

REPORT ON SINGLE-USE PLASTICS

Background, Alternatives, Local Actions, Covid-19 Impacts and Recommendations for Sunnyvale

1 Background

1.1 Single-use Plastics and Challenges

Single-use plastics are goods that are primarily made from fossil fuel-based chemicals. While plastic was invented in the mid-19th century, it wasn't until the 1970s that it became more popular. Paper and glass staples traditionally used, started being replaced with lighter and more affordable plastic alternatives; plastic milk jugs replaced glass milk bottles, plastic cups replaced durable coffee mugs. Plastic's range of unique properties has made it a product that is now seen as essential in society. Many of the uses for plastic are both reasonable and important, such as surgical gloves or medical devices. However, these products make up a very small portion of all plastics made. The rest, because it is lightweight and inexpensive, such as packaging, service ware, wrappers, straws and bags, are designed as single-use products and get thrown in the trash, sometimes minutes after use. Since the 1950s, 8.3 billion metric tons of plastic have been produced and half of that has been in the last 15 years. Today we produce 300 million tons of plastic globally per year and 50 percent of it is for single use¹.








Nearly all single-use plastic produced today is made from fossil fuel feedstock derived from natural gas or a by-product of crude oil refining. The production of these items is harmful to the environment and contribute to greenhouse gas emissions (GHG) at every point in their production. If plastic production and growth continue as predicted, GHG emissions could reach 1.34 gigatons per year which is equivalent to the emissions from 295 new 500-megawatt coal-fired power plants². The process of drilling for oil and gas, plastic's source material, leads to methane leaking and flaring and is often combined with clearing forests and wetlands that would have otherwise sequestered carbon. And refineries, where crude oil is turned into plastic, are one of the most intensive greenhouse gas emissions industries in the manufacturing sector.

At the end of their useful life, which as mentioned previously can be a very short lifespan, single-use plastics become plastic waste unless they are recycled. Despite the widespread use of recycling symbols on plastic products and convincing marketing that it is acceptable to use disposables, only nine percent

¹ <https://www.unenvironment.org/interactive/beat-plastic-pollution/>

² <https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf>

of plastic actually gets recycled³. This is because global markets no longer accept the masses of mixed plastics being produced and only plastics with a #1 or #2 recycling symbol (bottles and jugs) can find decent and reliable markets.

Plastic Resin Identification Codes						
						
PETE	HDPE	PVC	LDPE	PP	PS	OTHER
Polyethylene Terephthalate	High-Density Polyethylene	Polyvinyl Chloride	Low-Density Polyethylene	Polypropylene	Polystyrene	Other

And if disposed of improperly, or even properly, aerodynamic plastic bags and other lightweight plastic can become litter in the environment. More than eight million tons of plastic ends up in the oceans each year, wreaking havoc on marine wildlife, fisheries and tourism and costing at least \$8 billion in damage to marine ecosystems⁴. Due to the challenges that single-use plastics pose to the environment, health and safety, there is now a concerted effort to limit the use of single-use plastics worldwide. The focus of this paper is to discuss alternatives to single-use products and what the challenges are, summarize the local and state efforts under way to limit their use, discuss the impacts of the Covid-19 pandemic and recommend options for Sunnyvale given both limited staff resources as well as impacts on businesses due to Covid-19.

2 Alternatives to Single-use Plastics

As the fight against single use plastics has intensified over the last few years, more and more companies have started selling alternative “environmentally friendly” products they claim can biodegrade, compost or be recycled at the end of its useful life. The most popular alternatives include bioplastics and molded fiber made from plants rather than fossil fuel. Other plant-based options include bamboo, wheat straw, seaweed, wood and food (pasta and licorice straws), to name a few. However, these too have concerns.

2.1 Alternative Material Types

- **Bioplastics**

Bioplastics are exactly what they sound like, products made from plant or other biological material instead of petroleum. They can either be made by extracting sugar from plants like corn and sugarcane to convert into polylactic acids (PLAs) or can be made from polyhydroxyalkanoates (PHAs) through bacterial fermentation of sugars or lipids. PLA plastic is commonly used in food packaging, plastic bottles, utensils and textiles while PHA is often used in medical devices like sutures and cardiovascular patches.

While bioplastics do produce up to 25 percent fewer GHGs than traditional plastic over their lifetime, the negatives may outweigh the good when the materials’ life cycle is taken into

³ Roland Geyer, Jenna R. Jambeck, Kara Lavender Law, Production, use, and fate of all plastics ever made, *Science Advances* (2017)

⁴ https://wedocs.unep.org/bitstream/handle/20.500.11822/27113/plastics_limits.pdf

consideration. A 2010 University of Pittsburgh study found that bioplastics production resulted in greater amounts of pollutants due to fertilizers and pesticides used to grow the crops and chemical processing needed to make it into plastic. There was also more ozone depletion than traditional plastic during production and required extensive land use to grow the crops. Another challenge with bioplastics is with both the recyclability and biodegradability of the products, discussed later in the report.

