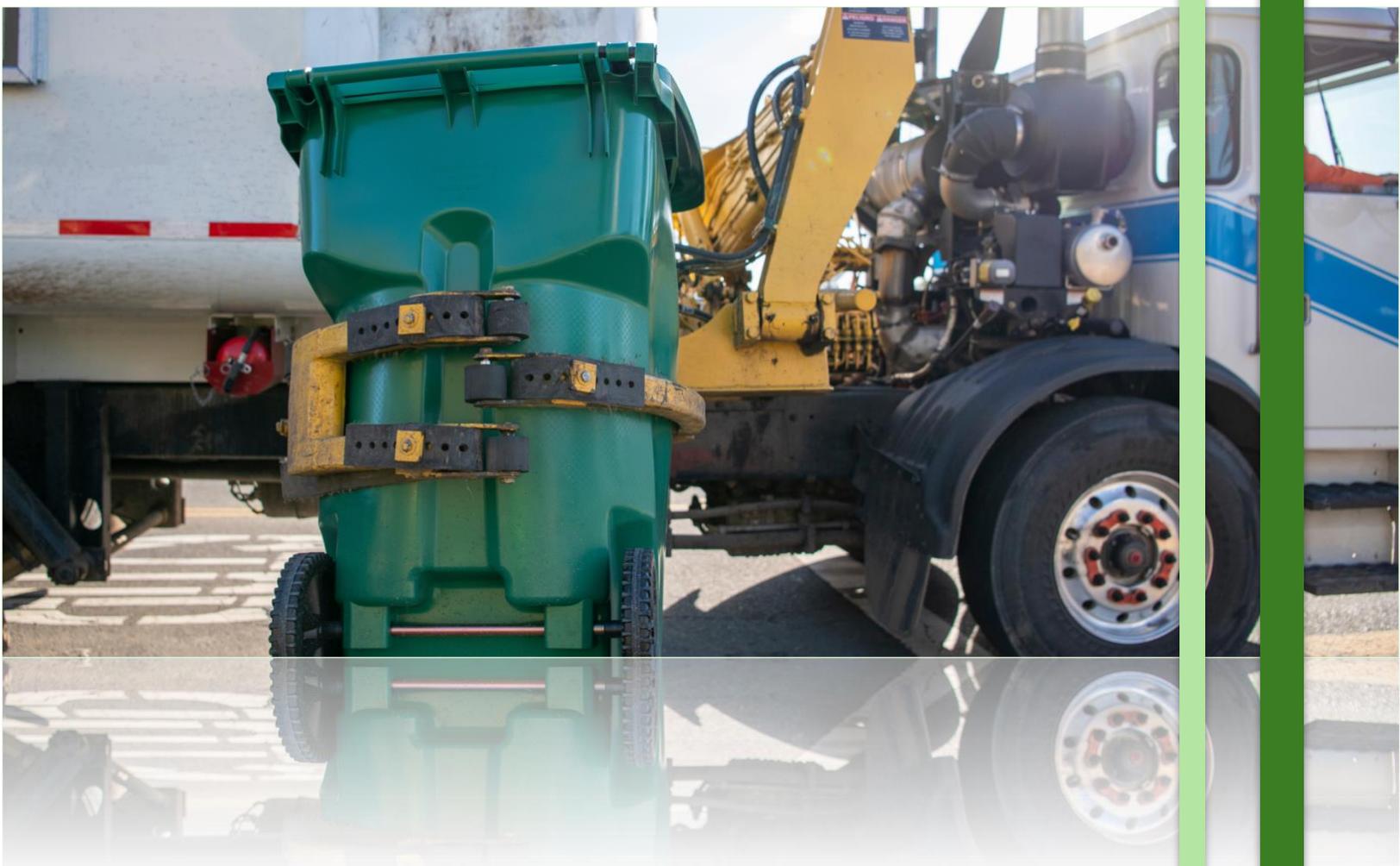


The Current State of Collection

A Plastic Pollution Prevention and
Packaging Producer Responsibility Act
Needs Assessment Technical Report

February 2026



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Executive Summary

[The Plastic Pollution Prevention and Packaging Producer Responsibility Act](#) (Senate Bill (SB) 54, Allen, Chapter 75, Statutes of 2022) (the Act) established an extended producer responsibility (EPR) program to manage single-use packaging and single-use plastic food service ware (covered material) in California. The Act requires the Department of Resources Recycling and Recovery (CalRecycle) to conduct a needs assessment to aid its implementation. CalRecycle awarded a contract to investigate the actions and investments needed to meet the law's requirements, with a focus on ensuring that all covered material is recyclable or compostable by 2032 and that plastic covered material achieves a 65% recycling rate.

This report evaluates the current state of collection for covered material in California in 2024. The focus is on access, participation, costs, contamination, and impacts on communities and the environment. These topics are addressed regionally (e.g., Coastal, Mountain, Bay Area, Southern, and Valley regions) because collection programs in different areas of California have different considerations for collection programs.

While about 87% of the state's population has full access to onsite curbside collection services, including recycling and organics recycling, regional disparities remain. Access is disproportionately limited in the state's Coastal and Mountain regions, where only 56% and 17% of the region's populations, respectively, have full access to onsite curbside collection services.

The presence of accessible programs does not ensure that people will sign up for collection services or actively use them. Areas with access may have low subscription rates due to factors such as cost, local jurisdiction-issued waivers, low awareness of available programs, and low confidence in collection programs for recycling. Additionally, access does not mean all covered materials are accepted for diversion. For example, only 9% of local jurisdictions indicated that ceramics may be collected for recycling, while 98% reported acceptance of plastic #1 - PET rigid in their programs.

Statewide, an estimated 5.5 million tons of covered material is collected for recycling and 1.0 million tons for organics recycling through onsite curbside collection services. This includes material collected for recycling and organics recycling in single container systems, but excludes amounts collected via self-haul, drop-off, or alternative collection systems.

The weighted average cost to operate onsite collection of generated materials (including, but not limited to, covered materials) was estimated at \$300 per ton for calendar year 2024. However, there were regional differences. The lowest calculated cost per ton for onsite collection was \$284 in the Southern region and the highest calculated cost per ton was \$338 in the Coastal region. Based on each household that is currently occupied, the monthly costs ranged from approximately \$28 to \$42. These costs per household may not align with costs charged to customers by recycling service providers since other factors (such as disposal and processing of materials) are not included in this estimate.

In addition to onsite curbside collection, alternative collection systems and local jurisdiction drop-off programs currently accept certain types of covered material. Access and participation in these collection programs vary widely by region and by type of covered material. Alternative collection systems that accept covered material are often limited by the type of material they accept, and may also impose restrictions based on size, material type, or brand. However, alternative collection programs currently collect materials that are hard to manage in the existing system, such as films, flexibles, and small format items. Local jurisdictions and other types of drop-off programs are especially important in rural areas and other areas of the state where onsite curbside collection is limited or infeasible.

Community-based organizations (CBOs), environmental justice groups (EJ groups), and California Native American Tribes (Tribes) were engaged as part of this study. Their expertise and experiences with recycling and composting were gathered through a 46-question Community Recycling and Composting Survey, introductory meetings, and listening sessions. The contractor received 324 survey responses from CBOs and EJ groups, and eight responses from Tribes. A total of 14 CBOs and EJ groups, and three Tribes participated in meetings and listening sessions. 65% of CBOs and EJ groups and 75% of Tribal respondents reported that environmental problems disproportionately affect certain groups in their areas — such as low-income residents, people of color, and youth.

The impacts of collection identified were increased waste filling the nearest landfill, greenhouse gas emissions, litter, and neighborhood cleanliness. When asked specifically about the impacts they have personally experienced, CBOs and EJ groups across all regions most often identified litter and illegal dumping. These impacts were identified more often by respondents in the Mountain region, with 80% of respondents stating they have been directly impacted by litter and 88% impacted by illegal dumping, which may be linked to lack of access to affordable collection.

Positive impacts identified from the collection of material for recycling and organics recycling include reducing litter and pollution, diverting material from landfills, and reducing greenhouse gas emissions. 77% of CBO and EJ group respondents from single-family residents identified reducing litter and pollution — thereby creating cleaner neighborhoods — as a top positive environmental impact that can result from collecting materials for recycling.

1.0 Introduction

1.1 Background

[The Plastic Pollution Prevention and Packaging Producer Responsibility Act](#) (Senate Bill (SB) 54, Allen, Chapter 75, Statutes of 2022) (the Act), established an extended producer responsibility (EPR) program to manage single-use packaging and single-use plastic food service ware (covered material) in California. The Department of Resources Recycling and Recovery (CalRecycle) is required to conduct a statewide needs assessment to aid its implementation and investigate the actions and investments needed to meet the requirements of the Act.

The law requires that by 2032:

- Plastic covered material be source reduced by 25%.
- Covered material be recyclable or eligible to be labeled compostable.
- Plastic covered material achieve a 65% recycling rate.

1.2 Study Overview

CalRecycle contracted with HF&H Consultants (the contractor) to investigate the actions and investments needed to meet the requirements of the Act, specifically that by 2032 all covered material must be recyclable or compostable and that plastic covered material must achieve a 65% recycling rate.

The Collection, Processing, and End Market Needs Assessment Study (CPEM Study) was conducted under contract (DRR24043) and is one component of the statewide needs assessment. The CPEM Study findings are divided into an analysis of the current state and the needed state of collection, processing, and end markets as they pertain to covered material and meeting the requirements under the Act. The CPEM Study includes three reports for the current state (collection, processing, and end markets) and one combined report for the needed state.

The CPEM Study spans the full value chain for the recovery of material that may be covered and addresses the following:

- **Collection:** Where material (both dry and organic) is collected for recycling and organics recycling, including curbside and alternative collection systems.
- **Processing:** Where the material is sorted, segregated, and prepared to meet specifications for sale to end markets.
- **End Markets:** Where the material is recovered to be used in lieu of virgin material to produce new or reconstituted products.

This report is part of a wider study commissioned by CalRecycle as part of the statewide needs assessment to understand the flow of covered materials sent for recycling and composting in 2024 within the state.

1.3 Collection (Current State) Report

This report analyzes the current state of collection with respect to covered material, focusing on the following four topic areas:

1) Collection Programs

Types of collection programs operating in the state.

Access to and participation in collection programs.

Current funding and costs for the collection system.

2) Acceptance of Covered Materials

Types of covered materials currently accepted in collection systems.

Methods used to enhance the capture of covered materials.

3) Contamination Analysis

Common contaminants in collection programs for recycling and organics recycling.

Amount of contamination present in collection programs for recycling and organics recycling.

Strategies for and costs of monitoring and mitigating contamination in collection programs for recycling and organics recycling.

4) Environmental and Public Health

Public health and environmental impacts of the collection system.

Summary of the feedback provided by communities during the interested party engagement process.

2.0 Methods

For this report, the contractor used a combination of desk research, modeling, surveys, and listening sessions.

The desk research consisted of reviewing and using the following data:

- Recycling and Disposal Reporting System (RDRS) for 2024 tonnage: An electronic data system where businesses, facilities, and operations submit information related to recycling and disposal quarterly. It includes information from disposal facilities, transfer facilities, recycling processing facilities, organics processing facilities (OPF), brokers, and haulers.
- [SB 343 \(Allen, 2021\) Material Characterization Study Final Findings Report](#) (SB 343 Report): In 2024, CalRecycle completed a statewide material characterization study of material types and forms collected and sorted by large volume transfer and processors for recycling.
- Jurisdiction 2023 Electronic Annual Report (2023 EAR): Provides data about state regulations Mandatory Commercial Recycling (Assembly Bill (AB) 341, Chesbro, 2011), Mandatory Commercial Organics Recycling (AB 1826, Chesbro, 2014), and Short-lived Climate Pollutants (SB 1383, Lara, 2016) (EAR dataset was from 2023 because EAR data are updated annually and 2024 data were not available at the time this report was written).
- Contractor’s internal data sources related to collection from previous projects.
- Relevant datasets from internet research (i.e., population estimates from the California Department of Finance (DOF), pollution impacts on communities from CalEnviroScreen 4.0, magazine articles with information on alternative collection systems).

For this study, two types of surveys were conducted, both of which were developed and implemented by the contractor. One survey was designed for local jurisdictions to be completed with support from their recycling service providers, which focused on the information about recycling, composting, and waste collection programs in relation to covered materials. Throughout this report, the term “Collection Survey” refers to this survey. The second survey, entitled the “Community Recycling and Composting Survey,” was completed by community-based organizations (CBOs), environmental justice (EJ) groups, and California Native American Tribes (Tribes), along with individuals from those communities. Further details are included in section 2.2. The detailed methodology used for this report is further discussed in Appendix A.

This report relies upon the covered material category (CMC) list that was published on December 31, 2024, by CalRecycle and contains 94 covered material categories

(CMCs) that categorize covered material under the Act.¹ However, based on the nature of the recycling system, at each stage in the process, the granularity of the accepted materials will differ. For example, collection contains the least granularity, as it is focused on what postconsumer items are intended to be included in each onsite collection container (or accepted at a drop-off site or alternative collection system), compared to processing facilities that segregate materials into marketable commodities by grade, and facilities that may qualify as end markets that may further disaggregate the materials based on physical and chemical properties. Additionally, collection often contains less granularity to simplify messaging to generators to provide clear direction and increase participation. As such, for the purposes of this report, the contractor aggregated the list of CMCs into 31 CMC collection groups that better align with how collection systems are typically tracked and evaluated.

2.1 Model Development

The contractor estimated the current amounts of materials collected in onsite curbside collection systems for three different material streams: solid waste sent to landfill, material collected for recycling, and materials collected for organics recycling. The contractor used RDRS as the basis for estimating the solid waste collection stream with adjustments made to remove the estimated residual tonnage that reaches landfill (as that residual was assumed to be captured in the material collected for recycling or organics recycling stream).

The contractor reviewed and compiled tonnage information provided by approximately 60 surveyed private and public recycling service providers and the contractor's project files to calculate the regional proportion of materials collected for recycling and materials collected for organic recycling per ton of total collected material. This allowed the contractor to estimate the amounts of materials collected for recycling and organics recycling by applying this proportion to the estimated solid waste collected. The contractor then used CalRecycle's "2021 Disposal Facility-Based Characterization of Solid Waste in California" report to allocate solid waste tonnage within each region by residential, commercial/multifamily and self-haul (see Appendix B.4 for further information).

The contractor then estimated regional collection costs associated with the estimated regional tons collected. Using cost estimates for collection provided by Collection Survey respondents, the contractor estimated an initial statewide estimate of cost per ton of collection, by material stream. The contractor used this as the starting point to make adjustments to estimate regional costs per ton. Regional adjustments were made based on labor costs, customer density, and material density (see Appendix B.5). The regional cost per ton was then multiplied by the tonnage estimated per region, by material stream, to estimate costs associated with collection of material. The resulting adjusted regional costs were aggregated to calculate the estimated statewide cost of collection for 2024.

¹CalRecycle, Plastic Pollution and Packaging Producer Responsibility Act – SB 54 Covered Materials Category List, 2025, calrecycle.ca.gov/packaging/packaging-epr/cmclist, (09/27/2025)

The cost model provides an estimate of regional and statewide costs of collecting material (including both covered and non-covered material). The contractor was not able to accurately estimate the costs associated specifically to covered material.

Aside from the cost model, the contractor also estimated the current amounts of covered materials collected in onsite curbside collection systems for three different material streams: solid waste sent to landfill, material collected for recycling, and materials collected for organics recycling. To do this, the contractor used the SB 54 Material Characterization Study to estimate the composition of the solid waste stream and the Alameda County Waste Characterization Study (2023–2024) to estimate the composition of the materials collected for recycling and organics recycling. The Alameda County Study was not conducted specifically for SB 54, thus it required the contractor to map the findings to CMC collection groups with the introduction of additional data sources. This included data from the 2021 American Chemistry Council's Resin Review and CalRecycle's January 1, 2025 Recycling Program Rates for CRV material which were applied to validate and refine the tonnage distribution between the CMC collection groups and Alameda County Waste Characterization Study. These refinements included removal of CRV material and disaggregation of materials that may be covered. To refine the analysis, the contractor used collection survey data and internal data on waste characterizations to account for regional differences in material collection availability and inform adjustments to the CMC collection group distribution by customer class and geographic region. The contractor applied these composition estimates for each material stream to the total tonnage of the material stream to estimate the proportion that is covered material, by CMC collection group.

2.2 Engagement with Community Based Organizations, Environmental Justice Groups, and California Native American Tribes

The contractor engaged with interested parties representing priority populations, including Tribes, CBOs, and EJ groups through introductory meetings, virtual listening sessions, and an online survey over a four-month time frame. The primary objective was to have these communities share their experiences and provide their expertise related to their waste practices, as well as understand communities' concerns and suggestions on barriers and opportunities to access collection services, the impacts of collection services, and perspectives on the development and expansion of collection services.

The contractor collaborated with CalRecycle to develop a list of 43 CBOs and EJ groups and 20 Tribes to contact for engagement. The contractor sought participation from groups that represented priority populations from the five regions of California defined by CalRecycle's Statewide Waste Characterization Studies. More information on how the CBOs, EJ groups, and Tribes were selected for participation in the study can be found in Appendix A-5 of the Current State of Processing Report.

The Community Recycling and Composting Survey was designed to assess the impacts of activities associated with collection services, recycling and composting, barriers and

opportunities to access and participate in these programs, and unique challenges and underlying needs related to waste management activities for the communities represented by the CBOs, EJ groups, and Tribes. This survey was translated into Spanish and simplified Chinese, and a version of the survey was adapted for Tribal communities. Results from the surveys are included throughout this report, as appropriate.

Virtual introductory meetings and listening sessions were held to introduce participants to the project and its objectives, and to provide a space for participants to share some of their lived experiences. These listening sessions provided a forum for community members to voice their experiences and provide more narrative discussion on the information captured in the survey. This included experiences with both opportunities and barriers to accessing collection services, as well as input on how to shape solutions that increase access and participation in their communities.

