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A Survey of Single-use Plastic Foodware Ordinances of the San Francisco Bay Region

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A Survey of Single-use Plastic Foodware Ordinances of the San Francisco Bay Region

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Abstract

Municipal jurisdictions in the San Francisco Bay Region (SFBR) are passing comprehensive single-use plastic (SUP) foodware ordinances in response to growing public pressure, and a California mandate to achieve zero waste. SUP foodware items have become an issue of concern because they are readily available in the restaurant industry, and are regularly among the top-ten pollutants collected during beach cleanups. SUP foodware items pose a danger to marine wildlife and contribute to rising carbon dioxide (CO_2) emissions. Policy makers in the SFBR are creating local ordinances that regulate the distribution and use of a variety of SUP foodware items. SUP ordinances are a new type of regulation and to help future policy makers better understand these regulations, a survey of all 108 SFBR municipal codes was conducted to identify the various types of SUP ordinances, and to identify and compare key ordinance characteristics. The results of the survey and analysis were: 45 (41.67%) municipalities do not have a SUP foodware ordinance, 52 (48.15%) have a polystyrene ordinance, four (3.70%) have a polystyrene and straw ordinance, and seven (6.48%) have a comprehensive SUP ordinance. Additional results were: municipalities that passed comprehensive SUP ordinances met the requirements of the California Environmental Quality Act (CEQA), ordinance language varied between municipalities, municipalities varied on what foodware items were regulated and how, and municipalities varied only slightly on what ordinance exemptions were provided. The identified variations were expected without the guidance of state-wide legislation or a regional model ordinance. Variations between ordinances may lead to regional consumer and food vendor confusion but more data on the environmental and fiscal impact of these ordinances should be collected before state-wide legislation or a model ordinance is developed.

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Table of Contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

BPI	Biodegradable Products Institute
CEQA	California Environmental Quality Act
EBT	electronic balance transfer
PLA	polylactic acid, a compound commonly used in compostable foodware items certified by the Biodegradable Products Institute as compostable
Region 2	Region 2 of the State Water Resources Control Board is the San Francisco Bay Area Regional Quality Control Board
SFBR	San Francisco Bay Region
SUP	single-use plastic

Introduction

Imaging strolling alongside the lapping waves of a beach shrouded in coastal fog. You are surrounded by marine birds hunting for fish and crab and you spot a half-buried plastic straw sticking up out of the wet sand. It looks out of place; its two bright red stripes stand out against the sandy background. Although designed to be used just once, this durable single-use plastic (SUP) straw will last longer than our lifetimes, or the lifetimes of future generations. You might react with sorrow or disgust as you quicken your pace to pick it up, you might react with indifference, or you might not think there is a problem. Then, you start to notice other items, maybe a stir stick, a fork, and other pieces of plastic pollution.

Plastic pollution, like this straw, presents a few immediate problems. It is an eyesore and it is a hazard for marine animals which might ingest it (Gall and Thompson 2015; Szostak-Kotowa 2004). Then, there are more long-term effects. As the straw floats in the water it will absorb other synthetic organic compounds which are toxic to organisms, the straw will eventually degrade into smaller and smaller pieces, those pieces may be eaten by marine wildlife, and plastic carried in the stomachs of marine animals will travel back up the food chain, carrying toxins with it, until a fish is caught with plastic in its stomach and then served on your plate (Andrady 2011; Azad et al. 2018; Germanov 2018; Oberbeckmann et al. 2015; Possatto et al. 2011).

There are upstream effects too. For the straw to get to the beach you found it at, first the polymers that make it up were processed from extracted petroleum or plant starches which are industrial processes that cause serious and significant harm to the environment (Harding et al. 2007). Then, the straw was manufactured and transported which used gasoline and contributed to rising carbon dioxide (CO_2) emissions. The straw was then given to a customer or selected by a customer from a self-serve station and then used for mere minutes before it was discarded on the ground or blown out of a waste receptacle before migrating to the beach. The cost of this

convenience is paid for by the environment and it is an externalized cost that most consumers are unaware of. That is, until, news began to spread that a plastic island was floating in the Pacific Ocean. Straws are a startling, if not trendy, example of SUP pollution. However, the problem also extends to cups, lids, utensils, and the many other items that are used to serve and consume food by a population constantly on-the-go.

Solving the marine plastic pollution problem has engaged the minds of scientists, activists, entrepreneurs, and policy makers across the globe. Solutions like beach cleanups bring awareness to the issue, promote civic engagement, and rid beaches and waterways of plastic pollution for a few days. Advanced technological solutions like the plastic catching boom of the Ocean Cleanup Project, or the surface water skimming device of Seabin, are able to remove plastic once it is waterborne (The Ocean Cleanup 2019; The Seabin Project 2019). Recycling and other material capturing systems are able to recycle a very small percentage of the plastic produced and used each year (Jambeck et al. 2015). However, SUP foodware items are being produced and consumed at an ever-increasing rate and clean-up efforts and recycling, though needed, are not enough to stem the tide of plastic pollution or prevent the environmental damage associated with production and distribution (Geyer et al. 2017).

Policies that regulate the availability and use of SUP items may provide a solution. 'Single-use plastic' often has different meanings because it is a new term. In this paper, SUP refers to a plastic item that has been designed for one use - whether or not it is compostable. The recent success of a state-wide plastic bag ban in California provides a compelling example of how regulating an item like SUP bags may reduce the instance of the regulated item in the watershed and marine environments (California Coastal Commission 2018).

The San Francisco Bay Area has become a hot-bed of SUP ordinances in recent years and this research paper had two main objectives regarding the local policy landscape. The first objective was to conduct a San Francisco Bay Area regional survey of local municipal codes to discover which municipalities have ordinances and to identify any comprehensive SUP ordinances. The

second objective was to analyze the comprehensive SUP ordinances to find out if there are any legal challenges to the ordinances, what materials and items are regulated, and how. It was predicted that a survey will show variability among which municipalities have adopted ordinances and which items are regulated and how. Without a model ordinance that all municipalities are borrowing language from or without a state-wide law, ordinances will vary and that will create a patchwork legislative landscape in the San Francisco Bay Area.

In order to address the issue of regulating SUP it is necessary to first examine the lifecycle impacts of SUP associated with: resource extraction, production and distribution, use, and disposal. In order to understand how the issue of SUP pollution was brought to the attention of policy makers, the history of public awareness of plastic pollution will be given. Then, to understand the current policy landscape, the history of plastic bag, plastic microbead, straw, polystyrene, and the emergence of comprehensive SUP ordinances as the preferred method to address SUP pollution will be examined.

Background

The history of federal, state, and municipal statutes governing the use of SUP items is also the history of growing public awareness of the problem of marine plastic pollution. Media outlets now regularly report on the impact that plastic pollution has on the environment and human health. As a knowledgeable public has put pressure on legislatures and policy makers, SUP statutes have grown in diversity and scope.

The Lifecycle of Single-use Plastics and their Impact on the Environment

Plastic is a ubiquitous component of consumer life and has been so since LIFE magazine heralded the age of the throwaway lifestyle (LIFE 1955). The promise of the throwaway lifestyle is that it would free women from the household chore of washing dishes. The throwaway lifestyle also makes it possible for companies to cheaply deliver their products to consumers and gives consumers the ability to be constantly productive without having to pause for chores. Plastic is cheap to manufacture, durable, and widely used. Plastic is used to create everything from medical devices and clothing to beverage straws. Many of these items are used just once before they are discarded. However, there is no “away” that plastics can be thrown to. The true cost of cheap and convenient plastic is externalized onto the environment and the health of individuals and communities.

Plastic is derived from extracted oil and oil extraction impacts the air, soil, and water of areas surrounding an oil field (Johnston et al. 2019). Studies have found concentrations of carcinogenic volatile organic compounds in the atmosphere of communities near active oil fields, high levels of radioactive radium in residue of evaporated waste water pits, and carcinogenic petroleum hydrocarbons from leaking injection wells in groundwater (Macey et al. 2014, Spitz et al. 1997, Teng et al. 2013). Communities near oil extraction sites have restricted access to drinking water because oil extraction requires substantial amounts of water, and oil

extraction waste water may pollute remaining drinking water supplies (Horner et al. 2016). The large oil refinery business in Kern County California is an example of how the oil extraction industry impacts the environment and human health (Jeremy 2011). Three of the largest refineries in the U.S. are located in Kern County, California and much of the petroleum in Kern County is a heavy oil which cannot be removed from the ground by simply tapping into it like light oil and must be extracted by forcing high pressure steam into the oil veins. The Central Valley of California experiences frequent water scarcity so the water for extraction is drawn from the drinking water supply of the Central Valley and State Water Projects, and from nearby underground aquifers. The high demand for water by the oil industry has restricted the residential and agricultural access to clean water. Furthermore, discharge of waste water from oil extraction has poisoned local underground aquifers and the water supply downstream of the oil fields.

Plastic products are created by molding preproduction pellets into plastic items and most manufactured plastics are SUPs. Pre-production plastic pellets are commonly made from polypropylene and high- and low-density polyethylene polymers that are derived from a fraction of the oil extracted from oil fields like those in Kern County. By 2016, it was estimated that the world has produced a total of 5.8×10^{12} kg of plastic since plastic was first produced at a large scale in 1950 and 4.9×10^{12} kg (84.48%) of that plastic is either in landfill or in the environment (Geyer et al. 2017). Of all the preproduction pellets produced each year, about 45% of the pellets are used to create single-use packaging (Barnes 2019). Driven by the growing demand for single-use products, the total amount of plastic produced is projected to exceed 2.5×10^{19} kg by the year 2050 (Geyer et al. 2017).

The process of producing and distributing plastic products along global supply chains produces CO_2 - and other greenhouse gases. Lifecycle analyses have indicated that polypropylene releases 3.4 kg CO_2/kg polymer, high-density polyethylene releases 2.5 kg CO_2/kg polymer, and low-density polyethylene releases 3.0 kg CO_2/kg polymer over the life cycle of the plastic product

(Harding et al. 2007). These emissions have been linked to global warming, ocean acidification, toxic effects on environmental and human health, and ozone depletion (Harding et al. 2007).

Plastic is a preferred material for many items because it is lightweight, durable, and adaptable. Plastics contain chemical additives to give them certain properties or plastics absorb chemicals from the surrounding environment like plasticizers, polychlorinated biphenyls, Bisphenol A, and polyvinyl chloride biproducts (Bara and Leonard 2018; Teuten et al. 2009). These additives and contaminants are known to migrate from plastic products into organisms through ingestion (Teuten et al. 2009). A study by Fierens et al. (2012) tested U.S. food products, food packaging, and food for phthalates which are commonly used plasticizers. It was found that food packaging and products contained concentrations of phthalates between 140-55,000 μg/kg and food contained concentrations of phthalates between <10 – 810 μg/kg (Fierens et al. 2012). Phthalates act as endocrine disruptors and have been linked to obesity, endocrine disruption, and birth defects (Gray et al. 2000). The Consumer Product Safety Improvement Act of 2008 was passed to protect children from the risk of exposure to phthalates through plastic items like baby bottles and toys. However, there is no legislation that bans the use of phthalates in food packaging or food products.

After SUPs are used, consumers discard the items into waste streams destined for landfill, recycling centers, or compost facilities according to local municipal and waste hauler guidelines. Consumers also litter the items directly into streets and the environment. Due to waste mismanagement in the U.S., it is estimated that between 2.5×10^{13} kg and 1×10^{14} kg of plastic waste entered the ocean in 2010 (Jambeck et al. 2015). Furthermore, it is projected that 1.7% to 4.6% of plastic produced in the U.S. will leak into the environment each year. For instance, SUP bags are easily blown away from open garbage cans, landfills, or garbage trucks and into streets and marine environments (Wagner 2017).

To complicate matters, on January 1, 2018, China's National Sword policy went into effect which prohibited trade partners from exporting scrap plastic contaminated at proportions

>0.5% with non-recyclable materials into China (Javorsky 2019). California has historically exported one third of the recycling it has recovered and China has been the largest buyer by purchasing and processing about 40% of California's exported material (Javorsky 2019: US, California, CalRecycle 2019). National Sword has highlighted the deficiencies of the U.S. recycling industry because U.S. waste haulers have contamination proportions up to 25% which means that many California recyclers will be unable to sell scrap plastic unless contamination proportions are reduced or a different buyer is found (Javorsky 2019; Johnson 2019). Now that China is not using recycled feedstock to produce plastic products, China is purchasing greater quantities of U.S. virgin plastic feed stock and it is predicted that U.S. exports will quintuple by 2020 (Kaskey and Koh 2017).

Once in the marine environment both macroplastics and microplastics pose a threat to wildlife because they resist decomposition, carry toxins, suffocate the animal or harm the digestive tract when they are mistakenly or intentionally ingested, and may entangle animals (Gall and Thompson 2015; Szostak-Kotowa 2004). Macroplastics like shopping bags may also sink to the sea floor where they disrupt the lives and habitats of invertebrates and are a disease vector for coral (Green et al. 2015; Lamb et al. 2018).

Macroplastic items eventually degrade into microplastics. Plastics do not decompose in a marine environment, but breakdown into ever smaller pieces because of wave action, biodegradation, photodegradation, and thermal degradation (Andrady 2011). Marine plastic pollution like microbeads, preproduction pellets, and degraded bits of plastic may be consumed by small species and have been found in the stomachs of commercial fish (Azad et al. 2018; Possatto et al. 2011). Ingested microplastics can harm the digestive tracks of wildlife and the toxins and biofilm carried by microplastics may become stored in wildlife and bioaccumulate up the food chain (Germanov 2018; Oberbeckmann et al. 2015). However, it is unknown what toxicological risks ingested plastic may pose for animals and humans (Jungnickel et al. 2018; Ziccardi et al. 2016).

The largest quantity of items entering the marine environment are land-sourced SUP items categorized as food packaging and foodware (California Coastal Commission 2018; Jambeck et al. 2015). The California Coastal Commission (CCC) has conducted a litter pick-up and characterization study along the California coastline, river banks, and tributaries since 1989 in coordination with the annual International Coastal Cleanup Day organized by the Ocean Conservancy. The top ten items collected and identified by the CCC between 1989 and 2017 were: cigarettes and cigarette filters at 37.0%; food wrappers and containers at 10.8%; caps and lids at 9.1%; bags at 7.7%; cups, plates, forks, knives, and spoons at 5.5%; straws and stirrers at 4.2%, glass beverage bottles at 3.3%; plastic beverage bottles at 2.7%; beverage cans at 2.4%, and construction materials at 1.8% (Figure 1).

