "non-urbanized area" per 23 CFR 490.101: "Non-urbanized area means any geographic area that is not an 'urbanized area' under either 23 United States Code (USC) 101(a)(34) or 23 CFR 450.104."

Sample

Sample means litter items collected by the cleanup crew during sample collection and site cleanups. A sample may consist of a combination of bags, bundles, buckets of glass, and buckets of cigarette butts.

Sampling area

For sampling sites, the full sampling area was typically 4,500 square feet in size:

- Roadway sites: the full sampling area was typically 300 feet long and 15 feet wide located on one side of the road at a milepost.
- On-off ramps: the full sampling area was typically located on the side of the on-ramp.
- Rest areas, state and county parks, and DNR and DFW lands: contiguous area (typically, 300 feet by 15 feet), which in some cases includes the entire site.

The subsampling area was the first 225 square feet contained within the full sampling area. It was typically 15 feet by 15 feet in size.

Site interference

Interference with the study through the removal of litter from the sampling site by groups that routinely or voluntarily collect litter around the state. Site interference does not include activities undertaken to maintain normal site aesthetics, such as lawn-mowing.

State and county parks

State and county parks include all state- or county-owned or operated public parks and open spaces. These include public parks, open spaces, public squares, beaches, trails, play and recreation grounds, athletic fields or facilities, community centers, skate parks, shelters, and restrooms or parking lots. This study measured litter in the high-use areas of state and county parks. High-use areas are places that typically have visitors every day during summer. For parks, these areas include parking areas, campsites, trails, ballfields, picnic and play areas, and permanent restrooms or other buildings.

Urban areas

According to definitions in 23 USC 101(a), areas of population greater than 5,000 people qualify as urban for transportation purposes. Urban areas include areas defined by the Federal Highway Administration as small urban areas with a population between 5,000 and 49,999 and urbanized areas with a population of 50,000 or more. The study used this dataset to identify urban areas and as a reference layer for geographic information systems at WSDOT.

Abbreviations

Studies

- 1999 study: 1999 Washington Statewide Litter Generation and Composition Study
- 2004 study: 2004 Washington Statewide Litter Generation and Composition Study
- 2009 KAB study: 2009 Keep America Beautiful National Litter Study
- 2020 KAB study: 2020 Keep America Beautiful National Litter Study
- 2022 study: 2022 WA Statewide Litter Generation and Composition Study

Organizations

- DNR: Washington State Department of Natural Resources
- Ecology: Washington State Department of Ecology
- EPA: U.S. Environmental Protection Agency
- ETAP: Escaped Trash Assessment Protocol
- KAB: Keep America Beautiful
- DFW: Washington Department of Fish and Wildlife
- WSDOT: Washington State Department of Transportation
- WSP: Washington State Patrol

Executive Summary

Why did we measure litter?

Litter harms road safety, our environment, and the wellbeing of our communities. The Washington State Department of Ecology and Department of Transportation together spend more than $12 million annually on litter cleanup. Unfortunately, cleanup crews can pick up only a small portion of the waste that accumulates on the ground. Knowing the types and amounts of litter will help develop strategies to prevent litter and littering behavior and to measure the effectiveness of those strategies over time.

How did we measure litter?

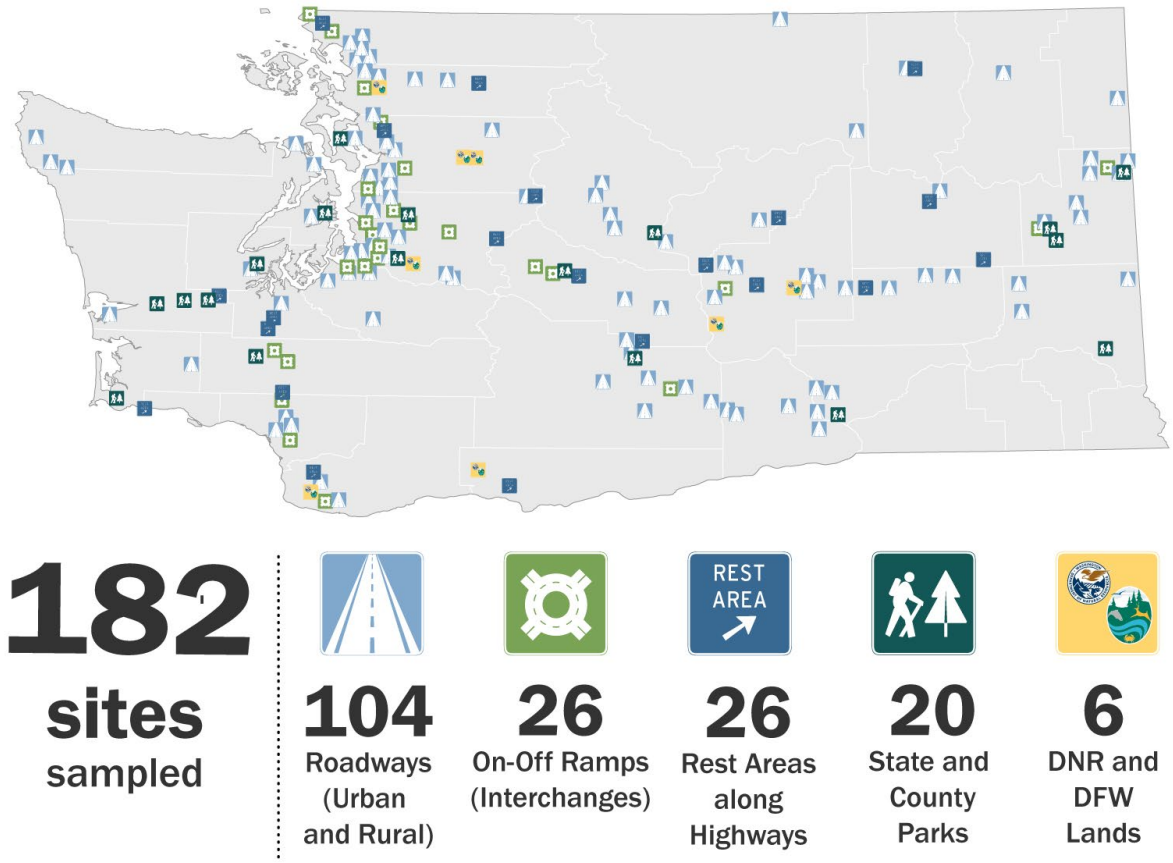
The Cascadia Consulting Group team ("we") collected and hand-sorted litter from 182 randomly selected sites across Washington. We categorized sampling sites into five main groups: roadways, on-ramps and off-ramps (also called interchanges), rest areas, parks, and recreation areas. We sorted the litter by type (such as glass bottles, cigarette butts, cardboard boxes, plastic film), counted the pieces of litter, and weighed the samples collected at each site. Using the data, we estimated the yearly average pounds and pieces of litter statewide.

Where did we measure litter?

We measured litter along roadways, on-ramps and off-ramps, and at high-use areas of parks, rest areas, and certain public lands (see Figure 1). Many of these sites were also included the 1999 and 2004 litter studies. We used the Washington Environmental Health Disparities Map to ensure representation across diverse communities.[3]

[3] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map

Figure 1. Map of sampling sites across Washington.

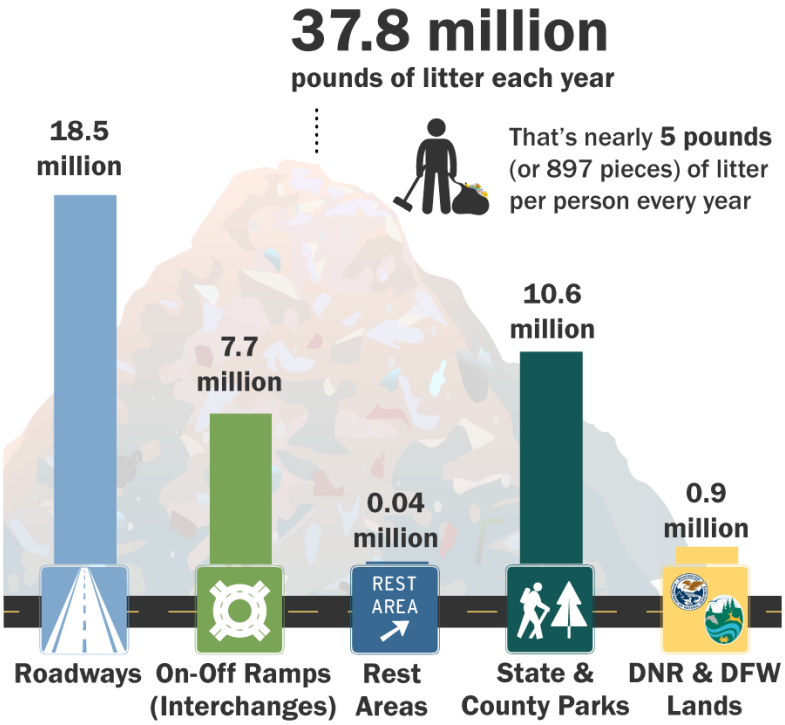


How much is littered in Washington?

Statewide, 37.8 million pounds of waste are littered each year, or 4.8 pounds for each person in Washington. That total is made up of 7.1 billion items each year, or 897 pieces of litter for each person (Figure 2).

In total, litter along roadways accounts for the most pounds of litter per year (nearly 18.5 million pounds), and high-use areas of state and county parks receive the most pieces of litter per year (3.4 billion pieces). Our understanding of litter accumulation changes when we consider the size of each area, however. On a per-acre basis, on-off ramps are the most-littered sites in both pounds and pieces per year, while roadways accumulated the least litter.

Figure 2. Litter accumulation across site types by pounds.



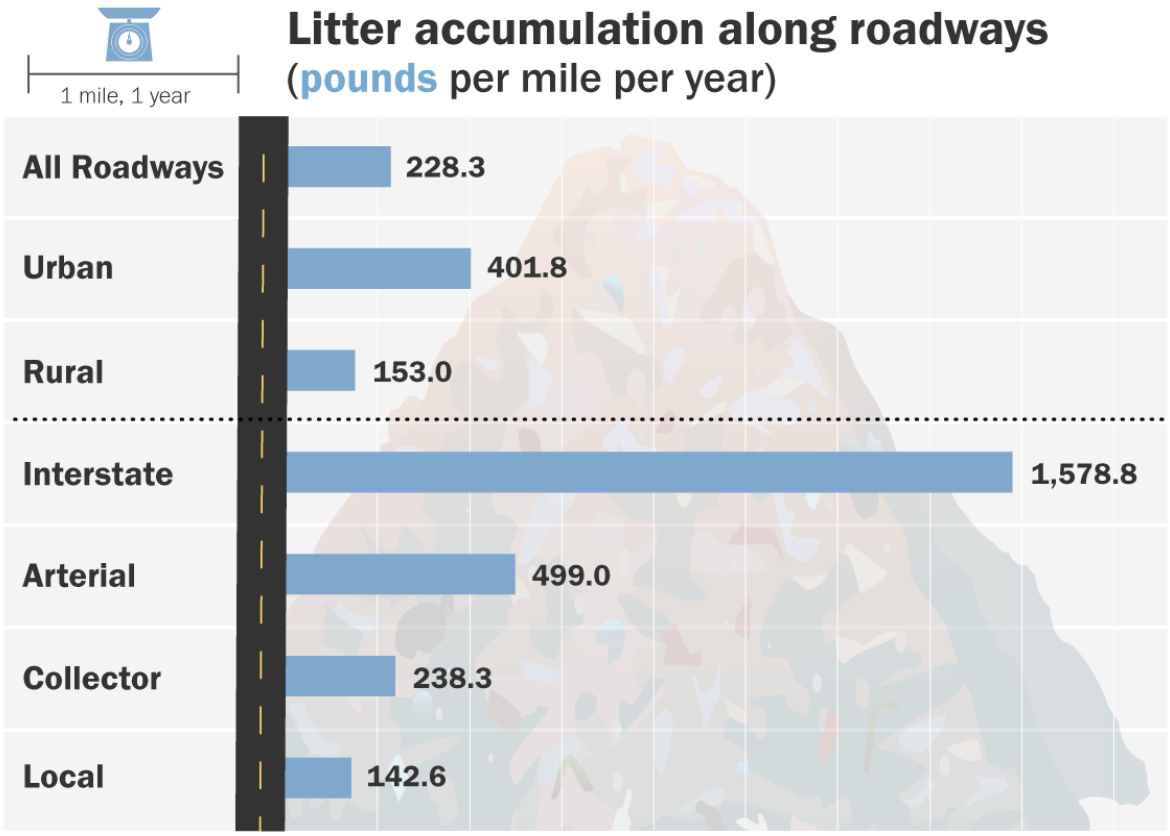
ROADWAYS

Roadways were divided into four road types (interstate, arterial, collector, and local) and two locations (urban and rural).

- Interstates accumulate the most litter per mile per year (1,578.8 pounds and 73,569 pieces). They accumulate nearly as much litter per mile as all other roadways combined, and they are also the most difficult and dangerous roadways to clean.
- Local roads accumulate the least litter per mile per year (142.6 pounds and 18,051 pieces).

Urban roads accumulate two to four times more litter than rural roads. Urban roads accumulate 401.8 pounds and 48,903 pieces per mile per year, while rural roads accumulate 153.0 pounds and 11,672 pieces per mile per year (Figure 3).

Figure 3. Litter accumulation along roadways.



ON-RAMPS AND OFF-RAMPS (INTERCHANGES)

On-off ramps accumulate 7.7 million pounds of litter per year and 1.6 billion pieces per year. Per acre, about 737.3 pounds of material and 158,617 pieces are discarded on on-off ramps per year. More pieces and pounds of litter appear on urban on-off ramps than on rural ones. This is likely a result of the higher population size and increased roadway traffic in urban areas.

PUBLIC PLACES

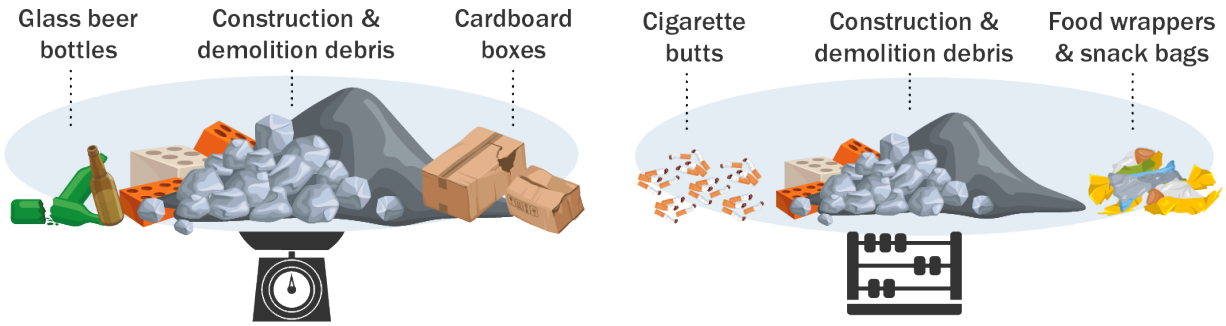
Public places were divided into three site types for this study: state and county parks, state-owned recreation areas (DNR and DFW), and roadside rest areas. Combined, all three public place types accumulate 11.6 million pounds of litter annually.

- State and county parks accumulate 10.6 million pounds per year.
- State-owned recreation areas accumulate 946,165 pounds per year.
- Rest areas accumulate 38,739 pounds of litter per year, the lowest of the three site types.

What items are littered the most?

The most-littered items vary by site type and whether measuring by pounds or pieces. The three most common littered items across site types by pounds are glass beer bottles, construction and demolition debris, and cardboard boxes. The top three littered items across site types by pieces are cigarette butts, construction and demolition debris, and food wrappers and snack bags (Figure 4).

Figure 4. Most-littered items by weight and count.



What litter comes from unsecured loads?

Properly secured loads prevent materials from shifting, blowing into the air, or falling onto the road, where they become litter and create hazards. Unsecured loads contain materials that can fall off, or blow out of, a moving vehicle. Typical materials in this category include construction and demolition debris, cardboard, plastic film, wood products, yard debris, and large bulky items such as mattresses. To estimate the amount of litter from unsecured loads, we recategorized material types based on whether Ecology considered them as more likely to have come from unsecured loads.

Unsecured loads accounted for 39% of roadside litter in the 2022 study. Along urban roads, unsecured loads accounted for 37% of pounds and 20% of pieces of litter per year, and along rural roads they accounted for 32% of pounds and 23% of pieces of litter per year.

In the 1999 study, unsecured loads accounted for nearly 40% of roadside litter but used a slightly broader definition that included tires and vehicle debris, which we categorized separately in 2022. Using this broader definition, more than half of all roadside litter in the 2022 study by weight came from unintentional littering: 39% from the narrower definition of unsecured loads plus 14% from vehicle and tire debris.

How much of Washington's litter is taxable?

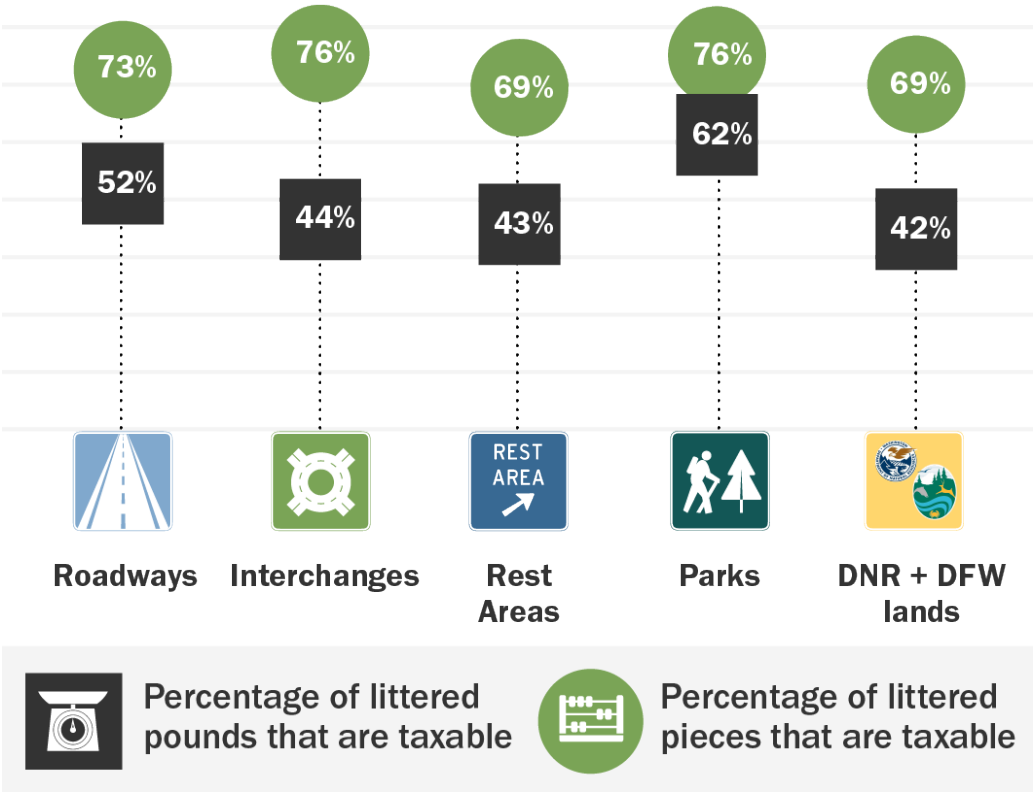
Washington's Litter Tax was established in 1971 to help fund litter cleanup statewide. The tax rate and 13 taxable items have not changed in over 50 years. Current tax revenue does not cover all the costs to clean up the amounts or types of litter found today.

The 13 items included are listed below:

- Food for human or pet consumption
- Groceries
- Cigarettes and tobacco products
- Soft drinks and carbonated beverages
- Beer and other malt beverages
- Wine
- Newspapers and magazines
- Household paper and paper products
- Glass containers
- Metal containers
- Plastic or fiber containers made of synthetic materials
- Cleaning agents and toiletries
- Non-drug drugstore sundry items

Today, 69–76% of littered pieces, by location, are covered by the litter tax, while only 42–62% of littered pounds are covered (Figure 5). Many of the items covered by the tax—such as cigarette butts, food wrappers, and snack bags—are lightweight, while many of the heavier littered items – such as large appliances, furniture, carpet, and bulky Items – are not taxed.

Figure 5. Percent of taxable littered pounds and pieces, by location.



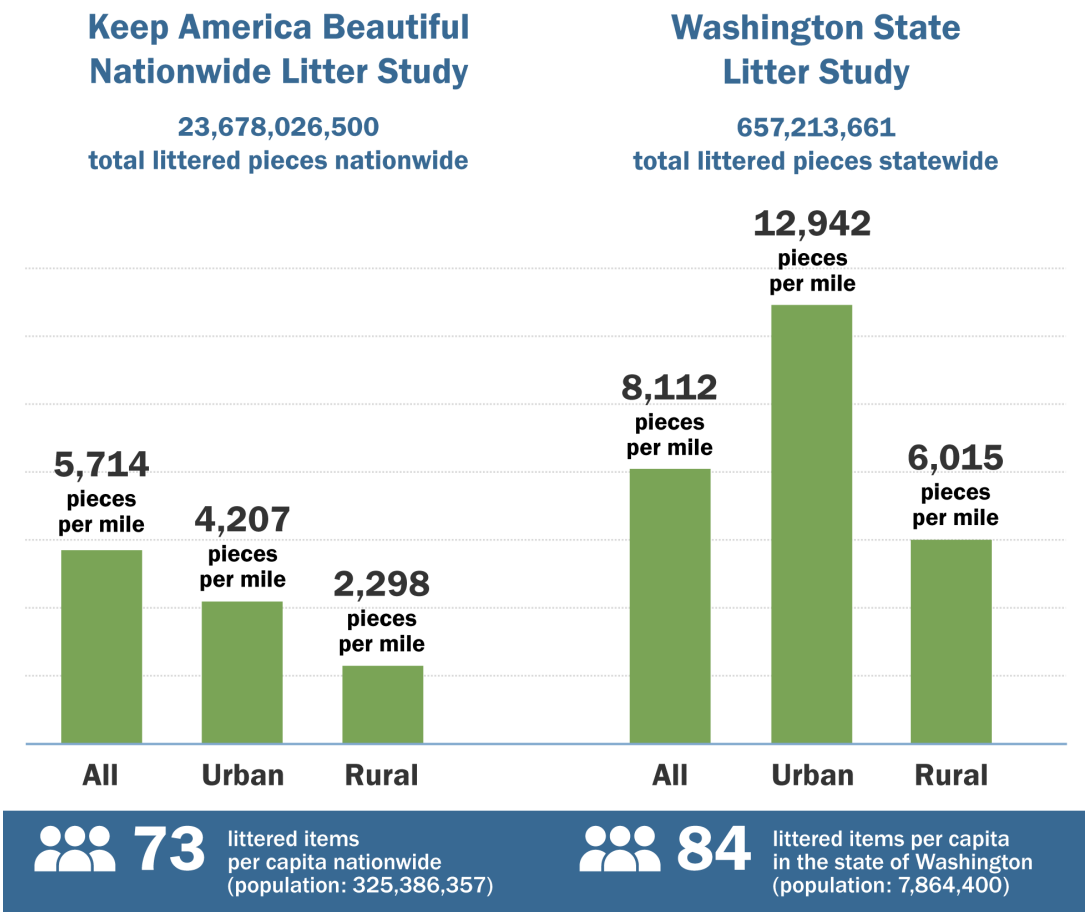
How does Washington's litter compare with the rest of the country?

In 2020, a national organization called Keep America Beautiful studied litter nationwide.[4] Like the Washington study, Keep America Beautiful estimated the amount of litter on rural and urban roadways. Comparing the two studies shows:

- Washington has more litter (84 pieces per person) than the national study (73 pieces).
- Differences in litter per mile are larger than differences in litter per person. This may mean that litter is more concentrated along roadways in Washington than nationwide.
- The most common types of litter are similar, including other film (plastic film wrapping for boxes, plastic mailing pouches, air pillows, shrink-wrap, and bubble wrap), metal beer cans, construction and demolition debris, and cigarette butts.
- Cigarette butts make up a smaller share of pieces of litter in Washington (6%) than nationwide (24%).

[4] Keep America Beautiful, 2020 National Litter Study, https://kab.org/litter/litter-study

Figure 6. Comparison of Washington's roadway litter to nationwide study findings.



How has Washington's litter changed over time?

Ecology studied litter in Washington starting in 1982 and most recently (before the current study) in 2004. Studies were intended to continue every few years, however, changes in funding and legislative priorities led to a gap in litter studies from 2004 until 2022. During that time, funding was also reduced for litter cleanup and eliminated for litter prevention. This gap can be seen in the results, with a decrease in litter from 1999 to 2004, following a comprehensive litter prevention campaign that began in 2001. After funding was removed, litter began to increase, as we see in the current study for several site types.

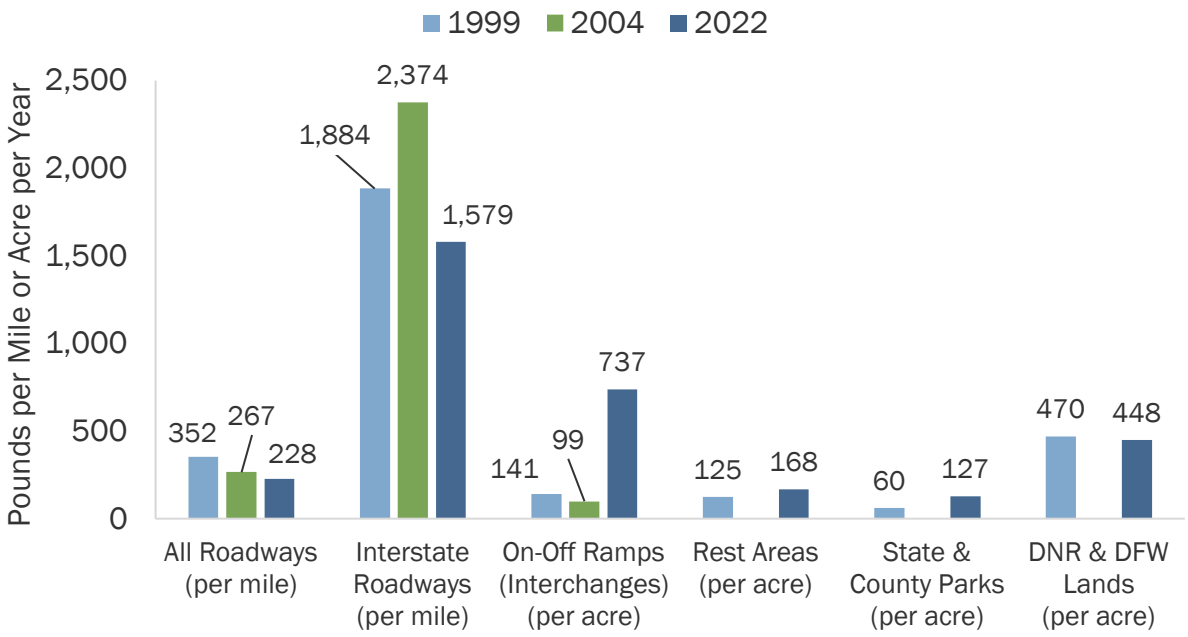
In 2022, litter increased along on-off ramps, at rest areas, and in state and county parks (Figure 7). Along all roadways combined, interstate roadways, and DNR and DFW lands, litter decreased from 1999. The annual litter accumulation in 2022 along on-off ramps was estimated at 737.4 pounds per acre per year. This is more than five times higher the 141.3 pounds per acre per year estimated in 1999, and even larger than the 98.7 pounds per acre per year estimated in 2004.

Per mile, the amount of litter generated along all roadways combined has decreased since 1999. Along interstate roadways, litter accumulation rates were highest in 2004 (2,372 pounds per year) and lowest in 2022. Both urban and rural interstate roadways had less litter in 2022, while more litter was found along on-off ramps.

The increase in litter along on-off ramps is visible in the quantity of litter found along both rural and urban on-off ramps. Urban on-off ramps had more than eight times more litter in 2022 (836.2 pounds per acre per year) compared to 2004. Along rural on-off ramps, litter increased about six times, from 65.3 to 394.8 pounds per acre per year from 2004 to 2022.

At rest areas, litter generation increased by 34%, from 125 pounds per acre per year in 1999 to 168 pounds per high-use acre per year.

Figure 7. Comparison of litter accumulation rates across study years, for each site type.



Trends in litter in public places remained consistent with previous studies, with recreation areas (DNR and DFW) seeing the highest amount of litter generated compared to rest areas and state and county parks.

Within rest areas, the amount of litter generated increased modestly from 125 to 168 pounds per acre per year. In high-use areas at state and county parks, litter generation more than doubled, from 60 pounds per acre in 1999 to 127 pounds per acre in 2022 (Figure 7). In high-use areas at DNR and DFW recreation areas, the amount of litter decreased slightly, from 470 pounds per acre in 1999 to 448 pounds per acre in 2022.

The smoking category (including cigarette butts) made up a much greater percentage of the litter found across roadways, on-off ramps, and public places in 2022 than it did in 1999. At rest areas, the smoking category increased 16 times from 1.4 pounds per acre per year to 22.0 pounds per acre per year (Figure 82). At state and county parks in 1999, 1.3 pounds per acre per year were from smoking (Figure 83). In 2022, 11.5 pounds per acre per year of smoking items were littered at state and county parks, eight times as much as in 1999. In DNR and DFW lands, the amount of litter items in the smoking category increased ten times, from 1.9 pounds per acre per year to 19.0 pounds per acre per year (Figure 84). Meanwhile, along on-off ramps, smoking litter increased 40 times, from 1.3 pounds per acre in 1999 to 50.7 in 2022 (Figure 80).

How can we reduce litter and littering behavior?

Several opportunities exist for reducing litter and changing littering behavior. The recommendations below address litter in general and the most commonly littered materials.

- **Adopt a beverage container deposit return law.** Beverage containers make up 13% of pounds of litter that accumulate each year. Bottle bills have been shown to lower the amount of litter in other states.
- **Improve cigarette butt collection through installing more public ash receptables and providing portable ashtrays.** Cigarette butts were the most frequently littered item, by piece, at nearly every site type in this study. Programs elsewhere have shown that cigarette butt litter decreases with prevention through improved collection infrastructure.
- **Require towing companies to remove all vehicle debris from accidents.** By pounds, auto rubber products and vehicle debris were among the most common litter items in Washington. Pennsylvania has a similar law, although education is also needed to ensure towing companies understand their responsibilities.
- **Conduct audience research and pilot a social marketing campaign to prevent "trucker bottles."** Urine-filled bottles are a longstanding problem that is unlikely to be solved through messaging alone. Audience research with both truckers and the companies that hire them is needed to understand the root causes of this litter, including barriers to taking bathroom breaks and feasible alternatives to littering urine-filled bottles.
- **Promote newer commercial waste collection trucks that minimize escaped trash.** Many Washington residents report to Ecology and local governments that they see waste becoming litter when collection trucks empty collection containers into the vehicle and afterward from the truck if the body is not fully sealed. Some newer models are designed to prevent littering.
- **Review enforcement of and exemptions to covered loads requirements.** An estimated 39% of Washington's litter comes from materials that Ecology associates with unsecured loads. Improving enforcement of covered load requirements and reconsidering exemptions could identify opportunities to reduce litter from unsecured loads.

- **Expand litter prevention partnership with the Department of Licensing.** An expanded partnership could include adding litter prevention messaging to the Washington Driver Guide, requiring driver education courses to cover litter prevention, providing messaging during driver and vehicle licensing and renewals, and distributing a litter bag with every driver license and license plate.
- **Reconsider the adequacy of the litter tax rate and list of covered items.** The litter tax rate (0.015%) and list of items covered by the tax were developed in 1971 based on the costs of items and litter cleanup efforts in 1970. Currently, funding from the litter tax for cleanup efforts covers less than one-fifth of the estimated litter each year. Based on the 2022 litter study, approximately 47% of pounds and 25% of pieces of litter that accumulate yearly are not covered by the litter tax.
- **Evaluate the impacts of single-use item legislation with future litter studies.** The 2022 study provides a baseline that Ecology can use to evaluate the impact of recently adopted and potential future legislation banning or restricting items commonly found in litter, such as plastic carryout bags, plastic food serviceware, and certain foam products.
- **Conduct further research on litter sources, behaviors, and impacts.** The current study addressed how much litter is on the ground but not where it came from, why it was littered, how to prevent littering, or what impact litter has on the environment. Additional research on litter sources, attitudes and behaviors, environmental effects, and amounts of litter in and along waterways could help Washington improve litter prevention efforts and prioritize cleanup.

Introduction

Litter and littering behavior in Washington are longstanding and serious challenges. The Washington State Department of Ecology (Ecology) and Department of Transportation (WSDOT) spent nearly $12 million dollars in 2022 to clean up an estimated 7.4 million pounds of litter. Despite the significant funding and effort, the cleanup amounted to less than one-fifth of the 37.8 million pounds of litter that accumulate each year. Behavior change campaigns and litter prevention strategies are actively underway to reduce littering behavior and reduce litter found on the ground each year.

To better understand this challenge and potential strategies to address it, Ecology initiated a statewide litter study in 2022. The study looked at 182 sites along roadways, on-off ramps, and public places across the state. Crews collected and sorted litter from these sites in spring and fall 2022. This report covers the methodology and findings from this study, including strategies and solutions for reducing litter and littering behavior and the history of litter prevention efforts in Washington.

History of Anti-Litter Efforts in Washington

Litter prevention efforts in Washington have been ongoing since 1971, with fluctuations in funding over time. Ecology conducted statewide litter studies in 1982, 1983, 1985, 1987, 1990, 1999, and 2004. Between the 1999 study and the 2004 study, the state saw a decrease in litter on roadways and on-off ramps and a statistically significant decrease in beverage containers. In addition, there were statistically significant decreases in CDL, fast food containers, and tires and auto rubber products on roadways. This was largely due to the impact of the Litter and It Will Hurt campaign that launched in 2002 (Figure 8). In 2009, Ecology lost a significant portion of its litter funding and had to reduce litter cleanup efforts and discontinue litter surveys and prevention work. Funding was not restored until a decade later, in 2019.

Figure 8. Washington litter campaign highway sign in 2001 (Litter and It Will Hurt).

With restored funding, Ecology launched the We Keep WA Litter Free brand and Secure Your Load for Safer Roads campaign in spring 2021 (Figure 9). In 2022, Ecology launched the Simple As That campaign targeting intentional littering on roadways and conducted a litter study.

Figure 9. Washington litter campaign highway and recreation area signs in 2021.

2022 Litter Study Overview

This study assesses current litter levels, accumulation rates, and trends over the last 20 years; compares results to other studies; and creates an updated baseline to evaluate programs, legislation, and litter prevention efforts. This report presents the details of the statewide litter study, including methods, results, discussion, and detailed appendices.

Figure 10. Litter collection across Washington sites.

In the 2022 statewide litter study, we measured litter in two different ways to understand different patterns:

- **Current snapshot**. In spring 2022, we measured litter on sites exactly as we found it, providing a snapshot of current litter levels and litter types. The data may reflect the reduced cleanup efforts during the COVID-19 pandemic.
- **Accumulation rate**. In fall 2022, we returned to the same sites to measure how much new litter had accumulated since spring and estimate the amount of littering behavior occurring each year. The data may be influenced by the nearly 12 years without funding for litter prevention.

We sampled on roadways, on-off ramps, and public places at 182 sites across the state during spring and fall 2022 (Figure 11). Many of these locations were also included in the 1999 and 2004 litter studies.

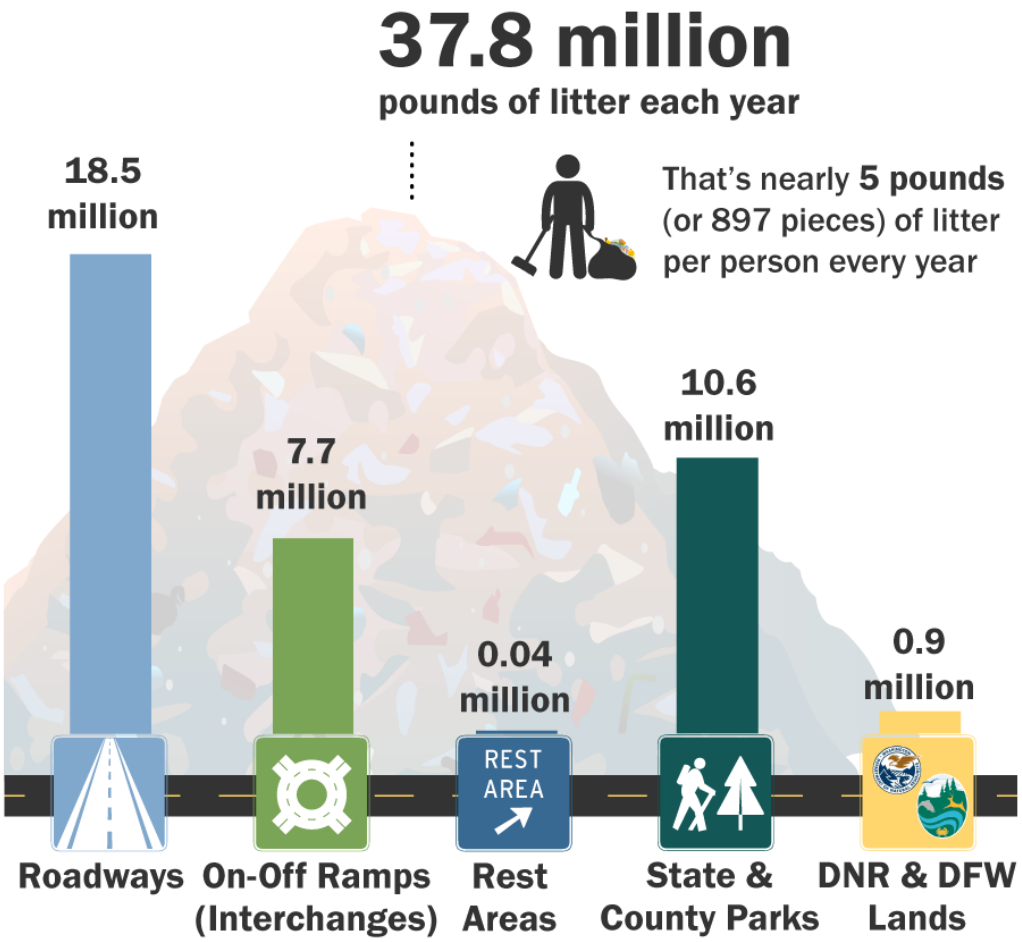
Figure 11. Map of sampling sites in 2022.

Key Findings From 2022 Litter Study

Statewide, 37.8 million pounds of litter is littered per year, or 4.8 pounds per person. These pounds are made up of 7.1 billion individual pieces of litter per year, or about 897 pieces of litter per person.

In total, roadways receive the greatest mass of litter per year (nearly 18.5 million pounds) and high-use areas of state and county parks receive the most pieces of litter per year (3.4 billion pieces). Our understanding of litter accumulation changes when we consider the size of each area, however. When we look at litter per acre, on-off ramps are the most heavily littered places, both in pounds and pieces per year, while roadways accumulated the least litter.

Figure 12. Litter accumulation across site types by pounds.



Roadways were the most heavily littered site type and accumulated more litter per year in the current study (18.5 million pounds) than in past studies (12.6 million pounds in 2004).

- Interstates receive the most litter per mile per year (1,579 pounds and 73,580 pieces). They receive nearly as much litter as all other roadways combined and are also the most difficult and dangerous roadways to clean.
- Local roads accumulate the least litter per mile per year (143 pounds and 18,051 pieces).
- Urban roads receive two to four times more litter per mile than rural roads. Urban roads have 402 pounds and 48,903 pieces of litter, while rural roads receive 151 pounds and 11,559 pieces of litter per mile per year.

On-off ramps accumulate 7.7 million pounds of litter per year, which amounts to 2,500 pounds of litter at the average on-off ramp.

- Roughly 45% more litter accumulates on urban on-off ramps than on rural ramps, likely due to more vehicles in urban areas.

Public places were divided into three categories: 1) rest areas, 2) state and county parks, and 3) state-owned recreation areas (DNR and DFW).

- In pieces of litter per 1,000 square feet, rest areas (1,234 items) had more pieces of litter than both recreation areas (959 items) and state and county parks (309 items). In rest areas, the most-littered item was cigarette butts (344 pieces per 1,000 square feet).
- By weight of litter per 1,000 square feet, the most litter was found in recreation areas (6.6 pounds), followed by rest areas (6.1 pounds) and state and county parks (5.1 pounds).

Figure 13. Litter study sample photograph.

The most-littered items vary by site type and measure (pounds or pieces). The three most common littered items across site types by pounds are glass beer bottles, construction and demolition debris, and cardboard boxes. The top three littered items across site types by pieces are cigarette butts, construction and demolition debris, and food wrappers and snack bags.

COVID-19 Impacts

The COVID-19 pandemic severely reduced litter cleanup efforts and delayed prevention campaigns through a mandatory freeze on state hiring and service contracts and as well as social distancing requirements. Over the course of the COVID-19 pandemic, litter in Washington became much more noticeable and led to increased complaints to state and local governments and elected officials.

In 2020 and 2021, Ecology's summer youth crews were cancelled and only a small number of two-person adult crews conducted cleaning statewide. WSDOT's Adopt-a-Highway

program, with nearly 500 volunteer groups, was also put on a temporary hiatus through mid-2021. The WSDOT program is still struggling to return to pre-pandemic participation levels. In spring 2021, Ecology was able to launch the new "We Keep WA Litter Free" brand and "Secure Your Load for Safer Roads" campaign targeting unsecured vehicle loads. As COVID-19 cases decreased and restrictions lifted, Ecology litter crews returned at a reduced capacity during 2022.

In response to the setbacks from the COVID-19 pandemic, the state legislature created a new grant program and provided $2.8 million in additional funding for litter cleanup and prevention efforts. In 2021, the legislature passed the Welcome to Washington Act (Senate Bill 5040), which created a new program that provides grants to local governments for litter cleanup on state highway ramps in their jurisdiction. In 2022, the legislature provided Ecology with an additional $2 million for cleanup efforts along state highways and approved a supplemental budget request for $800,000 annually for litter prevention. This new funding increased cleanup efforts through state and local partnerships and contracted litter crews and helped launch the Simple As That campaign targeting intentional littering on roadways (Figure 14).

Figure 14. Washington "Simple As That" litter campaign sign.

Report Overview

The rest of this report presents the 2022 statewide litter study in the following sections:

- **Methods** summarizes how we collected and analyzed litter data.
- **Litter Accumulation and Snapshot Results** describes overall findings and for each site type including:
  - How to understand results tables and charts.
  - Yearly accumulation rates and the five fastest accumulating materials.
  - Current snapshot of the amount and composition of litter on the ground.
- **Additional Analyses** examines the 2022 results with regard to these topics:
  - Unsecured Loads: estimates the amount of litter from this common source.
  - Litter Tax: estimates the amount of current litter covered by the litter tax.
  - Litter and Environmental Equity: considers whether data show a correlation between litter and environmental health disparities.
- **Comparison with Other Studies** compares 2022 Washington statewide results to the 1999 and 2004 Washington statewide studies and the 2020 KAB nationwide study.
- **Recommendations** suggest options for litter control strategies based on study findings and additional research to improve understanding of litter and how to prevent it.
- **Appendices** provide more details on the Litter Reduction Efforts in Washington, Site Selection and Sampling Sites, Fieldwork Protocol, Field Forms, Material List and Reclassifications, Calculations, and Detailed Composition Results.

Methods

This section summarizes how we conducted the 2022 litter study. To ensure results are comparable to past statewide studies, we use the same methods and study sites whenever possible. When we needed to choose new study sites, we followed past methods and also used the Washington Environmental Health Disparities Map to ensure representation across diverse communities.[5] To enhance the 2022 study, we also estimated the amount of litter that may have come from unsecured loads and the share of litter that is not covered by the Litter Tax.

Table 1 shows the project schedule including project planning, two seasons of field work to collect and characterize litter, and data analysis and reporting.

Table 1. 2022 project schedule.

Project task	Timeline
Planning	March–May 2022
Field crew training • Observation of Ecology litter crew (4/27/2022) • Online training (5/2 and 9/19/2022) • In-person field training (5/9 and 10/3/2022)	April–October 2022
Spring sample collection, sorting, and counting	May 2–27, 2022
Fall sample collection, sorting, and counting	September 26–October 21, 2022
Data analysis	November–February 2023
Report writing	February–June 2023

Planning

At the start of the project, we made key decisions about study methods. To the extent possible, we kept sites, definitions, and procedures consistent with past studies to be able to compare results. During planning we:

- Defined site types and selected specific sites to sample, using as many sites as possible from past studies.
- Created a list of materials to be collected and weighed, staying consistent with material lists from past studies while adding selected materials from the U.S. Environmental Protection Agency's Escaped Trash Assessment Protocol (EPA-ETAP) to allow for comparisons to national studies.

[5] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map

- Developed procedures for collecting and sampling, using procedures from past studies.
- Prepared protocols for safety, especially when working near traffic, handling unsafe items, and minimizing risks from the COVID-19 pandemic.

SITE TYPES

We measured litter at sample sites along roadways, on-off ramps, and at high-use areas of rest areas, state and county parks, and state recreation areas administered by the Department of Natural Resources (DNR) and Department of Fish and Wildlife (DFW). For all types of sites, we kept each sample site the same size, about 4,500 square feet.

Roadways

Roadways in Washington include all 81,021 miles of public roads from interstate highways to small neighborhood streets, including land areas within 15 feet of the side of the road—the approximate throwing distance from a moving vehicle. This amounts to nearly 6.4 billion square feet or 147,311 acres of "litter-able" roadway area.

The roadway site types were grouped by type using definitions from WSDOT's highway functional classification system.[6]

- Interstates are freeways, expressways, and divided highways designed for long-distance travel with limited access using on-off ramps. WSDOT calls them interstates and other freeways and expressways.
- Arterials are highways and large roadways that are designed for heavy traffic or long trips that connect different areas but that drivers can typically enter from streets and driveways without using an on-off ramp. WSDOT calls them other principal arterials and minor arterials.
- Collectors are roads that gather traffic from local roads and funnel them to arterials. WSDOT calls them major and minor collectors.
- Local roads are designed to provide direct access to the places we want to be—such as homes and businesses—and not long-distance travel. They are often designed to discourage traffic traveling through other areas. WSDOT calls them local roads.

In sampling, each roadway site was 300 feet long and 15 feet wide on one side of the road, for a total size of 4,500 square feet.

[6] https://wsdot.wa.gov/about/transportation-data/roadway-data/functional-classification

On-Off Ramps (Interchanges)

On-off ramps connect one interstate to another interstate or a different type of roadway. They are also called interchanges. Washington has a total of 590 on-off ramps along state highway routes, and WSDOT classifies 458 of them as being in urban areas.[7,8] These add up to more than 470 million square feet, or 10,794 acres of litter-able on-off ramp areas.

Like roadways, each on-off ramp sampling site was 300 feet long and 15 feet wide on one side of the on-off ramp, for a total size of 4,500 square feet.

Rest Areas

We measured litter in the high-use parts of rest areas located along highways. Examples include parking lots, picnic tables, and permanent restrooms or other buildings. Washington's highway rest areas have 230 acres of high-use areas.

Rest areas typically include a roadside facility equipped with permanent restroom building(s), a parking area, picnic tables, refuse receptacles, illumination, and other ancillary services. WSDOT also calls them safety rest areas.[9]

State and County Parks

State and county parks include all state or county-owned or operated public parks and open spaces. We measured litter in the high-use areas of state and county parks. High-use areas are places that typically have visitors every day during summer. For parks, these areas include parking areas, campsites, trails, ballfields, picnic and play areas, and permanent restrooms or other buildings. Washington's state and county parks have 83,888 acres of high-use areas.

DNR and DFW Lands

We measured litter on high-use areas of recreation land owned by the Washington State Department of Natural Resources (DNR) and Department of Fish and Wildlife (DFW). Examples of these areas include parking areas, campsites, trails, and permanent restrooms or other buildings. DNR and DFW lands have 2,112 acres of high-use areas.

SAMPLE ALLOCATIONS ACROSS SITE TYPES

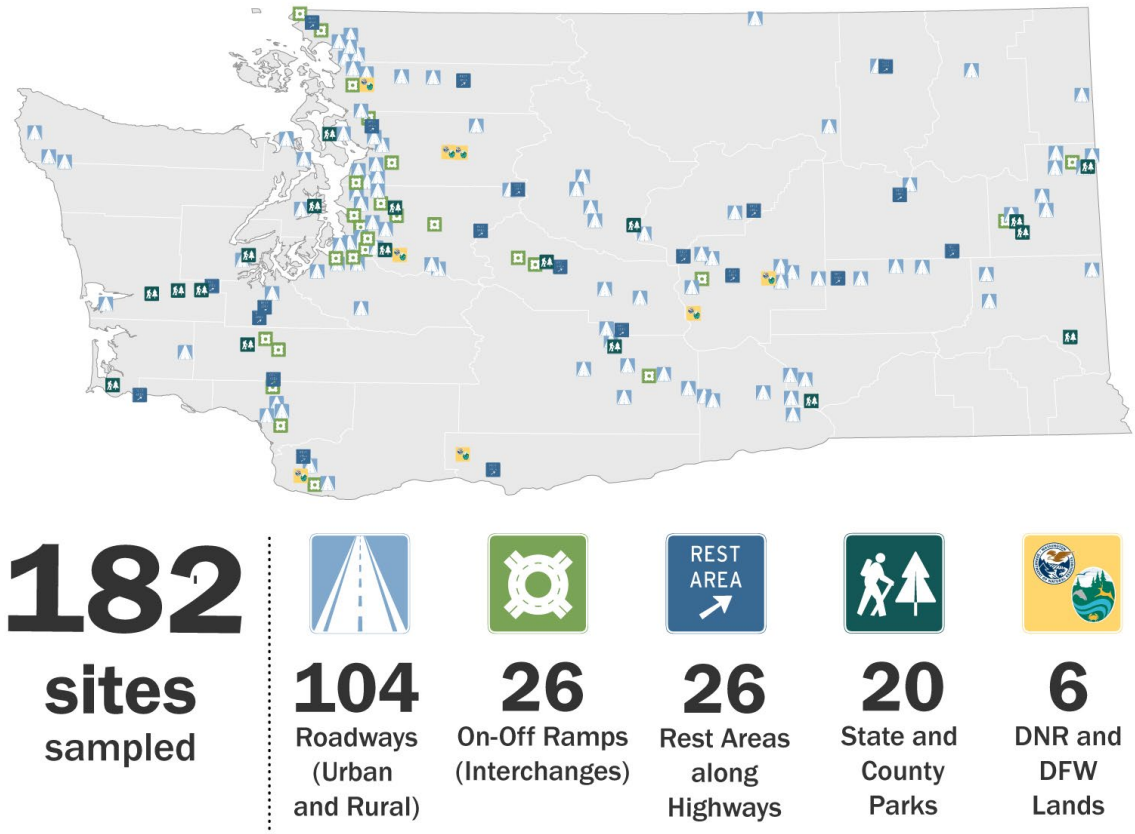
When possible, we measured litter at the same sites used in the 1999 and 2004 litter studies. When adding new sites, we chose them in a similar way to previous litter studies. We also used the Washington Environmental Health Disparities Map to ensure

[7] https://wsdot.maps.arcgis.com/home/item.html?id=39b4acdb7e0d4ef19252db5c37b8a719
[8] https://wsdot.maps.arcgis.com/home/item.html?id=eaada5497acd49e1b4db15f3efad14e7#!
[9] https://wsdot.wa.gov/publications/manuals/fulltext/M22-01/1710.pdf

representation across diverse communities.[10] *Appendix C. Fieldwork Protocol* describes the site selection procedure in more detail.

We measured litter at 182 sample sites, along roadways, on-off ramps, and at high-use areas of rest areas, parks, and certain public lands. These sites included 104 sites across four different roadway types, 26 on-off ramps, 26 rest areas, 20 in state and county parks, and 6 on DNR and DFW lands. For all site types except DNR and DFW lands, we sampled from a mix of urban and rural sites. Figure 15 shows a map of these sites, and Table 2 lists the number of sites measured by type.

Figure 15. Map of sampling sites across Washington.



[10] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map

Table 2. Number of sampling sites for each site type and urban and rural locations.

Site Type	Urban Sampling Sites	Rural Sampling Sites	Total Sites
All Roadways	52	52	104
Interstate Roadways	13	13	26
Arterial Roadways	13	13	26
Collector Roadways	13	13	26
Local Roadways	13	13	26
On-Off Ramps	13	13	26
Rest Areas	8	18	26
State and County Parks	10	10	20
DNR and DFW Lands	4	2	6
Total Sampling Sites	**87**	**95**	**182**

Fieldwork

We measured litter in two seasons: spring and fall 2022. During each season, we cleaned up sites and collected samples, sorted and weighed samples, and hand-counted litter pieces. During the project, we adjusted our schedule to reflect health and safety recommendations from local and state public health officials due to the COVID-19 pandemic.

LITTER COLLECTION AND SITE CLEANUP

Sample collection crews gathered litter samples from 182 pre-selected sampling sites across Washington. Each sampling site was approximately 4,500 square feet. Across the entire site, the sampling crew collected all litter items larger than 4 square inches that could be safely collected. From a 225-square-foot subsampling area, the sampling crew collected all visible cigarette butts and all other litter items between 1 and 4 square inches in size that could be safely collected. See *Appendix C. Fieldwork Protocol* for more details on sample collection protocol and data collection forms.

Figure 16. Sampling crew on roadside.

Consistent with the 1999 and 2004 studies, the sampling crew did not collect certain litter items for health and safety reasons (Figure 17). These items were documented but excluded from the generation and composition estimates (Table 3). “Trucker bottles” (urine-filled bottles) and other samples of human waste were found on all site types in both sampling seasons. They made up 48.6% of the count of excluded items in spring, and 42.7% of count of excluded items in the fall sampling season.

Figure 17. Examples of items found at sampling sites but excluded from sampling.

Table 3. Count of items excluded from sampling.

Sampling Season	Spring	Fall
Items too large or heavy	31	19
Trucker bottles or other human waste	70	73
Condoms	6	4
Needles	9	13
Razors	4	2
Knives	2	2
Firearms	0	0
Other hazardous materials (for example pet waste)	22	58
Total	**144**	**171**

CHARACTERIZE SAMPLES, BY WEIGHT AND COUNT

Sampling collection teams brought the collected samples from across the state to Ecology's Northwest Regional Office (NWRO) parking lot in Shoreline for sorting and counting. The sorting crew hand-sorted samples into 9 material classes made up of 94 material types that were aligned with materials lists from past studies in Washington and the EPA's ETAP list for national comparability. Then the sorting crew recorded the weights and the counts of pieces

for each material type in the sample. The material classes were paper, plastic, glass, metal, smoking, organics, CDL, hazardous, and other. See *Appendix C. Fieldwork Protocol* for the fieldwork procedures; *Appendix D. Field Forms for fieldwork forms*; and *Appendix E. Material List and Reclassifications* for the full list and definitions for each material.

Figure 18. Sorting crew hand-sorting items into material classes.

Data Analysis and Reporting

We analyzed data collected during fieldwork to characterize the overall quantity and composition of litter by material type for each site type. We conducted a primary analysis using the same methods applied in the 1999 and 2004 studies. We conducted additional analyses to explore the potential relationship of litter to unsecured loads, litter tax coverage, and environmental equity. We also compared 2022 results to past statewide results and a recent nationwide study.

PRIMARY DATA ANALYSIS

We primarily analyzed data in two ways to understand patterns in littering, create a snapshot of current litter on the ground, and estimate an accumulation rate for the new litter added each year.

- **Litter snapshot**. We used data from spring 2022 to determine current litter levels and litter types. This snapshot may reflect the reduced cleanup efforts during the COVID-19 pandemic.

- **Accumulation rate**. In fall 2022, we returned to the same sites to measure how much new litter had accumulated since the previous time the site had been cleaned and then scaled the amount of litter found into an estimate of new litter added each year.

For each site type, we calculated the following estimates for the state:

- **Accumulation rates**: Pounds and pieces of new litter added each year, in total and per acre or per mile.
- **Accumulation rates by material class**: How much each of the nine material classes contributes to the pounds and pieces of new litter added each year.
- **Fastest accumulating material types**: Out of the 94 material types, the five types that accumulated fastest in pounds and pieces.
- **Litter snapshot levels**: Pounds and pieces of litter on the ground in spring 2022, in total and per acre or mile.
- **Litter snapshot composition by material class**: How much each of the nine material classes contributed to the pounds and pieces of litter on the ground per acre.
- **Top five most common material types**: Out of the 94 material types, the five that were the most common types of litter on the ground in pounds and pieces per acre or mile.

Consistent with the EPA-ETAP methodology, we calculated litter levels per 1,000 square feet, and then converted to acres for comparison purposes.[11] Roadway results were calculated per roadway mile by doubling our results from sampling one side of the road to reflect that each roadway has two "litter-able" sides. Roadway miles were converted to acres for analyses across all site types.

For the accumulation rate, we also considered the amount of time litter had accumulated between the spring cleanup and fall sampling. For roadways and on-off ramps, we assumed that no cleanup had occurred since our spring visit that would interfere with results. High-use areas of rest areas, state and county parks, and DNR and DFW lands are cleaned regularly. For these sites, we gathered input from site supervisors, maintenance crews, and private individuals, which resulted in an average estimate of seven days since last cleanup.

To develop a statewide estimate for the litter snapshot and accumulation rates, we multiplied the estimated average pounds and pieces of litter—by material type—for each site type by the number of road miles or high-use acres that the site type covers in Washington. For each site type, we also calculated the overall estimated percent composition of each material type in pounds and pieces as well as the 90% confidence interval for each material

[11] https://www.epa.gov/trash-free-waters/epas-escaped-trash-assessment-protocol-etap

type. Details and equations for the calculations for composition, statistical confidence intervals, and pounds and pieces are described in *Appendix F. Calculations*.

ADDITIONAL ANALYSES AND COMPARISONS WITH OTHER STUDIES

We conducted several additional analyses to explore other issues related to litter.

- **Unsecured loads**: To estimate the amount of litter that may come from unsecured loads, we classified the 94 material types into groups based on where it may come from: unsecured loads, intentional littering, and vehicle and tire debris.
- **Litter tax**: To estimate the amount of litter that is not covered by the litter tax, we classified the 94 material types as being likely covered or not covered by the litter tax.
- **Environmental justice**: To ensure that sampling sites represented diverse communities, we compared sampling sites to the Washington Environmental Health Disparities Map.[12] We also conducted a correlation analysis to explore whether data showed a relationship between litter levels or accumulation rate and environmental health disparity ranks.
- **Comparison to past studies**: To explore how litter has changed in Washington over time, we compared the composition estimates with the estimates from the 1999 and 2004 statewide litter studies. In some cases, calculations were modified to be able to compare current results to past studies. For example, we used the standardized areas for urban and rural on-off ramp sites from the 2004 study to estimate total litter generation for on-off ramp sites.

[12] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map

Litter Accumulation and Snapshot Results

Introduction

This section summarizes annual accumulation rates and snapshots of litter currently on the ground for the state as a whole and for each of the site types. It is organized into the following sections:

- **Overall** presents results for all site types combined.
- **Roadways** presents results for roadways overall and for each of the four road types—interstate, arterial, collector, and local roads—divided into urban and rural designations.
- **On-off ramps (interchanges)** presents results for on-off ramps overall and divided into urban and rural designations.
- **Rest areas** presents results for rest areas overall and divided into urban and rural designations.
- **State and county parks** presents results for parks overall.
- **DNR and DFW lands** presents results for state recreation areas overall.

Each section first presents findings for yearly accumulation rates and for a snapshot of litter currently on the ground. The accumulation rate and litter snapshot sections show:

- Total pounds and pieces statewide and per acre or per mile
- Pounds and pieces per acre or per mile by the nine material classes
- Average pounds and piece per acre or per mile for the top five material types

Appendix G. Detailed Composition Results provides additional detail on the composition and quantity of litter for each site type included in the report.

LITTER ACCUMULATION AND SNAPSHOT

As mentioned above, we measured both yearly litter accumulation rates and a "snapshot" of how much litter is currently on the ground in Washington. These complementary analyses allowed us to distinguish between estimates of litter in the presence and absence of cleanup activities. The accumulation rate estimates assumed no site interference from cleanup activities, while the snapshot estimates assumed a potential effect of cleanup activities.

Generally, because of Ecology, WSDOT, and volunteer-led cleanup, the total amount of uncollected litter observed in Washington is lower than it otherwise would be. The accumulation rate results highlight the importance of regular litter removal and site maintenance (Table 4).

Differences between accumulation and snapshot results also emphasize that litter cleanup activities do not affect all types of litter equally. Litter removal may be effective in capturing larger visible litter pieces, but smaller pieces, such as cigarette butts, are difficult to remove. As a result, differences between small and large litter materials may be more pronounced in the snapshot data than the accumulation data.

Table 4. Accumulation rates by primary site categories.

Site Type	Pounds per Year	Pieces per Year	Pounds per Acre per Year	Pieces per Acre per Year
Roadways	18,496,103	1,858,555,848	125.6	12,617
On-Off Ramps	7,695,559	1,630,078,616	712.9	151,017
Rest Areas	38,739	17,860,777	168.4	77,656
State and County Parks	10,617,224	3,403,996,166	126.6	40,578
DNR and DFW Lands	946,165	141,717,369	448.0	67,101
Total	**37,793,789**	**7,052,208,776**	**154.7**	**28,863**

Overall

This section presents litter accumulation rates and litter snapshot results for all five site types combined.

ACCUMULATION RATES (OVERALL, BY MATERIAL CLASS, AND FASTEST)

Litter accumulates at a rate of 37.8 million pounds per year, or 7.1 billion pieces per year, on all site types combined (Table 5). This is the overall litter accumulation rate throughout the state of Washington, without interference from cleanup crews.

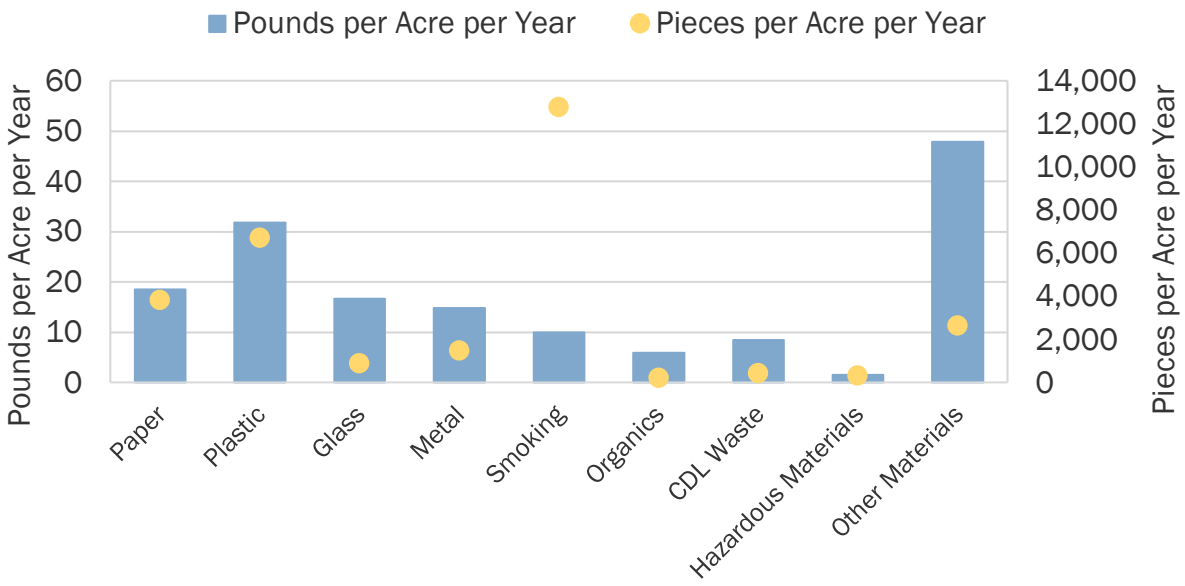
Table 5. Yearly litter accumulation rates, combined across all site types, by pound and by piece.

	Pounds per Year	Pounds per Acre per Year	Pieces per Year	Pieces per Acre per Year
All Site Types	37,793,789	154.7	7,052,208,776	28,863

Items classified as other materials accumulate fastest, by weight, at a rate of 47.9 pounds per acre per year (Figure 19). This material class includes tires, tire shards and treads, large appliances, and whole bags of mixed trash, among others. Materials associated with

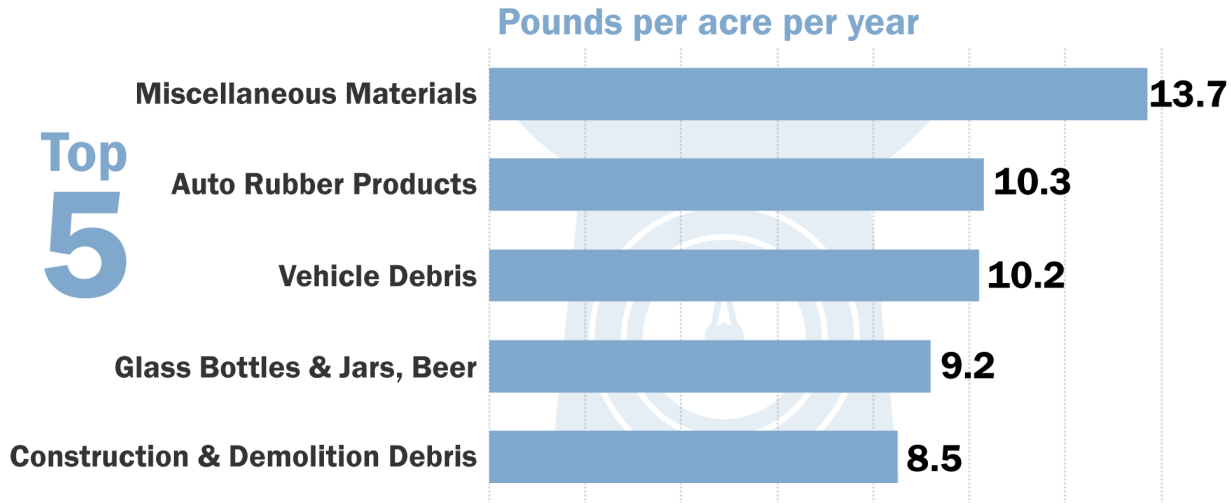
smoking, including cigarette butts, accumulate fastest by piece, at a rate of 12,771 pieces per acre per year.

Figure 19. Yearly litter accumulation rates for all material classes, by pound and by piece.



At the level of specific material types, miscellaneous materials accumulate fastest by pound (Figure 20). Miscellaneous materials include small fragments of litter, small unidentified items, and any other material not captured in other categories.

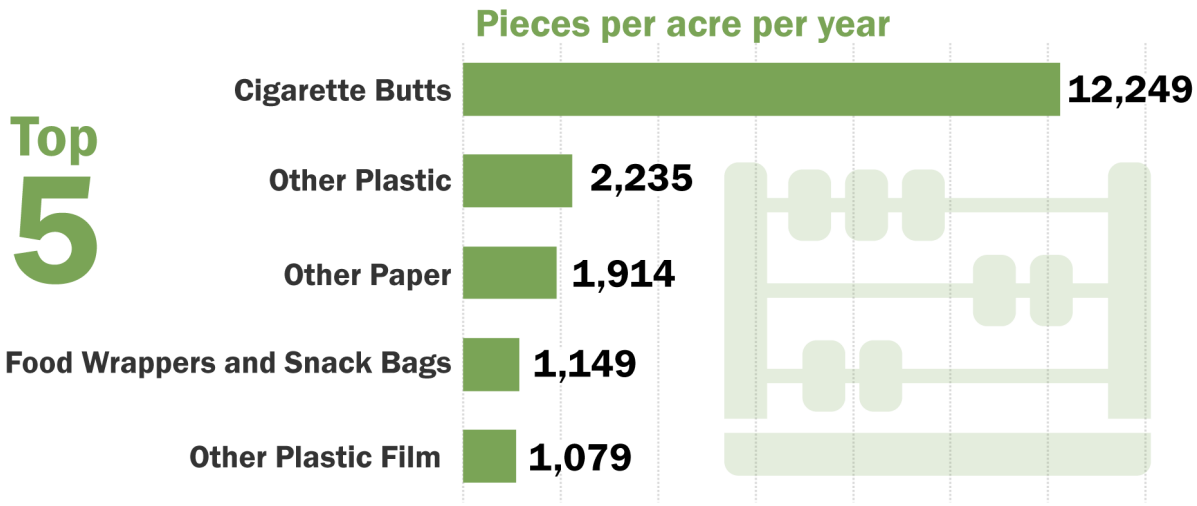
Figure 20. Top five fastest accumulating material types, by pound.



Cigarette butts are the fastest accumulating material type, by piece, for all site types combined (Figure 21). Cigarette butts accumulate more than five times faster than the next

fastest material type, other plastic. When found along roadways and on-off ramps, other plastic material types are likely to come from unsecured loads. Other plastic includes items like packing insulation, zip ties, twist ties, and plastic lollipop sticks, and plastic items hard to identify.

Figure 21. Top five fastest accumulating material types, by piece.



LITTER SNAPSHOT (OVERALL, BY MATERIAL CLASS, AND MOST COMMON)

An estimated 43.8 million pounds and 2.2 billion pieces of litter were present throughout Washington, on all site types combined (Table 6).

Table 6. Litter levels combined across all site types, by pound and by piece.

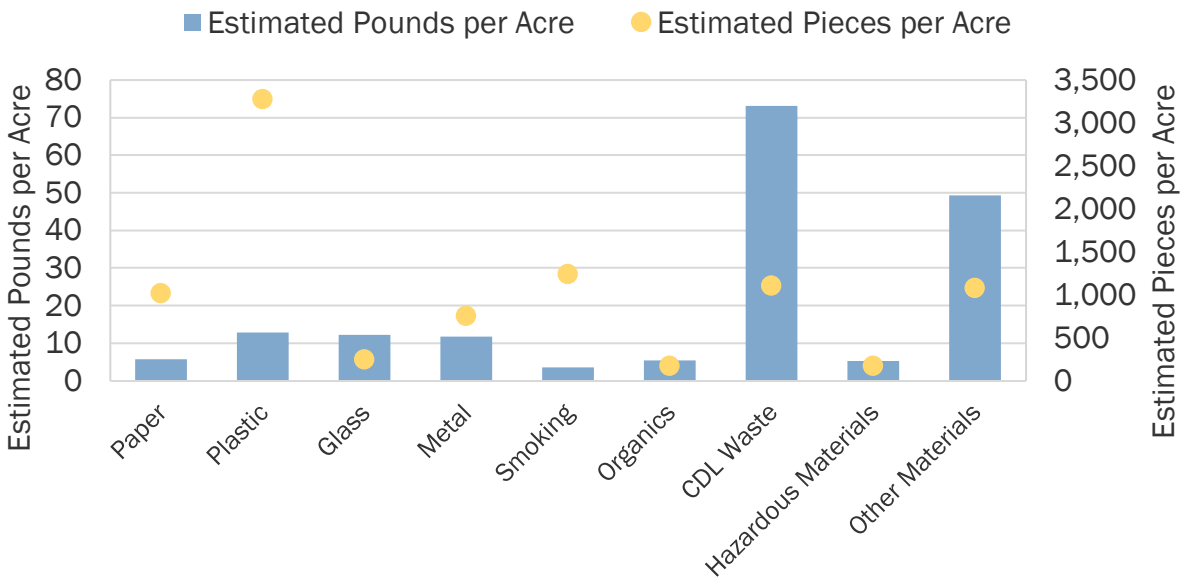
	Pounds	Pieces	Pounds per Acre	Pieces per Acre
All Site Types	43,810,625	2,208,012,258	1,130.9	143,076

CDL waste was the most common material type by pound, at an estimated 71.3 pounds per acre (Figure 22). This material class includes a wide range of debris associated with construction, demolition, and land clearing, such as plywood, pallets, rebar, and traffic cones. Materials classified as other materials, including tires, appliances, and whole bags of mixed trash, were also commonly found, at an estimated 49.4 pounds per acre.

Plastic litter was the most common material class by piece, at an estimated 3,270 pieces per acre (Figure 22). This category includes various types of plastic beverage bottles, food packaging, plastic bags, and foam materials. Materials associated with smoking were the

second most common material class, by piece. However, these pieces were about as common as pieces of paper, CDL waste, and other materials.

Figure 22. Snapshot of litter composition by material class, combined across all site types, by pound and by piece.



For all site types combined, construction and demolition debris was by far the most common material type, by pound (Figure 23). It was nearly six times as common as the next most common material type, miscellaneous materials.

By piece, construction and demolition debris was also the most common material type, closely followed by cigarette butts (Figure 24).

Figure 23. Top five most common material types, by pound, across all site types.

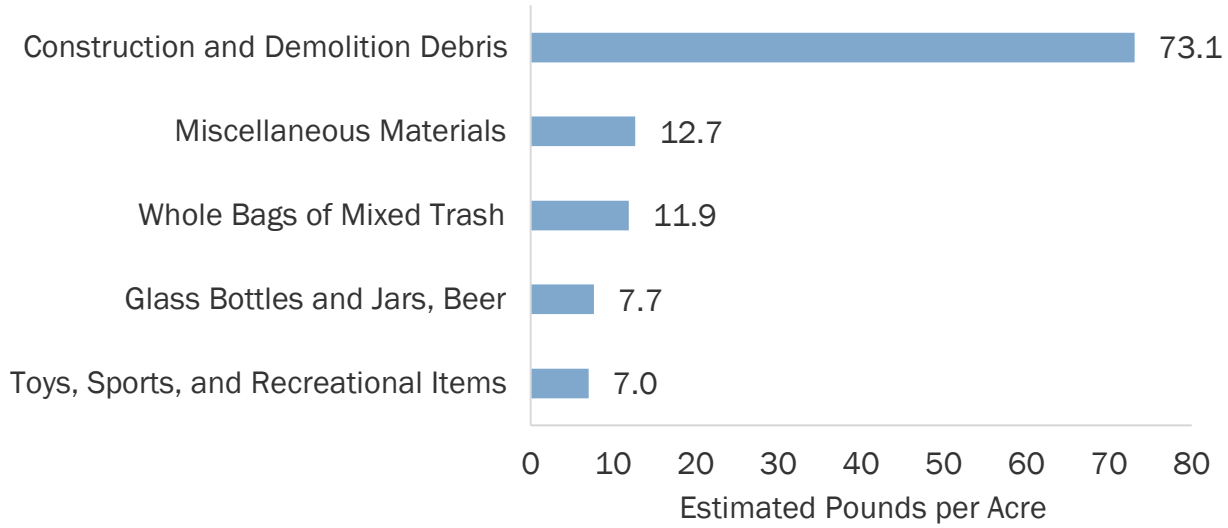
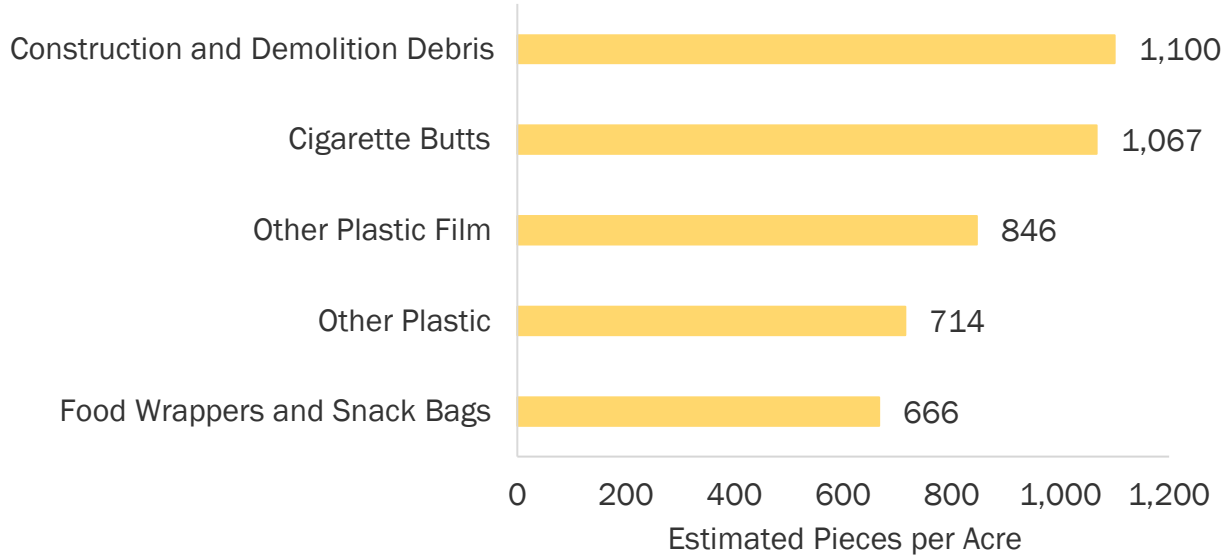


Figure 24. Top five most common material types, by piece, across all site types.



