UPDATE OF THE 2010 RETAIL BAGS REPORT

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Florida Department of Environmental Protection

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Introduction

Many Floridians are interested in strategies to reduce waste, increase recycling, and promote environmentally friendly decisions regarding the products and packaging used in their everyday lives. Images and news reports of plastics in the marine environment and their effect on wildlife have heightened consumer awareness of possible consequences of the improper management of waste products. Single use plastics such as retail bags and carryout food containers are among those materials commonly identified as needing additional control. These concerns have prompted some governments around the US (and beyond) to enact legislation or promote policies aimed at reducing the amount of single use packaging entering the environment.

In accordance with the Energy, Climate Change, and Economic Security Act of 2008 (Section 403.7033, Florida Statutes), the Florida Legislature enacted a stay on local-level plastic regulations in the state (sometimes referred to as a “ban on bans”; see Appendix A). Counties and local municipalities in Florida are prohibited from regulating the use of plastics until the state enacts regulations of plastics or rescinds the stay. Prior to the legislative stay, several county and municipal governments had enacted or considered varying degrees of plastic bag or single-use plastic regulations. As part of the Statute, the Florida Department of Environmental Protection (DEP) was directed to produce a report (released in 2010) and examine the necessity for regulation of auxiliary containers, wrappings, and disposable plastic bags used to carry consumer products from retail establishments. In this report we collectively refer to these materials as single use carryout packaging (SUCP), with each major component defined as follows:

- Auxiliary Containers – Secondary container into which a product is placed for transport by a consumer. It includes, but is not limited to, reusable bags, paper bags, gift bags, gift boxes, hat boxes, cloth bags and food takeout boxes and clamshells. Disposable plastic bags have been intentionally excluded from this definition.
- Wrappings – Plastic films that are used to protect and transport the items within them; including, but not limited to, dry-cleaning, meats, fruits, bulk products, sandwiches, and newspaper. The focus for wrappings is on the external wrappings and not materials such as bubble wrap and tissue paper.
- Disposable plastic bags – Disposable plastic film bags used by the consumer to carry products from restaurants and retail establishments in the sale of products and goods. These bags are not necessarily meant to be reused multiple times but may have beneficial secondary uses and may be recycled at certain retail establishments.

The 2010 Retail Bag Report discussed the use of plastic bags in the state, including environmental and wildlife impacts resulting from improper disposal, and provided domestic and international examples of city, state, and nationwide programs to reduce plastic bag use. In the 2021 Legislative Session Section 403.7033, F.S. was amended to require DEP to review and update the 2010 Retail Bags Report and submit this report to Legislature by December 31, 2021. The Statute directed the report to include analysis of the need for new or different regulation of auxiliary containers, wrappings, or disposable

plastic bags used by consumers to carry products from retail establishments, including recommendations. Work carried out in preparation of this updated reported included a survey of Florida stakeholders to examine current practices, attitudes, and behaviors regarding the regulation of auxiliary containers, wrappings and disposable plastic bags.

Current State of Practice

Generation and Disposition of SUCP

In 2020 an estimated 47 million tons of municipal solid waste (MSW) was collected in Florida, with 50% landfilled, 42% recycled, and 8% combusted (Florida Department of Environmental Protection, 2021). Using information provided by local governments and private industry, DEP provides estimates for the total weight of collected and recycled major waste component categories (e.g., food waste, yard waste, newspapers), but similar information is not tracked for items such as auxiliary containers, wrappings, and disposable retail bags. An examination of several waste composition studies conducted by local governments suggests that the contribution of SUCP in typical MSW is on the order of 11.7-13.6%, Appendix F4. While the majority of these materials end up buried in landfills or combusted in waste-to-energy (WTE) facilities, smaller fractions get recycled and enter the environment as litter.

Consumer Opportunities for SUCP Avoidance, Reuse, and Recycling

Depending on the retail establishment, the product, and the type of SUCP, many Florida consumers may have several choices to address SUCP concerns (Table 1). In the case of retail shopping bags, many retailers offer reusable bags (at a price) and encourage customers to bring their own bags. Examples of retailers that have similar or other options for consumers are presented in Appendix D. While disposable plastic bags are often the default choice, some retailers provide options for paper bags. And many large retail establishments provide recycling bins for disposal plastic bags and possibly other plastic film. Starting in 2019, some Florida consumers participated in a DEP promoted program called Wrap Recycling Action Program (WRAP). This private-public partnership between the Flexible Film Recycling Group and several Florida local governments promoted expanded opportunities to recycle plastic films, packaging, and bags. Indian River County was one of the partners and they plan to continue the recycling opportunities resulting from WRAP.

Unlike the opportunities for recycling plastic retail bags and related film plastics, consumer options for recycling other SUCP such as auxiliary containers are more limited. Some businesses provide consumers alternative materials packaging options such as biodegradable containers. A few Florida restaurants and retailers require consumers to bring their own containers to shop or dine (Appendix D). Depending on local government allowances for the types of materials accepted in their recycling program, some auxiliary containers can be placed in the curbside recycling bin. Many consumers currently reuse SUCP for other purposes before disposing or recycling them. Many consumers, for example, reuse their single-use plastic bags as liners for indoor trash cans or to hold food waste or pet waste. And as highlighted in Table 1, consumers have options to reduce the use of SUCP, though often at the expense of convenience.

Table 1. Options Florida consumers currently have to reduce SUCP consumption and promote recycling and reuse, including the advantages and disadvantages of each.

Options:	Advantages:	Disadvantages:

Use Reusable Bags.	• Reduces plastic bag usage.
	• Cost effective.
	• Customizable to consumer.
	• Last longer than SUCP.
	• Can be used for multiple purposes.
		• Can be less convenient than a plastic bag.
		  ○ Customer has to remember to bring their own bags or buy them
		  ○ Non-uniform bag size can reduce bagging efficiency

Reuse Old Plastic Bags.	• Lessens use of additional SUCPs. • Allows for a SUCP to be used more than once (reduces environmental impact with each reuse).	• Customer has to remember to bring their own bags • Can be fragile and easily worn. • Does not completely eradicate plastic bag use. • Eventually will still need to be disposed of in some way.
Re-Purpose Used Plastic Bags.	• Reuses SUCPs. • Allows for creativity. • More elaborate re-purposed creations can be sold.	• Can be fragile and easily worn. • Some may see re-purposed bags as an eyesore. • Eventually will still need to be disposed in some way.
Refuse A Plastic Bag When Purchasing Items.	• Reduces plastic usage.	• Can be less convenient than using a plastic bag or plastic bag alternative.
Buy Products In Bulk.	• Reduces number of plastic bags used when consumers can bring their own container. ○ Many wholesale/bulk retailers do not offer plastic bags. • Can saves the consumer money. • Reduces food/other waste when consumers can buy small/appropriate amounts.	• Not available in all locations • Bringing your own container can be less convenient than pre-packaged products.
Recycle Plastic Bags.	• Accessible at many retailers. • Promotes recycling. • Reduces plastic litter.	• Most plastic bags/wraps cannot be recycled at curbside. ○ Can damage recycling facilities machinery.

Environmental Concerns

Litter

Improperly managed SUCP can end up in Florida's environment, along roads as a result of vehicle litter, in stormwater collection systems and freshwater resources, and the State's abundant marine ecosystems. The 2010 Retail Bag Report described past roadside litter studies where plastic bags accounted for 1.21% of all large litter items and plastic film accounted for 8.74% of small litter items. No similar statewide litter studies have been conducted in the past decade, but cleanup efforts initiated by civic organizations environmental groups have documented litter amounts and types. Additionally, in the past 10 years the scientific community worldwide has begun estimating the amount of waste, particularly plastic waste, entering the marine environment.

In the last 10 years, many litter cleanup organizations created online websites and apps that allowed citizens to input the number of units, location, and types of materials cleaned up (referred to as citizen science). More recently many of these organizations have openly provided public access to this data. Concurrently, researchers have developed methods to estimate the mass of plastics entering the ocean in over a hundred countries, including the US. These data were collected to provide a current glimpse of the magnitude and composition of marine litter originating from Florida, and the potential mass entering the

ocean from Florida (Appendix F). One estimate places the amount of all plastics entering Florida's marine environment in 2020 at roughly 7,000 tons. Based on citizen science data, the total number of large litter items collected in 2020 from Florida shorelines was 542,544 units (reported as 102 tons), of which SUCP comprised approximately 10% (on a unit basis). From the same data source, the amount of SUCP collected from Florida cleanups increased from 2013 to 2020 by 36% for plastic take out containers, 20% for foam take out containers, and 93% for plastic grocery bags by (Appendix F).

Impacts on Wildlife and the Environment

Florida boasts thousands of miles of shoreline, and the state's beaches and waterways support diverse ecosystems and wildlife, thus pollution from SUCP is an obvious concern to many. Plastic has been documented as the most abundant anthropogenic material in marine ecosystems, and scientists report growing evidence of damage to wildlife (Galgani et al., 2015). Plastics can cause harm through entanglement and ingestion and have been found to smother resources such as coral reefs and aquatic vegetation (Reddy et al., 2018; Kühn et al., 2015; Lamb et al., 2018). Some scientists warn that trace chemicals leached from plastics can adversely affect aquatic organisms, and in recent years there has been a growing concern with the problem of microplastics. Microplastics are plastic fragments less than 5 mm in length (Arthur et al., 2009). The ingestion of microplastics is reported to negatively affect the reproduction and increase the mortality of marine life (Wilcox et al., 2018), as well as to pose a possible risk to humans through biomagnification in seafood (Rochman et al., 2015).

Conventional plastic materials are substantially resistant to degradation. Plastic bags have been found at the deepest point on Earth, the Mariana Trench in the Western North Pacific, over 10,000 meters below sea level (Chiba et al., 2018). Plastics also accumulate in coastal sand dunes – ecologically important environments and a potential source of plastic chemical leaching during rainfall (Menicagli et al., 2019). According to previous studies, impacts of exposure chemicals which leach from plastics and mineralized plastic degradation products are the same as those of microplastics: harmful to reproductive health and a known carcinogen linked to lung cancer, lung and liver damage (O'Brine et al., 2010; Paluselli et al., 2019; Przybylińska et al., 2016). Additional information regarding the environmental impacts of plastic pollution are included in Appendix E.

Broader Life Cycle Impacts

The choice of materials used for SUCP has broader implications beyond the impact these have when improperly discarded into the environment. Every material or product has a "footprint" that corresponds to amount of energy or water required to manufacture it, or the amount of harmful emissions released during manufacture. The environmental footprint of alternative carryout packaging materials can be compared using a process known as life cycle assessment (LCA). In the 2010 Report an LCA approach was used to compare plastic bags to paper bags and it was determined that paper bags were more costly than plastic bags. The concept of using LCA principles to aid in waste and materials decision-making has increased since 2010 and an expanded analysis, including other materials, was evaluated.

The results of the 2010 Report found paper bags to be more environmentally costly than plastic bags. Presented in Appendix G is a general introduction to the concept of LCA

and a concise literature review to determine which alternative bag has the least environmental impact. Since 2010, many new studies focused greatly on this topic and several key studies' results were extracted and compared to one another in the Appendix G. Based on the studies' reported results, the number of times a reusable bag needs to be reused ranged from 0 to 20,000 times, depending on the type of reusable bag and the environmental impact indicator, for greenhouse gas emissions that number changes to 0 to 177 times. The range of number of times needed to be reused for GHG emissions are provided in Appendix G, Figure G3. Generally, the studies reported cotton reusable bags to require the greatest number of reuses, followed by polypropylene (PP), paper, plastics (e.g., recycled PET, LDPE, HDPE), and biopolymer/biodegradable.

Regulatory and Retailer Options to Address SUCP

The 2010 report described several different regulatory options that have been used in various parts of the US (and beyond) to address SUCP, primarily bans and fees or taxes. As of 2010 thirteen local governments, in Florida, were identified with bans in place and two were found to impose some type of fee. Over the past decade, a greater number of state and local governments have enacted some type of regulatory action to address SUCP concerns. SUCP bans have been enacted in Colorado, New Jersey, and New York, while states such as Arkansas, Indiana, and Ohio continue to prohibit local governments from banning SUCP (Appendix B). Documentation on the effectiveness of SUCP is limited. A California study reported for the San Francisco Bay Area the effects of a SUCP ban (Taylor et al., 2019). The study found that they estimated the ban eliminated 40 million pounds of carryout plastic bags, but that this was offset by 12-million-pound increase in trash bag purchases (Taylor et al., 2019). A plastic bag ban and fee in San Jose was reported to reduce bag litter in rivers to less than one third of the pre-ordinance levels. (Surfrider, 2019). Other regulatory options that grown in use in some US states and municipalities include fees on plastic bag use, requiring certain minimum recycled content in SUCPs, and requiring retailers to provide recycling options (Appendix B).

In the absence of regulatory requirements, some businesses have elected to pursue voluntary means to address SUCP concerns, with a variety of options highlighted in Table 2. Many large retailers continue to provide consumers alternative choices for retail shopping bags and recycling drop off locations following use of bags and wrappings. Other stores charging customers fees for using a disposable bag, stores not offering plastic bags and containers, stores providing incentives for using reusable bags and containers, and stores providing in-store recycling options. A few smaller retailers in Florida have decided not to offer SUCP at checkout, and instead encourage their consumers to shop using their own home-brought reusable containers and bags. Currently, however, most major retailer chains offer free SUCP along with some alternatives.

