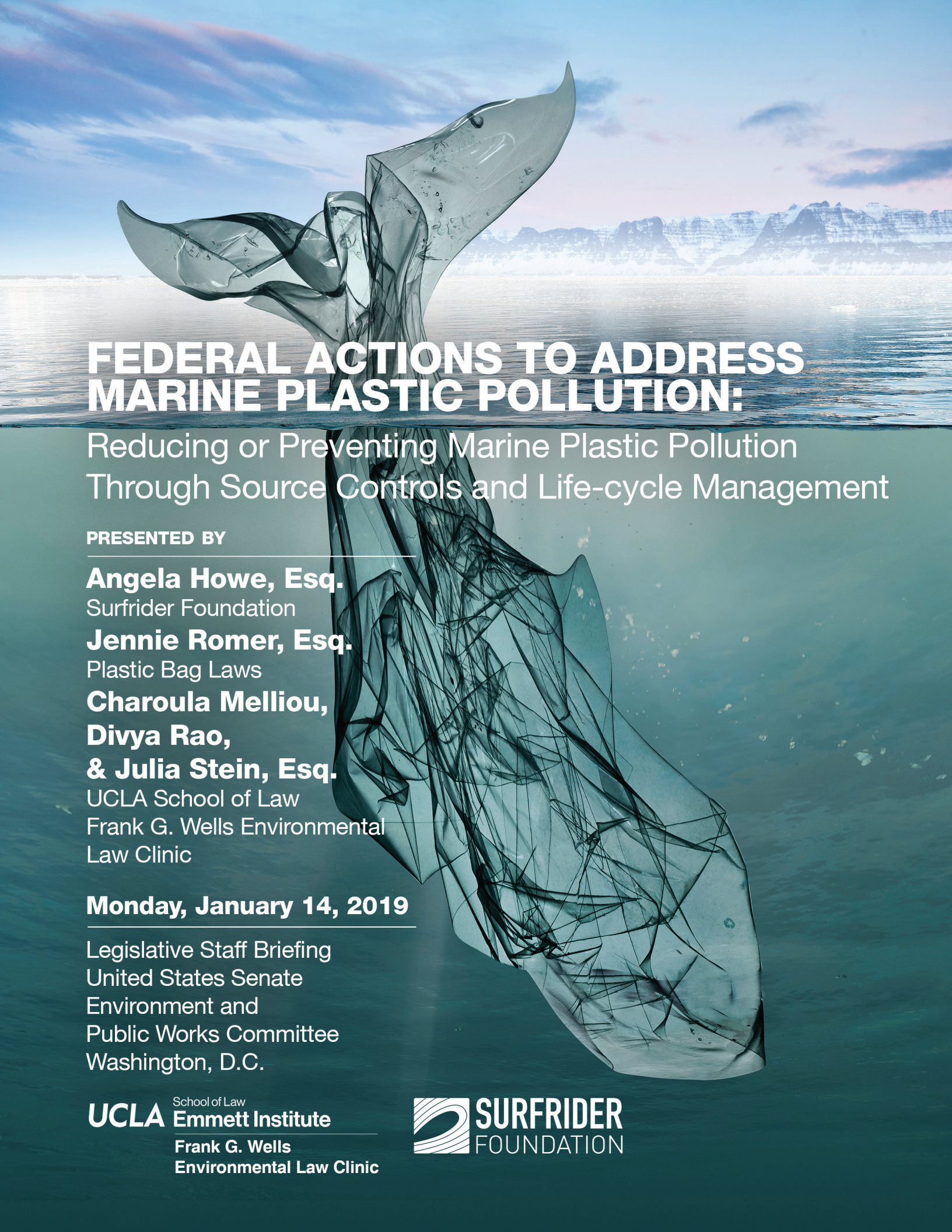

FEDERAL ACTIONS TO ADDRESS MARINE PLASTIC POLLUTION:

Reducing or Preventing Marine Plastic Pollution Through Source Controls and Life-cycle Management

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UCLA School of Law Emmett Institute
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Surfrider Foundation is a nonprofit grassroots organization dedicated to the protection and enjoyment of our world's ocean, waves and beaches through a powerful network. Founded in 1984 by a handful of visionary surfers in Malibu, California, the Surfrider Foundation now maintains more than one million supporters, activists and members, with over 160 volunteer-led chapters and student clubs in the U.S., and more than 500 victories protecting our coasts. In 2007, the organization's Rise Above Plastics program was founded to reduce impacts of single-use plastics on the marine environment by raising awareness about the dangers of plastic pollution and advocating for a reduction of single-use plastics and the recycling of all existing plastics.

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I. INTRODUCTION

Global plastics pollution is on the rise. Despite efforts by the federal, state, and local governments to address aspects of this issue, the problem remains significant. Not only does plastic pollution raise environmental and public health concerns, but it has serious economic impacts as well: plastic pollution impacts our food supply and the tourism industry along America's over 12,000 miles of coastline.

In 2015, through a bipartisan effort, Congress successfully passed legislation regulating plastic microbeads—the Microbead-Free Waters Act of 2015—recognizing the significant harms they pose to the environment and to wildlife. By the time federal legislation was passed, cities and states, including California, New York, and Illinois, had already taken action on banning plastic microbeads, creating a hodgepodge of regulation and prompting federal action. The tourism, fishing, and cosmetics industries had expressed support for state and local bans and, in some cases, had already instituted private efforts to eliminate the use of plastic microbeads. The Microbead-Free Waters Act was a strong federal solution that stabilized conditions for manufacturers, protected industry, and prevented further environmental harms from microbeads. Moreover, as the first country to ban plastic microbeads, the Act established the United States as a global leader in reducing plastic pollution.

Plastic pollution has a direct, deadly effect on marine ecosystems, mainly due to the fact that animals confuse common plastic items, especially bags, with food, often ending up injured, entangled, or dead.

Unfortunately, the plastic problem remains unsolved and requires additional strong federal action. While the Microbead-Free Waters Act addressed plastic microbeads, it left unregulated another large source of plastic pollution: single-use plastics, such as plastic bags, plastic straws, and plastic bottles. Single-use plastics, much like plastic microbeads, pose significant threats to the environment and to wildlife. Turtles often mistake single-use plastic bags for jellyfish and eat the plastic bags. Moreover, single-use plastics often break down into microplastics that are the same size as—or even smaller than—federally-banned plastic microbeads. Hundreds of fish and seabird species consume these plastic particles; 268,940 tons of them are currently floating at sea.[1] Many of the fish species that consume plastics, like Bigeye Tuna, end up on American dinner plates. And recent studies have found that 90% of all table salt contains microplastics—making plastic firmly a part of the average American's diet.