Roadways

This section describes yearly litter accumulation rates and litter levels during the litter snapshot for roadways. Results are presented for all roadway types combined, for each roadway type individually (interstate, arterial, collector, and local), and for urban and rural roadway locations.

We estimated litter accumulation in total and per mile. Both measures are important because some roadway types, such as local roads, accumulate a lot of litter in total because they make up a large share of total miles in the state, even though each mile accumulates a comparatively small amount of litter. In contrast, other roadway types—such as interstates—accumulate a small share of total litter but each mile is much more heavily littered.

ACCUMULATION RATES

Overall, 18.5 million pounds of litter made up of 1,858.6 million pieces are estimated to accumulate each year on Washington roadways (Table 7). This is equivalent to every person in Washington dropping 2.4 pounds and 236 pieces of litter on roadways every year. Per mile, this amounts to 228.3 pounds per mile per year, or 22,939 pieces per mile per year (Figure 25).

In total, local roadways accumulate more pounds and pieces of litter than other roadway types (Table 7). This is likely because there are more miles of local roadways. While local roadways make up 67% of all roadway miles statewide, they receive 42% of pounds of roadway litter and 53% of pieces each year.

Per mile, interstate roadways accumulate the most pounds and pieces of litter (Figure 25). The average mile of interstate roadway accumulates litter 11 times faster in pounds and 4 times faster in pieces than the average mile of local roadway (Table 8). While they make up only 2% of roadway miles statewide, interstates receive a much greater share of traffic—40% of the annual vehicle miles traveled on these roads.[13]

Per mile for all roadway types combined, urban roadways accumulate individual pieces of litter over 4 times faster than rural roadways and accumulate pounds of litter more than 2.5 times faster (Figure 25). This difference in rates suggests that urban roadways may receive smaller pieces of litter than rural roadways. Considering specific roadway types, urban interstates, collectors, and local roadways accumulate more litter in pounds and pieces per mile than their rural counterparts (Table 8). However, urban arterial roadways accumulate more pieces but fewer pounds than their rural counterparts.

In total, urban roadways accumulate nearly twice as many individual pieces of litter as rural roadways but only slightly more pounds of litter, for all roadway types combined (Table 7).

[13] https://www.fhwa.dot.gov/policyinformation/statistics/2020/

This result is consistent with findings from the 2004 and 1999 Washington studies, which found that urban roads also accumulated more litter than rural roads, which the past studies described as "non-urban."

Table 7. Yearly litter accumulation rates for all roadway types, by pound and by piece.

Roadway Type	Pounds per Year	Pieces per Year
All Roadways	18,496,103	1,858,555,848
All Urban Roadways	9,852,447	1,199,063,608
All Rural Roadways	8,643,656	659,492,240
All Interstates	2,839,049	132,297,220
Urban Interstates	2,066,074	81,548,842
Rural Interstates	772,975	50,748,378
All Arterials	3,784,915	468,322,294
Urban Arterials	1,625,121	319,788,627
Rural Arterials	2,159,794	148,533,667
All Collector	4,124,301	277,199,043
Urban Collectors	1,252,216	103,392,989
Rural Collectors	2,872,085	173,806,054
All Local Roadways	7,747,838	980,737,291
Urban Local Roadways	4,909,037	694,333,150
Rural Local Roadways	2,838,801	286,404,141

Figure 25. Yearly litter accumulation rates per mile per year for all roadway types, by pound and by piece.

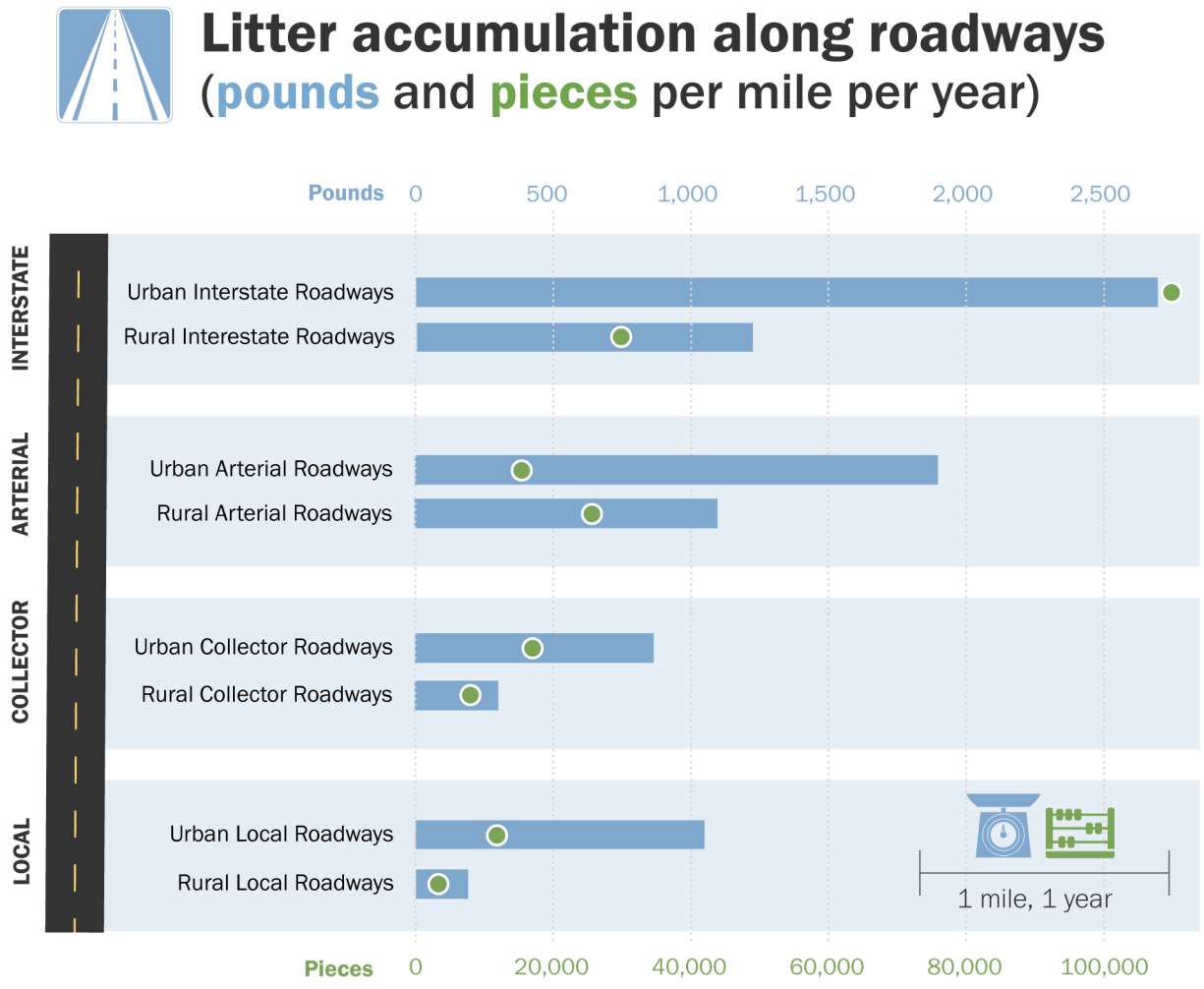


Table 8. Yearly litter accumulation rates per mile for all roadway types, by pound and by piece.

Roadway Type	Pounds per Mile per Year	Pieces per Mile per Year
All Roadways	228.3	22,939
All Urban Roadways	401.8	48,903
All Rural Roadways	153.0	11,672
All Interstates	1,578.8	73,569
Urban Interstates	2,728.8	107,705
Rural Interstates	742.4	48,744
All Arterials	499.0	61,745
Urban Arterials	386.0	75,951
Rural Arterials	640.1	44,019
All Collector	238.3	16,014
Urban Collectors	419.1	34,604
Rural Collectors	200.5	12,136
All Local Roadways	142.6	18,052
Urban Local Roadways	296.4	41,919
Rural Local Roadways	75.2	7,584

Litter Accumulation by Material Class for Roadways Overall

POUNDS PER MILE PER YEAR

On all roadway types combined, and on interstate and arterial roadways, items classified as other materials accumulate at the fastest rate by weight (Table 9). Examples of other materials include whole bags of mixed trash, large appliances, and tires. Many of these other materials likely come from unsecured loads or from vehicle and tire debris.

Table 9. Yearly litter accumulation rates per mile for all roadway types, by material class and by pounds per mile per year.

Material Class	All Roadways	Interstate	Arterial	Collector	Local
Paper	27.7	131.5	107.7	25.7	13.8
Plastic	37.7	118.1	65.6	31.3	33.1
Glass	33.8	28.8	23.8	58.7	27.4
Metal	20.0	58.1	58.0	17.6	14.1
Smoking	11.0	19.0	33.4	9.7	7.9
Organics	14.2	27.1	24.4	21.9	9.9
CDL Waste	18.0	308.7	16.5	14.9	9.6
Hazardous Materials	1.2	2.6	2.9	1.4	0.8
Other Materials	64.8	884.8	166.6	57.0	25.9
Total	**228.3**	**1,578.8**	**499.0**	**238.3**	**142.6**

PIECES PER MILE PER YEAR

On all roadway types except interstates, items related to smoking accumulate at the fastest rate, per mile per year and by piece (Table 10). Smoking materials include cigarette butts, e-cigarettes, and other products and packing associated with smoking or vaping tobacco, nicotine, or cannabis.

On interstate roadways, items classified as other materials accumulate fastest by piece. This material class includes small pieces of auto rubber products, such as tire shards and treads, which may be more common on high-speed and heavily travelled interstates. The next section on individual material types shows that auto rubber products and vehicle debris are in the top five fastest accumulating material types on interstate roadways (Figure 26 and Figure 27).

Table 10. Yearly litter accumulation rates per mile for all roadway types, by pieces per mile per year.

Material Class	All Roadways	Interstate	Arterial	Collector	Local
Paper	2,762	8,507	4,389	1,309	2,808
Plastic	4,623	18,770	8,853	4,033	3,753
Glass	1,317	1,597	816	859	1,523
Metal	1,185	3,436	2,268	1,323	916
Smoking	9,297	13,544	39,169	5,812	6,097
Organics	272	330	301	93	324
CDL Waste	847	2,859	357	347	1,007
Hazardous Materials	114	227	285	172	67
Other Materials	2,521	24,301	5,307	2,067	1,556
Total	**22,939**	**73,569**	**61,745**	**16,014**	**18,052**

Top Five Fastest Accumulating Material Types by Roadway Type

POUNDS PER MILE PER YEAR

By weight, glass beer bottles and jars are the fastest accumulating litter items on all roadways combined and on collector and local roadways (Figure 26).

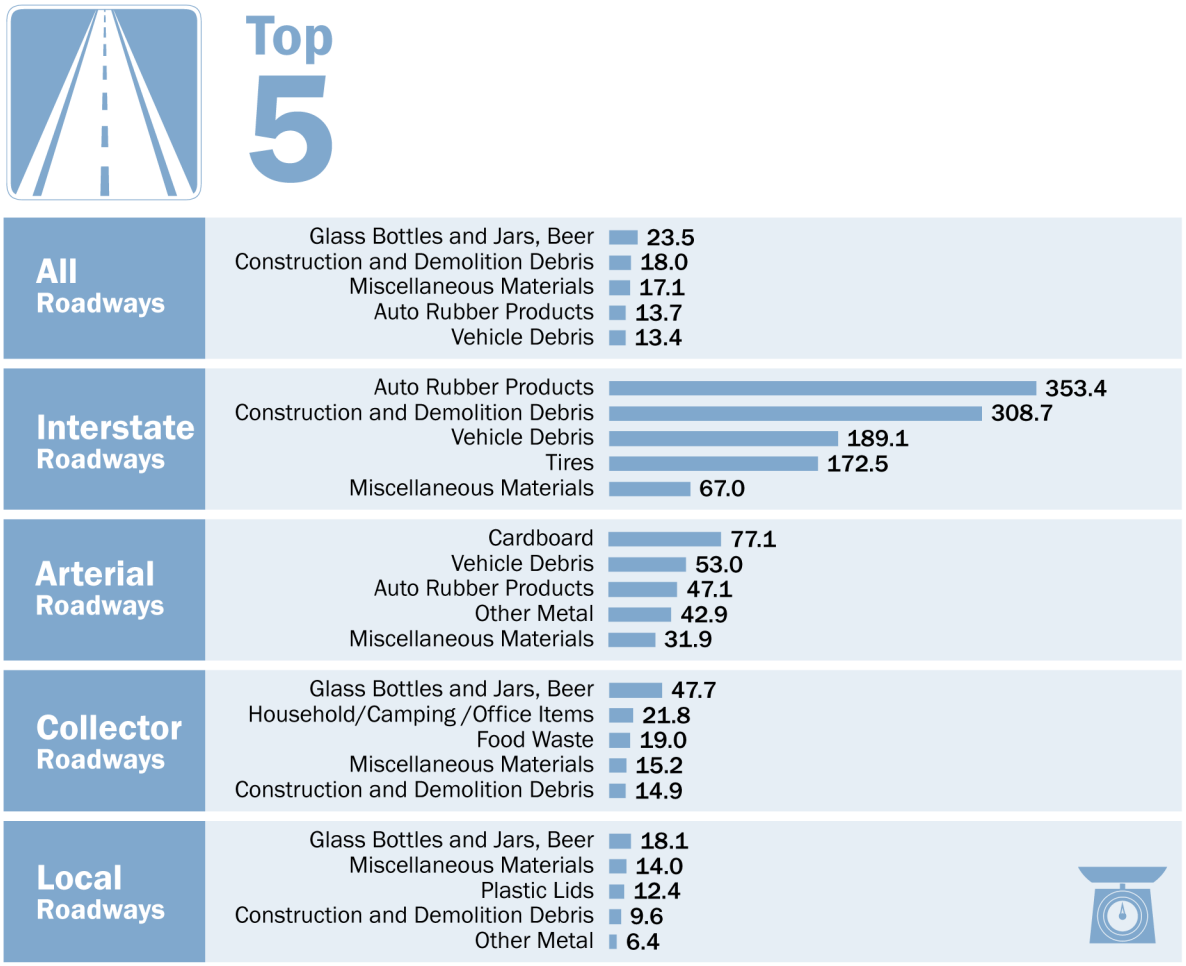
Construction and demolition debris is the second fastest accumulating litter item on all roadways combined. It is also among the top five fastest accumulating materials along interstate, collector, and local roadways (Figure 26). Construction and demolition debris includes lumber, piping, tarps, concrete, and more. Ecology considers these items to be typically dropped from unsecured loads instead of being littered intentionally.

Miscellaneous materials are among the top five fastest accumulating material types along every type of roadway and were ranked third fastest accumulating on all roadways combined, when measured by weight (Figure 26). Miscellaneous materials include pieces of

litter smaller than 1 inch, and items that were hard to identify. The latter two materials could have dropped from uncovered loads: trucks hauling loose materials are exempt from covering their loads if they have 6 inches or more of free space above the materials in their truck bed.[14]

Auto rubber products also accumulate quickly on interstate and arterial roadways. By weight, this category is the fourth fastest accumulating litter item on roadways overall.

Figure 26. Yearly accumulation rates per mile for the top five fastest accumulating material types on all roadways, by pound.



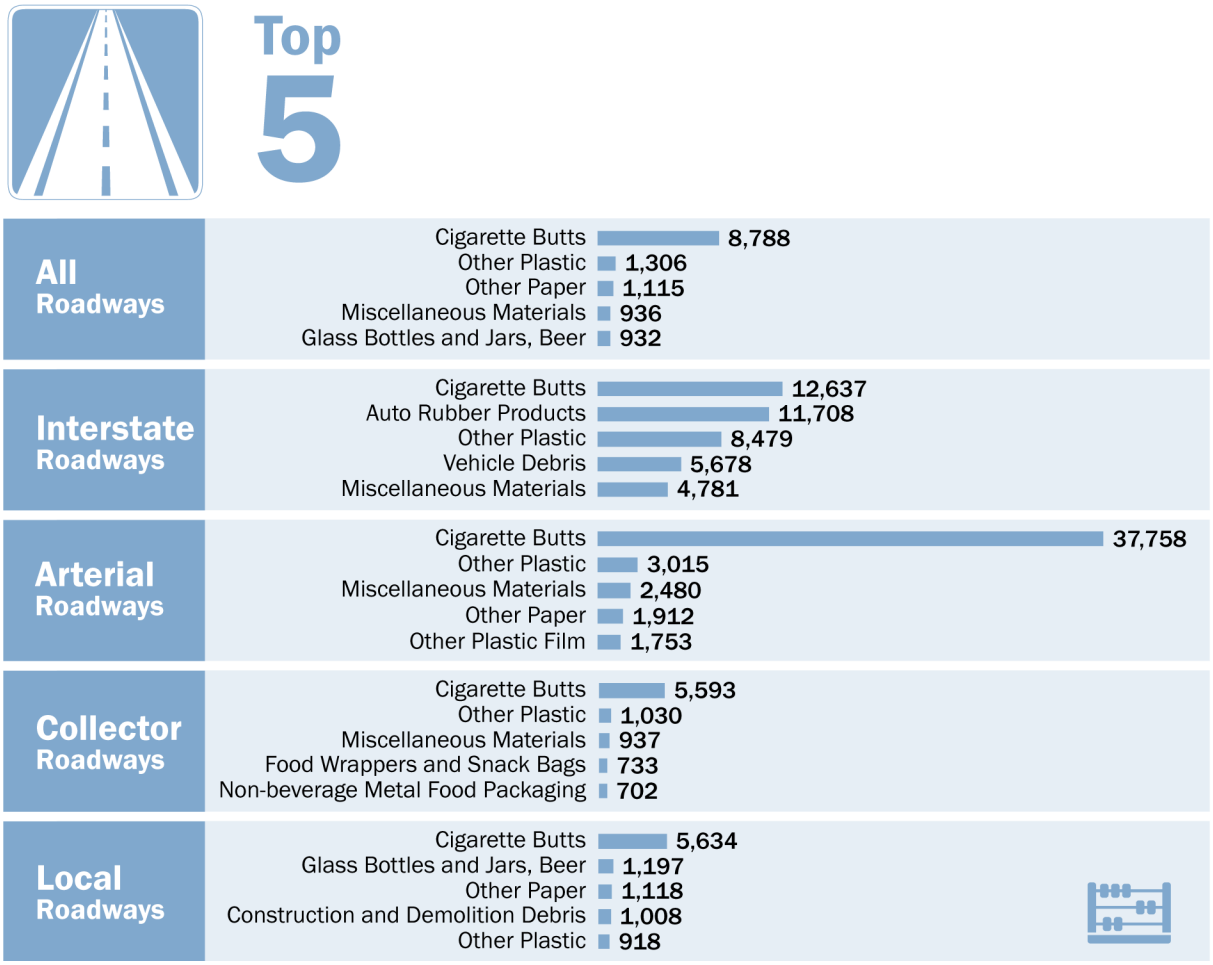
[14] https://app.leg.wa.gov/RCW/default.aspx?cite=46.61.655

PIECES PER MILE PER YEAR

When looking at the quantity in pieces per mile per year, cigarette butts are the fastest accumulating litter item on all roadway types (Figure 27). On all roadway types combined, cigarette butts accumulate at a rate of 8,788 individual pieces per mile per year. Cigarettes and other tobacco products are currently subject to a 0.015% litter tax.

Other plastic items also accumulate quickly on all roadways. This material type, which includes packing insulation and zip ties, is among the top five fastest accumulating materials on every roadway type and ranks second on all roadways combined (Figure 27). Other quickly accumulating items include other paper (such as sticky notes, books, envelopes) and miscellaneous materials, which accumulate quickly both by piece and by pound (Figure 26).

Figure 27. Yearly accumulation rates per mile for the top five fastest accumulating material types on all roadways, by piece.



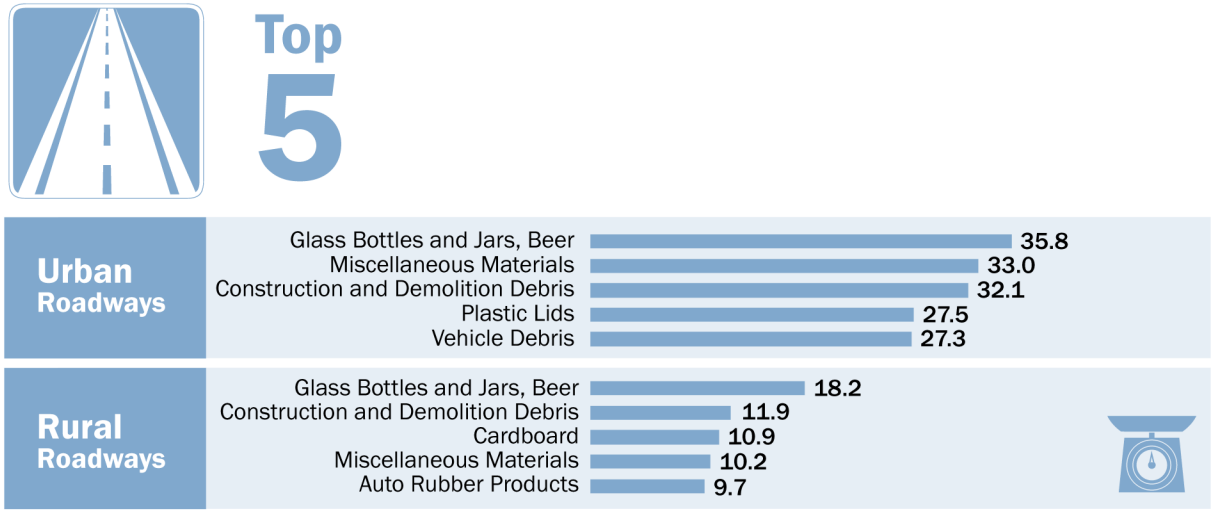
For accumulation rates for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

Top Five Fastest Accumulating Material Types by Urban-Rural Location

POUNDS PER MILE PER YEAR

Although urban roadways accumulate litter faster than rural roadways, the types of fastest accumulating litter materials by weight are similar between urban and rural roadways. Glass beer bottles and jars, miscellaneous materials, and construction and demolition debris are all among the top five fastest accumulating material types on both urban and rural roadways (Figure 28). Plastic lids from food containers and vehicle debris are among the top five on urban roads, while cardboard and auto rubber products are among the top five on rural roads.

Figure 28. Yearly accumulation rates per mile for the top five fastest accumulating material types on urban and rural roadways, by pound.

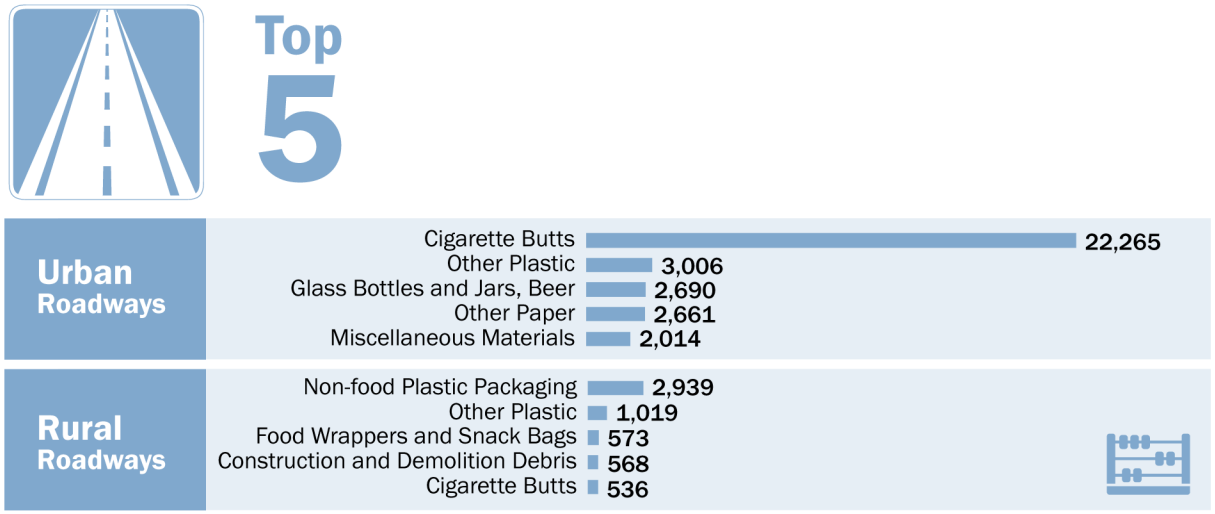


PIECES PER MILE PER YEAR

Cigarette butts are the fastest accumulating material type on both urban and rural roadways when looking at number of pieces per mile per year (Figure 29). However, cigarette butts accumulate 7.5 times faster on urban roadways than rural roadways.

Other plastic materials are also among the top five fastest accumulating materials for both types of roadways. The other fastest accumulating material types by piece differ between urban and rural roadways. Glass beer bottles and jars, other paper, and miscellaneous materials are in the top five materials for urban roadways. Construction and demolition debris, food wrappers and snack bags, and non-food plastic packaging accumulate more quickly, relative to other material types, on rural roadways.

Figure 29. Yearly accumulation rates per mile for the top five fastest accumulating material types on urban and rural roadways, by piece.



For accumulation rates for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

LITTER SNAPSHOT

Overall, 22.2 million pounds of litter made up of 657.2 million pieces were estimated to be on Washington roadways in spring 2022 (Table 11). This this is equivalent to 274.3 pounds of litter, or 8,111 pieces, on every mile of roadway (Figure 30).

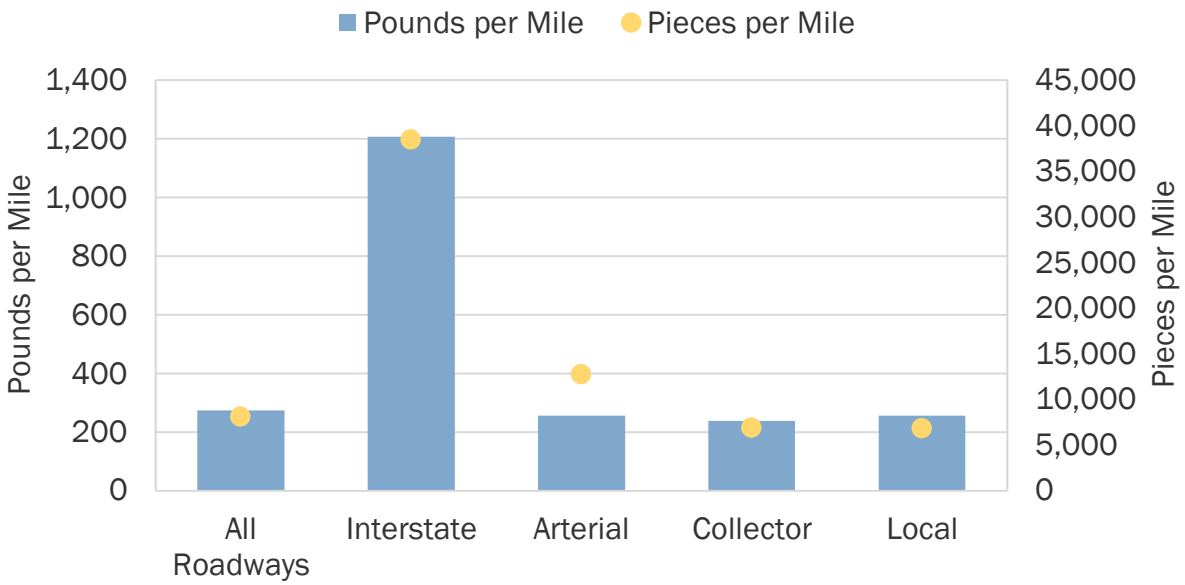
In total, local roadways had the most litter, both by pound and by piece, likely because local roadways make up the majority of road miles in Washington (Table 11). Per mile, however, interstate roadways had the most litter, both by pound and by piece (Figure 30). Interstates had about five times more litter by pound than any of the other roadway types and three to five times more litter by piece. This aligns with the finding that interstate roadways accumulate litter at a much faster rate per mile than other roadways (see *Accumulation Rates* above).

In total across all miles, most rural roadways had more litter than their urban counterparts, both by pound and by piece (Table 11). Interstate roadways were one exception: urban and rural interstates had similar amounts of litter, both by pound and by piece.

Table 11. Snapshot of litter levels on all roadway types, by pound and by piece.

Roadway Type	Pounds	Pieces
All Roadways	22,220,829	657,213,661
Urban	5,906,602	317,335,622
Rural	16,314,227	339,878,039
Interstate	2,170,423	69,262,977
Urban	1,139,567	36,346,543
Rural	1,030,855	32,916,434
Arterial	1,939,489	97,041,012
Urban	579,821	52,570,274
Rural	1,359,668	44,470,738
Collector	4,136,269	119,896,756
Urban	818,862	30,791,676
Rural	3,317,407	89,105,080
Local	13,974,648	371,012,916
Urban	3,368,352	197,627,130
Rural	10,606,296	173,385,787

Figure 30. Snapshot of litter levels per mile for all roadway types, by pound and by piece.

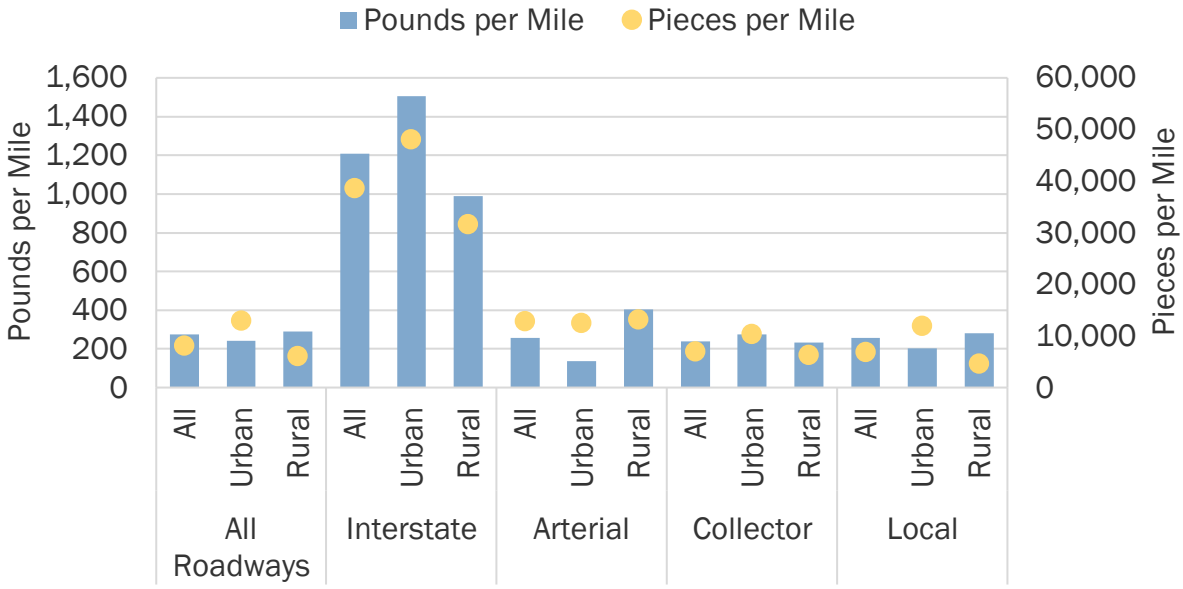


Per mile for all roadway types combined, rural roadways had more pounds but fewer pieces of litter on average than their urban counterparts (Figure 31). This is consistent with findings from the Keep America Beautiful 2020 study (see *Comparison with KAB 2020 National Litter Study*). The difference between pounds and pieces suggests that rural roadways tend

to have litter that is larger or heavier, while urban roadways have litter that is smaller or lightweight.

However, this pounds-to-pieces relationship varies by roadway type. All but one rural roadway type has fewer pieces per mile than its urban counterparts. The exception is that rural and urban arterials have similar numbers of pieces per mile. Rural arterials and local roads have more pounds per mile than their urban counterparts, but rural interstates and collectors have fewer (Figure 31). These differences between pounds and pieces suggests that some urban and rural roadways receive different types of litter, as discussed in more detail below (see *Litter Composition by Material Class for Roadways Overall*).

Figure 31. Snapshot of litter levels per mile for urban and rural roadways, by pound and by piece.



Litter Composition by Material Class for Roadways Overall

POUNDS PER MILE

By weight, between 44% and 55% of litter on all roadway types except collector roadways were other materials (Table 12 and Table 13). The other materials category includes whole bags of mixed trash, toys and recreational items, and vehicle and tire debris, among many others.

On collector roadways, the most commonly littered material classes in pounds were glass (24.0%) and other materials (21.7%), as shown in Table 15. Glass items represented less than 9% of litter by weight on other roadway types, suggesting an unusual concentration of glass litter on collector roadways.

Table 12. Snapshot of litter composition by material class for all roadway types combined, by pound.

Material Class	Est. %	+ / -	Est. Pounds per Mile
Paper	4.6%	0.7%	12.7
Plastic	9.5%	0.8%	26.1
Glass	8.3%	2.0%	22.7
Metal	9.7%	2.9%	26.5
Smoking	1.5%	0.2%	4.0
Organics	3.7%	1.4%	10.2
CDL Waste	12.5%	2.1%	34.1
Hazardous Materials	5.6%	2.5%	15.4
Other Materials	44.7%	5.7%	122.5
TOTAL	**100.0%**		**274.3**

Table 13. Snapshot of litter composition by material class for interstate roadways, per pound.

Material Class	Est. %	+ / -	Est. Pounds per Mile
Paper	4.2%	0.8%	50.1
Plastic	12.5%	1.5%	151.0
Glass	1.3%	0.4%	16.1
Metal	6.9%	1.9%	83.5
Smoking	1.4%	0.3%	17.5
Organics	8.5%	4.8%	102.8
CDL Waste	9.5%	1.6%	114.7
Hazardous Materials	0.7%	0.4%	8.0
Other Materials	55.0%	5.1%	663.3
TOTAL	**100.0%**		**1,207.0**

Table 14. Snapshot of litter composition by material class for arterial roadways, per pound.

Material Class	Est. %	+ / -	Est. Pounds per Mile
Paper	4.3%	0.8%	11.1
Plastic	17.1%	2.6%	43.7
Glass	8.6%	2.1%	22.0
Metal	6.7%	1.7%	17.2
Smoking	3.6%	0.9%	9.3
Organics	3.2%	1.2%	8.2
CDL Waste	12.5%	3.2%	31.9
Hazardous Materials	0.2%	0.1%	0.6
Other Materials	43.8%	5.4%	111.9
TOTAL	**100.0%**		**255.7**

Table 15. Snapshot of litter composition by material class for collector roadways, per pound.

Material Class	Est. %	+ / -	Est. Pounds per Mile
Paper	10.6%	5.2%	25.4
Plastic	17.4%	5.1%	41.6
Glass	24.0%	10.6%	57.3
Metal	9.2%	4.7%	21.9
Smoking	2.7%	1.1%	6.5
Organics	1.6%	1.8%	3.9
CDL Waste	11.1%	8.3%	26.5
Hazardous Materials	1.7%	2.1%	4.0
Other Materials	21.7%	6.0%	51.9
TOTAL	**100.0%**		**239.0**

Table 16. Snapshot of litter composition by material class for local roadways, per pound.

Material Class	Est. %	+ / -	Est. Pounds per Mile
Paper	3.0%	1.0%	7.7
Plastic	5.7%	1.5%	14.6
Glass	4.6%	3.7%	11.9
Metal	10.7%	6.3%	27.4
Smoking	0.8%	0.3%	2.0
Organics	3.7%	3.2%	9.4
CDL Waste	13.3%	4.1%	34.2
Hazardous Materials	8.3%	5.6%	21.3
Other Materials	50.0%	12.8%	128.6
TOTAL	**100.0%**		**257.2**

PIECES PER MILE

Plastic was the most commonly littered material class on all types of roadways, representing 37% to 46% of litter by piece (Table 17 through Table 21). The plastic material class is mainly made up of food and beverage packaging, which Ecology classifies as typically littered intentionally by motorists and pedestrians. Various plastics, including plastic food wrappers and snack bags, were among the top five most commonly littered items, by piece, on most roadway types (Figure 33).

Table 17. Snapshot of litter composition by material class for all roadway types combined, by piece.

Material Class	Est. %	+ / -	Est. Pieces per Mile
Paper	11.1%	0.7%	902
Plastic	39.8%	1.6%	3,232
Glass	4.0%	0.6%	325
Metal	10.1%	0.9%	819
Smoking	8.5%	0.7%	691
Organics	1.4%	0.2%	116
CDL Waste	4.4%	0.4%	358
Hazardous Materials	5.2%	1.3%	425
Other Materials	15.3%	0.9%	1,243
TOTAL	**100.0%**		**8,112**

Table 18. Snapshot of litter composition by material class for interstate roadways, by piece.

Material Class	Est. %	+ / -	Est. Pieces per Mile
Paper	11.4%	1.2%	4,374
Plastic	38.6%	2.9%	14,866
Glass	1.3%	0.3%	511
Metal	5.1%	0.6%	1,977
Smoking	5.0%	0.8%	1,913
Organics	1.1%	0.3%	425
CDL Waste	5.1%	0.6%	1,961
Hazardous Materials	0.6%	0.3%	224
Other Materials	31.8%	3.4%	12,265
TOTAL	**100.0%**		**38,516**

Table 19. Snapshot of litter composition by material class for arterial roadways, by piece.

Material Class	Est. %	+ / -	Est. Pieces per Mile
Paper	11.6%	1.3%	1,484
Plastic	44.0%	2.9%	5,633
Glass	3.8%	1.1%	480
Metal	6.3%	0.6%	807
Smoking	11.6%	1.7%	1,485
Organics	1.5%	0.5%	192
CDL Waste	5.1%	0.9%	656
Hazardous Materials	0.5%	0.2%	67
Other Materials	15.6%	2.3%	1,990
TOTAL	**100.0%**		**12,794**

Table 20. Snapshot of litter composition by material class for collector roadways, by piece.

Material Class	Est. %	+ / -	Est. Pieces per Mile
Paper	12.6%	3.9%	870
Plastic	46.2%	4.9%	3,202
Glass	10.4%	4.0%	718
Metal	10.3%	1.9%	710
Smoking	7.4%	2.2%	512
Organics	0.6%	0.4%	39
CDL Waste	4.9%	1.8%	342
Hazardous Materials	0.8%	0.7%	54
Other Materials	6.9%	1.4%	479
TOTAL	100.0%		6,927

Table 21. Snapshot of litter composition by material class for local roadways, by piece.

Material Class	Est. %	+ / -	Est. Pieces per Mile
Paper	10.5%	1.3%	716
Plastic	36.9%	3.5%	2,521
Glass	2.5%	1.1%	172
Metal	12.0%	2.1%	817
Smoking	8.7%	1.7%	597
Organics	1.8%	0.5%	120
CDL Waste	3.9%	0.9%	268
Hazardous Materials	8.8%	3.4%	600
Other Materials	14.9%	2.1%	1,017
TOTAL	100.0%		6,829

Top Five Most Common Material Types by Roadway Type

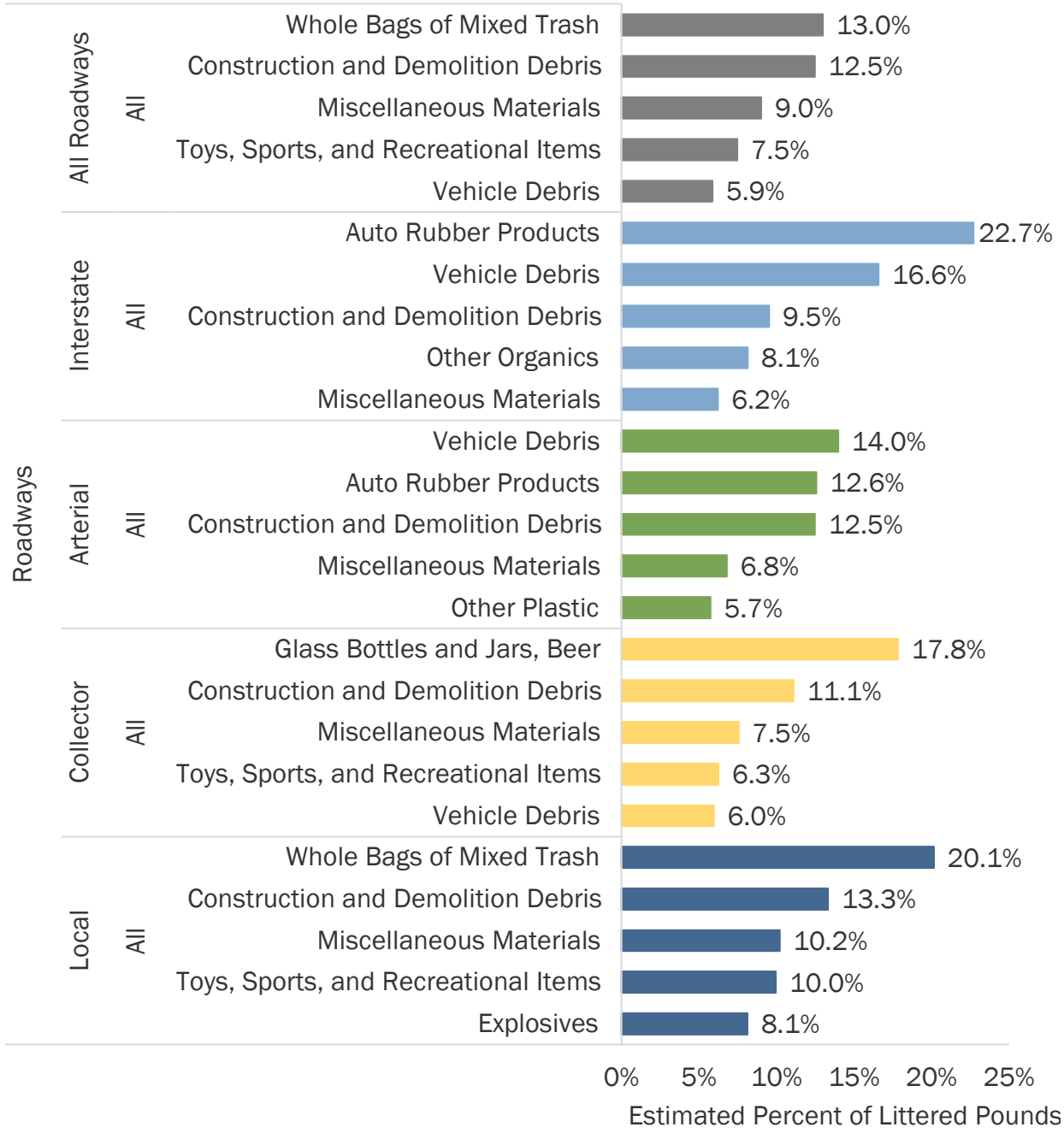
POUNDS PER MILE

For every roadway type, construction and demolition debris and miscellaneous materials were among the top five most common material types by pound (Figure 32). Miscellaneous materials include pieces of litter smaller than 1 inch, and items that were hard to identify.

For all but local roadway types, materials from vehicle debris—which includes hubcaps, lights, and window glass—were among the top five most commonly littered materials by pound (Figure 32). Auto rubber products, which include tire pieces but not whole tires, were the most common litter item on interstates by pound.

Whole bags of mixed trash were the most common item for local roadways, which make up 67% of roadway miles in Washington, therefore, they were also the most commonly littered item on roadways overall. Toys, sports, and recreational items were also heavily littered on local and collector roadways.

Figure 32. Top five most common material types on all roadway types, by pound.



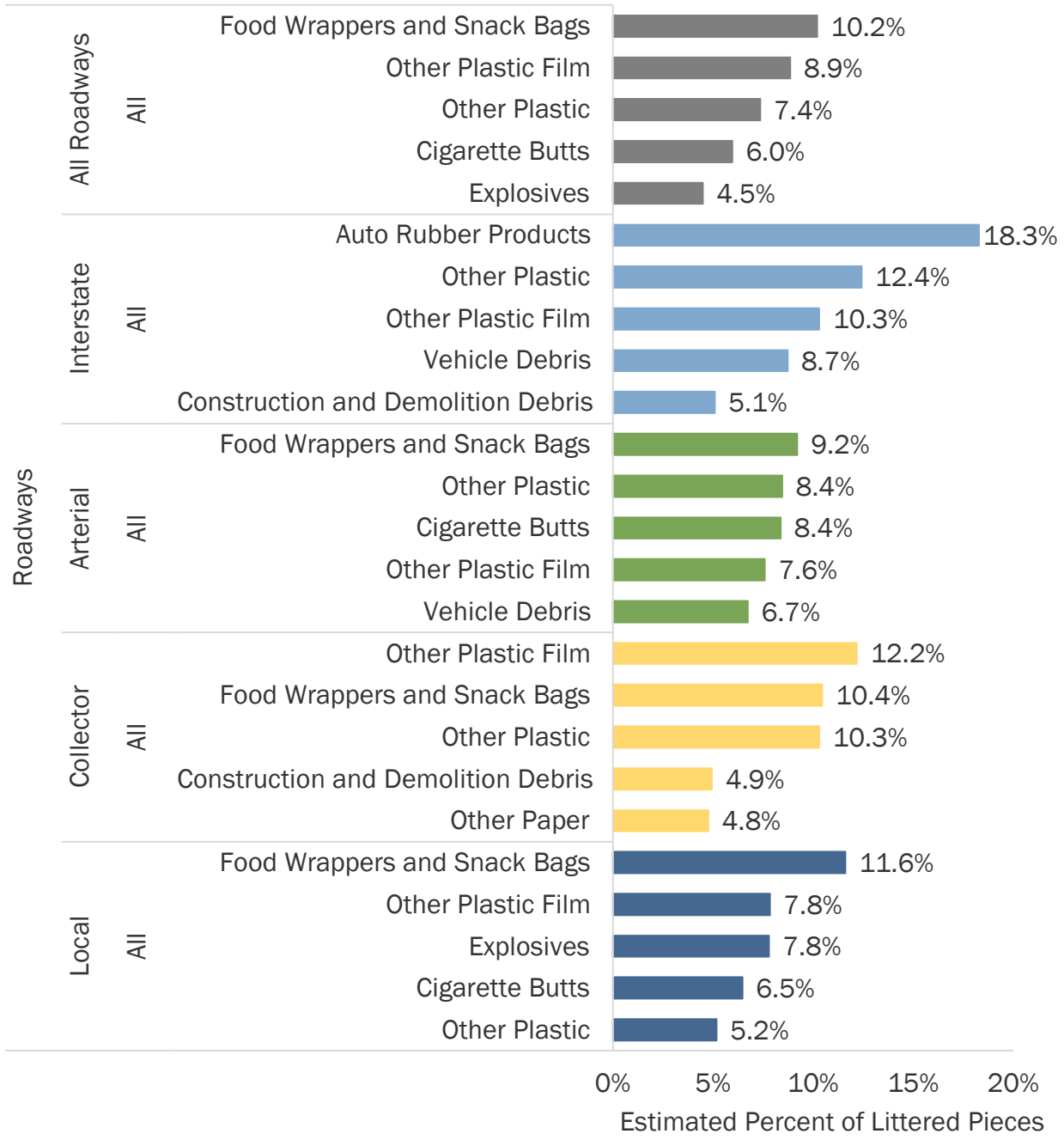
PIECES PER MILE

Other plastic film and other plastic items were among the top five most commonly littered materials on every type of roadway, by piece (Figure 33). Both of these material types are likely to come from unsecured loads. They include items like agricultural film, plastic sheeting, shrink-wrap, bubble wrap, and packing insulation, as well as smaller items like zip ties and twist ties. A third type of plastic material, food wrappers and snack bags, was also among the top five most commonly littered materials on all roadway types, except interstates.

Cigarette butts were the fourth most commonly littered material on all roadway types combined, representing 6.0% of all litter pieces (Figure 33). They were the third most commonly littered item on arterial roadways and the fourth on local roadways. Nationally, cigarette butts are the most commonly littered roadway item, making up 24.1% of litter in the 2020 KAB Study.

Explosives were the fifth most commonly littered item, by piece, on all roadway types combined (4.5% of all litter pieces; Figure 33). Explosives include fireworks, ammunition, and casings (for example shotgun wads).

Figure 33. Top five most common material types on all roadway types, by piece.



For estimated composition percentages for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

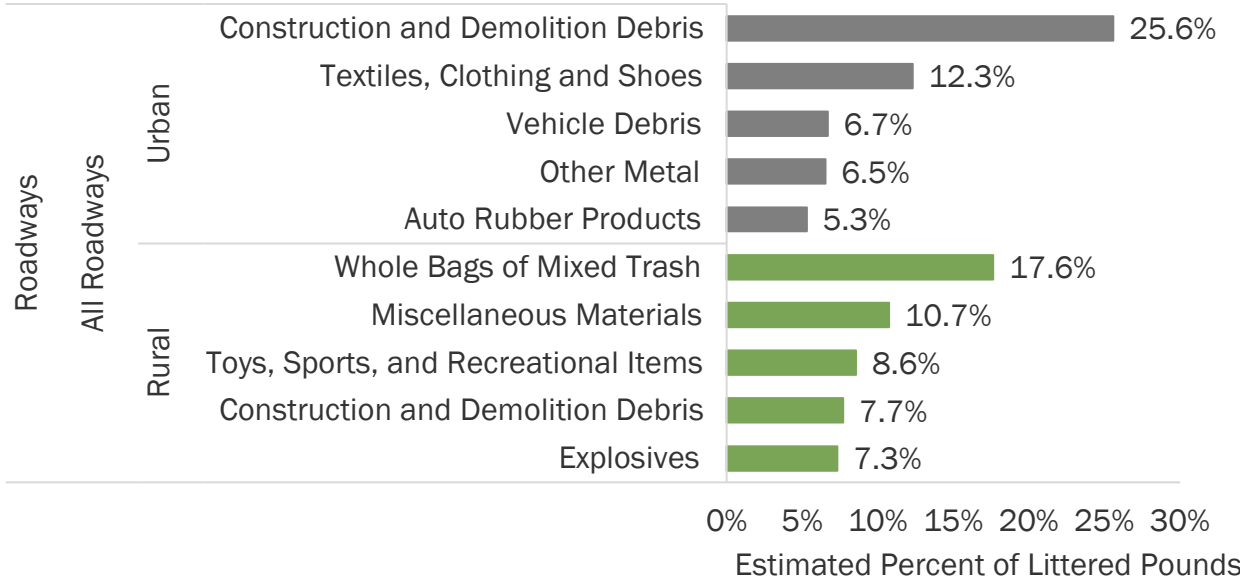
Top Five Most Common Material Types by Urban-Rural Location

POUNDS PER MILE

Urban and rural roadways differed considerably in their top five most commonly littered material types. On urban roadways, construction and demolition debris made up 25.6% of litter and was the most common litter material by weight (Figure 34). On rural roadways, however, construction and demolition debris made up only 7.7% of litter and was the fourth most common material.

On rural roadways, whole bags of mixed trash accounted for 17.6% of litter and were the most common litter material by pound (Figure 34). Ecology defined whole bags of mixed trash found on rural roads as likely to be dumped illegally.

Figure 34. Top five most common material types on urban and rural roadways, by pound.

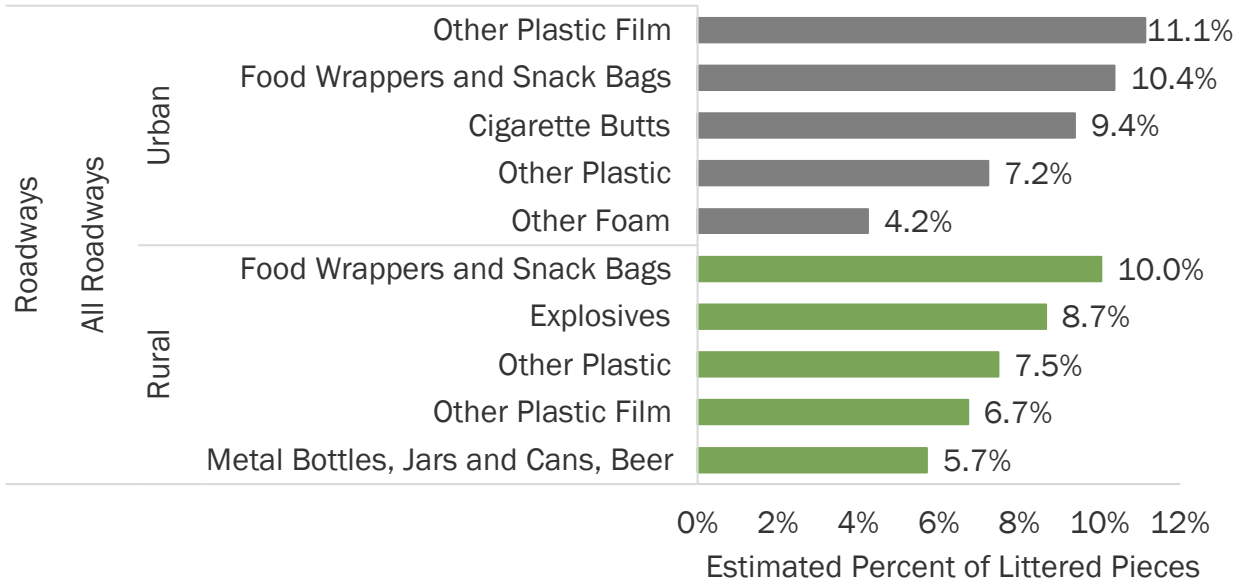


PIECES PER MILE

The most commonly littered material types for urban and rural roadways were more similar when considering pieces instead of pounds. Other plastic film, other plastic, and food wrappers and snack bags were among the top five most common materials littered on both urban and rural roadways, by piece (Figure 35).

In contrast, explosives were the second most common material on rural roadways (8.7% of all rural roadway litter pieces) but were not among the top five most common materials littered on urban roadways. For urban roadways, cigarette butts were the third most common material (9.4% of all urban litter pieces) but were not among the top five for rural roadways.

Figure 35. Top five most common material types on urban and rural roadways, by piece.



For estimated composition percentages for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

On-Off Ramps (Interchanges)

This section describes yearly litter accumulation rates and litter levels during the litter snapshot for on-off ramps (also called interchanges). This section also compares results for urban and rural on-off ramps. Results are presented in total and per acre.

ACCUMULATION RATES

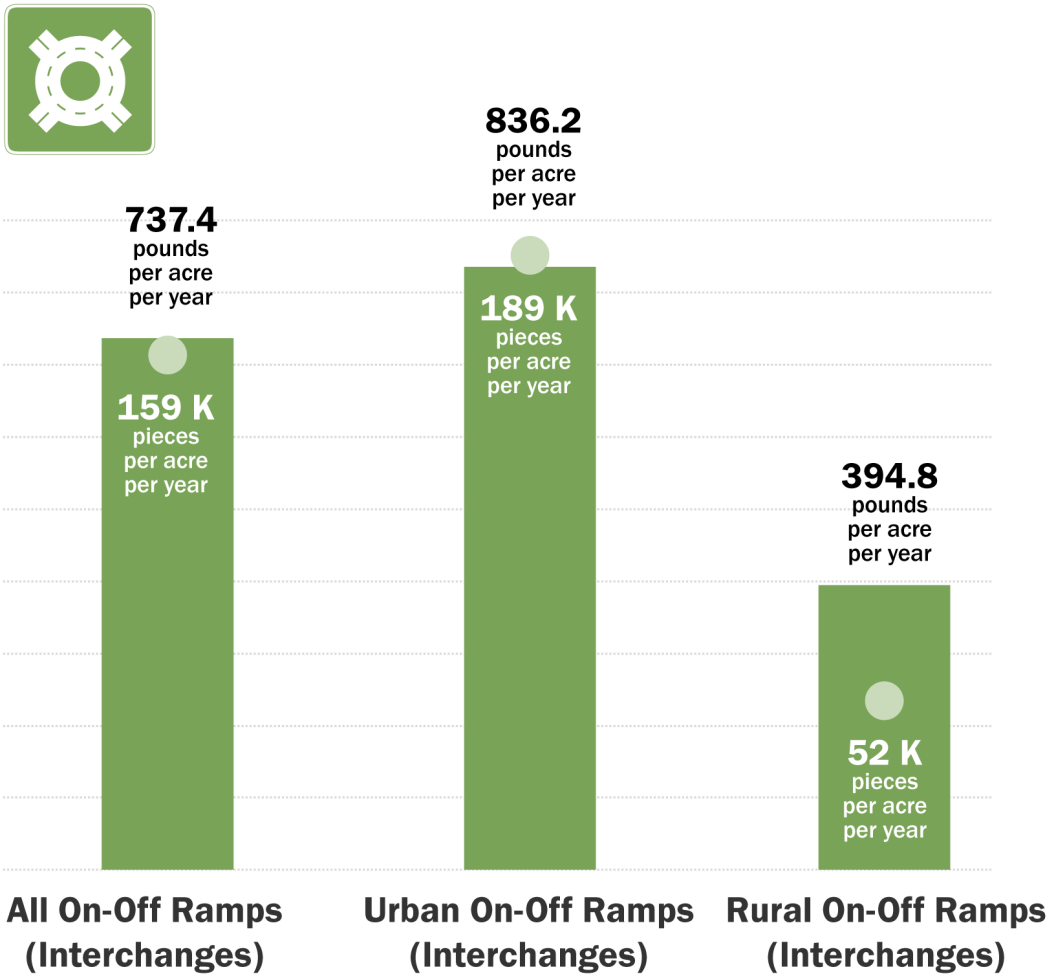
On-off ramps accumulate litter at a rate of 7.7 million pounds per year, or 1,630.1 million pieces per year (Table 22). This translates to 737.4 pounds of litter per acre per year, made up of 158,617 pieces per acre per year (Figure 36).

Urban on-off ramps accumulate litter faster than rural on-off ramps, both by pound and by piece (Table 22). This is true whether litter is measured in total (across all on-off ramps) or per acre. On each acre of an urban interchange, litter accumulates twice as quickly by pound and more than three times as quickly by piece than on each acre of a rural interchange (Figure 36). Urban on-off ramps also accumulated litter more quickly than rural on-off ramps in the 1999 and 2004 Washington statewide litter studies.

Table 22. Yearly litter accumulation rates for on-off ramps (interchanges), by pound and by piece.

	Pounds per Year	Pieces per Year
All On-Off Ramps	7,695,559	1,630,078,616
Urban On-Off Ramps	6,505,560	1,472,670,890
Rural On-Off Ramps	1,189,999	157,407,727

Figure 36. Yearly litter accumulation rates per acre for on-off ramps (interchanges), by pound and by piece.



Litter Accumulation by Material Class

POUNDS PER ACRE

Litter items classified as other materials accumulate at the fastest rate along on-off ramps, in pound per acre (260.9 pounds per acre per year; Figure 37). This material class includes many items that are likely dropped from unsecured loads, such as furniture, and large appliances, as well as vehicle debris and auto rubber products. Other materials are also the

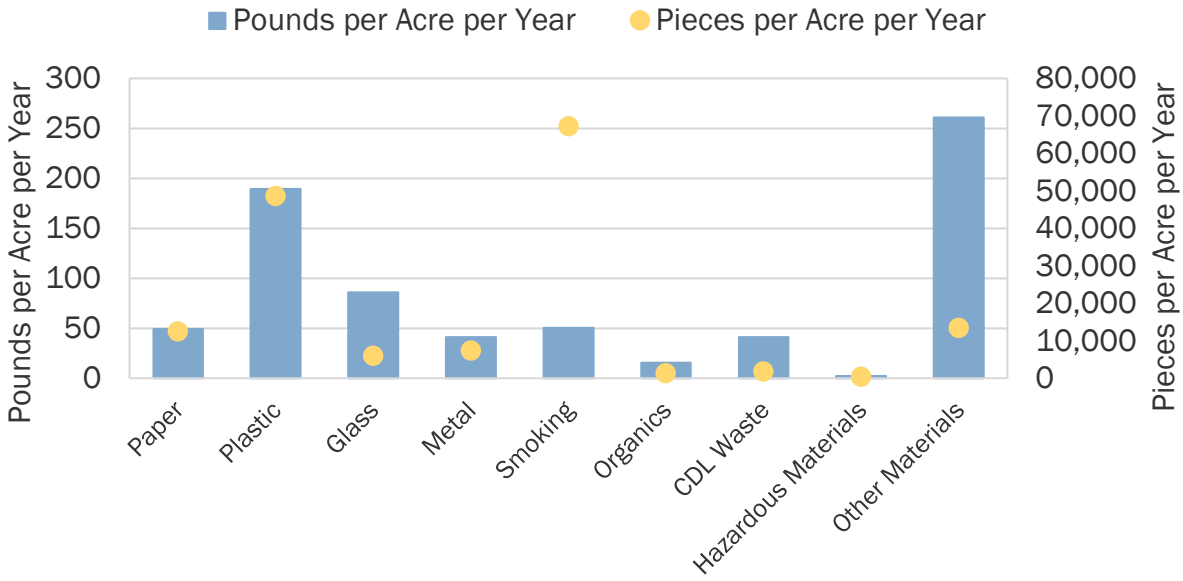
fastest accumulating material class for three other site types: all roadway types combined (Table 9), rest areas (Figure 44), and state and county parks (Figure 50).

Plastic materials also accumulate quickly along on-off ramps, at a rate of 189.2 pounds per acre per year.

PIECES PER ACRE

Materials associated with smoking (67,089 pieces per acre per year) and plastic materials (48,617 pieces per acre per year) accumulate the fastest along on-off ramps in pieces per acre (Figure 37). All other material classes accumulate at a rate of less than 14,000 pieces per acre per year.

Figure 37. Yearly litter accumulation rates per acre for all on-off ramps (interchanges), by material class and by pound and by piece.



Top Five Fastest Accumulating Material Types

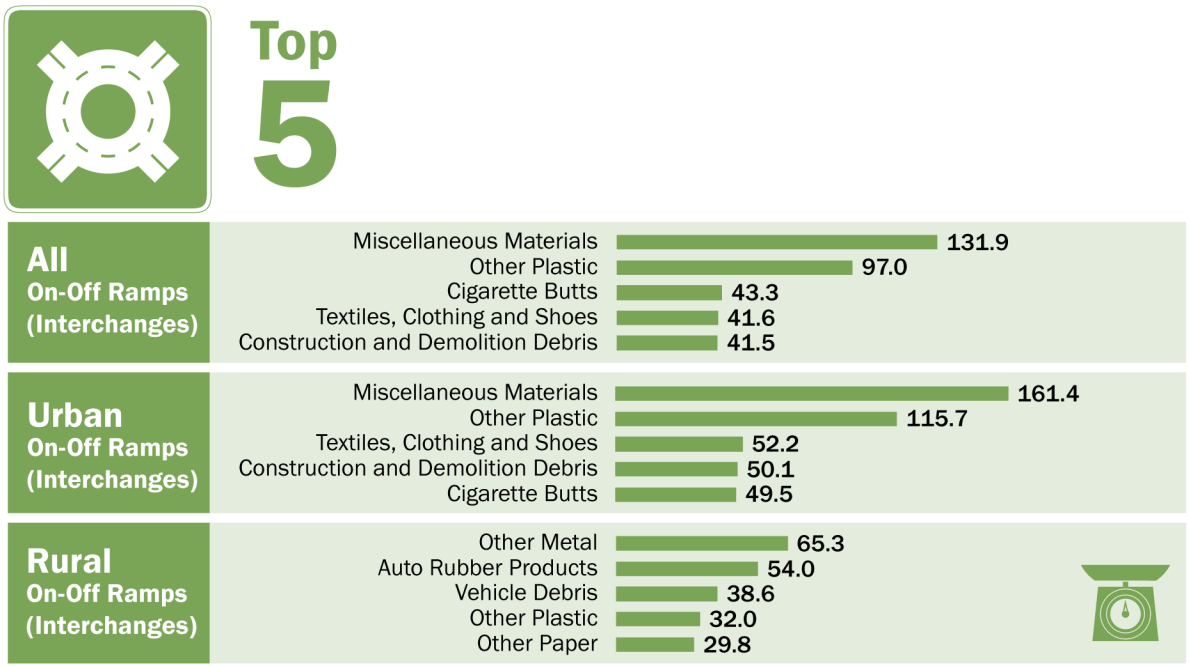
POUNDS PER ACRE

Miscellaneous materials are the fastest accumulating material type along on-off ramps, at a rate of 131.9 pounds per acre per year. This material type includes which likely drops from uncovered or unsecured loads of loose materials. Miscellaneous materials accumulate much more quickly along urban on-off ramps than along rural on-off ramps.

Other plastic items accumulate the second fastest along on-off ramps, at a rate of 97.0 pounds per acre per year. These accumulate much more quickly along urban on-off ramps than rural on-off ramps.

Although small and lightweight, cigarette butts still contribute significantly to litter pounds along on-off ramps: cigarette butts accumulate at a rate of 43.3 pounds per acre per year (Figure 38). They also accumulate more quickly along urban on-off ramps than rural on-off ramps.

Figure 38. Top five fastest accumulating material types for on-off ramps (interchanges), by pound.

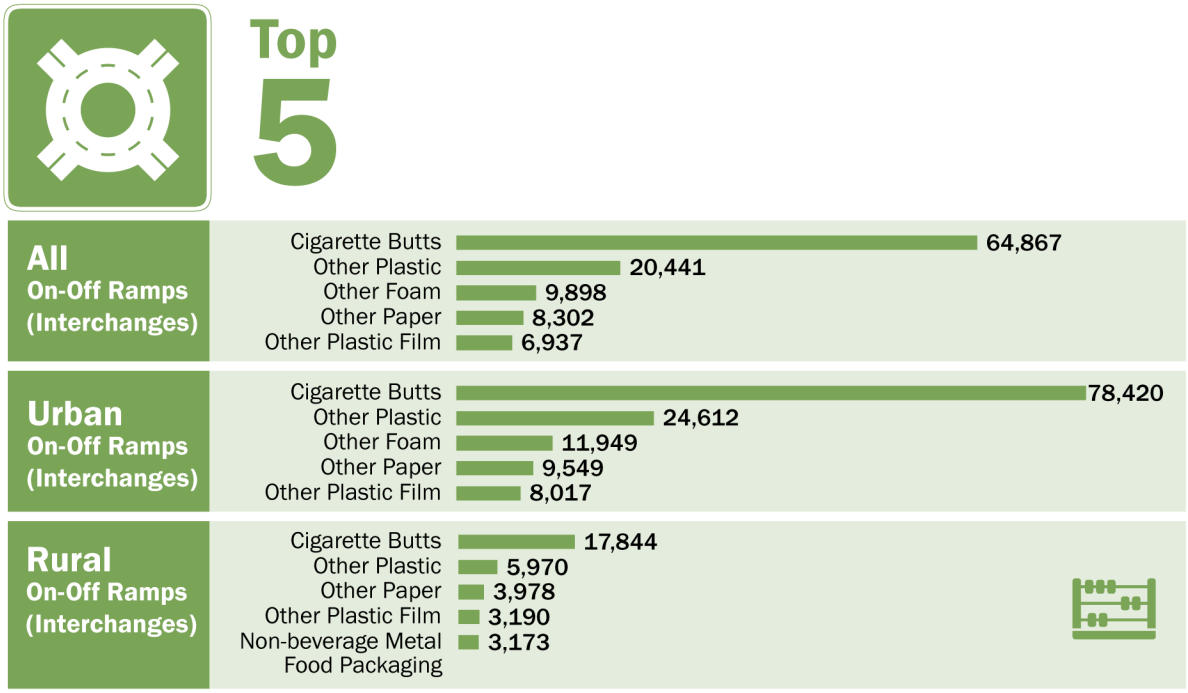


PIECES PER ACRE

Cigarette butts are the fastest accumulating material type along all on-off ramps by piece, for both urban and rural on-off ramps (Figure 39). The other fastest accumulating material types along all on-off ramps vary, but many are made from plastic or associated with packaging. Other plastic materials include insulation and blister backs. Other foam materials include ice chests and packing peanuts. Other plastic film materials include plastic mailing pouches, shrink-wrap, and bubble wrap.

Urban on-off ramps accumulate cigarette butts about four times faster than rural on-off ramps (Figure 39). Overall, the material types that accumulate fastest along urban and rural on-off ramps are largely similar.

Figure 39. Top five fastest accumulating material types for on-off ramps (interchanges), by piece.



For accumulation rates for each material type measured in this study, see *Appendix G. Detailed Composition Results.*

LITTER SNAPSHOT

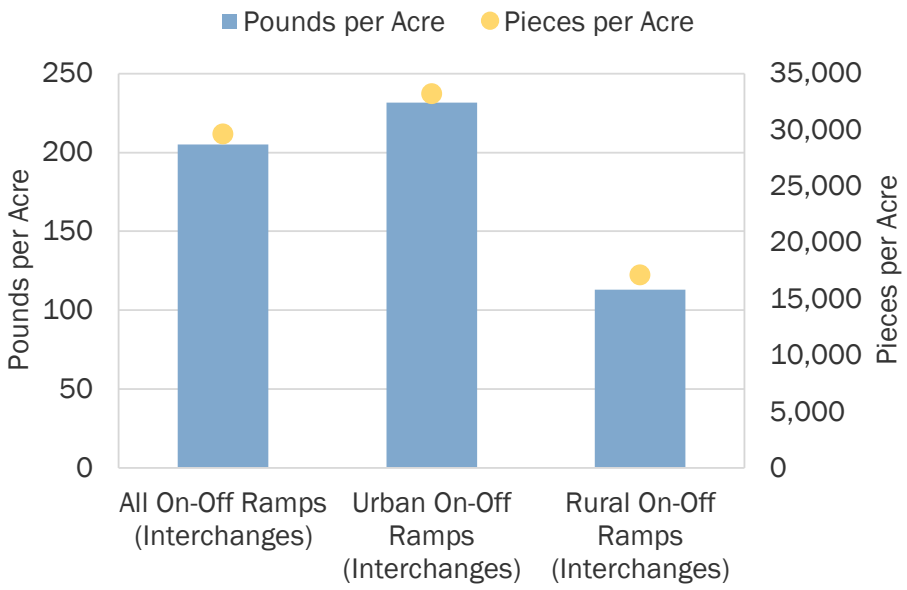
Overall, 2.2 million pounds of litter, or 319.7 million pieces, are estimated to be along Washington's on-off ramps (Table 23). This is equivalent to 205.1 pounds of litter, or 29,614 pieces of litter per acre along all on-off ramps in Washington (Figure 40).

Urban on-off ramps had more litter than rural on-off ramps by all measures—in total pounds and pieces (Table 23), as well as in pounds and pieces per acre (Figure 40). Urban on-off ramps had five times more litter in total and about two times more litter per acre.

Table 23. Snapshot of litter levels for on-off ramps (interchanges), by pound and by piece.

	Pounds	Pieces
All On-Off Ramps	2,214,070	319,673,231
Urban On-Off Ramps	1,802,539	258,465,711
Rural On-Off Ramps	340,381	51,550,738

Figure 40. Snapshot of litter levels per acre for on-off ramps (interchanges), by pound and by piece.



Litter Composition by Material Class

POUNDS PER ACRE

Other materials make up 40.9% of pounds of litter along on-off ramps, making it the most commonly littered material class by pound (Table 24).

Results were similar between urban and rural on-off ramps, with some exceptions. Urban on-off ramps had a higher percentage of glass while rural on-off ramps had higher percentages of organics and CDL wastes (construction, demolition, and land clearing).

PIECES PER ACRE

In pieces, plastic was the most commonly littered material class, accounting for 48.8% of all pieces littered along on-off ramps (Table 24). It was most common on both urban and rural on-off ramps, representing 40.2% to 50.1% of litter, by piece (Table 25 and Table 26). The plastic class primarily consists of food and beverage packaging, which Ecology considers to be littered intentionally by motorists and pedestrians.

Table 24. Snapshot of litter composition by material class for all on-off ramps (interchanges), by pound and by piece.

Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	6.6%	3.8%	13.5	10.5%	3.6%	3,095
Plastic	20.0%	6.2%	41.0	48.8%	8.3%	14,464

Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Glass	11.9%	11.5%	24.4	5.5%	7.1%	1,636
Metal	7.6%	3.3%	15.6	4.5%	1.7%	1,334
Smoking	4.5%	2.2%	9.3	17.0%	5.1%	5,038
Organics	3.9%	3.9%	7.9	0.5%	0.4%	144
CDL Waste	3.9%	2.9%	8.1	2.1%	2.1%	634
Hazardous Materials	0.7%	0.9%	1.4	0.1%	0.1%	35
Other Materials	40.9%	13.9%	84.0	10.9%	2.5%	3,235
TOTAL	**100.0%**		**205.1**	**100.0%**		**29,614**

Table 25. Snapshot of litter composition by material class for urban on-off ramps (interchanges), by pound and by piece.

Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	6.6%	3.7%	15.2	10.3%	3.4%	3,430
Plastic	20.1%	5.8%	46.7	50.1%	8.4%	16,649
Glass	12.6%	12.4%	29.1	6.0%	8.0%	2,008
Metal	7.4%	3.0%	17.2	4.3%	1.5%	1,437
Smoking	4.5%	2.1%	10.4	16.0%	4.9%	5,305
Organics	3.4%	3.8%	7.9	0.4%	0.4%	120
CDL Waste	3.1%	2.2%	7.2	1.9%	1.9%	623
Hazardous Materials	0.6%	0.9%	1.5	0.0%	0.0%	6
Other Materials	41.7%	13.9%	96.6	11.0%	2.2%	3,641
TOTAL	**100.0%**		**231.7**	**100.0%**		**33,220**

Table 26. Snapshot of litter composition by material class for rural on-off ramps (interchanges), by pound and by piece.