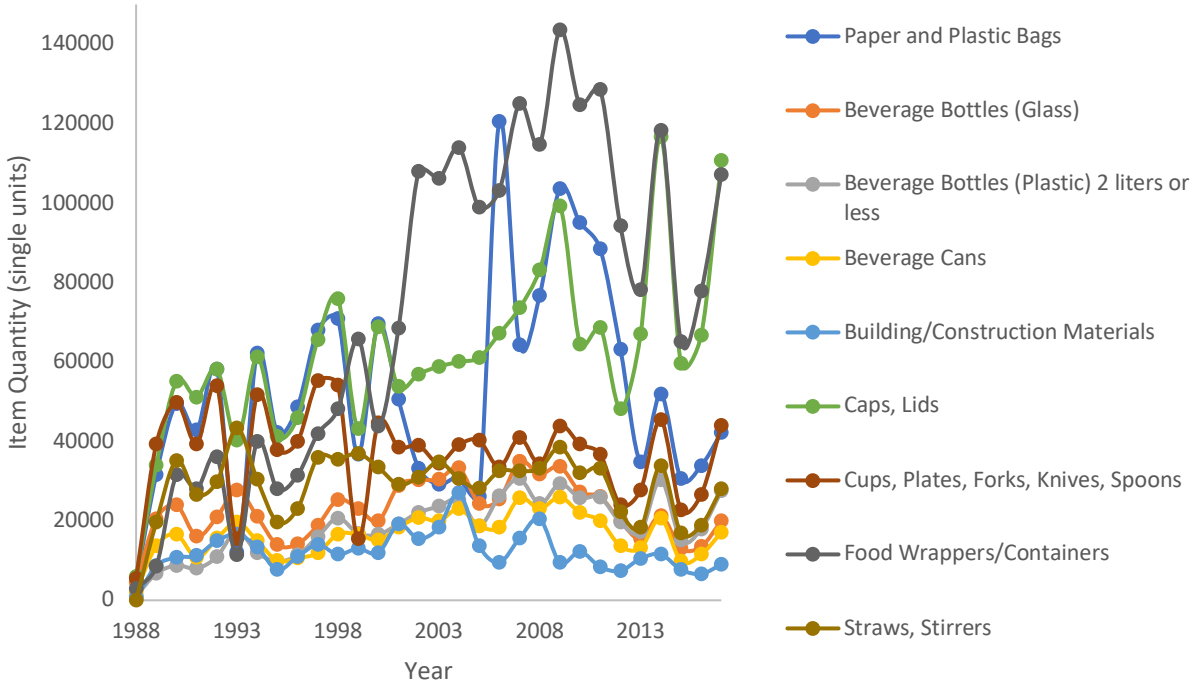

Figure 1. Changes in quantity of top ten items (not including cigarette butts and filters) collected and characterized by the California Coastal Commission on International Coastal Cleanup Day, 1988-2017. Data from California Coastal Commission (2018).

Although SUP items make up a significant portion of coastal and river bank litter in California a study published by the San Francisco Estuary Institute (SFEI) found that polyethylene made up 8% and polypropylene made up 8% (common SUP polymers) of the estimated 7.2 million pieces of microplastic particles and fibers entering the San Francisco Bay estuary each year (Gilbreath 2019). Research has indicated that plastic microfibers may be entering water bodies like the San Francisco Bay through atmospheric deposition as the fibers are ejected into the air by clothing driers (Gasperi et al. 2018). Of the remaining 84% of microplastics identified in the study by SFEI, the most significant materials were black rubber fragments that may have been tire rubber and textile fibers. This finding suggests that San Francisco regional policies and stormwater trash capture systems are preventing non-degraded SUP items from entering the estuary through stormwater systems and tributary flows.

History of Public Awareness

Since the 1970s a series of scientific papers have noted the presence of plastic pollution in the ocean. However, it has taken time for the public to become aware of the problem of marine plastic pollution and only recently has awareness translated into policy. In the late 1990s, media attention around the research and advocacy of Captain Charles Moore brought the issue of marine plastic pollution to public attention. Finally, a viral video of a plastic straw being pulled from the nostril of a sea turtle was cause for global alarm and lobbyists used that energy to create laws banning and restricting the use of SUP straws (Rosenbaum 2018).

Carpenter and Smith (1972) noted the presence of plastic particles in the Sargasso Sea at a density of 3,500 pieces/km^2 and concentration of 290 g/km^2 in one of the first published studies of marine plastic pollution. The authors warned that unless the production of plastic decreased and waste capture and management systems improved, the density and concentration of marine plastic pollution would possibly increase. In 1989, plastic pollution was found near the Subarctic Front in the central North Pacific at a density of 202,700 pieces/km^2 and concentration of 3,008 g/km^2 (Day et al. 1990).

Then, plastic pollution was observed in the Northwest Pacific Gyre at a density of 334,271 pieces/km^2 and concentration of 5,114 g/km^2 (Moore et al. 2001). Compared with previous studies, Moore demonstrated that concentrations of plastic pollution were increasing and animals were being exposed to the toxins carried and sorbed by plastics (Moore 2012; Moore et al. 2001). Charles Moore realized that publishing scientific papers was not going to be enough to bring public attention to the issue because papers had been published without reaction so he became an activist and made national headlines as having discovered the Great Pacific Garbage Patch (Moore 2012). These early researchers, and the activists that rallied around the findings of scientific papers, were the first wave of scientists and organizers that worked hard to bring public attention to the problem of marine plastic pollution and the impact it was having on the environment, wildlife, and human health.

The studies conducted by these early researchers and organizations provided the data needed for legislators to pass a number of statutes that banned the use of SUP carryout bags, plastic microbeads, and polystyrene. Ordinances that use a combination of material bans and consumer fees have been shown to effectively reduce single-use plastic bag pollution (Ogunola 2018; Taylor and Villa-Boas 2016). Then, in the atmosphere of growing public awareness of marine pollution and the passage of SUP statutes, agonizing footage of scientists extracting a plastic straw from the nostril of a sea turtle went viral (which currently has 37,808,554 views on YouTube) on social media (Figgener 2015). It was then that the public, at large, embraced marine plastic pollution as a problem that needed a solution. The resulting public outcry from the video has largely translated into municipal bans on SUP straws, the rejection of SUP straws by consumers, and the volunteer elimination of SUP straws from corporate operations.

The Variety of Single-use Plastic Statutes

There is a growing movement among California municipalities to adopt comprehensive SUP statutes that restrict the use of a variety of items and materials through bans and fees.

However, the first wave of SUP statues targeted items and materials individually and piecemeal. This paper is focused on California SUP statutes so statutes outside of California will only be discussed at a federal and state level. This section has been divided by SUP statute type: plastic bag statutes, microbead statutes, straw statutes, Styrofoam statutes, and ends with an introduction to comprehensive SUP statutes.

By 2016, 110 California municipalities passed statutes restricting the use of SUP bags through bans or fees (Wagner 2017). The plastic and chemical industry lobbied to preemptively prohibit California from adopting SUP bag statutes but Ballot Proposition 67, a referendum on the state plastic bag ban, was approved by California voters on November 2, 2016. The proposition defeated a resolution to veto the Single-Use Carryout Bag Law of 2014. The bag ban prohibited the sale and distribution of SUP bags of thickness <2.25 mm (Single-Use Carryout Bags 2014). The statute also prohibited retailers from distributing reusable or compostable carry-out bags without selling them for at least $0.10. Reusable bags include plastics with thickness >2.25 mm, and bags made from natural and synthetic fibers. The adoption of SUP bag laws across the states of California, Connecticut, Delaware, Hawaii, Maine, New York, Oregon, Vermont, and the District of Columbia and other local jurisdictions has created backlash (National Conference of State Legislatures 2019; Toloken 2018). The states of Arizona, Idaho, Indiana, Iowa, Michigan, Minnesota, and Missouri have passed laws prohibiting municipalities within the states to pass statutes that restrict the use of SUP bags through bans or fees.

Beginning with Illinois on June 10, 2014, several states passed bans on plastic microbeads including Colorado, Indiana, Maine, Maryland, and New Jersey (Abrams 2015; Ahlberg 2014). These statutes banned the use of plastic microbeads in rinse-off personal care products but provided exemptions for biodegradable plastic microbeads. Then, on November 8, 2015, California Governor Brown signed AB 888 into law which prohibited manufacturers from adding any plastic microbeads to personal care products including biodegradable plastic microbeads (Plastic Microbeads Nuisance Prevention Law 2015). This was a significant advancement because biodegradable plastic is not necessarily benign in a marine environment (McDevitt et

al. 2017). Biodegradable plastics biodegrade at different rates, in different environmental conditions, and some biodegradable materials may leave behind toxic additives. As a result, California AB 888 became the legislative model and the U.S. looked to California AB 888 when it wrote the federal Microbead-Free Waters Act of 2015 which President Barack Obama signed into law on December 28, 2018. The Microbead-Free Waters Act of 2015 banned the use of all plastic microbeads in rinse-off personal care products at a federal level (Microbead-Free Waters Act of 2015).

The California cities of Davis on September 1, 2017 and San Louis Obispo on March 1, 2018 passed statutes requiring restaurants to provide straws only upon request in response to public outcry over the danger that straws posed to marine wildlife (Breggin 2018; Kim 2019). California Governor Brown signed state-wide AB 1884 into law on September 20, 2018 which requires businesses to provide customers SUP straws only upon request (Single-Use Plastic Straws 2018). Some California cities like Alameda and Palo Alto have gone further and banned the use of SUP straws with exemptions for persons with disabilities who request a SUP straw (*City of Alameda, CA Municipal Code* 2019; *City of Palo Alto, CA Municipal Code* 2019).

Expanded polystyrene (EPS), commonly known by the trademark Styrofoam, is widely used as protective shipping packaging and as insulating material for food and beverage containers (Graca et al. 2013). EPS sorbs more dioxin and similar chemicals when in marine environments than other plastics and ingested EPS may exposure animals to dioxin (Chen et al. 2019). Since 1988, 120 California municipalities have passed statutes banning the use of polystyrene including: Alameda County, Los Angeles County, San Francisco, San Mateo County, Santa Clara County, and Santa Barbara (Californians Against Waste 2015). The majority of these statutes prohibit the use of polystyrene in retail food service but some statutes prohibit the sale of polystyrene products and a few statutes only apply to city and county facilities. Attempts to create a state-wide polystyrene ban in California have repeatedly failed. However, in a move toward more comprehensive bans, California Governor Brown signed SB 1335 on September 20, 2018. SB 1335 requires all food businesses and food vendors to use reusable, recyclable, or

compostable food service packaging when serving prepared food in state facilities (Sustainable Packaging for the State of California Act of 2018). Although SB 1335 does not explicitly ban the use of polystyrene, SB 1335 effectively will ban polystyrene because polystyrene is difficult to recycle when soiled and costly to transport due to its volume and light weight (Verespeg 2007).

The SUP statutes that applied to SUP carryout bags, microbeads, straws, and polystyrene products focused on individual items or materials because of the concerns over the environmental and health impacts of those items. However, where the first wave of statutes targeted specific types of SUP items, the second wave of legislation is looking to target a wider range of products and materials with a special focus on SUP foodware due to growing awareness of the harm SUP, in general, are causing. Policy makers have noted that a piecemeal policy landscape is ineffective at stemming the tide of plastic pollution. California cities like Alameda, Berkeley, and Palo Alto have already passed comprehensive statutes and other municipalities like San Francisco and San Mateo County are considering their own statutes. Furthermore, the effort to pass state-wide statutes that will address the problem of marine pollution are on the rise. Although the bills failed, the California senate recently considered a pair of bills that would have required a 75% reduction in the use of SUP packaging and foodware by 2030 (Becker 2019). The results section of this paper will provide a comprehensive analysis of current SUP statutes of the San Francisco Bay Region (SFBR).

Methodology

A literature review of academic journal papers, news and magazine articles, and government statute language was conducted to find information on the lifecycle impacts of SUPs, the history of SUP legislation in the U.S. and California, and the need for comprehensive SUP statutes and ordinances. Primarily, the literature review was conducted using the Gleeson Library at the University of San Francisco to search through the following databases: Business Source Complete, Environment Complete, GreenFILE, Hospitality & Tourism, and Political

Science Complete. FUSION and Google were also used to search for information on recent ordinances and events that would not yet be addressed by peer-reviewed literature.

The municipal codes of SFBR municipalities were thoroughly reviewed to search for SUP ordinances and gather SUP ordinance data for analysis. SFBR municipal codes analyzed are listed in Appendix I: Municipal Code Data Sources.

To gather the ordinance data, first, a spreadsheet was developed to capture characteristics of ordinances that regulated polystyrene and other SUP foodware items. Kaitlyn Cyr, who is an analyst with the Recycling & Zero Waste Division of the Public Works Department for the City of Mountain View, shared the spreadsheet that Mountain View used to profile the ordinances of various SFBR municipalities in preparation for their own ordinance in an email to the author on October 16, 2019. The spreadsheet was used to profile ordinances according to six categories of characteristics identified by Kaitlyn Cyr in a personal communication with additions made by the author (2019) (Table 1). The prohibition category was divided into three characteristics; the disposable foodware use and charges category was divided into eight characteristics; the disposable foodware standards category was divided into four characteristics; the reusable foodware use category was divided into three characteristics; and the exemptions category was divided into six characteristics. Lastly, a definitions category was added to the City of Mountain View's spreadsheet to collect data on how municipalities defined terms in the ordinance language.

Table 1. Parameters Used for Evaluation of Various Aspects of Municipal Ordinances

Analysis	Categories
Categories evaluated	• Prohibitions • Disposable foodware use and charges • Disposable foodware standards • Reusable foodware use • exemptions
Prohibitions enacted by municipalities	• Prohibits foam • Prohibits single-use foodware containers (sometimes implied and not stated) • Prohibits single-use plastic foodware accessories
Disposable foodware use and charges	• Requires all single-use foodware accessories provided only upon request or in a self-serve area • Requires single-use straws provided only upon request • All disposable foodware must be recyclable or compostable products • Requires a charge on disposable foodware of $0.25 per cup • Requires a charge on disposable foodware of $0.25 per food container • Requires a charge for disposable to be shown on the receipt • Food vendors must provide signs indicating reasons for the foodware charges • Food vendors may charge a fee if compostable foodware is more expensive that non-compostable foodware
Disposable foodware standards	• Requires disposable foodware must be acceptable in the City's composting or recycling collection program • Requires disposable items to be free of fluorinated chemicals • Compostables must be BPI certified • Straws must be fiber based (not PLA)
Reusable foodware use	• Requires reusable foodware for dine-in with exceptions for compostable liners, wrappers, napkins, straws • Requires future foodware vendors to have onsite or offsite dishwashing capacity • Requires food vendors to provide public-facing three stream waste bins except full service restaurants
Exemptions	• Exemption for SUP straws upon request • Exemption for lack of available alternatives • Exemptions for food vendors that package prepared food outside the municipality • Exemptions for feasibility-based hardship • Exemptions for disposable foodware composed entirely of aluminum or aluminum foil • Exemptions for emergencies

Source: data adapted from a personal communication from Kaitlyn Cyr (2019).