Just like microbeads, single-use plastics can also cause significant economic losses for the tourism industry when beaches are closed and littered with plastic pollution. But they also have a worse economic impact than microbeads: they cost municipalities and states millions of dollars every year. In total, governments spend between $3.2 and $7.9 billion every year just to control plastic bag litter.[2] As a result, several states and municipalities have created plastic bag bans and hybrid bag bans and fees, resulting in a patchwork of regulations that dwarfs the amount of state and local action on microbeads prior to Congress' 2015 action. Industries have also already initiated efforts to reduce single-use plastic consumption after recognizing the significant harms from single-use plastics—for example, Carlsberg Brewery, which distributes beer in the United States, has announced that they will stop using plastic multi-pack rings for beer cans. Nor would the United States be alone in addressing this problem if Congress were to act: several countries have already enacted national single use plastic bag bans.

Like plastic microbeads, the harms from single-use plastic bags to government, industries, the environment, human health, and wildlife require swift and strong federal regulation. Successes from policies enacted at

the local and state level can provide a model for federal regulation. California's ban/fee hybrid on all carryout bags has achieved great success in reducing single-use plastic bag use by influencing consumer behavior. The success of California's statewide ban demonstrates that Congress can adopt a nation-wide policy that would diminish the harms from single-use plastic by reducing the production and consumption of plastic bags. Policies enacted in other countries also serve as examples of regulatory options and corroborate the success of regulations implemented domestically.

This briefing booklet will provide background information on single-use plastics and their associated harms, demonstrate the need for federal action, analyze enacted single-use plastic regulations both domestically and internationally, and provide federal policy recommendations to address the single-use plastic crisis. Because of the unique environmental harms and economic costs associated with single-use plastic bags, and because so many state and local governments have taken action to address them, this briefing booklet will focus in-depth on strategies to reduce consumption of single-use plastic bags nationwide but will also discuss federal actions that can operate in tandem with plastic bag-focused legislation to reduce consumption of other single-use plastic products.

II. BACKGROUND

A. Single-Use Plastic Waste Generally

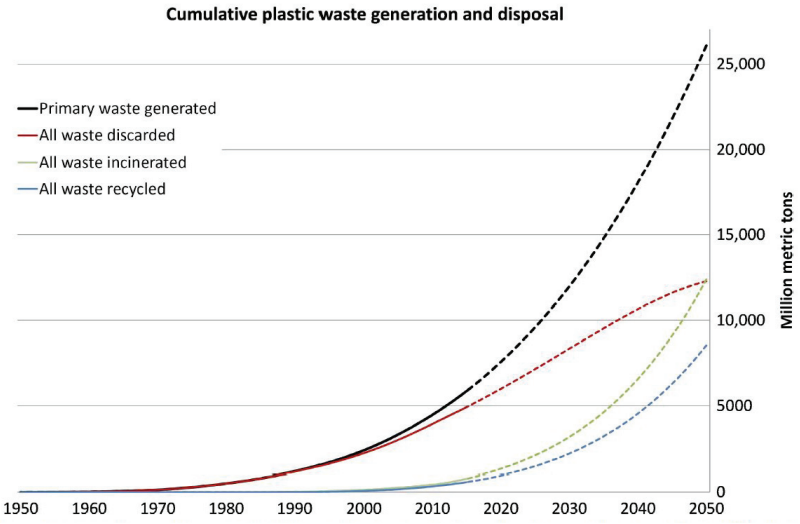


Fig. 3. Cumulative plastic waste generation and disposal (in million metric tons). Solid lines show historical data from 1950 to 2015; dashed lines show projections of historical trends to 2050

Global plastic production and the consequent plastic waste generation has increased from almost 5 million tons per year during the 1950s to over 280 million tons in 2009[3] and today exceeds 300 million tons per year[4]. The majority of plastic is used to make single-use items, which are disposed of within a year of production. These single-use plastics are typically used only once before they are thrown away or recycled, and they include plastic bags, cigarette butts, cutlery, plates, straws, stirrers, bottles and caps, food wrappers, and plastic and foam packaging[5]. Based on 2015 figures, the United States was the largest generator of plastic packaging waste on a per-capita basis.[6] Considerable quantities of these single-use plastics are accumulating in landfills and waterways. The natural capital cost of plastic use from the consumer goods sector alone is $75 billion. The natural capital cost represents the scale of environmental damage and social impacts in monetary terms. $13 billion of the natural capital costs are tied to the impacts on marine ecosystems, which are significantly tied to single-use plastic bags. Each year, about 18 billion pounds of plastic waste enter the worlds' oceans from coastal regions.[7] The quantity of single-use plastics in the marine environment is abundant and widely distributed in the oceans, causing immense harm to the ecosystem. These plastics also progressively fragment into small pieces, known as microplastics, which never fully disappear,[8] because these plastics are not fully biodegradable[9].

B. Marine Plastic Debris

Single-use plastic products become litter and end up in waterways, flowing downstream into the oceans, where they eventually become marine debris. A recent estimate projects that 8.8 million tons of plastic enters the ocean every year.[10] Once plastics find their way into the oceans, they often remain there for decades or longer,

making them the most serious and persistent form of marine debris. In some regions, plastics account for 90-95% of marine litter; plastics make up about 60-80% of all marine debris globally.[11]

Marine plastic debris can come from either land-based or ocean-based sources. Land-based sources of plastic debris contribute 80% of the total plastic debris in the marine environment, with densely populated or industrialized areas being the major sources because of littering, plastic bag usage and solid waste disposal.[12] In other words, poorly-managed waste on land results in the great majority of marine plastic pollution. Ocean-based sources account for the remaining 20% of marine plastic debris, to which commercial fishing is the major contributing human activity.[13]

The problem of marine debris is large and growing every day. "The numbers are staggering: There are 5.25 trillion pieces of plastic debris in the ocean. Of that mass, 269,000 tons float on the surface, while some four billion plastic microfibers per square kilometer litter the deep sea."[14] Over time, ocean currents bring together enormous quantities of plastic waste on the surface of the sea, forming vast "ocean gyres" such as the "North Pacific Gyre," known as the "Great Pacific Garbage Patch."

In total, governments spend between $3.2 and $7.9 billion every year just to control plastic bag litter.

C. Plastic Waste and Wildlife

All of this plastic is causing harm to the marine ecosystem, from coral reefs smothered in bags; to turtles choking on straws; to whales and seabirds that starve because their stomachs are full with plastic items, leaving no space for real food.[15] Recent studies indicate possible long-term impacts from plastic on the marine food chain, raising serious questions about the ultimate impact of this marine plastic debris on human health and food security.[16]

Plastic pollution has a direct, deadly effect on marine ecosystems, mainly due to the fact that animals confuse common plastic items, especially bags, with food, often ending up injured, entangled, or dead. Multiple examinations of dead fish, mammals, birds, turtles, and squid have shown traces of ingested plastic debris. In birds, ingested marine debris has been reported to cause reductions in nutrient absorption and in the amount of space for food, ulceration of tissues, and mechanical blockage of digestive processes. Entanglement makes movement, feeding, and growth of marine animals difficult or even impossible.[17] Fish, marine mammals, and seabirds are being injured and killed by plastic pollution, and it is estimated that this could force many species – including endangered wildlife – into extinction (e.g. the Hawaiian monk seals and the Pacific loggerhead sea turtles).[18] At least 700 species worldwide have already been affected, including 84% of sea turtle species, 44% of all seabird species, and 43% of all marine mammal species, and approximately 25% of fish sold at markets in California contained plastic in their guts, mostly in the form of plastic microfibers.[19]

