Appendices A and B

Current State Report: An Evaluation of Reuse and Refill Systems and Covered Materials that Utilize Other Source Reduction Strategies

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

February 2026

Data and information used in this report provided as part of contract number DRR24062.

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Due to rounding, the totals shown may vary slightly and may not add up to 100%.

Appendix A: Additional Data and Information

Taxonomy of Reuse/Refill Solutions and Other Source Reduction Strategies

Taxonomy of source reduction strategies provides a structured framework for comparing incremental and systemic approaches. It includes strategies such as lightweighting, large format packaging, concentration, elimination, material substitution, and reformulation as illustrated in Table 27. Note: Concentration and large format are considered source reduction strategies and sometimes linked to reuse/refill.

Table 27: Taxonomy of reuse/refill solutions and other source reduction strategies

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Refill (consumer provides the container)	Dispensing to replace single use plastic packaging	Retail	Dispensers or other forms of in-store refill are used to deliver goods without packaging into a container provided by the consumer. Dispensers can include scoop bins, gravity fed dispensers, pump bottles, jugs with spigots, and standalone machines. This model is most commonly seen in B2C settings for food, personal, care, home care, and pet care products, but this model could be applied across other product types and sectors, as well as in a B2B context.	• Kitty litter dispensing stations in pet stores to replace packaging. • Machines designed to dispense one or a few products from the same brand, which may offer sanitizing as well. • Zero waste focused shops offering goods with no packaging. • Packaged product retailers that also offer goods in scoop bins, gravity fed dispensers, or tech enabled dispensers. • Truck or trailer outfitted with dispensers that change locations.

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Refill (consumer provides the container)	Dispensing to replace single use plastic packaging	Food service	Dispensers are used to deliver goods without consumer-facing packaging. This category refers to the use of dispensers to replace packaging used in a food service context, distinct from food service ware. In these instances, a serving of the food or beverage product is dispensed, commonly through a pump, directly onto or into the food or drink, or onto the food service ware, such as a plate, ramekin, or tray, so that no sachets or packets are needed.	• Pump dispensers for condiments at stadiums and cafeterias. • Milk and creamer dispensers at convenience stores, in hospitality, and in cafeterias.
Refill (consumer provides the container)	Dispensing to replace single use plastic food service ware	Bring your own cup or container	Consumers bring their own food service ware to avoid using single use plastic food service ware. Prepared, ready-to-consume foods and beverages are served in a consumer's reusable cup or container rather than in a single use plastic food service ware item. This also includes consumers using their own utensils or straws. This solution occurs in cafes, restaurants, convenience stores, and other hospitality or food service contexts.	• Coffee shops or restaurants filling a consumer’s cup or other reusable food service ware. • Consumers filling their own reusable cups at traditional soda fountains or using tech-enabled soda fountains (such as Coca-Cola's Freestyle machine or Pepsi's Spire machine).

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Refill (consumer provides the container)	Refill via single use packaging	Refill via large format packaging	Users refill an original smaller container of the same brand and product, where the original container has functionality that the refill package does not, such as a pump or nozzle.	• Dish soap, hand soap, and other cleaning products sold in large jugs with simple caps used to refill the primary packaging that has a pump or spout.
Refill (consumer provides the container)	Refill via single use packaging	Refill via concentrate	Users purchase refill packages with powder, liquid or solid (e.g., tablet) to reconstitute the product, typically in the original package. This differs from single use concentrate because it is reconstituted in a package provided for that specific brand and good.	• Products allowing users to refill a bottle or container with concentrate (tablet, gel, powder) and, usually, water for reconstitution.
Refill (consumer provides the container)	Refill via single use packaging	Refill via cartridge, pod, pouch, container	This category includes all refill via single use packaging that is neither large format nor a concentrate.	• Dish soap sold in a partial bottle or an incomplete package (e.g., with the spray nozzle screwed on at home to complete the packaging).
Reuse (producer/third party provides the container)	Prefill systems	Prefill previously used and returned packaging, filled at production facility	The producer provides the reusable package already filled with the good, and the consumer returns the package to the producer or another third-party to be washed and used again to sell the same or similar product. This submodel distinguishes that the package is being filled at the primary production facility.	• Milk in reusable glass bottles. • Mascara or deodorant in reusable packaging. • B2B food service back of house packaging. • Prepared meal delivery. • Garment hangers (where clothes are put on reusable hangers at the production facility).

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Reuse (producer/third party provides the container)	Prefill systems	Prefill previously used and returned packaging, filled via fractional manufacturing/ co-filling site	The producer provides the reusable package already filled with the good, and the consumer returns the package to the producer or another third-party to be washed and used again to sell the same or similar product. This submodel distinguishes that the package is being filled at a fractional or contract manufacturing facility or a co-filling site. In this model, the manufacturer either contracts for localized production of the product or ships large quantities of product in intermediate bulk containers to be re-packed into consumer packaging for sale. Packages are returned to the local production/packing site for refilling, reducing the need for long distance shipping of empty consumer packaging.	• Cooking oil transported to local distributors in intermediate bulk containers (IBCs) then transferred to reusable oil packages that are supplied to restaurants and cafeterias, recovered when empty, refilled and redelivered. • Brands in Indonesia have used co-fillers, or contracted manufacturing facilities, to hygienically repack their products into smaller packaging for local resale, return, washing and reuse.

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Reuse (producer/third party provides the container)	Reusable food service ware programs	Open-loop food service ware programs	Reusable food service ware programs operating in an open-loop environment, where the food or beverage is taken away from the point of purchase for consumption, such as restaurant take-out or purchases from food trucks or convenience stores. This is distinct from closed-loop environments because the consumer departs with the food/drink in the reusable food service ware and brings it back the next time they patronize the business (or another participating business), possibly to be exchanged for another, sanitized container.	• Reusable cup program in Aarhus, Denmark. • Monaco's Ma Consigne program providing glass reusable food service ware for to-go meals. • University dining halls using washable, partitioned-tray plastic clamshells for to-go dining. Students bring back their used container to be exchanged for a new one. • Truckee, CA Green Box To-Go program.
Reuse (producer/third party provides the container)	Reusable food service ware programs	Closed-loop food service ware programs	Reusable food service ware programs operating in a closed-loop environment, where the food or beverage is consumed in the same location where it was purchased, such as a cafeteria, stadium, venue, or event. The food service ware is collected on-site for reuse and is recovered for reuse when the consumer finishes eating and/or drinking.	• Reusable food service ware service to schools and cafeterias. • Reusable cup programs in stadiums and music venues. • Reusable food service ware rental for picnics, events, or other consumer use.
Reuse (producer/third party provides the container)	Reusable packaging for shipping and logistics	B2B reusable secondary packaging	Reusable secondary packaging is intended to bundle, sell in bulk, brand, or display the product.	• Clothes hangers that are circulated for reuse. • Reusable Plastic Containers (RPCs), totes, crates, and bins.

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Reuse (producer/third party provides the container)	Reusable packaging for shipping and logistics	B2C reusable transport packaging	Transport or tertiary packaging intended to protect the product during transport, in this case, to consumers.	• Reusable appliance packaging. • Retail bag-as-a-service. • Transport packaging for home grocery delivery. • Reusable shipping mailers. • Reusable dunnage, bubble wrap, foam, paper, and air pillows used to protect goods during shipping, fill empty spaces, create barriers, and absorb shock.
Reuse (producer/third party provides the container)	Reusable packaging for shipping and logistics	B2B reusable transport packaging	Reusable transport or tertiary packaging intended to protect the product during transport, this case, to businesses.	• Reusable pallet wrap, hard shell pallet cover, and bands. • Reusable dunnage. • IBCs, drums, and pallets.

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Other source-reduction strategies	Concentration	N/A	A product sold with water removed, which the consumer adds back later to reconstitute the original good.	• Frozen orange juice concentrate. • Bouillon cubes. • Concentrated laundry detergent. • Syrups or powder format sauces (often in B2B context).
Other source-reduction strategies	Large format packaging	N/A	A larger amount of the good is included than the typical single purchase amount for that product resulting in less packaging per unit of the good. Large format is generally marketed at a markedly lower unit price. What is considered large format must be determined on a product-by-product basis and considered in relation to the relative sizes of all packages sold for a product.	• Bag of rice over 10 pounds. • Jugs of nuts or snacks. • Cleaning products sold in large volumes.
Other source reduction strategies	Lightweighting	N/A	Reducing the weight or amount of material used in a specific packaging or food service ware item without functionally changing the packaging or food service ware. "Lightweighting" does not include changes that result in a recyclable or compostable covered material becoming nonrecyclable or noncompostable or less likely to be recycled or composted.	• Reducing the material used in single use plastic cups.

Refill/reuse or other source reduction?	Model	Submodel	Description	Examples
Other source-reduction strategies	Elimination	N/A	The removal of a plastic component from a covered material without replacing that component with a nonplastic component as a source reduction strategy.	• Removing components like tamper seals, small plastic rings on pumps. • Utilizing elimination strategies as described in Upstream's "Skip the Stuff" campaign to reduce consumption of unnecessary straws and other single use plastic food service ware.
Other source-reduction strategies	Material substitution	N/A	Replacing a plastic material with a different material, such as paper, metal, glass, or other nonplastic material, resulting in an overall reduction of plastic use.	• Changing a rigid plastic package into a flexible film one. • Changing plastic mailer to paper one.
Other source-reduction strategies	Reformulation	N/A	Altering a product's composition or processing (e.g., to allow for compatibility with an expanded range of packaging types).	• Packaged shampoo in bar form. • Toothpaste tablets or powder.

Additional Data Tables from In Store Data Collection

For the in-store data collection analysis, the per-unit costs were created based on a normalization of units across products. The values are included here for easy reference, and the full methodology is detailed further in Appendix B: Store-level Data Collection in California.

- For milk products
  - Source reduced large format: anything over one gallon
  - Source reduced concentrate: evaporated, condensed, and powdered milk
  - Normalized amounts for comparison:
    - Cold and shelf-stable liquid milk: 8 fluid ounces (fl oz)
    - Evaporated and condensed milk: 4 fl oz
    - Powdered milk: 2 oz
- For rice products
  - Source reduced large format: package of 10 pounds (lb) or more
  - Rice had no concentrate options
  - Normalized amounts for comparison: 1 oz of rice
- For dish soap products
  - Source reduced large format: over 28 fl oz
  - Source reduced concentrate: dish soap bars
  - Refill via single use packaging: products that were the standard size but not sold with the pump or spray nozzle.
  - Refill via dispensing: dish soap available for in-store dispensing to replace packaging using dispensers.
  - Normalized amounts for comparison:
    - Regular dish soap: 1 fl oz
    - Dish soap bar: 0.2 oz (because one oz of a dish soap bar is equal to 5 fl oz of liquid dish soap according to the usage instructions on the package)
- For shampoo products
  - Source reduced large format: anything over 16.91 fl oz
  - Source reduced concentrate: shampoo bars and pads

- Refill via dispensing: shampoo available for in-store dispensing to replace packaging using dispensers.
- Normalized amounts for comparison:
  - Liquid shampoo: 1 fl oz
  - Concentrate (bar): 0.2 oz (determined using the average number of washes each option provides per ounce)
  - Concentrate (pad): 0.6 oz (determined to be equivalent to one fl oz of regular shampoo based on directions on the package)

- For multi-surface cleaning products
  - Source reduced standard format: spray bottles
  - Source reduced large format: 5 gallons or more
  - Source reduced concentrate: dissolvable tablets sold without an original bottle option and concentrated nonspray liquid cleaners.
  - Refill via concentrate: dissolvable tablets that were sold with a bottle
  - Refill via dispensing: surface cleaner available for in-store dispensing to replace packaging using dispensers.
  - Normalized amounts for comparison:
    - Liquid surface cleaner: 1 fl oz
    - Concentrated liquid cleaner: 0.125 fl oz (based on specific instructions to make a 16 oz bottle of cleaner)

In the following tables, rows with zero values have been omitted. Rows where zero products are offered in a certain format are not applicable and have been omitted. Only milk has a row for prefill format because deposit-based reusable milk bottle programs are offered across California.

Table 28 summarizes the range of unit costs in dollars of every product by format and number of observations.

Table 28: Unit cost range details in dollars per unit (statewide)

Product	Type	Format	Number of Price Observations	High	Low	Median	Average
White Rice	Single-Use	Standard	255	0.71	0.02	0.17	0.19
		Large Format	44	0.14	0.01	0.04	0.05
		Concentrate	0	--	--	--	--
	Refill	Single-Use	0	--	--	--	--
		Large Format	0	--	--	--	--
		Concentrate	0	--	--	--	--
		Dispensing	13	0.31	0.12	0.25	0.24
	Reuse	Prefill	0	--	--	--	--
Milk	Single-Use	Standard	253	1.99	0.12	0.59	0.67
		Large Format	5	0.39	0.20	0.21	0.25
		Concentrate	124	11.00	0.14	0.86	1.00
	Refill	Single-Use	0	--	--	--	--

Product	Type	Format	Number of Price Observations	High	Low	Median	Average
Milk	Refill	Large Format	0	--	--	--	--
		Concentrate	0	--	--	--	--
		Dispensing	0	--	--	--	--
	Reuse	Prefill	16	0.94	0.31	0.86	0.81
Surface Cleaner	Single-Use	Standard	304	1.00	0.05	0.23	0.24
		Large Format	2	0.08	0.07	0.07	0.07
		Concentrate	245	0.53	0.00	0.02	0.03
	Refill	Single-Use	7	0.56	0.05	0.28	0.30
		Large Format	1	0.20	0.20	0.20	0.20
		Concentrate	10	0.45	0.08	0.22	0.22
	Refill	Dispensing	22	1.50	0.14	0.39	0.44

Product	Type	Format	Number of Price Observations	High	Low	Median	Average
Surface Cleaner	Reuse	Prefill	0	--	--	--	--
Dish Soap	Single-Use	Standard	436	1.34	0.08	0.24	0.27
		Large Format	128	0.56	0.05	0.16	0.16
		Concentrate	11	0.47	0.27	0.31	0.33
	Refill	Single-Use	21	0.41	0.16	0.26	0.26
		Large Format	154	0.59	0.05	0.14	0.15
		Concentrate	0	--	--	--	--
		Dispensing	22	1.25	0.15	0.35	0.40
	Reuse	Prefill	0	--	--	--	--
Shampoo	Single-Use	Standard	930	5.00	0.08	0.83	0.97
		Large Format	457	2.04	0.04	0.38	0.45
Shampoo	Single-Use	Concentrate	72	2.93	0.05	0.77	0.92
	Refill	Single-Use	3	1.50	0.53	0.53	0.85

Product	Type	Format	Number of Price Observations	High	Low	Median	Average
Shampoo	Refill	Large Format	0	--	--	--	--
		Concentrate	0	--	--	--	--
		Dispensing	37	2.20	0.47	0.75	0.84
	Reuse	Prefill	0	--	--	--	--

Table 29 summarizes the unit cost in dollars of every product by format in urban/suburban/rural areas.

Table 29: Urban/suburban/rural average unit costs in dollars per unit

Product	Type	Format	Urban	Suburban	Rural
White Rice	Single-Use	Standard	0.18	0.19	0.20
		Large Format	0.06	0.05	0.05
		Concentrate	--	--	--
	Refill	Single-Use	--	--	--
		Large Format	--	--	--
		Concentrate	--	--	--
		Dispensing	0.23	0.28	0.23
	Reuse	Prefill	--	--	--
Milk	Single-Use	Standard	0.68	0.66	0.66
		Large Format	0.27	--	0.21
		Concentrate	0.93	0.91	1.34
	Refill	Single-Use	--	--	--
		Large Format	--	--	--
		Concentrate	--	--	--
		Dispensing	--	--	--
	Reuse	Prefill	0.82	0.93	0.72
Surface Cleaner	Single-Use	Standard	0.26	0.24	0.20
		Large Format	0.07	0.08	--
		Concentrate	0.04	0.03	0.03
	Refill	Single-Use	0.30	0.28	0.31
		Large Format	0.20	--	--
		Concentrate	0.22	--	0.20
		Dispensing	0.44	0.30	0.59
	Reuse	Prefill	--	--	--

Product	Type	Format	Urban	Suburban	Rural
Dish Soap	Single-Use	Standard	0.26	0.28	0.25
		Large Format	0.16	0.18	0.15
		Concentrate	0.33	0.30	--
	Refill	Single-Use	0.24	0.32	0.25
		Large Format	0.16	0.16	0.14
		Concentrate	--	--	--
		Dispensing	0.44	0.28	--
	Reuse	Prefill	--	--	--
Shampoo	Single-Use	Standard	0.99	1.02	0.84
		Large Format	0.46	0.47	0.41
		Concentrate	0.96	0.71	0.93
	Refill	Single-Use	--	0.85	--
		Large Format	--	--	--
		Concentrate	--	--	--
		Dispensing	0.87	0.78	0.78
	Reuse	Prefill	--	--	--

Table 30 summarizes the unit cost in dollars of every product by format in each region.

Table 30: Average unit costs in dollars per unit by California region

Dashes indicate no applicable data was collected.

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
White Rice	Single-Use	Standard	0.18	0.20	0.19	0.19	0.15
		Large Format	--	0.06	0.05	0.06	0.04
		Concentrate	--	--	--	--	--
	Refill	Single-Use	--	--	--	--	--
		Large Format	--	--	--	--	--
		Concentrate	--	--	--	--	--
		Dispensing	0.27	0.18	0.27	0.22	0.25
	Reuse	Prefill	--	--	--	--	--
Milk	Single-Use	Standard	0.66	0.61	0.65	0.70	0.64
		Large Format	0.21	0.30	--	0.20	0.22
		Concentrate	0.74	0.95	0.96	1.16	0.74
	Refill	Single-Use	--	--	--	--	--
		Large Format	--	--	--	--	--
		Concentrate	--	--	--	--	--
		Dispensing	--	--	--	--	--
	Reuse	Prefill	0.83	0.56	0.89	0.83	--
Surface Cleaner	Single-Use	Standard	0.20	0.25	0.25	0.25	0.19
		Large Format	--	--	0.07	0.08	--
		Concentrate	0.02	0.02	0.04	0.04	0.01
	Refill	Single-Use	--	0.28	0.37	0.31	0.05
		Large Format	--	0.20	--	--	--
		Concentrate	--	--	--	0.22	0.20

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
Surface Cleaner	Refill	Dispensing	--	0.31	0.32	0.53	0.47
	Reuse	Prefill	--	--	--	--	--
Dish Soap	Single-Use	Standard	0.28	0.27	0.29	0.26	0.22
		Large Format	0.16	0.16	0.18	0.17	0.13
		Concentrate	--	0.27	0.30	0.34	--
	Refill	Single-Use	0.24	0.28	0.33	0.25	0.27
		Large Format	0.15	0.15	0.16	0.16	0.12
		Concentrate	--	--	--	--	--
		Dispensing	--	0.31	0.35	0.45	0.42
	Reuse	Prefill	--	--	--	--	--
Shampoo	Single-Use	Standard	0.94	1.01	1.05	0.96	0.60
		Large Format	0.43	0.51	0.45	0.46	0.33
		Concentrate	0.85	0.71	0.65	1.07	--
	Refill	Single-Use	--	--	0.85	--	--
		Large Format	--	--	--	--	--
		Concentrate	--	--	--	--	--
		Dispensing	--	0.83	0.57	0.94	0.84
	Reuse	Prefill	--	--	--	--	--

Table 31 summarizes the unit cost in dollars of every product by format in disadvantaged and not disadvantages communities.

Table 31: Disadvantaged and not disadvantaged communities: Average unit costs in dollars per unit

Dashes indicate no applicable data was collected.

Product	Type	Format	Disadvantaged	Not Disadvantaged
White Rice	Single-Use	Standard	0.18	0.19
		Large Format	0.06	0.05
		Concentrate	--	--
	Refill	Single-Use	--	--
		Large Format	--	--
		Concentrate	--	--
		Dispensing	0.22	0.26
	Reuse	Prefill	--	--
Milk	Single-Use	Standard	0.68	0.66
		Large Format	0.21	0.27
		Concentrate	0.90	1.13
	Refill	Single-Use	--	--
		Large Format	--	--
		Concentrate	--	--
		Dispensing	--	--
	Reuse	Prefill	0.78	0.84
Surface Cleaner	Single-Use	Standard	0.23	0.25
		Large Format	0.07	0.08
		Concentrate	0.03	0.03
	Refill	Single-Use	0.35	0.22
		Large Format	--	0.20
		Concentrate	0.19	0.24
		Dispensing	0.69	0.32
	Reuse	Prefill	--	--
Dish Soap	Single-Use	Standard	0.28	0.25

Product	Type	Format	Disadvantaged	Not Disadvantaged
Dish Soap	Single-Use	Large Format	0.18	0.15
		Concentrate	0.35	0.32
	Refill	Single-Use	0.27	0.25
		Large Format	0.15	0.15
		Concentrate	--	--
		Dispensing	0.57	0.34
	Reuse	Prefill	--	--
Shampoo	Single-Use	Standard	0.94	1.00
		Large Format	0.45	0.46
		Concentrate	1.13	0.72
	Refill	Single-Use	0.85	--
		Large Format	--	--
		Concentrate	--	--
		Dispensing	0.94	0.78
	Reuse	Prefill	--	--

Table 32 summarizes the unit cost in dollars per unit of every product by format in each retailer North American Industry Classification System (NAICS) code.

Table 32: Retailer NAICS codes: Average unit costs in dollars

Dashes indicate no applicable data was collected.

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience stores	455211 Warehouse clubs and super centers	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, beauty supplies, and perfume stores
White Rice	Single-Use	Standard	0.19	--	0.12	0.13	0.34	--
		Large Format	0.06	--	0.04	0.04	--	--
		Concentrate	--	--	--	--	--	--
	Refill	Single-Use	--	--	--	--	--	--
		Large Format	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--
		Dispensing	0.24	--	--	--	--	--
	Reuse	Prefill	--	--	--	--	--	--
Milk	Single-Use	Standard	0.69	0.78	0.51	0.51	0.56	--
		Large Format	--	--	0.25	--	--	--
		Concentrate	1.08	--	0.68	0.52	1.16	--
	Refill	Single-Use	--	--	--	--	--	--
		Large Format	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--
		Dispensing	--	--	--	--	--	--
	Reuse	Prefill	0.81	--	--	--	--	--
Surface Cleaner	Single-Use	Standard	0.25	0.22	0.21	0.12	0.25	0.84

Product	**Type**	**Format**	**445110 Supermarkets and other grocery retailers**	**445120 Convenience stores**	**455211 Warehouse clubs and super centers**	**455219 All other general merchandise retailers**	**456110 Pharmacies and drug retailers**	**446120 Cosmetics, beauty supplies, and perfume stores**
Surface Cleaner	Single-Use	Large Format	--	--	0.07	--	--	--
		Concentrate	0.04	0.05	0.01	0.01	0.02	--
	Refill	Single-Use	0.34	--	--	0.05	--	--
		Large Format	0.20	--	--	--	--	--
		Concentrate	0.20	--	--	--	--	0.28
		Dispensing	0.31	--	--	--	--	0.62
	Reuse	Prefill	--	--	--	--	--	--
Dish Soap	Single-Use	Standard	0.28	0.39	0.26	0.16	0.30	--
		Large Format	0.17	--	0.15	0.12	0.17	--
		Concentrate	0.31	--	--	--	--	0.36
	Refill	Single-Use	0.27	--	0.20	0.27	0.25	--
		Large Format	0.16	--	0.12	0.11	0.24	--
		Concentrate	--	--	--	--	--	--
		Dispensing	0.33	--	--	--	--	0.45
	Reuse	Prefill	--	--	--	--	--	--
Shampoo	Single-Use	Standard	0.96	0.49	0.09	0.48	1.12	--
		Large Format	0.47	0.33	0.39	0.19	0.51	--
		Concentrate	0.85	--	--	--	0.86	1.24
Shampoo	Refill	Single-Use	0.85	--	--	--	--	--

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience stores	455211 Warehouse clubs and super centers	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, beauty supplies, and perfume stores
Shampoo	Refill	Large Format	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--
		Dispensing	0.68	--	--	--	--	1.03
	Reuse	Prefill	--	--	--	--	--	--

Table 33 summarizes the range in number of brands observed at each retail location by product and format.

