DEPARTMENT OF ECOLOGY
State of Washington

Recycling Refund Model Study

Legislative Direction

Chapter 70A.208 Revised Code of Washington (RCW), also known as the Recycling Reform Act, directs Ecology to conduct two studies on the potential statewide impacts of a recycling refund system in Washington state.

RCW 70A.208.240 states:

> *(1) The department shall contract with an independent consultant to conduct two studies on the potential statewide impacts of a recycling refunds program, also known as a beverage container deposit return system, in Washington state. The studies must prioritize equity, accessibility, and community perspectives.*
>
> *(2) The consultant, in coordination with the department, shall lead a community engagement process in at least three geographically diverse areas of the state with a high concentration of socially vulnerable or overburdened populations, as identified by the department consistent with RCW 70A.02.010. The results of this engagement process must be submitted to the legislature by January 1, 2027. The engagement process must:*
>
> *a) Solicit input on access to recycling and redemption services, local infrastructure needs, and community priorities related to convenience and equity;*
> *b) Assess consumer sentiment, awareness, and perceptions of a recycling refunds program, including perceived benefits, barriers to participation, and potential economic impacts, particularly for low-income households;*
> *c) Include:*
>
> *i. Community input sessions in overburdened communities;*
> *ii. Outreach to local governments, tribal governments, environmental justice and equity organizations, producers, recycling system operators, and other relevant stakeholders; and*
> *iii. Engagement with individuals and organizations concerned about the economic impacts of a recycling refunds program, particularly on low-income consumers; and*
>
> *d) Develop recommendations to ensure that a recycling refunds program is equitably accessible, convenient, and responsive to community needs across all regions of the state.*
>
> *(3) In the same three regions required to be identified under subsection (2) of this section, the consultant shall evaluate and model what convenient access to redemption services would look like, with respect to the types of express and full-service redemption sites. The results of this engagement process must be submitted to the legislature by January 1, 2026. This analysis must at a minimum consider:*

a) *The availability of suitable infrastructure for redemption services that include reusable packaging;*
b) *Accessibility via public transportation;*
c) *Co-location opportunities with existing waste or recycling facilities; and*
d) *Strategies to reduce transportation burdens on residents in rural, remote, and underserved communities.*

(4) The department shall submit the consultant's findings and recommendations to the appropriate committees of the house of representatives and the senate by January 1, 2026, for the study completed in subsection (3) of this section and January 1, 2027, for the study completed in subsection (2) of this section.

(5) Registered producer responsibility organizations under RCW 70A.208.030 are responsible for payment of the department's cost to complete these studies as part of the one-time payment due to the department on September 1, 2026, under RCW 70A.208.030(4).

Background

Ecology contracted with Eastern Research Group, Inc. (ERG) and their team of subconsultants to conduct the conduct two studies on the potential statewide impacts of a recycling refund system in Washington state. As required by the Recycling Reform Act, the ERG team is conducting the recycling refund studies in two phases.

The first phase (this report) focuses on understanding what a recycling refunds system could look like in Washington. This technical study models how the system might operate, how many sites would be needed, where they should be located, and how the program could support equity and convenience for all residents. Ecology selected King, Spokane, and Yakima counties for detailed modeling because they represent different types of communities—urban, suburban, and rural. Learning from these counties helps the study estimate how a larger, statewide system might function. The results and early recommendations from this phase are due to the Legislature on January 1, 2026.

The second phase will engage communities, including Tribes, using phase one model results to gather input on the access models developed for potential redemption services. This phase will gather input from Tribal nations, residents, community groups, recycling system partners, local governments, and others who may be affected by a recycling refunds program. Community feedback is essential because convenience and equity look different in different parts of the state. For example, rural areas may have longer travel distances, while urban areas may face challenges related to space, traffic, or site safety. The Recycling Refund Community Engagement report is due to the Legislature by January 1, 2027.

Should legislation requiring a recycling refunds program be enacted within Washington, it would not inherently apply to Tribal lands within the state, though Tribal Nations would be impacted by the program. For this reason, Ecology initiated formal Tribal consultation in phase one of this study and will continue to engage with and consult Tribes throughout phase two of this study. Ecology also will provide a separate Tribal government comment period to gather feedback on

the draft community engagement report and recommendations before it is submitted to the legislature on January 1, 2027.

