
Washington State Litter Study



Volume One – Final Report



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1 OVERVIEW OF THE LITTER STUDY

In 1997, a Litter Task Force was created to evaluate Washington's litter collection and prevention activities. Recommendations from the Task Force were incorporated as 1998 amendments to the Litter Act. One of the provisions of this legislation directs the Washington State Department of Ecology to conduct a statewide litter survey, which is to be used to guide prevention and clean-up efforts. Previous litter surveys had been conducted by the State in 1982, 1983, 1985, 1987, and 1990. The Task Force concluded that previous data may not be representative of today's situation, although it recommended that the goals of previous surveys be carried forward. Specifically, the goals were to collect "usable data on current litter volumes, composition, sources, the groups contributing to the problem, effectiveness of litter prevention, and levels of littering in different areas of the state."

This study was designed to achieve the Task Force's goals by using three different methods to gather data about littering:

- **Field research and sampling** to determine the generation and composition of litter along roads and in selected public areas in Washington;
- **Focus groups** targeting admitted or potential litterers, designed to collect qualitative data regarding why Washington residents litter and to investigate litter prevention strategies; and
- **A telephone survey** of the general population to collect quantitative data regarding the types of people and situations that create littering behavior and to test litter prevention messages.

Chapter 70.93 of the Revised Code of Washington defines litter as "all waste material including but not limited to disposable packages or containers thrown or deposited as herein prohibited and solid waste that is illegally dumped, but not including the wastes of the primary process of mining, logging, sawmilling, farming or manufacturing." This definition is applied throughout the study. It is important to note that illegally dumped materials are included in the state's definition of litter. Illegal dumps themselves were not included in the study. However, if illegally dumped materials were found within the study area, they were included in the composition analysis.

Three separate studies were conducted for this comprehensive litter survey. Each study is detailed in separate volumes, which together create the complete litter report. Volume 1 provides a summary of the entire litter study, Volume 2 is the Litter Generation and Composition Report, Volume 3 is the Litter Focus Group Report, and Volume 4 is the Telephone Survey Report.

Volume 1 (this report) is organized as follows: Section 2 provides a brief summary including results of each separate study; section 3 states conclusions and recommendations; and section 4 compares this study to previous Washington state litter studies.

2 SUMMARY AND RESULTS OF EACH STUDY

Following are summaries of each study (which can be found in their entirety in Volumes 2, 3 and 4). The goal and objectives of each study are stated, followed by a summary of the methodology and key findings for each.

2.1 SUMMARY OF THE LITTER GENERATION AND COMPOSITION STUDY

The goal of the Litter Generation and Composition Study was to characterize the quantity and composition of litter along roadways and in public areas across the state of Washington. The primary objectives guiding the design and execution of this study were:

- To produce statistically valid data reflecting the overall annual amount, distribution and composition of litter in the state of Washington;
- To design and document a sampling methodology that would permit replication of the study in the future; and
- To draw conclusions about littering behavior in order to guide prevention and clean-up efforts.

2.1.1 METHODOLOGY

The litter generation and composition study involved three phases. First, a comprehensive sampling plan was developed with input from stakeholders. Next, samples in three categories of sites were collected and their component materials were sorted and weighed. Finally, samples were analyzed to determine their composition and the generation rates within the state on an annual basis.

Three principal site categories were defined for the study: *roadways*, *highway interchanges*, and *public areas*. These categories were selected to represent areas where litter originated from different behaviors. Within each of these site categories, a number of subcategories also were defined as follows:

- **Roadways** were subdivided into interstate highways, state routes, and county roads.
- **Interchanges** included all interchanges along interstates and state routes.
- **Public Areas** were subdivided into parks (state and county), public access areas (Department of Natural Resource lands and Department of Fish & Wildlife lands), and rest areas.

Using U.S. Census data, roadway subcategories and interchanges were further classified as urban and non-urban in order to identify any differences in littering between urban and non-urban areas.