Table 33: Brands observed per retail location details (statewide)

Dashes indicate no applicable data was collected.

Product	Type	Format	High	Low	Median	Average
White Rice	Single-Use	Standard	8.0	1.0	2.0	3.0
		Large Format	3.0	1.0	1.5	1.8
		Concentrate	--	--	--	--
	Refill	Single-Use	--	--	--	--
		Large Format	--	--	--	--
		Concentrate	--	--	--	--
		Dispensing	1.0	1.0	1.0	1.0
	Reuse	Prefill	--	--	--	--
Milk	Single-Use	Standard	10.0	1.0	2.0	3.0
		Large Format	2.0	1.0	1.0	1.3
		Concentrate	6.0	1.0	2.0	2.0
	Refill	Single-Use	--	--	--	--
		Large Format	--	--	--	--
		Concentrate	--	--	--	--
		Dispensing	--	--	--	--
	Reuse	Prefill	2.0	1.0	1.0	1.1
Surface Cleaner	Single-Use	Standard	16.0	1.0	4.5	5.1
		Large Format	1.0	1.0	1.0	1.0
		Concentrate	11.0	1.0	3.5	3.8
	Refill	Single-Use	1.0	1.0	1.0	1.0
		Large Format	1.0	1.0	1.0	1.0

Product	Type	Format	High	Low	Median	Average
Surface Cleaner	Refill	Concentrate	2.0	1.0	2.0	1.7
		Dispensing	3.0	1.0	2.0	1.8
	Reuse	Prefill	--	--	--	--
Dish Soap	Single-Use	Standard	14.0	1.0	6.0	5.6
		Large Format	5.0	1.0	3.0	2.6
		Concentrate	3.0	1.0	1.5	1.7
	Refill	Single-Use	3.0	1.0	1.0	1.3
		Large Format	7.0	1.0	3.0	3.3
		Concentrate	--	--	--	--
		Dispensing	5.0	1.0	2.0	2.0
	Reuse	Prefill	--	--	--	--
Shampoo	Single-Use	Standard	43.0	1.0	14.0	14.7
		Large Format	19.0	1.0	6.0	6.9
		Concentrate	13.0	1.0	3.0	3.7
	Refill	Single-Use	3.0	3.0	3.0	3.0
		Large Format	--	--	--	--
		Concentrate	--	--	--	--
		Dispensing	5.0	1.0	2.0	2.6
	Reuse	Prefill	--	--	--	--

Table 34 summarizes the number of brands observed in urban/suburban/rural areas by product and format.

Table 34: Urban/suburban/rural: Average brands per retail location

Dashes indicate no applicable data was collected.

Product	Type	Format	Urban	Suburban	Rural
White Rice	Single-Use	Standard	2.8	3.3	3.2
		Large Format	2.0	1.7	1.5
		Concentrate	--	--	--
	Refill	Single-Use	--	--	--
		Large Format	--	--	--
		Concentrate	--	--	--
		Dispensing	1.0	1.0	1.0
	Reuse	Prefill	--	--	--
Milk	Single-Use	Standard	3.2	3.5	1.9
		Large Format	1.5	--	1.0
		Concentrate	1.8	2.5	1.6
	Refill	Single-Use	--	--	--
		Large Format	--	--	--
		Concentrate	--	--	--
		Dispensing	--	--	--
	Reuse	Prefill	1.1	1.0	1.0
Surface Cleaner	Single-Use	Standard	4.9	5.6	4.7
		Large Format	1.0	1.0	--
		Concentrate	3.3	4.6	3.8
	Refill	Single-Use	1.0	1.0	1.0
		Large Format	1.0	--	--
		Concentrate	1.6	--	2.0
		Dispensing	1.8	2.0	1.0
	Reuse	Prefill	--	--	--
Dish Soap	Single-Use	Standard	5.6	5.7	5.2
		Large Format	2.3	3.0	2.8
		Concentrate	1.8	1.0	--
	Refill	Single-Use	1.2	1.3	1.5

Product	Type	Format	Urban	Suburban	Rural
Dish Soap	Refill	Large Format	3.3	3.3	3.3
		Concentrate	--	--	--
		Dispensing	2.0	2.0	--
	Reuse	Prefill	--	--	--
Shampoo	Single-Use	Standard	15.4	15.2	12.3
		Large Format	7.3	7.1	5.6
		Concentrate	4.2	2.5	3.0
	Refill	Single-Use	--	3.0	--
		Large Format	--	--	--
		Concentrate	--	--	--
		Dispensing	2.8	2.0	2.0
	Reuse	Prefill	--	--	--

Table 35 summarizes the average number of brands observed in each California region by product and format.

Table 35: Average brands per retail location, by California region

Dashes indicate no applicable data was collected.

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
White Rice	Single-Use	Standard	2.1	2.9	2.8	3.6	3.2
		Large Format	--	1.3	1.5	2.0	2.0
		Concentrate	--	--	--	--	--
	Refill	Single-Use	--	--	--	--	--
		Large Format	--	--	--	--	--
		Concentrate	--	--	--	--	--
		Dispensing	1.0	1.0	1.0	1.0	1.0
	Reuse	Prefill	--	--	--	--	--
Milk	Single-Use	Standard	1.7	2.5	3.0	4.0	2.2
		Large Format	1.0	2.0	--	1.0	1.0
		Concentrate	1.3	2.4	2.3	1.9	1.8
	Refill	Single-Use	--	--	--	--	--
		Large Format	--	--	--	--	--
		Concentrate	--	--	--	--	--
		Dispensing	--	--	--	--	--
	Reuse	Prefill	1.0	1.0	1.0	1.1	--
Surface Cleaner	Single-Use	Standard	3.8	6.5	5.8	5.0	3.8
		Large Format	--	--	1.0	1.0	--
		Concentrate	3.2	5.0	3.9	3.5	4.0
	Refill	Single-Use	--	1.0	1.0	1.0	1.0
		Large Format	--	1.0	--	--	--
		Concentrate	--	--	--	1.6	2.0
		Dispensing	--	2.0	3.0	1.6	1.0

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
Surface Cleaner	Reuse	Prefill	--	--	--	--	--
Dish Soap	Single-Use	Standard	5.3	6.4	5.6	5.3	5.5
		Large Format	1.8	3.3	3.3	2.5	2.5
		Concentrate	--	1.0	1.0	2.0	--
	Refill	Single-Use	1.7	1.0	1.3	1.2	1.0
		Large Format	3.2	2.7	3.8	3.3	3.7
		Concentrate	--	--	--	--	--
		Dispensing	--	2.0	1.0	2.0	3.0
	Reuse	Prefill	--	--	--	--	--
Shampoo	Single-Use	Standard	13.5	18.0	13.6	17.1	6.8
		Large Format	6.3	7.1	6.4	7.7	6.5
		Concentrate	2.5	7.0	2.2	3.9	--
	Refill	Single-Use	--	--	3.0	--	--
		Large Format	--	--	--	--	--
		Concentrate	--	--	--	--	--
		Dispensing	--	2.7	2.3	2.9	1.0
	Reuse	Prefill	--	--	--	--	--

Table 36 summarizes the number of brands observed in disadvantaged and not disadvantaged communities by product and format.

Table 36: Average brands per retail location in Disadvantaged and not Disadvantaged communities:

Dashes indicate no applicable data was collected.

Product	Type	Format	Disadvantaged	Not Disadvantaged
White Rice	Single-Use	Standard	3.0	3.1
		Large Format	1.7	1.8
		Concentrate	--	--
	Refill	Single-Use	--	--
		Large Format	--	--
		Concentrate	--	--
		Dispensing	1.0	1.0
	Reuse	Prefill	--	--
Milk	Single-Use	Standard	3.1	2.9
		Large Format	1.0	1.5
		Concentrate	2.5	1.5
	Refill	Single-Use	--	--
		Large Format	--	--
		Concentrate	--	--
		Dispensing	--	--
	Reuse	Prefill	1.1	1.0
Surface Cleaner	Single-Use	Standard	5.8	4.4
		Large Format	1.0	1.0
		Concentrate	4.3	3.3

Product	Type	Format	Disadvantaged	Not Disadvantaged
Surface Cleaner	Refill	Single-Use	1.0	1.0
		Large Format	--	1.0
		Concentrate	1.3	2.0
		Dispensing	1.6	1.9
	Reuse	Prefill	--	--
Dish Soap	Single-Use	Standard	5.5	5.7
		Large Format	2.8	2.5
		Concentrate	1.3	2.0
	Refill	Single-Use	1.4	1.0
		Large Format	3.7	2.9
		Concentrate	--	--
		Dispensing	1.5	2.3
	Reuse	Prefill	--	--
Shampoo	Single-Use	Standard	12.5	17.3
		Large Format	6.0	8.0
		Concentrate	3.6	3.7
	Refill	Single-Use	3.0	--
		Large Format	--	--
		Concentrate	--	--
		Dispensing	2.5	2.6
	Reuse	Prefill	--	--

Table 37 summarizes the type of brand observed in each retail type by product and format. Dashes indicate no applicable data was collected.

Table 37: Brand type: Average brands per retail location

Product	Type	Format	Mainstream/ National Brand	Private Label/ Store Brand	Premium/ Specialty Brand	Natural Organic Brand	Value/ Discount Brand	Local/ Regional Brand	Emerging/ Challenger Brand
White Rice	Single-Use	Standard	2.4	1.0	1.6	2.1	1.0	1.1	--
		Large Format	1.2	1.0	1.0	1.0	1.0	1.0	--
		Concentrate	--	--	--	--	--	--	--
	Refill	Single-Use	--	--	--	--	--	--	--
		Large Format	--	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--	--
		Dispensing	--	1.0	1.0	1.0	--	1.0	--
	Reuse	Prefill	--	--	--	--	--	--	--
Milk	Single-Use	Standard	1.6	1.2	1.9	2.0	1.0	1.6	--
		Large Format	--	1.0	1.0	--	--	1.0	--
		Concentrate	1.4	1.0	1.4	1.6	1.0	1.3	--
	Refill	Single-Use	--	--	--	--	--	--	--
		Large Format	--	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--	--
		Dispensing	--	--	--	--	--	--	--
	Reuse	Prefill	--	--	1.1	1.0	--	1.1	--
Surface Cleaner	Single-Use	Standard	2.6	1.2	2.4	4.0	1.4	--	1.1
		Large Format	1.0	--	--	1.0	--	--	--
Surface Cleaner	Single-Use	Concentrate	3.0	1.2	1.3	2.1	1.7	--	1.0

Product	Type	Format	Mainstream/ National Brand	Private Label/ Store Brand	Premium/ Specialty Brand	Natural Organic Brand	Value/ Discount Brand	Local/ Regional Brand	Emerging/ Challenger Brand
	Refill	Single-Use	--	--	--	1.0	1.0	--	1.0
		Large Format	--	--	--	--	1.0	--	1.0
		Concentrate	--	1.0	1.0	1.7	--	1.0	1.5
		Dispensing	--	--	1.5	1.6	--	--	1.8
	Reuse	Prefill	--	--	--	--	--	--	--
Dish Soap	Single-Use	Standard	2.9	1.3	2.3	3.6	1.6	1.0	1.0
		Large Format	2.5	1.1	1.0	1.0	1.1	--	--
		Concentrate	--	--	1.4	1.5	--	2.0	1.2
	Refill	Single-Use	1.1	1.0	1.0	1.0	--	--	1.0
		Large Format	2.4	1.2	1.3	1.7	1.2	2.0	1.0
		Concentrate	--	--	--	--	--	--	--
		Dispensing	--	--	1.9	1.8	--	1.0	1.5
	Reuse	Prefill	--	--	--	--	--	--	--
Shampoo	Single-Use	Standard	9.4	1.7	9.0	8.7	2.5	1.7	1.3
		Large Format	6.1	1.0	2.6	2.3	1.6	1.0	1.2
		Concentrate	--	1.0	1.9	4.1	1.0	1.8	2.2
	Refill	Single-Use	--	--	2.0	3.0	--	--	--
		Large Format	--	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--	--
		Dispensing	--	1.0	1.8	2.5	--	--	1.5
Shampoo	Reuse	Prefill	--	--	--	--	--	--	--

Table 38 summarizes the type of brand observed in each retailer NAICS code by product and format. Dashes indicate no applicable data was collected.

Table 38: Retailer NAICS codes: Average brands per retail location

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience stores	455211 Warehouse clubs and supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, beauty supplies, and perfume stores
White Rice	Single-Use	Standard	3.5	--	2.4	2.0	1.2	--
		Large Format	1.7	--	2.2	1.0	--	--
		Concentrate	--	--	--	--	--	--
	Refill	Single-Use	--	--	--	--	--	--
		Large Format	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--
		Dispensing	1.0	--	--	--	--	--
	Reuse	Prefill	--	--	--	--	--	--
Milk	Single-Use	Standard	3.5	1.0	3.0	1.8	1.2	--
		Large Format	--	--	1.3	--	--	--
		Concentrate	2.0	--	2.4	1.8	1.0	--
	Refill	Single-Use	--	--	--	--	--	--
		Large Format	--	--	--	--	--	--
		Concentrate	--	--	--	--	--	--
		Dispensing	--	--	--	--	--	--
Milk	Reuse	Prefill	1.1	--	--	--	--	--
Surface Cleaner	Single-Use	Standard	5.6	1.0	6.7	3.8	3.3	2.0
		Large Format	--	--	1.0	--	--	--
		Concentrate	3.5	1.0	4.8	5.5	2.8	--
Surface Cleaner	Refill	Single-Use	1.0	--	--	1.0	--	--

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience stores	455211 Warehouse clubs and supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, beauty supplies, and perfume stores
Surface Cleaner	Refill	Large Format	1.0	--	--	--	--	--
		Concentrate	1.8	--	--	--	--	1.5
		Dispensing	1.8	--	--	--	--	1.8
	Reuse	Prefill	--	--	--	--	--	--
Dish Soap	Single-Use	Standard	5.5	5.0	4.3	5.8	6.1	--
		Large Format	2.7	--	2.2	2.6	2.9	--
		Concentrate	1.5	--	--	--	--	2.0
	Refill	Single-Use	1.4	--	1.0	1.0	1.0	--
		Large Format	3.2	--	4.3	4.0	1.8	--
		Concentrate	--	--	--	--	--	--
		Dispensing	1.5	--	--	--	--	2.6
	Reuse	Prefill	--	--	--	--	--	--
Shampoo	Single-Use	Standard	16.0	3.0	1.0	4.3	20.9	--
		Large Format	7.1	1.0	5.4	4.8	9.9	--
		Concentrate	3.8	--	--	--	1.0	4.0
	Refill	Single-Use	3.0	--	--	--	--	--
		Large Format	--	--	--	--	--	--
Shampoo	Refill	Concentrate	--	--	--	--	--	--
		Dispensing	2.2	--	--	--	--	3.2
	Reuse	Prefill	--	--	--	--	--	--

Tables 39 and 39.1 summarize the type of format observed in each retailer NAICS code by product. Dashes indicate no applicable data was collected.

Table 39: Product availability totals by retailer type

Total Retail Locations	445110 Supermarkets and other grocery retailers	445120 Convenience Stores	455211 Warehouse clubs and supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, Beauty Supplies, and Perfume Stores
Assessed in the Study	**50**	**1**	**10**	**7**	**10**	**5**
With White Rice	45	0	8	6	6	0
With Milk	43	1	8	6	6	0
With Surface Cleaner	45	1	8	6	7	5
With Dish Soap	47	1	8	6	7	5
With Shampoo	45	1	8	6	8	5

Table 39.1: Format availability by retailer type and product type

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience Stores	455211 Warehouse clubs and supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, Beauty Supplies, and Perfume Stores
White Rice	Single-Use	Standard	96%	--	100%	100%	100%	--
		Large Format	40%	--	63%	17%	0%	--
		Concentrate	0%	--	0%	0%	0%	--
	Refill	Single-Use	0%	--	0%	0%	0%	--
		Large Format	0%	--	0%	0%	0%	--
White Rice	Refill	Concentrate	0%	--	0%	0%	0%	--
		Dispensing	29%	--	0%	0%	0%	--

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience Stores	455211 Warehouse clubs and supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, Beauty Supplies, and Perfume Stores
White Rice	Reuse	Prefill	0%	--	0%	0%	0%	--
Milk	Single-Use	Standard	98%	100%	50%	100%	100%	--
		Large Format	0%	0%	50%	0%	0%	--
		Concentrate	84%	0%	63%	83%	67%	--
	Refill	Single-Use	0%	0%	0%	0%	0%	--
		Large Format	0%	0%	0%	0%	0%	--
		Concentrate	0%	0%	0%	0%	0%	--
		Dispensing	0%	0%	0%	0%	0%	--
	Reuse	Prefill	35%	0%	0%	0%	0%	--
Surface Cleaner	Single-Use	Standard	91%	100%	38%	83%	100%	20%
		Large Format	0%	0%	25%	0%	0%	0%
		Concentrate	87%	100%	100%	100%	57%	0%
	Refill	Single-Use	13%	0%	0%	17%	0%	0%
		Large Format	2%	0%	0%	0%	0%	0%
		Concentrate	9%	0%	0%	0%	0%	40%
Surface Cleaner	Refill	Dispensing	18%	0%	0%	0%	0%	100%
	Reuse	Prefill	0%	0%	0%	0%	0%	0%
Dish Soap	Single-Use	Standard	94%	100%	38%	100%	100%	0%
		Large Format	64%	0%	63%	83%	100%	0%
		Concentrate	9%	0%	0%	0%	0%	40%
	Refill	Single-Use	23%	0%	13%	17%	14%	0%
Dish Soap	Refill	Large Format	53%	0%	100%	50%	86%	0%
		Concentrate	0%	0%	0%	0%	0%	0%
		Dispensing	13%	0%	0%	0%	0%	100%

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience Stores	455211 Warehouse clubs and supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, Beauty Supplies, and Perfume Stores
Dish Soap	Reuse	Prefill	0%	0%	0%	0%	0%	0%
Shampoo	Single-Use	Standard	89%	100%	25%	100%	100%	0%
		Large Format	87%	100%	100%	100%	100%	0%
		Concentrate	36%	0%	0%	0%	13%	60%
	Refill	Single-Use	2%	0%	0%	0%	0%	0%
		Large Format	0%	0%	0%	0%	0%	0%
		Concentrate	0%	0%	0%	0%	0%	0%
		Dispensing	20%	0%	0%	0%	0%	100%
	Reuse	Prefill	0%	0%	0%	0%	0%	0%

Table 40 summarizes the type of format observed in each urban/suburban/rural area by product.

Table 40: Product availability totals by urban/suburban/rural area

Total Retail Locations With:	Urban	Suburban	Rural
White Rice	34	18	13
Milk	32	17	15
Surface Cleaner	37	18	16
Dish Soap	38	19	16
Shampoo	39	18	15

Table 40.1: Format availability by urban/suburban/rural

Product	Type	Format	Urban	Suburban	Rural
White Rice	Single-Use	Standard	94%	100%	100%
		Large Format	26%	50%	46%
		Concentrate	0%	0%	0%
	Refill	Single-Use	0%	0%	0%
		Large Format	0%	0%	0%
		Concentrate	0%	0%	0%
		Dispensing	26%	11%	15%
	Reuse	Prefill	0%	0%	0%
Milk	Single-Use	Standard	91%	100%	87%
		Large Format	6%	0%	13%
		Concentrate	75%	88%	73%
	Refill	Single-Use	0%	0%	0%
		Large Format	0%	0%	0%
		Concentrate	0%	0%	0%
		Dispensing	0%	0%	0%
	Reuse	Prefill	28%	12%	27%
Surface Cleaner	Single-Use	Standard	73%	94%	81%
		Large Format	3%	6%	0%
		Concentrate	68%	89%	100%
	Refill	Single-Use	8%	11%	13%
		Large Format	3%	0%	0%
		Concentrate	14%	0%	6%
		Dispensing	30%	6%	6%
	Reuse	Prefill	0%	0%	0%
Dish Soap	Single-Use	Standard	74%	95%	88%
		Large Format	61%	68%	63%

Product	Type	Format	Urban	Suburban	Rural
Dish Soap	Single-Use	Concentrate	13%	5%	0%
	Refill	Single-Use	13%	21%	25%
		Large Format	45%	79%	56%
		Concentrate	0%	0%	0%
		Dispensing	24%	11%	0%
	Reuse	Prefill	0%	0%	0%
Shampoo	Single-Use	Standard	69%	89%	87%
		Large Format	77%	94%	93%
		Concentrate	33%	22%	20%
	Refill	Single-Use	0%	6%	0%
		Large Format	0%	0%	0%
		Concentrate	0%	0%	0%
		Dispensing	26%	11%	13%
	Reuse	Prefill	0%	0%	0%

Table 41 summarizes the type of format observed in each region code by product based on the number of retail locations within the region.

Table 41: Product availability by California region

Total Retail Locations with:	Coastal	Bay Area	Mountain	Valley	Southern
White Rice	11	9	14	24	7
Milk	12	9	15	22	6
Surface Cleaner	12	11	16	26	7
Dish Soap	12	11	16	27	8
Shampoo	12	12	15	26	8

Table 41.1: Format availability by California region

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
White Rice	Single-Use	Standard	100%	100%	100%	96%	86%
		Large Format	0%	44%	43%	38%	71%
		Concentrate	0%	0%	0%	0%	0%
	Refill	Single-Use	0%	0%	0%	0%	0%
		Large Format	0%	0%	0%	0%	0%
		Concentrate	0%	0%	0%	0%	0%
		Dispensing	9%	11%	29%	25%	14%
	Reuse	Prefill	0%	0%	0%	0%	0%
Milk	Single-Use	Standard	92%	89%	93%	95%	83%
		Large Format	8%	11%	0%	5%	17%
		Concentrate	67%	89%	87%	77%	67%
	Refill	Single-Use	0%	0%	0%	0%	0%
		Large Format	0%	0%	0%	0%	0%
Milk	Refill	Concentrate	0%	0%	0%	0%	0%
		Dispensing	0%	0%	0%	0%	0%

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
Milk	Reuse	Prefill	17%	22%	27%	32%	0%
Surface Cleaner	Single-Use	Standard	83%	73%	94%	81%	57%
		Large Format	0%	0%	6%	4%	0%
		Concentrate	75%	73%	94%	77%	86%
	Refill	Single-Use	0%	9%	19%	8%	14%
		Large Format	0%	9%	0%	0%	0%
		Concentrate	0%	0%	0%	19%	14%
		Dispensing	0%	27%	6%	31%	14%
	Reuse	Prefill	0%	0%	0%	0%	0%
Dish Soap	Single-Use	Standard	75%	73%	100%	81%	75%
		Large Format	67%	73%	50%	63%	75%
		Concentrate	0%	9%	6%	15%	0%
	Refill	Single-Use	25%	9%	19%	22%	13%
		Large Format	42%	82%	56%	59%	38%
		Concentrate	0%	0%	0%	0%	0%
		Dispensing	0%	27%	6%	22%	13%
	Reuse	Prefill	0%	0%	0%	0%	0%
Shampoo	Single-Use	Standard	67%	67%	100%	77%	75%
		Large Format	92%	83%	93%	81%	75%
		Concentrate	17%	17%	33%	42%	0%
	Refill	Single-Use	0%	0%	7%	0%	0%
		Large Format	0%	0%	0%	0%	0%
		Concentrate	0%	0%	0%	0%	0%
		Dispensing	0%	25%	20%	27%	13%
	Reuse	Prefill	0%	0%	0%	0%	0%

Table 42 summarizes the type of format observed in disadvantaged and not disadvantaged communities by product.

