

# TRASH TRUE SOURCE CONTROLS

*A summary of existing and planned San Francisco Bay Area municipal source control actions, observed benefits to water quality, and a case for the continuation of regulatory crediting towards stormwater trash load reduction goals*

**Prepared for:**



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## Executive Summary

The level of trash in San Francisco Bay Area surface waters (e.g., creeks, lakes, and SF Bay) has increased substantially over the past few decades. This increase has become one of the most significant water quality issues in the SF Bay Area. The increased generation and inadequate management and disposal of litter-prone items (e.g., single-use plastic products, plastic packaging, and cigarette butts) are the main reasons for the high levels of trash.

Trash can be transported to surface waters through different pathways, including stormwater conveyance systems, wind, and direct dumping/littering. To address trash in stormwater, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) via the Municipal Regional NPDES permit for stormwater discharges (i.e., MRP) has set trash load reduction benchmarks for SF Bay Area cities and counties. To date, municipalities have implemented a myriad of control measures to address these trash reduction requirements, including the retrofitting of storm drains with trash treatment controls and the expansion of source controls. Source controls that focus on the original source of trash by reducing the use, sale or distribution of litter-prone items are called Trash True Source Controls (TTSCs). Examples include product-related ordinances, policies, or legislation adopted and implemented at the local or state level. TTSCs are the most cost-effective and long-term solutions to reducing the levels of trash in stormwater and surface waters.

SF Bay Area municipalities are worldwide leaders in TTSCs through their adoption of local ordinances. These local actions have generally targeted single-use plastic foodware (e.g., plastic grocery bags, EPS products and straws) and smoking-related materials (e.g., cigarettes). More recent trends include the adoption of more comprehensive regulations that attempt to reduce the use of broader categories of litter-prone items, such as single-use plastic foodware. Under the current version of the MRP (i.e., MRP 2.0), cities and counties are allowed to claim a trash load reduction “credit” for the successful implementation of a TTSC. These credits are based on the observed reductions of the applicable item(s) in stormwater via monitoring studies conducted by municipalities. The available credits have spawned considerable interest from SF Bay Area cities and counties and have led to the adoption of over 100 ordinances to address specific litter-prone items. As a result of the TTSC ordinances, the 2009 levels of single-use plastic grocery bags and expanded polystyrene (EPS) foodware in stormwater have been reduced by greater than 65%.

The successful results of ordinances focused on target litter-prone items and the availability of stormwater trash load reduction credits has led municipalities to consider expanding TTSC ordinances to address a broader array of litter-prone items. However, the Regional Water Board has proposed the discontinuation of TTSC credits with the adoption of MRP 3.0 and municipalities are currently rethinking their investments in TTSCs and considering additional control measures that intercept trash, rather than these pollution prevention measures. Based on a survey of SF Bay municipalities conducted in June 2021, 75% of survey respondents indicated that the credits for TTSCs provided in MRP 2.0 were a factor in deciding whether to adopt an ordinance or address trash through an alternative strategy (e.g., treatment). Additionally, respondents indicated that even though TTSCs are long-term solutions to trash levels in stormwater and receiving waters, the removal of credits from the MRP would significantly reduce the impetus for developing, adopting, and implementing (enforcing) resource intensive TTSCs. Based on the explanation provided in the MRP 3.0 Tentative Order fact sheet, the reasoning behind the discontinuation is that the trash load reduction benefits of source controls should be observed through On-land Visual Trash Assessments (OVTAs) conducted by municipalities. However, because OVTAs are blunt monitoring tools, they can only detect trash reductions in the 20-25% range, far above the anticipated trash reductions in stormwater that would occur as a result of TTSC implementation (e.g., 10-15%).

Recommendations supported by the observable water quality benefits of TTSCs in the SF Bay Area include maintaining the existing MRP 2.0 source control framework with crediting up to 10% for TTSC;

allowing credits for existing and new/expanded TTSCs allowing credits towards the 100% compliance benchmark; and recognizing that TTSCs provide trash reduction benefits beyond those quantified to date and reduce environmental impacts to our frontline communities that result from the extraction, manufacturing, and disposal of products before and after they become trash.

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## **APPENDIX A - TRASH TRUE SOURCE CONTROLS SURVEY RESULTS (MRP PERMITTEES – ALAMEDA, SAN MATEO, AND SANTA CLARA COUNTIES, JULY 2021)**

# 1. Introduction and Purpose

## Purpose of White Paper

The purpose of this White Paper is two-fold: 1) to summarize the importance and observed benefits that “Trash True Source Controls” implemented by San Francisco Bay Area municipalities via local ordinances and policies have had on reducing trash in stormwater discharges and surface waters, and; 2) to provide information to support the ongoing crediting of existing source control actions and new or enhanced source control actions towards the 100% trash reduction goal included in the San Francisco Bay Area Municipal Regional Stormwater NPDES permit (a.k.a., MRP 3.0) currently under consideration by SF Bay Regional Water Quality Control Board (Regional Water Board).

## Trash Problems in California and Bay Area Surface Waters

Each year, Californians dispose of 38 million tons of consumer items and waste materials, equating to over one ton of municipal solid waste generated by each resident each year. While a majority of this waste is properly disposed of, recycled, or composted through appropriate solid waste management systems, a portion of it enters the environment as trash. Once in the urban landscape, trash can be transported to local surface waters (e.g., creeks, channels, rivers, lakes, and estuaries) and eventually to the Pacific Ocean, where it can impact water quality and beneficial uses of these surface waters.

The level of trash in California surface waters has increased substantially over the past few decades. This increase has become one of the most significant water quality issues that our society faces today (Ocean Conservancy 2021; Napper and Thompson 2020; and Borrelle et. al. 2020). The increased generation and inadequate management and disposal of litter-prone items (e.g., single-use plastic products, plastic packaging, and cigarette butts) are the main reasons for the high levels of trash observed in California surface waters.

Although significant actions have been taken in the recent past by municipalities, other public agencies, non-governmental organizations, and volunteers to reduce the levels of trash in surface waters, the generation and littering of trash (in particular single-use plastic items) is outpacing our ability to intercept trash before it reaches surface waters and causes impacts. The magnitude of the issue is predicted to get worse. Geyer et. al. (2017) predict a four-fold increase plastic generation over the next thirty years (Figure 1) and the Ellen MacArthur Foundation (2015) predicts that the amount of plastic in oceans will surpass fish by 2050 as a result of the increase in plastic generation. The level of plastic waste is increasing to unsustainable levels, which is also increasing the risk to surface water quality.

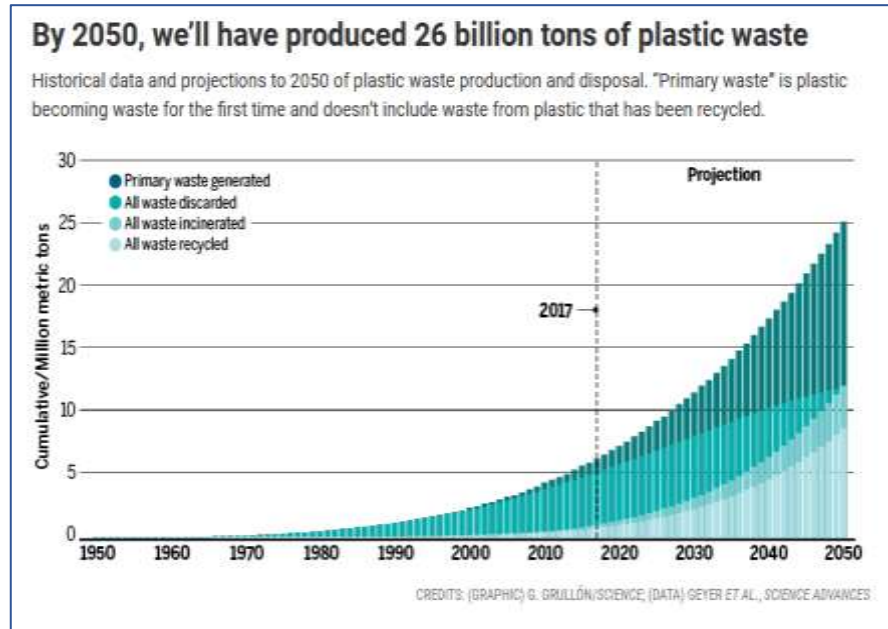
### Definition of Trash

For purposes of managing stormwater quality in California, trash is defined as:

*All improperly discarded solid material from any production, manufacturing, or processing operation including, but not limited to, products, product packaging, or containers constructed of plastic, steel, aluminum, glass, paper, or other synthetic or natural materials.*

*Statewide Trash Amendments California State Water Resources Control Board (2015)*

In addition to impacting water quality, this upward trend in plastic generation will significantly increase the extraction of fossil fuels for plastic production and increase greenhouse gas emissions, which will further contribute to climate change and associated environmental impacts (CIEL 2019). From an overall environmental perspective, a significant decrease in the generation, sale, and distribution of items made of plastic would significantly reduce the risk of environmental degradation caused by the manufacturing and disposal of these items.



**Figure 1.** Documented and projected plastic waste between 1950 and 2050 (Geyer et. al. 2017)

### Trash Sources, Pathways, and Types

Trash from different sources can reach surface waters through a number of transport pathways, as illustrated in the Figure 2. To address trash transported via the stormwater conveyance pathway in the San Francisco Bay Area, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) first included trash load reduction requirements in the Municipal Regional NPDES permit for stormwater discharges in the Bay Area (i.e., MRP) in 2009. Since that time, SF Bay Area municipalities have implemented numerous trash control measures to address the mandated trash load reduction goals.

Aside from stormwater conveyances, trash can also directly enter local creeks, rivers and lakes via illegal dumping or unhoused populations living adjacent to these surface waters. Trash can also be windblown directly into surface waters from nearby land areas (e.g., parks). The importance of these non-stormwater transport pathways will be site specific, but can be significant, considering the volumes of trash that are directly (illegally) dumped into surface waters in some instances. For example, in the two-year trash monitoring study required by the MRP that was recently conducted in the San Francisco Bay Area, researchers found that between 75% and 85% of the trash volumes in urban creeks and channels is associated with direct dumping into these surface waters (BASMAA 2020).