The Community Recycling and Composting Survey questions, response rates, and other relevant information are presented in Appendices D, E, and F. Further details of engagement can also be found in the Current State of Processing Report Appendix G.

3.0 Collection Programs for Covered Materials

3.1 Introduction

California's solid waste management system involves numerous local collection programs shaped by decades of policy and diverse provider relationships. To understand the impact of the Act, it is important to identify program types, assess access and participation, and recognize barriers and opportunities for recycling covered materials. This section describes existing collection programs for recycling and organics recycling with a focus on covered material, including access to and participation in those collection programs, and their operational costs and funding requirements.

3.2 Types of Programs

Consistent with Public Resources Code (PRC) section 42041(g), curbside collection refers to a program for the collection of material, including but not limited to covered materials, by a local jurisdiction or recycling or composting service provider under contract with a local jurisdiction. Curbside collection programs include onsite curbside collection and drop-off services that meet those criteria.

In comparison, alternative collection programs are not operated by a local jurisdiction or recycling or composting service provider under contract with a local jurisdiction.

3.2.1 Curbside Collection Programs

Local jurisdictions in California regulate solid waste collection activities at different levels of government, including cities, counties, special districts, and joint powers authorities. Occasionally one level of government regulates certain activities while another level of government is responsible for other interrelated activities. For example, a city may regulate collection while the county provides disposal services, and the joint powers authority owns facilities. Common onsite collection regulation mechanisms include franchise agreements (exclusive or nonexclusive), service contracts, and permits. These mechanisms regulate the collection of local jurisdictions' materials, including most materials generated at residential and commercial premises (e.g., non-hazardous waste), some of which are covered materials.

3.2.1.1 Onsite Curbside Collection Services

Some local jurisdictions provide curbside collection services using their own staff, either instead of or in addition to contracting with recycling service providers. In some cases, local jurisdiction staff only collect materials from residential generators; in other cases, they serve all generators. Additionally, local staff may collect only certain materials (e.g., solid waste), while a contracted recycling service provider collects the other materials for recycling.

Local jurisdictions may also provide onsite collection arrangements that vary by generator type (e.g., residential and commercial) or geographically (e.g., exclusive areas and nonexclusive/permit areas). Therefore, a local jurisdiction may arrange for

exclusive collection service for residential generators and nonexclusive collection service for commercial generators. The various onsite collection arrangement types are:

- **Exclusive:** An exclusive collection system allows one entity, either local jurisdiction staff or a recycling service provider, to collect materials within the entire local jurisdiction. Exclusive contracts or agreements with private companies tend to have prescriptive programmatic requirements around collected materials, education and outreach, and reporting.
- **Zones:** A zoned collection system allows separate collection arrangements for each geographically distinct area of the local jurisdiction (zone). Each zone can implement exclusive collection services through different recycling service providers, or some zones can implement nonexclusive or permit systems. Additionally, arrangements within a zone may differ by generator type (e.g., exclusive for residential and nonexclusive for commercial). Similar to exclusive arrangements, recycling service providers usually have prescriptive contracts or agreements to operate within a specific zone, unless that zone utilizes a permit system.
- **Nonexclusive:** A nonexclusive collection system allows multiple recycling service providers to operate in a local jurisdiction through nonexclusive agreements or contracts. Recycling service providers are not geographically limited within the local jurisdiction, although generator types may be limited (e.g., exclusive residential and nonexclusive commercial onsite curbside collection service). Therefore, recycling service providers may compete for customers. Similar to exclusive arrangements, recycling service providers usually have prescriptive contracts or agreements that allow them to operate within a local jurisdiction.
- **Permit:** A permit collection system allows multiple recycling service providers to operate in a local jurisdiction through permits. The local jurisdiction's ordinances generally require submission of documentation to operate (e.g., vehicle lists, insurance certificates, health department inspections, California Highway Patrol Basic Inspection of Terminals, etc.). Permit collection systems are similar to nonexclusive systems in that specific geographic areas within the local jurisdiction serviced by recycling service providers are not typically dictated by the local jurisdiction and recycling service providers may compete for customers.

The following three tables show onsite curbside collection arrangement types for different generators by region, as of calendar year 2024, based on the contractor's franchise profile database.² Table 3-1 presents the onsite collection arrangement types for residential generators. Table 3-2 presents the same information, but for multifamily generators (properties with five or more units) and Table 3-3 presents it for commercial generators. The most common arrangement for each generator type is a single exclusive recycling service provider. In some instances, this includes collection provided

² 23. "Franchise Profiles Database." "HF&H Consultants Intranet", HF&H Consultants, LLC. Accessed August 15, 2025.

by local jurisdiction staff, particularly for single-family generators in the Southern and Valley regions. Nonexclusive and permit arrangements are not particularly common but are implemented in some local jurisdictions for commercial generators, mostly in the Southern and Valley regions.

Table 3-1: Occurrence of Onsite Curbside Collection Arrangement Types for Residential Generators by Region (Number of Local Jurisdictions)

Onsite Curbside Collection Arrangement	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Exclusive	64	36	11	161	39	311
Zones	3	4	2	4	10	23
Nonexclusive	0	0	1	2	0	3
Permit	0	0	0	2	0	2
Data Unavailable	61	31	34	69	83	278
Total	128	71	48	238	132	617

Table 3-2: Occurrence of Onsite Curbside Collection Arrangement Types for Multifamily Generators by Region (Number of Local Jurisdictions)

Onsite Curbside Collection Arrangement	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Exclusive	64	35	11	157	35	302
Zones	3	4	2	6	9	24
Nonexclusive	0	0	1	8	4	13
Permit	0	0	0	3	1	4
Data Unavailable	61	32	34	64	83	274
Total	128	71	48	238	132	617

Table 3-3: Occurrence of Onsite Curbside Collection Arrangement Types for Commercial Generators by Region (Number of Local Jurisdictions)

Onsite Curbside Collection Arrangement	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Exclusive	64	35	11	147	35	292
Zones	3	4	2	5	8	22
Nonexclusive	2	0	1	12	4	19
Permit	0	0	0	5	1	6
Data Unavailable	59	32	34	69	84	278
Total	128	71	48	238	132	617

Local jurisdictions and recycling service providers in California administer onsite curbside collection services that utilize the following container systems to collect materials from residents and businesses and comply with existing state laws:

One-Container System

A one-container onsite curbside collection system does not allow for source separation of materials by the generators (e.g., generators place solid waste, materials collected for recycling, and materials collected for organics recycling in a single collection container). Where required by applicable law, processing facilities process collection container contents to separate materials collected for recycling, including organics recycling, from solid waste.

Two-Container System

A two-container onsite curbside collection system allows generators to intentionally commingle solid waste with either material collected for recycling or materials collected for organics recycling. If one collection container commingles solid waste and materials collected for recycling, then the other collection container accepts materials collected for organics recycling. If one collection container commingles solid waste and materials collected for organics recycling, then the other collection container accepts materials collected for recycling. Where required by applicable law, processing facilities process the mixed waste collection container contents to separate materials collected for recycling or materials collected for organics recycling from solid waste.

Three-Container System

A three-container onsite curbside collection system allows generators to source separate solid waste, materials collected for recycling, and materials collected for organics recycling, all of which are collected in three distinct collection containers. One container accepts solid waste, a second container accepts materials collected for recycling (e.g., plastic, fiber, metals), and a third container accepts materials collected for organics recycling (e.g., yard trimmings, food scraps, and food-soiled paper).

Three-Plus-Container System

An onsite curbside collection system with more than three collection containers allows generators to source separate materials collected for recycling and/or materials collected for organics recycling into more than one collection container. This may include source separating materials collected for organics recycling into yard trimmings and food scraps collection containers or source separating materials collected for recycling into separate glass, plastic, and/or fiber collection containers. Additionally, some local jurisdictions allow materials to be collected outside of collection containers (e.g., old corrugated cardboard [OCC] and yard trimmings).

Multiple Container Systems

Some local jurisdictions, particularly unincorporated areas with different service requirements in different geographic areas, may offer more than one method of onsite collection to residents and businesses. For example, a three-container collection system may be used for residents in urban and suburban areas, while a one- or two-container collection system may be used for low-population areas. This may be done to maintain compliance with state laws, accommodate multiple recycling service providers (e.g., nonexclusive or zoned hauling arrangements), and/or comply with the availability of processing facilities.

Using data from 2023 EAR, supplemented by contractor knowledge and research (as described in Appendix A.2.A), Table 3-4 and Table 3-5 show onsite collection container systems offered to residential and commercial generators, respectively, by region, for calendar year 2023. For the purposes of collection, and in alignment with state laws,

such as AB 341, AB 1826, and SB 1383, contractor staff categorized public entities and multifamily properties with five or more units as commercial premises. Collection at multifamily properties is often facilitated via the use of shared commercial collection containers, instead of residential carts, and may be collected on a commercial route.

Table 3-4: Number of Local Jurisdictions Using Each Onsite Curbside Collection Method for Residential Generators by Region

Collection Program Type	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Three-Plus-Container	24	3	0	10	5	42
Three-Container	99	56	9	192	82	438
Two-Container	0	6	2	17	18	43
One-Container	0	0	1	2	3	6
Other	0	0	0	4	1	5
Multiple	3	2	1	4	5	15
No Residential Generators	0	0	0	3	0	3
Drop Off Only	0	0	0	0	2	2
Indiscernible	1	2	1	3	1	8
No Data	1	2	34	3	15	55
Total	128	71	48	238	132	617

Table 3-5: Number of Local Jurisdictions Using Each Onsite Curbside Collection Method for Commercial+ Generators by Region

Collection Program Type	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Three-Plus- Container	19	5	1	33	8	66
Three-Container	100	52	8	129	74	363
Two-Container	1	8	1	31	12	53
One-Container	0	0	0	3	3	6
Other	1	0	2	4	3	10
Multiple	3	1	2	4	6	16
No Commercial Generators	0	0	0	4	1	5
Drop Off Only	0	0	0	0	1	1
Indiscernible	3	1	2	25	8	39
No Data	1	4	32	5	16	58
Total	128	71	48	238	132	617

+ Includes service for public agencies and multifamily properties with five or more units.

The most common onsite curbside collection service for residential and commercial generators, in all regions and statewide, is the three-container onsite collection system. A three-container system accepts all materials collected for recycling in one collection container (such as glass, plastic, aluminum and fiber) and all materials collected for organics recycling in one collection container (such as yard trimmings and food scraps). Materials collected for recycling are sent to material recovery facilities where materials are separated by commodity type and sent to secondary processors or end markets. Materials collected for organics recycling are sent to composting and/or anaerobic digestion facilities for processing.

Most of the local jurisdictions offering a three-plus-container onsite collection system are in the Bay Area and Southern regions. In one case, the three-plus-container onsite collection system is a product of the local jurisdiction's zero-waste goals and intends to keep fiber dry and free of contamination to enhance capture rate at the processing facility. In another case, the local jurisdiction collects yard trimmings outside of a collection container. Additionally, in some cases, food scraps are allowed to be placed for collection in plastic bags or bags made from plastics designed for compostability. While the use of bags is intended to increase participation in food scrap collection programs, it also means that these materials must be sent to processing facilities that are able to de-package the material. Notably, de-packagers cannot manage fibrous yard trimmings. This often necessitates separate onsite collection routes for food scraps and yard trimmings as materials collected for organics recycling require distinct processing.

Local jurisdictions in the Coastal, Southern, and Valley regions also offer one and two-container onsite collection systems, which sometimes include mixed waste processing post-collection. These differences in onsite collection systems are a result of local

recycling requirements, local jurisdictional hauling arrangements, and the availability of processing facilities that can manage food scraps and/or sort materials collected for recycling or materials collected for organics recycling from solid waste. Additionally, depending on the waiver type, some local jurisdictions are not required to offer onsite collection for materials collected for recycling and organics recycling due to SB 1383 department-issued waivers.

Please note that some special districts overlap with cities and counties and may only service residential generators. Additionally, some small cities do not have any commercial generators.

3.2.2 Local Jurisdiction Drop-Off Programs

Drop-off programs provide designated locations where generators can deliver materials, such as plastics, glass, metals, high grade fiber, or difficult-to-recycle materials for proper processing. Consistent with PRC section 42041(g), drop-off programs are treated as curbside collection programs, rather than alternative collection programs, if such drop-off programs are operated by a local jurisdiction or recycling or composting service provider under contract with a local jurisdiction. Alternative collection programs, including third-party drop-off programs, are described in further detail in section 3.2.4. of this report.

Drop-off programs require generators to transport accepted materials to designated collection bins, centers, or kiosks. Drop-off programs are typically designed for source separation by the generator and do not allow for the commingling of materials collected for recycling and solid waste. Operational details vary from location to location; some locations provide collection for only one type of material (e.g., aluminum), some accept multiple materials, and some provide seasonal collection (e.g., excess cardboard).

Drop-off program operators usually accept or collect the material and sell it to a third party or redeem it through a processing center or sponsoring program for a profit. Overall, drop-off program material volume varies, depending on the types of materials collected, size and location of the drop-off infrastructure, and accessibility of the drop-off site.

Drop-off programs can be designed for residential or commercial generators, depending on the program, accepted material type, and location. Drop-off programs can be tailored to serve rural or less densely populated areas but may also be utilized in higher density areas to provide supplemental capacity and added convenience, including access for commercial generators with limited access to onsite curbside collection services.

Drop-off programs include both “Attended Drop-Off” and “Unattended Drop-Off” programs.

Attended Drop-Off: Attended drop-off locations include onsite personnel who provide support with donations, education, monitoring, and proper sorting. Attended drop-off locations may allow self-service through a designated kiosk or collection bin. Some programs do not use a centralized collection bin, but instead designate an area where staff oversee the direct drop-off of accepted

materials. Personnel at attended drop-off locations may also assist with operating scales, collecting fees, issuing economic incentives, directing materials to correct locations, and unloading.

Unattended Drop-Off: Unattended drop-off locations are self-service, often through a designated kiosk or collection bin, and may be open 24 hours per day or may be limited to certain days and hours, depending on site location, accessibility, and operator guidance.

Based on interviews with interested parties, the primary obstacle to drop-off collection is a lack of mobility or access to transportation, particularly when the generator is dropping off substantial quantities of materials.

Additionally, common forms of contamination at drop-off locations include:

Wet materials

Food waste or organic/bio-contaminants

Commingled materials

Incorrect material separation due to incorrect, inadequate, or confusing labelling on the material

Examples of drop-off programs that may accept covered materials are limited due to unavailability of data, economic value of covered material, lack of processing infrastructure, lack of potential markets, and/or lack of existing drop-off programs specifically designed for covered material. The following examples, based on each referenced program's website, provide drop-off collection programs for materials that may include covered materials.

Rethink Waste of the South Bayside Waste Management Authority, a joint powers authority comprised of Belmont, Burlingame, East Palo Alto, Foster City, Hillsborough, Menlo Park, Redwood City, San Carlos, San Mateo, County of San Mateo, and West Bay Sanitary District, provides a convenience center for materials collected for recycling at its Shoreway Environmental Center. The center includes a drop-off collection point that accepts difficult-to-recycle materials, including waxed cardboard and aerosol cans, both of which include covered materials. Based on the South Bayside Waste Management Authority's website, no other materials that include covered material are collected through this drop-off program.³

The Mojave Desert and Mountain Recycling Authority, a joint powers authority comprising Adelanto, Apple Valley, Barstow, Big Bear Lake, Needles, San Bernardino County, Twentynine Palms, Victorville, and Yucca Valley, hosts six "Clean Mountain Site" drop-off collection centers, operated by a private collection service provider for solid waste and materials collected for recycling. The six Clean Mountain Sites are for residential properties subscribed to either onsite curbside collection service or "Clean

³ About Shoreway – Rethink Waste, South Bayside Waste Management Authority, 2025, rethinkwaste.org/shoreway-environmental-center/about/, 08/29/2025

Mountain Service,” and are open every weekend, with the exception of the collection service provider’s recognized holidays. Based on the Clean Mountain Site’s website, the drop-off program accepts many materials that include covered material, including cardboard, glass, metal, and some plastic packaging.^{4, 5, 6, 7, 8, 9}

3.2.3 Self-Haul Programs

If permitted by a local jurisdiction, a self-hauler may separate solid waste, material collected for recycling, material collected for organics recycling, and/or construction and demolition materials onsite and deliver those materials to an appropriate facility that processes or recovers those materials, including transfer stations or recycling processing facilities. Materials accepted for recycling and organics recycling include covered material, including cardboard. Self-haulers can be individuals hauling household material or businesses hauling commercial material. Where onsite collection is not available, particularly in rural or low-density areas, self-hauling can serve as the primary means of collecting materials for recycling. Self-haulers may also collect commingled materials onsite and deliver those materials to a processing facility.¹⁰

3.2.4 Alternative Collection Programs

In this report, alternative collection programs refer to programs that are not operated by or under contract with a local jurisdiction and usually tailored to the unique challenges of handling difficult-to-recycle materials. Alternative collection programs vary in the types of collection program, accepted materials, and geographic accessibility across regions. Compared to curbside collection programs, alternative collection programs are not as common or widely utilized. Some alternative collection programs include covered materials.