Toxic compounds from plastics are absorbed by the organisms that ingest them, impacting marine, and ultimately human, life. Scientists have found that these chemicals have detrimental effects to the immune system, the reproductive system, development, neurological responses and the overall growth of organisms, and can cause tumor development and liver problems in animals.[20] Bisphenol A, or BPA, which is found in many plastics entering the ocean, acts as an endocrine disruptor for fish. Freshwater fish exposed to BPA have exhibited confusion and difficulty mating. Plastic pollution is also impacting gender in some fish species (chemicals are found to cause feminization of male fish or have caused fish to become intersex due to BPA exposure).[21]

D. Human Health Consequences

Plastic pollution in the marine environment has a direct impact on human health.[22] Fish consume plastics which may carry a variety of chemicals and pollutants, such as PCBs and heavy metals, depending on how long they have been floating in the water. The absorption of these chemicals from ingested plastic triggers consecutive transfers of the chemicals from fish to the bodies of animals higher up in the food chain, including humans, who are exposed to various chemicals through the consumption of fish and seafood,[23] as well as through consumption of other meat that has been fed fishmeal. It has been reported that plastics and the various additives contained therein such as plasticizers, stabilizers, flame retardants and colorings, some of which are toxic, bioaccumulative, and persistent in the environment, are associated with several human health concerns, including disruption of the endocrine and reproductive systems, infertility, and possibly with some types of cancer.[24] For example, BPA, which is still used in plastic food service products, has been classified as an endocrine disruptor, and laboratory and epidemiological studies suggest links between BPA exposure and reduced fertility, altered timing of puberty, and changes in mammary gland development; BPA exposure in utero or to children has been linked to adverse neurodevelopmental outcomes and childhood obesity.[25] Furthermore, plastic pollution also threatens the health and security of beach visitors and divers, including by fouling propellers and jet intakes of commercial and recreational boaters.

Apart from the impacts on the environment, on wildlife and on human health, plastics are also associated with carbon pollution, and consequently with climate change.

E. Single-use Plastics and Climate Change

Apart from the impacts on the environment, on wildlife and on human health, plastics are also associated with carbon pollution, and consequently with climate change. From materials extraction to product production and waste disposal, plastics emit green-house gases. Conventional plastic is made from fossil fuels.[26] Natural gas liquids (NGLs) ethane and propane get extracted and sent to a "cracking facility" where ethane is made into ethylene, and at a dehydrogenation plant, propane is made into propylene.[27] Polyethylene, an ethylene compound, is the most common plastic in the world and is frequently used for packaging, bottles, synthetic clothing, and for making plastic bags. Polypropylene, a propylene compound, is a plastic commonly found in food packaging and vehicle manufacturing.

As the fossil fuel industry is investing in the expansion of the petrochemicals business, plastic production is projected to triple by 2050. Petrochemicals are by far the largest driver of global oil demand growth and thus, the largest industrial energy consumer, and the third-largest industrial emitter of greenhouse gas emissions. A recent report of the International Energy Agency estimates that direct greenhouse gas emissions from petrochemicals will increase 20% by 2030 and 30% by 2050, with the main driver of the petrochemical industry's growing climate footprint being plastic production.[28]

Furthermore, according to recent studies, plastics emit greenhouse gases - in particular methane and ethylene - as they degrade in sunlight.[29] Methane as a gas can trap heat roughly 30 times more than carbon dioxide. Polyethylene is considered the worst offender.

III. THE NEED FOR FEDERAL ACTION

A. Economic Benefits of Plastics Regulation

Given the practical challenges of removing decades of accumulated plastics from the oceans, it is clear that source reduction and prevention, in addition to remediation, is critical. Single-use plastics harm the economy, creating significant costs for industry and for government. Controlling the manufacture and use of single-use plastics prior to disposal is necessary.

Congress can take action to create both economic and environmental benefits by banning single-use plastic bags or placing a fee on all single-use bags. Studies on existing bag bans and fees have shown that they are effective in changing consumer behavior and have a beneficial environmental and economic impact.

Single-use plastic bags cause particular harm: they are a resource-intensive product made from natural gas or petroleum, yet are often used for mere minutes before being disposed of.[30] Plastic bags are frequently littered and float easily and freely through the air and water, clogging stormwater drainage systems and public waterways. The cleanup costs of plastic bag litter are significant for local governments; across the United States, governments spend between $3.2 and 7.9 billion annually on plastic bag litter control alone.[31] Moreover, the majority of plastic bags are not recycled, creating additional costs to landfill discarded plastic bags; California, for example, spends $25 million every year to landfill discarded plastic bags.[32] Indeed, single-use plastic bags are difficult to recycle. Recycling companies incur significant costs as a result of plastic bags' impact on machinery: they gum up recycling machines, temporarily halting operations. Plastic bag litter heavily impacts other industries as well. The tourism and coastal hospitality sectors, in particular, are harmed by single-use plastic litter, which can shut down beaches.

The common practice throughout the United States has been to distribute plastic bags for free along with purchases at various retail stores. Although today the single-use plastic bag is omnipresent, it is a relatively recent addition to the retail experience; its high popularity derives from its light weight and its perceived low cost. Globally, it is estimated that two million single-use plastic bags per minute are distributed at store checkout counters.[33] The waste and pollution that results from these vast quantities of single-use plastic bags has devastating environmental impacts.

Congress can take action to create both economic and environmental benefits by banning single-use plastic bags. Studies on existing bag bans have shown that bag bans are effective in changing consumer behavior and have a beneficial environmental and economic impact. After Washington D.C. banned carryout bags, there was a 72% reduction in the number of bags found in waterways. 80% of D.C. residents used fewer disposable bags, and 79% of businesses provided fewer disposable bags. Overall, in D.C., there has been an 85% reduction in plastic bag consumption.

Addressing single-use plastic bags will be economically beneficial for local and state governments. Currently, the estimated annual direct costs of plastic debris management ranges from $8.9 to $18.33 per capita. However, in certain communities, costs can be far more significant; for example, the City of Del Mar, California pays an annual cost of $71.22 per capita to manage plastic debris. California alone spends almost half a billion dollars annually just to combat plastic litter and prevent the entry of that litter into waterways.[34] Reducing this litter by banning single-use plastic bags will consequently dramatically reduce government costs for plastic litter control and debris management. California's statewide ban on plastic bags has resulted in a 72% reduction in plastic bag litter; such litter now accounts for less than 1.5% of all litter. San Francisco has saved up to $600,000 annually on plastic processing fees since the enactment of its plastic bag ban. Additionally, some municipalities have been able to offset their plastic-related costs by charging a fee for single-use bags. For example, the City of Aspen enacted an ordinance that banned single-use plastic bags and charged for all carry-out bags. While retailers were allowed to keep a portion of the collected fee, the remaining amount was remitted to the city government for their waste reduction and recycling program, which benefitted all Aspen residents.