**Figure 2.** Potential trash sources and transport pathways, including stormwater, to surface waters (SCVURPPP 2010)

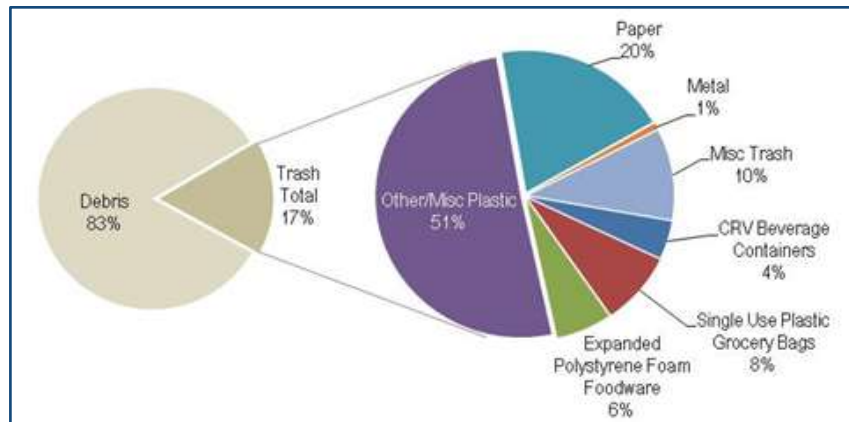
Based on previous studies carried out in the U.S. and around the world, products and packaging made of plastic frequently comprise the vast majority of trash (by volume) found in rivers, lakes, beaches and oceans (Redford et al. 1992; Cornelius et al. 1994; Allison and Chiew 1995; Armitage and Rooseboom 2000; Marais and Armitage 2003; Ocean Conservancy 2013). For example, the University of Cadiz (Morales-Caselles et. al. 2021) found that 80% of the trash observed in the ocean is made of plastic and is composed primarily of just 10 different items. The study found that four of those eight plastic items represented 44% of all trash found in the ocean. On average in all ocean environments, the most prevalent four items were plastic bags (14%); bottles (12%); plastic food containers and cutlery (9%); and food



**Figure 3.** Top ten most frequent trash items removed from U.S. surface waters during annual International Coastal Cleanup Day (Ocean Conservancy 2013)

wrappers (9%). As illustrated in Figure 3, data from the International Coastal Cleanup Day compiled by the Ocean Conservancy found similar results (Ocean Conservancy 2013).

The types of trash found in stormwater are generally similar to those observed in surface waters. As illustrated in Figure 4, a regional study conducted in the San Francisco Bay Area by the Bay Area Stormwater Management Agencies Association (BASMAA), found that roughly 17% of the material intercepted by full capture systems was trash, and 70% of the trash was made of plastic (BASMAA 2014).



**Figure 4.** Trash types identified in municipal stormwater conveyances in the San Francisco Bay Area, CA (BASMAA 2014)

### Types of Stormwater Control Measures for Trash

Stormwater control measures used to address trash in surface waters generally fall into two broad categories: **treatment controls** and **source controls**. Trash controls are further grouped into two sub-categories:

#### Treatment Controls

- Full Capture Systems
- Partial Capture Systems

#### Source Controls

- Operational Source Controls
- True Source Controls

Treatment controls are structural Best Management Practices (BMPs) that either remove pollutants from stormwater runoff or capture, infiltrate, or use stormwater (CASQA 2021). Stormwater treatment controls include, but are not limited to, mechanical trash capture systems and Low Impact Development (LID) controls. A stormwater treatment system is considered a “Full Capture System” if it meets the definition established by the State Water Resources Control Board (State Water Board) and is certified by the State Water Board. Stormwater treatment systems that are not certified by the State Water Board as full capture systems, but provide trash reduction benefits are called “Partial Capture Systems.”

Source Controls are stormwater management measures that prevent the generation or release of a pollutant into the environment or measures that keep pollutants out of contact with rainfall and stormwater. “Operational Source Controls” keep pollutants that have entered the environment out of contact with rainfall and stormwater through physical separation or cleaning. These controls include traditional stormwater practices such as street sweeping / cleaning and storm drain inlet maintenance. “True Source Controls” focus on the original source of potential pollutants and keep them from entering the environment by eliminating or significantly reducing their generation. Examples include product-related ordinances, policies, or legislation to reduce/eliminate the use, sale or distribution of a pollutant or a product containing a pollutant.

### **True Source Controls for Stormwater Quality Management**

Public agencies are confronted on a daily basis with managing a tsunami of items, products and packaging that enter their jurisdictional areas. Cities and counties have tried to use a variety of strategies to adequately manage these materials/products and reduce the risk for environmental impacts to occur. Keeping these materials from polluting the environment is an ongoing battle for local public agencies, while the manufacturers usually do not take responsibility for the end of life of their products. The most cost-effective method used to manage the most problematic of these materials is to prevent the materials and products from being produced, sold, and/or distributed in the first place. In the stormwater sector these types of controls are called “True Source Controls.”



Figure 5. Zero Waste Hierarchy (Zero Waste International Alliance 2013)

In the solid waste field, a similar concept to true source controls is called “Source Reduction.” The Zero Waste hierarchy used to manage solid waste is presented in Figure 5. The Zero Waste hierarchy puts the highest priority on waste reduction or “Source Reduction” as shown in Figure 5 (ZWIA 2013). While source reduction can be utilized in a number of different phases of a product’s life cycle, True Source Controls are used in the manufacturing and sale/distribution phases.

From a stormwater and solid waste management perspective, true source controls are generally considered the most cost-effective approaches to reducing pollutants in the environment because they address the generation and use of the pollutant before it can cause environmental harm. Like solid waste managers, municipal stormwater permittees (i.e., cities, counties, and other public agencies) in California have a long track-record of supporting the use of true source controls for trash and other pollutants as well. Successful true source control programs implemented by municipal stormwater agencies in California include the Brake Pad Partnership, which assisted in developing invaluable information on the contributions of copper to stormwater from brake pads, resulting in the adoption of legislation reducing the level of copper in brake pads sold in California and collaborations with the California Department of Pesticide Regulation (DPR) that is improving the pesticide registration process to better take into account the potential impacts to water quality prior to registration. These successful and ongoing experiences with identifying and implementing true source controls for pollutants like copper and pesticides, suggest a similar level of effectiveness is possible for true source controls focused on trash. That is why true source control is an essential element of the California Stormwater Quality Association (CASQA) Vision for Sustainable Stormwater Management (CASQA 2020).

### **Trash True Source Controls**

True source controls for stormwater that address trash are called Trash True Source Controls (TTSCs). These controls include the following:

- Prohibiting the types of products a business can use, sell, or distribute (e.g., prohibition on providing single-use plastic straws);

- Prohibiting certain material types (e.g., Expanded Polystyrene foodware);
- Limiting locations where the products can be legally used by the public (e.g., prohibition on smoking in certain areas);
- Imposing a charge for providing those products to the customer (e.g., fees on single-use bags);
- Restricting how products are distributed to customers (e.g., “straws by request only”);
- Limiting a particular product use based on product constituents and how the ingredients of the product can affect its toxicity or other issues (e.g., restricting fluorinated compounds in “compostable” fiber-based foodware that is affecting compost products for farmers);
- Limiting the ingredients in certain types of allowable products (e.g., PFAS or cigarette filters); and
- Collecting a fee on the use of product to fund clean-up activities or other impacts from the product (e.g., cigarette butts).

## 2. Importance of Trash True Source Controls

Trash True Source Controls (TTSCs) are one of the most important tools that municipalities can use to address trash before it enters the environment and potentially causes harm. Numerous SF Bay Area cities and counties have adopted and implemented source controls specifically to address trash level in stormwater, local surface waters, and the San Francisco Bay. In comparison to treatment controls and institutional source controls, TTSCs are the most cost-effective approach for reducing the levels of litter-prone items in stormwater and surface waters (see illustration in Figure 6). TTSCs address the generation of litter-prone materials/products by addressing the manufacturing, sale, or distribution instead of cleaning up the items and materials once they reach the environment. This section provides summaries of the environmental and economic benefits of TTSCs.

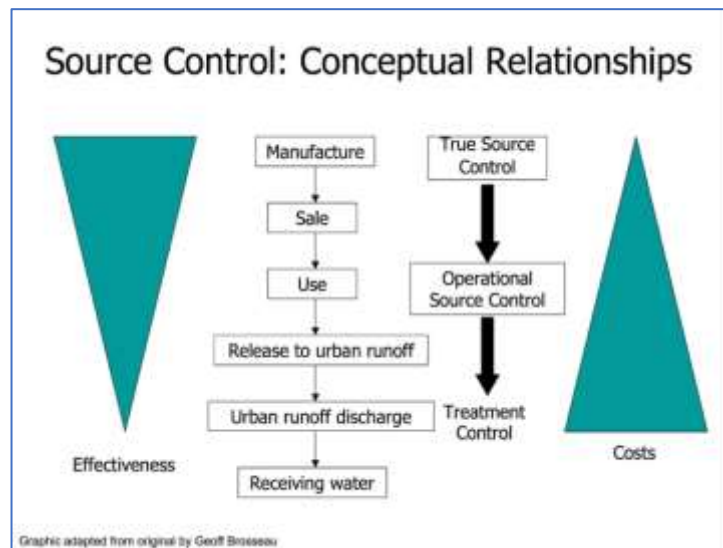


Figure 6. Source Control Types and Conceptual Relationships

### Sustained Long-term Surface Water Quality Benefits

#### Reductions in Trash at the Source

TTSCs provide sustained environmental benefits by significantly reducing the generation of litter-prone items through the ongoing enforcement of local ordinances. As more types of packaging move from being made of metal, glass and paper to plastic, the prevalence of litter-prone plastic items is increasing in storm drains, streets, creeks, and the environment. Additionally, as plastic bags and other materials are controlled, other types of plastic materials increase in prevalence. As observed over a five-year period in On-land Visual Trash Assessments (OVTAs), single-use foodware proportions have **consistently increased** since 2014 as shown in Figure 7 (Sommers and Fons 2019):

These results reinforce the need for comprehensive single-use foodware source control actions. Eventually it won't be feasible to intercept the ever-growing amounts of plastic, even with a 90% capture rate achieved by Full Trash Capture Devices. More plastic trash will be in the creeks, so TTSCs are an important control measure because they manage trash in ways that FTCDs cannot.