Second, the geographic and municipal boundaries set by the State Water Resources Control Board were used to describe the SFBR and to target which municipal codes would be analyzed. A map of the counties covered by the San Francisco Regional Quality Control Board was created using ArcGIS Online software by Environmental Systems Research Institute. The map consists of a map of the San Francisco Regional Quality Control Board layered over a map of SFBR counties.

Third, the municipal codes of SFBR municipalities were screened for the presence of SUP foodware ordinances. The Californians Against Waste (CAW) website was first referenced to quickly identify any ordinance that applied to the following SUP foodware items: polystyrene, single-use straws, foodware items and foodware accessories, and takeout packaging. After an ordinance was identified, the municipal code was reviewed to assure that the data were accurate and current. For each city within the SFBR that was not listed on CAW's website, the municipal code was searched using the following terms: polystyrene, single-use, straw, foodware, food ware, and disposable. Fourth, each municipal code was identified as having one of four characteristics:

- no SUP ordinance (not including SUP bags)
- only a polystyrene ordinance
- polystyrene and straw ordinance
- comprehensive SUP ordinance

Comprehensive SUP ordinances were identified as those ordinances left over after all the ordinances were screened using the previous three criteria because these ordinances regulated multiple single-use items and materials. The comprehensive SUP ordinances were selected for further analysis and the ordinance attributes were analyzed according to seven categories (Table 2). Case law and municipal ordinance language was reviewed to determine if SUP ordinances adhered to CEQA requirements. Each municipality defined several terms in the definitions section of their ordinance. Terms that are not commonly used, novel terms, and terms with varying definitions between municipalities were chosen for analysis: compostable,

food vendor, prepared food, disposable, disposable cup, disposable foodware, disposable foodware accessories, food service container, foodware item, and single-use straw. The following terms were defined by the municipal SUP ordinances but were not chosen for analysis: American Society for Testing and Materials (ASTM), city, city contractors and lessees, city facilities, city manager, customer, department, director, distribute, egg carton, event, event producer, fluorinated chemical free, meat and fish tray, municipal compost facility, packing material, person, plastic foam, polystyrene foam, private schools, and public works director. The municipal single-use foodware prohibitions of each city were divided and analyzed by material type. Then, disposable foodware use and charges were divided and analyzed by three types. Next, disposable foodware standards were divided and analyzed by four types. Then reusable foodware use was divided and analyzed by reusable foodware for dine-in and dishwashing capacity. Lastly, exemptions were divided and analyzed by six types of exemptions.

Table 2. Parameters Used for Evaluation of Various Aspect of Municipal Comprehensive Single-use Plastic Foodware Ordinances

Analysis	Categories
Categories evaluated	• California Environmental Quality Act • Definitions • Prohibitions • Disposable Foodware Use and Charges • Disposable Foodware Standards • Reusable Foodware Use • Exemptions
Materials regulated	• Foam • Single-use plastic foodware • Single-use plastic foodware accessories
Disposable foodware use regulations and charges	• Foodware accessories by request • Single-use foodware accessory requirements • Single-use cup charge
Disposable foodware standards	• Requires disposable foodware to be accepted by city compost or recycling facility • Requires single-use items to be fluorinated free • Compostables must be Biodegradable Products Institute (BPI) certified • Straws must be fiber-based, no PLA
Exemptions	• Single-use straws upon request • Exemption for food prepared outside municipality • Hardship exemptions • Aluminum foodware exemptions • Exemptions from disposable cup and food container charges • Exemptions for emergencies

Source: data adapted from a personal communication from Kaitlyn Cyr (2019).

Findings

The San Francisco Bay Area Region

The State Water Resources Control Board defines the geographic and municipal boundary of the San Francisco Bay Area Regional Quality Control Board (Region 2) as composed of areas of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties (Figure 2) (Lauffer 2013). This study goes beyond the boundaries of Region 2 to include a complete survey of all the municipalities within the nine counties bordering the San Francisco Bay.

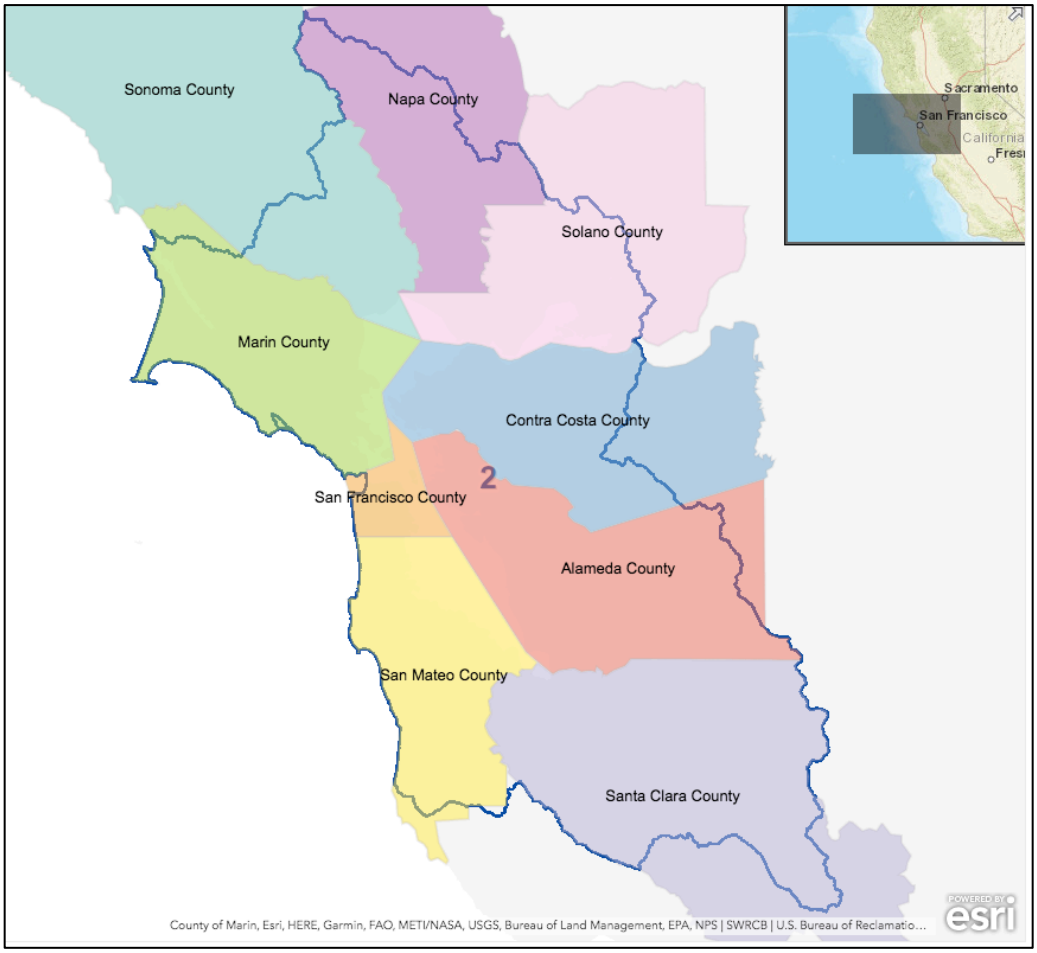

Figure 2. Map of California counties covered by the San Francisco Regional Water Quality Control Board created with ArcGIS Online software developed by Environmental Systems Research Institute (HSACadmin 2019; swrcb_hq 2017).

All data presented in Findings were adapted from municipal codes listed in Appendix I: Municipal Code Data Sources and compiled in Figure 3 and Tables 13 through 21 except as noted. There are 108 municipalities within the nine counties of the SFBR. Forty-five (41.67%) municipalities have no SUP foodware ordinance of any kind; 52 (48.15%) municipalities have only a polystyrene ordinance; four (3.70%) municipalities have both a polystyrene and SUP straw ordinance; and seven municipalities (6.48%) have comprehensive SUP ordinances that includes polystyrene, SUP straw, and other SUP foodware item regulations (Figure 3). Of the 63 municipalities that have polystyrene prohibitions in the municipal code, 43 (68.25%) simply prohibit food vendors from using polystyrene foodware products. Ten (15.87%) prohibit food vendors from using polystyrene foodware products and require disposable foodware products to be compostable or recyclable. Six (9.52%) prohibit food vendors from using polystyrene foodware products and require disposable foodware products to be biodegradable, compostable, or recyclable. Two (3.18%) prohibit food vendors from using polystyrene foodware products also require food vendors to increase the ratio compostable or recyclable foodware products to unrecyclable or un-compostable foodware products over time. Two (3.18%) prohibit food vendors from using polystyrene foodware products and require food vendors to use disposable foodware products that are actively recycled by the waste hauler. Of the 11 municipalities that prohibit the use of SUP straws, 9 (81.82%) prohibit the use of SUP straws and require alternative straws to be available by request only. One (9.09%) allows SUP straws but requires them to be available by request only and one (9.09%) prohibits SUP straws but does not require alternative straws to be available by request only. Lastly, seven municipalities have comprehensive ordinances which regulate polystyrene foodware products, SUP straws, and a greater array of SUP foodware items (Tables 3 through 11).

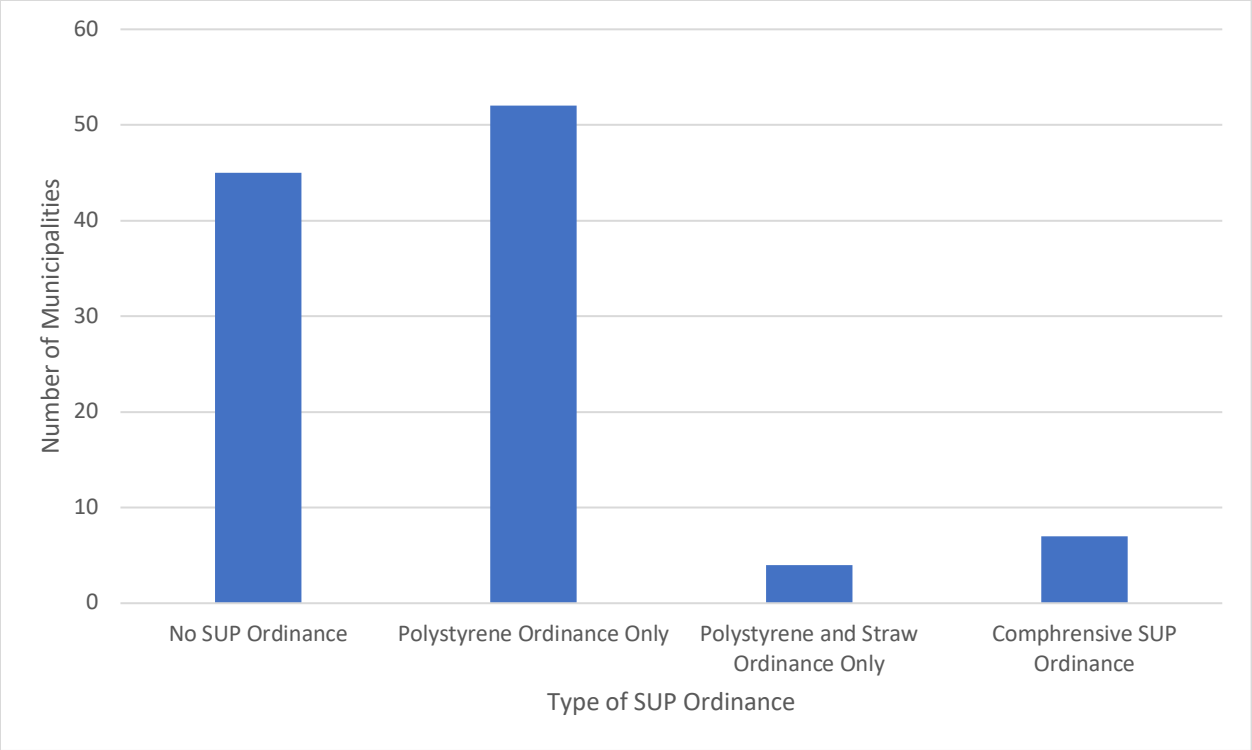

Figure 3. Number of San Francisco Bay Region Municipalities with a SUP ordinance by ordinance type. Data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.

Table 3. Types of Single-use Plastic Ordinances in Alameda County by Municipality

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
Alameda County	x[1]	…	…
Alameda	x	x	x
Albany	x	…	…
Berkeley	x	x	x
Dublin	x[2]	…	…
Emeryville	x[2]	…	…
Fremont	x[1]	…	…
Hayward	x[1]	…	…
Livermore	x[1]	…	…
Newark	…	…	…
Oakland	x	x	…
Piedmont	…	…	…
Pleasanton	x[1]	…	…
San Leandro	x[1]	…	…
Union City	x	x[6]	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.
x[1] also requires disposable foodware products to be compostable or recyclable.
x[2] also requires disposable foodware products to be biodegradable, compostable, or recyclable.
X[6] Does not require alternatives to be available by request only

Table 4. Types of Single-use Plastic Ordinances in Contra Costa County by Municipality

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
Contra Costa County	…	…	…
Antioch	…	…	…
Brentwood	…	…	…
Clayton	…	…	…
Concord	x[1]	…	…
Danville	…	…	…
El Cerrito	x[1]	…	…
Hercules	x	…	…
Lafayette	x[3]	…	…
Martinez	x[3]	…	…
Moraga	…	…	…
Oakley	…	…	…
Orinda	…	…	…
Pinole	…	…	…
Pittsburg	…	…	…
Pleasant Hill	…	…	…
Richmond	x	x	…
San Pablo	x[1]	x[5]	…
San Ramon	…	…	…
Walnut Creek	x	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.
x[1] also requires disposable foodware products to be compostable or recyclable.
x[3] also requires an increase in the % of disposable foodware products used in food service that compostable or recyclable over time.
x[5] SUP are still available but by request only

Table 5. Types of Single-use Plastic Ordinances in Napa County by Municipality

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
Napa County	…	…	…
American County	…	…	…
Calistoga	…	…	…
Napa	…	…	…
St. Helena	…	…	…
Yountville	…	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.

Table 6. Types of Single-use Plastic Ordinances in Marin County by Municipality

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
Marin County	x	…	…
Belvedere	…	…	…
Corte Madera	…	…	…
Fairfax	x	x	x
Larkspur	…	…	…
Ross	…	…	…
Sausalito	x	…	…
Tiburon	…	…	…
Mill Valley	x	…	…
Novato	x	…	…
San Anselmo	x	x	x
San Rafael	x	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.