Industries also benefit from bans on single-use plastics. United States retailers, like grocery stores, currently spend $4 billion annually to purchase 100 billion plastic bags for single use, but will have to spend much less to provide bags to customers once a ban on single-use bags is implemented. Retailers can also recoup some of their expended costs by imposing a fee on carry-out bags. Reducing plastic litter will also have a positive impact on the coastal hospitality and tourism sector, which generated $93 billion in 2010. Economic losses to coastal businesses as a result of plastics-related interference can range from 15-40%; for example, the cost of closing a Lake Michigan beach because of pollution is $37,030 per day. These costs would be avoided if single-use plastics were properly regulated.

Some consumer goods companies have found it beneficial to implement their own policies to manage plastic waste; indeed, consumer good companies that have implemented plastic management programs have saved a collective $4 billion. Half of these savings is tied to better management of single-use plastics in packaging in the retail, soft drinks, and food sectors. Recently, a number of companies in these spaces have announced initiatives to reduce their reliance upon single-use plastics; for example, Starbucks plans to eliminate its use of plastic straws by 2020, and Dunkin' Donuts has pledged to phase out all Styrofoam cups from its global supply chain in the same time period.[35] A Harvard Business School Study found that companies that enacted sustainability policies, including policies on plastics reduction and recycling, outperform other companies in the stock market over the long-term.[36] Some companies have also already found that reduction in plastic use can result in brand popularity and loyalty. Private initiatives from large companies like United Airlines, Starbucks, Dunkin' Donuts, Shake Shack, Carlsberg Brewery, and Red Lobster to reduce reliance on single-use plastics signal that there can be economic boosts from limiting plastic use. However, these kinds of company-led efforts to manage plastic waste are by no means universal; federal legislation is needed to level the playing field and ensure that appropriate steps to reduce plastic consumption and waste are being taken.

B. Types of State and Local Single-use Plastic Reduction Efforts

Many states and local governments in the U.S. have long been concerned with reducing the use of plastics and have come up with different measures to address the issue. These measures include existing plastic bag laws, extended producer responsibility, and recycling.

i. Types of Domestic Plastic Bag Laws

- **Straight Bag Ban:** Retailers are prohibited from offering plastic single-use bags at the point of sale. A "straight" plastic bag ban generally means that thin plastic bags are banned; however, this often results in shifting consumers to other single-use items, as long as these are provided for free (e.g. paper bags and thicker plastic bags that qualify as "reusable bags"), with negative outcomes. Such a measure is also easy to bypass by simply upping the thickness of plastic bags to qualify as "reusable" bags.
- **Bag Fee:** Fee mandated for all carryout bags. It can be a minimum fee or a flat fee, with the minimum fee allowing for retailers to provide different types of carryout bags at varying prices, and allowing businesses that have already adopted stricter bag policies to continue implementing them.
- **Hybrid Ban/Fee:** The so-called "second generation" ban, consisting of a ban on thin plastic bags and a fee for all other carryout bags (paper, reusable, compostable).
- **Recycling Laws:** Legislation related to labeling, recycling, and reusing plastic bags has been in force in several U.S. states for decades. Maine was the first state to adopt legislation in 1991 requiring recycling efforts from the retailers; the law prevents retailers from supplying plastic bags unless they provide storefront means for the collection and recycling of used bags. Since then, this example has been followed by California, Delaware, New York and Rhode Island, and the District of Columbia.

The bag fee and hybrid ban/fee strategies have proven to be the most effective in changing consumer behavior and reducing carryout bag consumption.[37]

ii. Other Domestic Single-use Plastic Bans

A number of state and local governments have also taken action to reduce consumption and disposal of other single-use plastic items through the enactment of targeted bans, which include:

- **Bans of Plastic Straws, Stirrers, Utensils, and Cups:** Plastic straws and other carryout plastics, like single-use plastic bags, are ubiquitous and create many of the same environmental and human health harms and economic losses for governments and industries. Several local governments have passed laws banning the use of plastic straws, stirrers, and other utensils, or requiring that such items only be offered upon a customer's request, and states are beginning to follow suit. These laws are sometimes called comprehensive foodware policies, because they address a wide range of single-use foodware packaging.

Recycling does not tackle the problem of marine plastic pollution at its source and for many plastics is not a viable solution.

- **Bans on Expanded Polystyrene (a.k.a. Styrofoam™):** EPS foam implicates different human health concerns from single-use plastic bags. Hot, greasy, or acidic foods can make the synthetic chemicals and the fossil fuels that are used to make EPS foam leach out into food, allowing them to be consumed by humans. There is no economically feasible or environmentally effective system for recycling polystyrene and consequently most single-use foam items are either sent to landfills or littered.[38] During a three-day survey of plastic items floating to the ocean in Los Angeles, researchers found that 71% of the 2.3 billion plastic items of marine debris were expanded polystyrene foam.[39] Hundreds of local jurisdictions have banned retailers and manufacturers from selling or using polystyrene packaging, and a number of jurisdictions have prohibited food service businesses from distributing EPS containers and food service products to customers.

- **Cigarette-free Beach Laws:** Cigarette butts have consistently been reported as the most common item found on beaches during the International Coastal Clean Up Day. Over 300 local jurisdictions in the United States, as well as some states, have banned smoking on beaches in an effort to reduce the amount of cigarette litter and smoke exposure in these spaces. Some jurisdictions have also banned smoking in other public spaces, such as public parks and walkways.

iii. Extended Producer Responsibility

Extended Producer Responsibility (EPR) is a producer-end mechanism for decreasing waste, particularly plastic waste, usually by increasing recycling and decreasing dependency on raw materials. EPR shifts the cost of managing post-use products partially or fully from local governments to the producing industry.[40] EPR is based on the "polluter pays" principle, which makes those who produce the waste responsible for its reuse, recycling and/or disposal. Requiring industry to take back products at the end of their useful lives incents industry to design products with a mind to enhanced reusability.[41] In this way, EPR is similar to product liability law.[42] EPR laws for packaging serve as a means to divert waste from entering landfills and to increase recycling of reusable materials, thereby decreasing sources of marine pollution.