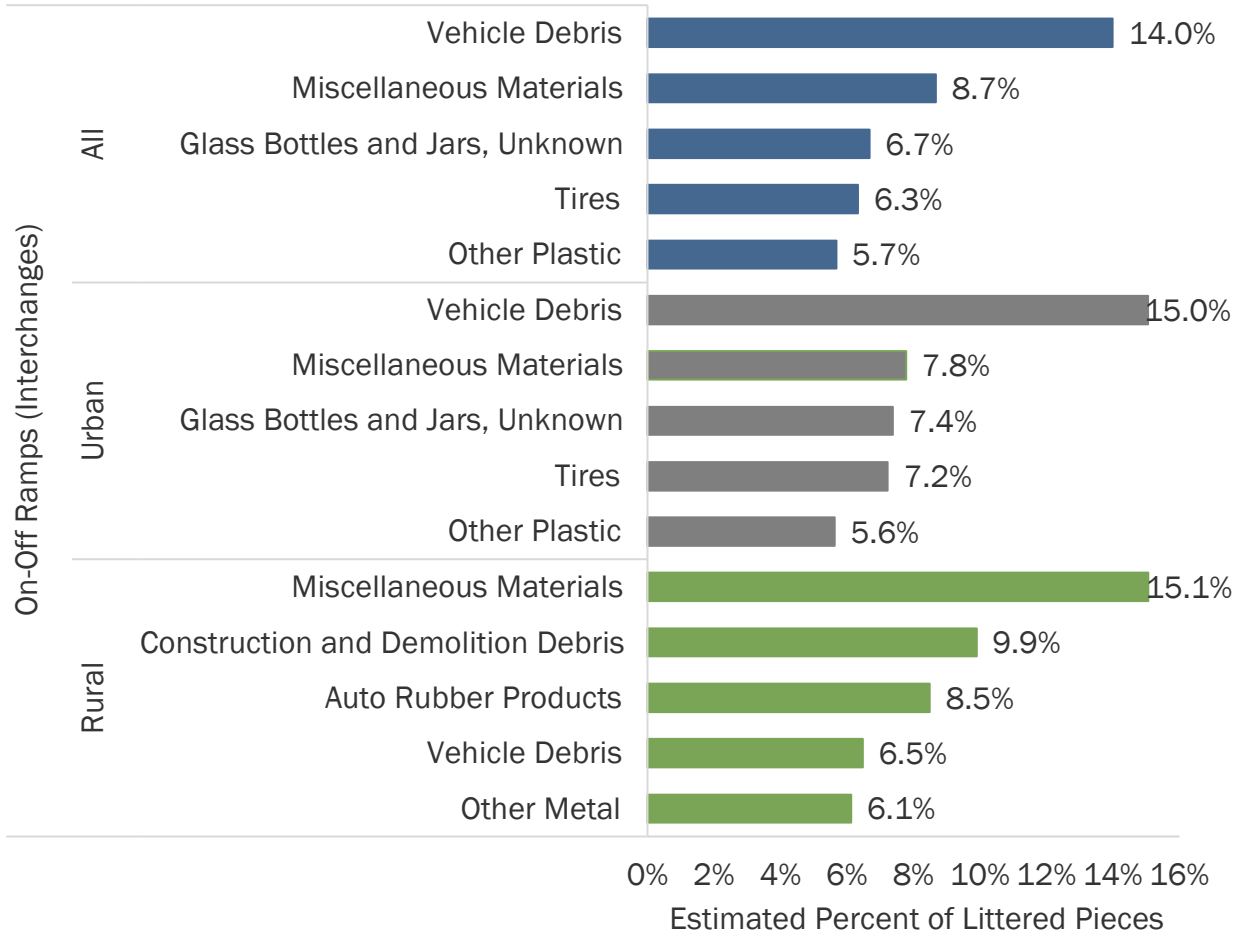
Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	6.7%	3.9%	7.6	11.3%	5.2%	1,932
Plastic	18.8%	8.9%	21.3	40.2%	7.4%	6,881
Glass	7.1%	5.1%	8.0	2.0%	1.5%	345
Metal	8.8%	5.4%	10.0	5.7%	3.2%	974
Smoking	4.8%	2.6%	5.4	24.0%	6.5%	4,110
Organics	7.1%	4.6%	8.0	1.3%	0.8%	226
CDL Waste	9.9%	7.9%	11.2	3.9%	3.2%	671
Hazardous Materials	1.0%	1.3%	1.2	0.8%	0.9%	136
Other Materials	35.7%	13.6%	40.4	10.7%	4.4%	1,828
TOTAL	**100.0%**		**112.9**	**100.0%**		**17,103**

Top Five Most Common Material Types

POUNDS PER ACRE

Both urban and rural on-off ramps had vehicle debris and miscellaneous materials in their top five most commonly littered material types. After that, urban and rural on-off ramps differed considerably in their top five most commonly littered material types. Urban on-off ramps had a much higher percentage of vehicle debris in pounds per acre than rural on-off ramps, while rural on-off ramps had a much higher percentage of miscellaneous materials than urban on-off ramps. Urban ramps also had unknown types of glass bottles and jars, as well as tires among the most common litter types, in pounds per acre (Figure 41). Rural on-off ramps had miscellaneous materials, construction and demolition, and auto rubber products among their most common litter types, in pounds per acre.

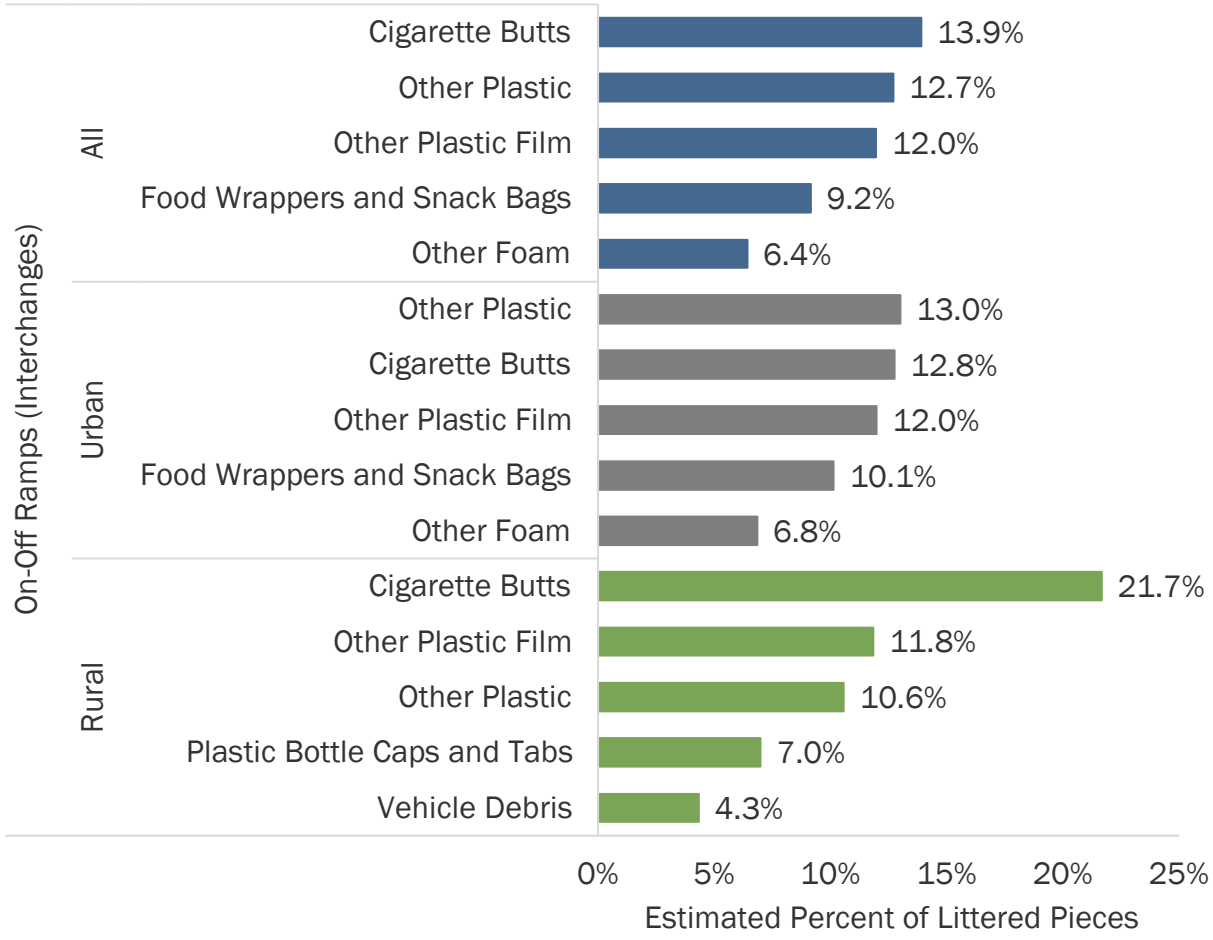
Figure 41. Top five most common material types on on-off ramps (interchanges), by pound per acre.



PIECES PER ACRE

The most commonly littered material types for urban and rural on-off ramps were more similar when considering pieces instead of pounds. Other plastic film, other plastic, and cigarette butts were among the top five most common materials littered in both urban and rural on-off ramps, by piece (Figure 42). Along rural ramps, there were many more cigarette butts by piece than urban ramps and other materials found around rural ramps.

Figure 42. Top five most common material types on on-and-off ramps (interchanges), by piece.



For estimated composition percentages for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

Rest Areas

This section describes yearly litter accumulation rates and litter levels during the litter snapshot for rest areas. This section also compares results for urban and rural rest areas. Results are presented in total and per acre.

ACCUMULATION RATES

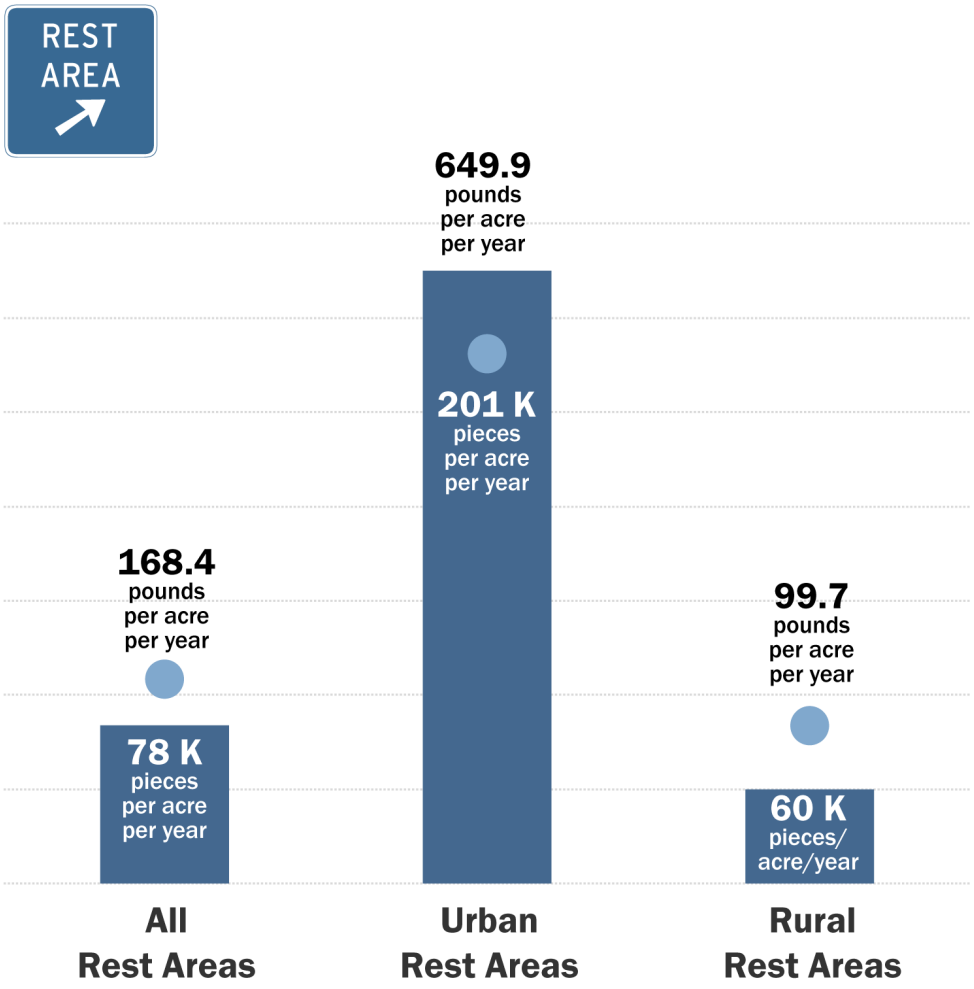
Rest areas accumulate litter at a rate of 38,739.0 pounds per year, or 17.9 million pieces per year (Table 27). Per acre, this is 168.4 pounds of litter per acre per year, or 77,656 pieces of litter per acre per year (Figure 43).

Although there are relatively fewer rest areas in urban environments than in rural environments, each acre of urban rest area accumulates litter much faster than each acre of rural rest area, both by pound and by piece (Figure 43). Urban rest areas accumulate litter more than six times faster by pound and three times faster by piece than rural rest areas.

Table 27. Yearly litter accumulation rate for all rest areas, by pound and by piece.

	Pounds per Year	Pieces per Year
All Rest Areas	38,739	17,860,777

Figure 43. Yearly litter accumulation rate per acre for all rest areas, by pound and by piece.



Litter Accumulation by Material Class

POUNDS PER ACRE PER YEAR

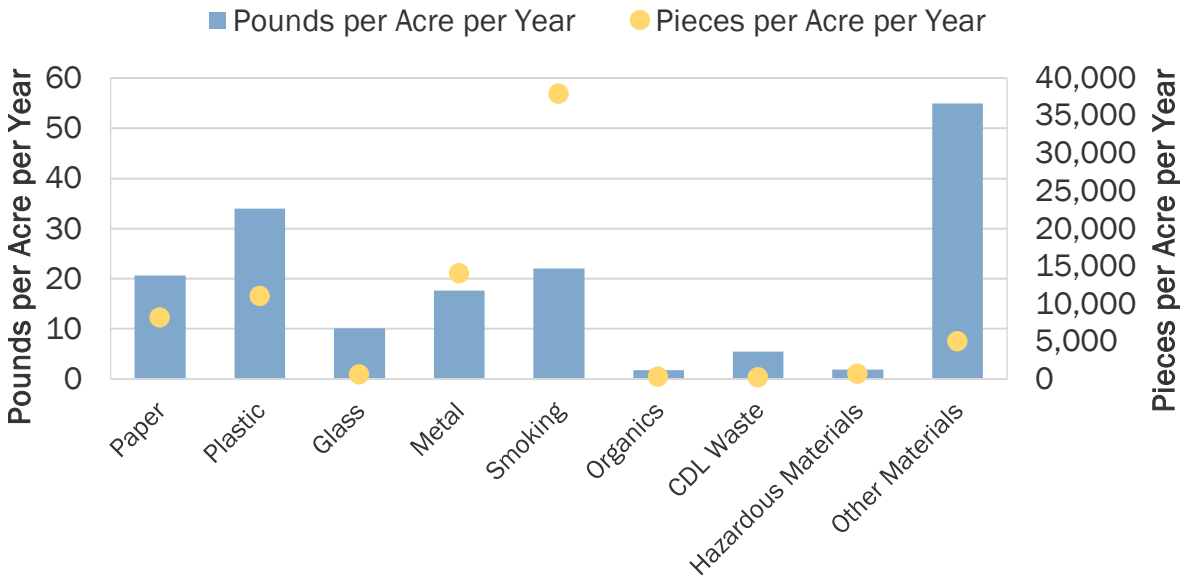
Litter items classified as other materials accumulate at the fastest rate at rest areas, per acre and by pound (55.0 pounds per acre per year in Figure 44). This material class includes household/camping items/office items, vehicle debris, auto rubber products, and miscellaneous materials.

Plastic materials also accumulate quickly at rest areas, at a rate of 33.9 pounds per acre per year. Paper accumulates at 20.6 pounds per acre per year.

PIECES PER ACRE PER YEAR

Materials associated with smoking (37,898 pieces per acre per year) accumulate the fastest at rest areas (Figure 44). Metal materials (14,009 pieces per acre per year) and plastic materials (10,928 pieces per acre per year) also accumulate quickly.

Figure 44. Yearly litter accumulation rates per acre for all rest areas, by material class and by pound and by piece.



Top Five Fastest Accumulating Material Types

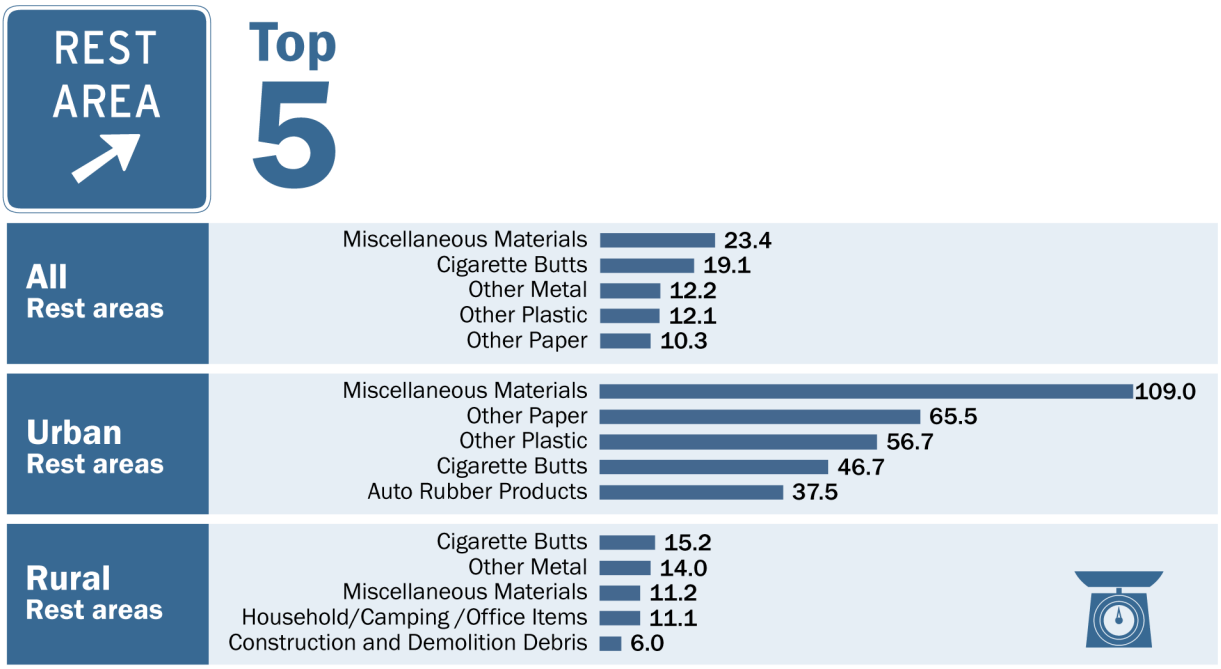
POUNDS PER ACRE PER YEAR

Miscellaneous materials are the fastest accumulating material type at rest areas, at a rate of 23.4 pounds per acre per year (Figure 45). Miscellaneous materials include pieces of litter smaller than 1 inch, and items that were hard to identify. Miscellaneous materials accumulate much more quickly at urban rest areas than at rural rest areas.

Cigarette butts accumulate the second fastest at rest areas overall, at a rate of 19.1 pounds per acre per year. While they are the top material at rural rest areas, urban areas accumulate about three times as many pounds of cigarette butts per year.

In pounds, the top materials accumulated at urban rest areas also included other paper, other plastic, and auto rubber products. For rural rest areas, top materials accumulated in pounds included other metal, household/camping items/office items, and construction and demolition debris.

Figure 45. Top five fastest accumulating material types at rest areas, by pound.



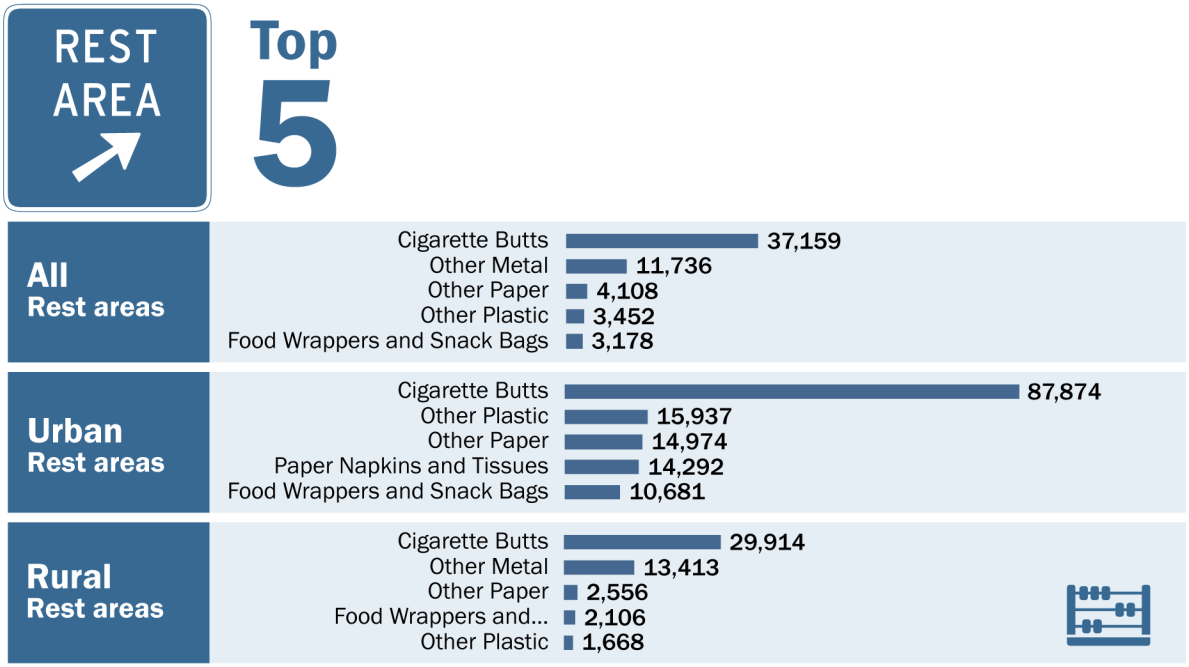
PIECES PER ACRE PER YEAR

Cigarette butts are the fastest accumulating material type at both urban and rural rest areas by piece (Figure 46). Urban rest areas accumulate nearly three times more pieces of cigarette butts per year than rural rest areas.

The second fastest accumulating material type at rest areas overall are other metals, (11,736 pieces per acre per year), which were also the second fastest accumulating material at rural rest areas, but not in the top five for urban rest areas.

Both urban and rural rest areas shared three other fastest accumulating materials: other paper, other plastic, and food wrappers and snack bags.

Figure 46. Top five fastest accumulating material types at rest areas, by piece.



For accumulation rates for each material type measured in this study, see *Appendix G. Detailed Composition Results.*

LITTER SNAPSHOT

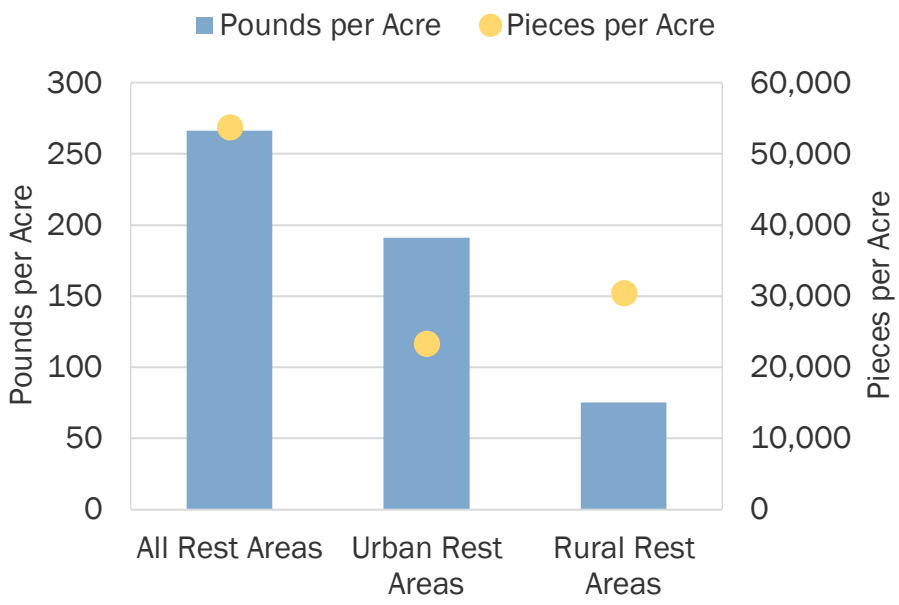
Overall, 61,288.6 pounds, or 12.4 million pieces, are estimated to be littered in Washington rest areas (Table 28). This is equivalent to 266.5 pounds of litter, or 53,750 pieces of litter per acre at rest areas in Washington (Figure 47).

Urban rest areas had more litter than rural on-off ramp in pounds per acre, while rural areas had more litter in pieces per acre (Figure 47). Urban rest areas had double the amount of litter than rural rest areas.

Table 28. Snapshot of litter levels for rest areas, by pound and by piece.

	Pounds	Pieces
All Rest Areas	61,289	12,362,604

Figure 47. Litter levels per acre for rest areas, by pound and by piece.



Litter Composition by Material Class

POUNDS PER ACRE

Other materials make up 37.9% of pounds of litter at rest areas overall, making it the most commonly littered material class by pound (Table 29).

Results were similar between urban and rural rest areas, with some exceptions (Table 30 and Table 31). Rural rest areas had a higher percentage of smoking items while urban rest areas had higher percentages of CDL waste (construction, demolition, and land clearing).

PIECES PER ACRE

In pieces, plastic was the most commonly littered material class, accounting for 33.7% of all pieces littered rest areas (Table 29). It was the most common material class at urban rest areas, accounting for 42.6% of litter pieces (Table 30). The plastic class primarily consists of food and beverage packaging, which Ecology considers to be littered intentionally by motorists and pedestrians. Cigarette butts were the most common material class at rural rest areas, making up 45.1% of litter pieces (Table 31).

Table 29. Snapshot of litter composition by material class for all rest areas, by pound and by piece.

Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	7.4%	0.5%	19.8	16.2%	1.7%	8,698
Plastic	12.8%	1.2%	34.2	33.7%	4.1%	18,095
Glass	3.0%	0.8%	8.0	1.3%	0.4%	695
Metal	2.8%	0.5%	7.6	4.8%	0.8%	2,576
Smoking	13.4%	2.3%	35.7	31.3%	5.6%	16,847
Organics	2.1%	0.8%	5.6	1.5%	0.7%	814
CDL Waste	19.2%	2.5%	51.2	1.8%	0.8%	978
Hazardous Materials	1.4%	0.5%	3.6	0.8%	0.4%	418
Other Materials	37.9%	3.3%	100.9	8.6%	1.5%	4,629
TOTAL	**100.0%**		**266.5**	**100.0%**		**53,750**

Table 30. Snapshot of litter composition by material class for urban rest areas, by pound and by piece.

Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	8.9%	0.7%	17.1	22.4%	0.9%	5,220
Plastic	11.1%	0.6%	21.2	42.6%	0.7%	9,925
Glass	3.1%	0.5%	6.0	2.3%	0.3%	544
Metal	2.4%	0.2%	4.6	6.0%	0.3%	1,410
Smoking	8.1%	1.6%	15.4	13.4%	0.9%	3,123
Organics	1.2%	0.3%	2.2	0.2%	0.0%	42
CDL Waste	23.5%	3.1%	44.8	2.3%	0.2%	540
Hazardous Materials	1.3%	1.0%	2.6	1.0%	0.2%	224
Other Materials	40.3%	1.5%	77.1	9.8%	0.5%	2,297
TOTAL	**100.0%**		**191.0**	**100.0%**		**23,325**

Table 31. Snapshot of litter composition by material class for rural rest areas, by pound and by piece.

Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	3.6%	1.9%	2.7	11.4%	3.2%	3,478
Plastic	17.2%	4.6%	13.0	26.9%	8.3%	8,171
Glass	2.6%	3.2%	2.0	0.5%	0.8%	152
Metal	3.9%	1.9%	3.0	3.8%	1.6%	1,166
Smoking	26.9%	8.8%	20.3	45.1%	11.2%	13,724
Organics	4.5%	3.0%	3.4	2.5%	1.5%	772

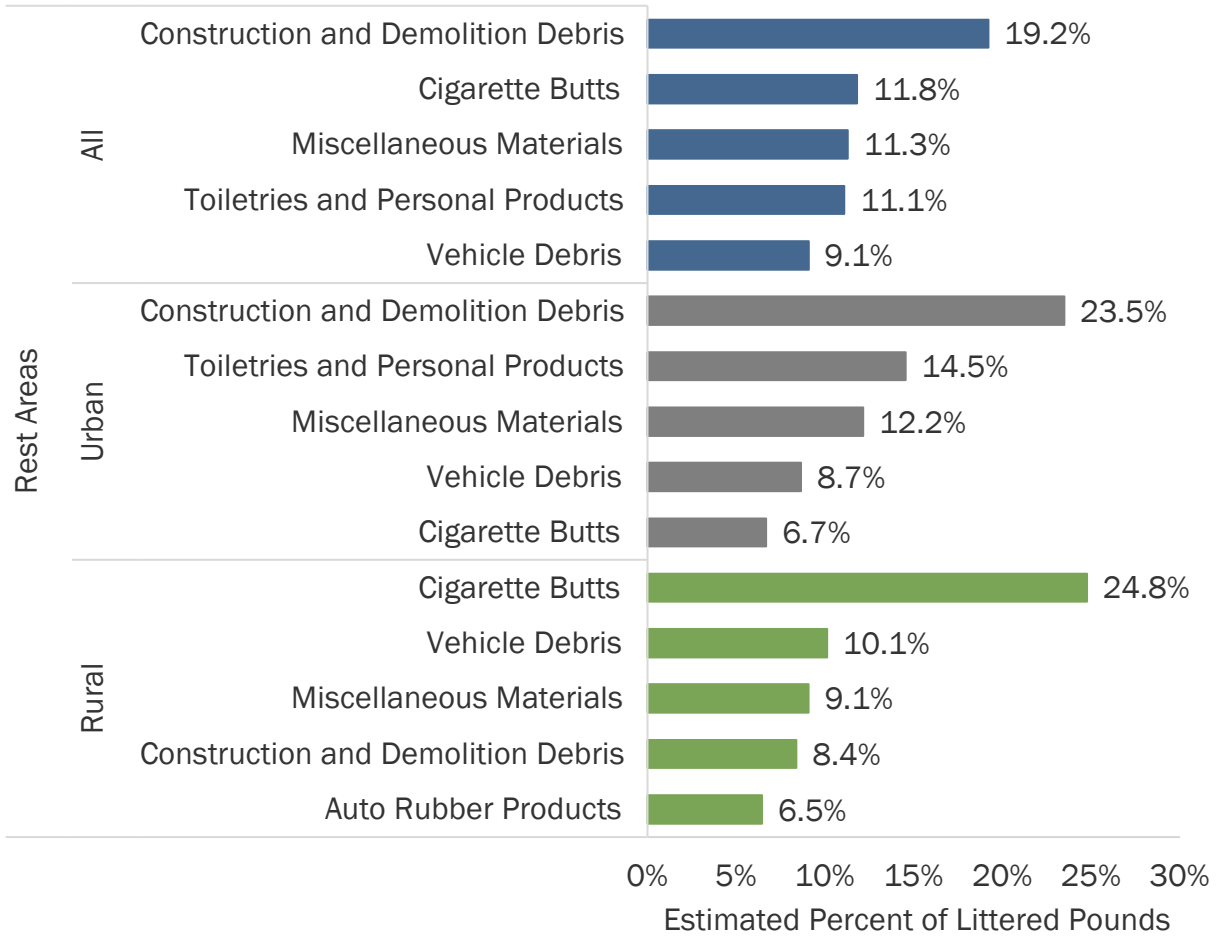
Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
CDL Waste	8.4%	9.0%	6.3	1.4%	1.6%	438
Hazardous Materials	1.4%	1.5%	1.0	0.6%	0.7%	194
Other Materials	31.6%	12.6%	23.8	7.7%	3.0%	2,331
TOTAL	**100.0%**		**75.5**	**100.0%**		**30,426**

Top Five Most Common Material Types

POUNDS PER ACRE

Both urban and rural rest areas had vehicle debris, cigarette butts, construction and demolition debris, and miscellaneous materials in their top five most commonly littered material types (Figure 48). Nearly a quarter (23.5%) of littered pounds at urban rest areas was construction and demolition debris, while cigarettes made up a quarter (24.8%) of the pounds of litter at rural rest areas.

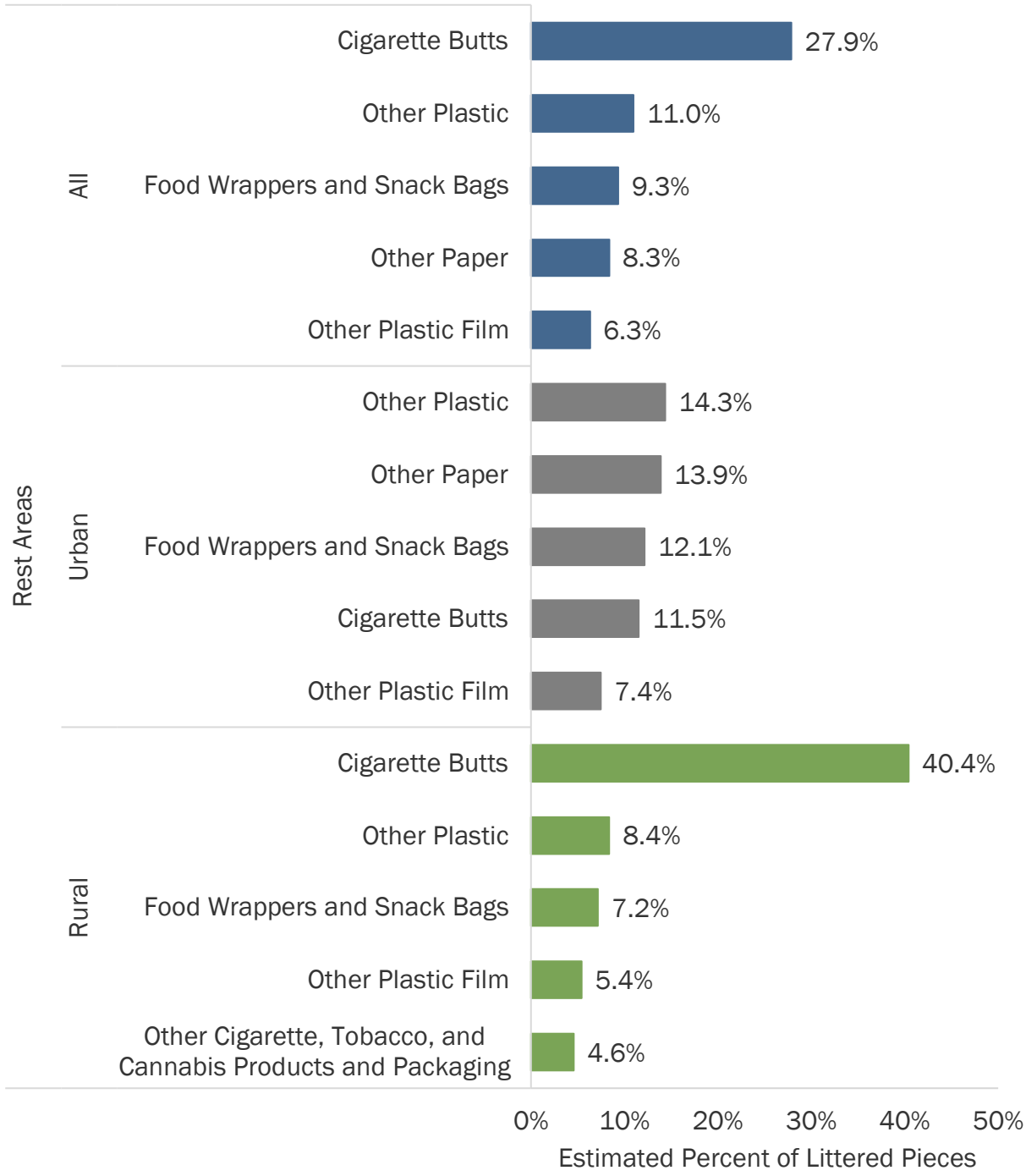
Figure 48. Top five most common material types at rest areas, by pound.



PIECES PER ACRE

The most commonly littered material types for urban and rural rest areas were more similar when considering pieces than pounds. Other plastic film, other plastic, cigarette butts, and food wrappers and snack bags were among the top five most common materials littered in both urban and rural rest areas, by piece (Figure 49). Cigarette butts made up 40.4% of litter pieces at rural rest areas—far more than at urban rest areas and more than any other material type at rural rest areas.

Figure 49. Top five most common material types at rest areas, by piece.



For estimated composition percentages for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

State and County Parks

This section describes yearly litter accumulation rates and litter levels during the litter snapshot for state and county parks overall. We sampled a mix of urban and rural parks, but the number of samples in each area is not large enough to report separately.

ACCUMULATION RATES

State and county parks accumulate litter at a rate of 10.6 million pounds per year, or 3,404.0 million pieces per year (Table 32). Per acre, this is 126.6 pounds of litter per year, or 40,578 pieces per year (Table 32).

Table 32. Yearly litter accumulation rate for all state and county parks, by pound and by piece.

	Pounds per Year	Pieces per Year	Pounds per Acre per Year	Pieces per Acre per Year
State and County Parks	10,617,224	3,403,996,166	126.6	40,578

Litter Accumulation by Material Class

POUNDS PER ACRE PER YEAR

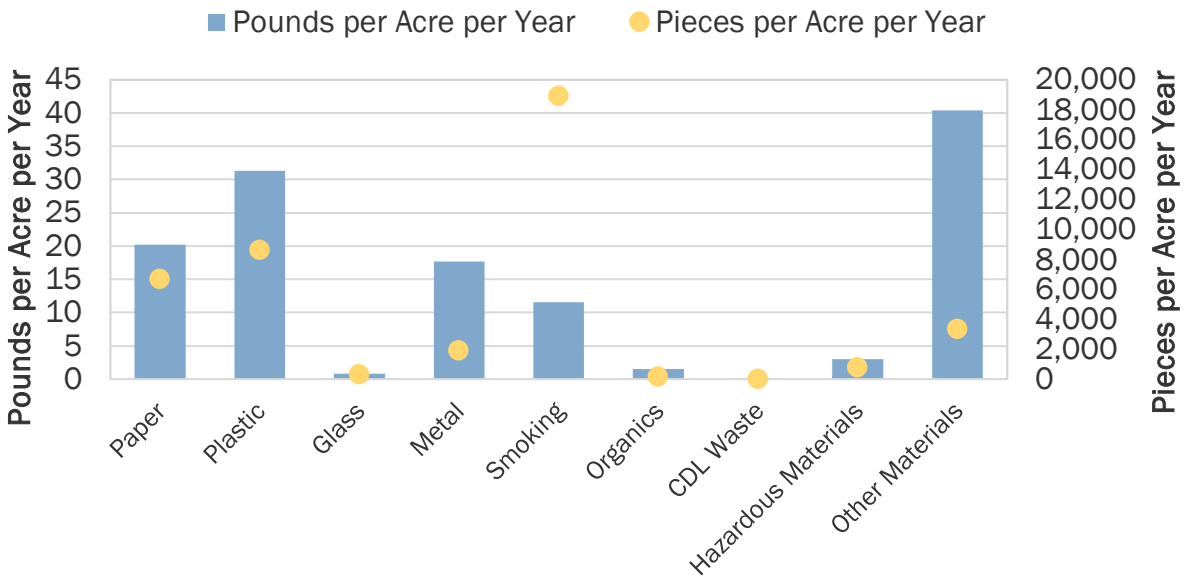
Litter items classified as other materials accumulate at the fastest rate in state and county parks, per acre and by pound (40.4 pounds per acre per year; Figure 50). This material class includes items such as auto rubber products; vehicle debris; and textiles, clothing, and shoes.

Plastic materials also accumulate quickly at state and county parks, at a rate of 31.3 pounds per acre per year. Paper accumulates at 20.2 pounds per acre per year while metal accumulates at 17.7 pounds per acre per year in state and county parks.

PIECES PER ACRE PER YEAR

Materials associated with smoking accumulate the fastest at state and county parks, at a rate of 18,875 pieces per acre per year (Figure 50). Plastic materials accumulate 8,605 pieces per acre per year, and paper is close behind at 6,655 pieces per acre per year.

Figure 50. Yearly litter accumulation rates per acre for all state and county parks, by material class and by pound and by piece.



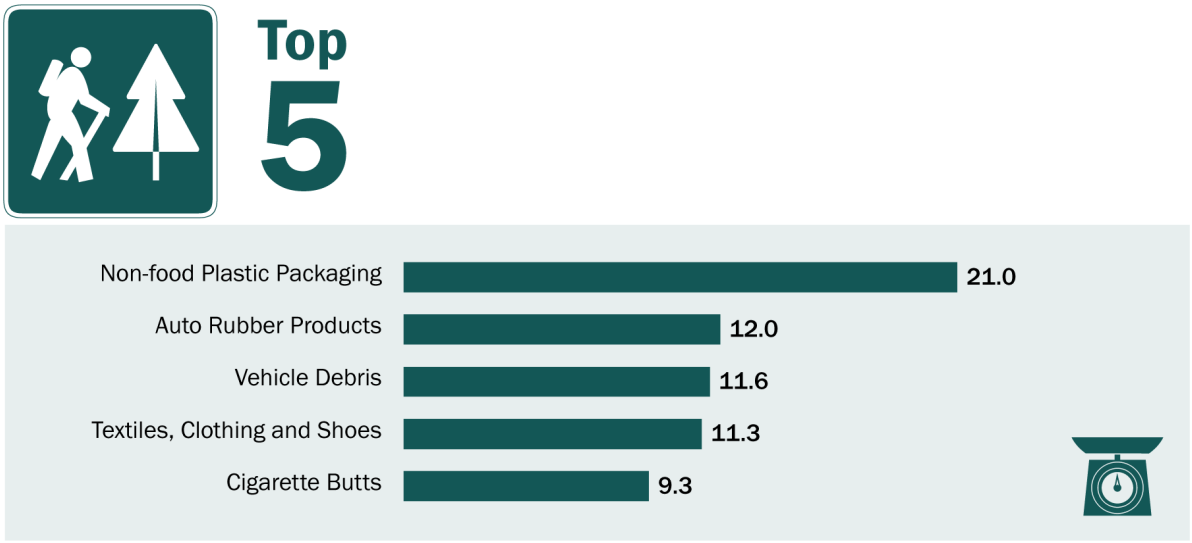
Top Five Fastest Accumulating Material Types

POUNDS PER ACRE PER YEAR

Non-food plastic packing is the fastest accumulating material type at state and county parks, at a rate of 21.0 pounds per acre per year. This material type includes plastic boxes, wrappings, bags, or other plastic packaging materials not used to package food items.

The next three fastest accumulating materials have similar accumulation rates: auto rubber products (12.0 pounds per acre per year); vehicle debris (11.6 pounds per acre per year); and textiles, clothing, and shoes (11.3 pounds accumulated per acre per year).

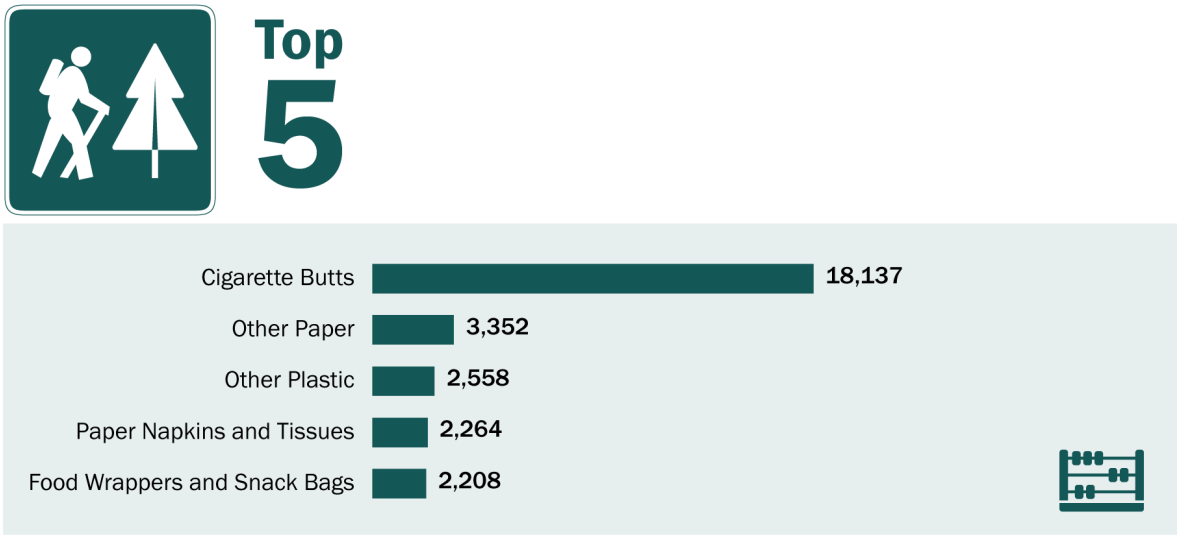
Figure 51. Top five fastest accumulating material types at state and county parks, by pound.



PIECES PER ACRE PER YEAR

Cigarette butts are the fastest accumulating material type in state and county parks (Figure 52). The other fastest accumulating material types at all rest areas are other paper (3,352 pieces per acre per year), while the other five material types are relatively similar in terms of accumulation. Other plastic accumulates 2,558 pieces per acre per year; paper, napkins, and tissues accumulate 2,264 pieces per acre per year; and food wrappers and snack bags accumulate 2,208 pieces per acre per year.

Figure 52. Top five fastest accumulating material types at state and county parks, by piece.



For accumulation rates for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

LITTER SNAPSHOT

Overall, 18.7 million pounds of litter, or 1,130.5 million pieces, are estimated to be in state and county parks (Table 33).

Table 33. Snapshot of litter levels for state and county parks, by pound and by piece.

	Pounds	Pieces	Pounds per Acre	Pieces per Acre
State and County Parks	18,711,621	1,130,537,356	223.1	13,477

Litter Composition by Material Class

POUNDS PER ACRE

Construction and demolition materials are 79.0% of litter by weight at state and county parks, making it the most commonly littered material class by pound (Table 34). The remaining materials made up a smaller amount of the total litter by pound, with glass (4.2%) and other materials (6.1%) making up more than other materials.

PIECES PER ACRE

When measured by piece, plastic was the most commonly littered material class, accounting for 30.2% of all pieces littered in state and county parks. The plastic class primarily consists of food and beverage packaging, which Ecology considers to be littered intentionally by motorists and pedestrians. Construction and demolition materials were also common, making up 20.3% of total pieces at state and county parks. However, the range of possible values around this estimate is quite large (+/- 19.9%), indicating this is not a very precise estimate.

Table 34. Snapshot of litter composition by material class for all state and county parks, by pound and by piece.

Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	0.8%	0.6%	1.8	11.4%	5.0%	1,536
Plastic	2.7%	1.2%	6.0	30.2%	11.1%	4,075
Glass	4.2%	0.6%	9.3	0.6%	0.6%	79
Metal	2.6%	2.8%	5.9	7.8%	6.5%	1,057
Smoking	2.3%	1.2%	5.2	15.7%	7.1%	2,113
Organics	2.2%	1.4%	4.9	2.6%	2.1%	346

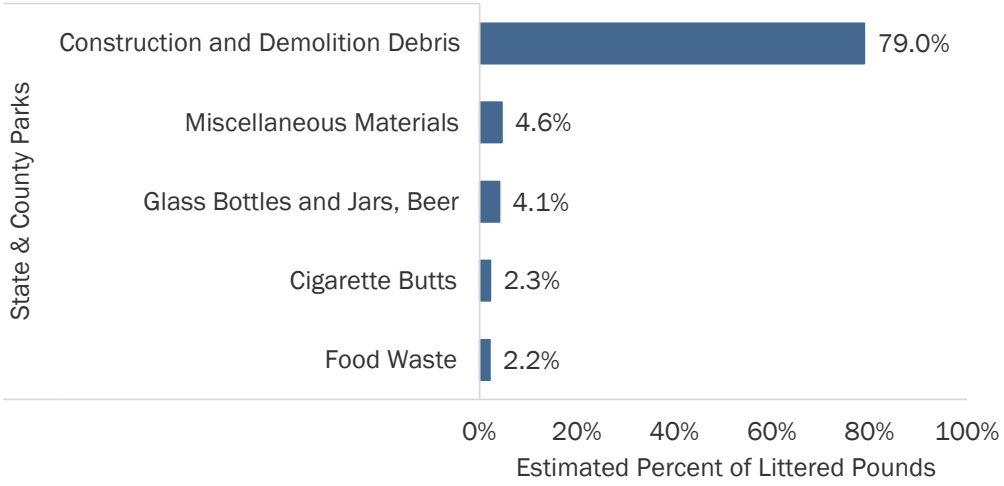
Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
CDL Waste	79.0%	5.8%	176.1	20.3%	19.9%	2,741
Hazardous Materials	0.1%	0.1%	0.2	0.6%	1.1%	81
Other Materials	6.1%	5.0%	13.7	10.8%	7.2%	1,449
TOTAL	**100.0%**		**223.1**	**100.0%**		**13,477**

Top Five Most Common Material Types

POUNDS PER ACRE

By weight, construction and demolition was by far the biggest contributor to litter at state and county parks, accounting for 79% of total pounds. Miscellaneous materials and glass bottles and jars, beer made up a much smaller amount of litter.

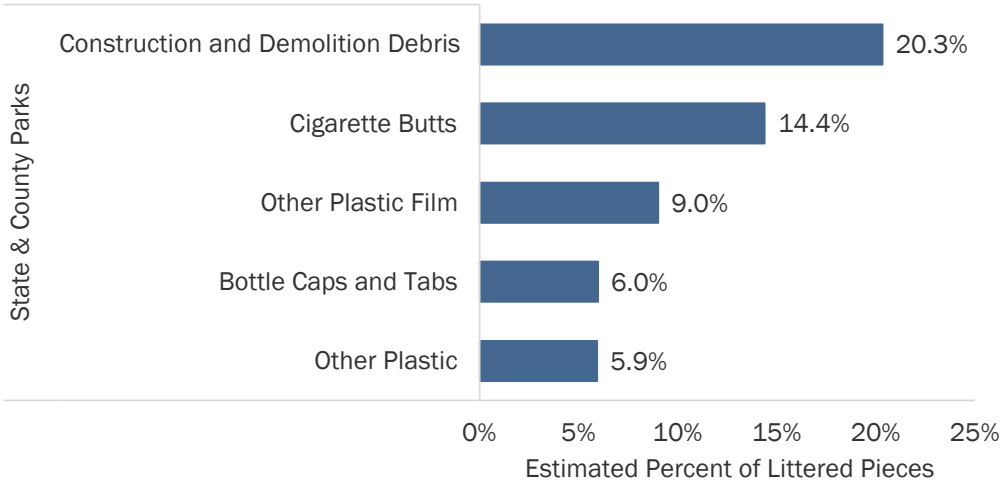
Figure 53. Top five most common material types at state and county parks, by pound.



PIECES PER ACRE

Measured by piece, the different litter categories are more similar in percentage. While construction and demolition debris accounted for 20.3% of total pieces, cigarette butts were 14.4%, showing that while they are light and therefore do not show up as a major contributor by weight, cigarette butts are still widely littered.

Figure 54. Top five most common material types at state and county parks, by piece.



For estimated composition percentages for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

DNR and DFW Lands

This section describes yearly litter accumulation rates and litter levels during the litter snapshot for high-use parts of Department of Natural Resources (DNR) and Department of Fish and Wildlife (DFW). These are publicly owned recreation lands administered by the DNR and DFW. High-use areas include parking areas, campsites, trails, and areas near permanent restrooms or other buildings. This site type is considered to represent only rural areas.

ACCUMULATION RATES

DNR and DFW lands accumulate litter at a rate of 946,165 pounds per year, or 141.7 million pieces per year (Table 35).

Table 35. Yearly litter accumulation rate on DNR and DFW lands, by pound and by piece.

	Pounds per Year	Pieces per Year	Pounds per Acre per Year	Pieces per Acre per Year
DNR and DFW Lands	946,165	141,717,369	448.0	67,101

Litter Accumulation by Material Class

POUNDS PER ACRE PER YEAR

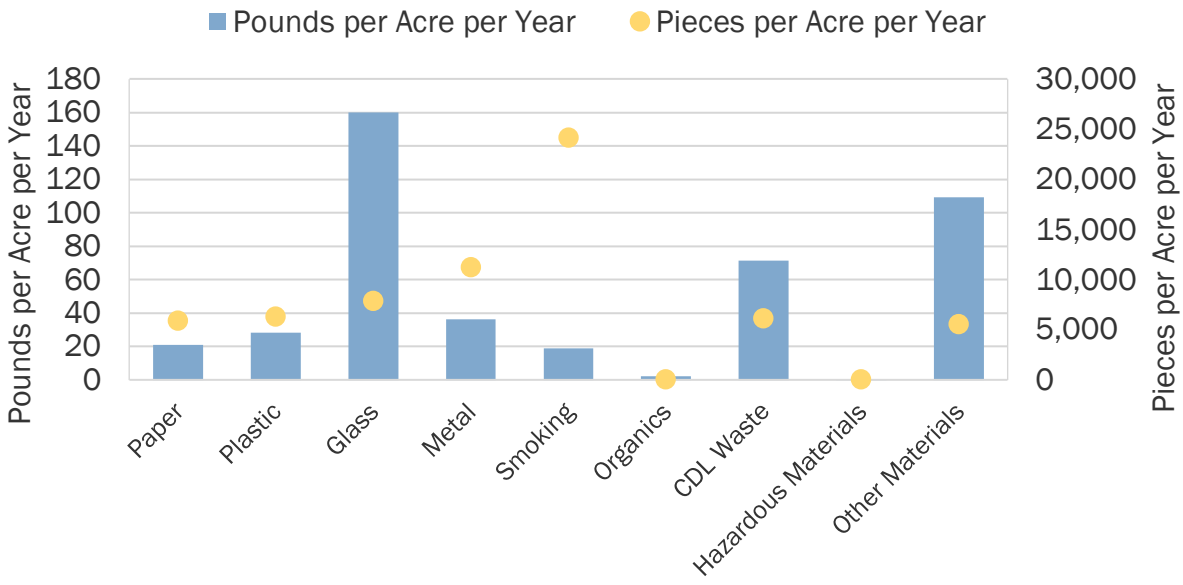
Glass accumulates at the fastest rate in DNR and DFW lands, per acre and by pound (159.9 pounds per acre per year; Figure 55). This category includes glass bottles and containers and other glass containers.

The second fastest accumulating litter item is other materials, at a rate of 109.4 pounds per acre per year. CDL waste also accumulates quickly, at 71.4 pounds per acre per year.

PIECES PER ACRE PER YEAR

Materials associated with smoking accumulate the fastest at DNR and DFW lands, at rates of 24,165 pieces per acre per year (Figure 55). Metal materials accumulate 11,232 pieces per acre per year.

Figure 55. Yearly litter accumulation rates per acre for all DNR and DFW lands, by material class and by pound and by piece.

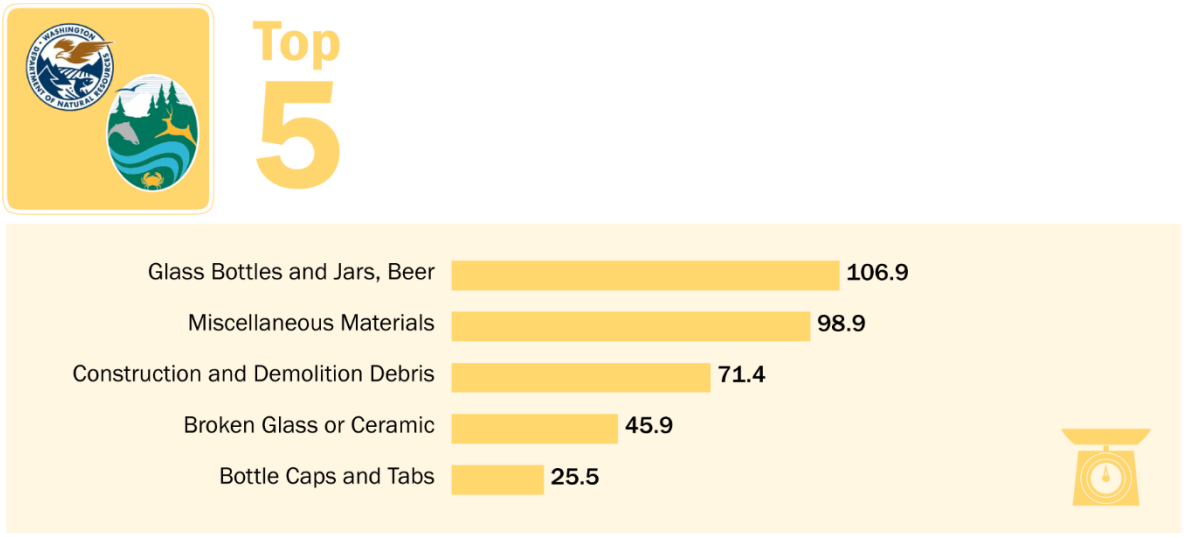


Top Five Fastest Accumulating Material Types

POUNDS PER ACRE PER YEAR

Glass bottles and jars, beer is the fastest accumulating material type at DNR and DFW lands, at a rate of 106.9 pounds per acre per year (Figure 56). This material type includes glass beer bottles and bottles and jars for other malt beverages. Miscellaneous materials also accumulate quickly, at 98.9 pounds per acre per year.

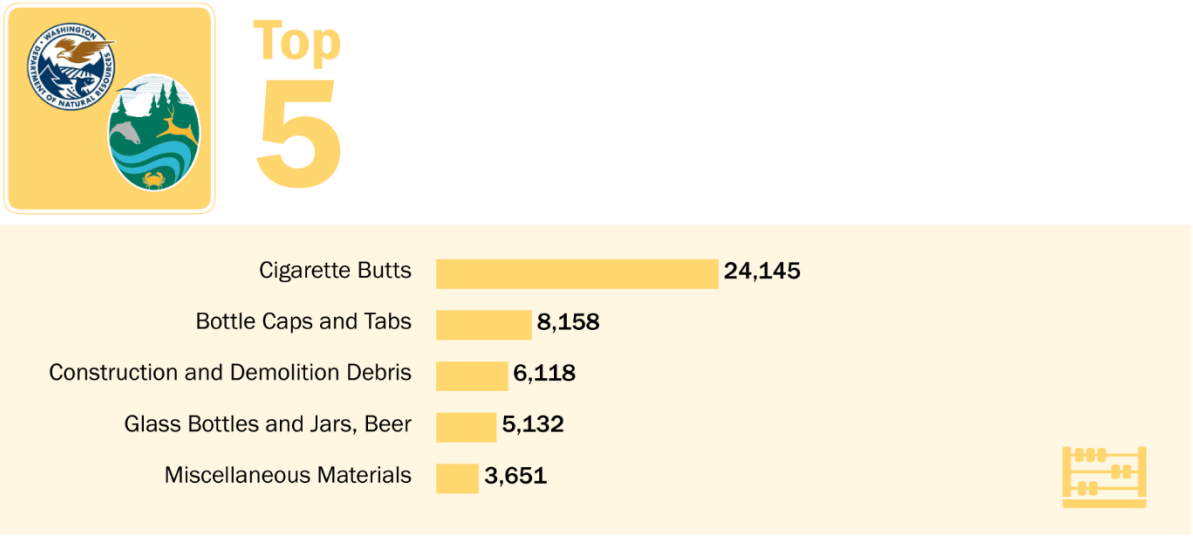
Figure 56. Top five fastest accumulating material types on DNR and DFW lands, by pound.



PIECES PER ACRE PER YEAR

Cigarette butts are the fastest accumulating material type in DNR and DFW lands, at 24,145 pieces per acre per year (Figure 57). The other fastest accumulating material types at DNR and DFW lands are bottle caps and tabs (8,158 pieces per acre per year) and construction and demolition debris (6,118 pieces per acre per year).

Figure 57. Top five fastest accumulating material types on DNR and DFW lands, by piece.



For accumulation rates for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

LITTER SNAPSHOT

Overall, 602,817.1 pounds of litter, or 88.2 million pieces, are estimated to be in DNR and DFW lands (Table 36).

Table 36. Snapshot of litter levels for DNR and DFW lands, by pound and by piece.

	Pounds	Pieces	Pounds per Acre	Pieces per Acre
DNR and DFW Lands	602,817	88,225,406	285.4	41,773

Litter Composition by Material Class

POUNDS PER ACRE

Construction and demolition waste was the most commonly littered material class by pound, making up 36.4% of pounds of litter for all DNR and DFW lands (Table 37). Glass (19.0%) and paper (10.8%) were the next two largest items per pound per acre.

PIECES PER ACRE

In pieces, plastic was by far the most commonly littered material class, accounting for 39.7% of all pieces littered at DNR and DFW lands. The next highest material class by pieces per acre was metal (15.1%), smoking (13.4%), paper (12.1%), and glass (10.4%).

Table 37. Snapshot of litter composition by material class for all DNR and DFW lands, by pound and by piece.

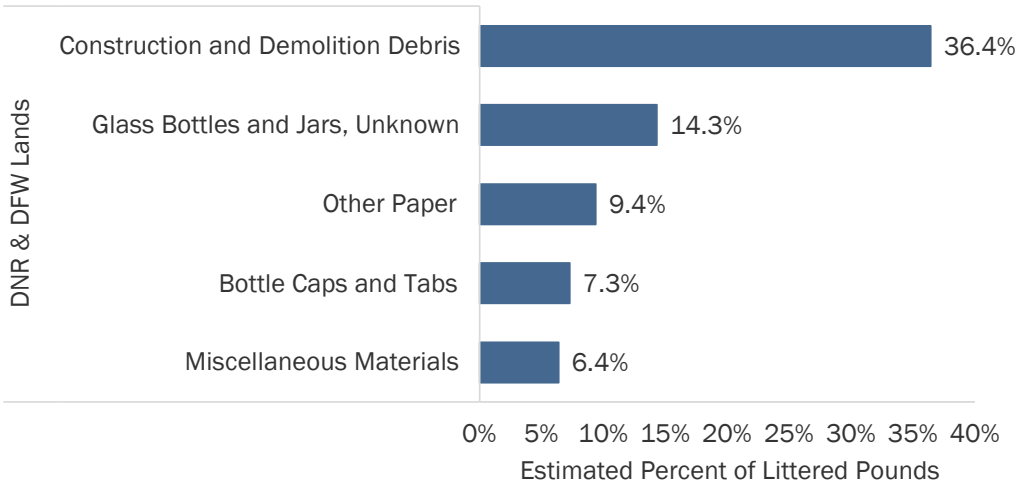
Material Class	Est. %	+ / -	Est. Pounds per Acre	Est. %	+ / -	Est. Pieces per Acre
Paper	10.8%	14.5%	30.7	12.1%	17.4%	5,053
Plastic	8.9%	11.0%	25.4	39.7%	10.7%	16,584
Glass	19.0%	34.4%	54.4	10.4%	14.1%	4,364
Metal	8.1%	3.8%	23.1	15.1%	5.0%	6,322
Smoking	2.5%	2.1%	7.0	13.4%	4.5%	5,601
Organics	0.3%	0.3%	0.8	1.1%	1.4%	440
CDL Waste	36.4%	47.5%	104.0	3.1%	5.4%	1,315
Hazardous Materials	3.5%	1.5%	9.9	0.0%	0.0%	5
Other Materials	10.6%	9.1%	30.2	5.0%	3.9%	2,089
TOTAL	**100.0%**		**285.4**	**100.0%**		**41,773**

Top Five Most Common Material Types

POUNDS PER ACRE

Construction and demolition debris was the most common litter item, making up 36.4% of total pounds at DNR and DFW lands (Figure 58). Per piece, construction and demolition material tends to be heavier than other types of litter.

Figure 58. Top five most common material types on DNR and DFW lands, by pound.

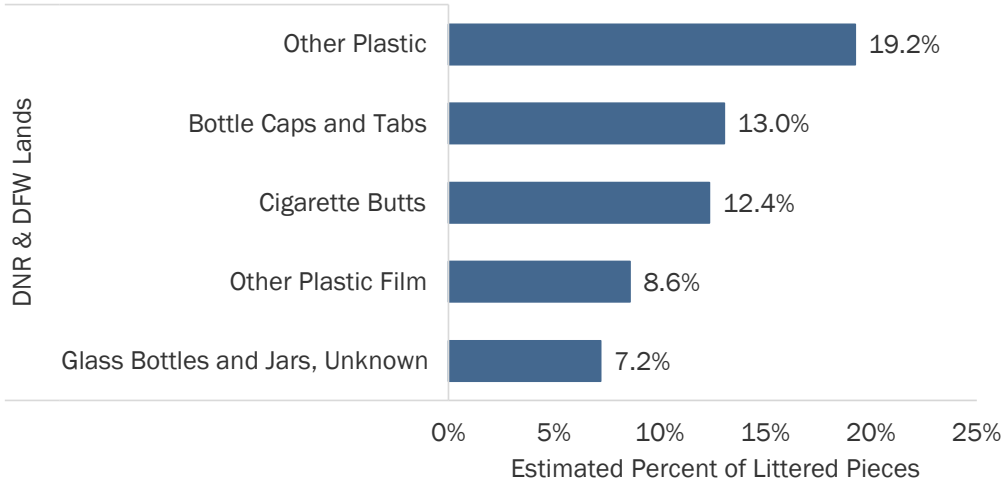


PIECES PER ACRE

In pieces, other plastic was the most-littered item, making up 19.2% of total pieces at DNR and DFW lands (Figure 59). Bottle caps and tabs (13.0%) and cigarette butts (12.4%) were the next most common material type, in pieces. Other plastics and cigarette butts are lighter materials, so neither material type was among the top five items by pound.

Bottle caps and tabs, as well as glass bottles and jars, unknown, were in the top five most common material types by both pound and piece.

Figure 59. Top five most common material types on DNR and DFW lands, by piece.



For estimated composition percentages for each material type measured in this study, see *Appendix G. Detailed Composition Results*.

Additional Analyses

This section adds additional analyses to the main results for litter in Washington State. The section explains in detail unsecured loads, litter tax findings and recommendations, litter and environmental equity, and comparisons with other studies.

Unsecured Loads

To estimate litter amount by source, we recategorized material types based on the type of road (urban or rural), and whether Ecology considered them as more likely to have come from unsecured loads, vehicle debris, or intentional littering (see *Appendix E. Material List and Reclassifications*). Material types associated with hauling unsecured or uncovered loads include construction and demolition debris, miscellaneous materials, cardboard, other metal, household/camping items/office items, and textiles, clothing, and shoes. We generally followed the same recategorization used in the 1999 statewide study but also broke out vehicle and tire debris into its own category in 2022. We cannot be sure why littering happened without observing the act, so this recategorization provides the best estimate given the available information.

In 2022, an estimated 38.5% of pounds and 24.2% of pieces of litter per year along all roadways come from materials commonly associated with unsecured loads (Figure 60). This adds up to 7.1 million pounds and 450.4 million pieces per year (Table 38).

On urban roads, an estimated 37.3% of pounds and 20.2% of pieces of litter per year come from materials commonly associated with unsecured loads (Figure 60). This adds up to 3.7 million pounds and 242.6 million pieces per year (Table 38).

On rural roads, an estimated 32.2% of pounds and 22.8% of pieces of litter per year come from materials commonly associated with unsecured loads (Figure 60). This adds up to 3.5 million pounds and 207.8 million pieces per year (Table 38).

According to the 1999 study, “items associated with hauling uncovered loads (tires, wood products, other metal and composites, or automotive parts and other organics, including items such as yard debris, stumps, firewood, and branches) made up almost 40% of roadside litter.” In the current study, items considered to be coming from either unsecured loads or vehicle and tire debris together made up 52.2% of litter by weight.

Figure 60. Yearly litter accumulation by likely source.

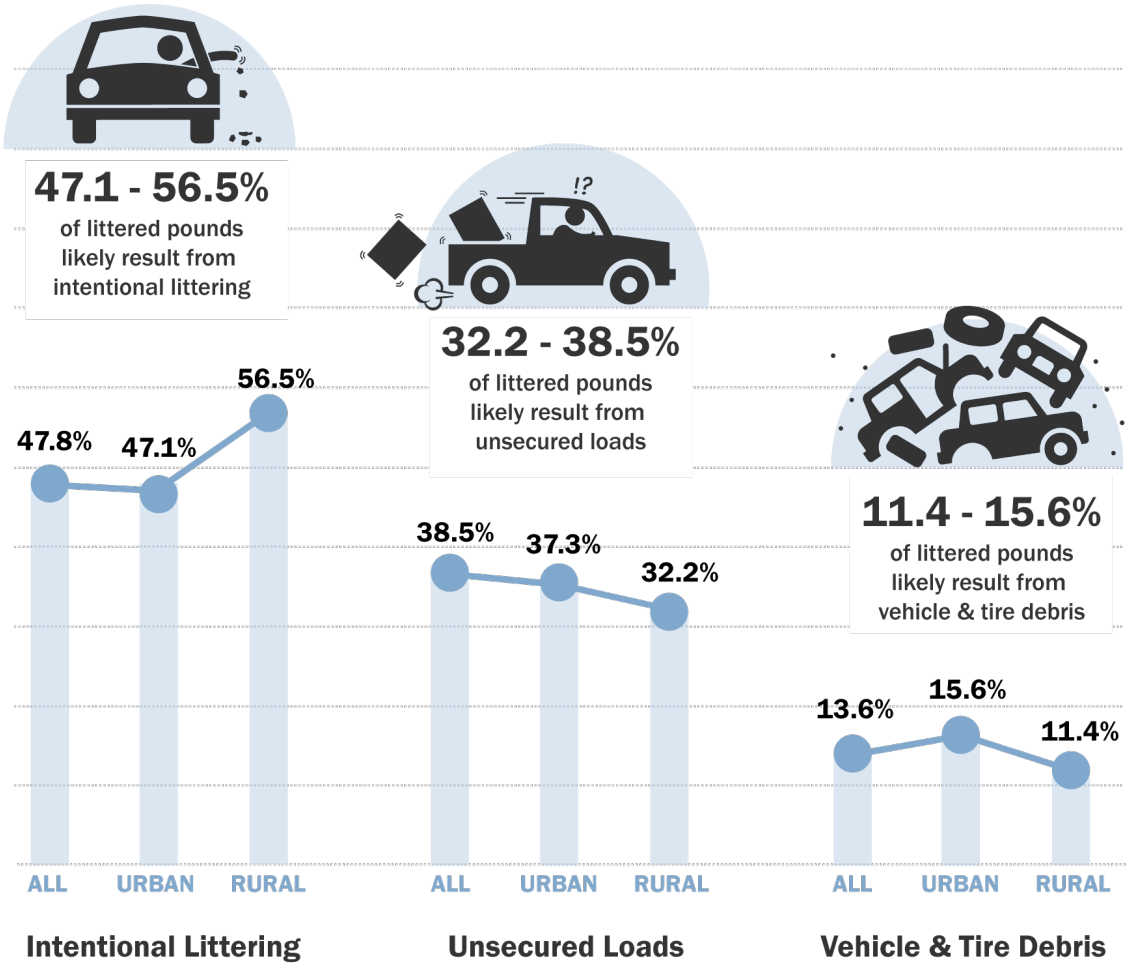


Table 38. Yearly litter accumulation by likely source.

Roadway type and Likely Source of Littering	Est. %	Pounds per Year	Est. %	Pieces per Year
All Roadways: All Sources	**100.0%**	**18,496,103**	**100.0%**	**1,858,555,848**
All Roadways: Intentional Littering	47.8%	8,846,730	72.6%	1,349,291,571
All Roadways: Unsecured Loads	38.5%	7,126,729	24.2%	450,379,684
All Roadways: Vehicle and Tire Debris	13.6%	2,522,644	3.2%	58,884,593
Urban Roadways: All Sources	**100.0%**	**9,852,447**	**100.0%**	**1,199,063,608**
Urban Roadways: Intentional Littering	47.1%	4,640,031	77.7%	931,708,298
Urban Roadways: Unsecured Loads	37.3%	3,672,654	20.2%	242,604,778
Urban Roadways: Vehicle and Tire Debris	15.6%	1,539,762	2.1%	24,750,533
Rural Roadways: All Sources	**100.0%**	**8,643,656**	**100.0%**	**659,492,240**
Rural Roadways: Intentional Littering	56.5%	4,206,699	72.1%	417,583,273
Rural Roadways: Unsecured Loads	32.2%	3,454,074	22.8%	207,774,907
Rural Roadways: Vehicle and Tire Debris	11.4%	982,882	5.2%	34,134,060

Litter Tax

Washington's litter tax is a tax on 13 types of items typically found in roadside litter.[15] When litter tax revenues are not diverted by the state legislature, Ecology uses the funds for litter prevention, litter cleanup, and recycling. The litter tax rate and 13 covered items have not changed in over 50 years. Current revenues do not cover what it costs to clean up the amounts or types of litter we find today.

LITTER TAX HISTORY AND STUDY METHODS

Washington's litter tax was established in 1971 to help meet the costs of litter cleanup statewide. The tax rate was set by dividing the amount the state spent on litter cleanup in 1970 by the dollar value in the state of manufacturing, wholesaling, and retailing the 13 products that studies at the time identified as being most commonly found in litter. The litter tax generates approximately $14–$15 million annually, which goes toward the Waste Reduction, Recycling and Litter Control Account (WRRLCA), Ecology is mandated to split WRRLCA 3 ways.[16] Ecology spends 40% on waste reduction and recycling, then another 40% is spent on litter cleanup and prevention programs through Ecology and state agency agreements. The last 20% goes to local government litter cleanup and prevention efforts. Manufacturers, wholesalers, and retailers pay 0.015% on the sale of products listed below:[17]

- Food for human or pet consumption
- Groceries
- Cigarettes and tobacco products
- Soft drinks and carbonated beverages
- Beer and other malt beverages
- Wine
- Newspapers and magazines
- Household paper and paper products
- Glass containers
- Metal containers
- Plastic or fiber containers made of synthetic material
- Cleaning agents and toiletries
- Non-drug drugstore sundry items

[15] https://ecology.wa.gov/Waste-Toxics/Solid-waste-litter/Litter/Paying-for-litter
[16] https://ecology.wa.gov/Waste-Toxics/Solid-waste-litter/Litter/Paying-for-litter
[17] https://dor.wa.gov/taxes-rates/other-taxes/litter-tax

For the 2022 statewide litter study, we used Ecology's guidance and information received from the Washington State Department of Revenue to recategorize the 94 material types we measured by whether they were more or less likely to be taxable under the litter tax.

- **Litter tax materials**: 68 material types more likely to be covered by the litter tax [18]
- **Non-litter tax materials**: 26 material types unlikely to be covered by the litter tax

Appendix E. Material List and Reclassifications presents definitions for the 13 products covered by the litter tax and how we reclassified the full list of study material types based on guidance from Ecology and information received from the Washington State Department of Revenue.

For site types combined and individual site type, this section presents estimates of the share of litter tax materials compared to non-tax materials as well as the top three litter tax materials and non-litter tax materials.

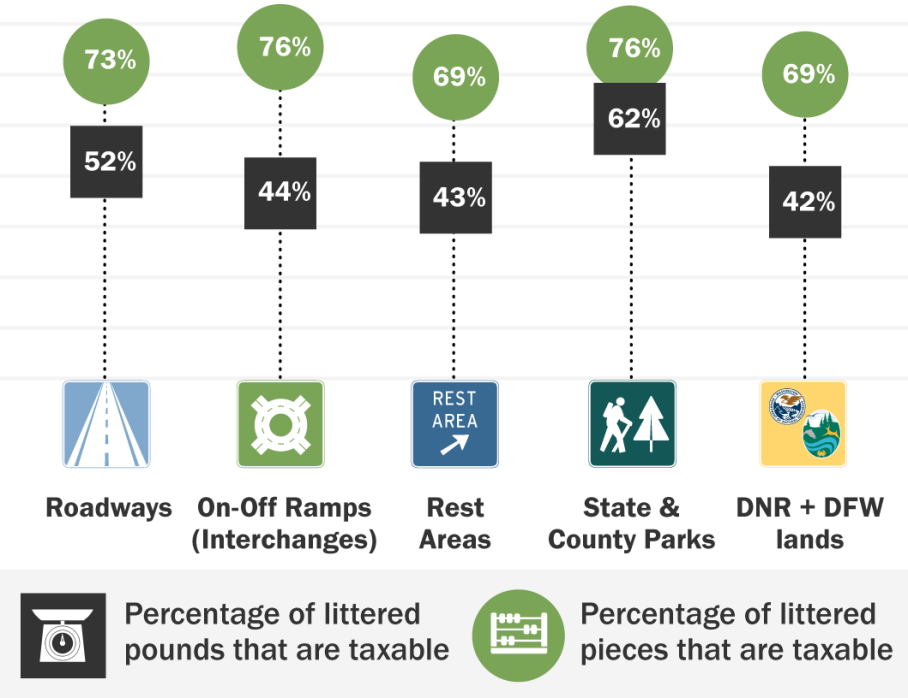
LITTER TAX FINDINGS

This section discusses items covered under Washington's litter tax, and the amount, in pounds, of total litter collected covered by this tax. The findings present results for roadways, on-off ramps, rest areas, recreation areas, and state and county parks. We present results for both pounds and pieces in this section. Because some taxed materials, such as cigarette butts are often smaller and lighter than non-taxed materials, such as CDL debris, they make up a larger share of the litter when measured in pieces instead of pounds.

Today, **69–76% of littered pieces** are covered by the litter tax, while only **42–62% of littered pounds** are covered. This distinction is important because of the disposal costs associated with litter cleanup efforts for non-covered items. Many of the items covered by the tax—such as cigarette butts, food wrappers, and snack bags—are lightweight, while many of the heavier littered items are not taxed. This gap in coverage is important because the cost to dispose of collected litter is based on pounds. The recommendations section at the end of this report discusses options for creating a more robust litter tax (see recommendation: *Reconsider Adequacy of Litter Tax Rate and Covered Items*).

[18] According to the guidance received from the Department of Revenue, a more detailed definition of litter tax materials such as nondrug drugstore sundry products does not exist and the department does not maintain a list of specific items subject to litter tax. The department advised that generally, nondrug drugstore sundry products include any products generally sold by a business selling prescription drugs that are not specifically excluded by definition or exempt under RCW 82.16.050.

Figure 61. Percent of littered pounds and pieces that are taxable, by location.



Overall

Litter tax materials make up 52.9% of pounds of litter and 75.0% of pieces on all site types combined each year (Table 39). However, 17.9 million pounds and 1,780.0 million pieces of litter on all site types combined are non-litter tax materials each year. Ecology and WSDOT use funds from the litter tax to clean up these littered materials from manufacturers or sources that do not pay the tax.