Table 7. Types of Single-use Plastic Ordinance in San Francisco County

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
San Francisco	x	x	x

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.

Table 8. Types of Single-use Plastic Ordinance in San Mateo County

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
San Mateo County	x	…	…
Atherton	…	…	…
Belmont	x	…	…
Brisbane	x	…	…
Burlingame	x	…	…
Colma	x	…	…
Daly City	x	…	…
East Palo Alto	…	…	…
Foster City	x	…	…
Half Moon Bay	x	…	…
Hillsborough	…	…	…
Menlo Park	x	…	…
Millbrae	x[2]	…	…
Pacifica	x[2]	…	…
Portola Valley	x	…	…
Redwood City	x	…	…
San Bruno	x[2]	…	…
San Carlos	x	…	…
San Mateo	x	…	…
South San Francisco	x[2]	…	…
Woodside	…	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.
x[2] also requires disposable foodware products to be biodegradable, compostable, or recyclable.

Table 9. Types of Single-use Plastic Ordinance in Santa Clara County

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
Santa Clara County	x[4]	…	…
Campbell	x	…	…
Cupertino	x	…	…
Los Altos	x	…	…
Los Altos Hills	x[4]	…	…
Los Gatos	x	…	…
Milpitas	x	…	…
Monte Sereno	…	…	…
Morgan Hill	x	…	…
Mountain View	x	…	…
Palo Alto	x	x	x
San Jose	x	…	…
Santa Clara	x	…	…
Saratoga	…	…	…
Sunnyvale	x	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.
x[4] also requires disposable foodware products to be actively recycled by waste hauler.

Table 10. Types of Single-use Plastic Ordinance in Solano County

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
Solano County	…	…	…
Benicia	…	…	…
Dixon	…	…	…
Fairfield	…	…	…
Rio Vista	…	…	…
Suisun City	…	…	…
Vacaville	…	…	…
Vallejo	…	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.

Table 11. Types of Single-use Plastic Ordinance in Sonoma County

Municipality	Prohibits food vendors from using polystyrene foodware products	Prohibits SUP straws	Comprehensive SUP Ordinance
Sonoma County	x	…	…
Cloverdale	…	…	…
Cotati	x	…	…
Healdsburg	…	…	…
Petaluma	…	…	…
Rohnert Park	…	…	…
Santa Rosa	…	…	…
Sebastopol	x[1]	x	x
Sonoma	x	…	…
Windsor	…	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in municipal code.
… this characteristic not in municipal code.
x[1] also requires disposable foodware products to be compostable or recyclable.

California Environmental Quality Act Requirements

California municipalities have been sued by the Save the Plastic Bag Coalition (SPBC) under the California Environmental Quality Act (CEQA) for declaring that their municipality was exempt from issuing an Environmental Impact Report (EIR) when a SUP bag ban was passed (*Save the Plastic Bag Coalition v. County of Marin* 2013; and *Save the Plastic Bag Coalition v. City and County of San Francisco* 2014). There is a question whether municipalities that pass comprehensive SUP foodware ordinances will also be sued under CEQA.

CEQA was passed in 1970 to protect California natural resources and requires public or private agents to consider how a proposed project might impact the environment. The first step is to determine if an action will significantly affect the environment. If the project will not affect the environment then a notice of exemption is given. If the project might significantly affect the environment, then the municipality conducts an impact assessment and either releases a negative decision, a decision declaring no impact, or drafts a EIR and invites public comment. If the project will significantly affect the environment then the municipality drafts a EIR and invites public comment. After the municipality receives public comment then the municipality releases a final EIR and a notice of decision.

Under these guidelines the City of Manhattan Beach passed a SUP bag ban and declared that the city was exempt from issuing an EIR because it determined that banning SUP bags in favor of paper bags would have no environmental impact (*Save the Plastic Bag Ban Coalition v. City of Manhattan* 2011). SPBC sued, arguing that the city needed to submit a EIR because the use of paper bags caused greater environmental harm than SUP bags. In *Save the Plastic Bag Coalition v. City of Manhattan Beach* (2011) the California Supreme Court decided that Manhattan Beach could declare itself exempt from having to issue a EIR because the population of Manhattan Beach was too small to for the ban to impact the environment.

The County of Marin and the City and County of San Francisco also passed SUP bag ordinances, declared exemption from issuing an EIR, and were sued by the SPBC. SPBC argued that Marin and San Francisco were not a regulatory agency authorized to declare exemption under CEQA and that they could not declare exemption because they were larger than Manhattan Beach and so their bans would significantly impact the environment (*Save the Plastic Bag Coalition v. County of Marin* 2013; and *Save the Plastic Bag Coalition v. City and County of San Francisco* 2014). As in *Manhattan Beach*, the courts ruled in favor of the decision of Marin and San Francisco to declare exemption from issuing an EIR. In both cases, the appellate courts affirmed the decisions of the lower courts for two main reasons. First, Marin and San Francisco were given the power of a regulatory agency by the California Constitution and could declare exemption from issuing an EIR under CEQA. Second, Marin and San Francisco could declare exemption from issuing an EIR because the intent of the SUP bag ordinances were to reduce harm to natural resources and the environment by banning SUP bags which were known to have a significant impact on the environment in favor of items which were determined to have a lesser affect.

Since the single-use plastic bag ban cases were decided, the cities of Alameda, Fairfax, Palo Alto, San Anselmo, San Francisco, and Sebastopol have also declared during public hearings that they are exempt from issuing a EIR for their SUP foodware ordinances (*Alameda, CA City Council* 2017; *Fairfax, CA City Council* 2019; *Palo Alto, CA City Council* 2019; *San Anselmo, CA Town Council* 2018; *San Francisco, CA Board of Supervisors* 2018; *Sebastopol, CA City Council* 2019). The cities justify exemption from issuing a EIR by arguing that they have the authority to declare exemption and the intent of the ordinances are to reduce the well documented impacts of SUP foodware items on natural resources.

Definitions

Single-use plastic ordinances are a new type of law and some of the terms used in the ordinance language are similarly novel or used in a new manner. This fact leads to variation

among municipalities for how certain terms are defined or how certain foodware items are categorized. An understanding of how terms are defined is necessary to properly understand the variations between ordinances. Generally speaking, SUP ordinances prohibit food vendors from serving prepared food in and with certain types of disposable foodware and disposable foodware accessories. Each municipality defines these terms, sometimes with the same word and other times with a synonym, in their municipal code and the following data show where the definitions are similar or different.

Food Vendor

Single-use foodware ordinances primarily apply to food vendors. Municipalities use a combination of the following characteristics to define food vendor: establishment type, establishment location, what the establishment sells, and the purpose of the sale (Table 12). Only Alameda provides a brief and definitive list of what kind of establishment constitutes a food vendor. The remaining cities provide various examples of what a food vendor is and then add that the category of food vendor applies to any other or similar establishment. Alameda defines a food vendor as any restaurant, bar, retail food vendor, or food truck that operates within the city. Berkeley (Berkeley refers to a food vendor as a prepared food vendor), Palo Alto (Palo Alto refers to food vendors as food establishments), San Anselmo, and Sebastopol define food vendor as any establishment, within the city, that sells prepared food; and San Francisco defines food vendor as any establishment, within the city, that sells *or delivers* food. Lastly, Fairfax defines a food vendor as any establishment, within the city, that sells food to be eaten on or off the premises.

Table 12. Characteristics of 'Food Vendor' Definition by Municipality

Municipality	Establishment types	Location	Item of Sale	Purpose of Sale
Alameda	Restaurant, bar, retail food vendor, food truck	Within city	…	…
Berkeley[a]	Any establishment	Within city	Prepared food	…
Fairfax	Any establishment	Within city	Prepared food	Eaten on or off the premises
Palo Alto[b]	Any establishment	Within city	Prepared food	…
San Anselmo	Any establishment	Within city	Prepared food	…
San Francisco	Any establishment	Within city	Prepared food for sale or delivery	…
Sebastopol	Any establishment	Within city	Food or beverage	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
… this characteristic not in definition.
[a] Berkeley refers to 'food vendor' as 'prepared food vendor'.
[b] Palo Alto refers to 'food vendor' as 'food establishment'.

Prepared Food

To define prepared food, municipalities list any combination of five characteristics: techniques used to prepare food that require no additional preparation by the customer, location of preparation, if takeout food is included in definition, and the types of food included or excluded from this definition (Table 13). The cities of Alameda, Fairfax, San Anselmo, Sebastopol define prepared food as food that is prepared on the premises using one of several techniques requiring no additional preparation by the customer, includes takeout food, and excludes uncooked meat, fish and poultry – Sebastopol excludes mean and fish. Berkeley, Palo Alto and San Francisco use similar definitions as Alameda, Fairfax, and San Anselmo but Berkeley does not include takeout food, excludes meats rather than meat, fish, and poultry, and additionally excludes raw or uncooked fruits and vegetables from the definition; Palo Alto includes raw or uncooked fruits and vegetables; and San Francisco does not include takeout food in the definition.

Table 13. Characteristics of 'Prepared Food' Definition by Municipality

Municipality	Techniques to prepare food	Preparation on premises	Takeout included	Includes raw or uncooked fruits and vegetables	Excludes Uncooked meat, fish, poultry
Alameda	x	x	x	…	x
Berkeley	x	x	...	…	x[ab]
Fairfax	x	x	x	…	x
Palo Alto	x	x	x	x	x
San Anselmo	x	x	x	…	x
San Francisco	x	x	…	…	x
Sebastopol	x	x	x	…	x

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in definition.
… this characteristic not in definition.
[a] Additionally excludes raw or uncooked fruits and vegetables.
[b] Excludes meats rather than meat, fish, and poultry.

Biodegradable, Compostable, and Disposable Materials

Municipalities use varying combinations of the following characteristics to determine whether an item is compostable or not: the item is either certified as compostable by an authorized agent, free of fluorinated chemicals, or both and the item is either accepted by the municipal compost facility, determined as compostable by a municipal agent, or both (Table 14). In the City of Alameda, the Public Words director determines if an item is compostable. Neither Berkeley nor Sebastopol define compostable but Sebastopol defines biodegradable as any item that meets the standards of American Society for Testing and Materials for composability. Fairfax requires that a compostable item be BPI certified or free of fluorinated chemicals. San Anselmo also requires that a compostable item be certified by BPI or free of fluorinated chemicals and accepted by the city's compost facility. Both Palo Alto and San Francisco require that a compostable item be accepted by the city's compost program as determined by a municipal agent. Lastly, only Palo Alto defined disposable as any item designed to be used once and then discarded into a landfill, compost, or recycling stream.

Table 14. Characteristics of 'Compostable' Definition by Municipality

Municipality	Certified as compostable by third-party	Free of fluorinated chemicals	Accepted by municipal hauler	Determined as compostable by municipal agent
Alameda	…	…	…	x
Berkeley*	…	…	…	…
Fairfax	x	x	…	…
Palo Alto	…	…	x	x
San Anselmo	x	x	x	…
San Francisco	…	…	x	x
Sebastopol[+]	…	…	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in definition.
… this characteristic not in definition.
*City of Berkeley does not define 'compostable'.
[+]Sebastopol does not define 'compostable' but does define 'biodegradable' as any item that meets the American Society for Testing and Materials standards for composability.

Disposable Cup, Disposable Foodware, and Disposable Foodware Accessories

Berkeley, Fairfax, and San Anselmo define a disposable cup as a single-use cup of any material type that is used to serve water, hot and cold beverages, and alcohol before being discarded (Table 15). Sebastopol lists bowls, cartons, containers, cups, forks, knives, lids, napkins, plates, spoons, straws, stirrers, trays, and other one-time use foodware items. The items listed as disposable foodware items by the cities of Alameda, Berkeley, Fairfax, and San Anselmo vary slightly and the definitions also include the clauses: "and other related items" and "including but not limited to" which serve to widen the definition beyond the individual items listed. Alameda lists all single-use bowls, cartons, containers, cups, forks, knives, lids, plates, straws, spoons, trays, and other items supplied by the food vendor for food eaten on-site, leftovers, and takeout as disposable food service ware items. Berkeley lists all single-use bowls, boxes, cartons, condiment containers, containers, cups, lids, paper or foil food wrappers and liners, pizza boxes, plates, sleeves, spill plugs, straws, trays, utensils, and other items supplied by the food vendor for food eaten on-site and takeout. Fairfax and San Anselmo list all single-use bowls, boxes, containers, cups, forks, knives, lids, napkins, plates, spoons, straws, trays, and

other items supplied by the food vendor for food eaten on-site, leftovers, and takeout. Palo Alto does not define disposable foodware but does provide separated definitions for disposable and foodware. The items listed as disposable foodware accessories by the cities of Berkeley, Fairfax, San Anselmo, and San Francisco vary. Additionally, Fairfax, San Anselmo, and San Francisco simply list what items are considered disposable foodware accessories but Berkeley further defines these items as those that accompany a foodware item. Berkeley lists single-use condiment cups and condiment packets, cup lids, cup sleeves, cup tops, spill plugs, napkins, stirrers, straws, utensils, and other similar items as accessory to disposable foodware items. Fairfax, San Anselmo, and San Francisco list single-use items that include but are not limited to chopsticks, cocktail sticks, condiment containers and saucers, cup lids, cup sleeves, food or beverage trays, napkins, splash sticks, stirrers, straws, toothpicks, and utensils that are provided with prepared food served in plates or cups. Additionally, Palo Alto does not list any disposable foodware items but lists disposable foodware accruements under the heading 'foodware item'.