For roadways and interchanges, litter was collected from the sampling sites three times during the study year: an initial clean-up and two seasonal samples. For public areas, litter was collected from the sampling sites during two one-month periods, each with an initial cleaning at the beginning of the month.

Litter samples were collected between October 1998 and October 1999 by Department of Ecology Youth Corps (EYC) crews with assistance from Washington Departments of Transportation, Corrections, Natural Resources, and the Parks and Recreation Commission (State Parks). County parks departments and some local community crews also assisted. Each sample of litter was carefully labeled ("tagged") by the crews, then transported to regional storage locations.

Once each collection period was completed, all the samples were transported to sorting locations in Tacoma, Spokane, or Lacey. There, Sky Valley Associates, a professional waste audit company, sorted, weighed, and tabulated the litter into component categories (e.g., paper

beverage containers, metal automotive parts, cigarettes, etc.). Throughout the course of the study, 356 samples, weighing a total of 21.7 tons, were collected.

The roadway subcategories surveyed in this study (interstate highways, state routes and county roads) represent the majority of roadways in the state with the exception of city streets. Thus combined data from the sampled roadway sites provide a general picture of overall statewide litter on roadways. Interchange data represent all interchanges in the state.

Public area data were not combined because the subcategories selected (state and county parks, recreational public access areas, and rest areas) represent only a fraction of all public areas in the state. (Schools, fairgrounds, federal land, etc. were not included in the sampling.) Since the selected site categories do not represent **all** public areas in the state, the combined results may be misleading.

Litter generation rates were calculated for each of the site sub-categories by unit (pounds per mile, interchange, or acre per year) and for the total site category statewide. Composition estimates also were calculated and are presented as a percentage of total weight in tons, which is how composition is typically reported in waste generation and composition studies. It is important to note that items with a higher unit weight (such as glass, tires, and wood) will typically constitute a larger percentage of the overall composition. However, the volume of these materials may be less than other litter components that have a lower unit weight (such as aluminum cans and plastic beverage containers.)

2.1.2 KEY FINDINGS

The following paragraphs summarize the key findings of the litter generation and composition study, beginning with the state's roadways, followed by interchanges, then public areas, and concluding with overall findings.

2.1.2.1 ROADWAYS

- In Washington, almost one ton of litter accumulates each year along a typical mile of interstate highway. In urban areas accumulation rates on interstate highways approach 1.5 tons per mile.
- Litter generation rates for state routes and county roads are much lower than for interstates. State routes average about 475 pounds per mile each year; county roads average slightly more than 300 pounds per mile per year.
- Glass beverage containers constitute the largest single litter item by weight along roadways (all road categories combined), approximately 24% of the composition. (While glass beverage containers are the largest component by weight, the volume of glass beverage containers is actually less than the corresponding volume of aluminum cans and plastic beverage containers.)
- Wood products, other organics (including yard debris, stumps, firewood, branches and prunings, but excluding food and pet waste), tires and other metal/composite materials comprise approximately 35% of roadway litter; together with glass beverage containers, these materials make up almost 60% of litter along the state's roadways by weight.
- On interstates, tires are the largest category of litter (nearly 25%). Metal and plastic automotive parts also make up over 8% of interstate litter. Interstate highways have a much

higher volume of vehicle traffic per mile than county and state roads, which may explain the greater volume of tire and automotive litter.

- Glass beverage containers and tires represent a greater proportion of litter on non-urban roadways (including interstates, state routes, and county roads) than on urban roadways. Wood products comprise a greater percentage of litter on urban interstates and state routes than on non-urban interstates and state routes.

2.1.2.2 INTERCHANGES

- During a year, an average of about 2,500 pounds of litter accumulates within interchanges; 45% more litter accumulates on urban interchanges than on non-urban interchanges.
- Within interchanges, wood products and “other organics” are the largest litter components (about 15% each). Glass beverage containers, tires, and metal automotive parts also represent a substantial portion of litter. Combined, these five items constitute over 58% of interchange litter.