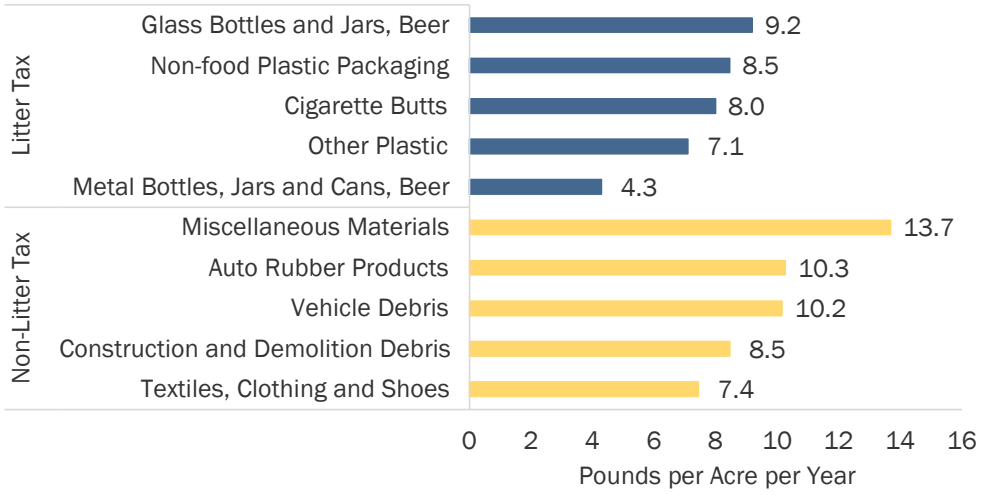
Table 39. Litter quantities by litter tax class for all site types combined.

Litter Tax Class	Litter Tax Materials	Non-Litter Tax Materials
Total pounds per year	20,129,132 pounds	17,928,079 pounds
Pounds per acre per year	82.4 pounds	73.4 pounds
Percentage of pounds	52.9%	47.1%
Total pieces per year	5,354,015,180 pieces	1,779,986,704 pieces
Pieces per acre per year	21,913 pieces	7,285 pieces
Percentage of pieces	75.0%	25.0%

By weight, the fastest accumulating materials on all site types combined are not covered by the litter tax: miscellaneous materials, auto rubber products, and vehicle debris (Figure 62).

Miscellaneous materials include pieces of litter smaller than 1 inch, and items that are hard to identify. The latter two materials could have dropped from uncovered loads; trucks hauling loose materials are exempt from covering their loads if they have 6 inches or more of free space above the materials in their truck bed.[19]

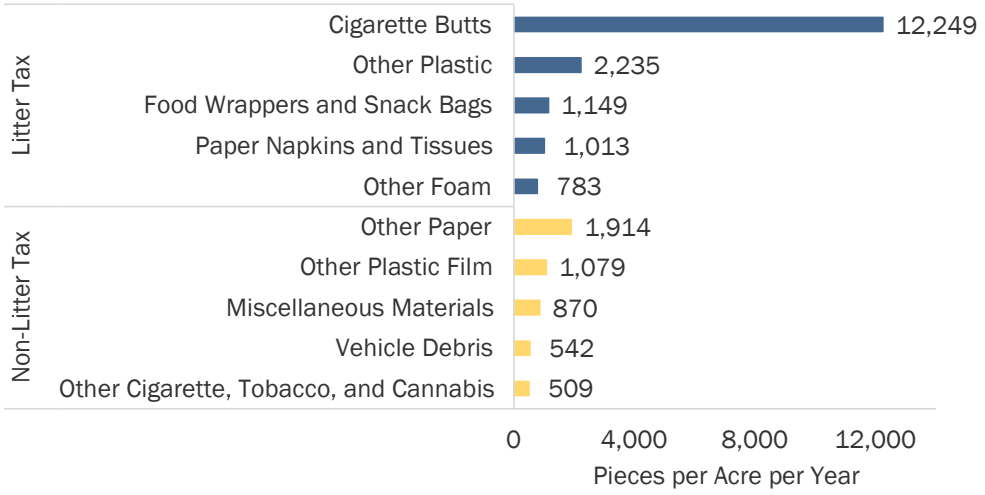
Figure 62. Top five fastest accumulating material types by litter tax class for all site types combined, by pound.



Cigarette butts are by far the fastest accumulating material by piece for all site types combined (12,249 pieces per mile per year), and they are covered by the litter tax (Figure 63). Other paper, other plastic film, and miscellaneous materials are among the fastest accumulating non-litter tax materials for all site types combined, by piece.

[19] https://app.leg.wa.gov/RCW/default.aspx?cite=46.61.655

Figure 63. Top five fastest accumulating material types by litter class for all site types combined, by piece.



Roadways

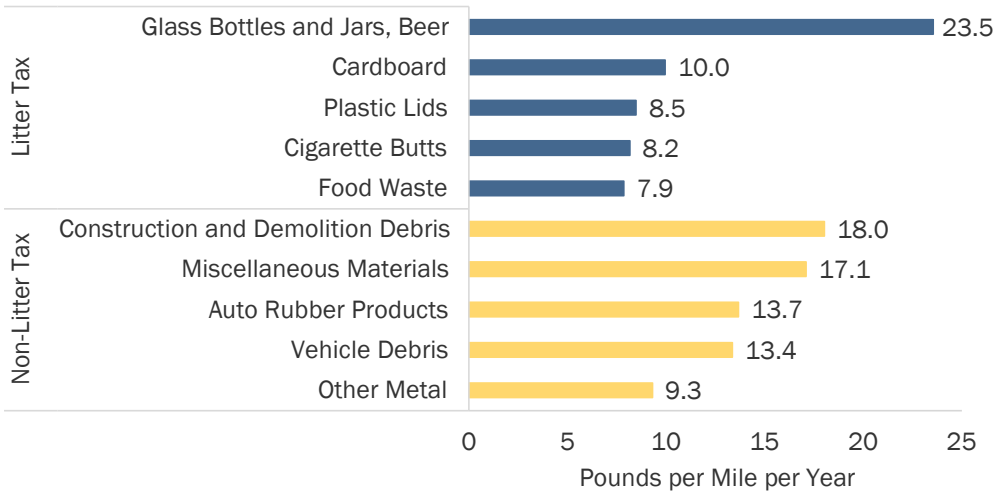
Litter tax materials made up 51.8% of pounds of litter and 72.9% of pieces along roadways, (Table 40). However, 8.9 million pounds and 503.3 million pieces of litter on roadways were non-litter tax materials.

Table 40. Litter quantities by litter tax class for all roadways.

Litter Tax Class	Litter Tax Materials	Non-Litter Tax Materials
Total pounds per year	9,581,984 pounds	8,914,119 pounds
Pounds per mile per year	118.3 pounds	110.0 pounds
Percentage of pounds	51.8%	48.2%
Total pieces per year	1,355,216,253 pieces	503,339,595 pieces
Pieces per mile per year	16,727 pieces	6,212 pieces
Percentage of pieces	72.9%	27.1%

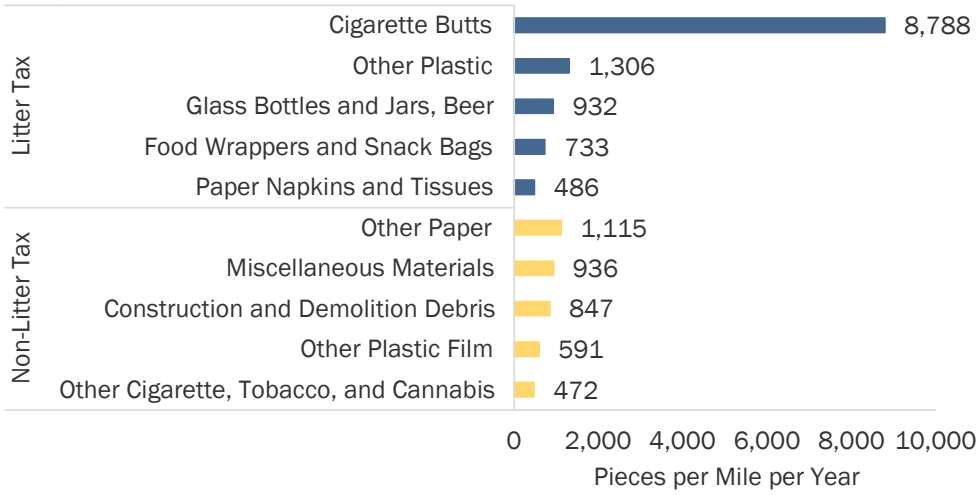
By weight, the fastest accumulating material on roadways—glass beer bottles and jars at 23.5 pounds per mile per year—is covered by the litter tax (Figure 64). The next four fastest accumulating materials are not covered by the litter tax: construction and demolition debris, miscellaneous materials, auto rubber products (which includes tire shreds), and vehicle debris.

Figure 64. Top five fastest accumulating material types by litter tax class for all roadways, by pound.



Cigarette butts are by far the fastest accumulating material by piece for roadways (8,788 pieces per mile per year), and they are covered by the litter tax (Figure 65). Other paper, miscellaneous materials, and construction and demolition debris are among the fastest accumulating non-litter tax materials for roadways, by piece.

Figure 65. Top five fastest accumulating material types by litter tax class for all roadways, by piece.



On-off Ramps (Interchanges)

Litter tax materials made up 44.2% % of pounds and 76.3% of pieces of litter along on-off ramps (Table 41). However, 4.4 million pounds and 405.2 million pieces of litter on on-off ramps were non-litter tax materials.

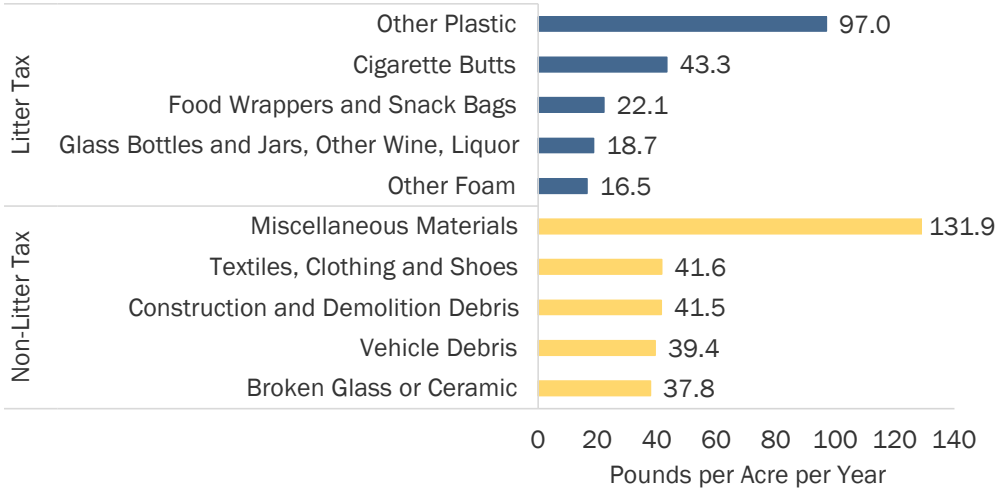
Table 41. Litter quantities by litter tax class for on-off ramps (interchanges).

Litter Tax Class	Litter Tax Materials	Non-Litter Tax Materials
Total pounds per year	3,514,747 pounds	4,444,853 pounds
Pounds per acre per year	325.6 pounds	411.8 pounds
Percentage of pounds	44.2%	55.8%
Total pieces per year	1,306,862,724 pieces	405,248,882 pieces
Pieces per acre per year	121,073 pieces	37,544 pieces
Percentage of pieces	76.3%	23.7%

At on-off ramps, miscellaneous materials accumulate the fastest by weight (131.9 pounds per acre per year) and are not covered by the litter tax (Figure 66). The second-fastest material type, other plastic (97.0 pounds per acre per year), is covered by the litter tax.

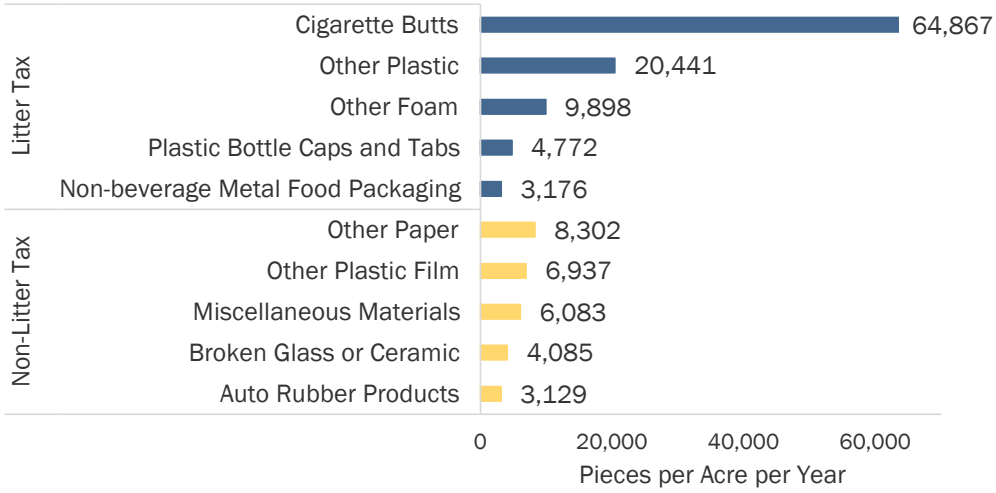
Cigarette butts (litter tax) are the next fastest accumulating materials, accumulating at a similar rate as textiles, clothing and shoes (non-litter tax), and construction and demolition debris (non-litter tax).

Figure 66. Top five fastest accumulating material types by litter tax class for on-off ramps (interchanges), by pound.



Cigarette butts are by far the fastest accumulating material by piece for on-off ramps (64,867 pieces per acre per year), and they are covered by the litter tax (Figure 67). Other plastic materials accumulate the second fastest (20,441 pieces per acre per year) and they are also covered by the litter tax. Other paper, other plastic film and miscellaneous materials are among the fastest accumulating non-litter materials for on-off ramps, by piece.

Figure 67. Top five fastest accumulating material types by litter tax class for on-off ramps (interchanges), by piece.



Rest Areas

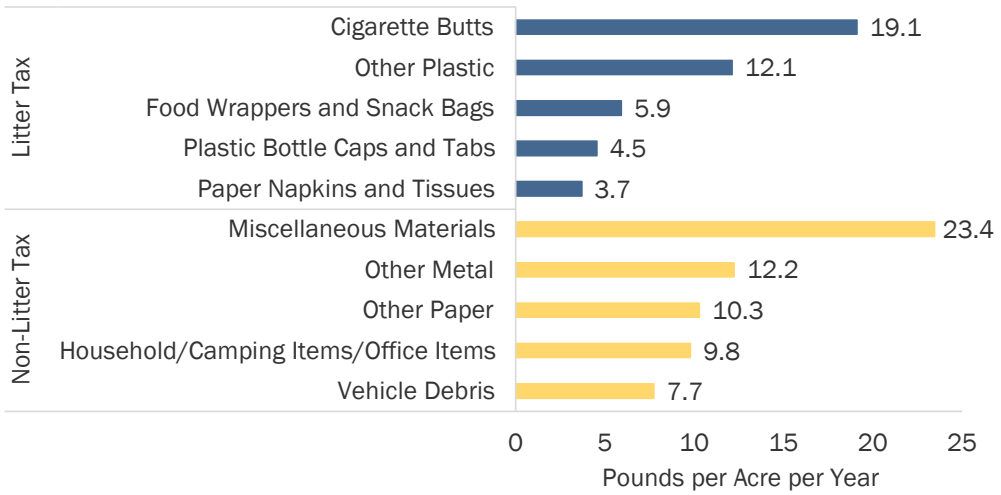
Litter tax materials made up 43.0% of pounds and 68.9% of pieces of litter in rest areas (Table 42). However, 22,072 pounds and 5.6 million pieces of litter in rest areas were non-litter tax materials.

Table 42. Litter quantities by litter tax class for all rest areas.

Litter Tax Class	Litter Tax Materials	Non-Litter Tax Materials
Total pounds per year	16,667 pounds	22,072 pounds
Pounds per acre per year	72.5 pounds	96.0 pounds
Percentage of pounds	43.0%	57.0%
Total pieces per year	12,302,488 pieces	5,558,290 pieces
Pieces per acre per year	53,490 pieces	24,167 pieces
Percentage of pieces	68.9%	31.1%

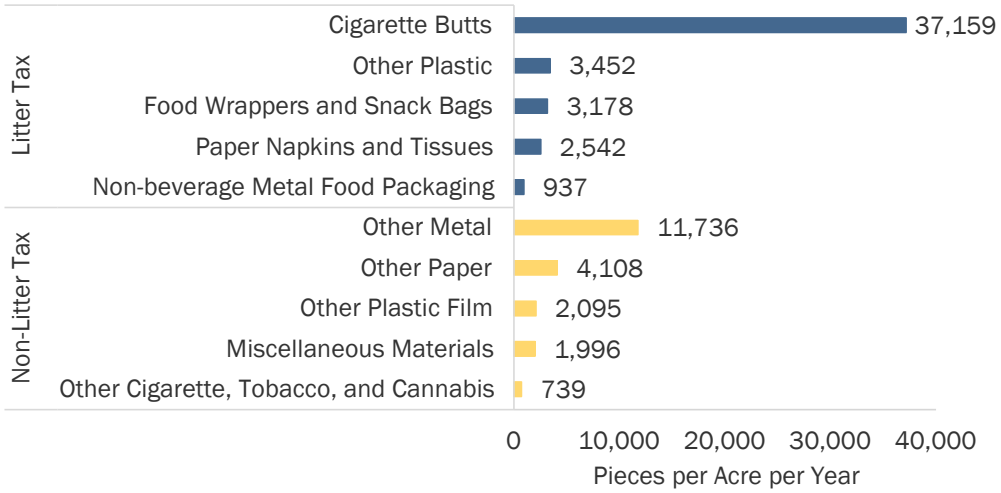
At rest areas, miscellaneous materials accumulate the fastest by pound (23.4 pounds per acre per year) and are not covered by the litter tax (Figure 68). The second-fastest material type, cigarette butts (19.1 pounds per acre per year), is covered by the litter tax. Other metal and other paper are the second and third fastest accumulating non-litter tax materials, by pound.

Figure 68. Top five fastest accumulating material types by litter tax class for all rest areas, by pound.



Cigarette butts are by far the fastest accumulating material by piece for rest areas (37,159 pieces per acre per year), and they are covered by the litter tax (Figure 69). Other metal, other paper, and other plastic film are the fastest accumulating non-litter tax materials for rest areas, by piece.

Figure 69. Top five fastest accumulating material types by litter tax class for all rest areas, by piece.



State and County Parks

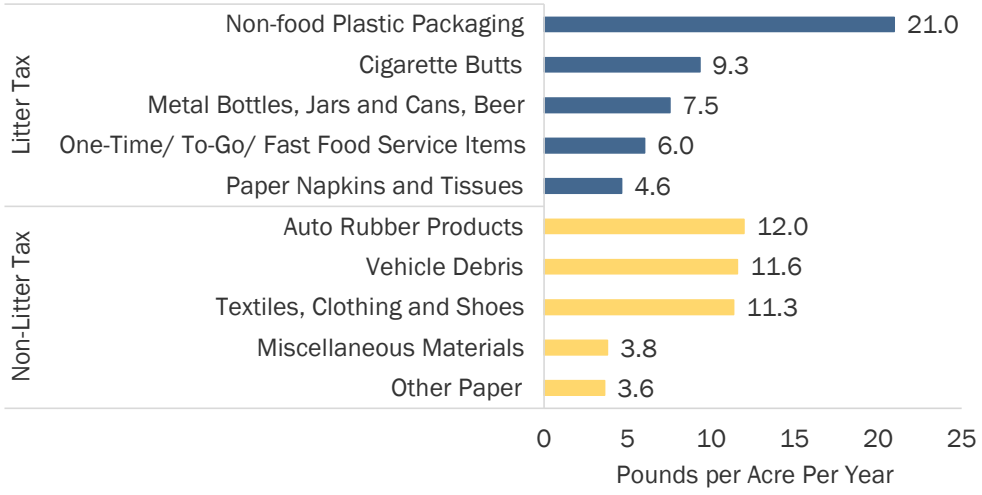
Litter tax materials made up 62.3% of pounds and 75.8% of pieces of litter in state and county parks (Table 43). However, 3.9 million pounds and 822.6 million pieces of litter in state and county parks were non-litter tax materials.

Table 43. Litter quantities by litter tax class for all state and county parks.

Litter Tax Class	Litter Tax Materials	Non-Litter Tax Materials
Total pounds per year	6,619,387 pounds	3,997,836 pounds
Pounds per acre per year	78.9 pounds	47.7 pounds
Percentage of pounds	62.3%	78.9%
Total pieces per year	2,581,398,914 pieces	822,597,252 pieces
Pieces per acre per year	30,722.0 pieces	9,805.9 pieces
Percentage of pieces	75.8%	24.2%

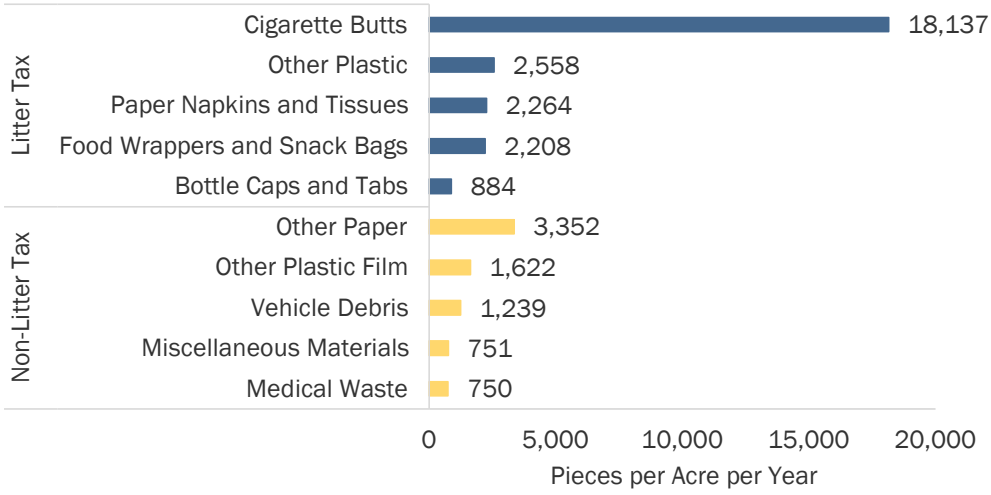
In state and county parks, non-food packaging accumulates the fastest by weight (21.0 pounds per acre per year) and is covered by the litter tax (Figure 70). The next three fastest accumulating materials in state and county parks by weight are not covered by the litter tax: auto rubber products; vehicle debris; and textiles, clothing, and shoes.

Figure 70. Top five fastest accumulating material types by litter tax class for all state and county parks, by pound.



Cigarette butts are by far the fastest accumulating material by piece in state and county parks (18,137 pieces per acre per year), and they are covered by the litter tax (Figure 71). Other paper, other plastic film, and vehicle debris are among the fastest accumulating non-litter tax materials for state and county parks, by piece.

Figure 71. Top five fastest accumulating material types by litter tax class for all state and county parks, by piece.



DNR and DFW Lands

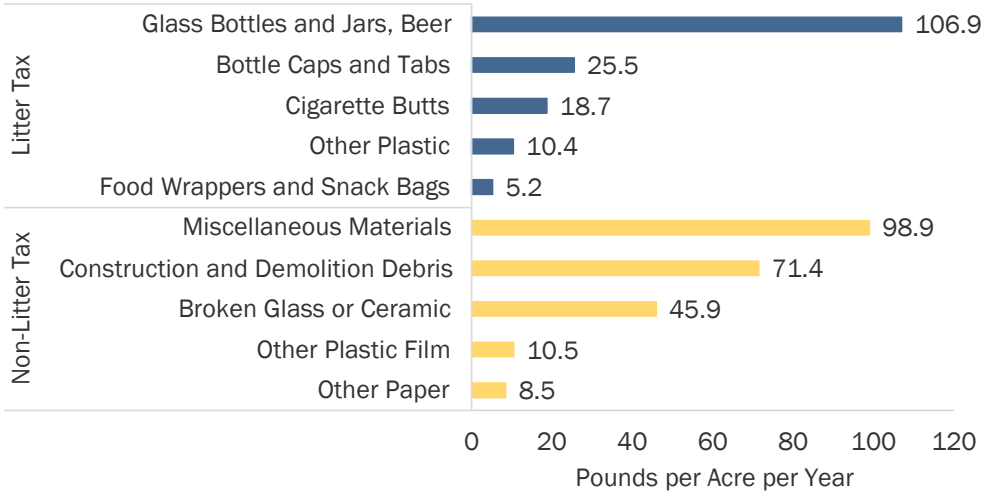
Litter tax materials made up 41.9% of pounds and 69.4% of pieces of litter in DNR and DFW lands (Table 44). However, 549,360 pounds and 43.3 million pieces of litter on DNR and DFW lands were non-litter tax materials.

Table 44. Litter quantities by litter tax class for all DNR and DFW lands.

Litter Tax Class	Litter Tax Materials	Non-Litter Tax Materials
Total pounds per year	396,804 pounds	549,360 pounds
Pounds per acre per year	187.9 pounds	260.1 pounds
Percentage of pounds	41.9%	58.1%
Total pieces per year	98,416,294 pieces	43,301,075 pieces
Pieces per acre per year	46,599 pieces	20,502 pieces
Percentage of pieces	69.4%	30.6%

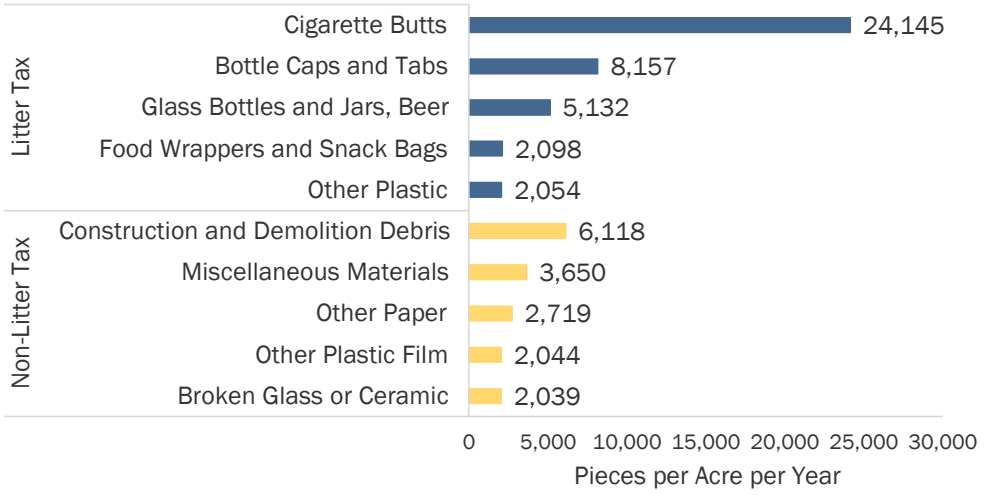
In state and county parks, glass bottles and jars, beer accumulate the fastest by weight (106.9 pounds per acre per year) and is covered by the litter tax (Figure 72). The next three fastest accumulating materials on DNR and DFW lands by weight are not covered by the litter tax: miscellaneous materials (98.9 pounds per acre per year), construction and demolition debris (71.4 pounds per acre per year), and broken glass or ceramic (45.9 pounds per acre per year).

Figure 72. Top five fastest accumulating material types by litter tax class for all DNR and DFW lands, by pound.



Cigarette butts are by far the fastest accumulating material by piece on DNR and DFW lands (24,145 pieces per acre per year), and they are covered by the litter tax (Figure 73). Construction and demolition debris, miscellaneous materials, and other paper are among the fastest accumulating non-litter tax materials for DNR and DFW lands, by piece.

Figure 73. Top five fastest accumulating material types by litter tax class for all DNR and DFW lands, by piece.



Litter and Environmental Equity

Everyone has the right to live, learn, work, and play in a clean, safe, and healthy environment, regardless of race, ethnicity, language, or income. Ecology is developing strategies to reduce pollution and health disparities in communities most at risk. To support this effort, we made sure sites in this study included those with high and low environmental health disparities rankings, using the Washington Environmental Health Disparities (EHD) Map.[20]

The Washington EHD Map uses 19 environmental, health, and socioeconomic indicators to rank Census tracts into 10 groups. Environmental exposure indicators include proximity to heavy traffic roadways and air quality emissions related to vehicles. Areas in rank 1 have the lowest environmental health disparities, which means they are the least burdened or at risk. Areas in rank 10 have the highest environmental health disparities, which means they are the most burdened or at risk.

EHD RANKING OF STUDY SITES

In this study, we selected sites using three goals. First, we used sites included in the 1999 and 2004 Washington statewide studies whenever possible so results could be compared over time. Next, we spread study sites across the range of site types, including on-off ramps, recreation areas (DNR and DFW), and different types of roadways. After meeting these first two goals, we checked that the study sites represented a range of areas with higher and lower environmental health disparities rankings.

Table 45 shows the EHD rank of each of the 182 sampling sites included in this study. Because rest areas and state and county parks include more rural areas away from pollution sources, they tend to have lower EHD ranks.

Table 45. Distribution of sampling sites by EHD rank.

EHD Rank	Roadways	On-Off Ramps	Rest Areas	State and County Parks	DNR and DFW Lands	Total
1	12	0	2	2	0	16
2	11	1	6	8	2	28
3	12	7	3	3	0	25
4	14	0	6	2	1	23
5	9	3	3	1	1	17
6	9	2	4	1	1	17
7	9	1	0	2	0	12
8	14	4	2	0	0	20

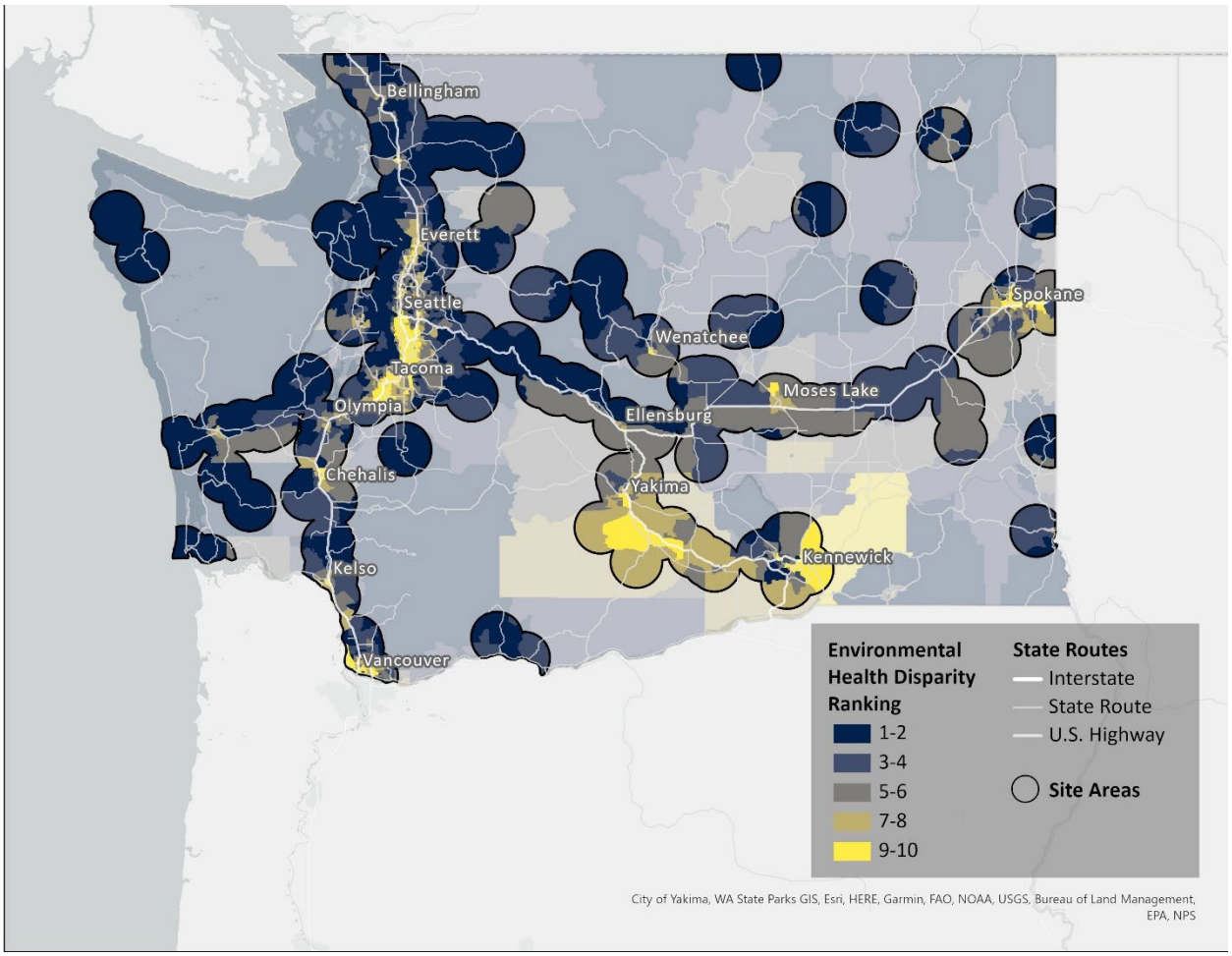
[20] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map

EHD Rank	Roadways	On-Off Ramps	Rest Areas	State and County Parks	DNR and DFW Lands	Total
9	9	1	0	1	1	12
10	5	7	0	0	0	12
Total	**104**	**26**	**26**	**20**	**6**	**182**

Figure 74 shows a map of the EHD rankings for each study site. Areas with lower EHD rankings (less burdened) are shown in dark blue while areas with higher EHD rankings (more burdened) are shown in yellow. The sites with the highest EHD ranking of 9-10 are typically clustered around larger cities near interstate highways, while sites with the lowest EHD ranking of 1–2 are typically along state and U.S. highways, and further away from interstate highways. On the map, sampling sites with higher EHD rankings included those in the following areas:

- Along I-5, I-90, and I-82.
- Between South Seattle and Tacoma
- Spokane area
- Vancouver area
- Kennewick area
- Yakima area
- Moses Lake area
- Wenatchee area

Figure 74. Map showing EHD rankings of sampling sites and state routes.



CORRELATION ANALYSIS METHOD

To assess the potential association between EHD rank and litter more quantitatively, we analyzed Spearman Rho correlations between EHD rank and both pounds and pieces of litter across all sites combined and for subsets of roadways and on-off ramps.[21] We excluded did not conduct separate analyses for rest areas, state and county parks, and DNR and DFW lands because of small sample sizes and because fewer people live near these areas, making their individual EHD rank less meaningful. However, we included them in the analysis for all site types combined. Sampling sites along roadways and on-off ramps were also more representative of the full range of EHD ranks.

Correlation values fall between -1 and 1. A positive correlation indicates that there is generally more litter at sampling sites with higher EHD ranks. The higher the value, the stronger this association between litter and EHD rank. A negative correlation indicates that

[21] https://mathworld.wolfram.com/SpearmanRankCorrelationCoefficient.html

there is generally less litter at sampling sites with higher EHD ranks. The closer the value is to zero, the weaker this association between litter and EHD rank.

It is important to note that these correlation values only indicate potential associations, and not direct cause-and-effects. Based on these data alone, we cannot say that a sampling site has a high EHD rank *because* it is heavily littered, nor that a site is heavily littered *because* it has a high EHD rank. It is also possible that any correlation is related to a third factor that affects EHD rank and litter levels separately.

EHD RANKING AND POUNDS OF LITTER

Table 46 presents correlations between EHD rank and pounds of litter. For each correlation, we also assessed whether it was statistically significant, meaning it is unlikely that the correlation occurred by chance. Statistically significant correlation values are indicated by an asterisk (*). More information about these correlation values and tests for statistical significance can be found in *Appendix G. Detailed Composition Results*.

Table 46. Correlation values between EHD rank and pounds of litter for all sampling sites combined and for roadways and on-off ramps (interchanges) overall.

Site Type	Number of Sites	Correlation Value
All Sites Combined	179	0.229*
All Urban Sites	84	0.119
All Rural Sites	95	0.082
All Roadways	103	0.226
Urban Roadways	52	0.023
Rural Roadways	51	0.238
All On-Off Ramps	26	0.471
Urban On-Off Ramps	13	0.329
Rural On-Off Ramps	13	0.302

There was a weak but statistically significant correlation between EHD rank and pounds of litter for all sampling site types combined (roadways, on-off ramps, rest areas, state and county parks, and DNR and DFW lands which are state-owned recreation land). This means that at sampling sites with higher EHD ranks, there were slightly more pounds of litter than at sites with lower EHD ranks.

When correlations were evaluated separately for urban and rural locations and specific subtypes, none of the correlation values was statistically significant (Table 47). These results could reflect the relatively small sample sizes for specific site types and locations as well as the variability of the data. A statistically significant relationship between EHD rank and pounds of litter only emerges when data from all sampling sites are combined together.

Table 47. Correlation values between EHD rank and pounds of litter for roadway subtypes.

Site Type	Number of Sites	Correlation Value
All Interstate Roadways	26	0.376
Urban Interstate Roadways	13	0.204
Rural Interstate Roadways	13	0.254
All Arterial Roadways	26	-0.099
Urban Arterial Roadways	13	-0.316
Rural Arterial Roadways	13	0.139
All Collector Roadways	26	0.145
Urban Collector Roadways	13	-0.117
Rural Collector Roadways	13	0.058
All Local Roadways	25	0.163
Urban Local Roadways	13	-0.642
Rural Local Roadways	12	0.336

EHD RANKING AND PIECES OF LITTER

Table 48 presents the correlations between EHD rank and pieces of litter. There was a weak but statistically significant correlation between EHD rank and pieces of litter for sampling sites combined, for all roadway types, and for interstate roadways. This means sampling sites with higher EHD ranks had slightly more pieces of litter than sites with lower EHD ranks.

Table 48. Correlation values between EHD rank and pieces of litter for all sampling sites combined and for roadways and on-off ramps (interchanges) overall.

Site Type	Number of Sites	Correlation Value
All Sites Combined	179	0.259*
All Urban Sites	84	0.146
All Rural Sites	95	0.055
All Roadways	103	0.370*
Urban Roadways	52	0.194
Rural Roadways	51	0.246
All On-Off Ramps	26	0.448
Urban On-Off Ramps	13	0.111
Rural On-Off Ramps	13	0.087

Except for interstate roadways, these correlations were not statistically significant when site types were divided by specific subtype or by urban and rural location (Table 49). There may be too much variation in the small sample sizes to detect a meaningful relationship. A correlation was seen only when data for all site types are combined.

For interstate roadways, there was a moderately strong and statistically significant correlation between EHD rank and pieces of litter. Communities along interstates with high EHD ranks generally had more pieces of litter than communities with low EHD ranks. As shown in Figure 74, sites with high EHD ranks are generally clustered around interstate highways.

Table 49. Correlation values between EHD rank and pieces of litter for roadway subtypes.

Site Type	Number of Sites	Correlation Value
All Interstate Roadways	26	0.554*
Urban Interstate Roadways	13	0.522
Rural Interstate Roadways	13	0.379
All Arterial Roadways	26	0.213
Urban Arterial Roadways	13	0.336
Rural Arterial Roadways	13	-0.079
All Collector Roadways	26	0.380
Urban Collector Roadways	13	0.164
Rural Collector Roadways	13	0.111
All Local Roadways	25	0.362
Urban Local Roadways	13	0.003
Rural Local Roadways	12	0.348

Comparison with Other Studies

This section compares results for the 2022 Washington statewide litter study with those from the 1999 and 2004 Washington statewide studies and the 2020 KAB nationwide study.

All four studies used similar methods and material lists, but slight differences required us to make some adjustments and note limitations in comparing results. For example, the 1999 and 2004 Washington studies did not include local roadways and the 2020 KAB nationwide study did not measure litter in pounds, only in pieces.

To the extent possible, we aligned the 2022 material list with prior studies while also trying to align with the EPA-ETAP method, align with the 2020 KAB nationwide study, and provide additional detail on food packaging and single-use items.

Comparison with 1999 and 2004 State Studies

Investment in litter prevention and cleanup in Washington has varied considerably since Ecology conducted its first statewide litter study in 1999 (see *History of Anti-Litter Efforts in Washington*). Comparisons between the 1999 and 2004 litter studies indicate that the amount, type, and distribution of litter has varied, too. The goal of this section is to extend existing comparisons and evaluate how litter in 2022 compares to litter in previous years.

To be able to compare results to previous studies, we kept the study methods in 2022 as similar as possible to previous study methods. However, differences between the studies mean we can compare only accumulation rates in pounds between 2022, 2004, and 1999, since the 1999 and 2004 studies did not take a point-in-time litter snapshot. Additionally, 1999 and 2004 studies looked at weight of litter and did not count pieces. While we kept as many of the original sites as possible, the 2022 study used a more representative sampling of roadways, which limited the ability to compare by roadway type. In addition, we do not have data from 2004 on rest areas, state and county parks, or DNR and DFW lands to compare to 2022 results.

ALL ROADWAYS COMPARISON

While litter accumulation per mile appeared to decrease between 1999 and 2004 for all roadway types combined, the 2004 study found that the change was not statistically significant. This trend continued in 2022 (Figure 75).

Interpretations of this trend are somewhat limited, however, because the 2022 study included a wider network of roadways than was sampled in the 1999 and 2004 studies. This network is more representative of the roadway types in Washington and includes city roadways that were largely excluded in previous studies. Non-interstate roadways were also

recategorized by type (arterial, collector, and local road) instead of ownership (state highways and county roads), using the Federal Highway Administration's (FHWA) Functional Classification system.[22] We controlled for the increase in the number of roadways for which litter was estimated in 2022 by comparing accumulation rates per mile across study years. The per mile comparisons are a reasonable but imperfect approximation for comparing litter estimates across study years where the roadways included in these studies, and their classification, differ. Future studies that are based on the more representative roadway sampling used in the 2022 study will allow for more accurate comparisons over time.

Figure 75. Comparison of yearly litter accumulation rates per mile for all roadway types combined across study years.

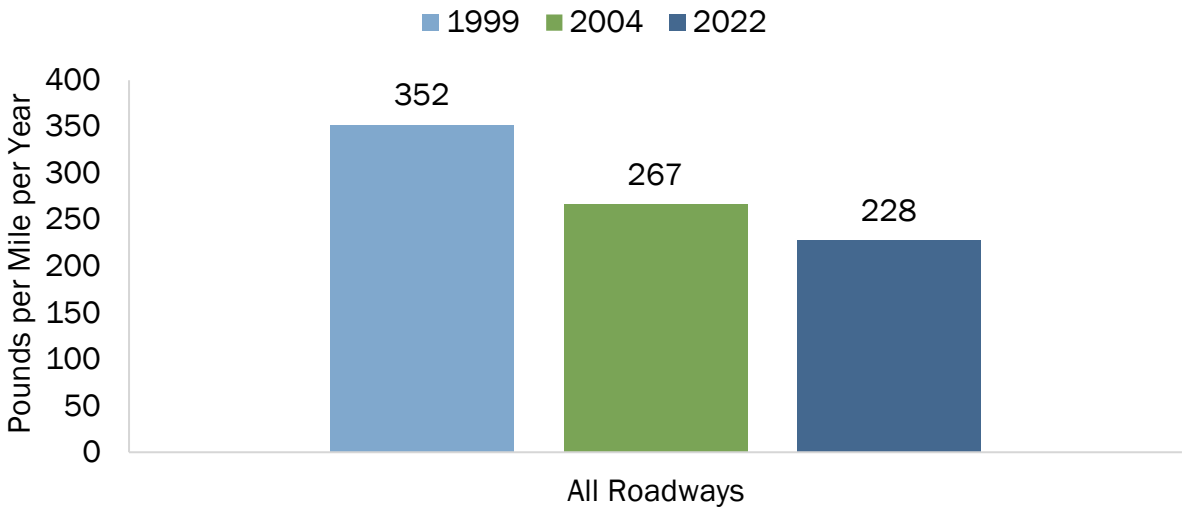
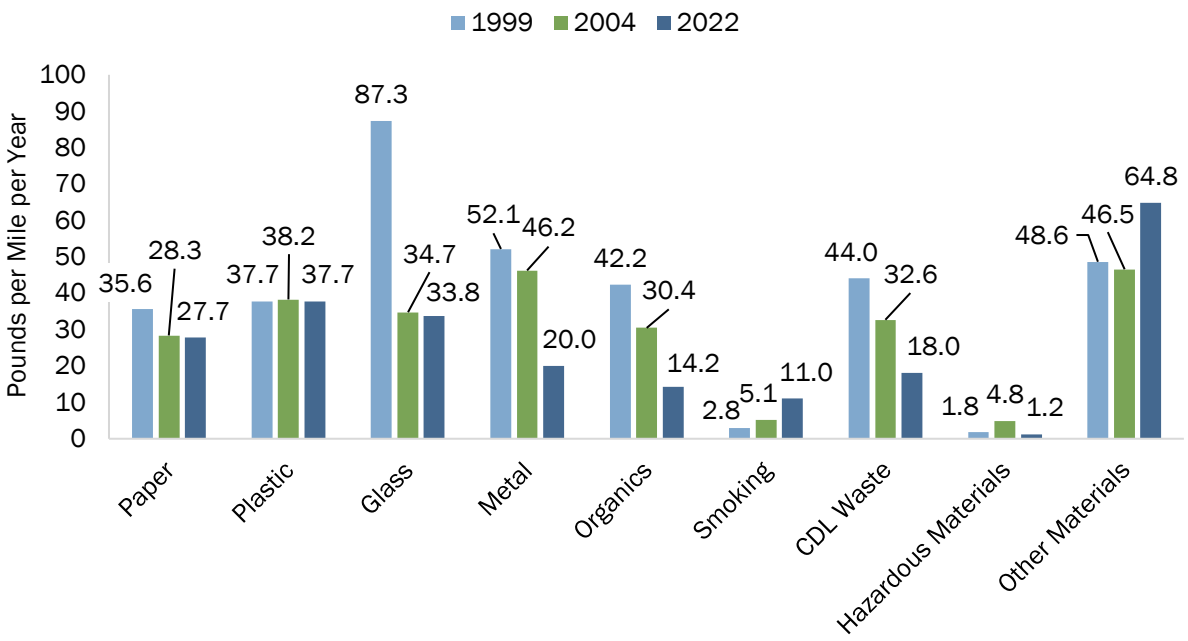


Figure 76 shows accumulation rates by material class for all roadway types combined across the three studies, in pounds per mile per year. While interpretation is limited and results were not analyzed for statistical significance, the chart shows that smoking materials (including cigarette butts, cannabis products, and other smoking-related materials) increased the most relative to 1999 and 2004. Accumulation rates per mile per year for smoking-related materials more than doubled between 2004 (5.1 pounds) and 2022 (11.0 pounds) and have nearly quadrupled compared to 1999 (2.8 pounds). This change may be partially due to the rise of vaping products and legalized cannabis, which are heavier than cigarettes, and partially due to including city roads in the 2022 study.

Litter classified as other materials also accumulated at a faster rate per mile per year in 2022 (64.8 pounds) than in 2004 (46.5 pounds) and in 1999 (48.6 pounds). Accumulation rates for metal materials and organics decreased the most in 2022 relative to 1999 and 2004.

[22] https://www.fhwa.dot.gov/policyinformation/statistics/2020/

Figure 76. Comparison of litter by material class for all roadway types combined across study years.



INTERSTATE ROADWAYS COMPARISON

Comparisons of specific roadway types across study years are limited to interstate roadways, because of the expanded network of roadways sampled in 2022 and the recategorization by roadway type instead of ownership. The interstate category was consistent across both categorization methods.

While the 2004 study estimated that litter on all roadways combined decreased by 25% between 1999 and 2004 (Figure 75), litter on interstates alone showed an increase during that period (Figure 77). Considering all interstate roadways and urban interstates, 2022 litter levels appeared similar to levels in 1999. Litter levels in 2022 appear lower for rural interstates.

Figure 77. Comparison of yearly litter accumulation rates per mile for interstates across study years.

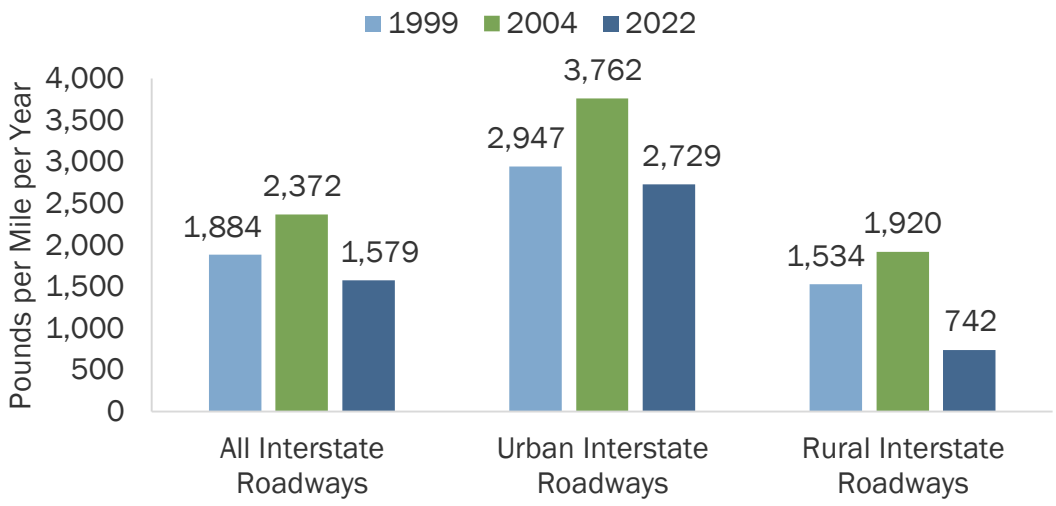


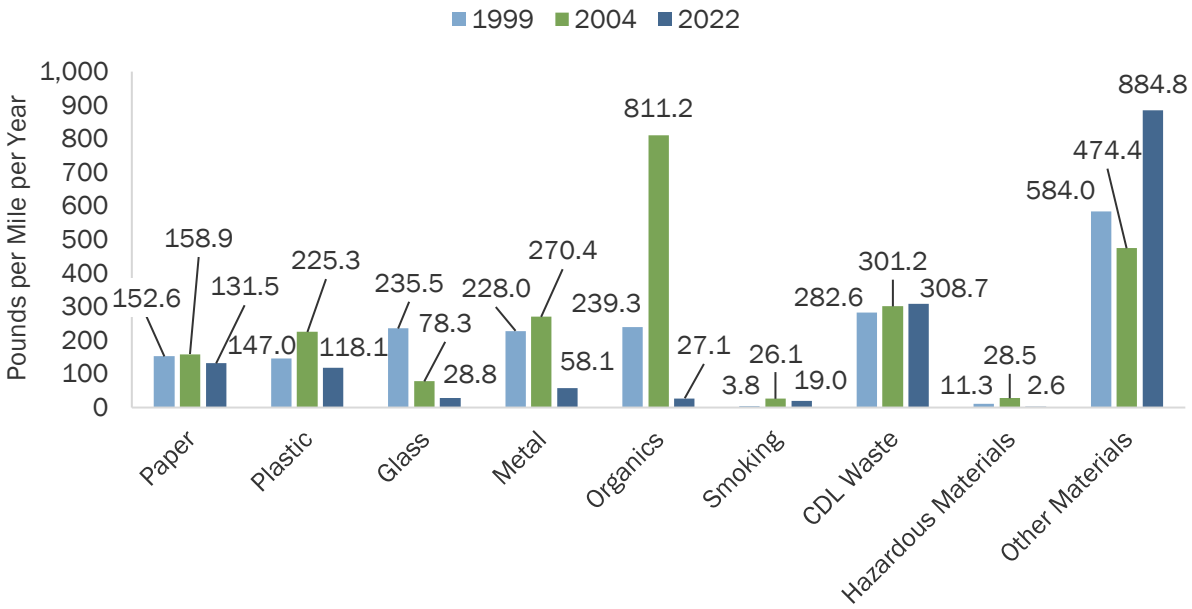
Figure 78 shows pounds per mile per year for each material class across study years.

The chart shows that, of all materials between each study, other materials increased the most, nearly doubling from 474.4 pounds per mile per year to 884.8 pounds per mile per year. Smoking materials (includes cigarette butts) increased by five times, from 0.2% in 1999 study to 1.2% in the 2022 study, by pounds per mile per year.

Some categories decreased in the 2022 study. Figure 78 shows that organics decreased the most from 2004 to 2022, dropping 784.1 pounds per mile per year. Glass, as well, decreased, from 78.3 pounds per mile per year to 28.8 pounds per mile per year, and an even bigger decrease from the 235.5 pounds per mile per year in 1999. Metal dropped from 228.0 pounds per mile per year to 58.1 pounds per mile per year, following an increase from 1999 to 2004, from 228.0 to 270.4 pounds per mile per year.

Plastics dropped below the 2009 study levels, dropping from the high of 225.3 in 2004 to 118.1 pounds per mile per year in 2020, while hazardous materials also dropped below 1999 levels, from 11.3 to 2.6 pounds per mile per year.

Figure 78. Comparison of yearly litter accumulation rates per mile by material class for interstates across study years.



ON-OFF RAMPS (INTERCHANGES) COMPARISON

While not statistically significant, litter accumulation at on-off ramps showed a strong decreasing trend of about 30% between 1999 and 2004, in pounds per acre per year. In 2022, litter accumulation at on-off ramps increased by more than five times compared to 1999, in pounds per acre per year (Figure 79). Litter increased at all types of on-off ramps, but the percentage increase appears to be much higher for urban on-off ramps than for rural ones.

Figure 79. Comparison of yearly litter accumulation rates for on-off ramps (interchanges) across study years.

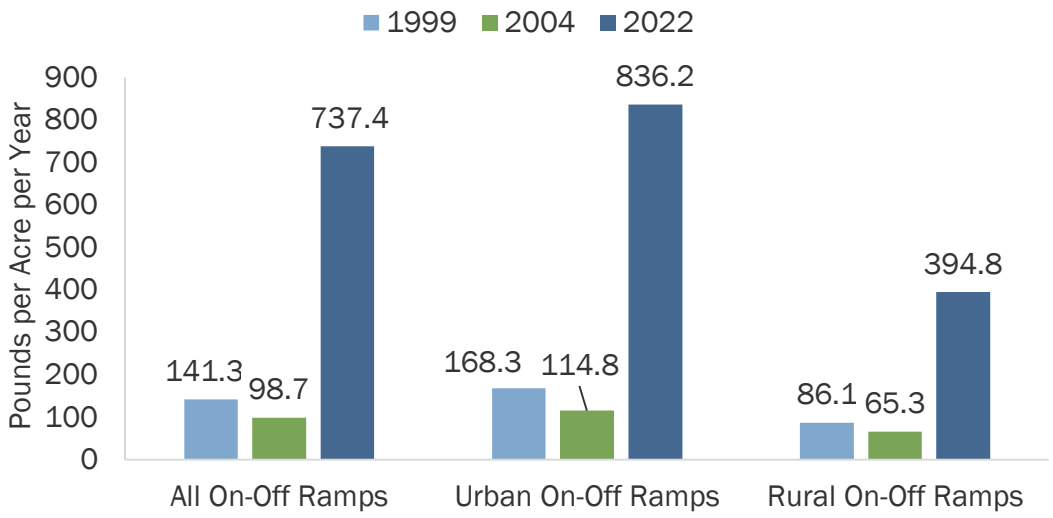
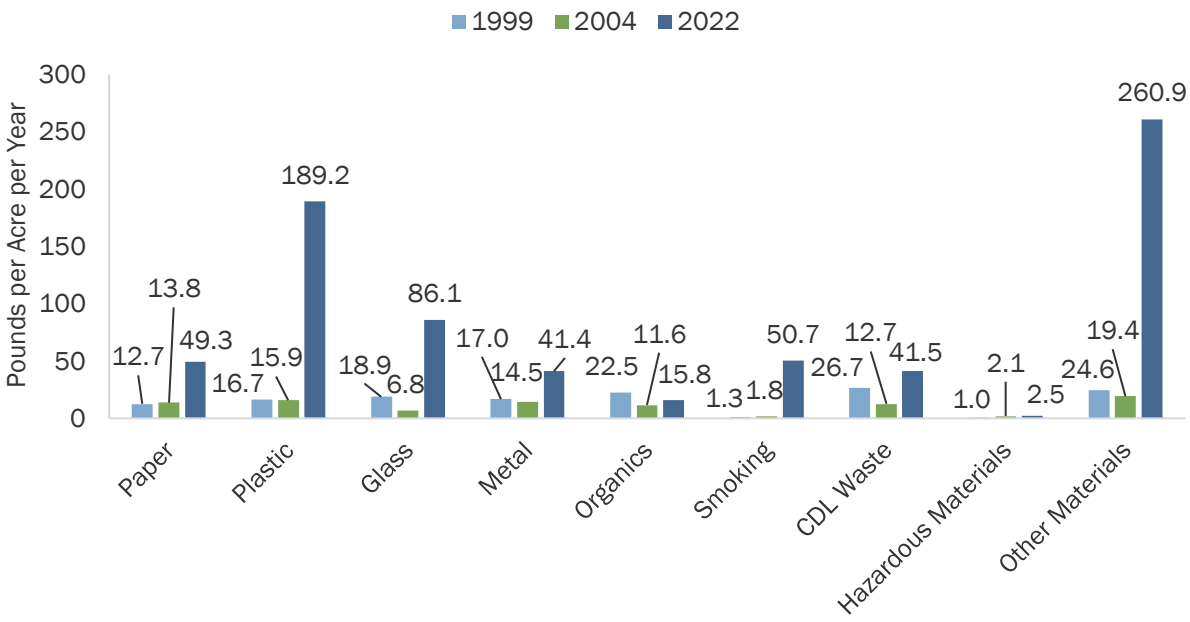


Figure 80 shows accumulation rates by material class for on-off ramps across the three studies, in pounds per acre per year. Between 1999 and 2022, the accumulation rate for other materials and plastics increased by the most pounds per acre per year. Other materials may be higher in 2022 partly because it includes the material category whole bags of mixed trash. In 1999 and 2004, whole bags of trash were opened and sorted into individual material categories.

Smoking (includes cigarette butts) materials increased by the highest percentage, accumulating nearly 40 times as many pounds per acre per year in 2022 compared to 1999. This may be partially due to the rise of vaping products, which are heavier than cigarettes.

Figure 80. Comparison of litter by material class for on-off ramps (interchanges) across study years.



REST AREAS, STATE AND COUNTY PARKS, AND DNR/DFW LANDS COMPARISON

Rest areas, state and county parks, and DNR and DFW lands, which are state-owned recreation lands, were not sampled in the 2004 study, so we compare 2022 results to only the 1999 study. Litter accumulation appears to have strongly increased for state and county parks, more than doubling in pounds per acre per year between 1999 and 2022 (Figure 81). Litter accumulation appears to have increased for rest areas (34%) and marginally decreased for DNR and DFW lands (-5%), but the changes are so small that they may not be meaningful.

Figure 81. Comparison of yearly litter accumulation rates per acre for public places across study years.

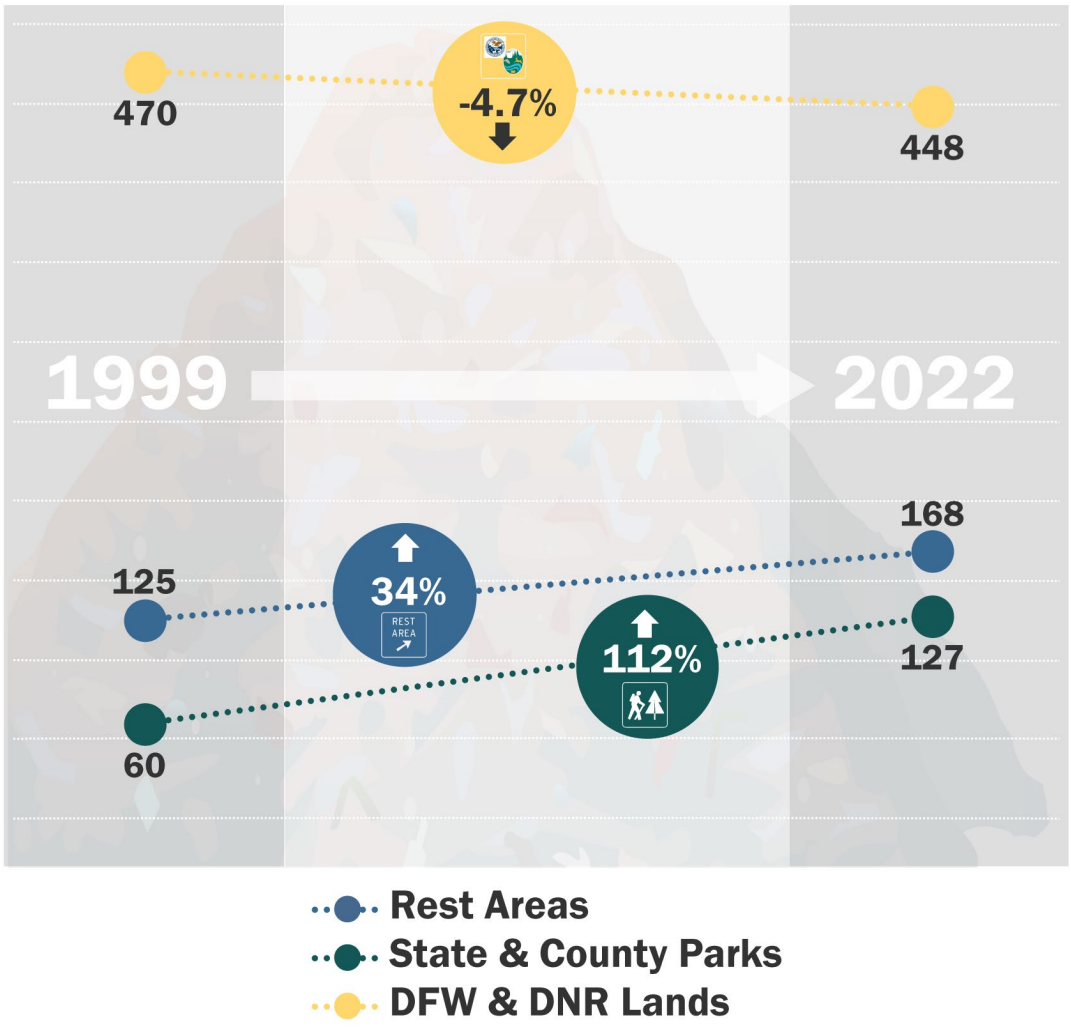


Figure 82 shows accumulation rates by material class for rest areas for 1999 and 2022, in pounds per acre per year. Between 1999 and 2022, the accumulation rates for other materials, smoking (includes cigarette butts), and plastics increased by the most pounds per acre per year. The accumulation rate for smoking (includes cigarette butts) was estimated to be 16 times higher in 2022 compared to 1999. The accumulation rates for CDL wastes, organics, and glass decreased compared to 1999.

Figure 82. Comparison of yearly litter accumulation rates per acre by material class for rest areas across study years.

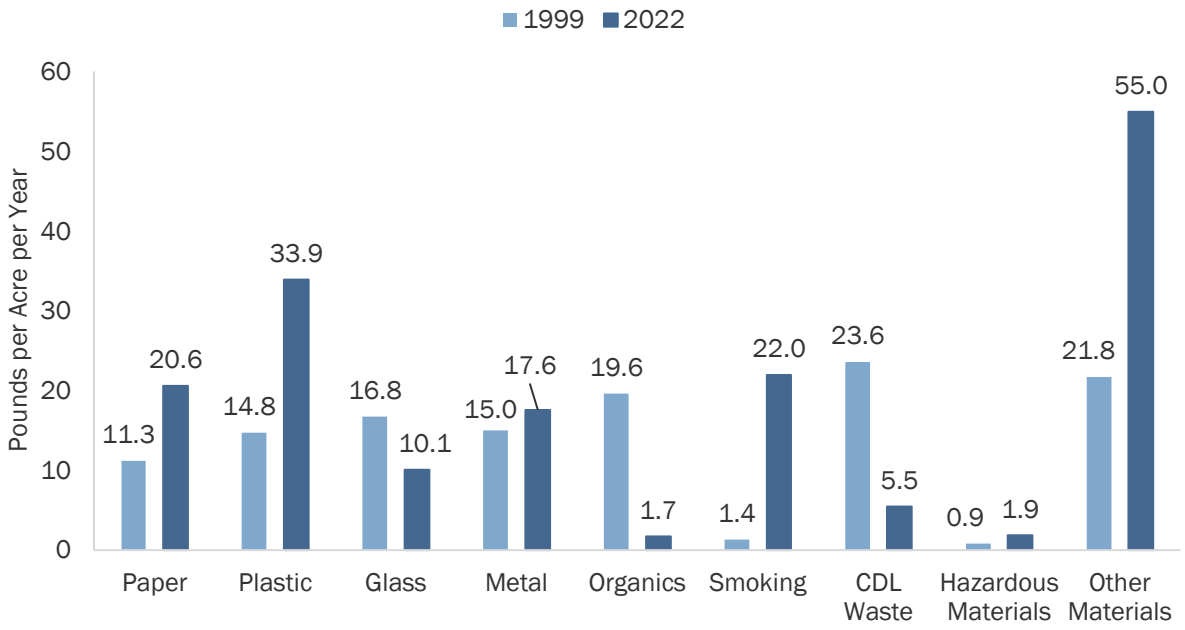


Figure 83 shows accumulation rates by material class for state and county parks for 1999 and 2022, in pounds per acre per year. Between 1999 and 2022, the accumulation rates for other materials and plastics increased by the most pounds per acre per year. The accumulation rate for hazardous materials was estimated to be 25 times higher in 2022 compared to 1999. The accumulation rates for CDL wastes, glass, and organics decreased compared to 1999.

Figure 83. Comparison of yearly litter accumulation rates per acre by material class for state and county parks across study years.

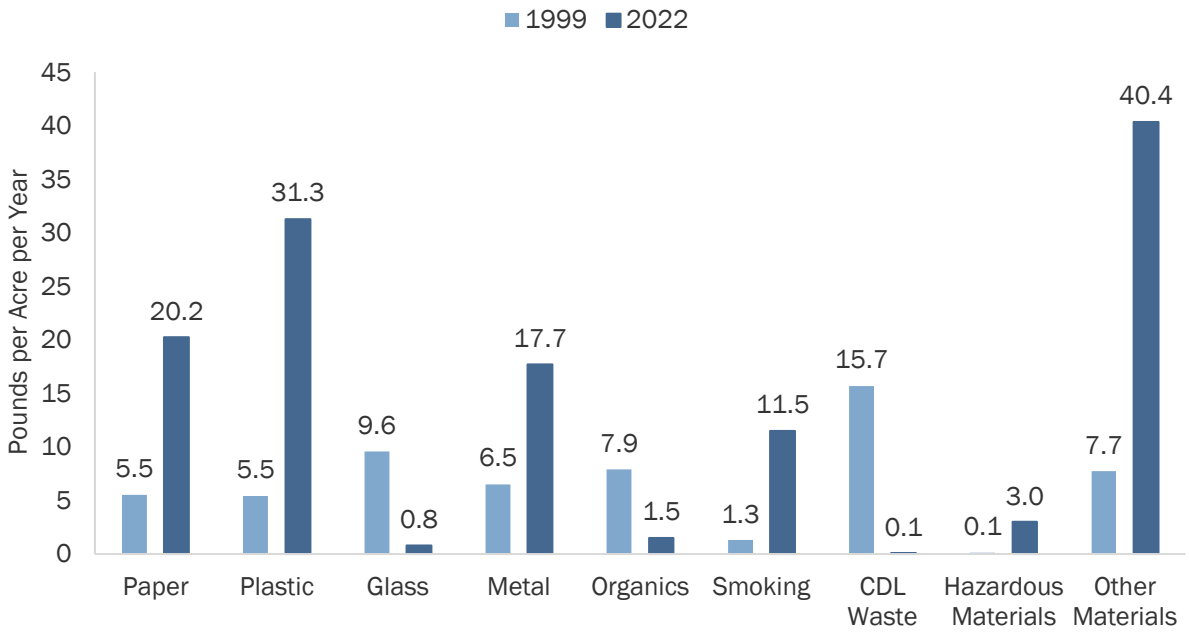
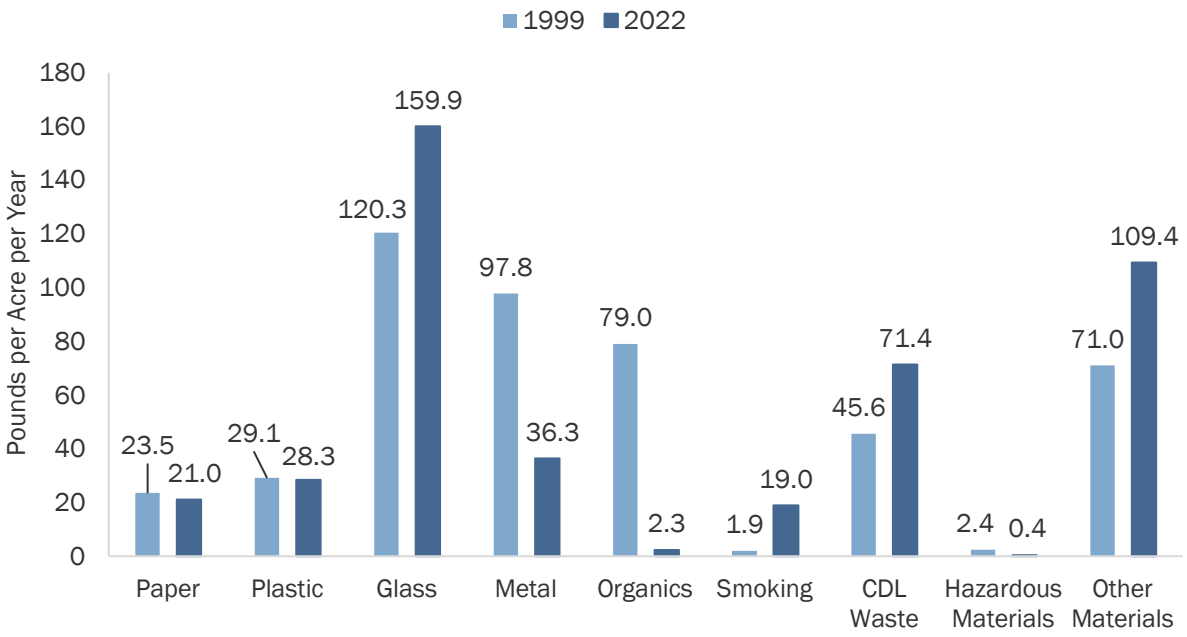


Figure 84 shows accumulation rates by material class for DNR and DFW lands for 1999 and 2022, in pounds per acre per year. Between 1999 and 2022, the accumulation rates for glass, other materials, and increased by the most pounds per acre per year. The accumulation rate for smoking (includes cigarette butts) was estimated to be 10 times higher in 2022 compared to 1999. The accumulation rates for organics and metal decreased compared to 1999.

Figure 84. Comparison of yearly litter accumulation rates per acre by material class for DNR and DFW lands across study years.



SPECIFIC MATERIAL TYPES COMPARISON

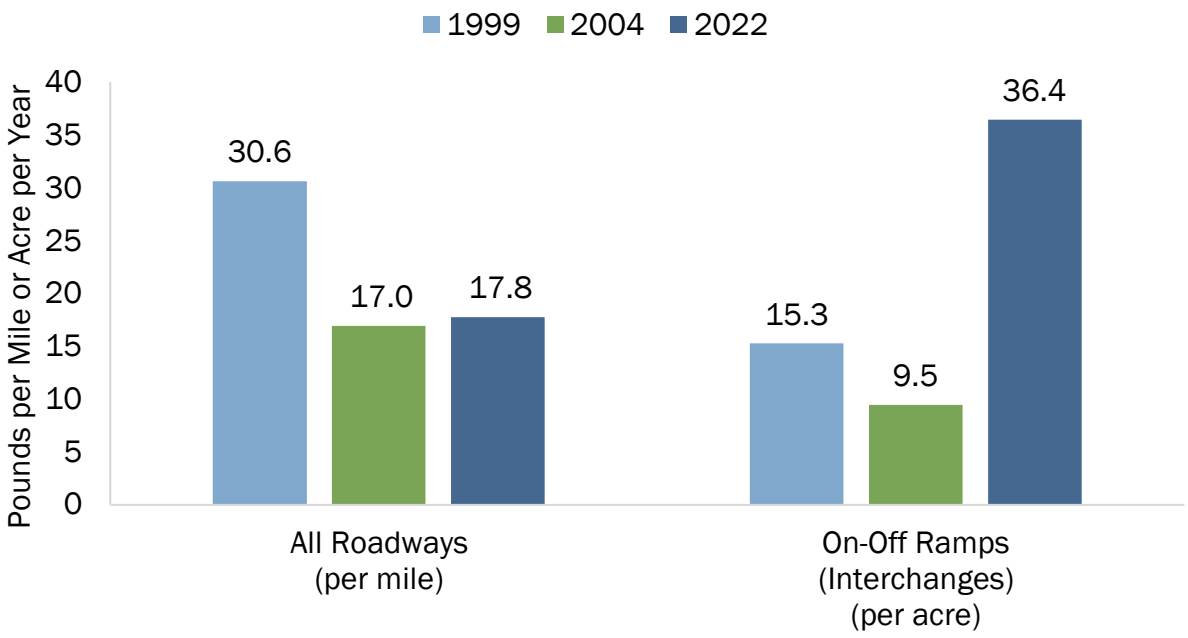
The 2004 study included statistical tests that compared litter accumulation rates for specific material types and groups of materials from 1999 to 2004. For materials that showed considerable changes between 1999 and 2004 or are of particular interest to Ecology, we qualitatively compared them against 2022 litter accumulation rates. We did this analysis for pounds accumulated along all roadway types combined and along on-off ramps (interchanges). Litter at public places (rest areas, state and county parks, DNR and DFW lands) was not measured in the 2004 study and pieces of litter were not measured in either the 1999 or 2004 study.

Tires and Auto Rubber Products

The 2004 study reported a strong decreasing trend in litter accumulation rates for tires and auto rubber products (including tire shards) along all roadways overall. On roadways, accumulation rates in 2022 were about the same (17.8 pounds per mile per year) as in 2004 (17.0 pounds per mile per year) (Figure 85). While accumulation rates appear steady, this may be partially due to a change in study methodology since the 2022 study included a wider network of roads (including city roads) than was sampled in 1999 and 2004. This expanded network is a more accurate representation of roadways in Washington. However, because litter accumulates differently on different types of roadways, the introduction of additional roadway types in 2022 may have partially obscured trends in litter accumulation for the other sampled roadways.

For on-off ramps, accumulation rates were nearly four times higher in 2022 (36.4 pounds per mile per year) than in 2004 (9.5 pounds per mile per year) (Figure 85). After decreasing slightly between 1999 and 2004, tire and auto rubber products now accumulate much faster along on-off ramps.

Figure 85. Comparison of yearly litter accumulation rates per mile or per acre for tires and auto rubber products, for roadways and on-off ramps (interchanges) across study years.



