

**THE STATE OF
RECYCLING
& COMPOSTING
IN COLORADO**

**REDUCING WASTE AND BUILDING
A CIRCULAR ECONOMY**

2023

7th edition

CoPIRG

eco·cycle®



2023 STATE OF RECYCLING & COMPOSTING IN COLORADO

Reducing waste and building a circular economy

7th Annual

VIEW THE REPORT ONLINE AT
[ECOCYCLE.ORG/SORC-REPORT](https://ecocycle.org/sorc-report)

Authors

Rachel Setzke and Ryan J. Call, Eco-Cycle

Eco-Cycle is a Zero Waste pioneer and one of the nation's oldest and largest nonprofit recyclers. Eco-Cycle innovates, implements, and advocates for local and global Zero Waste solutions to foster a more regenerative, equitable, and climate-resilient future. For more information, visit ecocycle.org.

Danny Katz, CoPIRG Foundation

CoPIRG Foundation is a nonprofit, nonpartisan group. Through research, public education, and outreach, we serve as counterweights to the influence of powerful special interests that threaten our health, safety, or well-being. For more information, visit copirgfoundation.org.

Table of Contents

Executive Summary	iv
Introduction	1
Reduce & Redesign	6
Reducing Starts with Redesigning the Production System	7
Highest Priority for Reducing: Eliminating the Most Harmful and Problematic Plastics	7
Progress: Colorado Reduces Waste Through the Plastic Pollution Reduction Act	8
Colorado models working to reduce plastic pollution	11
Progress: New water regulations enable reduction of plastic water bottle waste	12
Colorado models in reducing single-use water bottles	12
RECOMMENDED ACTIONS for Communities to Reduce Plastic Waste	12
Food Waste Reduction is a Key Climate Solution	13
Colorado models in reducing food waste and addressing food access disparity	14
RECOMMENDED ACTIONS for Communities and the State to Reduce Food Waste	14
Reuse & Repair	15
Implementing Reuse Systems in Schools	16
Colorado models educating the next generation in the three Rs of Zero Waste	17
Reuse Reduces Waste and Saves Businesses Money	17
Colorado models in replacing restaurant disposables with reusables	19
Colorado models replacing single-use disposables with reusables at music venues and events	20
Reuse in Hotels Saves Money and Reduces Plastic	20
Colorado model in switching hotel disposables to reusables	20
Colorado models for promoting reuse and repair communitywide	21
RECOMMENDED ACTIONS for Communities and the	

State to Reduce Plastic and to Support Transitions to Reuse and Refill	22
Right to Repair and Planned Obsolescence	23
RECOMMENDED ACTIONS for Communities and the State to Promote Right to Repair and End Planned Obsolescence	24
Recycling & Composting	25
Implementation of Producer Responsibility is On Track to Deliver Recycling to all Coloradans	26
Colorado models for expanding and improving recycling	28
Circular Economy Development Center Poised to Propel Manufacturing Using Recycled Materials	29
RECOMMENDED ACTIONS: for Communities and the State to Improve and Expand Recycling Access and Capacity	29
Colorado models for leveraging state & federal funds to expand programs	30
Colorado Composting 2023: Major Wins and a Course Correction	31
Compost Permitting Regulation Updates	32
Two Compost Bills to Expand Composting and Reduce Contamination	33
Colorado models in organics diversion and compost production	34
RECOMMENDED ACTIONS for Communities and the State to Expand Compost Access, Capacity & Use	35
Environmental Justice and the Three Rs	36
RECOMMENDED ACTIONS for Communities & the State to Center Environmental Justice in three R Efforts	38
Conclusion	39
References	40
Endnotes	41

STATE OF RECYCLING & COMPOSTING IN COLORADO

Executive Summary

For the past six consecutive years, Eco-Cycle and CoPIRG have published this report highlighting Colorado’s stagnant and low recycling and composting rate, which has remained at around 16%, half of the national average.ⁱ Despite the rate remaining unchanged in this seventh year of the report, there is notable progress. **New state and local policies and programs are underway, creating the potential to significantly boost recycling and composting rates and broaden recycling access throughout the state.**



Recycling is not enough. This year’s report is expanded to include Colorado efforts to reduce and reuse.

In addition to significant advancements in recycling, Colorado has bolstered its commitment to surpass the limits of recycling by actively implementing reduce and reuse strategies. These initiatives aim to prevent the need for natural resource extraction in the first place, thereby mitigating the negative environmental and social impacts associated with it. From natural resource extraction to disposal, the entire linear life cycle of the products we consume creates pollution and climate-warming greenhouse gas (GHG) emissions called “[consumption-based emissions](#).” Astonishingly, these emissions account for 42% of the US GHG footprint.ⁱⁱ Recycling alone is not enough to address these emissions.

To truly make a difference, it’s essential to engage all three Rs of the Zero Waste hierarchy: Reduce, Reuse, Recycle (and compost, the recycling of organic matter). This approach is crucial to bending our linear, polluting production system into a [circular economy](#). A circular economy, which focuses on reducing pollution, redesigning products to be less resource-intensive and toxic, and capturing “waste” for reintroduction into the economy as feedstocks for new products, offers a comprehensive solution. This circularity maintains the highest value of materials and products for as long as possible, which is not just better for our environment, it’s better for us as consumers as well.

In a departure from the previous six editions, this year Eco-Cycle and CoPIRG will not report on local recycling and composting rates because the statewide Needs Assessment for the Producer

ⁱ Colorado Department of Public Health and Environment (CDPHE). “2021 Colorado Recycling Rate.” <https://cdphe.colorado.gov/hm/colorado-recycling-totals>. Accessed 11/6/23

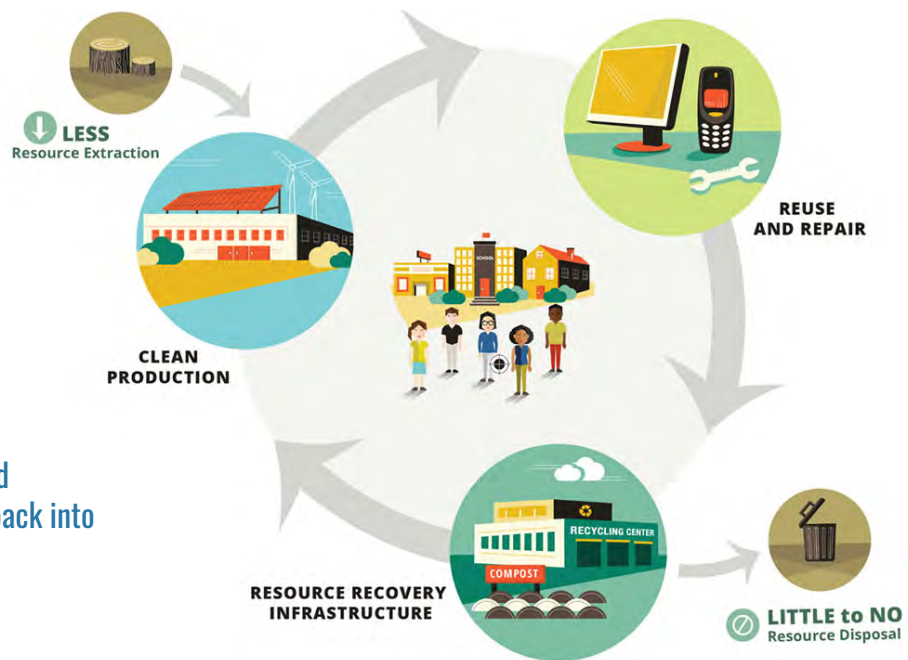
ⁱⁱ EPA. “Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM).” (2020) https://www.epa.gov/sites/default/files/2020-12/documents/warm_background_v15_10-29-2020.pdf. Accessed 10/16/23.

Responsibility for Recycling program is capturing that data as of the writing of this report. This report looks at more than our “recycling and compost” rates, or the percentage of waste diverted from the landfill. While that is a critical metric, it is only one piece of a truly circular economy that engages all Zero Waste strategies and opportunities. To go beyond just diversion, we shifted the questions we typically asked our municipal contacts to include reduce and reuse practices. Accordingly, the subtitle “Reducing waste and building a circular economy” has been added to the title of the report, and it highlights programs and policies some jurisdictions and businesses in the state have enacted to actively incorporate the first two Rs—reduce and reuse—into their work, in addition to recycling and composting. The report elaborates on these initiatives, demonstrating how they contribute to Colorado’s progress in building a circular economy and positioning the state as a leader in waste reduction.

This report is intended to serve as a tool to support Colorado’s future circular economy.

One of the major challenges hindering waste reduction and diversion projects in Colorado is the limited resources available to support programming and infrastructure. Our goal with this report is to assist Colorado communities in maximizing the services and programs in development, thanks to new state policies focused on the three Rs—reduction, reuse, and recycling/composting. Individual Colorado communities have done some innovative Zero Waste work and we aim to spotlight their successes as inspiration and guidance for others as we collectively pursue the frontier of circularity. Looking ahead, we hope to demonstrate in future releases that Colorado continues to make significant strides toward becoming a leader in the three Rs and fostering a circular economy.

A circular economy reduces the need for resource extraction and reintroduces “waste” back into the economy.



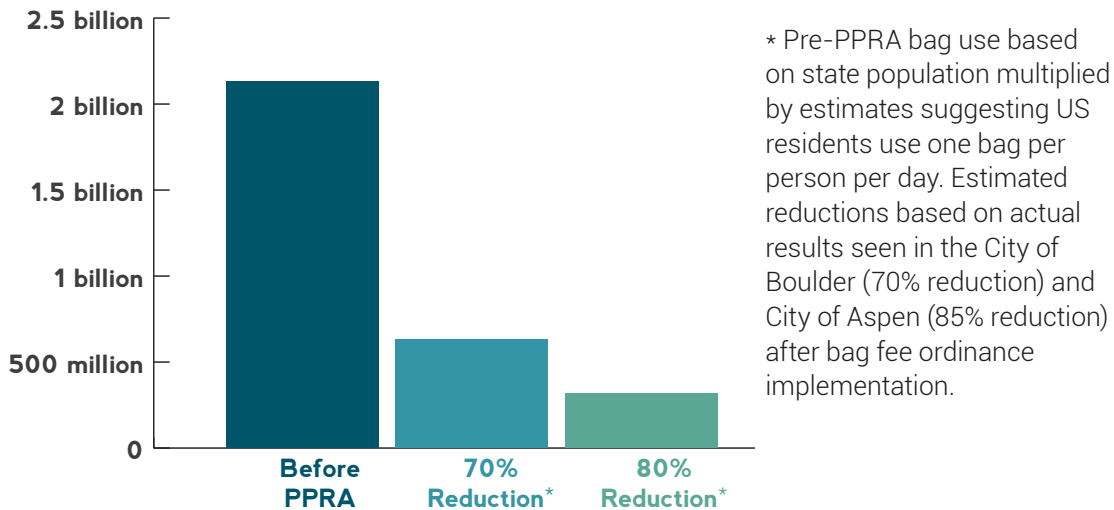
Key findings for each of the three Rs: Reduce, Reuse, Recycle (and Compost)

Please see the full report for models being pioneered by Colorado businesses and communities, as well as recommended actions related to each of the sections.

REDUCE & REDESIGN

Implementation of the **Plastic Pollution Reduction Act (HB21-1162)** is **dramatically reducing problematic plastic**. The law's first phase implemented a statewide fee on single-use checkout bags that is estimated to reduce between 1.5 and 1.8 billion single-use checkout bags in Colorado each year.ⁱⁱⁱ Phase two, starting January 2024, will ban polystyrene take-out food containers and single-use plastic checkout bags altogether. In July 2024, phase three will lift the state preemption on local jurisdictions from banning plastics, creating opportunity for municipalities to take action to reduce plastics even further.

FIGURE 2: ESTIMATED REDUCTION IN SINGLE USE CHECK-OUT BAGS IN COLORADO



ⁱⁱⁱ Eco-Cycle calculation based on state population (5,839,926 in 2022) US Census Bureau. "Quick Facts: Colorado." <https://www.census.gov/quickfacts/fact/table/CO/PST045222>. Accessed 10/23/23.

National Geographic. "Fast Facts About Plastic Pollution." (2018) <https://www.nationalgeographic.com/science/article/plastics-facts-infographics-ocean-pollution>. City of Aspen. "Single-Use Bag Study." (2017) <http://www.aspen.gov/DocumentCenter/View/687/City-of-Aspen-Single-Use-Bag-Study-PDF?bidId=>.

City of Boulder. "Disposable Bag Fee." <https://bouldercolorado.gov/services/disposable-bag-fee>. Accessed 10/23/23.

- **Colorado lags behind on state-level policies to reduce wasted food and address food access disparity.** Some progress is being made through programs in communities like Denver and the Boulder Valley School District, but there is much more work needed. Ordinances like the organic landfill ban Aspen is implementing, and additional laws encouraging food donation, are good models for other local jurisdictions and the state to reduce the production of food waste and address food access disparity in Colorado.

REUSE & REPAIR

- **Reuse in school cafeterias presents an enormous opportunity to reduce waste and save money through the tens of millions of meals served every year in Colorado schools.**^{iv} Reusable trays and utensils reduce waste, are healthier for students as they keep food off toxic foam trays, and they save schools money. Switching to bulk milk dispensers with refillable cups, instead of cartons, reduces carton waste and costs to schools by reducing roughly two gallons of wasted milk per student per year.^v
- **Colorado food venues and municipalities are reducing significant costs, water use, and greenhouse gasses (GHG) by switching to reuse and refill.** In the past year, just two of the emerging reusable food serviceware businesses operating in Colorado, [r.World](#) and [DeliverZero](#), have avoided more than 13,000 pounds of waste to landfills, saved over 325,000 gallons of water, and avoided over 46,000 kgCO₂e of GHG emissions (the equivalent of over 5,000 gallons of gasoline).^{vi} Supporting in-house reuse and expansion of reuse service businesses through subsidies, pilot programs, community education, and policies promise tremendous cost and climate impact savings in years to come.
- Switching from mini personal-care bottles (shampoo, lotion, etc.) to **refill dispensers in the hotel industry can lower costs and dramatically reduce plastic waste:** for example, family-owned Breckenridge Grand Vacations estimates cost savings of 40% and reduction of over half a million mini-bottles per year.^{vii}
- **Adopting “Right to Repair” and “Ending Planned Obsolescence” principles and policies are key to lengthening the lives of existing products and avoiding the need to make new products.** Colorado is a leader with two national-model Right to Repair bills, which ensure Coloradans have access to the tools and information they need to repair electric-powered wheelchairs ([HB22-1031](#)) and agricultural equipment ([HB23-1011](#)). Colorado needs the same Right to Repair policy for consumer electronics.

iv Colorado Children’s Campaign. “Time to Eat: An Emerging Consideration for School Lunch Delivery and the Nutrition of Colorado’s Students.” <https://files.eric.ed.gov/fulltext/ED607085.pdf>. Accessed 10/23/23.

v Eco-Cycle calculation based on WWF. “Abandoning the carton: how bulk milk dispensers can help schools reduce waste.” (2022) <https://www.worldwildlife.org/stories/abandoning-the-carton-how-bulk-milk-dispensers-can-help-schools-reduce-waste>.

vi Email communication with DeliverZero on 10/16/23. Email communication with r.World on 10/25/23. EPA. “EPA Greenhouse Gas Equivalencies Calculator” <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results>. Accessed 10/27/23. Some units needed to be clarified with respective companies and converted to other units so they could be directly compared to each other.

vii Email conversation with Emily Kimmel, Breckenridge Grand Vacations. 10/25/23.