⁴ Recycling Programs Defined – Dropoff or Collection Program (CP)., 2025, calrecycle.ca.gov/bevcontainer/certoperator/recycleprograms, 09/22/2025

⁵Community Service Programs/Dropoff or Collection Program Details, 2025, www2.calrecycle.ca.gov/BevContainer/CertifiedPrograms/OtherPrograms, 09/22/2025

⁶ National Academies of Sciences, Engineering, and Medicine, 2025, Municipal Solid Waste Recycling in the United States: Analysis of Current and Alternative Approaches. Washington, DC: The National Academies Press. [Doi.org/10.17226/27978](https://doi.org/10.17226/27978)

⁷ Kessler, CRRA, SWANA, Zero Waste Principles and Practices Manual/Instructor Guide, 2017, Chapter 4 Collection, 09/24/2025,

⁸ PineCone Press Newsletter, Clean Mountain Sites Drop-Off Locations for Trash and Recyclables, 2022, www.burrtec.com/wp-content/uploads/2022/04/SBC-Mountain-Summer-2022-M3d-proof.pdf, 08/29/2025

⁹ Recycling Drop Off Center – Mojave Desert and Mountain Recycling Authority, 2025, urecycle.org/residential-recycling, 08/29/2025

¹⁰ CalRecycle – Haulers, 2025, calrecycle.ca.gov/organics/slcp/haulers, (09/22/2025)

There is no single database source for alternative collection programs that accept covered materials. The following descriptions, findings, and results are based on interviews with interested parties engaged in alternative collection programs, industry understanding, and secondary research involving program-specific public websites.

Please note that alternative collection program examples are based on third party data, were not independently verified, and may not be inclusive of all alternative collection programs.

3.2.4.1 Third Party Drop-Off Services

Third-party drop-off programs match the description provided for local jurisdiction drop-off programs in section 3.2.2, except that they are not operated by or under contract with a local jurisdiction, and are instead operated by a private entity, third party, commercial entity, or nonprofit organization.

For example, the following major national retailers provide onsite drop-off collection programs that accept some covered materials, including film plastic and plastic bags: Target, Walmart, Kroger, Safeway and all its associated stores, Whole Foods, Home Depot, and Lowes. Drop-off bins or collection kiosks are usually located near the entrance of the retail location and are clearly marked to differentiate between the types of accepted materials. Target's drop-off program, specifically, includes collection kiosks for metals, glass, and plastic bottles, in addition to film plastic.^{11, 12}

Another example of a third-party drop-off program is run by TerraCycle and sponsored by Pet Supplies Plus, a pet specialty retailer, which provides a national in-store pet food packaging collection program for recycling at all 743 of its retail locations, approximately 16 of which are located in California. According to TerraCycle, the program has collected 50 tons of flexible packaging material for recycling since its inception in 2023.¹³

3.2.4.2 Public Space Collection Services

Public space collection programs allow for a public collection point, commonly in convenient locations for consumers, such as retail locations, places of worship, community centers, schools, doctor's offices, and other locations that consumers and the public visit regularly. These programs are hosted or sponsored by private businesses and not local jurisdictions.

For example, TerraCycle partners with private businesses and currently reports 311 active producer-sponsored collection programs for recycling in California that accept

¹¹ Recycling Center Near Me, 2025, www.recyclingcenternear.me/plastic-bag-recycling/, (8/29/2025)

¹² Target, 2025, Waste Elimination and Reduction, corporate.target.com/sustainability-governance/circularity/waste-elimination-reduction, (8/29/2025)

¹³ Golden, Ali, TerraCycle RFI Response – CA 54, Received by Colleen Foster, 08/05/2025, "Email"

materials that may be covered materials (plastics #1, #2). Of the 311 programs, 31 include active public space drop-off programs. The highest concentrations of TerraCycle public space drop-off programs are in San Francisco, Los Angeles, and San Diego.

3.2.4.3 Buy-Back Programs

Buy-back centers collect materials for recycling from households, businesses, or industries to process, package, or recover those materials. Buy-back centers usually offer payments for accepted materials. In California, buy-back programs generally focus on beverage containers that are part of the California Redemption Value (CRV)¹⁴ system and not on covered materials. While the economic incentive model used for the BCRP could apply to future infrastructure, buy-back examples for materials that include covered materials are limited or only in concept/pilot stages, such as Olyns which is further described in the following paragraphs.

Olyns is currently piloting various buy-back collection systems, in which generators can deposit plastic materials in a reverse vending machine kiosk, which in turn provides an economic reward to the generator. For example, in October 2022 Olyns launched a pilot with Mars Wrigley North America called the “Sweet Rewards Challenge,” during which consumers were able to deposit rigid plastic candy and gum containers to participating Olyns’ reverse vending machines in the San Francisco Bay Area. Olyns incentivized participation through an app-based game that allowed users of the reverse vending machines to earn badges and win cash prizes.¹⁵

3.2.4.4 Mail-Back Programs

Mail-back programs often collect items not accepted in curbside collection programs, including hard-to-recycle materials and hazardous materials. Some mail-back programs accept covered materials. Some programs operate alongside third-party drop-off programs, such as drop-off sites serving as collection points for mail-back shipments, during which the generator uses the collection container at a centralized drop-off point, and the contents of the collection container are subsequently mailed back.

Nespresso® implemented the “WeRecycle” mail-back program to facilitate the collection of its aluminum single-use coffee capsules. Customers may request complimentary collection bags with their coffee capsule purchases. After use, consumers place the spent capsules in the prepaid bag and mail them back for collection. In addition to the mail-back option, Nespresso® also provides retail take-back programs at select retail

¹⁴ CRV is a deposit paid by consumers when they purchase certain beverages that are included in the BCRP, which they can redeem by returning empty containers.

¹⁵ Crider, Johnna, “Reverse Vending Machine That Pays Cash For Plastic — Clean Technica Interview”, www.cleantechnica.com/2021/07/30/reverse-vending-machine-that-pays-cash-for-plastic-cleantechnica-interview, (07/30/2021)

stores nationwide, during which consumers deposit their coffee capsules at the retail store and those capsules are mailed back for collection.¹⁶

Mail-back systems often provide pre-paid labels or special containers for safe and compliant shipping. Mail-back systems are convenient and allow for material traceability, regulated waste documentation, and improved access for rural or remote users, but they may apply fees for handling and processing. The mail-back program examples provided in the following paragraphs accept both covered and non-covered material.

For example, Ridwell operates Ridwell Express, which is a subscription-based mail-back program designed to extend access to consumers beyond Ridwell's doorstep service areas for specialty collection. Available across California, Ridwell Express provides members with the option to mail back select difficult-to-recycle items using pre-paid shipping materials. Occasionally, brands or retailers may compensate the member for Ridwell's mailing services or shipping materials, depending on the material type. Collected materials are shipped to the nearest Ridwell warehouse for consolidation and transfer to processing facilities. This program primarily accepts plastic film, pill bottles, multi-layered plastic, and small caps and lids.^{17, 18}

Another example, Corning Life Sciences provides a mail-back program for some packaging that may be covered materials. Participants can pack lab-based Corning, Falcon, or Axgen materials (e.g., plastic pipet tip racks and lids, centrifuge tubes and Styrofoam racks, and select product packaging) into cardboard boxes and ship the materials to Corning Life Sciences for collection. To cover the cost of shipment, participants can download and print a postage-paid mailing label to be placed on the box prior to shipping.¹⁹

3.2.4.5 Retail Take-Back Programs

Retail take-back programs allow manufacturers or retailers to collect used products from consumers and ensure appropriate disposal, recycling, or refurbishment of such products. Customers may return used items directly to retail locations or designated collection points, often facilitated through prepaid shipping labels to enable convenient and consolidated processing. The following examples of retail take-back programs currently operate in California for the collection of materials that include covered materials.

¹⁶ Nespresso "Choose to Recycle, 2025, www.nespresso.com/us/en/recycling?msockid=397e2e471552628234073a7f14a963c4, (09/22/2025)

¹⁷ Newcomer, Emily, Ridwell Response to RFI – CA 54, 08/06/2025, "Email"

¹⁸ Ridwell, 2025, express.ridwell.com, (08/29/2025)

¹⁹ Corning Recycles: Corning Customer Recycling Program, 2025, www.corning.com/worldwide/en/products/life-sciences/resources/life-sciences-sustainability/package-recycle-program.html, (8/29/2025)

TerraCycle operates nationwide free collection programs for products and packaging that may have limited local collection options, such as flexible plastic film and multi-layered packaging. These programs are supported by brands and retailers, enabling consumers throughout the contiguous United States to participate by sending their waste to TerraCycle with prepaid shipping labels. Kroger currently collaborates with TerraCycle and sponsors a national collection initiative for its private label flexible packaging, and since the program began in 2020, TerraCycle reported the collection of 31 tons of Kroger’s flexible plastic packaging.²⁰

Sephora provides the “Beauty (RE) Purposed” program in partnership with Pact Collective, a nonprofit dedicated to giving empty beauty products a second life. Program participants can bring clean, unbagged, and liquid-free beauty products to any Sephora store by dropping the materials into a dedicated collection bin. Sephora’s program accepts plastic packaging (must be 2-by-2-by-2 inches or smaller), including small tubes, bottles, jars, caps, lipstick, lip gloss, mascara tubes, pumps, and dispensers; glass, such as small bottles and jars; and other mixed materials, such as beauty pallets, compacts, dental floss containers, and toothpaste tubes.²¹

3.2.4.6 Doorstep Collection Programs

Doorstep collection programs are designed to be provided to residential or commercial generators at their doorstep or curb to increase access and participation. These programs provide convenient collection access to generators for materials that may not be accepted in local jurisdiction curbside programs. These programs are operated by a third party and are not operated or contracted by a local jurisdiction or a local service provider contracted by a local jurisdiction.

For example, Ridwell operates an optional, subscription-based doorstep collection program, currently available in 76 cities across the San Francisco Bay and Los Angeles metropolitan areas. Members of Ridwell’s subscription program source separate materials into category-specific bags, which are then collected, sorted, and consolidated in California-based warehouses for transfer of materials to partners. Ridwell reports that the list of acceptable materials varies across their market areas, but common plastic material types include plastic film, multi-layered plastic, expanded polystyrene, empty pill bottles, flat plastic lids, and clear #1 PET thermoforms.²²

As another example, TerraCycle hosts a “Zero Waste Bag Curbside Pickup” program via direct-to-consumer subscription services to provide additional collection opportunities for flexible and film plastic at the curb. TerraCycle reported that services are currently only provided in communities where TerraCycle has partnered with an existing direct-to-consumer compost subscription service. According to TerraCycle this allows them to capitalize on existing routing infrastructure, membership, and

²⁰ Golden, Ali, TerraCycle RFI Response – CA 54, Received by Colleen Foster, 08/05/2025, “Email”

²¹ Sephora + Pact, 2025, www.pactcollective.org/pact-x-sephora, (08/30/2025)

²² Newcomer, Emily, Ridwell Response to RFI – CA 54, 08/06/2025, “Email”

participation of an existing collection system. TerraCycle's Zero Waste Bag Curbside Pickup program is not yet available in California but can be considered as a model for alternative collection systems in California.²³

3.2.4.7 Business-to-business Collection Programs

Business-to-business collection is designed so that discards generated by a business are donated or sold to another business. The most common instances of business-to-business collection programs do not include covered materials. However, businesses generate materials, such as cardboard and pallets that may include covered material, so the following examples can be considered as a model for alternative collection systems for covered materials.

New-Indy Containerboard (New-Indy) operates four mills, two of which are located in California. New-Indy is a provider of business-to-business collection for large volume cardboard generators and receives more than 100 truckloads per day of cardboard (some directly from businesses).²⁴

Another common form of business-to-business collection is pallet collection. Pallet collectors receive pallets from businesses and often provide payments to generators for the material. Once received, pallets are sorted, and then either repaired or dismantled. Pallets that are not reused or repaired may be disposed of or receive further processing and recycling, such as chip-and-grind.

²³ Golden, Ali, TerraCycle RFI Response – CA 54, Received by Colleen Foster, 08/05/2025, "Email"

²⁴ New-Indy Containerboard, 2025, newindycontainerboard.com/what-we-do, (09/22/2025)

3.2.4.8 Back-Haul

Back-haul collection occurs when a generator or business receives product materials for retail, and then the same generator or business, using either the same transportation vehicle or another empty vehicle onsite, transports materials back to a centralized processing location. Back-hauling can also be considered a form of self-hauling and can prove efficient in the aggregation of material streams for generators that may have multiple retail locations and waste streams. For example, grocery stores may consider back-hauling organic materials or other material streams. In California, back-haul collection systems are typically used to back-haul some material for recycling, such as cardboard or other plastic packaging, organic materials, and construction and demolition debris.^{25, 26}

3.3 Access and Participation

3.3.1 Onsite Curbside Collection

For the purposes of this report, full access to onsite curbside collection services refers to a local jurisdiction providing onsite curbside collection services for solid waste, materials collected for recycling, and materials collected for organics recycling to all generators (i.e., any generator, regardless of size, type, or location, is eligible to subscribe to these services). Partial access refers to onsite curbside collection services that differ within a local jurisdiction, which often happens in large geographic regions with varied population densities and topography. For instance, a local jurisdiction's urban and suburban areas with high population density may receive full access to onsite curbside collection services, including materials collected for recycling and materials collected for organics recycling, while that same local jurisdiction's rural areas with lower population density may have limited or no access to onsite curbside collection services for materials collected for recycling and/or materials collected for organics recycling. See Appendix A.3 for further description of access.

When determining level of access to onsite curbside collection for materials collected for recycling and organics recycling, local jurisdictions with approved low population waivers, SB 613 (Seyarto, 2023.) waivers, and rural exemptions were assumed to have no access, whereas counties with only low-population waivers were assumed to have partial access. Please note that this analysis of SB 1383 department-issued waivers did not include an analysis of populations living in special districts (see limitations, Appendix A.8.). Appendix A.3.A provides full details on SB 1383 and SB 613 waivers and how they were used to perform this analysis.

²⁵ Waste Today Staff, "Kroger to Process Foodwaste for Energy", 05/17/2013, www.wastetodaymagazine.com/news/kroger-food-waste-energy-anaerobic-digestion, (09/10/2025)

²⁶ International Paper, "Cardboard Recycling Challenge for Fast Growing Healthy Foods Supermarket", 11/25/2024, www.internationalpaper.com/resources/customerstories/cardboard-recycling-challenge-fast-growing-healthy-foods-supermarket, (09/10/2025)

Based on the Collection Survey, 2023 EAR, and California DOF population data, Table 3-6 shows the population of each region and its accompanying level of access to onsite curbside collection services for recycling and organics recycling (in Appendix A.3.A). Excluding the total row in Table 3-6, percentages refer to the percentage of population within a region. In the total row, the percentages refer to the percentage of the entire population of California.

Table 3-6: Total and Percent of Population With Access to Onsite Curbside Collection Services for Materials Collected for Recycling and Organics Recycling by Region

Access Type	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Full access	7,307,534 (95.4%)	1,005,816 (55.5%)	61,956 (10.4%)	20,719,926 (93.8%)	5,357,778 (72.8%)	34,453,010 (87.2%)
Partial access	341,403 (4.5%)	624,677 (34.5%)	225,832 (37.8%)	1,352,570 (6.1%)	1,832,290 (24.9%)	4,376,772 (11.1%)
No access	7,754 (0.1%)	182,781 (10.1%)	310,013 (51.9%)	28,449 (0.1%)	170,322 (2.3%)	699,319 (1.8%)
Total	7,656,691 (19.4%)	1,813,274 (4.6%)	597,801 (1.5%)	22,100,945 (55.9%)	7,360,390 (18.6%)	39,529,101 (100%)

The Southern and Bay Area regions, the most populous regions of the state, show 93% and 95% of the population, respectively, have full access to onsite curbside collection services for materials collected for recycling and organics recycling. The Valley region is estimated to have 72% of the population with full access to onsite curbside collection services for materials collected for recycling and organics recycling. The Valley region is almost as populous as the Bay Area (see Figure 3-1), but much larger in physical area. As this illustrates, when comparing regions, it is important to consider population density and how this may impact access to services.

While the majority of the state population (88%) has full access to onsite curbside collection services for materials collected for recycling and organics recycling, the Coastal and Mountain regions are estimated to disproportionately lack access with only 55% and 10% of the population having full access, respectively. This finding is based on an analysis of SB 1383 (Lara, 2016) department-issued waivers, which did not include an analysis of populations living in special districts (see limitations in Appendix A.8.B.2). Therefore, it is possible that full access is available in areas serviced by special districts that may have a higher population density. Additionally, even if areas have full or partial access to onsite curbside collection service for materials collected for recycling and organics recycling, many generators may not participate in these onsite curbside collection services for a variety of reasons.

Overall, it is important to consider that the provision of onsite collection services in rural and low population areas can be operationally challenging, as they often have narrow or windy roads or significant vegetation that may pose height limitations on collection vehicles. Additionally, the large distances between generators can make collecting separate material streams inefficient and, historically, cost prohibitive.

Figure 3-1 is a map of the state highlighting census tracts and cities that were assumed to not have full access to onsite curbside collection services for recycling (this analysis does not include special districts). A closer analysis of the census tracts and cities without access to onsite collection for recycling shows that those who are 65 and older and Tribal populations are a larger proportion of the communities that were assumed to be without access in comparison to the regional averages across the state. The average median household income of populations without access is lower than the regional average in the Coastal, Mountain, Southern, and Valley regions. The Bay Area is an outlier in this respect, since areas without access have a higher average median household income. The aforementioned demographic analysis was completed using American Community Survey Data from 2020. A complete description of how the analysis was performed, and the full results are provided in Appendix A.3.

The presence of accessible onsite curbside collection services for materials collected for recycling and/or organics recycling does not ensure subscription to the service or active participation. Areas with access may have low subscription rates due to costs, low awareness of available programs, low faith in collection programs for recycling or composting, or other factors, as discussed further in the next section. Table 3-7 and Table 3-8 summarize the estimated number of households and commercial generators that are not participating in onsite curbside collection services for recycling and organics recycling, as extrapolated from the Collection Survey, by region.