Table 15. Disposable Foodware Categories by Municipality

Title	Municipality	Sing-use Items in Common	Single-use Items in Variance	Supplied By	Purpose
Disposable	Palo Alto	any	…	…	single use
Disposable Cup	Berkeley, Fairfax, San Anselmo	any single-use cup	…	…	…
Disposable Food Service Ware	Sebastopol	Bowls, cartons, containers, cups, forks, knives, lids, napkins, plates, spoons, straws, stirrers, trays, and other items	…	Food providers	One-time use for prepared food for on-site eating, leftovers, takeout
Disposable Foodware	Alameda	bowls, containers, cups, lids, plates, straws, trays, and other items	cartons, forks, knives, spoons	food vendor	on-site eating, leftovers, takeout
	Berkeley	bowls, containers, cups, lids, plates, straws, trays, and other items	boxes, cartons, condiment containers, paper or foil food wrappers and liners, pizza boxes, sleeves, spill plugs, utensils	food vendor	on-site eating, takeout
	Fairfax, San Anselmo	bowls, containers, cups, lids, plates, straws, trays, and other items	boxes, forks, knives, napkins, spoons	food vendor	on-site eating, leftovers, takeout
Disposable Foodware Accessories	Berkeley	cup lids, cup sleeves, napkins, stirrers, straws, toothpicks, utensils, and other similar items	condiment cups and packets, cup tops, spill plugs	…	accessory to disposable foodware items
	Fairfax, San Anselmo, San Francisco	included but are not limited to, cup lids, cup sleeves, napkins, stirrers, straws, toothpicks, and utensils	condiment containers and saucers, chopsticks, cocktail sticks, food or beverage trays, splash sticks	…	accessory to prepared food served in plates and cups

Title	Municipality	Sing-use Items in Common	Single-use Items in Variance	Supplied By	Purpose
Food Service Container	Palo Alto	bowls, cups, hinged or lidded containers, lids, plates, trays	…	…	on-site eating, takeout
Foodware Item	Palo Alto	beverage spill plugs, chopsticks, condiment cups and packets, drink stirrers, food service containers, forks, knives, napkins, spoons, sporks, straws, and other drink or food accessories	…	…	on-site eating, takeout
Single-use Straw	Alameda	Straw	…	…	single use

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
… this characteristic not in definition.

Food Service Container, Foodware Item, and Single-use Straw

Only Palo Alto defines food service container as any item that includes but is not limited to bowls, cups, hinged or lidded containers, lids, plates, trays used by a food vendor for food eaten on site or packaged for takeout. The items listed by Palo Alto as foodware items are beverage spill plugs, chopsticks, condiment cups and packets, drink stirrers, food service containers, forks, knives, napkins, spoons, sporks, straws, and other drink or food accessories provided by the food vendor for food eaten on site or packaged for takeout. Alameda defines single-use straw as a drinking straw designed for one use.

Overview of Single-use Foodware Ordinances

The SUP ordinances of Alameda, Berkeley, Fairfax, Palo Alto, San Anselmo, and San Francisco regulate the availability and use of a number of single-use foodware and foodware accessory items. Each municipality regulates a different set of items with a varying number and combination of regulations that prohibit SUP items, require foodware accessory items to be available only by request or at self-serve stations, require single-use items to be compostable if not reusable, require the item to be reusable if used by food vendors to serve customers on the premises, and require the food vendor to charge customers for the use of single-use items (Figures 4 through 11).

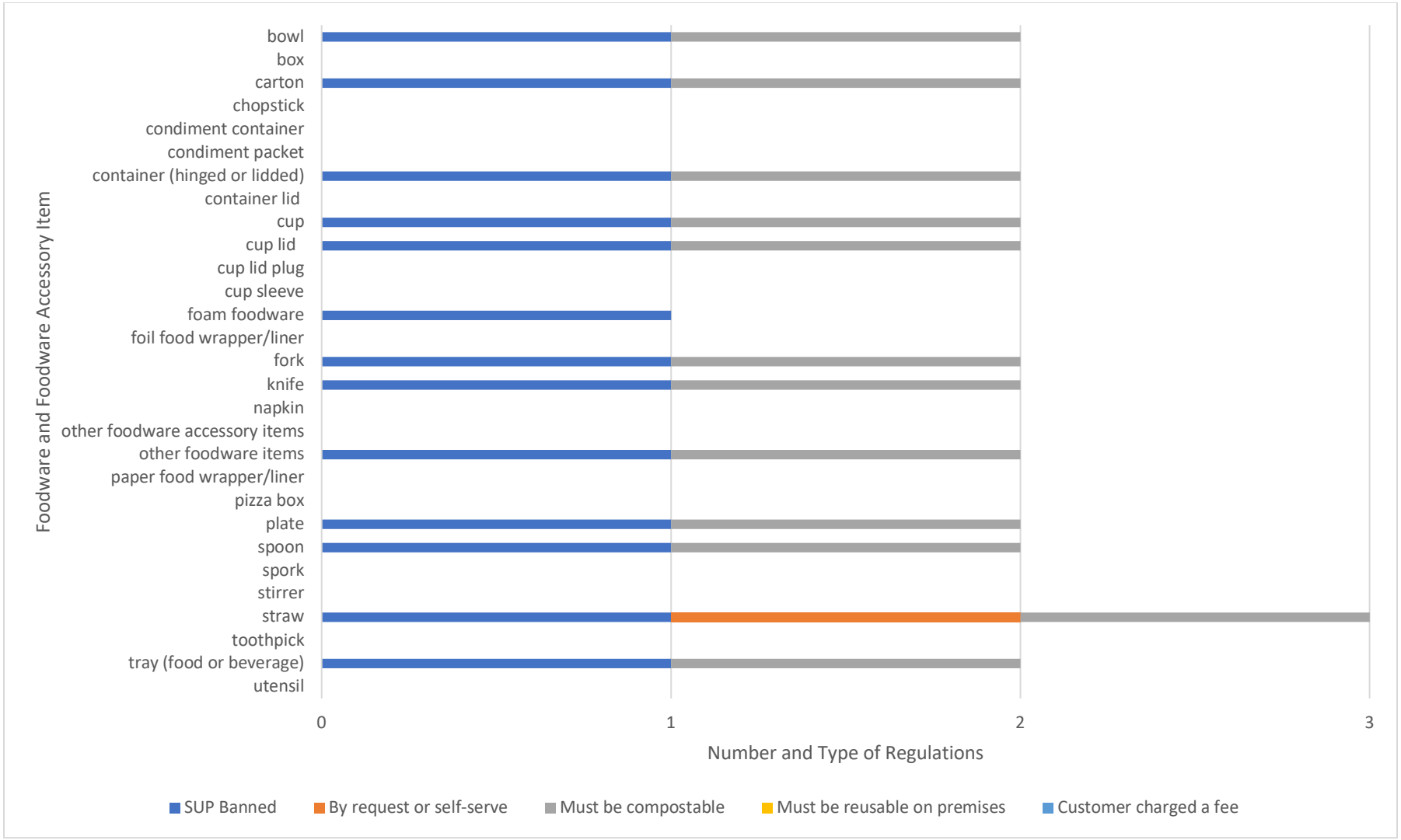

Figure 4. Number and type of regulations per foodware and foodware accessory item in Alameda, CA. Data adapted from City of Alameda CA Municipal Code 2019 (Appendix I).

Figure 5. Number and type of regulations per foodware and foodware accessory item in Berkeley, CA. Data adapted from City of Berkeley CA Municipal Code 2019 (Appendix I).

Figure 6. Number and type of regulations per foodware and foodware accessory item in Fairfax, CA. Data adapted from Fairfax CA Municipal Code of Ordinances 2019 (Appendix I).

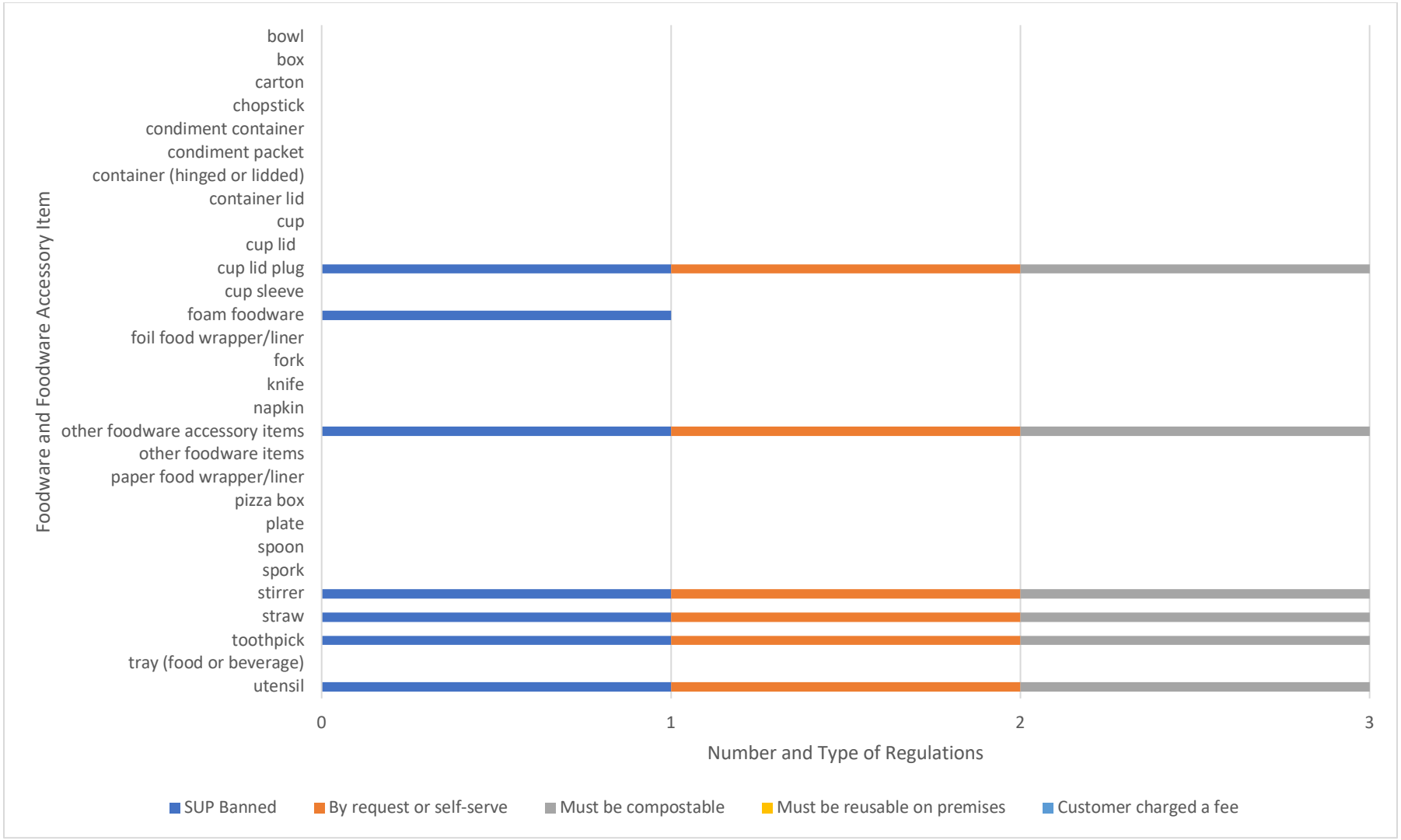

Figure 7. Number and type of regulations per foodware and foodware accessory item in Palo Alto, CA. Data adapted from City of Palo Alto CA Municipal Code 2019 (Appendix I).

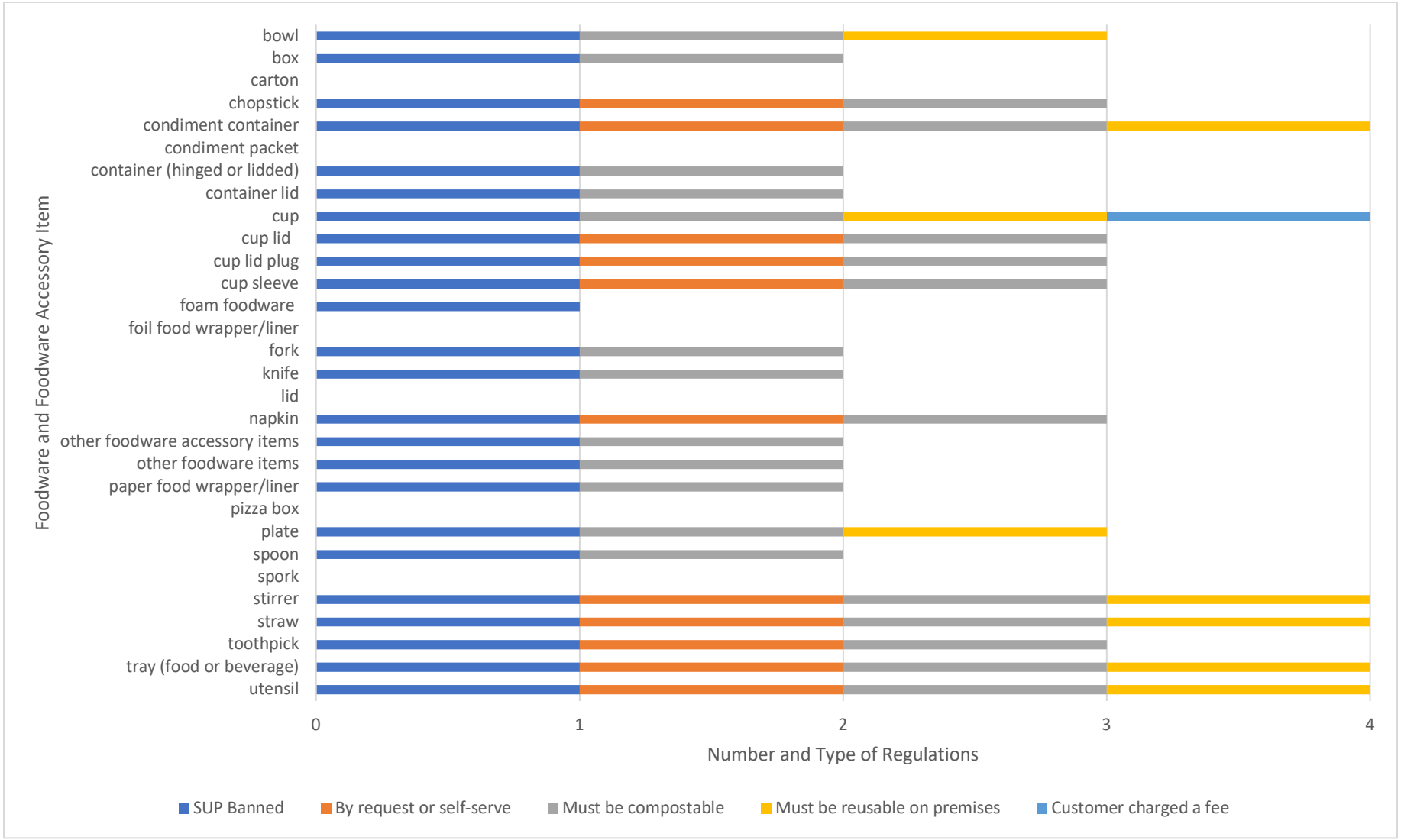

Figure 8. Number and type of regulations per foodware and foodware accessory item in San Anselmo, CA. Data adapted from City of San Anselmo CA Municipal Code 2019 (Appendix I).

