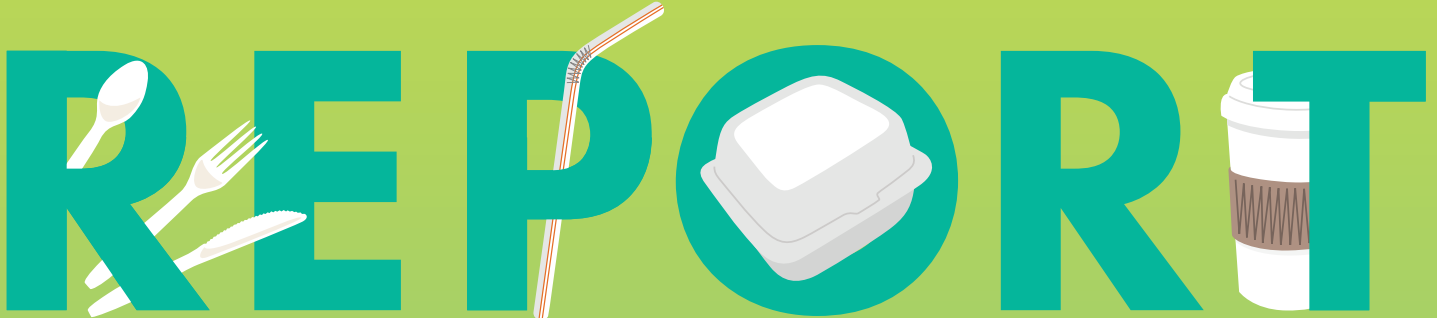


SINGLE-USE REDUCTION REPORT



PREPARED BY

Keep Truckee Green,
the Town of Truckee
Solid Waste and
Recycling Division



Contents

Introduction	2
Background	2
Single-Use Foodware Policies	5
Single-Use Foodware Material Types	6
Education	8
Community Feedback	8
Policy Options for Consideration	9
Conclusion.....	13
Acknowledgments.....	13

Appendices

Appendix 1- Business Stakeholder Workshop Notes from August 5, 2019

Appendix 2- Business Survey Results from October 16-30, 2019

Appendix 3- Community Workshop Presentation Slides from October 29, 2019

Appendix 4- Community Workshop Notes from October 29, 2019

Appendix 5- Oregon DEQ Report

Appendix 6- Kirkland Washington Introductory Report on Single Use Food Service Ware Policies

Introduction

In 2017, the United States generated 267 million tons of waste. Of that, an estimated 1.1 million tons was single-use foodware.¹ These single-use items are part of our everyday lives. Whether purchasing food in plastic packaging from the grocery store, or getting a to-go beverage in a compostable cup with a lid and plastic straw—single-use items are difficult to avoid. Though we use them once, most disposables persist in our environment forever. The waste ends up in our landfills, natural environment, streams, lakes, and oceans. Microplastics, the particulate debris of plastic breaking into smaller pieces over time, is found in oceans worldwide, and for the first time ever was found in Lake Tahoe last year.

While we witness the harmful disposal of single-use items, most of the environmental impact is created in the item's production due to the use of natural resources. Currently about eight percent of the world's oil production is used to make plastic. If we continue business as usual, this oil production is projected to increase to twenty percent by 2050.² Though compostable items may seem like a viable alternative, the production of products that use paper and bioplastics can result in ten to one hundred times higher environmental impact than that of non-compostable items.³ From production to disposal, each single-use item yields an immense and often preventable burden on our environment.

Background

Governmental Action

Awareness of the proliferation of single-use items has increased in recent years. As a result, local and statewide governments have begun taking action. In 2013, the Town of Truckee became the 89th community to ban single-use plastic bags and require retailers to charge a 10-cent fee for recycled paper bags. Soon after in 2016, California voters passed Proposition 67, enacting a statewide single-use carryout bag ban. Six months later, the number of plastic bags provided to customers reduced by 85% and paper bags by 61%.⁴

In January 2019, a California state single-use straw law went into effect, requiring full-service restaurants to provide single-use plastic straws upon request only. The law does not ban plastic straws, nor does it affect fast food or other limited-service restaurants. Rather, the law intends to reduce excess waste by requiring customers to request a straw only when needed. By presenting the consumer with a choice, positive behavioral changes are more likely to be made.



Outreach material for the 2014 plastic bag ban in Truckee.

¹ Environmental Protection Agency, <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>

² National Geographic, <https://www.nationalgeographic.com/news/2018/05/plastics-facts-infographics-ocean-pollution/#close>

³ Oregon Department of Environmental Quality, <https://www.oregon.gov/deq/FilterDocs/FoodLCareport.pdf>

⁴ CalRecycle, <https://www2.calrecycle.ca.gov/Publications/Details/1647>

Another state law passed in July 2019 clarifies health code laws to make serving in reusable foodware easier for establishments. Dubbed the “Bring Your Own Bill,” AB 619 allows customers to bring reusable containers to restaurants for takeout and temporary food facilities at events to service customers in reusable containers.

Recycling and Composting

Many businesses and individuals seek to reduce the environmental impact of using disposable items by relying on recycling and composting. Recycling often helps consumers rationalize the consumption of materials by giving an “out.” Unfortunately, the reliability of recycling outlets is dwindling. China was formerly the largest recyclables importer in the world, but in 2013, began limiting imports of recyclables to improve their nation’s own environmental quality. Imported recycling loads have historically been heavily contaminated—containing trash and non-recyclable materials—passing the responsibility of disposal onto the Chinese. In January 2018, China enacted National Sword, a policy that restricts imports of foreign recyclables and sets strict contamination standards. The restrictions have significantly disrupted the global recycling market. As a result, many cities throughout the country and world have been unable to recycle certain materials collected through recycling programs.

Due to Truckee’s relative small volume of materials and its distance from port cities, the impacts were felt locally after China’s first policy restrictions. In 2013, we began only recycling plastics #1 and 2 due to the inability to sell the lower, less valuable grades #3-7 to plastic recyclers. The market for other historically recyclable materials including office paper, has also been reduced. With a shrinking end market, the ability to recycle the overwhelming amount of products coming through the waste stream has dramatically decreased. The products that are still marketable have also decreased significantly in commodity value. In July 2017, Truckee’s local processing facility, Eastern Regional Landfill (ERL), was receiving \$200/ton of corrugated cardboard. Since then, this value has shrunk to \$12/ton for the same material. Due to this global disruption and decline of the recycling industry, it is likely that local governments will begin to pay for recycling in the near future.

In the wake of our waste crisis, compostable products have gained popularity as a means to prevent materials from going to landfill. Bio-based plastics have emerged onto markets leading consumers to believe that they are sustainable alternatives. These products are made out of corn, sugarcane, or other plant-based materials, but resemble traditional plastics. In reality, most composters do not accept these materials because they do not break down in their facilities. Bioplastics and other compostable foodware require extremely high temperatures to break down, something that is infeasible for most composting operations. Contamination of trash is also an issue for composters. When unaccepted materials end up in the compost stream, it may lead to an entire compost load being rejected by a facility and subsequently landfilled. When composters accept compostable items, look-alike items such as traditional plastics mistakenly get thrown in, resulting in increased contamination of the compost stream and higher operational costs. Recently, Oregon composters collectively published a letter listing these issues as reason why they will no longer take compostable packaging and foodware. Truckee’s two local composters, RT Donovan and Full Circle, also do not accept compostable products for these reasons.

Traditionally, local governments and waste haulers have been responsible for waste management by collecting, recycling and disposing of waste. This job is increasingly difficult today as the materials

collected are more difficult to recycle. Waste haulers have the challenging task of sorting through the disposed material and finding buyers to recycle each material type. What can't be sold because of unmarketable material type, contamination, or failed markets is landfilled.

Keep Truckee Green—Local Programs

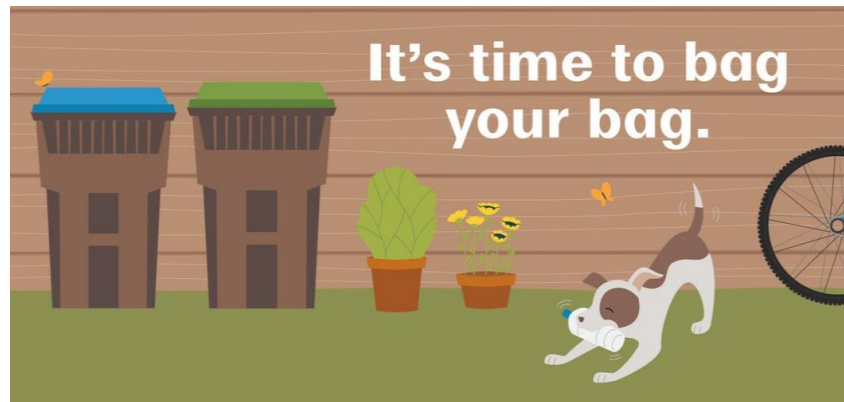
Given these challenges and the desire to generate less overall waste, Keep Truckee Green programming has focused efforts on waste reduction.

On July 1, 2018 the Town of Truckee entered a new 10-year agreement with TTSD to enact a suite of more sustainable waste collection services. In summer 2018, residential green waste and recycling carts were implemented to reduce the residual waste from green and

blue bags, while also increasing recycling rates by reducing contamination through source-separated recycling. A recycling cart program similarly began in August 2018 for all Truckee businesses. Spurred by California state regulations, a commercial food waste program was also introduced for all large generating restaurants in February 2019. Through the program, 53 restaurants in Truckee have diverted their food waste from landfill. In the summer of 2019, a partnership with Slow Food Lake Tahoe expanded composting to include a residential drop-off program. The food scraps collected in these programs go to the local commercial composters.

A reusable to-go box exchange program is also available at five partner restaurants where customers can purchase a reusable to-go box for to-go meals or leftovers. Keep Truckee Green has supplied participating restaurants Red Truck, Siam Cuisine, The Station, Stella, and Wild Cherries with reusable boxes, and customers can purchase a reusable box for \$5. For future orders, customers can exchange their box for a clean one with their next meal. Restaurants are responsible for cleaning boxes and administering the box exchange. There are currently 1,300 reusable boxes being used across town as opposed to single-use boxes.

Keep Truckee Green also offers reusable dishes for residents and organizations to utilize at events. All meetings at Town Hall utilize this reusable dishware. To date, an estimated 6,000 single-use dishes, utensils, and cups have been saved from the landfill through this program.



Keep Truckee Green's 2017 campaign to switch from blue and green bags to carts.



A reusable to-go box at Stella.

Waste reduction is also the focus of events hosted in partnership with the Truckee Roundhouse, including Fixit Clinics and First Tuesdays for Planet Earth. At Fixit Clinics, a bi-annual repair event, community members can restore broken household items with help from expert “Fixit Coaches.” This not only reduces the amount of items going to the landfill, but also prevents the purchase of new items. Also at Truckee Roundhouse is First Tuesdays for Planet Earth, a monthly workshop to teach the creation of self-made, zero waste lifestyle items such as reusable produce bags.

Keep Truckee Green has installed two bag share bins outside of grocery store entryways to encourage shoppers to utilize reusable bags. The bins allow shoppers to “leave a bag, take a bag” to reduce the number of single-use bags needed from the store.

Single-Use Foodware Policies

Local governments have the ability to reduce single-use foodware generated throughout their jurisdiction. Many communities have placed bans or restrictions on items including polystyrene (commonly known as Styrofoam), straws, utensils, cups, or takeout containers. Single-use ordinances vary across cities depending on community priorities as well as recycling and composting capacities. Over 100 jurisdictions across the US have banned polystyrene. Plastic straws ordinances are emerging as a priority for many communities.

Many policies limit specific single-use items, but still allow the use of others.



An example breakdown of the carbon footprint of a single-use product from Eco-Products.

In a comprehensive report from Oregon Department of Environmental Quality, impacts from the complete lifecycle of various single-use items were compared in terms of Global Warming Potential (GWP). When analyzing the impacts from production to end-of-life, the report finds that there is no “best” material type among the single-use items analyzed. Eight material types were compared, including reusable foodware, single-use bio-based plastic, paperboard, plastic, and polystyrene. Reusable items were the only option determined to have a significantly lower global warming potential. Often only the end-of-life impacts of a material are considered—whether it be landfilled, recycled, composted, or even littered. However, disposal of a product only accounts for about 18% of its carbon footprint. The majority of a product’s impacts really come from sourcing, manufacturing, and transporting the products before they’re even used. Reusable products, in comparison, are produced once and can be reused hundreds or thousands of times, cutting out the majority of the impacts. The energy and resources put into washing reusable foodware is still less than the production impacts of a new single-use item.⁵

⁵ Oregon Department of Environmental Quality, <https://www.oregon.gov/deq/FilterDocs/FoodLCareport.pdf>



The most effective solutions are reducing the usage of disposable foodware and interchanging reusable dishware whenever feasible. This strategy is reflected in the waste hierarchy, where preferences for managing waste are outlined from most preferred to least preferred. Source reduction, the most preferred management strategy, eliminates waste before it's created by reducing consumption and preventing unnecessary use of items in the first place. This follows the same principle of the commonly known slogan "Reduce, Reuse, Recycle."

Waste management hierarchy developed by the Environmental Protection Agency.

Single-use policies can be categorized by their impact on source reduction. Less impactful policies choose specific disposable materials over others but do not consider the problem as a whole. More impactful policies reduce the availability of all disposable items and shift usage towards reusable dishware. The most effective policies spur a cultural shift away from disposables all-together rather than towards another single-use item that may have different, yet comparable environmental impacts.

Single-Use Foodware Material Types

Polystyrene

Polystyrene is a type of plastic made from fossil fuels and synthetic chemicals. It is manufactured into expanded polystyrene (EPS) and is used in disposable cups, plates, take-out containers. It can as be used as solid polystyrene, to create disposable plastic cutlery and a variety of other items. Polystyrene is labelled as #6 plastic and is not recyclable in most communities, including Truckee. Polystyrene, like all plastic, never biodegrades. Commonly found as litter, EPS is extremely light and can easily be blown around and break into smaller pieces. Volunteers with the Truckee Litter Corps, a volunteer-led monthly litter clean-up group, collected over 1,400 pieces of litter during the October and November 2019 clean-up days. Of those, 100 litter items were polystyrene, including take-out containers, cups, and indecipherable pieces. Most cities with polystyrene foam bans only regulate foodware, including takeout containers, cups, and plates. Some cities, including South Lake Tahoe, have also regulated the retail sale of polystyrene containers including disposable foam coolers, packing peanuts, cups, plates, and bowls. The drawback to a polystyrene ban alone, however, is that businesses and consumers could still utilize other disposable alternatives, resulting in similar environmental impacts.

Straws

Disposable straws can be made from plastic or biodegradable materials. All disposable straws are sent to landfill in Truckee, as plastic straws are not recyclable and biodegradable straws are not composted. Single-use straws have emerged as a popular subject in the waste discussion due to their lack of necessity and low requisite for habit change. Many Tahoe-Truckee students with SOS Outreach, Sierra Expeditionary Learning School, and Sierra Watershed Education Partnerships have started local campaigns against straws. Students have taken the initiative to educate local restaurants about the importance of going straw free. Excess straw use can be dramatically reduced by requiring that they are only provided upon request. Although California has already passed a statewide straw law, further action can require all restaurants, including limited-service and fast food restaurants, to comply under the same requirement. Policies should consider accessibility to straws for persons with disabilities.

Utensils and Accessories

Most plastic utensils are made from polystyrene and derived from fossil fuels. Upon request policies can also be applied to single-use utensils and accessories, including forks, knives, spoons, condiment packets, stirrers, cup sleeves, and lids. Stricter policies can require restaurants to provide reusable utensils for all customers dining in-house.

Cups

Disposable cups are typically made from paper and plastic, derived from fossil fuels, water and other natural resources. Coffee cups are made with paper, but lined with plastic, which makes recycling or composting them nearly impossible. Americans throw away 100 billion of these cups each year. The cities of Berkeley, Watsonville, Santa Cruz, and Vancouver are early pioneers of ordinances that require a 25-cent fee for disposable takeout cups at restaurants and coffee shops. Similar to the statewide plastic bag fee, the policy intends to create an incentive to bring a reusable cup or mug and force behavior change. Results from plastic bag bans across the country indicate a fee is more effective at changing habits than offering a discount.⁶ Studies also show that a 25-cent fee is most likely to incentivize customers to bring their own cup.⁷ The four ordinances passed thus far permit the businesses to keep the fee revenue. The City of Berkeley's ordinance also requires restaurants to provide reusable cups for all in-house dining. After passing their ordinance, Berkeley began piloting a reusable coffee cup program.

Takeout containers

Takeout containers can be made from paper, polystyrene, recyclable plastic, or different grades of plastic. These materials are derived from fossil fuels, water, and other natural resources. Takeout containers made from plastic #1 or 2 are recyclable, but require that food residue is removed in order to

⁶ Tatiana Homonoff, <https://pubs.aeaweb.org/doi/pdfplus/10.1257/pol.20150261>

⁷ Rethink Disposable, http://www.rethinkdisposable.org/file/213/download?token=_YS-M8uE

be recycled. Though takeout containers can be harmful, wasted food is much more detrimental. Estimates indicate that food waste has 1.5 times more greenhouse gas (GHG) emissions than disposable foodware.⁸ Policies restricting takeout containers should be careful to not discourage customers from taking home leftover food and increase food waste. Restaurants and customers participating in Keep Truckee Green's reusable to-go box program are eliminating single-use takeout boxes by exchanging reusable boxes for takeout orders and leftovers.

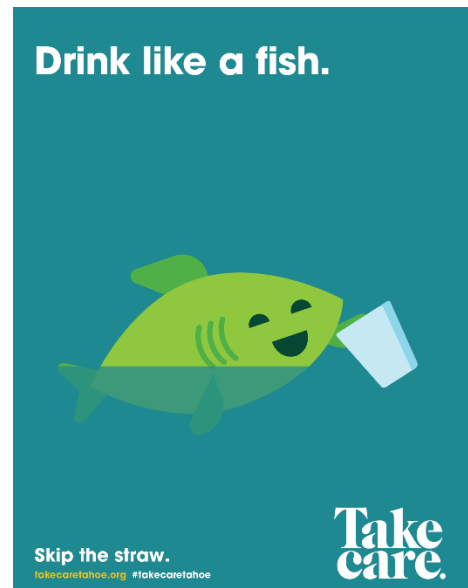
Education

The goal of a single-use reduction policy is to change the behavior of both consumers and businesses. For this reason, any policy change should be paired with extensive outreach and education. Widespread outreach campaigns targeting local consumers, businesses, and visitors will be prioritized as the first strategy to reduce waste. A powerful educational campaign, even on its own, can prompt voluntary behavior change.

Community Feedback

Business Community Feedback

On August 5, 2019, 14 business representatives attended a workshop to deliberate policy options and provide valuable feedback. Business owners expressed the desire to do the right thing, but faced challenges such as expenses, a lack of time, and limited information. Nonetheless, many businesses have voluntarily offered discounts for "bring-your-own" and provide alternatives such as paper straws. In the workshop, unique challenges with providing items upon request were deliberated, including the additional labor and stress to the flow of business. In a survey conducted after the workshop, 34% of businesses indicated they do not have dishwashers, providing a hindrance for reusable dishware. Other concerns included cost of additional labor and product loss or damage. Business owners were also fearful that a fee on disposables might deter business, especially from visitors who many not be aware of policies in Truckee. Many agreed support from the Town to help navigate the changes would be desired, including grants for reusable dishware and dishwashers, education on sustainable procurement options,



Skip the straw campaign from Take Care Tahoe.



Participants at the October 29 Single-Use Reduction Workshop.

⁸ Oregon Department of Environmental Quality, <https://www.oregon.gov/deq/FilterDocs/FoodLCareport.pdf>

coordinating cost-sharing of procurement, and public education to encourage customers to bring their own reusable foodware.

Public Feedback

On October 29, 2019 over 65 individuals attended a Single-Use Reduction Workshop, including 20 local students and 5 business representatives. Participants brainstormed solutions to reduce the number of single-use items in Truckee. Many solutions were focused on education for consumers, comprising of campaigns to make reusables “cool” and engraining sustainability in the town’s cultural identity. Notable ideas included a green ambassador program, an art competition, and youth-led education programs. Approaches to specifically educate visitors were also discussed, including a regional awareness campaign in partnership with neighboring entities. Policy ideas discussed amongst attendees focused on discounts and fees to incentivize use of reusable foodware.



An art piece on display at the Single-Use Reduction Workshop showcasing single-use items picked up as litter in Truckee.

Policy Options for Consideration

1. **Provide single-use straws, utensils, and accessory items upon request only.**

This would require businesses to offer straws, utensils, and items such as condiment packets and napkins to customers upon request only. This forces consumers to make a choice on whether they actually need to receive these disposable items.

Benefits	Challenges
<ul style="list-style-type: none"> • Reduction in excess waste of disposable items. • Expands on the State Law to include all food services, including grocery stores and fast food establishments. • Heightens customer awareness of consumptive behavior. 	<ul style="list-style-type: none"> • Continues some use of single-use plastics. • Challenging for business work flow by providing an extra customer service burden on employees.

2. **Provide only reusable foodware items for in-house dining.**

This would require businesses to provide reusable dishes for in-house dining only. No single-use items such as plastic utensils, cups, or dishware would be used by customers consuming items within the establishment.