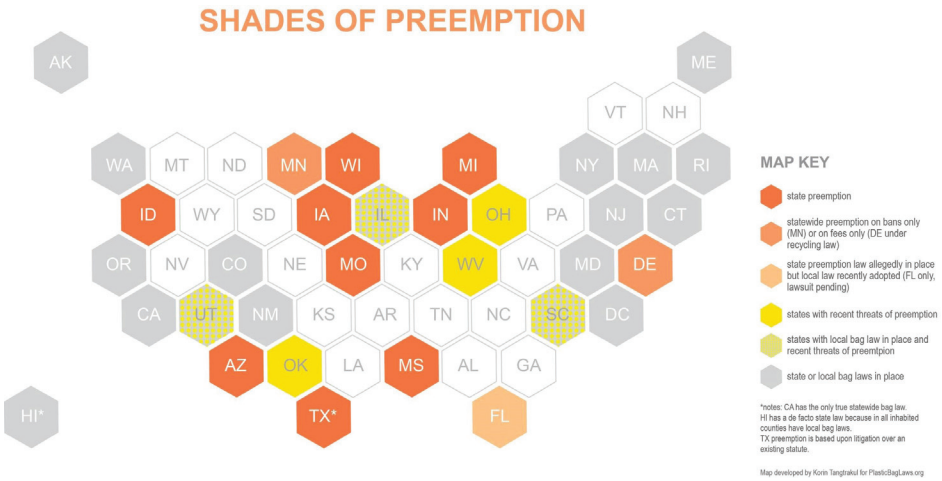
In the U.S., the federal government has a limited role in municipal solid waste (MSW) management. It provides technical assistance, establishes minimum solid waste landfill criteria and it regulates waste-to-energy facilities. This allocation of power can prevent local governments from enacting EPR laws; however, local governments have developed other mechanisms to reduce disposal of MSW and are tackling single-use plastic bag pollution through a combination of bans, taxes and fees, specified bag design, consumer education, and mandated retailer take back.[43]

iv. Recycling

Recycling does not tackle the problem at its source and for many plastics is not a viable solution. Single-use plastics can be challenging and costly to recycle, and despite plastic products having been in use for over 50

years, the U.S. lacks the necessary infrastructure to efficiently manage this resource-intensive process. When single-use items like plastic bags and straws reach recycling facilities, they often jam and damage the sorting machines, and some single-use plastics, like EPS foam, cannot be recycled cost-effectively at all.[44] Many plastics—like single-use plastic bags—cannot be recycled into a widely re-usable plastic material.

Plastics recycling is fraught with humanitarian issues, and is causing a dire domestic waste management problem. Since it is so expensive to recycle plastics, the United States has long relied on selling plastic scrap to China and other Asian countries that are able to recycle plastics more cheaply. Individuals, including children, often rummage through landfills and garbage dumps hand-sorting and seeking recyclable plastics. However, China has stopped accepting non-pure plastics for recycling, shifting the burden to other Southeast Asian countries that have been rapidly overwhelmed by the sheer volume of plastics.[45] Other Asian countries have followed China's lead, leaving the United States with a waste management crisis as it is suddenly faced with the need to find alternative solutions to dispose of plastic waste.



C. Consequences of the Lack of Federal Action

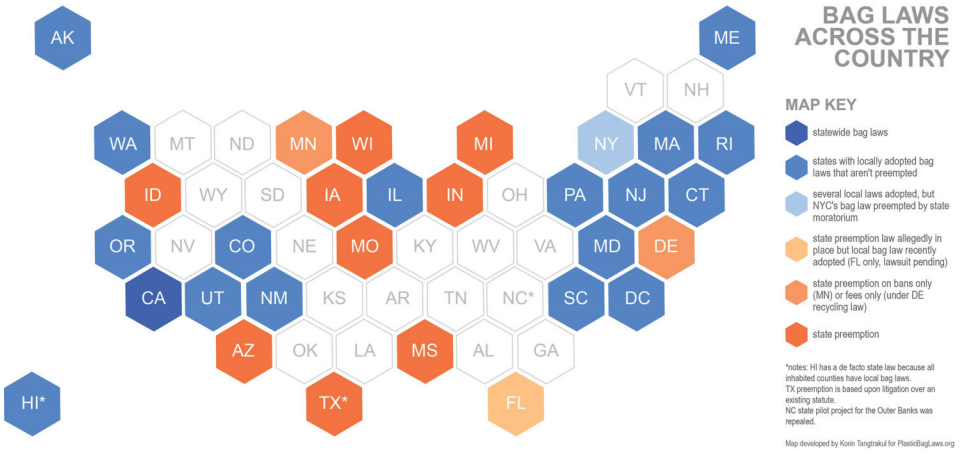
In the U.S., apart from the 2015 Microbead-Free Waters Act, there are no laws that eliminate or reduce the production or use of single-use bags or single-use plastics in general at a federal level. In the absence of federal legislation, state and local governments have sprung to action to fill the void, resulting in a variety of different regulations nationwide. These local legislative laboratories that have developed different methods to addressing the single-use plastics problem have allowed us to determine which ordinances and laws work the best. Many governments have focused their efforts on regulating single-use plastic bags. There are currently 331 local plastic bag ban ordinances across 24 states in the United States. This means that today, more than 40 million Americans reside in a jurisdiction with plastic bag bans or fees pursuant to local ordinances (or state law in California).[46] Certain municipalities have bag bans that only apply to single-use plastic bags.[47] Other municipalities have a hybrid ban/fee policy that mandates a ban on all single-use plastic bags and a fee for all other carryout bags (both paper and plastic). Oftentimes the retailer retains these fees, but in some cases these fees are remitted to the local government. Other municipalities have put a fee on all single-use bags.

However, some municipalities have been stymied in their attempt to make progress on this issue as their efforts to ban plastic bags have been met with state preemption laws and lawsuits. Several local bag ban ordinances have faced state preemption challenges that seek to stifle local government efforts. For example, a local bag ban ordinance in the City of Laredo, Texas faced a preemption challenge; the suit alleged that an antiquated state waste management law preempted the modern bag ban ordinance despite the local government's insistence that the ban aimed to protect local streams and watersheds. The Court determined that state law did preempt the city's ordinance, which has been a blow to the ability of local communities in Texas to address single use plastic.

The existence of state laws that preempt local action, usually by usurping Home Rule, interfere with local authorities' ability to adopt regulations and ordinances that impose bans or fees on the use of plastic bags and "ancillary containers" (bags, expanded polystyrene foam food containers, etc.). In Minnesota, Michi-

gan, Arizona, Florida, Idaho, Indiana, Missouri, Mississippi, Delaware, Wisconsin, and Iowa, regulation of single-use plastic bags has already been preempted by state laws, and similar legislation has been proposed in South Carolina, Ohio, Illinois, Pennsylvania, and Texas.[48] With the exception of California, which enacted a uniform statewide bag reduction law in 2016, and Hawai'i, which has essentially covered the entire state with county-by-county bag reduction laws, there are no other states that affirmatively restrict the use of plastic bags or containers.[49]

This form of preemption is a rising threat against local laws trying to fight plastic pollution and associated harms. In contrast, the adoption of federal bag reduction legislation would tackle plastic pollution nationally, providing a federal solution to the single-use plastic crisis that builds on local and state momentum and initiatives. Like the 2015 Microbead-Free Waters Act, federal legislation regulating single-use plastics would create a helpful, comprehensive nation-wide strategy that adequately addresses plastic pollution and its impacts.



IV. EXISTING DOMESTIC AND INTERNATIONAL PLASTICS REGULATION

A. Successful examples of Single-Use Plastic Bans in the U.S.

i. Plastic Bag Bans[50]

WASHINGTON, D.C.