2.1.2.3 PUBLIC AREAS

- Public access areas (Department of Fish & Wildlife and Department of Natural Resources lands) accumulate more litter per acre of high-use area than do parks and rest areas.
- The main litter items in public areas mirror those found along roadways and in interchanges, with the exception of tires which were less common. Wood products, glass beverage containers and other organics account for approximately 35% to 50% by weight of all litter in these areas.
- Other significant components of public area litter include food, metal automotive parts, textiles, paper fast-food items, and cigarettes. Each of these items constitutes 5% or more of public area litter.

2.1.2.4 OVERALL FINDINGS

- **Litter is not just a roadside problem.** High-activity areas in county parks, public access areas, and rest areas accumulate more litter per acre each year than roadways do. While vehicles are the primary mode of access to these areas, non-driving activities such as walking, boating, fishing and picnicking may generate the majority of litter at these sites. The composition of litter at some of these sites also suggests the possibility of illegal dumping.
- **More litter accumulates in urban areas.** More litter accumulates along urban roadways and interchanges than on non-urban roadways and interchanges. Litter generation along urban interstate highways approaches 1.5 tons per mile each year; this is about twice the amount generated along non-urban interstates. State routes in urban areas generate about 1.0 tons of litter per mile; only 0.13 tons per mile are generated along non-urban state routes. Also, urban interchanges accumulate 45% more litter than do non-urban interchanges. This is most likely due to the higher volume of vehicles using these roads and interchange areas.
- **One-third of roadside waste is not perceived as “litter.”** Wood and wood products, other organics (including items such as yard debris, stumps, firewood, branches and prunings, but excluding food and animal wastes) automotive parts and tires together make up

approximately 33% of litter along Washington's roadsides. These items are also notable litter components in the state's public areas. According to citizen surveys, these items are not typically considered to be litter.

- **Much of the state's roadside littering may be accidental.** Items associated with driving vehicles or hauling uncovered loads (tires, wood products, other metal and composites, automotive parts and other organics, including items such as yard debris, stumps, firewood, branches and prunings) comprise almost 40% of roadside litter. These items are not necessarily the result of deliberate littering; they are more likely to result from "accidental" littering such as material falling from unsecured loads.

2.2 SUMMARY OF THE FOCUS GROUPS

The major goal of the focus group research was to examine the primary reasons residents might engage in littering behaviors and to explore various communication strategies and messages that might substantially contribute to a decrease in littering activity. This qualitative research was conducted to assess residents' perceptions of littering. The results of this preliminary exploratory research aided in the design of the telephone survey.

There were three objectives for the focus groups:

- To find out why people litter by talking to confessed or potential litterers.
- To test some anti-litter slogans on people who admitted to littering.
- To develop topics for further investigation during the telephone survey.

2.2.1 METHODOLOGY

While litter sampling was in progress, focus groups were conducted in order to gain qualitative information about littering – who litters, why they litter, and how to prevent littering. FBK Research conducted two focus groups on February 9, 1999 in Tacoma, Washington. A total of 17 citizens participated in the focus groups. To gain participation, potential candidates were contacted by telephone and were screened to determine whether they met the following qualifications:

- 18 to 30 years of age;
- No more than a 4-year college education;
- A personal income below \$75,000;
- Believed that litter was not a very important issue in the state; and
- Indicated some propensity to litter.

The moderator facilitated an exercise to examine perceptions of litter and the extent to which participants believed that littering is an important issue. Following this discussion, the moderator explored the participants' past exposure to education about litter. Lastly, the moderator explored what types of communication strategies might be most compelling to reduce the extent to which consumers litter.