Benefits	Challenges
<ul style="list-style-type: none"> • Reduction in excess waste of disposable items. 	<ul style="list-style-type: none"> • Not all businesses have dishwashers. • Additional cost for procurement of

<ul style="list-style-type: none"> Reinforces the reuse of items and waste reduction culture in Truckee. 	<ul style="list-style-type: none"> reusable dishes. Greater expense to ratepayers as funding for business assistance increases.
---	---

Other considerations: An exception would need to be addressed for restaurants that do not have dishwashers. This could also require any future restaurants built to have a commercial dishwasher in order to receive its complete building permit.

3. **Require businesses to charge a fee on disposable foodware items.**

Similar to the plastic bag fee, this policy requires businesses to charge a fee on single-use foodware items. Such items could include coffee cups, utensils, or accessory items. The fee collected would be kept by businesses to be invested into reusable dishware procurement. The fee could be a \$0.10 to \$0.25 fee that reflects the actual cost of the disposable item to the customer.

Benefits	Challenges
<ul style="list-style-type: none"> Reduction in excess waste of disposable items. Reinforces the waste reduction culture in Truckee. Potentially has the largest impact on driving behavior change, as supported by results seen by plastic bag fees. 	<ul style="list-style-type: none"> Not largely supported idea by businesses. Instituting a fee on to-go boxes may have the unintended consequence of increased food waste by deterring customers from taking home leftovers.

Other considerations: Council may need to consider the type of items requiring a fee. Other communities that have imposed a fee have done so on disposable cups, but not utensils. Additionally, studies show that a \$0.25 fee is the most effective in impacting behavior change; however survey results from businesses reflected a \$0.15 fee being the most popular amongst the businesses who responded. Instead of allowing businesses to keep the fee, money collected could alternatively go into a reusable foodware program fund. However, this is not recommended by staff due to a variety of reasons, including the complexity of collection and remittance. It seems appropriate that any fee collected be maintained by the restaurant itself to enable sustainable procurement and address dishwashing costs.

4. **Continue to expand the reusable to-go container program.**

Include language to allow staff to continue developing the reusable to-go box program pilot and explore a reusable to-go cup program. Staff recommends this remain a voluntary program to businesses and consumers for best participation results.

Benefits	Challenges
<ul style="list-style-type: none"> • Reduction in waste of disposable items. • Reinforces the reuse waste reduction culture in Truckee. 	<ul style="list-style-type: none"> • Not all businesses have dishwashers. • Additional cost for procurement of reusable containers. • Greater expense to ratepayers as funding for business assistance increases. • May have unintended consequences of excess waste generated by boxes disposed of by visitor population that may not use the box again or have the ability to travel home with the container.

Other policies that have been explored include the following, but are not recommended by staff due to drawbacks and potential unintended consequences that may result:

1 . Not recommended—Ban all polystyrene foodware items.

This would require all businesses to stop use of polystyrene foam products, such as to-go boxes, coffee cups, plates, and bowls. Businesses would be free to choose a different alternative material type that is not polystyrene.

Benefits	Challenges
<ul style="list-style-type: none"> • Most restaurants in Truckee do not utilize polystyrene products, so this would have a limited business impact. 	<ul style="list-style-type: none"> • This may not actually reduce waste generated, but would simply shift the disposable item to a different material type that would still likely be landfilled.

2 . Not recommended—Require cups and to-go containers be made out of recyclable materials (plastics 1 & 2 only).

This would require all businesses to provide cups and to-go containers that are made out of plastic 1 or 2 only. Businesses currently utilizing other materials would need to shift to plastics 1 or 2, the only recyclable numbers in Truckee.

Benefits	Challenges
<ul style="list-style-type: none"> This provides the possibility for materials to be recycled as an end-of-life disposal method. 	<ul style="list-style-type: none"> Items containing liquid or food items are unlikely to actually be recycled unless they are thoroughly emptied and dried. Therefore, this policy may not actually reduce waste as a result of contaminated recyclables. This poses a significant cost increase to businesses as these container types are more costly and there are limited products on the market. Another unintended consequence may be increased GHG impacts by moving from paper-based products to plastic.

3 . Not recommended—Require disposable foodware items be made out of compostable materials only.

This would require all businesses to provide cups, to-go boxes, straws, utensils and other items made out of paper or bioplastic materials. Businesses currently utilizing other materials would need to shift to fiber-based or bioplastics.

Benefits	Challenges
<ul style="list-style-type: none"> Businesses can provide an option that is perceived by consumers as the most sustainable option. 	<ul style="list-style-type: none"> This policy would not reduce the waste generated. The local commercial composters will not accept compostable materials. Therefore, any compostable disposables would still be landfilled. This poses a significant cost increase to businesses as these material types are a much higher expense. Another unintended consequence may be increased GHG impacts by moving away from traditional materials to bioplastics.

4 . Not recommended—Require businesses to utilize reusable to-go containers.

This policy would require businesses to participate in the reusable to-go box program and any future reusable beverage cup program.

Benefits	Challenges
<ul style="list-style-type: none"> • Reduction in waste of disposable items. • Reinforces the reuse waste reduction culture in Truckee. 	<ul style="list-style-type: none"> • Not all businesses have dishwashers. • Additional cost for procurement of reusable containers. • Greater expense to ratepayers as funding for business assistance increases. • May have unintended consequences of excess waste generated by boxes disposed of by visitor population that may not use the box again or have the ability to travel home with the container.

Conclusion

It is difficult to evaluate the environmental impact of a single-use foodware ordinance. The end-of-life GHG impact of disposable foodware is relatively small in comparison to the production of the foodware itself, or the much more detrimental GHG impacts of food waste. Despite this, many communities are adopting ordinances as the public and jurisdictions are becoming more aware of the negative impacts of single-use plastics and microplastics in our environment. A single-use foodware reduction ordinance may reduce waste, help to draw attention to the root issue of unnecessary waste, and encourage more sustainable behavior practices. An ordinance may have its largest impact, though immeasurable, by fostering a waste reduction cultural change.

This single-use foodware reduction ordinance will take a lot of effort, education, time and adjustment, but it may have positive ripple effects on individuals' behavior and could influence the community at-large to think about their use of single purpose foodware.

Acknowledgments

Staff would like to extend a thank you to Jenna Mcinnis and The City of Kirkland staff for providing valuable insight during this process, and for their dedication to parallel work in Washington.

Gillian Greenberg also contributed to these efforts, notably to the start of the green box program, during her time working at the Town of Truckee from 2018-2019.

Thank you to the many Truckee students, who have provided us with insightful messages through their letters, Council presentations, and community engagement. More importantly, thank you to these young leaders for the inspiration to be stewards of our environment.

This report was prepared by Melanie Conti with contributions by Erica Mertens and Erin Ronald.

Appendix 1

SUMMARY OF BUSINESS SINGLE-USE FOODWARE REDUCTION WORKSHOP

Workshop: On August 5, 2019, 14 business representatives discussed strategies to reduce various different single-use items. Attendees namely included managers and owners from local coffee shops and restaurants. Representatives discussed changes already made to reduce waste in their businesses, including offering incentives for “bring your own” and elimination of Styrofoam. Challenges for switching to more sustainable options were also discussed, which included lack of knowledge for “best” items to procure and cost. Staff presented reduction strategies undertaken in other communities for each single-use item and representatives discussed support and challenges for each item. Comments received for each single-use item are listed below:

Cups

- Fees don't work in a tourist economy
- Enough viable alternatives to Styrofoam
- Costco offering environmentally friendly cost-effective options
- Look at sharing to buy cost effectively in bulk
- Can require extra customer service as customers adjust to changes

Takeout Containers

- Enough alternatives to Styrofoam
- No fees
- Good experience with incentivizing “bring your own”

Accessories

- Upon request is difficult in a self-serve environment
- Important to educate customers
- Doesn't make sense to regulate stirrers/sleeves

Utensils

- Reusable utensils disappear
- Compostable materials cost more and still go to the dump
- Tourists will reject fees for utensils
- Problem is that there is no good alternative
- Costs pass on to tourists reflect on the business and the region
 - o Look at other mountain communities to see what they are doing

Straws

- Some restaurants have already switched to paper
 - o And most people like it
- Some have option for people to buy reusable
- Lots of voluntary switches, why does the Town Council want to regulate?
- Would we ban the sale of plastic straws at grocery stores?

Trays and Plates

- Most people aren't using
- Hard to get rid of at middle and high schools

Business Support

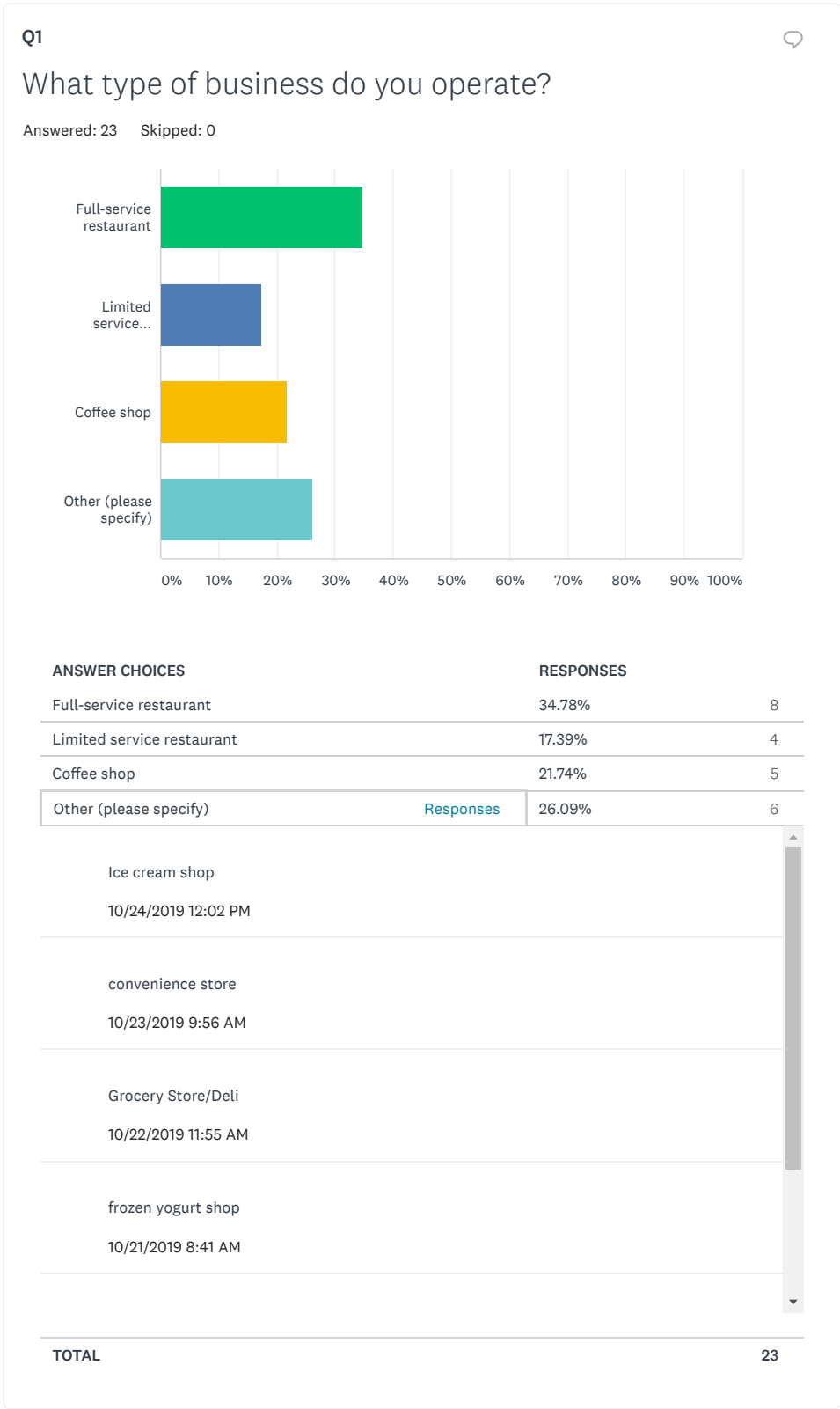
- Procurement support with what can be recycled or composted
- Education to change behavior
- Make sure there are enough alternatives/options before regulating



Appendix 2

Single-Use Foodware Business Survey

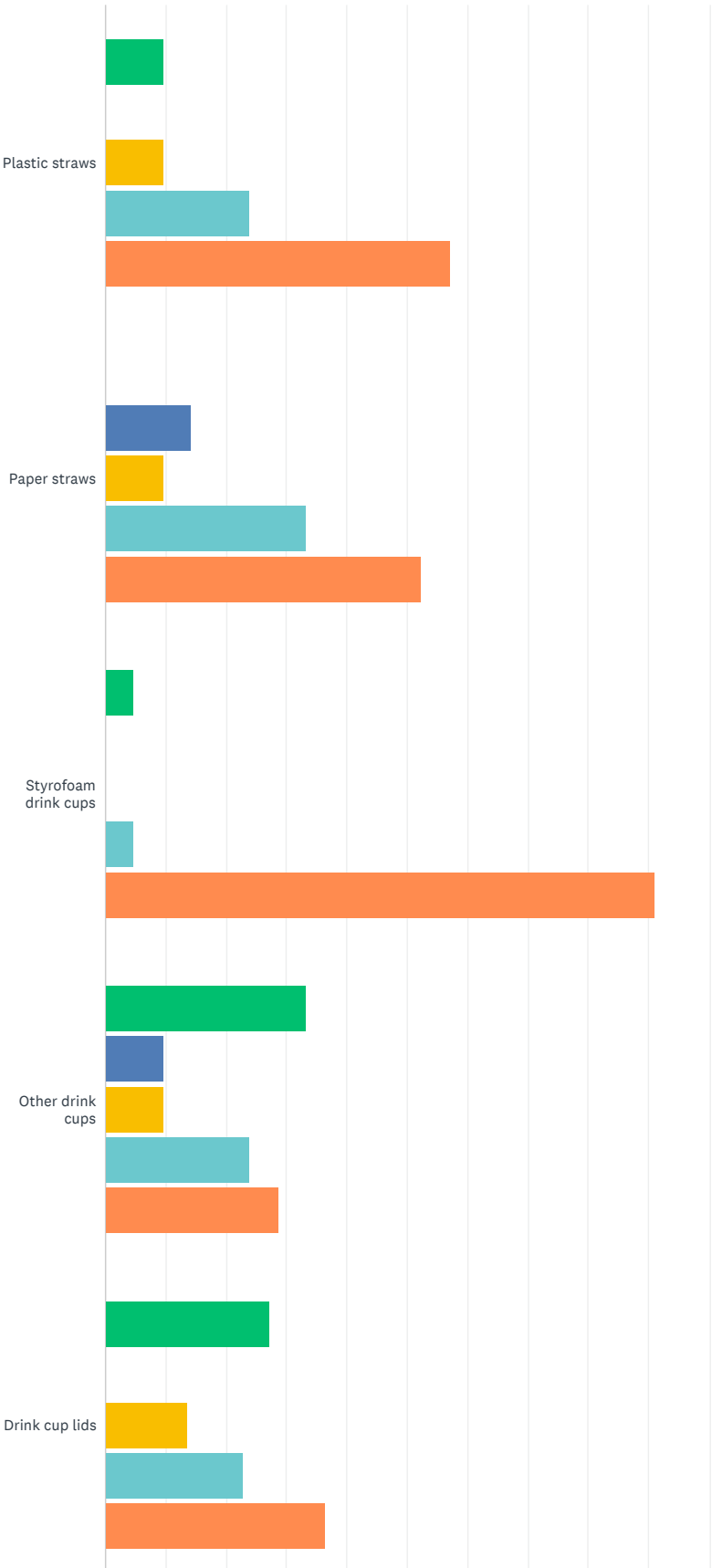
QUESTION SUMMARIES DATA TRENDS





Please select how it is provided. (Select all that apply)

Answered: 23 Skipped: 0



Share Link

<https://www.surveymonkey.com/re:>

COPY

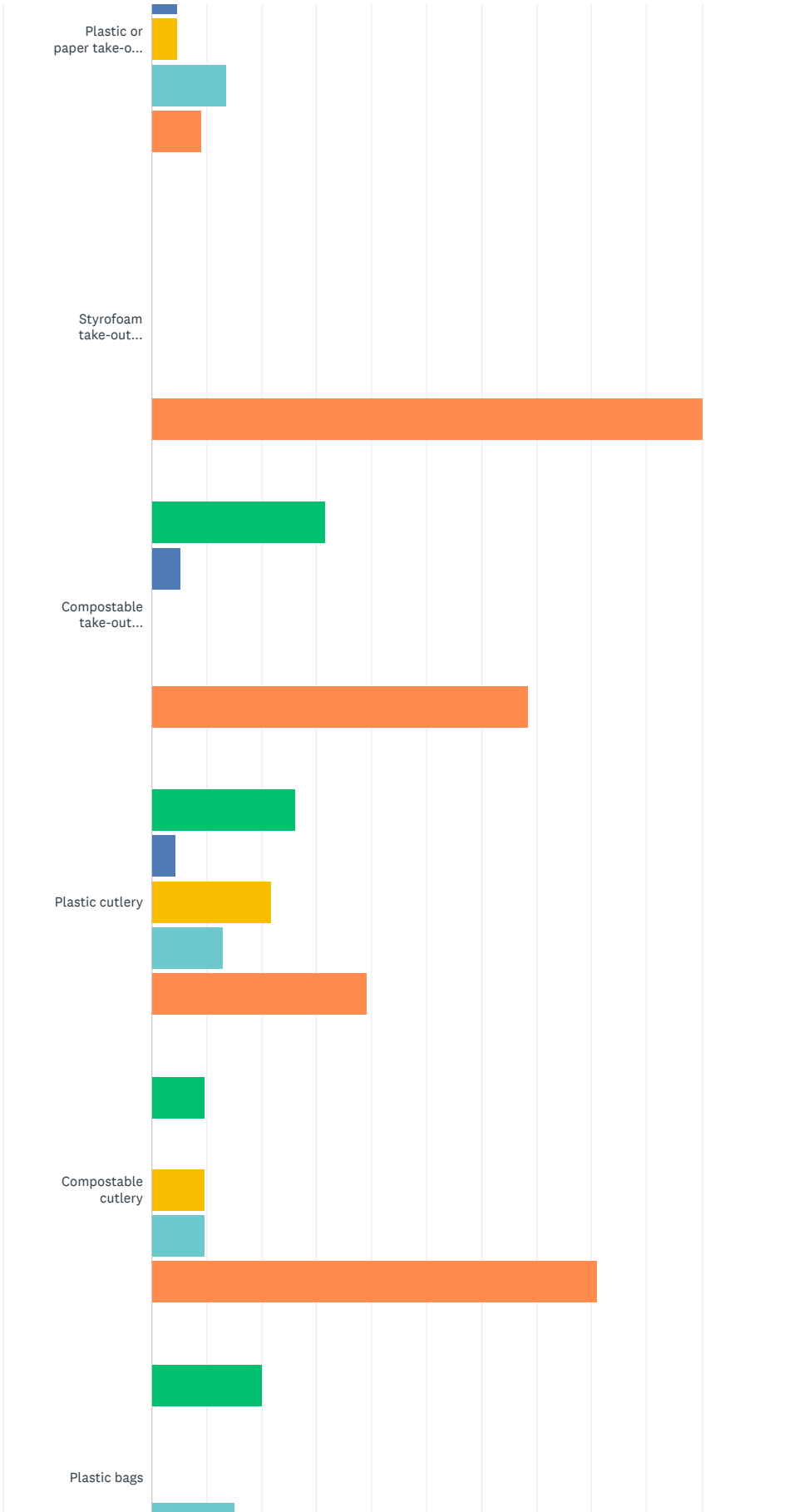
SHARE SETTINGS

Share

Tweet

Share

23 responses



Share Link

<https://www.surveymonkey.com/re:>

COPY

SHARE SETTINGS

Share

Tweet

Share

23 responses



	ALL TAKEOUT MEALS	ALL IN-HOUSE DINING	SELF-SERVICE COUNTER	UPON REQUEST ONLY	WE DON'T OFFER THIS ITEM	TOTAL RESPONDENTS
Plastic straws	9.52% 2	0.00% 0	9.52% 2	23.81% 5	57.14% 12	21
Paper straws	0.00% 0	14.29% 3	9.52% 2	33.33% 7	52.38% 11	21
Styrofoam drink cups	4.55% 1	0.00% 0	0.00% 0	4.55% 1	90.91% 20	22
Other drink cups	33.33% 7	9.52% 2	9.52% 2	23.81% 5	28.57% 6	21
Drink cup lids	27.27% 6	0.00% 0	13.64% 3	22.73% 5	36.36% 8	22
Plastic or paper take-out containers	72.73% 16	4.55% 1	4.55% 1	13.64% 3	9.09% 2	22
Styrofoam take-out containers	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 20	20
Compostable take-out containers	31.58% 6	5.26% 1	0.00% 0	0.00% 0	68.42% 13	19
Plastic cutlery	26.09% 6	4.35% 1	21.74% 5	13.04% 3	39.13% 9	23
Compostable cutlery	9.52% 2	0.00% 0	9.52% 2	9.52% 2	80.95% 17	21
Plastic bags	20.00% 4	0.00% 0	0.00% 0	15.00% 3	65.00% 13	20
Paper bags	45.45% 10	4.55% 1	0.00% 0	45.45% 10	13.64% 3	22
	ALL TAKEOUT	ALL IN-HOUSE	SELF-SERVICE	UPON REQUEST	WE DON'T	TOTAL RESPONDENTS

Share Link

<https://www.surveymonkey.com/re:>

COPY

SHARE SETTINGS

Share

Tweet

Share

23 responses



we offer edible containers :) also, we use compostable (containers that are only compostable in a commercial facility, so end up in the landfill anyway. We pay more than 4 times the price of recyclable petroleum based containers. We also offer stainless steel containers for in house customers upon request.