RECYCLING & COMPOSTING

- **Recycling rates in Colorado are low and stagnant, yet we are poised to become a national leader with Colorado’s groundbreaking Producer Responsibility Law ([HB22-1355](#)).** Once fully implemented, ALL Coloradans will have convenient recycling access and a much higher percentage of the state’s recyclable materials will be captured and returned to the supply chain, instead of landfilled. All stakeholders need to engage now in the law’s implementation process to ensure that the new system builds on existing successful recycling programs, and provides robust education and convenient, equitable access to recycling. Producer Responsibility should also incentivize the reduction of unnecessary packaging and the use of greener, more recyclable materials through a truly circular economy.
- Building up to full implementation of Producer Responsibility, **communities across Colorado are adopting policies to expand access to residents and require businesses to recycle.**
- **While Colorado has a ways to go to reduce organic waste like food scraps and yard trimmings, and capture more of it to put into beneficial uses including compost, the state has made some major steps forward.** Many communities have invested in composting infrastructure and programs and the state has proposed updates to composting regulations (Colorado solid waste regulations Section 14; see chart on next page) that will facilitate the growth of composting infrastructure to meet increasing demand. Additionally, the legislature passed two important compost bills that will help expand compost access and infrastructure ([SB23-191](#)), and help reduce contamination in compost streams by clarifying labeling of certified compostable and lookalike “compostable” packaging ([SB23-253](#)).
- **Changes to compost guidelines for Front Range communities** restricted the inclusion of compostable products in the compost stream, which prompted a regional **Clean Compost Campaign** to help residents understand the importance of keeping contaminants out of valuable finished compost that will be used to regenerate soil. It also **prompted communities to look at adopting reuse systems** for products like restaurant to-go containers, and eliminating single-use items like condiment packaging and replacing them with refillable bulk condiments, all of which have the potential to help create cleaner organic discards and ultimately better compost for our soils.

SECTION 14 COMPOST FACILITY REGULATION CHANGES

	Existing Regulations	Proposed Updated Regulations
Conditionally Exempt Small Quantity	Allows 5 cubic yards (roughly ONE average sized trash dumpster) of food scraps in process at any time on a given site	Allows 20 cubic yards (roughly FOUR average sized trash dumpster) of food scraps in process at any time on a given site
Class I	Allows 50,000 cubic yards of "vegetative waste" (yard trimmings); allows limited food scraps if generated onsite	Allows 50,000 cubic yards of "vegetative waste" (yard trimmings) OR 5,000 cubic yards of "source separated organics" (food scraps)
Class II*	50,000 cubic yards of vegetative waste and manure	50,000 cubic yards of vegetative waste and manure
Class III**	Allowed to process all types of organic feedstock (vegetative, food, manure, biosolids, etc.); no regulatory cap on amount in process	Allowed to process all types of organic feedstock (vegetative, food, manure, biosolids, etc.); no regulatory cap on amount in process

* No change in the amount or type of feedstock at this specialty type of facility which does not apply to composters processing food scraps.

** No change in the amount or type of feedstock. Changes to Class III mainly relate to training of employees.

CENTERING ENVIRONMENTAL JUSTICE IN THE CIRCULAR ECONOMY

Environmental Justice must be at the center of the circular economy. The impacts of the extraction and processing of materials needed to make the stuff we depend on, as well as the end-of-life disposal of those products, disproportionately affect overburdened low-income and Black, Indigenous, People of Color (BIPOC) communities. These same communities tend to have less access to recycling and composting services. Recently passed legislation in Colorado will expand access to recycling ([HB22-1355](#)) and compost programs ([SB23-191](#)), and is reducing plastic waste and the associated production and disposal harms ([HB21-1162](#)). As we work toward building a circular economy, solutions must be developed with collaborative partnerships among stakeholders, most importantly groups and individuals representing impacted communities. The promise of this work is a more equitable, inclusive, and resilient economy and environment for all.

Introduction

Reduce, Reuse, Recycle . . . we've likely all heard of the "three Rs," foundational to a Zero Waste, environmentally sustainable future. It would be reasonable to assume that abiding by the principles of the three Rs is second nature to us here in Colorado, given residents' love for the state's natural beauty, its parks and open spaces, mountains, rivers, and wildlife. But, perhaps surprisingly, the state of Colorado has a lot of work to do when it comes to reducing, reusing, recycling, and composting our waste stream.

This isn't breaking news. For the past six consecutive years, Eco-Cycle and CoPIRG have presented this report to draw attention to a glaring issue: Colorado's recycling and composting rate continues to stagnate at a mere 16%, half the national average of 32%.¹ Equally concerning is our consistent disposal rate of roughly 5.6 pounds per person per day.² To turn the tide, we can't rely solely on individual efforts. It's time for systemic change statewide—a shift necessary to boost landfill diversion and prevent waste right from the start.

CHANGE IS COMING FOR RECYCLING AND COMPOSTING RATES

The good news is that systemic change *is* coming with regard to that third R, recycling. Six years of reporting on Colorado's consistently low recycling rate has gotten the attention of the public and of state and local decision-makers, resulting in new programs and policy changes statewide that will ensure that more cans, bottles, boxes, and packaging will be returned to our local supply chains for remanufacturing and that ALL Coloradans have convenient access to recycling at no cost to them. There is still a lot of work ahead in implementing these policies successfully, and our future reports will continue to track that progress.

The third R also refers to recycling organics through composting. Communities statewide are increasingly eager to initiate or expand compost programs in recognition of the critical importance of diverting organics from landfills to reduce landfill-generated methane emissions and of utilizing compost to enrich local soils and increase their carbon sequestering impact. This surge in public interest has brought both challenges and opportunities, supporting growth for Colorado's entrepreneurial compost businesses, and revealing valuable lessons about necessary infrastructure and policies to scale up access to compost services and the making of quality compost for agricultural use.

THE FIRST TWO Rs, REDUCE AND REUSE, ARE ON THE RISE

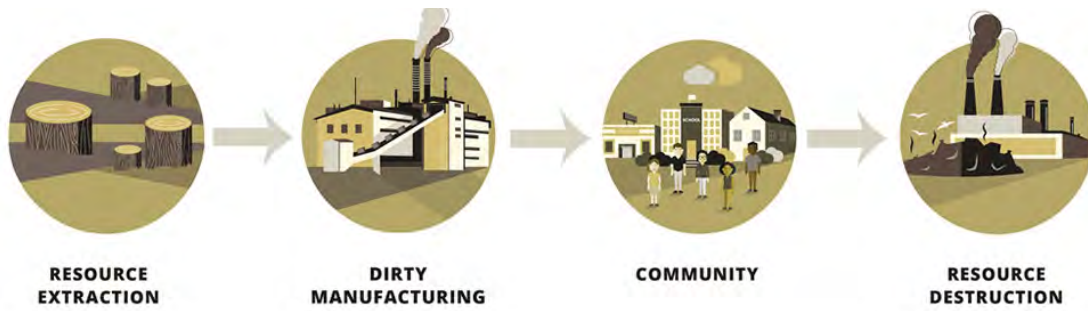
More good news: Coloradans are increasingly recognizing recycling alone isn't enough to mitigate the environmental and social impacts of the products and packaging we consume. The negative impacts of all of our stuff begins long before it reaches our homes. From natural resource extraction to disposal, the entire life cycle of the products we consume creates pollution and climate-warming greenhouse gas (GHG) emissions called "[consumption-based](#)" emissions. Astonishingly, these emissions account for 42% of US GHG emissions.³ Recycling and composting address impacts at the point of disposal, but we also need to engage those first two Rs—reduce and reuse—to really make a dent in consumption-based emissions.

The EPA reports that, 42% of US GHG emissions are associated with with the manufacturing, use, and disposal of materials and products. . . As a result, changing materials management patterns is an important strategy to help reduce or avoid GHG emissions. Reducing the amount of materials used to make products, extending product life spans, and maximizing recycling rates are examples of possible materials management strategies that can significantly reduce GHG emissions.”⁴

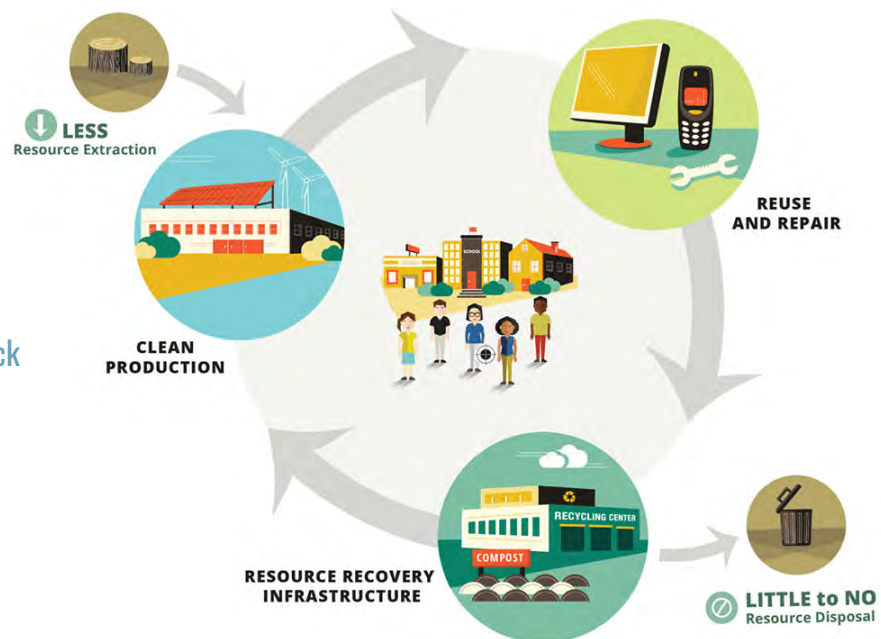
Eco-Cycle and CoPIRG are pleased to report, as you will read in further detail, that there are growing efforts across Colorado to reduce the overall materials that are created for our consumption, used, and discarded—particularly the reduction of single-use or disposable products and packaging, helping to keep us from drowning in the flood of often unnecessary disposable stuff that comes wrapped, packed, and tied to what we buy. Reuse, too, is on the rise as a systems replacement for single-use products of all kinds—even recyclables and compostables.

As municipalities, businesses, and residents employ these three Rs, we begin to disrupt our society's current linear production model in which resources are mined, made into products that are often used just once, and then landfilled as waste. In place of this linear model, we can create a more regenerative [circular economy](#)—a systems-focused approach that reduces pollution across the board, redesigns materials to be less resource-intensive and less toxic, and captures “waste” to reintroduce it back into the economy as feedstocks to manufacture new materials and products. This circularity maintains the highest value of materials and products for as long as possible, which is not just better for our environment, it's better for us as consumers as well.

LINEAR ECONOMY: One way, from extracting natural resources to disposal.



CIRCULAR ECONOMY: Reduces the need for resource extraction and reintroduces “waste” back into the economy.



A NEW FOCUS FOR THIS YEAR'S REPORT

There are two key differences in this year's report from past editions. First, the subtitle “Reducing waste and building a circular economy” has been added to the title of the report to reflect this year's reporting on ways businesses and jurisdictions are going beyond recycling and composting to employ those first two Rs—reduce and reuse. This report details how those efforts help move Colorado toward creating a circular economy, and toward becoming a leader in waste reduction.

In a second departure from prior editions, this report will not cover jurisdictions' diversion data this year, because the Producer Responsibility Organization (PRO) that the state appointed to implement the Producer Responsibility for Recycling program ([HB22-1355](#)) is, at the time of this writing, in the midst of completing a massive Needs Assessment about the current state of recycling access and capacity in Colorado. To do this, they are gathering a lot of data, including diversion data similar to what Eco-Cycle and CoPIRG typically capture in this annual report, from Colorado municipalities, waste and recycling haulers and processors, and other stakeholders. Rather than survey municipalities on the same topics,

we encouraged municipal contacts to participate in the larger Needs Assessment survey, findings from which will be made public in the next few months.

To comprehensively track progress toward a circular economy involving reduction and reuse, we must move beyond assessing landfill diversion rates alone. While these metrics are valuable, they only tell one part of the story—material recovery and recirculation—not the avoidance or prevention of resource depletion, pollution, and GHG emissions. Analyzing the complete life cycle of a product—including material sourcing, manufacturing, transportation, product life span, and disposal—provides a holistic view, equipping us with more effective tools to minimize waste impact on our planet and our communities. It also encourages products that are higher quality for consumers because they are longer lasting, repairable, and designed to be recovered when their useful lives have ended.



Colorado jurisdictions, including **Boulder County**, **City of Boulder**, and **City of Lakewood**, are joining national and international peers to examine their local consumption-based emissions to better devise plans for reducing their municipal GHG impacts.⁵ As of the writing of this report, **Colorado's Energy Office** was working on the **Colorado GHG Pollution Reduction Roadmap 2.0**, an “achievable pathway to meet the state’s science-based climate targets.”⁶ Eco-Cycle, CoPIRG, and other environmental organizations encouraged the state to conduct a statewide consumption-based emissions inventory to better understand the full GHG impact of the foods and other goods that Coloradans consume.

CONTINUED AND INCREASED SUPPORT IS CRITICAL FOR LOCAL IMPLEMENTATION OF THE THREE Rs

With each year’s report, we have asked our municipal contacts to share their successes and their challenges in recycling, and, as the focus of the report has expanded, their successes and challenges with composting, waste reduction, and reuse. Without exception, one of the biggest challenges they identify is the lack of funding and support to implement sustainability programs, as local government budgets are tight, and most Colorado jurisdictions lack sufficient staff and resources to implement sustainability solutions. The models presented in this report are included to help inspire jurisdictions to pursue similar programs or policies in their communities, recognizing that more funding and support will be needed to implement these solutions widely.

However, help is on the way! In the past few years, Colorado has adopted two laws that are integral to supporting local implementation of reduce, reuse, recycle programs:

- **Producer Responsibility for Recycling Packaging and Paper**, which will fund recycling programs throughout the state (see page 26), and
- **The Front Range Waste Diversion (FRWD) enterprise fund**, which passed in 2019 and is now a national model that collects a small fee from loads “tipped” at Front Range landfills to provide approximately \$15 million grants annually as well as technical assistance to Front Range businesses and jurisdictions (see page 30).⁷

Additionally, FRWD's smaller statewide counterpart—the Recycling Resources Economic Opportunity (RREO) fund—supports programs across the state, and is particularly important to rural Colorado, where lower population density and longer distances to recycling markets and reuse hubs add additional cost burdens. In 2022, the RREO program distributed \$2.1 million in grants and \$500,000 in rebates.⁸

It is our aim that this report helps Colorado communities understand what state policies are being implemented that will support a collective increase in our state's efforts around the three Rs. We want to celebrate the good work communities across Colorado are doing and share their examples as inspiration to help guide other communities to action. The hope is that in the years to come, future report releases will demonstrate that Colorado continues to make great strides to be a leader in the three Rs and a circular economy.