Table 2. Options Florida retailers, restaurants, and manufactures currently and potentially have to reduce SUCP consumption and promote recycling and reuse, including the advantages and disadvantages of each.

Options:	Advantages:	Disadvantages:
Stores Charge Fees for Disposable Plastic Bags	• Reduces plastic bag use. • Encourages customers to use plastic bag alternatives. • Promotes "greener" thinking. • Additional revenue for retailers.	• Customers may be against the additional fee. ○ This could be harmful to smaller businesses with lower traction than a corporation.
Stores Do Not Offer Plastic Bags and Containers	• Reduces SUCP use. • Customers may lean towards other green bagging options such as going without a bag. • A way for companies to reuse old packing containers as something customers can carry their groceries out with. • Supports selling reusable bags.	• Customers may prefer the convenience of a plastic bag or container. • Smaller businesses may not have reusable bags for sale or additional ways for a customer to carry out their items.
Provide Reusable Bags and Containers to Customers	• Reduces plastic usage. • Customers may lean towards other green bagging options such as going without a bag. • Gives customers more options when packing their groceries. • Puts more reusable bags in circulation and encourages their use. • Stimulates store revenue (if fee-based).	• Customers still have the ability to use plastic bags. • More expensive for the retailer (if free to customers). ○ Especially smaller businesses. • Can cause an excess of reusable bags to be put in circulation (if free to customers). • Additional expense for customers (if fee-based).
Provide Incentive for Using Reusable Bags and Containers	• Reduces plastic usage. • Attractive to customers. • Money could go to charities.	• May be more difficult for smaller retailers to implement. ○ Cost of incentive may outweigh number of plastic bags used. • Incentives tend to be small.
Provide In-Store Recycling of SUCPs	• Promotes recycling of SUCPs. • May be a cost reduction on retailers if they can sell their collected material to a recycling processor.	• Specific recycling practices may be difficult for smaller retailers to provide (Wagner, 2017). • Certain retailers do not have access to the collection containers and companies that recycle SUCP bags, auxiliary containers and wrappings. • May be a cost burden on retailers to pay for collection and recycling process.
Provide Clear Instructions on Packaging of How to Recycle SUCPs	• Promotes recycling of SUCPs. • Provides more information to customers on proper recycling methods.	• Requires new packaging for each individual product. ○ May be financial burden to retailers.
Require Recycled Content in SUCPs	• Reduces environmental concerns from manufacturing products made with 100% virgin products. • Promotes recycling of different materials (paper, plastic, textiles).	• Insufficient amount of recycled materials collected may cause issues relating to meeting manufacturing demand. • May be financial burden if the recycled content products are more expensive than virgin content products.
Setting Sustainability Goals	• Provides information to customers related to the retailers sustainability efforts. • Usually paired with other sustainability goals that are not directly tied to SUCPs.	• Retailers are not required by anyone to reach these goals. • Updates on the progress of the sustainability efforts are at the discretion of the retailer.

Feedback from Florida Stakeholders

Section 403.7033, F.S. requires that input, from state and local government agencies, stakeholders, private businesses, and citizens, be gathered for this updated report. Five different surveys (one each for local governments, residents, retailers, manufactures, and recycling facilities) were created and administered in the Fall of 2021. The survey questions and the results are presented in Appendix C. Note, the survey respondents all participated voluntarily, and the results of the survey may reflect respondents that are more interested or motivated with regard to SUCP reuse, recycling, and reduction strategies relative to those who did not participate in the survey.

In four out of five stakeholder categories (local government, retailers, residents, recycling facility), a substantial majority of respondents support the need for regulation (as opposed to the voluntary efforts supported by “many people and retailers” described in the 2010 Report) with the understanding that survey respondents may have a high interest in SUCP reuse, recycling, and reduction strategies. Results for the three same questions related to regulation and increased fees asked to all stakeholders are summarized in Table 4. A majority of respondents believe that regulation on SUCP would be effective. Among resident and local government stakeholders, 82% and 90%, respectively, of respondents reported a willingness to support additional waste reduction, reuse and recycling through increased fees.

Half of the local government respondents (52%) reported that they have an existing waste reduction or similar program/incentive (e.g., litter campaign, sustainability initiatives) for SUCP and 57% reported that they have educational campaigns to discourage placement of SUCP in curbside recycling. Although it is difficult to track the number of retailers that have adopted efforts to manage SUCP more sustainably since 2010, based on the survey results 73% of retailers give preference to purchasing SUCP with recycled plastic content. However, when it comes to the business respondents providing reusable bags to customers the majority (75%) do not provide them. Referring back to the previous discussion on how Florida residents reuse their plastic bags, 31% of survey respondents recycle them at a local store/facility drop-off site and 66% reuse them (e.g., trash can liner, shopping bag). The resident respondents also mentioned that plastic packaging is somewhat important (68%) and very important (13%) in their decision making when shopping. According to the recycling facility stakeholders survey 67% reported that when plastic films, wrappings and bags do make their way into a recycling facility (usually referred to as a materials recovery facility (MRF)) they can cause costly shutdowns from the damage to the equipment in the MRF.

Table 4. Survey responses on the effectiveness of regulation of containers, wrappings, and disposable plastic bags. The number in parentheses refers to the total number of respondents that answered an answer other than "No" for that question.

Stakeholder	Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?	Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?	Are you willing to support additional waste reduction, reuse and recycling through increased fees?
Local Government	97% (92)	89% (83)	90% (82)
Retailer	67% (24)	56% (20)	42% (15)
Residents	93% (2,110)	89% (2,021)	82% (1,851)
MRFs	100% (6)	100% (6)	83% (5)
Manufacturer	25% (1)	50% (2)	75% (3)

Conclusions and Recommendations

At the direction of the Legislature, DEP reviewed and updated the 2010 Retail Bags Report including an analysis of the need for new or different regulation of auxiliary containers, wrappings, or disposable plastic bags used by consumers to carry products from retail establishments. As part of this update, five voluntary surveys of stakeholder groups were conducted, and while the survey results cannot be thought of as scientifically representative of Florida's population, they do provide insight into the prevailing thoughts on many residents and businesses.

The situation surrounding SUCP remains similar to that observed in 2010. While the vast majority of all SUCP in Florida is either landfilled, combusted, or recycled, some is mis-managed and ends up in litter, including in Florida's marine environment. Scientific evidence of the potential harms of plastics in the environment has increased since 2010, as has public awareness of the issue. Currently Florida residents have options for recycling plastic retail bags and similar film plastics, but depending on product type and location, options for auxiliary containers are more limited.

Options for the legislature to address SUCP concerns are similar to those in 2010, and in addition to maintaining the status quo, include some form of statewide action or lifting the stay of local government enaction of such measures. The number of locations around the US implementing bans, fees, or recycling requirements, at both the state and local level, has increased since 2010. Several states, besides Florida, maintain requirements that prohibit local governments from enacting rules, regulations, or ordinances regarding use, disposition, sale, prohibition, restriction, or tax of SUCP.

The survey results suggest that there is an appetite from many to institute regulations to address SUCP concerns, including a willingness to support additional waste reduction, reuse, and recycling of SUCP through increased fees. Again, the respondents may have a higher interest in SUCP reuse, recycling, and reduction strategies than those that did not participate in the survey. Table 3 highlights the options recommended to the Legislature to review and consider.

Table 3. Potential regulatory and non-regulatory options for the Florida Legislature to consider to reduce SUCP consumption and promote recycling, including advantages and disadvantages of each.

Options:	Advantages:	Disadvantages:
SUCPs Bans (regulatory)	• Reduces plastic usage. • Reduces plastic litter. • Reduces some environmental impacts. • Encourages use of alternatives. • May indirectly promote other sustainable behaviors of stakeholders.	• Customers may not be inconvenienced to use alternatives and they may need to purchase items to replace what they reuse the plastic items for (e.g., plastic auxiliary container for another to-go meal, plastic bag as a garbage bag). • May be a cost burden to stakeholders that must change their operations. • May be challenging to enforce.
SUCPs Fees (regulatory)	• Reduces plastic bag usage. • Reduces litter. • Multiple options for fee types. ○ Can do a flat fee or a fee that increases over time. • Money gathered can be allocated for other uses. • Encourages use of reusable bags.	• Fee may be perceived as a tax. • Potentially could not reduce plastic usage but rather have people get used to the fee.
Require Recycled Content in SUCPs (regulatory)	• Reduces environmental concerns from manufacturing products made with 100% virgin products. • Promotes recycling of different materials (paper, plastic, textiles).	• Insufficient amount of recycled materials collected may cause issues relating to meeting manufacturing demand. • May be financial burden if the recycled content products are more expensive than virgin content products. • Can be difficult to enforce.
Increase Accessibility/ Opportunities to Recycle SUCPs through Educational Campaigns (non-regulatory)	• Promotes recycling of SUCPs at current existing in-store and drop-off locations. • May be a cost reduction on retailers if they can sell their collected material to a recycling processor.	• Must work with retailers or property owners to place these. • Specific recycling practices may be difficult for smaller retailers to provide. • Certain retailers do not have access to the collection containers and companies that recycle SUCP bags, auxiliary containers and wrappings. • May be a cost burden on retailers to pay for collection and recycling process.
Setting Recycling Goals (can be either regulatory or non-regulatory)	• Increases recycling. • May indirectly create solutions to other environmental issues. • Goal can be based on weight, volume, or other life cycle environmental impacts.	• Difficult to track since there are no current requirements for SUCP recycled to be reported. • Does not directly reduce plastic bag usage. • If using a life cycle environmental impact metric will need to develop a standardized method.
Increase Education Programs on SUCPs Usage (non-regulatory)	• Raises a more environmentally conscientious youth. • Can reduce plastic usage. • Can increase recycling.	• May not be as effective compared to other methods. • Funds would need to be allocated for these programs. Difficult to reach people who are not in school.
Implement Pilot Program(s) of Any of These Options in a Few Key Communities that have Already Expressed Interest (non-regulatory)	• Will provide overview on what works and does not work before making statewide changes. • Can follow similar program structure as the WRAP program.	• Difficult for retail chains to implement in only a small area. • Will need to be determined which option or combination of options should be piloted and whether all areas are willing to establish the same program.
Require SUCP Consumption Reduction Plan and Enact Ban or Fees if Not Reached (regulatory)	• Reduces SUCP consumption and potential associated recycling and litter issues. • Gives retailers flexibility to determine their own plans first.	• Hard to establish what a baseline plan will be that all retailers must at minimum include in their plans. • Difficult for smaller stores to implement. • Will require new tracking procedures.
Deposit System for SUCP (regulatory)	• Customer gets amount of deposit back when bags are turned in for recycling. • Increases recycling.	• Requires stores to take bags back for recycling and might strain retailers existing capabilities. • Does not reduce the number of bags consumed.
Require Alternative Bags as Option at Checkout (regulatory)	• Customers can feel they are contributing to more “sustainable” or “greener” purchase. • Easy for stores to purchase and make available. • Can potentially reduce other environmental impacts (e.g., litter, GHG emissions) if reused properly.	• Depending on the type of bag it may be more expensive, and this could be passed onto the customer. • Some bags are biodegradable and/or compostable and this can be confusing to customers since not all bag types can be backyard composted. • Many alternative bags require a minimum number of reuses to be environmentally advantageous; therefore, alternative bags must be designed to withstand reuse to minimum specification. • Places most responsibility on consumers; educational campaign can help inform consumers.

Appendix A: Section 403.7033, Florida Statutes

[1]**403.7033 Departmental analysis of particular recyclable materials.** —The Legislature finds that prudent regulation of recyclable materials is crucial to the ongoing welfare of Florida's ecology and economy. As such, the Department of Environmental Protection shall review and update its 2010 report on retail bags analyzing the need for new or different regulation of auxiliary containers, wrappings, or disposable plastic bags used by consumers to carry products from retail establishments. The updated report must include input from state and local government agencies, stakeholders, private businesses, and citizens and must evaluate the efficacy and necessity of both statewide and local regulation of these materials. To ensure consistent and effective implementation, the department shall submit the updated report with conclusions and recommendations to the Legislature no later than December 31, 2021. Until such time that the Legislature adopts the recommendations of the department, a local government, local governmental agency, or state governmental agency may not enact any rule, regulation, or ordinance regarding use, disposition, sale, prohibition, restriction, or tax of such auxiliary containers, wrappings, or disposable plastic bags.

History. —s. 96, ch. 2008-227; s. 1, ch. 2021-125.

[1]**Note.**—Section 3, ch. 2021-125, provides that "[t]his act does not apply to any displacement as defined in s. 403.70605(3)(a), Florida Statutes, if the local government provided 3 years' notice to the displaced private company or companies on or before December 31, 2020

Appendix B: Review of Existing and Proposed Regulatory Practices for SUCP

B1. Florida Cities

Table B1. Florida cities that had previously passed or proposed a regulatory plastic product ban. Information collected from a review of local ordinances and news media.