10/24/2019 12:02 PM

straws are PLA compostable plastic, to-go boxes are dishwasher safe and reusable, they reuse them multiple times and offer them to customers for to-go meals. plastic & paper bags are extremely rare if a customer has multiple to-go boxes only.

10/22/2019 4:14 PM

We use compostable cups when its really busy and glasses start getting broken. We basically do not do to go food but when we do its in paper containers. We have a few plastic forks that people left when they brought in a cake that we give to to-go people when they ask for something.

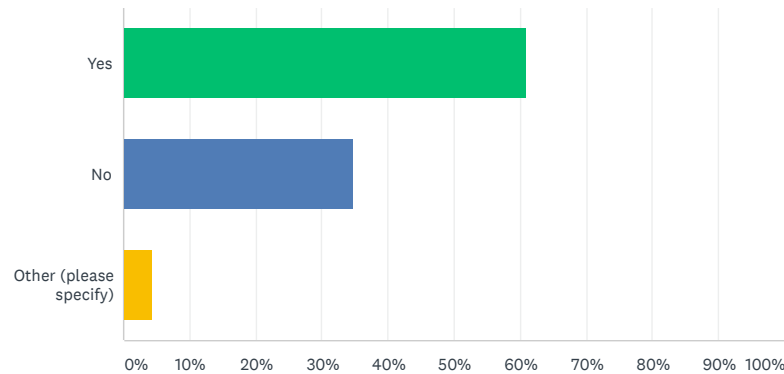
10/21/2019 8:52 PM

Q3



Does your business have a dishwasher?

Answered: 23 Skipped: 0



ANSWER CHOICES

RESPONSES

Yes	60.87%	14
No	34.78%	8
Other (please specify)	4.35%	1

3 compartment sink for manual wash

10/24/2019 12:02 PM

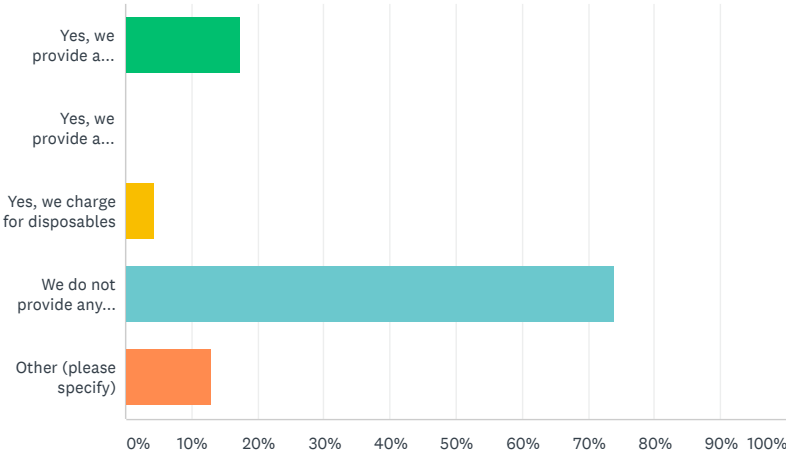


TOTAL 23

Q4

Does your business provide any customer incentives to motivate customers to bring their own reusable cup or to-go box? Select all that apply

Answered: 23 Skipped: 0



ANSWER CHOICES	RESPONSES
Yes, we provide a discount	17.39% 4
Yes, we provide a customer loyalty program	0.00% 0
Yes, we charge for disposables	4.35% 1
We do not provide any incentives	73.91% 17
Other (please specify)	13.04% 3

we absorb the increased cost and do not pass them on to customer.

10/30/2019 12:14 PM

used to hand out reusable bags but nobody brought them back

10/22/2019 2:11 PM

We ask people to bring their own containers on Noodle Bowl day if they want to take it to-go, if they don't bring them then they can't take it to go. Otherwise we do not offer other incentives.

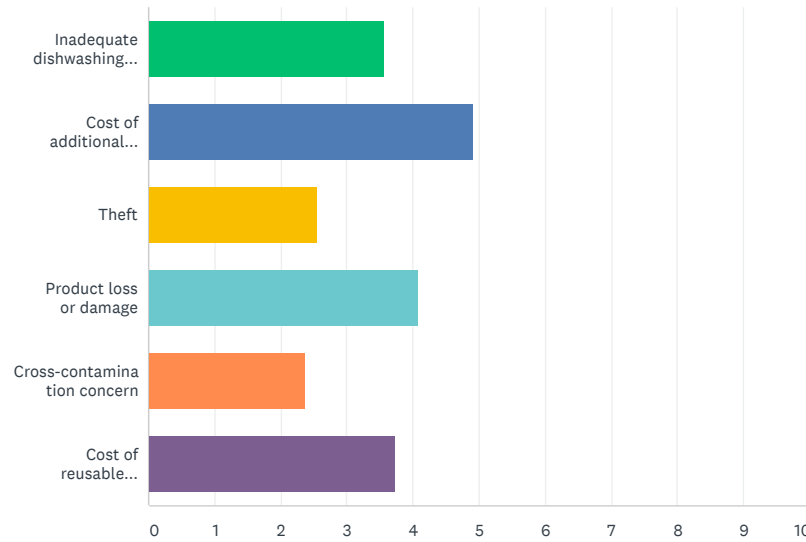
10/21/2019 8:52 PM

Total Respondents: 23



reusable foodware items for on-site dining? Please rank with (1) being the highest concern.

Answered: 12 Skipped: 11



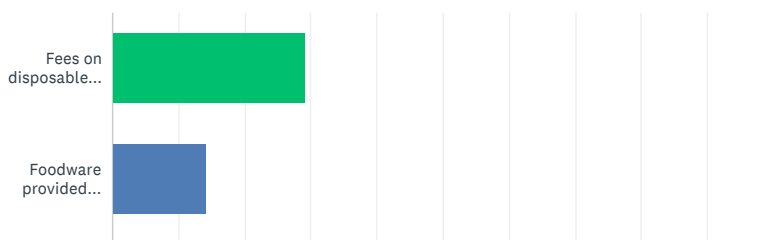
	1	2	3	4	5	6	TOTAL	SCORE
Inadequate dishwashing capacity	18.18% 2	27.27% 3	9.09% 1	9.09% 1	9.09% 1	27.27% 3	11	3.55
Cost of additional labor	36.36% 4	45.45% 5	9.09% 1	0.00% 0	0.00% 0	9.09% 1	11	4.91
Theft	0.00% 0	9.09% 1	9.09% 1	27.27% 3	36.36% 4	18.18% 2	11	2.55
Product loss or damage	33.33% 4	8.33% 1	16.67% 2	16.67% 2	25.00% 3	0.00% 0	12	4.08
Cross-contamination concern	0.00% 0	9.09% 1	9.09% 1	27.27% 3	18.18% 2	36.36% 4	11	2.36
Cost of reusable dishware	18.18% 2	0.00% 0	45.45% 5	18.18% 2	9.09% 1	9.09% 1	11	3.73

Q6



What are the major concern(s) with implementing a single-use reduction policy? Please rank with (1) being the highest concern.

Answered: 15 Skipped: 8



Share Link

<https://www.surveymonkey.com/re:>

COPY

SHARE SETTINGS

Share

Tweet

Share

23 responses



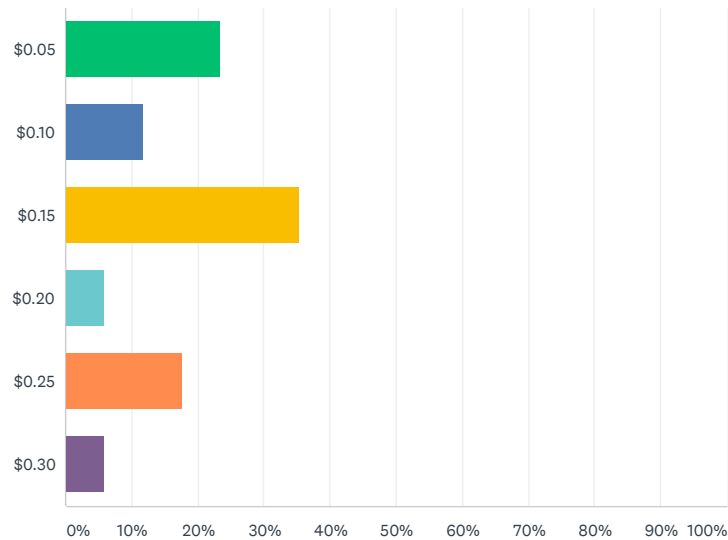
	1	2	3	TOTAL	SCORE
Fees on disposable items will deter business	90.91% 10	9.09% 1	0.00% 0	11	2.91
Foodware provided upon-request will decrease customer satisfaction	8.33% 1	25.00% 3	66.67% 8	12	1.42
Foodware provided upon-request will require more staff time	28.57% 4	50.00% 7	21.43% 3	14	2.07

Q7



If all businesses in the Town were required to charge for disposable hot and cold beverage cups, how much do you think is a fair/appropriate amount to charge for one disposable cup?

Answered: 17 Skipped: 6



ANSWER CHOICES	RESPONSES	
\$0.05	23.53%	4
\$0.10	11.76%	2
\$0.15	35.29%	6
\$0.20	5.88%	1
\$0.25	17.65%	3
\$0.30	5.88%	1
TOTAL		17

Share Link

<https://www.surveymonkey.com/re:>

COPY

SHARE SETTINGS

Share

Tweet

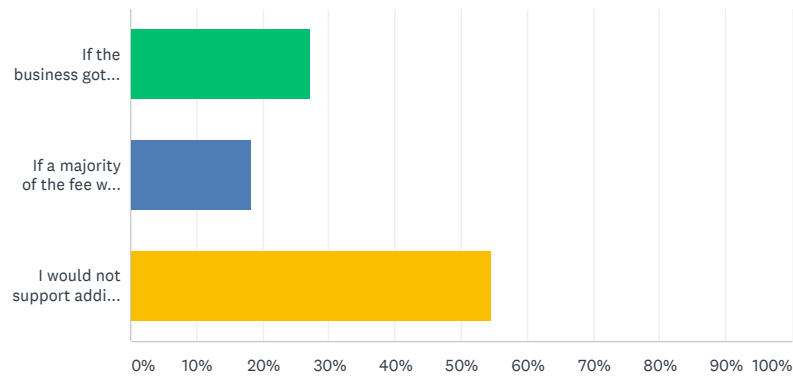
Share

23 responses



the town was required to charge for disposable items, would you support adding a charge?

Answered: 22 Skipped: 1



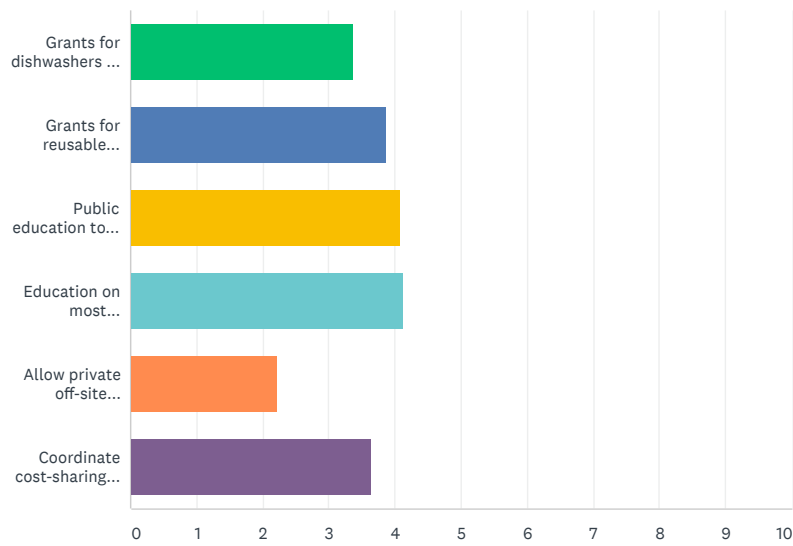
ANSWER CHOICES	RESPONSES	
If the business got to keep 100% of the fee to cover the costs of the disposables	27.27%	6
If a majority of the fee went to the business and a portion went to litter abatement in Truckee	18.18%	4
I would not support adding a charge for disposable items	54.55%	12
TOTAL		22

Q9



What support from the Town would be most helpful with your business reducing waste? Please rank in order of importance with (1) being most helpful.

Answered: 16 Skipped: 7



	1	2	3	4	5	6	TOTAL	SCORE
Grants for	28.57%	7.14%	7.14%	14.29%	14.29%	28.57%		

Share Link

<https://www.surveymonkey.com/re:>

COPY

SHARE SETTINGS

Share

Tweet

Share

23 responses



Public education to bring-your-own and reduce waste	21.43% 3	28.57% 4	14.29% 2	21.43% 3	0.00% 0	14.29% 2	14	4.07
Education on most sustainable procurement options	26.67% 4	20.00% 3	20.00% 3	6.67% 1	26.67% 4	0.00% 0	15	4.13
Allow private off-site washing/cleaning services to provide service in lieu of on-site cleaning	0.00% 0	14.29% 2	7.14% 1	14.29% 2	14.29% 2	50.00% 7	14	2.21
Coordinate cost-sharing of procurement	14.29% 2	14.29% 2	21.43% 3	21.43% 3	28.57% 4	0.00% 0	14	3.64

Q10



Do you have any additional feedback?

Answered: 14 Skipped: 9

change is hard for customers. they want their food fast. small community with repeat customers = customers notice any change in pricing. reusable silverware gets thrown away. maybe magnetic lids?

10/22/2019 2:11 PM

I think Businesses should do what's right and limit the amount of waste they produce. It's a moral and conscious obligation. Consumers should support those businesses and not the others. I don't think making laws and forcing businesses into doing things is the best way. It is already really difficult to run a business successfully in California. There are way too many fees and procedures weighing down small businesses already.

10/21/2019 8:52 PM

Most of us are on compostable cups, getting a facility to take those cups.

10/20/2019 7:16 AM

Powered by SurveyMonkey

Check out our [sample surveys](#) and [create your own now!](#)

Share Link

<https://www.surveymonkey.com/re:>

COPY

SHARE SETTINGS

Share

Tweet

Share

23 responses

Q10 Do you have any additional feedback?

We are all at the mercy of the Town/Municipality. It would be extremely refreshing and helpful to make any changes practical and not hostile to local businesses. Any changes should be universally enforced to include fast food restaurants, grocery stores, delis, chain operators, convenience stores, charity events, special events (eg. Truckee Thursday), food trucks, caterers and the Town of Truckee just to name a few.

10/30/2019 12:14 PM

I DON'T like the idea of the town REQUIRING anything above what is already required for the operation of a restaurant. Educating the public would be a much better use of time rather than implementing ANOTHER tax. It is already hard enough for a business to succeed in this town (especially new restaurants). We could use more HELP, not TAXATION.

10/26/2019 10:34 AM

Because most of our items are non-taxed, a small fee for the single use items would not work for us.

10/24/2019 12:02 PM

We have no plastic in restaurant, not many to-go boxes passed out: portions are appropriate. togo boxes are recycled paper, offer paper straws. it's already costly for restaurants to get any supplies up here, a cup of soda is already expensive. adding a tax would be difficult for the consumer. BYO cup- businesses may have issues with what is already in the cup- alcohol, liquor license underage drinking concern. supports the reduction of single-use but brought that up from the perspective of a restaurant manager.

10/24/2019 11:48 AM

All about recycling, but don't make it too burdensome on businesses. Cormack(sp?) is supplier for all convenience stores locally. 7/11 corporation switching next year to bio cups (bio plastic?). discount for BYOcup: \$1.89 for coffee, \$1.00 with own cup. charge 10cents for paper bags- CA bag ban. may have issues with computer program to show separate line item for cup charges. may be logistical issues with additional labor. labor is hard to find in Truckee.

10/23/2019 9:56 AM

Compare adding fee to disposables to smoking legislation in Nevada City. social norms make no smoking happen, not legislation.

10/22/2019 4:14 PM

change is hard for customers. they want their food fast. small community with repeat customers = customers notice any change in pricing. reusable silverware gets thrown away. maybe magnetic lids?

10/22/2019 2:11 PM

I think Businesses should do what's right and limit the amount of waste they produce. It's a moral and conscious obligation. Consumers should support those businesses and not the others. I don't think making laws and forcing businesses into doing things is the best way. It is already really difficult to run a business successfully in California. There are way too many fees and procedures weighing down small businesses already.

10/21/2019 8:52 PM

Most of us are on compostable cups, getting a facility to take those cups.

10/20/2019 7:16 AM

We need commercial composting! And residential curbside compost. This will reduce waste so much! People don't know that by using "compostable" items, they are basically just trash, since they only compost in a commercial composting facility. Truckee should take some notes from San Francisco and Marin County on rad waste management. Thanks!!!

10/19/2019 1:37 PM

This is for Coffeebar Bakery! We gladly support all efforts to increase sustainability! Let us know how we can help :)

10/19/2019 8:08 AM

Savemart wraps sandwiches in tissue paper, then puts into a plastic bag (same as the meats and cheese bags). They could consider only providing the wrapped sandwich without the bag.

10/17/2019 12:21 PM

Challenge because disheartened to hear that compostable cups are the worst option. Customers will expect the "greenest" option, and feel that moving to styrofoam would deter customer base from returning. Interested in sharing procurement.

10/17/2019 11:17 AM

SINGLE-USE REDUCTION

WORK- SHOP

The word 'WORK-SHOP' is rendered in large, bold, teal letters. The letter 'O' in 'WORK' contains a white illustration of a foam food container. The letter 'K' has a white straw with a red stripe passing through it. The letter 'S' in 'SHOP' contains a white coffee cup with a brown sleeve. The letter 'O' in 'SHOP' contains a white illustration of a spoon, fork, and knife.

Introduction Presentation

October 29, 2019

AGENDA

- Presentation
- Breakout group
- Present-out
- Closing remarks

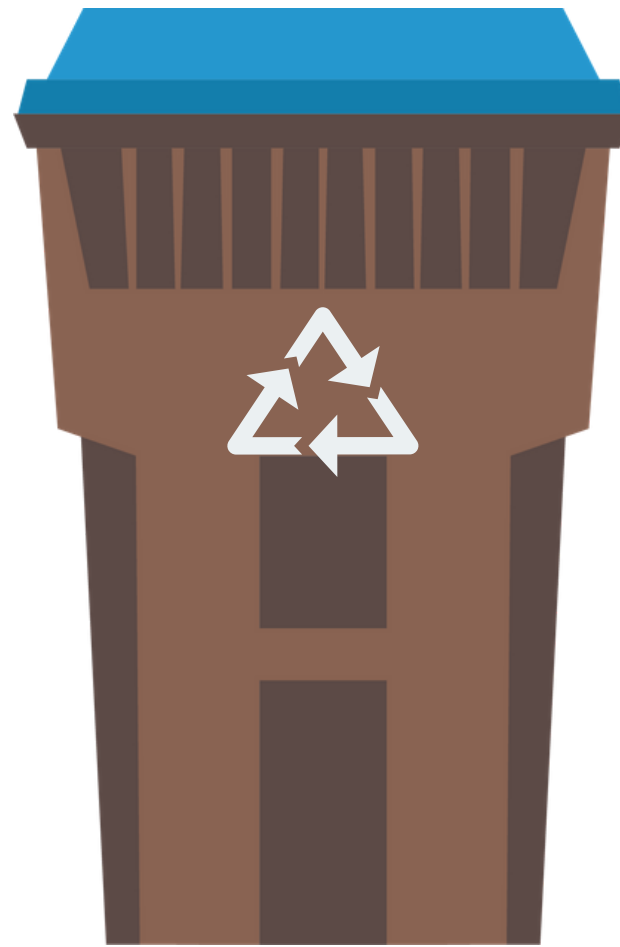
COMMUNITY PRIORITIES

- Sustainability & waste reduction goals
- Student groups: "Outlaw the Straw" "Skip the Straw" "Styrofoam kids"
- Litter reduction

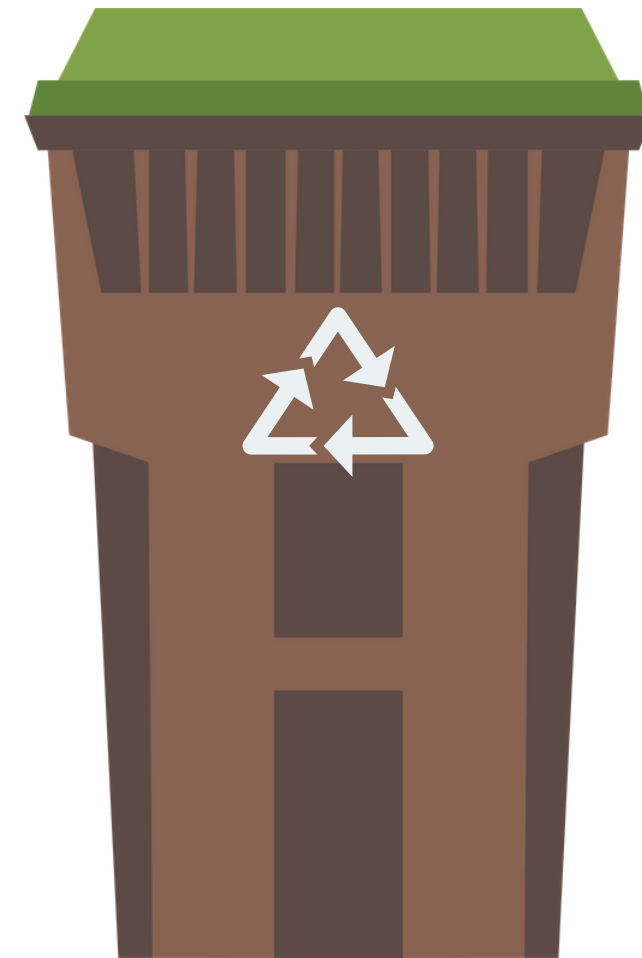
CURRENT WASTE PRACTICES



Trash/Landfill



Recycle



Compost




RECYCLING

RECICLAJE

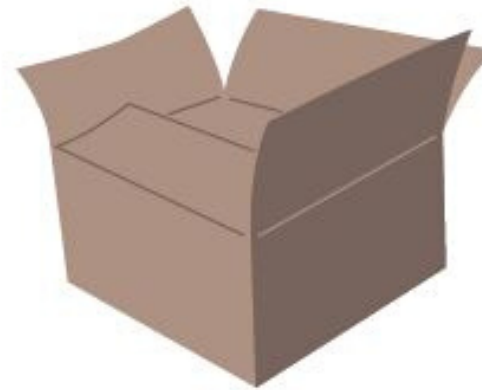
Do not bag. Loose materials only.
No utilice bolsas. Sólo artículos sueltos.



