CalRecycle

SB 343 Material Characterization Study Final Findings 2023/2024

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State of California

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Executive Summary

Lawmakers enacted Senate Bill 343 (SB 343, Allen, Chapter 507, Statutes of 2021) prohibiting the use of the chasing arrows symbol or any other indicator of recyclability on products and packaging unless producers can show certain criteria are met. (See Public Resources Code section 42355.51. Unless otherwise indicated, all statutory references in this report are to the Public Resources Code (PRC).) SB 343 places responsibility of the use of recyclability labeling on the producer of the product and packaging.

SB 343 additionally requires the California Department of Resources Recycling and Recovery (CalRecycle) to conduct and publish a characterization study of materials collected, sorted, sold, or transferred for recycling in California (see section 42355.51(d)(1)). SB 343 neither authorizes nor directs CalRecycle to determine or report on the recyclability of particular products and packaging or the appropriate use of the chasing arrows or other indicators of recyclability. Parties evaluating whether a product is eligible to be labeled recyclable in California may utilize additional information not presented in this study.

In 2023, CalRecycle completed its first material characterization study to inform a baseline understanding and initial benchmark of common materials collected, sorted, sold or transferred for recycling through a sample size of the state's large processors. CalRecycle contracted with Cascadia Consulting Group to conduct the study. SB 343 specifically requires CalRecycle to study recycling streams through large volume processors that collect waste from more than half of the state's population areas. CalRecycle and Cascadia designed a study that incorporated representative, cost-effective sampling and analysis for data gathering that minimized disruption to facility operators. Collection of additional material characterization sampling was conducted in January and February 2024, and jurisdiction collection program information was conducted in September and October 2024.

The final 2023/2024 study findings provide information on whether a product or package is commonly recyclable in California for the purposes of section 42355.51. The findings of this study reflect:

- Information from local jurisdictions on the materials accepted by their residential curbside recycling programs.
- Survey results detailing the sorting activities at California large volume transfer/processing facilities (LVTP facilities).
- Results of material characterization sampling of recyclable materials at LVTP facilities statewide.

SB 343 requires CalRecycle to revise the study in 2027 and every five years thereafter. CalRecycle will continuously improve its methodology and approach to support a broad look at recyclability of materials across the state.

Future studies will be designed to better align with covered materials categories for SB 54 (Allen, Chapter 75, Statutes of 2022).

For a brief overview of the tables and pertinent data within this study, refer to the Summary of Findings section.

Note on Recyclability Determinations

Section 42355.51(d)(2) requires that products and packaging meet several criteria to be considered recyclable in the state. Criteria include that such materials:

1) Are accepted for collection by jurisdiction recycling programs (section 42355.51(d)(2)(A)). See Table 1 and supporting data in Appendix 1.
2) Are sorted into defined streams by large volume transfer/processing facilities (LVTP facilities) (section 42355.51(d)(2)(B)(i)). See Table 2 and supporting data in Table 3 and Appendix 1.
3) Are sent to a reclaimer and reclaimed consistent with the Basel Convention (section 42355.51(d)(2)(B)(i)).
4) Meet specific composition and design requirements (section 42355.51(d)(3)).

This report provides data only on jurisdiction residential curbside recycling program collection and the sorting behaviors of LVTP facilities in California (items (1) and (2) above). It does not provide information on the destination or ultimate disposition of materials sorted and sold by LVTP facilities (item (3)). Nor does it provide information regarding the composition or design of specific products or packaging (item (4)).

Regarding item (3), the “Basel Convention” refers to the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal, which entered into force in 1992 and has 179 member countries. It aims to reduce the adverse impacts of the cross-border transportation, management, and disposal of hazardous and other waste. See the Basel Convention webpage for more information.

The Basel Convention elements most relevant to SB 343 are those restricting the export and import of plastic recyclables and waste. These restrictions were added through amendments that became effective January 1, 2021, (see the U.S. Environmental Protection Agency (EPA) webpage or the Basel Convention plastic waste webpage for more information). Basel Convention restrictions focus on the type of material (e.g., type of plastic), contamination levels, whether the importing country is a party to it, and whether there are additional trade agreements in place (see the U.S. EPA webpage concerning international trade agreements, including the Basel Convention).

Because this report does not provide information regarding items (3) and (4), it does not contain all the information necessary to determine the recyclability status for any particular product or packaging. To make such a determination, entities will require additional information - in particular, information relevant to sections 42355.51(d)(2)(B)(i) and 42355.51(d)(3).

Public comments received from December 28, 2023, through May 31, 2024, and January 1, 2025, through March 12, 2025, are included in Appendix 2.

Overview of Changes

This section summarizes the revisions to the Revised Preliminary Findings Report (DRRR-2024-1746) published December 31, 2024, embodied in this final report.

Main Report

This final report incorporates the following revisions:

- Minor clarification changes to Table 1 (see report section – Collection by Jurisdiction Residential Curbside Recycling Programs).
- Updated text throughout to reflect updated numbers of counties served by study facilities (34 of 58 counties, encompassing 93% of California's population) due to the inclusion of additional counties served by two study facilities, as verified by CalRecycle's collected survey data.
- Results updated in Table 2 (see report section – Materials Sorted by Large Volume Transfer/Processing Facilities), based on the inclusion of four additional counties served by two study facilities and the modification of two facility outflows from Gable-top Carton or Aseptic Containers to one inclusive outflow of both Gable-top Carton and Aseptic Containers. All changes were verified by CalRecycle's collected LVTP facilities survey data.
- Minor clarifying changes to Table 2 (see report section – Materials Sorted by Large Volume Transfer/Processing Facilities).

Appendix 1

- Minor clarifying changes to several tables.
- Updated text throughout to reflect updated numbers of counties served by study facilities (34 of 58 counties, encompassing 93% of California's population) due to the inclusion of additional counties served by two study facilities, verified by CalRecycle's collected survey data.
- Added methodology for inclusion of a table from the Preliminary Report - "2023 jurisdiction survey" in Section 1.4.

- Added a table from the Preliminary Report – “2023 jurisdiction survey” to supplement Material Types and Forms not addressed in the updated jurisdiction survey (“2024 jurisdiction survey”). The new table is in Section 2.2 Table E1.
- Results updated in Section 1.6, Table B1; Section 2.3, Table F1; Section 2.4, Table G1; Section 2.4, Table G2; Section 2.5, Table G3, based on the inclusion of four additional counties served by two study facilities, as well as the modification of two facility outflows from Gable-top Carton or Aseptic Containers to one inclusive outflow of Gable-top Carton and Aseptic Containers. All changes were verified by CalRecycle’s collected data.
- Added a new table to Section 2.8, Table K1 which examines approximate object count for cartons in ONP and Mixed Paper, Gable-top Carton and Aseptic Carton, and Residual outflows.

Additional Elements

The following two elements have been added:

- Description of the Basel Convention parameters and how they apply to SB 343 criteria (see Note on Recyclability Determinations section, above).

- Public comments received by CalRecycle from January 1, 2025, through March 12, 2025 (see Appendix 2 – Public Comments).

Data Records Available Pursuant to the Public Records Act

Records related to this report, such as R Statistical Program scripts, can be requested through the CalRecycle Public Records Portal and include:

- Local Jurisdiction Internet-Based Survey (2023)
- Local Jurisdiction Survey (2024)
- LVTP Facilities Survey
- LVTP Facilities-Based Material Characterization Study

Background

SB 343 prohibits the use of the chasing arrows symbol or any other indicator of recyclability on products and packaging unless certain criteria are met. CalRecycle is required to publish data about the material types and forms that are collected, sorted, sold, or transferred by solid waste facilities (section 42355.51(d)(1)(B)(i)).

Section 42355.51(d)(1)(B)(v) directs CalRecycle to publish preliminary findings of the study and conduct a public meeting to present those findings and receive public comments. CalRecycle published the SB 343 Material Characterization Study

Preliminary Findings report (DRRR-2023-1728) on December 28, 2023. After receiving and considering public comments, CalRecycle is directed to finalize and publish the findings of the study. This report presents the findings of the study and also includes information regarding jurisdiction residential curbside recycling programs.

As outlined in section 42355.51(d)(2), a product or packaging may be considered recyclable in the state if the product or packaging is of a material type and form that is both:

1) Collected for recycling by jurisdiction recycling programs that collectively encompass at least 60% of the population of the state; and
2) Sorted into defined streams for recycling processes by large volume transfer/processing facilities (LVTP facilities) that:
   a) Process materials and collectively serve at least 60% of recycling programs statewide.
   b) Send the defined streams to and reclaimed at a reclaiming facility consistent with the requirements of the Basel Convention.

Collecting the information necessary to determine whether a material type and form meets the requirement of being sent to and reclaimed at a reclaiming facility consistent with the requirements of the Basel Convention would require reclaiming facilities located both in and out of the state to report on their acceptance of materials and the ultimate reclamation of those materials. SB 343 does not give CalRecycle the authority to require reclaiming facilities in or out of the state to report on their acceptance of materials and the ultimate reclamation of those materials.

Methods

CalRecycle conducted two primary data collection efforts to provide information on the two criteria outlined in section 42355.51(d)(2). Data collection was conducted to:

- Gather information on material types and forms collected for recycling by jurisdiction residential curbside recycling programs.
- Gather information on material types and forms sorted by LVTP facilities in California.

The following methods are provided separately for each of the two data collection efforts.

Material Types and Forms List

To standardize unique item descriptions across recycling programs at both the curbside collection and processing stages, CalRecycle first developed the material types and forms list. Candidate items were identified through consultation with internal subject-matter experts, informal survey of common products and disposed items, and interviews

of staff at LVTP facilities. Items likely handled by collection and/or sorting activities for recycling in California were assigned to 91 unique material types and forms. Each material type and form have a corresponding material class, alphanumeric code, name, definition, and example items for inclusion or exclusion (Appendix 1, Section 1.7, Table C1).

Collection by Jurisdiction Residential Curbside Recycling Programs

To identify which recyclable materials are being accepted by jurisdiction residential curbside recycling programs across the state, local recycling information was collected for each jurisdiction in California. Using population data combined with information on materials accepted by jurisdiction residential curbside recycling programs, CalRecycle estimated the proportion of the statewide population that has access to jurisdiction residential curbside programs that accept a given material type and form for recycling collection (Table 1).