Cities	Polystyrene ban	Plastic Straw ban	Plastic-bag ban
Coral Gables	X		X
Surfside		X	
Sunny Isles	X	X	
Miami Beach		X	X
Orlando	X	X	
City of Winter Garden	X	X	X
Fort Myers Beach		X	
West Palm Beach		X	
Town of Palm Beach	X		X
Boca Raton	X		
Boynton Beach	X		
Delray Beach		X	
Hallandale Beach	X	X	
City of Hollywood	X		
City of Largo	X	X	
St. Petersburg		X	

Coral Gables, Miami Dade County

- May 9, 2017: Passed Ordinance No. 2017-13 to prohibit the use of single-use carry out plastic bags by any entity or individual who has been issued a special event permit by the city.(City of Coral Gables)
- Exceptions exist for prescription medication bags and garbage bags. Residents will be allowed to repurpose plastic bags.(City of Coral Gables)
- January 1, 2019: Implemented Ordinance No. 2016-2018, prohibited the use of expanded polystyrene to city vendors/contractors and special events permittees and their subcontractors. Prohibits the city from purchasing any products made of polystyrene. City enforcements will issue tickets to those in violation.
- Originally the ordinance enforced the same ban on restaurants and businesses, but the ordinance was declared unconstitutional as the Florida Retail Federation challenged its legality in 2019. The ordinance was not repealed but modified to the one above. (Cardona)

Surfside, Miami Dade County

- July 10, 2019: Passed an ordinance that expands plastic straw ban Ordinance No. 2018-1676(Town of Surfside, 2018)to include single-use plastic bags, utensils, and dinnerware. (Shammas)
- The expanded ordinance was overturned a few days later after receiving a letter from Florida Retail Federation threatening to sue.(Lipscomb)

Sunny Isles Beach, Miami Dade County

- January 2, 2020: Passed Ordinance 2019-543 that prohibits the sale and distribution of plastic straws and stirrers by food providers.(City of Sunny Isles Beach)
- March 18, 2021: Passed an Ordinance that prohibits the use of polystyrene food ware and cups on city property.(City of Sunny Isles Beach)
- 2019: The city began to host beach cleanups through their “ECOCOMMITTED” campaign.(“Sunny Isles Beach is ECOMMITTED”)
- 2020: Through the same campaign, the city added Fill A bag stations and repurposed plastic buckets to fill with trash throughout the city.

Miami Beach, Miami-Dade County

- 2019: City commission passed an ordinance that prohibits single-use plastic beverage straws and stirrers on city beaches, streets, parks, cafes, marinas and other public places. Additionally, the distribution of single-use plastic bags by sidewalk cafes is prohibited.(Chamber, 2018)
- 2019: Mayor Dan Gelber expressed his goal of making Miami Beach the most plastic-free city in the world.

Orlando, Orange County

- 2019: Implemented 137.2 Subject Single-Use Products on city property. It prohibited the sale and distribution of single-use products and plastics (biodegradable polystyrene) on city property by contractors or permittees. (Orlando City Office of Sustainability, 2019)
- Policy was a part of the city’s Community Sustainability Action Plan
- Orlando Community Action Plan of 2018: outlines the sustainable aspirations of the city. The city strives to become a “zero waste” community and aims to eliminate solid waste to landfills by 2040 through means of recycling plastics and metals.(Orlando City, 2018)

City of Winter, Orange County

- 2021: Passed a policy that bans plastic straws, stirrers and bags and polystyrene containers on city property.(Gargotta)

- 2021: Conducted a virtual video series education the public on plastic pollution in celebration of Earth Day.
- May 22, 2021: The city held a public waste collection event that collected hazardous waste and e-waste.

Fort Myers Beach, Lee County

- 2017: Ordinance No. 17-13 ("Prohibition of Plastic Straws" Ordinance) prohibited the distribution and sale of plastic straws within the town by any person, business, corporation, public nonprofit entity, or institution. (Fort Myers Beach)
- 2018: The city pushes to phase out the use of plastic bags. The Marine Resources Task Force (MRTF) paid and distributed 3,000 reusable bags made from natural materials to its residents.(Staff)

West Palm Beach, Palm Beach County

- 2019: Ordinance No. 4836-19 was passed and prohibited the distribution, sale or use of plastic straws and stirrers in any commercial establishments. Bioplastics are not an allowable alternative to this ban.(West Palm Beach)
- "Plastic-Straw Free" initiative. The city's office of Sustainability provides its residents a free supply of metal straws if requested via the city's website. (West Palm Beach County)
- The Office of Sustainability participated in the global "Plastic Free July" movement to help residents refuse single use plastics by giving away free reusable items to participants.
- They encourage their residents and businesses to continue eliminating single-use plastics by visibly providing resources on their government website.
- Ordinance 4298-10: Established a Sustainability Advisory Committee to help advance sustainability goals of the city such as "promote the use of methods systems and materials that do not deplete natural land, water, and energy resources or harm natural cycles" and "employ environmentally-responsible products and technologies". No clear timeline is given to establish these sustainability goals.(*ARTICLE III. - BOARDS, COMMITTEES AND COMMISSIONS* | *Code of Ordinances* | *West Palm Beach, FL* | *Municode Library*, 2021)

Town of Palm Beach, Palm Beach County

- June 11, 2019: Council adopted Ordinance No. 24-2019 to prohibit the use of expanded polystyrene containers and single use carry out plastic bags within the city.[16]
- Weeks later the Town received a letter from the Florida Retail Federation and Florida Restaurant & Lodging Association requesting the Town to repeal the Ordinance citing Ch. 403.7033.
- October 10, 2019: Resolution No. 122-2019 was adopted to strongly encourage the state legislature to approve Senate Bill 182 and any other companion bills

relating to the removing preemption language to single-use plastic bags and polystyrene materials.(Town of Palm Beach)

Boca Raton, Palm Beach County

- January 1, 2021: Banned balloons & confetti and restricted polystyrene at its parks and on city property. Individual and takeout businesses are exempted. Food trucks and food stands are not exempted.(Erblat)

Boynton Beach, Palm Beach County

- May 2021: City Ordinance No. 21.12 prohibits polystyrene foam products at concerts, city events, and city property by vendors. Also prohibits vendors use of balloons and confetti. Private citizens are not subject to the ordinance.(City of Boynton Beach)
- Incentivizes citizens to go plastic-free by offering “Pass on Plastics Pledge” in which citizens that rent city facilities can do so at a discounted rate. (Perkin)

Delray Beach, Palm Beach County

- 2019: Passed the Straw Ordinance that restricts the distribution of plastic straws at all restaurant and beverage establishments unless a customer requests them. Straws that are biodegradable such as paper, bamboo, and reusable metal are permissible.(“Straw Ban Ordinance | City News | City of Delray Beach, FL”)

Hallandale Beach, Broward County

- 2018: Ordinance No. 18-387 prohibited the sale and distribution of plastic and bioplastic straws within the city including its public beaches. The use of plastic straws on public beaches is also prohibited.(“Straw Ordinance | Hallandale Beach, FL - Official Website”)
- 2019: Coral Reef Protection Ordinance prohibits the use and distribution of polystyrene products in the food service industry and of single-use carryout plastic bags on public beaches.(Hallandale Beach)

City of Hollywood, Broward County

- 2018-2020: Code of Ordinance 97.05 bans the use of nonbiodegradable containers (plastics, expanded polystyrene foam) for serving food products on city owned properties such as the beach and community centers. (City of Hollywood)
- October 21, 2020: the city banned the intentional release of balloons within city limits.
- 2010 – 2016: Uses a recycling reward program through a contract with RecycleBank, residents earn points based on the amount they recycle, which can then be redeemed for discounts at local and national businesses. (*Sustainability in Broward County, FL*, 2011)
- Hollywood has seen a 130 percent increase in recycling city-wide since the program’s inception.

- Encourages local restaurants to become Surfrider Foundation certified “Ocean Friendly Restaurant” by offering free promotions, discounts on vendors, and tax-deductible donation opportunities in exchange. (“Ocean Friendly Restaurants”)

City of Largo, Pinellas County

- July 1, 2019: Ordinance 2019-19 prohibits the distribution of polystyrene, plastic straws & stirrers, utensils, plates, cups, and bowls on city property. Compostable alternatives will be encouraged to use instead. Ordinance does not impact private rental contractors and individuals.(City of Largo)
- Encourages local businesses to become Ocean-friendly certified for free-marketing benefits in exchange.

St. Petersburg, Pinellas County

- 2018: Ordinance 356-H prohibits the distribution of single-use plastic straws and expanded polystyrene on city-owned property of within the city right-of-way (food trucks, sidewalk cafes, parks, etc).(City of St. Petersburgh, 2018)
- The city has made a goal to be a zero-waste city by 2050.(St. Peterburg)

City of Tampa, Hillsborough County

- 2021: Mayor Jane Castor “Transforming Tampa’s Tomorrow” initiative that focuses on sustainability and resilience amongst other city concerns.(City of Tampa)
- The Sustainability & Resilience only mentions the use of recycling materials in terms of plastic materials.

B2. Florida Counties

39 Florida counties and cities supported and signed a resolution (Florida Surfrider Organization)for local regulation of single-use plastic carry-out shopping bags in 2015-2018.(Florida Surfrider Organization)

Alachua

- July 9, 2019: Passed Ordinance No. 2019-14, a ban on polystyrene, Styrofoam, containers, and single-use plastic bags at unincorporated areas.
- August 6, 2019: County commissioners repealed Ordinance No. 2019-14
- Received a letter from the Federal Retail Federation and the Florida Restaurant and Lodging Association stating that the ordinance was unlawful citing Ch. 403.7033 of the Florida Statutes; the letter served as an official recommendation to repeal or face litigation (Khan, 2019)
- March 10, 2020: ban the sale or distribution of plastics straws and stirrers at restaurants in unincorporated areas of the county such as Gainesville. (Nelson)
- Offers curbside recycling.(Alachua County Waste Collection Office)

Brevard

- July 11, 2011: County commissioners unanimously approved to seek authority from FL legislature to regulate plastic bags.(Berman)
- Recycle Brevard: independent 501(c)3 Florida non-profit organization whose mission is to reduce wase and promote sustainable living through advocacy, action and education throughout the county.("Who We Are")
- Keep Brevard Beautiful: an affiliate organization of Keep America Beautiful; officially certified in 1981. They organize litter control, education, recycling, and beautification programs.
- "Litter Quitter" program that has support from the Brevard Zoo and partners with local businesses to reduce litter from single-use plastics, plastic bags and polystyrene. It is an incentive program for local businesses by providing free-marketing's, discounts on sustainable products, and network/education opportunities in exchange for reducing plastics and polystyrene.(Keep Brevard Beautiful)
- TerraCycle: Point-system recycling programs for hard-to-recycle waste.
- Student Recycling Education Program: Implemented in 1991, Brevard County includes conservation of our natural resources using the "3 R's": Reduce, Reuse and Recycle. Responsible management of our solid waste and the operation of the Brevard County Central Disposal Facility (landfill) as well as the basics of composting is presented in the 4th and 5th Grade programs.("Student Recycling Education")
- Sponsors: Brevard County, Board of County Commissioners, Brevard County Solid Waste Management Department
- Single-Stream Curbside Recycling and Curbside pickup for household electronics.(F. Keep Brevard Beautiful)
- Encourages residents to reuse retail containers by making crafts or donating clean plastic bags to local businesses.

Broward

- 2007: The Environmental Protection and Growth Management Division established the Broward Climate Change Government Operations Workgroup.(Broward County)
- Tasked with reducing the county's greenhouse gas emissions seven percent below baseline levels by the year 2015.
- Joined the United States Environmental Protection Agency's (EPA) WasteWise program. The program seeks to reduce solid waste through waste prevention and recycling techniques. ("Waste Prevention Broward County is WasteWise!")
- The county vaguely states that it is committed to reducing greenhouse gas emissions from government operations and implements projects to reduce energy, fuel use and waste.

Duval

- December 2019: Atlantic Beach City commission members voted to seek authority from FL legislature to regulate plastic shopping bags. No local rules are being suggested.(Patterson)

Escambia

- 2015: Emerald Coastal Utilities Authorities (ECUA)—Biosolids compositing facility—launched a “Brown is the New Green, Leaf the Plastic Behind!” to encourage residential customers to use compostable paper/reusable bags instead of plastic bag for storing residential yard waste.(*DEP’s Northwest District 2017 Environmental Stewardship Achievement Awards*)
- 2017: This campaign received the Public Information & Education Excellence Award from the National Association of Clean Water Agencies.
- ECUA produced 72,000 compostable paper bags for yard waste and were distributed at any community events within the county.

Hillsborough

- 2019: Be The Solution to Plastic Pollution education and recognition program that aims to reduce waste from single-use plastics. Program is part of the “Reduce Your Use” campaign.(Hillsborough County)
- Encourages local businesses to take the reduce your use pledge and to be recognized as a “Businesses for the Bay” partner; benefits include free promos and marketing
- Pinellas County, City of Tampa, City of St. Petersburg, Keep Tampa Bay Beautiful, Keep Pinellas Beautiful is part of the campaign

Indian River

- Implemented the WRAP 6-month pilot program and has permanently installed it as part of their recycling program.
- Recycles plastic films and auxiliary materials separately from their single stream recycling.