Plastics / Plásticos  & 



Paper / Papel



Cardboard / Cartón



Glass / Vidrio



Cans / Latas



For more information visit:
KeepTruckeeGreen.org

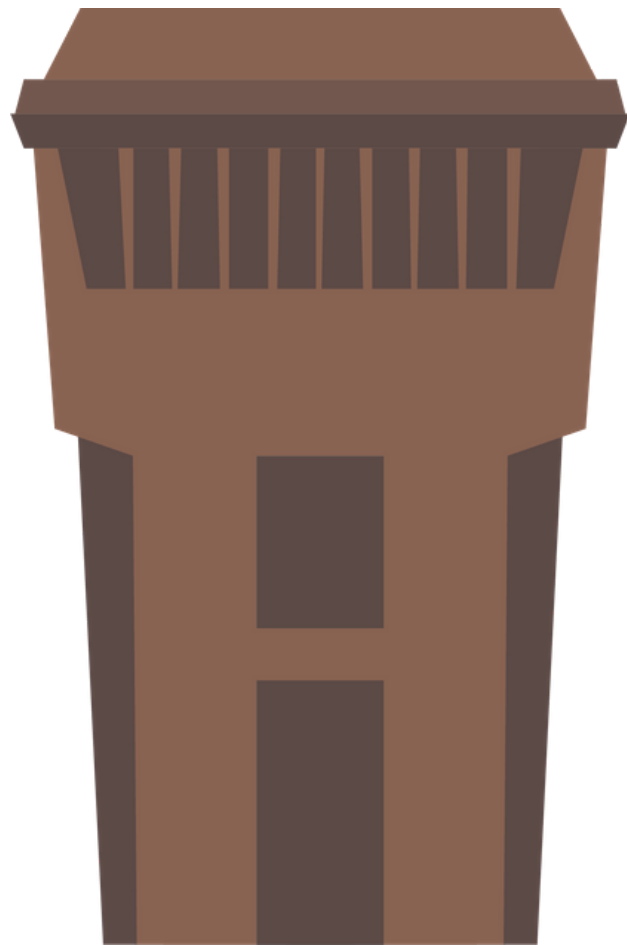


FOOD WASTE ONLY

SOLO RESTOS DE COMIDA



Be the difference.
KeepTruckeeGreen.org

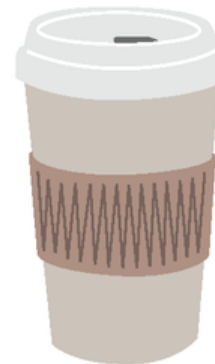
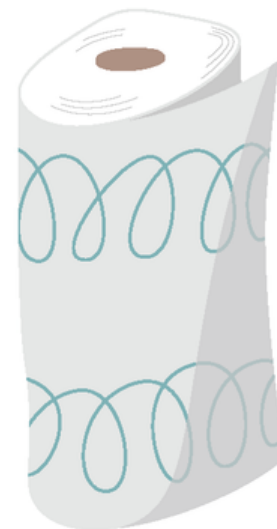


LANDFILL

BASURA

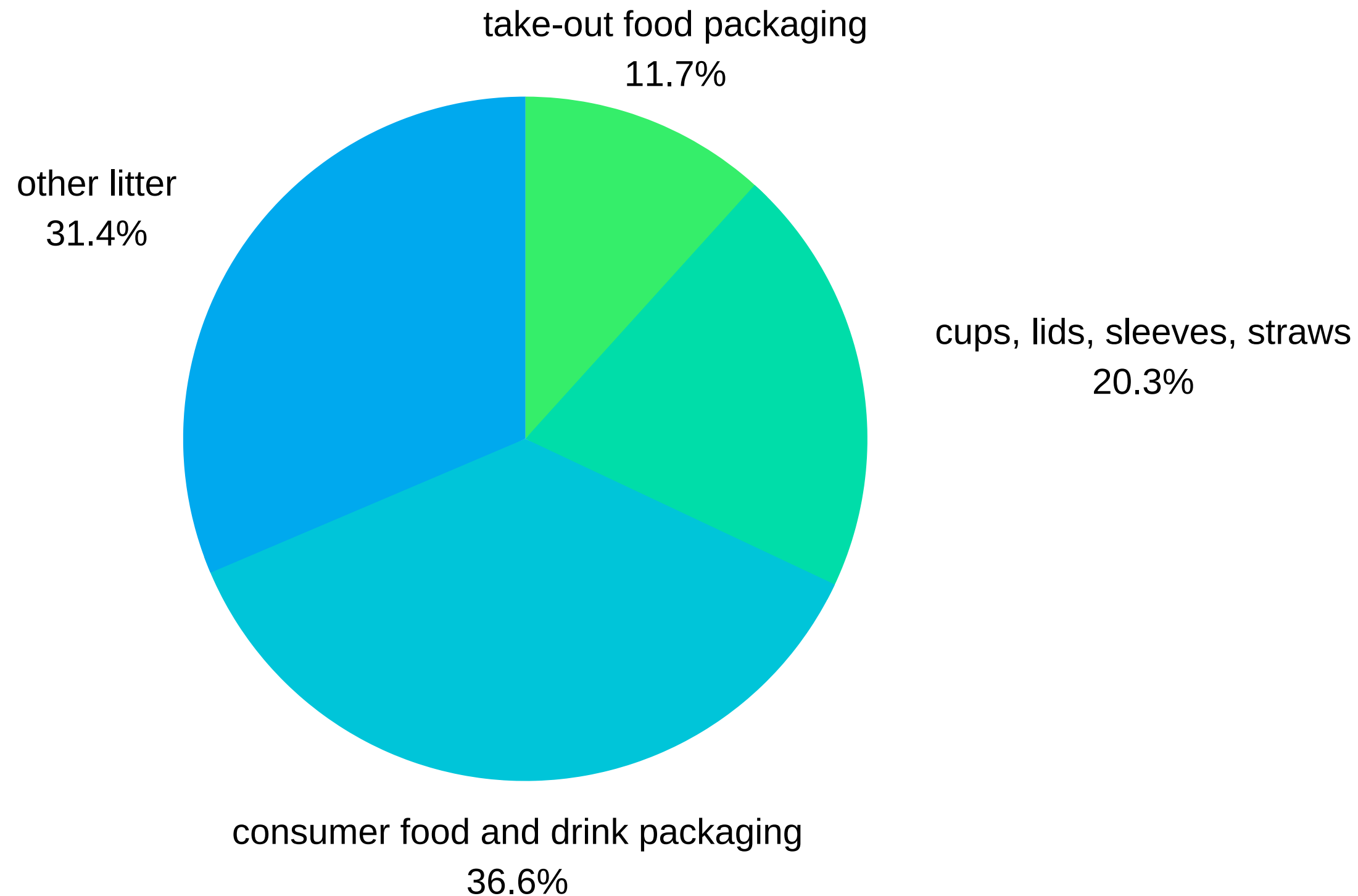


Plastics / Plásticos     

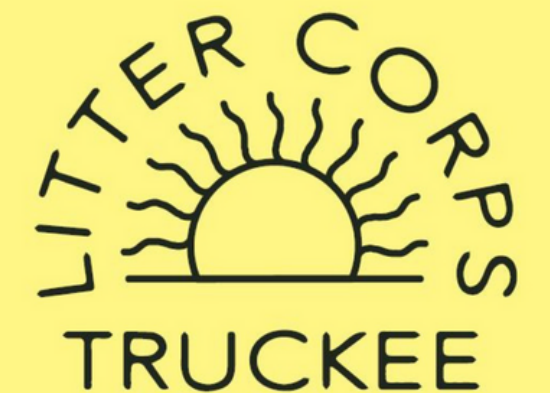


Be the difference.
KeepTruckeeGreen.org

LITTER FROM SINGLE-USE ITEMS



95 lbs
8-11 am
10/5/19



ONE PIECE AT A TIME

REUSABLE TO-GO BOX PROGRAM

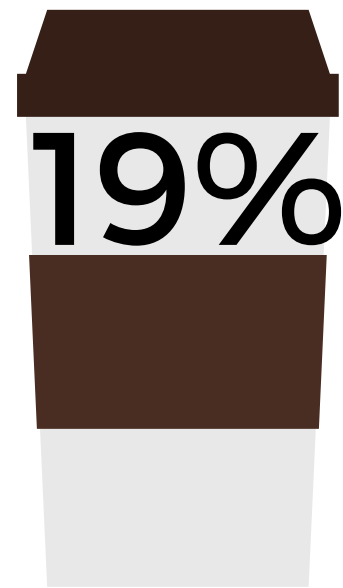


\$5 to purchase box

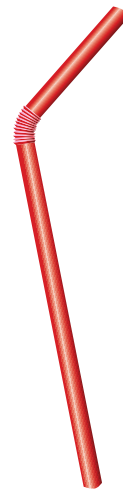
Exchange out for clean box
on your next order



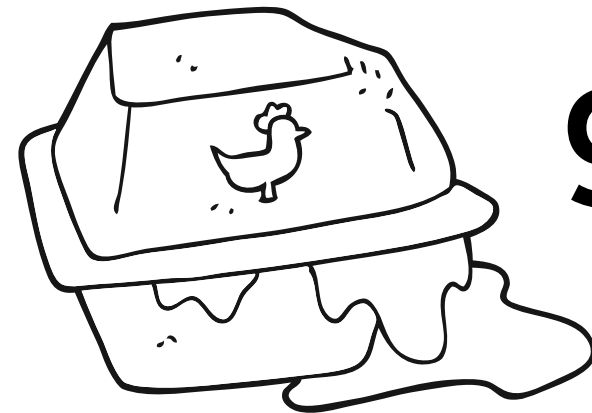
BUSINESS CONTRIBUTION



19% provide a discount for BYO container



57% provide straws only upon request



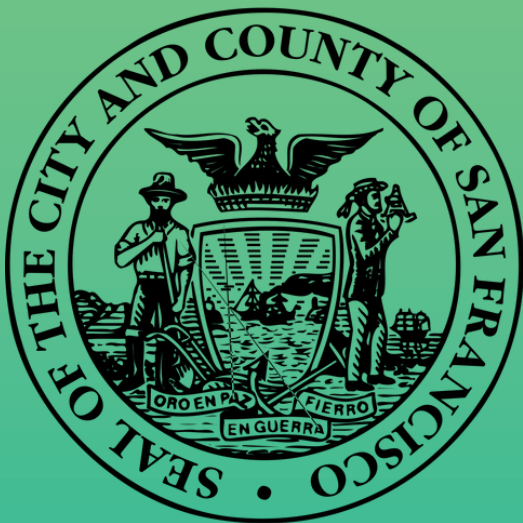
90% don't use Styrofoam



CITY OF
SOUTH LAKE TAHOE



City of Seattle



POTENTIAL STRATEGIES

- Public outreach & education
- Reusable green box program
- Upon-request
- Reusables in-house
- Fee for disposables (ie. plastic bags)

BUSINESS FEEDBACK

Reusable dishware:
labor cost & lack of
dishwasher

**Fees on
disposables**
deter
business

**Foodware upon
request** requires
more staff time

How do we get
visitors to BYO?

What is the best single-use option???

Appendix 4

SUMMARY OF COMMUNITY SINGLE-USE FOODWARE REDUCTION WORKSHOP

Workshop: Over 65 community members attended Keep Truckee Green's Single-Use Foodware Reduction workshop on October 29th, 2019 at the Community Arts Center. Participants, including local students, businesses, representatives, and residents, identified why disposables are so prominent in Truckee, core problems surrounding disposables, and solutions to reduce the amount of disposables in Truckee. Solutions generally were a combination of incentives, regulations, education, or additional opportunities.

The following comments were captured from roundtable group discussions at the workshop:

Community Identified Problems:

- Disposable items cause unsightly litter and overflowing trash bins, both of which cost to clean-up.
- The products we use do not decompose properly and contribute to growing landfills that produce methane emissions.
- Recycling is confusing, and varied. Many people do not know how to dispose of single-use items correctly.
- There are high levels of emissions and pollution produced in the production, transportation, and disposal of disposables items.
- Food items and goods often have excessive packaging and unnecessary accessory items.
- Replacing disposables with reusable plates or containers is costly to businesses due to staff time, a limited capacity for dishwashing, and cost of purchasing reusable items.
- Both litter and pollution negatively impact nature and wildlife.
- There is a widespread culture of overconsumption and convenience, as well as a lack of education and awareness on the environmental and health consequences of using disposable items.
- Using reusables in Truckee is difficult and there is a lack of knowledge of how they can be used.

Community Proposed Potential Solutions:

Incentives

- Offer attractive and reduced price reusables that are available for both tourists and residents. Capitalize on souvenir opportunities for tourists.
- Offer subsidies and grants to local businesses for increasing dishwashing capacity, creating extra staff time, and purchasing reusables.
- Create an easy deposit system to return cups or reusable trays throughout Town.
- Work with businesses to offer significant discounts for customers who bring their own container or cup.

Regulations

- Implement fees for all single-use items including take-out containers. Use fee to fund reusable program.
- Establish ordinance to limit disposables in all businesses.
- Increase costs or fines for trash pickup.

- Ban single-use plastics in Truckee.
- Create reusable requirements for new restaurants.
- Only allow disposables in restaurants and businesses that are recyclable.
- Require in-house reusables.
- Work with businesses to gradually roll out more reusable focused policies.
- Create policies to reduce waste at special events.

Education

- Provide extensive education to residents, tourists and students through media and marketing on 1) mindful consumption, 2) environmental impacts of waste, 3) zero-waste living tips, 4) existing programs available in Truckee.
- Use campaigns to increase the attractiveness of reusables, and support a culture change by 1) connecting waste to important issues, 2) implementing visible reminders, 3) using positive reinforcement, 4) making sustainability it cool/mainstream, 5) featuring young people.
- Provide tools that informs consumers which businesses offer reusable or green alternatives.
- Enhance "green" marketing to tourists by 1) setting expectations for visitors through advertisements and media, 2) promoting the image that Truckee is a "green" Town, 3) utilizing podcasts and emails.
- Create a sustainability/recycling ambassador program, and expand marketing of existing programs.
- Coordinate with the school districts, with particular focus in elementary schools, to provide opportunities for 1) students to teach parents, 2) projects around waste such as art installations, competitions, or senior projects, 3) the implementation of reusables throughout the school district.
- Work with businesses to 1) provide the true cost of disposables that customers pay for by highlighting it on receipts, 2) promote reusables at events, offices, or restaurants, 3) create signage at points of sale & self-serve counters.

Other Potential Initiatives

- Offer reusables at all events including greenware and concert cups.
- Create a sustainability fund that customers can pay into to support reusable.
- Expand the greenbox program. Create a centralized supply, distribution, and collection to system for Town-wide pickup and drop off of greenboxes. Create opportunity for collaborative purchasing.
- Creating fun and innovative ways to encourage residents to pick up trash.
- Expanding Terracycle opportunities for all residents.
- Aid grocery stores procure a larger bulk selection.
- Support technical solutions such as bio-based packaging.
- Advocate for national policies that 1) support extended producer responsibility, 2) create a uniform labeling system, 3) pressure producers to incentivize reusables.
- Create local competitions for sustainability.
- Support initiatives for locally made food.
- Create sorting and litter pickup jobs.

- Develop procurement list of green manufacturers for businesses and consumers.

Appendix 5

Food Service Ware LCA Harmonization

Submitted to: City of Portland Bureau of Planning and Sustainability (BPS)

By: Anna Withington, Peter Canepa, and Minal Mistry

April 2019



Materials Management

700 NE Multnomah St.

Suite 600

Portland, OR 97232

Phone: 503-229-5696

800-452-4011

Fax: 503-229-6124

Contact: Peter Canepa

www.oregon.gov/DEQ

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.



State of Oregon
Department of
Environmental
Quality

This report prepared by:

Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232
1-800-452-4011
www.oregon.gov/deq

Contact:
Peter Canepa
(503) 229-5467

The authors would like to recognize the significant support and contributions of Lindsey Maser (City of Portland) and Kim White (City of Portland)

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

Table of Contents

Executive Summary	3
1. Overview	4
2. Methodology	5
2.1 Data categorization	6
2.2 Statistical Tests	7
3. Global Warming Potential Results.....	8
3.1 Mean Net GWP.....	8
3.2 Net GWP, Boxplot	9
3.3 GWP by Life Cycle Stage.....	9
3.4 Production-only plot	10
3.5 End of Life Contributions	12
3.5.1 EOL Overview	12
3.5.2 GWP from EOL Treatment.....	12
4. Data Overview	14
4.1 Data available by Product Category.....	14
4.2 Data available by Material Type.....	14
4.3 Count of data within Product Category, across Material Type	15
4.4 Data available by EOL Treatment	15
4.5 Data available by Study	16
4.6 Data available by Region	16
5. Portland Scenario.....	17
5.1 Net GWP, Portland Scenario	17
5.2 Boxplot of Net GWP for Portland Scenario.....	18
5.3 Portland Scenario, GWP by Life Cycle Stage	19
6. Conclusions and Limitations.....	20
7. Context.....	21
8. Recommendations.....	22
9. Citations	24

Executive Summary

Many businesses and individuals are seeking to reduce the environmental impact of single-use food service ware items, such as cups, clamshells, and cutlery. Purchasing products that feature attributes such as “compostable” or “biobased” is a very common strategy. However, recently published research by the Oregon Department of Environmental Quality suggests that these attributes do not necessarily correlate with low-impact food service ware items. In response, the City of Portland asked DEQ if there is some other simple way of identifying lower-impact food service ware items. Specifically, the City asked if items made of certain materials can be shown to reliably and consistently result in lower impacts when compared against items made of different materials.

To evaluate that question, DEQ used the same methods as its previous research: a review of previously published life cycle assessment literature. For simplicity and due to inconsistency across studies, this new assessment considers only one type of environmental impact: climate change. Forty-seven data points were found representing food service ware that is “all or mostly landfilled,” which is representative of waste management practices for food service ware in the Portland area. Considering all types of end-of-life methods, a total of 78 data points were found. The relatively small sample size representative of Portland-area waste management resulted in fewer statistically meaningful findings.

Across the larger sample, the following key findings emerge:

- Reusable dishware is often found to result in a lower carbon footprint than several different types of single-use items.
- Other than that, the type of material (e.g., PET vs. paperboard) is not a consistent or reliable predictor of reduced impact. There does not appear to be a clear “best” material among single-use options, at least from the perspective of climate change. Paperboard items frequently were found to have a lower carbon impact than items made from molded pulp or a number of different plastic resins (including bio plastics), but the distinction was not statistically significant.
- With the exception of reusable items, where washing dominates impacts, production-related impacts are typically many times larger than impacts at end of life.
- Different end-of-life treatments (e.g., landfilling, composting, recycling, or incineration) can result in different levels of emissions (or in some cases, emissions reductions). Recycling was found to consistently reduce emissions, while composting was found to consistently increase emissions. However, the number of data points evaluating recycling and composting were limited. The impacts of landfilling and incineration vary by material type – both sometimes result in net emissions and sometimes result in net emission reductions, depending in part on the material.
- Food service ware is a relatively small contributor to climate change. If every Oregonian used a single-use hot cup, cold cup, clamshell, dish, and cutlery set every day of the year, and happened to always choose the material and formulation with the highest carbon footprint, the resulting greenhouse gas emissions would equate to approximately 0.6 percent of Oregon’s total consumption-based greenhouse gas emissions. In contrast, food and beverages represent 13 percent of emissions. Preventing the wasting of food may be a more important area to focus.
- That said, food service ware (FSW) items should not be ignored, as they are highly visible and sometimes unessential. The best approach is to avoid them when unnecessary, then to identify better choices by screening options using life cycle assessment to accurately understand environmental trade-offs.