List and Population of Jurisdictions in California

Jurisdiction names from survey entries were aligned to jurisdiction names in CalRecycle's Recycling and Disposal Reporting System (RDRS) and to city and county names in data from the California Department of Finance (DOF). The DOF publishes Population and Housing Estimates for the State of California each year on its website. The 'Balance of County' sections within the population spreadsheet were used to account for the population of unincorporated areas within a given California county.

Materials Collected by Jurisdiction Residential Curbside Recycling Programs

2024 Jurisdiction Survey

To obtain information on the percentage of the California population with access to residential curbside recycling programs which accept each SB 343 material type and form, CalRecycle administered an online survey sent to all California jurisdictions via listserv from September 18 to October 18, 2024 ("2024 jurisdiction survey"). Staff from CalRecycle's Local Assistance and Market Development Branch followed up with individual jurisdictions after the survey's release. The survey was part of a larger data collection effort to characterize the types and forms of materials accepted for recycling by residential curbside collection programs (not including materials collected for composting or organics recycling).

Survey questions addressed information on type of collection program (e.g., number of bins), followed by six sections, organized by material class: (1) glass; (2) ceramic; (3) metal; (4) paper/fiber; (5) plastic; and (6) wood and other organics. For each section,

survey questions listed material types and asked respondents to indicate if a jurisdiction did not accept any of those materials in their residential curbside recycling programs (see Appendix 1, Section 1.2 for a full list of survey questions). If a jurisdiction has more than one hauler or the residential curbside recycling program differs within a jurisdiction, respondents were asked to answer in terms of the hauler/collection that serves the largest population.

The “2024 jurisdiction survey” response entries with any answered material acceptance questions were retained. For the jurisdiction-completed surveys, blank answers were considered “Accepted.” Survey entries that were blank for all material acceptance questions or could not be identified by the respondent or jurisdiction covered were removed.

CalRecycle received survey responses from 295 entities representing local jurisdictions, regional agencies, or recycling service providers. Some individual responses from regional agencies or recycling service providers covered multiple jurisdictions if the material types and forms in the residential curbside collection program were the same for every jurisdiction. The survey responses cover 437 out of 538 local jurisdictions, representing 89% of the California population.

Remediating “2024 Jurisdiction Survey” / Local Jurisdiction Response Duplication

For local jurisdictions that completed the “2024 jurisdiction survey,” CalRecycle staff conducted data remediation and analysis. Jurisdiction names were manually reviewed and aligned to city and county names in data from the California Department of Finance. CalRecycle staff reviewed the survey responses for duplication. When a single respondent submitted multiple complete survey entries for a single jurisdiction, the first submission was removed. When multiple survey entries covering a single jurisdiction were provided by both a local jurisdiction and hauler, CalRecycle staff combined entries into a single response, described under Recycling Acceptance Calculations.

All jurisdictions with no responses at the end of the duplication remediation process were added to the “CalRecycle online research secondary survey.”

CalRecycle Online Research Secondary Survey

For jurisdictions without recorded survey responses to the “2024 jurisdiction survey,” CalRecycle staff conducted online research and completed a modified version of the survey (see Appendix 1, Section 1.3) based on information provided to the public. The irecyclesmart.com website was used as a starting point to access recycling information for each jurisdiction, provided by a jurisdiction or hauler on materials collected for recycling in local residential curbside recycling programs. The Local Recycling Information webpage lists California jurisdictions and their corresponding recycling guides, which were obtained directly from the websites of the jurisdictions or from those

of the haulers partnered with a given jurisdiction. When the Local Recycling Information webpage included an inaccessible link or outdated information, staff used alternative data sources, such as jurisdictions' waste-disposal or recycling webpages found through the jurisdictions' websites and/or the websites of haulers partnered to a jurisdiction.

CalRecycle completed online research for the 101 local jurisdictions in which no relevant survey response was received. Additionally, CalRecycle completed online research for 11 additional jurisdictions in which jurisdiction-completed survey responses were later received. This resulted in an overlap of survey responses between the local jurisdiction surveys and the CalRecycle staff completed surveys. The remediating "2024 jurisdiction survey"/local jurisdiction response duplication section describes how duplicate information was resolved.

In CalRecycle's online research secondary surveys, each material type and form could be assigned as "Accepted," "Not Accepted," or "Unknown." "Unknown" was designated when a review of the relevant websites did not provide sufficient evidence for or against material acceptance in curbside recycling. The "Unknown" coding was used only for CalRecycle's online research secondary survey.

Each "Unknown" was converted to a proportion of "Accepted" based on the statewide average acceptance rate for each material type and form. For example, if a single material type and form was found to be accepted by 43% of the population based on known survey responses, all jurisdictions with an "Unknown" for that material type and form had the "Unknown" replaced with "43%," which represented 43% of that jurisdiction's population accepting that material type and form. If all responses for a given material type and form were "Unknown," this was estimated at 50% acceptance.

Local Jurisdiction Survey Recycling Acceptance Calculations

In the jurisdiction-completed surveys, each material type and form were assigned as "Accepted" or "Not Accepted." When multiple jurisdictions completed surveys (by the same respondent, answering for the same set of jurisdictions) that were retained after the earlier duplication remediation steps, these surveys were combined into a single response. Each material type and form were designated a proportion of "Accepted" based on consensus among the set of duplicated surveys. For example, if two survey copies said a material type and form was "Not Accepted," this was represented as 0% acceptance. If one survey copy said a material type and form was "Not Accepted" and the other copy was blank (presumed "Accepted"), this material type and form was represented with 50% acceptance.

Calculating Statewide Acceptance Rates

Analysis was conducted to determine the curbside residential recycling acceptance of each material type and form for each city or unincorporated county jurisdiction.

Populations of each jurisdiction served by residential curbside programs accepting each material were then summed and divided by the total state population. This calculated the statewide material acceptance rates.

This methodology assumes that each response reflects the entire population of a jurisdiction (city or unincorporated county). CalRecycle does not have data sufficient to accurately scale responses to cover subpopulations or partial material flows within jurisdictions.

Alignment with SB 343 Material Types and Forms

Survey material types were converted to material types and forms. Material types surveyed did not uniquely identify SB 343 material types and forms. As such, a crosswalk table was developed and used to translate survey material category responses to SB 343 material type and form results (Appendix 1, Section 1.1).

Further, for some items, several survey material categories were averaged and reported as a single material type and form. For example, X13, Fines and Residuals, is the average of six distinct categories of small items which are unique within the collection survey (Ceramic, Glass, Metal, Organics, Paper, and Plastic) (see Appendix 1, Section 1.1 and Appendix 1, Section 2.1, Table D1 for details). In some cases, material types and forms are more specific than the survey material categories, so multiple material types and forms correspond to a single survey result. For example, Other Mixed Paper in the survey is the data source for four fiber material types and forms (see Appendix 1, Section 1.1 and Appendix 1, Section 2.1, Table D1 for details).

Materials Sorted by Large Volume Transfer/Processing Facilities (LVTP Facilities)

Using a combination of surveys, facility visits, and material sorting at LVTP facilities, CalRecycle estimated the proportions of the state's recycling programs, at the county level, that are served by LVTP facilities sorting material types and forms into specified outflows for recycling processing.

Large Volume Transfer/Processing Facility Surveys and Visits

Using information from CalRecycle's Solid Waste Information System (SWIS) and outflow data from CalRecycle's Recycling and Disposal Reporting System (RDRS), CalRecycle generated a list of 50 facilities that were permitted LVTP facilities with average quarterly potential reuse (AQPR) outflows of over 4,000 tons in 2022. In line with statute and to understand outcomes for the majority of materials collected and sorted for recycling statewide, this data collection prioritized the highest volume facilities among LVTP facilities statewide. The candidate facility list was developed from self-reported data in RDRS. If data was missing or misreported in RDRS, some high-volume LVTP facilities may be excluded from this candidate list.

CalRecycle developed phone and on-site surveys to collect information from LVTP facilities sorting recyclable materials (see Appendix 1, Section 1.5) ("2023 LVTP facility survey"). Questions covered topics including basic facility information, facility capacity, inflows and material origins, outflows and types of material aggregated for sale, and technologies deployed at the facility (see Appendix 1, Section 1.5 for a list of survey questions). Throughout the LVTP facilities survey data collection period (April 2023 through September 2023), CalRecycle staff made multiple attempts to contact each of the identified facilities. Out of 50 LVTP facilities, 37 facilities were responsive to phone surveys and 13 facilities opted not to participate in the survey or were not responsive. CalRecycle performed phone surveys with 37 LVTP facilities. Eight of the surveyed facilities did not perform material sorting activities on-site and were removed as facilities of interest. The surveyed facilities which do perform material sorting activities on-site serve counties that make up 93% of the state's population (see Appendix 1, Section 1.6). For data analysis purposes, CalRecycle treated the 93% of the population as representative of the state population. As such, "100% of counties served" means that CalRecycle has data supporting sortation by LVTP facilities that serve 93% of California's population and data was extrapolated for the remaining 7% of the population.

CalRecycle staff conducted more in-depth, in-person surveys with 24 of the 37 facilities, which included tours of the sorting activities and discussions on topics such as contamination, bale destinations and origins of processed material (see Appendix 1, Section 1.5). For each facility, information was gathered on the types of materials that were processed and aggregated for sale by LVTP facilities.