Table 42: Average brands per retail location, by disadvantaged and not disadvantaged communities:

Total Retail Locations with:	Disadvantaged	Not Disadvantaged
White Rice	33	32
Milk	33	31
Surface Cleaner	35	37
Dish Soap	37	37
Shampoo	37	36

Table 42.1: Average brands per retail location, by disadvantaged and not disadvantaged communities

Product	Type	Format	Disadvantaged	Not Disadvantaged
White Rice	Single-Use	Standard	97%	97%
		Large Format	42%	31%
		Concentrate	0%	0%
	Refill	Single-Use	0%	0%
		Large Format	0%	0%
		Concentrate	0%	0%
		Dispensing	21%	19%
	Reuse	Prefill	0%	0%
Milk	Single-Use	Standard	94%	90%
		Large Format	6%	6%
		Concentrate	73%	84%
	Refill	Single-Use	0%	0%
		Large Format	0%	0%
		Concentrate	0%	0%
		Dispensing	0%	0%
	Reuse	Prefill	24%	23%
Surface Cleaner	Single-Use	Standard	80%	81%
		Large Format	3%	3%
		Concentrate	83%	78%
	Refill	Single-Use	11%	8%
		Large Format	0%	3%
		Concentrate	9%	8%
		Dispensing	14%	22%

Product	Type	Format	Disadvantaged	Not Disadvantaged
Surface Cleaner	Reuse	Prefill	0%	0%
Dish Soap	Single-Use	Standard	86%	78%
		Large Format	65%	62%
		Concentrate	8%	8%
	Refill	Single-Use	24%	14%
		Large Format	57%	57%
		Concentrate	0%	0%
		Dispensing	11%	19%
	Reuse	Prefill	0%	0%
Shampoo	Single-Use	Standard	84%	72%
		Large Format	89%	81%
		Concentrate	27%	28%
	Refill	Single-Use	3%	0%
		Large Format	0%	0%
		Concentrate	0%	0%
		Dispensing	16%	22%
	Reuse	Prefill	0%	0%

Table 43 summarizes the choice scores of every product format by urban/suburban/rural area.

Table 43: Average choice scores, by urban/suburban/rural areas

Product	Type	Format	Urban	Suburban	Rural
White Rice	Single-Use	Brand Count	33.0	21.0	21.0
	Refill	Single-Use	0.00	0.00	0.00
		Large Format	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00
		Dispensing	0.15	0.10	0.05
	Reuse	Prefill	0.00	0.00	0.00
Milk	Single-Use	Brand Count	42.0	32.0	24.0
	Refill	Single-Use	0.00	0.00	0.00
		Large Format	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00
		Dispensing	0.00	0.00	0.00
	Reuse	Prefill	0.05	0.03	0.08
Surface Cleaner	Single-Use	Brand Count	54.0	37.0	35.0
	Refill	Single-Use	0.02	0.03	0.057
		Large Format	0.02	0.00	0.00

Product	Type	Format	Urban	Suburban	Rural
Surface Cleaner	Refill	Concentrate	0.11	0.00	0.057
		Dispensing	0.20	0.054	0.027
	Reuse	Prefill	0.00	0.00	0.00
Dish Soap	Single-Use	Brand Count	55.0	26.0	35.0
	Refill	Single-Use	0.06	0.08	0.11
		Large Format	0.33	0.54	0.37
		Concentrate	0.00	0.00	0.00
		Dispensing	0.20	0.12	0.00
	Reuse	Prefill	0.00	0.00	0.00
Shampoo	Single-Use	Brand Count	184.0	98.0	95.0
	Refill	Single-Use	0.00	0.031	0.00
		Large Format	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00
		Dispensing	0.071	0.031	0.042
	Reuse	Prefill	0.00	0.00	0.00

Table 44 summarizes the choice scores of every product format by California region.

Table 44: Choice score by California regions

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
White Rice	Single-Use	Brand Count	17.0	17.0	19.0	28.0	14.0
	Refill	Single-Use	0.00	0.00	0.00	0.00	0.00
		Large Format	0.00	0.00	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.059	0.059	0.11	0.14	0.071
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00
Milk	Single-Use	Brand Count	17.0	20.0	30.0	39.0	10.0
	Refill	Single-Use	0.00	0.00	0.00	0.00	0.00
		Large Format	0.00	0.00	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.00	0.00	0.00	0.00	0.00
	Reuse	Prefill	0.059	0.10	0.033	0.051	0.00
Surface Cleaner	Single-Use	Brand Count	31.0	30.0	33.0	42.0	19.0
	Refill	Single-Use	0.00	0.033	0.061	0.024	0.053
		Large Format	0.00	0.033	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00	0.14	0.11
		Dispensing	0.00	0.17	0.091	0.19	0.053
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00
Dish Soap	Single-Use	Brand Count	31.0	23.0	27.0	42.0	24.0
	Refill	Single-Use	0.13	0.043	0.074	0.071	0.042
		Large Format	0.29	0.57	0.48	0.38	0.29
		Concentrate	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.00	0.22	0.037	0.21	0.13
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00

Product	Type	Format	Coastal	Bay Area	Mountain	Valley	Southern
Shampoo	Single-Use	Brand Count	91.0	111.0	93.0	143.0	44.0
	Refill	Single-Use	0.00	0.00	0.032	0.00	0.00
		Large Format	0.00	0.00	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.00	0.063	0.054	0.084	0.023
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00

Table 45 summarizes the choice scores of every product format in disadvantaged and not disadvantaged communities.

Table 45: Choice scores by disadvantaged and not disadvantaged communities:

Product	Type	Format	Disadvantaged	Not Disadvantaged
White Rice	Single-Use	Brand Count	32.0	32.0
	Refill	Single-Use	0.00	0.00
		Large Format	0.00	0.00
		Concentrate	0.00	0.00
		Dispensing	0.13	0.094
	Reuse	Prefill	0.00	0.00
Milk	Single-Use	Brand Count	45.0	41.0
	Refill	Single-Use	0.00	0.00
		Large Format	0.00	0.00
		Concentrate	0.00	0.00
		Dispensing	0.00	0.00
	Reuse	Prefill	0.044	0.024
Surface Cleaner	Single-Use	Brand Count	51.0	51.0
	Refill	Single-Use	0.039	0.039
		Large Format	0.00	0.020
		Concentrate	0.059	0.12
		Dispensing	0.12	0.12
	Reuse	Prefill	0.00	0.00
Dish Soap	Single-Use	Brand Count	49.0	47.0
	Refill	Single-Use	0.12	0.043
		Large Format	0.45	0.34
		Concentrate	0.00	0.00
	Refill	Dispensing	0.10	0.19

Product	Type	Format	Disadvantaged	Not Disadvantaged
Dish Soap	Reuse	Prefill	0.00	0.00
Shampoo	Single-Use	Brand Count	150.0	173.0
	Refill	Single-Use	0.02	0.00
		Large Format	0.00	0.00
		Concentrate	0.00	0.00
		Dispensing	0.06	0.052
	Reuse	Prefill	0.00	0.00

Table 46 summarizes the choice scores of every product format by retailer NAICS code. Dashes indicate no applicable data was collected.

Table 46: Choice scores by retailer NAICS codes:

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience Stores	455211 Warehouse clubs ad supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, beauty supplies, and perfume stores
White Rice	Single-Use	Brand Count	35.0	0.0	9.0	8.0	3.0	0.0
	Refill	Single-Use	0.00	0.00	0.00	0.00	0.00	0.00
		Large Format	0.00	0.00	0.00	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.14	0.00	0.00	0.00	0.00	0.00
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00	0.00
Milk	Single-Use	Brand Count	48.0	1.0	11.0	13.0	6.0	0.0
	Refill	Single-Use	0.00	0.00	0.00	0.00	0.00	0.00
		Large Format	0.00	0.00	0.00	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.00	0.00	0.00	0.00	0.00	0.00
	Reuse	Prefill	0.042	0.00	0.00	0.00	0.00	0.00
Surface Cleaner	Single-Use	Brand Count	54.0	2.0	16.0	18.0	10.0	2.0
	Refill	Single-Use	0.037	0.00	0.00	0.056	0.00	0.00
		Large Format	0.019	0.00	0.00	0.00	0.00	0.00
		Concentrate	0.12	0.00	0.00	0.00	0.00	1.50
		Dispensing	0.19	0.00	0.00	0.00	0.00	3.00
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00	0.00
Dish Soap	Single-Use	Brand Count	51.0	5.0	10.0	17.0	10.0	3.0
	Refill	Single-Use	0.12	0.00	0.10	0.059	0.10	0.00
		Large Format	0.35	0.00	0.90	0.35	0.30	0.00

Product	Type	Format	445110 Supermarkets and other grocery retailers	445120 Convenience Stores	455211 Warehouse clubs ad supercenters	455219 All other general merchandise retailers	456110 Pharmacies and drug retailers	446120 Cosmetics, beauty supplies, and perfume stores
Dish Soap	Refill	Concentrate	0.00	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.14	0.00	0.00	0.00	0.00	2.3
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00	0.00
Shampoo	Single-Use	Brand Count	190.0	4.0	14.0	24.0	55.0	10.0
	Refill	Single-Use	0.016	0.00	0.00	0.00	0.00	0.00
		Large Format	0.00	0.00	0.00	0.00	0.00	0.00
		Concentrate	0.00	0.00	0.00	0.00	0.00	0.00
		Dispensing	0.037	0.00	0.00	0.00	0.00	1.1
	Reuse	Prefill	0.00	0.00	0.00	0.00	0.00	0.00

Community Engagement Insights into Current Use of Single Use Plastic Packaging and Food Service Ware and Existing Opportunities for Reduction

Across all community engagement methods, participants self-reported that plastic bottles and bags are the most commonly used plastic packaging and single use plastic food service ware, followed closely by soft plastics, such as chip bags. Tubs and single use plastic food service ware show more situational use yet still represent significant categories. Table 47 summarizes self-reported consumer use of some types of plastic covered material collected through this study's engagement activities.

- Plastic bottles (55% often) and plastic bags (57% often) are the most embedded in daily life.
- Soft plastics (46% often) such as wrappers and films are also common.
- Plastic tubs (49% sometimes) and food service ware (38% often, 40% sometimes) show more mixed reliance, indicating situational use tied to shopping and dining patterns.

Table 47: Which single use plastic packaging and food service ware are most used?

Item	Often	Sometimes	Rarely/never	Total responses
Plastic tubs	33%	49%	18%	668
Plastic bags	57%	32%	11%	655
Soft plastics	46%	37%	17%	673
Plastic bottles	55%	32%	13%	670
Single use plastic food service ware	38%	40%	22%	657

Use of single use plastic food service ware (cups, clamshells, utensils) showed mixed reliance: 38% report using them often, 40% sometimes, and 22% rarely/never. This may indicate situational dependence tied to take-out or dining habits and highlights opportunities for reusable food service systems to replace single use plastic food service ware. When asked specifically about saying no to single use plastics when dining in, participants were split: 40% said it was easy, 37% somewhat challenging, and 23% very challenging. This reflects how convenience and cultural dining norms continue to shape behavior in restaurants and cafés. Across regions and language groups, participants consistently described single use plastic food service ware as convenient and familiar, yet they also voiced interest in reusables when these were accessible, affordable, and easy to use. The discussions revealed persistent barriers but also generated clear, practical ideas for system-level solutions.

These statewide results highlight which categories of single use plastics are considered most prevalent and therefore most critical for intervention. Bottles, bags, and soft plastics represent priority targets for reuse/refill systems and design-based source reduction strategies. Tubs and single use plastic food service ware remain relevant but may require more context-specific approaches given their mixed usage patterns.

Community Engagement Feedback on Single Use Plastic Reduction Strategies

Participants were asked how easy or challenging it would be to adopt different plastic-reduction behaviors. The results show that people are most open to actions that align with existing shopping habits, while changes that require new infrastructure or routines are seen as harder to adopt. Table 48 summarizes the range of difficulties of each reduction strategy.

- Buying family-size products or concentrates was viewed as easiest, with 70% saying it is easy or already doing it.
- Buying products with no packaging (60% easy/already doing) and choosing paper, glass, or metal instead of plastic (57% easy/already doing) were also seen as feasible.
- Saying no to single use plastic food service ware when dining or taking out split the group: 40% said it was easy/already doing, while 37% found it somewhat challenging and 23% very challenging.
- Bringing personal containers to refill stations was the hardest option: only 37% said it was easy/already doing, while 27% found it somewhat challenging and 36% very challenging.

Table 48: How challenging are reduction strategies?

Option	Easy/ already doing	Somewhat challenging	Very challenging	Total responses
Buy family-size products or concentrates	70%	17%	13%	609
Buy goods with no packaging	60%	26%	14%	651
Buy products with paper, glass, or metal packaging	57%	31%	13%	609
Say no to single use plastic when dining/takeout	40%	37%	23%	626
Bring reusable containers to refill stations	37%	27%	36%	651

This data may indicate that consumers are most comfortable with product-level solutions that are readily available in stores (larger packages, alternative materials). Options requiring behavior change at point of sale or dining (refusing single use plastic food service ware, bringing containers) are less appealing, with refill infrastructure seen as more burdensome. Further, these findings help identify where consumers are most likely to adopt reduction strategies and highlight the importance of evaluating access and infrastructure for refill and reuse, since consumers perceive those as challenging.

What could make reduction strategies easier to adopt?

Participants were asked what would help them reduce their single use plastic packaging use, and were each given an odd number of marbles to vote on four options by adding their marbles to labeled jars. The results show a demand for packaging and product-level solutions that are both accessible and affordable, supported by infrastructure and clearer information. The most common need identified was products available in plastic-free packaging (32%), followed closely by more affordable options (31%). Together, these two categories accounted for nearly two-thirds of all responses. Access to refill stations (23%) was also a notable factor, pointing to interest in reuse systems if they are made convenient. Finally, clear labeling of plastic-free packaging (14%) was seen as helpful but less central than affordability and availability. Table 49 summarizes the support of ways to make source reduction easier to adopt by percentage.

Table 49: What would make reduction strategies easier to adopt?

Option	% of Marbles	Total Marbles
Products available in plastic-free packaging	32%	1,362
More affordable options	31%	1,349
Access to refill stations (dispensing to replace packaging) in my community	23%	967
Labels that clearly identify packaging material	14%	611
Total	100%	4,289

The results point to availability and affordability as the highest priorities as people want more sustainable choices designed into the products they already buy and for those choices to be affordable for them.

Refill access is valued but secondary, reinforcing earlier findings that convenience and infrastructure matter. Clear labeling is useful but not sufficient on its own to drive behavior change.

Having a mandatory "ask first" at point of sale could also be useful. Input gathered through community engagement identified the need for vendors to ask consumers whether they want utensils, straws, lids, or other single use plastic and nonplastic food service ware rather than automatically including them. Participants strongly supported "ask first" policies for dine-in settings as well, noting that this would make it easier to say no and would quickly normalize refusal, addressing any potential social frictions noted as a barrier.

Community engagement emphasized the need for support for small businesses, suggesting technical support or shared dishwashing infrastructure so small restaurants and cafés are not left behind.

Additionally, community engagement feedback highlighted the need for bilingual and culturally relevant education, indicating that clear outreach in English, Spanish, and Traditional and Simplified Chinese promoted through schools, community centers, and social media, would help normalize reuse across diverse communities. Immigrant-serving CBOs emphasized the importance of outreach in Spanish, Vietnamese, Tagalog, and in Cantonese and Mandarin.

Community Engagement Insights on Barriers and Opportunities for Reuse, Refill, and Source Reduction Solutions

Large Format and Concentrate Options for Consumers

In public-facing materials, the contractor used “family size” for clarity; in this report the contractor is using CalRecycle’s preferred term “large format packaging” for consistency.

Barriers to Large Format Packaging and Concentrates

- **Upfront cost burden**: While larger-size packaging is seen as saving money in the long run, participants emphasized that the higher upfront price is a barrier for families living paycheck-to-paycheck. **“It’s easier for people with money to buy the big container once. For people with less, we just buy what we can that week, even if it means more plastic.”**
- **Storage and handling challenges:** Larger containers can be heavy and difficult to manage, especially for people in small apartments, older adults, and those with disabilities.
- **Access limitations:** Some participants pointed out that access to larger packaging often requires warehouse memberships and cars, which excludes lower-income, smaller-households, or transit dependent people.
- **Product fit:** Concentrates for cleaning were popular, but food concentrates had mixed reception. Some participants said powdered or condensed foods “don’t feel fresh” or don’t align with cultural cooking preferences. For cleaning products, the concentrates are not the brands people use right now and feel niche.
- **Lack of awareness and availability of concentrates:** Participants said they were often unfamiliar with concentrated products. Those who were aware typically purchased them online, noting that they were rarely available in the brick-and-mortar stores they frequent.

Opportunities for Large Format Packaging and Concentrates

- **Perceived cost savings:** Many participants strongly associated larger packaging with saving money in the long run and reducing plastic at the same time. Several participants said concentrated formats could help overcome the challenge of paying more upfront for economy-size packaging. By reducing container size while maintaining volume through dilution, concentrates were seen to combine affordability with lower plastic use.
- **Alignment with current shopping habits:** Larger packaging was seen as a natural extension of what people already buy at warehouse and grocery stores.

- **Expanding access:** Participants wanted family-size products and concentrated goods to be available in everyday supermarkets, not just at Costco or niche retailers.
- **Concentrates as a solution for smaller living spaces:** Participants noted that concentrates could be a good alternative to large, heavy packaging for people in urban apartments, multifamily housing, or college campuses where storage is limited.

Buying Goods in Paper, Glass or Metal Packaging

Fifty-seven percent of participants said buying goods packaged in paper, glass, or metal is easy or something they already do. Similarly, when asked what would make reducing plastic easier, the top statewide response was "products available in plastic-free packaging," cited in 32% of all responses. Participants described this approach as both familiar and desirable: people already purchase products in glass jars, metal cans, and cardboard boxes, and they want to see more products available in those formats.

A smaller but still notable share (14%) specifically pointed to clearer labeling of plastic-free options. While less frequently raised than affordability or product availability, labeling when layered with other approaches and with considerations of the following barriers may support transparency and education to help consumers make informed choices. The conversations about buying products in plastic-free packaging highlighted enthusiasm for expanding access and regulating manufacturers to make changes, while also surfacing practical considerations around cost, convenience, and product performance.

Barriers to Buying Goods in Paper, Glass, or Metal Packaging

- **Limited product availability:** Participants said most everyday goods are still overwhelmingly packaged in single use plastic. They expressed frustration that only select, or specialty products come in paper, glass, or metal packaging while acknowledging the convenience of the plastic packaged options.
- **Higher costs for alternatives:** Some noted that products in glass or metal often cost more than their plastic-packaged counterparts, making them less accessible to people on tight budgets or who simply cannot justify the higher price point for the same type of product in nonplastic packaging. It is also worth noting that some participants acknowledged that glass, metal, or paper packaged goods are often, from their experience, marketed higher quality products which further raise the price.
- **Bulkiness and weight:** Glass jars and metal containers were described as heavier to carry and store, which felt inconvenient for people who rely on public transit, walk or bike to shop, have stairs at home, older participants, and for people with disabilities. A few mentioned that too many glass jars put weight on their fridge shelves and door racks that have created wear and tear on their fridge, and one participant shared her cupboards have pull out drawers and too much glass can become dangerously heavy.

- **Durability concerns:** Paper packaging is reported to fail with moisture or perishables, and glass can break, which discouraged use for certain products.
- **Seeing the product in the package:** In discussions, participants are quick to talk about the durability challenges with paper and the weight and breakable factor of glass. When pressed about metal packaging, which can be lighter than glass, participants noted there are two main factors that deter them from metal: not being able to see the product and that sometimes liquids in metal can 'taste like metal' impacting the desirability of some products in metal packaging.
- **Skepticism about recycling creating apathy towards nonplastic alternatives:** Participants were skeptical about what recyclable really means in practice. Some questioned whether glass, metal, or paper is actually recycled or simply landfilled and therefore question how different it really would be in reducing waste compared to plastic. Rural participants noted that their communities do not always have glass recycling pick up, while others pointed to places like Old Sacramento, where only one waste can was available near businesses and there were no recycling or compost options in some areas in general. This left many feeling that recyclability claims were misleading without real infrastructure in place, so choosing glass, metal, plastic, or paper doesn't make a big difference from a waste reduction perspective. Labels can be misleading or inconsistent, which creates confusion and limits adoption.
- **Lack of awareness of plastic packaging health impacts:** While some participants were aware of the impacts plastic has on the environment, hardly any participants spoke about their knowledge of plastic packaging and the impacts on human health. Many participants were proud to talk about their reuse of plastic packaging, like tubs, bags, and bottles, but reporting a mix of uses for this, including food and reheating.

Opportunities and desired features for buying goods in paper, glass, or metal packaging

- **Make staples available in plastic-free packaging:** Participants note that things like yogurt that come in glass or cooking oil in metal jugs are niche, expensive, and luxury goods and want to see alternatives to plastic packaging for everyday goods such as dry beans, rice, canned foods, bread, nuts/snacks, spreads and sauces, and cleaning basics sold in glass, paper, or metal. Supermarkets and discount retailers were highlighted as critical points of access. People emphasized that plastic-free packaging should not be limited to upscale or specialty grocers.
- **Standardization and visibility:** Participants called for clearer labeling and more consistent packaging formats so shoppers can easily identify plastic-free options. Some also envisioned more standardized reusable containers with universal lids and parts to make reuse easier across products. Even though fewer people raised labeling than affordability or availability, participants said clearer and more

honest labels would help them trust and choose alternatives. They wanted labels to be easy to spot, multilingual, and standardized.

    - **"I'm imagining a world where everything that comes in a jar uses the same lid or set of lids based on the size. It would be great for storing, reusing, preserving, or bringing to a refill station."**- Community Member from Lompoc County

- **Education and promotion:** Outreach campaigns and in-store signage could help normalize these packaging types and highlight their environmental and health benefits.

Unique regional or priority population insights related to buying goods in paper, glass, or metal packaging

- Consumers are less comfortable with material substitution when they perceive that it compromises the viability of the goods, but they expressed general support for paper, glass, and metal packaging, with some caveats around weight or bulkiness.

Urban areas

- Reported better access to glass jars, paper boxes, and metal cans, but noted these options often appear only in higher-end or "green" grocery stores.
- Participants expressed concerns about affordability, stressing that plastic-free options should not remain a premium offering.

Rural areas

- Said local stores rarely stock paper, glass, or metal options.
- Recycling access was uneven — some communities lacked glass pick up entirely. This reinforced skepticism that "recyclable" packaging would actually be recycled.

Southern region

- Participants tied packaging choices to broader equity concerns, emphasizing that plastic-free options need to be available in neighborhood supermarkets, not just boutique groceries.
- Participants raised examples of inconsistent recycling infrastructure in business districts.

Coastal region

- Connected packaging choices to concerns about marine debris.
- Expressed strong support for paper, glass, and metal as a way to cut back on plastics entering the ocean.
- Farmers' markets and smaller coastal grocers were mentioned as places where cardboard containers or paper bags are already in use.

Bay Area region

- Participants were familiar with paper, glass, and metal packaging and already used these regularly.
- Many expected stricter producer requirements and saw expansion of these options as realistic, especially given local ordinances and zero-waste culture.
- Participants noted some markets, like Berkeley Bowl using more cardboard for some produce goods like berries and mushrooms.

Spanish-speaking groups

- Urban participants said they see paper, glass, and metal but usually at higher prices, which discourages families with limited budgets.
- They wanted these formats in mainstream supermarkets and accessible to households at all income levels.

Cantonese- and Mandarin-speaking participants

- Shared cultural familiarity with glass jars and paper boxes for food storage.
- Expressed interest in broader availability of affordable plastic-free packaging but questioned whether recycling systems were functioning as advertised.

Buying Goods with No Packaging

Buying goods without packaging is something participants said they had not thought about often, but the idea received strong support once discussed. 60% of participants said it would be easy or is something they already do, with only 14% saying it would be very challenging. This suggests openness to shifting away from packaging altogether, particularly for produce and other goods that can be sold loose or in reusable containers.

Barriers to Buying Goods with No Packaging

- **Uncertainty at checkout:** Several participants said they did not know they could put multiple types of produce into a reusable bag and have the checker weigh them separately. Others worried that cashiers might not know how to process it correctly, slowing down the line or creating tension at checkout.