1. Overview

Oregon DEQ's Materials Management program recently completed an analysis of published life cycle assessment (LCA) literature to answer the question, "Do material attributes correlate with reduced environmental impacts?" The study examined four attributes – recycled content, recyclable, compostable, and bio-based, along with two product categories – packaging and food service ware (FSW). Many of the [study findings](#) run contrary to popular wisdom and generally suggest (with exceptions) that, taken alone, a given attribute is not a consistent predictor of reduced environmental impacts.¹

The results of DEQ's analysis are potentially disruptive, since purchasers, producers, and policy-makers have commonly used these attributes to make decisions. Furthermore, the results have limited potential for immediate action: they suggest what *not* to do—rely exclusively on attributes—but do not explicitly suggest an actionable alternative, other than to make decisions based on actual environmental impacts. However, information on actual impacts, especially for food service ware, is rarely available to purchasers in today's marketplace. Reflecting on that dynamic and in response to DEQ's analysis, the City of Portland asked DEQ the following questions (paraphrased): Since attributes are not a reliable predictor of reduced impact for food service ware, is there other, similarly simple guidance that the City could provide to businesses instead? Specifically, are certain materials or classes of materials consistently associated with reduced impacts?

This report documents DEQ's effort to answer that question. The following analysis is an extension of the original attributes study in which we seek to determine the preferred material for each of five FSW categories. As with the original study, the methodology here involves evaluating existing life cycle assessment literature, as opposed to conducting original modeling of environmental impacts. In this case, **Global Warming Potential (GWP)** is the environmental impact against which each product category and material type is evaluated. GWP was the most reported impact category across the literature, though it should be acknowledged that there are other impact categories and trade-offs that occur, those are omitted here since only GWP is considered. All GWP values within this report have the unit of "kilograms of carbon dioxide equivalents" (**kg CO₂ eq.**) unless otherwise noted.

¹ See <https://www.oregon.gov/deq/mm/production/Pages/Materials-Attributes.aspx>.

2. Methodology

To determine the preferred material – in terms of GWP – for each product category, we started with the literature from the original attributes study. The original attributes research contained 11 studies for FSW, however, four were deemed unsuitable for harmonization and so were excluded. DEQ contacted the authors of these four studies in an attempt to resolve data gaps, but was unable to obtain the necessary information. As an example, two of these four studies published normalized results, as opposed to absolute Life Cycle Impact Assessment results, meaning that the values could not be harmonized.

We ended up with 78 data points across seven studies. This represents a small sample size for FSW, particularly when compared to the number of studies found for packaging as a general category. A table of the original FSW studies can be found below, with key details related to their scope, and an indication of whether they were included in this report (Table 1). A decision flowchart illustrates our data exclusion process (Figure 1).

Table 1 - Summary of Literature Used for Harmonization

Author	Year	FSW Product	Functional Unit	Geography	LCIA Method	Generic Material					Boundary			Included in Harmonization?
						Fossil-based Plastic Resins	Bio-based Plastic Resins	Paperboard	Composite/Other		Cradle-to-Gate	Product Use	End of Life	
Pro.Mo	2015	Dishes and cups	1,000 meals/drinks	Italy	ILCD 2011 midpoint	x	x	x			x	x	x	x
Potting and van der Harst	2015	Cups	Serving of one hot beverage from vending machine	The Netherlands	CML 2001 baseline, Ecoinvent CED	x	x	x			x		x	x
Broca	2008	Plates	Dishwasher load, 2,960 plates	United States	Inventory based, EcoIndicator 99		x		x		x	x	x	
Pladerer et al.	2008	Cups	0.5 L drink	Germany, Austria, Switzerland	UBA (German Ministry of the Environment) Method	x	x	x			x	x	x	
PE Americas	2009	Drinking cups and flat lids	16-ounce single use cold beverage cup with flat lid	United States	CML	x	x				x		x	x
Franklin Associates	2011	Hot and cold cups, plates, clamshells	10,000 items of each FSW product	United States	IPCC 2007	x	x				x		x	x
Hakkinen and Vares	2010	Cups	100,000 cups	Europe	Not specified	x		x			x	x	x	
Fieschi and Pretato	2017	Tableware	1,000 single use tableware	Italy	Impact 2002+	x	x	x			x		x	x
Vercalsteren et al.	2010	Cups	100 L of beverage	Belgium	Eco-Indicator 99	x	x	x			x	x	x	
Razza et al.	2009	Cutlery	Serving 1000 meals	Italy	Impact 2002+	x	x				x		x	x
Hamoto	2013	Clamshells	360 uses	United States	Inventory based	x	x				x	x	x	x
						91%	91%	55%	9%		100%	55%	100%	64%

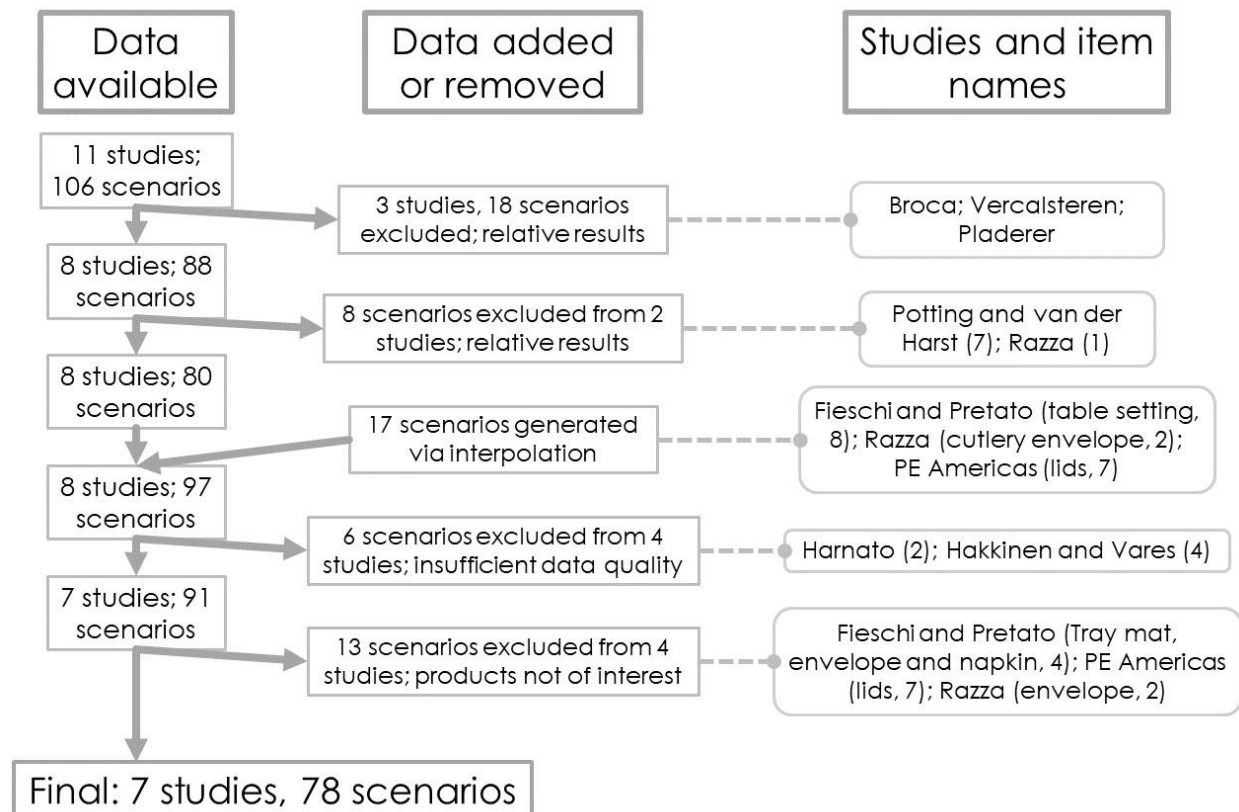


Figure 1 - A data exclusion flowchart illustrating data that was added or removed, the motivation for exclusion, and the originating source.

2.1 Data categorization

From the studies suitable for harmonization we identified five major FSW *Product Categories*:

- Clamshells
- Cups (cold)
- Cups (hot)
- Cutlery sets (consisting of a fork and knife)
- Dishes

The results of the original studies were harmonized to **10,000 units** of the specified product category to ensure functional equivalence. Cups were additionally harmonized to a volume of 16 oz.

For clarity, we grouped the materials from the data into eight main *Material Types*. These categories are **Pulp, PET, PLA, PS, PP, Mater-Bi, Paperboard and Reusables**.

Polyethylene terephthalate (PET or PETE), polypropylene (PP) and polystyrene (in a rigid form referred to as PS and an expanded foam version referred to as EPS) are petroleum-derived polymers. **PET** is lightweight and can be transparent, and has a wide variety of uses such as textiles, water bottles, and plastic film. **PP** is a durable, flexible polymer that holds up to repeated deformation and can be found in applications such as ropes, lid hinges, yogurt tubs and planter pots. **PS** is especially rigid, which makes it

suitable for uses like disposable cutlery or clear clamshells. It can also be manufactured as expanded foam (EPS) used to make cups, plates, bowls, and foam clamshells.

Polylactic acid (PLA) is a bio-based plastic that is manufactured from sources of starch such as corn or sugarcane and can have properties similar to PET and PS. **Mater-Bi** is a compostable bioplastic made from a proprietary mix of starches, cellulose, and vegetable oils. **Pulp** denotes different types of molded wood fibers or cellulose, typically with a barrier material infused into the pulp before the product is formed. **Paperboard** refers to cardboard or paper products coated with a separate material to provide a barrier to moisture and grease. Barrier materials in the data included petroleum-based plastics, bio-based plastics, and wax.

Finally, **reusables** refers to durable dishware items, such as ceramic plates, durable cold drink cups, or durable clamshells made of rigid plastic, which are designed and intended to be washed and reused multiple times.

This analysis also considered three main *stages of the life cycle*. **Production** refers to all steps leading up to consumer use of the item. **End of Life (EOL)** refers to how the material was handled after use. The **Use** phase was excluded from the harmonization except in the case of materials that were reused and thus required washing.

2.2 Statistical Tests

A mixed-effect model was selected to determine how well materials predicted GWP. This allowed us to draw conclusions in spite of the unbalanced data structure. We were also able to control for the effect of the specific studies on the reported global warming potential. We expect values from a given study to be similar to each other in a meaningful way that explains some of the variation we see in the data. The mixed-effects model approach replaced a more traditional analysis of variance (ANOVA) that would compare means between our groups of interest.

We were specifically interested in net GWP as explained by material type within each product category. The post hoc tests of the main model indicated that product category, and the interactions between product category and material type were not significant predictors of GWP from the total life cycle. We retained this level of analysis to limit conclusions about material types that may not apply universally to our products of interest. The interaction between material type and product category was significant for the model that only considered GWP from production.

Models were fit using the “lme4” package in R. A Wald Type II Chi Square Analysis of Deviance indicated which explanatory variables in the model were significant. Estimated marginal means were estimated from the model using the “emmeans” package. A pairwise comparison identified differences between material means within product categories based on a 95 percent confidence interval.

3. Global Warming Potential Results

3.1 Mean Net GWP

This first plot displays the average total (Production + End of Life + Use, if applicable) amount of GWP within each product category, broken down by material (Figure 2).

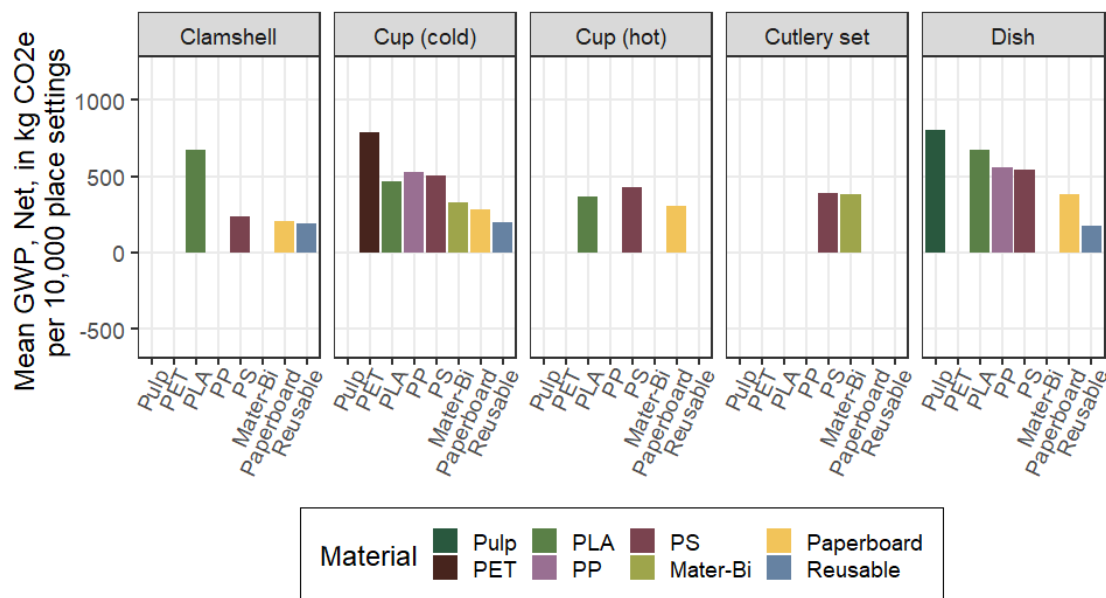


Figure 2 - The mean net GWP for each material separated by the five product categories. Net GWP was calculated by combining the GWP values for the different life cycle stages: production, end of life, and use, in the case of reusable items.

Interpretation

The results suggest, that on average, paperboard leads to marginally lower impacts than the other materials across all product types where it was evaluated. Differences between the averages for all other materials, which include fossil-based (PET, PS, PP) and bio-based (PLA, Mater-Bi), vary depending on the product category though no clear trend emerges to definitively rank the materials. Some materials stand out as the highest in given categories: PLA clamshells, PET cold cups and Pulp dishes.

Interestingly, results clustered between approximately 300-600 kg CO₂e per 10,000 servings when comparing the magnitude of GWP across different product categories, by taking the average of all results for all materials in a given product category. This suggests (and is further evaluated in Figure 3) an overall inability to clearly differentiate one product category being inherently more or less impactful than another.

3.2 Net GWP, Boxplot

Below, a boxplot shows the range of net GWP results for all scenarios in a given product category and for a given material type (Figure 3). The dots show the individual observations; the upper end of the box represents the upper quartile, while the lower end of the box represents the lower quartile. The horizontal line within the box shows the median value. The “whiskers” (vertical lines) extending beyond the box denote approximately two standard deviations. Dots beyond the end of the whiskers fall outside of this range and are often considered outliers.

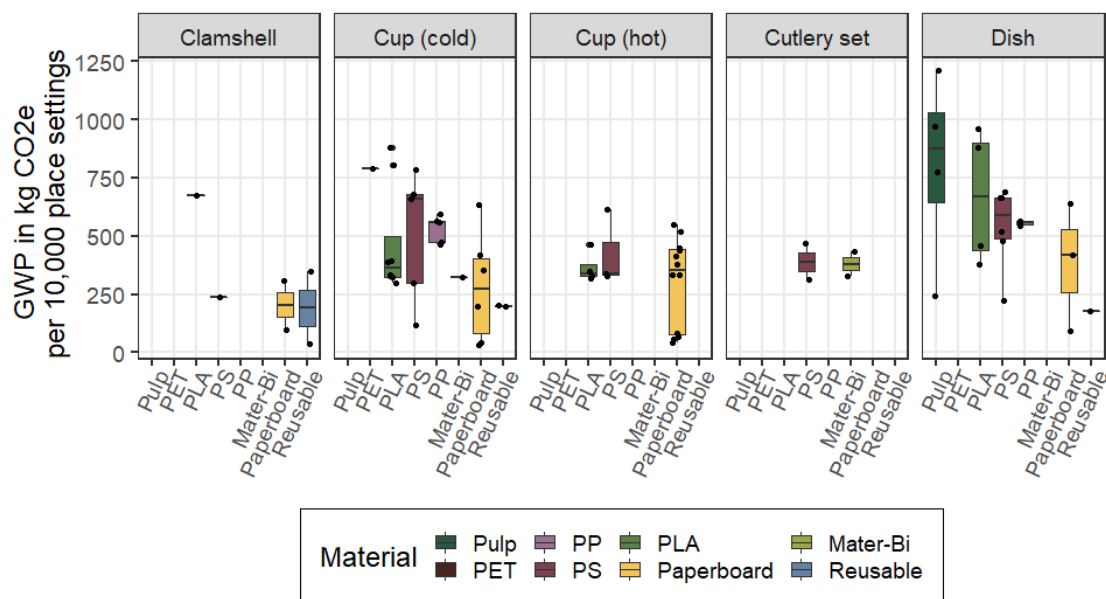


Figure 3 - Net GWP boxplot for a given material, within a product category. Dots show the GWP for individual observations. The top and bottom end of the boxes represent the upper and lower quartiles, respectively. The middle line in the boxes indicate the median. In contrast to Figure 2, this plot demonstrates the range and overlap of the values.

Interpretation

Here we get a better sense of the variation in GWP between different material types. In most cases, this shows that there is a good degree of overlap between material types in a given product category even when the medians appear to be different.

Using the mixed-effect model with pairwise comparisons, we identified four differences that were statistically significant (all $p < 0.05$). In the cold cups category, there was a difference between **PET and reusables** and **PLA and reusables**. In the dish category, there was a difference between **pulp and reusables** and **PLA and reusables**. The small number of observations for some groupings made it difficult to statistically detect differences.

3.3 GWP by Life Cycle Stage

On the next page, the contributions of life stages are represented (Figure 4Figure 5). This is the same data used to generate the net results. A variety of EOL treatments are included in this dataset; different treatments are compared against each other in a later section. Some EOL treatments result in negative values (a credit) for GWP, indicated by the bars dipping below zero. This is a function of the chemical composition of that material and its potential to either generate recoverable GHGs or sequester carbon

when landfilled, incinerated, or recycled. It should be noted that the carbon sequestration of landfilled PLA, while modeled by papers included in the literature scan, is not a universally accepted fact. Laboratory tests of PLA intended to simulate landfill conditions have demonstrated that PLA will remain largely inert (sequestering biogenic carbon and not releasing methane) in landfills at lower temperatures, while at higher temperatures commonly found inside some landfills, the PLA can degrade into methane and carbon dioxide, resulting in minimal carbon sequestration.²

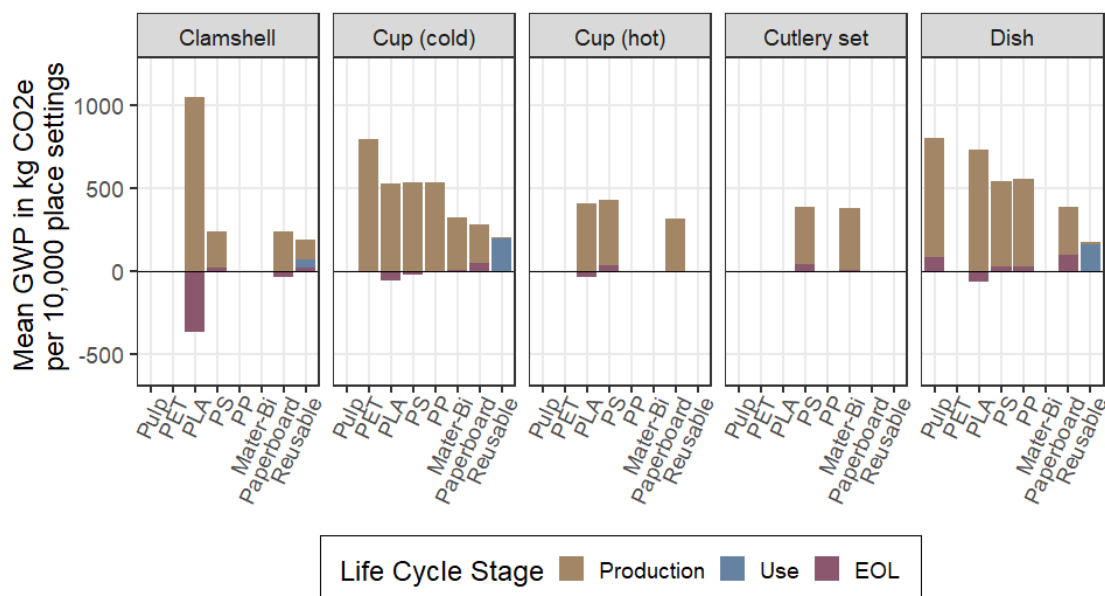


Figure 4 - A stacked bar plot illustrating the mean GWP contribution of the individual life cycle stages within each material, separated by product category. Values below zero indicate a GWP savings. Where there are multiple life stages all with positive GWP, the total height of the bar represents the sum of the mean life cycle contributions. Across all categories, production is the largest contributor to GWP.

Interpretation

The biggest takeaway from this chart is that, on average, the EOL contribution is a small fraction of the overall impact. The EOL contribution can vary widely depending on the method of EOL treatment and the assumptions from the original study. However, what this also means is that Production dominates the life cycle.

3.4 Production-only plot

For this reason, the next plot visualizes the range of GWP results for production only (Figure 5). This indicates the extent of variation in impacts from production by filtering out EOL treatments.