The growing plastics problem reinforces the variety and breadth of TTSC community and environmental benefits. These benefits can continue in perpetuity at a lower cost than trash management and include:

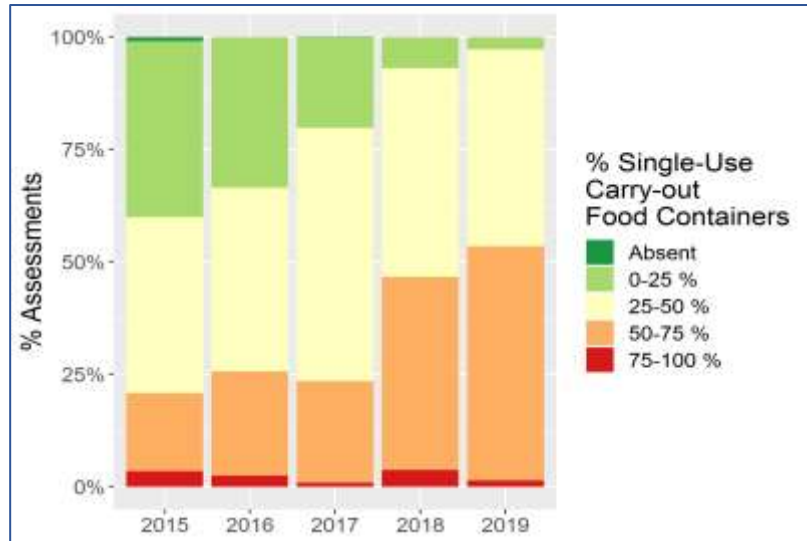
- Addressing trash from relatively large areas;
- Reducing trash in low trash generating areas where FTCDs are not as effective or required;
- Controlling wind-blown and direct discharges of trash that FTCDs cannot manage;
- Reducing the manufacture of litter-prone, single-use plastic items generating upstream environmental benefits and impacts outside of the Bay Area such as in front-line communities where fossil fuels, toxic chemicals and other materials are extracted and processed;
- Providing a model for other communities in the US and other countries;
- Addressing specific types or sources of trash or broad categories;
- Having much lower maintenance costs than installation of FTCDs; and
- Having a high success rate due to the significant implementation experience by California public agencies including successful education campaigns creating issue-aware communities.

### **Both Macro and Micro/Nano Plastics**

Macro litter-prone items (>5mm) can also degrade into macro, micro and nano-plastics in the environment. New studies have shown that these plastic particles can find their way into the food chain and our bodies (CIEL 2020). Plastic fibers from clothing, carpeting and other products are being released into local creeks and the San Francisco Bay in staggering quantities every day (SFEI 2019).

### **Other Emerging Contaminants of Concern**

TTSCs can be used to reduce the prevalence of other contaminants that can reach water bodies, including persist chemicals such as pesticides and plastic additives that are emerging through scientific study as significant environmental concerns (EPA 2021). Foodware, plastic bags and other materials, which have been targeted by TTSCs in the Bay Area, can contain PFAS, PFOA Bisphenol A and other types of persistent chemicals. Reducing these problematic materials at the source is much more effective and less costly than managing the materials once they have entered the environment. The chemicals can enter the environment through compost that has been made with feedstocks that include foodware such



**Figure 7.** Upward trend in levels of single-use foodware in OVTAs (2015-2019) (Sommers and Fons, 2019)

as fiber-based products that contain PFAS. The State of California has passed laws to ban PFAS from being used in foodware that is labeled as “compostable” to reduce this issue. PFAS can also show up in potable water sources from other uses (SWRCB 2021).

### **Extended Producer Responsibility and the Reduced Need for Downstream Controls**

Municipalities are primarily burdened with the costs of managing plastic and other litter-prone materials. With TTSCs, less management and interception of trash is required which reduces the use of limited local resources and allows public agencies to focus on other water quality issues. While historically customers and product users have been targeted as the problem (i.e., “litter bugs”), the tide has now shifted. As trash O&M management costs, including for FTCDs, have ballooned in recent years, laws are being passed that push the responsibility upstream from users to the manufacturers of these products. The strategy of Extended Producer Responsibility (EPR) aims to require product producers, distributors, and retailers to manage their products through green design, take back programs, fees, and other customer support. EPR can also create “trash avoidance.” The goals of these programs are to support a more circular economy instead of the current straight path to landfill that has allowed manufacturers to escape responsibility for the pollution they enable. In California there are several EPR programs and policies. While some of these EPR programs have not resulted in True Source Controls and are only post-consumer material management programs, these policies and laws are also sending the “responsibility” signal to the commercial sector. Some forward-looking companies have read the writing on the wall and have begun to take voluntary pre-emptive action to redesign their products and remove toxic ingredients. For example, Apple Computer has removed lead in many of their devices.

But to date most producers of litter-prone items are largely not changing their manufacturing processes, including the materials they use, or taking responsibility of the product after its end-of-life to ensure that the products they produce do not cause water quality impacts. In fact, the number of plastic items observed in the environment continues to increase, causing an increased impact to surface waters and beneficial uses, regardless of the extent of stormwater treatment or institutional source control implementation. The level of trash generation continues to outpace the ability to clean up the items being produced, sold/distributed, and littered. Mandates to reduce the levels of trash in stormwater have required stormwater management agencies to intercept these litter-prone items via costly treatment controls or institutional source controls, while the manufacturers of these products continue to have no responsibility for the product once sold. True source controls address this issue by placing restrictions and/or responsibility upon the manufacturers, distributors and/or users of the products, rather than expended public resources to intercept the material downstream. Extended Producer Responsibility (EPR) programs need to have government oversight and control in addition to true source control requirements to produce long-term changes beneficial to public agencies and the public and to reduce the use of toxic materials in products that would otherwise be released into the environment.

### **Other/Upstream Environmental Benefits**

The reductions in litter-prone items entering the environment via true source controls also provide upstream benefits such as reduced extraction and reduced manufacturing, which in turn reduces health impacts on front-line communities where the mining and chemical processing takes place. For most of society, the people suffering from the impacts of our non-circular economy are hidden from view. Just as moving to organic agriculture improves the health of farm workers and the environment by reducing the use of pesticides and synthetic fertilizers, the move towards a circular economy via true source controls for our packaging, products and foodware benefits not only the downstream environment (i.e., water quality), but the upstream environment as well. Trash treatment controls and institutional source controls do not have that benefit – they only address the problem by cleaning it up at the faucet – not turning off the tap. Even with 90%+ capture rates, more trash will be entering sensitive water bodies and the Ocean

as generation rates continue to climb and more products move from truly recyclable materials such as glass and metal, to multi-material plastic packaging that is not recyclable nor reusable. To avoid the concept of a circular economy from being co-opted by corporate interests, the definitions, terms and criteria for circular products and services need to have public agency input and involvement. True source controls are a crucial part of the discussion and the requirements that should be incorporated.

### 3. Recent and Ongoing Leadership by SF Bay Municipal Agencies

Based on trash generation studies conducted in California, single-use products and packaging make up the vast majority of trash in stormwater. For decades state and local governments have adopted policies, ordinances, and laws designed to minimize the environmental impacts of single-use items. Beginning with Earth Day in 1970, the State of Oregon and then nine other states passed “bottle bills” to reduce litter and encourage recycling. Since that time, the manufacture and use of single-use products has risen exponentially and the impacts on local waterways and the ocean have significantly increased along with the public’s awareness of this issue. Looking forward, the production of plastic materials in the United States alone is expected to triple over the next 30 years (Geyer et. al. 2017).

California municipalities have and continue to adopt regulations to manage the sale, distribution, and use of problematic products. In terms of litter-prone items, these regulations have generally targeted single-use plastic foodware (e.g., plastic grocery bags, EPS products and straws) and smoking-related materials (e.g., cigarettes). Additionally, States have passed laws to reduce the impacts of single-use materials (e.g., California’s plastic grocery bag ban). Most policies, ordinances and laws enacted to date have focused on specific litter-prone items. More recent trends include the adoption of more comprehensive regulations that attempt to reduce the use of broader categories of litter-prone items, such as single-use foodware.

Information on the effectiveness of municipal ordinances and policies to reduce trash in stormwater has been collected as modest levels. Those studies that have been conducted suggest that if the public is adequately informed about the regulations and municipal governments conduct enforcement, ordinances and policies can be extremely effective stormwater trash control measures. Costs associated with the adoption and implementation of municipal ordinances and policies are largely a function of the size of the municipality and the scale of the regulation.

Internal policies adopted by municipalities on the purchasing of certain types of single-use items are inexpensive and have a limited scope. More holistic ordinances adopted by large cities can be resource intensive but have the potential for substantial positive impacts on the levels of trash in stormwater.

San Francisco Bay Area municipalities (and California municipalities in general) have been leaders in the field of True Source Controls for over 30 years starting with the City of Berkeley’s Styrofoam ban in 1988. Since then, hundreds of municipal ordinances and policies reducing and managing the use of plastic bags, foodware and smoking-related materials have been adopted throughout California. Studies of actual



**Figure 8.** EPS was the first target of a local TTSC in 1988 (City of Berkeley, 2019)

and observable storm drain contents have quantified the reduction in discharges that these actions have accomplished.

## **Actions Taken to Date by Bay Area Municipalities**

### **Pre-MRP Actions**

Single-use foodware includes dishes, containers, and eating utensils that restaurants typically provide for takeout orders. The first generation of local ordinances (aka TTSC ordinances) that were designed to control the distribution of specific problematic single-use foodware products began in 1988 in California when the City of Berkeley banned the use of expanded polystyrene (EPS) foodware by businesses for food prepared on-site (City of Berkeley 2019). Since that time, municipal ordinances targeting EPS have expanded their scope to prohibit the distribution, and sometimes the sale of EPS foodware. As of 2019, there are 120 California municipalities that have adopted regulations to reduce the prevalence of EPS foodware (CalRecycle 2019).

In 2005, the City/County of San Francisco considered requiring grocers to charge a 17-cent fee on single-use plastic carryout bags. The action was delayed in a compromise with grocers to study the issue and collect bag usage data. Meanwhile, local fee regulations on single-use plastic bags were blocked by State of California pre-emption in 2006, leading San Francisco to adopt the first ban in the nation on single-use plastic and paper carryout bags. San Francisco later required that customers be charged 10 cents for each single-use paper or compostable plastic bag or reusable plastic carryout bag (Romer 2010).

### **Actions During MRP 1.0**

Continuing the trend started by San Francisco during MRP 1.0 jurisdictions in Alameda County and San Mateo County adopted countywide shopping bag ordinances while other jurisdictions passed their own laws including San Jose as shown in Figure 9 (City of San Jose, 2012) and all the agencies in Santa Clara County. These efforts and other local efforts throughout California eventually lead to a state-wide law coming into effect in 2016 to reduce the impacts of bags (Surfrider Foundation 2019).