Table 3-7: Households Not Participating in Onsite Curbside Collection Services for Materials Collected for Recycling and Organics Recycling as Estimated Number of Household and Percentage of Total Households (Collection Survey, 2024-2025)

Material Type	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Total Number of Households in California	2,082,410	557,641	235,356	5,513,423	2,167,749	10,556,579
Materials Collected for Recycling	14,577 (0.7%)	4,461 (0.8%)	3,060 (1.3%)	137,836 (2.5%)	15,174 (0.7%)	175,108 (1.7%)
Materials Collected for Organics Recycling	47,895 (2.3%)	40,708 (7.3%)	30,361 (12.9%)	308,752 (5.6%)	156,078 (7.2%)	583,794 (5.5%)

Table 3-8: Commercial Generators¹ Not Participating in Onsite Curbside Collection Services for Materials Collected for Recycling and Organics Recycling as Estimated Number of Commercial Generators and Percentage of Total Commercial Generators (Collection Survey, 2024-2025)

Material Type	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Total Number of Generators in California	89,177	21,912	3,597	276,768	72,938	464,392
Materials Collected for Recycling	6,688 (7.5%)	3,133 (14.3%)	1,302 (36.2%)	47,051 (17.0%)	22,538 (30.9%)	80,712 (17.4%)
Materials Collected for Organics Recycling	21,759 (24.4%)	11,482 (52.4%)	1,205 (33.5%)	96,038 (34.7%)	54,631 (74.9%)	185,115 (39.9%)

¹Includes multifamily properties with five or more units.

3.3.2 Alternative Collection Programs

Alternative collection programs vary by region, size, accessibility, and accepted material types; therefore, access and participation vary dramatically. Alternative collection systems are not operated by local jurisdictions and therefore may be unique in regard to access and participation based on how private entities operate the programs, the materials the programs collect, and how the programs are offered or promoted to participants. The sporadic nature of alternative collection systems means that a comprehensive analysis of access and participation was not performed. The findings in this section are largely based upon program-specific public websites and interviews with interested parties that have experience with alternative collection programs.

Many alternative collection programs are specifically designed or limited to a specific material type, which requires a generator to engage with multiple alternative collection programs and systems. For example, retail take-back programs may be limited to the products that a retailer sells or sponsors for collection and drop-off locations may be limited to only certain material types.

Based on the Collection Survey responses, Table 3-9 presents the percentage of local jurisdictions per region where respondents were aware of third-party alternative collection programs operating in or near their local jurisdiction. The data show that most local jurisdictions across each region of the state are not aware of alternative collection programs operating within their region. Collection Survey responses can be found in Appendix D.3.

Table 3-9: Percent of Local Jurisdictions Aware of Alternative Collection Programs Operating in their Local Jurisdiction (Collection Survey)

Alternative Collection Program	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Yes	27.5%	7.7%	0.0%	15%	9.1%	17.9%
No	72.5%	92.3%	100%	85%	90.9%	82.1%

3.3.3 Barriers to Participation

Barriers faced by generators, which vary widely across communities and generator types, impact current and potential levels of participation. Some common barriers include accessibility and knowledge gaps, which are also related to education and outreach and cost of participation.

To further understand common barriers to participation, local jurisdictions that responded to the Collection Survey and CBOs, EJ groups, and Tribes that responded to the Community Recycling and Composting Survey ranked a list of potential barriers and the impact of such barriers.

3.3.3.1 Curbside Collection Programs

Local jurisdictions identified confusion over how to sort materials as the top barrier to participation, followed by lack of importance and priority, as well as difficulty coordinating with property managers and landlords (Appendix D.3.A). CBOs, EJ groups, and Tribes that participated in listening sessions echoed similar challenges, such as confusion over sorting (particularly when several haulers service a community and accept different materials), lack of importance and priority and difficulty accessing services and educational materials for those living in multifamily dwellings. CBOs and EJ groups reported in the Community Recycling and Composting Survey that confusion over how to sort materials is a participation barrier but identified the main barriers as lack of available services, lack of awareness of programs, unclear product labels, and costs. CBO and EJ group respondents residing in multifamily properties selected confusion over how to sort materials, unclear product labels, and lack of awareness of programs as significant barriers to participation, which was less of a barrier for those residing in single-family homes (Appendix E.3.A). As previously mentioned, this may be, in part, because many pieces of outreach and education are sent to property managers and billing contacts, which means that tenants in multifamily properties may not receive such materials.

Community Recycling and Composting Survey respondents from Tribes also reported that cost of services and lack of access are the main barriers to participation (Appendix F.3.A, Table F-7). This aligns with the demographic analysis that revealed that Tribal populations disproportionately lack access to collection for recycling and organics recycling in comparison to general populations in each region of the state (Appendix A.3, Tables A-13 and A-14). Listening session participants from CBOs and EJ groups also cited lack of access as a barrier to participation, noting that certain generator types have less access to onsite collection and that drop-off facilities are located far away from many residents and only accept certain material types.

An additional factor influencing participation in collection programs for recycling and organics recycling is education and awareness. State law requires local jurisdictions to provide annual outreach and education to residents and businesses to increase awareness regarding proper sorting and its associated positive environmental impacts.

The most identified barriers to participation were as follows:

Accessibility

- Generators are unable to access onsite collection containers for recycling and organics recycling.
- Capacity of onsite collection containers is insufficient to accommodate all materials.

Knowledge Gaps

- Generators are not provided with the resources they need to feel confident to properly source separate material for collection.
- Generators are unaware of programs.

- Educational materials are not provided in languages spoken by the generators.
- Generators have a lack of faith in the system.

Cost

- Service costs or infrastructure costs (e.g., trash enclosures) are too high for the generator's proper participation.
- Costs of onsite collection for recycling and organics recycling may be higher than for solid waste, disincentivizing participation.

One key finding from the surveys is that while virtually all local jurisdictions indicated in the Collection Survey that they provided education materials, 46% of Community Recycling and Composting Survey respondents indicated that they had not received education from their local jurisdiction or recycling service provider on proper sorting (Appendix E.3.A). Tribal communities also report not receiving education or informational materials on proper sorting (Appendix F.3.A, Table F-8). Collection Survey respondents reported that local jurisdictions use ads in public spaces, emails, radio/television ads, digital/social media ads, and direct mailers to educate the public (Appendix D.3.A). These broad messaging tactics can reach large audiences but can also be impersonal and easy to ignore, which may explain this finding.

Some participants in listening sessions stated that currently the onus is on the consumer to conduct research into what materials are accepted in local programs, and that the information found can be outdated or confusing. Likewise, only 34% of CBO and EJ group respondents to the Community Recycling and Composting Survey reported that they were aware of local organizations or municipalities that have hosted events around environmental education and waste management/disposal in the past six months (Appendix E.3.A).

Local jurisdictions reported in the Collection Survey that the main barriers faced in managing collection programs are contamination, staff capacity, funding, and lack of public engagement (Appendix D.3.A). With limited staff capacity and funding, it can be difficult to implement educational outreach tactics that may result in more meaningful interactions, such as one-on-one technical assistance, door-to-door outreach, or community events. Based on the Collection Survey, most local jurisdictions do not provide one-on-one or door-to-door methods for technical assistance, and those that do focus on commercial and multifamily generators (Appendix D.3.A).

Additionally, local jurisdictions provide educational materials and technical assistance primarily in English and Spanish, with fewer than 30% of respondents providing materials in Mandarin and Cantonese, and fewer than 18% of respondents providing educational materials in any other language. According to the 2020 American Community Survey, 44% of people in California speak a language other than English. This shows a potential gap in education for residents speaking languages other than English or Spanish at home, since outreach materials are not presented in accessible language to all residents. Please see Appendix D.3.A for further information on languages included in educational materials.

3.3.3.2 Alternative Collection Programs

The Community Recycling and Composting Survey did not contain specific questions regarding barriers to alternative collection programs. However, during listening sessions, Tribal members reported a lack of access, lack of information and education, and lack of redemption compensation as being common barriers to participation in alternative collection programs (Appendix F.3.A). Additionally, based on program-specific public websites and interested parties' interviews, common barriers identified for curbside collection services generally apply to alternative collection programs. These barriers include, but are not limited to:

Accessibility

- Lack of convenience.
- Lack of access for the public and the unhoused.

Knowledge Gap

- Lack of awareness of available alternative collection systems.
- Confusion over types of materials that are accepted.
- Confusion over how to participate.
- Lack of information and/or education on the impacts of materials on the environment if not properly disposed of.

Cost

- Cost of service.
- Lack of financial incentives to participate.

4.0 Acceptance of Covered Material

4.1 Introduction

Under the Act, all local jurisdictions and recycling service providers are required to collect all covered material deemed recyclable or compostable on the covered material categories (CMCs) list published by CalRecycle pursuant to PRC sections 42060.5(a). Therefore, it is important to understand what CMCs are currently being collected within the state, identify strategies used to collect those materials, and evaluate the current cost to collect those materials.

While covered materials may be accepted in collection programs for recycling or organics recycling, they may still end up being disposed of through processing loss or because they are considered contamination by the processing facilities. This could be due to factors such as operational challenges related to sorting certain materials at processing facilities and volatility in potential end markets making sorting certain materials at times cost prohibitive. Onsite curbside collection services are designed to be simple for the average user to increase participation, which shields generators from the intricacies of processing facilities and potential end markets.

4.2 Onsite Curbside Collection Programs

Collection programs often communicate to their generators a more general classification of materials than CMCs under the Act. For example, CMCs delineate between PET (#1) bottles and jars and other forms of rigid PET (#1), however a local jurisdiction may message that all PET (#1) are accepted. As such, from the list that was published on December 31, 2024, by CalRecycle, CMCs are aggregated into CMC collection groups for the purposes of this report. Appendix A.4.A describes the methodology for extrapolating and combining the data shown in Table 4-1, while survey responses can be found in Appendix D.

Using a combination of 2023 EAR data and Collection Survey responses, Table 4-1 presents the estimated percentage of local jurisdictions per region accepting CMC collection groups for diversion in residential onsite curbside collection programs.

Table 4-1: Percent of Local Jurisdictions that Collect CMC Collection Groups in Source-Separated Residential Onsite Curbside Collection Services, by Region

CMC Collection Group	Bay Area (128)	Coastal (71)	Mountain (48)	Southern (238)	Valley (131)	Statewide (616)
Aluminum	100%	96%	73%	98%	96%	96%
Aseptic Cartons	48%	15%	8%	63%	26%	42%
Ceramic	0%	23%	0%	18%	0%	9%
Flexible and Film Plastic	21%	4%	15%	28%	12%	19%
Flexible and Film Plastic Designed for Compostability	13%	31%	0%	18%	18%	17%
Gable-Top Cartons	50%	20%	13%	71%	37%	49%
Glass	99%	96%	88%	98%	95%	96%
Mixed Paper	99%	97%	65%	100%	97%	96%
Old Corrugated Cardboard (OCC)	100%	97%	90%	100%	98%	98%
Other Ferrous	88%	85%	50%	70%	73%	78%
Other Metal	65%	77%	50%	50%	64%	60%
Other Mixed Organic	12%	32%	0%	40%	15%	25%
Other Mixed Plastics	25%	38%	50%	33%	55%	33%
Other Multi-material laminate	3%	23%	0%	18%	9%	11%
Other Nonferrous	85%	85%	50%	70%	73%	77%
Paperboard	96%	90%	50%	96%	92%	91%
Plastic #1 - Polyethylene terephthalate (PET) Rigid	100%	96%	88%	98%	98%	98%
Plastic #2 - High-density polyethylene (HDPE) Rigid	100%	97%	88%	99%	96%	97%
Plastic #3 - Polyvinyl chloride (PVC) Rigid	66%	65%	35%	82%	66%	70%
Plastic #4 - Low-density polyethylene (LDPE) Rigid	67%	68%	31%	76%	60%	66%

CMC Collection Group	Bay Area (128)	Coastal (71)	Mountain (48)	Southern (238)	Valley (131)	Statewide (616)
Plastic #5 – Polypropylene (PP) Rigid	89%	90%	35%	92%	92%	87%
Plastic #6 - Expanded or Foamed Plastic, Rigid	6%	1%	13%	36%	10%	18%
Plastic #6 – Polystyrene (PS) Rigid	52%	56%	29%	70%	60%	59%
Plastic #7 - Other Rigid Designed for Compostability	58%	58%	31%	66%	58%	59%
Plastic Pouches and Envelopes	10%	23%	0%	15%	9%	13%
Textiles	10%	51%	25%	37%	18%	28%
Tin/Steel/Bimetal	98%	96%	67%	97%	95%	94%
Waxed OCC	58%	23%	0%	25%	36%	38%
Wood – Treated	35%	63%	25%	59%	48%	50%
Wood – Untreated	67%	75%	27%	78%	62%	68%

¹ One jurisdiction in the Valley region did not have data entered in the 2023 EAR.

Aluminum, glass, mixed paper, paperboard, OCC, plastic #1 (PET rigid), plastic #2 (HDPE rigid), and tin/steel/bimetal are the most broadly accepted materials by onsite curbside collection services statewide. These materials are both widely available to consumers and have existing outlets that may qualify as end markets, which incentivizes collection and processing. Whereas ceramic, other multi-material laminate, plastic #6 - expanded or foamed plastic, rigid, and textiles are the materials least accepted in collection programs statewide. This is likely due to limited potential end markets for these materials, as well as operational challenges with sorting and processing (e.g., textiles can tangle equipment at sorting facilities and multi-material laminates may be made with more than one material, making them more difficult to manage).

4.2.1 Current Capture of Materials that Include Covered Materials

Table 4-2 presents the statewide tonnage of covered materials derived from residential and commercial onsite collection. Because no single resource provided a comprehensive assessment of CMC collection group materials across all collection streams, contractor staff used multiple studies to develop these estimates (described in Appendix A.4.C). Material collected for recycling and organics recycling in single container systems were included in those estimates. This analysis reflects only the managed portion of the waste stream and does not include self-haul. The contractor did

not include leakage and litter occurring outside of the solid waste management system in these estimates.

The contractor estimated the quantity of covered materials sent to landfill using CalRecycle’s report, “California Landfills: Measuring Single-Use Packaging and Plastic Food Service Ware Disposed (2025).” The contractor supplemented this calculation with data from SB 343 Report, data from the waste characterization study conducted by the City of San Francisco and StopWaste, a joint powers authority (JPA) for the County of Alameda (Alameda County 2023-24 Waste Characterization Study), the 2021 American Chemistry Council’s Resin Review, and CalRecycle’s 2025 BCRP Recycling Program Rates.

Table 4-2: Estimated Statewide Tons of Covered Materials by Onsite Curbside Collection Material Stream (2024)

Material Stream (Covered Material Only)	Residential and Commercial Statewide Tons Collected	Percentage of Statewide Tons Collected
Solid Waste Sent to Landfill	6,279,755	49.1%
Materials Collected for Recycling	5,506,452	43.0%
Materials Collected for Organics Recycling	1,013,374	7.9%
Total	12,799,581	100.0%

Table 4-2 summarizes the total tons of covered material estimated to be collected in the three materials streams for onsite curbside collection: solid waste, material for recycling, and material for organics recycling. Of the approximately 57 million tons of total estimated onsite residential and commercial curbside collection (see Appendix B.4, Table B-6), about 12.8 million tons is attributed to collection of covered material. Material collected for recycling and organics recycling in single container systems was included in those estimates.

The cumulative result in Table 4-3 illustrates the total tons by CMC collection group statewide, among all three collection streams. Appendix C provides a more detailed breakdown of Table 4-3 by region and material collection stream. OCC makes up the largest portion of the current materials that include covered materials in the collection system at 36.86%. Mixed Paper is the second most prevalent, at 21.78%, followed by flexible and film plastic at 9.13%.

Paper products that are commonly accepted in onsite curbside collection services across the state (e.g., cardboard, mixed paper, paperboard) make up more than half the materials that include covered materials collected in residential and commercial collection programs. However, as identified in Table C-1 in Appendix C, these materials that include covered materials are prominent in the solid waste collection stream.

All plastic categories, including plastics #1-#7, flexible and film plastic, other mixed plastics, plastic designed for compostability, and plastic pouches, together encompass 21.45% of all covered material available within the combined collection stream.

Table 4-3: Residential and Commercial Statewide Collected Tons of Covered Material by Material Type (2024)

CMC Collection Group	Statewide	Percent of Total
Ceramic	4,458	0.03%
Glass	255,089	1.99%
Metals	649,997	5.08%
Aluminum	148,405	1.16%
Other Ferrous	174,134	1.36%
Other Metal	10,866	0.08%
Other Nonferrous	63,665	0.50%
Tin/Steel/Bimetal	252,927	1.98%
Plastic	2,745,874	21.45%
Flexible and Film Plastic	1,168,708	9.13%
Flexible and Film Plastic Designed for Compostability	180,242	1.41%
Other Mixed Plastics	240,044	1.88%
Other Multi-Material Laminate	58,188	0.45%
Plastic #1 - PET Rigid	334,301	2.61%
Plastic #2 - HDPE Rigid	305,946	2.39%
Plastic #3 - PVC Rigid	13,367	0.10%
Plastic #4 - LDPE Rigid	22,602	0.18%
Plastic #5 - PP Rigid	250,849	1.96%
Plastic #6 - Expanded or Foamed Plastic, Rigid	8,758	0.07%
Plastic #6 - Other Expanded or Foamed Plastic	3,737	0.03%
Plastic #6 - PS Rigid	81,981	0.64%
Plastic #7 - Other Rigid Designed for Compostability	29,896	0.23%
Plastic Pouches and Envelopes	47,255	0.37%
Paper and Fiber	8,304,245	64.86%
Mixed Paper	2,788,270	21.78%
Paperboard	390,642	3.05%

CMC Collection Group	Statewide	Percent of Total
Aseptic Cartons	64,379	0.50%
Gable top Cartons	96,336	0.75%
Waxed OCC	246,207	1.92%
OCC	4,718,411	36.86%
Wood and Other Organic Materials	839,918	6.57%
Wood - Untreated	752,612	5.88%
Wood - Treated	70, 029	0.55%
Textiles	5,117	0.04%
Other Mixed Organic	12,160	0.10%
Total	12,799,581	99.98%

4.3 Enhancing Capture of Covered Materials in Onsite Curbside Collection

Local jurisdictions and recycling service providers implement various strategies to improve the collection of materials for recycling and organics recycling in their programs. Nearly all Collection Survey respondents indicated that they provide education and outreach intended to improve the capture of acceptable materials directly to generators; however, as noted in section 3.3.3, this educational material is primarily available in English and Spanish. This limits the effectiveness of such strategies for populations across the state who do not speak English or Spanish.