² See for example Krause, Max J. and Townsend, Timothy G. "Life-Cycle Assumptions of Landfilled Polylactic Acid Underpredict Methane Generation" *Environmental Science & Technology Letters*, 2016, 3 (4), Pages 166-169. <https://pubs.acs.org/doi/abs/10.1021/acs.estlett.6b00068>

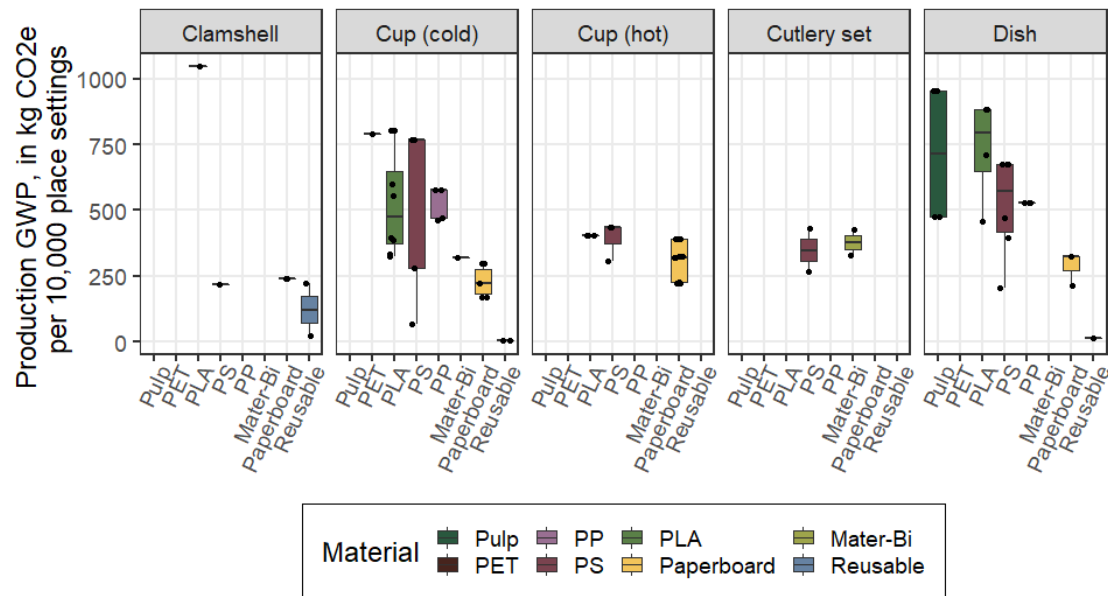


Figure 5 - A boxplot of GWP generated from the production stage. The differences in distribution from Figure 2 suggest that differences in impact between categories are sensitive to assumptions about EOL treatment, despite their small relative contributions to GWP.

Interpretation

Here again we still see lots of overlap between the middle quartiles of different material types. For example, in the product category “Cup (cold)” three material categories (PP, PS, PLA) completely overlap, where the range of impacts for paperboard production seem to be meaningfully lower.

A mixed-effect model identified more differences than for GWP across the whole life cycle (all $p < 0.05$). Findings for reusables are confounded by the fact that a number of reusables appeared to have low estimates for GWP from the production stage.

Within clamshells, differences were found between **PLA and Paperboard**, **PLA and PS**, and **PLA and reusables**. Within cold cups, **PET** (the highest value in the category) and **reusables** (the lowest) were found to be different from each of the other material categories. Differences were also found between **Paperboard and PLA**, **Paperboard and PP** and **Paperboard and PS**. No differences were found between materials in the hot cups or cutlery categories.

Within dishes, differences were identified between **reusables** and each other category. In addition, **Paperboard and PLA**, **Paperboard and Pulp**, **PLA and PP**, **PLA and PS**, and **PP and Pulp** were different from each other.

The increase in statistical findings suggests that comparisons are sensitive to assumptions about the EOL treatment. The same general trends in the net GWP were evident here, when there was a detectable difference, with Pulp, PET, and PLA tending to be higher impact, and paperboard and reusables tending to be lower impact.

3.5 End of Life Contributions

3.5.1 EOL Overview

There were fourteen distinct EOL categories in the original data. These were simplified into five *EOL Treatments*: **50% or greater energy recovery (ER)**, **All or mostly landfilled**, **Composted**, **Mixed Disposal**, and **Recycled**.

The category **50% or greater ER** aggregates EOL treatments such as, 100% incineration with ER and a blend of 50% incineration with ER and 50% composting or recycling. **All or mostly landfilled** includes any scenarios where materials were landfilled at a rate of 79% or greater.

Composted refers to items that were composted at a rate of 100%, as well as items that were 100% anaerobically digested. **Mixed disposal** combined scenarios that had a blend of recycling, incineration, and landfilling, or a split of 55% landfilling and 45% incineration. **Recycled** refers to items that were recycled at a rate of 100%.

3.5.2 GWP from EOL Treatment

The plot below illustrates the mean individual contributions to the EOL, with additional detail illustrating the contribution of each end of life treatment to the mean EOL for a given product category and material type (Figure 6). In some cases, the contributions of a type of treatment exceed the overall mean for EOL. For example, for the product category “Cup (hot)” and material type “PS” three of the five EOL treatments were found in the literature. The mean impacts of those three treatments are represented. This gives a sense of the trade-offs for different types of EOL treatments and the relative magnitude of GWP of the EOL treatment for a given material and product category. Unlike previous figures, the different components of these stacked bars are not additive but rather represent the net emissions for each EOL method for any given product type/material combination.

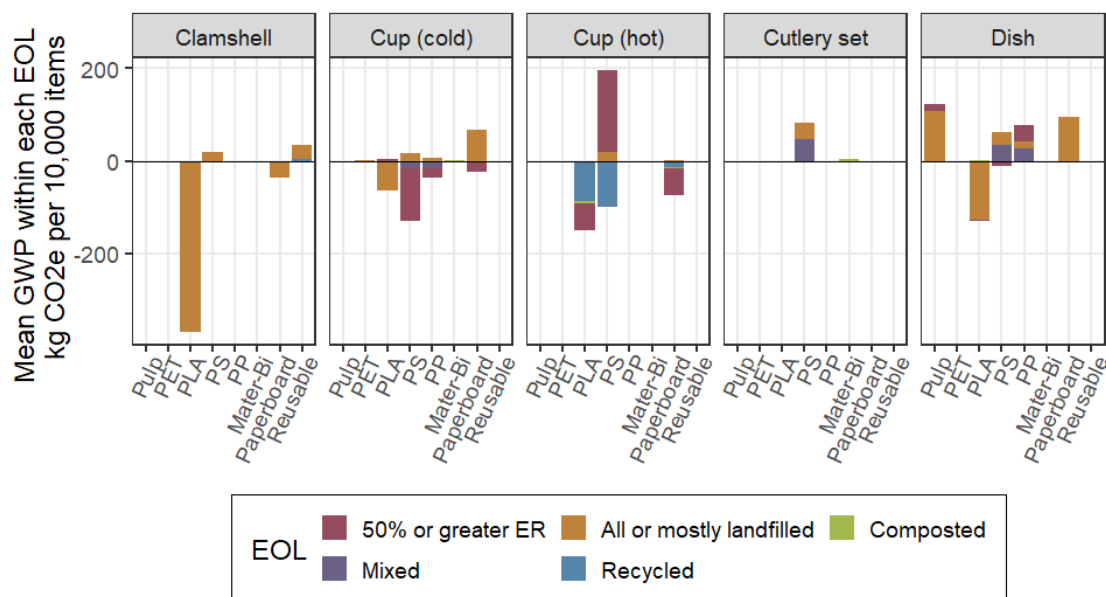


Figure 6 - This stacked bar plot shows the mean individual contributions of the different EOL treatments within the material categories for each product type. Some of the values are generated from only one data point, for example, Cup (cold) - PS - 50% or greater ER. This means the values are especially sensitive to the assumptions of the study from which they originate. As in Figure 4, the net contributions from EOL overall are low.

Interpretation

Credits (negative GWP) or burdens (positive GWP) can occur at end of life, dependent on a few key factors – the method of EOL disposition, assumptions regarding what is displaced, and the composition of the material itself. As shown above, the magnitude of the EOL stage is relatively small compared to production. In addition, when all EOL dispositions are averaged for all materials across each product category the results cluster around zero.

4. Data Overview

We had 78 data points across seven studies. The following plots indicate the amount of data available within the categories to provide supplemental details on the scope of the studies and observations behind the GWP results above.

4.1 Data available by Product Category

Cold cups, hot cups and dishes were the most prevalent product categories (Figure 7). For this analysis, we excluded data from lids and tableware envelopes due to their special use case and small sample sizes.

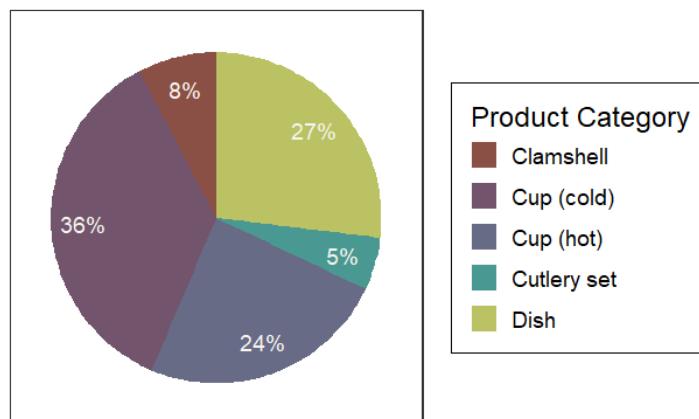


Figure 7 - The percentages of data available for each product category. Cold cups were the most well represented item in the data.

4.2 Data available by Material Type

Paperboard was the most frequently evaluated material type in the literature (Figure 8). The paperboard category includes a variety of coating materials. Pulp, Mater-Bi, PET and reusables had relatively few observations.

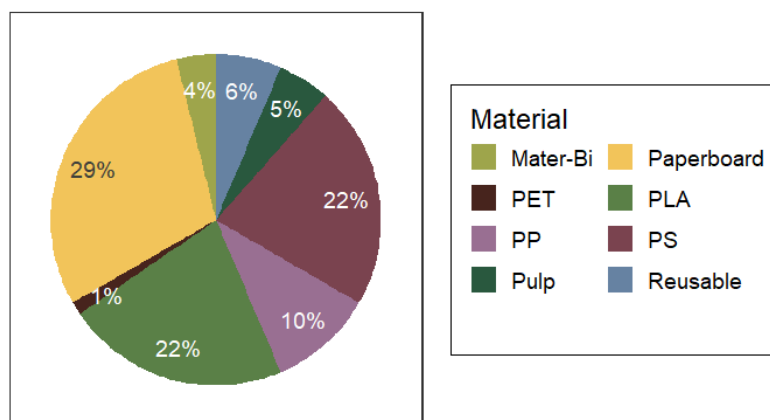


Figure 8 - Proportions of material types in the data. Paperboard included any paper or cardboard that was coated with any kind of barrier, such as wax or PLA. PS combined polystyrene subtypes.

4.3 Count of data within Product Category, across Material Type

The plot below indicates the number of observations available for each Material Type within each product category (Figure 9). Having fewer data points makes the GWP values reported more sensitive to the assumptions and boundaries of the original study.

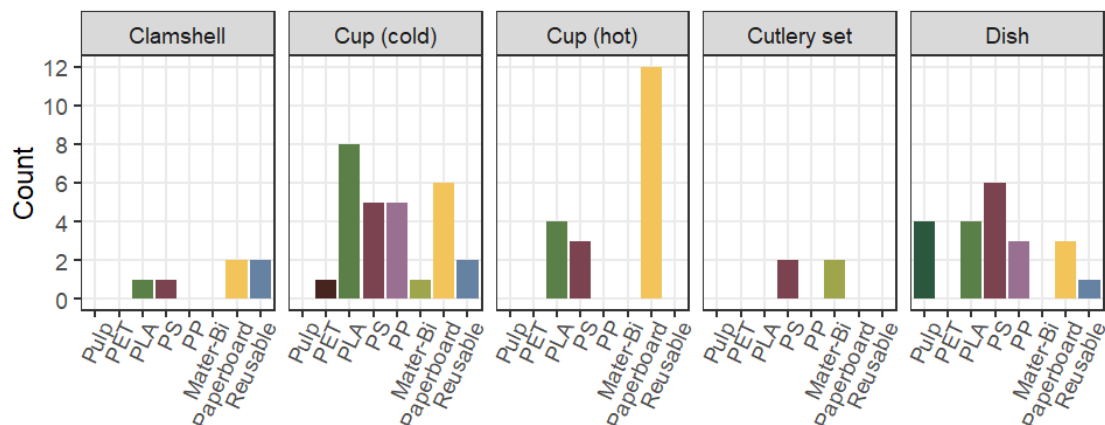


Figure 9 - A bar plot of the number of observations of each material within each product category.

4.4 Data available by EOL Treatment

Most of the values in the data were based on Landfilling (at a rate of 79% or greater) as an EOL treatment (Figure 10). This is likely an advantage when considering decisions for Portland, since food service ware is most likely to be landfilled. For that reason, it is possible for the energy recovery or other treatments to give a skewed indication of GWP in practice here in Oregon, although EOL tended to be a small contributor to the net GWP.

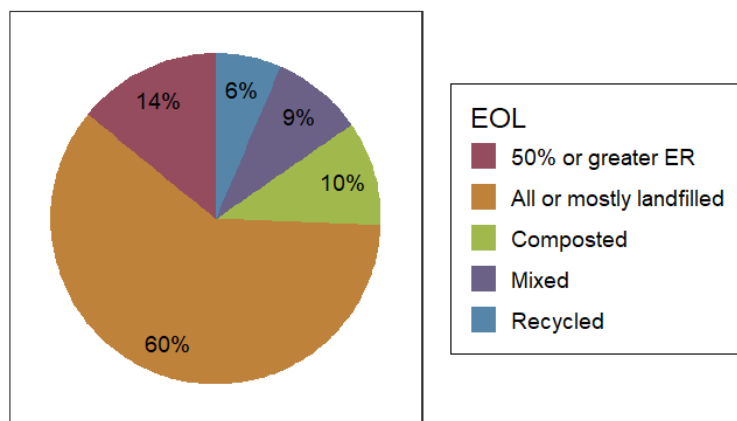


Figure 10 - Landfilling (at a rate of 79% or greater) was the most common type of EOL treatment, covering 60% of observations.

4.5 Data available by Study

Altogether, 75% of the data came from the private companies Pro.Mo, Franklin Associates, and PE Americas (Figure 11). The other 25% came from three academic studies.

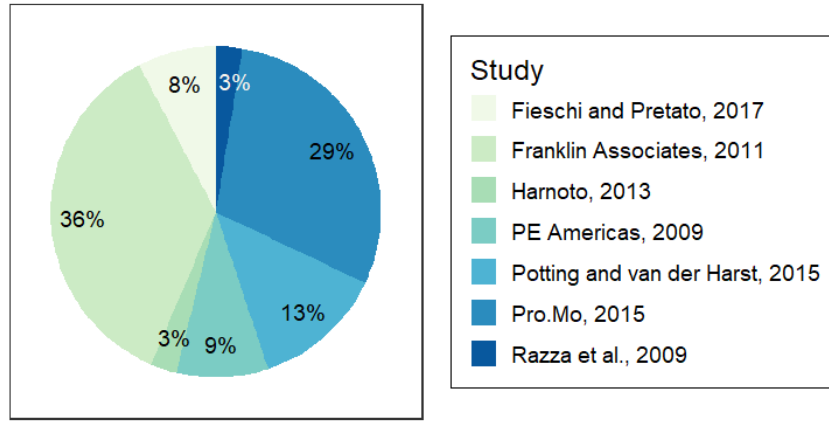


Figure 11 - A pie chart of percentage of data derived from each of the original data sources

4.6 Data available by Region

The data was fairly evenly split between the U.S. and Europe (Figure 12).

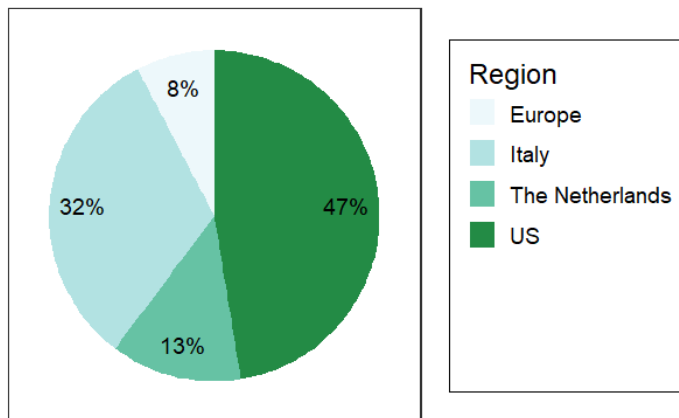


Figure 12 - A pie chart of the percentage of data from the originating geographical regions of the studies.

5. Portland Scenario

In Oregon, FSW is not readily recycled and has a limited potential for incineration (with only a fraction of total municipal solid waste going to one incinerator in Marion County). FSW is also not accepted in residential or commercial composting in the Portland Metro region. This means that the vast majority of FSW will end up being landfilled, as such the charts below are filtered to EOL treatments that better represent regional conditions.

5.1 Net GWP, Portland Scenario

In the plot below, we removed all observations (cases) that had an EOL scenario other than “All or mostly landfilled” to reflect the expected conditions in Portland. There were 47 data points available. The chart below reflects the net GWP based on this data subset (Figure 13).

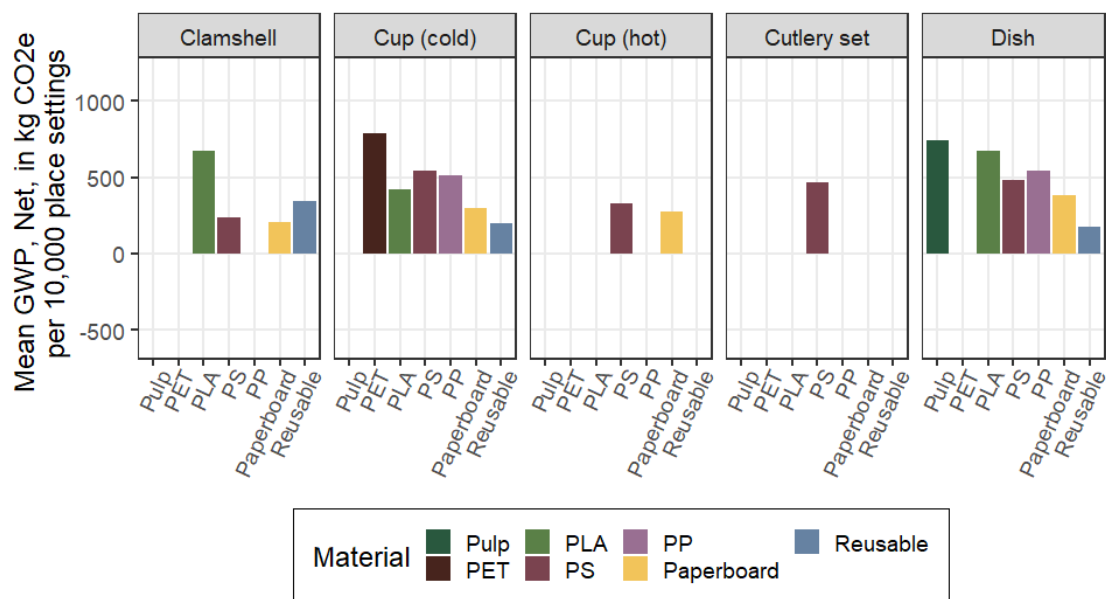


Figure 13 - A bar plot showing the mean net GWP for each material type within each product category, for a scenario representing Portland’s current end of life treatment. Only data that was all or mostly landfilled at end of life was included.

Interpretation

First, this filtered result reinforces the findings above (Figure 4) that the EOL treatment is a *de minimis* contributor to the overall impacts of FSW. On average, there appears to be some difference between individual material types within a given product category, which is a similar conclusion one might have drawn for the full set of results. Here it appears paperboard leads to lower impacts across different product categories. The same materials stand out for having the highest impacts in a given product category: PLA clamshells, PET cold cups, and pulp dishes. However, it is difficult to determine if these differences are statistically significant when comparing means.

5.2 Boxplot of Net GWP for Portland Scenario

The plot below (Figure 14) is a boxplot showing the range of net GWP results for all Portland scenarios in a given product category and for a given material type. It uses the same data as used above, but instead of being summarized as a mean, the full spread of results is shown. The dots show the individual observations; the upper end of the box represents the upper quartile, while the lower end of the box represents the lower quartile. The horizontal line within the box shows the median value and the whiskers extending beyond the box denote the highest and lowest observation.

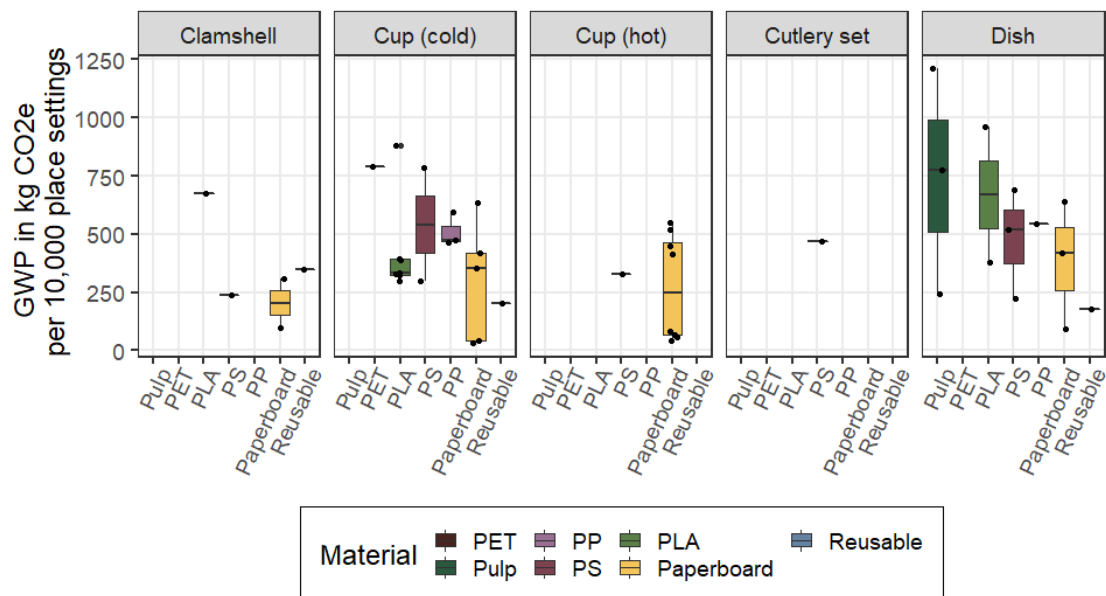


Figure 14 - A boxplot of data for a scenario that reflects the likely end-of-life treatment in Portland, Oregon. Data was subset to include only observations whose end-of-life was modeled as all or mostly landfilled.