Many Bay Area jurisdictions also began to adopt ordinances aimed at whole classes of litter-prone items basic on use type. These second-generation ordinances targeted single-use foodware in general and were adopted by the Cities of Berkeley, Oakland, San Jose, Emeryville, Menlo Park, Palo Alto and eventually many others in the Bay Area. Many of these ordinances used a model ordinance promoted by *Zero Waste Bay Area*, a group of recycling advocates. The model typically required that all single-use foodware be accepted in the jurisdiction's composting and/or recycling programs. While considered a more comprehensive approach than the ordinances that only targeted one product type at time, one downfall of this generation of ordinances was the increase in the use of compostable plastic materials. At first compostable plastic foodware was seen as a possible "silver bullet" for increasing diversion from landfill and a more benign type of plastic, but experience and practical issues at the compost facilities have revealed a litany of problems including confusion by the public and contamination problems for compost facilities. Compostable plastics also do not appear to reduce the risk for impacts to aquatic life or recreational uses of surface waters.



**Figure 9.** Bag ordinance messaging (City of San Jose, 2012)

### **Actions During MRP 2.0**

The motivation to focus on specific single-use products, such as those identified in Figure 4 (BASMAA, 2014), continued when plastic straws came into the crosshairs of the public in 2015 with the viewing of a viral video of a sea turtle gruesomely having a straw removed from its nostril. Since then, the State of California and many municipalities have adopted straw-related laws in California (e.g., Cities of Carmel, San Luis Obispo, Davis, Malibu, Manhattan Beach, Oakland, Redondo Beach, Richmond, San Francisco, and Berkeley). Actions include plastic straw bans, straw “by-request-only” requirements, compostable straw standards, reusable straw promotions, and other related policies.

In 2017, the City of Alameda was one of the first SF Bay Area jurisdictions to target all single-use plastic foodware. The City banned all types of single-use plastic foodware in their ordinance – favoring fiber-based foodware that is compostable in the City’s composting collection program with food scraps. The City promotes reusable foodware



**Figure 10.** Foodware Ordinance Messaging (City of Alameda, CA, 2018)

but does not require it, as shown in Figure 10 (City of Alameda, 2018). Other jurisdictions soon followed including the County of San Mateo which adopted an ordinance in 2019 regulating businesses in unincorporated areas of the County. The County created a comprehensive model ordinance that other public agencies within the County could also adopt and leverage the enforcement staff of the County to perform inspections of the affected businesses creating a uniform program and message. The County’s ordinance included several newer aspects including accessory items only “upon request” of the customer, a ban on all types of single-use plastic foodware with technical support and encouragement for businesses to switch to reusable foodware.

### **Planned/Potential Actions During MRP 3.0**

One issue with the effectiveness of some of the TTSC ordinances adopted by municipalities is that they focus on specific materials or categories of products (e.g., EPS, plastic bags, and straws) instead of addressing the reduction all single-use litter-prone items. Although significant reductions in specific litter items have been observed due to TTSC ordinances, sometimes a “whack-a-mole” situation occurs, where the banning of a product made of plastic results in the increase of the same item made of a different problematic material. For example, single-use fiber-based “compostable” materials, such as those made from trees, bamboo, or other plant-based sources, have often been considered to be more environmentally preferable over single-use plastic materials, but many life cycle assessment reports show that fiber-based materials also have negative environmental impacts and can be similarly problematic when looked at in a holistic manner.

Over the last 50 years, plastic packaging has replaced more readily recyclable glass, metal, and paper packaging, and become the dominant type of material used in single-use products and food packaging. While the production of plastic materials continues to increase, recycling levels have fallen more recently due to the lack of overseas markets for used materials. Specifically, in 2018 China began restricting imports of plastic scrap and other materials from the U.S. To address the problems with the recycling and exporting of post-consumer plastic materials, some municipalities are shifting their focus to upstream control of foodware and packaging – these are often in the True Source Control category – affecting production or sale – but also Operation Source Controls affecting use. Similar to the “Paper or plastic? No

thanks, I've got my own bag!" message promoted by TTSC carryout bag regulations that incentivize the "bring your own bag" behavior with charges on single-use bags, a new generation of ordinances are now focusing on behavior change and reduction of all types of single-use foodware (County of San Mateo 2018 and Upstream Solutions 2019) through different types of regulations that focus on requiring reusable foodware in different situations and/or types of uses. These new TTSC ordinances typically have several of the following elements:

- Charges on single-use to-go foodware, such as 25 cent charges on beverage containers, to incentivize behavior change by the public;
- Removal of toxic chemicals in foodware by leveraging third party certification of fiber-based foodware for compostability;
- Requiring businesses to ask customers first if they want accessory foodware items such as utensils and straws - aka "Upon Request" regulations;
- Requiring standardized signage and placement of disposal containers in appropriate locations;
- Requiring permitted events to use reusable beverage cups; and
- Requiring restaurants to provide reusable foodware for on-site dining.

The first of the new generation of TTSC ordinances was adopted by the City of Berkeley, CA in 2019 (City of Berkeley 2019) after a two-year development and community outreach period. Since this time, similar ordinances have since been adopted by other California cities (e.g., Fairfax, San Anselmo, Watsonville, Arcata, and Santa Cruz) and by the City of Vancouver in Canada. While the Covid-19 pandemic has put enforcement of these ordinances on hold, the tidal wave of single-use foodware, plastic bags and single-use personal protective equipment (PPE) being generated by restaurants related to take-out and delivery orders, since the beginning of the health crisis, has brought home the message to many that there must be a better way of getting food from a restaurant to a customer. As society comes out of the pandemic, there is a new-found emphasis on source reduction with a "reusables" zeitgeist. However, in other parts of the country and over the last few years, many states have passed preemption laws prohibiting local municipalities from adopting foodware and shopping bag related laws, creating challenges for municipalities that want to do something to reduce the plastic litter problem (Freiburg 2014).



**Figure 11.** Vessel Reusable To-Go Cup (Vesselworks, 2018)

In June 2021, MRP cities and counties were surveyed to document whether TTSC ordinances are planned for development/adoption or whether municipalities would consider developing an ordinance in the next five years. A total of 29 individuals, representing 28 municipalities, responded to the survey. Over 60% of municipalities Permittees that have yet to adopt a TTSC ordinance are planning to develop such an ordinance within the next five years. Additionally, information on the results of the survey is included in **Appendix A**.

## MRP Permittee Survey Results

*Is your municipality currently planning to develop/consider a TTSC ordinance within the next five years?*

60% of respondents (n=29) that do not already have an ordinance plan to adopt an ordinance during MRP 3.0.

Smoking-related products have also been the subject of local and state-wide legislation. Many jurisdictions have adopted laws that regulate where tobacco products can be smoked, primarily on the grounds of protecting public health (Change Lab Solutions, 2019). To reduce the risk of cigarette impacts on surface water quality, an approach that has been considered to reduce the prevalence of cigarette butt litter, is to ban the sales of tobacco products with single-use filters (i.e., butts). There are at least 10 brands of pre-rolled cigarettes that are manufactured without single-use filters included, so a ban on single-use-filtered-cigarettes would not mean a ban on all types of cigarettes and there are also “roll-your-own” tobacco products where the tobacco comes loose in a bulk pouch. While it may be technically possible for a municipality to ban the sale of smoking-related products that contain single-use filters (aka cigarette butts) within their jurisdictional area, no municipality has yet done that. Over the last few years several bills have been introduced in the State legislature that would ban the sale of cigarettes with filters in California, but they have failed to advance. Senate Bill 424 from State Senator Hannah-Beth Jackson in 2019 was the most recent attempt to deal with the issue.

Although cigarettes have not yet been the focus of true source controls, the demonstrated effectiveness of the EPS and plastic bag bans show that it is possible through similar ordinances to reduce the level of smoking-related products found in stormwater and/or surface waters. One challenge, however, to using this kind of approach to address tobacco-related litter items is that these types of products are often sold via the internet and/or sold and transported from further distances, compared to prepared food products, and related foodware, which are served/distributed by local food businesses. This makes smoking-related TTSCs possibly difficult to enforce by a local agency. A state-wide law may be a more effective way to address this issue. A law restricting the shipping of packages with certain types of materials was recently passed in Washington State. The law prohibits packages with a type of EPS (aka “Styrofoam Peanuts”) to be transported into Washington State. This type of law could be enacted for tobacco-related products as well.

### Demonstrated Effectiveness of TTSCs

Over the last 30 years, foodware, tobacco and other trash-related ordinances have aided public agencies in reducing the levels of problematic trash items in waterways. The effectiveness of these TTSCs has been demonstrated in many ways in several studies. Data collected from storm drain outfalls, trash full capture systems, creek monitoring, illegal dumping, OVTAs, clean up events, harbor trash robots, marine debris trolling, store sales, shopping bag customer surveys, and brand audits of litter all contribute demonstrable and verifiable evidence that TTSCs are effective trash control measures when enforced. Monitoring observations and quantitative studies conducted in the SF Bay Area to evaluate whether reductions of trash in stormwater have occurred as a result of TTSCs are summarized below.



### **Single-Use Plastic Grocery Bags**

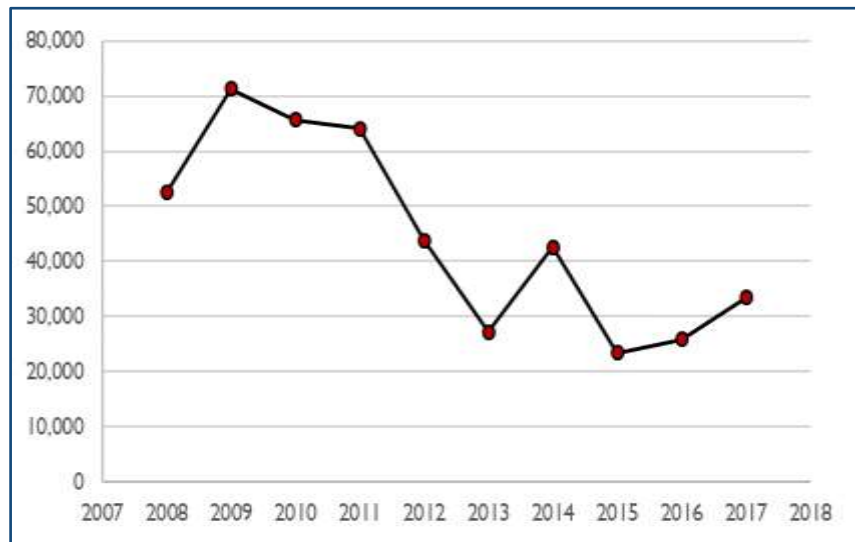
Single-use carryout bag ordinances have been adopted by over 151 California cities and counties between 2007 and 2014, resulting in the passing of a state-wide law in 2014 and enactment in 2016 after a failed attempt through a state referendum to overturn the law (Plastic Bag Laws 2020). Californians Against Waste (CAW) estimated that the number of plastic shopping bags distributed in California was reduced from 30 billion plastic bags per year in 2005 to 13 billion bags per year in 2014 and continuing down to 1-2 billion per year after the State's shopping bag law came into effect in 2016 (CalRecycle 2019).