Over half of Collection Survey respondents adopted additional strategies to enhance capture of targeted material, including contamination reduction efforts and adjustments to service frequency. Other strategies reported by local jurisdictions aim to increase accessibility of outreach to the community or implement stronger enforcement mechanisms. Collection Survey respondents noted the following additional strategies were used by local jurisdictions to enhance the capture of materials:

- Providing community-based social marketing and grants to nonprofits to expand the reach of education in culturally relevant and effective ways.

- Implementing school programs for children to sort food service ware at lunch for collection.

At least two local jurisdictions in the more populous areas of the Bay Area and Southern regions reported that their recycling service provider or JPA perform education and contamination reduction activities on their behalf. This demonstrates that the number of local jurisdictions in which these strategies are employed may be even higher than reported in Collection Survey results.

Collection Survey data indicate that over 80% of respondents consider general education and outreach to be highly effective, while more than 60% cite contamination reduction initiatives as effective. Contamination reduction initiatives may include

education and outreach, but the focus is specifically on shifting behaviors to reduce contamination. These types of initiatives include activities such as route monitoring, delivery of contamination notices, and contamination fee assessments. These methods are among the most widely utilized, with education and outreach implemented by 98% of local jurisdictions that responded to the survey, although only 82% designate it as one of the most effective measures. Some Collection Survey respondents emphasized the need for more robust community-based social marketing efforts that utilize a methodical approach to drive behavior change.

Statewide, improving clarity in product labeling was reported as the third most effective approach, except in the Bay Area. However, only 20% of respondents have implemented this strategy, with lower adoption rates noted in the Mountain and Southern regions. This lower uptake may relate to the limited authority local jurisdictions possess to alter consumer product labeling, which typically requires regulatory changes or higher-level negotiations, since major brands operate in multiple local jurisdictions.

5.0 Cost Model for Onsite Curbside Collection

Currently, covered materials are contained within all material streams (e.g., solid waste, material collected for recycling, and material collected for organics recycling). As all material streams may be affected in the exploration of methods to enhance the capture of covered materials, it is valuable to understand the current cost of collection within the state for all material streams. All material streams will be utilized as a baseline to compare to the incremental costs or cost savings, which will be explored further in the needed state report.

Refer to Appendix B for a walkthrough of the step-by-step calculations that are referenced in this subsection.

The current annual cost of material collection, including both covered and non-covered materials, is estimated at \$13,803,576,495 (refer to Appendix B, Table B-13) and was estimated by multiplying each region’s adjusted collection costs per ton (Table 5-1) by its regional tonnage (Table 5-2). Self-haul was not included in this analysis.

Table 5-1: Adjusted Regional Per-Ton Cost of Material Collection for Residential, Commercial, and Multifamily Properties (2024)

Customer	Bay Area (\$/Ton)	Coastal (\$/Ton)	Mountain (\$/Ton)	Southern (\$/Ton)	Valley (\$/Ton)	Statewide (\$/Ton)
Solid Waste	\$258	\$288	\$262	\$234	\$283	\$249
Materials Collected for Recycling	\$645	\$720	\$655	\$587	\$708	\$623
Materials Collected for Organics Recycling	\$199	\$223	\$202	\$181	\$219	\$196
Weighted Average	\$324	\$338	\$317	\$284	\$321	\$300

Table 5-2: Total Tons of Material Collected by Region and Customer Class (2024)

Customer	Bay Area	Coast	Mountain	Southern	Valley	Statewide
Residential						
Solid Waste	1,509,811	524,738	166,160	7,493,278	2,176,405	11,870,392
Materials Collected for Recycling	615,108	126,219	41,778	1,797,200	434,047	3,014,352
Materials Collected for Organics Recycling	787,525	187,149	42,077	1,701,569	818,037	3,536,357
Commercial/Multifamily						
Solid Waste	2,262,366	786,289	248,981	11,228,245	3,261,217	17,787,098
Materials Collected for Recycling	921,705	189,131	62,601	2,693,000	650,394	4,516,831
Materials Collected for Organics Recycling	1,180,061	280,432	63,051	2,549,702	1,225,782	5,299,028

The cost per ton of material collected for organic recycling was estimated to be the least expensive, since the material is significantly heavier than either solid waste or materials collected for recycling, thereby requiring less route time, and thus less route cost, to collect the same amount of tonnage. Collecting materials for recycling is estimated to be the most expensive, since the material is generally much lighter.

Appendix B details the cost estimate methodology. Briefly, Table B-5 shows the difference between the collection ratio of materials collected for recycling and organics recycling per ton of solid waste collected in each region. Table B-10 presents the regional cost adjustment factors for collection (based on route density, with regions of higher route density having lower costs per ton). Table B-12 estimates the average cost per ton for each region by combining these two tables. The summary of the tables is as follows.

The Coastal region has the lowest route density, estimated at 39% less dense than the statewide average, and has approximately 15% lower labor rates than the statewide average (Tables B-10 and B-9). The Coastal region is tied with the Valley region for having the second highest collection ratio of materials collected for organics recycling per ton of solid waste collected. The Coastal region is estimated to be the most expensive with an average cost per ton of \$338.

The Bay Area region is the most densely populated, estimated at 19% denser than the statewide average, and has the highest labor costs of all regions, at approximately 30% more expensive than the statewide average. Additionally, the Bay Area has the highest collection ratio of all regions, with more tons of materials collected for recycling and for organics recycling per ton of solid waste collected than any other region. This results in the Bay Area's average cost per ton of \$324, which is the second highest among the regions.

The Valley region has the second lowest route density, estimated at 37% less dense than the statewide average, and it has approximately 16% lower labor rates than the statewide average. The Valley region is tied with the Coastal region for having the second highest collection ratio of materials collected for organics recycling per ton of solid waste collected. The Valley region's average cost per ton is \$321, which falls in the middle among the regions.

The Mountain region is slightly less dense than the statewide average, estimated at 16% less dense, and has labor costs that are only slightly lower than the statewide average, at approximately 8% less expensive. The Mountain region has the second lowest collection ratio of materials collected for organics recycling per ton of solid waste collected and the same ratio of materials collected for recycling, due to lack of access to regular onsite curbside collection services. Compared to other regions, more generators in the Mountain region rely upon self-hauler and drop-off programs. Since self-haul and drop-off are not included in this cost analysis, this reduces the estimated regional collection for the Mountain region. The combination of these factors ultimately results in the Mountain's average cost per ton of \$317, which is the second lowest among the regions.

The Southern region is the second-most dense region, estimated at 12% denser than the statewide average, and has marginally higher labor costs than the statewide average, at approximately 8% less expensive. The Southern region is also the highest tonnage generator in the state (Appendix B, Table B-8) and has the lowest collection ratio for materials collected for recycling and materials collected for organics recycling per ton of solid waste collected. As demonstrated in the Collection Survey results within this report in section 3.3.1, the Southern region has high access to onsite curbside collection services for all material streams but is estimated to have lower participation in onsite curbside collection services for materials collected for recycling or materials collected for organics recycling. This lack of participation results in reduced collection of material collected for recycling, which is the most expensive per-ton material stream to collect. This results in most of the tonnage collected to be solid waste, which is less expensive than the overall state average cost per ton across all material streams. The Southern region's estimated average cost per ton of \$284 makes it the least expensive among the regions.

The estimated current annual cost of collection for residential bundled service (includes collection of solid waste, materials collected for recycling, and materials collected for organics recycling) is presented in Table 5-3 as a monthly cost per occupied household by region using the DOF's "E-5 Population and Housing Estimates." The estimated residential regional costs of collection were divided by the number of occupied

households per region and the number of months per year to estimate the monthly per household cost of collection. The estimated costs do not include processing of materials collected for recycling and materials collected for organics recycling, disposal of solid waste, or local jurisdiction fees and reimbursements. Regional monthly per household cost is only an estimated average and does not encompass the diversity within each region, which would further affect costs for rural versus urban environments.

Table 5-3: Average Monthly Residential Collection Cost per Household by Region (2024)

Description	Bay Area	Coastal	Mountain	Southern	Valley
Occupied Households (DOF E-5)	2,082,410	557,641	235,356	5,513,423	2,167,749
Annual Residential Collection Cost	\$942,993,373	\$283,736,451	\$79,398,064	\$3,116,367,441	\$1,102,377,994
Average Monthly Collection Cost per Occupied Household	\$38	\$42	\$28	\$47	\$42

As an alternative representation of residential tonnage collected per person, Table 5-4 below represents the tons of residential material collected by region and material stream. This was calculated by dividing the tons of material collected from residential generators by the population per region as provided by the DOF E-5 Report.

For example, in the Bay Area region, the contractor calculated that 0.20 tons of solid waste, 0.08 tons of material collected for recycling, and 0.10 tons of material collected for organics were collected annually per person. This representation further emphasizes how much material was collected per person within a region and the individual impact on tonnage collected. The Bay Area has the lowest solid waste collection per person across all regions, but the highest materials collected for recycling. The Southern region has the highest collected tons of solid waste per person, while the remaining regions fall relatively close to the statewide average. The Bay Area, Coast, and Valley regions have a similar collection rate for materials collected for organics recycling. This information may be used in the Needed State report to inform which regions may have the most potential to capture additional materials that may be covered materials through use of targeted programmatic changes or education and outreach to the residential customer class.

Table 5-4. Estimated Annual Residential Tons Collected per Person by Region and Material Stream

Description	Bay Area	Coast	Mountain	Southern	Valley	Statewide
Population per Region (DOF E-5)	7,656,691	1,813,274	597,801	22,100,945	7,360,390	39,529,101
Solid Waste (Tons)	0.20	0.29	0.28	0.34	0.30	0.30
Materials Collected for Recycling (Tons)	0.08	0.07	0.07	0.08	0.06	0.08
Materials Collected for Organics Recycling (Tons)	0.10	0.10	0.07	0.08	0.11	0.09
All Materials	0.38	0.46	0.42	0.50	0.47	0.47

6.0 Contamination Analysis

6.1 Introduction

The Act requires the Producer Responsibility Organization (PRO) to use education and promotion to encourage proper participation in recycling and composting collection systems, which includes reducing the rate of inbound contamination and unwanted materials [PRC section 42051.1(e)]. Addressing contamination is essential to achieving the goals of the Act, since contamination can lead to lower recycling rates and increased costs. Contamination during the collection phase has downstream impacts on the diversion, operational efficiency, maintenance, safety, and economics of processing facilities and outlets that may qualify as end markets.

This section assesses baseline conditions of contamination in collection systems, including identification of the most common contaminants, amount of contamination, contributing factors, costs, and impacts. This section also identifies successful approaches used throughout the state to monitor and reduce contamination.

6.2 Identification of Contaminants in Onsite Curbside Collection Programs

The Collection Survey asked local jurisdictions to report the three most prevalent contaminants found in their collection programs, categorized by sector and material stream. Local jurisdictions reported plastic bags and film as the most frequent contaminant in both residential and commercial recycling streams, with 83% and 77% of all respondents identifying these items, respectively. The Mountain region was the only region that reported higher contamination in the residential stream from other items besides plastic bags and film, including poly-coated paper, nitrous oxide containers, and household batteries. Poly-coated paper was the second most cited contaminant in material collected for recycling across the state for both residential and commercial sectors. Bulky items were also frequently cited as a contaminant in the commercial sector, with 28% of Collection Survey respondents citing bulky materials as a common contaminant, compared to only 16% in the residential sector.

When asked about contamination in the materials collected for the organics recycling stream, Collection Survey respondents cited plastic as the most common contaminant across all regions for both the residential and commercial sectors, with 91% of Collection Survey respondents citing it as the top contaminant in the residential stream and 85% in the commercial stream. Overall, Collection Survey respondents identified materials containing poly-coated linings and plastics designed for compostability as the second and third most common contaminants for both the residential and commercial streams; however, these items were cited more often in the commercial than residential sectors.

In both the commercial and residential sectors, 27% and 37% of all Collection Survey respondents identified “other” top contaminants, respectively. “Other” contaminants included general municipal solid waste and construction and demolition debris. A detailed breakdown of all Collection Survey responses and “other” contaminants

reported by local jurisdictions can be found in Tables D-15 through D-18 in Appendix D.3.C.

6.3 Amount of Contamination in Onsite Curbside Collection Programs

The volume of individual collection containers at the onsite collection stage makes it impractical for local jurisdictions to conduct individualized waste characterizations to assess the amount of onsite collection contamination. For this reason, the Current State of Processing Report contains a more detailed analysis of the amount of contamination once materials are aggregated at facilities. However, the contractor conducted an analysis of the number of generators with contamination in their collection containers and reviewed a select number of waste characterization reports to estimate region-wide contamination levels.

Collection Survey responses were received from the Bay Area, Coastal, Southern, and Valley regions regarding the number of contamination notices sent to generators in calendar year 2024. The median number of notices sent across each of these regions was less than 1% of the total population. According to the Recycling Partnership's 2020 "West Coast Contamination Initiative Research Report," the average contamination rate across all cities in California is 20%, with a range of 8% to 46%. These findings are in alignment with the waste characterization study conducted by the City of San Francisco and StopWaste JPA, which found contamination levels between 14% and 24% for materials collected for organics recycling and 20% to 25% for materials collected for recycling.²⁷ Although there is a low number of generators receiving contamination notices, there are still relatively high levels of contamination across the state.

6.4 Cost of Contamination

6.4.1 Direct Costs to Ratepayers

Contamination can result in monetary costs to both ratepayers and local jurisdictions. For ratepayers, these costs can be direct or indirect costs. Direct costs include contamination fees or return fees, in which a recycling service provider has to return to an individual home or business to collect a previously contaminated collection container. Indirect costs include increased rates due to the higher cost of processing or managing contaminated material streams, including costs for contamination monitoring and the implementation of contamination reduction strategies. These indirect costs are contemplated further in the Current State for Processing Report.

To assess the direct costs on ratepayers, the Collection Survey asked local jurisdictions to select the type of contamination reduction initiatives they employed. The Bay Area and Valley regions reported the highest use of contamination fees at 65% and 63.6%, respectively. A separate survey conducted by the contractor of 69 local jurisdictions in

²⁷ The 2024 waste characterization study conducted in San Francisco only characterized the materials collected as solid waste and for organics recycling. Therefore, the numbers represented here for contamination of materials collected for recycling only includes findings from the StopWaste, 2023-2024, report.

Los Angeles County (under a different project) found that 67% of these local jurisdictions had commercial contamination fees included in their rate schedule. An additional 14% of local jurisdictions had language in their franchise agreements allowing the assessment of contamination fees for commercial businesses but no set rate in the rate schedule^{28,29}. The contractor contamination survey identified a median contamination fee, for the first instance of contamination of \$58.94 for contamination in a cart and \$97.60 for contamination in a bin. The results of these two separate surveys indicate that contamination fees may be more prevalent in areas of the state with a higher density of people. Additionally, despite allowing the assessment of fees for reducing contamination and the significant rates at which they are assessed, which may alleviate some local jurisdiction cost, contamination fees are not a frequently reported strategy to reduce contamination. This results in a low direct-cost impact to ratepayers because of contamination. However, as discussed further in section 6.7, contamination fees are seen as highly effective measures to curb contamination.

6.4.2 Local Jurisdiction Costs

In addition to direct costs to ratepayers, the Collection Survey asked respondents to identify the average number of full-time equivalent (FTE) staff (including contractors) assigned to contamination reduction initiatives. These numbers were used to estimate the total FTE staffing level for contamination reduction initiatives in each region and assess staffing costs. Table 6-1 shows the estimated population per FTE and the total estimated number of FTEs in each region.

Table 6-1: Estimated Full Time Equivalent Staffing Levels for Contamination Reduction Initiatives

Description	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Estimated population per FTE	8,300	18,100	27,200	8,300	73,600	10,400
Estimated FTEs	923	100	22	2,663	100	3,808

The Coastal, Mountain, and Valley regions were estimated to have significantly lower FTEs per capita than the Bay Area and Southern regions. For the Coastal and Mountain regions this aligns with the fact that these regions have low access rates to recycling and organics collection programs, as described in section 3.3, thereby reducing the

²⁸ "Contamination Fee Database." "HF&H Consultants Intranet", HF&H Consultants, LLC. Accessed September 4, 2025.

²⁹ The contractor commercial contamination fee survey was not conducted as part of the Needs Assessment study. The contractor contamination fee survey only requested data related to commercial contamination fees. Fees for residents were not analyzed.

need for staff to support proper participation and contamination reduction. The Valley region, however, has an access rate of 72%, only 20% lower than the Bay Area and Southern regions; but an estimated population per FTE that is nearly nine times higher than both those regions. Total, current, staffing costs are reported in Table 6-2.

Table 6-2: Estimated Staffing Costs for Contamination Reduction Initiatives

Description	Bay Area	Coastal	Mountain	Southern	Valley	Statewide
Estimated Cost per FTE (\$)	157,104	119,614	139,722	136,228	105,877	N/A
Estimated Total Cost (\$)	145,006,992	11,961,400	3,073,884	362,775,164	10,587,700	533,405,140

A local jurisdiction’s total budget for contamination monitoring and reduction initiatives is often included with general education and outreach funds. For this reason, it can be difficult to identify costs related specifically to contamination monitoring and reduction initiatives. Additionally, many of these costs may be covered by a local jurisdiction’s recycling service provider. The Recycling Partnership Report states that education budgets in local jurisdictions ranged from \$0.10 to \$7.00 per household. The collection survey only had a 37% response rate when providing the jurisdiction budget for contamination monitoring and reduction initiatives. These responses ranged from \$0.13 to \$5.59 per household.