Lee

- 2019: Grassroots petition to ban plastic bags in the county.(Thiele)

Leon

- 2019: Prohibited the use and distribution of single-use straws during county sponsored events.(Gainey, 2019)
- Seven municipalities have completely banned plastic straws. Three others adopted policies that only apply to county & county sponsored events.
- County commissioner Kristin Dozier introduced an idea of offering incentives and connecting with manufacturers to offer business discounts of paper straws to make possible the expansion of the ban to local businesses.[17]

- Three municipalities have approved resolutions encouraging people to stop using plastic straws.
- The county strives to educate the public on the importance of using single-use plastic straws.

Martin

- April 2019: County commissioners signed a resolution that supports the voluntary reduction of single-use plastic straws, polystyrene, and plastic use in general by local businesses.(Holsman)
- Single-Use Plastics Reduction Program: An education outreach campaign that educates K-12 students, the public, and businesses the dangers of plastic pollution and the importance of using plastic alternatives and products. (Martin County)
- Teamed up with the Florida Department of Environmental Protection to promote the “Skip the Straw” initiative towards individuals, schools, and businesses.[19]
- The county has a vague sustainable goal of reducing and eliminating single-use plastics to preserve, protect and enhance the local waterways and prevent plastic pollution from entering the marine environment.[19]

Miami-Dade

- July 1, 2017: Resolution No. R-501-16 is implemented which bans all products made from polystyrene in county parks and beaches which includes but it is not limited to cups, bowls, trays, coolers, and hinged or lidded containers. The ban applied to any individual or count vendor, food establishment or CBO.(Miami-Dade County, 2017)
- 2010: Establish a “GreenPrint Plan: Our Design For a Sustainable Future” that outlines several sustainable aspirational goals.(Alvarez et al., 2010)
- Some of the goals include 1) use less water and water by reducing non-renewable energy use to 20% below 2007 baseline by 2015. Reduce water consumption by 1.5 million gallons a day. Reduce government electricity use by 20% from 2007 to 2014 in accordance with Board of County Commissioners legislation, 2) reinvent our solid waste system by reducing or diverting 75% of solid waste from landfills by 2020 through reusing, recycling, and generating electricity.

Monroe

- 2017: County commission members voted three straight tears to ask FL legislators for the right to create a pilot program to reduce plastic bags that are discarded/escape from trash bins and end up in the streets, trees and ocean. The bill failed again.(Wadlow)

Palm Beach

- February 17, 2021: County commissioners signed Resolution No. 2017 urging the FL legislature to amend Section 403.7033, Florida Statute, under House Bill

93 and Senate Bill 162 which would authorize municipalities to establish a pilot program to regulate or ban disposable plastic bags.(Palm Beach County, 2017)

- Established a “Recycle Right Everyday” campaign to help residents understand what can and cannot be recycled at home, school, and work.(“Solid Waste Authority of Palm Beach County, Fla., Sees Success with Recycle Right Everyday Campaign”)
- July 2009: Greek Task Force on Environmental Sustainability and Conservation reported to the Board of County Commissioners their concerns about plastic waste but were not directly addressed by their recommendations.(Palm Beach County, 2009)

Polk

- 2017: Polk County Waste and Recycling limited the types of plastics that can be recycled to only plastic with the same consistency as a milk jug.(“Polk County restricts items to be recycled,” 2017)
- The recycling facility used to accept a wider variety of recyclable materials such as glass and other plastics, but the county deemed it was not profitable and practical.

Sarasota

- January 1, 2020: Passed an ordinance that prohibits the distribution and use of expanded polystyrene and plastic straws (except upon request by customers) within special events, sidewalk cafe permits and city lease agreements.(A. Staff)

Wakulla

- May 7, 2018: The county commissioners held a workshop hearing to discuss a prohibition on single use carry out plastic bags in the county. There have been no regulations or bans up to date.
- Keep Wakulla County Beautiful: an environmental initiative in the county that is compromised of volunteers and community involvement.(Beautiful, 2012)
- They do Recycling Education and Program Support, Litter Reduction & Prevention, Great American Cleanups and Coastal Cleanups.
- Partnered with Keep America Beautiful to educate the community and provide programs and resources to improve recycling in the county.(Keep Wakulla County Beautiful, 2011)

Walton

- Participates in the Winn-Dixie Community Bag Program—encourages customers to buy a reusable bag for $1 which can be directed as a donation to a non-profit.(Walton County, 2020)

B3. US National

Table B1. Examples of states that have SUCP bans across the entirety of the state.

State:	Bill Name/ Number:	Key Points Related to Ban:
Colorado	HB 21-1162	• Repeals law of local governments being able to prohibit requiring or banning use or sale of specific types of plastic products or materials. • Prohibits stores and retail food establishments, as of 1/1/2024, from providing single-use plastic carryout bags to customers. • Prohibits retail food establishments, as of 1/1/2024, from distributing an expanded polystyrene product for use as a container for ready-to-eat food ("HB21-1162").
New Jersey	P.L. 2020, c117	• No grocery store or food service business can provide or sell a single-use plastic carryout bag as of 5/4/2022. • Food service businesses can only provide customers single-use plastic straws per request as of 11/4/2021. • Dispensing of polystyrene foam food service products are prohibited as of 5/4/2022 (*P.L. 2020, c.117 (S864 4R CC)*)
New York	Environmental Conservation (ENV) Chapter 43-B, Article 27, Title 28	• Distribution of any plastic carryout bags from retailer to customer is prohibited. • Retailers are not allowed to prevent a person from using a bag of any kind that they have brought on their own to carry out goods (*Environmental Conservation (ENV) Chapter 43-B, Article 27, Title 28: Plastic carryout bag ban*).

Table B2. Examples of municipalities/counties in the US that have SUCP bans.

Municipality:	State:	Bill Name/ Number:	Key Points Related to Ban:
South Fulton	Georgia	Part 2, Title 14, Chapter 12	• As of 9/1/2020, no retail establishments in the city can provide a single-use plastic carryout bag to a customer. • All retail establishments must provide reusable bags to customers either for sale or at a minimum charge of $0.10 per bag. • Encourages businesses, residents, and other municipalities within Georgia to adopt with the objective and effect of reducing the distribution of single-use plastics (*Part 2, Title 14, Chapter 12*, , p. 12).
Kauai County	Hawaii	Ordinance No. 885; Amended Article 19, Chapter 22	• All retail establishments must only provide recyclable paper bags, biodegradable bags, or reusable bags for customers (*Ordinance No. 885; Amended Article 19, Chapter 22*).
Evanston	Illinois	Ordinance 66-O-14	• Retailers cannot provide a disposable plastic shopping bag to any customer. • Retailers must provide reusable bags, recyclable paper bags, or commercially compostable bags to customers. • Does not apply to any restaurant or any store that is not a chain store organization (*Ordinance 66-O-14*).

Table B3. Examples of states that have bans against banning single-use plastics.

State:	Bill Name/ Number:	Description:
Arkansas	Act 751	• Cities and towns are not allowed to regulate the use of auxiliary containers, including that of imposing fees. • Does not prohibit a municipality or county from operating a recycling program, composting program, or a solid waste disposal program ("Act 751 of the Regular Session House Bill 1704," , p. 751).
Indiana	HB 1053	• Prohibits local governments from the regulation of reusable or disposable auxiliary containers. • Prohibits any sort of restriction, fee, or tax in relation to auxiliary containers or auxiliary container manufacturers/distributors (*HB 1053*).
Ohio	HB 242	• Prohibits local governments from regulating the use of auxiliary container, including that of imposing fees. • Applies existing anti-littering law to auxiliary containers (*HB 242 General Assembly of the State of Ohio*, , p. 242).

Table B4. Examples of municipalities in the United States that have enacted fees for SUCPs.

State/ Municipality:	Bill Name/ Number:	Key Points Related to Fees:
Colorado	HB 21-1162	• As of 9/2021, plastic bags and paper bags cost 10 cents each where 6 cents go to local governments to pay for compost and recycling programs while 4 cents go directly to the businesses. • As of 9/2022, only paper bags may be provided by retailers for the same price of 10 cents. • Part of a bill that eventually leads to a ban (*HB21-1162*, , p. 21).
District of Columbia	18-55; 8-102.03	• 5 cent bag fees, 1 cent goes to business unless a rebate is offered to the customer (in this case they get two cents), other 3 or 4 cents goes to Anacostia River Cleanup and Protection Fund (*§ 8–102.03*).
Chicago, Illinois	Chicago Checkout Bag Tax: Chapter 3-50	• 7 cent bag fees where 2 cents go to the retailer and 5 cents goes to the city of Chicago (*Chicago Checkout Bag Tax Ordinance: Chapter 3-50*).
Howard County, Maryland	CB64-2019	• As of 10/1/2020, 5 cent fees for disposable bags where 1 cent foes to retailers and 4 cents goes to the county for the Disposable Plastics Reduction Fund. • Disposable Plastics Reduction Fund was created within this bill along with the fee (*CB64-2019*, , p. 6).

Table B5. Examples of states who have imposed legislation related to requiring a certain amount of recycled content in SUCPs.

State:	Bill Name/ Number:	Description:
Washington	SB 5219	• Plastic packaging must contain minimum recycled content of 15% by 7/2023, 25% by 1/2027, and 50% by 1/2031 (*SB 5219*). • Also required minimum recycled contents requirements for plastic beverage bottles in a separate bill (*SB 5022*).
New Jersey	SB 2515	• Rigid plastic containers must contain at least 35% recycled content by 1/1/2022. • Plastic beverage containers must contain at least 10% recycled content by 2022, 25% by 2026, 50% by 2031. • Plastic film bags must contain 20% recycled content by 2022, 40% by 2025 (*SB 2515*).
Oregon	HB 2065	• No specific obligations regarding recycled content in packaging but mandates that a plastic packaging recovery rate be established. • Requires producers to join a producer responsibility organization. • If statewide plastic packaging recovery goal is not met each year, the producer responsibility organizations would be required to submit a plan to address the failure (*HB 2065*).

Table B6. Examples of states that require retailers to provide recycling programs.

State:	Bill Name/ Number:	Description:	Additional Notes:
California	2006 AB 2449	• Retail stores must adopt at-store recycling programs. • Retailers must clearly print "Please Return to a Participating Store for Recycling" on plastic bags (*2006 AB-2449*).	• California eventually enacted a plastic bag ban in the bill 2014 SB 270 (*2014 SB 270*).
Delaware	Title 7, Chapter 6099A	• Retail stores must adopt at-store recycling programs. • Retailers must clearly print "Please Return to a Participating Store for Recycling" or something similar on plastic bags (*Title 7, Chapter 6099A*).	• This bill was amended to completely ban single-use plastic bags in Delaware (*2017, Title 23 Chapter 23-18.11*).
Rhode Island	2017, Title 23 Chapter 23-18.11	• Retailers must provide recycling areas for clean and dry plastic bags and plastic film (*2017, Title 23 Chapter 23-18.11*).	N/A

Table B7. Examples of states and their respective recycling goals.

State:	Goal:
California	Goal to have 75% recycling, composting, or source reduction of solid waste by 2020 ("California's 75 Percent Initiative Defining the Future," , p. 75).
Connecticut	Goal of diverting, reducing, reusing, and recycling 60% of municipal solid waste by 2024 ("General Information on Recycling in Connecticut").
South Carolina	Recycle at least 40% of municipal solid waste and well as reduce municipal solid waste disposal to 3.25 pounds per person per day ("S.C. Solid Waste Management Annual Report for FY20").

Table B8. Examples of states that have incorporated increased education on environmentally-friendly practices within schools.

State:	Description:
Connecticut	Department of Energy and Environment Protection provides tips on waste reduction and reuse within school settings ("Tips on Waste Reduction and Reuse for Schools").
Wisconsin	"Green and Healthy Schools Wisconsin" promotes and celebrates achievements of schools relating to reduction of environmental impacts and increasing environmental and sustainability literacy ("Green and Healthy Schools," 1969).

Table B9. The 19 US states with a prohibition of regulating plastics on a state-wide basis. All of these legislative actions have taken place since the publication of the 2010 Report.

State	Bill Number/Name	Year Passed
Arizona	SB 1241 (Revised Statute 9-500.38) (Arizona State Legislature)	2015
Arkansas	Act 751(State of Arkansas)	2021
Florida	Florida Statute 403.7033 (auxiliary container preemption); Statute 500.90 (polystyrene preemption)	2008; 2016
Idaho	Title 67, Chapter 23-2340 ("Section 67-2340 – Idaho State Legislature")	2016
Indiana	HB 1053 ("IN HB1053 | 2016 | Regular Session | LegiScan")	2016
Iowa	House File 295(State of Iowa)	2017
Michigan	SB 853 (State of Michigan)	2016
Minnesota	471.9998 ("Sec. 471.9998 MN Statutes")	2017
Mississippi	SB 2570 ("SB2570 (As Passed the Senate) - 2018 Regular Session")	2018
Missouri	HB 722 (State of Missouri)	2015
Montana	HB 407 ("Montana HB407 | 2015 | Regular Session")	2021
North Dakota	HB 1200 ("North Dakota Bill Actions: HB 1200")	2019
Ohio	HB 242 (State of Ohio)	2021
Oklahoma	SB 1001 ("Oklahoma SB1001 | 2019 | Regular Session")	2019
Pennsylvania	HB 1083, Section 7, 1706-E(Center)	2019
South Dakota	SB 54 ("South Dakota SB54 | 2020 | Regular Session")	2020
Tennessee	HB 1021 ("Tennessee HB1021 | 2019-2020 | 111th General Assembly")	2019
West Virginia	HB 2500 (West Virginia Legislature)	2021
Wisconsin	Act 302 ("Wisconsin Legislature: 2015 Wisconsin Act 302")	2015

Table B10. States which have passed a regulatory plastic product ban since the 2010 Report.