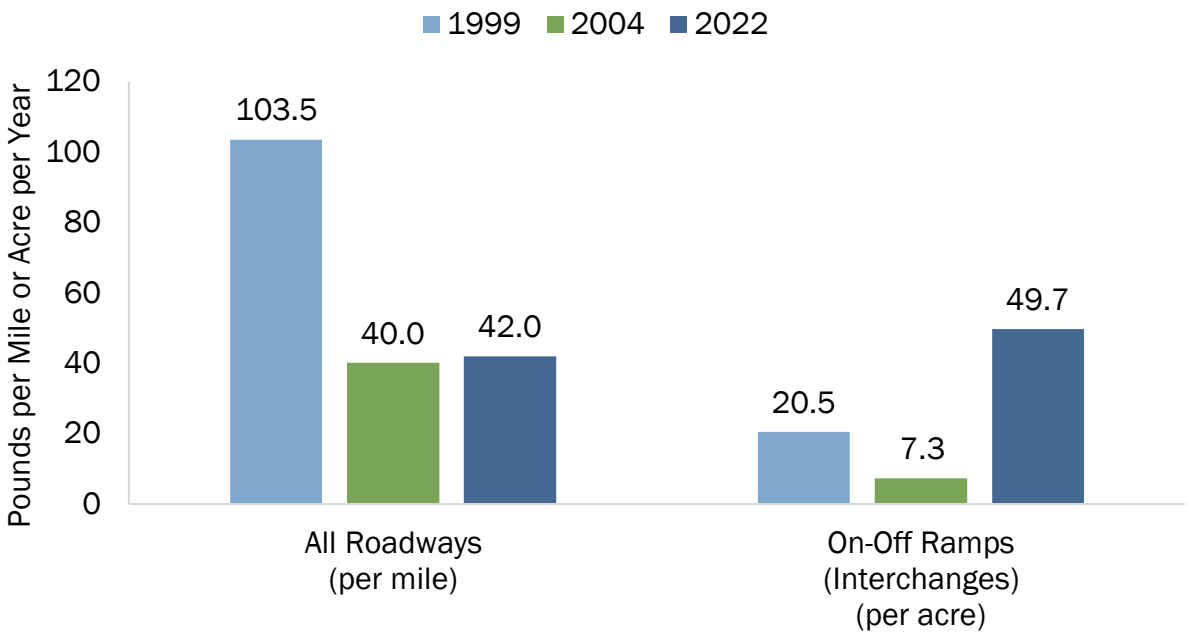
Beverage Containers

The analysis of beverage containers between 1999 and 2004 combined plastic, glass, and metal bottles into a single category and excluded paper beverage cartons. For comparison, we do the same for beverage containers in the 2022 study.

The 2004 study reported a significant decrease in litter accumulation rates for all types of beverage containers combined along roadways. On roadways, accumulation rates in 2022 were about the same (42.0 pounds per mile per year) as in 2004 (40.0 pounds per mile per year) (Figure 86). However, it is unclear whether beverage containers accumulate at the same rate when measured by piece, since the 1999 and 2004 studies measured only pounds of litter per year. It is possible that the number of lightweight bottles made of plastic or aluminum actually increased during the same time period, especially if the number of heavier glass bottles decreased. Additionally, interpretation of these results is somewhat limited because the 2022 study included a wider network of roads (including city roads) that were not sampled in 1999 and 2004.

For on-off ramps, the accumulation rate for beverage containers is now seven times higher when comparing 2004 (7.3 pounds per mile per year) to 2022 (49.7 pounds per mile per year) (Figure 86). After decreasing considerably between 1999 and 2004, the accumulation rate now exceeds that in 1999 (20.5 pounds per mile per year). As noted above, it is also possible that the increase in the accumulation rate would have been even more dramatic if measured by piece.

Figure 86. Comparison of yearly litter accumulation rates per mile or per acre for beverage containers, for roadways and on-off ramps (interchanges) across study years.



Single-Use Serviceware and Expanded Polystyrene

Washington recently introduced legislation that restricts or bans the use of certain single-use items that are commonly found as litter (see *Evaluate Impacts of Single-Use Item Legislation*). This includes a restriction on automatically providing single-use food

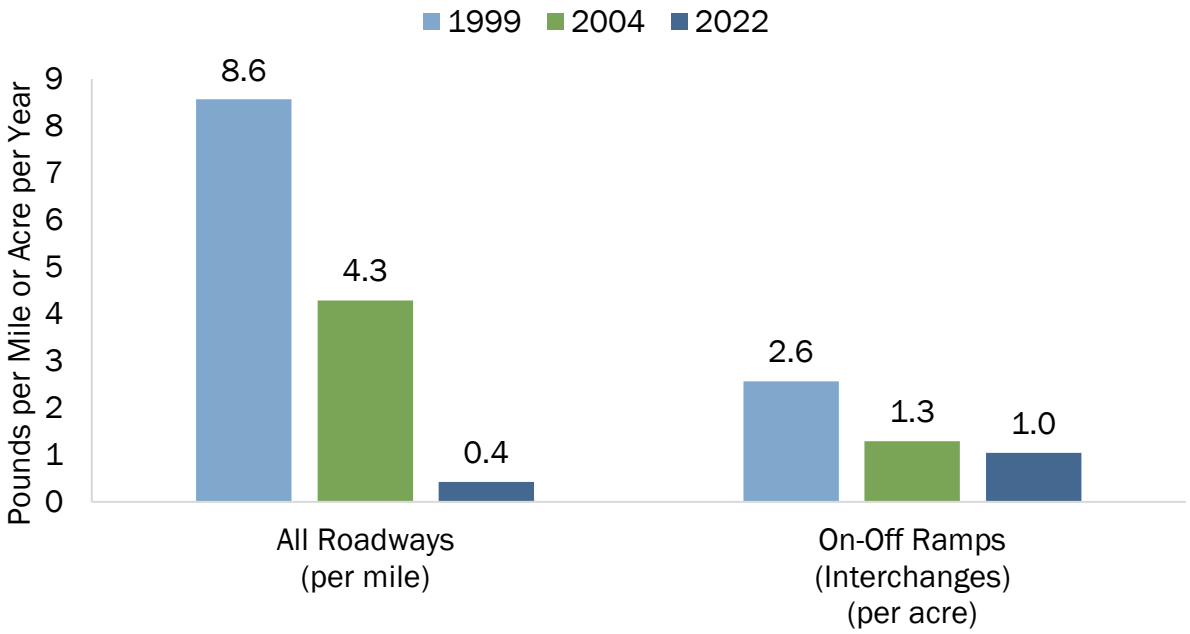
serviceware like plastic utensils and straws and a future ban on expanded polystyrene (EPS) products like foam clamshells, trays, and cups.

In 1999 and 2004, the materials subject to current legislation were primarily classified as plastic one-time/fast food service items. This category included restricted and banned items like plastic cold cup lids, straws, and utensils; individual condiment packets; and foam clamshells, plates, bowls, and cups. It also included items not covered under legislation like plastic plates, bowls, and food wrappings. In 2022, the litter material types plastic straws and stirrers, plastic utensils, and foam cups, bowls, and clamshells were covered under the legislation. Other items subject to legislation, such as wood and bamboo chopsticks, wooden stirrers, and condiment packets, were grouped with other material types not subject to a ban or restriction. Those items are excluded from the comparison across years.

Several materials covered by this legislation were measured in the 1999, 2004, and 2022 litter studies. Comparisons of these materials across study years are approximations because the material types measured in each study year are not identical. These material types both do not fully capture all items covered by the single-use serviceware and EPS legislation and also include some items not covered by the legislation.

On roadways, litter accumulation rates by pound for plastic single-use serviceware and EPS products have declined considerably over time (Figure 87). Rates decreased by 50% between 1999 and 2004 and by a further 90% between 2004 and 2022. For on-off ramps, litter accumulation rates also declined across study years (Figure 87). As with roadways, rates decreased by 50% between 1999 and 2004, but they only decreased by about 20% between 2004 and 2022.

Figure 87. Comparison of yearly litter accumulation rates per mile or per acre for plastic food serviceware and expanded polystyrene, for roadways and on-off ramps (interchanges) across study years.



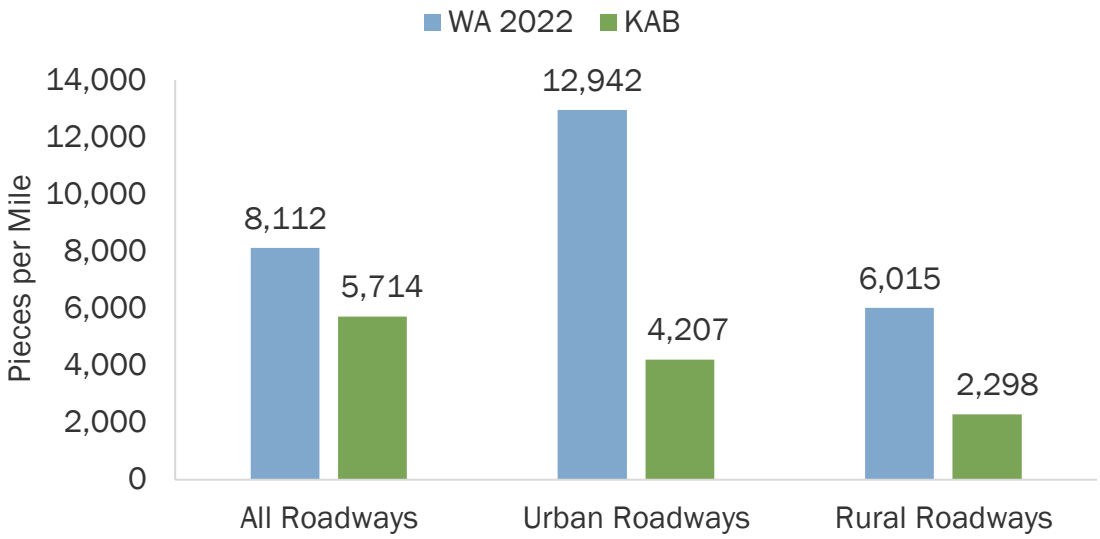
Comparison with KAB 2020 National Litter Study

We used data from publicly available report from KAB 2020 National Litter Study to compare selected results to the 2022 Washington litter study. [23] The 2020 KAB study reported only a litter snapshot by pieces for urban and rural roadways in the continental United States. The mix of roadways used in the 2020 KAB study is comparable to the mix of roadways used in the 2022 Ecology study.

Compared to roadways nationally, Washington roadways have 42% more pieces of litter per mile (8,112 compared to 5,714; Figure 88). This relationship held true for both urban roads (three times more pieces of litter than national roads) and rural roads (nearly three times more pieces of litter than national roads).

[23] https://kab.org/litter-study/

Figure 88. Comparing 2022 Washington statewide findings with 2020 Keep America Beautiful Nationwide Litter Study findings (litter snapshot).

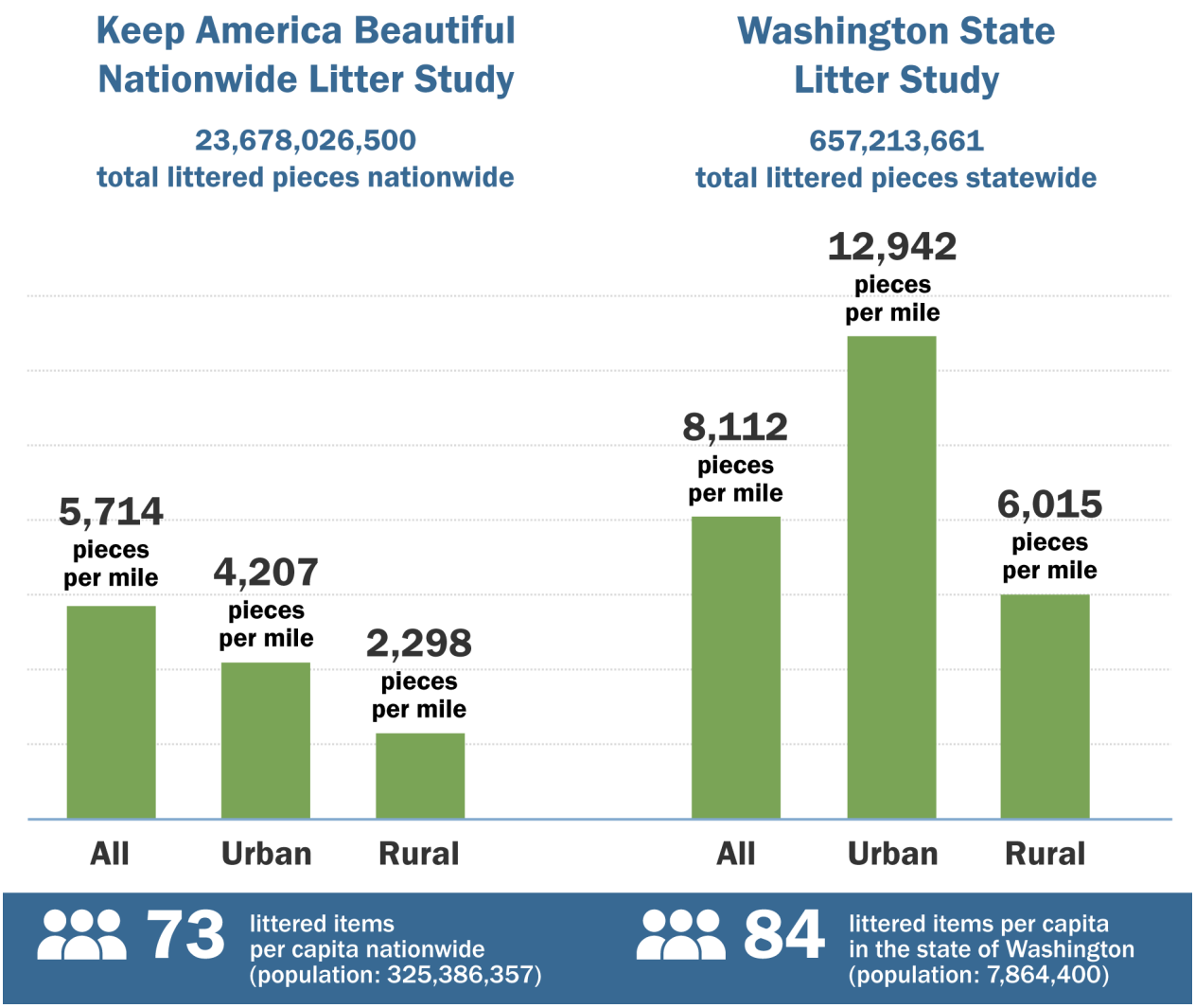


We also compared pieces of litter per person, using population data from the 2020 Census for the continental United States and from the 2022 populations trend report for Washington.[24,25] Considering population, Washington's roadways had 84 pieces of litter per person compared to 73 pieces per person nationally (Figure 89).

Differences in the pieces of litter per mile along roadways are larger than the differences in pieces of litter per person. This is likely because there are relatively fewer roads in Washington relative to population size than for the national overall. This could mean that litter is more concentrated along roadways in Washington than nationwide.

[24] https://data.census.gov/profile/Washington?g=0400000US53
[25] https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/ofm_april1_poptrends.pdf

Figure 89. Comparison of Washington's roadway litter to nationwide study findings.



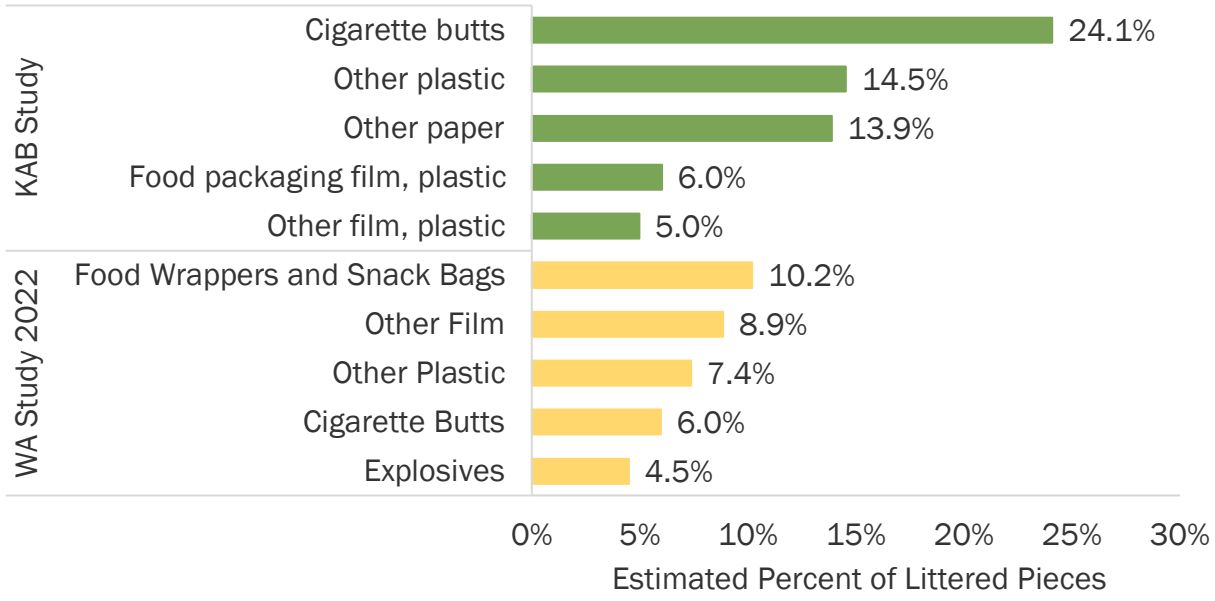
The 2020 KAB study also summarized the five most common material types in litter by pieces. Overall, the top five most common material types make up 63.5% of litter pieces along roadways nationally and 37% of litter pieces along roadways in Washington.

Three of the top five materials are the same in both studies: cigarette buts, other plastic, and other film (plastic and other film, respectively). A fourth top material is similar in both studies: food wrappers and snack bags in Washington are similar to food packaging film, plastic in the 2020 KAB study.

While in the top five for both studies, cigarette butts were far more common nationally, making up 24.1% of pieces of litter in the 2020 KAB study compared to 6.0% in the 2022 Washington study.

In contrast, Washington's litter had a higher percentage of food wrappers and snack bags (similar to food packaging film, plastic) and other film (similar to other film, plastic) than litter nationally, by piece.

Figure 90. Comparison of top five most common material types for roadways by piece, across studies (litter snapshot).



Recommendations

In 2022, Ecology and WSDOT spent almost $12 million dollars cleaning up litter throughout Washington State. However, the nearly 7.4 million pounds of litter that their crews picked up were less than one-fifth of the 37.8 million pounds of litter that newly accumulate each year and less than one-fifth of the 43.2 million pounds of litter estimated to be currently on the ground.

Because studies show that people are more likely to litter if there is already litter on the ground, cleanup efforts are crucial to both reducing and preventing litter.[26] However, cleanup efforts alone cannot resolve Washington's litter problem. Behavior change campaigns, improved collection infrastructure, targeted legislation, and new funding sources are all necessary to stop litter at its source.

Litter Reduction & Prevention Strategies

This section presents recommendations for strategies that focus on the types of litter that accumulate most quickly or are problematic, likely sources of litter, and opportunities to build on or fill gaps in existing efforts.

- **Focus on key materials**: beverage containers, cigarette butts, vehicle debris including auto rubber products, and urine-filled bottles (commonly called trucker bottles).
- **Focus on key sources**: escaped litter from commercial waste collection vehicles and unsecured loads from any vehicle.
- **Expand existing efforts**: Department of Licensing partnership and litter tax funding.
- **Conduct further research**: evaluation of recent single-use litter item legislation and research to support litter prevention efforts.

These recommendations build on Washington's existing strategies and partnerships, draw from successful approaches used in other states and in national litter campaigns, and identify additional research that would support future efforts. Recommendations draw on social marketing principles and research on behavior change related to solid waste that indicates messaging is most effective when it is supported by collection infrastructure, incentives, and—when needed—requirements.

[26] https://kab.org/wp-content/uploads/2021/05/Litter-Study-Summary-Report-May-2021_final_05172021.pdf

Figure 91. Roadside litter sample containing beverage containers.

ADOPT A BEVERAGE CONTAINER DEPOSIT RETURN LAW

Beverage containers are a significant source of litter in Washington, especially along roadways and on DNR and DFW lands. At all sites combined, beverage containers (glass, metal, plastic, and paper carton) make up 5.1 million pounds, which is 13% of accumulated pounds of litter each year. For some site types, littered beverage containers are becoming more common: along off-ramps, current estimated accumulation rates are seven times higher than in 2004. These materials could be covered by a bottle bill.

Table 50. Yearly litter accumulation for beverage containers.

Material Type	Estimated % of Pounds per Year	Estimated Pounds per Year	Estimated % of Pieces per Year	Estimated Pieces per Year
Paper beverage containers	0.02%	8,145	0.001%	69,656
Plastic beverage containers	1.32%	504,176	0.165%	11,740,363
Glass beverage containers	8.24%	3,134,051	1.458%	104,003,989
Metal beverage containers	3.71%	1,412,924	0.453%	32,349,225
Total beverage containers	**13.29%**	**5,059,296**	**2.077%**	**148,163,233**

A container deposit return law, also known as a "bottle bill," could reduce littered bottles by providing a financial incentive for people to save and recycle them and to clean up bottles that have already become litter. Container deposit return laws can cover both alcoholic and non-alcoholic beverages in glass, metal, or plastic bottles, cans, or jars. Many such laws, like Oregon, exempt infant formula, liquid meal replacements, or dairy or plant-based milk where milk is listed as the first ingredient. Some include only beer, while others (like Iowa and California) currently or will soon include wine and liquor.

A national study found that the 10 states with container deposit return laws have 50% fewer littered beverage containers than states without any such laws.[27] States with container deposit return laws have 30% less litter than states with no such laws. Nationally, support for container deposit return laws is high. Even in states without a law, 75% of respondents to the 2020 Keep America Beautiful survey reported strong support for container deposit return policies.[28]

The Oregon Department of Environmental Quality reports that beverage containers decreased from as much as 40% of roadside litter in 1971 before the bottle bill to only 6% in 1979 after the bottle bill.[29] Oregon's statewide redemption rate was also 80% in 2021.[30] In California, 68% of beverage containers are recycled because of the state's container deposit return law.[31]

In 2021, the proposed Washington Recycling and Packaging Act included a container deposit return system. While that bill did not pass, efforts are underway to revise and reintroduce the bill in the next legislative session.

IMPROVE CIGARETTE BUTT COLLECTION

Cigarette butts were the most frequently littered item, by piece, at nearly every site type in this study for Washington. The study estimates that 12,249 pieces per acre per year across all site types combined are cigarette butts (Figure 21). Nationwide, cigarette butts are also the most frequently littered item.[32] They also rank first or second in litter studies in

[27] https://kab.org/wp-content/uploads/2021/05/Litter-Study-Summary-Report-May-2021_final_05172021.pdf
[28] https://kab.org/wp-content/uploads/2021/05/Litter-Study-Summary-Report-May-2021_final_05172021.pdf
[29] https://web.archive.org/web/20080910085315/http://www.deq.state.or.us/lq/pubs/factsheets/sw/ExpandedBottleBill.pdf
[30] https://www.oregon.gov/olcc/Docs/bottle_bill/2021-Beverage-Container-Return-Data.pdf
[31] https://calrecycle.ca.gov/bevcontainer/
[32] https://kab.org/wp-content/uploads/2021/05/Litter-Study-Summary-Report-May-2021_final_05172021.pdf

Pennsylvania, Tennessee, Texas, and Utah.[33,34,35,36] While small, cigarettes are a large source of microplastic and toxin contamination. They also threaten the health of waterways and wildlife, as well as contributing to the initiation of wildfires.[37]

Litter prevention programs elsewhere have shown that improving collection infrastructure reduces litter. Increasing access to ashtrays in personal vehicles, along roadways, and in public areas could help reduce cigarette litter in Washington. Below are potential options for expanding access to ashtrays across the state.

Give away portable ashtrays and install more ash receptacles in rest areas and parks. Ecology's existing partnership with Fred Meyer stores to give away litter bags once a year could be expanded to also offer portable ashtrays. Ecology could also build on partnerships with DNR, DFW, and Parks in providing portable ashtrays at state-owned recreation areas. In Pennsylvania state parks, cigarette butt litter decreased by 42% after the state installed disposal receptables at park entrances and gave pocket ashtrays to visitors as they entered.[38] Municipalities that have received additional ash receptables through Keep America Beautiful Cigarette Litter Prevention Program saw a 50% decrease in cigarette butt litter, on average.[39] The city of Vancouver, Canada has piloted giving away free pocket ashtrays and installing a 'cigarette butt ballot box' where smokers could answer a yes/no question by disposing of their cigarette in the corresponding hole.[40] Terracycle and Santa Fe Natural Tobacco Company partnered to offer free shipping and recycling for cigarette butts collected by participants.[41] Marlboro and American Spirit companies also offer free disposable cigarette pouches to reduce littering.

[33] https://www.terracycle.com/en-US/https://www.dep.pa.gov/Business/Land/Waste/littering/Pages/Research.aspxbrigades/cigarette-waste-recycling
[34] https://www.tn.gov/content/dam/tn/tacir/commission-meetings/2023january/2023Jan_Tab6Litter_Report.pdf
[35] www.dontmesswithtexas.org/about/litter-facts/
[36] https://rosap.ntl.bts.gov/view/dot/60313
[37] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2697937/
[38] https://www.dep.pa.gov/Business/Land/Waste/littering/Pages/Litter-Action-Plan.aspx
[39] https://kab.org/our-signature-programs/cigarette-litter-prevention-program/
[40] https://vancouver.ca/green-vancouver/cigarette-litter-reduction.aspx
[41] https://www.terracycle.com/en-US/brigades/cigarette-waste-recycling

Figure 92. Cigarette butt litter collection.

Increase anti-litter messaging where cigarettes are sold. Supporting expanded collection infrastructure with messaging campaigns on cigarette packaging and at stores that sell cigarettes could also reduce cigarette butt litter. A 2022 study found that smokers who received anti-littering labels on their packs were significantly less likely to litter their cigarette butts.[42]

[42] https://www.sciencedirect.com/science/article/abs/pii/S0306460321003695

Figure 93. Social media outreach around cigarette butts.[43]

REQUIRE TOWING COMPANIES TO REMOVE ALL VEHICLE DEBRIS

By pounds, auto rubber products and vehicle debris were among the top litter items in Washington, with 10.3 pounds per acre per year for auto rubber products and 10.2 pounds per acre per year for vehicle debris across all site types combined (see Figure 20). These items pose a similar problem in other states. A 2019 litter study in Ohio found vehicle debris was the second largest category of litter.[44] Ohio's report recommended that companies towing vehicles after accidents also be required to remove car parts from the scene. Suffolk County, New York, adopted a similar law in June 2022 to reduce litter and prevent additional accidents caused by vehicle debris.[45]

[43] https://twitter.com/EcologyWA/status/1305597636007739392
[44] https://www.transportation.ohio.gov/programs/litter/study-litter
[45] https://www.scnylegislature.us/DocumentCenter/View/85545/Introductory-Resolution-1557-22-PDF

Pennsylvania state law currently says that "Any person removing a wrecked, damaged or disabled vehicle from a highway shall remove from the highway or neutralize any glass, oil or other injurious substance resulting from the accident or disablement."[46] However, Pennsylvania's Litter Action Plan noted that towing companies and first responders may need more education on their responsibilities for the law to become effective.[47] As a result, the Pennsylvania Department of Transportation is developing educational materials that Pennsylvania State Patrol will share with towing companies and first responders.

Washington could adopt a similar requirement for towing companies to remove all vehicle debris and partner with WSDOT and the Washington State Patrol to educate towing companies, first responders, drivers, and other affected persons about the new law and how to comply.

Figure 94. Litter sample including vehicle and tire debris.

RESEARCH AND SOCIAL MARKETING PILOT FOR URINE-FILLED BOTTLES

"Trucker bottles" are plastic bottles that motorists urinate into and then toss out the window while driving. Urine-filled bottles have been a problem in Washington for decades and are

[46] https://www.legis.state.pa.us/WU01/LI/LI/CT/HTM/75/00.037..HTM
[47] https://www.dep.pa.gov/Business/Land/Waste/littering/Pages/Litter-Action-Plan.aspx

not unique to our state.[48,49,50] The 1999 study found 150 trucker bottlers, mainly along interstates and on-off ramps. During the spring litter sampling, fieldworkers found 70 trucker bottles and other samples of human waste: 12 at rest areas, 24 along on-off ramps, and the rest along the various types of roadways. During the fall litter sampling, fieldworkers found 73 of these bottles and other samples of human waste: 11 at rest areas, 30 at on-off ramps, and the rest along roadways. Scaled statewide, this would be 644 to 703 trucker bottles and human waste at rest areas across Washington and 96,449 to 120,561 of these items at on-off ramps.

To address the longstanding problem of trucker bottles, Ecology may need to conduct dedicated audience research and a comprehensive social marketing effort that addresses root causes or provides additional infrastructure. The effort could involve partnering with transportation and labor agencies, representatives of professional drivers, and trucking and logistics companies. Audience research should identify the root causes of urinating in bottles, the root causes of disposing of those bottles as litter, barriers to taking bathroom breaks, and alternative solutions to pilot test that will benefit and work for drivers.

PROMOTE NEWER COMMERCIAL WASTE COLLECTION TRUCKS THAT MINIMIZE LITTER

Many Washington residents report to Ecology and local governments that they see waste becoming litter while collection trucks empty collection containers into the vehicle and afterward from the truck while driving if the body is not fully sealed. Washington is not alone in this problem: a study in Utah estimated that 42% of highway litter comes from trash and recycling vehicles.[51]

Promote switching to newer waste collection trucks. Switching to newer garbage and recycling truck models could prevent waste from escaping as it is loaded. For example, drop frame side-load trucks keep waste carts closed as long as possible and lift them lower into the truck, reducing wind exposure. The truck body is also fully sealed. However, buying new vehicles is an expensive solution, and may not be feasible for all haulers outside of normal vehicle replacement schedules. For all vehicles, maintenance and operation methods, such as fully closing trucks between stops, could reduce escaping waste.

Partner with other agencies or organizations to promote trucks that minimize litter. Ecology could reach out to waste collection companies, municipalities and other agencies and organizations that have influence over waste collection vehicles. Examples include cities that provide or contract for waste collection service, counties or cities that adopt state-

[48] https://www.nbcnews.com/id/wbna7912464
[49] https://www.twincities.com/2012/03/25/trucker-bombs-discarded-bottles-of-urine-foul-roadsides-in-n-d-oil-patch/
[50] https://www.businessinsider.com/amazon-drivers-say-peeing-in-bottles-common-despite-company-denials-2021-3
[51] https://rosap.ntl.bts.gov/view/dot/60313

approved solid waste management plans or licensing requirements for waste collection vehicles, and state agencies that promote switching to electric collection trucks.

REVIEW ENFORCEMENT OF AND EXEMPTIONS TO COVERED LOADS REQUIREMENTS

Improved enforcement of existing laws could reduce unsecured or uncovered loads. An estimated 38.5% of Washington's litter comes from materials that Ecology associates with unsecured loads. Ecology launched the annual Secure Your Load for Safer Roads campaign in 2021. The campaign includes emphasis patrols from the Washington State Patrol and partners with big box hardware stores and local governments to provide education about properly securing loads. In addition to ongoing education at solid waste facilities, local government partners also host free cargo net giveaway events and ideally enforce an unsecured load fee at their solid waste facilities.

Washington has several laws that require covering loads, but these laws have exemptions that could be reviewed for their impact on litter, then revised if appropriate.

RCW 70A.200.120 **Transported waste must be covered or secured.**[52] Requires cities and counties to adopt an ordinance that requires vehicles to cover their load when transporting waste to a staffed transfer station or landfill. However, not all local governments have or enforce fines for vehicles arriving at transfer stations or landfills with unsecured loads. Other exemptions include:

- Vehicle transporting waste that is unlikely to spill, but "unlikely to spill" is not further defined. Pennsylvania is considering expanding its covered load law to include vehicles leaving disposal sites, to prevent leftover waste from escaping.[53]
- Vehicle transporting sand, dirt, or gravel in compliance with RCW 46.61.655.

RCW 46.61.655 **Dropping load, other materials—Covering.**[54] Requires vehicles on public highways to cover loads to prevent dropping, sifting, leaking, or otherwise escaping. Exemptions include:

- Vehicles with dirt, sand, or gravel "if six inches of freeboard is maintained within the bed."

[52] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.200.120
[53] https://www.dep.pa.gov/Business/Land/Waste/littering/Pages/Litter-Action-Plan.aspx
[54] https://app.leg.wa.gov/RCW/default.aspx?cite=46.61.655

EXPAND PARTNERSHIP WITH THE DEPARTMENT OF LICENSING

Ecology partners with the Department of Licensing on anti-litter campaigns and could expand these joint education efforts to include more messaging and distribution of litter bags.

Expand education in the Washington Driver Guide and partner with driver education courses. According to an unpublished report by Ecology, the majority of litterers in Washington are males ages 18-40, which makes educating younger drivers especially impactful.[55] While the current Washington Driver Guide emphasizes the importance of securing loads, its section on litter overall is relatively brief. Driver education courses are an opportunity to educate new drivers and prevent littering habits along roadways before they start. Texas currently requires driver education courses to include litter prevention education.[56] Louisiana's anti-litter task force has recently recommended a similar requirement for its driver education classes.[57]

Provide messaging during driver and vehicle licensing and renewals. In Washington, drivers interact with licensing centers at least every six years to renew their licenses, providing repeat opportunities for clear and consistent messaging about litter prevention. Several states provide anti-litter education during licensing and registration services. For example, Pennsylvania's Department of Transportation is developing anti-litter messaging for vehicle registrations, which could be expanded to vehicle inspections and license renewals.[58]

Mail litter bags with license cards and plates. To ensure drivers have a straightforward way to prevent litter, Ecology, WSDOT, and the Department of Licensing could partner to distribute a litter bag with every new or renewed driver license, every new license plate, or every new registration or transfer of vehicle ownership. This program could start with a pilot test and evaluation in a few counties around the state.

RECONSIDER ADEQUACY OF LITTER TAX RATE AND COVERED ITEMS

In 2022, Ecology, WSDOT and partners cleaned up an estimated 7.4 million pounds of litter at a cost of nearly $12 million. That cleanup effort picked up less than one-fifth of the 37.8 million pounds of litter that accumulate each year. With the current rate of litter accumulation, the cost to clean up all new litter could be over $60 million per year. That cost estimate does not consider the litter already on the ground from reduced efforts due to funding cuts from 2009 to 2019.

Litter cleanup and prevention efforts are funded primarily through Washington's litter tax. The litter tax rate (0.015%) and list of items covered by the tax were developed in 1971

[55] Ecology, unpublished research by C+C in 2020.
[56] https://texas.public.law/statutes/tex._educ._code_section_1001.107
[57] https://keeplouisianabeautiful.org/publications/
[58] https://www.dep.pa.gov/Business/Land/Waste/littering/Pages/Litter-Action-Plan.aspx

based on the costs of items and litter cleanup efforts in 1970. Costs have risen dramatically over the years, but the litter tax has not risen alongside these changing costs. Based on the 2022 litter study, approximately 47.1% of pounds and 25.0% of pieces of litter that accumulate yearly are not covered by the litter tax. By weight, some of the most common material types not covered by the litter tax are auto rubber products; vehicle debris; construction and demolition debris; and textiles, clothing, and shoes.

Washington should reconsider the adequacy of the rate and list of covered items for the litter tax compared to needs for expanding litter cleanup and prevention efforts.

EVALUATE IMPACTS OF SINGLE-USE ITEM LEGISLATION

In the past few years, Washington implemented legislation to reduce the use of several items found in litter: a ban on single-use plastic carryout bags (2021), a requirement to charge a fee for large paper carryout bags (2021), and a ban on providing single-use food serviceware automatically without a customer request (2022).[59,60] Washington has also passed bans that will be implemented in the future on expanded polystyrene (EPS) products include packing peanuts in 2023 and coolers and food service products in 2024.[61]

Results from the 2022 study can provide a useful baseline to evaluate how these policies impact the amount, composition, and distribution of litter throughout Washington. Table 51 presents the estimated annual accumulation levels for several banned single-use items:

- Single-use plastic carryout bags accumulate at 127,279 pounds or 18.7 million pieces each year.
- Plastic food serviceware accumulates at 38,412 pounds or 9.7 million pieces each year.
- EPS food service products accumulate at 11,053 pounds or 1.0 million pieces each year.

Due to limited resources, the 2022 study did not fully separate all materials covered by current laws. For example, our material type for single-use plastic bags included compostable plastic bags, which are not prohibited. We were also not able to separately measure cold cup lids, condiment packets, EPS packing peanuts, or EPS coolers. The other foam material category included prohibited EPS coolers and food serviceware in addition to other items that are not prohibited. Nonetheless, estimate for other foam can provide information for future comparison:

[59] https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Waste-reduction-programs/Plastics/Plastic-bag-ban

[60] https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Waste-reduction-programs/Plastics/2021-plastic-pollution-laws/Food-serviceware

[61] https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Waste-reduction-programs/Plastics/2021-plastic-pollution-laws/Expanded-polystyrene-ban

- Other foam accumulates at 363,226 pounds or 191.2 million pieces each year.

Comparing accumulation rates from previous studies can also contextualize future changes. For example, accumulation rates for plastic single-use serviceware and EPS products have decreased steadily along roadways and on-off ramps since the 1999 and 2004 statewide litter studies, although these results do not include all items subject to recent legislation. Additionally, bans and restrictions that were already in place during data collection for the 2022 study, such as the single-use plastic bag ban that went into effect in October 2021, may have affected results. After single-use plastic bags were banned in New Jersey in May 2022, cleanup efforts along the New Jersey coast later that fall saw an immediate 37% reduction in plastic bags compared to a 2021 cleanup.[62]

Table 51. Yearly accumulation rates for materials affected by single-use litter legislation, by pound and by piece.

Legislation and Effect	Study Material	Estimated % of Pounds per Year	Estimated Pounds per Year	Estimated % of Pieces per Year	Estimated Millions of Pieces per Year
Single-use plastic bags: ban	Grocery, retail, and shopping bags*	0.33%	127,279	0.26%	18.7
Single-use serviceware: restriction	Plastic straws and stirrers	0.07%	28,286	0.12%	8.4
Single-use serviceware: restriction	Plastic utensils	0.03%	10,127	0.02%	1.3
Expanded polystyrene: ban	Foam cups, bowls, and clamshells	0.03%	11,053	0.01%	1.0
Expanded polystyrene	Other foam**	1.0%	363,226	2.7%	191.21

* Included compostable plastic bags, which are not banned.
** Includes EPS peanuts and coolers as well as foam materials that are not banned.

[62] https://cleanoceanaction.org/fileadmin/editor_group2/Beach_Sweeps/2022_COA_Beach_Sweeps_Annual_Report.pdf

FURTHER RESEARCH ON LITTER SOURCES, BEHAVIORS, AND IMPACTS

The current study focused on field research for estimating litter accumulation, current levels, and material types along roadways, on-off-ramps, rest areas, state and county parks, and DNR and DFW lands. This field research addresses how much litter is on the ground but not where it came from, why it was littered, how to prevent littering, or what impact litter has on the environment. We identify potential additional research that could provide more information to inform future litter prevention efforts.

Research on sources of litter. The 2022 study, like previous litter studies in Washington, attributed litter to potential sources based on material type alone. Additional research that either incorporates context clues (such as the specific location or condition of the littered item) or directly observes littering would improve the reliability of source estimates. Observational studies could be done through in-person or camera monitoring.

With renewed funding, Ecology commissioned new audience research to inform its 2023 "Simple As That" campaign with new message, educational materials, and free litter bags.[63] Additional research could evaluate this campaign to refine messages, marketing channels, and behavior change tools for effectiveness and equity.

Research on the environmental effects of litter. Roadside litter is more than just a visual problem. Research on cigarette butts shows they also threaten the health of waterways and wildlife, as well as contribute to wildfires.[64] Ecology could consider partnering with the Washington Stormwater Center and Department of Fish and Wildlife on the impact of litter to inform messaging or on which types or locations of litter cause the biggest problems to prioritize prevention and cleanup efforts.

Research on litter along waterways. Like previous studies in Washington, the 2022 study did not include sites along waterways. With almost 74,000 miles of rivers and streams statewide, more than 4,000 lakes, and almost 3,000 square miles of marine estuaries, Washington could benefit from a study of litter on inland and coastal water bodies.[65] The 2021 Washington Marine Debris Action Plan includes a strategy to better understand the "physical and chemical traits, full life cycle, transport, quantity, and accumulation rate" of marine debris.[66] Ecology could also contribute to and analyze information gathered from using the Escaped Trash Assessment Protocol that combines statistics from litter cleanups done by nonprofits and others along Washington waterways.

[63] https://ecology.wa.gov/Waste-Toxics/Solid-waste-litter/Litter/litter-prevention/Simple-as-that
[64] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2697937/
[65] https://ecology.wa.gov/About-us/Who-we-are/Our-Programs/Water-Quality
[66] https://marinedebris.noaa.gov/regional-action-plan/washington-marine-debris-action-plan

Appendices

Appendix A. Litter Reduction Efforts in Washington

Litter prevention efforts in Washington have been ongoing since 1971, with fluctuations in funding over time. The Washington Department of Ecology (Ecology) conducted statewide litter studies in 1982, 1983, 1985, 1987, 1990, 1999, and 2004. This section highlights major litter prevention and cleanup efforts in Washington. The discussion focuses on efforts by the Department of Ecology (Ecology), but also covers other public and private programs.

Washington State Department of Ecology

Ecology serves as the primary government agency coordinating litter prevention and cleanup efforts in Washington. Ecology conducts several litter prevention and cleanup programs and coordinates litter programs with other state and local agencies.

Ecology Youth Corps hires youth and adults to collect litter on state roads and highways, providing job skills, experience in environmental work, and fields trips for youth.[67] Ecology Youth Corps was the largest youth employment program in Washington, employing about 300 young people (14–17 years old) as summer litter crews and hiring adult litter crews for March through November. In 2022, the Ecology Youth Corps removed more than 1.3 million pounds of litter from 2,036 miles of roads across the state (Table 52).

Due to safety concerns associated with removing litter along highways, Ecology is moving away from youth crews and relying more on adult crews for litter removal along highways. In 2022, Ecology received $2 million funding from the legislature that was used to enter into a contract with the Adopt A Highway Maintenance Corporation to run contracted litter crews to help us clean state highways.

[67] https://ecology.wa.gov/Waste-Toxics/Solid-waste-litter/Litter/Ecology-Youth-Corps

Figure 95. Litter removal along highways by Ecology Youth Corps.

Table 52 summarizes all Ecology-funded litter cleanup efforts in 2022. Statewide, these efforts removed more than 5.4 million pounds of litter from nearly 16,000 miles of roadways.

Table 52. 2022 Ecology-funded litter cleanup efforts[68]

Litter Program	Hours	Pounds	Miles	Acres	# Dumps
Ecology Youth Corps (EYC)	57,670	1,339,335	2,036	550	216
Community Litter Cleanup Program (CLCP)	61,811	3,140,021	11,965	864	2,803
Ramp Litter Cleanup Program (RLCP, formerly SB 6040 Welcome to WA Act)	6,073	377,155	839	0	427
Department of Corrections (DOC)/Department of Transportation (WSDOT)	2,959	85,947	170	76	6
Department of Natural Resources (DNR)	10,819	144,287	117	322	413
Department of Fish and Wildlife (DFW)	5,169	172,911	42	2,352	650
State Parks and Recreation Commission (Parks)	2,903	50,747	18	0	0
Adopt A Highway Maintenance Corporation (AHMC)	2,923	97,043	807	0	0
2022 Total	**150,327**	**5,407,446**	**15,993**	**4,164**	**4,515**

[68] https://ecology.wa.gov/DOE/files/4f/4fac6a2b-824f-439b-85d3-497532a29d6e.pdf

Litter Program	Hours	Pounds	Miles	Acres	# Dumps
2021 Total	125,460	5,195,645	21,423	2,510	2,847
2020 Total	112,624	4,576,448	21,276	4,341	4,361

Other State Litter Programs

Adopt-a-Highway Program (WSDOT). The Adopt-a-Highway program is intended to keep the state's roadways clean and safe for motorists and other users. The Adopt-a-Highway Program includes a volunteer or commercially sponsored litter cleanup program and a commercial sponsorship program where a group can sign-up to clean a road segment (generally two miles in length). [69] In recognition of this adoption, WSDOT installs customized signs at the adopted highway segment.

Other interagency cleanup efforts. Ecology provides funding to other state agencies for cleanup and prevention efforts. DNR operates a correctional camps program in partnership with the Department of Corrections (DOC), in which inmates clean state lands and roads. WSDOT also partners with the DOC to clean state highways. The Washington Department of Fish and Wildlife hosts cleanup crews for natural areas around the state, and Washington State Parks coordinates beach cleanups with CoastSavers Washington.

Ecology also provides funding for litter cleanup and prevention to local governments through the Community Litter Cleanup Program and the Ramp Litter Cleanup Program.

Social marketing (behavior change) campaigns (2002–2009). Ecology launched the Litter and It Will Hurt campaign in April 2002, using findings from sampling, resident surveys, and focus groups in the 1999 litter study. The campaign used several strategies to first raise awareness of the litter problem, then change beliefs around littering, and finally change behaviors. The program included a media campaign, litter hotline, road and retail signs, a website, ongoing public relations, distribution of litterbags and campaign materials, and an enforcement plan. Between the 1999 study and the 2004 study, the state saw a reduction in roadway and on-off ramp litter.[70] The Litter and It Will Hurt campaign ended in 2009 when Ecology lost a significant portion of its litter funding. Ecology had to reduce litter cleanup efforts, discontinue litter surveys and prevention work.

(2019–present). In 2019, the state legislature restored litter funding. Since then, Ecology developed and promoted new social marketing campaigns, such as We Keep WA Litter Free, Secure Your Load for Safer Roads, and Simple As That.[71,72,73] These behavior change

[69] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2697937/
[70] https://ecology.wa.gov/Waste-Toxics/Solid-waste-litter/Litter/litter-prevention/Prevention-history
[71] https://ecology.wa.gov/LitterFreeWA
[72] https://ecology.wa.gov/SecureLoadsWA
[73] https://ecology.wa.gov/Waste-Toxics/Solid-waste-litter/Litter/litter-prevention/Simple-as-that

campaigns focus on stopping litter at its source through simple but high-impact actions. For example, the Simple As That campaign urges motorists to keep a litter bag in their vehicle to store trash until they can properly dispose of it at their destination. The Secure Your Load campaign promotes simple messages and tools (such as cargo nets) for securing loads. These campaigns are in English and Spanish and include diverse partnerships (including retail stores, sports teams, media outlets, state agencies, and local governments), public relations, strategic advertising and media buys, highway signs, messaging on WSDOT reader boards, and emphasis patrols in partnership with the Washington State Patrol.

Enforcement. Littering and illegal dumping are illegal in Washington. The Washington State Patrol, local police departments, sheriff's offices, and health departments have the legal enforcement authority for litter and unsecured load violations. Washington's RCW 70A.200.060 sets minimum fines for littering and illegal dumping as follows:

- Throwing or depositing litter on the highway = $231
- Littering less than 1 cubic foot = $103
- Litter more than 1 cubic foot, but less than 1 cubic yard = $500
- Littering more than 1 cubic yard = $1,000 - $5,000 and potential jail time
- Potentially dangerous litter (including cigarette butts) = $1,025

Other Litter Reduction, Removal, and Outreach Programs

The federal government, local counties and cities, state universities, and private sector anti-litter programs also contribute to litter prevention, cleanup, and research in Washington.

FEDERAL PROGRAMS

Nationally, the federal government in partnership with nonprofit organizations helps local communities to clean up open spaces, roads, and public areas. For example, the Environmental Protection Agency helps communities keep their water clean through the Trash Free Waters program, helping to clean marine areas of trash and litter.[74]

COUNTY PROGRAMS

Counties in Washington also run anti-litter programs. Many counties have Adopt-a-Road and Adopt-a-Spot programs for people to get involved in their community through volunteer litter cleanup. One example is Kitsap County's Adopt-a-Spot program.[75] Additionally, Spokane

[74] https://www.epa.gov/trash-free-waters
[75] https://adopt-a-spot-kitcowa.hub.arcgis.com/

County runs the Load Warrior program, encouraging drivers to ensure their loads are secured on their trucks.[76] Several volunteer-based cleanup organizations, such as Community Cleanup and Team Up to Clean Up operate in Spokane.[77] Furthermore, Spokane County used a grant from Keep America Beautiful to set up ash canisters around the Spokane County Courthouse Campus, reducing the number of cigarettes littered on the ground.

As an example of litter prevention, NextCycle Washington, a partnership of King County, Ecology, other state agencies, and Seattle Public Utilities, is working to replace single-use items with closed-loop reusable alternatives, which could reduce the number of products that likely to end up as litter.[78]

CITY PROGRAMS

Cities in Washington also run anti-litter programs. For example, the City of Seattle has multiple different programs for litter removal. Seattle's Clean City Initiative invests $3 million into new and existing programs to clean up litter and garbage around the city.[79] The initiative pays for additional Seattle Public Utilities litter routes, weekly park and neighborhood cleanups, increased trash cleanup from encampments and RVs, and needle collection efforts. Seattle also has public garbage and recycling cans to prevent litter and sponsors an Adopt-a-Street program, similar to Adopt-a-Highway.[80] As another example, the City of Tacoma runs a similar program called Adopt-a-Spot, in which Tacoma residents can adopt local streets in their area.[81] Tacoma also runs neighborhood litter patrols, in which community members can volunteer to collect litter in their neighborhoods.

STATE UNIVERSITY PROGRAMS

State universities also support anti-litter efforts. For example, the University of Washington released a report on the prevalence of litter on beaches in 2022.[82] Volunteer students at the University of Washington have also conducted cigarette litter studies to mark the prevalence of cigarette litter on campus.[83] Some Washington State University extension programs include litter cleanup volunteer opportunities.[84]

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[76] https://www.spokanecounty.org/CivicSend/ViewMessage/message/37853
[77] https://www.spokanecounty.org/4055/Team-Up-to-Clean-Up
[78] https://www.nextcyclewashington.com/circular-101
[79] https://www.seattle.gov/parks/about-us/plans-and-reports/clean-city-initiative
[80] https://www.seattle.gov/utilities/volunteer/adopt-a-street
[81] https://www.cityoftacoma.org/government/city_departments/neighborhood_and_community_services/adopt-a-spot_and_neighborhood_litter_patrol
[82] https://www.washington.edu/news/2022/08/23/beach-trash-accumulates-in-predictable-patterns-on-washington-and-oregon-shores/
[83] https://www.washington.edu/news/2022/08/23/beach-trash-accumulates-in-predictable-patterns-on-washington-and-oregon-shores/
[84] https://extension.wsu.edu/island/home/beachlitter/

NONPROFIT AND OTHER PRIVATE SECTOR PROGRAMS

Keep America Beautiful (KAB), a national nonprofit organization, is the largest litter-oriented nonprofit in the country with programs in Washington State.[85] The organization sponsors ongoing local community cleanups as well as focused programs, such as the Great American Cleanup, offering help in organizing cleanups, greening communities, and educating people on litter and recycling.

There are many nonprofit organizations working to clean up and prevent litter in Washington. Here are some examples:

- Clean Trails is an international non-profit focusing on picking up litter along trails and natural areas. use areas to encourage users to be responsible for their surroundings, using a one piece of litter picked up per person goal.[86]
- The Clean Earth Foundation focuses on wilderness trails and ocean areas. They are developing platforms that will allow users to plan and lead their own cleanup events along lakes, oceans, and trails.[87]
- Washington CoastSavers focuses on cleaning and preventing litter along ocean beaches.[88]
- Zero Waste Washington and other grassroots nonprofit research and advocacy organizations work toward legislation that would prevent litter, reduce plastic pollution, and minimize waste before it becomes litter.[89]
- Surfrider WA is a grassroots nonprofit organization that focuses on protecting ocean, waves, and beaches through several campaigns, programs, and other initiatives. Their work also addresses issues around water quality, beach access, and local policy decisions. They routinely organize community and beach litter pickup events, conduct local water quality testing, and run litter reduction programs such as an ocean-friendly restaurants program. They also operate the Hold On To Your Butt program to reduce cigarette litter and a reusable bag initiative. They work toward passing legislation to prevent litter and plastic pollution and to develop effective local strategies to combat climate change.[90]

Grassroots organizations helped pass Washington's litter tax in 1971 and continue to play an important role in litter prevention and cleanup efforts, such as advocating for deposit return systems and legislation to reduce single-use plastics.

[85] https://kab.org/
[86] https://www.cleantrails.org/
[87] www.cleanearthfoundation.com/
[88] https://www.coastsavers.org/
[89] https://zerowastewashington.org
[90] https://washington.surfrider.org/

Appendix B. Site Selection and Sampling Sites

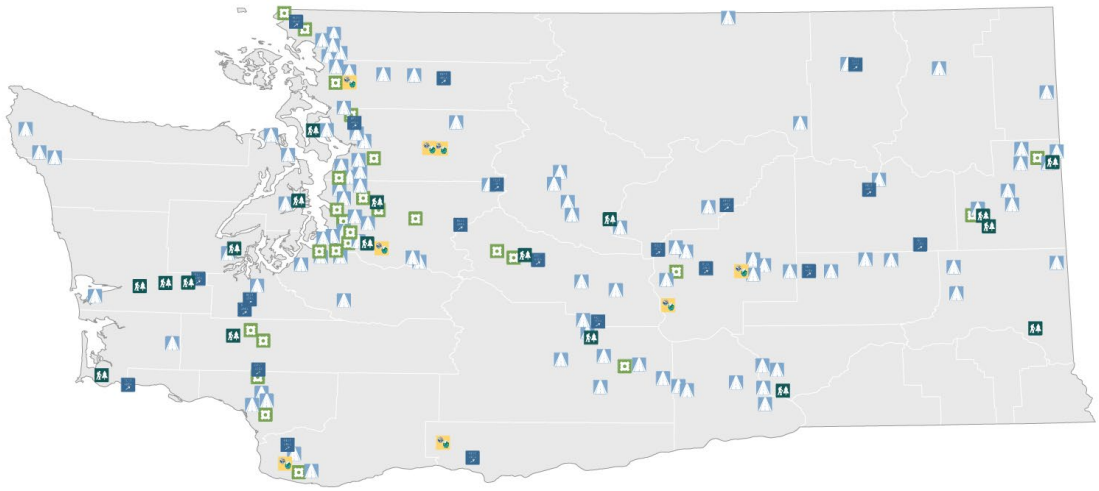
When possible, we measured litter at the same sites used in the 1999 and 2004 litter studies. When adding new sites, we chose new sites in a similar way to how those studies chose sites. We also used the Washington Environmental Health Disparities Map to ensure representation across diverse communities.[9]

We measured litter at 182 sample sites, along roadways, on-off ramps, and at high-use areas of rest areas, parks, and certain public lands. These sites included 104 sites across four different roadway types, 26 on-off ramps, 26 rest areas, 20 in state and county parks, and 6 on DNR and DFW lands.

For all site types, we sampled from a mix of urban and rural sites. Consistent with the 2004 and 1999 studies, sites were divided into urban and rural using the Census Bureau's urban-rural classification.[91]

Figure 96 shows a map of these sites, and Table 53 shows the number of sampling sites for each site type and urban and rural locations, lists the number of sites measured by type.

Figure 96. Map of sampling sites across Washington.



[91] To qualify as an urban area, the territory identified according to criteria must encompass at least 2,500 people, at least 1,500 of which reside outside institutional group quarters. "Rural" encompasses all population, housing, and territory not included within an urban area. https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-Rural/2010-urban-Rural.html

Table 53. Number of sampling sites for each site type and urban and rural locations.

Site Type	Urban Sampling Sites	Rural Sampling Sites	Total Sites
All Roadways	52	52	104
Interstate Roadways	13	13	26
Arterial Roadways	13	13	26
Collector Roadways	13	13	26
Local Roadways	13	13	26
On-Off Ramps	13	13	26
Rest Areas	8	18	26
State and County Parks	10	10	20
DNR and DFW Lands	4	2	6
Total Sampling Sites	**87**	**95**	**182**

We used geographic information system (GIS) tools and publicly available GIS datasets, such as those available through the Washington State Department of Transportation Geospatial Open Data Portal, to verify and finalize the site locations.[92] The GIS datasets and tools allowed the sampling crew to identify the exact location of the sampling site during fall season resampling. They also allowed the data manager to select additional or replacement sites, if needed.

To minimize site interference during the study, we worked with Ecology and the Washington State Department of Transportation to identify and remove from sampling any road segments that were either part of the Adopt-A-Highway program agreement or cleaned by the Ecology Youth Corps.

We also compared the site locations against the Washington Environmental Health Disparities (EHD) Map to verify the extent of coverage for communities with differing levels of environmental health disparities (Figure 97).[93]

[92] https://gisdata-wsdot.opendata.arcgis.com/

[93] https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map

Figure 97. Environmental health disparities map.

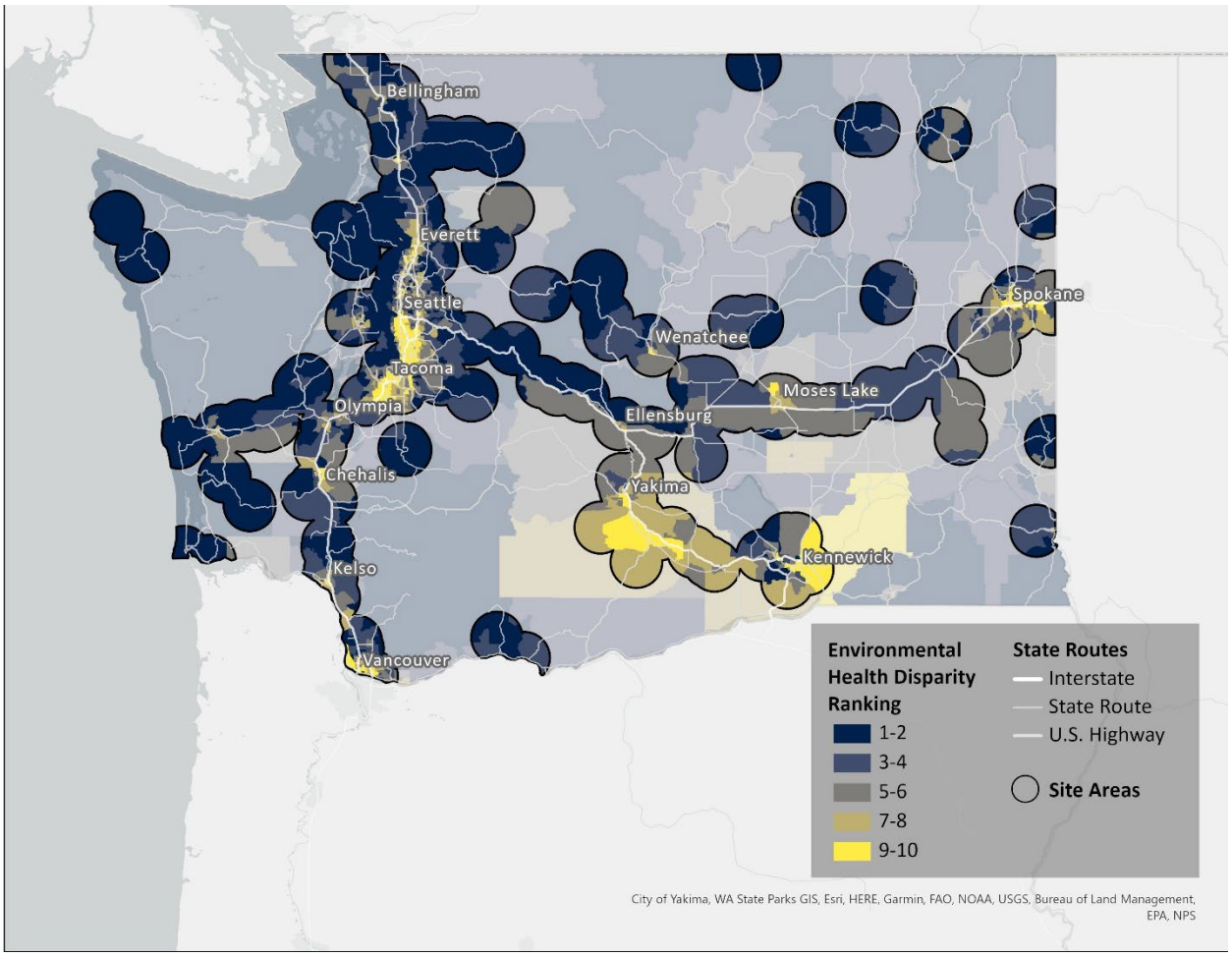


Table 54 through Table 58 shows the location and other site attributes of all sampling sites in the 2022 study. A more detailed record of sampling site attributes can be found on the Excel spreadsheet in *Appendix G. Detailed Composition Results*.

Table 54. Roadway sampling sites.

Site ID	Site Name	Sub Type	Region	Area	X-coordinate	Y-coordinate
RA-01	2 MP 86	Arterial	Rural	CRO	-120.738207	47.738645
RA-02	97 MP 180	Arterial	Rural	CRO	-120.632350	47.496502
RA-03	101 MP 189	Arterial	Rural	SWRO	-124.405266	47.923791
RA-04	28 MP 32	Arterial	Rural	ERO	-119.806256	47.234035
RA-05	105 MP 34	Arterial	Rural	SWRO	-124.112147	46.904977
RA-06	20 MP 8	Arterial	Rural	SWRO	-122.818119	48.074522
RA-07	97 MP 50	Arterial	Rural	CRO	-120.419024	46.241737
RA-08	23 MP 27	Arterial	Rural	ERO	-117.822081	47.113381

Site ID	Site Name	Sub Type	Region	Area	X-coordinate	Y-coordinate
RA-09	6 MP 15	Arterial	Rural	SWRO	-123.540613	46.557944
RA-10b	White River	Arterial	Rural	NWRO	-121.750312	47.164418
RA-11	272 MP 17	Arterial	Rural	ERO	-117.071666	46.910221
RA-12	542 MP 5	Arterial	Rural	NWRO	-122.373573	48.804018
RA-13	Bigelow Gulch Road	Arterial	Rural	ERO	-117.332098	47.721306
RC-01	E. Leavenworth Road	Collector	Rural	CRO	-120.658021	47.585644
RC-02	Hoko-Ozette Road	Collector	Rural	SWRO	-124.610338	48.128846
RC-03	Quillayute Road	Collector	Rural	SWRO	-124.509372	47.948881
RC-04	Whitehall Road	Collector	Rural	CRO	-119.619624	47.563379
RC-05	E. Zillah Drive	Collector	Rural	CRO	-120.134965	46.404339
RC-06	Winona South Road	Collector	Rural	ERO	-117.800327	46.924992
RC-07	Williams Lake Road	Collector	Rural	ERO	-117.936040	48.573933
RC-08	South Skagit Highway	Collector	Rural	NWRO	-121.780791	48.528209
RC-09	Shelton Matlock Brady Road	Collector	Rural	SWRO	-123.141548	47.204786
RC-10	Eatonville Highway	Collector	Rural	SWRO	-122.283939	46.863872
RC-11	Loomis Oroville Road	Collector	Rural	CRO	-119.472497	48.952939
RC-12	Cache Creek Road	Collector	Rural	CRO	-118.945822	48.174143
RC-13	Deer Valley Rd	Collector	Rural	ERO	-117.147740	48.159632
RI-01	5 MP 239	Interstate	Rural	NWRO	-122.343437	48.594547
RI-02	90 MP 146	Interstate	Rural	ERO	-119.914631	47.044291
RI-03	90 MP 190	Interstate	Rural	ERO	-119.020923	47.085353
RI-04	90 MP 266	Interstate	Rural	ERO	-117.666390	47.522126
RI-05	90 MP 121	Interstate	Rural	CRO	-120.302913	46.956495
RI-06	90 MP 204	Interstate	Rural	ERO	-118.724896	47.086034
RI-07	5 MP 216	Interstate	Rural	NWRO	-122.281610	48.278286
RI-08	90 MP 227	Interstate	Rural	ERO	-118.291209	47.168189
RI-09	82 MP 77	Interstate	Rural	CRO	-119.837642	46.242806
RI-10	I-5 MP 244	Interstate	Rural	NWRO	-122.372330	48.663274
RI-11	82 MP 45	Interstate	Rural	CRO	-120.385815	46.466816
RI-12	82 MP 116	Interstate	Rural	CRO	-119.202592	46.124493
RI-13	5 MP 44	Interstate	Rural	SWRO	-122.892498	46.202401
RL-01	Brae Burn Rd	Local	Rural	CRO	-120.710996	47.810878
RL-02	Obrien Creek Rd	Local	Rural	ERO	-118.597367	48.601152
RL-03	Old Cascade Hwy	Local	Rural	NWRO	-121.223638	47.719401
RL-04b	Crown Pacific Rd	Local	Rural	NWRO	-121.999959	48.531077
RL-05	Ohop Valley Ext Rd E	Local	Rural	SWRO	-122.290067	46.871102
RL-06	Swansonville Rd	Local	Rural	SWRO	-122.701474	47.937719
RL-07	Scheuber Rd S	Local	Rural	SWRO	-123.013309	46.660919

Site ID	Site Name	Sub Type	Region	Area	X-coordinate	Y-coordinate
RL-08	Birch Rd	Local	Rural	ERO	-119.130452	46.372535
RL-09	Dewald Rd	Local	Rural	ERO	-118.473268	47.176237
RL-10	Evans Rd	Local	Rural	CRO	-120.709557	46.433391
RL-11	Thompson Rd	Local	Rural	NWRO	-122.326327	48.650871
RL-12	Bridgewater Road	Local	Rural	NWRO	-122.255920	48.550376
RL-13	N side Sauk River	Local	Rural	NWRO	-121.461364	48.176721
UA-01	224 MP 4	Arterial	Urban	CRO	-119.403731	46.278723
UA-02	104 MP 31	Arterial	Urban	NWRO	-122.292998	47.763560
UA-03	124th Ave. NE	Arterial	Urban	NWRO	-122.180111	47.773060
UA-04	900 MP 15	Arterial	Urban	NWRO	-122.222752	47.478405
UA-05	Petrovisky Road	Arterial	Urban	NWRO	-122.109584	47.426761
UA-06	Wellesley Ave. / Malvern Rd	Arterial	Urban	ERO	-117.082348	47.700268
UA-07	Hatch Road	Arterial	Urban	ERO	-117.397182	47.609883
UA-08	Sunnyside Blvd	Arterial	Urban	NWRO	-122.146515	48.035345
UA-09	99 MP 48	Arterial	Urban	NWRO	-122.302777	47.835756
UA-10	167 MP 5	Arterial	Urban	SWRO	-122.316896	47.205302
UA-11	509 MP 7	Arterial	Urban	SWRO	-122.431038	47.313784
UA-12	Steilacoom-DuPont Road	Arterial	Urban	SWRO	-122.605090	47.140667
UA-13	Yew Street Road	Arterial	Urban	NWRO	-122.442490	48.762753
UC-01	E. Camano Drive	Collector	Urban	NWRO	-122.417248	48.111019
UC-02	Yakima Valley Highway	Collector	Urban	CRO	-119.957963	46.297151
UC-03	Harris St Rd	Collector	Urban	SWRO	-122.878978	46.148710
UC-04	Auburn-Black Diamond Rd.	Collector	Urban	NWRO	-122.207941	47.304622
UC-05	Kitsap Lake Road	Collector	Urban	NWRO	-122.712581	47.577692
UC-06	Chico Way	Collector	Urban	NWRO	-122.709293	47.595674
UC-07	Toad Lake Road	Collector	Urban	NWRO	-122.399018	48.768700
UC-08	South Wall St	Collector	Urban	ERO	-117.421955	47.654578
UC-09	N Grape Drive	Collector	Urban	ERO	-119.294137	47.138901
UC-10	5th St NE	Collector	Urban	CRO	-120.287027	47.411599
UC-11	W 15th Ave	Collector	Urban	CRO	-120.556961	47.006740
UC-12	S 64th St	Collector	Urban	SWRO	-122.449937	47.199234
UC-13	Championship Fields	Collector	Urban	NWRO	-122.313860	47.606111
UI-01	82 MP 80	Interstate	Urban	CRO	-119.789520	46.222358
UI-02	90 MP 177	Interstate	Urban	ERO	-119.287920	47.102298
UI-03	82 MP 29.7	Interstate	Urban	CRO	-120.509210	46.644672

Site ID	Site Name	Sub Type	Region	Area	X-coordinate	Y-coordinate
UI-04	5 MP 146	Interstate	Urban	NWRO	-122.293087	47.340229
UI-05	5 MP 171	Interstate	Urban	NWRO	-122.326020	47.686117
UI-06	5 MP 10	Interstate	Urban	SWRO	-122.664902	45.757473
UI-07	5 MP 37	Interstate	Urban	SWRO	-122.883085	46.113260
UI-08	5 MP 102	Interstate	Urban	SWRO	-122.919739	46.989687
UI-09	5 MP 143	Interstate	Urban	NWRO	-122.301507	47.303558
UI-10	205 MP 27	Interstate	Urban	SWRO	-122.551040	45.603248
UI-11	405 MP 21	Interstate	Urban	NRWO	-122.189674	47.721772
UI-12	90 MP 294	Interstate	Urban	ERO	-117.148554	47.665771
UI-13	90 MP 281	Interstate	Urban	ERO	-117.353759	47.654068
UL-01	Telford Rd	Local	Urban	ERO	-118.377663	47.752321
UL-02	Silver Crest Drive	Local	Urban	NWRO	-122.186217	47.874142
UL-03	Quil Ceda Blvd	Local	Urban	NWRO	-122.191584	48.101011
UL-04	28th Ave SW	Local	Urban	NWRO	-122.371070	47.329607
UL-05	Nordic Way	Local	Urban	NWRO	-122.576974	48.841429
UL-06	Hexon Rd	Local	Urban	CRO	-120.535657	46.701772
UL-07	Port Industrial Pkwy	Local	Urban	ERO	-119.869087	47.238704
UL-08	Silva St	Local	Urban	ERO	-119.243824	47.134684
UL-09	Sand Dunes Rd	Local	Urban	ERO	-119.294590	47.067185
UL-10	West C St	Local	Urban	SWRO	-123.130810	47.215930
UL-11	International Way	Local	Urban	SWRO	-122.941496	46.108322
UL-13	S Wapato St	Local	Urban	SWRO	-122.468200	47.199616
UL-14	W Umatilla Ave	Local	Urban	CRO	-119.215746	46.226917

Table 55. On-off ramp sampling sites.

Site ID	Site Name	Region	Area	X-coordinate	Y-coordinate
RN-01	5 MP 32.0	Rural	SWRO	-122.858059	46.041753
RN-02	5 MP 52	Rural	SWRO	-122.914100	46.324285
RN-03	5 MP 70	Rural	SWRO	-122.886192	46.584218
RN-04b	5 MP 77	Rural	SWRO	-122.978143	46.657886
RN-05	5 MP 274.8	Rural	NWRO	-122.725352	48.975092
RN-06b	I-5 MP 212	Rural	NWRO	-122.240339	48.239440
RN-07	90 MP 32.1	Rural	NWRO	-121.760696	47.473859
RN-08	90 MP 71.0	Rural	CRO	-121.174873	47.237107
RN-09	On-ramps on I-90	Rural	CRO	-121.052345	47.195642
RN-10	90 MP 149.3	Rural	ERO	-119.860153	47.084411
RN-11	90 MP 264.6	Rural	ERO	-117.692983	47.503928
RN-12	2 MP 8.8	Rural	NWRO	-122.071970	47.915669

Site ID	Site Name	Region	Area	X-coordinate	Y-coordinate
RN-13	Near 82 MP 53	Rural	CRO	-120.241923	46.393700
UN-01	I-5 MP 137	Urban	SWRO	-122.352138	47.240631
UN-02b	I-5 MP 178	Urban	NWRO	-122.315524	47.778372
UN-03b	I-5 MP 230	Urban	NWRO	-122.341679	48.471249
UN-04b	I-5 Exit 262	Urban	NWRO	-122.575784	48.848209
UN-05	90 MP 17.4	Urban	NWRO	-122.035591	47.539191
UN-06	90 MP 291.1	Urban	ERO	-117.214010	47.671905
UN-07	On-ramp to 16 near MP 0.7	Urban	SWRO	-122.466797	47.235608
UN-08	167 MP 19.9	Urban	NWRO	-122.243192	47.378335
UN-09	18 MP 3	Urban	NWRO	-122.256901	47.303827
UN-10	near 518 MP 3	Urban	NWRO	-122.290682	47.464790
UN-11	520 MP 9; OR-306	Urban	NRWO	-122.142158	47.634703
UN-12	14 on-ramp Exit 1	Urban	SWRO	-122.613760	45.616056
UN-13	99 MP 26.0	Urban	NWRO	-122.331452	47.533721

Table 56. Rest area sampling sites.

Site ID	Site Name	Region	Area	X-coordinate	Y-coordinate
RT-01b	Sutter Creek Rest Area	Rural	NWRO	-121.542175	48.494319
RT-02	Indian John Hill Rest Area on I-90 Eastbound (MP 89)	Rural	CRO	-120.850034	47.160736
RT-03	Chamberlain Lake (14 MP 74)	Rural	CRO	-121.323806	45.705597
RT-04	Snoqualmie Pass (I-90 Exit 53)	Rural	CRO	-121.410866	47.419961
RT-05	Selah Creek - Eastbound (I-82 MP 24)	Rural	CRO	-120.414726	46.712298
RT-06	Sprague Lake - Westbound (I-90 MP 242)	Rural	ERO	-118.033746	47.290050
RT-07	Winchester - Westbound (I-90 MP 162)	Rural	ERO	-119.614816	47.104252
RT-08	Telford (2 MP 238)	Rural	ERO	-118.396461	47.694604
RT-09	Blue Lake (17 MP 89)	Rural	ERO	-119.448612	47.569101
RT-10	White Mountain Viewpoint	Rural	ERO	-118.514675	48.601409
RT-11	Quincy Valley (28 MP 25)	Rural	ERO	-119.954508	47.232778
RT-12	Bow Hill - Northbound (I-5 MP 238)	Rural	NWRO	-122.344219	48.581709
RT-13	I-5 Bow Hill Southbound (MP-238)	Rural	NWRO	-122.346138	48.583467
RT-14	US-2 Iron Goat Rest Area	Rural	NWRO	-121.162346	47.711279
RT-15	Toutle River Rest Area -North Bound (MP 54)	Rural	SWRO	-122.906445	46.347798

Site ID	Site Name	Region	Area	X-coordinate	Y-coordinate
RT-16	Elma - Eastbound (8 MP 2)	Rural	SWRO	-123.351257	47.017986
RT-17	Megler (401 MP 1)	Rural	SWRO	-123.860655	46.249111
RT-18	Toutle River Safety Rest Area - South Bound	Rural	SWRO	-122.908178	46.352538
UT-01	Prosser (I-82 - Exit 80)	Urban	CRO	-119.789966	46.221116
UT-02b	Schrag Rest Area EB (I-90 MP 198)	Urban	ERO	-118.843827	47.085188
UT-03	SeaTac rest area	Urban	NWRO	-122.314366	47.271212
UT-04b	Custer - Northbound (I-5 MP 268)	Urban	NWRO	-122.622124	48.909215
UT-05b	Smokey Point Rest Area Southbound	Urban	NWRO	-122.192558	48.167825
UT-06	Smokey Point Rest Area Northbound	Urban	NWRO	-122.188701	48.169535
UT-07	Scatter Creek Safety Rest Area Northbound	Urban	SWRO	-122.970073	46.870112
UT-08	Vancouver - Southbound (I-5 MP 13)	Urban	SWRO	-122.679390	45.798418

Table 57. State and county park sampling sites.

Site ID	Site Name	Region	Area	X-coordinate	Y-coordinate
RP-01	Eye Park	Rural	CRO	-120.943930	47.195852
RP-02	Metzler Park	Rural	NWRO	-122.091673	47.286704
RP-07	Cape Disappointment State Park	Rural	SWRO	-124.071308	46.298507
RP-12	Chief Timothy Park	Rural	ERO	-117.192208	46.415333
RP-13	Camano Island	Rural	NWRO	-122.494325	48.123426
RP-14	Lake Sylvia	Rural	SWRO	-123.595683	46.996931
UP-01	Sunny View Park	Urban	CRO	-119.961383	46.300016
UP-02	Liberty Lake Public Beach	Urban	ERO	-117.061559	47.637193
UP-03	Pine Lake Park	Urban	NWRO	-122.037864	47.587774
UP-04	Vance Creek Park	Urban	SWRO	-123.416116	46.996672
UP-05b	Wenatchee Confluence State Park	Urban	CRO	-120.321966	47.461746
UP-08	Sacajawea Historical State Park	Urban	ERO	-119.037465	46.201137
UP-10	Yakima Sportsman	Urban	CRO	-120.459034	46.584937
UP-11	Illahee	Urban	NWRO	-122.595775	47.599680
UP-12b	Mason County Recreation Area	Urban	SWRO	-123.084782	47.246863

Table 58. DNR and DFW land sampling sites.