THE Rs: KEY CONCEPTS TO EMBRACE AS WE DRIVE OUR LOCAL ECONOMIES TOWARD CIRCULARITY

REDUCE the need for a product or its packaging in the first place. This R is the highest priority in the Zero Waste hierarchy. If we don't make a product, we don't need to extract natural resources and can avoid the associated negative environmental and social impacts.

REDESIGN products to use fewer resources, few-to-no toxins, and higher recycled content. Design should prioritize longevity of use, repair, and ultimately recycling.

REUSE already extracted resources, keeping materials and products in circulation for as long as possible. Establishing reuse systems can help eliminate the need for single-use items.

REFILL reusable containers. Rather than using single-use items (even those that are recyclable or compostable), durable, reusable containers are refilled for everything from condiments and milk in schools to reuse/refill to-go containers at restaurants and returnable/washable containers at reuse/refill stores.

REPAIR products and keep them in use. For some products, this requires changing systems to guarantee the right to repair products.

RECYCLE transparently and authentically, capturing products at the end of their useful lives and turning these materials into new products that can be recycled yet again. Composting is essentially the recycling of organic matter, including food scraps and yard trimmings.

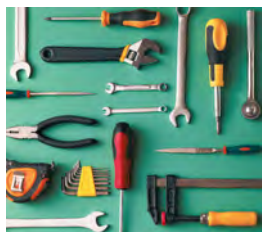


REDUCE & REDESIGN

Reduce is the first R in the “three R” Zero Waste hierarchy because it’s the most important step with the most benefits to planet and people. It refers to reducing the amount of stuff we consume. By doing this, we reduce the natural resources we extract from the Earth, reduce the amount of harm done to ecosystems, reduce our energy usage and GHG impacts, reduce the amount of money businesses and consumers spend on things, and reduce the negative health impacts on communities that live near extraction, processing, and disposal operations—communities that are most often low-income and/or BIPOC (Black, Indigenous, People of Color).⁹ Redesigning, yet another R, is a key part of reduction because it puts the onus on producers to design products that have more longevity, use less material overall as well as more recoverable materials, eliminate toxins and problematic components, and enable repair.

REDUCING STARTS WITH REDESIGNING THE PRODUCTION SYSTEM

Consumer behavior change alone cannot fix our current wasteful system; we need systemic change. In our current marketplace, when most companies are not held responsible for what happens to the end life of the stuff they produce, it can be nearly impossible for consumers to find products that don't have excessive packaging or that are designed for repair or longevity. Even the most well-meaning and educated consumer is challenged to navigate the minefield of unnecessary disposables that are ubiquitous in US society. A [2023 report](#) shows that 84% of American voters want increased reusable packaging and serviceware, 80% support requiring companies to reduce single-use plastics, and 81% support shifting the cost of plastic clean-up from taxpayers to businesses.¹⁰ Redesigning our products and our production system would make it much easier for people to follow the three Rs and make more sustainable purchasing choices.



Efforts to spur redesign include the reduction or elimination of unnecessary and harmful plastics, Right to Repair, an end to designing for obsolescence (see page 23), and promoting policies such as Producer Responsibility (page 26) that incentivize or require better design.

HIGHEST PRIORITY FOR REDUCING: ELIMINATING THE MOST HARMFUL AND PROBLEMATIC PLASTICS

All plastics can be problematic. In terms of their recyclability and their toxicity, some are worse than others. Black plastics, #3 PVC (polyvinyl chloride), #6 PS (polystyrene), and #7 PC (polycarbonate) plastics are the most toxic and hardest to recycle. These plastics are made with chemical compounds that are known carcinogens and other toxins that create adverse human health and environmental issues.¹¹

Over fifty chemical byproducts, including known carcinogens, are released during the manufacturing of polystyrene, contaminating air and water for those who work in or live near these facilities. These chemicals also leach into the foods with which they are in contact. The rate they leach increases with heat, acidity, and fat content of the foods.¹² Unfortunately, those are often the kinds of food and drink found in these cheap to-go containers.

Though there may be niche markets here and there, there are no scalable recycling markets for #3, #6, and #7 consumer packaging plastics, now or realistically at any point on the horizon. As we work to strengthen and expand plastics recycling for more recyclable, less toxic plastics, including #1 PET (polyethylene terephthalate), #2 HDPE (high-density polyethylene), and #5 PP (polypropylene) as a key part of the solution to overall plastic

pollution reduction, it is critical that we focus only on materials that have consistent, reliable, and economically viable markets, that can reasonably be expected to be returned to manufacturing as a feedstock, and whose recycling does not cause greater harm than good to the environment or in other communities in the US and other countries.



While it is important to pursue the use of less toxic, more recyclable products of any type of material, building out reuse systems that reduce the need for and use of all single-use packaging is a far better strategy toward creating a truly circular economy.

Businesses and environmental groups agree: problematic and unnecessary plastics must be eliminated

In 2022, the US Plastics Pact (a [member organization of nonprofits, local governments, major brands, and other stakeholders](#)) announced their member-approved [Problematic and Unnecessary Materials List](#) and commitments from members to take measures to eliminate these items by 2025.¹³ The list includes particularly toxic, mostly non-recyclable plastics (black plastics, #3 PVC, #6 PS), additives and components that hinder recycling or “pose a significant risk to human health or the environment,” and unnecessary items or items that can be replaced by recyclable, reusable, or compostable alternatives (e.g. cutlery, straws, stirrers). This list represents a lot of work and cooperation among brands, recyclers, and environmental groups for a *voluntary* agreement to reduce or eliminate the worst plastics. To achieve these and other necessary reduction goals, we need continued consumer pressure to show businesses that consumers will support changes with their buying power, as well as government policies to level the playing field for companies that want to invest in changes and those not interested in voluntarily doing so.

PROGRESS: COLORADO REDUCES WASTE THROUGH THE PLASTIC POLLUTION REDUCTION ACT

Colorado became the first non-coastal US state to implement a statewide fee on paper and plastic single-use checkout bags that will progress to a statewide ban on single-use plastic checkout bags and polystyrene take-out containers. The Plastic Pollution Reduction Act, [HB21-1162](#) (PPRA) was created to institutionalize and normalize behavior changes for customers and businesses to reduce plastic pollution and overall waste. The bill also reverses an old state statute and now allows municipalities to pass local ordinances banning plastic items.

Why Pass a Plastic Pollution Reduction Act?

Every type of material has an environmental footprint. Paper bags are very resource-intensive to create, requiring the cutting down of trees and high water usage. Plastic bags are made from petroleum and far too often pollute waterways and landscapes where livestock or other animals can fatally ingest them. Polystyrene is one of the most harmful plastics for human health and the environment (see page 7). These plastics contribute to our microplastics problem as they break apart but do not completely biodegrade. Microplastics

build up in our environment and [a recent survey of Front Range waterways found microplastics in every surveyed body of water](#).¹⁴

Decades of bag laws show that bag fees create a significant decrease in single-use bags and when individuals use reusable bags, they are more likely to adopt other reuse and plastic-reduction strategies.¹⁵ In addition, businesses can annually save hundreds or thousands of dollars by not providing free single-use bags.¹⁶

The Phases of Colorado’s Plastic Pollution Reduction Act

Phase 1: Targets single-use checkout bags by implementing fees. Effective January 1, 2023, large Colorado retailers must charge a fee of at least \$0.10 per single-use paper and plastic checkout bags. Consumers are able to skip the bag fees by bringing their own reusable bags. The fee is also waived for customers enrolled in state or federal food assistance programs. Local ordinances may set higher fees for checkout bags or expand the types of retailers that must comply.

Phase 2: Targets plastic bags and polystyrene foam cups and food containers by implementing bans. Effective January 1, 2024, plastic bags will be banned from distribution at large Colorado businesses (paper checkout bags will continue to be charged a minimum fee of \$0.10 per bag). Additionally, the use of polystyrene foam (sometimes mistakenly referred to as Styrofoam®) cups and food containers will be banned at retail food establishments.

Phase 3: Allows municipalities to enact more stringent laws to manage or restrict plastics. Effective July 1, 2024, the law repeals a state ban on local government regulation on plastics. Now, Colorado communities can utilize more options to manage the costs and environmental impacts of plastic products.

Visit ecocycle.org/ppra for details, timelines, and resources.

COLORADO’S PPRA IS ALREADY EFFECTIVELY REDUCING PLASTIC

If you’ve gone shopping in Colorado, you may have noticed how many people have started to bring their own reusable bags to grocery, hardware, or retail stores. The cities of Aspen and Boulder have each had bag fee ordinances in place for over a decade, and in the first year of implementation, they both saw 70–85% reduction in single-use bags used by customers. Because the statewide fee took effect in January of 2023, we do not yet have PPRA-driven reduction data, but we can extrapolate from Aspen and Boulder and expect bag usage to drop by as much as 1.8 billion bags statewide in the first year, down from an estimated two billion bags annually.¹⁷ That is a lot of plastic bags no longer in our landfills, streams, trees, and parks and open spaces.

FIGURE 1: STRATEGIES TO REDUCE: GOOD FOR THE ENVIRONMENT, GOOD FOR BUSINESS

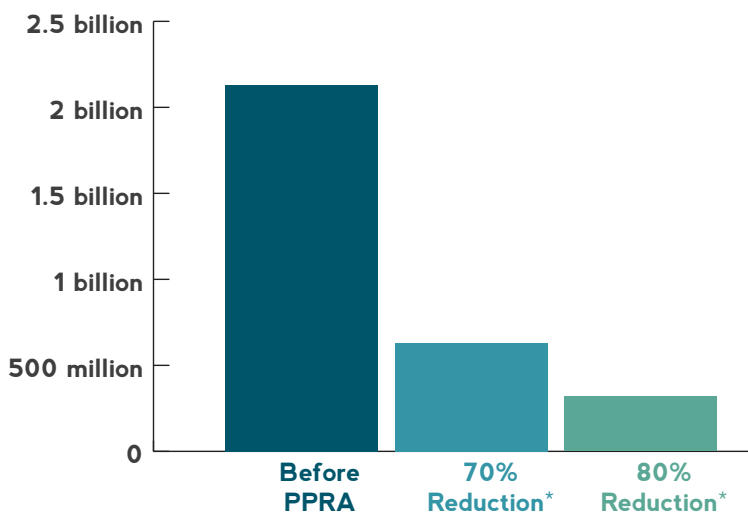
In addition to the environmental and health benefits of reducing plastics, reducing unnecessary packaging and single-use items can save businesses significant amounts of money. Asking first how many items customers need or providing self-serve stations rather than automatically providing items can easily reduce plastics. Learn more about cost savings in Eco-Cycle's [Guide to Sustainable Serviceware](#).

Current Scenario						Reduction Scenarios					
Item	Cost per item*	Avg. # of customers per day	Avg. # of units given per customer	Units provided per year	Cost per year	Reduce: 50%		Reduce: 75%		Reduce: 90%	
						Units provided per year	Cost per year	Units provided per year	Cost per year	Units provided per year	Cost per year
Straw	\$0.01	150	1	54,750	\$548	27,375	\$274	13,688	\$137	5,475	\$55
Ketchup packet	\$0.05	150	3	164,250	\$8,213	82,125	\$4,106	41,063	\$2,053	16,425	\$821
Utensil packet: fork, knife, spoon	\$0.04	150	1	54,750	\$2,190	27,375	\$1,095	13,688	\$548	5,475	\$219

*Cost based on prices for items on webstaurantstore.com as of July 2023.

Eco-Cycle created a [free toolkit](#) to help municipalities educate businesses, restaurants, and the public about PPRA. The toolkit, which provides newsletter articles, flyers, checkout signs, and a guide to purchasing sustainable serviceware for restaurants, is being used around the state and will be updated by year's end for the plastic bag ban. Learn more at ecocycle.org/ppra!

FIGURE 2: ESTIMATED REDUCTION IN SINGLE USE CHECK-OUT BAGS IN COLORADO



* Pre-PPRA bag use based on state population multiplied by estimates suggesting US residents use one bag per person per day.¹⁸ Estimated reductions based on actual results seen in the City of Boulder (70% reduction) and City of Aspen (85% reduction) after bag fee ordinance implementation. Because the fee started January 1, 2023, municipalities do not yet have PPRA-driven reduction data. Therefore, we are extrapolating from the data from municipalities that had fees in place earlier.



Colorado models working to reduce plastic pollution

- Starting July 1, 2024, local Colorado jurisdictions will finally be able to ban specific single-use plastics. Some municipalities, including [Telluride](#), [Breckenridge](#), and [Frisco](#), have already passed plastic reduction ordinances that will go into full effect on July 1. The ordinance language varies, but all of the ordinances include a requirement that food retailers provide single-use items to customers upon request only. In other words, customers must ask first if they would like to receive certain items, similar to [Denver's 2021 Skip the Stuff](#) ordinance. The three new ordinances also ban certain single-use plastic items outright, including plastic water bottles (except in cases of emergencies). Enforcement for all four of these communities' ordinances will be an ongoing challenge, yet education and enforcement are key to their successful implementation.
- In lieu of an ordinance to reduce the use of plastic straws, **Aspen** reached out to restaurant managers about greening their operations. During outreach efforts, a local restaurant shared their success in reducing straws by asking customers first if they wanted one instead of automatically providing a straw. Within six months, the majority of restaurants in the city were "asking first" and reporting an 80–90% straw reduction.¹⁹
- **Steamboat Springs** offers tiered sustainability training and financial incentives [for waste reduction](#) at events that require a special event permit from the City. Activities to qualify for incentives include providing water refill stations, using reusable, recyclable, or compostable serviceware, and providing staffed Zero Waste stations.²⁰
- In the summer of 2023, Eco-Cycle, with the support of a number of Colorado jurisdictions, produced the [Guide to Sustainable Serviceware](#) to help businesses transition away from polystyrene containers

PROGRESS: NEW WATER REGULATIONS ENABLE REDUCTION OF PLASTIC WATER BOTTLE WASTE

While single-use plastic water bottles are highly recyclable, for people who live in areas with clean drinking water they are a fairly unnecessary plastic. The first step local governments can take to reduce single-use water bottles is to ensure that all residents in their communities have access to potable water. Two major 2023 wins will help bring clean drinking water to Coloradans. First, enabled by millions of dollars in federal and local funding, in April, the Bureau of Reclamation broke ground on the [Arkansas Valley Conduit \(AVC\)](#), a 130-mile pipeline that will deliver treated water from Pueblo to 39 water systems serving 40 communities with around 50,000 residents in the Lower Arkansas Valley.²¹ The second is the passage of [SB23-1257](#), “Mobile Home Park Water Quality,” which establishes a water-testing program for mobile home parks; ensures testing result communications are made to residents in their chosen language; creates a funding program to help with remediation in communities where testing results indicate remediation is needed; and establishes environmental protections for residents including having [Colorado Department of Public Health and Environment’s \(CDPHE’s\) ombudsperson for Environmental Justice](#) (or EJ—see page 36 to learn more) advocate for park residents on water quality issues.²²



Colorado models in reducing single-use water bottles

- For municipalities that do have clean drinking water readily available, many are reducing single-use water bottle waste by installing water bottle refill stations in public areas such as recreation centers, libraries, and parks. A few municipalities have adopted the [2021 International Plumbing Code](#), which requires drinking fountains in certain types of buildings and requires half of them to be water bottle refill stations.
- **Breckenridge** [provides a map](#) of filling stations around town. The town also combined tourism dollars and bag fee revenue to purchase mobile refill stations for events.²³
- **Basalt** promotes not only the environmental benefit of refilling water bottles but also the [quality of town water](#).
- Many municipalities provide refill stations at town-sponsored events either through installed, permanent infrastructure or through mobile stations set up by public works departments or other city staff.
- With the help of the Public Works Department, **Avon’s** Special Events division funds and manages the town’s Water Monster at events.²⁴



Photo courtesy of Town of Avon

RECOMMENDED ACTIONS

FOR COMMUNITIES TO REDUCE PLASTIC WASTE

Please see page 22 for recommendations—many actions to reduce plastic waste are also actions to encourage reuse, so these recommendations are together in one place.