The U.S. capital made a significant contribution towards ending plastic pollution in 2009 by implementing a 5-cent tax on plastic bags. The revenue collected from this tax goes to the Anacostia River Clean Up and Protection Fund and distributes reusable bags to low-income and elderly communities in D.C. Before the implementation of the policy, D.C. locals consumed 22.5 million plastic bags per month, a number that has now dropped to 3.3 million bags per month, meaning that plastic bag consumption has been reduced by 85%.

MANHATTAN BEACH, CA

In July 2008, Manhattan Beach passed an ordinance banning the distribution of plastic bags at the point of sale for all retail establishments in the city. Although the city was sued by Save the Plastic Bag Coalition, in 2011, the California Supreme Court found that the bag ban would not cause significant negative environmental impacts.[51] This precedent allowed other California cities to ban plastic bags and spurred implementation of the "second generation" plastic ban model, which combines banning plastic bags and charging for paper bags.[52] Manhattan Beach began implementing its ban in June 2014.

SAN FRANCISCO, CA

Plastic bags have been completely banned in San Francisco grocery stores since 2007. Through San Francisco's pioneer policy, a 10-cent fee on single-use compostable or recycled paper bags at grocery store checkout prompts the city's residents to use reusable bags instead of single-use plastic bags. To the end of reaching "zero waste" by 2020, San Francisco extended the plastic bag ban to other stores and restaurants in 2012 and 2013, but—as is common in cities with plastic bag bans—bags for produce or other bulk items are still allowed at no cost. The city is tracking towards its "zero waste" goal–80% of its waste is currently sent to recyclers or com-

posters instead of landfills--while plastic bag pollution has dropped by approximately 70% since the first few years of the plastic bags ban policy.

SEATTLE, WA

In 2012, Seattle successfully enacted a ban on single-use plastic bags in retail stores despite a multi-million counter-campaign led by the American Chemical Society. Grocery stores are subject to a modified ban whereby they may provide customers with single-use bags for a 5-cent fee as long as such bags consist of a minimum of 40% recycled material. Since the ban's implementation, plastic bag use in Seattle has been reduced by 78%.

BOSTON, MA

As of December 2018, Boston will implement a hybrid ban/fee ordinance, imposing a 5-cent fee on sustainable single-use bags and banning single-use plastic bags. The adoption of this ordinance makes Boston one of dozens of Massachusetts cities and towns to ban plastic bags.[53]

BOULDER, CO

Since 2013, grocery stores have been charging 10 cents for plastic and paper bags, 4 cents of which are kept by the stores. The remainder covers the city's administrative costs in connection with the bag fee, namely the supply of free reusable bags to the residents, and the minimization of bag waste impacts. In only six months after the implementation of the fee, bag use had dropped by 68%.

ii. Bans of Plastic Straws, Stirrers, Utensils, and Cups

A number of state and local governments have taken action to address other common single-use plastic items like straws, stirrers, utensils, and cups. A 2012 city ordinance in Miami Beach, Florida banned straws in beachfront hotels, while Manhattan Beach, California prohibits the use of straws and other carryout materials. Starting July 1, 2018, Seattle banned the use of plastic straws and utensils in bars and restaurants, becoming the first U.S. city to enact such a law.

Most recently, California signed AB 1884 into law, which mandates that sit-down restaurants can only provide plastic straws by customer request. This law includes a penalty fine for restaurants that automatically distribute plastic straws to customers. And after finding that 10% of all roadside trash was from single-use plastic straws, cups, and lids, New Jersey decided to take action in 2018.[54] The state's governor is expected to sign, by the end of 2018, a bill that would, among other things, ban stores from providing plastic straws. That law is set to go into effect in 2019. Even the National Park Service requires that food and beverage concessioners only provide plastic straws to customers who request them.

Other relevant bans have been passed or proposed in San Francisco; Berkeley, California; San Luis Obispo, California; New York; and Washington, D.C. In July 2018, San Francisco's Board of Supervisors unanimously voted to prohibit restaurants, bars, and retailers from providing customers with plastic straws, stirrers, or toothpicks; that law is set to go into effect in July 2019 if signed by the city's mayor.[55] The city of Berkeley, California is proposing a ban on all single-use, non-recyclable plasticware as a move towards its goal to be a zero-waste city by 2020.[56] To encourage the use of reusable items, customers would be charged 25 cents each for to-go cups or containers. Restrictions on single-use plastic bottles, straws, and cups have already gone into effect in San Luis Obispo, California, as of February 2018.[57] There, plastic straws are only available upon request at restaurants, and single-use bottles and cups are banned at events on city property. In New York City, the City Council is considering legislation to ban plastic straws in food and drink establishments.[58] And in Washington, D.C., City Council members have introduced a bill that would bar restaurants from giving out plastic straws and stirrers.[59]

iii. Bans on Expanded Polystyrene (Styrofoam™)

A plethora of jurisdictions in the U.S. have banned polystyrene packaging at the manufacturing and retail levels, with more than 119 cities enacting such bans in California alone. Since 2015, New York City has completely banned expanded polystyrene foam (EPS). Food retailers, stores, and manufacturers there cannot possess, sell, or even offer the use of single-use EPS containers or loose packing fill ("packing peanuts"). In Alameda, California, food vendors are prohibited from providing packaged food to customers in disposable polystyrene foam containers.[60] In Montgomery County, Maryland, food service businesses are banned from using EPS and the sale of polystyrene loose fill packaging and EPS food service products was banned effective January 1, 2016.[61] All food service businesses and county agencies and contractors are required to use compostable or recyclable food service ware. New Jersey's pending legislation to ban plastic straws also bans polystyrene or foam clamshell food containers. Berkeley, California is considering a comprehensive foodware policy that would include bans on certain items, require reusable food utensils be available at some sit-down restaurants, and require a 25-cents-per-cup charge on disposable cups.[62]

iv. Legislation establishing Cigarette-Free Beaches

As of 2017, smoking on beaches has been banned by over 300 local U.S. governments.[63] Honolulu, Hawai'i was reportedly the first local government in the United States to pass (in 1993) a smoke-free ordinance, which remains in effect today. New York City banned smoking in public parks, beaches, and walkways in 2011,[64] and Los Angeles and Seattle also impose smoke-free beach laws.[65] Maine and New Jersey prohibit smoking in all state parks and on state beaches; Puerto Rico has also banned smoking in public parks.[66]

Enforcement of these bans has not been without challenges. When the New York City ban was initially adopted, then-Mayor Bloomberg declared police would not enforce it, saying that the ban would be "enforced by public pressure."[67] Lack of funding for enforcement and the absence of a streamlined enforcement process also pose hurdles to the effectiveness of smoking ban laws.[68] But research shows that the majority of the population prefers smoke-free places, and studies tracking compliance with indoor smoking ban laws, a precursor to many outdoor smoking bans, show that the public has tended to comply with those bans once enacted.[69] Nonetheless, cigarette butts still comprise an estimated 30% of the total litter along U.S. shorelines; smoke-free beach laws have only addressed a small part of this problem.[70]