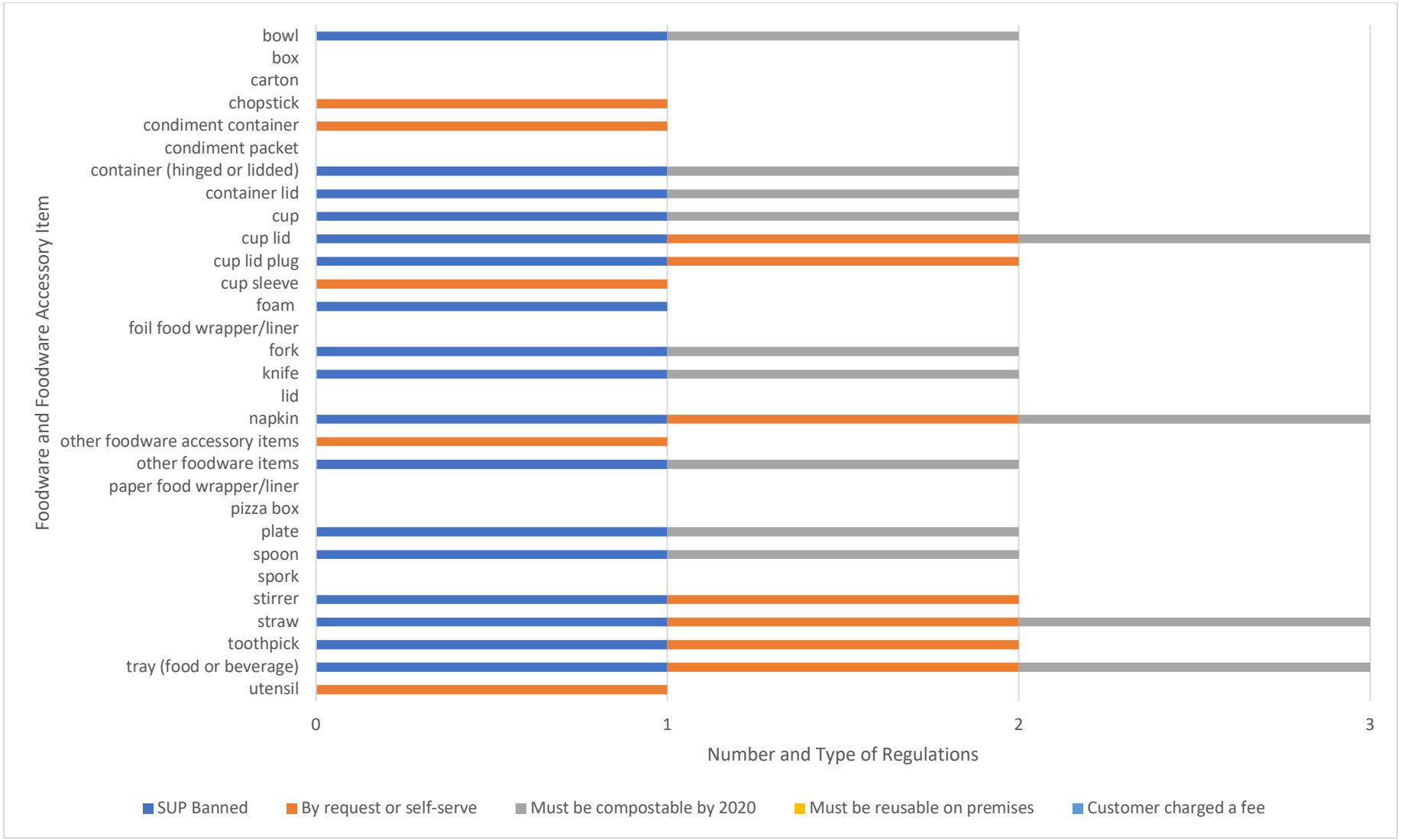

Figure 9. Number and type of regulations per foodware and foodware accessory item in San Francisco, CA. Data adapted from San Francisco CA Charter 2019 (Appendix I).

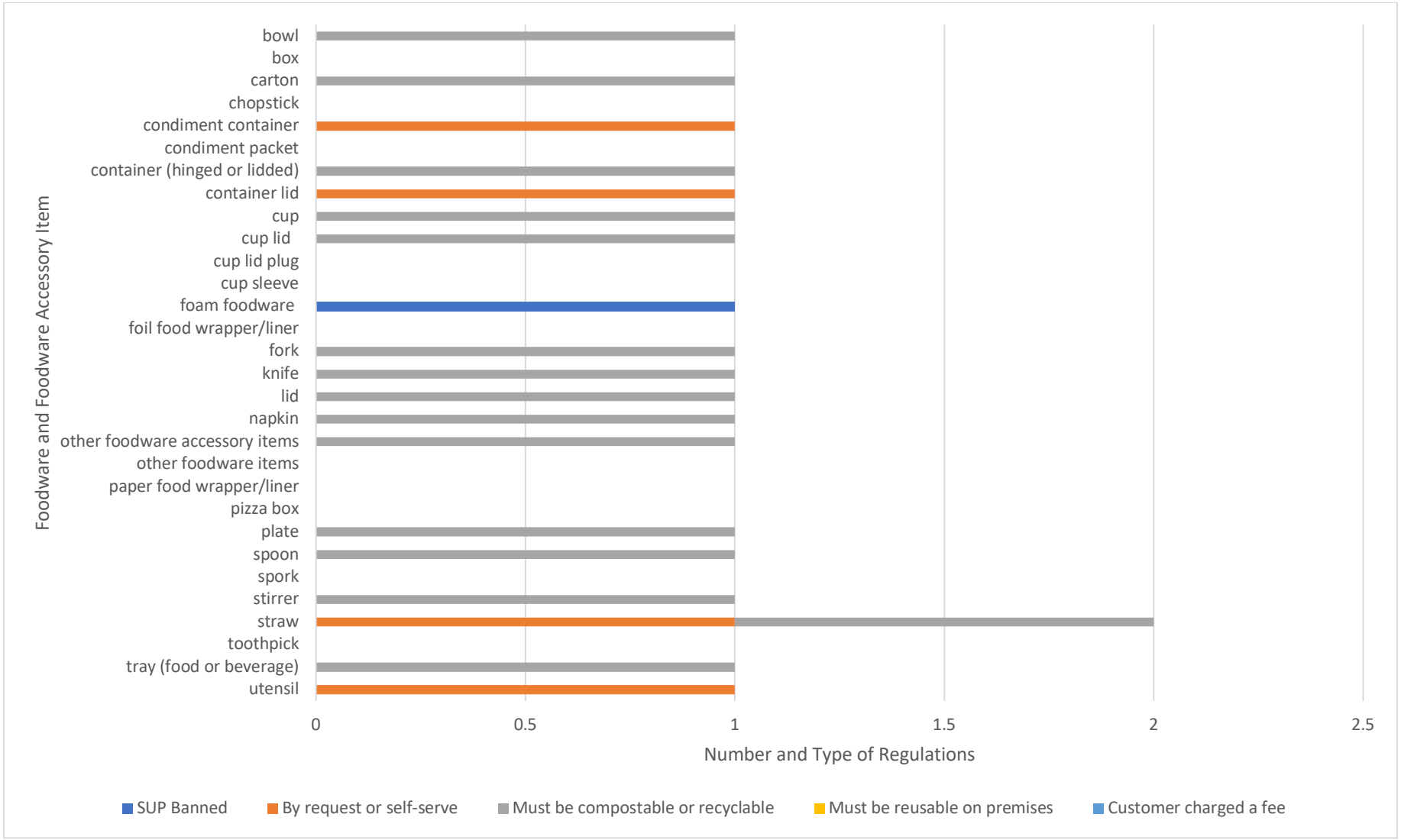

Figure 10. Number and type of regulations per foodware and foodware accessory item in Sebastopol, CA. Data adapted from Sebastopol, CA Municipal Code 2019 (Appendix I).

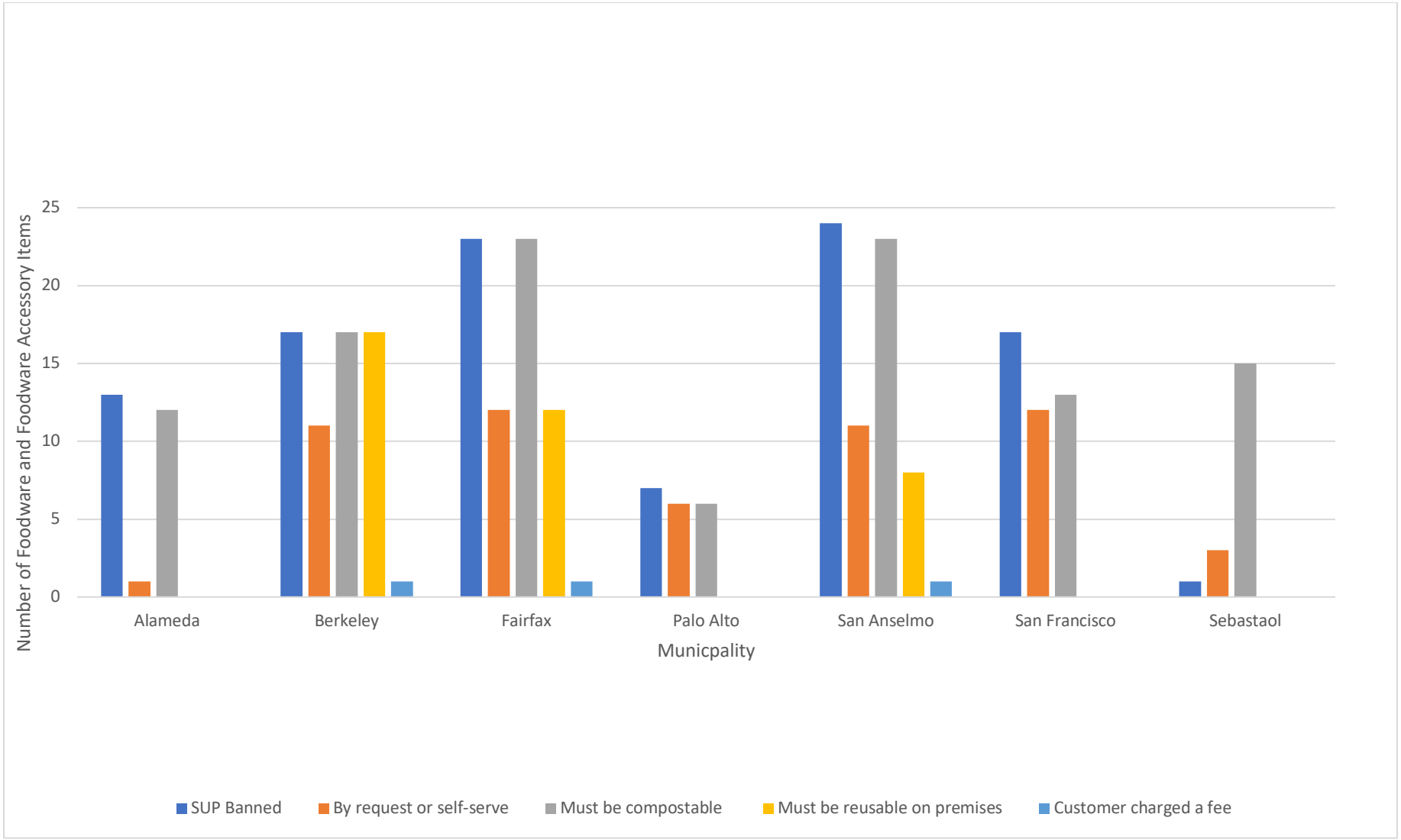

Figure 11. Number of foodware and foodware accessory items addressed by each regulation type by municipality. Data adapted from City of Alameda CA Municipal Code 2019; City of Berkeley CA Municipal Code 2019; Fairfax CA Municipal Code of Ordinances 2019; City of Palo Alto CA Municipal Code 2019; City of San Anselmo CA Municipal Code 2019; San Francisco CA Charter 2019; and Sebastopol, CA Municipal Code 2019 (Appendix I).

Prohibitions on Polystyrene, Single-use Plastic Foodware, and Single-use Plastic Foodware Accessories

The cities of Alameda, Berkeley, Fairfax, Palo Alto, San Anselmo, San Francisco, and Sebastopol have explicitly prohibited food vendors from using polystyrene foodware items when serving food that has been prepared within city limits for on-site consumption or takeout. Alameda bans any type of SUP item, including bioplastic. No city explicitly bans the use of single-use plastic foodware items apart from the prohibition of polystyrene foodware items. However, Alameda, Berkeley, Fairfax, San Anselmo effectively ban SUP foodware items by requiring that foodware items used for on-site dining be either reusable or compostable and that takeout foodware be reusable or compostable. San Francisco requires that foodware items be reusable, compostable, or recyclable.

Palo Alto is the only city that explicitly bans the use of SUP foodware item accessories and requires that any foodware accessory be reusable or a single-use item that is compostable (Table 16). Both Alameda and San Francisco implicitly ban all SUP foodware accessory items by requiring that the items be compostable. Neither Alameda or San Francisco accept bio-plastic foodware items as composable because bio-plastic foodware items are thought to have the same environmental impact as petroleum-based SUP foodware items do when in a marine environment (Harding et al. 2007). Berkeley implicitly bans SUP foodware accessories by requiring that all the items be compostable. Fairfax and San Anselmo also implicitly ban SUP foodware items by requiring that all items be reusable or compostable. Sebastopol does not define foodware accessory but it does require that one-time use foodware items be composable or recyclable.

Table 16. Foodware Accessory Prohibitions and Item Requirements by Municipality

Municipality	Explicit Ban	Requires	Compostable Plastic Allowed?
Alameda	…	compostable	no
Berkeley	…	compostable	yes
Fairfax	…	reusable or compostable	yes
Palo Alto	SUP	reusable or compostable	yes
San Anselmo	…	reusable or compostable	yes
San Francisco	…	compostable	no
Sebastopol*	…	compostable or recyclable	yes

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
… this characteristic not present
*Sebastopol does not define foodware accessory but it does require that one-time use foodware items be composable or recyclable.

Disposable Foodware Use Regulations, Charges, and Material Standards

Municipalities include disposable foodware use regulations and charges in their ordinances to regulate how the items are given out to customers. These regulations are divided into three categories: foodware accessories by request, single-use foodware accessory requirements, and single-use cup charge (Kaitlyn Cyr, personal comm., October 16, 2019). Alameda, Berkeley, Fairfax, Palo Alto, San Anselmo, and San Francisco require food vendors to provide customers with single-use foodware accessory items (including straws) by request only. An item is considered available by request only if a customer has to ask for the item or if a customer has to retrieve the item from a self-serve station. Palo Alto and San Francisco require that single-use foodware accessory items be compostable or recyclable. Alameda, Fairfax, and San Anselmo require single-use foodware accessory items are compostable. Lastly, Berkeley requires single-use foodware accessory items are compostable in 2020. Alameda, Palo Alto, San Francisco, and Sebastopol do not require that food vendors charge customers a fee for the use of single-use cups (Table 17). However, Sebastopol does encourage food providers to charge customers a $0.10 for the use of any combination of cups, lids, straws, and utensils. Berkeley and San Anselmo require food vendors to charge customers $0.25 for single-use cups, show the

charge on the receipt, and display signage alerting customers to the charge. Lastly, Fairfax also requires food vendors to charge customers $0.25 for single-use cups, show the charge on the receipt, and display signage alerting customers to the charge, but Fairfax exempts compostable cups from the cup charge.