Large Volume Transfer/Processing Facility Material Characterization Study

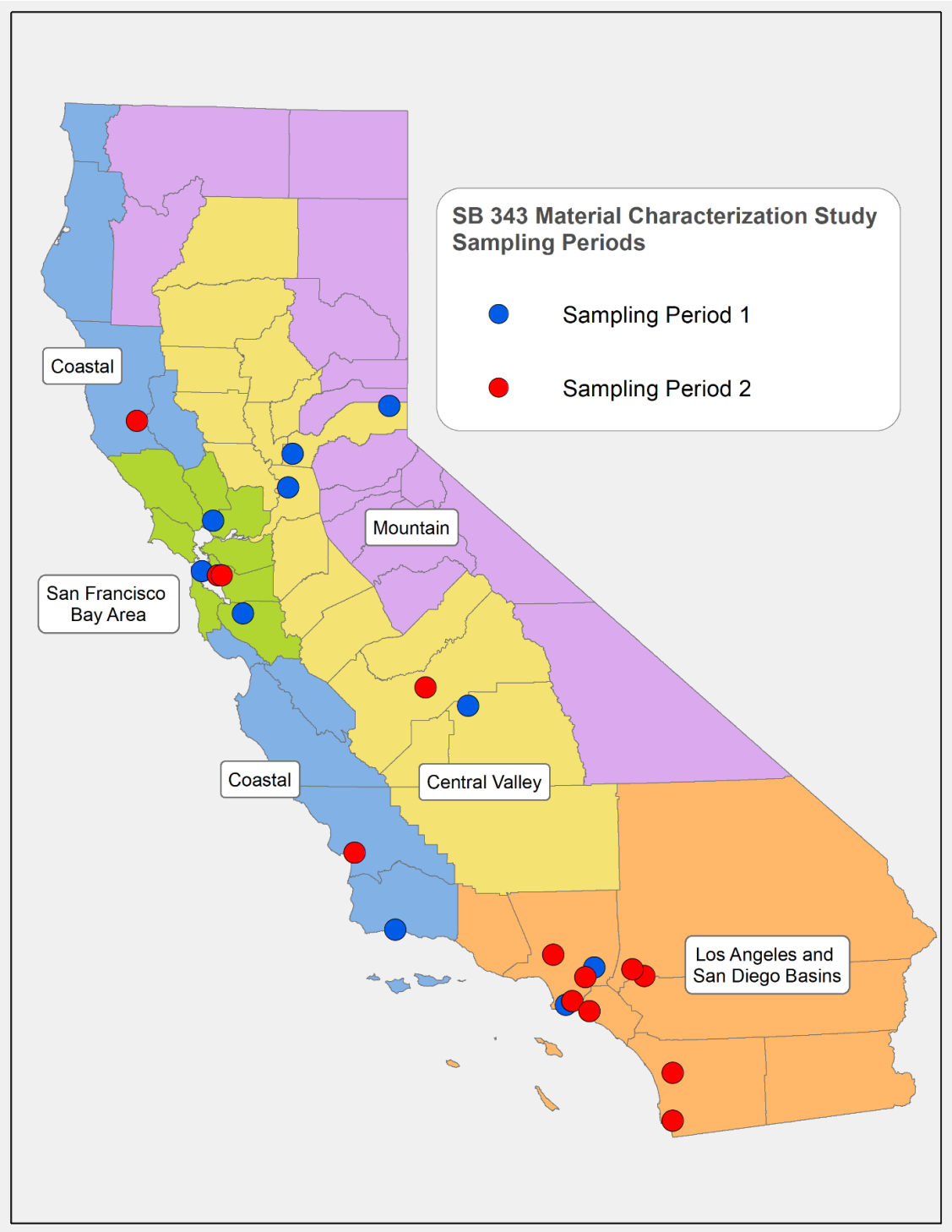
LVTP Facilities Sampled

From the 37 surveyed LVTP facilities, 10 facilities were selected for sampling and sorting in August 2023, and an additional 13 were sampled in January and February 2024. LVTP facilities were classified by five regions (Central Valley, Coastal, Los Angeles and San Diego Basins, Mountain and San Francisco Bay Area) (see Figure 1 and Appendix 1, Section 1.6 for representative sampling of focal regions). Facilities were selected to maximize representative sampling by geography and population density.

The 23 facilities were distributed as follows among the regions of California:

1. Mountain – 1 facility
2. Central Valley – 4 facilities
3. San Francisco Bay Area – 5 facilities
4. Coastal – 3 facilities
5. Los Angeles and San Diego Basins – 10 facilities

Figure 1. Map of Regions of California.



Sampling Logistics

A contracted field team, with oversight from CalRecycle staff, conducted sampling and sorting at the 23 LVTP facilities. The contracted field staff and CalRecycle staff were on-site at each facility for two days. The contracted field team consisted of four to five individuals whose primary roles were sort crew lead, material sorters, and a photographer. They conducted the sample selection, collection, and hand-sorting of material. CalRecycle staff provided on the ground support, oversaw contractor work, communicated with facility managers, and performed visual characterizations of additional recyclable outflows that were not being hand-sorted.

Samples were collected from post-sort outflows, meaning that material would not undergo further processing at that facility. Sampled outflows were materials aggregated for sale or for further processing at another facility. Residual outflow destined for disposal was also sampled. Samples from these outflows were used to determine material sorting into specified outflows, described in the hand-sorted characterization and visual characterization sections.

Figure 2. Excerpt from Contractor's Sampling Plan

Material outflows were identified for collection within each facility with a description of how samples were collected from each outflow.

1. OCC	2. Mixed Paper
	
Sorted material to be ejected from slide conveyor underneath storage container prior to baling	Sorted material to be ejected from slide conveyor underneath storage container prior to baling

Hand-Sorted Characterization

The contracted staff collected material from either loose or baled outflows prepared for sale or transfer by the facility and ensured that sampled material represented the outflows of the target facility. Each sample was measured out to a different weight depending on the material type (see Appendix 1, Section 2.3, Table F2 for further target sample weight details). The contractor determined that the target weight of each sample was representative of the composition of each outflow and supported by peer-reviewed scientific literature. Denser materials such as metal or glass consisted of 15- to 25-pound samples, while samples of low-density materials like cardboard or plastic weighed between 125 and 200 pounds. Each collected sample's weight (in pounds) was measured and recorded. The sorters spread out the collected sample on a sorting table with a grate, allowing for materials smaller than 2 inches to fall through; these materials are too small to be properly processed and sorted by the facility. Then the contracted field staff hand-sorted the remaining materials into 91 material subclasses based on material type and form (see Appendix 1, Section 1.7 for list) to a particle size of two inches until non-sortable fine material ("mixed residue") remained.

The sorters then weighed each material type and form sorted from each sample. The weight (in pounds) of the sorted material was recorded. Photos were taken of each sample before sorting, and throughout the sorting process. Raw data was collected through an application created by the contractor and subject to the application's built-in logic and error checking, and then subject to quality control and quality assurance measures. CalRecycle staff conducted statistical analysis on the collected information.

The contracted field team attempted to characterize a total of 20 samples per facility that included two samples from each 10 specific material type outflows selected (see Appendix 1, Section 2.3, Table F1 for a list of outflows sampled). Samples taken for hand-sorting prioritized outflows likely to contain heterogenous mixes of target items according to the defined material types and forms. Where appropriate to the content of the outflow, CalRecycle staff conducted visual characterizations of additional outflows of baled or piled post-sort material.

Visual Characterization

CalRecycle field staff conducted a visual characterization of materials. The visual characterization process included taking photos of aggregated bales or bunkers to later identify rates of contamination within these outflows. For each site, two to four visual characterizations were conducted per outflow. Characterizations on the same material outflow were distinguished by sampled outflow number and subsample number. A 0.5m x 0.5m quadrat was placed flat on a bale surface as a guide outlining the bounds of each sample. An image of each sample was recorded digitally through encompassing the full quadrat and a placard identifying the site location, date, sample material, sampled outflow number, and sample number. The minimum pictures captured, if safe to do so, were a close-up straight on view, slightly offset to the right view, slightly offset

to the left view, and a distant straight on view showing multiple aggregates if applicable. Any noteworthy information about the outflow materials were discussed and noted with facility operators.

Figure 3. A quadrat boundary for visual assessment for bales and other outflows.

Material Characterization Study

In total, 196 hand-sorted samples and 70 visually characterized samples were taken from 10 facilities in August 2023. In January and February 2024, 263 hand-sorted samples and 36 visually characterized samples were taken from an additional 13 facilities.

CalRecycle used field study sorting data to identify the average makeup of 32 outflow types across 23 LVTP facilities. This includes hand-sorted and visually characterized samples across five fiber outflows, five glass outflows, seven metal outflows, and 14 plastic outflows (see Appendix 1, Section 2.3, Table F1 for details on outflows sampled).

Results of the Material Characterization Study are presented in Table 3A-E.

Additional outflow volume was composed of many material types and forms at low volumes (each material type and form made up under 1% of total composition of each outflow); these are described in the report as rare or low-abundance material types and forms. In total there were 817 occurrences of rare material types and forms across 24 outflow types (see Appendix 1, Section 2.5 for list).

Estimating Proportions of Material Types and Forms Sorted into Specified Outflows by LVTP Facilities

CalRecycle estimated the percentage of counties statewide served by LVTP facilities sorting each material type and form into specified outflows for recycling processing. Using survey and sorting data, CalRecycle staff estimated the percentages in terms of the proportion of the state's recycling programs (at the county level) served by those LVTP facilities.

Data from the sampling and sorting were used to determine whether material types and forms were predominantly ending up in specified outflows, meaning the materials were consistently sorted into outflows destined for sale or further processing. Facilities often describe outflows with terminology unique to their operations. Inclusive alignment of cross-facility outflow information may miss nuance in variation in outflow contents (e.g., PET container vs. PET bottle and container vs. PET; mixed rigid plastic vs. rigid opaque composite plastic).

Hand-sorting data and visual characterization data were used to:

1. Identify which outflows each material type and form was found in; and
2. Estimate the proportion of that material type and form that ends up aggregated for sale/processing compared to disposed of in a residual outflow.

To estimate the information above, criteria were established to identify when the presence of a material type and form in an outflow is acceptable or likely to be a contaminant. For example, plastic items were commonly found in specified outflows for metal and paper. The plastic items are likely a contaminant and not a target material for those specified outflows. To avoid counting a contaminant as material sorted into a specified outflow, the following criteria were developed:

1. High-level material class (paper/fiber, glass, metal, plastic, other/ mixed) for the material type and form must match the material class of the specified outflow.
2. Where applicable, material type and form material subclass (e.g., resin type for plastic, or type of metal) must match the material subclass of the specified outflow.
3. The proportion of the material type and form in a specified outflow at a given facility must exceed the average proportion of material type and form in the disposed of residual across all facilities study-wide.
4. The material type and form must be present in that specified outflow for at least two facilities within the study.

If any of these criteria were not met, the presence of that material type and form in the specified outflow was not considered sufficient evidence of valid sortation. These methods are most effective for items that are relatively common within their target

outflows. If a material type and form was relatively rare across samples within an outflow, or across all samples within a facility, a robust evaluation may not be possible within the study parameters. Further explorations of rare items are provided in Appendix 1 (Section 2.5 – 2.8).