2.2.2 KEY FINDINGS

The following section provides a summary of the key findings of the focus groups:

- **The term “litter” carries with it many negative connotations.** Litter is considered something that is dirty, ugly, disgusting, gross and potentially dangerous. Litter typically is thought of as including beverage containers, fast food wrappers, candy wrappers and cigarette butts. Some of these participants mentioned that other items like tires, plastics, grass clippings and appliances also constitute litter. People who litter are thought to be lazy, careless, inconsiderate, disrespectful, and to lack social values and morals.
- **People have a difficult time admitting that they have recently littered.** They do not wish to view themselves as a part of the group that would engage in such a socially inappropriate behavior. “Accidental” littering is considered far more acceptable than is deliberate littering.
- **There is confusion about what constitutes litter and littering.** Some people believe that biodegradable products constitute litter and others do not. Some people do not think about cigarette butts as litter while others claim that it is a major source of litter. Some people think that appliances in a vacant lot constitute litter, while others seem more likely to refer to this as “dumping.”
- **Public awareness is important, and enforcement of fines would be a good idea to curb littering behavior.** The respondents in this research pointed to two approaches that might be effective in reducing littering behavior. Many seemed to believe that public awareness campaigns would be important in reminding the public that littering is not acceptable. A few believed that the enforcement of fines for littering would be most effective in reducing littering behavior.
- **Powerful, graphic anti-littering messages are needed.** With regard to a public awareness campaign and the messages that might be sent, respondents reported that it was imperative that the messages be very powerful. Most people agreed that the messages should be strong, they should clearly communicate that littering is not acceptable, they should graphically show what might happen if citizens did not take personal responsibility for proper trash disposal, and they should provide detailed information about the magnitude of the potential litter problem.

2.3 SUMMARY OF THE TELEPHONE SURVEY

A telephone survey was conducted in order to gain quantitative information about who litters and why, and to test the findings of the focus groups. This survey was a way to bring the focus group questions to a broader, randomly selected audience representative of the population of Washington State. In the telephone survey, people of different ages, incomes, education, and geographic distribution were queried.

The three primary objectives of the telephone survey were to:

- Test the focus group findings with a wider audience;
- Further identify the types of people and circumstances that create litter and people’s perceptions of litter and littering; and
- Test general litter prevention strategies and types of preventative messages.

2.3.1 METHODOLOGY

The survey was designed by Cascadia Consulting Group with assistance from FBK Research and input from the Department of Ecology project team. Results from similar surveys conducted in Texas and Arizona were also used in designing the survey.

Market Trends, Inc. conducted the phone calls in May 1999. A random sample of 300 residents of Washington who were at least 15 year of age were included. Residents without a telephone or only a cell phone were excluded from the survey. In order to achieve 300 completed surveys, a total of 2,000 phone numbers were randomly selected from all listed and unlisted numbers in Washington. Random selection ensured that a representative sample of urban and non-urban, and eastern and western Washington phone numbers were selected.

Due to the sensitive nature of the topic of litter (which was determined during the focus groups), many of the phone survey questions asked about respondents' perceptions of why "other people they know" litter. The survey was designed this way to de-personalize the issue and increase the propensity to understand the perceptions and profiles of litterers.

The survey data was analyzed for the entire sample of 300 respondents. Additional analyses were performed by demographic categories: gender, age, education, income, employment status, length of state residence, home ownership, and the presence of children in the household.

2.3.2 KEY FINDINGS

The following paragraphs summarize the key findings from the phone survey:

- **Residents see litter as a problem facing the state of Washington, but it may not be on the top of the list of their concerns.** While 79% indicated it was important, only 38% of the respondents were willing to say that litter was a "very important" issue facing the state. When asked if there was more, less, or the same amount of litter in the state as compared to three years ago, only about one-third of the respondents said "more."
- **The act of littering was deliberate as opposed to accidental.** Three-fourths of the respondents (74%) said that most of our state's litter was deliberate, 15% thought it was accidental and 11% thought it was both deliberate and accidental. Respondents tended to agree with the statements that portray littering as lazy or ignorant behaviors, such as people litter because "they don't care," "they think someone else will pick it up," or "they don't think their one piece of litter matters." Respondents were less inclined to agree with the statements that portrayed littering as accidental or unknowing behaviors such as "they don't realize it."
- **Residents typically thought driving was the primary activity responsible for litter, and they saw the most litter on roads, highways, and streets.** However, items that are vehicle-related, such as vehicle parts, tires, motor oil containers, or lawn debris (often associated with uncovered loads), were mentioned by no more than eight percent of the respondents. Respondents typically saw litter associated with eating, drinking, and smoking. Paper, aluminum cans, fast-food waste, and cigarettes were items frequently mentioned. This suggests that respondents either associate litter with people deliberately throwing items out of their vehicles, or they do not consider vehicle-related litter to be "litter."

- **Males and young adults appeared more likely to litter than females and middle-aged to older individuals.** Respondents who attributed littering to a specific age group cited teens and young people (ages 13-24) as those responsible for littering. Teens and young adults were more likely to personally engage in littering, at least on a rare occasion, than older respondents did. Young people were also less likely to pick up litter that either they or someone else dropped. Males were more likely to litter than females under all the circumstances asked in this survey, but they did not differ in their willingness to pick litter up.
- **Placing more trashcans in public places would be an effective strategy for curbing littering behaviors.** Despite the fact that respondents thought driving was the primary source of litter and most litter was found on roadsides, they thought that having more trashcans available would help curb littering.
- **Offering educational programs in schools and enforcing fines for littering would be effective strategies for curbing littering behaviors.** Survey respondents indicated it would be effective to communicate that litter is a critical issue by showing a graphic picture of what accumulation of litter over time would look like, or publicizing the environmental harm that litter can cause. Respondents considered these messages as effective because they are a dramatic visualization of the litter problem. Preventing people from littering would involve changing their behaviors, which is easier to do when people recognize the problem and understand the need for change. Respondents supported both fines and community service for litterers.
- **Phone survey results were very similar to those obtained from the focus groups.** Focus group and phone survey participants tended to agree that they generally see litter associated with eating, drinking, and smoking and that litterers are lazy and careless individuals. Young adults in both these studies showed some tendencies to litter, at least on a rare occasion. Both groups also thought that educational programs and enforcement of fines would be effective in reducing littering behaviors.

3 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions about litter, littering and litter prevention are based on the findings of the above studies. Each conclusion is accompanied by a recommendation for designing a litter prevention campaign. Overall, these conclusions point to the need for a broad-based litter prevention campaign that focuses on the nature and magnitude of the litter problem in Washington State.

Washington State residents do not perceive litter to be a critical issue.

Only 38% of Washington State residents reported that litter is a "very important" issue facing the State. It may be that current litter clean-up efforts are effective at minimizing the extent to which residents perceive the accumulation of litter as a problem.

Recommendation: Develop a long-term, broad-based litter *awareness* strategy and campaign that focuses on the extent to which litter and littering behavior can create a significant problem in Washington State.

Washington State residents tend to define litter differently than the state legislature.

The outcome of the focus groups and telephone survey indicates that there is some confusion among Washington State residents as to what constitutes litter. Residents are most likely to describe litter as paper, beverage containers, fast food containers, and cigarette butts. They do not tend to think of tires, car parts, wood and organics as litter; however, a significant percentage of roadside and public area litter consists of these items. Many people also do not consider biodegradable products as litter.

Recommendation: Broaden the public's perceptions of what constitutes litter.

The term "litter" has negative connotations and people don't like to admit that they have littered.

Litter is considered something that is dirty, ugly, disgusting, gross and potentially dangerous and litterers are thought to be lazy, careless, inconsiderate, disrespectful, and to lack social values and morals. Washington residents do not want to be perceived as litterers.