- **Not suitable for all foods**: Participants noted that going without packaging works for some produce but not all. Goods like mushrooms, berries, and certain small or loose foods were seen as needing some form of container.
- **Limited exposure and habits:** Many admitted they had not thought much about buying unpackaged goods. Without prompts in stores or strong community norms, packaging remains the default.
- **Cost:** Some discussions noted that loose produce is sometimes more expensive than the prepackaged alternatives. For example, buying bell peppers prepackaged is cheaper than buying the same number of bell peppers individually, making the choice to buy this item without packaging more challenging.

Opportunities for buying goods with no packaging

- **Farmers' markets and cardboard packaging:** Several participants cited farmers' markets where produce comes in cardboard containers or is simply handed over unpackaged and straight into a larger reusable bag. They were open to more mainstream stores adopting similar practices.
- **Education and systems shift:** Participants said education campaigns and clear store policies could make it easier to buy unpackaged produce without conflict at checkout. Some mentioned that if the plastic bags were no longer "just there" people would have to shift.

Unique regional or priority population insights related to buying goods with no packaging

Coastal region

- Participants connected unpackaged produce to reduce marine debris.

Spanish-speaking groups

- Participants said they were open to cloth produce bags but worried about slowing down the checkout line or confusing cashiers.
- They emphasized that clear bilingual signage and cashier training would make unpackaged shopping feel easier and less intimidating.

Cantonese- and Mandarin-speaking participants

- Participants noted a contrast between larger Asian supermarkets and smaller neighborhood markets. Bigger stores often overpackage produce, while smaller Chinatown markets commonly sell unpackaged fruits and vegetables.
- This made participants feel that buying produce without packaging is both possible and culturally familiar, but uneven across store types.

Urban areas

- Urban participants mentioned concerns about handling loose produce in busy, crowded stores, and stressed that paper or compostable bags should always be available as a back-up.

Rural areas

- Long drives to and from markets make it harder to manage loose produce in larger bags. Participants worried that goods like potatoes could crush softer foods such as tomatoes, or that wet produce like lettuce could damage other groceries during transport.

Community Engagement Feedback from Communities with Disabilities

The contractor conducted a dedicated focus group and an interview with Californians living with disabilities to ensure that accessibility and independence needs inform the study. Participants represented mobility, sensory, and neurodivergent disabilities, including wheelchair users, individuals with no or limited use of arms, people with low vision or blindness, and participants with chronic respiratory or immune conditions.

When residents signed up for small group discussions or interviews, the contractor asked what would make the environment comfortable and usable. Participants were asked what accessibility tools they needed and then provided live captions, large-print materials, and on-screen descriptions. Sessions used plain-language prompts and real-time captioning.

Participants expressed a strong desire to take part in plastic-reduction efforts and pride in California's environmental leadership. Many reported living with conditions aggravated by pollution and view environmental improvement as essential to their health and independence. Participants also emphasized the need systems that enable sustainable living without compromising personal autonomy.

Single Use Plastic Packaging

Barriers

While participants agreed with the Act's goals, they also recognized that single use plastic packaging often enables autonomy. Plastic containers are light, flexible, and easier to control in comparison to glass, metal, or thick paper. Standard opening methods rarely account for limited dexterity**. One participant explained, "When you can't grip, you use the back of your hand. Anything that needs a twist isn't an option." Another shared, "I often have to use my teeth to open things because I can't use both hands at once. Plastic lids are safest for that."**

People with respiratory or immune conditions rely on sealed packaging to avoid contamination. Reuse or refill systems that require handling previously used containers can increase health risks.

Opportunities

- Develop lighter nonplastic formats with pull tabs or push-button seals usable with one hand, mouth, or a prosthetic.
- Require usability testing with limited-grip and limited-mobility users before product release.
- Maintain hygienic sealed options for medically vulnerable consumers while advancing source reduction goals.

Refill Stations and Purchasing Through Dispensing to Replace Packaging

Barriers

Participants support refill in principle but described stations that function like obstacle courses. Most require two-handed operation to steady a container while engaging a lever or valve. Spouts and counters are often out of reach for wheelchair users. People with asthma or chronic bronchitis said open bins and powders trigger coughing or attacks. Some participants shared that bright lighting, loud sound, crowded aisles, and complex or multi-step instructions can be overwhelming and make participation harder. Travel introduces additional challenges. Scheduling paratransit in advance limits spontaneity and transporting multiple containers while using a mobility aid can be difficult and unsafe.

Opportunities

- Refill stations using button or one-hand dispensing mechanisms feel more accessible.
- Provide trained staff assistance as a standard service.
- Offer home-based or curbside refill delivery models for people who cannot travel safely.
- Display sanitation schedules and cleaning procedures to reassure those concerned about hygiene.
- Pick up used reusable containers from care centers and homes create possibilities for workforce development among young adults and youth.
- A community activist in the group expressed a deep interest and need to co-create and test accessible reuse and refill stations during the design phase.

“My independence is very important to me. When I shop, I don’t want to draw attention to myself, but I often need help from store staff and sometimes I have to wait a long time. Seeing other shoppers grow impatient makes me feel terribly uncomfortable. If the state is going to design refill stations, please make them accessible and staffed at least part of the time.”

Reusable Food Service Ware

Barriers

Reusable cups, plates, and utensils often weigh more and are harder to grip, increasing spill and burn risk. Balancing food service ware on wheelchairs is unstable. People with low vision need consistent tactile cues.

Participants cited the removal of flexible plastic straws as a particularly harmful example of policy that overlooked disability needs. Paper straws collapse, silicone straws have odor and texture issues, and metal straws can damage the palate, bruise or burn the mouth. For many participants, bendable plastic straws are the only safe option for drinking independently. Participants do not want to be made to feel guilty or called out for using bendable plastic straws. Participants brought up the advertisement that featured a straw stuck under the turtle's shell and shared, **"I reuse my bendable plastic The removal of flexible plastic straws was cited straws until they fall apart and dispose of them properly. The problem isn't the straws—it's people."**

Opportunities

- Require lightweight, ergonomic reusable ware with stable bases and optional hooks or clips to attach to mobility devices.
- Ensure flexible plastic straws are always available upon request without requiring proof of disability.
- Use visible color-coded labels to show that staff sanitized the containers.

Participants see themselves as committed environmental partners. Many live with conditions worsened by pollution and said clean air and water are essential to their health. They want to reduce single use plastics in ways that protect autonomy and dignity. "We want to do our part," one participant said, "but we need systems that let us do it safely and on our own."

Jurisdiction Engagement Findings

As part of public and interested party engagement, the contractor conducted structured interviews with staff from departments and agencies in the following counties: Alameda, Humboldt, Nevada, Santa Barbara, San Francisco, Ventura, and Yolo. These interviews gathered jurisdiction-level insights on policy design, operational realities, reuse and refill readiness, business engagement, and resource needs.

The contractor conducted interviews in October 2025 covering local ordinances, barriers and opportunities for reuse and refill, health and sanitation considerations, business participation, enforcement, data, and infrastructure gaps. Each discussion lasted about 45 minutes and focused on practical experiences and near-term needs to enable source reduction through reuse, refill, and design changes.

Purpose and Methods

The contractor sought to engage two jurisdictions per region and offered interviews to departments and agencies with aligned responsibilities, relevant ordinances or policy history, or programs focused on the study subject matter.

Findings below synthesize cross-jurisdictional themes without attributing statements to a specific city or county.

Findings

Jurisdiction staff reported strong public interest in reducing plastic covered material, with community support driven by concern about litter, microplastics, and marine debris. Local agencies noted that enthusiasm often outpaces the capacity of smaller or rural jurisdictions to implement and sustain programs without additional support. Respondents emphasized that statewide consistency and producer-led platforms will be more effective than piecemeal local efforts.

Policy Landscape

Interviewees described a mix of established and emerging local rules addressing single use items, most commonly restrictions on polystyrene and requirements for recyclable, reusable, or compostable food service ware. Where countywide model ordinances exist, jurisdictions would like to see standardized templates to avoid fragmentation and to phase requirements as infrastructure grows. Making reuse the default for dine-in service was frequently identified as a foundational step with high feasibility and clear public health pathways.

Barriers to Implementation and Enforcement of Local Policies

Jurisdictions consistently cited the following challenges:

- Smaller and mid-sized governments face limited budgets and staff for outreach, business assistance, and enforcement, even where political will is strong. Respondents underscored the need for state-supported toolkits and funding to enable ongoing field support.
- Rural interviewees described long haul distances to processing facilities and limited site options for wash hubs, which can undermine climate and cost goals. They asked that implementation frameworks account for distance, access to facilities, and service economics when defining reasonable access and program expectations.
- Food service businesses and small retail operate on thin margins. Transition costs for dishwashing space, replacement stock, and training are barriers. Several respondents observed that opt-in models rarely reach beyond already motivated users without complementary policy or price signals.

- Environmental health staff requested clear, state-endorsed standards and training for reusable systems, especially for BYO and large format packaging, to reduce liability and ensure consistent practices across jurisdictions.
- Multiple nonstandardized container programs and deposit rules create confusion. Public agencies cannot promote individual businesses and need brand-neutral, statewide platforms and signage to communicate reuse options equitably.
- Interviewees favored education-first, followed by field-based approaches that pair compliance expectations with hands-on support. Many noted that sustaining this model will require dedicated funding, especially in smaller jurisdictions.

Opportunities for Implementations and Enforcement of Local Policies

Respondents highlighted practical strategies that can be replicated and scaled:

- Teams reported high compliance when staff visit businesses before and after rule adoption, provide checklists and supplier lists, set short timelines, and return for follow-up checks. This approach reduces conflict and builds trust.
- Some settings allow for reuse to be a more enforceable default option, such as dine-in food service, schools, campuses, and large venues. These options, according to participants, show stronger participation than settings that offer voluntary participation models. While the primary challenge continues to be the higher cost of switching to reusable or nonplastic options, one jurisdiction reported working directly with local business communities and major sports venues to phase out plastic covered material, including coordinating with suppliers to identify alternatives.
- Regional wash hubs and shared services can lower per-item costs and improve reliability. Pairing hubs with venue contracts or institutional accounts can stabilize throughput and allow costs to compete with single use options.
- Jurisdictions requested plug-and-play materials similar to the successful toolkits, like those provided for SB 1383 (Lara, 2016), including model ordinance language, multilingual signage, training videos, and inspection forms that align with existing workflows.
- Interviewees identified making reuse the default for dine-in service as a foundational step with high feasibility and clear public health pathways. Shared language and graphics would reduce duplication and increase trust and participation across jurisdictions.

How the State can Support Jurisdictions in Furthering Reduction of Plastic Packaging and Single Use Plastic Food Service Ware

Interviewees highlighted five cross-cutting needs:

- Funding and grants for local staffing, field outreach, and business transition. Capital and operating support for regional wash hubs and return logistics. Stable funding to launch and maintain programs.
- Standardization of a statewide reuse platform with common containers, signage, deposit rules, and participation options so governments can promote programs without endorsing individual businesses. Model policies that jurisdictions can adopt or adapt while staying aligned statewide.
- Health and sanitation guidance with state-approved protocols and training for cleaning, handling, and equipment for BYO, scoopless bulk, and recirculating systems, coordinated with environmental health authorities.
- Business-facing toolkits with templates for multilingual signage, workflow steps, staff scripts, and compliance checklists for deployment via inspections and assistance visits. Short video modules and printable materials with QR codes were preferred by several respondents.
- Infrastructure and end markets funding for wash hubs, return logistics, and material recovery facility improvements, combined with producer responsibility and market development so collected materials are actually reused or recycled at scale.

Near-term Ideas Jurisdictions Would Pilot with State Support

- Standardized return bins in high-traffic community hubs such as grocery parking areas, libraries, campuses, and civic facilities, linked to a statewide deposit and refund system that offers nondigital options.
- Regional wash capacity serving schools, venues, and food businesses, paired with procurement incentives and venue contracts to stabilize throughput and lower per-item costs.
- Dine-in reuse requirements with early field visits, clear timelines, toolkits, and routine follow-up checks to support compliance with minimal conflict.
- Scoopless refill pilots that meet environmental health standards and reduce contamination risk, paired with clear signage and container weighing procedures.
- Statewide public messaging that jurisdictions can reuse locally to explain container returns, deposits, health safeguards, and participation options.

Appendix B: Methodology for Data Collection and Analysis

This appendix provides the detailed methodology for each aspect of data collection and analysis.

Instances Database

The data collection process began with basic desk research to locate the organization's website and social media. The contractor used blog posts, local news articles, and press releases as secondary reference sources to fill in most columns present in the Instances Database. Once all information was entered into the database as accurately as possible, the contractor recorded the organization's email and phone number. The contractor used short phone calls with employees to confirm small details for in-store dispensing to replace packaging and reuse, but other solutions required a more extensive effort. The contractor sent an email out to every solution with a public email address with a request to confirm their information in a comment-only copy of the database. Approximately 60 organizations with no public email address were not contacted, including both active and inactive solutions. The contractor categorized each solution into a model and submodel based on pre-determined definitions. Most organizations did not follow up to confirm their information, which is reflected in a column of the database.

Instances Database Gaps and Caveats

The database had some solutions with caveats to clarify.

- Sparkl Reusables is a reuse service provider partnered with locations around California through B2B service agreements. Not all their partnerships are listed publicly, so the database could be missing five to 15 additional locations in which they are operating.
- Straus Family Creamery operates a reusable glass milk bottle program, and in addition to their post-use collection infrastructure of retail drop-off, they are also a part of the Cyclei Curbside Collection pilot in Berkely, CA.
- Within reusable packaging for shipping and logistics, two examples of reusable pallet wrap were included in the database. They do not currently have pallet wrap rental or pooling programs but are developing them to ideally roll out in 2026.
- Regarding purchase context, some of these solutions may be sold in large and small retail or grocery stores, but a "yes*" means that although they are available, they have limited or inconsistent availability across stores.
- Since these solutions can be sold in multiple contexts, accepted payment types marked with a "yes*" only pertain to the brand's direct website.

- The prefill systems and refill via single use packaging solutions included in the database are examples of what exists, but do not make up an exhaustive list of solutions within that model.
- Refill via single use packaging is broken into three submodels: refill via cartridge, pod, pouch, or container, refill via large format, and refill via concentrate. Refill via concentrate can come in a pouch or container but are differentiated from other formats by their use of concentrate.
- The remaining caveats address purchase context and end of life for refill packaging.
  - The only solutions that qualify as e-commerce are online-only stores and stores with refill or prefill available on their website. This does not include every store that has a website or the option to order online for store pick up, as you may not be able to purchase the reuse/refill solutions online.
  - When assessing the end of life for refill packaging, the contractor labeled products that were only recyclable through TerraCycle as “not compostable or recyclable” in the database. Compostability and recyclability designations were determined using statements about packaging disposal found either in the product information or FAQ sections of each solution’s website.

The solutions are representative of diverse communities within California, including different rural, urban, suburban, and socioeconomic perspectives. The contractor completed an in-depth search of reuse and refill solutions in each region using mapping tools and other public databases. The only solutions that may not be well represented are organizations with minimal or no online presence, including websites and social media pages. To the contractor’s knowledge, there are no other gaps, data issues, caveats, or study design deviations to report.

Table 50 summarizes a description of every column seen in the Instances Database, including ones allowing multiple options.

Table 50: Descriptions of columns in the Instances Database

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Solution instance	X		The brand, program, or store name of the solution	free text]
Reuse versus refill versus enablers	X	X	Describes the mechanism of the solution	• Reuse • Refill • Reuse/refill enabler
Solution model	X	X	Model the solution falls under	• Apps and digital rewards (behavioral interventions) • Curbside collection of reusable packaging and food service ware • Dispensing to replace packaging, dispensing to replace food service ware • Prefill system • Refill via single use packaging • Reusable food service ware programs • Technical assistance for reuse for dine-in • Reusable packaging for shipping and logistics

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Solution submodel	X	X	Submodel (more detailed distinction) the solution falls under	• B2B reusable tertiary packaging • B2C reusable tertiary packaging • Reusable secondary packaging, closed-loop reusable food service ware program • Open-loop reusable rood service ware program • Curbside collection of reusable packaging and food ware • Education/consulting • Prefill at production facility • Prefill via fractional manufacturing/co-filling site • Refill via concentrate • Refill via cartridge, pouch, pod, container • Refill via large format packaging, retail bags • Bring your own food service ware
Entity type	X		The type of location or producer offering the solution	• Government • NGO • Producer • Retailer • Reuse service provider
Website	X		Solution URL	[Free text]
Solution for single use plastic food service ware or packaging	X	X	To describe what SUP the solution is replacing	• Packaging/unpackaged product delivery solution • Food service ware solution • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
B2B or B2C	X	X	Is the solution for business-to-business or business-to-consumer	• B2B • B2C
Product category - packaged food	X	X	What category the solution is classified or utilized in (multiple selections possible)	• Yes • No • N/A
Product category - packaged beverage	X	X		• Yes • No • N/A
Product category – personal care	X	X		• Yes • No • N/A
Product category - home care	X	X		• Yes • No • N/A
Product category - retail bag	X	X		• Yes • No • N/A
Product category - stadium/venue food and drink	X	X		• Yes • No • N/A
Product category - personal and private events	X	X		• Yes • No • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Product category - to-go food and drinks	X	X		• Yes • No • N/A
Product category – pet care	X	X		• Yes • No • N/A
Product category – office and school supplies	X	X		• Yes • No • N/A
Product category - automotive	X	X		• Yes • No • N/A
Product category - apparel, footwear and accessories	X	X		• Yes • No • N/A
Product category - healthcare	X	X		• Yes • No • N/A
Product category - raw materials/ unfinished goods	X	X		• Yes • No • N/A
Solution description	X		Description of solution instance from website/social media	[Free text]
Headquarters	X		Headquarters city and state location	[Free text]

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
HQ country	X		Headquarters country	[Free text]
City	X		City of solution instance	[Free text]
Street address	X		Physical address of solution instance	[Free text]
Geographic coverage of solution - level	X		Size of region the solution instance can be utilized	• Local • Regional • Multiple regions (2-5) • State, national • Global • Unknown
Tag for GIS mapping	X		Type of GIS map the solution coordinates with	• Exclude • Reusable Food Service Ware – Closed-Loop • Reusable Food Service Ware - Open-Loop • Retail - "all-refill" • Retail - partial refill • Retail - Standalone refill station
Purchase context - E-commerce	X	X	The location where the solution instance can be purchased (multiple selections possible)	• Yes • No • N/A
Purchase context - local delivery or mobile refillery	X	X		• Yes • No • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Purchase context - large retail or grocery	X	X		• Yes • Yes – limited availability • No • N/A
Purchase context - package-free shop	X	X		• Yes • No • N/A
Purchase context - small retail Including convenience stores	X	X		• Yes • Yes – limited availability • No • N/A
Purchase context - standalone dispenser	X	X		• Yes • No • N/A
Purchase context – pick up location	X	X		• Yes • No • N/A
Purchase context-restaurant/cafe/bar	X	X		• Yes • No • N/A
Purchase context - event rental	X	X		• Yes • No • N/A
Purchase context - stadium/venue/ cafeteria	X	X		• Yes • No • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Users targeted	X		The primary consumer of the solution instance	• B2B transport • At-home consumer • Food or drink consumption away from source • On-premises food or drink consumption • Food service back of house • Retail consumer • Retailers
Access to information technology required to use solution	X		The presence or absence of technology needed to utilize the solution	• Requires access to internet • Requires use of smartphone • None • N/A
Ease of use	X		How user-friendly the solution instance is based on directions required	• Intuitive, no instructions or guidance required • Requires simple instructions or guidance • Requires substantial instructions or guidance • N/A
For-profit or nonprofit	X		Type of business the solution falls under	• For-profit • Nonprofit

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Number of employees	X		Number of people employed by the solution	• 1- 10 • 11- 25 • 26- 50 • 51- 1,000 • 1,001- 10,000 • 10,001+
Packaging or single use plastic food service ware replaced by reusable/refillable solutions	X		The type of single use item being replaced (multiple items possible)	• Garment hangers • Pallet wrap • Multiple food service items • Food ware • Not replacing single use - facilitating collection of reusable items • Other primary packaging • Primary packaging - dry goods • Primary packaging – liquid • Single use container • Single use cup • Single use bottle • Single use plastic bag • Single use utensils • Single use plate • Shipping mailers • Consumer-owned refill packaging • Cardboard boxes

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Reuse/refill packaging format	X		The format or shape of the refill packaging (multiple formats possible)	• Bag • Bag-in-box • Bucket • Cup • Rigid container • Plate • Utensils • Flexible pouch • Rigid pouch • Garment hanger • Jar • Rigid box • Pod • Pot • Pouch • Reusable cup or container • Reusable pallet wrap • Rigid bottle • Pump • Shipping mailers • Tube • Cap • Unknown • N/A • Consumer or retail owned • Consumer-owned refill packaging

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Reuse/refill solution packaging or food service ware material	X		The material of the refill packaging (multiple materials possible)	• Aluminum • Bamboo pulp • Bio-based materials • Biodegradable pouch • Compostable pouch • Cardboard • Plastic fabric bag • Ceramic • Glass • Metal • Corn starch • Fabric • Bamboo • Plastic • Recycled plastic • Mesh or opaque vinyl • Paper • Paper pouch • Stainless steel • Plastic fabric • Polyester • PVC • Polyvinyl alcohol sachet • Unknown • Consumer-owned • Consumer-owned bag • Consumer-owned refill packaging

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
End of life for refill/prefill packaging	X		The appropriate disposal method for single use packaging	• Compostable only • Recyclable only • Compostable and recyclable • Not compostable or recyclable • No SUP- entire pod dissolves in water • N/A • Unknown
Return incentive	X		The leading factor encouraging consumers to return the solution instance	• B2B service agreement • Deposit • Discount • Store discount • Free pick up • Free return shipping • None • Pay only if not returned • Penalty • Rental agreement • Rewards/points • Swap • None • Unknown • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Cost implications for consumer	X		What the consumer owes in order to use the solution	• No cost • No up-front fee but fee charged upon nonreturn after a period of time • One-time membership fee • Ongoing subscription • Unknown • Per-use fee • Penalty fee • Refundable deposit
Accepted payment types - credit or bank card	X		The payment types accepted for the solution instance (multiple selections possible)	• Yes • No • Unknown • N/A
Accepted payment types - cash	X			• Yes • No • Unknown • N/A
Accepted payment types - assisted payment program	X			• Yes • No • Unknown • N/A
Accepted payment types - app	X			• Yes • No • Unknown • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Who washes reusable packaging or food service ware	X		What entity washes the reusable item (multiple entities possible)	• Consumer • Retailer/brand • Producer • Program operator • N/A
Post-use collection infrastructure- for business owned	X		The method used to collect a reusable solution instance	• B2B • Home pick up • On-site collection • Restaurant drop-off • Retail drop-off • Return by mail • Unknown • N/A
Consumer management requirements (if any)	X		Actions the consumer must take before returning a reusable solution instance	• Fold, • Rinse • Scrape dishware • None • Unknown • N/A
Reusable Item belongs to	X		The owner of the packaging being refilled or reused	• Consumer • Consumer - brand specific packaging • Retailer/brand • Producer • Program operator • Multiple business models • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
For business-owned reusable packaging and food service ware, is the reusable packaging and food service ware	X		Type of reuse system: Pooled- one company owns packaging, provides as a system to all companies (Ex: reusable pallets) Standardized - All packaging meets common set of specifications, but not specific who owns. Packaging is interchangeable between producers (CITEO in FR)	• Pooled (one company owns packaging, provides as a system to all companies) • Standardized (all packaging meets common set of specifications, but not specific who owns. Packaging is interchangeable between producers) • Hybrid (pooled option and business-specific option), none, N/A
Reusable/refillable solution washing location	X		Where the solution is washed	• Wash hub • Washing at production facility • Washing by restaurant/food service operator • Washing at retail location • Unknown • N/A
Website language	X		Primary language of the solution's public website	[Free text]

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Year founded	X		Year the organization was founded	[Free text]
Year solution started	X		Year the solution was founded	[Free text]
Maturity of solution	X		How developed is the solution	• 1-Concept • 2-Pilot/start-up • 3-Growth stage • 4-Established, unknown
System funding model	X		Main income that funds the solution	[Free text]
Data validated by organization (yes/no)	X		If the data has been reviewed by the solution organization or not	• Yes • No
Date entry last updated	X		Date the solution was last updated	[Free text]
Compliance with ADA - physically accessible in store		X	The solution models compliance with ADA requirements	• Never accessible • Sometimes accessible • Always accessible • N/A
Compliance with ADA - physically accessible in store comparable to single use options		X		• Equal or less accessible • Equally accessible • More accessible • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Compliance with ADA - package accessibility - physical manipulation		X		• Never accessible • Sometimes accessible • Always accessible • N/A
Compliance with ADA - package accessibility - physical manipulation comparable to single use options		X		• Equal or less accessible • Equally accessible • More accessible • N/A
Compliance with ADA - package accessibility - visually accessible		X		• Never accessible • Sometimes accessible • Always accessible • N/A
Compliance with ADA - package accessibility - visually accessible comparable to single use options		X		• Equal or less accessible • Equally accessible • More accessible • N/A

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Other costs or benefits to consumer - change to waste that consumer is responsible for managing (packaging or foodservice)		X	The solution models additional costs and benefits	• No waste • Low waste • N/A
Other costs or benefits to consumer – portion flexibility		X		• Yes • No • N/A
Other costs or benefits to consumer – opportunity to avoid exposure to chemicals of concern		X		• Not possible • Possible • N/A
Difference in food safety or quality vs single use alternative - compliant with California retail food code and 2019's AB 619		X	The solution models food safety and quality effects	• Yes • N/A • Not addressed in CalCode because it is for food being provided for imminent consumption and does not cover packaged food, CalCode does not contemplate this scenario, and AB 619 only pertains to consumer-owned items.