In addition to this analysis, the Collection Survey asked local jurisdictions to identify the biggest barriers in administering collection programs and, if resources were unlimited, how they would improve the effectiveness of their contamination monitoring programs. In response to identifying the top barriers of administering collection programs for recycling, local jurisdictions selected contamination, identified by 26% of respondents, and staff capacity, identified by 20% of respondents, as the top two responses. Additionally, 80% of all respondents identified “increased contamination monitoring staff” as a tool to improve contamination monitoring programs. This was second only to “more robust education campaigns,” indicated by 83% of respondents, which often require more staff capacity to implement.

6.4.3 Emerging Camera Technologies

There are an increasing number of local jurisdictions and service providers utilizing cameras to identify contamination at the source. Cameras can provide an automated approach to collect data at an individualized level, allowing local jurisdictions and service providers to target resources at the largest or most frequent sources of contamination. However, there is hesitancy about whether this technology is fully realized, as it still needs considerable human input to validate findings. Pilot studies conducted in the cities of San Francisco and Livermore utilized two different camera-based systems to test how effective they could be at monitoring and reducing contamination.

In Livermore, a \$236,000 grant from the Bay Area Air Quality Management District was used to install cameras on commercial customer bins and fund the technology service provided by Compology to identify contamination.³⁰ The grant also paid for staff time to review instances of contamination captured on camera and follow-up with generators. The pilot program ran for one year and included same-day or next-day follow-up when contamination was identified including calls, texts, site visits, and in-person trainings.^{31, 32}

In San Francisco, \$228,000 to \$248,000 was the annual estimate proposed by the city's recycling service provider to pilot on-board cameras and associated artificial intelligence technology for detecting contamination on six trucks.³³ Costs also included the addition of one FTE to validate and process contamination identified by the cameras.³⁴ The recycling service provider for San Francisco estimated utilizing the camera-based system could generate between \$119,000 and \$155,000 annually in revenues from the assessment of contamination fees.³⁴ This revenue would not fully cover the cost of the program.³⁵

In both programs, it was necessary to fund additional staffing, education, and outreach in tandem with the camera infrastructure and technology. Although it is expected that camera technologies will continue improving over time, reducing the need for human validation, it is unclear if, or when, the technology will be able to completely replace human monitoring or oversight.

³⁰ Waste360 Staff, "StopWaste Chooses Compology's Dumpster Monitoring Technology," *Waste 360*, November 7, 2018, <https://www.waste360.com/fleet-technology/stopwaste-chooses-compology-s-dumpster-monitoring-technology>.

³¹ Starkey, Meghan, "Minutes of Regular Meeting of the Planning Committee and Alameda County Recycling Board," *StopWaste*, June 11, 2020, <https://www.stopwaste.org/sites/default/files/meeting/PC%26RB%2006-11-20%20min.pdf>.

³² "Minutes of the Planning Committee and Alameda County Recycling Board." *StopWaste*, July 9, 2020, <https://www.stopwaste.org/sites/default/files/meeting/PC%26RB%2006-11-20%20min.pdf>.

³³ Recology, "Rate Change Request, Refuse Rate Board Hearing #1," Sf.gov, *City and County of San Francisco*, February 21, 2025, https://media.api.sf.gov/documents/Refuse_Rate_Board_Hearing_1_Recology_Presentation_-_2.21.2025.pdf, PowerPoint Presentation.

³⁴ Recology, "Refuse Rate Board Hearing," Sf.gov, City and County of San Francisco, September 30, 2024, https://www.sf.gov/sites/default/files/2024-09/2024-09-30%20Rate%20Board%20Hearing%20Agenda%20%235%20Presentation_Recology.pdf.

³⁵ HF&H Consultants, "San Francisco Refuse Rate Board, Capital Planning," Sf.gov, *City and County of San Francisco*, February 21, 2025, https://media.api.sf.gov/documents/HFH_SF_Capital_Plan_Recs_021825.pdf.

6.5 Impacts of Contamination

Contamination can impact the collection system in multiple ways, including increasing costs to local jurisdictions and ratepayers, increasing the amount of material sent to landfill, and disrupting scheduled collection services. The Collection Survey asked local jurisdictions to report common issues as a result of contamination. Over half of Collection Survey respondents in all regions, with the exception of the Valley region, identified increased monitoring and enforcement costs and higher costs for ratepayers due to contamination fees as negative contamination impacts. Valley region respondents reported other issues, including greater impacts on collection service (e.g., missed collections) and loss of revenue generated from the sale of recyclables. “Other” responses selected by Collection Survey respondents included additional impacts on ratepayer costs due to higher processing and operational costs to manage contaminated loads. Table D-21 in Appendix D.3.C provides a more detailed breakdown of identified contamination impacts by local jurisdictions in each region.

The Community Recycling and Composting Survey asked which contamination impacts respondents were aware of. Over 77% of CBO and EJ group respondents as well as 63% of Tribal respondents recognized that contamination could lead to material getting sent to a landfill rather than processed for recycling or composting. Only 25% of CBO and EJ group respondents and 38% of Tribal respondents recognized they could be charged a fee for collected material that is contaminated.

6.6 Reasons and Factors Contributing to Contamination

There are a variety of reasons that contamination might occur in onsite curbside collection services. Identifying the factors that contribute to contamination helps establish a baseline understanding for potential strategies to mitigate such contamination in the future.

6.6.1 Emerging Camera Technologies

The Collection Survey asked local jurisdictions to identify the main causes of contamination in their programs. Over 75% of statewide respondents cited “confusion over sorting” as the primary cause. Unlike other regions, the Valley region identified lack of recycling priority among generators as the top factor. These findings align with the findings in section 3.3.3, which acknowledge that many generators experience a wide range of knowledge gaps when it comes to accessing and participating properly in collection programs.

The Recycling Partnership Report additionally indicated that contamination is often a result of people thinking that an item is recyclable in their program. The report also found that there were differences in recycling behavior between demographic groups. Particularly, the study found that people who rely more on visual cues to determine the recyclability of an item versus relying on translated text or word-heavy messaging can inadvertently cause more contamination.

6.6.2 Community Factors

6.6.2.1 General Factors

Among CBOs and EJ groups that took the Community Recycling and Composting Survey, 37% cited “a lack of trust in the recycling system” as a common factor leading to contamination, while 52% of respondents cited “confusion over how to sort.” The latter was also tied for the most frequently selected factor indicated by Tribal respondents, with 50% of respondents selecting this reason. The other top response, from 50% of Tribal respondents, was “other people placing items in containers.” These findings are in alignment with local jurisdiction responses to the Collection Survey and findings from the Recycling Partnership’s report, indicating that there is a strong need for education, clarity, and transparency around what specific materials are and are not recyclable.

6.6.2.2 Contamination Education

Education and outreach can play a key role in addressing the confusion generators have about properly sorting materials, which was the main factor contributing to contamination, as identified by local jurisdiction responses to the Collection Survey. In the Community Recycling and Composting Survey, only 39% of CBO and EJ group respondents and 25% of Tribal respondents indicated they have ever received education from their city or recycling service provider about how to properly sort waste or prevent contamination. When asked to identify what method of education they received and prefer to receive, 48% of CBO and EJ group respondents indicated they have received mailed information about collection programs for recycling; however, only 33% of respondents indicated their preference is to receive communications in this way.

In contrast, 41% of CBO and EJ group respondents indicated they prefer email communications, but only 29% reported receiving recycling education in this manner. 50% of Tribal respondents stated they have received education about how to properly sort waste from labels on consumer products and through social media. Of these two methods, 13% stated they prefer education from product labels and 50% stated they prefer education from social media. While there seems to be a preference for digital resources reported by Community Recycling and Composting Survey respondents, the Recycling Partnership Report found residents in focus groups preferred quick guides like magnets and information cards. These findings indicate there is a potentially wide range of preferences for how education materials are administered and distributed. The Community Recycling and Composting Survey found that the preferred outreach method throughout the state varied across each region, further indicating a need to tailor educational programs specifically to each community. Detailed responses can be found in appendix E.3.B and F.3.B.

6.7 Monitoring and Reducing Contamination

6.7.1 Strategies to Monitor and Reduce Contamination

Collection programs use a variety of approaches to monitor and reduce contamination in the collection system. Examples of commonly used methods to monitor contamination include:

Technical Assistance Audits

On-site inspections of generator collection containers and collection infrastructure to provide information and assistance regarding contamination.

Route Monitoring

Reviews of collection containers along collection routes to identify contaminants in collection containers.

Waste Characterizations

Studies to characterize the composition of one or more waste streams, which can help identify materials commonly placed in incorrect collection containers.

Truck-Mounted Cameras

Camera technology attached to collection truck hoppers that allow recordings of material from collection containers entering the trucks, which can be used to visually identify contaminants.

Bin-Mounted Cameras

Camera technology attached to collection bins, which allows identification of contaminants as materials are placed in collection containers.

All methods of monitoring can provide an effective means of identifying key contaminants in materials collected for recycling, but there are unique additional benefits to different approaches. Waste characterizations, conducted once material from a specific collection route or community is aggregated or at the point of generation (e.g. during a technical assistance audit), can provide specific data on the amount and types of contamination in a collection program. Visual monitoring, via route monitoring or camera technologies, offers more details on which generators or communities are producing the most contamination.

When asked what forms of contamination monitoring are conducted, Collection Survey respondents overwhelmingly reported the use of route monitoring, with over 90% of local jurisdictions from the Bay Area, Coastal, Southern, and Valley regions stating they utilize this approach. The Mountain region, with only two respondents, reported a 50% split between route monitoring and truck-mounted cameras. The Bay Area, Coastal, and Valley regions additionally reported high use of technical assistance audits, a strategy that is more resource intensive, yet more effective at identifying not only the presence of contamination, but also potential contributing factors.

Once contamination is identified, local jurisdictions may employ any number of strategies to reduce future instances of contamination, including but not limited to the following:

Education and Outreach

Educational materials or other outreach initiatives to broadly educate generators on proper sorting and contamination reduction.

Collection Container Tags

Tags or notices placed on collection containers that notify the customer of identified contaminants within their collection containers.

Door Notices or Door Hangers

Notices placed on a customer's door that notify the customer of identified contamination within their collection containers.

Mailed Notices

Notices mailed that notify the customer of identified contamination within their collection containers.

Emailed Notices

Notices sent via email that notify the customer of identified contamination within their collection container.

Contamination Fees

Assessment of monetary fees in response to contamination, as a disincentive for future contamination incidents.

Return Fees

Assessment of monetary fees for requiring a second trip by the recycling service provider to collect a collection container that was not collected during the normal route hours due to contamination.

When asked what contamination reduction initiatives are utilized when contamination is identified, nearly all of the Collection Survey respondents reported using public education and outreach as a method to reduce contamination. Collection container tags were also widely reported, with over 90% of Collection Survey respondents across the state claiming to use these programs. The Mountain region was the exception, with no reports of collection container tags, instead using mailed notices and contamination fees.

6.7.2 Effectiveness and Costs

Collection Survey respondents identified public education and collection container tags as the two most employed methods to reduce contamination. However, when asked in the Collection Survey to rank how effective various strategies are at reducing contamination, local jurisdictions ranked these strategies as less effective than both contamination fees and technical assistance audits. While technical assistance audits may be included in a local jurisdiction's education and outreach programs, it is a more resource-intensive strategy to employ; therefore, local jurisdictions often utilize technical assistance audits less than other forms of education and outreach. These findings demonstrate there may be cost or other barriers to implementing effective strategies that curb contamination. A full breakdown of how local jurisdictions responded to the

Collection Survey questions related to monitoring and reducing contamination can be found in Appendix D.3.C.

One reason local jurisdictions may see technical assistance audits as more effective than general education and outreach campaigns is that it allows the opportunity to engage directly with the generator in a manner that resonates with them. A study published in 2022 by Recreate Waste Collaborative found that in San Bernardino County educational messaging related to contamination had varying success rates dependent on the type of messaging. In a survey of residents, this study found people were most motivated by messaging related to how reducing contamination can improve the safety of local workers. This topic was rated as a higher motivating factor than both the economic and environmental impact of recycling right. The Recycling Partnership's West Coast Contamination Initiative Report also found that different communities have various factors motivating them to recycle properly and reduce contamination. A key motivating factor identified in the West Coast Contamination Initiative Report was to keep local communities clean and healthy. The report also noted that messaging focused on specific actions and materials was more effective than a general list of what can and cannot be recycled. Both reports highlight that populations are often motivated most by issues directly impacting their community.

In the San Francisco and Livermore pilot studies, contamination monitoring via camera technologies was coupled with both robust education, including technical assistance visits, and contamination fees. In San Francisco, large refuse generators with frequent or considerable amounts of contamination may also be subject to a compliance order requiring them to designate or hire a "zero-waste facilitator" to properly sort materials for 24 months or face fines.³⁶ The Livermore study resulted in a 3% reduction in total contamination and found that only 10% of businesses contributed to 6% of contamination, allowing staff to target resources on those businesses specifically.³² The San Francisco pilot resulted in a significant increase in the amount of generators with identified contamination. Over the one-year pilot, 36,000 containers were tagged via on-board cameras as having contamination.³⁵

³⁶ "Cal Recycle: SB 1383 Enforcement Ordinance Success Story," *San Francisco Environment Department*, September 9, 2025, <https://www.sfenvironment.org/media/14493>.

7.0 Public Health, Environmental, and Community Impacts

7.1 Introduction

The Act has specific provisions for a PRO plan and budget to avoid and minimize negative environmental and public health impacts, especially in disadvantaged, low-income, or rural communities already affected by plastic pollution [PRC section 42051.1(j)(1)(G)]. Therefore, it is critical to understand the current and potential impacts of collection on public health, the environment, and communities (PHEC).

7.2 Impact Mapping

Collection truck emissions are a key contributor to the environmental and public health impacts of the collection system. Collection truck traffic accumulates near facilities where vehicles drop off materials and park at the start and end of their collection routes. These facilities are often coupled with processing infrastructure, making it difficult to differentiate impacts to surrounding communities that result specifically from collection operations.

To assess the environmental and health impacts from collection operations, the contractor identified several areas in California that contain large regional facilities or truck yards, or multiple solid waste facilities within close proximity (i.e., areas that would experience a disproportionately high level of collection truck traffic).

Specific communities within these areas that had a CalEnviroScreen 4.0, solid waste burden greater than 75 were then assessed based on varying pollution indicators and population characteristics including average pollution burden, particulate matter (PM) 2.5 levels, diesel particulate matter levels, poverty levels, race, and amount of the population that is linguistically isolated. All indicators are represented as a percentile. For example, a census tract with a pollution burden score of 75 means that community has a higher pollution burden than 75% of the state's census tracts. These indicators and the method for selecting each community for analysis are further described in Appendix A.5.A. The areas identified include communities within the City of Industry, North Richmond, the Barrio Logan neighborhood in San Diego, Bakersfield, Long Beach, the Sun Valley neighborhood of Los Angeles, and the city of Sacramento. These communities represent the Bay Area (North Richmond), Valley (Sacramento and Bakersfield), and Southern (Sun Valley, Long Beach, Barrio Logan, and City of Industry) regions.

The aforementioned communities had an average CalEnviroScreen 4.0 Pollution Burden score of 87% or more, meaning the burden of pollution on their communities is higher than 87% of the state's census tracts. The pollution burden score for the identified communities in Bakersfield and Sacramento was the lowest out of these communities at 81% and 78% respectively; however, Bakersfield communities had the highest PM 2.5 score of 99% and Sacramento communities had a relatively high traffic burden score of 59% compared to the average of 50% for all of the identified communities. Communities identified in the City of Industry were in the highest

percentile for pollution burden, at 97%, and had the second highest particle pollution percentile, at 83%. The City of Industry communities are largely nonwhite, with 59% of residents identifying as Latino and 30% identifying as Asian American. Bakersfield and North Richmond communities also have majority nonwhite populations with less than 5% of populations in either area identifying as white and the majority (83% and 67%, respectively) identifying as Latino. North Richmond had communities with the highest solid waste burden score, at 97%, and had the highest overall CalEnviroScreen 4.0 score of 96%. This score considers both pollution burden and additional socioeconomic stressors and health conditions that make specific populations more vulnerable to the impacts of pollution. North Richmond communities also had the highest linguistic isolation score of 94% according to 2020 American Community Survey data. This shows that most residents in North Richmond speak limited English. These data also show that the average linguistic isolation score across all these communities was 67%, with Sacramento scoring the lowest, at 24%. The average poverty percentile for these communities was 73%. Barrio Logan and identified communities in Bakersfield were in the highest poverty percentile at 87% and 85%, respectively.

While these pollution indicators cannot be specifically or solely attributed to collection services and waste management versus other industrial and transportation-related industries, it is evident these communities are disproportionately burdened by these types of activities.

7.3 Local Jurisdiction Feedback on PHEC Impacts

Understanding the relative pollution burden on communities as a result of collection operations is important and understanding how these impacts are perceived and realized in the day-to-day lives of community members is essential to develop appropriate programs and resources to mitigate negative impacts and advance positive ones. The Collection Survey asked local jurisdictions to identify the most significant positive and negative PHEC impacts on their communities from collection operations. The findings are presented in the following subsections. Full Collection Survey responses received by local jurisdictions related to PHEC impacts can be found in Appendix D.3.D.

7.3.1 Negative PHEC Impacts

Local jurisdictions from all regions, except the Mountain region, identified asthma and other respiratory health impacts as the most significant potential negative impact of collection operations. The Mountain region identified cancer risks as the most significant negative impact. Several respondents noted “other” responses, expressing they did not feel there were any significant negative public health impacts or that the greatest impacts were related to the environment rather than public health. When asked directly, Collection Survey respondents in all regions identified greenhouse gas emissions as the most significant potential negative environmental impact. Truck exhaust that produces greenhouse gas emissions can also contribute to respiratory impacts.

The Bay Area, Southern, and Valley regions identified noise pollution and traffic congestion as negative community impacts resulting from collection operations. These findings suggest that noise and traffic may be more substantive impacts in denser, more

populated areas of the state. The Coastal region reported additional safety and parking impacts related to carts in the public right-of-way.