B. International Efforts to Combat Single-use Plastics

Globally, government interventions to reduce single-use plastics vary in range and scope, and while they have long been established in many countries, implementation strategies have been lacking. Bans (full and partial) and fees to minimize plastic bag pollution have been imposed at both the regional and national levels.[71] Some significant examples include:

Africa

The first plastic bag ban was introduced in 2003 in South Africa.[72] Since then, more than 15 countries on the continent have imposed bans or fees on plastic bags, among which are: Kenya, Mali, Cameroon, Tanzania, Uganda, Ethiopia, Malawi, Morocco, South Africa, Rwanda, and Botswana. In 2017, Kenya implemented a country-wide ban of plastic bags. Failure to comply with the law can result in a four-year jail sentence or $40,000 fine.[73]

Asia

Countries in Asia that have imposed bans or fees on plastic bags include China, Bangladesh, Cambodia, Hong Kong, India, Indonesia, Malaysia, and Taiwan. China adopted a ban on distribution of single-use plastic bags before the 2008 Olympic Games, and began requiring retailers to charge a tax on thicker bags.[74] China itself estimates that thin plastic shopping bag usage has fallen by 66% since 2008.[75] In

June 2018, India announced its commitment to end the consumption of single-use plastics by 2022[76] with a country-wide ban and joined the UN Clean Seas campaign.[77] Other regions of the sub-continent have already adopted effective measures. New Delhi banned all forms of single-use plastics in 2017. In 2016, Karnataka moved from a ban on plastic bags to a ban on several different single-use plastic items, including plastic dinnerware. Mumbai is the largest Indian city to ban single-use plastics, with violators caught using plastic bags, cups or bottles facing penalties of up to 25,000 rupees ($338) and three months in jail.[78]

Australia

Several states and territories have begun adopting bans on plastic bags, among which are the Northern Territory, South Australia, and Tasmania. In 2011, the Australian Capital Territory imposed a ban on plastic bags and all single-use polyethylene polymer bags that are less than 35 microns thick.[79] The ban has resulted in a 33% reduction in the amount of plastic waste that ends up in landfills.[80]

EUROPE

The European Union

In 2015 the EU adopted the EU Plastic Bags Directive[81] to reduce the consumption of light-weight plastic bags with a thickness of less than 50 microns. The Directive obligates Member State compliance by setting prices on plastic bags and/or introducing national reduction targets.[82] In January 2018 the European Commission adopted the first-ever European Strategy for Plastics in a Circular Economy. The European Commission has already begun introducing regulations and measures to the European Parliament, including a proposal on the regulation of single-use plastics, packaging waste, and port waste management. By 2030 all plastic packaging produced and sold in Europe should be reusable or recyclable,[83] and 65% of municipal waste and 75% of packaging waste should be recycled.

On October 24, 2018, the European Parliament voted a complete ban on a range of single-use plastics across the Union in an effort to cease ocean plastic pollution,[84] following the announcement by the European Commission, in May 2018,[85] of proposed EU-wide rules that target the 10 single-use plastic products most often found on Europe's beaches and seas, as well as lost and abandoned fishing gear, which together account for 70% of the marine litter in Europe.[86] The new rules introduce different measures for different products, completely banning plastic cutlery, plates, straws, and drink stirrers, and setting consumption reduction targets for plastic food containers and drink cups.[87] An EIS has estimated that these new rules will avoid the emission of 7.4 billion pounds of CO_2 equivalent, will avoid environmental damages which would cost the equivalent of more than $25 billion by 2030, and will save consumers almost $7.5 billion. EU countries with national legislation imposing similar measures include: Denmark, France, Germany, Greece, Italy, Ireland, and many others.

The United Kingdom

As of October 2015, large retailers with more than 250 employees in the United Kingdom are required to charge five pence per single-use plastic carrier bag, causing the consumption of plastic bags to fall more than 80% within the first year of implementation of the measure.[88] In April 2018, the British Government announced its intention to establish a ban on the sale of single-use plastics including straws, drink stirrers, and cotton swab handles.[89] The ban is currently subject to a consultation and will be enforced at some point between October 2019 and October 2020.[90]

NORTH AMERICA

Mexico

In Mexico, many cities and states are adopting measures to tackle plastic pollution, although there is no federal ban on plastic bags. In 2009, Mexico City introduced legislation prohibiting retailers from distributing single-use non-biodegradable plastic bags. The industrial hub of Queretaro banned plastic bags completely, in April 2018, and intends to strictly enforce the ban by confiscating illicit bags and denying business license renewal for offenders.

Canada

In Canada, many provinces have implemented efforts to reduce plastic pollution. In January 2018, Montreal adopted a ban on plastic bags with thickness less than 50 microns, while Vancouver adopted a policy in 2018, which will come into effect on June 1, 2019, prohibiting polystyrene foam cups and take-out containers and single-use plastic straws as part of its Zero Waste 2040 strategy.

SOUTH AMERICA

Chile

Chile has passed a national law banning plastic bags in all coastal cities, and the country is currently in the process of expanding the ban to apply to the entire country, which would make it the first country in the Americas with a nationwide ban. The partial ban applies to 230 coastal cities, including Chile's largest and most popular metropolitan and resort areas. Until the nationwide ban is fully in place, the number of bags customers may receive at checkout is limited. In July 2018, Chile's Constitutional Court upheld the nationwide ban bill, ruling against an appeal filed by the plastics industry.

V. RECOMMENDATIONS FOR SOLUTIONS

While there has been significant action at the state and local government level prohibiting or regulating the production and use of single-use plastics and the single-use plastic bag in particular, state-level preemption efforts have presented a hurdle to addressing plastic pollution's persistent harms to the environment and human health and economic burdens on industry and municipal governments. **Regulating single-use plastics' production and use is the most effective way to combat these issues and reduce marine plastic pollution.**

Controlling the number of available plastic bags can reduce the negative effects on the environment and, in particular, on oceans, rivers and the wildlife. Controlling the use of single-use plastics will also impact production trends and result in waste management benefits. Based on our analysis of domestic and international efforts to address single-use plastics, we propose the following options for federal action:

a. Federal Plastic Bag Legislation

Based upon our analysis of domestic and international plastic bag regulations, it is our assessment that imposition of either a fee or a hybrid plastic bag ban and fee policy would be most effective at reducing consumer reliance on single-use plastic bags. Our proposed policy would have the following key elements: (1) a fee on all other single-use bags and all reusable plastic bags, with the option to also ban all single-use plastic bags; and (2) use of collected fees to establish an environmental fund to address plastic pollution. The elements of our proposed policy are outlined in greater detail below:

- **Fee on all single-use and reusable plastic bags:** Federal legislation should initially impose a 10-cent fee on all single-use bags, recycled paper bags, and reusable plastic bags, and should raise that fee to 25 cents after the law has been in effect for two years. Fees would be applied at the point of sale in all retail outlets; retailers would pass the full amount of the fee to consumers as a bag charge stated on all invoices or receipts issued to customers. Reusable shopping bags sold for more than 50 cents would be excluded from the fee.