- **Molded Fiber and Bagasse**

Molded fiber is constructed from post-consumer content, typically made from recycled paperboard and/or newsprint. It is used for protective packaging or for food service trays and beverage carriers. Other typical uses are end caps, trays, plates, bowls and clamshell containers.

Bagasse is a by-product from the sugarcane industry. The raw material is the fiber that remains after sugarcane stalks are crushed to extract their juice. With renewable growth of between two to three times per year it is a highly sustainable material choice. Bagasse products are durable and sturdy with a high heat tolerance and a natural feel and texture. Products typically include plates, bowls, take-out containers and trays.

The concern with both molded fiber and Bagasse products is that special chemicals are added to the packaging to give them greater resistance to moisture, oil and grease. These chemicals, called PFAS or Per- and Poly fluoroalkyl substances, are a group of over 5,000 man-made chemicals that, according to the EPA, are impossible to break down, both in the environment and in the body and studies indicate they can cause reproductive and developmental, liver and kidney and immunological effects in lab animals. PFAS are found in a number of sources including food packaging (like compostable food containers), commercial household products, workplace facilities, drinking water and even living organisms like fish.

During production and use, PFAS can migrate into the soil, water and air. Most PFAS do not break down, so they remain in the environment. Because of their widespread use and their persistence in the environment, PFAS are found in the blood of people and animals and are present at low levels in a variety of food products and in the environment.

Research is still being done on what the human and environmental effects are. The federal government is looking for methods to address, regulate and monitor these chemicals in a variety of ways, but until then, PFAS are being phased out of foodware containers that retailers and restaurants purchase. And as of January 2020, the Biodegradable Products Institute (BPI), a third-party certifier of biodegradable products, now bans the use of PFAS in the manufacturing of the packaging or product that are BPI certified. Though progress will vary by manufacturer, it is likely that it will take time for more readily available alternative molded fiber or bagasse product to be widely available.

- **Bamboo**

While bamboo dishware may seem like it would be a harmless natural replacement to disposables, even these are problematic. Bamboo dishware is manufactured by using a

melamine binder to hold it together. Melamine is a chemical compound originally thought only to be toxic to the kidney in large quantities.⁵ There is new research now showing that even exposure to low doses of melamine can negatively impact brain development and reproductive functions in the body. The exposure generally comes from it leaching from dishes into food. It can be avoided by carefully looking at the materials list when it is purchased, but if these products are available at a restaurant for take-out or use in the store, you may not know what they are made from.

- **Wheat, straw, seaweed, pasta and other plant or food-based products**

While more innovative products are being made from plant-based materials such as edible cups made from seaweed and spoons made from rice, wheat and sorghum, most plant-based products other than bagasse and bioplastics are limited to straws and stir sticks.

2.2 Recyclability/ Compostability of Single Use Plastic Alternatives

Seeing the word “biodegradable,” “compostable,” or even “recyclable” on plant based alternative products leads consumers to believe that these products can be disposed of for recycling and they will be sorted out and taken to a compost facility or recycler who will make them into new products. However, challenges with recyclability and compostability of plant based alternative products have emerged. Some bioplastics, such as cold cups for drinks you purchase at coffee shops, have a lower melting temperature than other plastics and must be separated from them to be recycled. This is nearly impossible due to the similarity in appearance of the bioplastic items and regular plastic items. Even if they were separated out, reliable and available markets to recycle these plastics do not currently exist.

Regarding compostability, bioplastics need high heat to degrade, which can only be accomplished at an industrial composting facility. However, the abovementioned sorting challenges complicate the ability of such facilities to get a clean stream of bioplastics. Natural degradation of bioplastics in landfills or compost bins will take significantly longer without the high heat. If littered, bioplastics do not decompose so may persist as micro-sized pieces, thereby posing an environmental and human health risk similar to plastics.

Furthermore, with molded fiber and Bagasse products, as mentioned previously, these products can contain PFAS which can migrate into the soil, water, and air, and have significant human health impacts, including hormonal interference, adverse immune system impacts, and increased risk of cancer. These products do not belong in a composting facility, whether it’s a commercial facility or your backyard. In March of 2019, the Oregon state compost recyclers put out a statement indicating they no longer wanted compostable packaging and foodware brought to their facilities⁶. It is a movement that may likely spread to other states, especially as regulatory requirements increase the amount and quality of food scraps collected that get processed.