7.3.2 Positive PHEC Impacts

When asked to identify the most significant positive PHEC impacts from collection operations, local jurisdictions from all regions identified landfill diversion, which helps reduce methane emissions — a benefit for public health and climate change.

In addition to landfill diversion, 33% of respondents identified improved soil health and food safety in the Bay Area, and protection of natural resources in the Valley region as significant benefits.

Across all regions, over half of Collection Survey respondents identified reducing litter as the most significant community benefit.

7.3.3 Local Jurisdiction Engagement

To understand potential impacts and benefits, the Collection Survey asked local jurisdictions whether they had participated in public meetings or discussions about environmental and public health impacts related to collection services. Local jurisdictions in all regions, other than the Bay Area, were evenly divided between those that have held public meetings and those that have not. Bay Area respondents reported a higher rate of public meetings, with 62% reporting they have had such meetings and 35% reporting they have not.

7.4 Community Feedback on PHEC Impacts

As discussed in section 7.2, disadvantaged communities often bear a greater burden of pollution. In the Community Recycling and Composting Survey, 65% of CBOs and EJ groups and 75% of Tribal respondents reported that environmental problems disproportionately affect certain groups in their areas — such as low-income residents, people of color, youth. These findings underscore the historical marginalization of disadvantaged communities and reinforce the need to reduce negative PHEC impacts within disadvantaged communities. The following section provides further analysis of the impacts identified by CBOs, EJ groups, and Tribes.

7.4.1 Negative PHEC Impacts

In the Community Recycling and Composting Survey, when asked to identify the most concerning collection vehicle impacts, approximately 62% to 71% of CBOs, EJ groups, and Tribal respondents were mostly unsure or only somewhat concerned about the following:

- Greenhouse gas (GHG) emissions

- Neighborhood cleanliness issues

- Litter or spillover from trucks

- General environmental impacts

Among impacts that communities were “concerned” or “very concerned” about, increased waste filling landfills was identified more often than any other impact by respondents across all regions, with this concern cited by 51% of CBOs and EJ groups and 63% of Tribal respondents. This was the only concern cited by over 50% of CBOs and EJ respondents in each region, other than the Mountain and Bay Area regions, as either “concerning” or “very concerning.” No single impact was identified by over 50% of respondents in the Mountain or Bay Area regions as “very concerning” or “concerning.”

When asked specifically about the impacts they have personally experienced, CBOs and EJ groups across all regions most often identified litter. Illegal dumping, the second most identified impact across all regions, was identified more often by respondents in the Mountain region, with 80% of respondents stating they have been directly impacted by illegal dumping. Illegal dumping was also a concern commonly cited by CBOs, EJ groups, and Tribes that participated in listening sessions further described in Appendix A.5. During these sessions, CBOs and EJ group participants from all regions of California, and Tribal representatives expressed concern about the environmental impacts of illegal dumping, its contributions to contamination, and the need for public education on proper participation in recycling collection programs. In the Southern region, CBOs and EJ groups reported the highest rates of impact from litter and illegal dumping, with 93% and 69% of respondents, respectively, citing these impacts. In the Valley region, 37% of CBOs and EJ groups reported direct impacts from the loss of recycling service providers, which is the highest rate among all regions. Among Tribal respondents, litter was the most commonly reported direct impact, cited by 100% of those surveyed. Illegal dumping was the second most cited issue, identified by 63% of Tribal respondents.

At multiple listening sessions, participants from CBOs, EJ groups, and Tribes cited concerns about the public health and environmental impacts of plastic pollution. Several emphasized the importance of focusing on source reduction and holding producers accountable. There also was strong agreement on the need to mitigate additional impacts on already overburdened communities, including marginalized groups and those living near waste facilities.

7.4.2 Positive PHEC Impacts

In the Community Recycling and Composting Survey, 77% of CBOs and EJ groups identified reducing litter and pollution — thereby creating cleaner neighborhoods — as a positive environmental impact that can result from collecting materials for recycling. This was the most frequent response provided by CBOs and EJ groups in the Mountain, Southern, and Valley regions. The Coastal region most frequently reported the production of nutrient-rich compost, which enhances soil quality, improves water retention, and reduces the need for chemical fertilizers, as a positive environmental impact from collection services. In the Bay Area and in Tribal communities surveyed, all of the following were recognized as positive environmental impacts:

Reduction of greenhouse gas (GHG) emissions by diverting materials collected for recycling/material collected for organics recycling from landfills (helps address climate change).

- Production of nutrient-rich compost, which enhances soil quality, improves water retention, and reduces the need for chemical fertilizers.
- Reduction of energy and natural resources consumption, leading to a lower carbon footprint and protection of natural resources.
- Reduction in the amounts of plastic litter.
- Increased awareness about environmental conservation, fostering a culture of environmental responsibility in communities.

These findings suggest that there is a strong understanding of the benefits of recycling; however, the specific negative impacts are less understood. This could be due to the fact that negative impacts are not as openly discussed and are often interrelated with impacts resulting from other industrial activities. CBOs and EJ groups participating in listening sessions also expressed a general concern over environmental issues, but they also recognized there are knowledge gaps or other barriers that may prevent people in their communities from participating in programs to address these concerns. The Community Recycling and Composting Survey responses validate that priority populations experience the real, negative effects of pollution burdens and lack of access to collection systems identified in section 7.2 above.

Engaging directly with communities that are near collection infrastructure is crucial for assessing the specific impacts experienced by those communities. 64 CBO and EJ group respondents to the Community Recycling and Composting Survey, representing 20% of total respondents, reported residing near recycling or composting facilities. Of those living near a recycling or composting facility, 44% said they have had opportunities to share their perspectives about the facility with community leaders, elected officials, or facility staff. There was a wide disparity of responses between regions. In the Coastal region, 78% said they have had opportunities to share their perspectives about the facility with community leaders, elected officials, or facility staff. In the Mountain region, 71% reported the same, compared to and only just 43% in the Southern region and only 10% in the Valley region. No CBO or EJ group respondents in the Bay Area nor any of the surveyed Tribal communities reported living near a recycling or composting facility.

Abbreviations and Acronyms

Abbreviation	Description
AB	Assembly Bill
AB 341	Mandatory Commercial Recycling (Assembly Bill 341)
AB 1826	Mandatory Commercial Organics Recycling (Assembly Bill 1826)
CalRecycle	The Department of Resources Recycling and Recovery
CBO	Community-Based Organization
CMC	Covered Material Category
CRV	California Redemption Value
DOF	Department of Finance
EAR	Electronic Annual Report
EJ	Environmental Justice
EPR	Extended Producer Responsibility
HDPE	High-Density Polyethylene
HF&H	HF&H Consultants, LLC
LDPE	Low-Density Polyethylene
OCC	Old Corrugated Cardboard
PET	Polyethylene Terephthalate
PHEC	Public Health, Environment, and Community
PP	Polypropylene
PRC	Public Resources Code (California Statute)
PS	Polystyrene
PVC	Polyvinyl Chloride
RDRS	Recycling and Disposal Reporting System
SB	Senate Bill
SB 343 Report	SB 343 Material Characterization Study Final Findings Report
SB 613	Senate Bill 613 (Seyarto, 2023)
SB 1383	Short-lived Climate Pollutants (Lara, 2016)
The Act	The Plastic Pollution Prevention and Packaging Producer Responsibility Act
Tribes	California Native American Tribes

Glossary of Terms

Glossary of Terms are either referenced definitions from the Act or specifically used for the purposes of this study by CalRecycle or the contractor. If a referenced definition is from the Act, the Public Resources Code (PRC) is provided in the definition.

Term	Description
Alternative Collection Program	A program that includes the collection of material, including but not limited to covered materials, and is not curbside collection (e.g., mail-back, store drop-off, doorstep collection).
Back-Haul	Generating and transporting solid waste, materials collected for recycling, or materials collected for organics recycling to a destination owned and operated by the generator using the generator's own employees and equipment.
Beverage Container Recycling Program	CalRecycle administers the California Beverage Container Recycling & Litter Reduction Program (BCRP) in which consumers pay a refundable deposit every time they purchase an included beverage and then receive – California Refund Value (CRV) – when they return the empty container to a certified recycling center, registered dealer cooperative, or participating retail location. Californians may instead choose to forfeit their deposit by donating beverage containers to certified community service programs, or giving them to a registered curbside or certified drop-off or collection program for recycling.
Bin	A collection container with a capacity of 1 to 8 cubic yards (200 to 1,600 gallons) and a hinged lid. Bins may or may not have wheels. Typical bin volumes may vary by local jurisdiction.
Cart	A plastic collection container with a hinged lid and wheels with varying capacities ranging, typically from 10 to 100 gallons. Typical cart volumes may vary by local jurisdiction.
Census Tract	Small, relatively permanent statistical subdivisions of a county or statistically equivalent entity. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of statistical data. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. A census tract usually covers a contiguous area; however, the spatial size of census tracts varies widely depending on the density of settlement.
Collect, Collected, or Collection	The act of removing discarded materials from the place of generation within a region and delivering such materials to a facility for processing or disposal.

Term	Description
Collection Program	Refers to curbside single family, multifamily, and commercial, as well as noncurbside options such as residential and commercial drop-off, take-back, public space collection, and other options for the collection of covered materials. Depending on the collection program, single family, multifamily, and commercial sources may be mixed (e.g., a single hauler route may pick up curbside recycling from both commercial and multifamily locations). The definitions of single family, multifamily, and commercial may also differ between collection programs.
Commercial	Of, from, or pertaining to nonresidential premises where business activity is conducted, including but not limited to retail sales, services, wholesale operations, institutions, manufacturing and industrial operations, hotels, motels, other similar hospitality premises, and any and all facilities operated by governmental entities, but excluding businesses conducted upon premises that are permitted under applicable zoning regulations and are not the primary use of the property.
Community-Based Organization (CBO)	Refers to a public or private nonprofit organization of demonstrated effectiveness that: <ol style="list-style-type: none"> <li data-bbox="440 982 1421 1056">1. Has deployed projects and/or outreach efforts within the region of one or more impacted priority populations in California. <li data-bbox="440 1056 1421 1203">2. Has an official mission and vision statements that expressly identify serving priority populations (e.g., disadvantaged communities, low-income communities, and/or communities in rural areas). <li data-bbox="440 1203 1421 1312">3. Currently employs staff member(s) who specialize in and are dedicated to diversity, equity, or inclusion, or is a 501(c)(3) nonprofit.
Compactor	A mechanical apparatus that compresses materials to reduce their volume.
Composting	The controlled biological decomposition of organic solid wastes that are either source-separated from the municipal solid waste stream or separated from the municipal solid waste stream at a processing facility.
Collection Container	A receptacle for temporary storage of solid waste, materials collected for recycling, or materials collected for organics recycling. Collection containers include, but are not limited to, bins, carts, compactors, and roll off boxes.

Term	Description
Contamination	<p>Contamination occurs when material that is not intended to be recycled enters the recycling stream. This may include materials intentionally included in a product that are removed during the recycling process, and materials that incidentally or accidentally end up in the recycling stream (or in the incorrect recycling stream). It may also include materials that are deleterious to facilities or consumers. Contamination may encompass various situations and materials:</p> <ul style="list-style-type: none"> • A material that a collection program does not accept. • A material that a receiving processing facility or end market does not accept or is not designed, permitted, or authorized to recycle. • A material that a receiving processing facility or end market accepts but that is destined for disposal.
Covered Material	<p>The Act applies to “covered material,” which PRC section 42041(e) defines as:</p> <p>Single-use packaging [PRC section 42041 (e)(1)(A)] that is routinely recycled, disposed of, or discarded after its contents have been used or unpackaged, and typically not refilled or otherwise reused by the producer.</p> <p>Plastic single-use food service ware [PRC section 420241 (e)(1)(B)], including, but not limited to, plastic-coated paper or plastic-coated paperboard, paper, or paperboard with plastic intentionally added during the manufacturing process, and multilayer flexible material.</p>
Covered Material Category (CMC)	<p>A category that includes covered material of a similar type and form, as determined by the department [PRC section 42041(f)]. This report uses the CMCs that CalRecycle published on July 1, 2024. The list and other supplementary material can be found at https://CalRecycle.ca.gov/packaging/packagingepr/cmclist/.</p>
Covered Material Category Collection Group (CMC Collection Group)	<p>A group that includes related CMCs, as determined by the contractor for the purposes of this contract. Please see Appendix A, section 4.A for further details on groupings.</p>
CRV Materials	<p>See definition for Beverage Container Recycling Program.</p>
Curbside Collection (or Curbside)	<p>A program that includes the collection of material, including but not limited to covered materials, by a local jurisdiction or recycling (including composting) service provider under contract with a local jurisdiction (PRC 42041(g)).</p>

Term	Description
Customer	The person whom a local jurisdiction or their recycling service provider(s) submits its billing invoice to and collects payment from for collection services provided to a premises. The customer may be the occupant, owner, or manager of the premises.
Disposal (of Covered Material)	<p>Material landfilled, used for alternative daily cover (Title 27, California Code of Regulations (CCR), section 20690), used for alternative intermediate cover (Title 27, CCR, section 20700), combusted, incinerated, used for energy generation, or used for fuel production, except for anaerobic digestion of source-separated organic materials.</p> <p>Material that does not enter the managed disposal system or is lost from the recycling and waste management system through open burning, illegal dumping, or other forms of leakage.</p>
Disposed of	Material sent to any activity meeting the definition of disposal, such as landfill or incineration.
End Market	<p>For material sent to a composting or in-vessel digestion facility for the creation of compost, digestate, or biogas, the end market is that facility.</p> <p>For other material, the end market is the entity that converts the material into feedstock to be used in lieu of virgin material to produce new or reconstituted products. Example end markets include:</p> <ul style="list-style-type: none"> • Glass: a beneficiation plant that produces cullet. • Metal: an entity that smelts metal to produce ingots, sheets, or coils. • Paper: a beneficiation plant that repulps material into a pulp product. • Wood: an entity that chips and grinds wood material. • Plastic: an entity that creates pellet.
Exclusive	Refers to a type of agreement or service arrangement between a local jurisdiction and a recycling service provider for solid waste handling services in which the recycling service provider has the sole or exclusive right to collect designated material(s) within the local jurisdiction or designated part(s) of a local jurisdiction.

Term	Description
Food Waste	A subset of organic waste including: food scraps (discarded food that will decompose and/or putrefy including: [i] all kitchen and table food; [ii] animal or vegetable waste that is generated during or results from the storage, preparation, cooking or handling of food stuffs; [iii] fruit waste, grain waste, dairy waste, meat, and fish waste; and [iv] vegetable trimmings, houseplant trimmings, and other organic waste common to the occupancy of residential dwellings and some commercial kitchen operations).
Franchise Service	A type of agreement or service arrangement in which a recycling service provider may conduct collection services in a local jurisdiction, as memorialized in a franchise agreement between the local jurisdiction and recycling service provider. Franchise service may be exclusive or nonexclusive.
Kraft Paper	Stiff, sturdy paper derived from wood pulp, usually brown but can be white or colored.
Landfill Stream	Solid waste that is accepted by a local jurisdiction for collection, transfer (if applicable), and transport to a disposal facility. The exact list of solid waste accepted for collection in the landfill stream varies by local jurisdiction and is therefore not specifically listed herein. This does not include disaster debris or designated waste sent to landfill.
Leakage	Refers to the loss of materials from various stages of the recycling and waste management process, such as during collection, transportation, sorting, or processing. Leakage results in these materials failing to reach the intended processing, end market, or disposal facilities.
Local Jurisdiction	A city, county, city and county, regional agency formed pursuant to Chapter 5 (commencing with section 6500) of Division 7 of Title 1 of the Government Code or Article 3 (commencing with section 40970) of Chapter 1 of Part 2, or special district that provides solid waste collection services (PRC 42041(m)).
Materials Collected for Organics Recycling	Organic waste that is accepted by a local jurisdiction for collection, transfer (if applicable), and transport to a facility(ies) for composting, in-vessel digestion, or other organic waste processing permitted under applicable law. The exact list of materials collected for organics recycling will vary by local jurisdiction and is therefore not specifically listed herein.

Term	Description
Materials Collected for Recycling	<p>Materials accepted by a local jurisdiction for collection, transfer (if applicable), and transport to a facility(ies) for recycling, in accordance with applicable law. The exact list of materials collected for recycling will vary by local jurisdiction and is therefore not specifically listed herein.</p> <p>For the purposes of this report, materials collected for recycling do not include organic waste intended for composting or in-vessel digestion.</p>
Mixed Waste	<p>Solid waste that includes landfill stream material and may additionally be combined with materials collected for recycling and/or materials collected for organics recycling. The exact list of mixed waste accepted for collection will vary by local jurisdiction and is therefore not specifically listed herein.</p>
Multifamily	<p>Of, from, or pertaining to residential premises with five or more dwelling units. Multifamily properties do not include hotels, motels, or other transient occupancy facilities, which are considered commercial businesses.</p>
Natural/Clear	<p>Referring to glass or plastic without coloring.</p>
Nonexclusive	<p>A type of agreement or service arrangement between a local jurisdiction and a recycling service provider for solid waste handling services in which the recycling service provider does not have the exclusive right to collect materials within the local jurisdiction or a designated part of a local jurisdiction.</p>
Organic Waste	<p>Solid wastes containing material originated from living organisms and their metabolic waste products, including but not limited to food, green material, landscape and pruning waste, organic textiles and carpets, lumber, wood, paper products, printing and writing paper, manure, biosolids, digestate, and sludges. Not all organic waste is collected in collection containers for organics recycling.</p>

Term	Description
Packaging	<p>PRC section 42041(s): means any separable and distinct material component used for the containment, protection, handling, delivery, or presentation of goods by the producer for the user or consumer, ranging from raw materials to processed goods.</p> <p>“Packaging” includes, but is not limited to, all of the following:</p> <p>(1) Sales packaging or primary packaging intended to provide the user or consumer the individual serving or unit of the product and most closely containing the product, food, or beverage.</p> <p>(2) Grouped packaging or secondary packaging intended to bundle, sell in bulk, brand, or display the product.</p> <p>(3) Transport packaging or tertiary packaging intended to protect the product during transport.</p> <p>(4) Packaging components and ancillary elements integrated into packaging, including ancillary elements directly hung onto or attached to a product and that perform a packaging function, except both of the following:</p> <p>(A) An element of the packaging or food service ware with a de minimis weight or volume, which is not an independent plastic component, as determined by the department.</p> <p>(B) A component or element that is an integral part of the product, if all components or elements of the product are intended to be consumed or disposed of together.</p>
Paper	A material made from cellulose pulp derived mainly from wood, for the creation of consumer products.
Paperboard	A thicker paper material used for the production of packaging containers such as folding cartons, paper cups, and coated boards.
Permitted Service	A type of agreement or service arrangement in which a recycling service provider may conduct specified collection services in a local jurisdiction, provided that the recycling service provider has received a permit from the local jurisdiction.
Person	An individual, firm, limited liability company, association, partnership, public or private corporation, or any other legal entity.