States	Legislative Information		Impacted Materials				Businesses Response				Enforcement Process
	Bill Name/Number	Enacted or Passed Date	Plastic Bags	Plastic Straws	Polystyrene	Plastic Containers	Stakeholders Impacted	Acceptable Alternatives	Exceptions	Business violation fine	
California	Proposition 67/SB 270 (California Legislature)	2016	X				Retail stores with gross annual sales of at least $2 million; large retail stores with a pharmacy; convenience stores, food marts, and liquor stores.	Reusable paper bags; compostable plastic bags if jurisdiction has curbside; compost collection; charge at least 10 cents/bag	Bag fee cannot be applied to those on state/federal assistance	1st offense: $1000; 2nd offense: $2000; third offense: $5000	Cities, counties, and the State of California. Citizens can also report violations to the California Attorney General's Office.
	Assembly Bill 1884, Chapter 576 (*Bill Text - AB-1884 Food facilities: single-use plastic straws.*)	2019		X			Full-service restaurants	Paper, pasta, sugar cane, wood, and bamboo.	Customers must request plastic straw	$25/day that the restaurant violates the law but the total cannot exceed $300	State enforcement officer
	Division 30, Part 3, Chapter 6.5(*Chapter 6.5 Expanded Polystyrene Loose fill Packaging*)	2008			X		Wholesalers and manufacturers	Polystyrene loose-fill packaging compromise of 100% recyclable material.		An infraction is punishable by a fine not exceeding $1000	
Colorado	HB 21-1162 (Garcia et al.)	2021	X		X		Stores and retail food establishments	Paper bags	Bag fee cannot be applied to those on state/federal assistance	1st offense: $500 2nd offense: $1000	Municipality enforcement officers. Ban starts in 2024; stores must charge 10 cents/bag in 2023-2024
Connecticut	Section 22A-246A("Chapter 446d - Solid Waste Management")	2021	X				Retail stores	Plastic bags for newspapers, bulk items, produce/meat, laundry/dry-cleaning			

Table B10. (Continued)

States	Legislative Information		Impacted Materials				Business Response				Enforcement Process
	Bill Name/Number	Enacted or Passed Date	Plastic Bags	Plastic Straws	Polystyrene	Plastic Containers	Stakeholders Impacted	Acceptable Alternatives	Exceptions	Business violation fine	
Delaware	Title 7, Chapter 6099A(*Chapter 60 Environmental Control Subchapter IX Recycling and Waste Reduction*)	2021	X				Retail establishments and grocery chains	Plastic bags to contain frozen foods/plants and for waste.	Stores that offer plastic bags for exemption purposes have to set up for an at-store bag recycling program.	1st offense: $500 2nd offense: $1000 3rd offense: $2000	Delaware Department of Natural Resources and Environmental Control assess penalties for non-compliance
District of Columbia	A20-0385/L20-0142 (Sustainable DC Omnibus Amendment Act of 2014)("Foam Free DC | doe")	2016; 2019		X	X		Retail stores and restaurants	Compostable and recyclable food service ware		Fines from $100-$800	Department of Energy and Environment (DOEE) inspects retails businesses and issues fines to those in violation
Maine	L.D. 1532("Plastic Bag and Film Recycling, Waste Management, Maine Department of Environmental Protection")	2019	X				Retail stores, restaurants, and seasonal pop-ups	Reusable bags 4 ml thicker, recycled paper bags	Stores that offer plastic bags for exemption purposes have to set up for an at-store bag recycling program.	Subject to penalties under Section 349	Department of Environmental Protection of Maine
New Jersey	P.L. 2020, c117	2022	X		X		Retail stores and restaurants	Reusable carry out bags		1st offense: warning 2nd offense: fined up to $1,000 per day 3rd and subsequent offenses: fined up to $5,000 per day	

Table B10. (Continued)

States	Legislative Information		Impacted Materials				Business Response				Enforcement Process
	Bill Name/Number	Enacted or Passed Date	Plastic Bags	Plastic Straws	Polystyrene	Plastic Containers	Stakeholders Impacted	Acceptable Alternatives	Exceptions	Business violation fine	
New York	Environmental Conservation Law (ECL) Article 27, Title 28("Bag Waste Reduction Law: Information for Manufacturers and Retailers - NYS Dept. of Environmental Conservation")	2020	X				Retails stores	Reusable carry out bags			New York Department of Environmental Conservation regulates and enforces the law.
	ECL Article 27, Title 30("Polystyrene Foam Ban - NYS Dept. of Environmental Conservation")	2022			X		Retail stores and manufacturers				New York Department of Environmental Conservation regulates and enforces the law.

Table B11. Municipalities and counties in the US which have passed a regulatory plastic product ban since the 2010 Report.

States	Municipality/ County	Legislative Information		Impacted Materials					Businesses Response		
		Bill Name/Number	Enacted or Passed Date	Plastic Bags	Plastic Straws	Polystyrene	Plastic Containers	Stakeholders Impacted	Acceptable Alternatives	Exceptions	Business violation fine
Alaska	Anchorage	AO-No 2018-110; Municipal Code 15.95.20 (“Code of Ordinances | Anchorage, AK | Municode Library”)	2019	X				Retail stores	Recyclable paper bags taxed cents each	bags for: bulk items, produce, meat, ice, dry-cleaning, comic books, sold in packages for pet waste, yard waste, or garbage, provided by marijuana retail stores, newspapers	1st offense: warning; 2nd offense: $250; 3rd offense: $500
	Bethel	City Municipal Code Chapter 8.12(“Ch. 8.12 Plastic Bags and Polystyrene Containers”)	2009	X		X		Retail establishments	Reusable bags, recyclable paper bags, compostable/biodegradable bags	coolers/ice chests intended for reuse, emergency situations, situations where alternative options not feasible or incur undue hardship on business	
	Cordova	Cordova Municipal Code Chapter 8.37; Ordinance 1137(City of Cordova)	2016	X		X		Retail establishments, food vendors, nonprofit vendors	Reusable bags, recyclable paper bags, compostable/biodegradable bags	coolers/ice chests intended for reuse, emergency situations, situations where alternative options not feasible or incur undue hardship on business	
Georgia	South Fulton	Part 2, Title 14, Chapter 12(*Ord 2019-027*)	2021	X				Retail establishments	Reusable bags, compostable and 100% recyclable bags	Bags for bulk items, frozen food, meat, or plants, prescription drugs, newspaper, laundry/door-hanger bags, sold in packages intended for multiple use like garbage, yard waste, pet waste	

Table B11. (Continued)

States	Municipality / County	Legislative Information		Impacted Materials				Businesses Response			
		Bill Name/Number	Enacted or Passed Date	Plastic Bags	Plastic Straws	Polystyrene	Plastic Containers	Stakeholders Impacted	Acceptable Alternatives	Exceptions	Business violation fine
Hawaii	Kauai County	Bill No. 2775; amended Chapter 22 ("Recycling - Polystyrene Food Service Container Ban - Kauai.gov")	2022			X	X	Food vendors	Compostable food service containers	Packaging for foods packaged outside of the County, packaging for raw meats, poultry, fish, and eggs except if provided for consumption without further food preparation (eg. sashimi and poke); situations where there are no alternatives and approved by the director; official emergency situations	1st offense: $250 2nd offense: $500 3rd offense: $1000
		Ordinance No. 885; amended Chapter 22(*Bill No. 2322 Ordinance No. 885*)	2011	X				Retail establishments	Reusable bags, biodegradable bags, recyclable paper bags	Bags for bulk items or perishable produce, bags to protect garments, bags for prepared foods	1st offense: $250 2nd offense: $500 3rd offense: $1000
		Policy to Prohibit the Purchase, Use, or Distribution of Disposable plastics(The County of Kauai)	2021	X	X	X		County facility users, County permitted events, County employees, use of County funds	Straws: bamboo, grain stalk, paper. Food service containers: compostable material or recyclable materials	Plastic bags for trash collection, plastic utility gloves, catered food purchased by County when alternative materials would cause undue hardship as determined by Director, emergency situations	
Illinois	Evanston	Ordinance 66-O-14(Evanston City)	2015	X				Franchise retail establishments larger than 10,000 sq ft	Reusable bags, recyclable or compostable paper bags	Restaurants, non-chain stores, produce or meat bags	Each violation: $150

Table B11. (Continued)

States	Municipality / County	Legislative Information		Impacted Materials				Businesses Response			
		Bill Name/Number	Enacted or Passed Date	Plastic Bags	Plastic Straws	Polystyrene	Plastic Containers	Stakeholders Impacted	Acceptable Alternatives	Exceptions	Business violation fine
Maryland	Baltimore	Comprehensive Bag Reduction Act; Article 28 Section 32-1, Article 7 Section 62-1("Baltimore City Comprehensive Bag Reduction Act | Baltimore Office of Sustainability," 2020)	2021	X				Retail establishments, food vendors, convenience stores, gas stations	Paper bags, compostable bags, and plastic bags that are 4 mils or thicker; Any single use alternative bag has a $0.05 fee to the consumer	Fresh fish, meat, poultry products; unpackaged fruits, nuts, vegetables; unpackaged confectionary, fresh cheese, baked goods, and goods obtained at a farmer's market; prescription drugs from pharmacy; Users of SNAP, WIC, or FSP will be exempt from the ban and $0.05 surcharge.	1st offense: $250 2nd offense: $500 3rd offense: $1000
	Montgomery County	Bill 32-20; amending Chapter 48, Solid Waste, Article VII, Section 48-62.(Montgomery County)	2021		X			Food vendors	Reusable, compostable, or marine degradable straws	Can be distributed upon request by those with disabilities	
		Bill 41-14 (Montgomery County)	2015			X	X	Food vendors	Compostable food service containers	Food or beverage that are sealed in expanded polystyrene containers outside of the county. Used to package raw, uncooked, or butchered meat, fish, poultry, or seafood.	Class B civil violation; Each day a violation exists in a separate offense
South Carolina	Charleston	Ordinance No. 2018-146 with amendments under Ordinance No. 2019-087(City of Charleston)	2020	X		X		Retail establishments, food providers	Products made from polystyrene that is entirely encapsulated by a more durable material (surfboards, life preservers, etc.); Construction products made from polystyrene.		1st offense: warning 2nd offense: $200 3rd offense: $350 additional offense: $500

Table B11. (Continued)

States	Municipality / County	Legislative Information		Impacted Materials				Businesses Response			
		Bill Name/Number	Enacted or Passed Date	Plastic Bags	Plastic Straws	Polystyrene	Plastic Containers	Stakeholders Impacted	Acceptable Alternatives	Exceptions	Business violation fine
Utah	Park City	Bill Ordinance 2017-20(*Park City : Municipal Code*)	2017	X				Grocery stores larger than 12000 sq ft	Reusable bags made out of cloth or other machine washable fabric that is at least 2.25 mil thick	Bags provided by pharmacists to contain prescription drugs, disposable paper bags; bags that contain frozen foods such as meats, fish, nuts, grains, candy or small hardware items	1st offense: $250 2nd offense: $500 3rd and subsequent offenses: The City may obtain civil injunctive relief, without requirement of bond, upon proof of three or more violations within a one-year period.

B4. International

SUCP consumption is a global concern, and governments on six continents have enacted plastics regulations. Here, we describe examples of such regulations, organized by continent and then country. The majority of these examples have been enacted or passed since the publication of the 2010 Report.