In that vein, Sunnyvale’s unique “food only” food scraps program for both residents and businesses, puts us in a position to collect a clean stream of food scraps and provide us more options for end use of

⁵ Bolden, Ashley L., Johanna R. Rochester, and Carol F Kwiatkowski. “Melamine, beyond the kidney: A ubiquitous endocrine disruptor and neurotoxicant?” *Toxicology letters* (2017)

⁶ <https://www.oregon.gov/deq/mm/Documents/MessagefromComposter-En.pdf>

the products made (energy production from anaerobic digestion, soil amendment or an ingredient in animal feed). While compostable/biodegradable products are popular alternatives for food vendors, these products end up being disposed in the landfill because we don't accept them in our programs. Further, due to their human and environmental health impacts, these products should not take the place of single-use plastics. Table 1 summarizes the different types of single-use plastic alternative foodware products and challenges with each.

Table 1. Summary of Single-use Plastic Alternative Foodware

Product type	Easily sortable for recycling	Recyclable in Sunnyvale's recycling programs?	Accepted in Sunnyvale's food scraps program?	Toxicity
Bioplastic	No	No	No	No
Bagasse/Molded fiber	No	No	No	Yes
Bamboo	No	No	No	Yes
Stir sticks made from wood/pasta	No	No	Wood No, Pasta Yes	No

3 State, County and Local Efforts to Address Single-use Plastics

Many local jurisdictions, county agencies and the state are working on or have passed some type of ordinances in the last decade to address single-use plastics. According to Californians Against Waste, plastic bag bans had been implemented in 151 California cities (including Sunnyvale) prior to the Statewide ban that went into place in 2016. These bans have directly eliminated over five billion plastic shopping bags per year as well as the resulting litter and waste and has also reduced paper bag consumption by nearly 400 million bags. In addition, over 120 cities or counties (including Sunnyvale) have implemented foam foodware and product bans that has reduced the amount of polystyrene that ends up in the landfill or becomes litter in the environment.

A comprehensive list of jurisdictions that have enacted policies that have restricted disposable foodware items and brought reusables into food service for on-site dining, take-out and delivery can be found at *Reuse in Food Service: Enacted* at <https://upstreamolutions.org/policytracker>.

3.1 State efforts

In 2018, a straw ban (AB 1884) was signed into law which requires businesses to provide customers with single-use plastic straws only upon request. Two companion bills, SB 54 and AB 1080, were introduced in late 2018 to the legislature and would eliminate non-reusable, non-recyclable and non-compostable products and packaging. The proposed rules set a deadline of 2030 for several new requirements on manufacturers. Unfortunately, the legislative session ended with legislators failing to pass both bills.

Because the session ended without lawmakers voting on the measures, they were taken up again in the 2020 legislative session, but once again failed to pass.

3.2 Local Bay Area cities efforts

Many local Bay Area jurisdictions have started adopting ordinances that focus on restricting single use plastic items that go beyond polystyrene and plastic bags. Early versions of these ordinances focused on setting standards for disposable foodware, primarily by restricting these items to only that are recyclable or compostable and moving towards the requiring the use of reusable dishware for onsite dining. Below is a summary of local city ordinances that were passed or are being considered:

- The City of Palo Alto is currently the only jurisdiction in Santa Clara County that has a single-use plastic foodware ordinance. In Phase I of their ordinance, starting in January 2020, food service establishments were prohibited from the distribution of plastic straws, utensils (bioplastic utensils are ok) and stirrers. Staff has been instructed to hold off on checking for compliance in the short term, due to Covid impacts. By July 2020, grocery stores and farmer's markets were required to switch from regular plastic produce/meat bags to compostable ones. Staff estimates a 90 percent compliance rate with the switch to compostable bags. Palo Alto has developed a second phase for additional single-use foodware reduction requirements and will be meeting with City leadership in the near future to decide when the appropriate time to engage the public and business community will be, given the impacts from Covid-19. These may include fees on disposables, requiring reusables or a combination of both approaches.
- In March of 2019, the City of Berkeley adopted an ordinance that includes standards to reduce the use and disposal of single-use foodware items including cups, lids, utensils, straws, clamshells and other disposables and to increase reusable foodware over disposables. The ordinance uses a phased approach, starting with "accessory items" (straws, stirrers, utensils, lids and spill plugs) being available only upon request in the first phase which started in March 2019, then moving to a \$0.25 charge for disposable cups in the second phase which started in January 2020 and in the third phase, starting July 2021, food vendors must only offer reusable/washable food ware for onsite dining. Due to Covid-19 impacts, the ordinance is not being actively enforced, but if staff receives a complaint about a non-compliant business, they will visit and provide technical support to help them come into compliance. In early 2021, they will be reassessing the implementation and enforcement strategy for Phase III of the ordinance.
- In January 2020, the City of Santa Cruz adopted an update to its existing food packaging and products ordinance to include a \$0.25 fee on disposable to-go hot and cold cups and expanded its current definitions of "compostable" and "biodegradable." The definitions state that any to-go ware sold as compostable or biodegradable must be free of PFAS and must be able to completely decompose in nature.
- Other jurisdictions in Santa Clara County (San Jose, Los Altos, Cupertino and Mountain View) were in the process or considering a single-use plastic ordinance but they have all postponed or put on hold implementation due to the pandemic.