Table 17. Single-use Cup Charge by Municipality with Exemptions for Persons Using California Special Supplemental Food Program for Women, Infants, and Children (WIC) and Electronic Balance Transfer (EBT) (A Welfare Recipient Payment Program)

Municipality	Charge	Itemized on receipt	Signage required to inform customer	Exemptions
Alameda	…	…	…	…
Berkeley	$0.25	x	x	WIC, EBT
Fairfax	$0.25	x	x	WIC, EBT, Compostable cups
Palo Alto	…	…	…	…
San Anselmo	$0.25	x	x	WIC, EBT
San Francisco	…	…	…	…
Sebastopol*	…	…	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
x this characteristic in ordinance
… this characteristic not present
*Sebastopol encourages

Alameda and Palo Alto require that single-use foodware items that are not reusable be compostable in the municipal compost facility as defined by a city agent and Alameda does not allow PLA straws. Berkeley, Fairfax, and San Anselmo require compostable items be accepted by the municipal compost facility, free of fluorinated chemicals or BPI certified, and San Anselmo does not allow PLA straws. San Francisco requires that compostable items be accepted by municipal compost facility as determined by city agent, free of fluorinated chemicals or BPI certified, and PLA straws are not allowed. Lastly, Sebastopol requires that single-use food service ware items be compostable or recyclable.

Reusable Foodware Use

The cities of Berkeley, Fairfax, and San Anselmo require food vendors to provide customers with reusable foodware items when their customers eat food that is prepared to be eaten on the premises. The purpose of these requirements is to reduce the use of single-use foodware items by preventing their use when reusable foodware items are available or potentially available. Reusable foodware use regulations are divided into two components: "reusable foodware for dine-in" and "dishwashing capacity" (Kaitlyn Cyr, personal comm., October 16, 2019). Berkeley, Fairfax, and San Anselmo require that food vendors serve prepared food with reusable foodware when the food is served to be eaten on-site. Exemptions are made for compostable food liners and wrappers, napkins, and straws. Furthermore, food vendors may apply for an exemption if they are unable to meet the requirement (see Exemptions). Berkeley's reusable foodware requirement will go into effect in 2020 to give food vendors time to comply. Berkeley additionally requires food vendors who construct a kitchen or who remodel an old kitchen to include onsite or have access to offsite dishwashing to ensure that food vendors have the capacity to operate with reusable foodware items (*City of Berkeley, CA Municipal Code* 2019).

Exemptions

Municipalities provide exemptions to their ordinances in recognition of the fact that some businesses operate in areas outside the governing municipality, financial and physical constraints may make it difficult or impossible for certain businesses and residents to comply, some items are readily recycled, and emergencies happen. Exemptions to the ordinances of Alameda, Berkeley, Fairfax, Palo Alto, San Anselmo, San Francisco, and Sebastopol have been placed into six categories: exemptions for SUP straws upon request, exemption for food prepared outside municipality, hardship exemptions, aluminum foodware exemption, exemptions for persons participating in California Special Supplemental Food Program for

Women, Infants, and Children (WIC) or possessing an electronic benefit transfer card (EBT) from cup or container charges, and exemptions for emergencies (Table 18) (Kaitlyn Cyr, personal comm., October 16, 2019).

Table 18. Ordinance Exemptions by Municipality

Exemption	Alameda	Berkeley	Fairfax	Palo Alto	San Anselmo	San Francisco	Sebastopol
SUP straws upon request	…	x	x	x	x	x	…
Food prepared outside municipality	x	x	x	x	x	x	x
Hardship	x	x	x	x	x	…	x
Aluminum foodware	x	x	x	…	x	x	x
WIC and EBT exemption from cup or container charge	…	x	x	…	x	…	…
Emergencies	x	…	x	x	x	…	…

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
… this exemption not present

After ordinances banning the use of SUP straws began being passed, the disability community pushed back citing that the ordinances put the burden of finding accommodation on the disabled community rather than the service providers. In response to this feedback, municipalities began writing in exemptions for persons who requested the use of a plastic straw. The Cities of Berkeley, Fairfax, Palo Alto, San Anselmo, and San Francisco provide exemptions from their SUP straw bans for persons who request a SUP straw.

Some food vendors such as food trucks, catering services, and businesses that sell prepackaged food prepare and package the food outside of the municipality with a SUP ordinance. The cities of Alameda, Berkeley, Fairfax, Palo Alto, San Anselmo, San Francisco, and Sebastopol provide exemptions from their SUP ordinances for vendors who prepare and package food outside the municipality.

The cities of Alameda, Berkeley, Fairfax, Palo Alto, San Anselmo, and Sebastopol provide temporary compliance exemptions or waivers for one to two years to businesses who demonstrate that they are unable to comply with the ordinance because of economic hardship or physical constraints (Table 19). Alameda, Fairfax, Palo Alto and Sebastopol will grant a one-year and San Anselmo a two-year undue hardship exemption if the business demonstrates that a significant difficulty or significant expense exists that prevents the business from complying with the ordinance. A significant difficulty is present if the business is unable to obtain compostable single-use items and a significant expense is present if acquiring the required items will economically damage the business. Businesses in Berkeley can apply for a two-year waiver to come into compliance. If the business is unable to come into compliance within the two-year waiver period and provides documentation demonstrating why they were unable to comply, Berkeley may issue an additional two-year waiver.

Table 19. Food Business Compliance Exemptions and Waivers by Municipality

Municipality	Time	Requirement
Alameda	1 year	Significant difficulty or significant expense
Berkeley	2 year	Demonstration of efforts to come into compliance
Fairfax	1 year	Significant difficulty or significant expense
Palo Alto	1 year	Significant difficulty or significant expense
San Anselmo	2 year	Significant difficulty or significant expense
San Francisco	…	…
Sebastopol	1 year	Demonstrate continued undue hardship

Source: data adapted from municipal codes listed in Appendix I: Municipal Code Data Sources.
… this characteristic not present

Aluminum is a readily and easily recycled item that is commonly used as a food tray and as food wrap. The cities of Alameda, Berkeley, Fairfax, San Anselmo, San Francisco, and Sebastopol provide exemptions for foodware items made entirely of aluminum or aluminum foil.

There is concern that SUP ordinances requiring food vendors to charge customers a $0.25 fee for the use of a single-use beverage cup will disproportionally impact persons participating in WIC or EBT. The cities of Berkeley, Fairfax, and San Anselmo require food vendors to charge customers $0.25 for the use of a single-use beverage cup and waive that fee for customers who present a WIC or EBT card.

Single-use plastic items can be necessary to promote public health and safety in times of emergency or natural disaster. Therefore, the cities of Alameda, Fairfax, Palo Alto, and San Anselmo provide exemptions from the requirements of their SUP ordinances during emergencies and natural disasters.

Discussion and Recommendations for Further Research

The purpose of this research was to find out what municipalities of the SFBR had SUP ordinances, what items were regulated, and how. It was hypothesized that the survey would find a patchwork landscape of municipal ordinances regulating a variety of SUP foodware items in a variety of ways because there is no statewide legislation or obvious model ordinance guiding local policy. Comprehensive SUP ordinances are a new type of legislation in California and in the United States and there has not yet been enough time for researchers to collect data on these ordinances and publish their findings. A literature review only found studies on expanded polystyrene (EPS) foodware and SUP carry-out bag laws. These types of regulations are similar to comprehensive SUP ordinances in structure because they share two main characteristics. First, they prohibit the use one material in favor of another and second, some laws require that food vendors charge consumers a fee for the use of an alternative product.

For example, a plastic bag ban will prohibit the use of SUP bags and charges customers a fee of $0.10 for the use of a paper bag.

The hypothesis that variation would be found among jurisdictions and municipal codes was proved correct but it is not clear that the variation was due to a lack of state-wide laws or a model ordinance. A survey of the SFBR's 108 municipal codes showed that the number of cities without any SUP ordinance, with a polystyrene ordinance, with a polystyrene and straw ordinance, or with a compressive SUP ordinance varied greatly from county to county (Tables 3 – 11). Most municipalities had an ordinance which banned expanded polystyrene foodware products and only seven municipalities had a comprehensive SUP ordinance. It was expected that there would be little uniformity among the type and distribution of ordinances because there are no state laws or an obvious model ordinance. However, this study did not conduct research to discover if there was a correlation between a SUP ordinance and any socio-economic demographics and the author recommends that researchers conduct a study of the factors influencing SUP policies. A study of factors that influence SUP bag bans conducted by Li and Zhao (2017) found that four factors may determine whether or not a city in the United States will pass a ban: cost of living, level of education, earnings, and environmental interest.

Since California cities were sued by the STPBC for not issuing an EIR before passing a plastic bag ban, all seven SFBR municipalities with comprehensive SUP laws included language in the ordinances and city council hearings which protected the jurisdiction from lawsuit. In a law review article, Romer and Tamminen (2017) argue that a city needs to include protective language in an ordinance when declaring itself exempt from issuing an EIR to protect itself from a well-financed and persistent opponent in the plastic bag industry. The plastic industry uses the threat of lawsuits to create a chilling effect which causes cities to wait before passing a SUP ordinance out of fear of being sued. Furthermore, Romer and Tamminen (2017) argue that a EIR can be cost-prohibitive and a requirement to always issue a EIR would undermine a city's efforts to reduce plastic pollution. However, Santarpio (2012) wrote a law review article arguing that the California Supreme Court's ruling in the plastic bag cases weakened the EIR

requirements of CEQA which damaged the law's ability to protect the environment. EIR requirements are a necessary protection especially when little is known about the environmental impact of SUP foodware item alternatives such as compostable and biodegradable plastics. Lifecycle analyses have been conducted but lifecycle analyses are limited to very specific geographic and market conditions and it can be difficult to draw out generalities from their findings (Razzo et al. 2009; Santarpio 2012). Rather than declare categorical exemption from issuing a EIR, the lack of data is reason for a municipality to conduct an impact assessment and then either declare a negative decision or issue a EIR. Furthermore, it remains to be seen if a city will be sued for not issuing a EIR before passing a comprehensive SUP ordinance.

Municipalities with comprehensive SUP ordinances used various terms to designate what single-use foodware items and foodware item accessories are. Any variation in these terms does not seem likely to have an impact because the presence of phrases like 'and other similar items' act to include items that are not explicitly listed. However, there are significant variations in what foodware items are considered biodegradable, compostable, or recyclable. Variations matter when it comes to what is considered biodegradable, compostable, or recyclable because these are public-facing labels that people and business owners must navigate on a daily basis. Standards that change across jurisdictions create an unfamiliar landscape and familiarity is a key feature of efficient and correct waste sorting (Wu et al. 2018). Items are determined to be biodegradable, compostable, or recyclable by both the municipality and the municipal waste hauler (see Appendix I: Municipal Code Data Sources). Cooperation between the various municipalities and waste haulers will be needed to create a Bay Area wide standard so that all jurisdictions would agree on a foodware sorting method. Since the various San Francisco municipalities create ordinances with some varying language, this portion of the study was limited because it was difficult to find common terms that could be compared. Furthermore, it may not always be the case that compostable foodware items should be preferred over SUP items. Studies have found the polyfluoroalkyl substances (PFAS) used in some paper and cardboard food packaging may migrate from the packaging to the food (Schaider et al. 2017;

Trier et al. 2011). PFAS persist in the environment, bioaccumulate in animal protein sources such as food, may pose human health risks, and are a suspected developmental toxicant (Pan et al. 2017; Sagiv et al. 2015).

Municipalities also differ quite significantly with regard to what foodware items are regulated and how. Studies have noted that local SUP plastic bag ordinances in California were similarly varied before the state-wide law was passed (Wanger 2017; Willis et al. 2018), and Xanthos and Walker (2017) noted the diversity of SUP laws across the globe as countries have begun to pass legislation to reduce plastic pollution. Therefore, at this stage in the development of comprehensive SUP ordinances, it is important for local jurisdictions to continue to innovate and experiment with how to best reduce plastic waste to most effectively protect the environment (Fox 2017). Policy makers are encouraged to conduct research to determine the efficacy of local laws which ban a variety of materials with a variety of regulations. Innovation at the local level, experiments with regional standards, and supporting data will pave the way for state-wide regulations (Romer and Tamminen 2014; Wagner 2017; Willis et al. 2018).

Lastly, municipalities showed little variation between what exemptions were offered. All the municipalities with comprehensive SUP ordinances provide hardship exemptions except for San Francisco. It is noteworthy that municipalities with hardship exemptions do not have a mechanism for helping individual businesses come into compliance through technical assistance or other programs and, in fact, there is no mention of offering support to the business community. Studies have shown that involving stakeholders at every level of environmental policy development and implementation is crucial for success (Murray 2010; Roberts and Whorton 2015). However, certain segments of the population such as business owners and impoverished, disabled, or otherwise vulnerable populations cannot easily participate in policy work groups (Lee et al. 2016). Therefore, municipal policy makers ought to develop strategies for involving and supporting all stakeholders through surveys, trade associations, education and community outreach, and similar programs (Bartolotta and Hardy 2018; Hutch et al. 2011; Lee et al. 2016).

In conclusion, the municipalities of the SFBR are considerably varied in terms of which jurisdictions have SUP ordinances; how foodware items are classified and what is considered biodegradable, compostable, or recyclable; and what items are regulated and how. Ordinance language and exemptions tend to vary less. Although variation can be difficult to navigate as a consumer or food vendor, variation is important to maintain until enough data are collected on the efficacy of the various ordinances before a regional or state-wide ordinance is authored.

Management Recommendations for the Creation and Implementation of Single-Use Plastic (SUP) Foodware Ordinances

Policy makers should consider many factors when creating a comprehensive SUP ordinance. This research paper focused on how municipalities crafted ordinances to regulate the use SUP foodware and beverage items. Based on the findings, policy makers may benefit from the following recommendations: (1) include all stakeholders when developing and implementing ordinance regulations; (2) collect data to support the passage of legislation and to determine the efficacy of regulations; (3) define a foodware item as compostable according to the standards of the municipal hauler; (4) adopt a comprehensive suite of regulations; and (5) create assistance programs to help food vendors meet ordinance requirements. Finally, policy makers should take a flexible approach to the creation of regulations so that the ordinances meet the needs of each individual community.