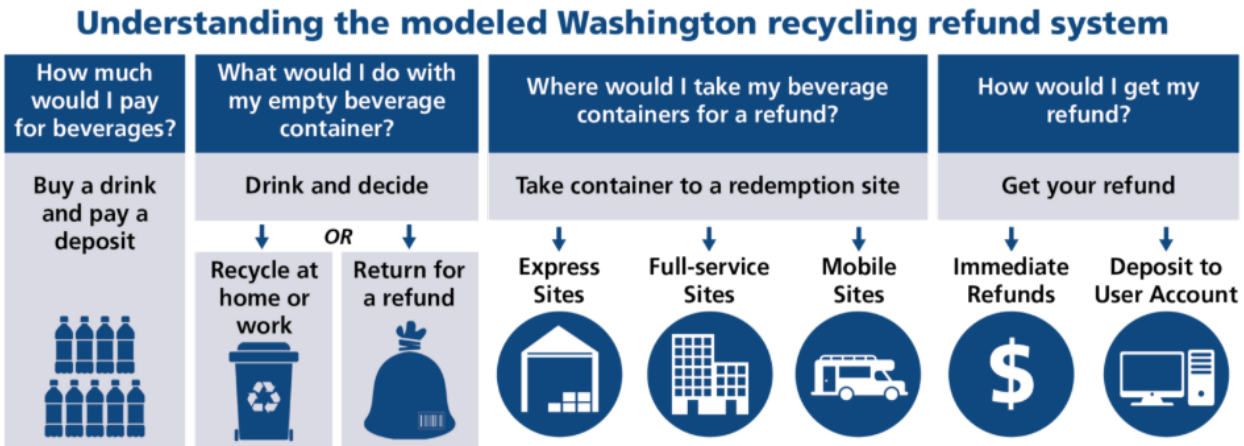
This report summarizes the consultant's findings for the first phase of the recycling refund studies. The consultant's full report is titled *Recycling Refund Model Study* (Ecology publication 27-07-065) and available here.

Recycling Refund System

This report summarizes the phase one recycling refund system modeling. A recycling refund system, also called a deposit-return system or bottle bill, places a refundable deposit on beverage containers at the point of sale. Consumers pay the deposit upfront and receive it back when they return the empty container for recycling. Within a recycling refund system, the redemption site network refers to the dedicated network of locations where consumers can return their beverage containers for a refund on the deposit they paid at the time of purchase.

Figure 1 provides an overview of a modeled recycling refund system in Washington from the perspective of the consumer. In this modeled system example, Washington residents and visitors would pay a 10-cent deposit on each covered beverage container. After consuming the beverage, the consumer may choose to recycle it, dispose of it, or return it to a redemption site to obtain a deposit refund. In general, there are three types of sites that provide access to redemption services: express sites, full-service sites, and mobile sites. Each of these site types offers different kinds of refund methods that may result in either an immediate refund or a refund being deposited into the consumer's account, typically within two to three days. This study models all three redemption site types.

Figure 1: The Modeled Recycling Refund System



Modeling Analysis

The ERG consulting team completed a modeling analysis of a recycling refund redemption system in King County, Spokane County, and Yakima County. The model used distance to retail as a measure of convenience. That measure was selected to mirror where consumers would go to purchase beverages. The model distributed redemption sites at average distances to retail for urban, suburban, and rural populations.

The three counties were selected to represent the range of geography, population, and density characteristics found across Washington state. The populations in each county were separated into five levels based on population density: remote, rural, suburban, urban, and dense urban. These levels allow the model to set differing measures of convenience and travel-time across each county.

Additional baseline assumptions were selected from requirements outlined in House Bill 1607, which was proposed – but not passed – during Washington's 2025 legislative session. House Bill 1607 excluded retail take-back of beverage containers and required the system provide access to redemption sites that are a convenient distance from retail or recycling sites. Additionally, the model relied on successful parameters from existing recycling refund systems operating in Oregon, Canada, and Australia. The assumptions used in the recycling refund system model include:

- An average of 700 beverage containers purchased per year per person
- A redemption target of 80% or 560 beverage containers per person per year
- Travel distances to redemption sites were similar in distance to retail
- Set distances to redemption sites at 0.25 miles from public transit stops and walking in dense urban areas
- A variety of site types and redemption methods to collect and process containers
- Immediate refund opportunities at sites near overburdened communities

The modeled system includes a range of bottle redemption return options, summarized in Table 1. Full-service redemption sites are dedicated indoor facilities or return depots with the highest daily collection capacity, typically operating from 8:00 a.m. to 6:00 p.m., and often offering extended hours for automated returns. Located mainly in suburban areas near dense population centers, they are staffed by two to twelve full-time employees. Express redemption sites, by contrast, are stand-alone units placed in retail or commercial parking lots and are optimized for speed and smaller volumes. They are usually accessible 24/7, operate without on-site staff, and may include kiosks for account access or, in the case of express flex sites, counting technologies that provide immediate cash or virtual account payments. Mobile and special-event sites use vehicles or temporary event setups to collect materials in rural areas with variable demand or in urban areas with limited space, offering instant cash through hand counts or staffed arrangements. Attributes of the redemption sites are described in Table 1.