Site ID	Site Name	Region	Area	X-coordinate	Y-coordinate
RP-03	Rose County Park	Rural	SWRO	-123.075532	46.616403
RP-04b	Clear Lake Boat Launch	Rural	NWRO	-122.225995	48.465778
RP-05	Friends of Turnbull NWR	Rural	ERO	-117.532349	47.415542
RP-06	Bass Lake	Rural	NWRO	-121.998022	47.252985
RP-08	Buck Creek Trailhead	Rural	CRO	-121.544995	45.819212
RP-09	Beverly Dunes Recreation Area	Rural	ERO	-119.895917	46.829569
RP-10	Reflection Ponds and Grieder Lake Trailhead	Rural	NWRO	-121.613637	47.973474
RP-11	Butte Creek Trail and Picnic Area	Rural	SWRO	-123.742482	46.716013
UP-06	South Outlet Public Access	Urban	ERO	-119.332873	47.079497
UP-07	Vancouver Lake Boat Ramp	Urban	SWRO	-122.717472	45.663577
UP-09	Hagara St	Urban	SWRO	-123.773220	46.969576

Appendix C. Fieldwork Protocol

The following section describes fieldwork protocols for site cleanup, hand-sorting, and for counting sampled litter.

Fieldwork Protocol for Sample Collection

For sampling sites, the full sampling area was typically 4,500 square feet in size:

- Roadway sites: the full sampling area was typically 300 feet long and 15 feet wide located on one side of the road at a milepost.
- On-off ramps: the full sampling area was typically located on the side of the on-ramp.
- Rest areas, state and county parks, and DNR and DFW lands: contiguous area (typically, 300 feet by 15 feet), which in some cases included the entire site.

For sampling sites, the subsampling area was the first 225 square feet contained within the full sampling area. It was typically 15 feet by 15 feet in size.

The field crew collected litter samples using the following steps:

1. Go to the pre-determined sampling location.
2. Park your vehicle at a safe distance from the road or non-roadway site with no barriers or hazards blocking you or the sampling area. If the designated roadway sampling site is not safe or has a barrier (such as a fence, bridge, or construction), go to the closest point after the designated site that is appropriate for sampling. If the designated non-roadway sampling site is not safe or has a barrier, contact the project manager and go to the nearest alternative site of same site type.
3. Set out the advance warning sign and the three-cone taper (Figure 98). Turn on the vehicle's amber strobe lights.
4. Leave encampments and personal items in place. Do not clean near tents and encampments.
5. Wear all necessary PPE (personal protective equipment) before leaving the vehicle.
6. Before leaving the vehicle, look up the survey in the electronic data collection application.
7. Record site information in the Survey Site Overview as completed as possible, noting weather, site cleanliness, proximity to water, storm drain, or critical habitat.
8. Measure and mark (using stake flags) the ends of the full sampling area and the subsampling area.

9. Perform a "comprehensive walk" of the full sampling area and collect the items that are 4 inches or larger in clear plastic bags with a 2-cubic-foot capacity (Figure 101).

10. Perform a "comprehensive walk" of the subsampling area and collect the items that are between 1 and 4 inches. Collect all cigarette butts that are visible to the unaided eye (Figure 101).

11. If the item can be carried but is too large for the bags, then tie these items into bundles with twine or duct tape.

12. For safety, collect broken glass separately in buckets.

13. For safety reasons, do not collect the following litter items from the sampling sites for health and safety reasons (Figure 102). Examples include:

    a. Closed bottles containing liquid
    b. "Trucker bottles" (urine-filled bottles) or other human waste
    c. Explosives and firearms
    d. Knives, needles, razors, crushed or shattered glass
    e. Condoms
    f. Other (such as unbagged pet waste, dead animals, and drug paraphernalia)
    g. Items too large or heavy to carry safely (such as railroad ties, pallets, mattresses, or concrete blocks)

14. After completing site cleanup, tag the full bags, bundles, and buckets that make up the sample. Place the sample placard inside each bag (one placard for the full sample bag and one placard for the sub sample bag).

15. Photograph the following at each sampling site.

    a. Photograph the site. Take site pictures at the beginning of the site facing toward the end of the site and at the end of the site facing toward the beginning of the site. Fully capture the site in these photos.

    b. Photograph litter. Take pictures of common or unique litter items and their litter location, etc. If a site has minimal or no-litter, the pictures should document the lack of litter at the site.

    c. Photograph anti-litter and no-smoking signage. Take pictures of any anti-litter signage and no-smoking signage.

16. Firmly drive the site interference signage into the ground at the beginning of the site. If the ground is not suitable for driving the stake through, then use nails to attach the sign to the ground.

17. Collect and remove all sampling equipment from the site.

18. Make sure surveys are fully completed and submitted.

19. Go to the next site.

20. At the end of the sampling day, tally collected samples on an electronic site inventory sheet.

21. At the end of the sampling route, transport all collected samples to Ecology's Northwest Regional Office (NWRO) parking lot in Shoreline, Washington. Samples from throughout the state were all delivered to Shoreline, Washington.

Figure 98. Work zone deployment, roadways.

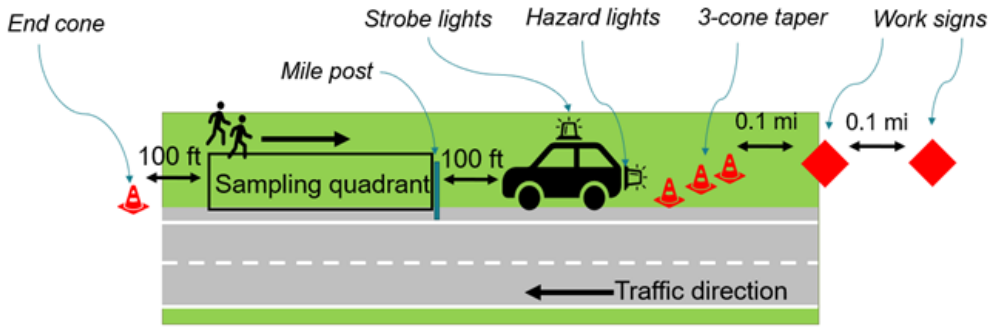


Figure 99. Work zone deployment, on-off ramps.

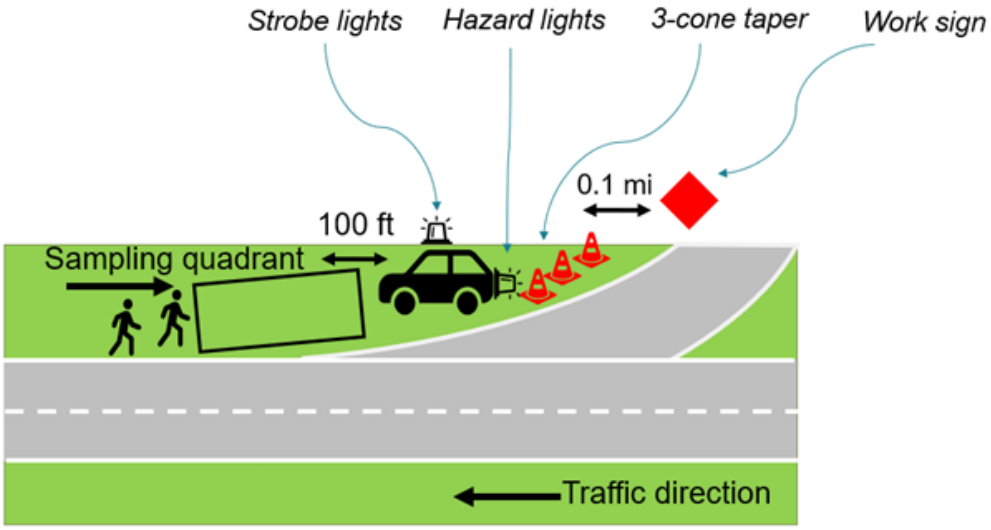


Figure 100. Sample collection.

Figure 101. Site cleanup.

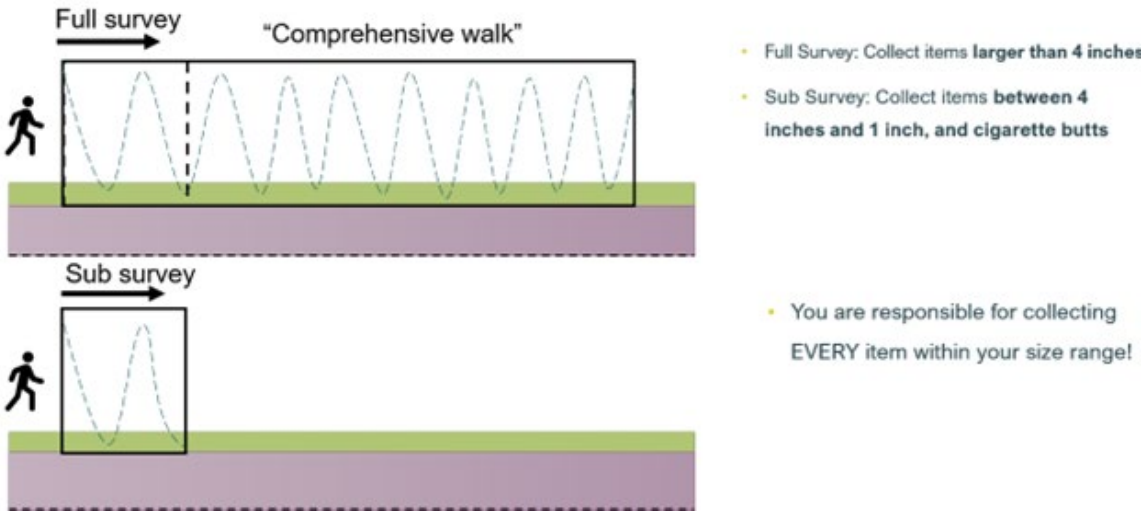
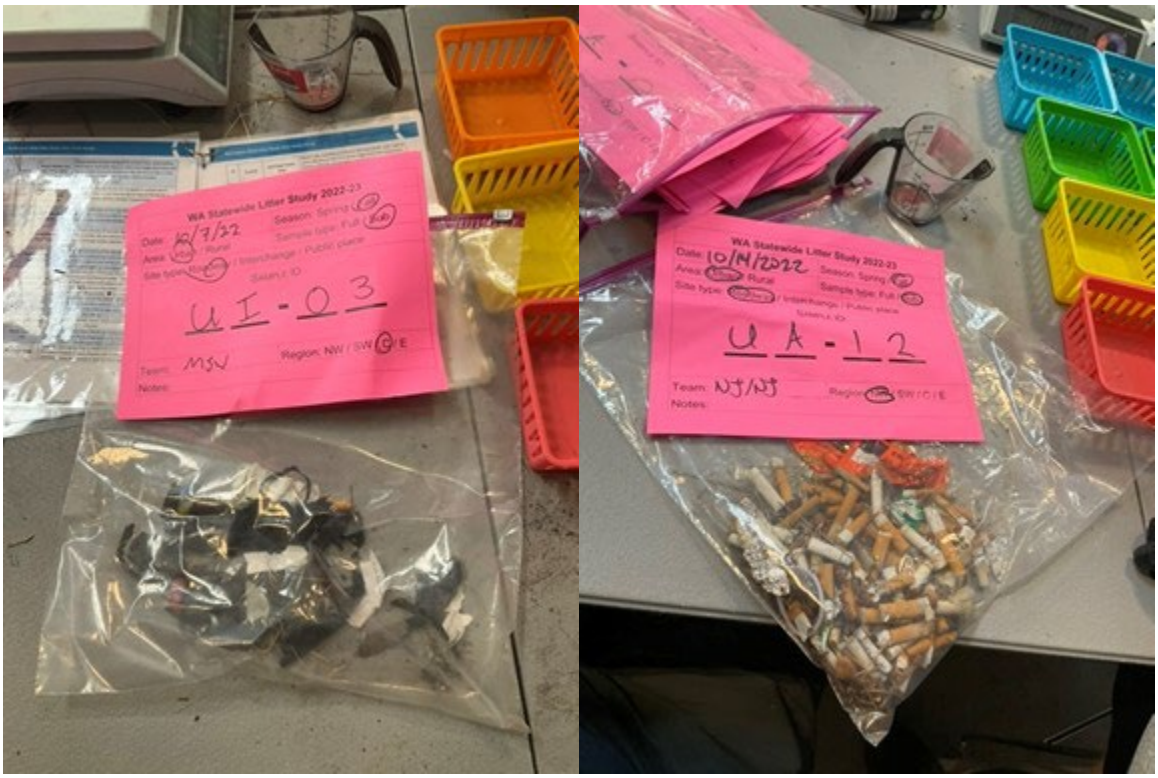


Figure 102. Example items excluded from generation and composition estimates.

Figure 103. Samples collected from “Full” sampling area.

Figure 104. Samples collected from “Sub” sampling area.



Fieldwork Protocol for Hand-Sorting

The sorting crew hand-sorted each collected litter sample as follows:

1. Identify and arrange all the bags, bundles, glass buckets, and containers of cigarettes associated with the sample together and photograph the sample using a digital camera. Position the sample placard that identifies each sample so that it is visible in each photograph.
2. For full samples, record the total weight of each sample by adding together the measured weights of all bags, bundles, glass buckets, and containers of cigarettes associated with the sample. For sub samples, record the total weight of all the collected bags (that is the total weight of the original sample).
3. Subtract the weights of the bags, twine, tarps, or other materials used to hold bundles from the recorded weight of the entire original sample.
4. Hand-sort each sample separately. Sort the sample by hand by placing each material type into separate baskets using material categories and definitions listed in *Appendix E. Material List and Reclassifications*.
5. Sort items that are up to 4 square inches for full survey site type sample, and items that are up to 1 square inch for sub-site type sample (Figure 105).
6. Throughout sorting, periodically check that material in the baskets contain only the intended materials and re-sort any materials that are improperly classified.
7. Record the net weight and number of items for each sorted material category on an electronic tally sheet using a handheld tablet computer. The tally sheet includes a list of all materials and cells to record the weights and counts for each material.

Figure 105. Sample sorting, full sample (left), sub sample (right).

Site Interference

After collecting each sample in spring 2022, the sample collection crew placed a site interference sign as close as possible to a permanent feature on the sampling site (such as a milepost) to mark the sampling site. The sign informed litter collection groups about the study and asked them not to collect litter or otherwise interfere with the site (Figure 106). In summer 2022, we conducted one visit to visit sampling sites along select highways in Washington (I-5, I-90, I-405) and reinstall signs if needed.

We also worked with the Department of Ecology to communicate to local agencies, litter prevention coordinators, volunteer organizations, and private individuals to not remove litter from the designated sampling sites or areas around the site interference signs.

We anticipated minimal site interference at the roadway, on-off ramp sampling sites, given their relatively smaller footprint (4,500 square feet). However, sites could be subject to "scavenging" by individuals collecting materials for recycling (such as aluminum beverage containers, which may be sold for recycling). For rest areas, state and county parks, and

DNR and DFW land sampling sites, we anticipated likely site interference through routine cleaning. For these sites, we gathered input from site supervisors, maintenance crews, and private individuals to estimate the number of days since the last cleanup and scaled our analyses to match.

Figure 106. Site interference signs ("RESEARCH AREA").

Quality Control Measures

The process to ensure quality and accuracy for characterizing sampled materials included the following steps:

1. During sample collection and sorting, the field manager continually conducts quality control review of the entered data, flags and resolves any anomalies, and ensures completeness of all information for each sample.
2. The field manager electronically records each material weight and counts it into Cascadia's cloud-based database (OSCAR) on rugged handheld tablets. OSCAR contains built-in logic and error checking to prevent data entry errors. The data automatically synchronizes to a cloud-based database, reducing data loss and transcription errors.
3. Following each season of fieldwork, the study's data manager verifies that all required data were recorded properly. As an additional step in quality control, randomly selected records are inspected in detail to monitor the accuracy of the data entry process. The QA/QC Manager inspects the entered data and resolves any anomalous data points (outliers) against the hand-written field forms and sample photos. The data manager reviews any anomalies discovered during this step with the field crew manager and/or the site to clarify and resolve if needed.

Appendix D. Field Forms

Script for Sampling Crew for Public Interaction

The sample collection crew professionally and politely used the following script in response to questions about the litter study asked by pedestrians, bystanders, or by agent of authority (e.g., State Patrol).

- Hi, I'm part of a team collecting data as part of the Washington Statewide Litter Study.
- This study is commissioned by the Washington Department of Ecology that has been conducting research about the state of litter in the State of Washington.
- My team, and teams like mine, are collecting data around the state about the litter on our roads, and in public places like parks and rest areas.
- The data will be extrapolated in efforts to develop strategies to reduce and eradicate litter in Washington State.

Site Survey Overview

Record site information in the Survey Site Overview as completely as possible on the Field Site Summary Sheet.

Date:
Recent weather:
Team Initials:
Site ID:
Site description *(road, beach, creek, city, etc.):*

Site coordinates:

Latitude	Longitude	Notes (landmarks, roads, etc.)

Proximity to water, storm drain, or critical habitat. Include photos.

Features	Number of features within site boundary	Number of features less than 100 ft from site boundary
Waterways		
Storm drains		
Critical Habitat		

Preventative measures (indicate number within or near the site of 1. receptacles as described below, 2. overflowing receptacles, and/or 3. receptacles without a lid (e.g., a trash receptacle within the site that is overflowing should be counted in both the "Within site" column and the "Overflowing" column.))

Receptacles	Within site	In View of Site		Overflowing	Without lid
Trash receptacle					
Recycling receptacle					
Cigarette receptacle					
Fishing line receptacle					
Dumpster					
Other					
Trash capture device					
Litter prevention signage					

Trash condition of the site was estimated using a simple visual assessment. If your site has variable levels of trash throughout the site, record the most predominant condition for your site.

Circle	Trash Condition	Definition
A	Not Littered	Effectively no trash is observed in the assessment area. Approximately less than one piece per two car lengths on average. There may be some small pieces in the area, but they are not obvious at first glance.
B	Slightly Littered	Predominantly free of trash except for a few littered areas. On average, one piece per two car lengths.

Circle	Trash Condition	Definition
C	Littered	Predominantly littered except for a few clean areas. Trash is widely/evenly distributed and/or small accumulations are visible on the street, sidewalks, or inlets. At least two or three pieces per car length on average.
D	Very Littered	Trash is continuously seen throughout the assessment area. Large piles and a strong impression of lack of concern for litter in the area. There is often significant litter along gutters.

Land use(s) within the boundaries of your site *(Circle all that apply):*

High density residential (5+ dwellings per acre)	**Low density residential (2–4 dwellings per acre)**
☐ Rural residential (1-5 acre lots)	☐ Retail and wholesale (i.e., stores, restaurants, post offices and hotels)
☐ Commercial and services (i.e., local government, education, research centers, offices, churches, hospitals, and military)	☐ Light and other industrial (i.e., light and unspecified industrial, warehousing, food processing)
☐ Heavy Industrial (i.e., heavy fabrication and assembly raw materials processing)	☐ Recreational (i.e., parks, golf courses, bike trails, etc.)
☐ K-12 schools	☐ Shoreline
☐ Cemetery	☐ State/ national park or wilderness
☐ Other (please describe):	

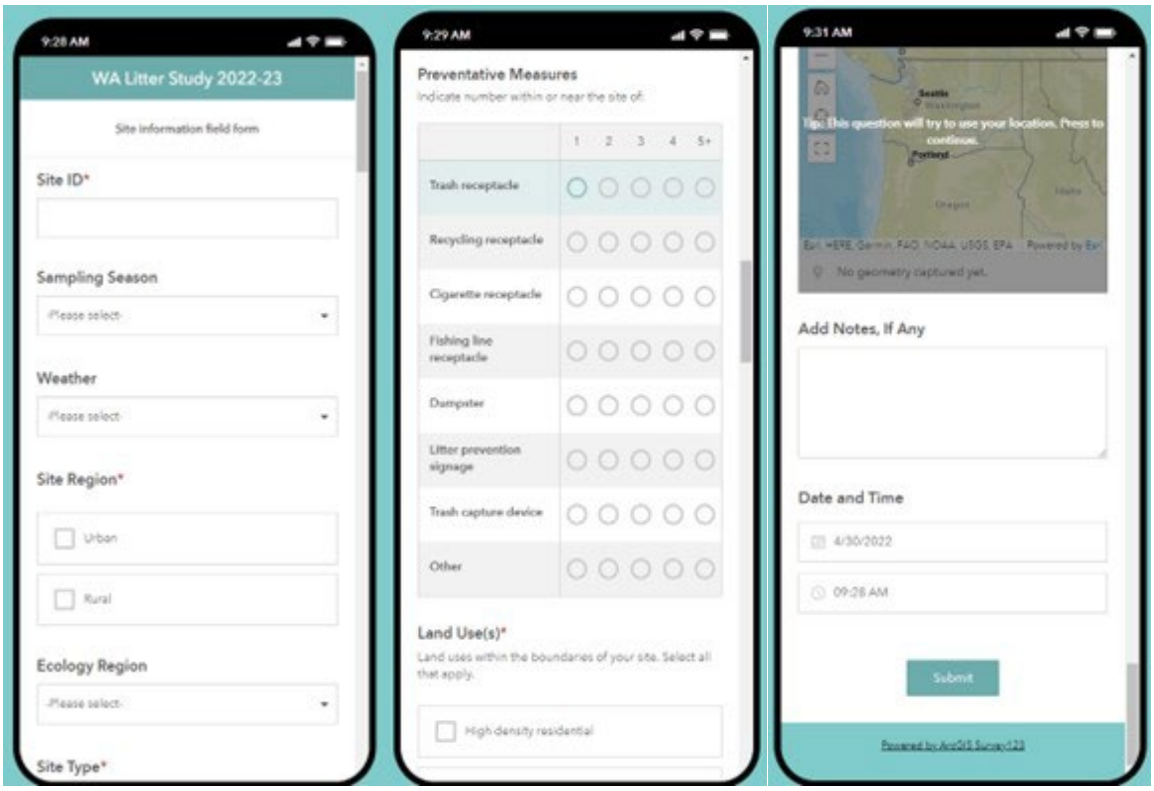
General observations (Including but not limited to):

- Recent big public event in the area
- Nearby buildings, roads, parking lots, and/or ditches
- Excessive trash near buildings
- Transit hub or bus stop
- Other features that could contribute to trash condition

Survey Site Overview Electronic Form

The sampling crew recorded the site information in the Survey Site Overview electronic form developed using ESRI Survey123 (Figure 107).[94]

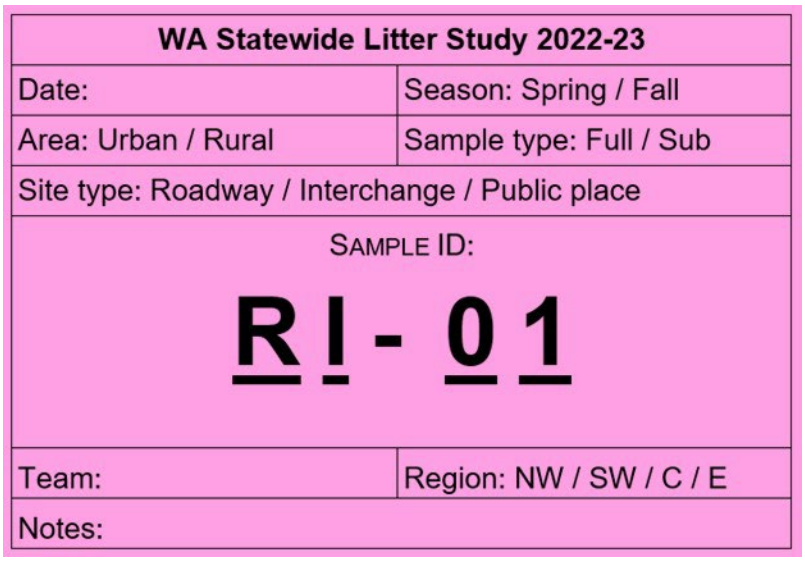
Figure 107. Example screenshots of survey site overview form.



[94] https://www.esri.com/en-us/arcgis/products/arcgis-survey123/overview

Example Placard

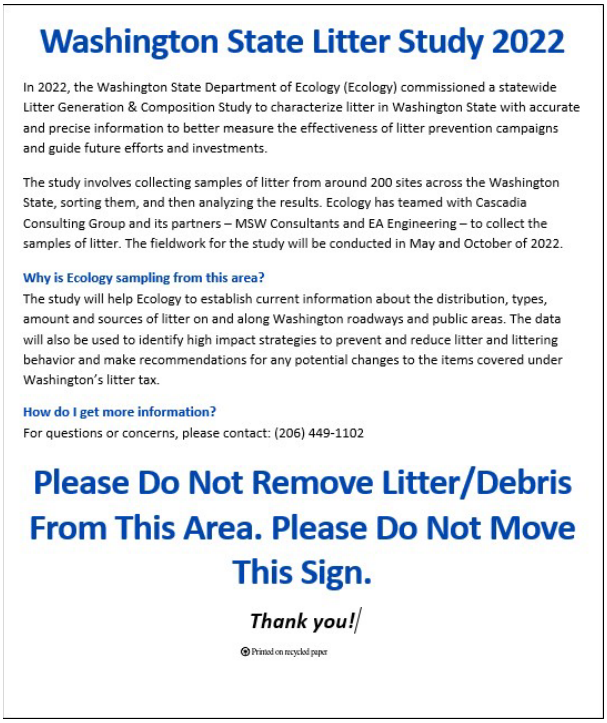
Figure 108. Example placard used for identifying litter samples collected.



WA Statewide Litter Study 2022-23	
Date:	Season: Spring / Fall
Area: Urban / Rural	Sample type: Full / Sub
Site type: Roadway / Interchange / Public place	
SAMPLE ID: **RI-01**	
Team:	Region: NW / SW / C / E
Notes:	

Example Handout

Figure 109. Handout explaining Washington State Litter Study 2022.



Washington State Litter Study 2022

In 2022, the Washington State Department of Ecology (Ecology) commissioned a statewide Litter Generation & Composition Study to characterize litter in Washington State with accurate and precise information to better measure the effectiveness of litter prevention campaigns and guide future efforts and investments.

The study involves collecting samples of litter from around 200 sites across the Washington State, sorting them, and then analyzing the results. Ecology has teamed with Cascadia Consulting Group and its partners – MSW Consultants and EA Engineering – to collect the samples of litter. The fieldwork for the study will be conducted in May and October of 2022.

Why is Ecology sampling from this area?

The study will help Ecology to establish current information about the distribution, types, amount and sources of litter on and along Washington roadways and public areas. The data will also be used to identify high impact strategies to prevent and reduce litter and littering behavior and make recommendations for any potential changes to the items covered under Washington's litter tax.

How do I get more information?

For questions or concerns, please contact: (206) 449-1102

Please Do Not Remove Litter/Debris From This Area. Please Do Not Move This Sign.

Thank you!

Printed on recycled paper

Appendix E. Material List and Reclassifications

We developed the following material list. To the extent possible, we ensured that the material list was compatible with the 1999 and 2004 studies, with the 2020 KAB study, and with EPA's Escaped Trash Assessment Protocol (ETAP) material list.

Material List for Primary Analysis

#	Material Group	Material Type	Material Type Description
1	PAPER	Cardboard	Cardboard has a center wavy layer sandwiched between two outer layers. Examples include entire cardboard containers, such as shipping and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons.
2	PAPER	Fast-food Paper Bags	Paper bags from restaurants, taverns, drive-ins, concessions, the fast-food section of a grocery store, and other such establishments. Paper may be brown (unbleached) or white (bleached).
3	PAPER	Kraft Paper Bags	Other paper Bags made from kraft paper. Paper may be brown (unbleached) or white (bleached). Examples include paper grocery bags, and department store bags.
4	PAPER	Fast-food Paper Cups	Paper cups used to serve one-time or fast-food drinks originating from restaurants, taverns, drive-ins, concessions, convenience stores, the fast-food section of a grocery store, and other such establishments. Includes to-go coffee cups.
5	PAPER	Cups	Other paper cups, often lined with either plastic or wax.
6	PAPER	One-Time/ To-Go/ Fast Food Service Items	Paper items used to serve one-time or fast-food service items originating from restaurants, taverns, drive-ins, concessions, the fast-food section of a grocery store, and other such establishments. Examples include plates, bowls, paper and waxed paper wrappings, paper straws, beverage holders/sleeves (cozies), and pizza boxes.
7	PAPER	Paper Napkins and Tissues	Napkins, paper towels, or tissues. Include compostable paper towels and tissues.

#	Material Group	Material Type	Material Type Description
8	PAPER	Paper Beverage and Food Cartons, Alcoholic	Any paperboard carton or other container of any size (excluding paper cups and packaging materials) designed to contain wine or wine cooler beverages.
9	PAPER	Paper Beverage and Food Cartons, Non-Alcoholic	Any paperboard carton or other container of any size (excluding paper cups) designed to contain non-alcoholic beverages. This includes such items as juice boxes and milk cartons, but excludes paper used as packaging material.
10	PAPER	Paper Non-Beverage Paper Food Packaging	Paper packaging for food and beverages and other items and not part of other categories, including chipboard and other solid boxboard such as for cereal, egg cartons, ice cream cartons, frozen food boxes, boxes used to hold multiple soft drinks or beer bottles or cans. Includes any paperboard carton or other container of any size designed to hold beverages, but whose previous contents are unknown.
11	PAPER	Non-Food Paper Packaging	Paper boxes, wrappings, bags, or other papers that contained cleaning agents such as soaps, shampoos, or detergents, which are primarily used for cleaning buildings, places, persons, animals, or things. Includes tissue boxes, paperboard boxes for software.
12	PAPER	Other Paper	Items made mostly of paper that do not fit into any of the above types. Examples include self-adhesive notes, hard cover and paperback books, telephone directories, sepia, carbon paper, photographs, sheets of paper, stick-on labels, and paper mailing envelopes lined with bubble wrap or plastic, or yard signs that are predominantly paper. Includes pieces and fragments of paper > 2.5 cm.
13	PAPER	Newspaper, Magazines, Junk Mail, and Office Paper	Paper used for newspapers, white ledger and other office paper, magazines and catalogs, glossy inserts, stapled college class schedules, manila envelopes, junk mail, carbonless forms, catalogs, and brochures.
14	PAPER	Receipts	Paper items showing purchases or receipt of items or goods.

#	Material Group	Material Type	Material Type Description
15	PLASTIC	Plastic Bottles and Jars, Beer	Plastic bottles and jars of any size designed to contain beer or other malt beverages. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
16	PLASTIC	Plastic Bottles and Jars, Soda	Plastic bottles and jars of any size designed to contain carbonated beverages other than those marketed or labeled as a type of water. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
17	PLASTIC	Plastic Bottles and Jars, Single-serve Wine and Liquor	Single serve (e.g., mini) plastic bottles of 50 ml or less designed to contain wine, wine coolers, hard liquor, and other liqueurs. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
18	PLASTIC	Plastic Bottles and Jars, Other Wine and Liquor	Plastic bottles and jars designed to contain wine, wine coolers, hard liquor, and other liqueurs other than single serve wine and liquor plastic bottles or containers. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
19	PLASTIC	Plastic Bottles and Jars, Sports and Health Drinks	Plastic bottles and jars of any size designed to contain sports and energy drinks. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
20	PLASTIC	Plastic Bottles and Jars, Juice	Plastic bottles and jars of any size designed to contain juices and fruit drinks. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
21	PLASTIC	Plastic Bottles and Jars, Tea and Coffee	Plastic bottles and jars of any size designed to contain ready to drink tea or coffee. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
22	PLASTIC	Plastic Bottles and Jars, Still-water	Plastic bottles and jars of any size designed to contain still (non-sparkling) plan (unflavored) water 24 ounces or less. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”

#	Material Group	Material Type	Material Type Description
23	PLASTIC	Plastic Bottles and Jars, Other water	Plastic bottles and jars of any size designed to contain sparkling water, enhanced and flavored waters, and larger still (non-sparkling) plain (unflavored) water larger than 24 ounces. Do not remove lids or caps on the bottle or containers. Includes bottles labelled “compostable” or “bio-based.”
24	PLASTIC	Plastic Bottles and Jars, Unknown	Plastic bottles and jars of any size or color designed to contain beverages whose previous contents are unknown or not distinguishable by type of beverage. Includes bottles labelled “compostable” or “bio-based.”
25	PLASTIC	Straws and Stirrers	Plastic drinking straws, splash sticks and stirrers, and plastic lollipop sticks. Includes “compostable” or “bio-based.”
26	PLASTIC	Bottle Caps and Tabs	Loose plastic bottle caps, plastic pull tabs, lids, and seals made of plastic, used in the packaging/sealing of beverage containers. Does not include bottle caps that are still on a beverage bottle.
27	PLASTIC	Beverage Rings	Beverage packaging rings to hold soft drinks or beer cans. Examples: 4-pack, 6-pack, 8-pack, and 12-pack beverage rings commonly used for canned or bottled beverages.
28	PLASTIC	Fast-food Plastic Cups	Plastic cups, including polystyrene fast food plastic cups, used to serve one-time or fast-food drinks originating from restaurants, taverns, drive-ins, concessions, convenience stores, the fast-food section of a grocery store, and other such establishments.
29	PLASTIC	Cups	Includes plastic cups of all sizes other than foam.
30	PLASTIC	Lids	Plastic lids from plastic tubs and containers, such as cottage cheese, yogurt, butter, etc. Excludes beverage caps, lids, seals, and tabs.
31	PLASTIC	Utensils	Plastic forks, knives, spoons, and chopsticks.

#	Material Group	Material Type	Material Type Description
32	PLASTIC	Plates, Bowls, and Single-Use Containers	Plastic plates and bowls and single-use containers of all sizes other than foam or clamshells. Plastic items used to serve one-time, fast-food service, or picnic items originating from restaurants, taverns, drive-ins, concessions, grocery stores, and other such establishments. Includes plastic/silicone/rubber cozies or sleeves for beverages, beverage holders. Includes items labelled “compostable” or “bio-based.”
33	PLASTIC	Clamshells	Hinged plastic (not foam) take-out containers of any size that open such as the shell of a clam.
34	PLASTIC	Plastic Trash Bags	Plastic trash bags or shopping bags used to contain trash. This type does not include full bags of trash. Includes bags labelled “compostable” or “bio-based.”
35	PLASTIC	Grocery, Retail and Shopping Bags	Plastic shopping bags used to contain merchandise, given out by the store or restaurant with the purchase (including dry cleaning bags). Includes bags labelled “compostable” or “bio-based.”
36	PLASTIC	Other Film	All other film packaging that does not fit into other categories excluding other plastic category. Examples include agricultural film (films used in various farming and growing applications, such as silage greenhouse films, mulch films, and wrap for hay bales), plastic sheeting used as drop cloths, building wrap, plastic film wrapping for boxes, plastic mailing pouches, air pillow, shrink-wrap, and bubble wrap.
37	PLASTIC	Food Wrappers and Snack Bags	Wrappings or bags used to package food, such as wrappers for candy and gum, snack bags, chip bags, zipper-closeable bags, condiment packets, and produce bags. Includes wrappers labelled “compostable” or “bio-based.” Does not include pouches.

#	Material Group	Material Type	Material Type Description
38	PLASTIC	Food and Drink Pouches	Plastic pouches made of thicker, multi-layer flexible material. May have a flat bottom so that package would stand up on its own, but not always. Material is thicker than potato chip bags. Examples include plastic coffee packages; juice pouches; baby food pouches with or without plastic screw top; soup pouches; salad dressing pouches; wine pouches; and backpacking meals in pouches.
39	PLASTIC	Foam Cups, Bowls, and Clamshells	Foam (also known as expanded polystyrene or Styrofoam) cups of all sizes. Foam plates and bowls of all sizes. Hinged foam take-out containers of any size that open such as the shell of a clam.
40	PLASTIC	Other Foam	All other foam items, including foam ice chests, foam packing peanuts and other product packing foam, and foam used for home food packaging such as foam meat trays and egg cartons. Includes unidentifiable items and pieces >2.5 cm. Does not include foam dock or floats or pieces.
41	PLASTIC	Non-beverage Plastic Food Packaging	Non-beverage food containers such as salad dressing bottles, condiment bottles, butter, yogurt, and cottage cheese tubs, cookie trays, and plastic frozen food trays. Includes cling wrap, plastic mesh, food box, jar, or cans.
42	PLASTIC	Non-food Plastic Packaging	Plastic boxes, wrappings, bags, or other plastic packaging materials that contained cleaning agents such as soaps, shampoos, or detergents, which are primarily used for cleaning buildings, places, persons, animals, or things. Plastic boxes, wrappings, bags, or other plastics used to package items that are not food, tobacco, cleaning agents; or hazardous materials, or whose previous contents are unknown.
43	PLASTIC	Other Plastic	Plastic that cannot be put in any other category. Includes durable plastic products not included elsewhere. Includes packing insulation, blister pack, zip/cable ties, twist-ties, plastic lollipop sticks, and strapping bands. Includes unidentifiable plastic items and pieces larger than 2.5 cm.

#	Material Group	Material Type	Material Type Description
44	GLASS	Glass Bottles and Jars, Beer	Glass bottles and jars of any size designed to hold beer or other malt beverages. Do not remove lids or caps on the bottle or containers.
45	GLASS	Glass Bottles and Jars, Soda	Glass bottles and jars of any size designed to hold carbonated beverages other than those marketed or labeled as a type of water. Do not remove lids or caps on the bottle or containers.
46	GLASS	Glass Bottles and Jars, Single-serve Wine and Liquor	Single serve (e.g., mini) glass bottles of 50 ml or less designed to contain wine, wine coolers, hard liquor, and other liqueurs. Do not remove lids or caps on the bottle or containers.
47	GLASS	Glass Bottles and Jars, Other Wine and Liquor	Glass bottles and jars designed to contain wine, wine coolers, hard liquor, and other liqueurs other than single serve wine and liquor plastic bottles or containers. Do not remove lids or caps on the bottle or containers.
48	GLASS	Glass Bottles and Jars, Sports and Health Drinks	Glass bottles and jars of any size designed to contain sports and energy drinks. Do not remove lids or caps on the bottle or containers.
49	GLASS	Glass Bottles and Jars, Juice	Glass bottles and jars of any size designed to contain juices and fruit drinks. Do not remove lids or caps on the bottle or containers.
50	GLASS	Glass Bottles and Jars, Tea and Coffee	Glass bottles and jars of any size designed to contain ready to drink tea or coffee. Do not remove lids or caps on the bottle or containers.
51	GLASS	Glass Bottles and Jars, Still-water	Glass bottles and jars of any size designed to contain still (non-sparkling) plan (unflavored) water 24 ounces or less. Do not remove lids or caps on the bottle or containers.
52	GLASS	Glass Bottles and Jars, Other water	Glass bottles and jars of any size designed to contain sparkling water, enhanced and flavored waters, and larger still (non-sparkling) plain (unflavored) water larger than 24 ounces. Do not remove lids or caps on the bottle or containers.
53	GLASS	Glass Bottles and Jars, Unknown	Glass bottles and jars of any size or color designed to contain beverages whose previous contents are unknown or not distinguishable by type of beverage.

#	Material Group	Material Type	Material Type Description
54	GLASS	Other Glass Food Packaging	Includes glass containers of any size or color designed to contain food such as pickles, olives, mayonnaise, jam, and sauces or contain food products.
55	GLASS	Other Glass Non-Food Packaging	Includes glass containers or other glass used to contain cleaning agents such as soaps, shampoos, or detergents that are primarily used for cleaning buildings, places, persons, animals, or things.
56	GLASS	Broken Glass or Ceramic	Broken glass pieces and ceramic products that do not fit into another category. Examples include broken glass beverage bottles, ceramic dishware, porcelain, garden pottery, and used toilets and sinks. Does not include automotive window glass. Item will be counted by volume, 16 oz. = 1 count.
57	GLASS	Other glass	Glass items that do not fit into another category, or that are not distinguishable by type of product. Glass pieces/fragments greater than 2.5 cm.
58	METAL	Metal Bottles, Jars and Cans, Beer	Metal bottles, jars, and cans of any size designed to contain beer or other malt beverages.
59	METAL	Metal Bottles, Jars and Cans, Soda	Metal bottles, jars, and cans of any size designed to contain carbonated beverages other than those marketed or labeled as a type of water.
60	METAL	Metal Bottles, Jars and Cans, Sports and Health Drinks	Metal bottles, jars, and cans of any size designed to contain sports and energy drinks.
61	METAL	Metal Bottles, Jars and Cans, Juice	Metal bottles, jars, and cans of any size designed to contain juices and fruit drinks.
62	METAL	Metal Bottles, Jars and Cans, Tea and Coffee	Metal bottles, jars, and cans of any size designed to contain ready to drink tea or coffee.
63	METAL	Metal Bottles, Jars and Cans, Still-water	Metal bottles, jars, and cans of any size designed to contain still (non-sparkling) plan (unflavored) water 24 ounces or less.

#	Material Group	Material Type	Material Type Description
64	METAL	Metal Bottles, Jars and Cans, Other Water	Metal bottles, jars, and cans of any size designed to contain sparkling water, enhanced and flavored waters, and larger still (non-sparkling) plain (unflavored) water larger than 24 ounces.
65	METAL	Metal Bottles, Jars and Cans, Unknown	Metal bottles, jars and cans of any size that is not distinguishable by type of beverage.
66	METAL	Non-beverage metal food packaging	Metal bottles, cans or containers of any size designed to contain canned food and pet food, aluminum or tin foil, foil-lined coffee bags, and foil pouches or wrappers for food. All metal containers or foils used to serve one-time or fast-food service items originating from restaurants, taverns, drive-ins, concessions, the fast-food section of a grocery store, and other such establishments. Examples include foil wrappings, aluminum bowls, and condiment packaging from such an establishment.
67	METAL	Metal non-food packaging	Any metal container foils used to contain cleaning agents such as soaps, shampoos, or detergents, which are primarily used for cleaning buildings, places, persons, animals, or things. Other metal used to package items that are not food, tobacco, cleaning agents, or hazardous materials, or whose previous contents were unknown.
68	METAL	Bottle Caps and Tabs	Pull tabs, bottle caps, lids, and seals made of metal or foil.
69	METAL	Other Metal	Products made entirely from metal or predominantly metal products that do not fit into any other category of any size. Includes metal strapping bands. Does not include electronics such as microwaves (see “OTHER: Batteries and Electronics”), or major appliances such as refrigerators (see “OTHER: Appliances”) or items in household/camping/office.
70	SMOKING	Cigarettes butts	Discarded ends, pieces or filters of cigarettes, cigars and cannabis products include unused or leftover marijuana, unsmoked items. Item will be counted by volume, 16 oz. = 1 count.

#	Material Group	Material Type	Material Type Description
71	SMOKING	Other Cigarette, Tobacco, and Cannabis Products and Packaging	Chewing tobacco, pipe tobacco, matches, matchbooks and packaging for tobacco and cannabis products such as paper boxes, plastic or foil wrappings, or other materials used to package cigarettes, cigars, cannabis, chewing or pipe tobacco, including individual cigarette packages and unused cigarette papers. Includes spent smokeless tobacco, containers used to contain cigarettes, cigars, chewing tobacco, or other tobacco products, and lighters of all types and sizes.
72	SMOKING	E-Cigarettes and Vaping	Includes all e-cigarette and vaping items. Includes rigged drug paraphernalia items (such as melted plastic tube).
73	ORGANICS	Food Waste	Food wastes and scraps including bones, rinds, etc. for human or pet consumption. Excludes the weight of food containers, except when the container weight is negligible compared to the food inside. Includes gum and confection.
74	ORGANICS	Human or Pet Waste	Loose or bagged pet waste. Containers of any size or shape that contain human feces or urine. Examples include disposable baby diapers, protective undergarments for adults, and plastic beverage bottles filled with urine.
75	ORGANICS	Other Organics	All organic materials not elsewhere classified. Examples include yard debris, stumps, branches, and prunings, entangled animals dead or alive. Includes hay and food packaging made from natural materials such as corks, wooden popsicle sticks, wood or bamboo chop sticks, wooden stirrers, etc. Includes firewood and charred wood. Includes cannabis organics - organic material generated during the cultivation, production, and manufacturing, or retail process. Examples include edibles, oils or extracts, cultivation trimmings, stems and root balls, exhausted growing medium, failed plants, and diseased or otherwise unmarketable leaves, buds, and seeds.

#	Material Group	Material Type	Material Type Description
76	CDL	Construction and Demolition Debris	Includes items used predominantly in commercial, industrial, office or agricultural settings. Includes metal pipes, chain link, brick, concrete, gypsum board, fiberglass insulation, roofing waste, asphalt, lumber, plywood, pallets, nails, screws, toilets, sinks, window glass, scaffolding/building shrink-wrap, plastic and canvas tarps, concrete slabs, rebar, wire, rubber tubing/hosing, and other building and infrastructure related materials. Includes plastic pipes and tubes. Includes shopping carts, hard hats, wheelbarrows, pallets, commercial signage, road signs, traffic cones, transportation/road materials, buckets, and equipment.
77	HAZARDOUS MATERIALS	Chemical, Paint and Other Hazardous	Includes lawn and garden, household chemicals and cleansers such as bags of fertilizer, bleach jugs, 55-gallon drums, aerosol can, pesticides, detergent box. Includes latex paint, oil-based paint, spray paint, stains and varnishes, pesticides, caustic cleaners, fluorescent and LED bulbs/lamps, and mercury-containing items such as thermostats and thermometers. This category includes empty containers of these materials. Propane canisters. Includes motor oil and other fuel oils. Gas, turpentine, and non-chlorinated solvents, including paint strippers and solvents contaminated with other products (such as paints, degreasers, and some other cleaners) if the primary ingredient is (or was) the solvent or an alcohol such as methanol or propanol.
78	HAZARDOUS MATERIALS	Medical Waste, Sharps, and Biohazardous	Medical waste includes products and their packaging including needles, syringes, I.V. tubing, medications, ointments, creams, nutritional supplements such as vitamins, etc. used to heal or supplement the nutrition of people or animals. Also includes medicine and medical equipment packaging (Band-aid or cough drop wrapper), Band-Aids, medicine bottle or cap, ace bandage, splint.

#	Material Group	Material Type	Material Type Description
79	HAZARDOUS MATERIALS	PPE Masks	PPE masks (may be used in connection with treating a patient or animal, or for COVID-19 safety.) Includes N95, surgical masks, cloth masks, or masks made from composite materials.
80	HAZARDOUS MATERIALS	Explosives	Fireworks, firecrackers, or any potentially explosive material, fireworks debris, ammunition and its casings, including gunpowder, unspent ammunition, and picric acid.
81	OTHER	Fishing and Maritime Items	Fishing or maritime-related items or gear. Includes nets and ropes, fishing line, tangled bundle of fishing line, bait box, buckets, light sticks and other items from commercial and recreational fishing and other water activities. Does not include vessel parts. Also includes pieces (any size larger than 2.5 cm) of docks, floats and other water-based items that are made primarily of foamed plastics. Includes fishing hooks, lures, buoys, floats, and traps used to catch crabs, lobster, fish, or other organisms.
82	OTHER	Tires	Includes tires from all types of automotive vehicles and all sizes.
83	OTHER	Auto Rubber Products	Rubber products that originate from vehicles, such as tire shards or treads.
84	OTHER	Vehicle Debris	All motorized auto, truck, boat, ship vehicle/vessel-related items other than tires, including hubcaps, foam seat filling, siding, tailpipes, batteries used for motorized vessels/vehicles, rearview mirrors, lights, or window glass known to be from a vehicle/vessel, and whole auto-bodies, trucks, trailers, truck cabs, and boats. Does not include canoes and kayaks (see “recreational”). Any metals known to originate from automobiles. Examples include hubcaps, tailpipes, and wheels. Does not include motor oil and other vehicle fluids (see "Chemical, Paint, and Other Hazardous").

#	Material Group	Material Type	Material Type Description
85	OTHER	Batteries, Electronics, and Small Appliances	Electronics and e-related materials such as earbuds, cell phones, portable electronic book readers, tablets, laptop computers, computer games and other electronic toys, CD players, camcorders, digital cameras, cell phone and other device chargers, microwaves, stereos, VCRs, DVD players, radios, audio/visual equipment, keyboards, printers, televisions, computers and computer monitors, tapes, CDs, DVDs, printers, remote controls, TVs, radios, game stations and accessories, clocks, electric cords and batteries of all types, including lithium batteries. Does not include household appliances such as microwaves and toasters (see “Appliances”).
86	OTHER	Large appliances	Includes large appliances such as refrigerators, dishwashers, stoves, and dryers. Does not include small electronics such as stereos or microwaves (see OTHER: Batteries and Electronics").
87	OTHER	Household /camping items /office items	Items found in households, camping, gardening, or offices. Includes tents, camping chairs, camping stoves, figurines, candles, mirrors, intact dishes and glassware, metal utensils, cookery, durable coolers, thermoses, intact ceramic dishware, clothes hangers, hair dryers, garden pottery, durable water bottles, buckets, laundry baskets, totes, garbage cans, flowerpots, umbrella frame, sleeping bags. Includes buckets, laundry baskets, totes, garbage cans, flowerpots, pens and pencils, desk trays, displays.
88	OTHER	Textiles, Clothing and Shoes	Items made of thread, yarn, fabric, cloth, or rubber. Examples include rags, clothes, fabric trimmings, draperies, leather belts, flip flops, and bathroom rugs. Includes finished products and scrap materials made of rubber, such as bathmats, inner tubes, rubber hoses, and foam rubber.

#	Material Group	Material Type	Material Type Description
89	OTHER	Toiletries / Personal products	Bottles and containers and packaging of health care products such as wipes, razor blades, tweezers, cosmetics, shampoo, hair care products, lotion, toothbrushes and toothpaste, pads and tampons, diapers, make-up sponges, gloves, condoms, hand mirrors, and contact lenses containers. Includes hand warmers, ear plugs, glasses, glasses lenses, and hair bands. Includes toilet paper.
90	OTHER	Balloons	Balloons made of all types of materials.
91	OTHER	Toys, Sports, and Recreational Items	Balls of all types, frisbees, sporting equipment of all types, other toys of all shapes and sizes, non-automotive bicycles, scooters, and tricycles. Includes games, bicycle parts/hose, and small non-motorized recreational vehicles (canoes and kayaks).
92	OTHER	Furniture, Carpet, and Bulky Items	All large and hard-to-handle items not defined elsewhere, as well as furniture, mattresses, carpet, lawn furniture, and box springs, shelving, chairs, tables, desks, filing cabinets, sofas, and outdoor furniture.
93	OTHER	Whole Bags of Mixed Trash	Whole, closed bags of trash of any size. Do not open and sort the waste.
94	OTHER	Miscellaneous Materials	Any other material not otherwise described. Includes dirt, soil, and non-distinct fines. Includes pieces/fragments smaller than 2.5 cm (1 inch), if found in the sample.

Materials Reclassified by Potential Source

In consultation with Ecology, Cascadia reclassified study materials into three categories based on assumptions about the potential source: unsecured loads, intentionally littered, and vehicle and tire debris (Table 55). Only materials from roadway sites were classified as being from unsecured loads by road type (urban and rural). Some material types could be classified either as from an unsecured load or intentionally littered, depending on whether they were found on an urban or rural roadway. Assumed likely sources were the same for urban and rural roadways except for four material types that were considered to be unsecured loads along urban roads and intentional littering along rural roadways:

- Construction and demolition debris

- Large appliances
- Furniture, carpet, and bulky items
- Whole bags of mixed trash

Table 59. Reclassification of study materials by assumed likely source.

Item #	Study Material Type	Assumed Likely Source, All Roadways Except as Noted
1	Cardboard	Unsecured Loads
2	Fast-food Paper Bags	Intentional Littering
3	Kraft Paper Bags	Intentional Littering
4	Fast-food Paper Cups	Intentional Littering
5	Cups	Intentional Littering
6	One-Time/ To-Go/ Fast Food Service Items	Intentional Littering
7	Paper Napkins and Tissues	Intentional Littering
8	Paper Beverage and Food Cartons, Alcoholic	Intentional Littering
9	Paper Beverage and Food Cartons, Non-Alcoholic	Intentional Littering
10	Paper Non-Beverage Paper Food Packaging	Intentional Littering
11	Non-Food Paper Packaging	Intentional Littering
12	Other Paper	Intentional Littering
13	Newspaper, Magazines, Junk Mail, and Office Paper	Intentional Littering
14	Receipts	Intentional Littering
15	Plastic Bottles and Jars, Beer	Intentional Littering
16	Plastic Bottles and Jars, Soda	Intentional Littering
17	Plastic Bottles and Jars, Single-serve Wine and Liquor	Intentional Littering
18	Plastic Bottles and Jars, Other Wine and Liquor	Intentional Littering
19	Plastic Bottles and Jars, Sports and Health Drinks	Intentional Littering
20	Plastic Bottles and Jars, Juice	Intentional Littering
21	Plastic Bottles and Jars, Tea and Coffee	Intentional Littering

Item #	Study Material Type	Assumed Likely Source, All Roadways Except as Noted
22	Plastic Bottles and Jars, Still-water	Intentional Littering
23	Plastic Bottles and Jars, Other water	Intentional Littering
24	Plastic Bottles and Jars, Unknown	Intentional Littering
25	Straws and Stirrers	Intentional Littering
26	Bottle Caps and Tabs	Intentional Littering
27	Beverage Rings	Intentional Littering
28	Fast-food Plastic Cups	Intentional Littering
29	Cups	Intentional Littering
30	Lids	Intentional Littering
31	Utensils	Intentional Littering
32	Plates, Bowls, and Single-Use Containers	Intentional Littering
33	Clamshells	Intentional Littering
34	Plastic Trash Bags	Intentional Littering
35	Grocery, Retail and Shopping Bags	Intentional Littering
36	Other Film	Unsecured Loads
37	Food Wrappers and Snack Bags	Intentional Littering
38	Food and Drink Pouches	Intentional Littering
39	Foam Cups, Bowls, and Clamshells	Intentional Littering
40	Other Foam	Unsecured Loads
41	Non-beverage Plastic Food Packaging	Intentional Littering
42	Non-food Plastic Packaging	Intentional Littering
43	Other Plastic	Unsecured Loads
44	Glass Bottles and Jars, Beer	Intentional Littering
45	Glass Bottles and Jars, Soda	Intentional Littering
46	Glass Bottles and Jars, Single-serve Wine and Liquor	Intentional Littering
47	Glass Bottles and Jars, Other Wine and Liquor	Intentional Littering

Item #	Study Material Type	Assumed Likely Source, All Roadways Except as Noted
48	Glass Bottles and Jars, Sports and Health Drinks	Intentional Littering
49	Glass Bottles and Jars, Juice	Intentional Littering
50	Glass Bottles and Jars, Tea and Coffee	Intentional Littering
51	Glass Bottles and Jars, Still-water	Intentional Littering
52	Glass Bottles and Jars, Other Water	Intentional Littering
53	Glass Bottles and Jars, Unknown	Intentional Littering
54	Other Glass Food Packaging	Intentional Littering
55	Other Glass Non-Food Packaging	Intentional Littering
56	Broken Glass or Ceramic	Intentional Littering
57	Other Glass	Intentional Littering
58	Metal Bottles, Jars and Cans, Beer	Intentional Littering
59	Metal Bottles, Jars and Cans, Soda	Intentional Littering
60	Metal Bottles, Jars and Cans, Sports and Health Drinks	Intentional Littering
61	Metal Bottles, Jars and Cans, Juice	Intentional Littering
62	Metal Bottles, Jars and Cans, Tea and Coffee	Intentional Littering
63	Metal Bottles, Jars and Cans, Still-water	Intentional Littering
64	Metal Bottles, Jars and Cans, Other Water	Intentional Littering
65	Metal Bottles, Jars and Cans, Unknown	Intentional Littering
66	Non-beverage Metal Food Packaging	Intentional Littering
67	Metal Non-Food Packaging	Intentional Littering
68	Bottle Caps and Tabs	Intentional Littering
69	Other Metal	Unsecured Loads
70	Cigarette Butts	Intentional Littering
71	Other Cigarette, Tobacco, and Cannabis Products and Packaging	Intentional Littering
72	E-Cigarettes and Vaping	Intentional Littering

Item #	Study Material Type	Assumed Likely Source, All Roadways Except as Noted
73	Food Waste	Intentional Littering
74	Human or Pet Waste	Intentional Littering
75	Other Organics	Unsecured Loads
76	Construction and Demolition Debris	Urban Roads: Unsecured Loads Rural Roads: Intentional Littering
77	Chemical, Paint and Other Hazardous Materials	Intentional Littering
78	Medical Waste	Intentional Littering
79	PPE Masks	Intentional Littering
80	Explosives	Intentional Littering
81	Fishing and Maritime Items	Unsecured Loads
82	Tires	Vehicle and Tire Debris
83	Auto Rubber Products	Vehicle and Tire Debris
84	Vehicle Debris (other than tires and auto rubber products)	Vehicle and Tire Debris
85	Batteries, Electronics, and Small Appliances	Unsecured Loads
86	Large Appliances	Urban Roads: Unsecured Loads Rural Roads: Intentional Littering
87	Household/Camping Items/Office Items	Unsecured Loads
88	Textiles, Clothing and Shoes	Unsecured Loads
89	Toiletries/ Personal Products	Unsecured Loads
90	Balloons	Unsecured Loads
91	Toys, Sports, and Recreational Items	Unsecured Loads

Item #	Study Material Type	Assumed Likely Source, All Roadways Except as Noted
92	Furniture, Carpet, and Bulky Items	Urban Roads: Unsecured Loads Rural Roads: Intentional Littering
93	Whole Bags of Mixed Trash	Urban Roads: Unsecured Loads Rural Roads: Intentional Littering
94	Miscellaneous Materials	Unsecured Loads

Materials Reclassified by Litter Tax Interpretation

The Washington litter tax is charged on the products in Table 60.[95] The litter tax does not apply to certain categories of products such as 1) products for use and consumption out-of-state, 2) agricultural products exempt from business and occupation tax, 3) certain wholesale sales by qualified grocery distribution cooperatives, 4) food or beverages sold for on-premises consumption, and 5) certain retail sales by caterers.

Table 60. Washington litter taxed item definitions.

Litter Tax Items	Definition
Food for human or pet consumption	Food for human or pet consumption is any substance, except drugs, where the chief, general use is for human or pet nourishment, regardless of whether the substance is sold in a consumable form. Food for human or pet consumption includes candy, chewing gum, condiments, packaged or unpackaged meat, bulk foods, shellfish, and ingredients used in processing food for human or pet consumption such as industrial chocolate, grain, barley, or hops. This category includes sales of meals, snacks, lunches, or other food and beverages at restaurants, drive-ins, snack bars, taverns, or by concessionaires.
Groceries	Groceries are all products sold by persons in a place of business selling food and food ingredients, as defined in RCW 82.08.0293, for off-premises consumption, but excluding drugs, building materials, clothing, furniture, and appliances.

[95] https://apps.leg.wa.gov/wac/default.aspx?Cite=458-20-243

Litter Tax Items	Definition
Cigarettes and tobacco products	Cigarettes and tobacco products include all the products subject to the excise taxes imposed by chapters 82.24 and 82.26 RCW.
Soft drinks and carbonated beverages	Soft drinks are nonalcoholic beverages that contain natural or artificial sweeteners. Soft drinks do not include beverages that contain milk or milk products, soy, rice, or similar milk substitutes, or greater than 50% of vegetable or fruit juice by volume. Carbonated waters are nonalcoholic beverages, containing carbon dioxide, which do not contain natural or artificial sweeteners.
Beer and other malt beverages	Beer and other malt beverages are all beverages defined as beer or malt liquor by RCW 66.04.010 or rules of the Washington State Liquor and Cannabis Board.
Wine	Wine includes all alcoholic beverages defined as wine in RCW 66.04.010 or rules of the Washington State Liquor and Cannabis Board, but does not include "spirits" as defined in RCW 66.04.010.
Newspapers and magazines	Newspapers and magazines are all daily and periodical publications, including real estate guides, vehicle trader publications, free community newspapers, and the like.
Household paper and paper products	Household paper and paper products are materials or substances made into sheets or leaves from natural organic or synthetic fibrous material for home or other personal use. Household paper and paper products include products or articles made from such sheets or leaves for home or other personal use, such as toilet tissue, paper cups, plates, napkins, cards, wrapping paper, stationery, personal banking checks or deposit slips, computer printer or copier paper, and the like. Household paper and paper products do not include paper products manufactured or sold for business or commercial use. Business and commercial use requires that the paper products be consumed by the business or used by the business in the manufacturing of articles, substances, or commodities.
Glass containers	Glass containers are articles made wholly or in substantial part of processed silicates that can be, or are, used to hold other things within themselves. Glass containers include only those containers that are sold with, and that contain, another product or products otherwise subject to litter tax, or containers that are produced so that they can later contain and be sold with another product or products otherwise subject to litter tax. Glass containers do not include containers that are produced to be sold at retail as empty reusable containers, such as drinking glasses, vases, and the like.

Litter Tax Items	Definition
Metal containers	Metal containers are articles made wholly or in substantial parts of materials such as iron, steel, tin, aluminum, copper, zinc, lead, silver, and any alloys thereof; and that can be, or are, used to hold other things within themselves. In addition, metal containers include only those containers that are sold with, and that contain, another product or products otherwise subject to litter tax, or containers that are produced so that they can later contain and be sold with another product or products otherwise subject to litter tax. Metal containers do not include containers that are produced to be sold at retail as empty reusable containers, such as pots and pans, or metal containers made for transporting other products.
Plastic or fiber containers made of synthetic material	Plastic or fiber containers made of synthetic material will be referred to as plastic or fiber containers for purposes of this subsection (4)(k). Plastic or fiber containers are articles that can be, or are, used to hold other things within themselves, and that are made of synthetically produced ethylene derivatives, resins, waxes, adhesives, or polymers, or made by synthesis of fiber materials with adhesives, polymers, waxes, resins, or other materials. Plastic or fiber containers include containers made of paper, pasteboard, or cardboard consisting of fibrous substances synthesized with other materials. Synthetic material is produced by the process of making or building up by a composition or union of simpler parts or elements, as distinguished from the process of extraction or refinement. Plastic or fiber containers include only those containers that are sold with, and that contain, another product or products otherwise subject to litter tax, or containers that are produced so that they can later contain and be sold with another product or products otherwise subject to litter tax. Plastic or fiber containers do not include containers that are produced to be sold at retail as empty reusable containers.
Cleaning agents	Cleaning agents are all soaps, detergents, solvents, or other cleansing substances used for cleaning buildings, places, persons, animals, or other things. Cleaning agents include packaged products and products sold in bulk form, as well as products sold in recyclable containers.
Toiletries	Toiletries are all substances such as soap, powder, shampoo, cologne, perfume, cosmetics, toothpaste, and the like, used in connection with personal dressing or grooming.
Non-drug drugstore sundry items	Nondrug drugstore sundry products are all products sold by persons in the business of selling prescription drugs to consumers, except the following: drugs, building materials, clothing, furniture, and appliances.

To estimate the share of litter covered by the litter tax, we reclassified study material types based on the best available interpretation of the litter tax and our study material definitions (Table 6157).

Table 61. Reclassification of study materials by litter tax interpretation.

Item #	Study Material Type	Litter Tax Class Interpretation
1	Cardboard	Litter tax
2	Fast-food Paper Bags	Litter tax
3	Kraft Paper Bags	Litter tax
4	Fast-food Paper Cups	Litter tax
5	Cups	Litter tax
6	One-Time/ To-Go/ Fast Food Service Items	Litter tax
7	Paper Napkins and Tissues	Litter tax
8	Paper Beverage and Food Cartons, Alcoholic	Litter tax
9	Paper Beverage and Food Cartons, Non-Alcoholic	Litter tax
10	Paper Non-Beverage Paper Food Packaging	Litter tax
11	Non-Food Paper Packaging	Litter tax
12	Other Paper	Not litter tax
13	Newspaper, Magazines, Junk Mail, and Office Paper	Litter tax
14	Receipts	Not litter tax
15	Plastic Bottles and Jars, Beer	Litter tax
16	Plastic Bottles and Jars, Soda	Litter tax
17	Plastic Bottles and Jars, Single-serve Wine and Liquor	Litter tax
18	Plastic Bottles and Jars, Other Wine and Liquor	Litter tax
19	Plastic Bottles and Jars, Sports and Health Drinks	Litter tax
20	Plastic Bottles and Jars, Juice	Litter tax
21	Plastic Bottles and Jars, Tea and Coffee	Litter tax
22	Plastic Bottles and Jars, Still-water	Litter tax
23	Plastic Bottles and Jars, Other water	Litter tax

Item #	Study Material Type	Litter Tax Class Interpretation
24	Plastic Bottles and Jars, Unknown	Litter tax
25	Straws and Stirrers	Litter tax
26	Bottle Caps and Tabs	Litter tax
27	Beverage Rings	Litter tax
28	Fast-food Plastic Cups	Litter tax
29	Cups	Litter tax
30	Lids	Litter tax
31	Utensils	Litter tax
32	Plates, Bowls, and Single-Use Containers	Litter tax
33	Clamshells	Litter tax
34	Plastic Trash Bags	Litter tax
35	Grocery, Retail and Shopping Bags	Litter tax
36	Other Film	Not litter tax
37	Food Wrappers and Snack Bags	Litter tax
38	Food and Drink Pouches	Litter tax
39	Foam Cups, Bowls, and Clamshells	Litter tax
40	Other Foam	Litter tax
41	Non-beverage Plastic Food Packaging	Litter tax
42	Non-food Plastic Packaging	Litter tax
43	Other Plastic	Litter tax
44	Glass Bottles and Jars, Beer	Litter tax
45	Glass Bottles and Jars, Soda	Litter tax
46	Glass Bottles and Jars, Single-serve Wine and Liquor	Litter tax
47	Glass Bottles and Jars, Other Wine and Liquor	Litter tax
48	Glass Bottles and Jars, Sports and Health Drinks	Litter tax
49	Glass Bottles and Jars, Juice	Litter tax

Item #	Study Material Type	Litter Tax Class Interpretation
50	Glass Bottles and Jars, Tea and Coffee	Litter tax
51	Glass Bottles and Jars, Still-water	Litter tax
52	Glass Bottles and Jars, Other Water	Litter tax
53	Glass Bottles and Jars, Unknown	Litter tax
54	Other Glass Food Packaging	Litter tax
55	Other Glass Non-Food Packaging	Litter tax
56	Broken Glass or Ceramic	Not litter tax
57	Other Glass	Not litter tax
58	Metal Bottles, Jars and Cans, Beer	Litter tax
59	Metal Bottles, Jars and Cans, Soda	Litter tax
60	Metal Bottles, Jars and Cans, Sports and Health Drinks	Litter tax
61	Metal Bottles, Jars and Cans, Juice	Litter tax
62	Metal Bottles, Jars and Cans, Tea and Coffee	Litter tax
63	Metal Bottles, Jars and Cans, Still-water	Litter tax
64	Metal Bottles, Jars and Cans, Other Water	Litter tax
65	Metal Bottles, Jars and Cans, Unknown	Litter tax
66	Non-beverage Metal Food Packaging	Litter tax
67	Metal Non-Food Packaging	Litter tax
68	Bottle Caps and Tabs	Litter tax
69	Other Metal	Not litter tax
70	Cigarette Butts	Litter tax
71	Other Cigarette, Tobacco, and Cannabis Products and Packaging	Not litter tax
72	E-Cigarettes and Vaping	Litter tax
73	Food Waste	Litter tax
74	Human or Pet Waste	Not litter tax
75	Other Organics	Not litter tax

Item #	Study Material Type	Litter Tax Class Interpretation
76	Construction and Demolition Debris	Not litter tax
77	Chemical, Paint and Other Hazardous Materials	Not litter tax
78	Medical Waste	Not litter tax
79	PPE Masks	Litter tax
80	Explosives	Not litter tax
81	Fishing and Maritime Items	Not litter tax
82	Tires	Not litter tax
83	Auto Rubber Products	Not litter tax
84	Vehicle Debris	Not litter tax
85	Batteries, Electronics, and Small Appliances	Not litter tax
86	Large Appliances	Not litter tax
87	Household/Camping Items/Office Items	Not litter tax
88	Textiles, Clothing and Shoes	Not litter tax
89	Toiletries/ Personal Products	Litter tax
90	Balloons	Not litter tax
91	Toys, Sports, and Recreational Items	Not litter tax
92	Furniture, Carpet, and Bulky Items	Not litter tax
93	Whole Bags of Mixed Trash	Not litter tax
94	Miscellaneous Materials	Not litter tax

Materials Reclassified by Potential for Bottle Bill Coverage

Table 62. Material types that could be covered under a bottle bill.

Material Type
Paper Beverage and Food Cartons, Alcoholic
Plastic Bottles and Jars, Beer

Material Type
Plastic Bottles and Jars, Soda
Plastic Bottles and Jars, Single-serve Wine and Liquor
Plastic Bottles and Jars, Other Wine and Liquor
Plastic Bottles and Jars, Sports and Health Drinks
Plastic Bottles and Jars, Juice
Plastic Bottles and Jars, Tea and Coffee
Plastic Bottles and Jars, Still-water
Plastic Bottles and Jars, Other water
Plastic Bottles and Jars, Unknown
Glass Bottles and Jars, Beer
Glass Bottles and Jars, Soda
Glass Bottles and Jars, Single-serve Wine and Liquor
Glass Bottles and Jars, Other Wine and Liquor
Glass Bottles and Jars, Sports and Health Drinks
Glass Bottles and Jars, Juice
Glass Bottles and Jars, Tea and Coffee
Glass Bottles and Jars, Still-water
Glass Bottles and Jars, Other Water
Glass Bottles and Jars, Unknown
Metal Bottles, Jars and Cans, Beer
Metal Bottles, Jars and Cans, Soda
Metal Bottles, Jars and Cans, Sports and Health Drinks
Metal Bottles, Jars and Cans, Juice
Metal Bottles, Jars and Cans, Tea and Coffee
Metal Bottles, Jars and Cans, Still-water
Metal Bottles, Jars and Cans, Other Water
Metal Bottles, Jars and Cans, Unknown

Materials Reclassified by Potential for Unsecured Loads

Table 63. Unsecured load category breakdown for litter on all roadways.

Item #	Material Category	Likely Source of Littering	Est. %	Pounds per Mile per Year	Est. %	Pieces per Mile per Year
1	Cardboard	Unsecured Loads	4.4%	10.0	1.4%	316
36	Other Plastic Film	Unsecured Loads	1.0%	2.2	2.6%	591
40	Other Foam	Unsecured Loads	0.7%	1.5	1.8%	419
43	Other Plastic	Unsecured Loads	3.2%	7.3	5.7%	1,306
69	Other Metal	Unsecured Loads	4.1%	9.3	0.9%	197
75	Other Organics	Unsecured Loads	2.6%	6.0	0.4%	88
76	Construction and Demolition Debris	Unsecured Loads	7.9%	18.0	3.7%	847
81	Fishing and Maritime Items	Unsecured Loads	0.2%	0.4	1.0%	227
85	Batteries, Electronics, and Small Appliances	Unsecured Loads	0.5%	1.2	0.1%	24
86	Large Appliances	Unsecured Loads	0.0%	0.0	0.0%	0
87	Household/Camping Items/Office Items	Unsecured Loads	2.8%	6.3	0.4%	93
88	Textiles, Clothing and Shoes	Unsecured Loads	2.2%	5.1	1.6%	375
89	Toiletries and Personal Products	Unsecured Loads	0.4%	0.9	0.4%	86
90	Balloons	Unsecured Loads	0.0%	0.0	0.0%	3
91	Toys, Sports, and Recreational Items	Unsecured Loads	0.7%	1.6	0.2%	50
92	Furniture, Carpet, and Bulky Items	Unsecured Loads	0.0%	0.1	0.0%	0
93	Whole Bags of Mixed Trash	Unsecured Loads	0.4%	1.0	0.0%	2

Item #	Material Category	Likely Source of Littering	Est. %	Pounds per Mile per Year	Est. %	Pieces per Mile per Year
94	Miscellaneous Materials	Unsecured Loads	7.5%	17.1	4.1%	936

Table 64. Unsecured load category breakdown for litter on urban roadways.

Item #	Material Category	Likely Source of Littering	Est. %	Pounds per Mile per Year	Est. %	Pieces per Mile per Year
1	Cardboard	Unsecured Loads	1.9%	7.7	1.5%	739.8
36	Other Plastic Film	Unsecured Loads	0.9%	3.6	2.1%	1,023.4
40	Other Foam	Unsecured Loads	0.4%	1.7	1.8%	860.3
43	Other Plastic	Unsecured Loads	4.0%	16.1	6.1%	3,006.4
69	Other Metal	Unsecured Loads	3.7%	15.0	0.9%	453.4
75	Other Organics	Unsecured Loads	4.1%	16.5	0.4%	177.9
76	Construction and Demolition Debris	Unsecured Loads	8.0%	32.1	0.9%	449.0
81	Fishing and Maritime Items	Unsecured Loads	0.0%	0.0	0.0%	0.0
85	Batteries, Electronics, and Small Appliances	Unsecured Loads	0.9%	3.5	0.1%	66.1
86	Large Appliances	Unsecured Loads	0.0%	0.0	0.0%	0.0
87	Household/Camping Items/Office Items	Unsecured Loads	0.8%	3.2	0.4%	218.3
88	Textiles, Clothing and Shoes	Unsecured Loads	2.1%	8.6	1.3%	650.7
89	Toiletries and Personal Products	Unsecured Loads	0.4%	1.5	0.4%	178.2
90	Balloons	Unsecured Loads	0.0%	0.0	0.0%	0.3
91	Toys, Sports, and Recreational Items	Unsecured Loads	1.0%	4.0	0.1%	50.9

Item #	Material Category	Likely Source of Littering	Est. %	Pounds per Mile per Year	Est. %	Pieces per Mile per Year
92	Furniture, Carpet, and Bulky Items	Unsecured Loads	0.0%	0.2	0.0%	0.8
93	Whole Bags of Mixed Trash	Unsecured Loads	0.8%	3.2	0.0%	4.7
94	Miscellaneous Materials	Unsecured Loads	8.2%	33.0	4.1%	2,014.2

Table 65. Unsecured load category breakdown for litter on rural roadways.

Item #	Material Category	Likely Source of Littering	Est. %	Pounds per Mile per Year	Est. %	Pieces per Mile per Year
1	Cardboard	Unsecured Loads	7.1%	10.9	1.1%	132
36	Other Plastic Film	Unsecured Loads	1.0%	1.6	3.5%	403
40	Other Foam	Unsecured Loads	0.9%	1.4	1.9%	228
43	Other Plastic	Unsecured Loads	2.3%	3.5	4.9%	568
69	Other Metal	Unsecured Loads	4.5%	6.8	0.7%	86
75	Other Organics	Unsecured Loads	1.0%	1.5	0.4%	50
81	Fishing and Maritime Items	Unsecured Loads	0.4%	0.6	2.8%	325
85	Batteries, Electronics, and Small Appliances	Unsecured Loads	0.3%	0.4	0.0%	4
87	Household/Camping Items/Office Items	Unsecured Loads	5.0%	7.7	0.3%	38
88	Textiles, Clothing and Shoes	Unsecured Loads	2.4%	3.6	2.2%	256
89	Toiletries and Personal Products	Unsecured Loads	0.4%	0.6	0.4%	45
90	Balloons	Unsecured Loads	0.0%	0.0	0.0%	4
91	Toys, Sports, and Recreational Items	Unsecured Loads	0.4%	0.6	0.4%	50

Item #	Material Category	Likely Source of Littering	Est. %	Pounds per Mile per Year	Est. %	Pieces per Mile per Year
94	Miscellaneous Materials	Unsecured Loads	6.7%	10.2	4.0%	468

Appendix F. Calculations

We estimated litter composition and quantities, by pounds and by pieces, as follows.

Table 66. Steps for calculating litter composition and quantities.

Step #	Calculation	Description
Step 1	QC and finalize sampling data	Generate table showing litter count by survey type for all samples for each sector and subsector.
Step 2	Convert quantities to "per mile" basis	Calculate litter weight and count for 1 mile using "mile multipliers": • Mile multiplier for "Full" sample (300 ft in length) = 17.6 • Mile multiplier for "Sub" sample (15 ft in length) = 352
Step 3	Calculate "average litter per mile"	Take simple average across all samples for each subsector for each sample type (e.g., average of litter across all urban – local – full samples).
Step 4	Calculate litter composition for each subsector	Calculate ratio-based estimates and confidence intervals (at 90% confidence levels) for each subsector using method described in Formula for Estimating Composition, by Pound and by Piece.
Step 5	Scale the litter estimate for each subsector	Multiply the ratio-based estimates of litter by the "scaling factor" (e.g., centerline miles of roadway subtype) to calculate total litter estimate for that subsector, by pound and by piece.
Step 6	Compute two-way litter estimates (for roadways only)	Double the total litter estimate to obtain a two-way estimate for each subcategory.
Step 7	Aggregate subsectors to estimate overall litter estimates	Aggregate the results for each subcategory to estimate the litter counts at the category level (e.g., litter estimate for overall roadways).
Step 8	Repeat steps 1 through 7 for weight and count estimates	Steps 1 through 7 were repeated for both units of measurement, by pound and by piece.