Among the 29 phone-surveyed facilities that perform material sorting activities on-site, 27 facilities reported a comprehensive list of common outflows from sorting of curbside recyclables. Survey data indicated which of the 27 survey facilities had each specified outflow present (Appendix 1, Section 2.3, Table F1). The 32 unique sampled outflows were mapped to the 26 closest-match survey outflows. This was then combined with survey data on which jurisdictions (at the county level) each facility serves. This produced the list of counties served by facilities with specified outflows available for each material type and form. Material sorting into mixed-resin plastic outflows and mixed paper outflows was also analyzed separately, by outflow, as these items may undergo secondary sorting at facilities outside the study parameters (See Appendix 1, Section 2.4, Table G2 for details).

Summary of Findings

The following findings are provided separately for each of the two data collection efforts: (1) Collection by Jurisdiction Residential Curbside Recycling Programs; and (2) Materials Sorted by LVTP facilities.

Overview of Data/Tables by Data Collection Effort

Survey of Collection by Jurisdiction Residential Curbside Recycling Programs

Jurisdiction Residential Curbside Recycling Program results were obtained through surveys answered either directly from a jurisdiction or by CalRecycle staff using online resources.

- Table 1: displays the estimated percentage of the California population with access to residential curbside recycling programs which accept each SB 343 material type and form.
- Appendix 1, Section 1.1, Table A1: displays the alignment of material subclasses accepted by jurisdictions with residential curbside recycling programs to the SB 343 Material Types and Forms List (see Appendix 1, Section 1.7 for additional information).
- Appendix 1, Section 1.2: displays the survey questions used to obtain information on materials collected by each jurisdiction's recycling program directly from each jurisdiction.
- Appendix 1, Section 1.3: displays CalRecycle's online research secondary survey questions that CalRecycle staff used to obtain information on materials collected by each jurisdiction.
- Appendix 1, Section 1.4: addresses material type and forms not reported in the local jurisdiction survey or the supplementary local jurisdiction internet research survey of this report that were previously assessed in SB 343 Preliminary Findings Report (DRRR-2023-1728).
- Appendix 1, Section 2.1, Table D1: displays the results of the jurisdiction survey by both the survey material categories and by SB 343 material types and forms.

- Appendix 1, Section 2.2, Table E1: displays the results of the SB 343 Preliminary Findings Report (DRRR-2023-1728) jurisdiction survey of selected SB 343 material types and forms to supplement the jurisdiction survey results in the main report.

Materials Sorted by LVTP Facilities/Material Characterization Study

- Table 2: displays the count and proportion of counties with access to surveyed LVTP facilities which sort to viable outflows, for each material type and form.
- Table 3A – 3E: displays the composition percentage of a material type and form within a given outflow, as categorized by material class. Results derived from Material Characterization Studies performed at LVTP facilities (supplementary data: see Appendix 1, Section 2.4).
- Appendix 1, Section 1.5: displays the questions asked of LVTP facilities by CalRecycle staff via phone interviews.
- Appendix 1, Section 1.6: displays the designation of counties to a focal region.
- Appendix 1, Section 1.7: displays the sortation list generated for the Material Characterization Study. The list includes outflow material classes, material type and form codes, material type and form names, and material definitions and examples. Appendix 1, Section 1.7 also informs Appendix 1, Section 1.1 (SB 343 material type and form alignment to materials accepted by jurisdictions for residential curbside recycling programs).
- Appendix 1, Section 2.3, Table F1: displays all outflow names, the corresponding number of samples, and number of facilities sampled in the Material Characterization Study.
- Appendix 1, Section 2.3, Table F2: displays proposed sample weights for common outflows targeted by the contracted field team.
- Appendix 1, Section 2.4, Table G1 - G3: displays information on materials sorted by Large Volume Transfer/Processing facilities, with data analysis for inflow-scaled partial coverage of counties, and specified outflows.
- Appendix 1, Section 2.5, Table H1 - H5: displays material types and forms rarely observed, as defined as less than 1% of the outflow, during the Material Characterization Study.
- Appendix 1, Section 2.6, Table I1: displays exempted material types and forms and provides the rationale for their exclusion from the study.
- Appendix 1, Section 2.7, Table J1: displays all material types and forms that met criteria to be classified as “sorted for recycling” and were evaluated for county access to sorting in this study.

- Appendix 1, Section 2.7, Table J2: displays all material types and forms that failed to meet criteria to be classified as “sorted for recycling,” and the cause of exclusion. These material types and forms were not further assessed for county access to sorting in this study.
- Appendix 1, Section 2.8, Table K1: provides an example of sparse data for rare and light-weight items in target outflows.

Collection by Jurisdiction Residential Curbside Recycling Programs

Table 1 indicates the results of the statewide jurisdiction survey which assessed residential curbside recycling program collection. Column one lists the material class (Fiber, Glass, Metal, Plastic, and Other). Column two lists the material type and form code. Column three lists the material type and form name. Column four lists the number of jurisdiction survey material categories that were combined for each material type and form result (see Appendix1, Section 2.1, Table D1 for details by each survey material type). Column five lists the estimated percentage of California’s population with access to residential curbside recycling collection for a given material type and form. Materials that were not addressed by this jurisdiction survey are marked with “not applicable” (“NA”) and are addressed separately within Appendix 1, Section 2.2, Table E1.

“NA” is applied to Remainder/Composite items which are not identifiable to the level of material type and form. “Subject to Another Program” (“SAP”) is applied to items subject to additional programs. This includes M09 (subject to section 48701 (h)(1)(A)); SP03 (includes items subject to Business and Professions Code (BPC) section 17580 (g)(1)(B)); and SP01 (subject to BPC 17580 (g)(1)(C)).

† This study included residential curbside programs utilizing a mixed waste (“one-bin”) system in which jurisdictions provide a single bin to collect all waste (solid waste, recycling, green waste, food waste). In jurisdictions utilizing a one-bin system, where material types and forms were not separated into a designated recycling container, materials beyond the parameters of this study were captured and included in Table 1 for comprehensiveness. Examples include Plant Material Food Service Ware (X08), Treated Wood (X09), and Green Material, Clean Wood, and Food Scraps (X10).

Table 1. Percentage of Statewide Population with Access to a Residential Curbside Recycling Program Which Accepts SB 343 Material Types and Forms

Material Class	MT&F Code	SB 343 Material Type and Form Name (MT&F)	Number of Jurisdiction Survey Material Types	Percent of Population with Collection Access
Fiber	F01	Uncoated Corrugated Cardboard/ Old Corrugated Containers (OCC)	1	99%
Fiber	F02	White Office-Type Paper and Mail	1	99%
Fiber	F03	Newspapers/ Newspaper Inserts	1	97%
Fiber	F04	Magazines and Catalogs	1	97%
Fiber	F05	Paper Bags and Kraft Paper	2	97%
Fiber	F06	Folded Paper Containers and Other Paperboard Packaging	1	98%
Fiber	F07	Other Mixed Paper	1	97%
Fiber	F08	Clean Molded Paper Fiber	1	94%
Fiber	F09	Uncoated Fiber-Based Food Service Ware	0	NA
Fiber	F10	Composite Food Service Paper and Packaging	0	NA
Fiber	F11	Uncoated Soiled Fiber Products	0	NA
Fiber	F12	Remainder/ Composite Fiber	1	38%
Fiber	X01	Gable-top Cartons/ Aseptics - CRV	2	73%
Fiber	X02	Gable-top Cartons - Non-CRV	1	74%
Fiber	X03	Aseptic Containers - Non-CRV	1	72%
Glass	G01	Glass Containers - Clear/ Flint - Non-CRV	1	97%
Glass	G02	Glass Beverage Containers - Clear/ Flint - CRV	1	97%
Glass	G03	Glass Containers - Green/ Emerald - Non-CRV	1	97%

Material Class	MT&F Code	SB 343 Material Type and Form Name (MT&F)	Number of Jurisdiction Survey Material Types	Percent of Population with Collection Access
Glass	G04	Glass Beverage Containers - Green/ Emerald – CRV	1	97%
Glass	G05	Glass Containers - Brown/ Amber - Non-CRV	1	97%
Glass	G06	Glass Beverage Containers - Brown/ Amber - CRV	1	97%
Glass	G07	Glass Containers - Other Colors - Non-CRV	1	97%
Glass	G08	Glass Beverage Containers - Other Colors - CRV	1	97%
Glass	G09	Remainder/ Composite Glass	1	46%
Other	H01	Household Hazardous Waste	0	NA
Metal	M01	Aluminum Cans and Lids - Non-CRV	1	96%
Metal	M02	Aluminum Beverage Cans - CRV	1	96%
Metal	M03	Aluminum Bottles - Non-CRV	1	96%
Metal	M04	Aluminum Bottles for Beverages - CRV	1	96%
Metal	M05	Aluminum Foil (<3 mm), Sheets	1	81%
Metal	M06	Aluminum Foil (>3 mm), Molded Containers	1	82%
Metal	M07	Tin/Steel Cans, Lids - Non-CRV	1	99%
Metal	M08	Tin/Steel Beverage Containers - CRV	1	99%
Metal	M09	Tin/Steel Paint Cans	SAP	SAP
Metal	M10	Tin/Steel or Aluminum Aerosol Containers	2	71%
Metal	M11	Metal Hazardous Waste: Used Oil Filters, Gas Cylinders	0	NA
Metal	M12	Other Ferrous Metal	2	77%
Metal	M13	Other Non-Ferrous Metal	2	78%
Metal	M14	Remainder/ Composite Metal	0	NA
Other	T01	Textiles and Clothing	2	19%