Overall bag usage has decreased significantly, as most customers have started to bring their own bags or just don't take a bag to avoid having to purchase a paper or reusable bag. From 2010 to 2017, the Coastal Commission reports a drop in plastic bags found at clean up events - from 10% down to 4% of total items collected on beaches as shown in Figure 12 (Coastal Commission, 2020).

SF Bay Area studies have also shown that TTSC ordinances have successfully reduced the levels of single-use plastic carryout bags in stormwater

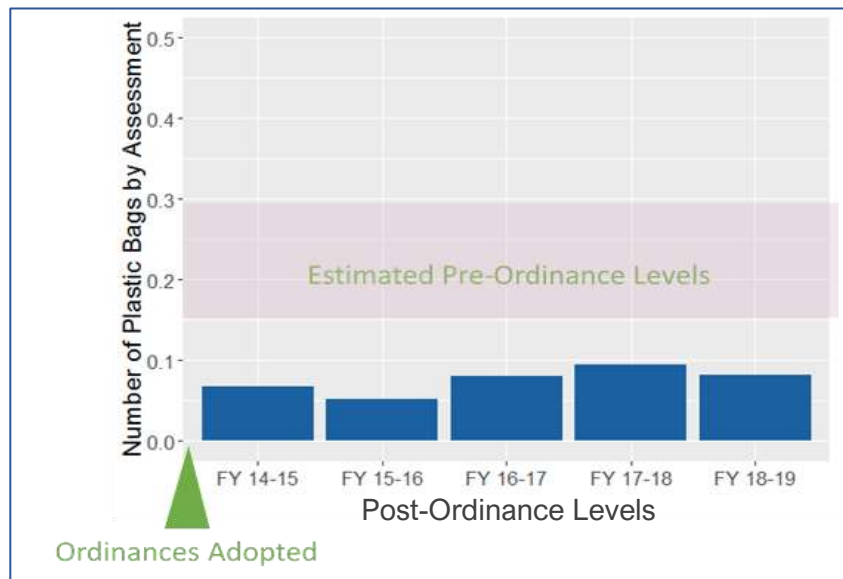
(SCVURPPP 2016, ACCWP and Stop Waste 2014). Studies conducted in Alameda and Santa Clara counties observed significant reductions in the number of single-use plastic bags observed in stormwater. In 2009 before ordinances were adopted in these counties, plastic bags were observed to be roughly 8% of trash in stormwater (BASMAA 2014). Post-ordinance, the number of bags observed in stormwater decreased by 70-75% (SCVURPPP 2016, ACCWP and Stop Waste 2014), equating to a roughly 5-6% decrease in the overall levels of trash in stormwater. The results from these studies were validated via a 2019 analysis conducted using quantitative data collected during OVTAs at over 500 sites during a five-year period. The 2019 analysis indicates that single-use plastic grocery bags are observed in 5-10% of OVTAs post-ordinance down from 15-30% pre-ordinance (see Figure 13). Importantly, increases in EPS foodware replacement products (e.g., fiber-based plastics) were not observed during these studies.

In addition to the quantitative studies conducted, the City of San Jose has also found a 76% reduction in creek and river plastic bag litter and a 59% drop in park and roadside plastic bag litter. Visual observations in stores reported that 54.6% of bags used by customers were reusable and 44.6% of customers did not use a bag (San Jose 2013) and (SCVURPPP 2016). Other effectiveness evaluations conducted by public agencies in California have yielded similar results, indicating that the reduction of levels of litter-prone items in stormwater are observable via trash monitoring and characterization.



**Figure 12:** Single-use Plastic Bags Found in California Waterways annually during International Coastal Cleanup Day (California Coastal Commission, 2020)

Unfortunately, during the pandemic in 2020 and 2021, single-use plastic shopping bags were temporarily allowed to be distributed state-wide per a Governor’s Order. This action, along with new local health code regulations that forbade customers from bringing their own shopping bags into grocery stores, and an increased concern among store owners for the safety of their employees touching the shopping bags brought by customers, greatly increased the use of plastic shopping bags. The effects of the increased allowable uses during the pandemic, however,



**Figure 13.** Results from five years of data collection on single-use plastic bags during OVTAs (Sommers and Fons, 2019)

were not observed in the number of single-use plastic bags observed during OVTAs. Comparisons of the average number of bags observed pre- versus post-relaxation of the statewide and local bag bans indicated that no statistically significant ( $p < 0.05$ ) changes in the number of single-use plastic bags observed on streets and sidewalks has occurred (SCVURPPP 2020, SMCWPPP 2020).

### **Expanded Polystyrene (EPS) Foodware**

Starting with the City of Berkeley in 1988, over 50 Bay Area municipalities and another 77 public agencies around California have adopted various forms of bans or policies on the use and distribution of polystyrene foodware (aka Styrofoam). These government organization have found various environmental justifications for these regulations. Water quality and trash are now the most cited grounds for action. For example, San Jose implemented an EPS foodware ban after determining it comprised a significant proportion of the litter observed in their storm drains (City of San Jose 2013). The San Jose ban began in 2013 and allowed one year for large chains to phase out EPS foodware and two years for all food vendors within the City. Similar EPS foodware bans were adopted by other SF Bay Area municipalities during this timeframe.

Based on the regional SF Bay Area trash generation study conducted in 2011-12, EPS foodware was roughly 6% of all trash observed in stormwater (BASMAA 2014). Many local ordinances were adopted prohibiting the distribution or sale post-2012. Local studies conducted by stormwater and solid waste agencies in the Bay Area have shown that EPS foodware ordinances have reduced the prevalence of EPS foodware in stormwater by between 65-74% (ACCWP and Stop Waste 2014, SCVURPPP 2016). This reduction equates to a roughly 4-5% decrease in trash in stormwater. Importantly, increases in EPS foodware replacement products (e.g., fiber-based foodware) were not observed during these studies.

### **Potential Benefits from New/Expanded TTSC Actions**

New and expanded TTSC actions are needed to continue reducing the levels of trash in the environment and impacting surface waters via stormwater or other transport pathways (e.g., wind and direct dumping). Capturing of trash via full capture systems and recycling of trash through solid waste collection programs alone will not be sufficient in the long term to combat the increased production of waste (mostly plastics) and risk to surface water quality. Therefore, waste reduction-type policies that are a key part of TTSC

ordinances will be an important tool moving forward to combat impacts to surface waters. Some of these measures may be better approached at the state-wide level and some may be more appropriate or effectively implemented at the local level. Innovation and a focus on reduction (rather than solely on treatment/interception) will assist in the further reduction of trash and can contribute to other sustainability goals such as zero waste, public health, toxics reduction, climate action, water, and energy conservation.

TTSC ordinances, such as the one adopted by the City of Berkeley in 2019, can move communities towards more sustainable long-term practices such as the use of reusable foodware for on-site dining as well as to-go, delivery and event food and beverage consumption situations. For example, some municipalities and public agencies in the U.S. have passed bans on the sale of bottled water in plastic containers. The San Francisco International Airport is the only public agency in the SF Bay Area to adopt such a policy. The City/County of San Francisco adopted a bottled water policy for its own operations and for public events. More jurisdictions may want to consider this type of policy.

New types of TTSCs that could be implemented at the Local or State level include:

- Foodware reduction ordinances (e.g., reusable foodware requirements);
- Food packaging reduction policies (e.g., bans on the sale of single-use plastic water bottles);
- Single-use plastic product reduction laws (e.g., bans on sale/use of EPS in foodware/shipping);
- Smoking-related trash reduction ordinances (e.g., bans on single-use filters);
- Building code policies (e.g., requiring businesses to have washing foodware equipment);
- Expanded EPS bans (e.g., banning the sale of “Styrofoam” coolers, meat trays, peanuts etc.);
- Expanded plastic bag bans (e.g., banning the use of plastic produce bags in grocery stores); and,
- Expanded public event regulations (e.g., requiring the use of reusable foodware at events etc.);

These actions would further reduce the generation and prevalence of litter-prone problematic trash items from entering storm drains, creeks, the SF Bay, and the Pacific Ocean. Additionally, they would have other sustainability and upstream benefits to the local and related communities.

Single-use plastic and fiber-based foodware comprise approximately 20-25% of trash observed in storm drains in the SF Bay Area (BASMAA 2014). If a jurisdiction adopts a comprehensive waste reduction TTSC ordinance, it can be predicted from past studies that a significant portion of that single-use foodware could be eliminated. As plastic bag and EPS ordinances have shown, 50%+ effectiveness and reduction is entirely possible for TTSC ordinances, and therefore these actions would likely produce an additional 10% reduction in overall trash in stormwater, as well as additional reductions in trash being discharged into impacted surface waters through wind and direct dumping/littering.

The Draft Tentative Order of MRP 3.0 proposes zero credit towards the 100% trash reduction compliance benchmark for existing or new/expanded TTSCs. The benefits of TTSCs have been well documented in this report and therefore are worthy of credit in the reissued permit.