North America

- Canada – In 2020, the federal government implemented a federal ban of six single-use plastics items that are set to be phased out by 2022. The plastics ban is an amendment to the Canadian Environment Protection Act established in 1999. The products include plastic grocery bags, straws, stirrers, plastic cutlery, six pack rings, and food containers made from hard-to-recycle plastics. (Canada, 2020)
- Mexico City, Mexico – On January 29, 2021, the city's a ban on plastic bags, utensils and other disposable plastic items has taken effect. The law bans single-use containers, forks, straws and other ubiquitous items but there are no associated fines for those in violation. ("Mexico City Ban on Single-Use Plastics Takes Effect | World News | US News")

Africa

- Benin – In November 2017, Adopted a ban on the production, importation, marketing, possession and use of non-biodegradable plastic bags. ("Benin: Select plastic laws | ELAW")
- Côte d'Ivoire – In November 2013, a ban on lightweight plastic bags was announced. It was meant to prohibit the production, importation, commercialization, possession, and the use of non-biodegradable plastic bags. But the announcement was repealed due to external pressures. In 2016, they outlawed plastic sachets used for alcohol.("Côte d'Ivoire Chokes on its Plastic Shopping Bags," 2014)
- Eritrea – In 2005, the Eritrean government banned plastic bags outright. ("Regulations to Prohibit the Production, Sale or Distribution of the Plastic Bags in Eritrea 63/2002")
- Ethiopia – In 2008, the Ethiopian government passed a new law (Proclamation 513) that bans the manufacturer and import of plastic bags less than 0.33 mm in thickness. (Giacovelli, 2018)
- Ghana – In July 2004, the Ghanian government created a Recycling Taskforce to hire waste collectors to collect and deliver plastic bags to warehouses for recycling. The plastic producers are required to help fund the project. ("Ghana's plastic house," 2021)
- Kenya – In 2017, outlawed the manufacturing, sale and distribution of plastic carrier bags. Companies in violation are fined up to $40,000 and individuals in violation are fined up to $500. In 2019, a ban was announced on single-use plastics in protected areas such as beaches, forests and conservation areas which would take effect in June 2020. ("Kenya bans single-use plastics in protected areas," 2020)
- Madagascar – In 2015, a ban on plastic bags less than 0.05 millimeters thick was implemented. (Giacovelli, 2018)

- Nigeria – In 2014, implemented a ban on plastic bags and sachets of drinking water. In 2019, Nigeria strengthened the ban by including a fine or 3-year jail term for any store found giving plastic bags to customers. (Giacovelli, 2018)
- Tanzania – In June 2019, plastic bags are prohibited from being imported, exported, manufactured, sold, stored, supplied, and used in Mainland Tanzania. Tourists are prohibited from carrying plastic bags into the country. ("Prohibition of Plastic Bags Effective June 1, 2019," 2019)
- Senegal – In April 2020, implemented a ban on single-use plastic water sachets and coffee cups. (Giacovelli, 2018)
- South Africa – In 2003, outlawed the manufacture, trade and commercial distribution of plastic bags made of plastic film with a thickness less than 80 micrometers. In the same year, a levy was implemented on plastic bags with a fixed normal price of 46 rand cents for 24-litre bags across all retailers.("Plastic Bags Regulation | ELAW")
- Rwanda – In 2008, instituted a national ban on non-biodegradable plastic bags. The ban prohibits the manufacturing, use, importation, and sale of plastic carrier bags. In 2010, officially declared "Umagunda" a national holiday where the residents are required to participate in mandatory clean ups of littered plastics. Participation is required by law and failure to participate can result in a fine.(Yee, 2018)
- Uganda – In 2007, imposed a thickness rule in plastic bags. ("Uganda bans plastic bags, promotes banana leaves," 2007)

Asia

- Bangladesh – In 2002, the government banned plastic bags but it is not enforced. ("Bangladesh: Sacking plastic bags | Tomorrow Today - The Science Magazine | DW | 26.02.2021")
- Bhutan – In 2019, the Bhutanese government reinforced their ban of the use and sale of plastic bags. Businesses would be fined if they are in violation of the law for their first offense, and the fine will increase if there are subsequent violations.
- China – 2021, a ban on plastic straws and plastic bags in restaurants, retailers and major cities has been implemented. Plastic bags and straws are restricted from being produced, sold, and used as a single-use plastic product.("China")
- India – In 2022, the national government's plastic ban will be implemented across the country. India banned the manufacture, sale and use of identifiable single-use items like plates, cups, straws, trays and polystyrene.(Goel, 2021)
- Israel – In 2021, the national government proposed a plan to doubled the taxes on single-use plastics to reduce the plastic consumption. If it is approved, the tax will be implemented in 2022.("Israel plans to tax disposable plastic in bid to reduce use," 2021)
- Maldives – In November 2020, a ban on single-use plastics that prohibit the importation of certain plastic items such as straws, cutleries, plates, stirrers, and 30 x 30 centimeter plastic bags, etc. The ban is part of a phase-out plan to eliminate single-

use plastics by the end of 2023 and the first phase will be begin in December 2020.(Andrea D. Steffen, 2021)

- Philippines – In July 2021, the Philippines legislation passed the Single-Use Plastic Products Regulation Act which prohibits the production, import, and sale of many single-use food packaging products. Violators of the law will be penalized with a fine including individuals and large businesses. The Philippines also seeks to phase out single-use plastics in a span of four years such as tableware, film wrap, packaging or bags less than 50 microns thick.(Twitter et al.)
- Taiwan – In July 2019, Taiwan banned plastic straws in fast-food restaurants and department stores. In 2020, all stores will be required to charge customers for plastic bags as an effort to entirely ban single-use plastics by 2030. (“Taiwan wages war on single-use plastics | Taiwan News | 2020-02-22 13:44:00”)

Australia

- On April 8, 2021, the Plastic Reduction Act 2021 was announced which included an amendment that gives effect to a phase-out single-use plastic by 2025 or sooner. The legislation aims to reduce the use of single-use plastics by prohibiting the sale, supply, or distribution of single-use plastic cutlery, stirrers, and expanded polystyrene takeaway food and beverage containers including biodegradable plastics. (“Australia”)
- In March 2021, the Australian government launched the National Plastics Plan 2021 that sets the government’s goal to reduce plastic waste and increase recycling rates, find plastic alternatives, and reduce the number of plastics impacting their environment.

Europe

- Belgium – On July 1 2020, The country of Belgium passed a tax on plastic bags in 2007 along with a tax on plastic films (like dry cleaning bags), aluminum foil, and disposable cutlery. (“How Belgium is implementing the EU plastics tax measures”)
- Denmark – On January 1 2021, the government banned lightweight plastic carrier bags and increased the minimum surcharge on plastic carrier bags in effort to reduce single-use plastic consumption.(“Denmark puts an end to free plastic bags”)
- England – 2021, started a campaign to ban single-use plastics plates and cutlery and polystyrene cups. In 2022, the government will begin to impose a plastic packaging tax that will charge 200 euros per ton for plastic that has less than 30% recycled content to encourage greater use of recycled material.(Carrington and editor, 2021)
- France – 2021, French legislatures set the objective toban single-use plastic packaging from the French market by 2040. To achieve this goal, France established a reduction, reuse, and recycling targets for 2021-2025. Their reduction target is 20% by 31 December 2025.(“Plastics and packaging laws in France| CMS Expert Guide”)
- Germany – On February 9 2021, a ban of the distribution of lightweight plastic bags (thickness below 50 microns) at the point of sale of goods or products will be implemented on January 1, 2022. Violators will be fined. (“Germany”)

- Ireland – In 2019, a ban on single-use plastic products such as cotton bud sticks, cutlery, plates, stirrers, chopsticks, straws, and expanded polystyrene will be implemented on July 3, 2019. By January 2025, it will be a requirement for drink producers to have a minimum 25% recycled materials in their single-use plastic bottles.(Daly)
- Italy – In 2020, the national government postponed the new plastics tax that was set to be established on July 1 2020 due to COVID-19 pandemic. The law is set to tax non-recyclable plastic packaging at a rate of 0.45 euros per kilograms. The tax was delayed until January 1, 2021.(“Italy to delay new plastics tax until 2021 | Food Packaging Forum,” 2020)
- North Macedonia, Macedonia – In January 1, 2020, approved of a ban that would replaces plastic bottles with glass bottles and plastic cups/spoons/other disposable dishes would not be obtained within the country. The regulations are still be discussed upon.(“Single-use plastics banned in state institutions of North Macedonia,” 2019)
- Scotland – The Scottish government set out its plans to expand restrictions on the single-use plastics ban which will include single-use plastic cutlery, plates, straws, stirrers, sticks and expanded polystyrene. The law will make it unlawful to make and supply any of the items commercially in both online and instore sales. (Scotl et al., 2021)
- Spain – In 2023, plastic wrapped produce will be banned.(“Spain to Ban Plastic Wrap for Fruits and Veggies,” 2021)
- Wales – As of 2019/2020 Wales has a recycling rate of over 65% which is the third total in the world. On March 2020, plastic straws, cutlery, and polystyrene food and drink containers will be banned as part of a wider measure to continue to increase their recycling rate.(“Single use plastics to be banned in Wales”)

South America

- Argentina – In November 2020, the Argentinian Senate passed a law that bans the production, import and marketing of cosmetics and care products with plastic microbeads. Argentina will have two years to adapt, implement and enforce the new law.(Prabhakar, 2020)
- Brazil - Rio de Janeiro, Brazil – On June 25 2018, the national government banned the use, distribution and sale of plastic bags all over the state.(“Brazil”). City of Sao Paulo, Brazil – January 1 2021, established a ban on single-use plastics (glasses, plates, cutlery) in commercial establishments. It also banned plastic drinking straws in 2019, lime many other cities in Brazil.
- Chile – May 20 2021, the Chilean government passed a law that prohibits food vendors from distributing plastic tableware such as cutlery, straws, and Styrofoam utensils. The law requires stores to actively display, sell, and receive refillable bottles and will only allow single-use bottles if they contain recycled materials that was collected in Chile.(“Chile Protects Oceans from Single-Use Plastics, Mandates Refillable Bottle”)

- Uruguay – August 2018, the national government passed a law that established measures for prevention and mitigation of environmental impacts of due to the use of plastic bags by prohibiting single-use plastic bags that were not certified or in compliance of a certain standard.(“Plastic Bags Banned in Uruguay, But No Hope for Larger Waste Bill”)

Antarctica

- While Antarctica has no government, plastic pollution in Antarctic waters has been the subject of international reporting (Waller et al., 2017) and attention of the multinational Antarctic Treaty System (Zhang et al., 2020).

Appendix C: Survey of Florida Stakeholders

C1. Survey Approach for Selected Stakeholders and Distribution

Five different surveys (one each for local governments, residents, retailers, manufactures, and recycling facilities) were created, where the survey questions were reviewed internally by the UF team then sent for review by the DEP team. The survey questionnaires for each of the five stakeholders are shown in Appendix C3. The five surveys were administered using the online web-survey platform Qualtrics for stakeholders to voluntarily participate. The survey period was from mid-September until October 31st. The survey results were processed and analyzed in November. Each stakeholder received a single link that housed all five surveys, the consent form (per IRB protocols (note the study was considered IRB exempt)) and contact information for issues with the survey. When the stakeholder was unsure of which survey to complete, they were encouraged to complete multiple surveys appropriate to their role. The single link that housed all the surveys was administered and managed on the UF team website and each survey included a UF themed design for the survey. The website link was shared with DEP to post onto their website and to be included in any email correspondence with appropriate stakeholders. A sample of the email drafts used to contact stakeholders are included in Appendix C3, along with the sample social media post language distributed.

The single website link is found here: https://faculty.eng.ufl.edu/timothy-townsend/survey/. Note, the survey links are not active since the survey has been closed as of October 31st, 2021. Surveys were distributed to the target contacts described below for each of the five stakeholders. However, many more stakeholders were contacted through various emails/phone calls and many of the stakeholders not listed here were referred to the UF team by contact with those that are listed here. The main form of correspondence with each target contact was through email.

1. **Local governments:** solid waste directors/recycling coordinators of the 67 Florida counties provided by DEP; and the membership of the Florida League of Cities, Recycle Florida Today, Solid Waste Association of North America, Florida Association of Counties, Florida Recycling Partnership Foundation (by contacting organization representative that can either send an email blast to all members and/or post as a news blog on their website).
2. **Residents:** the solid waste directors/recycling coordinators will be sent a link that can be voluntary posted to their local county website/app for their residents; and UF supplied social media posts for DEP to post on their accounts (e.g., Twitter and Facebook posts) and share these with solid waste directors/recycling coordinators to repost. Solid waste directors were also encouraged to share the survey link on other similar county websites (e.g., centralfloridarecycles.org)
3. **Retailers:** the membership of the Florida Retail Federation, Florida Restaurant and Lodging Association, Florida Chamber of Commerce, etc. (by contacting organization representative that either sent an email blast to all members and/or posted as a news blog on their website, and/or provided contact information for retailers).

4. **Manufactures:** Members of the American Chemistry Council, Manufacturers Association of Florida, etc. There is currently no comprehensive contact list or membership of Florida plastic bag, auxiliary materials and wrappings manufacturers therefore the UF team compiled a contact list of all Florida bag suppliers and recyclers (e.g., Berry Plastics, Gulf Coast Plastics, Starpack, Solupac) and contacted them through phone and email.
5. **Recycling facilities:** Public and Private Florida MRFs. The list of MRFs was provided by DEP.

The UF team sent multiple emails to each stakeholder, at least twice in September, and at least twice in October to ensure that they have received multiple opportunities to participate in the surveys. The UF team also conducted phone calls to stakeholders to facilitate survey participation.

C2. Survey Results

C2.1. Stakeholder 1: Local Governments

The survey results for each of the 12 questions (and additional comment option) asked to Local Government Stakeholder(s) are shown in Tables C1-C11 and Figure C1. See Appendix C5 for the survey questions and Appendix C2.6 for the extended response summaries.

Table C1. The percent answered for each question for Local Governments Stakeholder survey based on the total number of participants (count total) and the total number of participants that responded to that specific question (count not answered).