FOOD WASTE REDUCTION IS A KEY CLIMATE SOLUTION

Nearly 40% of all food is wasted in the US.²⁵ In Colorado, nearly 18%, or over 200,000 tons, of the material landfilled is food.²⁶ This represents a huge climate issue, given the resources needed to grow, harvest, transport, and process food as well as the methane gases generated by organic matter in landfills. It is also an environmental justice problem. In 2019, one in ten Coloradans could not afford the food they needed, and that disparity was greater for single mothers, residents of rural areas, Black and Hispanic/Latinx Coloradans, and the COVID-19 pandemic made that burden even greater.²⁷ While many food rescue organizations and food banks operate around the state, **Colorado needs stronger policies to help reduce wasted food and encourage donation of edible food and composting of non-edible food.**

It's best to reduce food waste whenever possible before needing to compost it. Rescuing edible food before it spoils helps keep people fed and saves individuals and communities money. As part of a series of Food Waste Policy Gap Analyses performed around the country, the Natural Resources Defense Council (NRDC) looked at [food waste policies in Colorado](#) in 2022 (with consulting assistance from Eco-Cycle). Not surprisingly, the report found that Colorado lacks some key food waste policies and most existing policies are weak. Specifically, the report found Colorado lacks organics diversion requirements (banning organic material from the landfill and requiring donation or composting), tax incentives for food donation (previous tax credits have expired) and state-level food systems plans, goals, and targets. Policies already in place that need strengthening include a uniform expiration date labeling rule (since no federal “best by,” “sell by,” or “expiration” labeling system exists, labeling is left up to states to regulate), food donation liability protections and compost procurement policies (compost processing regulations were noted in the report but are currently being updated—see page 32).²⁸ At the local level, municipal sustainability staff have reported that there is interest in addressing food access disparity, food waste reduction, and education for residents and businesses about reducing their own food waste; many do not have sufficient expertise or resources to devote to these important issues.²⁹



Colorado models in reducing food waste and addressing food access disparity

- **Denver's** program [Food Matters](#) is a bilingual community-based social marketing campaign that provides food waste reduction, food rescue, and composting resources to households and businesses.³⁰ Food reduction is prioritized in the [Denver Food Vision document](#), which set the goal of reducing food waste by 57% by 2030. Denver has partnered with **NRDC** and the **Montbello Organizing Committee** to conduct [focus groups on food waste](#).
- **Fort Collins** and the **City of Boulder** have interactive, educational websites with tips for residents on reducing food waste.
- **Aspen** has an organics landfill ban that encourages donations of edible food (see page 34). As part of the implementation of the ban, city staff are providing technical support for restaurants around food waste reduction, food donation, and landfill diversion methods.
- **Boulder Valley School District** (BVSD) has made concerted efforts to reduce food waste by adopting food waste reduction practices in district food preparation kitchens including tracking food waste using [Leanpath food waste tracking systems](#). The district was inspired to implement changes in part due to the [Food Waste Club at Douglass Elementary School](#) and was enabled to make these cost-saving measures by grants from **Boulder County Resource Conservation Division** and **RREO**.³¹

RECOMMENDED ACTIONS

FOR COMMUNITIES AND THE STATE TO REDUCE FOOD WASTE

- Food rescue organizations depend on volunteers and community partnerships to operate. Connect with your local food rescue organization(s) to see how you can support their efforts to reduce food waste and keep residents fed.
- Leverage educational materials from neighboring communities and organizations such as [Eco-Cycle](#) and [ReFED](#).
- Colorado should adopt new and strengthen existing food waste reduction policies to encourage edible food donation and composting of non-edible food.



REUSE & REPAIR

Apart from preventing the production of a product in the first place, there is nothing more effective at reducing resource extraction, GHG emissions, and the negative health and environmental impacts related to many manufacturing processes than reuse. Reuse and repair offer significant environmental benefits by reducing the need for new products and contribute to a thriving economy by saving consumers and businesses money. The reuse economy is vast, encompassing various sectors such as repair services (tailoring/mending, shoe repair, auto repair, etc.), resale markets (thrift/consign, used books and gear, used cars, auction, pawn, etc.), rental services (cars, bridal, sports equipment, etc.), and reuse/refill businesses (bulk food, serviceware, etc.). This approach not only minimizes waste, it also fosters a circular economy.

IMPLEMENTING REUSE SYSTEMS IN SCHOOLS

Behavior change is hard, but it's easier when you start teaching it early on in life! When students learn the importance of reduce, reuse, and recycle at a young age, and they experience it in their school community, it becomes a norm and a lifelong habit that they can share with the adults in their lives, effecting broader community behavior change.

Decades ago, reuse in school cafeterias was common practice, but disposables have crept their way in with products like disposable plastic cutlery and polystyrene foam food trays. Some Colorado schools are reversing the trend and demonstrating that disposables are not essential or inevitable by reintroducing reusables. Reusable trays and utensils reduce waste, are healthier for students as they prevent food from making contact with toxic foam trays, and they save the schools money. Given that Colorado schools serve tens of millions of meals every year, if other schools follow suit, this presents an enormous opportunity to reduce waste and save money.³²



[Case studies](#) by Plastic Free Restaurants (which provides [grants to schools](#) in support of a transition from disposables to reuse) show that by switching to reuse, the schools studied saved between \$5,780 and \$25,000 annually after factoring in the costs of labor, equipment, water, and electricity usage. Additionally, two of the schools reported avoiding between 3,376 and 8,152 pounds of waste every year. Funding reuse and Zero Waste habits in schools is money well spent that generates returns that will ripple out into the community over an extended period of time. The majority of school-based reuse systems in Colorado are funded and managed through the school districts.³³

Another huge opportunity for cost savings and waste reduction is through bulk milk dispensers. World Wildlife Fund (WWF) studied food waste in cafeterias across the country and found that one of the largest forms of waste—with regard to both the cartons and discarded milk—came from providing milk in cartons rather than bulk dispensers. The report found that by empowering students to serve themselves the amount of milk they will drink rather than provide one-size-fits-all cartons, students waste less milk—roughly two gallons of milk per student per year!³⁴ Since producing just one gallon of milk requires 17.6 pounds of CO₂ and 144.2 gallons of water, dispensers save 248 gallons of water and 30 pounds of CO₂ per student each year.³⁵ Bulk milk also avoids the challenge of recycling bins being highly contaminated by discarded milk.



COLORADO MODELS EDUCATING THE NEXT GENERATION IN THE THREE Rs OF ZERO WASTE

- Chef Ann Cooper, previously with the **Boulder Valley School District**, created the **Chef Ann Foundation** (a nonprofit with [grant opportunities for schools](#)) to forego single-use milk cartons in favor of bulk milk dispensers paired with reusable cups, which creates cost savings for schools and cuts down on packaging and food waste.³⁶
- Local governments in some districts, including **Summit**, **Boulder Valley**, and **St. Vrain Valley**, financially support the districts and programming. Local Zero Waste nonprofit advocacy groups, including **Eco-Cycle** and **High Country Conservation Center**, also partner with these districts by providing curriculum and programming.
- **Eagle County School District** received a [USDA grant](#) to establish Green Teams at schools, provide recycling education and support, support custodial staff with waste diversion, and monitor progress through waste audits.³⁷
- **Eco-Cycle's** [Zero Waste Schools Activity Guide](#) provides free resources, curricula, and activities for classrooms.
- **Eco-Cycle** received funding from **Superior** and **Boulder County** to provide reusable Zero Waste Event Kits to select schools. The kits, which are plastic tubs containing reusable plates, cups, napkins, and utensils, can be used at school-based events where refreshments are served, including staff and PTA meetings, school community events, and classroom celebrations. Reusable Zero Waste Event Kits reinforce the benefits of reuse to all participants while reducing the waste and cost of using any type (recyclable, compostable, or landfill) of single-use disposable serviceware. Since food waste must be scraped from the tableware, it also helps recover clean compost discards.

REUSE REDUCES WASTE AND SAVES BUSINESSES MONEY

There is a lot of potential for building a reuse economy in Colorado. A 2022 study in Minnesota (three-quarters the area and nearly equal in population to Colorado) found that their reuse economy, including repair, rental, resale, and reuse/refill saved 24 billion liters of freshwater and avoided nearly 500,000 metric tons of carbon dioxide equivalent (MTCDE) emissions per year, the equivalent of removing 100,000 gas-powered cars from the road.³⁸ The same report found that Minnesota's reuse economy creates between 36,000 and 54,000 jobs per year and generates \$3.1 and \$4.7 billion in revenue.³⁹

Colorado has long benefitted from traditional reuse businesses, such as repair for vehicles, gear, and clothing; lodging and car rentals; and recirculating books, home goods, and building supplies to new owners. However, in the last few years, Colorado has begun to see a new form of reuse—reusable food serviceware systems. While reuse in dining is not new, it has traditionally depended on restaurant employees washing restaurant-owned dishes

in-house. While in-house reuse is still a practical method for some businesses, some have less capacity for a dishwasher or have other barriers to dine-in reuse and are turning to reuse companies for support. Through this method, the food establishment contracts with a reuse company to provide reusable cups, to-go boxes, or other products. The reuse company collects used items, washes them, takes broken ones out of circulation, and returns clean stock to the venue or food establishment. This system works like a library book return—you check out the reusables, then return them when finished to a participating reuse business where they are recirculated to the next diner.



Colorado State Food Code allows businesses to fill customers' reusable cups (the customer must hold the lid and the lip of the cup should not touch any of the restaurant's equipment). Code also allows customers to scrape their leftovers themselves into their own reusable containers. Local jurisdictions may have codes that impact reuse at the local level.

Clean Water Fund's [ReThink Disposable](#) program found that reuse saved money for 100% of the 160 businesses surveyed, with the average small business saving between \$3,000 and \$22,000 per year by switching away from single-use items.⁴⁰ The same study, as well as Colorado case studies, show that switching to reuse avoids significant GHG emissions, reduces water usage, and eliminates waste. Companies including [OZZI](#), [Sodexo](#), [r.World](#) (formerly r.Cup), and [DeliverZero](#) (which acquired Denver-based RepEATer) are operating reuse systems on Colorado corporate and college campuses, and at events, concert venues, and restaurants. These companies save restaurants money by reducing the number of single-use cups or take-out containers they purchase.⁴¹ Even with the benefits that reuse systems offer, this new model requires changes in business practices, education, capital and technical support, and in some cases, dedicated space.

To ensure these models work, they need support from jurisdictions to help connect them with restaurants, promote them to residents, and help facilitate the build-out of wash-hub infrastructure. Locating wash hubs is particularly difficult in areas with high rent and property values or limited commercial space. To help facilitate the launch of reuse programs in other states, reuse businesses have partnered with existing commercial kitchens in facilities such as places of worship, nonprofits, restaurants, schools, colleges, or large institutions. While these partnerships may face challenges with liability, space constraints, or older equipment, they can provide the initial space to get the program going and may have the potential for longer-term partnerships.⁴² Communities like **Boulder, Denver, Lafayette, and Steamboat Springs** are offering incentives for reuse in restaurants and/or at events.⁴³ To drive the adoption of reuse, jurisdictions may need to adopt policies requiring reuse at events or in on-site and take-out dining, or by creating a financial disincentive for disposable options.



Colorado models in replacing restaurant disposables with reusables

- **City of Boulder** subsidized the cost of reusable cups at 2023 events in addition to offering [one-time grants to businesses](#) to purchase dishwashers, durable dishware, or other reuse solutions.⁴⁴
- **Lafayette** offers businesses [one-time \\$1,000 reusables incentives](#) through **Boulder County's Partners for A Clean Environment** (PACE) program.⁴⁵
- **Denver** [launched an incentive program](#) funding 35 food establishments to switch to reusable serviceware for on-site dining and is offering up to \$2,500 to help permitted events transition to reusable cups, which is paid for through the City's disposable bag fee program. Denver's reusable cup program also includes a Waste Data Sharing Agreement, to help the City quantify the program's results.⁴⁶

ACTUAL REUSE SAVINGS DATA FROM COMPANIES OPERATING IN COLORADO OVER THE LAST YEAR⁴⁷

Music producer [AEG Presents](#) adopted r.World's reusable cup services at five Denver-area venues and saw tremendous environmental benefits to transitioning from single-use to reusable cups at scale in the first year.⁴⁸ Additionally, DeliverZero is working with restaurants, events, and municipalities in Colorado to provide reusable take-out container systems.

FIGURE 3: ENVIRONMENTAL REUSE SAVINGS REPORTED BY COMPANIES IN THE LAST YEAR

	r.World reusable cups at five Denver venues	DeliverZero overall Colorado savings	DeliverZero Case 1: fast casual, three locations	DeliverZero Case 2: locally-owned restaurant, one location
Containers/cups	957,038	24,605	4,936	7,135
Pounds waste avoided	11,365	2,010	384	596
Gallons water use reduced	318,275	6,763	2,491	3,639
GHG avoided (kgCO ₂ e)	43,077	3,079	785	1,134
Equivalent gallons of gas conserved	4,847	346	88.3	128



Colorado models replacing single-use disposables with reusables at music venues and events

- Colorado-based [Planet Bluegrass](#) is at the forefront of designing and operating reusable food ware systems for their music festival venues in Colorado. Their free "[Reusable Plate Program: How-to Handbook](#)" offers lessons learned since implementing the program in 2016, including navigating local health codes, funding opportunities, inventory data, washing information, and an overall cost breakdown.
- **Edgewater, Erie, Longmont, and Breckenridge** reported contracting with reuse system companies for small to large community events.

REUSE IN HOTELS SAVES MONEY AND REDUCES PLASTIC

The hotel industry is another example of reducing cost and plastic by switching from single-use to bulk refill. Large hotel chains and small independently-owned hotels alike are switching away from providing guests single-use personal care items (shampoo, body wash, lotion, etc.) in favor of refillable dispensers in showers and by sinks. After the upfront cost of installing dispensers, hotels see cost savings by reducing the amount of product provided to guests, purchasing products at lower costs by volume and by reducing the frequency with which hotel staff must replace personal care items. While many hotels are voluntarily adopting these changes, California and New York have adopted laws prohibiting automatically providing small plastic personal care bottles and encouraging bulk dispensers.