Material Class	MT&F Code	SB 343 Material Type and Form Name (MT&F)	Number of Jurisdiction Survey Material Types	Percent of Population with Collection Access
Other	X04	Mailing Pouches & Shipping Envelopes	1	29%
Other	X05	Other Multi-Material Laminate Single-Use	2	35%
Other	X06	Single-Use Ceramic Packaging	1	7%
Other	X08	Plant Material Food Service Ware†	1	37%
Other	X09	Treated Wood†	1	7%
Other	X10	Green Material, Clean Wood, and Food Scraps†	2	40%
Other	X13	Fines and Residuals	6	46%
Plastic	PL01	PET Clear Bottles - Non-CRV	1	99%
Plastic	PL02	PET Clear Beverage Bottles - CRV	1	99%
Plastic	PL03	PET Pigmented Bottles - Non-CRV	1	96%
Plastic	PL04	PET Pigmented Beverage Bottles - CRV	1	96%
Plastic	PL05	PET Thermoformed Clamshells and Containers	1	88%
Plastic	PL06	Other PET Clear Single-Use Rigids	3	91%
Plastic	PL07	Other PET Pigmented Single-Use Rigids	3	90%
Plastic	PL08	PET Multi-Use Rigids	1	85%
Plastic	PL09	HDPE Clear Beverage Bottles - Non-CRV	1	99%
Plastic	PL10	HDPE Clear Beverage Bottles - CRV	1	99%
Plastic	PL11	HDPE Buckets: Food	1	88%
Plastic	PL12	HDPE Buckets: Non-Food	1	88%
Plastic	PL13	Other HDPE Clear Single-Use Rigids	3	92%
Plastic	PL14	HDPE Pigmented Single-Use Rigids	3	92%
Plastic	PL15	Other HDPE Multi-Use Rigids	1	88%
Plastic	PL16	PVC Single-Use Rigids	1	52%
Plastic	PL17	PVC Multi-Use	1	52%

Material Class	MT&F Code	SB 343 Material Type and Form Name (MT&F)	Number of Jurisdiction Survey Material Types	Percent of Population with Collection Access
Plastic	PL18	LDPE Clear Beverage Bottles	1	75%
Plastic	PL19	LDPE Clear Single-Use Rigids	2	73%
Plastic	PL20	LDPE Pigmented Single-Use Rigids	2	73%
Plastic	PL21	LDPE Multi-Use	1	70%
Plastic	PL22	PP Clear Single-Use Rigids	4	78%
Plastic	PL23	PP Pigmented Single-Use Rigids	4	78%
Plastic	PL24	PP Multi-Use	0	NA
Plastic	PL25	PS Thermoformed Clamshells and Containers	1	40%
Plastic	PL26	PS Densified: Single-Use Food Service Ware	2	37%
Plastic	PL27	PS Expanded - Packaging	2	35%
Plastic	PL28	PS Expanded - Food Service Ware	1	35%
Plastic	PL29	PS Densified: Multi-Use	1	40%
Plastic	PL30	Other (7) Single-Use Rigids	2	38%
Plastic	PL31	Plastic Wine Bladders	1	26%
Plastic	PL32	Films - Plastic Bags - Compostable	2	23%
Plastic	PL33	Films - Plastic Bags - Designed for Reuse	7	28%
Plastic	PL34	Films - Plastic Non-Bags - Agricultural and Commercial	9	29%
Plastic	PL35	Films - Plastic Non-Bags - Other Film	9	29%
Plastic	PL36	Films - Plastic Bags - Designed for Disposal	7	28%
Plastic	PL37	Unknown Plastic Type or Mixture of Multiple Plastic Resins (Single-Use)	2	38%
Plastic	PL38	Mixed Plastic Multi-Use	1	51%
Plastic	PL39	Remainder/ Composite Plastic	0	NA

Material Class	MT&F Code	SB 343 Material Type and Form Name (MT&F)	Number of Jurisdiction Survey Material Types	Percent of Population with Collection Access
Other	SP01	Tires	SAP	SAP
Other	SP02	Bulky Items	0	NA
Other	SP03	Mattresses and Foundations	SAP	SAP
Other	X11	Mixed Material Single-Use	0	NA
Other	X12	Remainder/ Composite Mixed Material Multi-Use	0	NA

Materials Sorted by Large Volume Transfer/Processing Facilities

Data gathered for this study is organized by those material types and forms sorted to each outflow. Supplementary data explores the impact of sorting to specified outflows (Appendix 1, Section 2.4, Table G1) and to mixed material outflows (Appendix 1, Section 2.4, Table G2), as well as inflow-scaled sorting for all outflows (Appendix 1, Section 2.4, Table G3). Surveyed facilities serve 34 of 58 counties statewide, and the populations of those counties make up 93% of the statewide population.

Table 2 displays the proportion of counties served by the surveyed LVTP facilities, with sorting of each material type and form by solid waste inflow tonnage. The first three columns describe the material type and form by unique material type and form code, SB 343 material type and form name, and material type and form class (Glass, Metal, Fiber, Plastic, and Other), respectively. The fourth and fifth columns show the count and percentage of counties served by surveyed LVTP facilities that sort that material type and form into outflows. Columns four and five assume that partial coverage of a county (at least one facility sorting each material type and form to a validated outflow) is equivalent to complete coverage of a county. Rows with a value of zero for counties served indicate material types and forms for which there was insufficient evidence of effective sorting to specified outflows within this study (see Appendix 1, Section 2.5; Appendix 1, Section 2.6; and Appendix 1, Section 2.7 for details).

“NA” is applied to Remainder/Composite items; Remainder/Composite categories are not identifiable to the level of material type and form. “SAP” is applied to items subject to additional programs. This includes M09 (subject to section

48701 (h)(1)(A)); SP03 (includes items subject to Business and Professions Code (BPC) 17580 (g)(1)(B)); SP01 (subject to BPC 17580 (g)(1)(C)); G02, G04, G06, G08, M02, M04, M08, PL02, PL04, PL10, X01 (subject to Division 12.1 of the PRC).

‡ This study included LVTP facilities that received waste through mixed waste ("one-bin") systems in which the residential curbside service providers utilize a single bin to collect all waste (solid waste, recycling, green waste, food waste). One-bin waste systems included materials, such as Plant Material Food Service Ware (X08), Treated Wood (X09), and Green Material, Clean Wood, and Food Scraps (X10), which are materials beyond the parameters of this study. These materials were not sorted into defined streams for recycling at the sampled LVTP facilities but were included in Table 2 for comprehensiveness.

Table 2. Sorting of Material Types and Forms to All Outflows, by Counties Served by Surveyed LVTP Facilities

MT&F Code	Material Type and Form (MT&F)	MT&F Class	Count of Counties Served	Percent of Counties Served
F01	Uncoated Corrugated Cardboard/ Old Corrugated Containers (OCC)	Fiber	34	100
F02	White Office-Type Paper and Mail	Fiber	33	97
F03	Newspapers/ Newspaper Inserts	Fiber	32	94
F04	Magazines and Catalogs	Fiber	32	94
F05	Paper Bags and Kraft Paper	Fiber	32	94
F06	Folded Paper Containers and Other Paperboard Packaging	Fiber	32	94
F07	Other Mixed Paper	Fiber	32	94
F08	Clean Molded Paper Fiber	Fiber	0	0
F09	Uncoated Fiber-Based Food Service Ware	Fiber	0	0
F10	Composite Food Service Paper and Packaging	Fiber	0	0

MT&F Code	Material Type and Form (MT&F)	MT&F Class	Count of Counties Served	Percent of Counties Served
F11	Uncoated Soiled Fiber Products	Fiber	0	0
F12	Remainder/ Composite Fiber	Fiber	NA	NA
G01	Glass Containers - Clear/ Flint - Non-CRV	Glass	34	100
G02	Glass Beverage Containers - Clear/Flint - CRV	Glass	SAP	SAP
G03	Glass Containers - Green/ Emerald - Non-CRV	Glass	34	100
G04	Glass Beverage Containers - Green/Emerald – CRV	Glass	SAP	SAP
G05	Glass Containers - Brown/Amber - Non-CRV	Glass	34	100
G06	Glass Beverage Containers - Brown/Amber - CRV	Glass	SAP	SAP
G07	Glass Containers - Other Colors - Non-CRV	Glass	34	100
G08	Glass Beverage Containers - Other Colors - CRV	Glass	SAP	SAP
G09	Remainder/ Composite Glass	Glass	NA	NA
H01	Household Hazardous Waste	Other	0	0
M01	Aluminum Cans and Lids - Non-CRV	Metal	27	79
M02	Aluminum Beverage Cans - CRV	Metal	SAP	SAP
M03	Aluminum Bottles - Non-CRV	Metal	27	79
M04	Aluminum Bottles for Beverages - CRV	Metal	SAP	SAP
M05	Aluminum Foil (<3 mm), Sheets	Metal	27	79
M06	Aluminum Foil (>3 mm), Molded Containers	Metal	27	79
M07	Tin/Steel Cans, Lids - Non-CRV	Metal	34	100
M08	Tin/Steel Beverage Containers - CRV	Metal	SAP	SAP
M09	Tin/Steel Paint Cans	Metal	SAP	SAP
M10	Tin/Steel or Aluminum Aerosol Containers	Metal	34	100
M11	Metal Hazardous Waste: Used Oil Filters, Gas Cylinders	Metal	0	0

MT&F Code	Material Type and Form (MT&F)	MT&F Class	Count of Counties Served	Percent of Counties Served
M12	Other Ferrous Metal	Metal	25	74
M13	Other Non-Ferrous Metal	Metal	25	74
M14	Remainder/ Composite Metal	Metal	NA	NA
PL01	PET Clear Bottles - Non-CRV	Plastic	34	100
PL02	PET Clear Beverage Bottles - CRV	Plastic	SAP	SAP
PL03	PET Pigmented Bottles - Non-CRV	Plastic	34	100
PL04	PET Pigmented Beverage Bottles - CRV	Plastic	SAP	SAP
PL05	PET Thermoformed Clamshells and Containers	Plastic	34	100
PL06	Other PET Clear Single-Use Rigids	Plastic	34	100
PL07	Other PET Pigmented Single-Use Rigids	Plastic	34	100
PL08	PET Multi-Use Rigids	Plastic	0	0
PL09	HDPE Clear Beverage Bottles - Non-CRV	Plastic	34	100
PL10	HDPE Clear Beverage Bottles - CRV	Plastic	SAP	SAP
PL11	HDPE Buckets: Food	Plastic	34	100
PL12	HDPE Buckets: Non-Food	Plastic	34	100
PL13	Other HDPE Clear Single-Use Rigids	Plastic	34	100
PL14	HDPE Pigmented Single-Use Rigids	Plastic	34	100
PL15	Other HDPE Multi-Use Rigids	Plastic	34	100
PL16	PVC Single-Use Rigids	Plastic	0	0
PL17	PVC Multi-Use	Plastic	0	0
PL18	LDPE Clear Beverage Bottles	Plastic	0	0
PL19	LDPE Clear Single-Use Rigids	Plastic	15	44
PL20	LDPE Pigmented Single-Use Rigids	Plastic	0	0
PL21	LDPE Multi-Use	Plastic	34	100