Interpretation

Although some trends are visible in this data, the statistical tests were unable to detect differences between almost all materials, probably in part due to the small sample sizes. The exception was a difference between **Pulp** and **reusable** in the dish category. Many of the general trends in the data were consistent with the overall dataset (Figure 3), with the GWP of paper and reusables tending to be lower.

5.3 Portland Scenario, GWP by Life Cycle Stage

Here again we show the breakdown of each life cycle stage to the overall impacts, using the same data as above for the Portland scenario.

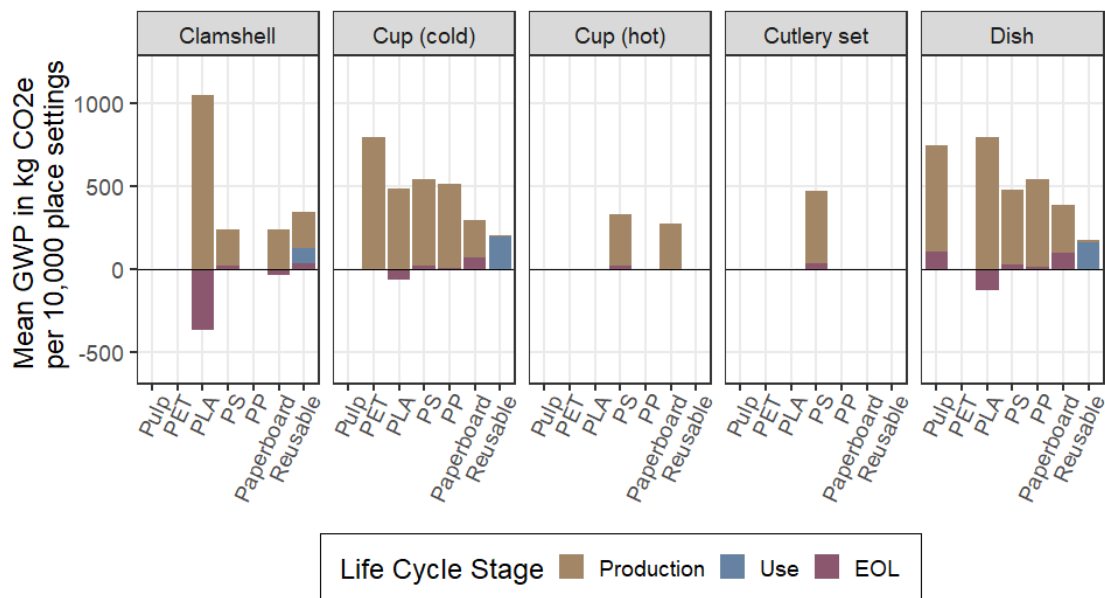


Figure 15 - A stacked bar plot that illustrates the mean contributions of each life cycle step (production, EOL, and use, if applicable) to GWP.

Interpretation

What is obvious here is the EOL contribution to the life cycle GWP of each material type is small. For reusables the use phase is often the most important contributor to GWP, except for clamshells where production of the reusable clamshells was the dominant contributor in one study. Finally, recalling that the Portland scenario filtered EOL dispositions to only include the 47 instances where the materials were “All or mostly landfilled” we see a decline in the number of EOL results that lead to a net GWP credit. This can be explained by the elimination of all scenarios associated with recycling or incineration with energy recovery.

6. Conclusions and Limitations

DEQ's original attributes study defined rigorous inclusion criteria for the literature it used, the same literature that formed the basis for this analysis. To the best of our knowledge, these data represent the universe of available published LCA research from the past 18 years.

Based on the limited available observations (cases), it is not possible to conclude with any meaningful certainty whether a given material type for a specific product category leads to reduced GWP. Paperboard consistently looked to have a lower mean GWP than other materials, however, further examination of the spread and variance of results for paperboard showed significant overlap between it and other material types. Unlike paperboard, there was no material that had higher impacts across product categories, though individual materials appear to stand out within a given product category. For example, PET cold cups have the highest mean GWP at ~750 kg of CO₂e, however, this result comes from only one observation.

A few limitations hindered the ability to draw conclusions from this analysis. First, the relatively small sample size (n=78) spread across multiple product categories and material types is a limiting factor. As noted above, some instances of a given product category may only have a single observation for a material type, or none at all. Second, not all possible combinations of FSW products and material types on the market were studied in this literature. The geographical coverage of the studies (and their background data) may have introduced some uncertainty, as about half of the studies are based on European boundary conditions and thus do not represent the specific supply chains and production pathways for FSW products here in Oregon.

A fourth limitation has to do with possible production technology changes since the studies were published. In particular, this could be relevant for the 2009 PE Americas study of PLA, where the primary producer of PLA in the US (Natureworks) updated their production processes that same year. Those changes are not reflected in the study.

Finally, and most importantly, here we evaluate only GWP. Other environmental impact categories (e.g. acidification, human toxicity, smog formation, etc.) are excluded from this analysis partially for clarity but also due to the limited and inconsistent inclusion of these other categories in the original studies.

7. Context

A vast degree of effort is devoted to environmental actions around single-use packaging materials, likely because they are highly visible and, at least in the case of FSW, generally unessential to daily life. Yet, how relevant are these FSW items to overall environmental impacts? When placed in context these findings provide an important sense of scale.

Using the GWP data from this analysis we were able to derive a worst-case scenario for FSW consumption in Oregon. To do so we selected the highest-impact FSW item from each of the five product categories and multiplied it by the population (4.017 million) of Oregon in 2015 (thus assuming that each Oregonian used a cold cup, hot cup, dish, utensils, and a clamshell of the material and formulation with the highest carbon impact). The sum of this product was then multiplied by 365, assuming each Oregonian did this every day for a year, to arrive at an estimate for total annual demand and carbon impact for FSW.

Oregon DEQ's [2015 Consumption Based Emissions Inventory \(CBEI\)](#) shows total emissions for all goods and services demanded in Oregon to be 88.7 MMT CO₂e. The worst-case estimate for FSW described above, arrived at 0.56 MMT CO₂e, or about 0.64 percent of total emissions in Oregon. In reality, the demand for FSW packaging is likely significantly lower than this worst-case estimate since not everyone in Oregon uses all or even some of these FSW items once every day of the year, and when they do, they do not always use the highest-carbon option available.

CBEI also provides a breakdown by sector and shows emissions associated with food and beverages at 11.8 MMT CO₂e. We compared the worst-case FSW estimate (0.56 MMT CO₂e) to this category of goods and services, since FSW is made to contain food and beverages (Figure 16). Here we find that under the worst-case assumption, FSW packaging constitutes just 4.7 percent of emissions relative to the food and beverages contained within it. To reiterate, this result is based on a highly unlikely overestimate of demand for FSW.

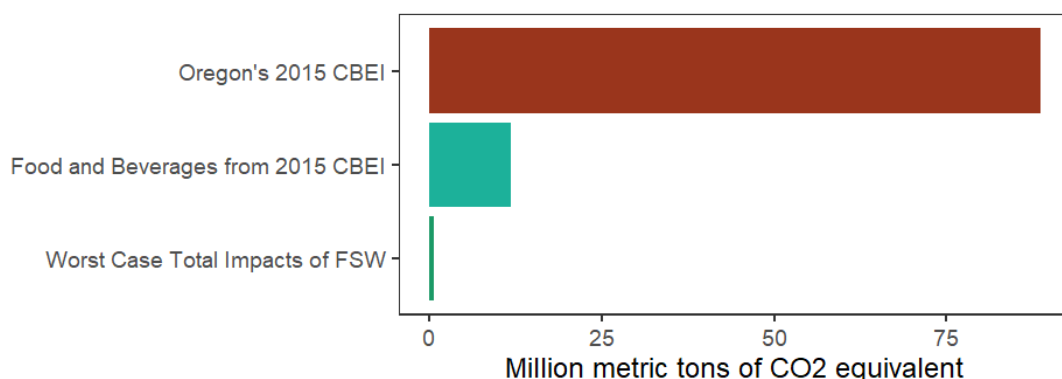


Figure 16 - A bar plot providing context for a worst-case scenario of every individual in Oregon using the worst (highest carbon) of each of the five FSW products every day for a year, compared against the 2015 Consumption Based Emissions Inventory for the whole state. Food and beverages represent about 13% of the CBEI for 2015. The impact from FSW in the worst-case scenario is only 4.7% of the GWP impact from food and beverages, and approximately 0.6% of the overall amount of CO₂ equivalent.

What this implies is that the decisions regarding which type of FSW material to select are likely to have very little effect on overall emissions, even in the worst-case scenario. Alternatively, a small reduction in food waste is likely to have a multifold greater reduction in emissions.

8. Recommendations

No clear material demonstrated meaningfully lower net GWP across a given product category based on the harmonization of literature in this analysis. As such, the decision on which single-use FSW product or material to purchase comes down to factors beyond carbon emissions.

The inconclusive results of this analysis could be resolved through primary analysis. A comparative LCA of actual packages from specific suppliers for a given business would yield more specific and representative results.

When selecting FSW:

- If possible, do not offer any superfluous FSW items to begin with. Not purchasing or offering single-use items is the best way to reduce environmental impacts.
- Where feasible, seek a reusable item that is durable enough to stand-up in your given application. Reuse it as long as is possible. Wash it with an efficient appliance.
- If a reusable item is not an option, use other criteria that are important to and align with the values of your business and consumer.
 - **Are you worried about land or marine litter?** Consider how many of your FSW items are likely to end up as litter. If you are providing customers with materials that likely will be littered, invest in litter prevention and control projects. Also, use something that readily breaks down or is otherwise innocuous in a marine environment such as non-coated paper or untreated wood.
 - **Are you concerned about potential exposure to toxics?** Consider selecting materials that do not contain toxicants and have no potential mechanisms for transfer. Use resources such as Clean Production Action's [Plastics Scorecard](#), Safer [Made's Safer Materials in Food Packaging Report](#), or the Center for Environmental Health's [Guide to Safer Foodware](#) to evaluate the chemical footprint of various choices.
 - **Are you disturbed by the thought of waste entering landfills?** Know that most food service ware is landfilled. Also know that what happens to the FSW item after its use contributes a very small fraction to total life cycle GWP impacts. Therefore, selecting a FSW item on its potential EOL disposition – compostability, for example – provides limited benefits (or costs) in terms of life cycle GWP. More importantly, understand your jurisdictions' rules for handling FSW items. Often, used compostable or recyclable FSW items will not be accepted for recovery or composting.
- Place your decision in context. FSW is a *de minimis* contributor to GWP here in Oregon. Therefore, feel empowered that whatever choice you make is not likely to have drastic implications in either direction.
 - That is not to suggest FSW items necessarily should be ignored; after all, they represent a highly visible and sometimes unessential use of materials.

- Should you want to identify better choices, the best approach is to screen FSW options using life cycle assessment to accurately understand the environmental trade-offs. This can be done using tools like [COMPASS](#), [PIQET](#), or [PackageSmart](#).

Finally, and most importantly, the inherent function of FSW is to contain food and beverages, the environmental impacts of which are vastly greater than the FSW items themselves. Estimates suggest that globally 30-40% of food that is produced is never eaten. A marginal reduction in the amount of food and beverages that are wasted would have a meaningful reduction in GWP emissions. Prioritizing efforts on reducing food waste would achieve the best outcomes for the environment in a food service setting.

9. Citations

Bates, Douglas, Martin Maechler, Ben Bolker, Steve Walker (2015). Fitting Linear Mixed-Effects Models Using lme4. Journal of Statistical Software, 67(1), 1-48.[doi:10.18637/jss.v067.i01](https://doi.org/10.18637/jss.v067.i01).

Broca, Mita. 2008. “A Comparative Analysis of the Environmental Impacts of Ceramic Plates and Biodegradable Plates (Made of Corn Starch) Using the Life Cycle Assessment Tool.” Masters, New Delhi, India: TERI School of Advanced Studies. <http://sustainability.tufts.edu/wp-content/uploads/LifeCycleAnalysisPlasticPlatevsCeramic.pdf>.

Fieschi, Maurizio, and Ugo Pretato. 2018. “Role of Compostable Tableware in Food Service and Waste Management. A Life Cycle Assessment Study.” Waste Management 73 (March): 14–25. <https://doi.org/10.1016/j.wasman.2017.11.036>.

Franklin Associates. (2011). Life cycle inventory of foam polystyrene, paper-based, and PLA foodservice products. Prepared for the Plastic Foodservice Packaging Group. Retrieved from https://www.plasticfoodservicefacts.com/wp-content/uploads/2017/12/Peer_Reviewed_Foodservice_LCA_Study-2011.pdf.

Harnoto, Monica. (2013). A Comparative Life Cycle Assessment of Compostable and Reusable Takeout Clamshells at the University of California, Berkeley. Retrieved from https://nature.berkeley.edu/classes/es196/projects/2013final/HarnotoM_2013.pdf.

Russell Lenth (2018). emmeans: Estimated Marginal Means, aka Least-Squares Means. R package version 1.3.1. <https://CRAN.R-project.org/package=emmeans>

Madival, Santosh, Rafael Auras, Sher Paul Singh, and Ramani Narayan. 2009. “Assessment of the Environmental Profile of PLA, PET and PS Clamshell Containers Using LCA Methodology.” Journal of Cleaner Production 17 (13): 1183–94. <https://doi.org/10.1016/j.jclepro.2009.03.015>.

Oregon’s Greenhouse Gas Emissions through 2015: An assessment of Oregon’s sector-based and consumption-based greenhouse gas emissions. May 2018. Retrieved from <https://www.oregon.gov/deq/FilterDocs/OregonGHGreport.pdf>.

Pladerer, Christian, Markus Meissner, Fredy Dinkel, Mischa Zschokke, Günter Dehoust, and Schüler, Doris. 2008. “Comparative Life Cycle Assessment of Various Cup Systems for the Selling of Drinks at Events.” Prepared for Austrian Federal Ministry of Agriculture and Forestry, Environment and Water Management; Swiss Federal Environment Authority. http://www.meucopoeco.com.br/environmental_study.pdf.

PE Americas. (2009). Comparative Life Cycle Assessment Ingeo™ Biopolymer, PET, and PP Drinking Cups. Prepared for Starbucks Coffee Company Seattle, WA & NatureWorks LLC. Joint Venture of Five Winds and PE International. http://www.ingeo.natureworkslc.com/~media/The_Ingeo_Journey/EcoProfile_LCA/LCA/PEA_Cup_Li d_LCA_FullReport_ReviewStatement_121209_pdf.pdf.

Potting, José, and Eugenie van der Harst. 2015. “Facility Arrangements and the Environmental Performance of Disposable and Reusable Cups.” The International Journal of Life Cycle Assessment 20 (8): 1143–54. <https://doi.org/10.1007/s11367-015-0914-7>.

Pro.mo/Unionplast. 2015. “Comparative Life Cycle Assessment Study of Tableware for Alimentary Use.” Milan, Italy. <http://www.pro-mo.it/data/uploads/report-lca-eng.pdf>.

Razza, Francesco, Maurizio Fieschi, Francesco Degli Innocenti, Catia Bastioli. (2009). Compostable cutlery and waste management: An LCA approach. Waste Management, Volume 29, Issue 4. Pages 1424-1433. <https://doi.org/10.1016/j.wasman.2008.08.021>.

Vercalsteren, An, Carolin Spirinckx, and Theo Geerken. (2010). Life Cycle Assessment and Eco-Efficiency Analysis of Drinking Cups Used at Public Events. The International Journal of Life Cycle Assessment 15 (2): 221–230. <https://doi.org/10.1007/s11367-009-0143-z>.



MARCH 2019

INTRODUCTORY REPORT ON SINGLE USE FOOD SERVICE WARE POLICIES

PREPARED BY THE CITY OF KIRKLAND SOLID WASTE DIVISION



SINGLE USE PLASTIC

ENVIRONMENTAL IMPACTS OF SINGLE USE PLASTIC

Single use plastics, whether plastic bags, straws, or forks, have similar characteristics of being used once, then disposed, in huge quantities every day.

Many single use plastics are not recyclable in curbside recycling systems, including plastic bags, foam takeout containers, plastic takeout containers, and plastic utensils and straws. Even among items where drop-off recycling options exist, such as expanded polystyrene foam and plastic bags, the vast majority of material is disposed as trash, not recycled.

Plastic is persistent in our landfills, in our environment, and in our streams, lakes, and oceans. Plastic does not decompose like organic materials; instead, over time, plastic in the environment degrades into smaller particles called microplastics. Because of their minute size and pervasive presence, at this time it is not possible to clean up existing environmental microplastics in any impactful way.

Plastic products are made using petroleum, which is a non-renewable resource. Estimates indicate that around 50% of annual plastic production is destined for single use packaging and products (National Geographic). Disposable food service ware accounted for approximately 0.4 percent (by weight) of solid waste generated in the United States in 2015, approximately 1.1 million tons (Environmental Protection Agency). Less than 14 percent of plastic packaging, which is the fastest-growing form of packaging, gets recycled (Natural Resources Defense Council).

If plastic use continues unchecked, scientists predict there will be more plastic by weight than fish in the ocean by 2050. Data indicate that a number of sources contribute to plastic in the oceans, including fishing gear and single use food and beverage containers.

Less than 14% of plastic packaging gets recycled.

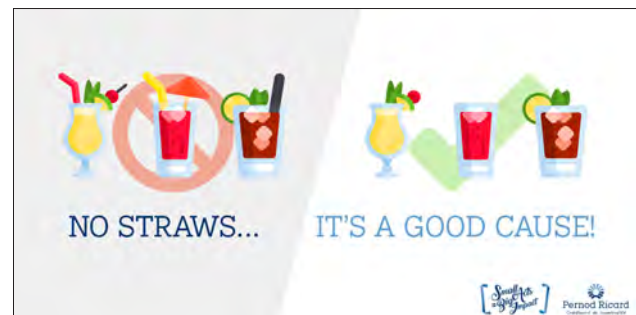
VOLUNTARY REDUCTION INITIATIVES

Grassroots initiatives to reduce the use of disposable plastic items have gained popularity in recent years. Environmental organizations such as Surfrider Foundation, 5 Gyres, and Lonely Whale have organized voluntary single use plastic reduction initiatives involving educational pieces and consumer pledges. In September 2017, the “Strawless in Seattle” campaign released celebrity videos encouraging people to “stop sucking” and partnered with local restaurants to voluntarily stop serving plastic straws.

Large corporations are beginning to voluntarily shift away from certain single use food service items. McDonald’s pledged to stop using foam cups and other packaging globally by the end of 2018. Alaska Airlines began phasing out plastic stir straws and citrus picks, and American Airlines, United Airlines, and Delta Air Lines announced similar plans. Starbucks plans to eliminate use of plastic straws by 2020.



Example of a voluntary straw reduction campaign by the National Union of Students in the UK



Wine and spirit group Pernod Ricard announced in 2018 that it would no longer use non-biodegradable plastic straws and stirrers at affiliate events and in advertising

More than 100 US cities, counties and states ban foam food service ware.

SINGLE USE PLASTIC SERVICE WARE POLICIES

Single use plastics bans are rapidly gaining attention as an opportunity for governments to protect the environment. Policies range in the materials limited and alternatives required, showing the wide range of possible actions in response to the challenges of single use disposable items. Unlike plastic bag reduction policies, where many policies are very similar, there are many vastly different versions of single use plastic food service ware reduction and expanded polystyrene ordinances.

More than 100 jurisdictions have banned expanded polystyrene (foam) food service ware in the United States since the late 1980s. In Washington State, Seattle and Issaquah were the first jurisdictions to institute bans on foam food packaging.

Plastic straw bans are emerging as recent priorities for governments and environmental organizations. Seattle became the first city to ban plastic straws in 2018. The European Union recently agreed on new measures to ban single use plastic items including cutlery, straws, and expanded polystyrene food containers and cups. Starting in 2019, full-service restaurants in California are prohibited from providing plastic straws except by request.

Plastic straws are seen as often unnecessary single use plastics that can be dramatically reduced through policy action. Plastic straws are neither the biggest component of ocean trash nor the key plastic threat to ocean health, but many view reducing use of plastic straws as an actionable item that encourages consumers to pay more attention to their use of other disposable plastic products.

This report captures basic information on the potential target materials and the variety of potential policy options that could reduce the amount of foam food service ware and single use plastics in the city.