Table 1: Redemption site type attributes

Redemption Site Type	Key Attributes	Average Containers Recovered Per Year Per Site	General Site Placement Guidelines	Land Use Zoning Requirements
Standard full-service	Multiple collection methods, including bag drop, various counting technologies, and immediate refund options.	45,000,000	Placed in suburban and urban areas.	Commercial, mixed use, and industrial
Specialized full-service	Similar to standard full-service sites but designed and	45,000,000	Included where full-service sites are	Commercial, mixed use, and

Redemption Site Type	Key Attributes	Average Containers Recovered Per Year Per Site	General Site Placement Guidelines	Land Use Zoning Requirements
	operated based on community needs and impacts.		permitted to be placed in overburdened communities.	industrial
Express drop	Collection method is only bag drop. Typically unstaffed. Refunds issued via account deposits instead of immediate refund.	4,000,000	Not placed in dense urban or overburdened communities. Not placed within 2 miles of a full-service site.	Commercial and mixed use
Express flex	Collection methods include bag drop, reverse vending machines, and hand counting. Offers both instant cash and account deposits.	4,912,500	Placed in overburdened communities and in remote and island communities. Not placed within 2 miles of a full-service site.	Commercial and mixed use
Mobile and event-based	Used in areas lacking other convenient options and lacking zoning or infrastructure to site permanent locations.	Variable	Areas with unique considerations.	Not applicable

The redemption site types included in Table 1 are only full-service and express sites -- a decision based on the Recycling Reform Act requirements and reviews of existing systems in Oregon, British Columbia, and New South Wales, Australia. These systems rely heavily on non-retail return options.

The key attributes in Table 1 are assumptions based on reviews of existing systems in Oregon and New South Wales and site types.

The average containers recovered per site per year in Table 1 is based on reported data from the Oregon Beverage Recycling Cooperative and reflects the number of containers processed at full-service sites and on calculations that assume express sites are serviced twice per week. The average containers processed are affected by the size and type of containers received. Therefore, the values shown represent the average assumption used in the model.

The model data included U.S. census population, land use zoning, retail locations, solid waste collection sites, zoning maps, and public transit stops to develop each county base map. Population census data provided an estimate for beverage container redemption per capita (560 containers per person per year). Redemption sites were placed across each county to meet the set scenario convenience criteria and process the volume of containers.

Modeled Study Scenario Results

Four scenarios were modeled by adjusting the system criteria. The base model assumptions (Scenario 1) provide redemption services as convenient as the closest retailer where beverages can be purchased. Scenario 2 consolidated closely located redemption sites to reduce redundance. Scenario 3 further adjusted average drive time to the retailer for urban and suburban populations. Scenario 4 added improved services for rural and overburdened populations.

The ERG report selected Scenario 4 as the recommended modeled approach offering the best level of convenience. The assumptions in that scenario include:

- Full-service sites are *not* in overburdened tracts; express-flex sites are *in* overburdened tracts; and express-drop sites are only in non-overburdened tracts.
- Drive time to redemption sites is less than five minutes in all areas, except in remote areas, where it is less than 15 minutes and consolidates sites within 0.5 miles
- Material flow is defined as 50% for full-service (large) sites, 49% for express sites, and 1% for mobile and event-based sites. This definition is similar to Oregon's model.
- Specialized full-service sites are allowed in overburdened communities.
- Additional express sites are co-located near large retailers in rural/remote areas and at recycling drop-off points.

Modeled scenarios were evaluated for capacity, convenience, and equity. Those criteria included drive-time to a redemption site, access via public transportation, opportunities for combined trips (a redemption site near a retailer, a transfer station, or recycling facility), and ability to immediately redeem container deposits.

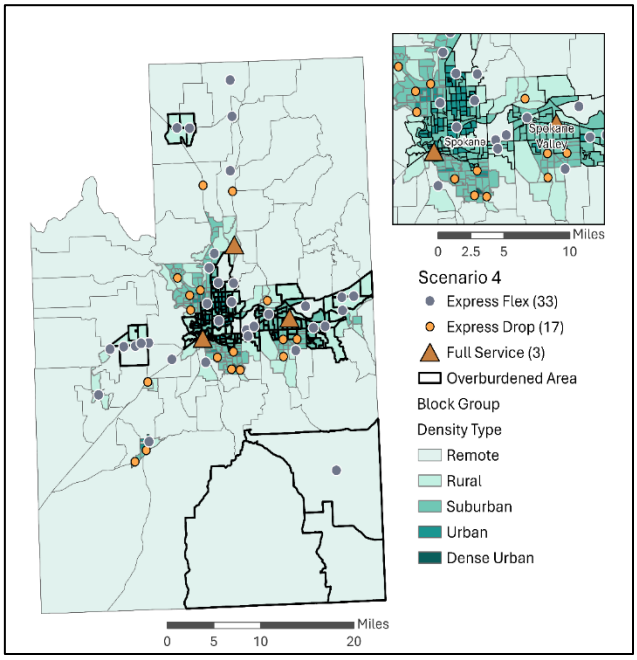
The evaluation identified scenario 4 as the recommended approach offering the best balance of convenience across urban and rural areas with capacity to process 80% of the estimated volume of beverage containers. Table 2 summarizes the number of redemption sites for each county for Scenario 4. Comparisons of all four scenarios is provided in the ERG report.