MT&F Code	Material Type and Form (MT&F)	MT&F Class	Count of Counties Served	Percent of Counties Served
PL22	PP Clear Single-Use Rigids	Plastic	32	94
PL23	PP Pigmented Single-Use Rigids	Plastic	34	100
PL24	PP Multi-Use	Plastic	34	100
PL25	PS Thermoformed Clamshells and Containers	Plastic	0	0
PL26	PS Densified: Single-Use Food Service Ware	Plastic	0	0
PL27	PS Expanded – Packaging	Plastic	0	0
PL28	PS Expanded - Food Service Ware	Plastic	0	0
PL29	PS Densified: Multi-Use	Plastic	0	0
PL30	Other (7) Single-Use Rigids	Plastic	15	44
PL31	Plastic Wine Bladders	Plastic	SAP	SAP
PL32	Films - Plastic Bags - Compostable	Plastic	0	0
PL33	Films - Plastic Bags - Designed for Reuse	Plastic	0	0
PL34	Films - Plastic Non-Bags - Agricultural and Commercial	Plastic	0	0
PL35	Films - Plastic Non-Bags - Other Film	Plastic	0	0
PL36	Films - Plastic Bags - Designed for Disposal	Plastic	19	56
PL37	Unknown Plastic Type or Mixture of Multiple Plastic Resins (Single-Use)	Plastic	34	100
PL38	Mixed Plastic Multi-Use	Plastic	34	100
PL39	Remainder/ Composite Plastic	Plastic	NA	NA
SP01	Tires	Other	SAP	SAP
SP02	Bulky Items	Other	0	0
SP03	Mattresses and Foundations	Other	SAP	SAP
T01	Textiles and Clothing	Other	0	0

MT&F Code	Material Type and Form (MT&F)	MT&F Class	Count of Counties Served	Percent of Counties Served
X01	Gable-top Cartons/ Aseptics - CRV	Fiber	SAP	SAP
X02	Gable-top Cartons - Non-CRV	Fiber	16	47
X03	Aseptic Containers - Non-CRV	Fiber	16	47
X04	Mailing Pouches and Shipping Envelopes	Other	0	0
X05	Other Multi-Material Laminate Single-Use	Other	0	0
X06	Single-Use Ceramic Packaging	Other	0	0
X08	Plant Material Food Service Ware‡	Other	0	0
X09	Treated Wood‡	Other	0	0
X10	Green Material, Clean Wood, and Food Scraps‡	Other	0	0
X11	Mixed Material Single-Use	Other	0	0
X12	Remainder/ Composite Mixed Material Multi-Use	Other	NA	NA
X13	Fines and Residuals	Other	NA	NA

Material Characterization Study at Large Volume Transfer/Processing Facilities

The following tables display the makeup of each characterized fiber, glass, metal, plastic, or residual outflow by material type and form. For ease of reading, tables are categorized by outflow material class: fiber (Table 3A), glass (Table 3B), metal (Table 3C), plastic (Table 3D), and residual (Table 3E). The residual outflows are samples from material aggregated at the end of the sorting process, destined for disposal. The first column of each table indicates the outflow name, and the second column indicates the total number of samples (hand-sort and visual characterization) of each outflow. Columns three through five describe the material type and form class, SB 343 material type and form name, and material type and form code, respectively. Column six indicates the mean percent composition of the outflow made up by each material type and form, and column seven indicates the standard deviation (SD). All rows with "NA" in the standard deviation column indicate that the material type and form occurred in only one sample of the relevant outflow. A related table of rare material types and forms in each outflow (<1% composition) is provided in Appendix 1, Section 2.5, Tables H1 - H5.

Table 3A. Material Characterization of Fiber Outflows

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Gable-top Carton and Aseptic Containers	15	Fiber	Gable-top Cartons - Non-CRV	X02	67%	25%
		Fiber	Aseptic Containers - Non-CRV	X03	30%	24%
Gable-top Carton and Aseptic Containers	15	NA	Other (rare items < 1% each)	NA	3%	NA

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
OCC	31	Fiber	Uncoated Corrugated Cardboard/ Old Corrugated Containers (OCC)	F01	91%	7%
		Fiber	Folded Paper Containers and Other Paperboard Packaging	F06	3%	3%
		Fiber	Other Mixed Paper	F07	1%	3%
		NA	Other (rare items < 1% each)	NA	6%	NA
ONP and Mixed Paper	44	Fiber	Uncoated Corrugated Cardboard/ Old Corrugated Containers (OCC)	F01	29%	16%
		Fiber	Other Mixed Paper	F07	13%	11%
		Fiber	White Office-Type Paper and Mail	F02	10%	11%
		Fiber	Folded Paper Containers and Other Paperboard Packaging	F06	10%	4%
ONP and Mixed Paper	44	Fiber	Newspapers/ Newspaper Inserts	F03	9%	7%
		Fiber	Magazines and Catalogs	F04	8%	5%
		Fiber	Composite Food Service Paper and Packaging	F10	4%	4%
		Fiber	Paper Bags and Kraft Paper	F05	2%	2%
		Fiber	Remainder/ Composite Fiber	F12	2%	2%
		Fiber	Uncoated Soiled Fiber Products	F11	2%	2%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
		Other	Remainder/ Composite Mixed Material Multi-Use	X12	1%	2%
		NA	Other (rare items < 1% each)	NA	9%	NA
Shredded Paper	1	Fiber	White Office-Type Paper and Mail	F02	100%	NA
White Office Paper	3	Fiber	White Office-Type Paper and Mail	F02	100%	0%

Table 3B. Material Characterization of Glass Outflows

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Glass - Brown/Amber	1	Glass	Glass Beverage Containers - Brown/Amber - CRV	G06	57%	NA
Glass - Brown/Amber	1	Glass	Glass Containers - Brown/ Amber - Non-CRV	G05	23%	NA
Glass - Brown/Amber	1	Glass	Glass Containers - Clear/ Flint - Non-CRV	G01	8%	NA
Glass - Brown/Amber	1	Glass	Remainder/ Composite Glass	G09	3%	NA
Glass - Brown/Amber	1	Plastic	Films - Plastic Bags - Designed for Disposal	PL36	2%	NA
Glass - Brown/Amber	1	Plastic	PP Pigmented Single-Use Rigids	PL23	1%	NA

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Glass - Brown/Amber	1	Fiber	Other Mixed Paper	F07	1%	NA
Glass - Brown/Amber	1	Plastic	Remainder/ Composite Plastic	PL39	1%	NA
Glass - Brown/Amber	1	Fiber	Remainder/ Composite Fiber	F12	1%	NA
Glass - Brown/Amber	1	NA	Other (rare items < 1% each)	NA	2%	NA
Glass - Clear/Flint	1	Glass	Glass Beverage Containers - Clear/Flint - CRV	G02	65%	NA
Glass - Clear/Flint	1	Glass	Remainder/ Composite Glass	G09	15%	NA
Glass - Clear/Flint	1	Glass	Glass Containers - Clear/ Flint - Non-CRV	G01	7%	NA
Glass - Clear/Flint	1	Glass	Glass Containers - Green/ Emerald - Non-CRV	G03	3%	NA
Glass - Clear/Flint	1	Metal	Tin/Steel Cans, Lids - Non-CRV	M07	2%	NA
Glass - Clear/Flint	1	Plastic	Films - Plastic Bags - Designed for Disposal	PL36	2%	NA
Glass - Clear/Flint	1	Plastic	PET Clear Beverage Bottles - CRV	PL02	2%	NA
Glass - Clear/Flint	1	Plastic	Films - Plastic Non-Bags - Other Film	PL35	1%	NA
Glass - Clear/Flint	1	NA	Other (rare items < 1% each)	NA	4%	NA

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Glass - Green/Emerald	1	Glass	Glass Beverage Containers - Green/Emerald - CRV	G04	31%	NA
Glass - Green/Emerald	1	Glass	Glass Containers - Green/ Emerald - Non-CRV	G03	28%	NA
Glass - Green/Emerald	1	Glass	Glass Beverage Containers - Brown/Amber - CRV	G06	17%	NA
Glass - Green/Emerald	1	Glass	Glass Containers - Brown/ Amber - Non-CRV	G05	8%	NA
Glass - Green/Emerald	1	Glass	Glass Containers - Clear/ Flint - Non-CRV	G01	5%	NA
Glass - Green/Emerald	1	Glass	Glass Beverage Containers - Clear/Flint - CRV	G02	4%	NA
Glass - Green/Emerald	1	Glass	Remainder/ Composite Glass	G09	3%	NA
Glass - Green/Emerald	1	Plastic	Films - Plastic Bags - Designed for Disposal	PL36	2%	NA
Glass - Green/Emerald	1	Fiber	Remainder/ Composite Fiber	F12	1%	NA
Glass - Green/Emerald	1	NA	Other (rare items < 1% each)	NA	2%	NA
Glass Fines	2	Glass	Remainder/ Composite Glass	G09	100%	0%
Mixed Glass	39	Glass	Remainder/ Composite Glass	G09	43%	29%
Mixed Glass	39	Other	Fines and Residuals	X13	20%	26%
Mixed Glass	39	Glass	Glass Containers - Green/ Emerald - Non-CRV	G03	6%	12%
Mixed Glass	39	Fiber	Remainder/ Composite Fiber	F12	5%	11%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Mixed Glass	39	Fiber	Other Mixed Paper	F07	5%	14%
Mixed Glass	39	Glass	Glass Containers - Clear/ Flint - Non-CRV	G01	5%	9%
Mixed Glass	39	Other	Green Material, Clean Wood, and Food Scraps	X10	4%	4%
Mixed Glass	39	Glass	Glass Containers - Brown/ Amber - Non-CRV	G05	2%	4%
Mixed Glass	39	Glass	Glass Containers - Other Colors - Non-CRV	G07	1%	3%
Mixed Glass	39	Other	Mixed Material Single-Use	X11	1%	2%
Mixed Glass	39	NA	Other (rare items < 1% each)	NA	8%	NA