## 4. Load Reduction “Credits” for Trash True Source Controls

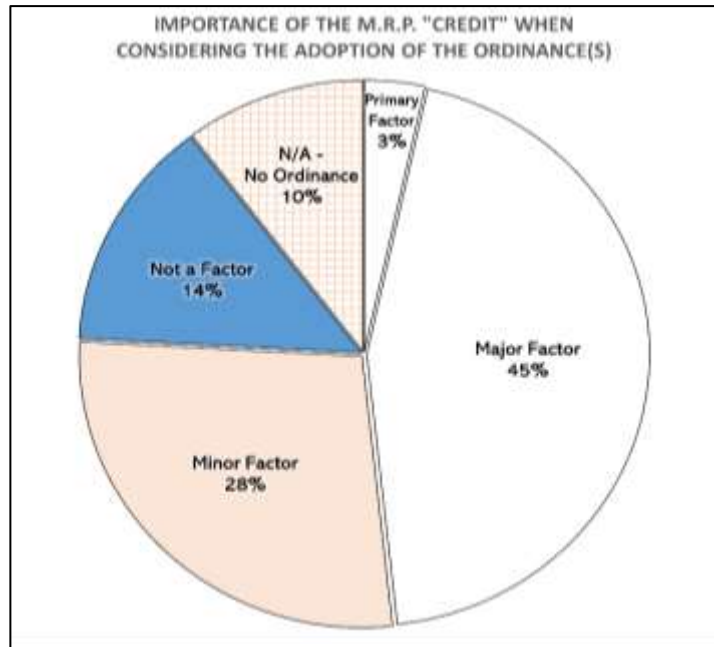
### Source Control Credit Framework

MRP 2.0 provides an option to Permittees to take credit for the adoption and implementation (including enforcement) of a TTSC ordinance if data indicate that trash reduction in stormwater is occurring as a result of this action. Specifically, MRP 2.0 provision C.10.b.iv states:

*Source Control – Permittee jurisdiction-wide actions to reduce trash at the source, particularly persistent trash items, may be valued toward trash load reduction compliance by up to ten percent load reduction total for all such actions. To claim a load percentage reduction value, Permittees must provide substantive and credible evidence that these actions reduce trash by the claimed value.*

As illustrated in the number of ordinances adopted during MRP 1.0 and 2.0, this crediting system has given MRP Permittees significant impetus to adopt and enforce various types of TTSC ordinances. All MRP Permittees have adopted single-use plastic grocery bag and/or EPS takeout foodware ordinances, or they are covered by default through the State of California’s shopping bag law. As described in the results of the *True Source Control Survey* (Appendix A) distributed to MRP Permittees, the allowable MRP source control “credit” was a significant factor in their decision to enact these ordinances. Figure 14 illustrates that over 75% of survey respondents (n=29) indicated that the availability of the source control credit in MRP 2.0 was a factor when determining whether to develop and adopt an ordinance.

Additionally, the MRP 2.0 crediting framework for source controls is also consistent with the Statewide Trash Amendments, which state that “Ordinances are a permissible type of institutional control that a Permittee could employ to achieve compliancy.” However, the Statewide Trash Amendments also discuss the need to account for potential product-substitution effect as a factor when demonstrating compliance, “Mere substitution would not result in reduced trash generation if such product substitution would be discarded in the same manner as the banned item.” For this reason, when collecting monitoring data to evaluate the effects of ordinances, changes in the levels of substitute products/items are also identified. Thankfully, monitoring studies conducted in the SF Bay Area have not found that TTSC ordinances have caused increases in the levels of substitute products in stormwater.



**Figure 14.** Importance of the MRP 2.0 Source Control “Credit” when Permittees decided to develop/adopt an ordinance

### **Water Board Staff Proposed Modifications to Source Control Framework in MRP 3.0**

In September 2021, Regional Water Board staff released the Draft MRP 3.0 Tentative Order for public comment. In provision C.10 (Trash Load Reduction) the source control framework included in MRP 2.0 was significantly modified, reducing the availability of the source control credit allowed under MRP 2.0. The proposed revised framework in MRP 3.0:

- Only allows for source control credits towards the 90% trash reduction compliance benchmark, not towards the 100% benchmark; and

- Only allows for source control actions other than those addressed under previous Permits (e.g., EPS foodware and single-use plastic grocery bags) to be valued towards compliance benchmarks; and

Similar to MRP 2.0, to claim a load reduction percentage value for source controls, Permittees will need to provide substantive and credible evidence that the source control action is being implemented jurisdiction-wide and reduces trash by the claimed value. A Permittee may support its claimed source control reduction value with reference studies from other jurisdictions provided that it also provides credible evidence that the chosen source control action would achieve comparable trash reduction if implemented in the Permittee's jurisdiction. Additionally, the MRP 3.0 Tentative Order also indicates that the trash reduction benefits of source control actions should inevitably be observed via OVTAs, and therefore credits towards the 100% trash reduction compliance benchmark are not needed or allowed.

There are many challenges with the modified source control crediting framework included in the MRP 3.0 Tentative Order. These issues include the following:

- Removal of credit for existing source control actions;
- No credit for any source controls towards 100% benchmark;
- Assumption that the benefits of source controls will be observed via OVTAs;
- No consideration of the trash reduction benefits in areas addressed by full capture systems or areas already achieving low trash generation (i.e., 100% reduction); and
- No consideration of the trash reduction benefits from other trash transport pathways to surface waters (e.g., wind and direct dumping/littering).

These issues and others are summarized in Table 1. Further considerations that support the continuation of the MRP 2.0 framework into MRP 3.0 are also summarized.

## 5. Recommended Approach for MRP 3.0

San Francisco Bay Area municipalities have been worldwide leaders in the development, implementation, and evaluation of Trash True Source Controls (TTSCs). Source control credits allowed in MRP 2.0 provided an enhanced impetus for MRP Permittees to adopt TTSC ordinances designed to significantly reduce the manufacturing, distribution or sale of litter-prone trash items observed in stormwater and to protect surface water quality. As documented through focused local monitoring studies, these TTSC ordinances have been successful in reducing trash in stormwater discharges and the impacts on water quality.

Based on the documented successes to date on reducing specific litter-prone items (e.g., single-use plastic bags and EPS foodware) and the need for additional/enhanced TTSCs to address other types of trash in stormwater and surface waters (e.g., single-use plastics and cigarettes), it is recommended that source control credits allowed in MRP 2.0 be continued into MRP 3.0 and used to demonstrate compliance with trash load reduction benchmarks (e.g., 90% and 100%). Specifically, the following modifications to the proposed source control framework presented in the MRP 3.0 Tentative Order are requested:

1. Maintain the existing MRP 2.0 source control framework with crediting up to 10% for TTSCs;
2. Allow crediting for existing TTSCs when enforced and maintained;
3. Allow crediting for new and expanded TTSCs when adopted and implemented;

4. Allow crediting for TTSCs towards the 100% compliance benchmark; and
5. Recognize that new and existing TTSCs provide additional trash reduction benefits by:
  - Addressing and accounting for additional trash reduction in low trash generation areas and in areas addressed by full capture systems;
  - Addressing trash transported to surface waters via non-stormwater pathways;
  - Reducing the creation of micro- and nano-plastics from macro-plastics; and
  - Taking actions that reduce impacts to frontline communities resulting from the extraction, manufacturing, and disposal of products before and after they become trash.

**Table 1.** Summary of issues with the modified Source Control Framework proposed in the MRP 3.0 Tentative Order.

<b>Proposed Modification to Framework in MRP 3.0</b>	<b>Issue with Proposed Modification to Framework</b>	<b>Proposed Modification to Proposed MRP 3.0 Framework to Address the Issue</b>
No credit for existing source control actions	Proposed modifications discount the ongoing benefit that existing source control actions have to surface water quality. EPS foodware and single-use plastic bags have been substantially reduced in stormwater discharges, as well as in surface waters.	Because they provide valuable and quantifiable trash reductions in stormwater, existing source controls implemented by MRP Permittees should continue to be credited towards the 90% and 100% compliance benchmarks in MRP 3.0.
No consideration of the trash reduction benefits in areas already achieving low trash generation (i.e., 100% reduction)	TTSCs provide benefits to area that inherently generate low levels of trash. These benefits are not quantified and accounted for in the MRP 2.0 framework.	The MRP 2.0 Framework should be modified to account for reductions associated with TTSCs in areas that generate trash at low levels. The modified framework as described should be included in MRP 3.0.
No consideration of the trash reduction benefits in areas addressed by full capture systems (i.e., 100% reduction)	Certified full capture systems are designed to only remove trash from flows up to the 1-yr, 1-hr design storm. Trash transported via larger storm flows either bypass or overflow these treatment systems.	The MRP 2.0 Framework should be modified to account for reductions associated with TTSCs in areas served by full capture systems. The modified framework as described should be included in MRP 3.0.
No consideration of the trash reduction benefits for other trash transport pathways to surface waters (e.g., wind and direct dumping/littering)	The MRP focuses primarily on trash discharged via the municipal stormwater conveyance system. The non-stormwater trash reduction benefits of TTSCs are not accounted for in MRP 2.0 or the proposed MRP 3.0 frameworks.	Because they address trash in non-stormwater pathways and provide valuable and quantifiable reductions to surface waters, credit for TTSCs should be included the MRP 3.0 framework towards the 90% and 100% compliance benchmarks.
No credit for any source controls towards 100% benchmark and assumption that the benefits of source controls will be observed via OVTAs	The Tentative Order justifies the removal of all credits for TTSCs based on the assumption that trash reductions occurring due to ordinances should be observed via OVTAs. Because OVTAs are blunt monitoring tools, they can detect reductions in the 20-25% range. This range is far below the anticipated trash reductions in stormwater that would occur as a result of TTSC implementation. Litter-prone items that may be addressed by TTSCs comprise less than 25% of the trash observed in stormwater and based on previous studies, TTSCs may reduce up to 60-70% of targeted items. OVTAs do not have the precision necessary to detect reductions associated with TTSCs and are therefore not recommended as the primary monitoring tool used to account for trash reductions occurring as a result of TTSC implementation.	The MRP 2.0 Framework should be continued into MRP 3.0. Due to the lack of precision, OVTAs should not be relied upon to demonstrate trash reductions associated with TTSCs.
The benefits of TTSCs on micro- and nano-plastics are not considered	Macro-plastics (>5mm) can break down into micro- and nano-plastics. These smaller sizes of plastics can also impact water quality. At these sizes, interception and treatment are even more challenging than macro-plastics.	The benefits that TTSCs have on the creation of micro- and nano-plastics should be incorporated into the MRP 3.0 framework.

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# Appendix A

## Trash True Source Controls Survey Results

MRP Permittees – Alameda, San Mateo and Santa Clara Counties

July 2021

### Background

Municipalities in the San Francisco Bay Area have been leaders in the adoption and implementation of policies and ordinances designed to reduce the use, distribution, or sale of items that are frequently littered. These "trash" items can be transported via storm drainage systems to, and adversely impact water quality in, local creeks, the Bay, and the Pacific Ocean. Policy/ordinance efforts to date include those focused on single-use grocery bags and plastic/polystyrene takeout food service ware, as well as other items.

These "trash true source controls" reduce the amount of these items that find their way to storm drains and local waterways. Bay Area municipalities have utilized the benefits of these policies/ordinances to demonstrate progress towards mandated stormwater trash reduction goals established by the SF Bay Regional Water Board.

To help evaluate the relationship between MRP "credits" and trash source control ordinance adoption, a web-based survey was developed in June 2021 and distributed to MRP Permittees. The goal of this survey was to compile information regarding the benefits of trash true source controls, identify whether new or expanded policies/ordinances are being considered or planned by Bay Area municipalities, and whether the MRP "credits" provide an impetus for maintaining existing ordinances and/or for adopting new/expanded ordinances. The survey was distributed to MRP Permittee staff in July. Survey recipients were allowed to share the survey with colleagues most knowledgeable about trash source control ordinances/policies in their municipalities (e.g., solid waste and stormwater coordinators).