3.3 Santa Clara County Model Foodware Ordinance

In July 2019, a Model Foodware Ad Hoc Subcommittee was formed by the Technical Advisory Committee (TAC) of the County Recycling and Waste Reduction Commission. Participating members of the ad hoc subcommittee provided input on the scope and specifics of a model ordinance to reduce litter and waste related to food service ware. Feedback from UPSTREAM Solutions, a public interest non-profit environmental organization that works locally and nationally on waste reduction measures, was also provided.

There are three phases of Santa Clara County Model Foodware Ordinance. Highlights of the first phase, which is 6-12 months after the ordinance is implemented, includes:

- Requirement that non-reusable food service ware be recyclable or compostable
- No distribution of plastic straws, utensils (bioplastic utensils ok) and other plastic accessories
- Food delivery service must have an “opt in” for food service ware accessories and condiments

The second phase, which is 12-18 months after the ordinance implementation includes:

- A \$0.25 charge on every non-reusable beverage cup provided to customers (income is retained by retailer)
- Only reusable food service ware, utensils and condiments provided for on-site consumption
There are many exciting new reusable dishware options available. One example is a reusable/returnable stainless steel cup from Vessel (<https://vesselworks.org/>). For more information on reusable dishware go to <https://upstreamolutions.org/services>)
- Food vendors must have dishwashing capacity or service on the premises (dishwashing services for inhouse and/or reusable take-out containers are becoming more popular for restaurants who don't have space for a dishwasher, one example is a company called Dishcraft (<https://dishcraft.com/insights/serve-it-safe>))

And the last phase which is 18-24 months after ordinance implementation includes:

- Reusable beverage cups must be available to no less than 10 percent of attendees at large events

The phases allow a two-year timeframe for adjustments by the food vendors to use up non-reusable products, switch to reusable foodware products, potentially install a dishwasher or set up a dishwashing protocol and provide outreach to customers about the change.

The model ordinance was originally going to be presented to TAC in early 2020, but due to Covid-19 impacts, TAC meetings were cancelled until August. Once the meetings resumed, the model ordinance was briefly discussed by TAC but not reviewed or approved. As of this writing, TAC has not approved or

adopted the Model Foodware Ordinance and the assumption is that jurisdictions can customize and use all or parts of the ordinance as they see fit.

4 Covid-19 Impacts

Before the start of the Covid-19 outbreak, cities were starting to make headway in efforts to reduce the use of single-use plastics and move to recyclable or reusable products. Many jurisdictions are now delaying rolling out new policies and many retailers are banning customers from bringing reusable bags and cups into stores. In a September 2020 letter from the City's Solid Waste Division, grocery stores were asked to start charging for bags again and most have complied. The surge in single-use plastic is especially apparent in the restaurant industry due to an increased reliance on food delivery service.

Due to the pandemic, there have been many changes to how food is served and provided to customers:

- The pandemic has shifted from dining in, to a much bigger reliance on take-out and delivery service, thereby increasing the dependence on single-use accessory items (utensils, condiment packets, napkins, etc.). According to the International Waste Association, the amount of accessory items wasted for take-out and delivery services has skyrocketed by 200-300 percent.
- At the beginning of the pandemic, stores and coffee shops were not allowing customers to BYO cups or reusable grocery bags. As mentioned previously, staff is working with grocery stores to allow reusable bags again, but coffee shops are slower to allow reusable cups at stores.
- Street and curbside dining is very popular-many restaurants moved to disposables for sit-down dining
- Events and catering on hold

Although reducing single-use products has many benefits, existing food businesses are struggling and overwhelmed just to stay in business during the pandemic. These impacts must be considered and will drive policy direction and recommendations until we are well beyond the impacts of the pandemic.