Column name	Instances Database	Solutions characterization dataset	Column description	Cell value options
Difference in food safety or quality vs single use alternative - compliant with 2022 FDA code and the 2024 supplement		X		• Yes • No • N/A
Impact on jobs		X	The impact on jobs the solution model has	• No direct impact • Directly creates jobs in California • Directly reduces jobs in California

Solutions Characterization Dataset

The Solutions Characterization Dataset builds off the Instances Database to further characterize and analyze reuse and refill solution types. Some aspects of solutions that were of interest for analysis were not feasible or appropriate to assess at the Instance level and are instead analyzed in the Solution Dataset at the model and submodel level.

For information that is common between the Instances Database and the Solutions Dataset, the data from the Instances Database was used in aggregate to characterize the solutions. The methodology is explained above in the Instances Database section in Appendix B. These were:

- Reuse vs refill
- Solution model
- Solution submodel
- Packaging level (primary, secondary, tertiary)
- Applicable to B2B
- Applicable to B2C
- Type of solution (packaging, food service ware)
- Product category
- Purchase context
- Pooled, standardized, harmonized
- Is access to technology required
- Ease of use
- Cost implications for consumer
- Accepted payment types

The Instances Database is limited to solutions operating in California, but the Solution Characterization Dataset is meant to represent what is possible for each type of solution and to bring in examples of programs elsewhere to illustrate this potential. To this end, interviews, desk research, and the full global landscape were used to identify solutions that are only currently available outside of California, or solutions that have existed but are currently unavailable.

The additional characteristics of the solutions that were expanded upon in the Solution Dataset are described here.

- **Requires reusable tertiary packaging:** For primary packaging solutions, do they require reusable tertiary packaging or is that decision separate. This was populated based on the industry knowledge of the team and validated in expert and business interviews.

- **Compliance with ADA requirements** were analyzed for consumer-facing solutions based on three aspects of access:
    - **Physical in-store accessibility**: Can someone in a wheelchair get to the solution and use it without help?
    - **Packaging accessibility**: Can someone with limited strength, dexterity, or only one hand successfully uses the package?
    - **Visual accessibility**: Is the visual information on signage and on the package large enough and with high enough contrast to be read by someone with limited vision?
    - For each aspect, models were assessed in two ways:
        - **Is the model always, sometimes, or never accessible**. Always and never indicate that the solution, by its nature, is always either accessible or not. Sometimes accessible indicates that the solution can be accessible but may require certain conditions be in place to enable this. For example, refill-in-store dispensers can be placed at a height where they can be used from a wheelchair, but some stores place them higher, out of reach of wheelchair users. The contractor assessment was based on store or site visits, interviews, desk research, and examination of physical products.
        - **How does the accessibility of the reuse or refill solution compare to the accessibility of the comparable single use plastic alternative.** For example, package accessibility was assessed as always accessible, because the consumer is choosing their own packaging and can always choose an accessible package. This was then compared to the package accessibility for single use packages, which is only sometimes accessible. In this case, the refill packaging was determined to be more accessible than the single use packaging. Accessibility comparisons were conducted by the contractor based on desk research, interviews, store visits, and examination of physical products.
- **Other costs or benefits to consumers**
    - This characterization goes beyond the cost implications for consumers to assess other potential costs or benefits to consumers for each solution model. The additional considerations assessed were:
        - **Changes to waste consumers had to manage**: This was categorized by model as low waste, no waste, or not applicable.

        - **Portion flexibility** was categorized by model as yes, some, or none based on how each solution works.

- **Opportunity to avoid exposure to chemicals of concern** was noted as always, sometimes, never, based on whether the user can choose to use inert, nontoxic packaging or food service ware as part of using the solution.
- **Implications for food safety** were gauged based on whether current food code allows for the solution either implicitly or explicitly. Three relevant food codes referenced were:
    - California Retail Food Code[1] and 2019's AB 619.[2]
    - 2022 FDA Code and the 2024 Supplement.
    - Reference material from the Center for Biological Diversity, which tracks food code at the state level including for California.
    - Perpetual's FDA Food Code Update webinar, which was conducted on June 18, 2025, and led by Perpetual co-founder and co-executive director Dagny Tucker, who co-chaired the Committee on Food Protection that provided the 2024 Supplement to the FDA Food Code.
- **Impact on jobs** was assessed based on the data and methodology described in the Assessment of Impact on Jobs section in Appendix B. The insights from the literature review, the interviews, the case studies, and Perpetual's modeling were applied to each of the solution types, with consideration of potential variations in models. It is beyond the scope of this research to assess the order of magnitude of job impacts, but it was possible to determine if, relative to the current single use plastic status quo, scaling of reuse, refill, and other source reduction methods were likely to increase the number of jobs in California, decrease the number of jobs in California, or have no impact on jobs in California. Notes provided for each solution type explain the logic of how this determination was made.

The contractor ensured that the information gathered is representative of diverse communities within California, including different rural, urban, suburban, and socioeconomic perspectives by utilizing the representative Instances Database, and supplementing with additional research of solutions that exist nationally and globally.

Solutions Dataset Gaps and Caveats

The Solutions Dataset was created using the best available public information and confirming it wherever possible with businesses or experts directly. There may be gaps where information is not publicly available or inaccessible to this contractor due to geography, language, or other barriers, or due to the limitations of the contractor's work.

Topics such as ADA and food code compliance are highly technical and can depend on very specific aspects of context. The assessments in this database are intended to provide directional information for the purposes of research and understanding and should not be interpreted as having any authority or official determination. It is possible that other experts working with the same data would come to different conclusions, and it is acknowledged that government inspectors and auditors do not always agree on the interpretation of these regulations.

Some of the solutions highlighted in the solutions dataset can vary in how they operate in different places and for different product categories. Every attempt was made to capture both current reality and the breadth of current operations, as well as what is possible with existing technology.

Store-level Data Collection in California

The contractor spent a total of 10 days in the field, allocating two days in each of these five regions: Southern, Valley, Bay Area, Mountain, and Coastal. In total, the contractor visited 55 stores, though data was only useable in 51 stores. Additionally, 14 CalRecycle staff members supported data collection, completing product surveys in 32 stores over approximately six days. In total, data collection took place across 83 stores.

The contractor designed and implemented a specific methodology and process to ensure data collection from a broad range of communities (including different rural, urban, suburban and socioeconomic perspectives), as detailed below.

The contractor conducted in-person data collection at a representative selection of purchasing locations across urban, suburban, and rural environments. Where possible, this included locations serving priority populations across different regions and communities in California. The purpose was to collect data on the availability of reuse and refill options, large format packaging, and concentrate solutions. The contractor also gathered information on:

- the cost of these options relative to comparable alternatives.
- brand selection within relevant solution formats versus other formats.
- potential barriers to implementation.
- operational considerations for businesses.
- other data points relevant to assessing the accessibility and availability of these solutions.

Based on the travel required to visit desired locations and conversations with experts in collecting packaging data in the field, the contractor estimated they would need approximately one hour to gather data at each site. The survey tool was designed with ArcGIS's Survey123 software to maximize the quantity of product data that could be collected in that amount of time. The tool enables users to capture product images and barcodes, both of which can be reviewed later to code brand name, packaging format, packaging size, and price, rather than entering that data in the survey separately.

To determine the availability of reuse and refill, large format packaging, and concentrate solutions, as well as cost relative to comparable alternatives, selection of brands in relevant solution formats versus other purchase formats, and other datapoints used in the consideration of accessibility and availability of solutions, the contractor selected five products to survey. These were: white rice, milk, shampoo, dish soap, and surface cleaner.

Community and Retail Selection

To ensure that data collection from a broad range of communities (including different rural, urban, suburban, and socioeconomic perspectives), the contractor developed and implemented a selection process to select representative communities that met requirements based on geographic feasibility.

First, to collect data representative of different levels of population density, the contractor selected at least one urban, suburban, and rural community in each region. The contractor used Rural-Urban Commuting Area (RUCA) codes, a census-based classification system used by the United Stated Department of Agriculture (USDA) and other organizations to identify the urban, suburban, and rural characteristics of a geographic area based on commuting patterns[3] to select communities from which to collect data. A description of the codes is provided in Table 51. The contractor did not visit lands under the control of federally recognized Tribes as part of this research element.

Table 51: Urban/suburban/rural segmentation by USDA RUCA codes

RUCA Code	Area type	Description
1.0-3.0	Urban	Census tracts in metro areas
4.0-6.0	Suburban	Micropolitan areas and large towns near metros
7.0-10.0	Rural	Small towns and isolated rural areas

The contractor then used a database of retail stores mapped in the GIS software tool ArcGIS, as well as Google Maps, to find retail stores to visit in at least one urban, suburban, and rural community in each of the five California regions. However, some California regions are disproportionately urban, suburban, or rural, making the selection of diverse-density communities impossible. In these cases, there were few or no communities with specific RUCA codes or where they did exist, there were no retail stores. As a solution, the contractor chose the retail stores nearest to the community within the target RUCA code range that appeared to serve the community under consideration.

Second, the contractor sought to ensure information would be gathered from stores located in different priority populations, socioeconomic, and demographic areas. The contractor developed the following methodology:

- Of the five urban sites visited, two will be in census tracts that are considered disadvantaged and/or low-income communities.
- Of the five suburban sites visited, two will be in census tracts that are considered disadvantaged and/or low-income communities.
- All five rural sites visited are considered disadvantaged communities (definition below).
- The remaining census tracts were to have a median income falling between 75%-125% of the state median income.

Priority populations were defined as including:

- **Disadvantaged communities, which CalEPA defines as:**
    - The top 25% of census tracts experiencing disproportionate amounts of pollution, environmental degradation, and socioeconomic and public health conditions according to the Office of Environmental Health Hazard Assessment's CalEnviroScreen 4.0 tool.
    - Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps but receiving the highest 5% of CalEnviroScreen 4.0 Pollution Burden composite scores.
    - Census tracts identified in 2017 as disadvantaged, regardless of their scores in CalEnviroScreen 4.0.
    - Lands under the control of federally recognized Tribes.
- **Low-income communities:** populations either at or below 80% of the statewide median income.
- **Communities in rural areas.**

Using this framework, the contractor used the GIS tool ArcGIS to map the retail stores and relevant overlaid socioeconomic and demographic data and select census tracts where stores would be selected and visited. When selecting stores to visit, the contractor encountered some challenges. In some communities, there is a low presence of retail stores in disadvantaged, low-income, and rural communities. This corresponds with "food desert"[4] and "food swamp"[5] terminology sometimes used to refer to specific communities that lack access to food retail. In areas where the contractor could not find enough stores in priority population areas, they selected the closest available store to the disadvantaged community census tract to fulfill the store selection quota. In the end, the contractor was able to gather data in priority populations census tracts in all five urban regions visited, two suburban regions visited, and all five rural regions visited.

Once communities that met the geographic, density, and socioeconomic considerations were identified, the contractor was able to select stores. The contractor sought to select a mix of stores including:

- Package free shops and/or refilleries
- Mainstream large and small chain retailers
- Discount retailers
- Local retailers
- Drugstores
- Warehouse clubs

The contractor sought to visit at least one of these store types in each of the five regions' urban areas visited. They also set a goal to visit at least three types in each region's selected suburban and rural communities were visited, with at least two being a local or small retailer, a discount retailer, or a retailer catering to a specific ethnic or culturally identified group.

Table 52 summarizes the retail locations originally selected for the contractor to visit and whether or not the store-level data was used. Retail locations were excluded if they were not visited (sometimes due to travel delays), visited but missing data for various reasons (such as being asked to leave the store before data collection was complete), or visited but a store declined to have its data included. Data was used from 83 stores and data was not used for 22 stores.

Table 52: Selected retail locations in California

Region	Store name	City	Entity type	Data used
Valley	Chico Natural Foods Cooperative	Chico	Zero-waste/refill store	Yes
Valley	Chico Refill	Chico	Zero-waste/refill store	Yes
Valley	Costco	Sacramento	Warehouse club	Yes
Valley	CVS	Tahoe City	Drugstore	Yes
Valley	Dollar General	Oroville	Discount retailer	Yes
Valley	Ecojoyous	Sacramento	Zero-waste/refill store	Yes
Valley	Holiday Market	Chester	Small chain retail - mainstream	No
Valley	Mi Pueblito	Truckee	Local retailer	Yes
Valley	New Earth Market	Chico	Zero-waste/refill store	Yes
Valley	New Moon Natural Foods	Truckee	Zero-waste/refill store	Yes

Region	Store name	City	Entity type	Data used
Valley	Raley's	Oroville	Local retailer	Yes
Valley	Raley's O-N-E Market	Truckee	Local retailer	Yes
Valley	Refill Madness	Sacramento	Zero-waste/refill store	Yes
Valley	Sacramento Natural Foods	Sacramento	Local retailer	Yes
Valley	Safeway	Sacramento	Large chain retail - mainstream	Yes
Valley	Safeway	Kings Beach	Large chain retail - mainstream	Yes
Valley	Safeway	Chico	Large chain retail - mainstream	Yes
Valley	Save Mart	Truckee	Discount Retailer	Yes
Valley	Smart and Final	Oroville	Warehouse club	Yes
Valley	Sprouts Farmers Market	Citrus Heights	Large chain retail - mainstream	Yes
Valley	Tahoe Central Market	Kings Beach	Local retailer	Yes
Valley	Target	Citrus Heights	Large chain retail - mainstream	Yes
Valley	Target	Chico	Large chain retail - mainstream	Yes
Valley	That's Cheap!	Sacramento	Discount Retailer	Yes
Valley	Trader Joe's	Roseville	Large chain retail - mainstream	Yes
Valley	Village General Store and Refillery	Roseville	Zero-waste/refill store	Yes
Valley	Walgreen's	West Sacramento	Drugstore	Yes
Valley	Walmart	Sacramento	Large chain retail - mainstream	No
Valley	Walmart	Oroville	Large chain retail - mainstream	Yes
Valley	Walmart Supercenter	Roseville	Large chain retail - mainstream	Yes
Central	Wing Fa Market	Sacramento	Local retailer	Yes
Coastal	Before 1907	Hollister	Zero-waste/refill store	No
Coastal	Costco	Santa Cruz	Warehouse club	Yes
Coastal	Costco	Gilroy	Warehouse club	Yes

Region	Store name	City	Entity type	Data used
Coastal	CVS	Santa Cruz	Drugstore	Yes
Coastal	D'La Colmena Market & Catering	Watsonville	Local retailer	Yes
Coastal	Dollar Tree	Santa Cruz	Discount retailer	Yes
Coastal	Grocery Outlet	Gilroy	Discount retailer	Yes
Coastal	Hernandez Market II	Santa Cruz	Local retailer	Yes
Coastal	Lupita's Supermercado	Hollister	Local retailer	No
Coastal	New Leaf Community Markets - Capitola	Capitola	Zero-waste/refill store	Yes
Coastal	Staff of Life	Santa Cruz	Zero-waste/refill store	Yes
Coastal	Target	Gilroy	Large chain retail - mainstream	Yes
Coastal	Trader Joe's	Santa Cruz	Large chain retail - mainstream	Yes
Coastal	Walgreen's	Hollister	Drugstore	Yes
Southern	Costco	El Centro	Warehouse club	No
Southern	Costco	Palm Desert	Warehouse club	Yes
Southern	Costco	San Diego	Warehouse club	Yes
Southern	CVS	San Diego	Drugstore	Yes
Southern	CVS	San Diego	Drugstore	No
Southern	CVS	El Centro	Drugstore	No
Southern	Dollar Tree	Brawley	Discount retailer	Yes
Southern	East Village Grocery Outlet	San Diego	Local retailer	Yes
Southern	El Sol	Brawley	Local retailer	Yes
Southern	Food For Less	Cathedral City	Discount retailer	Yes
Southern	Grocery Outlet	San Diego	Discount retailer	No
Southern	La Posta Market	San Diego	Local retailer	No
Southern	Origins Grocer	San Diego	Zero-waste/refill store	Yes
Southern	Smart and Final	San Diego	Warehouse club	Yes
Southern	Smart and Final	San Diego	Warehouse club	No
Southern	Smart and Final	El Centro	Warehouse club	No
Southern	Super Discount Store	San Diego	Discount Retailer	Yes

Region	Store name	City	Entity type	Data used
Southern	Target	El Centro	Large chain retail - mainstream	No
Southern	Vons	Brawley	Large chain retail - mainstream	Yes
Southern	Walgreen's	El Centro	Drugstore	No
Southern	Walmart	San Diego	Large chain retail - mainstream	No
Southern	Walmart	Palm Desert	Large chain retail - mainstream	No
Southern	Walmart	El Centro	Large chain retail - mainstream	No
Mountain	Briar Patch Food Co-op	Grass Valley	Local retailer	Yes
Mountain	CVS	South Lake Tahoe	Drugstore	Yes
Mountain	CVS	Grass Valley	Drugstore	Yes
Mountain	Dollar General	Penn Valley	Discount retailer	Yes
Mountain	Grass Roots Natural Foods	South Lake Tahoe	Zero-waste/refill store	Yes
Mountain	Grocery Outlet	South Lake Tahoe	Discount Retailer	Yes
Mountain	Medina's Market	Diamond Springs	Local retailer	No
Mountain	Mi Pueblo Markets	South Lake Tahoe	Local retailer	No
Mountain	Peninsula Market	Lake Almanor	Local retailer	No
Mountain	Placerville Food Co-Op	Placerville	Zero-waste/refill store	Yes
Mountain	Raley's	Placerville	Local retailer	Yes
Mountain	Safeway	Pollack Pines	Large chain retail - mainstream	Yes
Mountain	Safeway	South Lake Tahoe	Large chain retail - mainstream	Yes
Mountain	Save Mart	Placerville	Discount Retailer	Yes
Mountain	Siam Market Tahoe	South Lake Tahoe	Local retailer	No

Region	Store name	City	Entity type	Data used
Mountain	Smart & Final Extra!	South Lake Tahoe	Warehouse club	Yes
Mountain	Soda Springs General Store	Soda Springs	Local retailer	Yes
Mountain	SPD Market	Nevada City	Local retailer	Yes
Mountain	Feather River Food Co-Op	Portola	Zero-waste/refill store	Yes
Bay Area	Akia Inspirations	Rio Vista	Zero-waste/refill store	No
Bay Area	Costco	San Francisco	Warehouse club	Yes
Bay Area	CVS	Dixon	Drugstore	Yes
Bay Area	Davis Food Co-Op	Davis	Zero-waste/refill store	Yes
Bay Area	El Molino Supermarket	Concord	Local retailer	Yes
Bay Area	Family Dollar	Rio Vista	Discount retailer	Yes
Bay Area	Grocery Outlet	Concord	Discount retailer	Yes
Bay Area	Hwa Lei Market	San Francisco	Local retailer	Yes
Bay Area	Lira's Supermarket	Rio Vista	Local retailer	Yes
Bay Area	Rainbow Grocery	San Francisco	Zero-waste/refill store	Yes
Bay Area	Refill Madness Sonoma	Sonoma	Zero-waste/refill store	Yes
Bay Area	Safeway	Dixon	Large chain retail - mainstream	Yes
Bay Area	Smart and Final	Fairfield	Warehouse club	Yes
Bay Area	SoCo Trading Company	Healdsburg	Zero-waste/refill store	Yes
Bay Area	Super Save Supermarket	San Francisco	Discount retailer	Yes
Bay Area	Target	San Francisco	Large chain retail - mainstream	Yes
Bay Area	Visitacion Valley Pharmacy	San Francisco	Drugstore	Yes
Bay Area	Walmart	Dixon	Large chain retail - mainstream	No

Data Categorization and Normalization

To determine the cost, variety, and availability of products available in reuse, refill, or source reduced formats versus comparable single use products, the contractor organized and categorized the data.

The contractor categorized brands within every product into one or more selections.

- Mainstream brands are widely distributed in national or multi-regional grocery and big-box chains (e.g., Tide and Minute Rice).
- Private label or store brands belong exclusively to a particular retailer under its own brand name (e.g., Kirkland Signature and 365).
- Premium/specialty brands are focused on quality, niche appeal, or higher price; often sold in upscale markets, specialty stores, or natural food retailers (e.g., Method and Straus Family Creamery).
- Natural/organic brands market natural, organic, or sustainable attributes that often overlap with premium products (e.g., Dr. Bronner's).
- Value/discount brands compete primarily on low price; often sold in discount or dollar stores (e.g., Dollar General brands).
- Local/regional brands are distributed in a limited geographic area and may be independent or small-scale (e.g., Straus Family Creamery).
- Emerging/challenger brands are new entrants with disruptive business models or innovative packaging (e.g., Blueland and Kitsch).

The contractor also categorized the products by what type of solution they offered.

Single use categories included:

- Standard size: This includes the range of packages on the shelf that are neither travel size/mini/pocket size nor large format size and excludes multi-packs.
- Large format: Large format is differentiated by being a larger amount than the typical single purchase amount for that product and marketed at a markedly lower unit price. What is considered large format must be determined on a good-by-good basis and take into account the relative sizes of all packages sold for this product.
- Concentrate: A product sold with water removed, that the consumer adds back later to reconstitute the original good.

Refill and reuse categories included:

- Refill via single use large format packaging (differentiated from single use large format because it refills an original smaller container of the same brand and product, where the original container has functionality that the refill package does not, such as a pump or nozzle)
- Refill via concentrate (differentiated from single use concentrate because it is reconstituted in a package provided for that specific brand and product, not simply a concentrated product)
- Refill via single use packaging (e.g., pouch, pod, cartridge) that is neither large format nor concentrated.
- Refill via dispensing (consumer provides the package)
- Reuse via prefill (producer provides the reusable package already filled with product, and the consumer returns the package to the producer or another third-party to be washed and used again to sell the same product)

The contractor set size standards for each product to determine which category and sub-category to group it into. In-store data collection in California found that local retailers, drugstores, and most discount retailers do not typically carry products in packaging over a certain size, while mainstream chain retailers and warehouse clubs typically carry a wider range of product sizes. This difference in availability informed the decision to consider bags of rice over 10 lbs, milk jugs over a gallon, dish soap bottles over 28 fl oz, and multi-surface cleaner five gallons or more as source reduced large format packaging. Shampoo presented a more unique case because of the wide variety in package sizes and shapes. The consultant team identified that above 17 fl oz of shampoo, most shampoo bottles switch to a pump top, suggesting the bottle is no longer expected to be picked up for use, so contractor determined that source reduced large format for shampoo products would be anything over 16.91 fl oz. The contractor set a standard unit size in each product type for a product to be normalized against. These unit sizes are defined here, either in ounces (oz) or fluid ounces (fl oz).