The information gained through the survey is summarized below and may be used to inform future decisions by the SF Bay Regional Water Quality Control Board regarding trash source controls. Findings may be particularly helpful in determining whether trash source controls should continue to be creditable towards stormwater trash reduction goals in the future (e.g., 100% trash reduction).

### Survey Results

#### Overview of Respondents

A total of 29 individuals representing 28 municipalities responded to the survey. A summary of municipalities that responded and staff classification of the respondents are included in **Table 1** and **Table 2**.

**Table 1** – Summary of MRP Permittees that responded to the survey.

County	# Municipal Agencies Represented	Proportion of Respondents
Alameda	9	32%
San Mateo	12	43%
Santa Clara	7	25%

**Table 2 – Classifications of Permittee staff that responded to the survey.**

Classification/Position	# Respondents
Engineer	2
Program Specialist - Environmental, Water	5
Analyst - Sustainability Management	3
Environmental Compliance	4
Public Works Director/Manager	3
Water Pollution Control Administrator/Manager	4
Program Managers - Environmental Sustainability, Recycling/Solid Waste	8

## Current Trash Control Measure Ordinance Implementation

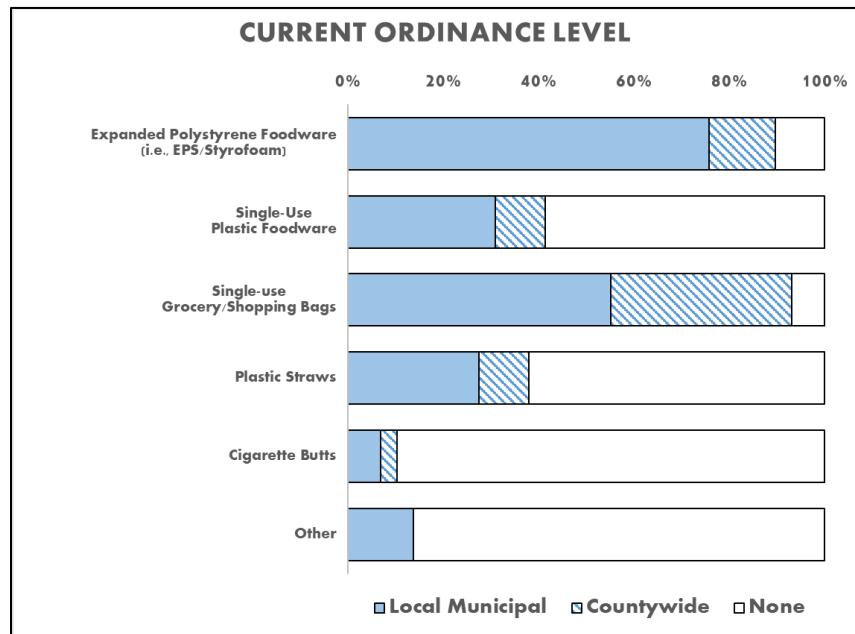
### Current Level of Ordinances for Litter-Prone Items

Respondents were asked:

***Which types of litter-prone items has your municipality/organization addressed via a local or countywide ordinances adopted to date?***

Respondents were provided the following list of litter-prone items: Expanded Polystyrene Foodware (i.e., EPS/Styrofoam), Single-Use Plastic Foodware, Single-use Grocer/Shopping Bags, Plastic Straws, Cigarette Butts, Other. After each item, the respondents could select the level of ordinance currently adopted, including Local Municipal ordinance, Countywide ordinance, and No ordinance. Respondents were given space to describe and/or further elaborate regarding their response to the “Other” category.

**Figure 1** provides a visual overview of the current ordinances in place and the geographical level the ordinance was developed/adopted by the municipal agency (i.e., local municipal, countywide, or none). **Table 3** provides a numerical breakdown of the responses per litter-prone item listed. **Figure 2** shows common words respondents used when describing “Other” litter-prone items not already listed, and/or related ordinances.



**Figure 1 - Current Trash True Source Control Ordinances adopted by MRP Permittees.**

**Table 3 – Scope of current Trash True Source Control Ordinances adopted by MRP Permittees.**

Item/Scope	Local	Countywide	None	TOTAL
Single-use Grocery/Shopping Bags	16	11	2	29
Expanded Polystyrene Takeout Foodware (i.e., EPS/Styrofoam)	22	4	3	29
Plastic Straws	8	3	18	29
Single-Use Plastic Takeout Foodware	9	3	17	29
Cigarette Butts	2	1	26	29
Other	4	0	25	29



**Figure 2 - Common words used in respondents' descriptions of "Other" litter-prone items not already listed, and/or related ordinances. Bolder and larger words indicate a greater frequency of appearing in responses.**

Overall, the respondents indicated the following related to ordinances regulating litter-prone items:

- 93% have a single-use grocery/shopping bag ordinance;
- 90% have an EPS takeout foodware ordinance;
- 41% have an ordinance focused on plastic straws;
- 40% have an ordinance focused on single-use plastic foodware; and
- 10% have ordinances related to cigarette butt litter.

### Enforcement of Source Control Ordinances for Litter-Prone Items

To evaluate the level of ordinance enforcement conducted by MRP Permittees, respondents were asked:

***For each ordinance adopted to date, briefly summarize the enforcement mechanism/process used.***

The enforcement procedures described by each respondent were sorted into categories and are presented in Table 4. Some respondents mentioned multiple enforcement procedures.

**Table 4 - Enforcement mechanisms for litter-prone ordinances adopted to-date.**

Enforcement Categories	# Responses Indicating Enforcement Mechanism/Process
Response to Public Complaints & Citations	8
Inspections & Citations	8
County Enforcement	8
Outreach/Education	4
External Program	2
Not applicable	1

The following are examples of responses:

- *Enforced primarily through City Code Enforcement, cases referred by Environmental Compliance and other Departments/Divisions while performing site inspections.*
- *Both ordinances have complaint-based enforcement. [The County] Environmental Health enforces the ordinance.*
- *City Code Enforcement Officer first educates and then follows through with the code enforcement process if violations continue.*
- *[The] County Environmental Health enforces the EPS and single-use shopping bags; [the] County Office of Sustainability will be enforcing the disposable foodware ordinance (which covers plastic straws).*
- *Enforcement for polystyrene is incorporated into C.4 inspections as well as referrals from the public. The county handles enforcement primarily for the plastic bag ban but local C.4 inspections also check for violations.*
- *City business inspection program, Countywide Stop Waste Program.*
- *Stormwater inspectors verify compliance with the EPS foodware ordinance; Stopwaste staff verify compliance with countywide reusable bag ordinance.*
- *The City's Reusable Bag Ordinance is enforced by the County's Environmental Health Division. Administrative finds may be issued upon findings that any retail establishment has provided a single-use carry-out bag to a customer... 2. The City's current Sustainable Food Packaging Ordinance prohibits food vendors from using disposable food service ware are prohibited from dispensing prepared food to customers in disposable food service ware made from polystyrene and is enforced by the City Manager/designee. Violations include administrative citations.*
- *Enforcement of each of the ordinances above utilizes a complaint-based system. The County or City will respond to complaints or referrals from the public and/or City staff and work to investigate and resolve reported issues.*
- *Education first, fines after numerous warnings. We respond to complaints received (notify business of violation); inspectors conduct visits to restaurants and if EPS is found, inform business to take corrective action.*

## Impact of MRP "Credit" in the Adoption of Current Ordinance(s)

To determine the importance of trash load reduction credits when adopting ordinances, respondents were asked:

***How much of a factor was the "Credit" allowable under the Municipal Regional Stormwater Permit (aka MRP 2.0) to your municipality/organization when you considered the adoption of the ordinance(s)?***

The following options were available: Primary Factor, Major Factor, Minor Factor, Not a Factor, and Not applicable/No ordinance. Figure 3 provides a summary of the responses to this question.

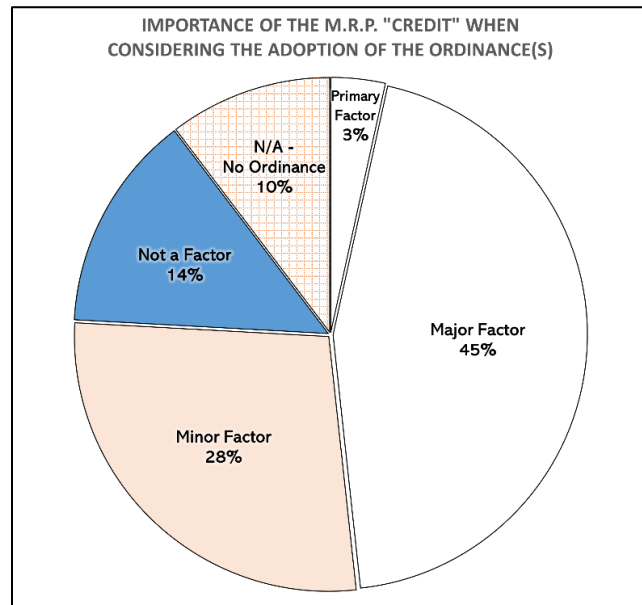
A total of 76% of all respondents noted that the MRP 2.0 reduction "credit" was a factor in determining whether to adopt their respective municipalities' current litter-prone source control ordinance(s). Approximately half (48%) of all respondents reported that the "credit" was a major or primary factor when considering the adoption of their respective municipalities' current litter-prone source control ordinance(s).

Respondents were also asked:

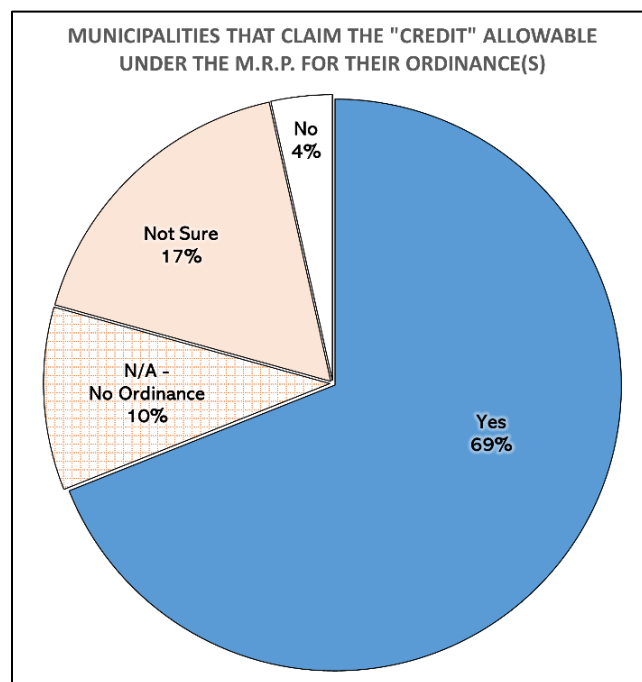
***Have you claimed the "Credit" allowable under the Municipal Regional Stormwater Permit for your ordinance(s)?***

The following options were available: Yes, No, Not sure, Not applicable/No ordinance. Figure 4 provides a summary of the responses to this question.