Table 2: Number and type of redemption sites modeled in Scenario 4

Criteria	King County	Spokane County	Yakima County
Number of full-service sites	13	3	2
Number of express flex sites	88	33	36
Number of express drop sites	69	17	3
Total number of sites	170	53	41

Scenario 4 Results

Figure 2: Scenario 4 redemption network in Spokane County



Scenario 4 provides the recommended system that meets equitable convenience requirements through an efficient network of sites, in terms of site type and location. Figure 2 shows the Scenario 4 distribution of redemption sites in Spokane County. The full ERG report includes maps of each county for all four scenarios and provides additional focus on overburdened community, rural, and island modeled service. The full ERG report also provides multi-level analysis of all four scenarios. Based on the models that were developed, Ecology concurs with the ERG modeling analysis and recommendation that Scenario 4 presents the most convenient and equitable recycling refund redemption system. While this is the initially preferred scenario, additional revisions will be incorporated from the engagement process in phase 2 with input from Tribes, community members, and other interested parties.

Preliminary Recommendations

The full report from ERG provides details on the data, base model, additional scenarios, and evaluation process used to identify the recommended scenario. In addition to the scenario modeling, ERG identified convenience criteria to be considered in the development of a system for consumers to redeem the beverage container recycling refunds.

Convenience

The recommended model for a convenient redemption system emphasizes widespread and easy access for customers. It aims to ensure that most residents—85% of the statewide population—are within a five-minute drive of a redemption site, while 70% of residents in remote areas are within 15 minutes. Additional convenience criteria include locating most urban sites near public transit, ensuring proximity to retailers, and co-locating sites with large rural retailers or existing recycling drop-off locations. The system must include enough sites in each county to meet demand based on expected redemption rates over time.

Site placement and management

Redemption site placement and management guidelines support a need to consider user experience and local compatibility. All sites should offer a bag-drop option, with immediate refunds available. Express sites should be located in commercial and mixed-use areas near retail,

while full-service sites may also be placed in industrial zones. Site operation plans must address safety, community impacts, and collaboration with local stakeholders to ensure the sites meet community needs.

Ensuring equity

Equity considerations need to be integrated into the network's design to ensure accessibility. This includes offering mobile redemption options for residents living beyond recommended drive-time distances, partnering with community-based organizations to operate high-use full-service sites, and guaranteeing immediate refunds in overburdened or isolated communities. Full-service sites must also implement security plans to manage site-related activity within and around their boundaries.

Planning, reporting, and accountability

Strong planning, reporting, and accountability measures are required for ongoing system performance. Plans must describe how site infrastructure will be developed, funded, and scheduled. Capacity must be monitored and reported by county, with updates offering solutions for overloaded sites. All redemption sites should track user activity and container types. The system must report on key convenience indicators to ensure that goals are being met.

Ecology concurs with these ERG recommendations for any potential future recycling refund redemption system.

Next Steps

Phase 2 of this project involves a community engagement process focused on reaching out to Tribes, communities and other interested stakeholders about the recycling refund modeling results. The engagement process will ensure that people of all backgrounds are given a variety of opportunities to provide input to help shape the final report, which Ecology will submit to the Legislature in January 2027.

Ecology and the ERG team will conduct community engagement within the three counties and with Tribes and other interested parties in Washington in 2026. The engagement process will gather Tribal and community perspectives on recycling and redemption services, focusing on access, infrastructure needs, and priorities related to convenience and equity. It will also evaluate public awareness and perceptions of a recycling refund system, including its benefits, barriers to participation, and potential economic effects, especially for low-income households. Engagement sessions will be held in overburdened communities to ensure their needs and experiences are represented. The process will involve a broad range of participants, including community members, local and Tribal governments, environmental justice and equity organizations, producers, and recycling system operators. The results of that feedback will be used to update the model's preliminary recommendations from phase one.

Publication information

This report is available on the Department of Ecology's website at
https://apps.ecology.wa.gov/ecy/publications/SummaryPages/2507069.html

Related document:
Publication 25-07-065 – (Full version) Recycling Refund Model Study[1]

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[1] https://fortress.wa.gov/ecy/publications/SummaryPages/2507065.html

[2] www.ecology.wa.gov/contact