- For milk products
  - Source reduced large format: anything over one gallon
  - Source reduced concentrate: evaporated, condensed, and powdered milk
  - Normalized amounts for comparison:
    - Cold and shelf-stable liquid milk: 8 fl oz
    - Evaporated and condensed milk: 4 fl oz
    - Powdered milk: 2 oz

- For rice products
    - Source reduced large format: over 10 lb package
    - Rice had no concentrate options
    - Normalized amounts for comparison: 1 oz of rice
- For dish soap products
    - Source reduced large format: over 28 fl oz
    - Source reduced concentrate: dish soap bars
    - Refill via single use packaging: products that were the standard size but not sold with the pump or spray nozzle
    - Refill via dispensing: dish soap available for in-store dispensing to replace packaging using dispensers
    - Normalized amounts for comparison:
        - Regular dish soap: 1 fl oz
        - Dish soap bar: 0.2 oz (because 1 oz of a dish soap bar is equal to 5 fl oz of liquid dish soap according to the usage instructions on the package)
- For shampoo products
    - Source reduced large format: anything over 16.91 fl oz
    - Source reduced concentrate: shampoo bars and pads
    - Refill via dispensing: shampoo available for in-store dispensing to replace packaging using dispensers
    - Normalized amounts for comparison:
        - Liquid shampoo: 1 fl oz
        - Concentrate (bar): 0.2 oz (determined using the average number of washes each option provides per ounce)
        - Concentrate (pad): 0.6 oz (determined to be equivalent to one fl oz of regular shampoo based on directions on the package)
- For multi-surface cleaning products
    - Source reduced standard format: spray bottles
    - Source reduced large format: 5 gallons or more

- Source reduced concentrate: dissolvable tablets sold without an original bottle option and concentrated nonspray liquid cleaners
- Refill via concentrate: dissolvable tablets were sold with a bottle
- Refill via dispensing: surface cleaner available for in-store dispensing to replace packaging using dispensers
- Normalized amounts for comparison:
  - Liquid surface cleaner: 1 fl oz
  - Concentrated liquid cleaner: 0.125 fl oz (based on specific instructions to make a 16 oz bottle of cleaner)

Choice Score

The choice score is intended to provide a measure of brand option availability to be able to compare the level of choice available for different reuse, refill, and source reduced formats. To calculate the choice score, the contractor divided the number of brand options available in a particular reuse, refill, or source reduced format by the total number of brands options available for the single use alternative across all store locations visited. This calculation was done for each of the five products evaluated. In addition to the overall calculation of the choice score, it is calculated with additional detail, including by urban, suburban, rural; by region; by disadvantaged vs not disadvantaged community, and by retailer type (e.g., superstore, convenience store, pharmacy/drug store).

Data Cleaning and Analysis

The data collected through ArcGIS Survey123 required extensive post-processing to enable structured analysis. The following steps were taken to clean, enrich, and prepare the data for analysis:

Image Management

All photos submitted via Survey123 were downloaded using ArcGIS Pro's attachment export function. A total of 4,580 images were collected across five product categories. The images were then reviewed manually to extract necessary product information. A data entry spreadsheet was created in Excel to facilitate data entry, with fields for price, size, unit (e.g., lb, oz, kg), and reviewer comments. The spreadsheet included a field the reviewer could use to flag a record for further review. Cleaned price and size data from the image review process was re-integrated into the master dataset based on file name and survey record ID.

Barcode Data Processing

A total of 2,204 unique barcode values were extracted from survey submissions. More barcodes were collected, but there were duplicates because the same brand and product packaging is used across retail locations. The barcodes were batch-processed using the BarcodeLookup.com application programming interface (API) to retrieve product metadata including product title, manufacturer, size, and packaging information. On the first attempt, fewer than 1,000 barcodes were matched through BarcodeLookup.com's API. While not all barcodes were expected to match, the larger than expected number of mismatches occurred primarily because:

- Barcodes were converted to scientific notation in Comma Separated Values (CSV) or Excel after extraction from Survey123 data
- Leading zeros were dropped during Excel formatting
- Matched barcode metadata was written back into the master dataset

Cleaning and Standardizing Fields

Open-ended survey responses for store names, brand names, and packaging were cleaned manually. Spelling variants and inconsistent formatting were standardized across records. Package size units were normalized to ounces for all products. Where only metric units were provided (e.g., grams or milliliters), values were converted using product-specific conversion factors where possible. Price per ounce was then calculated for each product using cleaned size and price data.

Store names were not entered for each record, but Survey123 automatically records the latitude and longitude of a survey entry. Geocoding was used to match all stores names in the surveys against the master list of the ones that were selected for the study to ensure accurate identification. A Python script was developed to match each survey record to the closest entry in the retailer master list within a defined distance threshold (e.g., 0.001 degrees). This process enabled consistent identifiers to be assigned to each store visit, even for chains with multiple store locations (e.g., Target). It also enabled geographic and demographic identifiers to be written back into the data, such as urban, suburban, rural, and disadvantaged community status.

Dataset Structuring

The raw data was originally stored in a wide format, with up to five packaging formats per product, per record. The data was normalized by splitting each packaging format into separate rows, creating a long format "Single Use Packaging Dataset" suitable for pivot table analysis. A separate "Refill Dataset" was also created to isolate data relevant to refill options.

Analysis Approach

Cleaned datasets were analyzed primarily in Excel using pivot tables to summarize results across:

- Product categories
- Store types and regions
- Packaging format prevalence
- Presence of refillable or reusable options
- Price-per-ounce comparisons across formats

Additional analysis was conducted to examine relationships between store characteristics and packaging availability (e.g., refill offerings in rural versus urban stores).

Gaps, Data Issues, Caveats

Limited Product Scope

Due to time constraints, the study was limited to five product types: white rice, milk, shampoo, dish soap, and surface cleaner. While these were selected to represent a mix of product characteristics, categories, and reuse/refill potential, the results should be considered directionally indicative rather than statistically representative of all product categories available in California retail stores.

Incomplete Store Coverage

The research plan aimed to achieve broad geographic coverage across California's major regions (e.g., Valley, Coastal, Southern, Mountain, and Bay Area), and across urban, suburban, and rural contexts. However, a number of challenges impacted full store coverage:

- Coverage was impacted by travel disruptions and logistical constraints, leading to the omission of some store locations selected originally.
- CalRecycle staff supported store visits, but staff availability and travel distances limited the number of stores they could feasibly visit within the data collection period.

Despite these efforts, notable gaps in store coverage remained, including:

- Not visiting some San Diego-area stores originally included in the sampling plan.
- Not visiting at least three different types of stores in some of the rural/suburban areas of some regions.
- Not visiting at least five different types of stores in some of the urban regions.
- A small number of store owners or managers explicitly declined participation or later requested that collected data not be used in the final analysis, further reducing the final data set.

NAICS Code Assignments

Each retailer visited was assigned a NAICS code to be properly analyzed. These codes cannot always be found for each store individually but are based on a set of criteria within each code. Most retailers fell under the code 445110, or "Supermarkets and Other Grocery Retailers (Excluding Convenience Stores)", including any package-free shop and dispensing station that sold food goods. Any shops and dispensing stations that did not sell food were more difficult to categorize. The code 446120 covers "Cosmetics, Beauty Supplies, and Perfume Stores" while the code 453998 covers "All Other Miscellaneous Store Retailers", including home care and cleaning supplies. Most of the package-free shops and dispensing stations offered a similar amount of home care and personal care products, so there was no clear code assignment. The contractor categorized any of these unclear cases under the code 446120 for "Cosmetics, Beauty Supplies, and Perfume Stores".

Data Collection

In some cases, data collection was constrained by store layout or product availability. Not all products were stocked in every store, and in others, reuse/refill formats were either not available or not clearly labeled. Additionally, image capture was occasionally prohibited or infeasible due to lighting, signage, or staff intervention. Also, barcodes were not collected for products in locked glass enclosures.

Not all fields were consistently filled out by data collectors, especially open-ended fields (e.g., brand name, packaging type) or pricing and sizing data that required close inspection or image review.

Product Selection

The first step to prepare for in-store data collection was to pick a representative set of products. The scope was selected from the most common food, beverage, personal, and home care products found in a majority of retail stores that also have alternative formats. A limit was set of 1.5 hours to survey each store, which allows approximately five products to be surveyed based on previous data collection and research. The time criteria created a product list of milk, rice, shampoo, dish soap and multi-surface cleaner. The surveys were developed using the Survey 123 tool in ArcGIS Pro. Each product had an independent survey so every brand of that product could be entered as a separate set of data. The key datapoints these surveys needed to capture were the brand name, product barcode, resin code, and a photo. The image of the product on the store shelf and a barcode scan enabled the contractor to identify price, packaging type, and quantity per package.

Product Criteria

The large range of product variations within each category required specific criteria to be set to determine what brands should and should not be collected. Within milk, only 2% cold, evaporated, powdered, and shelf-stable milk options were captured. For rice, white long-grain, medium-grain, enriched, sushi, quick-cook or microwavable formats were captured. For multi-purpose cleaners, the cleaner in liquid, paste, or concentrate form that do not include bleach, baking soda, or are antibacterial were captured. For dish soap (not dish detergent), all formats were captured including refill packs. For shampoo, drugstore and salon quality brands (regular and travel size) that offered options for most/all hair types were captured. Brands specific to curly hair, medicated shampoo, or 2-in-1 options were not captured.

Store and Product Qualitative Findings

General trends could be seen during the collection of data in California stores. Refill stores and co-ops tended to be seen in more populated suburban or urban areas, with a few co-ops available in rural regions. In most refill sections not at a package-free store, the store offered pre-filled single use rigid plastic containers of the same product for grab and go convenience purposes. These refill sections also offered plastic or compostable film bags to use, with some selling reusable containers. Various co-op employees stated that on average, over 85% of consumers bring their own containers for refilling home and personal care products, and less than 50% bring containers for refilling food products.

Product Gaps and Caveats

Several caveats arose during data collection that were determined to have an effect on data outcomes. Not all examples of organic milk and rice were captured at grocery stores, but the contractor learned that most co-ops or refill stores only offer organic options so there will be a price difference to consider. All reusable milk bottle programs only offered organic milk, so in addition to the deposit there will be a price difference. Warehouse stores like Costco only offer products in large format packaging or multiple packages sold together, so there will be a lower cost per unit.

Table 53 lists the number of stores where data was collected by urban/suburban/rural area.

Table 53: CA stores where data was collected (includes CalRecycle staff visits)

Region	Type	Total number of stores
Southern	Rural	5
	Suburban	0
	Urban	6
Coastal	Rural	3
	Suburban	1
	Urban	8
Bay Area	Rural	2
	Suburban	4
	Urban	10
Valley	Rural	3
	Suburban	7
	Urban	18
Mountain	Rural	3
	Suburban	8
	Urban	5
Total		**83**

Dine-in Restaurant Food Service Ware Sampling

The objective of this research was to create a statistically reliable statewide estimate of restaurants offering durable food service ware for dine-in meals. The approach was to draw a stratified random sample of California restaurants based on restaurant type and urbanicity, then visually inspect available online photos (primarily from Google Maps and Yelp) to identify the presence of durable food service ware.

Sample Selection

The sampling frame used was the “Restaurants and Food Services” table from the U.S. Environmental Protection Agency (EPA)’s Excess Food Opportunities Map. The EPA licensed the establishment-specific data (e.g., name, address) from D&B Hoovers in 2021. While this dataset is one of the few publicly available and comprehensive statewide sources, it is known to have some limitations, including potential under or overrepresentation of certain business types, outdated business listings, and minimal information on restaurant characteristics (e.g., service style or dine-in availability). These limitations were addressed through a careful process of stratified random sampling and field verification.

The dataset contained 451,092 facilities nationwide. This is a substantial undercount, as the National Restaurant Association estimates there are more than 700,000 restaurant establishments nationwide in 2025. Additionally, the data includes approximately 59,000 California establishments, while the restaurant industry suggests the number is closer to 86,000.

Within the 59,000 California establishments in the data, the contractor excluded categories not applicable to dine-in service (e.g., caterers, mobile food vendors) and drew the sample from the remaining 55,577 full-service restaurants (FSR) and limited-service restaurants (LSR).

The EPA dataset did not contain geographic categorization data, so that was added to reduce the chances of introducing geographic bias in the resulting estimate. The contractor first used the U.S. Census Geocoder to assign census tracts to approximately 52,000 restaurants. The next step was to assign RUCA codes using the most recently published data by the USDA’s Economic Research Service. RUCA codes were assigned using census tracts for the restaurants that were successfully geocoded and by zip code for the remaining restaurants. All restaurants were classified as being in a Metropolitan (RUCA codes 1-3), Micropolitan (4-6), Small Town (7-9), or Rural (10) area.

The contractor then built a sampling methodology to achieve:

- A statewide estimate (FSR and LSR combined) with ±7% margin of error at 95% confidence (196 observations)
- Separate estimates for FSR and LSR with ±10% margin of error at 95% confidence (approximately 97 each)
- Representation across diverse community sizes, including small and rural areas that are often underrepresented in business research

Eight primary strata were created:

- FSR - Metropolitan
- FSR - Micropolitan
- FSR - Small town
- FSR - Rural
- LSR - Metropolitan
- LSR - Micropolitan
- LSR - Small town
- LSR - Rural

The next step was to draw a random sample of 25 restaurant records to test the data collection method and estimate the sample size needed to generate sufficient usable observations. The test demonstrated that an estimated 68% of restaurant records drawn would result in valid observations. Based on this result, the contractor drew an initial stratified sample of 366 restaurants. In the end, the rate of usable observations per sample drawn was much lower than expected (about 33%). An additional sample was drawn, focusing on underrepresented strata, resulting in a total of 598 records in the sample.

Data Collection

Each sample record was manually reviewed by a trained research assistant who visually inspected photos available online (primarily from Google Maps and Yelp) to identify the presence of durable food service ware, including plates, bowls, cups and cutlery. For each restaurant, the assistant recorded:

- Whether the restaurant was open and operating at the listed address
- Whether it appeared to offer dine-in service
- Whether it appeared to be an FSR or LSR
- Whether durable food service ware (dishes, cups, and cutlery) was visible in photos of dine-in service
- If further review by the contractor was necessary

Restaurants that were closed, did not offer dine-in service, or lacked clear photo evidence were excluded as unusable observations. Restaurants were only marked as usable observations if they were currently open at the address specified in the sample and the type of food service ware used for dine-in service could be reasonably determined.

Analysis

Data was cleaned and checked for internal consistency. Restaurants whose actual service type (FSR or LSR) did not match the sampling frame were recategorized as needed. Observations were weighted according to the proportional distribution of each stratum in the statewide restaurant population. This allowed for an estimate that better reflects the actual distribution of restaurant types and geographies in California.

Gaps, Data Issues, and Caveats

Several limitations should be considered in interpreting results:

- The EPA dataset was not created for this type of analysis and does not fully reflect the restaurant landscape, particularly for newer or smaller establishments. However, it is comprehensive enough to support stratified sampling.
- The EPA dataset included many outdated or misclassified records (e.g., FSR versus. LSR), but these were verified during the review process.
- Publicly available photos are not guaranteed to reflect current practices, particularly for small or recently opened businesses.

Ensuring Representativeness and Equity

The contractor took several steps to ensure the analysis reflected California's diverse geography and socioeconomic conditions:

- Restaurants were randomly sampled across all geographic regions of California.
- Restaurant addresses were geocoded and stratified using RUCA codes to capture variation across urban, suburban, and rural areas.
- Both census tract and ZIP-level RUCA codes were used to capture rural and underserved communities.
- Sample quotas were calculated based on the population of restaurants in each RUCA and service-type category.
- Business closures and misclassifications were accounted for through a transparent, replicable process.

Although the original EPA dataset contains systemic biases (e.g., undercounting in rural or low-income areas), the stratified sampling and geographic coverage aimed to mitigate those biases. Additionally, tracking reviewed observations ensured that the contractor collected sufficient data from underrepresented categories.

There were no known deviations from the scope of work or study design for this.

GIS Data Analysis

The GIS analysis aimed to identify and summarize access to goods sold in single use plastic packaging and reusable or refillable packaging. The GIS analysis and visualization was conducted using the QGIS, and data exports were analyzed in Microsoft Excel.

Grocery store locations were plotted on a map using data from CalRecycle's "Convenience Zone and Recycling Center Status Report"[6] This represented baseline access to goods sold in single use packaging by consumers. This database includes locations that have gross annual sales of $2 million or more, considered a full-line self-service retail store that sells a line of dry grocery goods, canned goods, nonfood goods, and perishable goods and does not represent every location where single use packaging can be purchased. There are likely additional grocery stores and similar small stores that sell products in packaging with less than $2 million in gross sales whose location could not be identified at a comprehensive level. Therefore, the baseline access rate using available grocery store location data is a reasonable estimate, but not a comprehensive analysis of baseline access to covered material.

In the Instances Database, the column "Tag for GIS Mapping" categorizes retail stores into partial, all, and standalone refill stores, was used. "all refill" refers to stores that sell mostly or only goods through in-store dispensing, partial refill denotes stores selling a mix of packaged products and goods sold through in-store dispensing, and standalone refill includes retail stores with just one refill machine or dispenser. Additionally, food service ware was categorized into reusable food service ware, open-loop and closed-loop. Open-loop reusable food service ware includes locations where consumption and purchase happen in the same location, and the reusable packaging or food service ware item does not typically or cannot leave the premises. Whereas closed-loop reusable food service ware refers to a reuse system where goods purchased in a reusable package are consumed in a different location from where they are purchased. Solutions in the Instances Database were excluded from GIS mapping if they were online-only or the address was not relevant to the geographic access analysis (e.g., headquarters of a reusable food service ware provider, headquarters of a prefill facility, enabler, no public street address.)

Population data by census was accessed through the US Census Bureau[7] and plotted on the California map. A 1-mile buffer was plotted around each facility, and the geoprocessing tool "Join by location (summary)" was used to calculate the population that intersect with these 1-mile buffers. Population at the block level was chosen to maximize spatial granularity for this analysis. This process was repeated for urban areas, low-income, and disadvantaged communities, and their associated populations, within one mile of the facilities. Urban areas shapefiles were obtained from the US Census[8], and low-income disadvantaged communities were from the California Energy Commission.[9]

Proximity of Reuse and Refill Facilities to Public Transit (GIS Complexities)

Access to public transit can serve as a good indicator of proximity to reuse and refill facilities and should be considered further. The analysis conducted here used distance (1-mile) to assess access, and further investigation should be carried out into the transport modes customers may choose to visit the proposed refill facilities. Public transit specifically was not employed in this study due to the complexity of the spatial data available, and time constraints.

Future studies should assess the proximity of reuse and refill facilities to all types of public transit systems to garner a more comprehensive understanding of the populations with access.

Assessment of Impact on Jobs

The impact of reuse and refill solutions on jobs, both in and outside of California, is assessed relative to the current single use plastic status quo and considers both impacts at small scale, which is the reality for most solutions today, as well as potential impacts as that solution achieves a larger scale.

The potential for changes to the number of jobs in California are considered for first-order impacts: how does each solution type impact product production, package filling, transportation, retail, and, where applicable, collection, washing, and recirculation. Second-order job impacts such as changes to package manufacturing, company overhead expenses (e.g., from changes to how reusable packages appear in financial statements, or to support tracking of containers), material demand, and waste management are out of scope for this analysis.

The data sources used to assess the impacts on jobs were:

- **Literature review**: Though the literature is limited, eight papers on this topic were identified and reviewed.
- **Expert and Business Interviews**: Interviewees were asked if they had assessed the impact of different source reduction strategies on jobs.
- **Contractor's operational and financial modeling of open loop reusable food service ware programs at city scale**: As part of other work, the contractor created detailed models to assess operational and impact metrics for reusable food service ware programs. This model calculates the labor hours needed to collect, wash, inspect, and redistribute amounts of reusable food service ware as part of a service program. The model considers the size and weight of the containers, average distance traveled (in terms of hours of drive time), dishwasher capacity and staffing model, and items per person per hour for loading and unloading a conveyor-style dishwasher, inspecting, and packing, and hours for manager oversight. The values used for the calculation have been shared by reuse service providers based on actual operations. Please note that

the model itself is not able to be shared as it contains confidential information from third parties.

- **Additional desk research**: There are additional insights on jobs reported in online sources, for example, by trade associations like the Reusable Packaging Association on their website and Rethink Disposable in their case studies of restaurants and venues switching from single use plastic and nonplastic food service ware to reusable food service ware.

The conversion of number of reusable items to weight of items managed required an estimate of the average weight of a reusable item. These four reusable food service ware items were chosen to be representative – two cups (one plastic, one metal) and two containers (one plastic, one metal). The average weight of these four items is 4.3 ounces, which was rounded to 4 ounces for the analysis.[10]

- 20 oz capacity polypropylene cup: 41.3 gram[11], equivalent to 1.5 ounces
- Polypropylene clamshell: 19.19 grams[12], equivalent to 0.7 ounces
- Stainless steel cup: 199 grams[13], equivalent to 7.0 ounces
- Stainless steel container: 228 grams[14], equivalent to 8.0 ounces

Interviews with Experts and Businesses

The contractor conducted more than 40 interviews with various experts and industries to understand the current state of reuse, refill, and source reduction strategies directly from the interested parties who are exploring, testing, and implementing these strategies. This was done to ensure the outputs from this project were grounded in a shared understanding of current reality.

A summary of the interviews conducted by expert category is detailed in Table 54.

Table 54: Summary of interviews conducted by expert category

Expert category	Completed
Trade associations	5
Retailers	4
Product manufactures	8
Packaging manufacturers	3
B2B food service	1
Distributors	2
Food service establishments	6
Event organizers, stadiums, and venues	2
Logistics companies	1
Reuse and refill operators	8
Other	2
TOTAL	**42**

To complete this process, the contractor began by developing a long list of interested parties who may be impacted by or have a role in implementing reuse and refill systems, as well as wider source reduction-related design change. The contractor refined this list and our intended outreach approach as part of the development of the final study design.

The contractor sought to meet with a wide array of impacted industry sectors. To comprehensively assess the landscape and develop equitable recommendations, the contractor identified large, small, national, regional, and independent businesses across all categories. Key considerations for each sector included:

Retailers:

- Local, regional, and national players
- Discount, mainstream, and high-end price points
- Product categories sold
- Retailers that have and have not been part of reuse, refill, or other source reduction efforts

Product manufacturers:

- Small and large manufacturers
- Product categories sold
- Manufacturers that have and have not been part of reuse, refill, or other source reduction efforts

Food service establishments:

- Local, regional, and national players
- Low, middle and high-end price points

The contractor further established subcategories within each of the aforementioned categories, and aimed to meet with at least one party in each of the subcategories:

- **Trade associations:** Retail, food service; consumer brands; packaging; reusable packaging; stadiums/venues
- **Retailers:** Large retailer (grocery and general merchandise; grocery (large chain); grocery (small chain); specialty retail
- **Product manufacturers:** CA-based contract manufacturers and fillers; home beauty and personal care; food and beverage; CA-based food and beverage; consumer goods
- **Packaging manufacturers:** Packaging manufacturers; small, CA-based packaging designers and manufacturers
- **B2B food service**
- **Distributors:** Food service and restaurant distributors; CA-based food service and restaurant distributors; other distributors; transport food service and distributors
- **Food service establishments:** Casual dining/full-service restaurant (large chain); fast casual (large chain); fast casual (small/medium chain); quick service restaurant (large chain); quick service restaurant (small/medium chain)

- **Event organizers, stadiums, and venues:** Event space/venue; large event/festival; stadium/attraction
- **Logistics companies:** Food delivery; logistics and delivery
- **Reuse and refill program operators:** B2B reuse services; closed-loop reuse; open-loop reuse; enabling services
- **Other experts**

Activities commenced in late June 2025 by identifying interested parties for outreach and drafting outreach materials. Qualitative and quantitative data collection began in July 2025 with interviews continuing through August and into September 2025.

The contractor first identified contact persons for the interested parties in each of the subcategories, with outreach following. To reach the targeted parties, the contractor began by utilizing their network of contacts and using tools like LinkedIn to get in touch with the appropriate person(s), requesting introductions where necessary.