Approximately 70% of all respondents indicated that their respective municipalities have claimed the MRP 2.0 "credit" for litter-prone source control ordinances. Of the remaining respondents, a third (or 10% of all respondents) reported that their municipalities had no ordinance and 4% of all respondents indicated that their municipality had not claimed the MRP "credit" allowable.



**Figure3 - Importance of the MRP 2.0 Reduction "Credit" When Considering Adoption of Current Ordinance(s)**



**Figure 4 – Percentage of respondents that have claimed the MRP 2.0 "credit" for source control ordinances**

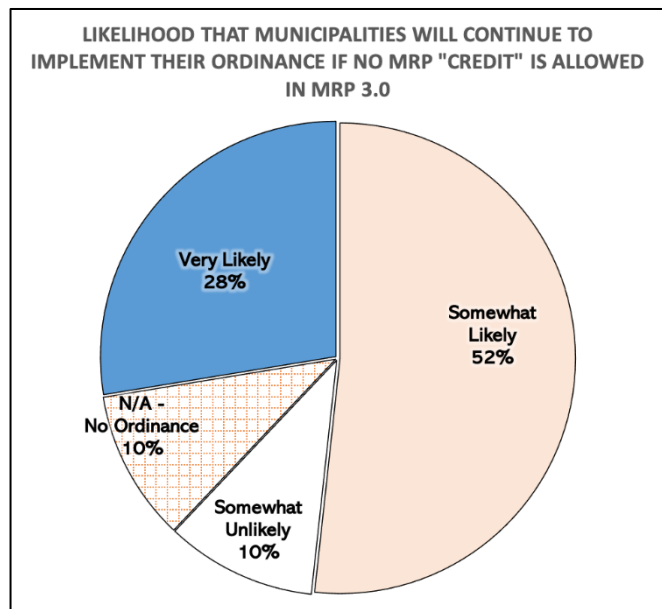
## Impact of MRP “Credit” in the Continuation of Current Ordinance(s)

To explore the impact of disallowing the trash load reduction credit on implementation, respondents were asked:

***If the “Credit” currently allowed under the Municipal Regional Permit was NO LONGER ALLOWED, then how likely would your municipality/organization continue to implement/enforce the current ordinance(s)?***

The following options were available: Very likely, Somewhat likely, Somewhat unlikely, Very unlikely, Not applicable/No ordinance. Figure 5 provides a summary of the responses to this question.

The vast majority of responded (80%) indicated that their municipality is “very likely” or “somewhat likely” to continue to implement their ordinance if the “credit” for existing source control ordinances is removed in the next iteration of the MRP.



**Figure 5 - Likelihood that municipalities will continue to implement trash source control if the allowable "credit" is removed in the next iteration of the MRP**

## Impact of “Credit” on Planned/Potential New and/or Expanded Ordinances

To gauge the extent to which new and/or expanded ordinances are planned respondents were asked:

***Which type(s) of ordinance(s) is your municipality/organization currently planning to develop/consider within the next five years?***

Respondents were provided this list of litter-prone items: Expanded Polystyrene Foodware (i.e., EPS/Styrofoam), Single-Use Plastic Foodware, Single-use Grocer/Shopping Bags, Plastic Straws, Cigarette Butts, and Other to choose from. Respondents were given space to describe and/or further elaborate regarding their response to the “Other” category. Table 5 provides a summary of the responses to this question.

**Table 5 - Municipal ordinance(s) targeting litter-prone items that are planned for adoption during the next five years.**

Item/Scope	Ordinance Already in Place	Ordinance Planned	No Ordinance Planned
<i>Single-use Grocery/ Shopping Bags</i>	86%	4%	10%
<i>Expanded Polystyrene Takeout Foodware (i.e., EPS/Styrofoam)</i>	86%	0%	14%
<i>Plastic Straws</i>	34%	35%	31%
<i>Single-Use Plastic Takeout Foodware</i>	38%	38%	24%
<i>Cigarette Butts</i>	10%	14%	76%
<i>Other</i>	10%	14%	76%

Respondents indicated the following:

- A significant level of respondents indicated that they have already adopted an ordinance to address litter-prone items;
- 35% plan to adopt an ordinance to address plastic straws;
- 38% plan to adopt an ordinance to address single-use plastic foodware; and
- 14% plan to adopt an ordinance to address cigarette butt litter.
- 14% selected the “Other: category. Descriptions of the narratives provided for the “Other” category include:
  - *Plastic Beverage Bottles (beyond city parks/beaches)*
  - *Expansion of EPS ordinance (ban of retail sales)*
  - *In compliance with state law, the City... will implement SB 1383 ordinances. The City also plans to participate in the [County-wide] Edible Food Recovery Program (to be adopted by County ordinance).*

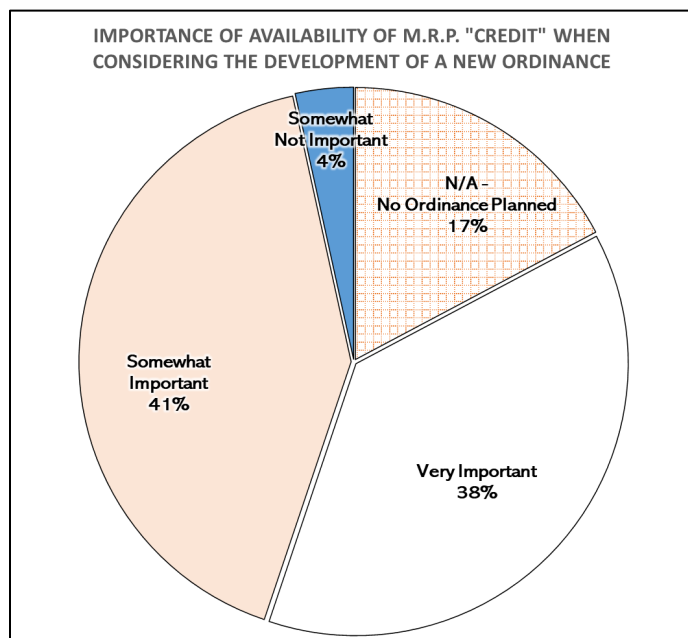
### Impact of MRP 3.0 “Credit” in the Development of New or Enhanced Ordinance(s)

To better understand the affect that including a trash load reduction “Credit” would have on the adoption of new/expanded ordinances in the near-term, respondents were asked:

***How important is the availability of the allowable “Credit” in the Municipal Regional Permit when deciding whether to develop/consider the adoption of a new or enhanced ordinance?***

The following options were available to select from: Very important, Somewhat important, Somewhat not important, Not important, Not Applicable/No new ordinance planned. Figure 6 provides a summary of the responses to this question.

Of the 29 survey respondents, 76% replied that the “Credit” was somewhat or very important to future ordinance development/adoption. Excluding those respondents that chose “N/A – No ordinance planned”, 23 of the 24 respondents (96%) indicated that the credit was an important consideration when deciding to move forward with additional/expanded ordinances.



**Figure 6 – Importance of MRP “credit” when considering the development/adoption of a new or enhanced ordinance.**

## Benefits of Trash Source Control Ordinances

Respondents were asked to briefly describe the benefits (to stormwater quality or otherwise) of trash source control ordinances for your organization. Narrative responses included the following:

- Not only is the credit needed for compliance with the MRP but the added value to the environment for true source control is unmatched. We simply cannot pick it up enough to stop the negative environmental effects of trash so, not having it in the environment from the beginning due to source control is the answer for future trash mitigation.
- Significant reduction in single-use plastic bags, though there are still plastic bags that are exempt from that ordinance that are in circulation. We also pick up a lot of plastic foodware items (straws, utensils, cups) in cleanup events and around commercial areas.
- No ordinances have been adopted as there are no commercial businesses in the City that these types of ordinances typically address
- The disposable foodware ordinance doesn't go into effect until March 2022, so I cannot speak to its benefits yet. I believe we have seen a reduction in litter due to prior plastic bag and polystyrene bans.
- Helps achieve trash reduction goal.
- Cleaner streets and water; educational benefit.
- Product bans and reusables are true source control and are the most effective way to keep litter out of local waterways.
- Having these ordinances in place helps the City reduce waste, improve the health and safety of community members, and helps keep the waterways clean and safe.
- Reduces litter and single use plastic food ware that overflow in bins or are left on streets.
- Reduction of problematic pollutants (bags, EPS) that are harmful to wildlife; breakdown; take long time to decompose; cause visual blight; landfill diversion
- There has been a visually noticeable reduction in polystyrene foodware.
- Ordinances provide multiple benefits, addressing stormwater pollution, waste reduction, and showing how the City is a stewards of our environment
- Source reduction of impactful material is critical in mitigating its impact on the environment.

## Additional Comments on Trash Source Control Ordinances

Respondents were asked to provide any additional information related to their trash source control ordinance(s). The following were the narrative responses:

- [Our City] will be pursuing more source control ordinances to benefit waterways and to reduce our percentage of waste to the landfill. We feel this is the best course of

environmental change in our community for trash control. It would completely make sense to have these actions aligned with trash credit under the MRP.

- Difficult to pass and gathering data on effectiveness is hard
- Enforcement of product bans takes resources. Resources are not infinite, so when credit for source control bans is taken away, resources currently allocated to enforcement are likely to shift to new requirements. With the new requirements proposed in MRP 3, plus the way source control credits are proposed in MRP 3, and with SB 1383 implementation beginning on Jan 1, 2022, it is unlikely that [our City] will be moving forward anytime soon with new product bans. Although I feel strongly that product bans can be impactful if fully enforced, we are stretched to take on all the new requirements as it is, let alone voluntarily adopt ordinances that would require additional enforcement resources. My response to question 11 may seem to contradict what I'm saying here; what I mean in my response to question 11 is that I would like to pursue these bans, but it will partly depend on how many new/expanded requirements are in MRP 3.
- [The option for MRP credit] is important tool for local agencies; credit towards permit compliance helps with political motivation