Question	Count Total	Count Not Answered	Percent Answered
Q1	95	4	96%
Q2	95	25	74%
Q3	95	0	100%
Q4	95	8	92%
Q5	95	0	100%
Q6	95	0	100%
Q7	95	0	100%
Q8	95	0	100%
Q9	95	0	100%
Q10	95	2	98%
Q11	95	3	97%
Q12	95	3	97%
Additional comments	95	43	55%

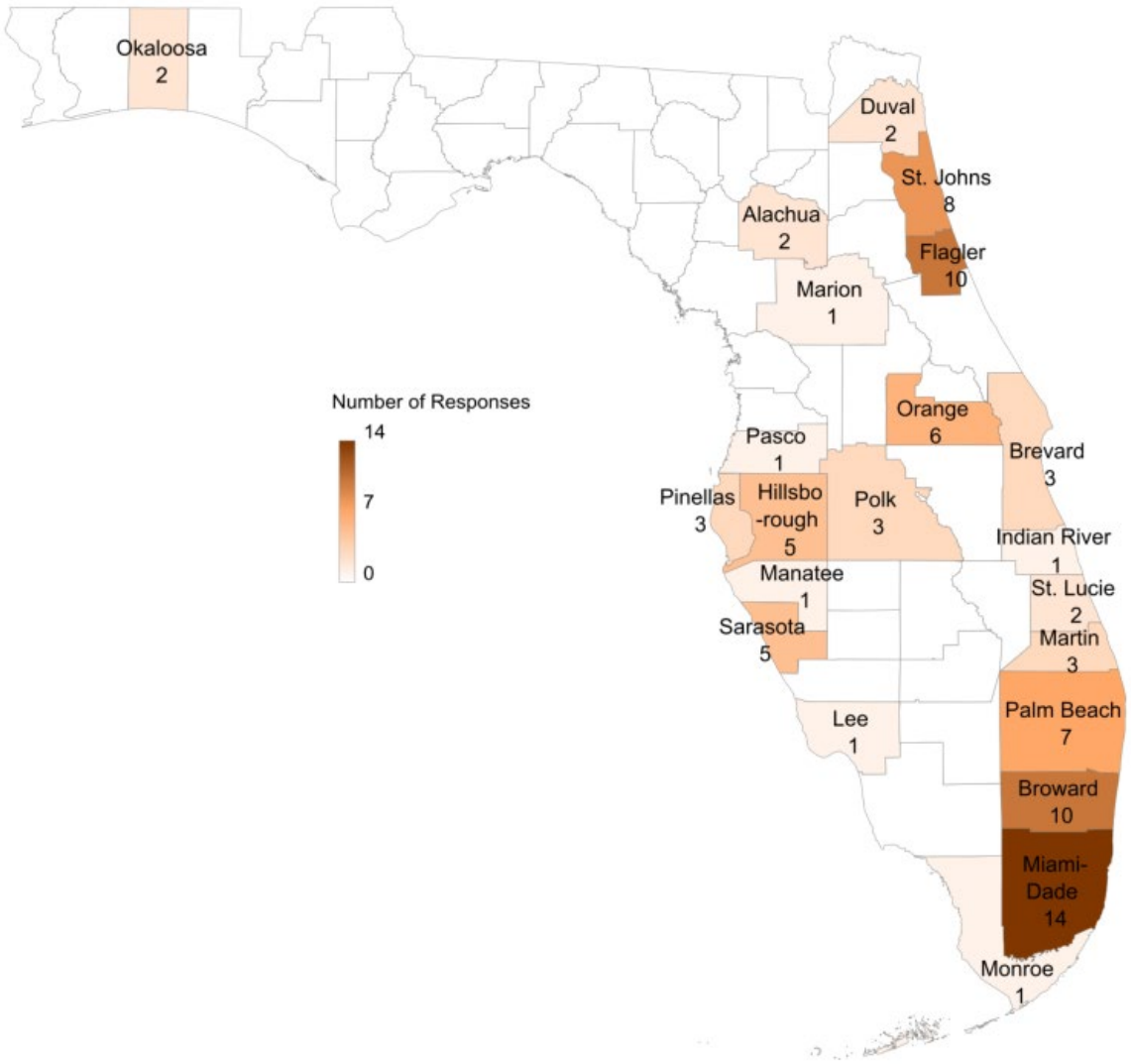


Figure C1. The number of responses from cities and/or counties that participated in the Local Government Stakeholder survey. Results from Question 1, Local Government Stakeholders survey responses.

Table C2. The population of Florida citizens represented by the individual that completed the survey and the identified county associated with the individual's response. Results from Question 2, Local Government Stakeholders survey responses.

No.	Response County/City	Response
1	Alachua County	141000
2	Alachua County	132000
3	Brevard County	615420
4	Brevard County	600000
5	Brevard County	2400000
6	Broward County	155000
7	Broward County	95000
8	Broward County	65000
9	Broward County	95000
10	Broward County	155000
11	Broward County	58000
12	Broward County	1940000
13	Broward County	1966120
14	Duval County	24000
15	Duval County	24000
16	Flagler County	15000
17	Flagler County	5000
18	Flagler County	14515
19	Flagler County	4654
20	Flagler County	17217
21	Flagler County	3000
22	Flagler County	5500
23	Flagler County	115000
24	Hillsborough County	1470000
25	Hillsborough County	399000
26	Hillsborough County	35000
27	Indian River County	158000
28	Lee County	2800
29	Manatee County	420000
30	Martin County	161381
31	Martin County	17000
32	Martin County	160000
33	Miami-Dade County	92000
34	Miami-Dade County	90000
35	Miami-Dade County	50226
36	Miami-Dade County	10000
37	Miami-Dade County	5553
38	Miami-Dade County	478251
39	Miami-Dade County	92000
40	Miami-Dade County	208000
41	Okaloosa County	200000
42	Okaloosa County	26000
43	Orange County	300000
44	Orange County	300000
45	Orange County	280000
46	Orange County	31000
47	Orange County	30000
48	Orange County	220000
49	Palm beach County	396
50	Palm beach County	100000

Table C2. continued.

No.	Response County/City	Response
51	Palm beach County	80139
52	Palm beach County	110000
53	Palm beach County	1500000
54	Palm beach County	100000
55	Palm beach County	68000
56	Pasco County	16500
57	Pinellas County	12000
58	Pinellas County	984054
59	Pinellas County	116000
60	Polk County	50000
61	Polk County	650000
62	Sarasota County	80000
63	Sarasota County	400000
64	Sarasota County	18000
65	Sarasota County	100000
66	St. Johns County	15000
67	St. Johns County	267042
68	St. Johns County	2000000
69	St. Johns County	264672
70	St. Johns County	10000

Table C3. The response to the question “Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 3, Local Government Stakeholders survey responses.

Response option	Response result	% of total
At both statewide and local levels	65	68%
At local level	7	7%
At the statewide level	20	21%
No	3	3%
Grand Total	**95**	**100%**

Table C4. The response to the question “Would such a regulation be effective?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 4, Local Government Stakeholders survey responses.

Response option	Response result	% of total
Yes	75	80%
No	2	2%
Other	9	10%
Grand Total	**94**	**100%**

Table C5. The response to the question “Did your entity have any disposable plastic bags, auxiliary containers and wrappings bans/laws/limitations in place prior to the 2010 legislative ban referenced in section 403.7033 Florida Statutes?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 5, Local Government Stakeholders survey responses.

Response option	Response result	% of total
I do not know	25	27%
No	61	65%
Other	3	3%
Yes, we had one that passed, and it is still in effect	5	5%
Grand Total	**94**	**100%**

Table C6. The response to the question “Who must comply with the ban/law/limitation? (e.g., retailers, residents, restaurants, etc.)?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 6, Local Government Stakeholders survey responses.

Response option	Response result	% of total
Businesses	1	1%
Citywide	2	2%
Everyone	35	37%
Food service industry	1	1%
Manufacturers	1	1%
N/A	30	32%
Properties with sidewalk cafe	1	1%
Residents	1	1%
Retailers	6	6%
Restaurants and retailers	6	6%
Retailers, residents, restaurants	4	4%
Retailers, residents, restaurants, grocery stores	2	2%
Retailers, residents, restaurants, local, county and state governments	1	1%
Retailers, restaurants, special event permittees	1	1%
All population within the community	1	1%
Any City facility, parks, recreation centers, venues, or public assembly permitted events (e.g., races, protests, concerts, and all other permitted events)	1	1%
City vendors/permittees and anyone on City property	1	1%
Grand Total	**94**	**100%**

Table C7. The response to the question “If there was/is a ban/law/limitation, please check off which materials are included in the ban/law/limitation?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 7, Local Government Stakeholders survey responses.

Response option	Response result	% of total
Other	27	28%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers, Single use plastic eating utensils, Styrofoam products, Plastic film products	19	20%
Single use plastic straws	7	7%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers, Single use plastic eating utensils, Styrofoam products, Plastic film products, Other	6	6%
Single use plastic bags, Styrofoam products	4	4%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers, Single use plastic eating utensils, Styrofoam products	4	4%
Single use plastic straws, Styrofoam products	4	4%
Single use plastic straws, Single use plastic bags	2	2%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers, Styrofoam products, Plastic film products	2	2%
Single use plastic straws, Single use plastic bags, Single use plastic to-go containers, Single use plastic eating utensils, Styrofoam products	2	2%
Single use plastic bags	1	1%
Single use plastic cups, Single use plastic to-go containers, Styrofoam products	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers, Plastic film products	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers, Single use plastic eating utensils	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Single use plastic to-go containers, Single use plastic eating utensils, Styrofoam products, Other	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Styrofoam products	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic cups, Styrofoam products, Plastic film products	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic eating utensils, Styrofoam products	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic eating utensils, Styrofoam products, Plastic film products	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic to-go containers, Styrofoam products, Other	1	1%
Single use plastic straws, Single use plastic bags, Single use plastic to-go containers, Styrofoam products, Plastic film products	1	1%
Single use plastic straws, Single use plastic bags, Styrofoam products	1	1%
Single use plastic straws, Single use plastic bags, Styrofoam products, Plastic film products	1	1%
Single use plastic straws, Single use plastic cups, Single use plastic eating utensils, Styrofoam products	1	1%
Single use plastic straws, Single use plastic cups, Single use plastic to-go containers, Single use plastic eating utensils	1	1%
Single use plastic straws, Single use plastic cups, Single use plastic to-go containers, Single use plastic eating utensils, Styrofoam products, Plastic film products	1	1%
Single use plastic straws, Single use plastic cups, Single use plastic to-go containers, Styrofoam products	1	1%
Styrofoam products, Other	1	1%
Grand Total	**95**	**100%**

Table C8. The response to the question “Does your entity provide any education campaigns to discourage placement of disposable plastic bags, auxiliary containers and wrappings in curbside recycling?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 8, Local Government Stakeholders survey responses.

Response option	Response result	% of total
No, we do not have campaigns because residents can place them in the bins for recycling	13	14%
No, we do not have campaigns even though they are not recycled when placed in the bins	28	29%
Yes, we provide educational campaigns	54	57%
Grand Total	**95**	**100%**

Table C9. The response to the question “Do you have any waste reduction or similar programs/incentives (e.g., litter campaigns, sustainability initiatives) in place for disposable plastic bags, auxiliary containers and wrappings?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 9, Local Government Stakeholders survey responses.

Response option	Response result	% of total
No	49	52%
Yes	46	48%
Grand Total	95	100%

Table C10. The response to the question “Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 10, Local Government Stakeholders survey responses.

Response option	Response result	% of total
No	10	11%
Yes	83	89%
Grand Total	93	100%

Table C11. The response to the question “Are you willing to support additional waste reduction, reuse and recycling through increased fees?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 12, Local Government Stakeholders survey responses.

Response option	Response result	% of total
No	10	11%
Not sure/depends	18	20%
Yes	64	70%
Grand Total	92	100%

C2.2. Stakeholder 2: Retailers

The survey results for each of the 33 questions (and additional comment option) asked to Retailers Stakeholder(s) are shown in Tables C12-C45 and Figure C2. See Appendix C5 for the survey questions and Appendix C2.6 for the extended response summaries. The responses for data requested in questions 14, 15, and 16 were provided by two participants but the data was not clearly defined and therefore is not provided here. While for questions 27, 28, and 29 only one participant provided data: 10,000 units in 2020 and 6,500 units in 2015 of reusable bags sold.

- In a separate interview (as part of the efforts in Section 4) with gas and convenience store Wawa data was provided:
    - 12,322 units in 2020 and 2,470 units in 2015 of reusable bags sold.
    - The amount of disposable plastic bags, auxiliary containers and wrappings collected for recycling in 2020 was 5,620 pounds per store and 2015 was 3,420 pounds per store.
    - The recycling rate of disposable plastic bags and auxiliary containers was about 2% per store.
    - The amount on a unit basis on how many disposal plastic bags and containers are procured for their customers was 56.3 million in 2020 and 22.3 million in 2015. Increase partially due to increased number of stores and footprint.

Table C12. The percent answered for each question for Retailers Stakeholder survey based on the total number of participants (count total) and the total number of participants that responded to that specific question (count not answered).