Table 3C. Material Characterization of Metal Outflows

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Aluminum - UBC	25	Metal	Aluminum Beverage Cans - CRV	M02	94%	1%
Aluminum - UBC	25	Plastic	PS Thermoformed Clamshells and Containers	PL25	3%	18%
Aluminum - UBC	25	NA	Other (rare items < 1% each)	NA	3%	NA
Aluminum – Other	11	Metal	Aluminum Foil (>3 mm), Molded Containers	M06	38%	27%
Aluminum – Other	11	Metal	Aluminum Cans and Lids - Non-CRV	M01	21%	20%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Aluminum – Other	11	Metal	Tin/Steel or Aluminum Aerosol Containers	M10	12%	10%
Aluminum – Other	11	Metal	Aluminum Foil (<3 mm), Sheets	M05	8%	7%
Aluminum – Other	11	Metal	Other Non-Ferrous Metal	M13	5%	8%
Aluminum – Other	11	Metal	Tin/Steel Cans, Lids - Non-CRV	M07	4%	3%
Aluminum – Other	11	Metal	Aluminum Beverage Cans - CRV	M02	2%	5%
Aluminum – Other	11	Metal	Aluminum Bottles - Non-CRV	M03	2%	3%
Aluminum – Other	11	Metal	Aluminum Bottles for Beverages - CRV	M04	2%	3%
Aluminum – Other	11	Other	Fines and Residuals	X13	2%	2%
Aluminum – Other	11	NA	Other (rare items < 1% each)	NA	3%	NA
Copper	2	Metal	Other Non-Ferrous Metal	M13	100%	0%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Metal	Tin/Steel Cans, Lids - Non-CRV	M07	63%	22%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Metal	Other Ferrous Metal	M12	15%	12%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Metal	Tin/Steel or Aluminum Aerosol Containers	M10	7%	4%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Metal	Remainder/ Composite Metal	M14	4%	8%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Metal	Tin/Steel Paint Cans	M09	2%	12%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Other	Remainder/ Composite Mixed Material Multi-Use	X12	2%	5%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Other	Green Material, Clean Wood, and Food Scraps	X10	1%	4%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	Metal	Other Non-Ferrous Metal	M13	1%	2%
Mixed Metal - Ferrous - Steel/ Tin Cans	30	NA	Other (rare items < 1% each)	NA	5%	NA
Mixed Metal - Large	19	Metal	Other Ferrous Metal	M12	64%	26%
Mixed Metal - Large	19	Metal	Remainder/ Composite Metal	M14	22%	23%
Mixed Metal - Large	19	Metal	Other Non-Ferrous Metal	M13	5%	10%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Mixed Metal - Large	19	Other	Remainder/ Composite Mixed Material Multi-Use	X12	4%	10%
Mixed Metal - Large	19	Other	Household Hazardous Waste	H01	2%	5%
Mixed Metal - Large	19	Metal	Tin/Steel Cans, Lids - Non-CRV	M07	1%	2%
Mixed Metal - Large	19	NA	Other (rare items < 1% each)	NA	2%	NA
Mixed Metal - Non-Ferrous	38	Metal	Aluminum Cans and Lids - Non-CRV	M01	25%	23%
Mixed Metal - Non-Ferrous	38	Metal	Aluminum Foil (>3 mm), Molded Containers	M06	21%	24%
Mixed Metal - Non-Ferrous	38	Metal	Aluminum Beverage Cans - CRV	M02	20%	34%
Mixed Metal - Non-Ferrous	38	Metal	Tin/Steel or Aluminum Aerosol Containers	M10	8%	15%
Mixed Metal - Non-Ferrous	38	Metal	Other Ferrous Metal	M12	6%	13%
Mixed Metal - Non-Ferrous	38	Metal	Other Non-Ferrous Metal	M13	4%	12%
Mixed Metal - Non-Ferrous	38	Metal	Tin/Steel Cans, Lids - Non-CRV	M07	3%	9%
Mixed Metal - Non-Ferrous	38	Metal	Remainder/ Composite Metal	M14	3%	6%
Mixed Metal - Non-Ferrous	38	Metal	Aluminum Foil (<3 mm), Sheets	M05	2%	3%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Mixed Metal - Non-Ferrous	38	Metal	Aluminum Bottles for Beverages - CRV	M04	1%	2%
Mixed Metal - Non-Ferrous	38	Other	Remainder/ Composite Mixed Material Multi-Use	X12	1%	3%
Mixed Metal - Non-Ferrous	38	NA	Other (rare items < 1% each)	NA	5%	NA
Mixed Metal - Small	6	Metal	Other Ferrous Metal	M12	40%	15%
Mixed Metal - Small	6	Metal	Remainder/ Composite Metal	M14	20%	25%
Mixed Metal - Small	6	Metal	Tin/Steel Cans, Lids - Non-CRV	M07	14%	7%
Mixed Metal - Small	6	Other	Fines and Residuals	X13	11%	16%
Mixed Metal - Small	6	Metal	Other Non-Ferrous Metal	M13	10%	13%
Mixed Metal - Small	6	Other	Household Hazardous Waste	H01	1%	2%
Mixed Metal - Small	6	Other	Remainder/ Composite Mixed Material Multi-Use	X12	1%	2%
Mixed Metal - Small	6	NA	Other (rare items < 1% each)	NA	3%	NA
Mixed Metal - Small Ferrous	11	Metal	Tin/Steel Cans, Lids - Non-CRV	M07	60%	16%
Mixed Metal - Small Ferrous	11	Metal	Other Ferrous Metal	M12	21%	11%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Mixed Metal - Small Ferrous	11	Other	Remainder/ Composite Mixed Material Multi-Use	X12	5%	7%
Mixed Metal - Small Ferrous	11	Metal	Tin/Steel or Aluminum Aerosol Containers	M10	4%	3%
Mixed Metal - Small Ferrous	11	Other	Mixed Material Single-Use	X11	2%	3%
Mixed Metal - Small Ferrous	11	Metal	Tin/Steel Paint Cans	M09	2%	4%
Mixed Metal - Small Ferrous	11	NA	Other (rare items < 1% each)	NA	7%	NA