Colorado model for switching hotel disposables to reusables

- **Breckenridge Grand Vacations** (BGV) is a family-owned company in Breckenridge with three resorts, one hotel, and two offices. Guests responded very positively when BGV voluntarily switched from single-use personal care bottles to bulk refill across all properties (over 800 units, two spa areas, and multiple locker rooms) in 2018. Added benefits include reduced trash/recycling bills and reduced contamination in recycling from partially full bottles.

BGV's bottom-line savings estimate: about 40% less cost and over half a million avoided little amenity bottles annually.⁴⁹



LESSONS LEARNED FROM BOULDER

It is difficult to scale reuse systems! As Boulder works to expand reuse systems, it is surprisingly difficult to change business and consumer behavior. Even when presented with data on the financial benefits of reusables, some businesses see changing how they currently do things as too difficult and time-consuming. For consumers, reuse absolutely needs to be more broadly and conveniently located, and systems need to move away from requiring extra fees. Local government is working to level the playing field through incentives, though policies requiring reuse or creating a financial disincentive for disposable options may eventually be needed.



Colorado models for promoting reuse and repair communitywide

- Maker spaces, tool libraries, and coached fix-it events enable residents to access equipment and expertise for projects without having to purchase their own tools.
- **Frisco's** annual Repair Fair, hosted by the Frisco Green Team, volunteers, and local sewing repair and bike shops, provides free small fixes for attendees and answers questions about repair. The event often generates paying work for participating businesses.⁵⁰
- **Boulder U-Fix-It Clinics** similarly host [pop-up fix-it events](#) with volunteer coaches who help visitors repair everything from appliances to jewelry.
- **Boulder's** [How To Live a More Circular Lifestyle](#) connects residents to local reuse organizations and programs and provides other useful tips for reducing individual footprints.

College and community diversion events and infrastructure can divert tons of materials from landfills at times during the year when large quantities of material are generated. For example:

- **CU Boulder** partners with local nonprofits and waste haulers to divert items students no longer need when moving out. In 2023, their move-out event [diverted 21.23 tons](#) of nonperishable food, household goods, clothing, and more.
- **Aspen** held a move-out event for seasonal employees, collecting over a ton of household goods, food, clothes, cleaning products, and 73 appliances. Another Aspen event collected over 600 pairs of skis to be repurposed by a Colorado furniture manufacturer.⁵¹
- **Pitkin County** launched [Motherload Mercantile](#), a resale store located at the county landfill to divert homegoods and building supplies away from landfill and back into circulation. In its first year, the Mercantile diverted 139 tons for local reuse, which accounts for 1,600 cubic yards of landfill space saved. Total revenues generated from June 2022 through September 2023 were \$88,142.⁵²



Photo courtesy of Town of Frisco

RECOMMENDED ACTIONS

FOR COMMUNITIES AND THE STATE TO REDUCE PLASTIC AND TO SUPPORT TRANSITIONS TO REUSE AND REFILL

- Ensure residents have access to clean drinking water so they do not have to spend money on bottled water.
- Invest in and promote water refill stations and adopt code to require refill stations in large commercial and government buildings.
- Financially support reuse, recycling, and composting in schools, including reusable trays and serviceware and bulk milk in cafeterias, reuse and compost in food prep and cafeterias, and recycling in classrooms and cafeterias. Schools and school districts can leverage philanthropic, local, state, and federal grants and funds to support reuse and waste reduction.
- Enforce PPRA paper and plastic bag fee, and plastic bag and polystyrene container ban in your municipality. Consider broadening the bag regulations to include smaller businesses exempted from the state law to increase plastic reduction and help small businesses save money.
- Educate businesses about harmful, problematic, and unnecessary plastic products, such as #3 PVC, #6 PS, #7 PC, and black plastic containers, single-use straws, utensils, condiment packets, and mini personal care bottles.
- Encourage businesses to reduce waste and save money through greener purchasing by allowing customers to “ask first” before providing them with plastic disposables they may not want or need, switching to bulk refill, and/or providing self-serve stations for customers to choose the items they need.
- If voluntary programs do not result in desired change, explore an ordinance requiring “ask first” for single-use items or banning specified single-use or harmful/unnecessary/problematic items.
- Subsidize the cost of introductory reuse/refill equipment (bulk dispensers, durable serviceware, dishwashers, etc.) or subscriptions to reuse businesses for local businesses and events. The State should support and strengthen FRWD and RREO programs so that they can continue to invest in reuse and waste reduction.
- Lead by example by adopting and enforcing sustainable purchasing policies that prohibit government purchase of #3 PVC, #6 PS, #7 PC, black plastic containers, and other problematic plastic items. Adopt policies that ban government purchase of unnecessary plastics.

RIGHT TO REPAIR AND PLANNED OBSOLESCENCE

Companies need to ensure the products they make last as long as possible. This is particularly true with electronics, which contain precious and heavy metals, etc., but manufacturing anything new—from a phone to a laptop to a blender—consumes a lot of resources. Researchers estimate that 85% of the climate impact of a smartphone comes from manufacturing, and a single iPhone 6 takes 295 pounds of raw mineral to produce.⁵³

It is Colorado state law to recycle e-waste, which is critically important (and far better when it is done by an e-Steward Certified recycler), but the best waste management practice is to not create waste in the first place. For example, in the US, the average expected life span of consumer smartphones is just over 2.5 years.⁵⁴ If cell phones were used for one year longer on average, the US would save [7.8 million tons](#) of raw materials per year.⁵⁵

Repairing, refurbishing, and reusing electronics are great strategies to extend product life and thereby reduce resource consumption and waste production. Companies need to design products that can be repaired and are built to last, and they must make available information and tools needed to repair products.

Colorado is a leader in Right to Repair

Not long ago, most consumer goods and business products were easily repaired with widely available parts. But increasingly, electronics manufacturers have implemented various legal, digital, and physical barriers that prevent consumers from doing their own repairs or using independent repair shops—in some cases, even batteries can't be replaced. Right to Repair laws require manufacturers to provide consumers and independent repairers with access to the parts, physical and software tools, and information, such as schematics and repair codes, at a fair and reasonable price. **Colorado is a leader in Right to Repair as the only US state to pass two Right to Repair laws.** The first, [HB22-1031](#), ensures Coloradans have the right to fix their electric-powered wheelchairs. The second, [HB23-1011](#), ensures farmers and ranchers have the right to fix their agricultural equipment. Outside of Colorado, [Minnesota passed a consumer electronics Right to Repair bill in May](#), and [California passed a similar bill in September](#).

The End of Planned Obsolescence

It's not your imagination that products used to last longer than they do now; your grandma's blender from 40 years ago is still working but the one you bought last year is broken—because it was designed to break on purpose. Producers need to stop designing for planned obsolescence—when a product is [designed in a way that restricts repair, uses hardware designed to break, and is coded with software that will expire](#).⁵⁶ Companies should design products to last with software and hardware that facilitate updates, repair, repurposing, and durability.

Key ways to stop planned obsolescence include:

- **Give consumers the right to know if a product is fixable:** Consumers should know if the expensive tech they buy is fixable, especially because a high price doesn't always equate to durability. Since 2021, France has required manufacturers to publish a repair score that rates their products from 0 to 10. CoPIRG's [Failing the Fix report](#) found displaying these simple scores at the point of sale, online and in stores, empowers consumers to purchase repairable products and pushes companies to build devices designed to last.
- **Extend software life:** [Too many functional electronic devices end up as e-waste](#) when companies stop making software updates available. Companies should extend every model's Automatic Update Expiration (AUE) to at least 10 years after its launch date, similar to the measures [Google announced in September 2023](#) for their Chromebooks after calls for action from parents, school districts, and consumers.
- **Extend hardware life:** [Many electronics aren't designed to last](#), but manufacturers have the power to change that by making spare parts available and standardizing part design to the greatest extent possible. This would reduce e-waste and increase repairability.

RECOMMENDED ACTIONS

FOR COMMUNITIES AND THE STATE TO PROMOTE RIGHT TO REPAIR AND END PLANNED OBSOLESCENCE

- Colorado should adopt a consumer electronics Right to Repair law.
- The state and local governments should use their contracting policies and purchasing power to ensure the electronics they purchase come with access to open repair and long service life spans.
- Colorado should ask the Federal Trade Commission to develop a repairability score system to provide consumers with information about product fixability. This transparency can lead to better competition in the marketplace and greater opportunities for businesses that make easily repairable products.



RECYCLING & COMPOSTING

In a circular economy, once reduction and reuse are maximized, any remaining materials should be recycled or composted back into new products and valuable soil amendments. Recycling and composting are essential waste reduction practices that are working well in parts of Colorado where they're expanding and benefiting the economy. However, access to both recycling and composting services is limited and the transportation and processing of both compostable feedstocks and recyclable materials is more challenging in some parts of the state than others. Composting and recycling create four and ten times more jobs, respectively, than sending the same materials to landfills.⁵⁷ **In Colorado, recycling, reuse, and remanufacturing industries already provide nearly 86,000 jobs and generate \$8.7 billion in economic benefits each year, despite our low statewide recycling rate.**⁵⁸ While Colorado's recycling and composting rate has not changed significantly in recent years, new policies and programs at the state and local levels promise to create dramatic improvements in access to services and processing capacity for recycling and composting of organic materials (such as food and yard trimmings).

IMPLEMENTATION OF PRODUCER RESPONSIBILITY IS ON TRACK TO DELIVER RECYCLING TO ALL COLORADANS

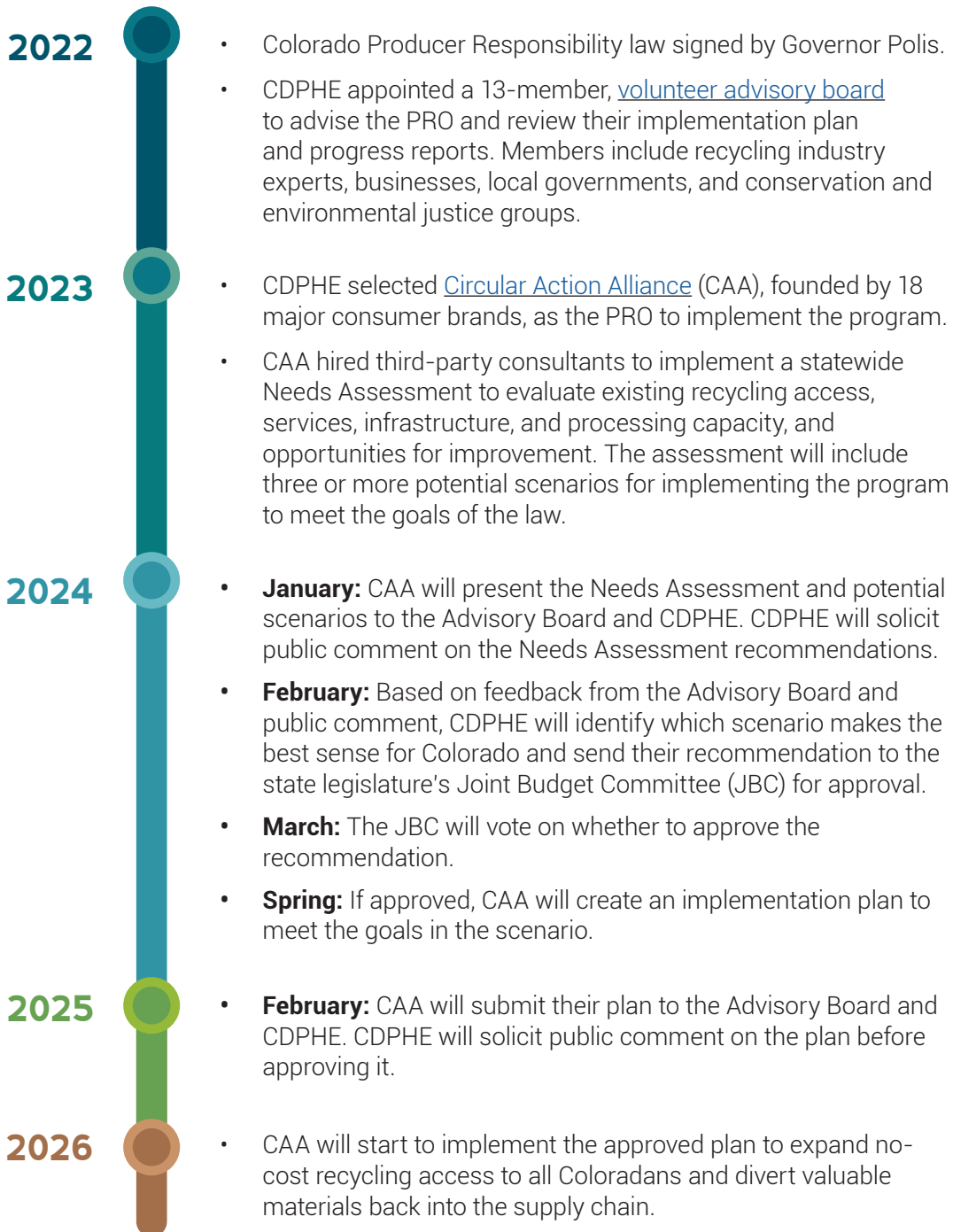
In 2022, Colorado became the third state to adopt Producer Responsibility for packaging and paper recycling. [HB22-1355](#) was drafted and supported by a broad group of stakeholders, many of whom continue to work to implement the law in order to achieve the best results for Colorado. Once fully implemented, Colorado's [Producer Responsibility](#) law will:

- Require producers of paper and packaging (cans, jars, boxes, etc.) who sell these products in Colorado to take responsibility for the end-of-life of these materials by ensuring recycling services for all Coloradans.
- Establish a Producer Responsibility Organization (PRO), joined by all of the producers, that will coordinate, fund, and manage this new statewide recycling system, overseen by the Colorado Department of Public Health and Environment (CDPHE).
- Provide access to recycling services at no cost to ALL Colorado residents, including those with historically limited access such as people living in apartments and rural areas.
- Fund 100% of the program, including the collection, processing, and transportation of recyclable materials.
- Provide Coloradans with a clear list of materials that can be recycled statewide.
- Save local governments money by reimbursing them for their costs to run recycling programs.

As this new Producer Responsibility system is developed for full implementation starting in 2026, it will be critical to use reliable data, broad stakeholder input, and lessons from other countries to ensure this new policy results in a model system for Colorado that:

- Builds on existing successful recycling programs, services, and infrastructure to create an efficient and expanded statewide system that benefits from economies of scale to maximize the diversion of recyclable materials back into the supply chain.
- Expands on successful existing recycling outreach programs to conduct effective, culturally appropriate, and robust recycling education across Colorado.
- Prioritizes safe working conditions, fair compensation and opportunities for advancement for industry workers.
- Incentivizes the reduction of unnecessary packaging and the use of greener, more recyclable materials through transparent “eco-modulation” dues, where producers are charged more for packaging that creates greater waste, isn't easily recyclable, and/or causes negative health or environmental impacts.