Recommendation: Capitalize on this negative perception of litter and litterers by using emotional messages in the anti-littering campaign.

Litter composition results indicate that up to 40% of litter discarded along roadways may be a result of "accidental" rather than "deliberate" littering.

It is reasonable to conclude that tires, wood products, other organics (including items such as yard debris, stumps, firewood, branches and prunings), other metal/composite materials (such as a radio) and metal automotive parts found along the roadsides are "lost" rather than deliberately thrown from the vehicle. Lost items may be a result of uncovered or unsecured loads, or autoparts becoming disengaged. It is worth noting that 74% of the telephone survey respondents said that most of our state's littering was deliberate. Clearly, there is a misperception regarding the primary cause of litter. Focus group respondents also considered accidental littering to be far more acceptable than deliberate littering.

Recommendation: Inform residents through a broad-based anti-litter awareness campaign that uncovered loads and other "accidental" acts are as problematic as throwing waste from a vehicle.

Litter is more than just a roadside problem in Washington State.

On a per acre basis, more litter accumulates in the high activity areas of county parks, public access areas (such as Fish & Wildlife sites and DNR sites) and rest areas than accumulates along roads. Litter is apparently not just thrown or lost from moving vehicles, it is also discarded in areas where people are stopping, parking, getting in and out of cars, and resting or recreating. Based on the telephone survey results, residents typically thought driving was the primary activity responsible for litter and they reported seeing most litter along highways.

Recommendation: Incorporate a message in the broad-based litter prevention campaign that portrays littering as a problem in other public areas as well as on the roadways. Avoid creating a campaign that is focused only on drivers.

Public education and awareness campaigns must be dramatic and utilize graphic depictions of the potential litter problem.

Respondents in the focus groups and phone survey clearly indicated that, in order to reduce littering behavior, it would be most effective to show the negative consequences of littering with graphics, photos and other visual aids.

Recommendation: In an anti-littering campaign, graphically depict the magnitude of the potential litter problem in Washington State.

4 COMPARISON TO PREVIOUS STUDIES

Previous Washington State litter surveys were conducted in 1982, 1983, 1985, 1987, and 1990. This section attempts to compare results obtained in the current study to those in 1990, the last time a litter study was conducted.

The results of the 1990 litter survey and the current study are not comparable because the areas sampled were not the same and it is unclear how the 1990 figures were calculated. However, measurements by the Washington State Department of Transportation have shown that the “cleanliness” of Washington roads has steadily declined since 1996 – roadways are getting dirtier. The current study estimated that each year about 8,300 tons of litter are discarded along Washington's roadways, 617 tons on highway interchanges, 2,536 tons in parks, 496 tons in public recreation areas, and 14 tons in rest areas.

While difficult to compare generation and composition data, it is possible to compare major findings and conclusions. A summary of key similarities and differences follows:

Both the 1990 study and the current study conclude that litter rates are higher in urban areas than in non-urban areas. The 1990 study concluded that urban street litter rates (items per mile per week) were three times higher in the Seattle-Tacoma area than in small cities under 10,000 population. The current study found that litter generation rates (pounds per mile per year) were approximately two to eight times higher, depending on the type of roadway, in urban areas than in non-urban areas.

In both studies it was found that “accidental” littering is responsible for a substantial quantity of litter along roadways. The 1990 study attributed 47% of overall litter to accidental causes (spills, lost loads and other careless acts). The current study concluded that items associated with vehicles and uncovered loads constituted almost 40% of roadside litter.

Both studies concluded that younger people and males tend to litter more than others. According to the 1990 study 6 to 24 year olds are more likely than others to deliberately litter; and older males are more likely to be responsible for accidental littering. The current study found that telephone survey respondents most often attributed littering to teens and young adults (13-24 year olds). The current study also revealed that males tend to litter more than females.

Finally, both of the studies emphasized the need for “hard-hitting”, dramatic litter prevention campaigns.