We did not combine the public area data because the subcategories selected (rest areas, state and county parks, DNR and DFW lands) represent potentially only a small fraction of all

public areas in the state. We used an average area for urban and rural on-off ramps, estimated in the 2004 study, to estimate the amount of litter (by weight) for all on-off ramps in the state.

Formula for Estimating Composition, by Pound and by Piece

For a given sampling site type (e.g., roadways), the composition estimate denoted by r_j represents the ratio of the material's weight to the total weight of all the samples in the stratum. It was derived by summing each material's weight across all the selected samples belonging to a given site type and dividing by the sum of the total weight of waste for all of the samples from that site type, as shown in the following equation:

Equation 1. Formula for estimating composition.

$$r_j = \frac{\sum_i c_{ij}}{\sum_i w_i}$$

where:

c = weight of particular material

w = sum of all material weights

for i = 1 to n, where n = number of selected samples

for j = 1 to m, where m = number of materials

The confidence interval for this estimate was derived in two steps. First, the variance around the estimate was calculated, accounting for the fact that the ratio included two random variables (the material and total sample weights). The variance of the ratio estimator equation follows:

Equation 2. Formula for deriving confidence interval.

$$\mathrm{Var}(r_j) \approx \left(\frac{1}{n}\right)\left(\frac{1}{\overline{w}^2}\right)\left(\frac{\sum_i \left(c_{ij} - r_j w_j\right)^2}{n-1}\right)$$

where:

$$\overline{w} = \frac{\sum_i w_i}{n}$$

For more information regarding the variance calculation, please refer to William G. Cochran, *Sampling Techniques, 3rd Edition*, John Wiley and Sons, Inc., Indianapolis, Indiana, 1977.

All estimates were presented along with statistical error and confidence intervals at the industry standard 90% confidence level. The confidence interval at the 90% confidence level was calculated for a material's mean as follows:

Equation 3. Formula for calculating confidence at the 90% confidence level.

$$r_j \pm \left(z \sqrt{\mathrm{Var}(r_j)} \right)$$

where:

z = the value of the *z*-statistic (1.645) corresponding to a 90% confidence level.

Overall composition for a primary site category was the weighted average of the individual subcategory compositions (e.g., the overall composition for roadway sector was the weighted average of the composition estimates for each roadway subtype). Roadway centerline miles were used as the weighting factors. The calculation was completed using the following formula:

Equation 4. Formula for calculating overall composition for a primary site category.

$$O_j = (p_1 * r_{j1}) + (p_2 * r_{j2}) + (p_3 * r_{j3}) + \cdots$$

where:

O_j = the mean % estimate for material *j* in the litter composition

p = the proportion of tons contributed by the noted group

r = ratio of material weight to total waste weight in the noted group

for *j* = 1 to *m*, where *m* = number of materials

The variance of the weighted average was calculated as follows:

$$\mathrm{Var}O_j = \left({p_1}^2 * \widehat{V_{r_{j1}}} \right) + \left({p_2}^2 * \widehat{V_{r_{j2}}} \right) + \left({p_3}^2 * \widehat{V_{r_{j3}}} \right) + \cdots$$

where:

$\widehat{V_{r_j}}$ = the variance of the composition estimate for the material *j* in the disposed waste countywide.

Accumulation Rate, by Pound and by Piece

We estimated litter accumulation rate by pound and piece using sampling data collected in fall 2022 sampling phase as follows:

Table 67. Steps for calculating accumulation rate.

Step #	Calculation	Description
Step 1	QC and finalize fall sampling data	Generate table showing litter count by survey type for all samples for each sector and subsector.
Step 2	Convert quantities to "per mile" basis	Calculate litter weight and count for 1 mile using "mile multipliers": • Mile multiplier for "Full" sample (300 ft in length) = 17.6 • Mile multiplier for "Sub" sample (15 ft in length) = 352
Step 3	Calculate "average litter per mile"	Take simple average across all samples for each subsector for each sample type (e.g., average of all urban – local – full samples).
Step 4	Calculate litter composition for each subsector	Calculate ratio-based estimates and confidence intervals (at 90% confidence levels) for each subsector using method described in Formula for Estimating Composition, by Pound and by Piece.
Step 5	Scale the litter estimate for each subsector	Multiply the ratio-based estimates by the "scaling factor" (e.g., centerline miles of roadway subtype) to calculate total litter estimate for that subsector, by pound and by piece.
Step 6	Compute two-way litter estimates	Double the total litter estimate to obtain a two-way estimate for each subcategory. Applicable to roadways only.
Step 7	Aggregate subsectors to estimate overall litter estimates	Once the results are obtained for each subcategory, these subcategories were aggregated together to estimate the litter counts at the category level (e.g., litter estimate for overall roadways).
Step 8	Calculate accumulation per day	Divide the litter estimates calculated in Step 7 by the number of days assumed in the accumulation period (the approximate number of days between fall sampling and a likely site-cleanup post spring sampling*).
Step 9	Calculate annual accumulation	Multiply the average accumulation per day by 365 to estimate the annual litter accumulation, by pound and by piece per year.
Step 8	Repeat steps 1 - 9 for pound and piece estimates	Repeat steps 1 through 9 for both units of measurement, by pound and by piece.

Litter and Environmental Equity Analysis

We estimated the total litter at each specific sampling site by adding together the pounds or pieces of litter from each full and sub sampling site. We used litter estimates from the fall sampling only. Of the 182 sampling sites, three were excluded. One had no litter data reported and two only had spring sampling data available. Active wildfires at some sampling sites in the fall limited data collection.

We then used a Spearman's Rho rank correlation to assess the relationship between EHD rank and pounds and pieces of litter. This nonparametric correlation measure is suitable for the EHD and litter data in this study, as the data are generally non-normally distributed and do not show strict linear trends. Correlations were calculated across 21 different subsets of litter data based on site type and location, including an overall correlation for all site types combined.

We also calculated the *p*-value associated with each correlation to test for its statistical significance. The significance level was set at $p = 0.1$. However, because the same dataset was used for each correlation, we applied a Bonferroni correction to obtain an adjusted significance threshold of $p = 0.005$.

Appendix G. Detailed Composition Results

This appendix contains detailed composition tables for pounds and pieces of litter collected across the five different sites types and across urban and rural locations. The tables include both litter snapshot results and litter accumulation rates. Table 68 presents the specific composition tables included in this section.

All of the data provided in these tables can be accessed in the Excel file embedded below.

Table 68. List of tables in Appendix G. Detailed Composition Results.

Table Number	Table Content
Table 69	Detailed litter composition table for all roadways.
Table 70	Detailed litter composition table for urban roadways.
Table 71	Detailed litter composition table for rural roadways.
Table 72	Detailed litter composition table for interstate roadways.
Table 73	Detailed litter composition table for arterial roadways.
Table 74	Detailed litter composition table for collector roadways.
Table 75	Detailed litter composition table for local roadways.
Table 76	Detailed litter composition table for all on-off ramps (interchanges).
Table 77	Detailed litter composition table for urban on-off ramps (interchanges).
Table 78	Detailed litter composition table for rural on-off ramps (interchanges).
Table 79	Detailed litter composition table for all rest areas.
Table 80	Detailed litter composition table for urban rest areas.
Table 81	Detailed litter composition table for rural rest areas.
Table 82	Detailed litter composition table for all state and county parks.
Table 83	Detailed litter composition table for all DNR and DFW lands.

Table 69. Detailed litter composition table for all roadways.

Material	Est. %	+ / -	Est. Pounds per Mile	Pounds per Mile + / -	Est. %	+ / -	Est. Pieces per Mile	Pieces per Mile + / -	Pounds per Mile per Year	Pieces per Mile per Year
Paper	**4.6%**	**0.7%**	**12.7**	**1.8**	**11.1%**	**0.7%**	**902**	**55**	**27.7**	**2,762**
Cardboard	1.2%	0.2%	3.2	0.5	1.4%	0.1%	111	11	10.0	316
Fast-food Paper Bags	0.1%	0.0%	0.2	0.1	0.2%	0.1%	19	6	1.5	15
Kraft Paper Bags	0.2%	0.1%	0.6	0.2	0.4%	0.1%	32	8	0.4	17
Fast-food Paper Cups	0.3%	0.0%	0.7	0.1	0.4%	0.1%	33	7	4.2	53
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	3
One-Time/ To-Go/ Fast Food Service Items	0.6%	0.4%	1.7	1.0	0.7%	0.2%	59	19	1.7	308
Paper Napkins and Tissues	0.5%	0.1%	1.5	0.3	1.8%	0.2%	148	20	2.8	486
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	1
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.1	0.1%	0.0%	5	3	0.3	139
Paper Non-Beverage Paper Food Packaging	0.5%	0.1%	1.5	0.3	1.0%	0.1%	84	11	1.0	62
Non-Food Paper Packaging	0.2%	0.1%	0.6	0.2	0.9%	0.2%	69	13	0.8	60
Newspaper, Magazines, Junk Mail, and Office Paper	0.1%	0.0%	0.3	0.0	1.0%	0.1%	80	7	1.5	159
Receipts	0.0%	0.0%	0.0	0.0	0.1%	0.0%	11	1	0.5	28
Other Paper	0.9%	0.1%	2.3	0.4	3.1%	0.3%	250	25	3.0	1,115
Plastic	**9.5%**	**0.8%**	**26.1**	**2.3**	**39.8%**	**1.6%**	**3,232**	**128**	**37.7**	**4,623**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Plastic Bottles and Jars, Soda	0.1%	0.0%	0.4	0.1	0.2%	0.0%	16	3	0.7	13
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.2%	0.0%	0.6	0.1	0.8%	0.1%	63	12	0.6	19
Plastic Bottles and Jars, Other Wine and Liquor	0.1%	0.0%	0.4	0.1	0.1%	0.0%	10	3	0.9	16
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.0%	0.4	0.1	0.2%	0.0%	14	4	1.0	10
Plastic Bottles and Jars, Juice	0.1%	0.0%	0.2	0.0	0.1%	0.0%	9	3	0.2	4
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.1	0.1	0.1%	0.0%	5	3	0.5	5
Plastic Bottles and Jars, Still-water	0.2%	0.0%	0.6	0.1	0.6%	0.1%	48	5	1.1	53
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	3
Plastic Bottles and Jars, Unknown	0.2%	0.1%	0.5	0.3	0.2%	0.0%	12	3	0.1	2
Plastic Straws and Stirrers	0.1%	0.0%	0.2	0.0	0.9%	0.2%	75	15	0.3	89
Plastic Bottle Caps and Tabs	0.7%	0.1%	2.0	0.4	1.9%	0.3%	151	21	1.6	420
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	1	0.0	0
Fast-food Plastic Cups	0.1%	0.0%	0.3	0.0	0.3%	0.0%	28	2	1.5	88
Plastic Cups	0.1%	0.0%	0.3	0.0	0.4%	0.1%	30	9	0.1	6
Plastic Lids	0.1%	0.0%	0.3	0.0	0.4%	0.1%	32	11	8.5	40
Plastic Utensils	0.0%	0.0%	0.1	0.0	0.2%	0.0%	17	3	0.1	11
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.6	18
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.2%	0.0%	0.5	0.1	0.5%	0.1%	38	6	1.1	54
Grocery, Retail and Shopping Bags	0.2%	0.1%	0.6	0.2	0.4%	0.1%	33	6	0.6	46
Other Plastic Film	1.8%	0.2%	4.9	0.5	8.9%	0.7%	718	53	2.2	591
Food Wrappers and Snack Bags	0.8%	0.2%	2.2	0.5	10.2%	1.3%	827	107	2.8	733
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	0	0.1	7
Foam Cups, Bowls, and Clamshells	0.1%	0.0%	0.3	0.0	0.8%	0.2%	65	14	0.0	7
Other Foam	0.4%	0.1%	1.1	0.2	2.8%	0.4%	225	29	1.5	419
Non-beverage Plastic Food Packaging	0.2%	0.0%	0.7	0.1	0.9%	0.1%	70	8	0.7	203
Non-food Plastic Packaging	0.8%	0.1%	2.1	0.4	1.8%	0.4%	145	36	3.4	460
Other Plastic	2.7%	0.4%	7.3	1.0	7.4%	0.6%	597	52	7.3	1,306
Glass	**8.3%**	**2.0%**	**22.7**	**5.5**	**4.0%**	**0.6%**	**325**	**47**	**33.8**	**1,317**
Glass Bottles and Jars, Beer	4.6%	1.1%	12.6	3.1	1.0%	0.3%	82	21	23.5	932
Glass Bottles and Jars, Soda	0.2%	0.1%	0.5	0.3	0.1%	0.0%	4	2	0.4	1
Glass Bottles and Jars, Single-serve Wine and Liquor	0.3%	0.1%	0.8	0.2	0.2%	0.1%	12	5	3.6	9
Glass Bottles and Jars, Other Wine and Liquor	0.3%	0.0%	0.7	0.1	0.0%	0.0%	2	0	0.4	1
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.1%	0.0%	0.4	0.1	0.0%	0.0%	3	1	0.2	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	1.9%	0.8%	5.3	2.3	1.2%	0.2%	98	16	1.8	37
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.5	2
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.8%	0.2%	2.1	0.6	1.4%	0.3%	116	25	3.2	335
Other Glass	0.1%	0.0%	0.2	0.0	0.1%	0.0%	8	1	0.1	1
Metal	**9.7%**	**2.9%**	**26.5**	**7.8**	**10.1%**	**0.9%**	**819**	**71**	**20.0**	**1,185**
Metal Bottles, Jars and Cans, Beer	1.8%	0.7%	5.0	1.8	3.4%	0.6%	278	49	4.9	144
Metal Bottles, Jars and Cans, Soda	0.7%	0.3%	1.8	1.0	1.2%	0.5%	99	37	0.8	26
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.1%	0.0%	0.4	0.1	0.3%	0.1%	28	5	0.8	22
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	1
Metal Bottles, Jars and Cans, Tea and Coffee	0.1%	0.0%	0.2	0.0	0.1%	0.0%	4	0	0.1	3
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.1	0.0	0.0%	0.0%	2	1	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.1	3
Metal Bottles, Jars and Cans, Unknown	0.2%	0.1%	0.4	0.2	0.4%	0.1%	35	12	0.0	3
Non-beverage Metal Food Packaging	0.5%	0.2%	1.4	0.5	1.7%	0.3%	136	20	1.7	336
Metal Non-Food Packaging	0.2%	0.1%	0.5	0.3	0.1%	0.0%	7	3	0.3	79
Bottle Caps and Tabs	0.5%	0.2%	1.4	0.5	1.1%	0.2%	92	14	1.9	372
Other Metal	5.6%	2.4%	15.3	6.5	1.7%	0.4%	136	31	9.3	197
Smoking	**1.5%**	**0.2%**	**4.0**	**0.5**	**8.5%**	**0.7%**	**691**	**60**	**11.0**	**9,297**
Cigarette Butts	0.7%	0.1%	2.0	0.3	6.0%	0.7%	483	55	8.2	8,788
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.6%	0.1%	1.5	0.2	2.4%	0.3%	196	23	2.4	472
E-Cigarettes and Vaping	0.2%	0.1%	0.4	0.2	0.1%	0.0%	12	4	0.4	38
Organics	**3.7%**	**1.4%**	**10.2**	**3.9**	**1.4%**	**0.2%**	**116**	**17**	**14.2**	**272**
Food Waste	0.7%	0.2%	2.0	0.4	0.7%	0.1%	57	10	7.9	180
Human or Pet Waste	0.4%	0.1%	1.2	0.3	0.2%	0.1%	13	6	0.3	4
Other Organics	2.6%	1.3%	7.0	3.6	0.6%	0.1%	47	6	6.0	88
CDL Waste	**12.5%**	**2.1%**	**34.1**	**5.8**	**4.4%**	**0.4%**	**358**	**34**	**18.0**	**847**
Construction and Demolition Debris	12.5%	2.1%	34.1	5.8	4.4%	0.4%	358	34	18.0	847
Hazardous Materials	**5.6%**	**2.5%**	**15.4**	**6.8**	**5.2%**	**1.3%**	**425**	**106**	**1.2**	**114**
Chemicals, Paint and Other Hazardous Materials	0.1%	0.0%	0.4	0.0	0.1%	0.0%	5	1	0.4	2
Medical Waste	0.0%	0.0%	0.1	0.0	0.4%	0.3%	31	21	0.3	59
PPE Masks	0.0%	0.0%	0.1	0.0	0.3%	0.0%	26	3	0.1	14
Explosives (Example, firecrackers or ammunition casings)	5.4%	2.5%	14.8	6.7	4.5%	1.2%	364	101	0.3	39
Other Materials	**44.7%**	**5.7%**	**122.5**	**15.6**	**15.3%**	**0.9%**	**1,243**	**72**	**64.8**	**2,521**
Fishing and Maritime Items	0.1%	0.0%	0.2	0.1	0.3%	0.2%	21	17	0.4	227
Tires	0.4%	0.0%	1.1	0.0	0.0%	0.0%	0	0	4.1	3
Auto Rubber Products (Example, tire shards or treads)	3.8%	0.2%	10.3	0.4	2.9%	0.1%	235	10	13.7	447
Vehicle Debris	5.9%	1.3%	16.1	3.5	3.4%	0.4%	280	29	13.4	277
Batteries, Electronics, and Small Appliances	0.1%	0.0%	0.3	0.0	0.2%	0.0%	16	3	1.2	24
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.9%	0.2%	2.4	0.6	0.9%	0.1%	74	11	6.3	93
Textiles, Clothing and Shoes	3.8%	0.7%	10.5	1.8	1.8%	0.2%	150	13	5.1	375
Toiletries and Personal Products	0.4%	0.1%	1.0	0.3	2.3%	0.4%	188	33	0.9	86
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	3
Toys, Sports, and Recreational Items	7.5%	2.3%	20.5	6.2	2.4%	0.5%	191	42	1.6	50
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	0
Whole Bags of Mixed Trash	13.0%	4.4%	35.5	12.1	0.1%	0.0%	6	2	1.0	2
Miscellaneous Materials	9.0%	2.8%	24.7	7.8	1.0%	0.4%	82	36	17.1	936
Estimated Total (per mile)	**100%**		**274.3**		**100%**		**8,112**		**228.3**	**22,939**

Table 70. Detailed litter composition table for urban roadways.

Material	Est. %	+ / -	Est. Pounds per Mile	Pounds per Mile + / -	Est. %	+ / -	Est. Pieces per Mile	Pieces per Mile + / -	Pounds per Mile per Year	Pieces per Mile per Year
Paper	**5.2%**	**1.1%**	**12.6**	**2.7**	**14.9%**	**1.7%**	**1,932**	**215**	**42.7**	**6,217**
Cardboard	0.9%	0.3%	2.1	0.6	1.8%	0.5%	235	65	7.7	740
Fast-food Paper Bags	0.0%	0.0%	0.1	0.1	0.1%	0.1%	19	15	0.4	17
Kraft Paper Bags	0.3%	0.1%	0.6	0.3	0.3%	0.1%	33	13	0.6	34
Fast-food Paper Cups	0.4%	0.1%	0.9	0.3	0.3%	0.1%	39	10	10.4	62
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	1	0.0	7
One-Time/ To-Go/ Fast Food Service Items	0.2%	0.1%	0.5	0.2	0.6%	0.2%	82	32	3.2	817
Paper Napkins and Tissues	1.1%	0.4%	2.8	0.9	2.9%	1.0%	377	129	4.4	635
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	1
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.0	0.1%	0.1%	7	8	0.7	456
Paper Non-Beverage Paper Food Packaging	0.5%	0.1%	1.2	0.3	1.4%	0.4%	177	50	1.4	157
Non-Food Paper Packaging	0.6%	0.5%	1.4	1.2	1.3%	0.6%	164	76	2.0	119
Newspaper, Magazines, Junk Mail, and Office Paper	0.4%	0.1%	0.9	0.2	1.7%	0.5%	215	69	3.3	442
Receipts	0.0%	0.0%	0.0	0.0	0.3%	0.1%	34	15	1.4	70
Other Paper	0.9%	0.4%	2.1	0.9	4.2%	1.3%	548	168	7.0	2,661
Plastic	**13.3%**	**2.1%**	**32.1**	**5.0**	**43.9%**	**2.9%**	**5,688**	**370**	**74.2**	**8,302**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.2%	0.1%	0.5	0.1	0.2%	0.1%	20	8	1.7	31
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.4%	0.2%	0.9	0.4	1.0%	0.4%	124	51	0.6	23
Plastic Bottles and Jars, Other Wine and Liquor	0.3%	0.0%	0.7	0.1	0.1%	0.0%	11	2	1.1	33
Plastic Bottles and Jars, Sports and Health Drinks	0.1%	0.0%	0.2	0.1	0.1%	0.1%	12	9	0.3	7
Plastic Bottles and Jars, Juice	0.1%	0.0%	0.2	0.0	0.0%	0.0%	4	1	0.7	11
Plastic Bottles and Jars, Tea and Coffee	0.1%	0.0%	0.2	0.1	0.1%	0.1%	7	8	0.1	1
Plastic Bottles and Jars, Still-water	0.2%	0.1%	0.6	0.1	0.4%	0.1%	55	16	1.9	93
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.6	7
Plastic Bottles and Jars, Unknown	0.2%	0.0%	0.5	0.0	0.1%	0.0%	15	2	0.2	4
Plastic Straws and Stirrers	0.1%	0.0%	0.2	0.0	1.0%	0.4%	127	46	0.8	230
Plastic Bottle Caps and Tabs	0.6%	0.2%	1.5	0.6	1.7%	0.4%	218	56	2.7	513
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.1%	0.1%	8	8	0.0	1
Fast-food Plastic Cups	0.3%	0.1%	0.7	0.2	0.5%	0.1%	59	12	2.0	198
Plastic Cups	0.1%	0.0%	0.2	0.0	0.1%	0.0%	15	2	0.2	16
Plastic Lids	0.0%	0.0%	0.1	0.0	0.1%	0.0%	14	1	27.5	37
Plastic Utensils	0.0%	0.0%	0.1	0.0	0.2%	0.1%	22	11	0.2	17
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.2	14
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.3%	0.1%	0.7	0.2	0.7%	0.3%	91	36	2.6	57
Grocery, Retail and Shopping Bags	0.4%	0.1%	0.9	0.3	0.6%	0.2%	74	30	0.8	134
Other Plastic Film	2.1%	0.7%	4.9	1.7	11.1%	2.1%	1,441	271	3.6	1,023
Food Wrappers and Snack Bags	0.9%	0.2%	2.1	0.5	10.4%	2.1%	1,342	266	3.7	1,104
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	3	1	0.1	8
Foam Cups, Bowls, and Clamshells	0.2%	0.1%	0.5	0.2	1.0%	0.3%	125	38	0.1	16
Other Foam	0.5%	0.1%	1.3	0.3	4.2%	1.7%	548	217	1.7	860
Non-beverage Plastic Food Packaging	0.3%	0.2%	0.8	0.4	1.0%	0.3%	128	39	1.4	570
Non-food Plastic Packaging	2.2%	1.0%	5.4	2.5	2.2%	1.3%	286	170	2.4	285
Other Plastic	3.8%	0.4%	9.1	1.0	7.2%	1.3%	935	169	16.1	3,006
Glass	**6.9%**	**2.9%**	**16.7**	**6.9**	**2.9%**	**0.9%**	**380**	**111**	**46.2**	**3,291**
Glass Bottles and Jars, Beer	1.5%	0.1%	3.7	0.3	0.2%	0.0%	21	2	35.8	2,690
Glass Bottles and Jars, Soda	0.0%	0.0%	0.1	0.0	0.0%	0.0%	4	1	0.8	1
Glass Bottles and Jars, Single-serve Wine and Liquor	0.8%	0.4%	1.8	0.9	0.2%	0.2%	30	25	1.0	6
Glass Bottles and Jars, Other Wine and Liquor	0.2%	0.0%	0.5	0.1	0.0%	0.0%	1	0	0.0	1
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.4%	0.4%	1.1	0.9	0.1%	0.1%	9	7	0.6	1
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	3.3%	2.6%	7.9	6.3	1.7%	0.7%	223	85	1.5	27
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.8	6
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.6%	0.1%	1.5	0.2	0.6%	0.1%	75	16	4.4	555
Other Glass	0.1%	0.0%	0.2	0.1	0.1%	0.1%	16	10	0.2	3
Metal	**8.7%**	**3.3%**	**21.0**	**7.9**	**6.8%**	**1.2%**	**881**	**158**	**30.5**	**2,574**
Metal Bottles, Jars and Cans, Beer	0.7%	0.2%	1.7	0.4	1.0%	0.2%	129	26	3.4	124
Metal Bottles, Jars and Cans, Soda	0.3%	0.1%	0.8	0.3	0.4%	0.1%	48	18	1.2	38
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.2%	0.1%	0.4	0.1	0.3%	0.1%	33	9	1.1	34
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	1
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.1	0.0	0.0%	0.0%	4	1	0.3	7
Metal Bottles, Jars and Cans, Still-water	0.1%	0.1%	0.3	0.3	0.1%	0.0%	7	6	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.1	0.0	0.0%	0.0%	2	0	0.1	5
Metal Bottles, Jars and Cans, Unknown	0.2%	0.2%	0.4	0.4	0.2%	0.1%	24	17	0.1	9
Non-beverage Metal Food Packaging	0.4%	0.2%	0.9	0.5	2.0%	0.8%	263	99	2.7	598
Metal Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	1.0	215
Bottle Caps and Tabs	0.3%	0.1%	0.6	0.3	1.2%	0.4%	150	55	5.5	1,090
Other Metal	6.5%	2.9%	15.7	7.1	1.7%	0.7%	221	95	15.0	453
Smoking	**1.9%**	**0.6%**	**4.6**	**1.4**	**11.7%**	**2.9%**	**1,514**	**377**	**20.9**	**23,382**
Cigarette Butts	1.1%	0.5%	2.8	1.2	9.4%	3.1%	1,215	397	15.9	22,265
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.4%	0.1%	1.1	0.3	2.2%	0.5%	279	68	4.4	1,006
E-Cigarettes and Vaping	0.3%	0.1%	0.8	0.1	0.2%	0.1%	20	8	0.6	110
Organics	**1.9%**	**0.7%**	**4.7**	**1.6**	**1.8%**	**0.6%**	**239**	**79**	**32.6**	**271**
Food Waste	1.1%	0.6%	2.6	1.4	0.9%	0.5%	122	61	15.1	82
Human or Pet Waste	0.1%	0.0%	0.2	0.0	0.0%	0.0%	3	1	1.0	11
Other Organics	0.8%	0.2%	1.9	0.5	0.9%	0.4%	115	45	16.5	178
CDL Waste	**25.6%**	**8.9%**	**61.6**	**21.4**	**4.0%**	**1.0%**	**517**	**125**	**32.1**	**449**
Construction and Demolition Debris	25.6%	8.9%	61.6	21.4	4.0%	1.0%	517	125	32.1	449
Hazardous Materials	**0.5%**	**0.2%**	**1.3**	**0.4**	**0.7%**	**0.2%**	**89**	**32**	**2.8**	**223**
Chemicals, Paint and Other Hazardous Materials	0.3%	0.2%	0.7	0.4	0.1%	0.1%	8	8	1.1	6
Medical Waste	0.1%	0.0%	0.2	0.1	0.0%	0.0%	5	1	0.3	66
PPE Masks	0.1%	0.1%	0.3	0.2	0.6%	0.3%	76	33	0.4	39
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.9	111
Other Materials	**35.8%**	**5.7%**	**86.3**	**13.7**	**13.1%**	**2.0%**	**1,701**	**255**	**119.8**	**4,194**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.1%	0.1%	9	7	0.0	0
Tires	0.5%	0.0%	1.1	0.1	0.0%	0.0%	0	0	12.6	1
Auto Rubber Products (Example, tire shards or treads)	5.3%	1.5%	12.7	3.6	1.9%	0.3%	247	43	22.8	522
Vehicle Debris	6.7%	0.8%	16.1	1.9	2.9%	0.5%	379	65	27.3	487
Batteries, Electronics, and Small Appliances	0.4%	0.1%	1.0	0.3	0.3%	0.1%	40	16	3.5	66
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	1.2%	0.3%	3.0	0.8	1.6%	0.6%	201	82	3.2	218
Textiles, Clothing and Shoes	12.3%	5.8%	29.6	14.0	2.9%	0.7%	369	92	8.6	651
Toiletries and Personal Products	0.7%	0.2%	1.6	0.5	2.9%	0.9%	377	120	1.5	178
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	0
Toys, Sports, and Recreational Items	4.4%	0.3%	10.7	0.7	0.1%	0.0%	14	2	4.0	51
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	1
Whole Bags of Mixed Trash	0.1%	0.0%	0.1	0.0	0.0%	0.0%	0	0	3.2	5
Miscellaneous Materials	4.3%	1.6%	10.2	3.7	0.5%	0.1%	64	13	33.0	2,014
Estimated Total (per mile)	**100%**		**240.9**		**100%**		**12,942**		**401.8**	**48,903**

Table 71. Detailed litter composition table for rural roadways.

Material	Est. %	+ / -	Est. Pounds per Mile	Pounds per Mile + / -	Est. %	+ / -	Est. Pieces per Mile	Pieces per Mile + / -	Pounds per Mile per Year	Pieces per Mile per Year
Paper	**4.4%**	**1.1%**	**12.7**	**3.2**	**7.6%**	**1.2%**	**455**	**72**	**21.2**	**1,262**
Cardboard	1.3%	0.3%	3.6	0.9	0.9%	0.2%	57	10	10.9	132
Fast-food Paper Bags	0.1%	0.0%	0.2	0.1	0.3%	0.2%	19	9	2.0	14
Kraft Paper Bags	0.2%	0.1%	0.6	0.3	0.5%	0.2%	32	15	0.3	9
Fast-food Paper Cups	0.2%	0.1%	0.7	0.2	0.5%	0.2%	30	12	1.5	49
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
One-Time/ To-Go/ Fast Food Service Items	0.8%	0.7%	2.2	2.0	0.8%	0.6%	49	34	1.1	87
Paper Napkins and Tissues	0.3%	0.1%	0.9	0.4	0.8%	0.3%	48	17	2.1	422
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	0
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.1	0.1%	0.1%	5	4	0.1	2
Paper Non-Beverage Paper Food Packaging	0.5%	0.2%	1.6	0.5	0.7%	0.2%	44	13	0.8	21
Non-Food Paper Packaging	0.1%	0.0%	0.3	0.1	0.5%	0.2%	28	12	0.2	35
Newspaper, Magazines, Junk Mail, and Office Paper	0.0%	0.0%	0.1	0.0	0.4%	0.0%	21	2	0.7	37
Receipts	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	0	0.0	9
Other Paper	0.9%	0.2%	2.5	0.6	2.0%	0.3%	121	19	1.3	444
Plastic	**8.1%**	**1.3%**	**23.5**	**3.8**	**36.0%**	**3.2%**	**2,166**	**194**	**21.8**	**3,027**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Plastic Bottles and Jars, Soda	0.1%	0.0%	0.3	0.1	0.2%	0.1%	14	5	0.3	5
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.1%	0.0%	0.4	0.1	0.6%	0.2%	37	15	0.6	18
Plastic Bottles and Jars, Other Wine and Liquor	0.1%	0.0%	0.3	0.1	0.1%	0.1%	9	6	0.8	8
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.0%	0.5	0.1	0.2%	0.1%	15	7	1.3	12
Plastic Bottles and Jars, Juice	0.1%	0.0%	0.3	0.1	0.2%	0.1%	12	5	0.0	0
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.1	0.1	0.1%	0.1%	4	4	0.6	6
Plastic Bottles and Jars, Still-water	0.2%	0.1%	0.6	0.2	0.7%	0.1%	45	8	0.8	35
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	1
Plastic Bottles and Jars, Unknown	0.2%	0.2%	0.6	0.5	0.2%	0.1%	11	6	0.0	1
Plastic Straws and Stirrers	0.1%	0.0%	0.1	0.1	0.9%	0.4%	52	22	0.1	29
Plastic Bottle Caps and Tabs	0.8%	0.2%	2.3	0.7	2.0%	0.6%	122	33	1.1	380
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.1%	0.0%	0.2	0.0	0.2%	0.0%	14	2	1.3	40
Plastic Cups	0.2%	0.0%	0.4	0.1	0.6%	0.3%	36	18	0.1	2
Plastic Lids	0.1%	0.0%	0.3	0.1	0.7%	0.4%	39	23	0.2	42
Plastic Utensils	0.0%	0.0%	0.1	0.0	0.3%	0.1%	15	4	0.0	8
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	20
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.1%	0.0%	0.4	0.1	0.2%	0.1%	15	7	0.5	52
Grocery, Retail and Shopping Bags	0.1%	0.1%	0.4	0.3	0.2%	0.1%	15	6	0.5	7
Other Plastic Film	1.7%	0.2%	4.8	0.7	6.7%	1.0%	404	58	1.6	403
Food Wrappers and Snack Bags	0.8%	0.3%	2.2	0.9	10.0%	2.8%	604	169	2.4	573
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.1	6
Foam Cups, Bowls, and Clamshells	0.1%	0.0%	0.2	0.0	0.6%	0.4%	38	22	0.0	3
Other Foam	0.3%	0.1%	1.0	0.4	1.4%	0.3%	85	18	1.4	228
Non-beverage Plastic Food Packaging	0.2%	0.0%	0.6	0.1	0.7%	0.2%	45	9	0.3	44
Non-food Plastic Packaging	0.2%	0.1%	0.7	0.3	1.4%	0.7%	83	42	3.9	536
Other Plastic	2.3%	0.6%	6.6	1.8	7.5%	1.3%	450	76	3.5	568
Glass	**8.8%**	**3.4%**	**25.3**	**9.9**	**5.0%**	**1.3%**	**302**	**76**	**28.4**	**460**
Glass Bottles and Jars, Beer	5.7%	2.2%	16.4	6.2	1.8%	0.7%	108	44	18.2	170
Glass Bottles and Jars, Soda	0.2%	0.2%	0.6	0.7	0.1%	0.1%	5	4	0.3	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.1%	0.1%	0.4	0.3	0.1%	0.1%	5	5	4.8	10
Glass Bottles and Jars, Other Wine and Liquor	0.3%	0.1%	0.8	0.2	0.0%	0.0%	2	1	0.5	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.1	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.1	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	1.5%	1.2%	4.2	3.5	0.7%	0.3%	44	17	1.9	41
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.8%	0.4%	2.4	1.2	2.2%	0.8%	133	49	2.7	239
Other Glass	0.1%	0.0%	0.2	0.0	0.1%	0.0%	5	0	0.0	0
Metal	**10.0%**	**5.1%**	**28.9**	**14.6**	**13.2%**	**1.9%**	**792**	**116**	**15.4**	**583**
Metal Bottles, Jars and Cans, Beer	2.2%	1.3%	6.4	3.7	5.7%	1.6%	343	96	5.5	153
Metal Bottles, Jars and Cans, Soda	0.8%	0.7%	2.2	1.9	2.0%	1.2%	121	72	0.6	21
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.1%	0.1%	0.4	0.2	0.4%	0.1%	25	8	0.7	17
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	1
Metal Bottles, Jars and Cans, Tea and Coffee	0.1%	0.0%	0.3	0.1	0.1%	0.0%	4	1	0.0	1
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
Metal Bottles, Jars and Cans, Unknown	0.2%	0.1%	0.5	0.3	0.7%	0.4%	40	21	0.0	0
Non-beverage Metal Food Packaging	0.6%	0.3%	1.7	0.9	1.4%	0.4%	82	23	1.2	223
Metal Non-Food Packaging	0.2%	0.2%	0.7	0.6	0.2%	0.1%	10	6	0.1	19
Bottle Caps and Tabs	0.6%	0.3%	1.7	1.0	1.1%	0.3%	67	19	0.3	60
Other Metal	5.2%	4.1%	15.0	12.0	1.7%	0.8%	99	46	6.8	86
Smoking	**1.3%**	**0.3%**	**3.8**	**0.7**	**5.6%**	**0.9%**	**334**	**53**	**6.6**	**3,186**
Cigarette Butts	0.6%	0.1%	1.7	0.3	2.8%	0.6%	165	38	4.8	2,939
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.6%	0.1%	1.7	0.4	2.7%	0.6%	160	35	1.6	240
E-Cigarettes and Vaping	0.1%	0.1%	0.3	0.3	0.1%	0.1%	8	6	0.3	6
Organics	**4.4%**	**2.7%**	**12.6**	**7.7**	**1.0%**	**0.4%**	**63**	**21**	**6.2**	**273**
Food Waste	0.6%	0.2%	1.7	0.6	0.5%	0.1%	29	9	4.7	223
Human or Pet Waste	0.6%	0.2%	1.6	0.7	0.3%	0.2%	17	12	0.0	0
Other Organics	3.2%	2.5%	9.2	7.3	0.3%	0.1%	17	4	1.5	50
CDL Waste	**7.7%**	**2.7%**	**22.2**	**7.8**	**4.8%**	**0.8%**	**289**	**46**	**11.9**	**1,019**
Construction and Demolition Debris	7.7%	2.7%	22.2	7.8	4.8%	0.8%	289	46	11.9	1,019
Hazardous Materials	**7.4%**	**4.8%**	**21.5**	**13.8**	**9.5%**	**3.5%**	**571**	**212**	**0.5**	**66**
Chemicals, Paint and Other Hazardous Materials	0.1%	0.0%	0.2	0.0	0.1%	0.0%	3	1	0.0	0
Medical Waste	0.0%	0.0%	0.1	0.0	0.7%	0.7%	42	43	0.3	55
PPE Masks	0.0%	0.0%	0.0	0.0	0.1%	0.0%	5	1	0.0	3
Explosives (Example, firecrackers or ammunition casings)	7.3%	4.8%	21.1	13.8	8.7%	3.5%	521	208	0.1	7
Other Materials	**47.9%**	**10.2%**	**138.2**	**29.5**	**17.4%**	**1.6%**	**1,044**	**99**	**40.9**	**1,796**
Fishing and Maritime Items	0.1%	0.1%	0.2	0.1	0.4%	0.5%	26	33	0.6	325
Tires	0.4%	0.0%	1.1	0.0	0.0%	0.0%	0	0	0.4	4
Auto Rubber Products (Example, tire shards or treads)	3.2%	0.1%	9.2	0.2	3.8%	0.2%	230	12	9.7	415
Vehicle Debris	5.6%	2.3%	16.1	6.7	3.9%	0.8%	236	48	7.3	185
Batteries, Electronics, and Small Appliances	0.0%	0.0%	0.0	0.0	0.1%	0.1%	6	4	0.2	6
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.8%	0.4%	2.2	1.1	0.3%	0.1%	19	7	7.7	38
Textiles, Clothing and Shoes	0.8%	0.4%	2.2	1.1	0.9%	0.2%	55	9	3.6	256
Toiletries and Personal Products	0.2%	0.2%	0.7	0.4	1.8%	0.7%	106	44	0.6	45
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	4
Toys, Sports, and Recreational Items	8.6%	4.4%	24.7	12.7	4.5%	1.4%	268	86	0.6	50
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	17.6%	8.6%	50.9	24.8	0.1%	0.1%	8	4	0.0	0
Miscellaneous Materials	10.7%	5.3%	31.0	15.3	1.5%	1.2%	90	72	10.2	468
Estimated Total (per mile)	**100%**		**288.7**		**100%**		**6,015**		**153.0**	**11,672**

Table 72. Detailed litter composition table for interstate roadways.

Material	Est. %	+ / -	Est. Pounds per Mile	Pounds per Mile + / -	Est. %	+ / -	Est. Pieces per Mile	Pieces per Mile + / -	Pounds per Mile per Year	Pieces per Mile per Year
Paper	**4.2%**	**0.8%**	**50.1**	**9.4**	**11.4%**	**1.2%**	**4,374**	**478**	**131.5**	**8,507**
Cardboard	1.2%	0.3%	14.6	3.2	2.2%	0.4%	862	158	51.2	1,111
Fast-food Paper Bags	0.0%	0.0%	0.3	0.2	0.1%	0.0%	29	14	1.0	46
Kraft Paper Bags	0.5%	0.3%	5.5	3.4	0.6%	0.3%	226	100	2.1	94
Fast-food Paper Cups	0.3%	0.1%	3.1	1.2	0.4%	0.1%	164	55	4.0	109
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	3	3	0.5	42
One-Time/ To-Go/ Fast Food Service Items	0.1%	0.0%	1.5	0.6	0.3%	0.1%	100	31	3.8	338
Paper Napkins and Tissues	0.2%	0.1%	2.7	1.6	0.6%	0.2%	216	68	6.5	1,434
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.1	0.1	0.0%	0.0%	3	3	0.2	3
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.3	0.1	0.0%	0.0%	15	7	0.5	209
Paper Non-Beverage Paper Food Packaging	0.3%	0.1%	3.1	0.8	0.6%	0.2%	238	74	2.9	145
Non-Food Paper Packaging	0.3%	0.1%	3.1	1.4	0.7%	0.2%	261	90	7.4	645
Newspaper, Magazines, Junk Mail, and Office Paper	0.6%	0.2%	7.7	2.7	2.6%	0.7%	1,000	267	18.0	1,519
Receipts	0.0%	0.0%	0.1	0.1	0.1%	0.1%	36	22	17.3	78
Other Paper	0.7%	0.2%	8.0	1.9	3.2%	0.6%	1,219	237	16.1	2,735
Plastic	**12.5%**	**1.5%**	**151.0**	**18.2**	**38.6%**	**2.9%**	**14,866**	**1,119**	**118.1**	**18,770**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	7	7	0.0	0
Plastic Bottles and Jars, Soda	0.2%	0.1%	2.4	0.7	0.3%	0.1%	135	40	2.0	32
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.1%	0.0%	1.1	0.4	0.2%	0.1%	92	34	0.8	23
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.3	0.2	0.0%	0.0%	8	5	1.1	7
Plastic Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.4	0.2	0.1%	0.0%	24	12	2.4	34
Plastic Bottles and Jars, Juice	0.2%	0.1%	2.6	1.0	0.2%	0.1%	66	29	0.0	0
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.5	0.2	0.0%	0.0%	14	7	1.2	13
Plastic Bottles and Jars, Still-water	0.4%	0.1%	4.7	0.9	1.2%	0.2%	459	63	8.8	414
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.1	0.1	0.0%	0.0%	3	2	1.3	16
Plastic Bottles and Jars, Unknown	0.3%	0.2%	4.2	2.9	0.1%	0.0%	27	16	1.1	18
Plastic Straws and Stirrers	0.0%	0.0%	0.5	0.1	0.5%	0.1%	202	50	0.5	170
Plastic Bottle Caps and Tabs	0.8%	0.2%	9.2	2.5	1.0%	0.2%	396	82	2.3	430
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	3	3	0.1	7
Fast-food Plastic Cups	0.3%	0.1%	3.5	1.1	0.6%	0.1%	218	42	3.5	115
Plastic Cups	0.1%	0.0%	0.7	0.3	0.2%	0.1%	63	23	0.8	102
Plastic Lids	0.1%	0.1%	1.7	0.6	0.7%	0.2%	264	79	0.1	3
Plastic Utensils	0.0%	0.0%	0.6	0.4	0.2%	0.1%	88	47	0.2	28
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.5	36
Clamshells	0.0%	0.0%	0.1	0.1	0.0%	0.0%	3	3	0.0	0
Plastic Trash Bags	0.2%	0.1%	2.3	1.0	0.2%	0.1%	95	28	3.6	193
Grocery, Retail and Shopping Bags	0.1%	0.0%	0.9	0.4	0.2%	0.1%	70	28	1.2	174
Other Plastic Film	1.5%	0.3%	18.7	3.5	10.3%	1.2%	3,969	461	9.0	2,451
Food Wrappers and Snack Bags	0.5%	0.1%	6.6	1.3	3.6%	0.5%	1,391	183	7.8	1,501
Food and Drink Pouches	0.0%	0.0%	0.1	0.1	0.0%	0.0%	16	7	0.5	82
Foam Cups, Bowls, and Clamshells	0.1%	0.0%	0.9	0.3	0.6%	0.2%	242	67	0.5	64
Other Foam	0.8%	0.2%	9.8	2.9	4.2%	0.7%	1,611	263	6.7	1,918
Non-beverage Plastic Food Packaging	0.2%	0.1%	2.3	0.7	0.7%	0.2%	287	85	2.5	113
Non-food Plastic Packaging	0.3%	0.1%	3.7	1.3	0.9%	0.1%	335	48	12.4	2,345
Other Plastic	6.1%	1.1%	73.4	13.5	12.4%	1.4%	4,778	541	46.3	8,479
Glass	**1.3%**	**0.4%**	**16.1**	**4.8**	**1.3%**	**0.3%**	**511**	**123**	**28.8**	**1,597**
Glass Bottles and Jars, Beer	0.7%	0.3%	8.8	4.1	0.2%	0.1%	74	30	18.5	141
Glass Bottles and Jars, Soda	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.1	0.0	0.0%	0.0%	3	2	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	0.1%	0.1%	1.1	0.8	0.2%	0.1%	70	54	2.1	85
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.3%	0.1%	3.5	0.7	0.7%	0.2%	253	79	8.1	1,363
Other Glass	0.2%	0.2%	2.6	1.9	0.3%	0.2%	111	59	0.1	8
Metal	**6.9%**	**1.9%**	**83.5**	**22.8**	**5.1%**	**0.6%**	**1,977**	**238**	**58.1**	**3,436**
Metal Bottles, Jars and Cans, Beer	0.4%	0.1%	4.7	1.1	1.2%	0.3%	451	112	9.7	264
Metal Bottles, Jars and Cans, Soda	0.2%	0.0%	1.9	0.5	0.5%	0.1%	189	37	3.0	96
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.3%	0.1%	3.3	1.1	0.7%	0.1%	261	46	3.7	120
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.1	0.0	0.0%	0.0%	8	2	0.1	5
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.3	0.2	0.1%	0.0%	26	13	1.0	25
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.1%	0.0%	1.0	0.6	0.0%	0.0%	13	7	0.3	12
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.2	0.1	0.1%	0.0%	23	11	0.2	10
Non-beverage Metal Food Packaging	0.2%	0.1%	2.6	0.8	0.8%	0.3%	313	99	2.8	930
Metal Non-Food Packaging	0.1%	0.0%	0.6	0.4	0.1%	0.0%	20	10	1.8	463
Bottle Caps and Tabs	0.2%	0.1%	2.5	1.5	0.3%	0.1%	128	45	1.1	187
Other Metal	5.5%	1.9%	66.2	22.6	1.4%	0.4%	543	140	34.4	1,324
Smoking	**1.4%**	**0.3%**	**17.5**	**4.0**	**5.0%**	**0.8%**	**1,913**	**305**	**19.0**	**13,544**
Cigarette Butts	0.5%	0.1%	6.2	1.7	3.4%	0.8%	1,316	310	11.8	12,637
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.3%	0.1%	4.0	1.2	1.4%	0.3%	533	118	3.8	789
E-Cigarettes and Vaping	0.6%	0.3%	7.3	3.6	0.2%	0.1%	64	21	3.5	118
Organics	**8.5%**	**4.8%**	**102.8**	**58.2**	**1.1%**	**0.3%**	**425**	**122**	**27.1**	**330**
Food Waste	0.2%	0.1%	2.9	1.5	0.1%	0.0%	48	15	9.1	195
Human or Pet Waste	0.1%	0.1%	1.7	1.2	0.1%	0.0%	22	14	0.0	0
Other Organics	8.1%	4.8%	98.2	58.1	0.9%	0.3%	356	121	18.0	134
CDL Waste	**9.5%**	**1.6%**	**114.7**	**19.8**	**5.1%**	**0.6%**	**1,961**	**242**	**308.7**	**2,859**
Construction and Demolition Debris	9.5%	1.6%	114.7	19.8	5.1%	0.6%	1,961	242	308.7	2,859
Hazardous Materials	**0.7%**	**0.4%**	**8.0**	**5.0**	**0.6%**	**0.3%**	**224**	**115**	**2.6**	**227**
Chemicals, Paint and Other Hazardous Materials	0.6%	0.4%	6.7	4.9	0.1%	0.0%	22	9	0.0	0
Medical Waste	0.1%	0.1%	0.8	0.7	0.3%	0.3%	133	108	0.8	148
PPE Masks	0.0%	0.0%	0.5	0.1	0.2%	0.0%	67	14	0.7	75
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	3	2	1.2	3
Other Materials	**55.0%**	**5.1%**	**663.3**	**61.2**	**31.8%**	**3.4%**	**12,265**	**1,303**	**884.8**	**24,301**
Fishing and Maritime Items	0.2%	0.1%	2.0	1.3	0.1%	0.1%	53	23	0.9	9
Tires	4.0%	3.3%	48.0	39.7	0.0%	0.0%	6	5	172.5	49
Auto Rubber Products (Example, tire shards or treads)	22.7%	4.4%	273.9	52.6	18.3%	3.0%	7,043	1,147	353.4	11,708
Vehicle Debris	16.6%	2.6%	200.1	31.0	8.7%	1.2%	3,357	444	189.1	5,678
Batteries, Electronics, and Small Appliances	0.1%	0.0%	1.1	0.5	0.1%	0.0%	21	10	1.5	93
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	1.0%	0.5%	12.4	5.5	0.5%	0.1%	183	55	25.5	424
Textiles, Clothing and Shoes	3.6%	0.8%	43.7	10.2	2.5%	0.5%	955	196	26.8	1,104
Toiletries and Personal Products	0.2%	0.1%	2.8	0.8	1.2%	0.3%	461	105	4.5	373
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	6	5	0.1	3
Toys, Sports, and Recreational Items	0.1%	0.0%	0.7	0.4	0.1%	0.1%	42	20	2.7	55
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	2.6	10
Whole Bags of Mixed Trash	0.3%	0.3%	3.6	3.0	0.0%	0.0%	6	5	38.3	12
Miscellaneous Materials	6.2%	1.5%	75.0	17.9	0.3%	0.1%	134	21	67.0	4,781
Estimated Total (per mile)	**100%**		**1,207.0**		**100%**		**38,516**		**1,578.8**	**73,569**

Table 73. Detailed litter composition table for arterial roadways.

Material	Est. %	+ / -	Est. Pounds per Mile	Pounds per Mile + / -	Est. %	+ / -	Est. Pieces per Mile	Pieces per Mile + / -	Pounds per Mile per Year	Pieces per Mile per Year
Paper	**4.3%**	**0.8%**	**11.1**	**2.1**	**11.6%**	**1.3%**	**1,484**	**169**	**107.7**	**4,389**
Cardboard	0.7%	0.4%	1.8	1.1	1.4%	0.8%	181	98	77.1	237
Fast-food Paper Bags	0.1%	0.1%	0.3	0.3	0.2%	0.1%	20	14	1.7	45
Kraft Paper Bags	0.1%	0.0%	0.2	0.1	0.1%	0.1%	18	8	0.9	40
Fast-food Paper Cups	0.3%	0.1%	0.8	0.3	0.5%	0.2%	65	25	2.3	77
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	5	5	0.3	14
One-Time/ To-Go/ Fast Food Service Items	0.3%	0.1%	0.7	0.4	0.8%	0.4%	107	55	5.0	361
Paper Napkins and Tissues	0.4%	0.2%	0.9	0.5	0.9%	0.3%	114	43	5.1	754
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.7	4
Paper Beverage and Food Cartons, Non-Alcoholic	0.1%	0.0%	0.1	0.1	0.0%	0.0%	4	2	0.5	9
Paper Non-Beverage Paper Food Packaging	0.5%	0.2%	1.3	0.4	1.2%	0.5%	148	58	5.7	459
Non-Food Paper Packaging	0.6%	0.3%	1.7	0.7	1.0%	0.4%	133	48	1.0	113
Newspaper, Magazines, Junk Mail, and Office Paper	0.5%	0.3%	1.3	0.7	2.2%	0.8%	283	108	3.6	312
Receipts	0.0%	0.0%	0.0	0.0	0.1%	0.1%	18	11	0.1	52
Other Paper	0.8%	0.3%	1.9	0.7	3.0%	0.8%	389	106	3.7	1,912
Plastic	**17.1%**	**2.6%**	**43.7**	**6.7**	**44.0%**	**2.9%**	**5,633**	**375**	**65.6**	**8,853**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	11
Plastic Bottles and Jars, Soda	0.3%	0.2%	0.8	0.4	0.2%	0.1%	30	14	2.3	37
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.7%	0.3%	1.7	0.7	1.6%	0.7%	207	88	2.2	74
Plastic Bottles and Jars, Other Wine and Liquor	0.1%	0.1%	0.4	0.2	0.1%	0.1%	19	11	0.4	4
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.1%	0.5	0.2	0.2%	0.1%	21	9	0.5	9
Plastic Bottles and Jars, Juice	0.4%	0.2%	0.9	0.5	0.2%	0.1%	28	15	0.5	13
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.4	4
Plastic Bottles and Jars, Still-water	1.0%	0.3%	2.6	0.8	1.4%	0.3%	184	39	1.4	61
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.5	17
Plastic Bottles and Jars, Unknown	0.3%	0.2%	0.7	0.5	0.4%	0.2%	55	29	0.1	4
Plastic Straws and Stirrers	0.1%	0.0%	0.2	0.1	1.3%	0.3%	168	44	0.5	151
Plastic Bottle Caps and Tabs	1.4%	0.6%	3.5	1.4	2.0%	0.6%	261	76	2.8	548
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	4
Fast-food Plastic Cups	0.4%	0.1%	1.0	0.3	1.0%	0.2%	129	30	2.7	181
Plastic Cups	0.4%	0.2%	0.9	0.6	0.8%	0.6%	108	77	0.3	9
Plastic Lids	0.8%	0.4%	1.9	1.1	0.5%	0.2%	61	26	0.1	22
Plastic Utensils	0.0%	0.0%	0.1	0.0	0.2%	0.1%	28	10	0.4	45
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.9	50
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.6%	0.3%	1.6	0.8	0.3%	0.2%	37	22	1.5	22
Grocery, Retail and Shopping Bags	0.3%	0.2%	0.7	0.4	0.4%	0.2%	56	27	0.4	22
Other Plastic Film	1.3%	0.3%	3.4	0.8	7.6%	1.6%	970	199	8.1	1,753
Food Wrappers and Snack Bags	0.9%	0.2%	2.2	0.6	9.2%	1.7%	1,178	216	6.2	1,626
Food and Drink Pouches	0.0%	0.0%	0.1	0.0	0.1%	0.1%	10	8	0.3	8
Foam Cups, Bowls, and Clamshells	0.2%	0.1%	0.6	0.3	0.9%	0.4%	113	51	0.1	12
Other Foam	0.6%	0.3%	1.6	0.7	4.1%	1.6%	526	207	4.4	808
Non-beverage Plastic Food Packaging	0.7%	0.3%	1.7	0.8	1.3%	0.3%	164	43	1.1	54
Non-food Plastic Packaging	0.7%	0.3%	1.8	0.8	1.6%	0.7%	201	85	2.5	293
Other Plastic	5.7%	1.5%	14.7	4.0	8.4%	1.6%	1,081	208	23.8	3,015
Glass	**8.6%**	**2.1%**	**22.0**	**5.2**	**3.8%**	**1.1%**	**480**	**137**	**23.8**	**816**
Glass Bottles and Jars, Beer	5.2%	1.6%	13.4	4.0	0.9%	0.2%	121	32	8.3	484
Glass Bottles and Jars, Soda	0.2%	0.1%	0.5	0.3	0.1%	0.0%	7	4	2.1	4
Glass Bottles and Jars, Single-serve Wine and Liquor	0.2%	0.2%	0.5	0.5	0.1%	0.1%	11	10	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	4.0	8
Glass Bottles and Jars, Sports and Health Drinks	0.2%	0.1%	0.4	0.3	0.0%	0.0%	2	2	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.4%	0.3%	0.9	0.8	0.1%	0.1%	8	7	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	1.3%	0.7%	3.2	1.7	0.8%	0.5%	107	59	3.1	40
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.7%	0.2%	1.9	0.6	1.5%	0.6%	192	83	5.9	276
Other Glass	0.5%	0.4%	1.2	0.9	0.3%	0.2%	34	27	0.5	4
Metal	**6.7%**	**1.7%**	**17.2**	**4.3**	**6.3%**	**0.6%**	**807**	**83**	**58.0**	**2,268**
Metal Bottles, Jars and Cans, Beer	1.3%	0.3%	3.4	0.8	2.5%	0.5%	316	62	5.5	243
Metal Bottles, Jars and Cans, Soda	0.3%	0.1%	0.7	0.2	0.6%	0.1%	74	19	2.3	74
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.3%	0.1%	0.8	0.2	0.6%	0.1%	79	19	2.2	71
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.1	0.0	0.0%	0.0%	4	2	0.3	7
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.1	0.1	0.1%	0.1%	8	7	1.1	22
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	2	0.5	15
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.1	0.0	0.1%	0.1%	12	9	0.1	4
Non-beverage Metal Food Packaging	0.1%	0.1%	0.3	0.1	0.9%	0.3%	110	34	1.3	577
Metal Non-Food Packaging	0.1%	0.0%	0.2	0.1	0.1%	0.0%	7	3	0.7	238
Bottle Caps and Tabs	0.0%	0.0%	0.1	0.1	0.3%	0.2%	33	20	1.3	256
Other Metal	4.4%	1.6%	11.4	4.1	1.3%	0.4%	162	55	42.9	761
Smoking	**3.6%**	**0.9%**	**9.3**	**2.4**	**11.6%**	**1.7%**	**1,485**	**219**	**33.4**	**39,169**
Cigarette Butts	2.2%	0.6%	5.6	1.6	8.4%	1.8%	1,070	233	23.9	37,758
Other Cigarette, Tobacco, and Cannabis Products and Packaging	1.3%	0.6%	3.4	1.5	3.0%	0.7%	385	85	8.6	1,407
E-Cigarettes and Vaping	0.1%	0.1%	0.3	0.2	0.2%	0.2%	30	20	1.0	4
Organics	**3.2%**	**1.2%**	**8.2**	**3.1**	**1.5%**	**0.5%**	**192**	**58**	**24.4**	**301**
Food Waste	1.7%	1.1%	4.3	2.7	0.6%	0.3%	81	38	12.9	136
Human or Pet Waste	0.3%	0.2%	0.7	0.4	0.1%	0.1%	12	7	0.3	4
Other Organics	1.2%	0.4%	3.1	1.0	0.8%	0.3%	99	36	11.1	161
CDL Waste	**12.5%**	**3.2%**	**31.9**	**8.3**	**5.1%**	**0.9%**	**656**	**120**	**16.5**	**357**
Construction and Demolition Debris	12.5%	3.2%	31.9	8.3	5.1%	0.9%	656	120	16.5	357
Hazardous Materials	**0.2%**	**0.1%**	**0.6**	**0.3**	**0.5%**	**0.2%**	**67**	**22**	**2.9**	**285**
Chemicals, Paint and Other Hazardous Materials	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	2	0.3	4
Medical Waste	0.1%	0.1%	0.3	0.3	0.1%	0.1%	13	9	1.3	256
PPE Masks	0.1%	0.1%	0.3	0.2	0.4%	0.1%	52	17	0.4	22
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.0	4
Other Materials	**43.8%**	**5.4%**	**111.9**	**13.7**	**15.6%**	**2.3%**	**1,990**	**296**	**166.6**	**5,307**
Fishing and Maritime Items	0.1%	0.0%	0.2	0.1	0.1%	0.0%	7	3	0.0	0
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	4
Auto Rubber Products (Example, tire shards or treads)	12.6%	2.7%	32.1	7.0	4.0%	1.2%	506	157	47.1	989
Vehicle Debris	14.0%	3.4%	35.7	8.7	6.7%	1.3%	861	163	53.0	535
Batteries, Electronics, and Small Appliances	1.1%	0.6%	2.7	1.4	0.5%	0.3%	70	37	1.3	103
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	3.5%	2.0%	8.9	5.2	0.6%	0.3%	79	34	7.9	203
Textiles, Clothing and Shoes	2.1%	0.9%	5.3	2.2	1.6%	0.5%	208	61	17.0	656
Toiletries and Personal Products	0.4%	0.2%	1.0	0.5	1.2%	0.4%	153	49	2.3	232
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	2	0.1	11
Toys, Sports, and Recreational Items	0.3%	0.2%	0.8	0.5	0.2%	0.1%	24	15	4.4	80
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	3.1%	2.1%	7.8	5.4	0.0%	0.0%	4	2	1.4	13
Miscellaneous Materials	6.8%	1.1%	17.3	2.8	0.6%	0.2%	76	28	31.9	2,480
Estimated Total (per mile)	**100%**		**255.7**		**100%**		**12,794**		**499.0**	**61,745**

Table 74. Detailed litter composition table for collector roadways.

Material	Est. %	+ / -	Est. Pounds per Mile	Pounds per Mile + / -	Est. %	+ / -	Est. Pieces per Mile	Pieces per Mile + / -	Pounds per Mile per Year	Pieces per Mile per Year
Paper	**10.6%**	**5.2%**	**25.4**	**12.4**	**12.6%**	**3.9%**	**870**	**272**	**25.7**	**1,309**
Cardboard	4.7%	4.0%	11.2	9.6	2.0%	1.5%	137	107	1.4	23
Fast-food Paper Bags	0.1%	0.1%	0.3	0.3	0.3%	0.4%	24	29	0.0	1
Kraft Paper Bags	0.5%	0.5%	1.2	1.3	1.0%	1.1%	68	75	0.8	27
Fast-food Paper Cups	0.5%	0.2%	1.2	0.6	0.6%	0.2%	40	16	14.0	42
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	6
One-Time/ To-Go/ Fast Food Service Items	0.1%	0.0%	0.1	0.1	0.2%	0.1%	11	7	0.8	74
Paper Napkins and Tissues	1.2%	1.3%	2.8	3.1	2.3%	1.7%	158	119	1.9	206
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	1
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	7
Paper Non-Beverage Paper Food Packaging	0.3%	0.4%	0.8	0.9	0.5%	0.1%	35	10	1.9	58
Non-Food Paper Packaging	0.1%	0.0%	0.2	0.1	0.4%	0.2%	28	16	0.5	88
Newspaper, Magazines, Junk Mail, and Office Paper	0.1%	0.0%	0.1	0.0	0.4%	0.2%	27	16	1.7	162
Receipts	0.0%	0.0%	0.0	0.0	0.2%	0.0%	13	3	0.1	26
Other Paper	3.1%	2.1%	7.5	5.1	4.8%	2.0%	330	141	2.2	588
Plastic	**17.4%**	**5.1%**	**41.6**	**12.1**	**46.2%**	**4.9%**	**3,202**	**337**	**31.3**	**4,033**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.4%	0.3%	0.9	0.8	0.4%	0.3%	27	20	0.5	8
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.3%	0.1%	0.7	0.2	0.6%	0.2%	42	15	0.9	31
Plastic Bottles and Jars, Other Wine and Liquor	0.4%	0.1%	1.0	0.2	0.2%	0.1%	12	6	0.7	7
Plastic Bottles and Jars, Sports and Health Drinks	0.1%	0.1%	0.3	0.2	0.1%	0.1%	8	6	0.2	6
Plastic Bottles and Jars, Juice	0.2%	0.1%	0.4	0.2	0.2%	0.1%	14	7	0.3	4
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	1
Plastic Bottles and Jars, Still-water	0.2%	0.1%	0.4	0.1	0.4%	0.2%	29	11	1.4	54
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	3
Plastic Bottles and Jars, Unknown	0.1%	0.1%	0.2	0.2	0.1%	0.1%	7	10	0.2	4
Plastic Straws and Stirrers	0.1%	0.2%	0.3	0.4	1.3%	0.7%	88	50	0.1	34
Plastic Bottle Caps and Tabs	2.2%	2.1%	5.2	5.0	2.2%	1.0%	151	69	2.1	559
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	0
Fast-food Plastic Cups	0.2%	0.1%	0.5	0.3	0.5%	0.2%	32	17	1.9	54
Plastic Cups	0.1%	0.0%	0.2	0.1	0.2%	0.1%	16	9	0.3	7
Plastic Lids	0.0%	0.0%	0.1	0.1	0.3%	0.3%	22	24	0.8	163
Plastic Utensils	0.1%	0.1%	0.3	0.3	0.6%	0.7%	41	46	0.1	11
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.4	23
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.5%	0.3%	1.1	0.7	0.7%	0.2%	48	17	1.2	168
Grocery, Retail and Shopping Bags	0.4%	0.2%	1.0	0.4	0.5%	0.2%	31	13	1.7	23
Other Plastic Film	4.7%	1.8%	11.2	4.3	12.2%	2.7%	843	190	1.3	213
Food Wrappers and Snack Bags	1.0%	0.4%	2.4	0.9	10.4%	2.3%	723	160	3.3	733
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	1
Foam Cups, Bowls, and Clamshells	0.1%	0.0%	0.2	0.1	0.4%	0.2%	30	11	0.1	7
Other Foam	1.0%	0.8%	2.5	2.0	2.0%	1.2%	142	86	1.5	254
Non-beverage Plastic Food Packaging	0.2%	0.1%	0.5	0.3	1.0%	0.6%	72	39	1.1	97
Non-food Plastic Packaging	0.6%	0.5%	1.5	1.1	1.6%	1.1%	109	76	4.1	538
Other Plastic	4.5%	3.0%	10.8	7.1	10.3%	4.2%	713	290	6.1	1,030
Glass	**24.0%**	**10.6%**	**57.3**	**25.2**	**10.4%**	**4.0%**	**718**	**275**	**58.7**	**859**
Glass Bottles and Jars, Beer	17.8%	10.6%	42.6	25.4	3.8%	3.5%	263	241	47.7	381
Glass Bottles and Jars, Soda	0.0%	0.0%	0.1	0.0	0.1%	0.0%	6	1	1.1	1
Glass Bottles and Jars, Single-serve Wine and Liquor	0.9%	0.5%	2.2	1.1	0.2%	0.1%	11	7	0.6	15
Glass Bottles and Jars, Other Wine and Liquor	1.4%	1.2%	3.3	2.8	0.1%	0.1%	9	10	0.0	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.1%	0.0%	0.3	0.1	0.0%	0.0%	1	0	0.8	1
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	1.1%	0.8%	2.7	1.9	2.0%	0.9%	135	60	6.2	130
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	1
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	2.5%	1.3%	6.0	3.1	4.2%	1.7%	291	118	1.8	327
Other Glass	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	0	0.0	1
Metal	**9.2%**	**4.7%**	**21.9**	**11.1**	**10.3%**	**1.9%**	**710**	**133**	**17.6**	**1,323**
Metal Bottles, Jars and Cans, Beer	1.8%	0.7%	4.4	1.7	3.3%	1.0%	231	71	10.5	276
Metal Bottles, Jars and Cans, Soda	0.6%	0.4%	1.5	1.0	1.0%	0.5%	69	32	0.4	13
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.2%	0.1%	0.4	0.2	0.3%	0.2%	22	13	0.5	16
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	1
Metal Bottles, Jars and Cans, Tea and Coffee	0.4%	0.3%	1.1	0.7	0.2%	0.1%	14	9	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.1	4
Metal Bottles, Jars and Cans, Unknown	0.2%	0.2%	0.6	0.5	1.2%	1.3%	80	93	0.0	1
Non-beverage Metal Food Packaging	0.1%	0.1%	0.3	0.2	1.3%	0.4%	87	27	3.7	702
Metal Non-Food Packaging	0.1%	0.1%	0.1	0.1	0.1%	0.1%	4	5	0.1	27
Bottle Caps and Tabs	0.6%	0.6%	1.5	1.4	1.4%	1.2%	100	81	1.1	213
Other Metal	5.1%	4.9%	12.1	11.7	1.5%	1.0%	102	72	1.2	68
Smoking	**2.7%**	**1.1%**	**6.5**	**2.7**	**7.4%**	**2.2%**	**512**	**156**	**9.7**	**5,812**
Cigarette Butts	1.5%	0.9%	3.6	2.1	3.9%	1.3%	270	91	7.7	5,593
Other Cigarette, Tobacco, and Cannabis Products and Packaging	1.2%	0.7%	2.8	1.6	3.5%	1.4%	239	94	1.7	212
E-Cigarettes and Vaping	0.1%	0.0%	0.2	0.0	0.1%	0.0%	4	1	0.3	7
Organics	**1.6%**	**1.8%**	**3.9**	**4.3**	**0.6%**	**0.4%**	**39**	**25**	**21.9**	**93**
Food Waste	0.3%	0.1%	0.7	0.3	0.2%	0.1%	13	6	19.0	12
Human or Pet Waste	1.3%	1.7%	3.1	4.1	0.2%	0.3%	16	18	0.0	0
Other Organics	0.0%	0.0%	0.0	0.0	0.1%	0.0%	9	2	2.8	81
CDL Waste	**11.1%**	**8.3%**	**26.5**	**19.9**	**4.9%**	**1.8%**	**342**	**125**	**14.9**	**347**
Construction and Demolition Debris	11.1%	8.3%	26.5	19.9	4.9%	1.8%	342	125	14.9	347
Hazardous Materials	**1.7%**	**2.1%**	**4.0**	**5.1**	**0.8%**	**0.7%**	**54**	**49**	**1.4**	**172**
Chemicals, Paint and Other Hazardous Materials	0.0%	0.0%	0.1	0.1	0.1%	0.1%	9	8	0.2	1
Medical Waste	0.1%	0.1%	0.3	0.2	0.1%	0.1%	5	5	0.9	147
PPE Masks	0.0%	0.0%	0.1	0.0	0.1%	0.1%	7	5	0.2	16
Explosives (Example, firecrackers or ammunition casings)	1.5%	2.1%	3.5	5.1	0.5%	0.7%	33	47	0.1	7
Other Materials	**21.7%**	**6.0%**	**51.9**	**14.4**	**6.9%**	**1.4%**	**479**	**100**	**57.0**	**2,067**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	0
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.1	7
Auto Rubber Products (Example, tire shards or treads)	0.6%	0.3%	1.3	0.7	0.5%	0.2%	35	11	3.9	236
Vehicle Debris	6.0%	3.2%	14.2	7.7	3.3%	1.3%	226	91	4.5	156
Batteries, Electronics, and Small Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	1
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.9%	0.2%	2.2	0.5	0.8%	0.2%	53	17	21.8	90
Textiles, Clothing and Shoes	0.3%	0.1%	0.7	0.3	0.5%	0.2%	33	13	5.0	382
Toiletries and Personal Products	0.2%	0.1%	0.5	0.2	0.7%	0.3%	49	24	1.1	83
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	7
Toys, Sports, and Recreational Items	6.3%	0.6%	14.9	1.4	0.2%	0.0%	14	2	4.4	169
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Miscellaneous Materials	7.5%	4.3%	18.0	10.3	0.9%	0.6%	65	45	15.2	937
Estimated Total (per mile)	**100%**		**239.0**		**100%**		**6,927**		**238.3**	**16,014**

Table 75. Detailed litter composition table for local roadways.

Material	Est. %	+ / -	Est. Pounds per Mile	Pounds per Mile + / -	Est. %	+ / -	Est. Pieces per Mile	Pieces per Mile + / -	Pounds per Mile per Year	Pieces per Mile per Year
Paper	**3.0%**	**1.0%**	**7.7**	**2.7**	**10.5%**	**1.3%**	**716**	**90**	**13.8**	**2,808**
Cardboard	0.2%	0.0%	0.4	0.1	1.0%	0.2%	67	11	1.9	394
Fast-food Paper Bags	0.1%	0.0%	0.1	0.1	0.3%	0.1%	17	10	2.0	14
Kraft Paper Bags	0.1%	0.1%	0.3	0.3	0.2%	0.2%	17	11	0.1	7
Fast-food Paper Cups	0.2%	0.1%	0.5	0.2	0.3%	0.2%	21	13	1.4	51
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
One-Time/ To-Go/ Fast Food Service Items	0.9%	0.8%	2.3	2.2	1.0%	0.6%	66	41	1.5	374
Paper Napkins and Tissues	0.4%	0.1%	1.1	0.2	2.2%	0.5%	147	32	2.6	507
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.1	0.1%	0.1%	7	6	0.2	198
Paper Non-Beverage Paper Food Packaging	0.6%	0.2%	1.6	0.5	1.3%	0.3%	86	22	0.0	5
Non-Food Paper Packaging	0.2%	0.1%	0.6	0.3	1.0%	0.4%	67	25	0.6	25
Newspaper, Magazines, Junk Mail, and Office Paper	0.0%	0.0%	0.0	0.0	0.6%	0.2%	38	12	0.6	92
Receipts	0.0%	0.0%	0.0	0.0	0.1%	0.0%	9	3	0.1	23
Other Paper	0.2%	0.1%	0.6	0.3	2.5%	0.6%	173	38	2.8	1,118
Plastic	**5.7%**	**1.5%**	**14.6**	**3.7**	**36.9%**	**3.5%**	**2,521**	**242**	**33.1**	**3,753**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.0%	0.0%	0.1	0.1	0.1%	0.1%	7	5	0.5	10
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.1%	0.1%	0.4	0.1	0.7%	0.3%	49	23	0.3	8
Plastic Bottles and Jars, Other Wine and Liquor	0.1%	0.0%	0.2	0.1	0.1%	0.1%	8	6	1.0	20
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.1%	0.5	0.1	0.2%	0.1%	14	8	1.3	11
Plastic Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.1%	0.1%	4	5	0.2	2
Plastic Bottles and Jars, Tea and Coffee	0.1%	0.0%	0.1	0.1	0.1%	0.1%	7	6	0.5	6
Plastic Bottles and Jars, Still-water	0.1%	0.1%	0.3	0.2	0.3%	0.1%	21	10	0.7	39
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Unknown	0.2%	0.2%	0.5	0.6	0.1%	0.1%	8	6	0.0	0
Plastic Straws and Stirrers	0.0%	0.0%	0.1	0.0	0.8%	0.4%	54	27	0.3	96
Plastic Bottle Caps and Tabs	0.2%	0.1%	0.6	0.3	1.9%	0.6%	128	39	1.3	358
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	3	2	0.0	0
Fast-food Plastic Cups	0.0%	0.0%	0.1	0.0	0.1%	0.0%	6	2	1.1	84
Plastic Cups	0.1%	0.0%	0.3	0.1	0.3%	0.3%	23	17	0.0	2
Plastic Lids	0.0%	0.0%	0.1	0.0	0.3%	0.3%	23	22	12.4	5
Plastic Utensils	0.0%	0.0%	0.0	0.0	0.1%	0.0%	6	2	0.0	6
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	11
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.0%	0.0%	0.1	0.1	0.5%	0.2%	33	12	0.9	17
Grocery, Retail and Shopping Bags	0.1%	0.1%	0.4	0.3	0.4%	0.2%	29	11	0.3	52
Other Plastic Film	1.0%	0.3%	2.6	0.7	7.8%	1.4%	535	94	1.4	487
Food Wrappers and Snack Bags	0.8%	0.4%	1.9	0.9	11.6%	3.2%	793	216	2.0	583
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	6
Foam Cups, Bowls, and Clamshells	0.1%	0.0%	0.3	0.1	0.9%	0.4%	63	30	0.0	5
Other Foam	0.1%	0.1%	0.3	0.2	2.4%	0.7%	164	51	0.9	368
Non-beverage Plastic Food Packaging	0.2%	0.0%	0.5	0.1	0.7%	0.2%	49	13	0.4	261
Non-food Plastic Packaging	0.9%	0.3%	2.3	0.7	2.1%	1.0%	142	70	3.0	396
Other Plastic	1.2%	0.5%	3.1	1.4	5.2%	1.2%	354	83	4.1	918
Glass	**4.6%**	**3.7%**	**11.9**	**9.5**	**2.5%**	**1.1%**	**172**	**74**	**27.4**	**1,523**
Glass Bottles and Jars, Beer	1.2%	1.6%	3.0	4.1	0.3%	0.3%	19	23	18.1	1,197
Glass Bottles and Jars, Soda	0.2%	0.3%	0.6	0.8	0.1%	0.1%	4	4	0.0	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.2%	0.2%	0.4	0.4	0.2%	0.1%	13	9	5.2	8
Glass Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.1%	0.1%	0.3	0.2	0.0%	0.0%	3	1	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	2.6%	1.9%	6.6	4.9	1.3%	0.4%	86	29	0.2	5
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.7	2
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.3%	0.4%	0.9	1.0	0.7%	0.6%	45	43	3.1	311
Other Glass	0.0%	0.0%	0.0	0.0	0.0%	0.0%	3	2	0.0	0
Metal	**10.7%**	**6.3%**	**27.4**	**16.2**	**12.0%**	**2.1%**	**817**	**143**	**14.1**	**916**
Metal Bottles, Jars and Cans, Beer	2.1%	1.5%	5.4	3.9	4.1%	1.5%	282	100	2.8	85
Metal Bottles, Jars and Cans, Soda	0.8%	0.8%	2.0	2.0	1.6%	1.1%	109	78	0.7	22
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.1%	0.1%	0.3	0.3	0.2%	0.1%	14	9	0.6	14
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.1	0.1	0.0%	0.0%	3	1	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Unknown	0.2%	0.2%	0.4	0.4	0.4%	0.2%	24	17	0.0	2
Non-beverage Metal Food Packaging	0.8%	0.4%	1.9	1.1	2.2%	0.6%	150	42	1.1	166
Metal Non-Food Packaging	0.2%	0.2%	0.6	0.6	0.1%	0.1%	8	6	0.3	60
Bottle Caps and Tabs	0.6%	0.4%	1.5	1.0	1.4%	0.3%	96	23	2.2	445
Other Metal	5.9%	5.1%	15.1	13.1	1.9%	0.9%	130	61	6.4	122
Smoking	**0.8%**	**0.3%**	**2.0**	**0.7**	**8.7%**	**1.7%**	**597**	**113**	**7.9**	**6,097**
Cigarette Butts	0.4%	0.1%	0.9	0.4	6.5%	1.6%	442	108	6.0	5,634
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.3%	0.1%	0.8	0.3	2.1%	0.6%	145	40	1.7	414
E-Cigarettes and Vaping	0.1%	0.1%	0.3	0.3	0.2%	0.1%	11	8	0.2	49
Organics	**3.7%**	**3.2%**	**9.4**	**8.1**	**1.8%**	**0.5%**	**120**	**35**	**9.9**	**324**
Food Waste	0.8%	0.3%	2.0	0.8	1.0%	0.3%	68	20	3.5	239
Human or Pet Waste	0.2%	0.1%	0.6	0.3	0.2%	0.2%	11	11	0.5	5
Other Organics	2.6%	3.1%	6.8	7.9	0.6%	0.2%	41	12	5.9	79
CDL Waste	**13.3%**	**4.1%**	**34.2**	**10.6**	**3.9%**	**0.9%**	**268**	**60**	**9.6**	**1,007**
Construction and Demolition Debris	13.3%	4.1%	34.2	10.6	3.9%	0.9%	268	60	9.6	1,007
Hazardous Materials	**8.3%**	**5.6%**	**21.3**	**14.5**	**8.8%**	**3.4%**	**600**	**231**	**0.8**	**67**
Chemicals, Paint and Other Hazardous Materials	0.1%	0.0%	0.3	0.1	0.0%	0.0%	3	2	0.4	2
Medical Waste	0.0%	0.0%	0.0	0.0	0.6%	0.7%	38	46	0.0	0
PPE Masks	0.0%	0.0%	0.1	0.0	0.4%	0.1%	27	6	0.1	10
Explosives (Example, firecrackers or ammunition casings)	8.1%	5.6%	20.9	14.4	7.8%	3.2%	532	220	0.3	55
Other Materials	**50.0%**	**12.8%**	**128.6**	**32.9**	**14.9%**	**2.1%**	**1,017**	**142**	**25.9**	**1,556**
Fishing and Maritime Items	0.1%	0.1%	0.1	0.2	0.4%	0.5%	28	37	0.6	338
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	0.5%	0.3%	1.4	0.7	0.5%	0.2%	36	17	0.9	66
Vehicle Debris	3.1%	2.6%	7.8	6.7	1.7%	0.8%	114	53	4.8	100
Batteries, Electronics, and Small Appliances	0.0%	0.0%	0.1	0.1	0.2%	0.1%	13	6	1.5	18
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.5%	0.5%	1.3	1.2	1.1%	0.3%	76	22	0.5	67
Textiles, Clothing and Shoes	5.1%	1.5%	13.2	3.9	2.2%	0.4%	152	26	2.8	310
Toiletries and Personal Products	0.4%	0.2%	1.1	0.5	3.3%	1.0%	228	69	0.5	56
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Toys, Sports, and Recreational Items	10.0%	5.3%	25.6	13.7	4.0%	1.4%	276	93	0.3	8
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	20.1%	10.4%	51.8	26.7	0.1%	0.1%	8	4	0.0	0
Miscellaneous Materials	10.2%	6.3%	26.2	16.2	1.3%	1.1%	87	75	14.0	592
Estimated Total (per mile)	**100%**		**257.2**		**100%**		**6,829**		**142.6**	**18,052**

Table 76. Detailed litter composition table for all on-off ramps (interchanges).