Outreach activities to contact interested parties primarily consisted of emails or phone calls, depending on the nature of the relationship with the contact person and available contact information. The initial communication, via emails and phone calls, introduced the purpose of the engagement, the nature of the project, and confirmed that the contact is the most appropriate person at the organization to provide information related to the study. In most cases, this resulted in the scheduling of a virtual interview/meeting with the interested party.

The contractor sought a number of interviews per subcategory of interested party far exceeding the quota, so as not to be overly dependent on reaching specific individual companies or people. This gave the contractor needed flexibility in case of challenges with engaging specific interested parties, as it allowed them to contact others that are in the same subcategory that have a similar profile.

When challenges arose securing an interview, the contractor utilized additional options for outreach:

- Activated alternate contacts from their reserve list
- Used industry associations to facilitate outreach
- Worked through common contacts, so the outreach is not cold
- Cold call outreach

Prior to each interview/meeting, the contractor prepared questions, information, and data requests to address with each interested party. The contractor sent this to the interviewee in advance so that they could review and prepare. This included information about what the data gathered will be used for and options for attribution. Detailed notes were captured from all interviews/meetings, as described below. Additionally, a detailed log was maintained on the status of outreach, recording outreach activities, scheduled interviews, and follow up responses. The log also captured situations where multiple contacts were necessary to secure an interview, including:

- Person or persons contacted
- Nature of the contact (e.g., email, phone, LinkedIn, or other)
- Status of the outreach and follow-up, where applicable
- Any instructions for follow-up
- Person or persons who attempted outreach

While outreach was mostly successful in generating a scheduled interview, the contractor was unable to secure an interview in specific instances where the appropriate person could not be identified or reached.

The most common scenarios were no response; or initial response without continued response to emails. In some cases, the contractor successfully established contact and received responses, but the interested party then declined the invitation outright, or implicitly by not responding to repeated follow ups. In the case of initial response, the interested party typically answered a phone call or email by asking for more information about the process, but then did not respond after, despite multiple follow up requests.

A summary of interviews with experts and businesses is provided in Table 55.

Table 55: Summary of interviews with experts and businesses

Category	Subcategory	Number of organizations interviewed
Trade Associations	Restaurants	1
	Reusable Packaging	1
	Stadiums / Venues	1
	Retail	1
	Packaging	1
Retailers	Large Retailer – Grocery and General Merchandise	2
	Grocery – large chain	0
	Grocery – small chain	1
	Specialty Retail	2
Product Manufacturers	Contract Manufacturers and Fillers	1
	Home, Beauty and Personal Care	2
	Food and Beverage	2
	CA-based Food and Beverage	1
	Consumer Goods	1
Packaging Manufacturers	Packaging manufacturer	2
	Small / CA-based packaging manufacturer	1
B2B Food Service	B2B Food Service	1
Distributors	Food and Restaurant Distributors	1
	Food service and Restaurant Distributors – CA-based	0
	Other Distributors	0
	Transport Food service and Distributors	1
Food Service Establishments	Casual Dining / Full Service Restaurant (large chain)	1
	Fast Casual (large chain)	1
	Fast Casual (small / medium chain)	1
	Quick Service Restaurant (large chain)	2
	Quick Service Restaurant (small / medium chain	1

Category	Subcategory	Number of organizations interviewed
Event Organizers, Stadiums, and Venues	Event space / Venue	1
	Large event / Festival	0
	Stadium / Attraction	1
Logistics and Delivery	Food Delivery	0
	Logistics and Delivery	1
Reuse and Refill Program Operator Examples	Open-Loop Reuse	4
	B2B Reuse Services	1
	Closed-Loop Reuse	1
	Enabling Services	2
Other Experts	Other Experts	2

The contractor also sought to engage companies for insights and data through a survey. The National Restaurant Association agreed to conduct a survey of its members on the contractor's behalf, generating results from 11 respondents: approximately 40% from full-service food service establishments and 60% from quick service food service establishments. The question-and-answer options posed in that poll were:

1. Which reuse/refill and single-use plastic source-reduction strategies do you see as having the greatest opportunity for single-use plastic reductions? Select top 3:
   - A. Lightweighting (e.g., cups made with less material for same functionality)
   - B. Elimination (e.g., use fewer units of food service ware/components or "skip the stuff" strategies)
   - C. Format shifts (e.g., single-use sachet to pump dispensing or switching single-use plastic to paper or compostable)
   - D. Adoption of B2C reusables (e.g., reusable food service ware)
   - E. Adoption of B2B reusables (e.g., reusable supply chain packaging (primary, secondary, or tertiary))
2. What enablers would support you in meeting SB-54 targets? Select top 2:
   - A. Packaging standardization.

B. Industry collaboration
C. funding for individual companies
D. Shared infrastructure for reuse, including standardized packaging
E. New/enhanced infrastructure for recycling
F. Innovation in packaging, technology, business model, or other

3. What are the biggest barriers for your company in adopting reuse and refill solutions? Rank the answers:
   A. Ongoing operating costs (i.e., wash, return, reuse)
   B. Upfront costs to switch (i.e., buying reuseable service ware)
   C. Consumer behavior
   D. Operational challenges (staff, training, ware washing)
   E. Current reusable packaging systems not great/unsuitable
   F. Loss of on-package marketing

The results of the survey are included in Tables 56 through 58.

Table 56: Question 1 survey results (ranked choice)

Question 1	A	B	C	D	E
survey 1	1	2	3	5	4
survey 2	2	1	5	4	3
survey 3	2	3	4	5	1
survey 4	2	1	3	4	5
survey 5	3	4	1	5	2
survey 6	1	3	2	5	4
survey 7	2	3	1	5	4
survey 8	5	4	1	3	2
survey 9	5	4	3	1	2
survey 10	1	4	3	5	2
survey 11	5	3	4	2	1
TOTAL	**29**	**32**	**30**	**44**	**30**

Table 57: Question 2 survey results (top 2 choices)

Question 2	A	B	C	D	E	F
survey 1			X		X	
survey 2	X					X
survey 3				X		X
survey 4		X		X		
survey 5			X			X
survey 6		X				X
survey 7		X				
survey 8		X				X
survey 9				X		X
survey 10				X		X
survey 11					X	X
TOTAL	**1**	**4**	**2**	**4**	**2**	**8**

Table 58: Question 3 survey results (ranked choice)

Question 3	A	B	C	D	E	F
survey 1	3	4	1	2	5	6
survey 2	1	4	5	3	2	6
survey 3	3	1	2	6	5	4
survey 4	3	6	2	1	4	5
survey 5	3	1	2	6	5	4
survey 6	4	3	5	1	2	6
survey 7	2	1	3	4	5	6
survey 8	2	3	1	5	6	4
survey 9	1	2	4	3	5	6
survey 10	2	1	3	4	5	6
survey 11	3	1	2	4	6	5
TOTAL	**27**	**27**	**30**	**39**	**50**	**58**

Interview Notes and Summaries

Interview guides were developed for six interested party categories; packaging manufacturers, product manufacturers, food service and distributors, retailers, reuse program operators, and trade associations. These guides were modified to best support each type of interested party, and the contractor took detailed notes throughout every interview. The contractor’s interview notes and Zoom AI meeting notes were aggregated to create interview summaries outlining barriers, opportunities, data points, and key findings from each interested party. The interview summaries delivered replaced organization and employee names with anonymous codes, and any references made that would identify an organization were removed to ensure confidentiality of all participants.

The interviews covered reuse and refill solutions and source-reduction strategies primarily through an operational lens, with environmental and economic considerations weighed heavily. A sample of questions posed are included below:

- What reuse/refill solutions and source-reduction strategies have you tested and, overall, what have you learned about what works and does not work? Why?
- For successful examples:
    - Did this require new equipment or processes?
    - What were the unit cost implications? Did any changes in cost impact the price to the consumer?
    - What feedback did you get from consumers about the changes? Any behavior insights?
    - What were the ripple effects of the new packaging on operations or costs through the supply chain?
- What have you learned from your tests and programs when it comes to…
    - Consumer behavior or readiness for specific reuse or refill models?
    - Operational insights for reuse and refill solutions?
    - Operational insights?
    - Hygiene, safety or quality challenges for the reuse/refill formats?
    - Up front or ongoing costs vs single-use?
    - Impacts on jobs for different reuse or refill models?
    - Any other insights or concerns that emerged?
- What are the most important enablers for reuse/refill solutions at this time?
- Looking industry wide, what trends do you observe when it comes to reuse and refill solutions? What is notable about what others are doing?
- Which source reduction strategies do you think may have greater potential industry-wide?

In each instance, the contractor asked the interviewee whether they could share data to back up their answers, and also asked data-specific questions such as:

- What metrics can you share from waste reduction, cost savings, or other environmental impact tracking?
- What is the packaging intensity per unit of your product (if tracked)?

- Can you share data on key cost elements such as:
    - Cost to you per reusable item for each type of item?
    - Cost of secondary packaging such as reusable totes?
    - Cost of reverse and forward logistics (on a unit basis if possible)?
    - Cost of washing equipment and space (on an annual basis or a per unit basis)?
    - Cost of energy and water for washing (ideally per unit or relative to volume, e.g., $X per month when processing 10,000 units)?
    - Cost of labor and levels needed for different roles (e.g., collection versus. washing), also in volume terms if possible?

For each interview conducted, the contractor took detailed notes and generated a detailed summary which included:

- Interviewee Organization
- Interviewee Name(s)
- Category
- Sub-Category
- Interview Date
- Interviewers
- Supporting Data or Documents Provided? (Yes/No – describe)
- Recommended Contacts/Follow-up Notes
- List of food service ware or packaging types/systems discussed
- Key Insights/Learnings
- Key Opportunities Identified
- Key Barriers Identified
- Key Data Point Provided in Interview

Additional Notes

When the interviews were concluded, the contractor amassed the detailed notes and interview summaries and analyzed the interview content to determine the most prevalently stated barriers and opportunities in adopting reuse/refill solutions as well as source reduction strategies. They did this by first scanning the documents for issues repeatedly cited and pulling together a list of issues. This list was organized for clarity.

Next, the contractor went back to the original interview to find supporting evidence to support the claim cited in the assembled list. If a point was only made once, or only made by one category of business, it would not constitute a relevant finding. In each of the barriers and opportunities detailed in the report, at least five distinct interviewees from three or more categories cited the issue. This allowed the contractor to corroborate and finalize the set of conclusions.

Gaps, Data Issues, Caveats

The contractor did not secure interviews in the following subcategories:

- Retailer: Large chain grocery
- Distributors: CA-based distributor and "other" distributor
- Event organizers, stadiums, and venues: Large event/festival
- Logistics companies: Food delivery

Despite these gaps, the contractor was able to draw meaningful inferences on barriers and opportunities related to reuse and refill solutions and source reduction strategies utilizing the content gathered from the interviews.

Community Engagement: Public, Community-based Organization, Tribal, and Jurisdiction Engagement

The engagement process for this study was designed to be comprehensive, rigorous, and inclusive of California’s diverse populations. The contractor led the public-facing engagement work, with a focus on CBOs, priority populations, Tribal representatives, interested parties, colleges, and local jurisdictions. The methodology combined structured planning with tailored interactive strategies designed to gather participants’ insights, opinions, and ideas to inform the assessment.

These activities were intentionally structured to be inclusive, culturally responsive, and accessible across regions and audiences. By standardizing the core questions across methods, the contractor created a comparable dataset that highlights statewide patterns while also capturing differences across regions.

For reference, the contractor has included the discussion guide used in the various public engagements in Table 59.

The terminology in this guide may differ from approved CalRecycle terminology for this report because this discussion guide is meant to be included verbatim from what the contractor used in public engagement.

Table 59: Public engagement discussion guide

Engagement method	Core areas of inquiry (high-level questions)	Alignment with report objectives
Virtual small group discussions (CBO leaders, Tribal communities, local jurisdictions)	1. Where is there already access to refillable options in your community? Where is the opportunity for refillable access? 2. What barriers (cost, distance, etc.) exist to having more refillable options) 3. From this list, which plastic do people in your community use most often? (This list will only include covered materials.) 4. What makes it hard for people to use less plastic? What makes it hard for people to use reusable items instead (referring to list)? 5. Are there local programs or businesses already trying to adopt or promote reusable or refillable options? 6. What would make it easier for people to use reusable or refillable alternatives? 7. Here are some examples of actions that may support adoption of reusable/refillable options. What do you think of these? Would these actions resonate with your community? 8. Would these actions create perceived challenges for your community? What ideas do we have to adapt to these and reduce those challenges?	Instances/Solutions Database: • Identify single use or short-lived plastic packaging and food service ware and drivers of use for access/availability analysis • Document barriers/opportunities • Capture examples of existing programs for Instances/Solutions Database

Engagement method	Core areas of inquiry (high-level questions)	Alignment with report objectives
Pop-ups	1. From this list, which plastic items do you use most often? (This list will only include covered materials.) 2. Which from this list could you replace with reusable or refillable options? What would make that easier? 3. What makes it hard to switch to reusable and refillable options? 4. Where is there already access to refillable options in your community? Where is the opportunity for refillable access? 5. What barriers (cost, distance, etc.) exist to having more refillable options)	• Provide consumer-level insight into top single use or short-lived plastic packaging and food service ware targeted in scenario modeling • Identify practical adoption and opportunity barriers to inform scenario feasibility criteria

Engagement method	Core areas of inquiry (high-level questions)	Alignment with report objectives
Virtual focus groups	1. Where is there already access to refillable options in your community? Where is the opportunity for refillable access? 2. What barriers (cost, distance, etc.) exist to having more refillable options) 3. What efforts are already happening around reusable/refillable options in your communities? How do you feel about switching to reusable/refillable options? 4. From this list, which plastic are most common in your home or work? 5. Are there on this list where reusable/refillable options are readably available to you? Are you using those refillable/reusable options? 6. Which seem reasonable to switch? 7. Which items don't feel reasonable to switch right now? What would help you make the switch? 8. Here are some examples of actions that may support adoption of reusable/refillable options. What do you think of these? Would these actions resonate with your community? 9. Would these actions create items perceived challenges for your community? What ideas do we have to adapt to these and reduce those challenges?	• Provide consumer-level insight into single use or short-lived plastic packaging and food service ware targeted in scenario modeling • Identify practical adoption and opportunity barriers to inform scenario feasibility criteria • Collect cultural/language-specific feedback to ensure more equitable representation in the analysis (in-language focus groups)

Engagement method	Core areas of inquiry (high-level questions)	Alignment with report objectives
Virtual public workshops	1. What efforts are already happening around reusable/refillable options in your communities? 2. Where is there already access to refillable options in your community? Where is the opportunity for refillable access? 3. What barriers (cost, distance, etc.) exist to having more refillable options) 4. From this list, which plastic items do you use most often? 5. Which items from this list could you replace with reusable or refillable options? What would make that easier? 6. What makes it hard to switch to reusable and refillable options? 7. Where possible, share findings from what's been heard so far and validate – do these findings match your experience? What's missing from what we've heard so far? 8. Here are some examples of actions that may support adoption of reusable/refillable options. What do you think of these? Would these actions resonate with your community? 9. Would these actions create perceived challenges for your community? What ideas do we have to adapt to these and reduce those challenges?	• Provide consumer-level insight into single use or short-lived plastic packaging and food service ware targeted in scenario modeling • Identify practical adoption and opportunity barriers to inform scenario feasibility criteria • Validate early engagement themes in a virtual space open to all interested parties

Engagement method	Core areas of inquiry (high-level questions)	Alignment with report objectives
Online intake form	1. From this list, what plastic items do you use most often? 2. Have you tried reusable or refillable options? Which ones? 3. What would help you use less plastic? 4. What would make it harder? 5. What is happening in your community to support adoption of reusable/refillable options? 6. Where is there already access to refillable options in your community? Where is the opportunity for refillable access? 7. What barriers (cost, distance, etc.) exist to having more refillable options) 8. Here are some examples of actions that may support adoption of reusable/refillable options. What do you think of these? Would these actions resonate with your community? 9. Would these actions create perceived challenges for your community? What ideas do we have to adapt to these and reduce those challenges?	• Provide online format to anyone interested to provide consumer-level insight into single use or short-lived plastic packaging and food service ware targeted in scenario modeling • Identify practical adoption and opportunity barriers to inform scenario feasibility criteria

Multiple engagement strategies were designed, tools and materials were developed and translated into Spanish and Traditional Chinese, stipends were provided to CBO participants, and activities were implemented across five geographic regions in California.

Regional Definitions and Profiles

This study uses five regions: Bay Area, Coastal, Mountain, Southern, and Valley. These regions were adopted from CalRecycle's Waste Characterization Study Regions, which group counties by shared geography, land use, and economic characteristics. The county lists in this appendix mirror CalRecycle's regional definitions. The contractor developed a community profile for each region. Table 60 includes a regional overview outlining key characteristics, relevant engagement considerations, priority populations, and interested parties to ensure diverse representation reflective of each region's unique characteristics.

Table 60: Regional overview of engagement considerations and key characteristics

Region	Bay Area	Coastal	Mountain	Southern	Valley
Counties	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	Del Norte, Humboldt, Lake, Mendocino, Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz	Alpine, Amador, Calaveras, El Dorado, Inyo, Lassen, Mariposa, Modoc, Mono, Nevada, Plumas, Sierra	Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura	Butte, Colusa, Fresno, Glenn, Kern, Kings, Madera, Merced, Placer, Sacramento, San Joaquin, Shasta, Stanislaus, Sutter, Tehama, Tulare, Yolo, Yuba
CalEnviroScreen 4.0	Specific pockets of higher Cal EnviroScreen 4.0 scores in Alameda, Solano, Contra Costa, San Francisco, San Mateo, Santa Clara. Areas around the Bay.	Low CalEnviroScreen 4.0 score with small areas of higher scores of 81 in parts of Santa Cruz and Santa Barbara.	Low CalEnviroScreen 4.0 score.	High CalEnviroScreen 4.0 scores in urban areas around Los Angeles, San Diego, Imperial, Ventura, San Bernardino, Venture.	Region with highest CalEnviroScreen 4.0 score including areas in Fresno, Madera, Merced, San Joaquin, Sacramento, Stanislaus, Kern, Kings, Tulare

Region	Bay Area	Coastal	Mountain	Southern	Valley
Counties with SB 535 disadvantaged communities	Alameda, Contra Costa, San Francisco, Santa Clara, Solano, Sonoma	Monterey, Santa Barbara, Santa Cruz	None	Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura	Butte, Fresno, Glenn, Kern, Madera, Merced, Sacramento, San Joaquin, Stanislaus, Sutter, Tulare, Yolo, Yuba
Language needs	Spanish, Chinese, Vietnamese, Tagalog, Korean, Russian	Spanish	Spanish	Spanish, Russian, Korean, Chinese, Vietnamese, Tagalog	Spanish, Chinese, Hmong
Median income (statewide: $95,521)	$100,027 - $154,954	$59,444-$107,324	$87,998-$108,594 Data from El Dorado and Nevada Counties	$60,243-$110,042	$55,128 - $109,713
Percentage below poverty level (statewide: 12%)	7.3%–12%	8.7%-17%	6.3%-11.2% Data from El Dorado and Nevada Counties	9.10%-16.9%	6.4%-21.1%

Region	Bay Area	Coastal	Mountain	Southern	Valley
Rural/ urban/ suburban characteristic	Urban density in SF, Oakland, and San Jose. Suburban and rural areas in outer counties	Some urban density in Monterey, San Luis Obispo, Santa Barbara, and Santa Cruz. Lake, Del Norte, Humboldt, Mendocino, San Benito more split between rural/ suburban/ urban	Alpine, Mariposa, Modoc, Plumas, and Sierra are Rural. The other counties are a mix of suburban and rural	Urban density in LA	Urban density in Fresno, Kern, Sacramento, Stockton, and Modesto. Suburban in Placer, Sacramento outskirts, and Yolo. Mostly rural and agricultural in Colusa, Glenn, Kings, Madera, Sutter, Tehama, Tulare and Yuba. Mixed urban/n suburban/rural in Butte, Merced, San Joaquin, Stanislaus, and Shasta

Region	Bay Area	Coastal	Mountain	Southern	Valley
Local ordinances	San Francisco: Plastic, toxics and litter reduction ordinance Berkeley: Single use food ware rules – $2,500 zero waste grant for businesses Los Altos: Single use plastic food ware ordinance + plastic bag ordinance Alameda County: StopWaste model ordinance for food service packaging reduction and reuse Plastic straw/utensil ban in most Bay Area cities	Monterey: Ban on single use plastic bags Monterey: Environmentally acceptable food service ware Santa Cruz: Acceptable food service materials	City of Lake Tahoe and Truckee: Sale of single use bottles of water is banned South Lake Tahoe banned expanded polystyrene Mono County plastic water bottle ban	Limiting single use plastics in Los Angeles County Unincorporated Areas Imperial: Mandatory organic commercial recycling Many city level ordinances or statewide legislations apply	Sacramento: Single use-plastic bag ordinance Sacramento County: Single use carryout bag ordinance Davis: Disposable bag reduction program; environmentally acceptable food packaging ordinance Stockton: Single use plastic policy Modesto: local bans on single use plastics and expanded polystyrene as part of zero waste strategies

Region	Bay Area	Coastal	Mountain	Southern	Valley
Priority populations and engagement consideration	• Urban residents, environmental NGOs, and multicultural community organizations. • Immigrant communities, with emphasis on Cantonese, Spanish, and additional languages as needed	• Fishing cooperatives and tourism operators facing marine-plastic impacts • Tribal communities with cultural and subsistence ties to coastal waters • Beach-cleanup CBOs and environmental-justice groups in Monterey, Santa Cruz and Humboldt	• Forest and watershed protection groups concerned about litter runoff into waterways • Tribal lands in Sierra foothills experiencing microplastic contamination • Outdoor-recreation outfitters and conservation organizations	•Neighborhood CBOs in environmental-justice hotspots (East LA, Wilmington) • Immigrant-serving organizations in Los Angeles, San Diego and the Inland Empire • Retail and hospitality associations exploring local reuse/refill business models	• Farmworker families and agricultural associations coping with plastic mulch pollution • Rural environmental-justice CBOs in Fresno, Bakersfield and Stockton • Local health-advocacy groups studying microplastics in groundwater

*As designated in the Census (https://www.census.gov/topics/income-poverty/poverty/about.html)

Pop up Events

The contractor implemented in-person pop-up events at existing community gatherings such as farmers' markets, cultural festivals, and neighborhood resource fairs. These events used interactive engagement activities to gather information on single use plastic usage, opportunities and barriers to adopting reusable or refillable alternatives, and community perspectives on what changes would make these alternatives more accessible. The pop-ups also documented where residents currently have (or lack) access to sustainable options in their communities. One to two pop-up events took place in all regions, one of which was focused on engagement with Tribal communities.

Small Group Discussions

The contractor conducted small group discussions with CBO leaders in each of the five study regions. For CBOs who were unable to attend, one-on-one interviews were offered to ensure their perspectives were still captured. A dedicated small group discussion was held with members of the disability community to ensure accessibility and ADA-related concerns were explicitly captured. Participants discussed barriers related to physical access, usability of systems, and the need for product and program designs that are inclusive for individuals with diverse needs. One small group discussion was conducted statewide with Tribal community members. This session provided insight into how single use plastics intersect with cultural practices, environmental stewardship, and the unique challenges faced by Tribal communities, particularly around land and water protection.

The information gathered was qualitative and descriptive, focusing on how single use plastics show up in different community contexts and how organizations anticipate alternatives could be implemented. This data was consolidated into the broader engagement dataset, providing regionally specific inputs to feed into the findings of the study.

Focus Groups

As part of the community engagement track, the contractor convened focus groups with residents across the five study regions.

The discussion framework was structured to capture both practical considerations (affordability, access, safety, convenience) and broader equity dimensions (inclusion of low-income households, rural residents, immigrant and limited English proficient communities, and people with disabilities).

One focus group was held per region to ensure representation of urban, suburban, and rural perspectives. Two focus groups were conducted in Spanish (one with urban participants, one with rural/suburban participants), and one focus group was conducted in Cantonese and Mandarin with limited English proficient participants from across the state. These language-specific groups ensured that participants could express their views fully and comfortably, without language barriers limiting input.