"[I]mposition of either a fee or a hybrid plastic bag ban and fee policy would be most effective at reducing consumer reliance on single-use plastic bags."

- **Optional ban on all single-use plastic bags:** We propose that federal legislation define single-use plastic bags as bags with a thickness of less than 2.25 mils. In addition to the fee, federal legislation could ban all such single-use bans at the point of sale in all retail outlets. Non-recycled paper bags should also be banned from distribution at the point of sale. All single-use paper bags should be required to be recyclable and contain at least 40% post-consumer recycled content.
- **Use of fees to establish environmental fund:** We suggest that revenue generated through the collection of bag fees be devoted to an environmental fund that could support source reduction of plastic pollution, including efforts to reduce waste, improved waste management, litter prevention and other environmental initiatives, including educational programs. We believe these programs would increase consumer engagement to reduce plastic pollution.

By shifting the costs of litter prevention and clean up of single-use plastic bags to producers, producers must take accountability of the environmental, economic, and human health harms caused by their products.

Rationale for the proposed measure:

❖ A combination of a ban on single-use plastic bags and a fee on other single-use bags has proven to be a highly effective mechanism to reduce consumption of single-use bags.[91]

❖ While a fee-only option may provide a less restrictive alternative, the ban/fee option creates strong incentives for consumers and thus can prove effective in ultimately reducing the amount of plastic produced and disposed of.

❖ Fees have been shown to incent changes in consumer behavior, as customers are required to decide consciously about purchasing a bag.[92]

❖ The application of a fee on both plastic and paper bags reduces consumption of single-use bags generally, avoiding difficulties with recycling plastic bags and the energy- and water-intensive process to produce paper bags.

❖ Even a very small fee can have a great impact on consumer behavior, especially for marginal costs.

❖ Research has shown that unless stores offer inexpensive reusable bags and charge more for paper bags, bans and fees generally have similar effects in terms of reducing total disposable bag consumption.[93]

❖ The findings relating to disposable and reusable bags can also be applied to policies regulating other disposable products, such as Styrofoam containers and plastic bottles.

b. Federal Action on Other Single-Use Plastics

Single-use plastic bags, while one of the most littered plastics, are not the only problematic single-use plastic items. Many cities, states, and other countries have already enacted legislation to ban or strictly regulate other single-use plastic items. Plastic straws, stirrers, utensils, single-use cups, and Styrofoam containers also require federal action. As discussed above, many state and local governments have already acted to address these sources of plastic pollution; large corporations, including Alaska Airlines, Hyatt Hotels, Starbucks, and Royal Caribbean Cruises, are banning plastic straws as well.

Thus, at a minimum, Congress should enact legislation that prevents the automatic distribution of plastic straws at all restaurants and bars nationally. In addition, because of the risks to human health and environmental impacts associated with EPS products, Congress should place an outright ban on all EPS foam products including foodware and packaging supplies.

c. Extended Producer Responsibility

Another approach to regulating the source of single-use plastics is to force producers and manufacturers of single-use plastics to internalize the externalities of their products. By shifting the costs of litter prevention and clean up of single-use plastic bags to producers, producers must take accountability of the environmental, economic, and human health harms caused by their products. This also incents corporations to improve product designs in a more sustainable fashion or create economically feasible ways to re-use or recycle products. This method of regulation aims to engage all actors—manufacturers, retailers, consumers, and disposers—in the life cycle of a plastic bag to take on responsibility to reduce the environmental impacts of the product. Moreover, this model of regulation reduces the financial burden of litter cleanup on municipalities. However, EPR should not be utilized alone; this solution should be implemented in tandem with single-use plastic bans/fees.

In the Northwest Territories of Canada, the regional government has implemented the "Mandatory Single-Use Bag Reduction Program," which charges retailers 25 Canadian cents per carry-out bag; retailers recuperate those costs by charging customers the same price for the bag. Distributors of the bags are required to pay 25 Canadian cents per bag to an environmental fund. This EPR program prevented the use of 5 million bags in little over a year's time. Canada has recently announced that it will be tackling plastic pollution as a federal priority with a multi-prong approach, including an EPR component.[94] In the European Union, 26 of 28 Member States have EPR programs designed to reduce single-use plastic waste from packaging. While each program differs slightly in approach, all of the schemes involve charging producers fees for the materials they use in their packaging. Some of these schemes set fees based on plastic type, while other schemes set fees based on recyclability of the plastic. One of the issues that has arisen with the different EPR programs is a lack of uniform approach causing differences in implementation and performance across the European Union. The schemes are enforced differently in different jurisdictions, causing the programs to be less effective overall because they fail to incent producers to make their products more environmentally sustainable.

To avoid such pitfalls, Congress could take action and set a uniform nation-wide EPR program for single-use plastic items, including bags, straws, foam containers, etc. This would reduce the financial burden on cities and states to clean up plastic litter and marine debris and would place more pressure on manufacturers to create sustainable products and reduce single-use plastic waste. If Congress decides to use an EPR program, it should implement a program that will pass on the costs to consumers, like the Northwest Territories program, so that there is a shift in consumer behavior in addition to a shift in producer operations.

"Congress should act now and develop legislation that attacks the problem at its source by regulating single-use plastics at their point-of-contact with consumers."

VI. CONCLUSION

In September 2018, representatives from the American Chemistry Council and Coca-Cola Corporation, speaking on behalf of companies that manufacture and use single-use plastics, participated in a Senate hearing on the plastic pollution problem. The briefing focused on the potential for recycling to alleviate plastic pollution, but two scientists on the panel stressed that source control, including in the form of a plastic bag ban or fee, would also be needed to adequately address the problem. As the panelists acknowledged, and based on the research conducted for this briefing document, recycling cannot be the primary solution to this growing problem. The recycling of U.S. plastic waste is creating a humanitarian and waste management crisis in Asia and at home. Moreover, a court in New York has determined that certain plastics, like EPS foam, cannot be recycled because of economic infeasibility. Even Congress has already recognized that recycling cannot be the whole solution.

In 2015, Congress acknowledged that plastics were a problem affecting all Americans and acted by passing the Microbead-Free Waters Act. The Act did chip away at a part of the problem, but the environmental and human health crisis created by single-use plastics litter and pollution has continued to grow. Single-use plastics have infiltrated our daily diets—contaminating our drinking water and table salt—and have polluted our roads and waterways. Moreover, single-use plastics are created from oil and gas; the creation, slow breakdown, and incineration of plastics all contribute to climate change. Congress should act now and develop legislation that attacks the problem at its source by regulating single-use plastics at their point-of-contact with consumers. Congress should implement a hybrid single-use bag ban/fee to regulate single-use plastic bags. For straws, EPS foam containers, and other single-use plastics, Congress should implement a straight ban. On top of the bans, Congress can consider shifting costs to manufacturers and retailers by creating an EPR program, which also incents industries to develop more sustainable products.

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