FIGURE 4: PRODUCER RESPONSIBILITY IMPLEMENTATION TIMELINE





Colorado models for expanding and improving recycling

Denver shows momentum on two transformational policies

- Denver convened a task force of diverse stakeholders to provide [implementation recommendations](#) on the voter-approved [Waste No More](#) initiative that requires recycling and composting services at multifamily complexes, businesses, and permitted events, and requires recycling at construction and demolition sites.⁵⁹ Denver's City Council will vote on recommendations in the coming months.
- To implement their new residential [Expanded Waste Services](#) ordinance, this summer the City of Denver began rolling out compost bins to the 180,000 households subscribed to municipal collection service (rollout expected to be complete in 2024).⁶⁰ By making recycling weekly instead of biweekly, expanding compost service, and switching to a Pay-As-You-Throw (PAYT) trash fee (with instant-rebate program to help low-income households), Denver saw a 13% increase in recycling, a 10% increase in compost, and a 4% decrease in landfill tonnage in the first half of 2023 compared to the same period in 2022.⁶¹

Universal Recycling Ordinances

- In July 2023, **Longmont** adopted a [Universal Recycling Ordinance](#) (URO), which will phase in recycling and composting requirements at multifamily complexes and businesses. The URO will support Longmont's 2022 Zero Waste goals to achieve 75% waste diversion by 2030, and 95% waste diversion by 2050. In February 2023, **Steamboat Springs** [updated its municipal code](#) to require waste collectors for residential and commercial properties to provide recycling services to their customers and to report data to the City quarterly.

Organized hauling to expand recycling and compost access

- In addition to **Edgewater's** municipal contract for universal PAYT trash and recycling, the City contracted with specialty compost hauler Scraps to offer *optional* curbside organics collection, to which 13% of households currently subscribe. The organics contract creates a subscriber base for the hauler to offer volume discounts to subscribers who want to reduce their household waste by diverting organics.⁶²
- In February 2023, after extensive research about the impacts of an open waste and recycling market, including inequities in customer pricing and cost for road wear and tear, the **Fort Collins** City Council approved a citywide hauling contract for residential trash and weekly recycling collection (to begin September 2024).⁶³ The contract will provide equitable, consistent pricing throughout Fort Collins and reduce waste collection vehicle traffic, which reduces GHG emissions and road wear, and increases road safety. The new contract includes PAYT pricing and seasonal yard trimming collections. The [Fort Collins volume-based pricing ordinance](#) is embedded in hauler licensing requirements and requires that all group accounts (or HOA accounts) also be billed the same way and include services that are at least equal to those offered in the municipal contract.
- **Glenwood Springs** adopted a residential PAYT program in June 2023, which is expected to begin in November 2023.⁶⁴ The PAYT program offers three sizes of bins, wildlife-resistant bin options, and every-other-week recycling collection.⁶⁵
- In October 2023, **Broomfield** City Council directed staff to release an RFP for a residential hauling contract with volume-based pricing and bundled recycling services, including options with and without bundled organics collection. Haulers can also bid on organics collection only.⁶⁶

CIRCULAR ECONOMY DEVELOPMENT CENTER POISED TO PROPEL MANUFACTURING USING RECYCLED MATERIALS

[HB22-1159](#) charged CDPHE with establishing Colorado’s Waste Diversion and Circular Economy Development Center (CEDC) to develop end markets for recycled materials and support new and existing businesses in Colorado that use recycled materials in their manufacturing. This summer, CDPHE selected the nonprofit [Circular Colorado](#) to run the new CEDC, which promptly began engaging stakeholders and establishing satellite offices throughout Colorado.⁶⁷ Circular Colorado decided their initial focus will be on three target materials: plastics, textiles, and shingles.⁶⁸ All of these materials are not only difficult to recycle, they are also pervasive in our economy and make up huge amounts of waste going to landfills each year.

RECOMMENDED ACTIONS

FOR COMMUNITIES AND THE STATE TO IMPROVE AND EXPAND RECYCLING ACCESS AND CAPACITY

Prepare for the new Producer Responsibility program by ensuring your community has best practices in place for convenient recycling, including:

- Implementing an organized hauling contract or ordinance to guarantee recycling to all residents.
- Requiring volume-based pricing (also known as Pay-As-You-Throw or PAYT) to incentivize diversion by charging customers based on the amount of trash they throw out.
- Requiring hauler licensing and reporting.
- Updating ordinances/building codes to require equal space for recycling and trash at new and remodeled multifamily and commercial buildings.

Participate in the Needs Assessment to ensure that the PRO considers solutions to meet your community’s specific needs and continue to engage as the Needs Assessment findings are released, and the program plan is developed.

Adopt a Producer Responsibility scenario that directs CAA to draft and implement a plan that ensures recycling access for ALL Coloradans, fully funds the recycling system, incentivizes less toxic and problematic packaging and reduction in packaging materials overall, and results in a truly circular recycling system.



Colorado models for leveraging state & federal funds to expand program

- Since 2019, the **Front Range Waste Diversion (FRWD)** enterprise fund has made 47 grants totaling over \$18 million to businesses, schools, nonprofits, and local governments to reduce waste and increase recycling and composting.⁶⁹ This past year, FRWD, which is funded by a small fee paid per cubic yard of waste tipped at Front Range landfills, added a free Technical Assistance Service Provider (TASP) program, managed by Eco-Cycle and Resource Recycling Systems (RRS) consultants, for Front Range municipalities and counties. The first TASP projects include helping communities with compost feasibility studies, waste studies, program and ordinance development, and a recycling drop-off expansion. CDPHE oversees FRWD and **Recycling Resources Economic Opportunity (RREO)**, a financially smaller statewide fund that provides similar grants throughout the state as well as rebates to help offset transportation costs for recycling programs in rural areas.
- The **Glenwood Springs South Canyon Landfill** received two grants this year to expand compost operations. A \$300,000 [USDA Compost and Food Waste Reduction \(CFWR\) grant](#) will double the size of their existing compost pad, support education, encourage business participation, and advertise sustainability efforts. An RREO grant enabled the purchase of a used green waste shredder to increase organic materials processing, make the operation more financially sustainable, and allow year-round wood processing. Recent improvements in feedstock screening and compost pile-building techniques have improved product quality and increased compost sales by over 80% from 2022 to 2023. The expanded compost processing capacity has allowed the city to begin piloting restaurant food diversion.⁷⁰
- **San Miguel County** received a \$243,397 USDA CFWR grant for a comprehensive compost and food waste reduction project, including building regional composting infrastructure, developing compost end markets on local agricultural lands, and creating a replicable model for rural mountain towns. The project will pilot residential and commercial collections this winter in partnership with Bruin Waste Management and 3xM Composting. The County will support businesses and individuals with incentives and workshops to improve composting. Within the next three years, the County hopes to reduce food waste by 80% through donations of edible food as well as composting, to build a local commercial composting facility, and to create long-term funding mechanisms for soil health and regenerative agriculture.⁷¹
- **Chaffee County** received a \$3,995,000 EPA Solid Waste Infrastructure for Recycling (SWIFR) grant funded by the Bipartisan Infrastructure Law to construct and manage a new waste transfer station, a materials recovery facility (MRF), and a public drop-off center. This investment will be transformational for the region's recycling access since the area currently does not have recycling drop-off.⁷² Curbside recycling relies on subscriptions to private haulers who haul recyclables over 100 miles to the nearest MRF in Colorado Springs. Once the transfer station is built, materials will be collected and consolidated in Chaffee County, increasing the volume and types of materials diverted and markedly improving the efficiency of materials transport, decreasing GHG emissions, and extending the County landfill's life span.⁷³



COLORADO COMPOSTING 2023: MAJOR WINS AND A COURSE CORRECTION

Composting in Colorado, and across the country, is where recycling was in the 1990s: compost processing infrastructure and end markets that use the materials collected are lagging behind public interest and demand for services.

The goal of composting is to keep organic materials like food scraps and yard trimmings out of the landfill, which prevents the generation of harmful methane emissions, and instead to create a valuable soil amendment that will help Colorado farms and landscapes build healthy soils that absorb carbon dioxide from the atmosphere, reduce water and chemical use, and grow nutritious foods.

Major wins for compost in Colorado

This year, Colorado’s compost journey saw some major steps forward—and one fork in the road that prompted a course correction. The steps forward include:

- Long-awaited and much-requested proposed updates to state composting regulations will facilitate the growth of composting infrastructure to meet demand.
- Two important compost bills will help expand compost access and infrastructure ([SB23-191](#)) and help reduce contamination in compost streams by clarifying labeling of certified compostable and look-alike “compostable” packaging ([SB23-253](#)).
- Multiple achievements at the local level will increase investments in composting infrastructure and programs to expand access.

A course correction for compost

Composters can’t make clean finished compost if the feedstock delivered to their facilities is contaminated; if there is trash and non-compostable material in compost bins, that garbage will contaminate the finished compost, resulting in higher costs for separating out contaminants. If compost is contaminated, it is inevitable that some contaminants like glass or microplastics within the compost will be spread on parks, gardens, and farms. The past decade has seen an increase in both the number of residents and businesses composting, as well as an increase in the amount of contaminants being sent to compost facilities.

This brings us to the fork in the road for composting along the Front Range: after months of work with Front Range municipalities and compost haulers, A1 Organics, the region’s primary compost manufacturer, changed their guidelines of what materials they would accept. Mirroring guidelines of many composters across the state and nation, A1 announced that beginning in April 2023, they would accept source-separated food scraps and yard trimmings only. Like many proverbial “forks in the road,” this guideline change created challenges and opportunities. Residents, businesses, municipalities, and compost haulers that rely on A1 had to shift behavior to comply with the new guidelines; any compost loads that are heavily contaminated are now landfilled. However, as municipalities, residents,

and businesses adapt to these changes, there has been increased public awareness about the importance of reducing contamination in compost streams in order to make high-quality finished compost with strong end markets for use. The loads that do comply with the new guidelines are producing much cleaner and higher-quality compost, which is more appealing to local farmers. In addition, the combination of this change and the forthcoming implementation of the ban on polystyrene food containers is encouraging businesses and jurisdictions to explore reusable options for food service, which could save money and reduce overall waste in the long run.

COMPOST PERMITTING REGULATION UPDATES

The most significant step forward in organics diversion this year was the drafting of updates to Colorado [solid waste regulations](#) in Section 14 pertaining to composting facilities. The updates will be considered for formal adoption by the state's Solid Hazardous Waste Commission in February 2024. Colorado lacks compost infrastructure in many parts of the state, resulting either in no processing capacity, or reliance on large regional compost facilities that require hauling heavy tons of organic materials long distances. In response to findings from the 2022 [Statewide Organics Management Plan](#), CDPHE has been working with stakeholders to update regulations for permitting smaller and mid-sized compost infrastructure that will dramatically reduce costs to start-up businesses and smaller public facilities and enable the expansion of much-needed, more distributed compost infrastructure.

EXCITEMENT FROM THE FIELD

"The regulation change will be HUGE for us as a mid-sized processor in a small rural community. We should be able meet the organic waste diversion needs in our area under the new Class 1 regs and save hundreds of thousands of dollars in permitting and construction costs associated with the Class 3 regulations. It will allow us to scale our operations more efficiently and create a replicable model for rural composting facilities."

—Julie Mach, owner of Elements Mountain Compost in Salida



Entrepreneurial composters like Elements Mountain Compost, pictured here, can process two to three roughly 30'Lx6'Wx10'H compost piles at a time per site.



Class III compost manufacturing facilities like A1 Organics in Keenesburg process more types of feedstock than Conditionally Exempt Small Quantity (CESQ) processors and receive several orders of magnitude more material (over 100,000 cubic yards per year in recent years).

Overview of Regulation Changes

These changes will enable entrepreneurial composters to start and scale up without previous cost barriers. Full proposed regulation changes can be found [here](#).

FIGURE 5: SECTION 14 COMPOST FACILITY REGULATION CHANGES		
	Existing Regulations	Proposed Updated Regulations
Conditionally Exempt Small Quantity	Allows 5 cubic yards (roughly ONE average sized trash dumpster) of food scraps in process at any time on a given site	Allows 20 cubic yards (roughly FOUR average sized trash dumpster) of food scraps in process at any time on a given site
Class I	Allows 50,000 cubic yards of "vegetative waste" (yard timings); allows limited food scraps if generated onsite	Allows 50,000 cubic yards of "vegetative waste" (yard timings) OR 5,000 cubic yards of "source separated organics" (food scraps)
Class II*	50,000 cubic yards of vegetative waste and manure	50,000 cubic yards of vegetative waste and manure
Class III**	Allowed to process all types of organic feedstock (vegetative, food, manure, biosolids, etc.); no regulatory cap on amount in process	Allowed to process all types of organic feedstock (vegetative, food, manure, biosolids, etc.); no regulatory cap on amount in process

* No change in the amount or type of feedstock at this specialty type of facility which does not apply to composters processing food scraps.

** No change in the amount or type of feedstock. Changes to Class III mainly relate to training of employees.

TWO COMPOST BILLS TO EXPAND COMPOSTING AND REDUCE CONTAMINATION

Eco-Cycle and CoPIRG worked to promote two compost bills through the state legislature that the governor signed into law in June 2023. The first, [SB23-253](#), the "Standards for Products Represented as Compostable," is intended to reduce consumer confusion over what products are truly compostable, thus reducing or eliminating contaminants from lookalike "compostables" in the compost streams. It requires that products marketed as compostable must be clearly marked with the words "certified compostable," along with the logo of the certifier, and use a green tint or stripe to be easily identified without reading labels. It also prohibits products that are not certified compostable to imply compostability by using the markings required of certified compostable products, or misleading terms such as "biodegradable" or "made with plants."

The second bill, [SB23-191](#), the “Colorado Department of Public Health and Environment Organics Diversion Study,” builds on the high-level findings of the 2022 Statewide Organics Management Plan to evaluate the impact of diverting organics on extending the life of existing landfills and reducing greenhouse gas emissions. It also creates actionable parameters and guidance for local governments to add or expand compost infrastructure.



Colorado models for organics diversion and compost production

- In continued efforts to reduce waste, **Aspen** has become the first municipality in Colorado to [ban organic materials](#) from landfills. Starting October 15, 2023, all businesses with a retail food license in the city limits must comply. Commercial businesses and multifamily properties will need to comply in 2026 and every owner or occupant in city limits will need to comply in 2028. City staff have been educating restaurants about compliance with the ordinance, which is focused on back-of-house materials in order to reduce contamination. Restaurants may add front-of-house collection if they choose and are encouraged to donate edible food to local food rescue agencies.⁷⁴ The city has purchased certified wildlife-proof steel receptacles for the commercial core of town, in addition to indoor receptacles for businesses.⁷⁵
- **Boulder County** Commissioners [approved updated land use zoning codes](#) that will expand local farmers' and property owners' capacity to compost on their own property by reducing the setbacks for compost piles and expanding allowable compostable materials. Previously, the code allowed only the composting of materials generated on-site. The updated code allows the delivery of source-separated compostable materials from off-site by a third party for composting. The updated code could serve as a helpful model for other counties to establish zoning codes that balance protection of neighbors with clear guidance for on-farm composting. To demonstrate the value of on-farm composting as part of a multiscale approach to diverting organics as well as to give farmers the tools they need to make their own compost, **Eco-Cycle** is setting up partner farms with Aerated Static Pile (ASP) compost systems and trialing new methods of producing high-quality compost with the attributes that regenerative farmers are seeking.
- Across Colorado, access to organics diversion programs is expanding through increased subscriptions to private hauling businesses and expanded municipal services in a variety of ways. The **Town of Eagle** is adding curbside compost collections, **Grand Junction** is piloting seasonal curbside yard trimming collections and restaurant food scrap collections, and **Englewood** added an organics drop-off site at their recreation center through Compost Colorado. **Loveland** added sod collections to their recycling drop-off site and partnered with a local landscaping company to process and reuse the resulting top soil.⁷⁶

RECOMMENDED ACTIONS

FOR COMMUNITIES AND THE STATE TO EXPAND COMPOST ACCESS, CAPACITY & USE

- **Put compost quality first** when designing new composting infrastructure to ensure compost programs are able to both divert organics from the landfill AND create clean finished compost that your community will use. Engage local compost haulers, manufacturers and end users to understand challenges, opportunities and processes to create great compost.
- **Prioritize contamination reduction** by planning to provide, and requiring any contracted haulers to provide, robust education and contamination mitigation measures.
- **Commit to using [Seal of Testing Assurance \(STA\) certified compost](#) in municipal projects** to help spur new collection and processing infrastructure by providing a ready end market.
- **Require use of compost in new builds or landscaping.** A growing number of municipalities require compost be added to new landscaping and lawns for new construction at a rate of [four cubic yards of compost per 1,000 square feet of permeable area](#).
- **Support composting at multiple scales**, including education for backyard composters, working with entrepreneurial compost businesses, and/or taking advantage of new state compost facility regulations to build out local compost infrastructure.