Term	Description
Plastic	PRC section 42041(t): means a synthetic or semisynthetic material chemically synthesized by the polymerization of organic substances.... "Plastic" includes, without limitation, polyethylene terephthalate (PET), high density polyethylene (HDPE), polyvinyl chloride (PVC), low density polyethylene (LDPE), polypropylene (PP), polystyrene (PS), polylactic acid (PLA), and aliphatic biopolyesters, such as polyhydroxyalkanoate (PHA) and polyhydroxybutyrate (PHB). "Plastic" does not include natural rubber or naturally occurring polymers such as proteins or starches.
Plastic Component	PRC section 42041(u): Plastic component means any single piece of covered material made partially or entirely of plastic. A plastic component may constitute the entirety of the covered material or a separate or separable piece of the covered material.
Plastic Covered Material	Plastic covered material includes any item of covered material with a plastic component.
Priority Populations	Disadvantaged communities, low-income communities, communities in rural areas, and Tribes.
Processing	To sort, segregate, break or flake, and clean material to prepare it to meet the specification for sale to a responsible end market (PRC 42041(v)).
Processing Facility	Any facility that engages in the statutory definition of processing (PRC 42041(v)).

Term	Description
<p>Producer</p>	<p>A person who manufactures a product that uses covered material and who owns or is the licensee of the brand or trademark under which the product is used in a commercial enterprise, sold, offered for sale, or distributed in the state (PRC 42041(w)(1)).</p> <p>If there is no person in the state who is the producer for purposes of paragraph (1), the producer of the covered material is the owner or, if the owner is not in the state, the exclusive licensee of a brand or trademark under which the covered product using the covered material is used in a commercial enterprise, sold, offered for sale, or distributed in the state. For purposes of this subdivision, a licensee is a person holding the exclusive right to use a trademark or brand in the state in connection with the manufacture, sale, or distribution of the product packaged in or made from the covered material (PRC 42041(w)(2)).</p> <p>If there is no person in the state who is the producer for purposes of paragraph (1) or (2), the producer of the covered material is the person who sells, offers for sale, or distributes the product that uses the covered material in or into the state (PRC 42041(w)(3)).</p> <p>“Producer” does not include a person who produces, harvests, and packages an agricultural commodity on the site where the agricultural commodity was grown or raised (PRC 42041(w)(4)).</p> <p>For purposes of this chapter, the sale of covered materials shall be deemed to occur in the state if the covered materials are delivered to the purchaser in the state (PRC 42041(w)(5)).</p>
<p>Producer Responsibility Organization (PRO)</p>	<p>An organization that is exempt from taxation under section 501(c)(3) of the federal Internal Revenue Code of 1986 and is formed for the purpose of implementing a plan to meet the requirements of this chapter (PRC 42041(x)).</p>
<p>Recycled Organic Product</p>	<p>Digestate used for land application, biogas, and compost produced by a process that meets the definition of recycling.</p>

Term	Description
Recycling	<p>PRC section 42041(aa) defines recycle or recycling as the process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise ultimately be disposed of onto land or into water or the atmosphere, and returning them to, or maintaining them within, the economic mainstream in the form of recovered material for new, reused, or reconstituted products, including compost, that meet the quality standards necessary to be used in the marketplace.</p> <p>Recycling does not include combustion, incineration, energy generation, fuel production (except for the anaerobic digestion of source-separated organic materials), or other forms of disposal.</p> <p>Recycling includes both traditional recycling processes (e.g., recycling steel cans) and organic recycling processes (e.g., composting organic materials). For material to be considered recycled, it must be sent to a responsible end market (PRC section 42041(aa)(3)).</p>
Recycling Rate	Weight of material recycled / (weight of material recycled plus weight of material disposed of).
Recycling Service Provider (RSP)	<p>A solid waste enterprise that provides solid waste handling services on behalf of a local jurisdiction (PRC 42041(ac)).</p> <p>Note: For the purposes of this report, RSP refers only to the collection service provider (i.e., does not include material processing).</p>
Region or Regional	Mutually exclusive and collectively exhaustive geographic areas of the state as determined by CalRecycle’s Agreement DRR24043 and Statewide Waste Characterization Study. There are five distinct regions: Bay Area, Coastal, Mountain, Southern, and Valley (regions). A map and further description of each unique region is included in Appendix A, section 1.
Residential	Of, from, or pertaining to single-family and multifamily properties used for human shelter, irrespective of whether such property units are rental units or are owner-occupied, excluding hotels, motels, or other similar premises.
Responsible End Market	A materials market in which the recycling and recovery of materials or the disposal of contaminants is conducted in a way that benefits the environment and minimizes risks to public health and worker health and safety (PRC 42041(ad)).
Roll-Off Box	An open-top collection container with a capacity, typically, of eight to 40 cubic yards that is serviced by a roll-off collection vehicle (Typical roll-off box volumes may vary by local jurisdiction).
Secondary Packaging	Packaging that is intended to bundle, sell in bulk, brand, or display a product (See the definition of packaging).

Term	Description
Self-Hauler or Self-Haul	A person who transports solid waste, organic waste, materials collected for recycling or recovered material they have generated to another person. Self-hauler also includes a person who back-hauls waste.
Single-Family	Of, from, or pertaining to a residential premises with less than five units.
Single-Use Packaging	Packaging that is routinely recycled, disposed of, or discarded after its contents have been used or unpackaged, and typically not refilled or otherwise reused by the producer (See the definition of covered material).
Solid Waste	Means and refers to the definition of “solid waste” in California PRC section 40191, as it may be amended or superseded from time to time.
Source Separated	The generator segregated the discarded materials into separate collection containers for collection by the recycling service provider, such that all solid waste was placed in a solid waste collection container, all materials collected for recycling were placed in a collection container for recycling, and all organic materials were placed in a collection container for organics recycling.
The Act	Refers to The Plastic Pollution Prevention and Packaging Producer Responsibility Act (The Act, Senate Bill 54, Allen, Chapter 75, Statutes of 2022).
Technical Assistance	A form of education and outreach conducted by a local jurisdiction, or their recycling service provider or designee, that typically involves direct contact with generators (e.g., on-site visits, phone calls, or video calls) for purposes such as general education, trainings, waste assessments, compliance support, service level adjustments, or other outreach.
Thermoform	A manufacturing process in which a plastic sheet is heated to a pliable forming temperature, formed to a specific shape in a mold, and trimmed to create a usable product. The sheet, or film when referring to thinner gauges and certain material types, is heated in an oven to a high enough temperature that it can be stretched into or onto a mold and cooled to a finished shape.
Yard Trimmings	A subset of organic waste including grass, lawn clippings, shrubs, plants, weeds, branches, and other forms of organic waste generated from landscapes, yards, or gardens.
White Paper	Generally, refers to white or cream-colored paper packaging recovered from offices, homes, schools, and other sources (e.g., white envelopes).

Bibliography

- “2021 Disposal Facility-based Characterization of Solid Waste in California.” CalRecycle. June 2024. <https://calrecycle.ca.gov/wcs/dbstudy/>. Accessed September 30, 2025.
- “ACS Demographic and Housing Estimates (DP05).” American Community Survey Data, 2020, <https://data.census.gov/table?q=DP05>. Accessed September 25, 2025.
- “Alameda – Curbside Service Information,” *Stop Waste*, <https://resource.stopwaste.org/curbside/alameda> (September 9, 2025)
- “All Salaries,” *Transparent California*, < <https://transparentcalifornia.com/>> (September 25, 2025)
- Bednarz, Alexia, Goodwill RFI Response – CA 54, Received by Colleen Foster, 08/10/2025, “Email”
- “California’s Central Valley, Regional Characteristics,” United States Geological Survey, <<https://ca.water.usgs.gov/projects/central-valley/about-central-valley.html>> (September 3, 2025)
- CalRecycle, “2022 State of Disposal and Recycling Report,” *CalRecycle*, February 20, 2024, <<https://www2.calrecycle.ca.gov/Publications/Details/1732.>>
- CalRecycle, California Landfills: Measuring Single Use Packaging and Plastic Food Service Ware Disposed, Preliminary Findings, 2025
- CalRecycle, Community Service Programs/Dropoff or Collection Program Details, 2025, www2.calrecycle.ca.gov/BevContainer/CertifiedPrograms/OtherPrograms, (09/22/2025)
- CalRecycle – Haulers, 2025, calrecycle.ca.gov/organics/slcp/haulers, (09/22/2025)
- CalRecycle, Plastic Pollution and Packaging Producer Responsibility Act – SB 54 List of Covered Materials Categories, 2025, calrecycle.ca.gov/packaging/packaging-epr/cmclist, (09/27/2025)
- CalRecycle, Recycling Programs Defined – Dropoff or Collection Program (CP)., 2025, calrecycle.ca.gov/bevcontainer/certoperator/recycleprograms, 09/22/2025
- CalRecycle, “SB 343 Material Characterization Study Preliminary Findings,” *CalRecycle*, December 28, 2023, <https://www2.calrecycle.ca.gov/Publications/Details/1729>.
- CalRecycle, “Publication Summary: SB 343 Final Findings Report (DRRR-2025-1750),” *CalRecycle*, 4 Apr. 2025, www2.calrecycle.ca.gov/Docs/Publications/Details/1751.
- “Contamination Fee Database.” “HF&H Consultants Intranet,” HF&H Consultants, LLC. Accessed September 4, 2025.

Corning Recycles: Corning Customer Recycling Program, 2025, www.corning.com/worldwide/en/products/life-sciences/resources/life-sciences-sustainability/package-recycle-program.html, 8/29/2025

Crider, Johnna, “Reverse Vending Machine That Pays Cash For Plastic — Clean Technica Interview”, www.cleantechnica.com/2021/07/30/reverse-vending-machine-that-pays-cash-for-plastic-cleantechnica-interview, (07/30/2021)

“Department-Approved Waivers for Reporting Entities.” CalRecycle, <https://calrecycle.ca.gov/organics/slcp/waivers/approved/>. Accessed September 1, 2025.

“E-5 Population and Housing Estimates for Cities, Counties, and the State, January 2021-2025, with 2020 Benchmark.” State of California, Department of Finance, <https://dof.ca.gov/forecasting/demographics/estimates/e-5-population-and-housing-estimates-for-cities-counties-and-the-state-2020-2025/>. Accessed June 12, 2025.

Cascadia Consulting Group, “2024 San Francisco Waste Characterization Study,” December 2024.

“Glossary.” United States Census Bureau, <https://www.census.gov/programs-surveys/geography/about/glossary.html>. Accessed September 23, 2025.

Golden, Ali, TerraCycle RFI Response – CA 54, Received by Colleen Foster, 08/05/2025, “Email”

“Franchise Profiles Database.” “HF&H Consultants Intranet”, HF&H Consultants, LLC. Accessed August 15, 2025.

Golden, Ali, TerraCycle RFI Response – CA 54, Received by Colleen Foster, 08/05/2025, “Email”

HF&H Consultants, “San Francisco Refuse Rate Board, Capital Planning,” *City and County of San Francisco*, February 21, 2025, https://media.api.sf.gov/documents/HFH_SF_Capital_Plan_Recs_021825.pdf, PowerPoint Presentation.

International Paper, “Cardboard Recycling Challenge for Fast Growing Healthy Foods Supermarket”, 11/25/2024, www.internationalpaper.com/resources/customerstories/cardboard-recycling-challenge-fast-growing-healthy-foods-supermarket, (09/10/2025)

“Jurisdiction Electronic Annual Data Reports.” CalRecycle, 2023, <https://calrecycle.ca.gov/lqcentral/datatools/reports/ear/>. Accessed May 19, 2025.

Laird, Karen, “New reverse vending Cube platform gamifies recycling”, www.sustainableplastics.com/news/new-reverse-vending-cube-platform-gamifies-recycling, (08/22/2023)

Kessler, CRRA, SWANA, Zero Waste Principles and Practices Manual/Instructor Guide, 2017, Chapter 4 Collection, Accessed on September 24, 2025

Mikala Kass, “First-of-its-kind plastics recycling microfactory to transform waste, create new jobs, Circular Plastics Microfactory result of partnership between ASU, City of Phoenix, Goodwill, Hustle PHX”, news.asu.edu/20240207-environment-and-sustainability-firstofitskind-plastics-recycling-microfactory-transform, (02/07/2024)

“Minutes of the Planning Committee and Alameda County Recycling Board.”
StopWaste, Thursday, July 9, 2020,
<https://www.stopwaste.org/sites/default/files/PC%26RB%2007-09-20%20pkt.pdf>.

National Academies of Sciences, Engineering, and Medicine, 2025, *Municipal Solid Waste Recycling in the United States: Analysis of Current and Alternative Approaches*. Washington, DC: The National Academies Press.
 Doi.org/10.17226/27978, Assessed September 22, 2025

Newcomer, Emily, Ridwell Response to RFI – CA 54, 08/06/2025, “Email”

New-Indy Containerboard, 2025, newindycontainerboard.com/what-we-do, 09/22/2025

Nespresso “Choose to Recycle, 2025,
www.nespresso.com/us/en/recycling?msocid=397e2e471552628234073a7f14a963c4, (09/22/2025)

Olyns “Rethinking Recycling,” 2025, www.olyns.com, 09/22/2025

PineCone Press Newsletter, Clean Mountain Sites Drop-Off Locations for Trash and Recyclables, 2022, www.burrtec.com/wp-content/uploads/2022/04/SBC-Mountain-Summer-2022-M3d-proof.pdf, (08/29/2025)

Recology, “Refuse Rate Board Hearing,” *City and County of San Francisco*, September 30, 2024, https://www.sf.gov/sites/default/files/2024-09/2024-09-30%20Rate%20Board%20Hearing%20Agenda%20%235%20Presentation_Recology.pdf, PowerPoint Presentation.

Recology, “Rate Change Request, Refuse Rate Board Hearing #1,” *City and County of San Francisco*, February 21, 2025,
https://media.api.sf.gov/documents/Refuse_Rate_Board_Hearing_1_Recology_Presentation_-_2.21.2025.pdf, PowerPoint Presentation.

Recreate Waste Collaborative, “Residential Recycling Contamination Pilot Project Report of Findings,” January 31, 2022.

“*Recycling and Disposal Reporting: Report List*,” *CalRecycle*, 2025, <
<https://www2.calrecycle.ca.gov/RecyclingDisposalReporting/Reports.>>

Recycling Center Near Me, 2025, www.recyclingcenternear.me/plastic-bag-recycling/, (8/29/2025)

Recycling Drop Off Center – Mojave Desert and Mountain Recycling Authority, 2025,
urecycle.org/residential-recycling, (08/29/2025)

Republic Services. “Otay Mesa Facility Tour,” April 15, 2025, Chula Vista, CA.

Rethink Waste, South Bayside Waste Management Authority, About Shoreway, 2025, rethinkwaste.org/shoreway-environmental-center/about/, (08/29/2025).

Ridwell, 2025, express.ridwell.com, (08/29/2025)

San Francisco Environment Department, "SB 1383 Enforcement Ordinance Success Story," San Francisco Environment Department, <https://www.sfenvironment.org/media/14493>, (September 9, 2025)

"Selected Economic Characteristics (DP03)." American Community Survey Data, 2020, <https://data.census.gov/table?q=DP03>. Accessed September 25, 2025.

Sephora + Pact, 2025, www.pactcollective.org/pact-x-sephora, 08/30/2025

Smalley, Megan, "Olyns, Mars partner to recycle rigid plastic candy containers," www.recyclingtoday.com/news/olyns-mars-partner-reverse-vending-machine-challenge, (10/25/2022)

Starkey, Meghan, "*Final Report: Grant Report on Compost Contamination Reduction Pilot*," StopWaste, June 11, 2020, <https://www.stopwaste.org/sites/default/files/PC%26RB%2007-09-20%20pkt.pdf>.>StopWaste – Alameda County Waste Management Authority, Alameda County 2023-2024 Waste Characterization Study, 2025, assessed on September 27, 2025

Target, 2025, Waste Elimination and Reduction, corporate.target.com/sustainability-governance/circularity/waste-elimination-reduction, 8/29/2025c

The Recycling Partnership, "West Coast Contamination Initiative Research Report," April 2020.

"*Summary: Diesel Particulate Matter Health Impacts*," California Air Resources Board, 2025, <<https://ww2.arb.ca.gov/resources/summary-diesel-particulate-matter-health-impacts#:~:text=Several%20factors%20exacerbate%20the%20health,damage%20DNA%20and%20cause%20cancer>> (September 3, 2025).

"Waived Tracts." CalRecycle. Accessed September 9, 2025.

Waste360 Staff, "*StopWaste Chooses Compology's Dumpster Monitoring Technology*," Waste 360, November 7, 2018, <https://www.waste360.com/fleet-technology/stopwaste-chooses-compology-s-dumpster-monitoring-technology>.

Waste Today Staff, "Kroger to Process Foodwaste for Energy," 05/17/2013, www.wastetodaymagazine.com/news/kroger-food-waste-energy-anaerobic-digestion, (09/10/2025)