Table 3D. Material Characterization of Plastic Outflows

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Expanded Polystyrene #6	1	Plastic	PS Expanded - Packaging	PL27	100%	NA
HDPE Mixed Bottle and Container	2	Plastic	HDPE Pigmented Single-Use Rigids	PL14	45%	2%
HDPE Mixed Bottle and Container	2	Plastic	HDPE Clear Beverage Bottles - Non-CRV	PL09	44%	0%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
HDPE Mixed Bottle and Container	2	Plastic	HDPE Buckets: Non-Food	PL12	2%	2%
HDPE Mixed Bottle and Container	2	Other	Mixed Material Single-Use	X11	1%	1%
HDPE Mixed Bottle and Container	2	Plastic	PP Pigmented Single-Use Rigids	PL23	1%	0%
HDPE Mixed Bottle and Container	2	Plastic	PP Clear Single-Use Rigids	PL22	1%	1%
HDPE Mixed Bottle and Container	2	NA	Other (rare items < 1% each)	NA	5%	NA
HDPE Natural Bottle and Container	30	Plastic	HDPE Clear Beverage Bottles - Non-CRV	PL09	56%	23%
HDPE Natural Bottle and Container	30	Plastic	Other HDPE Clear Single-Use Rigids	PL13	24%	12%
HDPE Natural Bottle and Container	30	Plastic	HDPE Pigmented Single-Use Rigids	PL14	9%	18%
HDPE Natural Bottle and Container	30	Plastic	HDPE Clear Beverage Bottles - CRV	PL10	6%	6%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
HDPE Natural Bottle and Container	30	NA	Other (rare items < 1% each)	NA	5%	NA
HDPE Pigmented Bottle and Container	32	Plastic	HDPE Pigmented Single-Use Rigids	PL14	76%	16%
HDPE Pigmented Bottle and Container	32	Plastic	Other HDPE Clear Single-Use Rigids	PL13	12%	12%
HDPE Pigmented Bottle and Container	32	Plastic	HDPE Clear Beverage Bottles - Non-CRV	PL09	2%	3%
HDPE Pigmented Bottle and Container	32	NA	Other (rare items < 1% each)	NA	10%	NA
Mixed Rigid Plastic	38	Plastic	Other HDPE Multi-Use Rigids	PL15	24%	23%
Mixed Rigid Plastic	38	Plastic	Mixed Plastic Multi-Use	PL38	22%	21%
Mixed Rigid Plastic	38	Plastic	HDPE Buckets: Non-Food	PL12	14%	11%
Mixed Rigid Plastic	38	Plastic	PP Multi-Use	PL24	14%	8%
Mixed Rigid Plastic	38	Plastic	HDPE Buckets: Food	PL11	4%	6%
Mixed Rigid Plastic	38	Plastic	HDPE Pigmented Single-Use Rigids	PL14	3%	4%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Mixed Rigid Plastic	38	Plastic	PP Pigmented Single-Use Rigids	PL23	3%	5%
Mixed Rigid Plastic	38	Other	Remainder/ Composite Mixed Material Multi-Use	X12	3%	9%
Mixed Rigid Plastic	38	Plastic	Remainder/ Composite Plastic	PL39	3%	7%
Mixed Rigid Plastic	38	Plastic	Unknown Plastic Type or Mixture of Multiple Plastic Resins (Single-Use)	PL37	3%	5%
Mixed Rigid Plastic	38	Plastic	Other HDPE Clear Single-Use Rigids	PL13	2%	5%
Mixed Rigid Plastic	38	Plastic	LDPE Multi-Use	PL21	1%	4%
Mixed Rigid Plastic	38	NA	Other (rare items < 1% each)	NA	5%	NA
PET Bottle	12	Plastic	PET Clear Beverage Bottles - CRV	PL02	55%	12%
PET Bottle	12	Plastic	PET Clear Bottles - Non-CRV	PL01	23%	6%
PET Bottle	12	Plastic	Other PET Clear Single-Use Rigids	PL06	6%	5%
PET Bottle	12	Plastic	PET Thermoformed Clamshells and Containers	PL05	5%	7%
PET Bottle	12	Plastic	PET Pigmented Beverage Bottles - CRV	PL04	3%	1%
PET Bottle	12	Plastic	Remainder/ Composite Plastic	PL39	2%	4%
PET Bottle	12	Plastic	PP Clear Single-Use Rigids	PL22	1%	2%
PET Bottle	12	NA	Other (rare items < 1% each)	NA	5%	NA
PET Bottle and Container	41	Plastic	PET Clear Beverage Bottles - CRV	PL02	48%	15%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
PET Bottle and Container	41	Plastic	PET Clear Bottles - Non-CRV	PL01	18%	8%
PET Bottle and Container	41	Plastic	Other PET Clear Single-Use Rigids	PL06	10%	7%
PET Bottle and Container	41	Plastic	PET Thermoformed Clamshells and Containers	PL05	10%	14%
PET Bottle and Container	41	Plastic	Remainder/ Composite Plastic	PL39	3%	8%
PET Bottle and Container	41	Plastic	PET Pigmented Beverage Bottles - CRV	PL04	3%	2%
PET Bottle and Container	41	Plastic	PET Pigmented Bottles – Non-CRV	PL03	2%	1%
PET Bottle and Container	41	NA	Other (rare items < 1% each)	NA	7%	NA
PET Thermoform	6	Plastic	PET Thermoformed Clamshells and Containers	PL05	88%	9%
PET Thermoform	6	Plastic	Unknown Plastic Type or Mixture of Multiple Plastic Resins (Single-Use)	PL37	5%	5%
PET Thermoform	6	Plastic	Remainder/ Composite Plastic	PL39	4%	4%
PET Thermoform	6	Plastic	Other PET Clear Single-Use Rigids	PL06	1%	1%
PET Thermoform	6	NA	Other (rare items < 1% each)	NA	2%	NA
Plastic #3-#7	9	Plastic	PP Clear Single-Use Rigids	PL22	33%	6%
Plastic #3-#7	9	Plastic	PP Pigmented Single-Use Rigids	PL23	27%	5%
Plastic #3-#7	9	Plastic	Mixed Plastic Multi-Use	PL38	4%	4%
Plastic #3-#7	9	Plastic	Other HDPE Multi-Use Rigids	PL15	4%	9%
Plastic #3-#7	9	Plastic	PP Multi-Use	PL24	3%	2%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Plastic #3-#7	9	Plastic	HDPE Pigmented Single-Use Rigids	PL14	3%	2%
Plastic #3-#7	9	Fiber	Other Mixed Paper	F07	2%	1%
Plastic #3-#7	9	Plastic	Other (7) Single-Use Rigids	PL30	2%	1%
Plastic #3-#7	9	Plastic	Other PET Clear Single-Use Rigids	PL06	2%	2%
Plastic #3-#7	9	Plastic	Films - Plastic Bags - Designed for Disposal	PL36	1%	1%
Plastic #3-#7	9	Plastic	PS Expanded - Packaging	PL27	1%	3%
Plastic #3-#7	9	Plastic	PET Thermoformed Clamshells and Containers	PL05	1%	1%
Plastic #3-#7	9	Plastic	PET Clear Beverage Bottles - CRV	PL02	1%	1%
Plastic #3-#7	9	Plastic	Unknown Plastic Type or Mixture of Multiple Plastic Resins (Single-Use)	PL37	1%	1%
Plastic #3-#7	9	Other	Mixed Material Single-Use	X11	1%	2%
Plastic #3-#7	9	Other	Green Material, Clean Wood, and Food Scraps	X10	1%	2%
Plastic #3-#7	9	Fiber	Folded Paper Containers and Other Paperboard Packaging	F06	1%	1%
Plastic #3-#7	9	NA	Other (rare items < 1% each)	NA	11%	NA
Plastic Film	2	Plastic	Films - Plastic Non-Bags - Agricultural and Commercial	PL34	98%	1%
Plastic Film	2	NA	Other (rare items < 1% each)	NA	2%	NA
Plastic Film - Agricultural and Commercial	1	Plastic	Films - Plastic Non-Bags - Agricultural and Commercial	PL34	100%	NA
Plastic Film - Plastic Bags	3	Plastic	Films - Plastic Bags - Designed for Disposal	PL36	100%	0%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Polypropylene #5	24	Plastic	PP Clear Single-Use Rigids	PL22	29%	12%
Polypropylene #5	24	Plastic	PP Pigmented Single-Use Rigids	PL23	25%	14%
Polypropylene #5	24	Plastic	Mixed Plastic Multi-Use	PL38	13%	11%
Polypropylene #5	24	Plastic	Unknown Plastic Type or Mixture of Multiple Plastic Resins (Single-Use)	PL37	5%	3%
Polypropylene #5	24	Plastic	Other (7) Single-Use Rigids	PL30	5%	5%
Polypropylene #5	24	Plastic	PP Multi-Use	PL24	4%	6%
Polypropylene #5	24	Plastic	HDPE Pigmented Single-Use Rigids	PL14	2%	3%
Polypropylene #5	24	Plastic	PET Thermoformed Clamshells and Containers	PL05	2%	4%
Polypropylene #5	24	Other	Remainder/ Composite Mixed Material Multi-Use	X12	1%	3%
Polypropylene #5	24	Plastic	PET Clear Beverage Bottles - CRV	PL02	1%	1%
Polypropylene #5	24	NA	Other (rare items < 1% each)	NA	13%	NA

Table 3E. Material Characterization of Residuals

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Residuals	44	Fiber	Uncoated Corrugated Cardboard/ Old Corrugated Containers (OCC)	F01	10%	9%
Residuals	44	Other	Fines and Residuals	X13	9%	14%
Residuals	44	Other	Textiles and Clothing	T01	8%	12%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Residuals	44	Other	Remainder/ Composite Mixed Material Multi-Use	X12	6%	10%
Residuals	44	Fiber	Other Mixed Paper	F07	6%	5%
Residuals	44	Plastic	Films - Plastic Bags - Designed for Disposal	PL36	5%	4%
Residuals	44	Other	Mixed Material Single-Use	X11	5%	5%
Residuals	44	Fiber	Folded Paper Containers and Other Paperboard Packaging	F06	4%	4%
Residuals	44	Other	Green Material, Clean Wood, and Food Scraps	X10	4%	4%
Residuals	44	Other	Treated Wood	X09	3%	7%
Residuals	44	Fiber	Magazines and Catalogs	F04	3%	6%
Residuals	44	Plastic	Films - Plastic Non-Bags - Other Film	PL35	3%	3%
Residuals	44	Fiber	Remainder/ Composite Fiber	F12	2%	5%
Residuals	44	Plastic	Films - Plastic Non-Bags - Agricultural and Commercial	PL34	2%	7%
Residuals	44	Fiber	Composite Food Service Paper and Packaging	F10	2%	2%
Residuals	44	Fiber	White Office-Type Paper and Mail	F02	2%	4%
Residuals	44	Plastic	Mixed Plastic Multi-Use	PL38	2%	3%
Residuals	44	Fiber	Uncoated Soiled Fiber Products	F11	2%	2%
Residuals	44	Plastic	PP Pigmented Single-Use Rigids	PL23	1%	2%
Residuals	44	Plastic	PP Multi-Use	PL24	1%	2%
Residuals	44	Fiber	Paper Bags and Kraft Paper	F05	1%	2%
Residuals	44	Plastic	HDPE Pigmented Single-Use Rigids	PL14	1%	1%

Outflow Name	Samples of Outflow	MT&F Class	Material Type and Form (MT&F)	MT&F Code	Percent of MT&F in Outflow (Mean)	Percent of MT&F in Outflow (SD)
Residuals	44	Plastic	PET Clear Beverage Bottles - CRV	PL02	1%	1%
Residuals	44	Plastic	PP Clear Single-Use Rigids	PL22	1%	1%
Residuals	44	Plastic	PET Thermoformed Clamshells and Containers	PL05	1%	1%
Residuals	44	Fiber	Newspapers/ Newspaper Inserts	F03	1%	1%
Residuals	44	NA	Other (rare items < 1% each)	NA	13%	NA

Abbreviations and Acronyms

AQPR: Average Quarterly Potential Reuse

BPC: Business and Professions Code

CalRecycle: California Department of Resources Recycling and Recovery

CRV: California Redemption Value

DOF: Department of Finance

HDPE: High Density Polyethylene

Lbs.: Pounds

LDPE: Low Density Polyethylene

LVTP: Large Volume Transfer/Processing Facility

MCS: Material Characterization Study

m: Meters

mm: Millimeters

MT&F: Material Type and Form

NA: Not Applicable

OCC: Old Corrugated Containers

ONP: Old Newspaper

PET: Polyethylene Terephthalate

PP: Polypropylene

PRC: Public Resources Code

PS: Polystyrene

PVC: Polyvinyl Chloride

RDRS: Recycling and Disposal Reporting System

SAP: Subject to Another Program

SB 343: Senate Bill 343 (Allen, Chapter 507, Statutes of 2021)

SD: Standard Deviation

SWIS: Solid Waste Information System

Glossary of Terms

Average Quarterly Potential Reuse: Based on self-reported data in the Recycling and Disposal Reporting System, the average of outflow tons sent per quarter in all of year 2022. Relevant entities included all reporting Transfer/Processors and Recycler/ Composters in California. Relevant material streams included End Use and Recycling/ Composting. Relevant outflow tons included Glass (all), Metal (all), Mixed (Mixed Recyclables), Mixed Residuals (Other: cardboard, Other: Metal, Processing Residuals), Other (Other Approved Material Type: Carton #52 (~ milk cartons, five end markets in USA), Paper (all), Plastic (all).

Jurisdiction: The same definition of jurisdiction was used as that used by California Department of Finance in its dataset entitled E-1 Cities, Counties, and the State Population and Housing Estimates with Annual Percent Change – January 1, 2022, and 2023. The 'Balance of County' included in the dataset encompasses the unincorporated areas of the California counties listed, which were also considered jurisdictions.

Large Volume Transfer/Processing Facility: From section 40200, a transfer or processing station includes those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials in the solid wastes, or to transfer the solid wastes directly from smaller to larger vehicles for transport, and those facilities utilized for transformation. A large volume transfer/processing facility transfers or processes greater than 100 tons per day of material greater than 100 tons per day of material.

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