ENVIRONMENTAL JUSTICE & THE THREE R_s

A linear production system—where natural resources are extracted, manufactured, consumed, and then trashed—has negative environmental impacts at each point of the system, as well as social impacts, as people’s health and well-being are impacted by resource extraction, manufacturing, landfilling, and incineration. Creating a true Circular Economy is key to both environmental sustainability and [Environmental Justice](#) (EJ) since it reduces the need to extract virgin natural resources and the need for landfills or incinerators.

THE IMPACT OF A LINEAR SYSTEM HAS DISPROPORTIONATE EFFECTS

The extraction of virgin raw materials disproportionately impacts low-income and BIPOC communities. For example, the fracking and oil drilling needed to create plastics are twice as likely to happen near Hispanic communities than near white communities in the US.⁷⁷ Another example, bauxite ore, a key ingredient for making aluminum from virgin materials, is often mined in or near Indigenous lands through strip mines that destroy ecosystems and pollute water sources, negatively impacting both the health and traditional economies of local communities.⁷⁸ Much of our virgin paper comes from logging in Canadian boreal forests destroying biodiversity and ecosystems that are the home to many Indigenous and First Nations peoples.⁷⁹ Toxic production and disposal sites are [far more likely](#) to be located in BIPOC communities, disproportionately affecting the health of these communities.⁸⁰ By reducing the amount of virgin natural resources we consume, we reduce the impacts on these frontline communities and on the communities disproportionately impacted from turning those raw materials into products. By reducing the materials landfilled or incinerated, we reduce the disproportionate negative impact on low-income and BIPOC communities who live near incinerators and landfills that have historically been built in or near these communities.⁸¹

ENVIRONMENTAL JUSTICE IN REDUCE/REUSE

Reducing and reusing are critical EJ solutions from the aspects of reducing impacts on frontline communities and on those who live near waste management facilities. As we work toward these solutions, however, we MUST be mindful of the approaches we take to create reduce/reuse systems so that unintended negative consequences don't outweigh the benefits of the approaches. This is a fine line to walk and there are not always perfect solutions. Solutions must be developed with collaborative partnerships among stakeholders—most importantly groups and individuals representing impacted communities.

In some instances, like promoting repair or “ask first” programs to limit single-use items like straws and napkins, there may be few or no negative consequences.* Other approaches may achieve significant success in reducing waste while also creating unintended burdens that need to be mitigated when writing policy or developing programs. For example, the Plastic Pollution Reduction Act (see page 8) created a fee for single-use checkout bags (including paper) and will ban single-use plastic checkout bags. This is a major win from the perspective of reducing oil and gas extraction, plastics manufacturing, waste, and litter—all of which is a win for frontline communities. At the same time, paying the bag fee or purchasing a reusable bag may create a disproportionate financial burden. While there is no perfect solution to this, the law follows the best practice of exempting individuals who use food assistance programs from paying the fee, and many communities and some businesses are providing free reusable bags to residents.

**Note that some in the Disability Rights community have raised concerns that “ask first” for straws can create stigma against people who do need straws to be able to drink.*

Work continues nationally in the reuse space to improve reuse systems for bags, food packaging, and other products to more closely align environmental and social intentions with practical and affordable implementation of programs and policies. Eco-Cycle and CoPIRG are actively engaged with this work, and partner with EJ-focused groups in hopes of continually improving both the systems for reduce/reuse/recycle and our own understanding and implementation of how these systems intersect with EJ.

ENVIRONMENTAL JUSTICE, RECYCLING, AND COMPOSTING

Access to recycling and composting is an equity issue; only 19% of multifamily complexes have curbside recycling access nationwide, compared to 40% of single-family homes, showing significant service disparity.⁸² For most of Colorado, access to composting and even recycling relies on subscription services, meaning people must pay more in addition to the cost of trash hauling fees to get access to these services, which is a cost barrier for lower-income households.⁸³ Guaranteed access to compost and recycling programs are more widely available in wealthier communities than in rural and lower-income communities.⁸⁴ [HB22-1355](#), Producer Responsibility for Recycling (see page 26) will provide convenient, no-cost recycling access to all Coloradans. Further, by incentivizing packaging that uses less material, reduces toxins, and increases recycled content, Producer Responsibility could help reduce extractive practices and packaging-related harm to the environment and human health. [SB23-191](#) (page 34) will study and report on how to build out composting infrastructure in Colorado to fill gaps in access and processing capacity.

RECOMMENDED ACTIONS

FOR COMMUNITIES AND THE STATE TO CENTER ENVIRONMENTAL JUSTICE IN 3 R EFFORTS

- Intentionally engage all stakeholders in waste-related programs and policies throughout development and implementation with online and in-person surveys, and events in public places. Offering childcare, food, transportation, compensation, and flexible times for in-person events can result in more inclusive participation.
- Make use of the resources, tools, definitions, and EnviroScreen map in [CDPHE's Environmental Justice Program](#).
- Support legislation that helps address equity issues in our state and communities.
- Ban municipal solid waste incineration and plastics-to-fuel chemical recycling projects that use and produce hazardous chemicals and generate hazardous waste.



Conclusion

While the recycling and composting rate in Colorado continues to be stagnant, we're seeing progress at all levels that is setting the stage for a very different future. This progress includes new and expanding entrepreneurial business models; adoption of local government policies and initiatives for waste reduction and diversion; more local and regional investments in capacity-building infrastructure; and passage of transformative state-level policies that clearly set waste reduction and diversion as high priorities. All of these efforts are positioning Colorado to become a leader in waste reduction, reuse, recycling, and composting. As current successes inspire future actions, we look forward to writing future reports about how Colorado is becoming a model of true circularity.

LEARN MORE ABOUT THE TOPICS IN THE REPORT AT:

[ECOCYCLE.ORG](https://ecocycle.org)

[PIRG.ORG/COLORADO](https://pirg.org/colorado)

REFERENCES

MUNICIPAL PROGRAM INFORMATION PROVIDED BY:

Arvada—Nalini Margaitis. Email communication. 10/05/23.
Aspen—Ainsley Brosnan. Email communication. 9/28/23.
Avon—Charlotte Lin. Email communication. 10/12/23.
Boulder—Jamie Harkins. Email communication. 10/10/23.
Breckenridge—Jessie Burley. Email communication. 9/27/23.
Broomfield—Alison Harvey. Email communication. 10/04/23.
Colorado Springs—Samantha Bailey. Email communication. 10/19/23.
Commerce City—Steve White. Email communication. 9/26/23.
Denver—Nina Waysdorf. Email communication. 10/06/23.
Durango—Marty Pool. Email communication. 9/26/23.
Eagle—Jackie VanEyll. Email communication. 9/27/23.
Edgewater—Paige Johnson. Email communication. 9/25/23.
Englewood—Melissa Englund. Email communication. 10/05/23.
Erie—Eryka Thorley. Email communication. 10/05/23.
Estes Park—Robert Schumaker. Email communication. 10/05/23.
Fort Collins—Caroline Mitchell. Email communication. 10/06/23.
Foxfield—Kathleen Schmitz. Email communication. 9/21/23.
Frisco—Hilary Sueoka. Email communication. 10/05/23.
Glenwood Springs—Elizabeth Mauro. Email communication. 9/26/23.
Golden—Mark Wesson. Email communication. 9/29/23.
Grand Junction—Kym Beck. Email communication. 10/05/23.
Greeley—Will Jones. Email communication. 10/06/23.
Green Mountain Falls—Becky Frank. Email communication. 10/05/23.
Lafayette—Elizabeth Szorad. Email communication. 10/05/23.
Lakewood—Jonathan Wachtel. Email communication. 10/06/23.
Leadville—Ash Warner. Email communication. 10/05/23.
Lone Tree—Abby Meyer. Email communication. 10/06/23.
Longmont—Lisa Knoblauch. Email communication. 10/02/23.
Louisville—Hannah Miller. Email communication. 10/03/23.
Loveland—Tyler Bandemer. Email communication. 10/06/23.
Lyons—Kim Mitchell. Email communication. 10/06/23.
Minturn—Cindy Kreig. Email communication. 10/05/23.
Northglenn—Brigid Sherrill. Email communication. 9/27/23.
Sheridan—Devin Granbery. Email communication. 10/9/23.
Steamboat Springs—Alicia Archibald. Email communication. 9/21/23.
Superior—Alexis Bullen. Email communication. 9/26/23.
Swink—Amanda Holland. Email communication. 10/05/23.
Telluride—Zoe Dohnal. Email communication. 9/26/23.
Thornton—Sandee Timmons. Email communication. 10/02/23.
Windsor—Eric Lucas. Email communication. 10/05/23.