Include All Stakeholders When Developing and Implementing Ordinance Regulations

Including stakeholders in the development and implementation of ordinance regulations is important in order to identify the community's needs, concerns, and interests. This information can be used to build consensus around what SUP foodware regulations will be implemented and why. Ongoing involvement of stakeholders as foodware regulations are implemented is

essential to gather feedback in real-time and adjust regulations as necessary. Finally, stakeholders should be involved in the data gathering process to determine the efficacy of the regulations. These recommendations are targeted toward increasing stakeholder involvement:

- Outreach to all stakeholders throughout the entire ordinance process from the development of ordinance language to the implementation of regulations. Stakeholders include but are not limited to: food vendors, representatives of business and trade associations, youth groups, community groups, environmental and environmental justice NGOs, municipal agencies, schools, disabled persons, homeless persons, and members of other vulnerable populations. Invite stakeholders to participate in an ordinance work group, town hall meetings, or municipal meetings.
- Survey stakeholders that are less likely to participate in meeting-based policy formation. Not all stakeholders (like business owners) will want to, or can, attend meetings, and a survey can be used to gather their input instead. Surveys can be conducted by phone or email, but in the case of business owners, it is recommended that surveys be conducted in person because most business owners are on the move and may not answer phone calls or emails.
- Keep surveys brief. A one-page survey with just a few questions is recommended. This is especially important in the case of food vendors because of time constraints. The survey questions will depend on the proposed regulations but here are some survey question examples: “Do you support a single-use foodware ordinance that prohibits the use of some foodware items and charges for others?”, “Why or why not?”, “Would you like to attend a townhall meeting or working group?”, “Why or why not?”.

Collect Data to Support the Passage of Legislation and to Determine the Efficacy of Regulations

The California Environmental Quality Act (CEQA) requires that an impact assessment must be conducted by an agency if a proposed project or policy may impact the environment.

Depending on the results, the agency must either declare a negative decision or issue an Environmental Impact Report (EIR). Comprehensive SUP ordinances have only recently been promulgated and data on the environmental impact of these policies are severely limited or non-existent. Rather than declare categorical exemption from the requirement to issue an EIR without conducting an assessment, it is recommended that municipalities conduct and publish an impact assessment to add to the body of knowledge about the impact of SUP ordinances on the environment. As part of the data collection process it is recommended to:

- Conduct lifecycle analyses that compare the impact of the prohibited or restricted product with the preferred product. For example, compare the lifecycle of single-use polyethylene and polypropylene products with single-use compostable plastic products to determine, if, in fact, compostable products are better for the environment.
- Collect data from food vendors to calculate what types and quantities of SUP or other single-use foodware products are being used to ensure that proposed ordinances are informed by business practice and high use SUP items. Keep surveys brief: what single-use items do you use (item and material), how many do you use a month (average).
- Conduct a street litter characterization study to determine the percentage of street litter that is made up of SUP foodware items so that proposed ordinance targets SUP foodware items that are most likely to end up in waterways.

If collecting data and publishing an impact assessment is not feasible, then declare categorical exemption from the CEQA requirement to issue an EIR. A declaration of exemption can be made on the grounds that research has shown that SUP foodware items impact the environment, and the purpose of the municipal ordinance is to prevent harm to the environment.

Furthermore, data should be collected to determine the efficacy of comprehensive SUP ordinance regulations like material bans, restrictions, and fees. Municipalities should collect baseline and follow-up data from food vendors about their use of SUP to determine if and how

regulations have impacted their use of SUP and other foodware items. Additionally, baseline and follow-up street litter characterization studies should be conducted to determine if and how the regulations impacted street litter. When surveying food vendors, the following questions are recommended:

- Baseline food vendor survey: what single-use items do you use (item and material), how many do you use a month (average), how difficult would it be to switch to reusable for dine in? Why?
- Follow-up food vendor survey: what single-use items do you use (item and material), how many do you use a month (average), how difficult would it be to switch to reusable for dine in? Why?

Define a Foodware Item as Compostable According to the Standards of the Municipal Hauler

A foodware item should be defined as compostable according to the standards of the municipal hauler so that, if the item reaches its intended destination, it is actually composted. Some municipal haulers accept items defined as compostable by the Biodegradable Products Institute (BPI) but those items are either not composted or are only partially composted. Furthermore, what is composted by one hauler may not be composted by another hauler, California will need to establish a standard for clarity among haulers. To this end, counties can form committees to establish regional standards and conduct public education campaigns.

Adopt a Comprehensive Suit of Regulations

A municipal ordinance may be most effective at reducing SUP foodware litter by adopting a comprehensive suite of regulations. An ordinance should include the following regulations, informed by relevant local practice and data:

- Prohibit all polystyrene foodware and beverage products including trays for prepared vegetables, meats, and poultry.
- Prohibit all SUP foodware and beverage items that are not actually composted or recycled by the municipal waste hauler.
- All single-use foodware and beverage items are required to be available by request only.
- Require food vendors to use reusable foodware and beverage items (items that can be washed and reused by the food vendor) when serving customers on their premise.
- Require food vendors to charge customers a nominal fee (suggested $.25, but based on the circumstances of the municipality) per single-use beverage cup.
- Require food vendors to charge customers a nominal fee (suggested $.25, but based on the circumstances of the municipality) per single-use container.

Create Assistance Programs to Help Food Vendors Meet Ordinance Requirements

It can be difficult for food vendors to meet the requirements of SUP foodware ordinances so municipalities may provide exemptions for food vendors facing economic or operational hardship. However, since exemptions do not further the goals of SUP ordinances, all food vendors should be encouraged to comply and may receive aid to offset costs related to compliance. Stakeholder input will help determine the nature of assistance programs but a municipality will do well to assist food vendors who might otherwise qualify for an exemption. To improve food vendor adherence to SUP ordinances, a municipality may:

- Provide educational support to businesses and consumers about the impact of SUP on the local environment to teach the community about the need for the regulations.
- Develop food vendor technical assistance programs to show food vendors how to come into compliance at low or no cost to the business.
- Create financial assistance programs for businesses that cannot afford the changes necessary to incorporate the use of reusable foodware items.

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Appendix I: Municipal Code Data Sources

Appendix I contains a list of the municipal codes analyzed in this survey. Entries are listed alphabetically according to the name of the jurisdiction as it appears in the municipal code. Single-use plastic ordinances are identified by their placement in the municipal code and by title. In cases where no SUP ordinance was found, only the municipal code is referenced.

Albany, CA General Code. 2019. Chapter VIII, sec. 20, Polystyrene foam, degradable and recyclable food packaging. https://www.ecode360.com/34834791.

American Canyon, CA Municipal Code. 2019. https://qcode.us/codes/americancanyon/.

Atherton, CA Municipal Code. 2018. https://www.codepublishing.com/CA/Atherton/.

Benicia, CA Municipal Code. 2019. https://www.codepublishing.com/CA/Benicia/.

Belvedere, CA Municipal Code. 2019. https://www.cityofbelvedere.org/92/Belvedere-Municipal-Code.

Brentwood, CA Municipal Code. 2019. https://qcode.us/codes/brentwood/.

Calistoga, CA Municipal Code. 2019. https://www.codepublishing.com/CA/Calistoga/.

Campbell, CA Municipal Code. 2019. Title 6, Chapter 30, Expanded polystyrene. https://library.municode.com/ca/campbell/codes/code_of_ordinances?nodeId=TIT6HESA_CH6.30EXPO.

City of Alameda, CA Municipal Code. 2019. Chapter IV, Article 1, sec. 4, Alameda disposable food service ware reduction law. https://library.municode.com/ca/alameda/codes/code_of_ordinances?nodeId=CHIVOFPUSA_ARTILIMAPR_4-4DIFOSEWA.

City of Antioch, CA Code of Ordinances. 2019. http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca.

City of Belmont, CA Municipal Code. 2019. Chapter 31, Article II, Polystyrene food service ware. https://library.municode.com/ca/belmont/codes/code_of_ordinances?nodeId=CICO_CH31WARE_ARTIIPOFOSEWA.

City of Berkeley, CA Municipal Code. 2019. Title 11, Chapter 64, Single use foodware and litter reduction. https://www.codepublishing.com/CA/Berkeley/.

City of Brisbane, CA Municipal Code. 2019. Title 8, Chapter 18, Prohibition of the use of polystyrene based disposable food service ware by food vendors. https://library.municode.com/ca/brisbane/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.18PRUSPOBADIFOSEWAFOVE.

City of Burlingame, CA Municipal Code. 2019. Title 8, Chapter 10, Prohibition of the use of polystyrene based disposable food service ware by food vendors. https://qcode.us/codes/burlingame/.

City of Pacifica, CA Municipal Code. 2019. Title 6, Chapter 5, Article 4, Sustainable food service ware ordinance. https://library.municode.com/ca/pacifica/codes/code_of_ordinances?nodeId=TIT6SAHE_CH5GACORE_ART4SUFOSEWAPRPLPR.

City of Palo Alto, CA Municipal Code. 2019. Title 5, Chapter 30 and 35, Disposable foodware items and other disposable products ordinance. http://library.amlegal.com/nxt/gateway.dll/California/paloalto_ca/paloaltomunicipalcode?f=templates$fn=default.htm$3.0$vid=amlegal:paloalto_ca.

City of San Anselmo, CA Municipal Code. 2019. Title 5, Chapter 10, Single use foodware ordinance. https://library.municode.com/ca/san_anselmo/codes/code_of_ordinances?nodeId=TIT5SAHE_CH10SIUSFOSEWA.

Clayton, CA Municipal Code. 2019. https://library.municode.com/ca/clayton/codes/municipal_code.

Cloverdale, CA Municipal Code. 2019. https://www.codepublishing.com/CA/Cloverdale/.

Colma City, CA Municipal Codex. 2019. Chapter 4, §13, Disposable polystyrene food service ware. https://www.colma.ca.gov/documents/cmc-4-13-disposable-polystyrene-food-service-ware/.

Concord, CA Municipal Code. 2019. Title 8, Chapter 17, Concord food and beverage service ware regulations ordinance. https://www.codepublishing.com/CA/Concord/#!/Concord08/Concord0817.html#8.17.

Corte Madera, CA Code of Ordinances. 2019. https://library.municode.com/ca/corte_madera/codes/code_of_ordinances.

Cotati, CA Municipal Code. 2019. Title 8, Chapter 20, Polystyrene food packaging. https://www.codepublishing.com/CA/Cotati/#!/Cotati08/Cotati0820.html#8.20.

Cupertino, CA Municipal Code. 2019. Title 9, Chapter 15, Prohibition of expanded polystyrene foam foodservice ware. http://library.amlegal.com/nxt/gateway.dll/California/cupertino/cityofcupertinocaliforniamunicipalcode?f=templates$fn=default.htm$3.0$vid=amlegal:cupertino_ca.

Daly City, CA Municipal Code. 2019. Title 8, Chapter 64, Prohibition of the use of polystyrene based disposable food service ware by food vendors. https://library.municode.com/ca/daly_city/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.64PRUSPOSEDIFOSEWAFOVE.

Danville, CA Municipal Code. 2019. http://library.amlegal.com/nxt/gateway.dll/California/danville_ca/danvillecaliforniamunicipalcode?f=templates$fn=default.htm$3.0$vid=amlegal:danville_ca.

Dixon, CA Municipal Code. 2019. https://www.codepublishing.com/CA/Dixon/.

Dublin, CA Municipal Code. 2019. Title 5, Chapter 34, Dublin Styrofoam ban. https://www.codepublishing.com/CA/Dublin/#!/Dublin05/Dublin0534.html#5.34.

East Palo Alto, CA Code of Ordinances. 2019. https://library.municode.com/ca/east_palo_alto/codes/code_of_ordinances.

El Cerrito, CA Municipal Code. 2019. Title 8, Chapter 24, El Cerrito food ware ordinance. https://library.municode.com/ca/el_cerrito/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.24FORE.

Emeryville, CA Municipal Code. Title 6, Chapter 14, Emeryville eco food-ware ordinance. https://www.codepublishing.com/CA/Emeryville/#!/Emeryville06/Emeryville0614.html#6-14.

Fairfax, CA Municipal Code of Ordinances. 2019. Title 8, Chapter 72, Single-use foodware reduction. http://library.amlegal.com/nxt/gateway.dll/California/fairfax_ca/townoffairfaxcaliforniamunicipalcodeofor?f=templates$fn=default.htm$3.0$vid=amlegal:fairfax_ca.

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Foster City, CA Municipal Code. 2019. Title 8, Chapter 8, Prohibition on the use of polystyrene based disposable food service ware by food vendors. https://www.codepublishing.com/CA/FosterCity/.

Fremont, CA Municipal Code. 2019. Title 8, Chapter 40, Article X, Expanded polystyrene (EPS) food service ware ordinance. https://www.codepublishing.com/CA/Fremont/#!/Fremont08/Fremont0840.html#8.40.

Half Moon Bay, CA Municipal Code. 2019. Title 7, Chapter 30, Polystyrene based disposable food service ware prohibited. https://www.codepublishing.com/CA/HalfMoonBay/#!/HalfMoonBay07/HalfMoonBay0730.html#7.30.

Hayward, CA Municipal Code. 2019. Chapter 5, Article II, Hayward polystyrene foam food containers ban. https://library.municode.com/ca/hayward/codes/municipal_code?nodeId=HAYWARD_MUNICIPAL_CODE_CH5SAHE_ART11POFODIFOSEWAPRRECOFOSEWARE.

Healdsburg, CA Municipal Code. 2019. https://www.codepublishing.com/CA/Healdsburg/.

Hercules, CA Municipal Code. 2019. Title 5, Chapter 3, sec. 109. Food Service Utensils. https://www.codepublishing.com/CA/Hercules/#!/Hercules05/Hercules053.html#5-3.

Hillsborough, CA Municipal Code. 2019. https://library.municode.com/ca/hillsborough/codes/code_of_ordinances?nodeId=HILLSBOROUGH_CALIFORNIAMUCO.

Lafayette, CA Municipal Code. 2019. Title 5, Chapter 8, Food packaging recycling. https://library.municode.com/ca/lafayette/codes/code_of_ordinances?nodeId=TIT5HESA_CH5-8FOPARE.

Larkspur, CA Municipal Code. 2019. https://larkspur.municipal.codes/Code.

Livermore, CA Municipal Code. 2019. Title 8, Chapter 20, Livermore Styrofoam ban. https://www.codepublishing.com/CA/Livermore/.

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