The information gathered was qualitative and descriptive, focusing on participants' awareness of single use plastics, their familiarity with reuse and refill options, and the feasibility of alternatives for them. This data was consolidated into the broader engagement dataset, providing regionally specific inputs to feed into the findings of the study.

Interviews with Local Jurisdictions

The information gathered was qualitative and descriptive, focusing on how local governments are currently addressing single use plastics and how they anticipate alternatives could be implemented in their jurisdictions. This data was consolidated into the broader engagement dataset, providing regionally specific inputs.

Public Engagement Quantitative Findings Summary

Quantitative data was collected through interactive activities designed to complement the qualitative insights gathered through all engagement methods. Three primary tools generated quantitative data:

- **Engagement boards at pop up events**: Participants used colored dots and marbles to indicate how often they use plastic covered material, how easy or challenging they find specific reduction options, and what would make it easier to reduce their use of plastic covered material. Engagement boards were multilingual and visually designed to support participation across literacy levels and language backgrounds.
- **Live polls during community member focus groups**: Participants responded to the same use and ease questions in a virtual polling format, creating consistency across engagement methods and providing another mechanism to reach residents statewide.
- **CBO small group discussions:** While these sessions did not include all of the board activities, participants were asked the initial question on plastic use, adding targeted perspectives from community-based leaders representing priority populations.

Qualitative public engagement findings in this report are thematic in nature.

Engagement Design and Implementation

Mapping and Identification of Participants

The process began with development of a detailed public engagement plan complete with a timeline and mapping of the five regions. This mapping combined CalEnviroScreen 4.0 data, SB 535 (De Leon, 2012) Disadvantaged Communities designations, census data on limited English proficiency households, and InterEthnica's proprietary database of CBO partners. The resulting master list identified:

- Urban, suburban, and rural perspectives

- Populations experiencing disproportionate environmental burdens
- Representation across the top spoken languages: Spanish, and Cantonese and Mandarin
- Inclusion of Tribal communities, including Tribal members living in urban areas.
- Colleges
- Other interested parties

The plan aligned engagement and research activities, events, locations, and potential participants for each of the five geographic regions, and detailed which groups or populations would be engaged, which engagement method would be used, and what specific outputs were expected.

Regional Roll-out

Engagement activities were conducted in all five regions. This required a coordinated roll-out plan, staffing across multiple teams, and a shared data-tracking system. Regional tailoring was applied. In the Valley region, for example, outreach prioritized farmworker families including Latino and Hmong refugee communities. In the Coastal region, outreach took place in the small rural college town of Arcata on the northern coast and the more densely populated city of San Luis Obispo. In Southern California, activities concentrated on immigrant-serving organizations and neighborhood events held in East Los Angeles and a community in southern San Diego. In the Mountain region, outreach targeted dispersed rural communities. In the Bay Area, outreach prioritized urban immigrant communities, Environmental Justice (EJ) communities and CBOs in Oakland, San Francisco, and San Jose.

Engagement Methods

The project deployed multiple methods to reach both organizational representatives and members of the public directly.

- Small group discussions with CBOs: Five regional virtual sessions, with six to 10 organizations per region. When CBO representatives could not attend, one-on-one interviews ensured their voices were still captured.
- Virtual focus groups with residents: Ten focus groups, including two in Spanish, one in Cantonese & Mandarin, one Tribal-community group, and five regional groups in English. Each session included up to ten participants.
- Tribal representatives: Statewide members, representatives, elders, and leaders of California's Tribal communities engaged at the Native American Day event in Sacramento, plus up to 10 members of Tribes in an online small group discussion or one-on-one interview.

- College students: College students engaged at pop-up events and through college organizations focused on environmental topics, participating in focus groups or one-on-one interviews.
- Spanish-language focus groups: Two focus groups with monolingual Spanish-speaking residents recruited from across the state.
- Statewide focus group in Cantonese and Mandarin: One statewide focus group conducted in Cantonese and Mandarin.
- Disability community small group discussion: One statewide focus group with people experiencing a variety of disabilities, addressing barriers and opportunities such as accessibility of refill (dispensing to replace packaging) stations.
- In-person pop-up events: The contractor designed large trilingual interactive boards that allowed people to give their feedback using a dot activity, vote using marbles, and sharing their proximity to refill (dispensing to replace packaging) stations. Nine events at community gathering places such as farmers' markets and neighborhood events, including Fruitvale Farmers' Market (Oakland), BaySpark (San Francisco), Arcata Farmers' Market (Humboldt), California Native American Day (Sacramento), and Echo Park Farmers' Market (East LA).
- Statewide workshops: Two virtual workshops for participants to review emerging findings and validate results.
- Online intake form: Online tool collecting feedback on plastic use, awareness of reuse and refill options, and barriers to adoption.
- Jurisdiction interviews: One-on-one interviews with local government staff on programs, ordinances, challenges, and community perspectives.
- Interested parties: Online intake form and statewide workshops open to interested individuals and organizations.

Each engagement method followed a consistent line of inquiry:

- Covered materials most-used locally
- Existing alternatives or reuse/refill options
- Barriers preventing adoption of reuse and refill systems
- Opportunities or solutions to support adoption
- Local examples of success
- Other ideas and input

Compensation and Accessibility

Recognizing that meaningful participation requires addressing barriers, the project implemented a structured stipend and accessibility plan.

- Stipends: $150 for a 1–1.5 hour session, provided to more than 60 CBO, Tribal representatives, and disability advocates statewide.
- Language access: Materials translated into Spanish and Traditional Chinese; simultaneous interpretation in focus groups and workshops.
- Accessibility: Daytime, evening, and weekend sessions; plain-language materials with culturally resonant visuals.
- Trust-building: Partnerships with trusted CBOs to convene networks and encourage safe participation.

Evaluation and Documentation

All engagement activities were documented through attendance logs, engagement boards, counters, marbles, and facilitator notes. Data was anonymized and stored in compliance with General Data Protection Regulation (GDPR) and California Consumer Privacy Act (CCPA) standards, with personally identifiable information deleted six months after project completion. Evaluation metrics tracked:

- Number of participants per activity
- Geographic distribution across regions
- Representation of language groups and priority populations

This methodology represents a significant investment in equitable engagement. The approach combined statewide coverage, region-specific tailoring, multiple engagement formats, financial compensation, and continuous integration with technical tasks. As a result, the findings reflect not only the perspectives of industry and experts but also the lived realities of priority and EJ communities, CBOs, Tribes, college students, people experiencing disabilities, and local jurisdictions across California.

Public Engagement Numbers and Reach

The public engagement process achieved statewide reach and depth, meeting the study’s goals for inclusivity, representation, and meaningful participation. These engagement activities ensured representation across California’s five regions and among urban, suburban, rural, and EJ communities. The contractor designed each method to provide actionable data, enabling the connection of lived experiences and local realities with the technical analyses of reuse, refill, and other source reduction strategies.

Across all methods, the contractor engaged 1,015 people through focus groups, small group discussions, interviews, pop up events, and public workshops (see Table 61). The contractor designed each activity to reach diverse audiences and facilitate in-depth interactions and data collection, ensuring that the voices of Californians directly informed the understanding of opportunities and barriers related to reuse, refill, and source reduction.

The breadth of engagement reflects strong participation across California's five study regions and demonstrates the contractor's success in reaching urban, rural, and suburban communities. The contractor intentionally designed activities to be accessible, multilingual, and culturally responsive, engaging participants in the settings where they live, work, and shop or inviting them to be focused discussions. Engagement activities were conducted in English, Spanish, Cantonese, Mandarin, Vietnamese, and Russian, ensuring that limited English proficient residents could contribute alongside English-speaking participants.

Together, the activities ensured that engagement was not only broad in reach but deep in quality. Interactions were two-way exchanges (combining education with listening) and supported the study's objectives to identify barriers, opportunities, and community-driven solutions for achieving source reduction goals under the Act.

Table 61: Engagement methods and number of participants

Engagement method	Participants engaged
Community member focus groups	71
Small Group Discussions/Interviews (including Tribal and Disability groups)	73
Pop up Events	769
Public Workshops	81
Jurisdiction Interviewed	21 (representing 10 Jurisdictions)
Total	1,015

Community Member Focus Groups

A total of 71 participants took part in focus groups across all five regions of California, reflecting a strong balance of urban, suburban, and rural representation (see Table 62). The participant pool captured a wide range of ages, income levels, languages, and community types, with two-thirds from EJ communities, demonstrating the success of this outreach effort in engaging and uplifting diverse voices statewide. The following table describes some of the demographic reach based on self-reported information from participants.

Table 62: Focus group participant demographics

Demographic type	Demographic criteria	Number of participants
Regions	Bay Area	19
	Coastal	10
	Mountain	8
	Southern	20
	Valley	14
Housing type	Single family	38
	Multifamily	32
	Unhoused/unstable	1
Income range	Under $50,000	24
	$50,001 – $76,000	24
	$76,001 – $115,000	8
Income range	$115,001 – $150,000	6
	Over $150,000	6
Race/ethnicity	Latino/a/x or Hispanic	36
	Asian or Pacific Islander	17
	White	12
	Black/African American	7
Age range	18 – 24	11
	25 – 34	30
	35 – 50	17
	51 – 64	11
	65 or older	2
Community type	Rural	23
	Suburban	22
	Urban	26
Gender identity	Female	48
	Male	21
	Nonbinary/gender nonconforming	2
EJ community	Lives in EJ community	46
Participants with disabilities		2

Small Group Discussions and Interviews with Community-based Organizations and Colleges

CBOs and college outreach successfully engaged a broad range of organizations and institutions that reflect California's geographic, cultural, and socioeconomic diversity. In total, 83 organizations or colleges received invites to a small group discussion or interview, with 50 attending a small group discussion or interview (see Table 63). These organizations spanned the five study regions and included EJ advocates, immigrant and refugee service providers, tribal representatives, youth and education groups, agricultural and farmworker organizations, and social service providers.

Across regions, participation levels were strong, with multiple CBOs engaged in each area: Bay Area region (12 organizations), Coastal region (10 organizations), Mountain region (10 organizations), Southern region (11 organizations), and Valley region (9 organizations). Together, these organizations provided trusted access to priority populations, including low-income residents, limited English proficient households, communities of color, rural and agricultural workers, and residents of EJ communities. The reach supports grounding the study's findings in real community experience, capturing both regional nuances and shared priorities that will inform the assessment of reuse, refill, and source reduction strategies statewide.

Table 63: CBO and college participants and invitees

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Bay Area	Students for a Sustainable Stanford	Students	X	
Bay Area	Reuse Alliance	Low-income communities Limited English proficient communities Farmworkers	X	
Bay Area	Multicultural Center of Marin	Youth Latino/a/x or Hispanic Immigrant Vietnamese	X	
Bay Are	Sustainable Contra Costa	EJ Youth	X	
Bay Area	Asian Pacific Environmental Network (APEN)	AAPI Low-income Urban	X	
Bay Area	Rose Foundation (New Voices Are Rising	Youth BIPOC	X	

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Bay Area	Rise South City	Frontline communities Latino/a/x or Hispanic EJ	X	
Bay Area	CARAS (Community Agency for Resources, Advocacy, and Services)	Latino/a/x or Hispanic EJ	X	
Bay Area	Breathe California	EJ	X	
Bay Area	HayCoCoa (Hayward Community Coalition)	Communities of color EJ	X	
Bay Area	Family Connections	Spanish Vietnamese Chinese	X	
Bay Area	Citizen Air Monitoring Network	EJ	X	
Bay Area	UC Berkeley Zero Waste Coalition	Students		X
Bay Area	Story of Stuff	N/A		X
Bay Area	Sustainable Solano	Youth EJ		X
Bay Area	Alameda Point Collective	Unhoused Low-income		X
Bay Area	Climate Resilient Communities	Samoan and Tongan EJ		

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Bay Area	Community Youth Center (CYC)	Youth Chinese EJ		
Bay Area	Sonoma Central Valley Collaborative	Latino/a/x or Hispanic		
Bay Area	Literacy for EJ	EJ		
Bay Area	La Raza	Immigrants Latino/a/x or Hispanic		
Bay Area	El Concilio	Latino/a/x or Hispanic Low-income		
Bay Area	Booker T Washington Center	Black/African American		
Bay Area	Unitedly	Asian		
Bay Area	UC Santa Cruz Zero Waste	Students		
Coastal	Mendocino Food & Nutrition Program	Low-income communities Limited English proficient communities Seniors Unhoused	X	
Coastal	Surfrider	Coastal	X	
Coastal	Lake Family Resource Center	Youth Low-income Rural Seniors	X	

Region	**Organization**	**Communities Represented**	**Participated**	**Invited (did not participate)**
Coastal	Barrios Unidos	Low-income Communities of Color Youth	X	
Coastal	Mujeres En Acción	Latino/a/x or Hispanic Women Communities of color Farmworkers Triba	X	
Coastal	The Village Project	BIPOC LGBTQ+ Youth Low-income Communities of color People with disabilities Black/African American	X	
Coastal	Communities for Sustainable Monterey County	EJ	X	
Coastal	Friends of the Lost Coast	Coastal	X	
Coastal	CSU Cal Poly San Luis Obispo Zero Waste Ambassador	Students		
Coastal	Arcata House Partnership	Low-income Rural People with disabilities Unhoused		X

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Coastal	Community Bridges	Low-income Limited English proficient Seniors		X
Coastal	Mixteco Indigena Community Organizing Project (MICOP)	Indigenous Migrant communities		X
Coastal	Community Action Partnership of San Luis Obispo	Low-income Youth Families Seniors Veterans Limited-English proficient		X
Coastal	Bright & Green Humboldt	Rural Agricultural	X	
Coastal	Leader4Earth	EJ	X	
Mountain	Inyo Mono Advocates for Community Action (IMACA)	Rural	X	
Mountain	Growing Modoc	Rural	X	
Mountain	LassenWORKS	Rural Low-income Families	X	
Mountain	Modoc Resource Conservation District	Rural Agricultural	X	
Mountain	Mono Lake Committee	Rural EJ	X	

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Mountain	Sierra Business Council	Rural Small businesses CBOs	X	
Mountain	Sierra Climate Adaptation and Mitigation Partnership and Sierra Business Council	Rural Small businesses CBOs	X	
Mountain	Lassen - Plumas - Sierra Community Action Agency	Rural Low-income Families		X
Mountain	United Way of Northern California	Low-income Unhoused Rural		X
Mountain	Tiny Mighty Strong	Rural		X
Mountain	Friends of Plumas Wilderness	Rural EJ		X
Mountain	Sierra Nevada Alliance	Rural/suburban EJ	X	
Mountain	Friends of the Inyo	Rural EJ		X
Southern	San Diego Miramar Community College Sustainability Club	Students	X	

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Southern	Environmental Health Coalition	EJ	X	
Southern	The 5 Gyres Institute	EJ	X	
Southern	Orange County Environmental Justice (OCEJ)	EJ	X	
Southern	Central City Neighborhood Partners	Low-income Youth EJ Families	X	
Southern	San Diego Mesa College	Students	X	
Southern	The Energy Coalition	EJ	X	
Southern	Heal the Bay	EJ Coastal		X
Southern	Multi-Ethnic Collaborative of Community Agencies (MECCA)	EJ Working class Communities of color Multicultural		X
Southern	El Concilio Family Services	Latino/a/x or Hispanic Low-income EJ		X
Southern	San Diego Coastkeeper	EJ		X
Southern	Comite Civico del Valle, Inc.	Latino/a/x or Hispanic EJ	X	

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Southern	Center for Community Action and Environmental Justice	EJ Working class Communities of color	X	
Southern	Chancelor's Associate Scholarship Program (CASP)	Students	X	
Southern	Imperial Central Valley Food Bank	Low-income EJ		X
Southern	Food Access LA	Low-income Youth EJ Families	X	
Valley	Atrium 916	N/A	X	
Valley	African American Network of Kern County	Black/African American Low-income Essential workers Communities of color EJ	X	
Valley	Stone Soup Fresno	Hmong/Laotian Arabic-speaking Refugee EJ Low-income Essential workers	X	
Valley	Camptonville Community Partnership	Rural Low-income Youth	X	

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Valley	Central Valley Improvement Projects	Low-income Working class Communities of color Immigrants Spanish-speakers LGBTQ Religious minorities Indigenous Youth Elders People with disabilities Houseless community EJ	X	
Valley	Merced Lao Family Community	Lao EJ	X	
Valley	Public Health Advocates	Youth Low-income Communities of color	X	
Valley	Modesto Junior College Climate & Sustainability Task Force	Students	X	

Region	Organization	Communities Represented	Participated	Invited (did not participate)
Valley	California Farmworker Foundation	Hmong Youth EJ Low-income Communities of color Undocumented Farmworkers Spanish-speakers		X
Valley	Little Manila Rising	Filipino Low-income Communities of color EJ		X
Valley	California Urban Partnership	Tribal communities and sovereign nations Black/African American communities Small businesses EJ		X
Valley	Hands of Hope: Resources for Homeless Families	Low-income People with disabilities Unhoused		X
Valley	Californians Against Waste	EJ Rural Low-income		X
Valley	Hmong Cultural Center of Butte County	Hmong	X	

Pop Up Events

The contractor hosted nine in person pop ups in community-anchored spaces chosen for accessibility, diversity, and existing community draw. In the Bay Area, the contractor met people where they already gather at the Fruitvale Farmers Market and BART station (Oakland) and BaySpark (San Francisco Bay Area EJ event); in the Coastal region at the San Luis Obispo Farmers Market (San Luis Obispo) and Arcata Farmers Market (Arcata); in the Mountain region at the El Dorado Hills Farmers Market (El Dorado Hills); in Southern region at the Chula Vista Farmers Market (Chula Vista) and Echo Park Farmers Market (Los Angeles); and in the Valley region at California Native American Day (Sacramento); and the Stone Soup Fresno Open House/Fall Harvest (Fresno). These venues connected us with immigrant, bilingual, Indigenous, farmworker, refugee, urban, suburban, and rural communities.

Collectively, as summarized on Table 64, the pop ups engaged 769 people with on-site conversations supported in English, Spanish, Cantonese, Mandarin, Vietnamese, and Russian, demonstrating effective, multilingual access in familiar, trusted settings where communities already convene.

Table 64: Pop up events by region

Region	Pop up event	# of people engaged	Languages spoken
Bay Area	Fruitvale Farmers Market	65	English, Spanish, Mandarin
	BaySpark	102	English, Spanish, Cantonese, Mandarin, Vietnamese
Coastal	San Luis Obispo Farmers Market	50	English, Spanish, Russian
	Arcata Farmers Market	90	English
Mountain	El Dorado Hills Farmers Market	32	English
Southern	Chula Vista Farmers Market	152	English, Spanish
	Echo Park Farmers Market	78	English, Spanish
Valley	Native American Day	92	English, Spanish
	Stone Soup Fresno Open House/Fall Harvest	108	English, Spanish, Mandarin

Small Group Discussion with Tribal Community Members

The contractor held a dedicated small group discussion with 16 participants, who self-reported affiliation with the following Tribal Nations and Indigenous lineages: Wok Tribe; Wiyot; Round Central Valley Indian Tribes/Lakota; Northern California Aztec Village; Nashville El Dorado Miwok; Mexica/Aztec; Mayo; Caxcán and Hñañu (Otomí); California Central Valley Miwok Tribe; Apache, Mayo; Towa descendant (New Mexico); Yurok; Coyote Central Valley Band of Pomo Indians. Their input surfaced culturally grounded stewardship practices, concerns about plastic impacts on land and waterways, and barriers to affordable, durable reusables in Tribal communities.

In addition, a project pop up at Native American Day in the Central Valley region engaged Tribal community members from across California. The statewide gathering included representatives from approximately 120 Tribes and members of the public, offering broad opportunities to connect, listen, and invite continued participation in the next phase of engagement.

Small Group Discussion with Disability Community

A total of seven participants representing California's disability community participated through a small group discussion and individual interviews. Participants included people experiencing a diverse range of disabilities, who work as staff from Centers for Independent Living, are members of resource and support groups for people with disabilities, advocates, caregivers, and community members who contributed both lived and professional perspectives. These discussions ensured that the perspectives of people with disabilities will be included in the statewide dialogue and will inform planning efforts to ensure equitable access to reuse and refill systems that are designed to effectively support the development of inclusive, accessible, and safe single use plastic packaging source reduction strategies moving forward.

Public Workshops

Two statewide interactive public workshops (one at lunch and one in the evening) were held to share preliminary results, confirm accuracy, and close the loop with participants. 81 people attended and workshop participants represented all five regions. Most attendees had already engaged earlier (focus groups, pop ups, or small group discussions), making the workshops an efficient forum to review what we heard and close the loop on the study's public engagement efforts.

Participants could ask questions, provide comments, and participate in optional discussion space. These workshops gave participants the opportunity to share personal stories and hear community concerns, perspectives, opinions, and effective approaches happening across the state.

Jurisdictions Engaged

The contractor invited two local jurisdictions per region for staff interviews so governmental perspectives could be represented alongside community input. Interviews often included multiple staff from a single jurisdiction. These jurisdiction interviews support the study but are tracked separately from public engagement totals reported in this section; they are not included in the public counts.

During the study period, the contractor has engaged jurisdictions in the following counties:

- Alameda County
- Humboldt County
- Nevada County
- San Francisco County
- Santa Barbara County
- Ventura County
- Yolo County

Bibliography

[1] California Department of Public Health, *California Retail Food Code*, accessed October 2025, https://www.cdph.ca.gov/Programs/CEH/DFDCS/Pages/FDBHSCodes.aspx

[2] *California State Legislature, Assembly Bill 619: Food Service Ware: Reusable Containers*,, Sacramento, 2019, accessed November 2025, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB619.

[3] U.S. Department of Agriculture, *Rural-Urban Commuting Area Codes,* 2025, accessed November 2025, https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.

[4] Institute of Medicine and National Research Council, *The Public Health Effects of Food Deserts: Workshop Summary*, Washington, DC: The National Academies Press, 2009, accessed November 2024, https://doi.org/10.17226/12623.

[5] Donald, J. Rose, Nicholas Bodor, Chris M. Swalm, Janet C. Rice, Thomas A. Farley, and Paul L. Hutchinson, "Deserts in New Orleans? Illustrations of Urban Food Access and Implications for Policy," *University of Michigan National Poverty Center / USDA Economic Research Service Research, 2009,* accessed November 2025, 2009., https://api.semanticscholar.org/CorpusID:15277497.

[6] CalRecycle, *Convenience Zone Status,* 2025, accessed November 2025, https://www2.calrecycle.ca.gov/BevContainer/ConvenienceZones.

[7] U.S. Census Bureau, *Households – Total – Less than $10,000 in 2023*, 2023, accessed November 2025, https://data.census.gov/chart/ACSST1Y2023.S1901?q=United+States+Income+and+Poverty.

[8] U.S. Census Bureau, *TIGER/Line® Shapefiles Technical Documentation, 2024, accessed November 2025,* https://www2.census.gov/geo/pdfs/maps-data/data/tiger/tgrshp2024/TGRSHP2024_TechDoc.pdf.

[9] California Energy Commission, *Low-Income or Disadvantaged Communities Designated by California*, California State Geoportal, 2025, accessed November 2025 https://reusables.org/reusable-packaging/cost-savings/.

[10] ReThink Disposable Case Studies, Clean Water Action, accessed November 2025, https://cleanwater.org/author/rethink-disposable-case-studies.

[11] Amcor, *400 ml PP reusable cold cup,* accessed November 2025, https://packagingsolutions.amcor.com/en/product/product-item/400ml-pp-reusables-cold-cups-13941489.

[12] EcoProducts, *9 inch reusable clamshell, Product Specifications*, accessed November 2025, https://ecoproducts.com/9in-clamshell-reusable/.

[13] Returnr, *Product Catalog, 16 oz stainless steel cup*, accessed November 2025, https://returnr.org/products/returnr_16oz_cup_lid_set_stainless_steel?variant=46785227358374.

[14] Returnr, *Product Catalog, 500 ml stainless steel tray*, accessed November 2025, https://returnr.org/products/returnr_tray_lid_set_500ml_stainless_steel_215_145?variant=43175798276262.