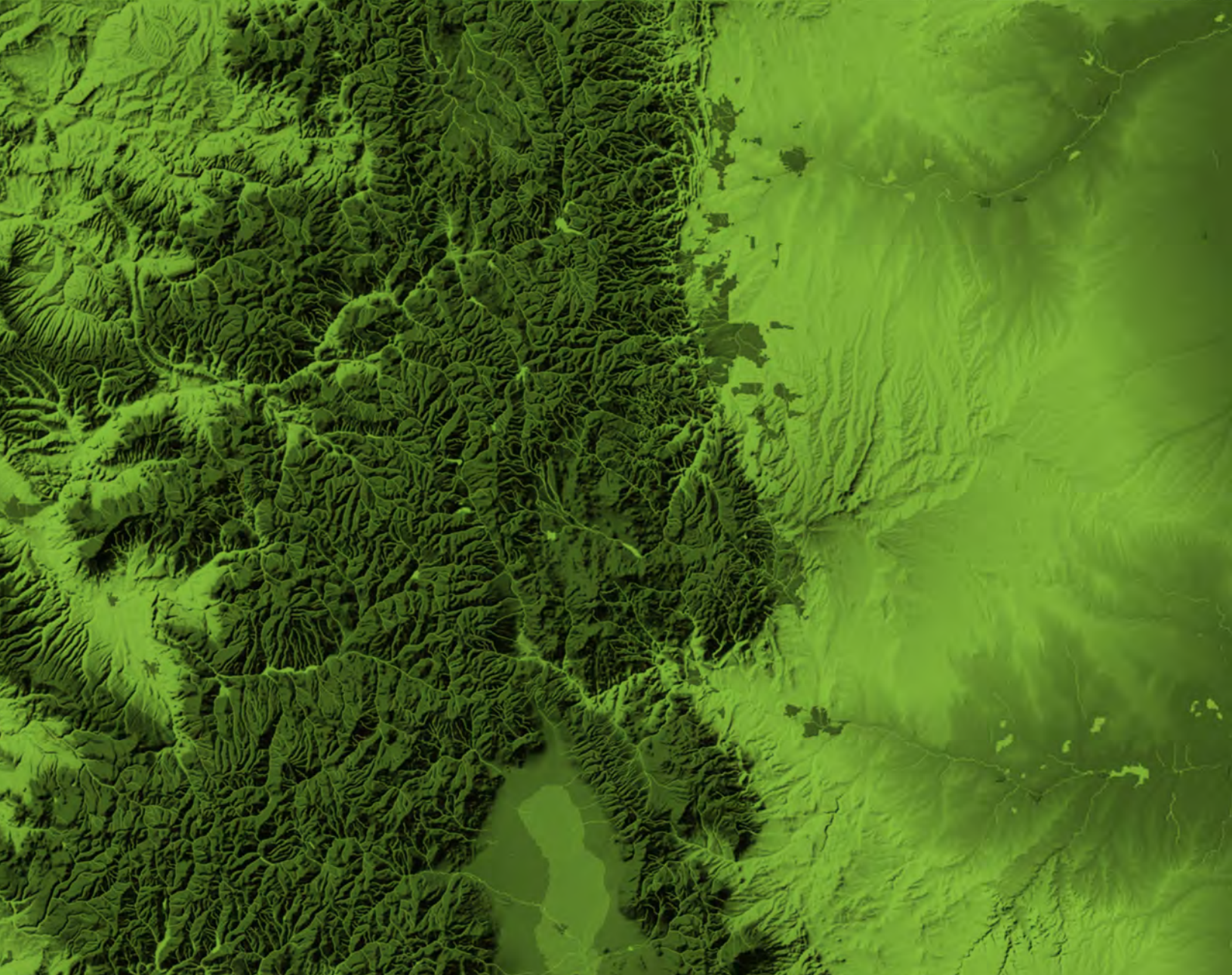
ENDNOTES

- 1 Email communication with Jace Driver, Colorado Department of Public Health and Environment (CDPHE). 11/6/23.
- 2 Email communication with Jace Driver, CDPHE. 11/6/23.
- 3 EPA. "Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)." (2020) https://www.epa.gov/sites/default/files/2020-12/documents/warm_background_v15_10-29-2020.pdf. Accessed 10/16/23.
- 4 EPA. "Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)" (2020). https://www.epa.gov/sites/default/files/2020-12/documents/warm_background_v15_10-29-2020.pdf. Accessed 10/16/23.
- 5 City of Boulder. "Circular Boulder: Pioneering Steps Towards a Zero-Waste and Climate-Neutral City." <https://www.metabolic.nl/publications/circular-boulder/>
- Boulder County. "Consumption-Based Emissions Inventory." (In process) <https://assets.bouldercounty.gov/wp-content/uploads/2023/06/CBEI-Presentation.pptx>
- City of Lakewood. "2018 GHG Inventory." (2018) <https://www.lakewood.org/files/assets/public/planning/sustainability/2018-ghg-emissions-inventory-summary-report.pdf>.
- 6 Colorado Energy Office. "GHG Pollution Reduction Roadmap 2.0." <https://energyoffice.colorado.gov/climate-energy/ghg-pollution-reduction-roadmap-20>. Accessed 10/23/23.
- 7 Front Range Waste Diversion. "Grants Program." <https://www.coloradofrwd.org/grants>. Accessed 10/30/23.
- 8 CDPHE. "Recycling Resources Economic Opportunity (RREO) data." <https://cdphe.colorado.gov/recycling-resources-economic-opportunity-data>. Accessed 10/30/23.
- 9 UN Environmental Programme. "Plastic pollution is an environmental injustice to vulnerable communities – new report." <https://www.unep.org/news-and-stories/press-release/plastic-pollution-environmental-injustice-vulnerable-communities-new>. Accessed 10/23/23.
- 10 Oceana. "Americans Are Sick of Single-Use Plastic Pollution, Poll Finds." (2023) <https://usa.oceana.org/press-releases/americans-are-sick-of-single-use-plastic-pollution-poll-finds>.
- 11 Eco-Cycle. "The Most Problematic and Unnecessary Plastics." <https://ecocycle.org/our-programs/reducing-plastics/eliminating-problematic-plastics/problematic-unnecessary-plastics/>.
- 12 National Library of Medicine. "An Insight into the Growing Concerns of Styrene Monomer and Poly(Styrene) Fragment Migration into Food and Drink Simulants from Poly(Styrene) Packaging." <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8160766/>. Accessed 10/23/23.
- 13 Ellen MacArthur Foundation. "U.S. Plastics Pact's Problematic and Unnecessary Materials List." <https://usplasticspact.org/problematic-materials/>. Accessed 10/23/23.
- 14 Environment Colorado. "Colorado's Waterways and Microplastics." (2023) <https://environmentamerica.org/colorado/center/resources/colorados-waterways-and-microplastics>.
- 15 Frontiers in Psychology. "The English Plastic Bag Charge Changed Behavior and Increased Support for Other Charges to Reduce Plastic Waste." (2019) <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00266/full>.
- 16 Eco-Cycle calculation based on the cost of plastic bags (https://www.webstaurantstore.com/1-6-size-white-thank-you-plastic-t-shirt-bag-case/433NHT101.html?utm_source=google&utm_medium=cpc&utm_campaign=GoogleShopping&gclid=CjwKCAjwyY6pBhA9EiwAMzmfwaWVG13qblX_8Fmm5w45eJxKlBy69iFnjc7pPT51rG2XFEv4oHmEBBoCxu8QAvD_BwE) and estimated number of bags used by convenience stores (<https://www.statista.com/statistics/308818/number-of-us-c-store-transactions-per-week/>) and large grocers (<https://www.nationalgeographic.com/environment/article/plastic-free-supermarket-grocery-shopping>).
- 17 Eco-Cycle calculation based on state population of 5,839,926 in 2022 per U.S. Census Bureau "QuickFacts: Colorado." <https://www.census.gov/quickfacts/fact/table/CO/PST045222>. Accessed 10/23/23. National Geographic. "Fast Facts About Plastic Pollution." (2018) <https://www.nationalgeographic.com/science/article/plastics-facts-infographics-ocean-pollution>.
- City of Aspen. "Single-Use Bag Study." (2017) <http://www.aspen.gov/DocumentCenter/View/687/City-of-Aspen-Single-Use-Bag-Study-PDF?bidId=> .
- City of Boulder. "Disposable Bag Fee." <https://bouldercolorado.gov/services/disposable-bag-fee>. Accessed 10/23/23.
- 18 Eco-Cycle calculation based on state population, 5,839,926 in 2022 Us Census Bureau "Quick Facts: Colorado." <https://www.census.gov/quickfacts/fact/table/CO/PST045222>. Accessed 10/23/23. National Geographic. "Fast Facts

- About Plastic Pollution." (2018) <https://www.nationalgeographic.com/science/article/plastics-facts-infographics-ocean-pollution>. City of Aspen. "Single-Use Bag Study." (2017) <http://www.aspen.gov/DocumentCenter/View/687/City-of-Aspen-Single-Use-Bag-Study-PDF?bidId=>. City of Boulder. "Disposable Bag Fee." <https://bouldercolorado.gov/services/disposable-bag-fee>. Accessed 10/23/23.
- 19 Email communication with Liz Chapman, Recycle Colorado, formerly City of Aspen. 7/5/23.
- 20 Email communication with Alicia Archibald, City of Steamboat Springs. 9/21/23.
- 21 Southeastern Colorado Water Conservancy District. "Arkansas Valley Conduit." <https://sewcd.org/content/arkansas-valley-conduit>. Accessed 10/23/23.
- 22 Clean Water For All Colorado. "Every Coloradan deserves access to clean water!" <https://www.cleanwaterforallco.org/>. Accessed 10/23/23.
- 23 Email communication with Jessica Burley, Town of Breckenridge. 5/11/23.
- 24 Email communication with Charlotte Lin, Town of Avon. 10/13/23.
- 25 Feeding America. "Food Waste and Food Rescue." <https://www.feedingamerica.org/our-work/reduce-food-waste#:~:text=How%20much%20food%20waste%20is,food%20in%20America%20is%20wasted>. Accessed 10/30/23.
- 26 Eco-Cycle calculation based on CDPHE. "Waste Composition of Municipal Solid Waste Disposal." <https://environmentalrecords.colorado.gov/HPRMWebDrawerHM/RecordView/420851>. CDPHE. "2021 Colorado Recycling totals." <https://cdphe.colorado.gov/hm/colorado-recycling-totals>. Accessed 10/30/23.
- 27 Colorado Health Institute. "An Uneven Burden: Food Insecurity in Colorado." (2019, updated 2023) <https://www.coloradohealthinstitute.org/research/uneven-burden-food-insecurity-colorado#:~:text=Some%20Coloradans%20were%20more%20likely,women%20were%20also%20disproportionately%20affected>. Hunger Free Colorado. "A Survey of Hunger in Colorado." (2021) <https://www.hungerfreecolorado.org/wp-content/uploads/2021/05/December-2020-Hunger-Survey-Results-Hunger-Free-Colorado.pdf>.
- 28 NRDC. "Colorado Food Waste Policy Gap Analysis and Inventory." (2022) <https://www.nrdc.org/sites/default/files/co-food-waste-policy-gap-report.pdf>.
- 29 See municipal communications in the references section.
- 30 Denver Public Health & Environment. "Food Matters Denver." <https://www.denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Public-Health-Environment/Community-Behavioral-Health/Food-System-Policies/Food-Matters-Denver>. Accessed 10/30/2023.
- 31 BVSD. "Food Waste Reduction." <https://food.bvsvd.org/programs/food-waste-reduction>. Accessed 10/30/23.
- 32 Colorado Children's Campaign. "Time to Eat: An Emerging Consideration for School Lunch Delivery and the Nutrition of Colorado's Students." <https://files.eric.ed.gov/fulltext/ED607085.pdf>. Accessed 10/23/23.
- 33 See municipal communications in the references section.
- 34 Eco-Cycle calculation based on findings by WWF. "Abandoning the carton: how bulk milk dispensers can help schools reduce waste." (2022) <https://www.worldwildlife.org/stories/abandoning-the-carton-how-bulk-milk-dispensers-can-help-schools-reduce-waste>.
- 35 Ibid.
- 36 Chef Ann Foundation. "Got (Bulk) Milk?" (2015) <https://www.chefannfoundation.org/blog/got-bulk-milk>.
- 37 Email communication with Amelia Kovacs, Walking Mountain Science Center. 10/30/23.
- 38 Reuse Minnesota. "Impact Report." (2022) <https://www.reusemn.org/impact-report>. Accessed 10/17/23.
- 39 Ibid.
- 40 Upstream Solutions. "Reuse vs. Single-use: Economics." <https://upstreamolutions.org/reuse-vs-single-use-economics>. Accessed 10/17/23.
- 41 Upstream Solutions. "5 Reuse Business Profiles." <https://static1.squarespace.com/static/5f218f677f1fdb38f06cebcb/t/649f1e07717fa83924c126ab/1688149513159/5+Reuse+Business+Profiles.pdf>. Accessed 10/23/23.
- 42 Email communication with Upstream Solutions' Reuse Solutions Network Basecamp message board group. 10/18/23.
- 43 See municipal communications in the references section.
- 44 Email communication with Jamie Harkins, City of Boulder. 10/9/23.
- 45 Email communication with Elizabeth Szorad, City of Lafayette. 10/5/23.

- 46 City and County of Denver. "Reusable Cups for Events Funding." https://denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-Resiliency/Resources-for-Businesses/Certifiably-Green-Denver/Reusable-Cups-for-Events-Funding?mc_cid=11bb786332&mc_eid=d8d4c769ee. Accessed October 2023.
- 47 Email communication with DeliverZero on 10/16/23. Email communication with r.World on 10/25/23. "EPA Greenhouse Gas Equivalencies Calculator" <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results>. Accessed 10/27/23. Some units needed to be clarified with respective companies and converted to other units so they could be directly compared to each other.
- 48 AEG Worldwide. "AEG Presents Rocky Mountains & r.Cup." <https://www.aegworldwide.com/case-study/aeg-presents-rocky-mountains-rcup>. Accessed 10/23/23.
- 49 Email conversation with Emily Kimmel, Breckenridge Grand Vacations. 10/25/23.
- 50 Email communication with Hilary Sueoka, Town of Frisco. 10/9/23.
- 51 Email communication with Ainsley Brosnan-Smith, City of Aspen. 9/28/23.
- 52 Email communication with Cathy Hall, Pitkin County. 10/27/23.
- 53 U.S. PIRG Education Fund. "The Fix Is In." (2020) <https://pirg.org/edfund/resources/the-fix-is-in-2/>.
- 54 Kim Komando. "How long before a phone is outdated? Here's how to find your smartphone's expiration date." USA Today. (2023) <https://www.usatoday.com/story/tech/columnist/komando/2023/10/22/how-to-find-smartphone-expiration-date/71255625007/>.
- 55 U.S. PIRG Education Fund. "The Fix Is In." (2020) <https://pirg.org/edfund/resources/the-fix-is-in-2/>.
- 56 U.S. PIRG Education Fund. "6 ways to stop planned obsolescence." (2023) <https://pirg.org/articles/6-ways-to-stop-planned-obsolescence/>.
- 57 Institute for Local Self Reliance. "Recycling Means Business." <https://ilsr.org/recycling-means-business>. Accessed 10/24/23.
- 58 Front Range Waste Diversion Enterprise. "RRS Waste Diversion Survey." (2020) <https://cdphe.colorado.gov/front-range-waste-diversion#Resources>.
- 59 City and County of Denver. "Waste No More." <https://denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Climate-Action-Sustainability-Resiliency/Zero-Waste/Waste-No-More>. Accessed 10/23/23.
- 60 City and County of Denver. "Expanded Waste Collection Services." <https://www.denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices-Directory/Recycle-Compost-Trash/Resources/Expanded-Service>. Accessed 10/23/23.
- 61 Email correspondence with Nina Waysdorf, City and County of Denver. 10/23/23.
- 62 Phone conversation with Paige Johnson, City of Edgewater. 10/24/23.
- 63 City of Fort Collins. "Contracted Residential Trash and Recycling Collection." <https://ourcity.fcgov.com/contract-for-trash>. Accessed 10/3/23.
- 64 Glenwood Springs. "Pay as You Throw." <https://cogs.us/719/Pay-as-You-Throw>. Accessed 10/3/23.
- 65 Email communications with Liz Mauro, South Canyon Landfill. 10/19/23.
- 66 City and County of Broomfield. "Universal Waste Collection." <https://www.broomfieldvoice.com/universalwastecollection-english>. Accessed 10/3/23. And email communication with Alison Harvey, Broomfield. 10/26/23.
- 67 Circular Economy Development Center. <https://coloradocedc.org/>. Accessed 10/23/23.
- 68 Circular Colorado. "Circular Colorado." <https://circularcolorado.org/>. Accessed 10/23/23.
- 69 Front Range Waste Diversion. "Grants Program." <https://www.coloradofrwd.org/grants>. Accessed 10/30/23.
- 70 Email communication with Liz Mauro, South Canyon Landfill. 10/19/23.
- 71 Email communication Chris Medary, San Miguel County. 10/19/23.
- 72 EPA. "EPA awards \$3,995,000 for new recycling and materials recovery facility in Chaffee County, Colorado." (2023) <https://www.epa.gov/newsreleases/epa-awards-3995000-new-recycling-and-materials-recovery-facility-chaffee-county>.
- 73 Email communication with Beth Helmke, Chaffee County. 10/24/23.
- 74 Email communications with Jimena Baldino and Ainsley Brosnan-Smith. 7/24/23 and 10/4/23.

- 75 Aspen Daily News. "Aspen City Council approves 'organics waste diversion' ordinance on first reading." (2023) https://www.aspendailynews.com/news/aspen-city-council-approves-organics-waste-diversion-ordinance-on-first-reading/article_059125ac-acfb-11ed-bbd7-0b66ec137f30.html
- 76 See municipal communications in the references section.
- 77 National Institute of Environmental Health Sciences. "Public Health Effects of Natural Gas Flaring: Understanding and Communicating Environmental Justice Implications." https://www.niehs.nih.gov/research/supported/translational/peph/newsletter/2021/02/public_health_effects_of_natural_gas_flaring_understanding_and_communicating_environmental_justice_implications.cf. Accessed 10/23/23.
- National Libraries of Medicine. "Environmental Justice Dimensions of Oil and Gas Flaring in South Texas: Disproportionate Exposure among Hispanic communities." <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8915929/>. Accessed 10/23/23.
- 78 Journal of Environmental Management. "Indigenous forest livelihoods and bauxite mining: A case-study from northern Australia." <https://www.sciencedirect.com/science/article/abs/pii/S0301479721010768>. Accessed 10/23/23.
- 79 NRDC. "Canada's Boreal Forest: Why It's So Important." (2022) <https://www.nrdc.org/stories/canadas-boreal-forest-why-its-important>.
- 80 Quartz. "Race is the biggest indicator in the US of whether you live near toxic waste." (2017) <https://qz.com/939612/race-is-the-biggest-indicator-in-the-us-of-whether-you-live-near-toxic-waste>.
- GAIA. "Pollution and Health Impacts of Waste-to-Energy Incineration." (2020) https://www.no-burn.org/wp-content/uploads/Pollution-Health_final-Nov-14-2019.pdf.
- 81 US Commission on Civil Rights. "Not in My Backyard: Executive Order 12,898 and Title VI as Tools for Achieving Environmental Justice." <https://www.usccr.gov/files/pubs/envjust/ch2.htm>. Accessed 10/23/23.
- 82 Sustainable Packaging Coalition. "2020-2021 Centralized Study on Availability of Recycling." (2021) <https://sustainablepackaging.org/wp-content/uploads/2022/03/UPDATED-2020-21-Centralized-Study-on-Availability-of-Recycling-SPC-3-2022.pdf>.
- 83 CDPHE. "Waste diversion baseline assessments." <https://cdphe.colorado.gov/recycling-grants/baseline-assessments>. Accessed 10/25/23.
- 84 Eco-Cycle calculation based on communications with municipalities (see municipal communications in the references section) as well as U.S. Census Income data for 2019. <https://data.census.gov/cedsci/table?t=Income%20and%20Poverty&g=0400000US08.160000&tid=ACST5Y2019.S1902&moe=false&hidePreview=true>.



CoPIRG

© 2023

eco·cycle®