5 Senate Bill 1383 Impacts

Another impact to businesses will be a new mandatory organics collection regulation, SB 1383. Signed into law in 2016, the regulation seeks to reduce greenhouse gas emissions by reducing organics in the landfill by 75 percent and recovering 20 percent of edible food for human consumption by 2025. While many of Sunnyvale's larger businesses have had food scraps collection in place for several years, medium and small businesses will now be required to implement a collection program which means finding space both inside and outside for new containers, setting up collection and sorting protocols, training staff and ensuring the material stays free of contaminants. Programs must be in place by 2022 and penalties for non-compliance will begin in 2024.

6 Recommendation

Single-use plastics have a harmful impact on the environment and human health and safety and limiting the use of single-use plastics is a worthwhile sustainability move. Further, limiting the use of single-use plastics in the food service sector provides the highest benefit. However, the food service sector has been dramatically impacted due to the pandemic. Therefore, it is recommended that the City take a slow, phased approach and with the exception of the "opt in" ordinance as described below, wait

several months post pandemic to implement a single-use plastic foodware accessories reduction program. Other actions, such as a charge on disposable cups, requiring reusable service ware, utensils and condiment containers for onsite dining and requiring events where food is served to make reusable beverage cups available to attendees can be considered at a later date.

While impacts from the pandemic are the most pressing reason to move slowly, SB 1383 is another reason. The organics mandate will impact food service providers at the same time they need to comply with restricting single-use plastic use. Imposing multiple regulations at the same time will not be received well by the impacted customers as they will have to deal with operational and financial impacts of the new regulations while recovering from the pandemic impacts. In addition, staff resources will be limited in the next two years as the focus will be on meeting the planning, outreach, implementation and compliance requirements of the new SB 1383 regulations.

Here is the phased approach recommended:

Phase 1 (Sept 2021)

- Implement an opt-in ordinance for accessories and condiments for online and take-out ordering from food service delivery vendors and restaurants. Under this ordinance, customers have to opt-in (specifically request) to receive these items, they are not provided by default. Restaurants and vendors would have to include this option on their websites or ask customers when they place their order whether they want the items or not. Several Bay Area cities, including the City of Santa Cruz and San Mateo County (see example⁷), have enacted such ordinances and some food delivery services are already offering this as an option.

Phase 2 (after implementation of SB 1383 Organics program is complete in late 2022/early 2023)

- Implement a single-use plastic accessories reduction ordinance. Businesses would provide customers with single-use plastic accessories and condiments only upon request, for in-store dining as well as take-out. Such items will be behind the counter and not readily available to customers.

Both phases can save money for the businesses due to reductions in restaurant purchases of disposable items, which would be a positive selling point during implementation.

One side note, since Sunnyvale's food scraps program does not allow any paper or compostable food service ware to be disposed with the food scraps, we would need to determine whether allowing PFAS-free compostable foodware items would be acceptable in future ordinances, even if those items would have to be disposed in the garbage. While compostable or biodegradable foodware products are made from renewable resources (paper or plants) which makes their production less impactful to the environment, they are typically more expensive than disposable foodware products. Asking food service vendors to spend more money to purchase compostable products, only to have their customers throw them in the trash instead of the compost bin, should be considered as a very short-term transitional solution.

⁷https://library.municode.com/ca/san_mateo_county/codes/code_of_ordinances?nodeId=TIT4SAHE_CH4.107REU_SDIFOSEWA_4.107.030DIDIFOSEWAAC&fbclid=IwAR1GnC4c9mdHJLW39Zrf18h4K1MRm2p1_l8xffi0o3NmMyS2KB7au-ozw

7 Conclusion

Reusable foodware regulations are becoming more crucial as cities continue being challenged by disposable items that wreak havoc on the environment and have no easy way to be recycled. Alternatives to plastic are no better, and in fact may be even more dangerous for human health. It is likely that in the next few years the state may pass regulations that address some or part of the issue, but until then, more and more single-use plastics are being disposed in the landfill and end up as litter in the Bay.

While there is no easy solution for disposing of single-use plastics or their plant-based alternatives, Sunnyvale's recommended phased approach uses a thoughtful and slow approach that minimizes back-to-back regulatory impacts on businesses that will likely still be recovering from the pandemic. It also gives staff time to focus first on implementing organics programs at these places of businesses to meet the requirements of SB 1383. Addressing the overabundance of disposables from food service delivery vendors by requiring an "opt in" request and later, restricting the use of the accessory items by only making them available by request, is a simple and non-impactful first step. Once the pandemic is well over, customizing the county's model ordinance can be used later to begin collaborations with business owners to determine what works best for them, how to help them transition away from disposables and importantly, will keep Sunnyvale aligned with its zero waste goal of 90 percent diversion by 2030.