The City of Vancouver, BC, is developing a comprehensive single use item reduction strategy with policies addressing foam takeout containers, other takeout containers, disposable straws and utensils, shopping bags, and disposable drink cups

DISPOSABLE FOOD SERVICE WARE

FOAM FOOD SERVICE WARE

THE MATERIAL EXPANDED POLYSTYRENE

Polystyrene is a type of plastic commonly used in consumer goods. It can be solid or foamed.

Expanded polystyrene (EPS) is a lightweight insulating plastic foam, commonly but inaccurately referred to as Styrofoam™ (see sidebar). Rigid and tough, EPS is widely utilized because it is light, cheap, flexible and multi-functional.

EPS is seen most often in the food service industry as food containers such as trays, plates, bowls and cups and packaging for consumer products such as electronics.



EPS foam food service ware

EPS VERSUS STYROFOAM™

Expanded polystyrene (EPS) is not Styrofoam™. Styrofoam™ is a distinct material created and trademarked by the Dow Chemical Company, though the name Styrofoam™ is informally used to refer to all forms of polystyrene. Styrofoam™ is extruded polystyrene foam (XPS), widely used as insulation in the construction industry, as an insulator in appliances like refrigerators, and in crafts and model building.

ENVIRONMENTAL ISSUES ASSOCIATED WITH EPS

The features that make EPS appealing for packaging also cause it to impact the environment.

EPS is typically not collected curbside because it breaks apart at the recycling center and is often contaminated with food residue. Clean EPS has limited recycling options through events such as Kirkland's Styrofest events. EPS collected for recycling is extruded into EPS ingots by local processors such as StyroRecycle, located in Kent, WA. Ingots are used by manufacturers to reconstitute the recycled plastic into durable materials such as decking.

Most EPS foam food service containers are used once and discarded. When used in food service, EPS is often too dirty to recycle due to food residue and staining, and must be disposed of as garbage.

When EPS is sent to the landfill, it takes more than 500 years to decompose. In addition, because it is so lightweight, EPS can be blown out of trash receptacles or the landfill and become litter, where it is easily transported by waterways and storm water collection systems into bodies of water. EPS has had negative environmental impacts in marine ecosystems, due to its propensity to break into smaller pieces that are easily ingested by wildlife.

PLASTIC STRAWS AND UTENSILS

Plastic straws and utensils are typically made out of polystyrene or polypropylene. There are varying estimates of how many plastic straws and plastic utensils are used in the US. World Centric estimates 40 billion plastic utensils are used annually in the US. Market research firm Technomic estimates that 170 million straws are used daily in the US, while other sources estimate higher

numbers ranging from 390 to 500 million straws used daily. Regardless of exact figures, plastic straws and utensils are a focus of policy actions, as organizations and municipalities work to reduce single use plastics and as more environmentally-friendly alternatives to single use plastic utensils and straws become available.



Graphic created by awareness campaign "The Last Plastic Straw," based on the 500 million straws per day estimate

ENVIRONMENTAL ISSUES ASSOCIATED WITH PLASTIC STRAWS AND UTENSILS

Plastic straws and utensils cannot be recycled in our commingled recycling system because they are too small to be sorted, and must be disposed of as garbage. Due to consumer confusion, they are often mistakenly placed in recycling or compost carts, and act as a contaminant that is difficult to remove.

Like EPS, plastic straws and utensils gradually fragment into microplastics in the environment, both on land and in the ocean.



CONSIDERATIONS FOR SINGLE USE REDUCTION POLICIES

There has recently been movement to reduce or eliminate use of foam food service ware and single use plastics like bags, straws, and utensils. There is a significant range in the types of reduction policies that have been adopted, ranging from voluntary reduction to bans. Citywide ordinances that specifically ban foam food service containers (as opposed to EPS packaging and other materials) for all businesses are the most common type of EPS foam reduction policy. Recently, plastic straw bans have also become more common, with the City of Seattle banning plastic straws in July 2018.

Below is a discussion of some of the important aspects of plastic reduction policies to illustrate the variety of approaches taken by local jurisdictions across the region and United States.

RESTRICTED ITEMS

Policies may restrict a single product type (e.g. foam food service ware or plastic straws only), or may affect multiple classes of products. Many food service ware bans include all types of food service ware, including foam food service ware, plastic utensils and straws (e.g. Seattle's policy).

Some food service ware policies ban items but include temporary exemptions, sometimes extended for years, to allow the market for acceptable alternatives to expand before removing the exemption. For example, Seattle's policy currently exempts metal foil-faced papers, small portion cups, and long-handled thick plastic soda spoons.

SUBSTITUTION

If foam food service ware is banned, it's important to consider the items that will replace it. Potentially, other single use plastic items will be used and they may need to be disposed of as trash. This is a consideration if overall goals are to reduce disposables headed to the landfill.

ACCEPTABLE ALTERNATIVES

There are many alternatives to foam food service ware, including potentially recyclable or compostable options. Some ordinances simply ban foam food service ware and do not require the use of specific alternatives, while others not only ban foam food service ware but also mandate that alternatives be recyclable or compostable (e.g. Seattle's policy), or compostable only (e.g. Alameda's policy). Current recycling market conditions make it challenging to find recyclable alternatives for many food service ware products.

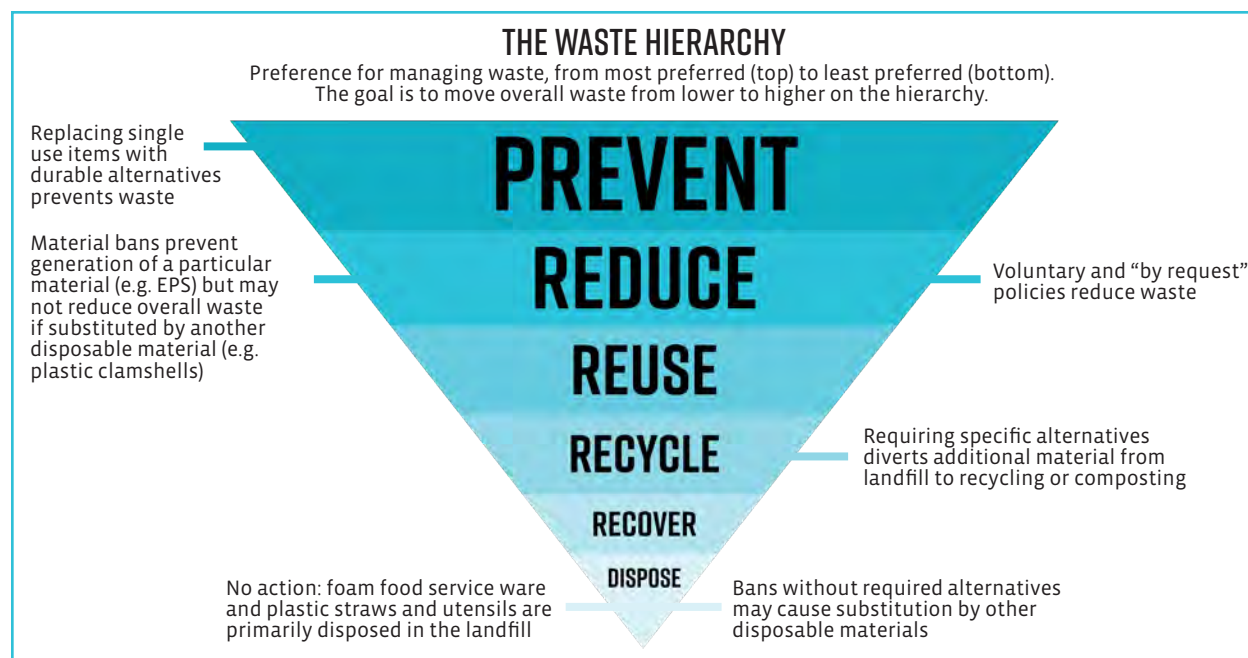
RESTRICTED ITEM EXAMPLES



EXAMPLE ALTERNATIVES



For plastic straws and utensils, many policies simply ban the provision of either at retail and restaurants, and require that if offered, the items be durable (reusable) or compostable. Compostable alternatives are now available for most products, though generally at a higher cost than disposable plastics. A recent search for products showed a foam clamshell container available for \$0.09/each, and a compostable fiber clamshell available for \$0.20/each.



SCOPE OF THE REDUCTION POLICY

In some cases, reduction policies may be imposed on only certain types of businesses, or for internal use by municipalities only. The City of San Diego, for example, originally had a ban on EPS for service contracts with the city, and recently expanded their ban citywide. Cities may consider city-wide reduction policies, or start by banning the purchase of these items for city use, or banning their use at city facilities or events. Cities can utilize Environmental Preferable Purchasing programs to establish guidelines for acceptable types of products.

PHASE-IN PERIOD

Many ordinances are implemented in phases, giving retailers time to use up existing stock before switching to acceptable service ware. A phase-in period also offers sufficient time for City staff to conduct education and outreach to businesses and the community. In 2016, Kirkland provided businesses with one year of advance notice before the Plastic Bag Reduction Policy ordinance took effect.

ENFORCEMENT

Many ordinances have a monetary fine built in to encourage businesses to comply. For the City of Kirkland’s Plastic Bag Reduction Policy, violations are enforced through the standard code enforcement monetary penalties outlined in Kirkland Municipal Code Section 1.12, though no penalties have been issued since staff took a passive, educational approach to enforcement.

ORDINANCE EXAMPLES

SEATTLE, WASHINGTON

In 2008, the City of Seattle enacted an ordinance requiring single use food service items, including packaging and utensils, to be recyclable or compostable. The first phase, effective January 1, 2009, banned foam food service ware without a requirement of alternatives. After 18 months, all single use food service ware was required to be compostable or recyclable. Seattle Public Utilities temporarily exempted certain items, including plastic utensils and straws, until July 1, 2018, when utensils and straws were no longer exempt due to increased options for approved compostable utensils and straws.

Straws and utensils now must be durable or compostable. Disposable flexible plastic drinking straws are allowed when needed by customers due to medical or physical condition.

The City of Seattle doesn't allow food and compostable paper in the garbage. Businesses that generate food waste or compostable paper must subscribe to a composting service, or self-haul their food waste to a transfer station for processing. Businesses pay for compost service.

SEATTLE POLICY ELEMENTS

- Foam food service ware, plastic straws and plastic utensils banned
- Requirement for food service ware to be compostable or recyclable
- Requirement for straws and utensils to be durable or recyclable
- Phase-in period for alternatives



Outreach graphic explaining City of Seattle's straw and utensil policy

ISSAQUAH, WASHINGTON

In 2009, the Issaquah City Council adopted an ordinance banning polystyrene foam food service ware and requiring businesses to use only recyclable or compostable food service packaging. Through this policy, businesses are also required to participate in and pay for a commercial food waste composting service. Issaquah's policy currently includes temporary exemptions for cutlery, straws, and other specific single use food service items.

ISSAQUAH POLICY ELEMENTS

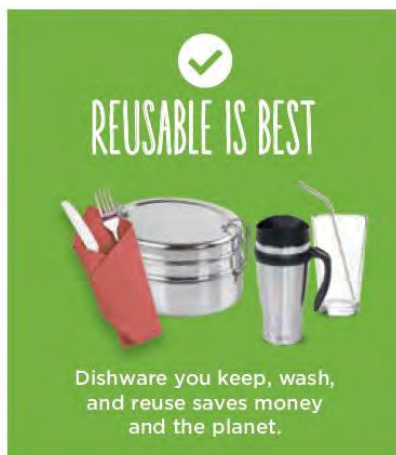
- Foam food service ware banned
- Requirement for food service ware to be compostable or recyclable
- Temporary exemption (currently in place) for plastic straws and cutlery

ALAMEDA, CALIFORNIA

In September 2017, Alameda City Council passed the Alameda Disposable Food Service Ware Reduction Law, requiring businesses to: only provide (compostable paper or reusable) straws on request, encourage customers to go reusable, and only provide compostable fiber-based packaging for to-go items. Many compostable options on the market are biobased plastics, which can look like plastic but are compostable – Alameda’s policy does not allow these options and instead is only allowing fiber based compostable options. If it looks like plastic, it is not compostable in Alameda’s system, so it is not permitted.

ALAMEDA POLICY ELEMENTS

- Foam food service ware, plastic utensils and plastic straws banned
- Straws by request only
- Requirement for food service containers to be compostable fiber
- Requirement for straws to be compostable paper or durable



Outreach graphic explaining City of Alameda’s disposable food service ware policy

SAN FRANCISCO, CALIFORNIA

In 2006, San Francisco passed a food service waste reduction ordinance prohibiting the use of foam food service ware and requiring the use of compostable or recyclable food service ware by restaurants, retail food vendors, municipal departments and municipal contractors. It allowed businesses to apply for a one-year waiver with proof of “undue hardship”. San Francisco staff made an effort to visit every establishment to conduct outreach in advance of implementation.

SAN FRANCISCO POLICY ELEMENTS

- Foam food service ware banned
- Requirement for food service containers to be compostable or recyclable
- Undue hardship extension

SAN JOSE, CALIFORNIA

The City of San Jose’s foam food container ordinance went fully into effect January 1, 2015, and requires all restaurants to use non-foam food service ware for both dine-in and takeout. Their ordinance allows restaurants to choose what alternative products to offer. The City of San Jose’s website offers information on other products and pricing.

SAN JOSE POLICY ELEMENTS

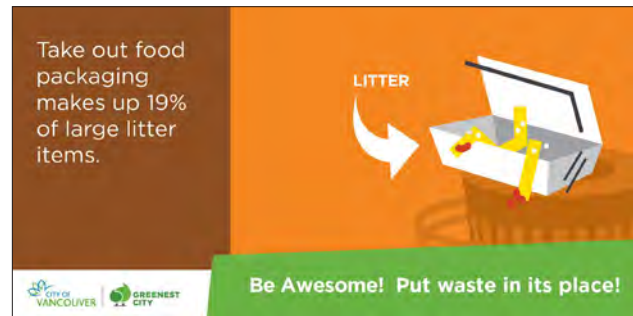
- Foam food service ware banned

VANCOUVER, BC, CANADA

In May 2018, Vancouver City Council approved a comprehensive zero waste strategic plan, Zero Waste 2040. In this plan's Single Use Item Reduction Strategy, Vancouver became the first city in Canada to ban plastic straws and foam cups and takeout containers, effective June 1 2019. Vancouver's Single Use Item Reduction policy also requires disposable utensils to be given out only if customers ask for them, rather than receiving them automatically. Vancouver is currently developing their implementation plans and are considering bylaw amendments to require items be recyclable or compostable.

VANCOUVER POLICY ELEMENTS

- Foam takeout containers, foam cups and plastic straws banned
- Plastic utensils by request



An educational campaign raises awareness about single use packaging in advance of implementation of Vancouver's policy

NEW YORK, NEW YORK

Starting January 1, 2019, New York city stores and food service establishments may no longer offer single use expanded foam food containers like takeout clamshells, cups, plates, bowls and trays. EPS foam is still allowed for raw meat or when prepackaged before arriving at the store. The policy allows businesses to choose any alternative products. Businesses have a 6-month grace period before fines will be assessed.

NEW YORK POLICY ELEMENTS

- Foam food service ware banned
- Grace period for enforcement

BERKELEY, CALIFORNIA

In 1988, Berkeley was one of the first cities to ban all polystyrene foam food service ware. In January 2019, the City of Berkeley passed a Single Use Disposable Foodware and Litter Reduction Ordinance. This multifaceted ordinance requires use of only compostable disposables, a 25 cent fee on all takeout cups, and the provision of durable dishware for eating on premises. The Ordinance is set to be fully implemented by January 1, 2022, with a phase-in plan beginning January 1, 2020.

BERKELEY POLICY ELEMENTS

- Foam food service ware banned (in previous policy)
- All single use food service items must be compostable
- Durable dishware must be provided for eating on premises
- 25-cent fee must be charged for all takeout cups

SUMMARY OF POSSIBLE POLICY ROUTES

Detailed descriptions of each policy follow, along with considerations, examples, and benefits and drawbacks to each approach.

LESS REGULATION

NO REQUIREMENTS

OPTION 0: TAKE NO ACTION

OPTION 1: VOLUNTARY REDUCTION

BAN FOAM FOOD SERVICE WARE ONLY

OPTION 2: BAN FOAM FOOD SERVICE WARE ONLY



OPTION 3: BAN FOAM FOOD SERVICE WARE ONLY, DISPOSABLE STRAWS + UTENSILS BY REQUEST ONLY



BAN FOAM FOOD SERVICE WARE, PLASTIC STRAWS AND UTENSILS

OPTION 4: BAN FOAM FOOD SERVICE WARE, PLASTIC STRAWS + UTENSILS



MORE REGULATION

OPTION 5: BAN FOAM FOOD SERVICE WARE AND PLASTIC STRAWS + UTENSILS, AND REQUIRE SPECIFIC ALTERNATIVES



ANALYSIS OF POSSIBLE POLICY ROUTES

NO REQUIREMENTS

OPTION 0: TAKE NO ACTION

The Council could take no action, and continue existing service offerings and education.

BENEFITS

- No requirements for businesses

DRAWBACKS

- No impact on use of single use food service ware

OPTION 1: VOLUNTARY REDUCTION

These types of policies educate businesses and customers about the problems with foam food service packaging and single use plastic disposable items.

CONSIDERATIONS

Voluntary reduction programs allow flexibility for businesses and require no enforcement. These policies may not be effective in reaching quantitative goals, however.

EXAMPLE

The City of Santa Cruz, CA, first had a voluntary foam food service policy, but later enacted restrictions after the voluntary program did not meet targets.

BENEFITS

- No requirements for businesses
- City can educate and engage with residents about the environmental impacts of their personal choices

DRAWBACKS

- Unlikely to make significant reduction in use of single use food service ware
- Number of businesses willing to voluntarily reduce use of foam food service ware and plastic utensils and straws may be limited

Example of a voluntary educational approach to plastic straws from the City of Fremont, CA



BAN FOAM FOOD SERVICE WARE ONLY

OPTION 2: BAN FOAM FOOD SERVICE WARE ONLY

Ban policies typically focus on foam food service containers (as opposed to EPS packaging or other uses). A ban on would require businesses to stop using all foam food service ware, including cups, clamshell containers, and plates. Businesses would choose whatever alternative products they want.



EXAMPLE

The City of San Jose, CA, bans foam food service ware and does not regulate alternatives.

BENEFITS

- Simple requirements for businesses
- Consumers typically support reduction of foam food service ware

DRAWBACKS

- Businesses could choose to use another disposable alternative to foam, which would likely not significantly reduce plastic waste
- Would not reduce use of single use plastic utensils or straws

OPTION 3: BAN FOAM FOOD SERVICE WARE ONLY, DISPOSABLE STRAWS AND UTENSILS ON REQUEST

This policy direction would require businesses to stop using all foam food service ware, and only provide disposable straws and utensils on request. Businesses would choose alternative products to use in place of the foam food service ware. Plastic straws and utensils could still be given out, but would likely be reduced.



EXAMPLE

The City of San Diego recently enacted a policy to ban foam food service ware and require businesses to only provide plastic straws and utensils upon request.

CONSIDERATIONS

This type of policy would require training and education of businesses and consumers, and would necessitate enforcement to ensure the policy is followed.


BENEFITS

- Consumers typically support reduction of foam food service ware
- Would cause some reduction in single use utensils and straws
- Single use plastic straws would still be widely available for those with medical needs

DRAWBACKS

- Businesses could choose to use another disposable alternative to foam, which would not reduce waste generated
- Would not completely eliminate use of disposable utensils and straws
- Ban versus “on request” could be slightly more difficult to communicate and / or enforce

OPTION 4: BAN FOAM FOOD SERVICE WARE AND PLASTIC STRAWS AND UTENSILS



Businesses may switch to a different disposable alternative to replace foam food service ware.

- Simple requirements for businesses
- Would eliminate unnecessary use of plastic utensils and straws

- Businesses could choose to use another disposable alternative to foam, which would not reduce waste generated
- While plastic straws would be exempted for medical use, businesses might be less likely to keep them on hand for customers

OPTION 5: BAN FOAM FOOD SERVICE WARE AND PLASTIC STRAWS AND UTENSILS, AND REQUIRE SPECIFIC ALTERNATIVES

These policies include the ban of foam food service ware, plastic straws, and/or plastic utensils and require specific products be used in their place.

CONSIDERATIONS

Most food service product providers do have recyclable or compostable options available. These types of policies would necessitate education on acceptable alternatives. Compostable products would need to be accepted by the City's compost processor, Cedar Grove.

Requiring recyclable or compostable alternatives can be challenging in the face of changing recycling markets, and also can still be hard for customers to understand appropriate disposal after use. For example, plastic clamshells are no longer accepted in recycling in Kirkland. Future changes in recyclable alternatives would need to be communicated to businesses. Additionally, even recyclable food service products are likely to be food soiled. Food is a contaminant in recycling.

A more straightforward option for consumers and businesses would be to only allow compostable alternatives, like Alameda's policy.



EXAMPLE

City of Seattle's policy requires that foam food service ware replacements be recyclable or compostable, and straw and utensil replacements be durable or compostable.

BENEFITS

- Eliminates foam food service ware and plastic straws and utensils
- Allows City to specify alternative food service ware products
- Potentially greatest reduction in waste

DRAWBACKS

- Could be complicated for businesses
- Significantly more staff time needed to educate and / or enforce policy
- Greater expense for businesses
- Potential for increased contamination in recycling and/or compost
- Compostable straws and utensils would be disposed in trash if compost service was not available
- Potentially greater expense for City ratepayers if businesses join existing, rate-subsidized compost program
- While plastic straws would be exempted for medical use, businesses might be less likely to keep them on hand for customers