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**6.6%**	**3.8%**	**13.5**	**7.7**	**10.5%**	**3.6%**	**3,095**	**1,068**	**49.3**	**12,549**
Cardboard	1.4%	1.4%	2.9	2.9	0.4%	0.4%	133	132	7.7	1,667
Fast-food Paper Bags	0.1%	0.1%	0.2	0.1	0.0%	0.0%	2	2	0.9	39
Kraft Paper Bags	0.1%	0.1%	0.2	0.3	0.1%	0.2%	33	52	0.4	14
Fast-food Paper Cups	0.3%	0.1%	0.6	0.2	0.0%	0.0%	10	3	1.9	51
Cups	0.1%	0.2%	0.3	0.5	0.2%	0.3%	60	101	0.3	11
One-Time/ To-Go/ Fast Food Service Items	0.3%	0.3%	0.6	0.6	0.4%	0.3%	113	101	2.7	271
Paper Napkins and Tissues	1.3%	1.4%	2.6	3.0	1.3%	1.4%	388	401	10.9	1,609
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	1	0.1	3
Paper Non-Beverage Paper Food Packaging	0.6%	0.6%	1.2	1.2	1.8%	1.3%	525	379	1.1	25
Non-Food Paper Packaging	0.2%	0.2%	0.4	0.3	0.7%	0.6%	203	189	1.1	51
Newspaper, Magazines, Junk Mail, and Office Paper	0.9%	0.9%	1.8	1.8	2.0%	1.7%	583	511	2.7	479
Receipts	0.1%	0.1%	0.1	0.1	0.3%	0.4%	103	119	0.1	27
Other Paper	1.3%	0.7%	2.6	1.5	3.2%	1.4%	939	421	19.4	8,302
Plastic	**20.0%**	**6.2%**	**41.0**	**12.8**	**48.8%**	**8.3%**	**14,464**	**2,454**	**189.2**	**48,617**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	0
Plastic Bottles and Jars, Soda	0.2%	0.1%	0.4	0.3	0.0%	0.0%	5	3	0.7	11
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.1%	0.0%	0.2	0.1	0.0%	0.0%	4	2	0.6	15
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	1	0.5	6
Plastic Bottles and Jars, Sports and Health Drinks	1.3%	2.1%	2.7	4.2	0.2%	0.3%	55	95	0.6	8
Plastic Bottles and Jars, Juice	0.2%	0.1%	0.3	0.2	0.0%	0.0%	5	2	0.5	5
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.5	4
Plastic Bottles and Jars, Still-water	0.4%	0.2%	0.8	0.3	0.1%	0.0%	20	7	2.2	74
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.4	5
Plastic Bottles and Jars, Unknown	0.1%	0.2%	0.3	0.4	0.1%	0.2%	30	51	0.1	1
Plastic Straws and Stirrers	0.1%	0.1%	0.1	0.2	0.3%	0.4%	79	111	0.2	59
Plastic Bottle Caps and Tabs	1.4%	1.3%	2.9	2.7	2.5%	1.8%	737	528	16.4	4,772
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.5%	0.4%	0.9	0.9	0.6%	0.6%	192	191	3.3	361
Plastic Cups	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	1	1.5	308
Plastic Lids	0.9%	1.2%	1.9	2.5	2.1%	2.6%	626	776	1.5	309
Plastic Utensils	0.2%	0.2%	0.4	0.5	0.4%	0.5%	121	153	0.2	20
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.4	17
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.2%	0.2%	0.4	0.5	0.2%	0.4%	68	113	0.1	9
Grocery, Retail and Shopping Bags	0.2%	0.2%	0.4	0.4	0.1%	0.1%	20	27	2.0	331
Other Plastic Film	3.9%	2.9%	8.0	5.9	12.0%	4.0%	3,544	1,174	14.1	6,937
Food Wrappers and Snack Bags	2.1%	1.3%	4.4	2.6	9.2%	4.7%	2,711	1,390	22.1	2,880
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	3.1	926
Foam Cups, Bowls, and Clamshells	0.2%	0.2%	0.3	0.4	0.4%	0.4%	122	111	0.7	36
Other Foam	1.4%	1.2%	2.8	2.4	6.4%	3.1%	1,902	919	16.5	9,898
Non-beverage Plastic Food Packaging	0.5%	0.4%	1.0	0.9	1.5%	1.3%	435	389	1.3	120
Non-food Plastic Packaging	0.4%	0.2%	0.7	0.4	0.1%	0.1%	23	28	2.7	1,061
Other Plastic	5.7%	3.2%	11.6	6.5	12.7%	4.4%	3,759	1,304	97.0	20,441
Glass	**11.9%**	**11.5%**	**24.4**	**23.7**	**5.5%**	**7.1%**	**1,636**	**2,109**	**86.1**	**5,970**
Glass Bottles and Jars, Beer	3.9%	5.9%	8.0	12.0	1.8%	3.1%	532	908	6.2	15
Glass Bottles and Jars, Soda	0.1%	0.1%	0.2	0.1	0.0%	0.0%	0	1	12.4	311
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	2
Glass Bottles and Jars, Other Wine and Liquor	0.4%	0.7%	0.9	1.3	0.0%	0.0%	1	1	18.7	927
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.1%	0.1	0.1	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.2%	0.1%	0.3	0.3	0.0%	0.0%	1	0	0.1	1
Glass Bottles and Jars, Tea and Coffee	0.1%	0.2%	0.3	0.3	0.0%	0.0%	1	0	0.3	3
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.4	1
Glass Bottles and Jars, Unknown	6.7%	5.9%	13.7	12.1	3.4%	4.1%	1,022	1,223	0.2	7
Other Glass Food Packaging	0.0%	0.0%	0.1	0.1	0.0%	0.0%	0	0	0.6	3
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.3%	0.2%	0.5	0.5	0.0%	0.0%	14	10	37.8	4,085
Other Glass	0.2%	0.3%	0.3	0.6	0.2%	0.4%	66	106	9.2	616
Metal	**7.6%**	**3.3%**	**15.6**	**6.8**	**4.5%**	**1.7%**	**1,334**	**518**	**41.4**	**7,353**
Metal Bottles, Jars and Cans, Beer	0.4%	0.1%	0.8	0.2	0.1%	0.0%	16	6	2.2	55
Metal Bottles, Jars and Cans, Soda	0.5%	0.7%	1.0	1.4	0.2%	0.3%	57	93	0.6	20
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.2%	0.1%	0.4	0.2	0.0%	0.0%	9	5	2.1	326
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	0	0.1	1
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	1	0.1	2
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.1	3
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.0	0.1	0.0%	0.0%	1	1	0.0	2
Non-beverage Metal Food Packaging	1.8%	2.2%	3.8	4.5	1.9%	0.8%	559	243	6.8	3,176
Metal Non-Food Packaging	0.1%	0.1%	0.1	0.1	0.2%	0.3%	52	89	6.7	1,641
Bottle Caps and Tabs	0.4%	0.4%	0.8	0.8	0.7%	0.9%	214	253	6.2	1,846
Other Metal	4.1%	3.5%	8.5	7.1	1.4%	0.8%	421	243	16.6	281
Smoking	**4.5%**	**2.2%**	**9.3**	**4.4**	**17.0%**	**5.1%**	**5,038**	**1,498**	**50.7**	**67,089**
Cigarette Butts	2.5%	1.1%	5.2	2.3	13.9%	3.8%	4,118	1,131	43.3	64,867
Other Cigarette, Tobacco, and Cannabis Products and Packaging	1.9%	1.5%	3.8	3.1	3.1%	1.9%	904	558	7.0	2,215
E-Cigarettes and Vaping	0.1%	0.2%	0.3	0.4	0.1%	0.1%	16	26	0.4	7
Organics	**3.9%**	**3.9%**	**7.9**	**8.0**	**0.5%**	**0.4%**	**144**	**128**	**15.8**	**1,359**
Food Waste	0.7%	0.6%	1.4	1.3	0.1%	0.1%	21	26	4.6	420
Human or Pet Waste	0.4%	0.3%	0.8	0.7	0.0%	0.0%	2	1	0.0	0
Other Organics	2.8%	3.2%	5.8	6.7	0.4%	0.4%	121	123	11.2	939
CDL Waste	**3.9%**	**2.9%**	**8.1**	**6.0**	**2.1%**	**2.1%**	**634**	**609**	**41.5**	**1,879**
Construction and Demolition Debris	3.9%	2.9%	8.1	6.0	2.1%	2.1%	634	609	41.5	1,879
Hazardous Materials	**0.7%**	**0.9%**	**1.4**	**1.9**	**0.1%**	**0.1%**	**35**	**35**	**2.5**	**338**
Chemicals, Paint and Other Hazardous Materials	0.6%	0.9%	1.2	1.7	0.0%	0.0%	0	1	0.6	3
Medical Waste	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	1.7	314
PPE Masks	0.1%	0.1%	0.1	0.1	0.1%	0.1%	19	25	0.2	21
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.1%	0.1	0.1	0.1%	0.1%	15	25	0.0	0
Other Materials	**40.9%**	**13.9%**	**84.0**	**28.4**	**10.9%**	**2.5%**	**3,235**	**731**	**260.9**	**13,463**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Tires	6.3%	4.7%	13.0	9.6	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	5.0%	4.6%	10.3	9.4	1.5%	1.3%	455	374	36.4	3,129
Vehicle Debris	14.0%	7.6%	28.7	15.7	5.2%	2.1%	1,532	625	39.4	571
Batteries, Electronics, and Small Appliances	1.6%	1.7%	3.3	3.5	0.0%	0.0%	1	1	0.5	92
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.4%	0.5%	0.9	1.1	0.8%	1.0%	223	295	1.2	15
Textiles, Clothing and Shoes	1.4%	1.0%	2.8	2.1	0.7%	0.7%	208	193	41.6	2,041
Toiletries and Personal Products	0.8%	0.4%	1.7	0.9	1.7%	0.8%	507	232	8.3	1,518
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
Toys, Sports, and Recreational Items	1.7%	2.3%	3.4	4.7	0.4%	0.6%	133	164	0.1	8
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	1.0%	1.4%	2.1	2.9	0.0%	0.0%	1	1	1.4	3
Miscellaneous Materials	8.7%	3.6%	17.8	7.4	0.6%	0.3%	175	93	131.9	6,083
Estimated Total (per acre)	**100%**		**205.1**		**100%**		**29,614**		**737.4**	**158,617**

Table 77. Detailed litter composition table for urban on-off ramps (interchanges).

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**6.6%**	**3.7%**	**15.2**	**8.7**	**10.3%**	**3.4%**	**3,430**	**1,121**	**46.0**	**14,478**
Cardboard	1.4%	1.4%	3.2	3.3	0.3%	0.3%	92	97	9.2	2,031
Fast-food Paper Bags	0.1%	0.1%	0.2	0.2	0.0%	0.0%	3	2	1.0	48
Kraft Paper Bags	0.0%	0.0%	0.1	0.1	0.0%	0.0%	4	2	0.4	16
Fast-food Paper Cups	0.2%	0.1%	0.6	0.2	0.0%	0.0%	10	2	2.3	61
Cups	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	2	0.4	14
One-Time/ To-Go/ Fast Food Service Items	0.3%	0.3%	0.7	0.7	0.4%	0.4%	144	130	2.1	111
Paper Napkins and Tissues	1.4%	1.6%	3.2	3.6	1.2%	1.3%	403	435	8.0	1,928
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.1	0.0%	0.0%	0	1	0.0	1
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	1	0.1	3
Paper Non-Beverage Paper Food Packaging	0.6%	0.6%	1.5	1.4	1.8%	1.2%	599	405	1.3	27
Non-Food Paper Packaging	0.2%	0.1%	0.4	0.3	0.6%	0.6%	203	190	1.3	55
Newspaper, Magazines, Junk Mail, and Office Paper	0.9%	0.9%	2.2	2.1	2.1%	1.7%	689	555	3.4	602
Receipts	0.1%	0.1%	0.1	0.2	0.4%	0.5%	133	153	0.1	34
Other Paper	1.3%	0.6%	3.0	1.5	3.5%	1.4%	1,149	473	16.4	9,549
Plastic	**20.1%**	**5.8%**	**46.7**	**13.6**	**50.1%**	**8.4%**	**16,649**	**2,795**	**224.0**	**58,514**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	2	0.0	0
Plastic Bottles and Jars, Soda	0.2%	0.1%	0.4	0.3	0.0%	0.0%	5	3	0.8	12
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.1%	0.0%	0.2	0.1	0.0%	0.0%	5	2	0.7	18
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.1	0.0%	0.0%	0	1	0.7	8
Plastic Bottles and Jars, Sports and Health Drinks	1.4%	2.3%	3.4	5.4	0.2%	0.4%	70	123	0.7	8
Plastic Bottles and Jars, Juice	0.1%	0.1%	0.3	0.3	0.0%	0.0%	5	3	0.5	6
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.5	4
Plastic Bottles and Jars, Still-water	0.4%	0.1%	0.9	0.3	0.1%	0.0%	23	8	2.5	86
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	5
Plastic Bottles and Jars, Unknown	0.1%	0.1%	0.2	0.2	0.0%	0.0%	0	1	0.0	1
Plastic Straws and Stirrers	0.1%	0.1%	0.2	0.2	0.2%	0.3%	81	111	0.2	68
Plastic Bottle Caps and Tabs	1.3%	1.2%	3.0	2.9	1.8%	1.5%	605	485	20.5	6,024
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.5%	0.4%	1.1	1.0	0.6%	0.6%	207	202	4.0	459
Plastic Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	2.0	397
Plastic Lids	1.0%	1.4%	2.4	3.2	2.4%	3.0%	804	999	2.0	397
Plastic Utensils	0.2%	0.3%	0.5	0.6	0.4%	0.5%	136	167	0.2	23
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.5	21
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.2%	0.2%	0.4	0.4	0.2%	0.4%	69	118	0.1	11
Grocery, Retail and Shopping Bags	0.2%	0.2%	0.5	0.4	0.0%	0.0%	6	2	2.6	424
Other Plastic Film	4.1%	3.1%	9.6	7.1	12.0%	4.1%	3,982	1,348	15.1	8,017
Food Wrappers and Snack Bags	2.3%	1.3%	5.3	3.0	10.1%	5.1%	3,368	1,678	27.3	3,449
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	4.0	1,193
Foam Cups, Bowls, and Clamshells	0.1%	0.1%	0.2	0.2	0.4%	0.3%	137	113	0.9	46
Other Foam	1.4%	1.1%	3.2	2.6	6.8%	3.1%	2,275	1,029	18.3	11,949
Non-beverage Plastic Food Packaging	0.5%	0.4%	1.1	0.9	1.6%	1.4%	539	467	1.0	33
Non-food Plastic Packaging	0.3%	0.1%	0.8	0.3	0.0%	0.0%	8	3	2.8	1,246
Other Plastic	5.6%	3.2%	13.0	7.3	13.0%	4.4%	4,322	1,475	115.7	24,612
Glass	**12.6%**	**12.4%**	**29.1**	**28.8**	**6.0%**	**8.0%**	**2,008**	**2,642**	**108.1**	**7,573**
Glass Bottles and Jars, Beer	4.0%	6.3%	9.3	14.6	2.0%	3.4%	664	1,141	7.4	18
Glass Bottles and Jars, Soda	0.1%	0.1%	0.2	0.2	0.0%	0.0%	0	1	15.7	400
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	2
Glass Bottles and Jars, Other Wine and Liquor	0.4%	0.6%	0.8	1.4	0.0%	0.0%	1	1	23.2	1,193
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.1%	0.1	0.2	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.2%	0.1%	0.4	0.3	0.0%	0.0%	1	0	0.1	1
Glass Bottles and Jars, Tea and Coffee	0.1%	0.1%	0.3	0.3	0.0%	0.0%	0	0	0.3	4
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.5	1
Glass Bottles and Jars, Unknown	7.4%	6.5%	17.1	15.0	3.8%	4.6%	1,259	1,523	0.3	9
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.8	4
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.2%	0.2%	0.5	0.5	0.0%	0.0%	16	12	47.5	5,149
Other Glass	0.1%	0.2%	0.3	0.5	0.2%	0.3%	66	104	11.9	793
Metal	**7.4%**	**3.0%**	**17.2**	**7.1**	**4.3%**	**1.5%**	**1,437**	**509**	**30.8**	**8,075**
Metal Bottles, Jars and Cans, Beer	0.4%	0.1%	0.8	0.2	0.0%	0.0%	16	7	2.4	57
Metal Bottles, Jars and Cans, Soda	0.5%	0.8%	1.2	1.8	0.2%	0.4%	72	119	0.7	22
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.2%	0.1%	0.5	0.3	0.0%	0.0%	10	5	2.6	417
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	1	0.1	1
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	1	0.1	3
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.1	3
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	3
Non-beverage Metal Food Packaging	2.0%	2.4%	4.7	5.6	1.8%	0.6%	604	199	6.4	3,176
Metal Non-Food Packaging	0.0%	0.1%	0.1	0.2	0.2%	0.3%	67	115	8.0	1,998
Bottle Caps and Tabs	0.3%	0.4%	0.7	0.8	0.6%	0.8%	199	257	7.9	2,378
Other Metal	3.8%	3.2%	8.9	7.4	1.4%	0.8%	466	256	2.6	17
Smoking	**4.5%**	**2.1%**	**10.4**	**4.9**	**16.0%**	**4.9%**	**5,305**	**1,611**	**59.0**	**81,276**
Cigarette Butts	2.4%	1.0%	5.6	2.4	12.8%	3.4%	4,236	1,121	49.5	78,420
Other Cigarette, Tobacco, and Cannabis Products and Packaging	2.0%	1.6%	4.7	3.8	3.2%	1.9%	1,068	635	8.9	2,849
E-Cigarettes and Vaping	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	1	0.5	8
Organics	**3.4%**	**3.8%**	**7.9**	**8.8**	**0.4%**	**0.4%**	**120**	**124**	**18.8**	**1,628**
Food Waste	0.6%	0.5%	1.4	1.2	0.0%	0.0%	7	3	4.8	423
Human or Pet Waste	0.2%	0.2%	0.5	0.6	0.0%	0.0%	2	1	0.0	0
Other Organics	2.6%	3.2%	6.0	7.3	0.3%	0.4%	112	122	14.0	1,205
CDL Waste	**3.1%**	**2.2%**	**7.2**	**5.1**	**1.9%**	**1.9%**	**623**	**625**	**50.1**	**2,067**
Construction and Demolition Debris	3.1%	2.2%	7.2	5.1	1.9%	1.9%	623	625	50.1	2,067
Hazardous Materials	**0.6%**	**0.9%**	**1.5**	**2.0**	**0.0%**	**0.0%**	**6**	**2**	**3.2**	**434**
Chemicals, Paint and Other Hazardous Materials	0.6%	0.9%	1.3	2.0	0.0%	0.0%	0	1	0.7	3
Medical Waste	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	2.2	404
PPE Masks	0.1%	0.0%	0.1	0.1	0.0%	0.0%	5	2	0.3	27
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Materials	**41.7%**	**13.9%**	**96.6**	**32.2**	**11.0%**	**2.2%**	**3,641**	**723**	**296.2**	**15,235**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Tires	7.2%	5.3%	16.7	12.4	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	4.5%	4.2%	10.5	9.6	1.4%	1.2%	468	394	31.4	3,220
Vehicle Debris	15.0%	8.1%	34.9	18.8	5.3%	1.8%	1,760	593	39.7	602
Batteries, Electronics, and Small Appliances	1.8%	2.0%	4.2	4.5	0.0%	0.0%	1	1	0.1	4
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.5%	0.6%	1.1	1.4	0.8%	1.0%	268	348	1.2	13
Textiles, Clothing and Shoes	1.2%	0.9%	2.7	2.1	0.6%	0.6%	209	190	52.2	2,503
Toiletries and Personal Products	0.9%	0.5%	2.0	1.1	1.8%	0.8%	610	255	8.9	1,607
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
Toys, Sports, and Recreational Items	1.6%	2.1%	3.7	4.9	0.4%	0.5%	133	166	0.0	2
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	1.1%	1.6%	2.6	3.7	0.0%	0.0%	1	1	1.2	2
Miscellaneous Materials	7.8%	2.8%	18.0	6.5	0.6%	0.3%	191	111	161.4	7,279
Estimated Total (per acre)	**100%**		**231.7**		**100%**		**33,220**		**836.2**	**189,281**

Table 78. Detailed litter composition table for rural on-off ramps (interchanges).

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**6.7%**	**3.9%**	**7.6**	**4.4**	**11.3%**	**5.2%**	**1,932**	**881**	**60.6**	**5,856**
Cardboard	1.3%	1.4%	1.5	1.5	1.6%	1.5%	275	257	2.8	407
Fast-food Paper Bags	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.2	8
Kraft Paper Bags	0.6%	0.8%	0.7	0.9	0.8%	1.3%	137	224	0.3	9
Fast-food Paper Cups	0.5%	0.3%	0.5	0.4	0.1%	0.0%	10	4	0.6	16
Cups	0.9%	1.5%	1.0	1.7	1.6%	2.6%	265	443	0.0	1
One-Time/ To-Go/ Fast Food Service Items	0.2%	0.1%	0.2	0.1	0.0%	0.0%	4	1	4.5	828
Paper Napkins and Tissues	0.6%	0.6%	0.7	0.7	2.0%	1.7%	339	284	20.7	501
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	1
Paper Non-Beverage Paper Food Packaging	0.4%	0.3%	0.4	0.3	1.6%	1.7%	270	290	0.7	18
Non-Food Paper Packaging	0.4%	0.4%	0.5	0.5	1.2%	1.1%	204	184	0.5	34
Newspaper, Magazines, Junk Mail, and Office Paper	0.6%	0.7%	0.6	0.8	1.3%	2.1%	216	357	0.5	50
Receipts	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	6
Other Paper	1.2%	1.5%	1.3	1.7	1.2%	1.4%	210	240	29.8	3,978
Plastic	**18.8%**	**8.9%**	**21.3**	**10.0**	**40.2%**	**7.4%**	**6,881**	**1,271**	**68.2**	**14,276**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.2%	0.1%	0.2	0.1	0.0%	0.0%	3	1	0.3	6
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.1%	0.0%	0.1	0.1	0.0%	0.0%	2	1	0.2	7
Plastic Bottles and Jars, Other Wine and Liquor	0.1%	0.1%	0.1	0.1	0.0%	0.0%	1	1	0.0	0
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.1%	0.2	0.1	0.0%	0.0%	3	1	0.4	7
Plastic Bottles and Jars, Juice	0.3%	0.1%	0.3	0.1	0.0%	0.0%	3	1	0.4	4
Plastic Bottles and Jars, Tea and Coffee	0.1%	0.1%	0.1	0.1	0.0%	0.0%	1	1	0.5	5
Plastic Bottles and Jars, Still-water	0.3%	0.2%	0.3	0.2	0.1%	0.0%	12	4	0.9	31
Plastic Bottles and Jars, Other water	0.1%	0.1%	0.1	0.1	0.0%	0.0%	1	1	0.5	4
Plastic Bottles and Jars, Unknown	0.6%	1.0%	0.7	1.2	0.8%	1.3%	133	226	0.2	3
Plastic Straws and Stirrers	0.1%	0.1%	0.1	0.1	0.4%	0.7%	73	114	0.1	27
Plastic Bottle Caps and Tabs	2.5%	1.7%	2.8	2.0	7.0%	3.9%	1,197	675	2.2	427
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Fast-food Plastic Cups	0.4%	0.3%	0.4	0.3	0.8%	0.9%	140	155	0.6	20
Plastic Cups	0.1%	0.1%	0.1	0.1	0.0%	0.0%	2	2	0.0	1
Plastic Lids	0.1%	0.0%	0.1	0.0	0.0%	0.0%	8	3	0.0	5
Plastic Utensils	0.1%	0.1%	0.1	0.1	0.4%	0.6%	69	104	0.1	11
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	5
Clamshells	0.0%	0.1%	0.0	0.1	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.5%	0.7%	0.6	0.8	0.4%	0.6%	68	97	0.1	3
Grocery, Retail and Shopping Bags	0.2%	0.2%	0.2	0.2	0.4%	0.6%	69	110	0.2	10
Other Plastic Film	2.4%	1.8%	2.7	2.0	11.8%	3.3%	2,026	568	10.4	3,190
Food Wrappers and Snack Bags	1.2%	1.2%	1.3	1.4	2.5%	2.3%	433	391	4.4	909
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Foam Cups, Bowls, and Clamshells	0.7%	1.0%	0.7	1.1	0.4%	0.6%	71	105	0.0	4
Other Foam	1.6%	1.6%	1.8	1.8	3.5%	3.1%	605	538	10.1	2,783
Non-beverage Plastic Food Packaging	0.5%	0.6%	0.6	0.7	0.4%	0.7%	77	118	2.4	422
Non-food Plastic Packaging	0.6%	0.8%	0.7	0.9	0.5%	0.7%	77	117	2.2	422
Other Plastic	6.0%	3.1%	6.8	3.5	10.6%	4.2%	1,808	713	32.0	5,970
Glass	**7.1%**	**5.1%**	**8.0**	**5.8**	**2.0%**	**1.5%**	**345**	**262**	**10.0**	**408**
Glass Bottles and Jars, Beer	3.0%	2.6%	3.4	2.9	0.4%	0.6%	71	99	2.2	5
Glass Bottles and Jars, Soda	0.1%	0.1%	0.1	0.1	0.0%	0.0%	0	1	0.6	1
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	1.0%	0.9%	1.1	1.0	0.0%	0.0%	1	1	3.2	2
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.3%	0.4%	0.3	0.4	0.0%	0.0%	1	1	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.1%	0.1%	0.1	0.1	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	1.7%	1.8%	1.9	2.0	1.2%	1.1%	199	184	0.0	2
Other Glass Food Packaging	0.2%	0.4%	0.2	0.4	0.0%	0.0%	0	1	0.0	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.1	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.4%	0.3%	0.4	0.3	0.0%	0.0%	5	5	4.0	396
Other Glass	0.3%	0.5%	0.3	0.6	0.4%	0.7%	66	114	0.0	2
Metal	**8.8%**	**5.4%**	**10.0**	**6.1**	**5.7%**	**3.2%**	**974**	**547**	**78.0**	**4,845**
Metal Bottles, Jars and Cans, Beer	0.6%	0.2%	0.6	0.2	0.1%	0.0%	16	3	1.6	46
Metal Bottles, Jars and Cans, Soda	0.3%	0.1%	0.3	0.2	0.0%	0.0%	6	2	0.4	15
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.2%	0.1%	0.2	0.1	0.0%	0.0%	7	4	0.4	10
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.1	0.0%	0.0%	0	0	0.0	1
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	1
Metal Bottles, Jars and Cans, Unknown	0.0%	0.1%	0.0	0.1	0.0%	0.0%	1	2	0.0	0
Non-beverage Metal Food Packaging	0.5%	0.5%	0.6	0.6	2.4%	2.3%	405	396	8.2	3,173
Metal Non-Food Packaging	0.1%	0.1%	0.1	0.1	0.0%	0.0%	1	1	2.0	401
Bottle Caps and Tabs	0.9%	0.8%	1.0	0.9	1.6%	1.4%	267	238	0.0	1
Other Metal	6.1%	5.4%	6.9	6.1	1.6%	1.2%	268	198	65.3	1,197
Smoking	**4.8%**	**2.6%**	**5.4**	**2.9**	**24.0%**	**6.5%**	**4,110**	**1,107**	**22.1**	**17,864**
Cigarette Butts	3.2%	2.0%	3.6	2.3	21.7%	6.8%	3,707	1,167	21.8	17,844
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.7%	0.7%	0.7	0.8	2.0%	1.7%	337	293	0.3	18
E-Cigarettes and Vaping	0.9%	1.5%	1.0	1.6	0.4%	0.7%	67	113	0.0	2
Organics	**7.1%**	**4.6%**	**8.0**	**5.2**	**1.3%**	**0.8%**	**226**	**141**	**5.4**	**428**
Food Waste	1.4%	1.3%	1.6	1.5	0.4%	0.6%	71	106	3.8	409
Human or Pet Waste	1.5%	1.0%	1.6	1.1	0.0%	0.0%	2	1	0.1	1
Other Organics	4.3%	3.9%	4.8	4.4	0.9%	0.7%	153	125	1.4	18
CDL Waste	**9.9%**	**7.9%**	**11.2**	**8.9**	**3.9%**	**3.2%**	**671**	**554**	**11.5**	**1,225**
Construction and Demolition Debris	9.9%	7.9%	11.2	8.9	3.9%	3.2%	671	554	11.5	1,225
Hazardous Materials	**1.0%**	**1.3%**	**1.2**	**1.5**	**0.8%**	**0.9%**	**136**	**146**	**0.3**	**5**
Chemicals, Paint and Other Hazardous Materials	0.6%	0.8%	0.7	0.9	0.0%	0.0%	0	1	0.3	1
Medical Waste	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
PPE Masks	0.1%	0.1%	0.1	0.1	0.4%	0.6%	68	104	0.1	3
Explosives (Example, firecrackers or ammunition casings)	0.3%	0.5%	0.4	0.6	0.4%	0.7%	67	113	0.0	0
Other Materials	**35.7%**	**13.6%**	**40.4**	**15.4**	**10.7%**	**4.4%**	**1,828**	**759**	**138.6**	**7,316**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	1
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	8.5%	7.7%	9.6	8.7	2.4%	1.8%	411	303	54.0	2,814
Vehicle Debris	6.5%	4.2%	7.3	4.8	4.3%	4.3%	743	736	38.6	465
Batteries, Electronics, and Small Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	2.0	397
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.2%	0.2%	0.2	0.3	0.4%	0.7%	68	111	1.3	24
Textiles, Clothing and Shoes	2.7%	2.1%	3.0	2.3	1.2%	1.2%	206	206	4.7	438
Toiletries and Personal Products	0.3%	0.3%	0.3	0.3	0.9%	0.9%	149	155	6.2	1,211
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Toys, Sports, and Recreational Items	2.3%	3.4%	2.6	3.8	0.8%	0.9%	133	158	0.3	28
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	0.2%	0.2%	0.2	0.2	0.0%	0.0%	1	1	2.0	6
Miscellaneous Materials	15.1%	9.3%	17.0	10.5	0.7%	0.2%	119	30	29.5	1,933
Estimated Total (per acre)	**100%**		**112.9**		**100%**		**17,103**		**394.8**	**52,222**

Table 79. Detailed litter composition table for all rest areas.

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**7.4%**	**0.5%**	**19.8**	**1.4**	**16.2%**	**1.7%**	**8,698**	**887**	**20.6**	**8,145**
Cardboard	0.4%	0.0%	1.1	0.1	0.0%	0.0%	8	1	0.3	3
Fast-food Paper Bags	0.1%	0.0%	0.2	0.1	0.0%	0.0%	3	1	0.1	2
Kraft Paper Bags	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	0	0.2	2
Fast-food Paper Cups	0.2%	0.0%	0.5	0.1	0.0%	0.0%	9	2	0.2	5
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
One-Time/ To-Go/ Fast Food Service Items	0.1%	0.1%	0.4	0.2	0.5%	0.4%	248	229	1.5	352
Paper Napkins and Tissues	2.5%	0.2%	6.6	0.6	2.1%	0.6%	1,113	322	3.7	2,542
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.1	0.1%	0.1%	48	73	0.0	0
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	0	0.1	2
Paper Non-Beverage Paper Food Packaging	0.5%	0.1%	1.3	0.2	2.2%	0.6%	1,179	346	2.1	395
Non-Food Paper Packaging	0.3%	0.0%	0.7	0.0	0.4%	0.0%	218	6	0.5	74
Newspaper, Magazines, Junk Mail, and Office Paper	0.8%	0.1%	2.1	0.4	2.3%	0.9%	1,229	502	1.4	599
Receipts	0.1%	0.0%	0.2	0.1	0.3%	0.1%	157	77	0.3	61
Other Paper	2.5%	0.2%	6.6	0.6	8.3%	0.8%	4,483	445	10.3	4,108
Plastic	**12.8%**	**1.2%**	**34.2**	**3.2**	**33.7%**	**4.1%**	**18,095**	**2,221**	**33.9**	**10,973**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.1%	0.0%	0.2	0.1	0.0%	0.0%	4	1	0.1	2
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.6%	0.8%	1.7	2.2	0.1%	0.1%	49	74	0.0	1
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.0%	0.4	0.1	0.0%	0.0%	4	1	0.1	2
Plastic Bottles and Jars, Juice	0.1%	0.0%	0.2	0.1	0.0%	0.0%	2	1	0.0	1
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.0	0
Plastic Bottles and Jars, Still-water	0.1%	0.0%	0.4	0.1	0.0%	0.0%	12	4	0.2	9
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.1	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Unknown	0.1%	0.1%	0.2	0.4	0.1%	0.1%	48	74	0.1	1
Plastic Straws and Stirrers	0.3%	0.0%	0.7	0.1	0.9%	0.2%	474	108	0.3	64
Plastic Bottle Caps and Tabs	2.0%	0.5%	5.5	1.4	3.5%	0.8%	1,906	420	4.5	894
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.3%	0.2%	0.9	0.4	0.3%	0.1%	159	77	1.0	173
Plastic Cups	0.1%	0.0%	0.3	0.0	0.2%	0.0%	113	4	0.0	0
Plastic Lids	0.0%	0.0%	0.1	0.0	0.0%	0.0%	9	2	0.0	2
Plastic Utensils	0.0%	0.0%	0.1	0.1	0.1%	0.1%	61	47	0.0	5
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.6	119
Clamshells	0.0%	0.0%	0.1	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.3%	0.0%	0.8	0.1	0.1%	0.1%	50	77	0.0	1
Grocery, Retail and Shopping Bags	0.1%	0.0%	0.3	0.1	0.1%	0.1%	50	76	0.1	3
Other Plastic Film	0.9%	0.2%	2.4	0.5	6.3%	1.2%	3,382	623	3.6	2,095
Food Wrappers and Snack Bags	2.1%	0.3%	5.7	0.8	9.3%	2.8%	5,011	1,479	5.9	3,178
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Foam Cups, Bowls, and Clamshells	0.1%	0.1%	0.4	0.1	0.5%	0.3%	261	135	0.1	3
Other Foam	0.1%	0.0%	0.2	0.1	0.7%	0.2%	375	82	2.5	624
Non-beverage Plastic Food Packaging	0.4%	0.0%	0.9	0.0	0.2%	0.0%	119	4	0.4	111
Non-food Plastic Packaging	0.2%	0.0%	0.6	0.1	0.2%	0.0%	117	3	1.9	233
Other Plastic	4.5%	0.7%	11.9	1.8	11.0%	2.0%	5,889	1,070	12.1	3,452
Glass	**3.0%**	**0.8%**	**8.0**	**2.2**	**1.3%**	**0.4%**	**695**	**235**	**10.1**	**552**
Glass Bottles and Jars, Beer	1.6%	0.1%	4.1	0.3	0.6%	0.0%	327	11	2.4	5
Glass Bottles and Jars, Soda	0.0%	0.0%	0.1	0.1	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.1	0.1	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	0.4%	0.0%	1.1	0.0	0.2%	0.0%	108	2	0.0	0
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	52
Broken Glass or Ceramic	0.1%	0.0%	0.3	0.1	0.0%	0.0%	9	7	6.5	442
Other Glass	0.9%	0.7%	2.3	1.8	0.5%	0.4%	251	229	0.6	52
Metal	**2.8%**	**0.5%**	**7.6**	**1.3**	**4.8%**	**0.8%**	**2,576**	**439**	**17.6**	**14,009**
Metal Bottles, Jars and Cans, Beer	0.2%	0.2%	0.6	0.5	0.2%	0.3%	105	154	0.3	9
Metal Bottles, Jars and Cans, Soda	0.1%	0.0%	0.2	0.0	0.0%	0.0%	5	1	0.1	5
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.5%	0.0%	1.2	0.1	0.4%	0.0%	218	5	0.1	3
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	0	0.0	1
Non-beverage Metal Food Packaging	1.0%	0.3%	2.6	0.8	3.0%	0.8%	1,621	441	1.1	937
Metal Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.2	473
Bottle Caps and Tabs	0.7%	0.2%	1.7	0.4	0.9%	0.2%	468	99	2.5	845
Other Metal	0.4%	0.3%	1.1	0.8	0.3%	0.1%	158	74	12.2	11,736
Smoking	**13.4%**	**2.3%**	**35.7**	**6.2**	**31.3%**	**5.6%**	**16,847**	**3,004**	**22.0**	**37,898**
Cigarette Butts	11.8%	2.2%	31.5	6.0	27.9%	5.4%	14,974	2,917	19.1	37,159
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.7%	0.3%	1.8	0.7	3.0%	0.8%	1,610	428	2.9	739
E-Cigarettes and Vaping	0.9%	0.1%	2.4	0.2	0.5%	0.1%	264	77	0.0	0
Organics	**2.1%**	**0.8%**	**5.6**	**2.0**	**1.5%**	**0.7%**	**814**	**389**	**1.7**	**279**
Food Waste	1.2%	0.7%	3.2	1.9	1.4%	0.8%	728	411	1.7	278
Human or Pet Waste	0.4%	0.1%	1.0	0.4	0.0%	0.0%	3	1	0.0	0
Other Organics	0.5%	0.1%	1.4	0.4	0.2%	0.1%	83	72	0.0	1
CDL Waste	**19.2%**	**2.5%**	**51.2**	**6.7**	**1.8%**	**0.8%**	**978**	**419**	**5.5**	**165**
Construction and Demolition Debris	19.2%	2.5%	51.2	6.7	1.8%	0.8%	978	419	5.5	165
Hazardous Materials	**1.4%**	**0.5%**	**3.6**	**1.2**	**0.8%**	**0.4%**	**418**	**195**	**1.9**	**641**
Chemicals, Paint and Other Hazardous Materials	0.5%	0.3%	1.2	0.8	0.0%	0.0%	0	0	0.0	0
Medical Waste	0.2%	0.1%	0.6	0.4	0.6%	0.4%	304	193	1.9	638
PPE Masks	0.0%	0.0%	0.1	0.0	0.0%	0.0%	5	1	0.0	2
Explosives (Example, firecrackers or ammunition casings)	0.6%	0.0%	1.6	0.1	0.2%	0.0%	108	4	0.0	0
Other Materials	**37.9%**	**3.3%**	**100.9**	**8.7**	**8.6%**	**1.5%**	**4,629**	**822**	**55.0**	**4,995**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	2.1%	1.4%	5.6	3.7	1.6%	0.7%	869	390	6.2	563
Vehicle Debris	9.1%	2.8%	24.2	7.4	2.0%	0.8%	1,087	444	7.7	383
Batteries, Electronics, and Small Appliances	0.8%	0.6%	2.1	1.6	0.1%	0.1%	49	74	0.0	1
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.3%	0.1%	0.8	0.2	0.3%	0.1%	158	77	9.8	420
Textiles, Clothing and Shoes	2.9%	0.4%	7.8	0.9	2.1%	0.7%	1,118	370	3.5	507
Toiletries and Personal Products	11.1%	0.7%	29.6	1.8	2.1%	0.5%	1,108	249	2.8	865
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Toys, Sports, and Recreational Items	0.1%	0.2%	0.3	0.4	0.1%	0.1%	48	77	0.0	1
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	0.2%	0.0%	0.4	0.1	0.0%	0.0%	1	0	1.4	260
Miscellaneous Materials	11.3%	1.1%	30.1	2.9	0.4%	0.1%	190	36	23.4	1,996
Estimated Total (per acre)	**100%**		**266.5**		**100%**		**53,750**		**168.4**	**77,656**

Table 80. Detailed litter composition table for urban rest areas.

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**8.9%**	**0.7%**	**17.1**	**1.3**	**22.4%**	**0.9%**	**5,220**	**202**	**113.4**	**34,360**
Cardboard	0.6%	0.2%	1.1	0.4	0.0%	0.0%	8	4	1.5	14
Fast-food Paper Bags	0.1%	0.0%	0.1	0.1	0.0%	0.0%	2	1	0.4	9
Kraft Paper Bags	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	1	1.6	9
Fast-food Paper Cups	0.2%	0.1%	0.4	0.2	0.0%	0.0%	6	4	1.5	37
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	5
One-Time/ To-Go/ Fast Food Service Items	0.1%	0.0%	0.2	0.0	0.0%	0.0%	5	2	9.7	1,923
Paper Napkins and Tissues	3.1%	0.4%	5.8	0.7	1.9%	0.3%	433	74	15.8	14,292
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	2
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	0	0.7	16
Paper Non-Beverage Paper Food Packaging	0.5%	0.1%	1.0	0.2	2.8%	0.6%	651	139	10.4	1,904
Non-Food Paper Packaging	0.3%	0.1%	0.6	0.1	0.9%	0.2%	217	48	1.0	147
Newspaper, Magazines, Junk Mail, and Office Paper	0.9%	0.2%	1.7	0.4	2.4%	0.2%	557	55	5.0	988
Receipts	0.1%	0.0%	0.1	0.0	0.5%	0.1%	108	19	0.1	37
Other Paper	3.0%	0.4%	5.8	0.7	13.9%	0.7%	3,231	174	65.5	14,974
Plastic	**11.1%**	**0.6%**	**21.2**	**1.2**	**42.6%**	**0.7%**	**9,925**	**170**	**150.3**	**45,735**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	0	0.4	7
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.1	5
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	2
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.1%	0.3	0.1	0.0%	0.0%	3	2	0.7	14
Plastic Bottles and Jars, Juice	0.0%	0.0%	0.1	0.0	0.0%	0.0%	1	1	0.3	2
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.1	0.0%	0.0%	1	1	0.3	2
Plastic Bottles and Jars, Still-water	0.1%	0.0%	0.2	0.0	0.0%	0.0%	6	4	1.0	40
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.1	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.1	5
Plastic Straws and Stirrers	0.3%	0.0%	0.5	0.1	1.4%	0.3%	326	75	0.2	58
Plastic Bottle Caps and Tabs	1.5%	0.1%	2.9	0.2	3.2%	0.2%	755	47	14.4	3,797
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.3%	0.1%	0.6	0.1	0.5%	0.1%	108	25	5.7	960
Plastic Cups	0.2%	0.1%	0.3	0.1	0.5%	0.1%	112	32	0.1	2
Plastic Lids	0.1%	0.0%	0.1	0.0	0.0%	0.0%	7	4	0.2	7
Plastic Utensils	0.0%	0.0%	0.1	0.0	0.1%	0.0%	12	8	0.3	30
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	5.0	944
Clamshells	0.0%	0.0%	0.1	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.4%	0.1%	0.7	0.2	0.0%	0.0%	2	1	0.0	2
Grocery, Retail and Shopping Bags	0.1%	0.0%	0.2	0.1	0.0%	0.0%	2	1	0.5	21
Other Plastic Film	0.6%	0.1%	1.1	0.2	7.4%	0.7%	1,737	166	14.1	8,422
Food Wrappers and Snack Bags	2.1%	0.2%	4.0	0.4	12.1%	1.1%	2,834	255	29.2	10,681
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Foam Cups, Bowls, and Clamshells	0.1%	0.0%	0.2	0.1	0.5%	0.1%	115	33	0.4	19
Other Foam	0.1%	0.0%	0.1	0.0	1.4%	0.3%	326	59	14.0	3,741
Non-beverage Plastic Food Packaging	0.5%	0.1%	0.9	0.1	0.5%	0.1%	116	26	0.6	40
Non-food Plastic Packaging	0.3%	0.1%	0.5	0.1	0.5%	0.1%	115	20	4.9	995
Other Plastic	4.2%	0.2%	8.1	0.5	14.3%	0.7%	3,345	153	56.7	15,937
Glass	**3.1%**	**0.5%**	**6.0**	**0.9**	**2.3%**	**0.3%**	**544**	**80**	**58.0**	**1,914**
Glass Bottles and Jars, Beer	1.9%	0.5%	3.7	1.0	1.4%	0.4%	326	86	17.4	37
Glass Bottles and Jars, Soda	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.9	2
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	0.6%	0.1%	1.1	0.3	0.5%	0.1%	108	19	0.0	0
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	1.3	2
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.1%	0.2%	0.2	0.4	0.0%	0.0%	2	4	37.5	1,872
Other Glass	0.6%	0.1%	1.1	0.1	0.5%	0.1%	108	23	0.0	0
Metal	**2.4%**	**0.2%**	**4.6**	**0.5**	**6.0%**	**0.3%**	**1,410**	**59**	**26.9**	**8,555**
Metal Bottles, Jars and Cans, Beer	0.1%	0.1%	0.2	0.1	0.0%	0.0%	4	2	1.9	54
Metal Bottles, Jars and Cans, Soda	0.0%	0.0%	0.1	0.0	0.0%	0.0%	2	1	0.8	28
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.6%	0.2%	1.2	0.3	0.9%	0.2%	217	38	0.4	12
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	2
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
Non-beverage Metal Food Packaging	0.7%	0.1%	1.4	0.1	3.2%	0.4%	755	94	0.1	5
Metal Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	9.4	3,769
Bottle Caps and Tabs	0.6%	0.1%	1.2	0.2	1.4%	0.1%	323	24	14.1	4,683
Other Metal	0.3%	0.1%	0.5	0.2	0.5%	0.1%	109	19	0.0	0
Smoking	**8.1%**	**1.6%**	**15.4**	**3.1**	**13.4%**	**0.9%**	**3,123**	**217**	**61.1**	**91,662**
Cigarette Butts	6.7%	1.4%	12.8	2.8	11.5%	0.9%	2,689	202	46.7	87,874
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.2%	0.0%	0.4	0.1	0.9%	0.1%	219	30	14.3	3,788
E-Cigarettes and Vaping	1.2%	0.3%	2.3	0.6	0.9%	0.1%	215	27	0.0	0
Organics	**1.2%**	**0.3%**	**2.2**	**0.6**	**0.2%**	**0.0%**	**42**	**10**	**8.8**	**961**
Food Waste	0.4%	0.3%	0.7	0.5	0.0%	0.0%	7	5	8.8	961
Human or Pet Waste	0.2%	0.1%	0.4	0.1	0.0%	0.0%	1	1	0.0	0
Other Organics	0.6%	0.1%	1.1	0.1	0.1%	0.0%	33	9	0.0	0
CDL Waste	**23.5%**	**3.1%**	**44.8**	**6.0**	**2.3%**	**0.2%**	**540**	**40**	**2.3**	**49**
Construction and Demolition Debris	23.5%	3.1%	44.8	6.0	2.3%	0.2%	540	40	2.3	49
Hazardous Materials	**1.3%**	**1.0%**	**2.6**	**2.0**	**1.0%**	**0.2%**	**224**	**41**	**15.2**	**4,702**
Chemicals, Paint and Other Hazardous Materials	0.3%	0.7%	0.6	1.3	0.0%	0.0%	0	1	0.0	0
Medical Waste	0.1%	0.1%	0.3	0.2	0.5%	0.1%	112	28	15.0	4,690
PPE Masks	0.0%	0.0%	0.1	0.0	0.0%	0.0%	3	1	0.2	12
Explosives (Example, firecrackers or ammunition casings)	0.8%	0.2%	1.6	0.5	0.5%	0.1%	108	29	0.0	0
Other Materials	**40.3%**	**1.5%**	**77.1**	**2.9**	**9.8%**	**0.5%**	**2,297**	**119**	**213.9**	**12,995**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	0.4%	0.1%	0.7	0.2	1.8%	0.2%	431	58	37.5	2,811
Vehicle Debris	8.7%	2.2%	16.6	4.2	2.8%	0.3%	648	77	33.0	949
Batteries, Electronics, and Small Appliances	0.5%	0.1%	0.9	0.3	0.0%	0.0%	1	2	0.1	5
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.4%	0.3%	0.7	0.5	0.5%	0.1%	109	31	0.9	26
Textiles, Clothing and Shoes	3.6%	0.9%	6.8	1.7	1.9%	0.2%	443	41	11.0	1,108
Toiletries and Personal Products	14.5%	1.6%	27.8	3.1	2.4%	0.4%	556	102	12.9	1,900
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Toys, Sports, and Recreational Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	5
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	0.2%	0.3%	0.4	0.6	0.0%	0.0%	1	0	9.5	1,872
Miscellaneous Materials	12.2%	1.5%	23.2	2.8	0.5%	0.0%	108	6	109.0	4,321
Estimated Total (per acre)	**100%**		**191.0**		**100%**		**23,325**		**649.9**	**200,933**

Table 81. Detailed litter composition table for rural rest areas.

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**3.6%**	**1.9%**	**2.7**	**1.4**	**11.4%**	**3.2%**	**3,478**	**985**	**7.4**	**4,400**
Cardboard	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	0	0.1	1
Fast-food Paper Bags	0.1%	0.1%	0.1	0.1	0.0%	0.0%	1	1	0.0	1
Kraft Paper Bags	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Fast-food Paper Cups	0.1%	0.1%	0.1	0.0	0.0%	0.0%	3	1	0.0	1
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
One-Time/ To-Go/ Fast Food Service Items	0.3%	0.3%	0.2	0.2	0.8%	0.9%	243	262	0.3	127
Paper Napkins and Tissues	1.0%	0.8%	0.7	0.6	2.2%	1.2%	680	358	2.0	863
Paper Beverage and Food Cartons, Alcoholic	0.1%	0.1%	0.0	0.1	0.2%	0.3%	48	83	0.0	0
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Paper Non-Beverage Paper Food Packaging	0.3%	0.3%	0.3	0.2	1.7%	1.2%	528	375	0.9	179
Non-Food Paper Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.4	63
Newspaper, Magazines, Junk Mail, and Office Paper	0.5%	0.5%	0.4	0.4	2.2%	1.9%	671	566	0.9	544
Receipts	0.1%	0.1%	0.1	0.1	0.2%	0.3%	49	85	0.3	64
Other Paper	1.0%	0.8%	0.8	0.6	4.1%	1.6%	1,252	484	2.4	2,556
Plastic	**17.2%**	**4.6%**	**13.0**	**3.5**	**26.9%**	**8.3%**	**8,171**	**2,514**	**17.3**	**6,007**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.2%	0.2%	0.2	0.1	0.0%	0.0%	3	1	0.1	1
Plastic Bottles and Jars, Single-serve Wine and Liquor	2.2%	3.4%	1.7	2.5	0.2%	0.3%	48	84	0.0	1
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Sports and Health Drinks	0.2%	0.1%	0.1	0.1	0.0%	0.0%	2	1	0.0	0
Plastic Bottles and Jars, Juice	0.2%	0.2%	0.1	0.1	0.0%	0.0%	1	1	0.0	0
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Still-water	0.3%	0.2%	0.2	0.1	0.0%	0.0%	6	4	0.1	5
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Unknown	0.3%	0.5%	0.2	0.4	0.2%	0.3%	48	85	0.0	0
Plastic Straws and Stirrers	0.2%	0.2%	0.1	0.1	0.5%	0.4%	148	112	0.3	64
Plastic Bottle Caps and Tabs	3.4%	2.2%	2.5	1.6	3.8%	1.6%	1,151	473	3.1	479
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.4%	0.6%	0.3	0.4	0.2%	0.3%	50	84	0.3	61
Plastic Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Lids	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	2	0.0	1
Plastic Utensils	0.1%	0.1%	0.1	0.1	0.2%	0.2%	49	53	0.0	1
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.1%	0.2%	0.1	0.1	0.2%	0.3%	49	88	0.0	1
Grocery, Retail and Shopping Bags	0.1%	0.1%	0.1	0.1	0.2%	0.3%	49	87	0.0	1
Other Plastic Film	1.6%	0.6%	1.2	0.5	5.4%	2.3%	1,645	688	2.1	1,191
Food Wrappers and Snack Bags	2.2%	1.2%	1.7	0.9	7.2%	5.4%	2,178	1,654	2.6	2,106
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Foam Cups, Bowls, and Clamshells	0.2%	0.2%	0.2	0.2	0.5%	0.5%	146	149	0.0	0
Other Foam	0.1%	0.2%	0.1	0.1	0.2%	0.3%	49	85	0.9	178
Non-beverage Plastic Food Packaging	0.1%	0.0%	0.1	0.0	0.0%	0.0%	3	1	0.3	122
Non-food Plastic Packaging	0.2%	0.1%	0.1	0.1	0.0%	0.0%	2	1	1.5	124
Other Plastic	5.0%	2.6%	3.8	2.0	8.4%	3.9%	2,544	1,200	5.7	1,668
Glass	**2.6%**	**3.2%**	**2.0**	**2.4**	**0.5%**	**0.8%**	**152**	**258**	**3.2**	**357**
Glass Bottles and Jars, Beer	0.6%	0.3%	0.5	0.2	0.0%	0.0%	1	0	0.2	1
Glass Bottles and Jars, Soda	0.2%	0.2%	0.1	0.1	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.1%	0.2%	0.1	0.1	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	59
Broken Glass or Ceramic	0.1%	0.1%	0.1	0.1	0.0%	0.0%	7	7	2.1	237
Other Glass	1.6%	2.7%	1.2	2.1	0.5%	0.8%	143	258	0.6	59
Metal	**3.9%**	**1.9%**	**3.0**	**1.4**	**3.8%**	**1.6%**	**1,166**	**494**	**16.3**	**14,788**
Metal Bottles, Jars and Cans, Beer	0.6%	0.7%	0.5	0.5	0.3%	0.6%	101	176	0.1	2
Metal Bottles, Jars and Cans, Soda	0.1%	0.1%	0.1	0.0	0.0%	0.0%	3	1	0.0	1
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.1%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.1	2
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Unknown	0.1%	0.1%	0.1	0.0	0.0%	0.0%	1	0	0.0	1
Non-beverage Metal Food Packaging	1.5%	1.2%	1.2	0.9	2.8%	1.6%	867	490	1.2	1,070
Metal Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
Bottle Caps and Tabs	0.7%	0.6%	0.5	0.5	0.5%	0.4%	144	110	0.9	297
Other Metal	0.8%	1.2%	0.6	0.9	0.2%	0.3%	49	81	14.0	13,413
Smoking	**26.9%**	**8.8%**	**20.3**	**6.6**	**45.1%**	**11.2%**	**13,724**	**3,402**	**16.4**	**30,217**
Cigarette Butts	24.8%	8.6%	18.7	6.5	40.4%	10.9%	12,285	3,305	15.2	29,914
Other Cigarette, Tobacco, and Cannabis Products and Packaging	2.0%	1.1%	1.5	0.8	4.6%	1.6%	1,390	485	1.3	304
E-Cigarettes and Vaping	0.1%	0.2%	0.1	0.2	0.2%	0.3%	48	85	0.0	0
Organics	**4.5%**	**3.0%**	**3.4**	**2.2**	**2.5%**	**1.5%**	**772**	**443**	**0.7**	**181**
Food Waste	3.3%	2.7%	2.5	2.1	2.4%	1.5%	721	469	0.7	180
Human or Pet Waste	0.7%	0.6%	0.5	0.4	0.0%	0.0%	1	1	0.0	0
Other Organics	0.4%	0.6%	0.3	0.4	0.2%	0.3%	50	81	0.0	1
CDL Waste	**8.4%**	**9.0%**	**6.3**	**6.8**	**1.4%**	**1.6%**	**438**	**473**	**6.0**	**181**
Construction and Demolition Debris	8.4%	9.0%	6.3	6.8	1.4%	1.6%	438	473	6.0	181
Hazardous Materials	**1.4%**	**1.5%**	**1.0**	**1.1**	**0.6%**	**0.7%**	**194**	**217**	**0.0**	**61**
Chemicals, Paint and Other Hazardous Materials	0.8%	1.0%	0.6	0.8	0.0%	0.0%	0	0	0.0	0
Medical Waste	0.5%	0.5%	0.4	0.4	0.6%	0.7%	192	217	0.0	59
PPE Masks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	1	0.0	1
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Materials	**31.6%**	**12.6%**	**23.8**	**9.5**	**7.7%**	**3.0%**	**2,331**	**923**	**32.3**	**3,853**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	6.5%	5.6%	4.9	4.2	1.4%	1.4%	439	437	1.7	242
Vehicle Debris	10.1%	10.4%	7.6	7.8	1.4%	1.6%	439	496	4.1	303
Batteries, Electronics, and Small Appliances	1.6%	2.4%	1.2	1.8	0.2%	0.3%	48	84	0.0	0
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.1%	0.2%	0.1	0.1	0.2%	0.3%	49	84	11.1	476
Textiles, Clothing and Shoes	1.3%	1.1%	1.0	0.8	2.2%	1.4%	675	417	2.4	422
Toiletries and Personal Products	2.4%	2.1%	1.8	1.6	1.8%	0.9%	552	270	1.4	717
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Toys, Sports, and Recreational Items	0.4%	0.6%	0.3	0.5	0.2%	0.3%	48	88	0.0	0
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	0.1%	0.1%	0.0	0.1	0.0%	0.0%	0	0	0.3	30
Miscellaneous Materials	9.1%	3.9%	6.9	2.9	0.3%	0.1%	82	41	11.2	1,663
Estimated Total (per acre)	**100%**		**75.5**		**100%**		**30,426**		**99.7**	**60,045**

Table 82. Detailed litter composition table for all state and county parks.

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**0.8%**	**0.6%**	**1.8**	**1.2**	**11.4%**	**5.0%**	**1,536**	**677**	**20.2**	**6,655**
Cardboard	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	1	1.5	1
Fast-food Paper Bags	0.0%	0.1%	0.1	0.2	1.9%	3.7%	258	501	0.0	0
Kraft Paper Bags	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	1	0.0	1
Fast-food Paper Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
One-Time/ To-Go/ Fast Food Service Items	0.0%	0.0%	0.1	0.1	0.7%	0.6%	88	80	6.0	305
Paper Napkins and Tissues	0.0%	0.0%	0.1	0.0	0.0%	0.0%	3	3	4.6	2,264
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Paper Non-Beverage Paper Food Packaging	0.3%	0.5%	0.7	1.1	3.1%	4.2%	416	561	1.4	437
Non-Food Paper Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.8	4
Newspaper, Magazines, Junk Mail, and Office Paper	0.3%	0.1%	0.6	0.2	1.9%	1.8%	252	239	0.7	286
Receipts	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	1.5	4
Other Paper	0.1%	0.1%	0.2	0.3	3.8%	4.0%	515	535	3.6	3,352
Plastic	**2.7%**	**1.2%**	**6.0**	**2.6**	**30.2%**	**11.1%**	**4,075**	**1,498**	**31.3**	**8,605**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	1	0.0	1
Plastic Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Still-water	0.0%	0.0%	0.1	0.0	0.0%	0.0%	2	2	0.0	1
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Straws and Stirrers	0.0%	0.0%	0.1	0.1	0.6%	0.6%	87	78	0.0	5
Plastic Bottle Caps and Tabs	0.8%	0.3%	1.9	0.7	4.4%	2.9%	588	397	3.6	874
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.4%	0.1%	0.8	0.1	2.9%	3.0%	392	405	0.0	150
Plastic Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.7	136
Plastic Lids	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	1	0.0	1
Plastic Utensils	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	151
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	1
Grocery, Retail and Shopping Bags	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.7	136
Other Plastic Film	0.6%	0.2%	1.2	0.5	9.0%	4.8%	1,216	648	1.4	1,622
Food Wrappers and Snack Bags	0.3%	0.3%	0.6	0.7	5.5%	4.0%	738	533	2.2	2,208
Food and Drink Pouches	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Foam Cups, Bowls, and Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Foam	0.0%	0.1%	0.1	0.2	1.2%	2.2%	157	302	0.7	599
Non-beverage Plastic Food Packaging	0.0%	0.1%	0.1	0.2	0.7%	1.3%	88	170	0.0	2
Non-food Plastic Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	21.0	157
Other Plastic	0.4%	0.7%	0.9	1.5	5.9%	5.8%	802	786	0.8	2,558
Glass	**4.2%**	**0.6%**	**9.3**	**1.2**	**0.6%**	**0.6%**	**79**	**81**	**0.8**	**301**
Glass Bottles and Jars, Beer	4.1%	0.5%	9.1	1.1	0.6%	0.6%	78	81	0.5	1
Glass Bottles and Jars, Soda	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	0.1%	0.1%	0.2	0.2	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	0
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	299
Other Glass	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Metal	**2.6%**	**2.8%**	**5.9**	**6.3**	**7.8%**	**6.5%**	**1,057**	**881**	**17.7**	**1,896**
Metal Bottles, Jars and Cans, Beer	0.0%	0.0%	0.1	0.1	0.0%	0.0%	2	2	7.5	1
Metal Bottles, Jars and Cans, Soda	0.7%	0.1%	1.6	0.2	0.6%	0.6%	79	82	0.0	0
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	0
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.1	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	1	2.1	136
Non-beverage Metal Food Packaging	0.1%	0.2%	0.2	0.4	1.2%	2.3%	165	303	3.6	273
Metal Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.8	600
Bottle Caps and Tabs	1.6%	2.7%	3.6	6.1	6.0%	6.7%	807	908	3.7	884
Other Metal	0.1%	0.2%	0.3	0.4	0.0%	0.0%	1	1	0.0	2
Smoking	**2.3%**	**1.2%**	**5.2**	**2.7**	**15.7%**	**7.1%**	**2,113**	**959**	**11.5**	**18,875**
Cigarette Butts	2.3%	1.2%	5.0	2.8	14.4%	6.4%	1,940	858	9.3	18,137
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.1%	0.1%	0.2	0.3	1.3%	2.0%	173	264	2.2	738
E-Cigarettes and Vaping	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Organics	**2.2%**	**1.4%**	**4.9**	**3.2**	**2.6%**	**2.1%**	**346**	**286**	**1.5**	**152**
Food Waste	2.2%	1.4%	4.9	3.2	2.6%	2.1%	346	286	1.5	152
Human or Pet Waste	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Organics	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	1	0.0	0
CDL Waste	**79.0%**	**5.8%**	**176.1**	**13.0**	**20.3%**	**19.9%**	**2,741**	**2,679**	**0.1**	**2**
Construction and Demolition Debris	79.0%	5.8%	176.1	13.0	20.3%	19.9%	2,741	2,679	0.1	2
Hazardous Materials	**0.1%**	**0.1%**	**0.2**	**0.3**	**0.6%**	**1.1%**	**81**	**143**	**3.0**	**751**
Chemicals, Paint and Other Hazardous Materials	0.0%	0.0%	0.1	0.1	0.0%	0.0%	0	0	0.0	0
Medical Waste	0.0%	0.1%	0.1	0.2	0.6%	1.0%	78	140	0.0	750
PPE Masks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	3	3.0	1
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Materials	**6.1%**	**5.0%**	**13.7**	**11.1**	**10.8%**	**7.2%**	**1,449**	**965**	**40.4**	**3,340**
Fishing and Maritime Items	0.4%	0.8%	0.9	1.7	1.2%	2.0%	165	272	0.0	0
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	12.0	449
Vehicle Debris	0.4%	0.1%	0.8	0.2	0.6%	0.6%	82	83	11.6	1,239
Batteries, Electronics, and Small Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.3%	0.6%	0.7	1.2	2.9%	3.8%	393	517	0.1	2
Textiles, Clothing and Shoes	0.2%	0.2%	0.4	0.6	3.1%	2.6%	417	347	11.3	294
Toiletries and Personal Products	0.2%	0.2%	0.5	0.4	1.9%	1.7%	261	233	1.6	304
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	1
Toys, Sports, and Recreational Items	0.0%	0.1%	0.1	0.2	0.6%	1.1%	78	145	0.0	1
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	299
Miscellaneous Materials	4.6%	3.7%	10.2	8.3	0.4%	0.2%	51	30	3.8	751
Estimated Total (per acre)	**100%**		**223.1**		**100%**		**13,477**		**126.6**	**40,578**

Table 83. Detailed litter composition table for all DNR and DFW lands.

Material	Est. %	+ / -	Est. Pounds per Acre	Pounds per Acre + / -	Est. %	+ / -	Est. Pieces per Acre	Pieces per Acre + / -	Pounds per Acre per Year	Pieces per Acre per Year
Paper	**10.8%**	**14.5%**	**30.7**	**41.4**	**12.1%**	**17.4%**	**5,053**	**7,279**	**21.0**	**5,887**
Cardboard	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	5.1	2,042
Fast-food Paper Bags	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Kraft Paper Bags	0.0%	0.1%	0.1	0.1	0.0%	0.0%	2	4	0.0	0
Fast-food Paper Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	5
Cups	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
One-Time/ To-Go/ Fast Food Service Items	0.1%	0.2%	0.3	0.5	1.4%	1.4%	575	602	0.0	3
Paper Napkins and Tissues	0.1%	0.1%	0.2	0.4	0.0%	0.1%	18	29	0.5	66
Paper Beverage and Food Cartons, Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	2
Paper Beverage and Food Cartons, Non-Alcoholic	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Paper Non-Beverage Paper Food Packaging	0.2%	0.2%	0.4	0.6	2.1%	4.0%	860	1,671	1.0	8
Non-Food Paper Packaging	0.9%	1.2%	2.5	3.5	3.8%	6.7%	1,583	2,816	0.3	13
Newspaper, Magazines, Junk Mail, and Office Paper	0.1%	0.1%	0.3	0.4	1.4%	1.4%	574	601	0.0	0
Receipts	0.0%	0.0%	0.0	0.0	0.0%	0.0%	4	7	5.1	1,030
Other Paper	9.4%	13.4%	26.8	38.3	3.4%	4.7%	1,436	1,967	8.5	2,719
Plastic	**8.9%**	**11.0%**	**25.4**	**31.4**	**39.7%**	**10.7%**	**16,584**	**4,465**	**28.3**	**6,285**
Plastic Bottles and Jars, Beer	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Soda	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	0
Plastic Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	2
Plastic Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.1	0.0%	0.0%	1	1	0.5	9
Plastic Bottles and Jars, Other water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	3
Plastic Bottles and Jars, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Straws and Stirrers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	5	3	0.0	5
Plastic Bottle Caps and Tabs	1.8%	3.3%	5.2	9.3	5.1%	6.7%	2,151	2,803	0.1	15
Plastic Beverage Rings	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Fast-food Plastic Cups	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	2	0.1	3
Plastic Cups	0.2%	0.2%	0.5	0.7	1.0%	2.0%	431	837	0.0	0
Plastic Lids	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Utensils	0.0%	0.0%	0.0	0.0	0.0%	0.0%	5	4	0.1	10
Plates, Bowls and Single-Use Containers	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.3	8
Clamshells	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Plastic Trash Bags	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.5	3
Grocery, Retail and Shopping Bags	0.0%	0.0%	0.1	0.1	0.0%	0.0%	1	2	0.0	7
Other Plastic Film	0.5%	0.1%	1.4	0.3	8.6%	11.3%	3,593	4,730	10.5	2,044
Food Wrappers and Snack Bags	0.3%	0.4%	0.9	1.2	3.9%	6.8%	1,633	2,855	5.2	2,098
Food and Drink Pouches	0.0%	0.0%	0.0	0.1	0.0%	0.0%	1	1	0.0	0
Foam Cups, Bowls, and Clamshells	0.0%	0.0%	0.0	0.1	0.0%	0.0%	1	2	0.0	5
Other Foam	0.9%	1.5%	2.4	4.4	1.7%	2.1%	717	880	0.0	15
Non-beverage Plastic Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	3	4	0.0	0
Non-food Plastic Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	3	0.1	5
Other Plastic	5.1%	6.9%	14.7	19.6	19.2%	22.7%	8,038	9,475	10.4	2,054
Glass	**19.0%**	**34.4%**	**54.4**	**98.0**	**10.4%**	**14.1%**	**4,364**	**5,898**	**159.9**	**7,856**
Glass Bottles and Jars, Beer	0.3%	0.6%	1.0	1.8	0.0%	0.0%	2	3	106.9	5,132
Glass Bottles and Jars, Soda	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Single-serve Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Wine and Liquor	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.2	3
Glass Bottles and Jars, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Glass Bottles and Jars, Unknown	14.3%	27.0%	40.9	77.1	7.2%	9.7%	3,012	4,061	0.1	3
Other Glass Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Other Glass Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Broken Glass or Ceramic	0.6%	0.9%	1.8	2.5	0.1%	0.2%	59	100	45.9	2,039
Other Glass	3.8%	7.1%	10.8	20.3	3.1%	4.2%	1,291	1,740	6.8	680
Metal	**8.1%**	**3.8%**	**23.1**	**10.9**	**15.1%**	**5.0%**	**6,322**	**2,094**	**36.3**	**11,232**
Metal Bottles, Jars and Cans, Beer	0.0%	0.0%	0.1	0.1	0.0%	0.0%	2	2	0.5	11
Metal Bottles, Jars and Cans, Soda	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	2
Metal Bottles, Jars and Cans, Sports and Health Drinks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	3
Metal Bottles, Jars and Cans, Juice	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Tea and Coffee	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Still-water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Other Water	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Metal Bottles, Jars and Cans, Unknown	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Non-beverage Metal Food Packaging	0.8%	1.4%	2.2	4.1	2.1%	2.8%	869	1,170	5.1	2,039
Metal Non-Food Packaging	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Bottle Caps and Tabs	7.3%	5.2%	20.8	14.8	13.0%	7.8%	5,450	3,247	25.5	8,157
Other Metal	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	2	5.1	1,020
Smoking	**2.5%**	**2.1%**	**7.0**	**6.1**	**13.4%**	**4.5%**	**5,601**	**1,886**	**19.0**	**24,165**
Cigarette Butts	2.3%	1.8%	6.5	5.1	12.4%	3.1%	5,163	1,300	18.7	24,145
Other Cigarette, Tobacco, and Cannabis Products and Packaging	0.2%	0.4%	0.6	1.0	1.0%	1.4%	438	586	0.2	17
E-Cigarettes and Vaping	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.1	3
Organics	**0.3%**	**0.3%**	**0.8**	**0.9**	**1.1%**	**1.4%**	**440**	**593**	**2.3**	**36**
Food Waste	0.2%	0.3%	0.6	0.9	1.0%	1.4%	437	588	1.9	18
Human or Pet Waste	0.1%	0.0%	0.2	0.1	0.0%	0.0%	1	1	0.0	0
Other Organics	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	4	0.4	18
CDL Waste	**36.4%**	**47.5%**	**104.0**	**135.5**	**3.1%**	**5.4%**	**1,315**	**2,263**	**71.4**	**6,118**
Construction and Demolition Debris	36.4%	47.5%	104.0	135.5	3.1%	5.4%	1,315	2,263	71.4	6,118
Hazardous Materials	**3.5%**	**1.5%**	**9.9**	**4.3**	**0.0%**	**0.0%**	**5**	**3**	**0.4**	**3**
Chemicals, Paint and Other Hazardous Materials	3.4%	1.5%	9.8	4.2	0.0%	0.0%	1	1	0.4	3
Medical Waste	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
PPE Masks	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Explosives (Example, firecrackers or ammunition casings)	0.0%	0.0%	0.1	0.1	0.0%	0.0%	3	2	0.0	0
Other Materials	**10.6%**	**9.1%**	**30.2**	**25.9**	**5.0%**	**3.9%**	**2,089**	**1,609**	**109.4**	**5,520**
Fishing and Maritime Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	4	0.1	3
Tires	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Auto Rubber Products (Example, tire shards or treads)	0.0%	0.0%	0.0	0.0	0.0%	0.0%	2	3	0.0	0
Vehicle Debris	1.7%	3.4%	4.8	9.6	1.1%	1.4%	446	592	0.1	5
Batteries, Electronics, and Small Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	1	1	0.0	0
Large Appliances	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Household/Camping Items/Office Items	0.6%	0.6%	1.6	1.8	0.7%	0.7%	290	303	0.3	8
Textiles, Clothing and Shoes	0.3%	0.6%	1.0	1.8	2.8%	5.4%	1,153	2,255	1.1	124
Toiletries and Personal Products	0.1%	0.1%	0.2	0.3	0.0%	0.0%	14	8	3.5	705
Balloons	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Toys, Sports, and Recreational Items	1.5%	0.6%	4.4	1.6	0.0%	0.0%	1	1	5.4	1,025
Furniture, Carpet, and Bulky Items	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Whole Bags of Mixed Trash	0.0%	0.0%	0.0	0.0	0.0%	0.0%	0	0	0.0	0
Miscellaneous Materials	6.4%	8.2%	18.2	23.5	0.4%	0.2%	180	69	98.9	3,650
Estimated Total (per acre)	**100%**		**285.4**		**100%**		**41,773**		**448.0**	**67,101**