Question	Count total	Count Not Answered	Percent Answered
Q1	36	20	44%
Q2	36	6	83%
Q3	36	0	100%
Q4	36	0	100%
Q5	36	0	100%
Q6	36	0	100%
Q7	36	0	100%
Q8	36	3	92%
Q9	36	2	94%
Q10	36	0	100%
Q11	36	0	100%
Q12	36	1	97%
Q13	36	1	97%
Q14	36	34	6%
Q15	36	35	3%
Q16	36	35	3%
Q17	36	0	100%
Q18	36	0	100%
Q19	36	0	100%
Q20	36	0	100%
Q21	36	2	94%
Q22	36	0	100%
Q23	36	0	100%
Q24	36	0	100%
Q25	36	0	100%
Q26	36	23	36%
Q27	36	35	3%
Q28	36	35	3%
Q29	36	36	0%
Q30	36	0	100%
Q31	36	0	100%
Q32	36	0	100%
Q33	36	0	100%
Additional comments	36	36	0%

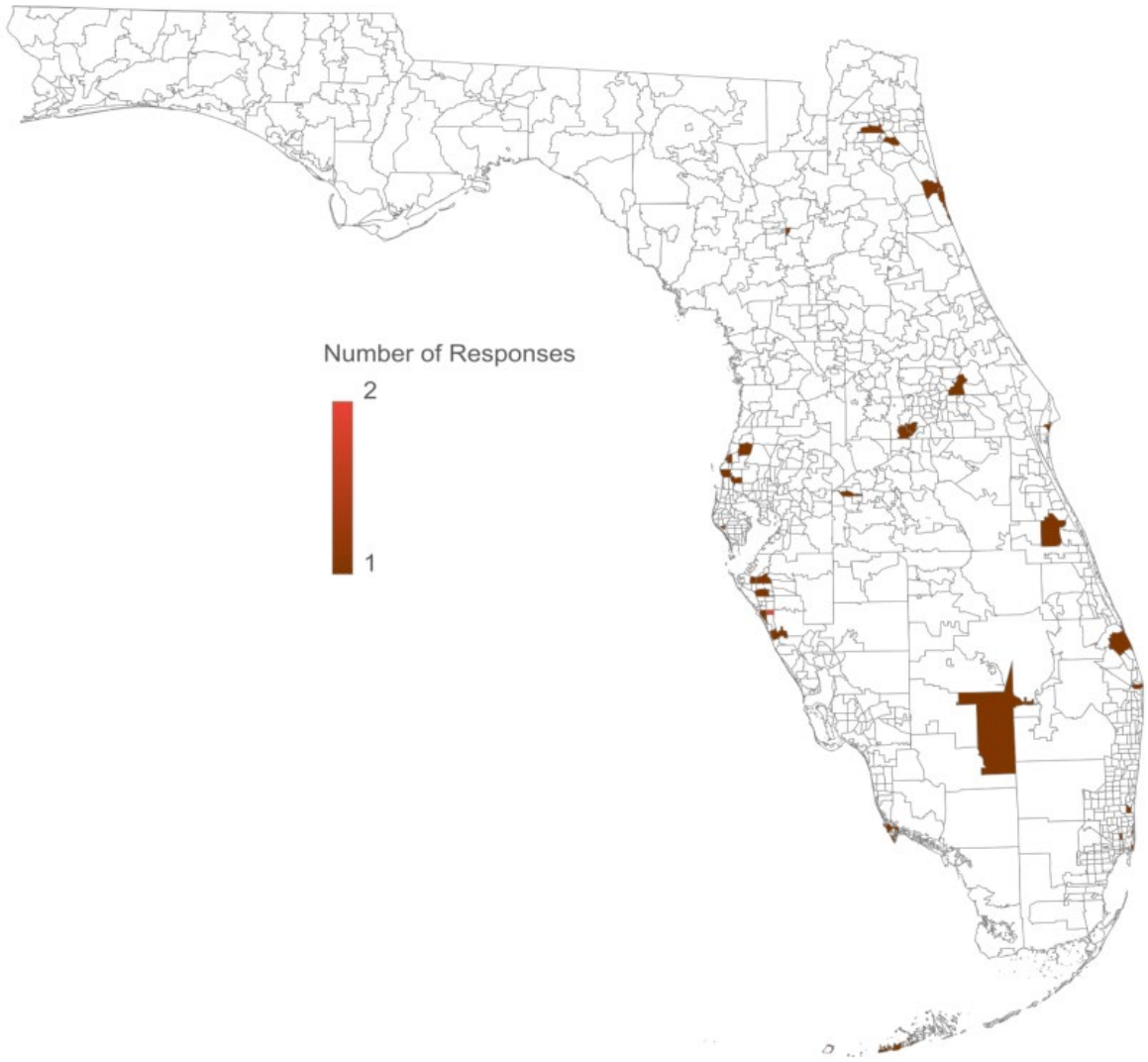


Figure C2. The location of the companies that participated in the Retailers Stakeholders survey. Results from Question 2, Retailers Stakeholders survey responses.

Table C13. The zip code and company name of Florida retailers that completed the survey. Results from Question 1 and 2, Retailers Stakeholders survey responses. “NA” refers to the participant not providing their company name.

Company name	Location
Meehan's Irish Pub & Seafood House	32084
NA	33455
NA	34652
Red Door Lakeland	33803
NA	34208
NA	33150
Easy exit homes	34275
The Beanz Man	34233
Children's World	34233
East Lake Cafe	34685
Sweet Berries	32601
Cabana club swim Resort	33051
NA	32080
NA	33785
NA	33708
NA	33706
Elite’s Flowers	33020
Hightide Burrito	32210
BLUE BAMBOO	32257
NA	34243
NA	33040
Grand Beach Hotel Surfside	33154
3800 Ocean	33404
NA	32948
NA	32084
NA	34689
NA	34654
NA	34205
NA	33139
Sage Bistro	32920
Vitambi Springs Resort	33440
NA	34231
NA	32765
NA	32836
NA	32830
NA	34765
NA	32876
CJ's on the Bay	34145

Table C14. The response to the question “Please select all the types of materials commonly sold at your store:”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 3, Retailers Stakeholders survey responses.

Response option	Response result	% of total
Clothing	1	3%
Clothing and Other products	4	11%
Groceries	3	8%
Other products	28	78%
Grand Total	**36**	**100%**

Table C15. The response to the question “Are the answers you are providing today representing:”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 4, Retailers Stakeholders survey responses.

Response option	Response result	% of total
Multiple Florida business locations	11	31%
One individual business location	25	69%
Grand Total	**36**	**100%**

Table C16. The response to the question “Do you believe regulation is necessary for at least one of the following: auxiliary containers, wrappings, and disposable plastic bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 5 for Auxiliary Containers, Retailers Stakeholders survey responses.

Response option	Response result	% of total
At local level	6	17%
At the statewide level	8	22%
Both statewide and local levels	10	28%
No	12	33%
Grand Total	**36**	**100%**

Table C17. The response to the question “Do you believe regulation is necessary for at least one of the following: auxiliary containers, wrappings, and disposable plastic bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 5 for Wrappings, Retailers Stakeholders survey responses.

Response option	Response result	% of total
At local level	6	17%
At the statewide level	8	22%
Both statewide and local levels	10	28%
No	12	33%
Grand Total	**36**	**100%**

Table C18. The response to the question “Do you believe regulation is necessary for at least one of the following: auxiliary containers, wrappings, and disposable plastic bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 5 for Disposable Plastic Bags, Retailers Stakeholders survey responses.

Response option	Response result	% of total
At local level	5	14%
At the statewide level	8	22%
Both statewide and local levels	11	31%
No	12	33%
Grand Total	**36**	**100%**

Table C19. The response to the question “Please select all the items below available, free of charge, for customers to protect purchases for transport from the retail establishment:”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 6, Retailers Stakeholders survey responses.

Response option	Response result	% of total
Boxes/Other	1	3%
None	1	3%
Yes, only paper	3	8%
Yes, paper, Boxes/Other	3	8%
Yes, only plastic	4	11%
Yes, plastic, Boxes/Other	3	8%
Yes, plastic, paper, reusable bags	1	3%
Yes, plastic and paper	5	14%
Yes, plastic and paper, Boxes/Other	11	31%
Yes, reusable bags	2	6%
Yes, reusable bags, Boxes/Other	1	3%
Yes, reusable bags, plastic, and paper, Boxes/Other	1	3%
Grand Total	**36**	**100%**

Table C20. The response to the question “Please provide the name of the company that your business purchases single use auxiliary containers/wrappings/disposable plastic bags from (If you cannot share this data write “NA”):”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 7, Retailers Stakeholders survey responses.

Response option	Response result	% of total
All reused items - none purchased	1	3%
Cheney Brothers	1	3%
Sysco	1	3%
Dade paper	2	6%
Edward Don	1	3%
GFS	1	3%
GFS, Sams, Webstaurant	1	3%
Martin Brower	1	3%
N/A	17	47%
PFG, ED Don, US Foods	1	3%
Sysco	5	14%
Sysco & Cheney Brothers	1	3%
Sysco/GFS	1	3%
US Foods, Cheney Brothers	1	3%
US Foods, Cheney Brothers, Sysco	1	3%
Grand Total	**36**	**100%**

Table C21. The response to the question “When purchasing single use auxiliary containers, wrappings, or disposable plastic bags, does your business give preference to items with recycled plastic content?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 8 for Auxiliary Containers, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	9	27%
Yes	24	73%
Grand Total	**33**	**100%**

Table C22. The response to the question “When purchasing single use auxiliary containers, wrappings, or disposable plastic bags, does your business give preference to items with recycled plastic content?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 8 for Wrappings, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	9	27%
Yes	24	73%
Grand Total	**33**	**100%**

Table C23. The response to the question “When purchasing single use auxiliary containers, wrappings, or disposable plastic bags, does your business give preference to items with recycled plastic content?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 8 for Disposable Plastic Bags, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	9	27%
Yes	24	73%
Grand Total	**33**	**100%**

Table C24. The response to the question “For question 8, did your business give preference because:”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 9, Retailers Stakeholders survey responses.

Response option	Response result	% of total
It was included as part of your request for proposal (RFP) (e.g., your business is/was soliciting bids with desired specifications, including recycled content)	4	12%
Other considerations like price, availability, or durability	15	44%
Other	13	38%
Required to do so to meet local or state policy obligation	2	6%
Grand Total	**34**	**100%**

Table C25. The response to the question “Does your business collect information on the rate of customers bringing in their own bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 10, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	35	97%
Yes	1	3%
Grand Total	**36**	**100%**

Table C26. The response to the question “Does your business offer disposable plastic bags, auxiliary containers and wrappings recycling options?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 11, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	29	81%
Other	2	6%
Yes, we collect all together in one container and we have collection bins inside our stores	2	6%
Yes, we collect all together in one container, and we have collection bins outside our store entrance	1	3%
Yes, we collect separately, and we have collection bins inside our stores	2	6%
Grand Total	**36**	**100%**

Table C27. The response to the question “Does your business track the weight or units of collected disposable plastic bags, auxiliary containers and wrappings for recycling?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 12 for Auxiliary Containers, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	33	94%
Yes	2	6%
Grand Total	**35**	**100%**

Table C28. The response to the question “Does your business track the weight or units of collected disposable plastic bags, auxiliary containers and wrappings for recycling?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 12 for Wrappings, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	34	97%
Yes	1	3%
Grand Total	**35**	**100%**

Table C29. The response to the question “Does your business track the weight or units of collected disposable plastic bags, auxiliary containers and wrappings for recycling?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 12 for Disposable Plastic Bags, Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	35	100%
Grand Total	**35**	**100%**

Table C30. The response to the question “For question 12, can you provide us numerical data for the weight or units of collected disposable plastic bags, auxiliary containers and wrappings for recycling?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 13 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	33	94%
Yes, and we can provide numerical data to you	2	6%
Grand Total	**35**	**100%**

Table C31. The response to the question “Please provide the name of the company that your business location sells/gives/pays to remove the disposable plastic bags, auxiliary containers and wrappings collected for recycling (If you cannot share this data write “NA”):”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 17 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
City of Lakeland	1	3%
City Of St Augustine	1	3%
Town of Surfside	1	3%
Waste Management	3	8%
N/A	30	83%
Grand Total	**36**	**100%**

Table C32. The response to the question “Does the municipality/county where your business is located, have any disposable plastic bags, auxiliary containers and wrappings bans/laws/limitations? (Note if you have multiple locations select the most appropriate response)”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 18 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
I do not know	4	11%
No	28	78%
Yes, we had one within the past 10 years and it is still in effect	1	3%
Yes, we had previously in the last 10 years	3	8%
Grand Total	**36**	**100%**

Table C33. The response to the question “Did disposable plastic bags, auxiliary containers and wrappings increase in the last year due to COVID 19 pandemic? (Hint: Review your procurement data for purchases of these items)”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 19 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	9	25%
Yes, large increase due to other reasons (e.g., business expansions, brand acquisitions, other marketplace developments)	1	3%
Yes, large increase due to pandemic	23	64%
Yes, normal increase	3	8%
Grand Total	**36**	**100%**

Table C34. The response to the question “For question 19, was this in response to a state or local government directive or policy?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 20 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No, our own response to the pandemic	30	83%
Yes	6	17%
Grand Total	**36**	**100%**

Table C35. The response to the question “Does your business prioritize contracts with packaging vendors that produce products with less packaging for customers purchases?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 21 Auxiliary Containers, for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	21	62%
Yes	13	38%
Grand Total	**34**	**100%**

Table C36. The response to the question “Does your business prioritize contracts with packaging vendors that produce products with less packaging for customers purchases?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 21 Wrappings, for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	22	65%
Yes	12	35%
Grand Total	**34**	**100%**

Table C37. The response to the question “Does your business prioritize contracts with packaging vendors that produce products with less packaging for customers purchases?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 21 Disposable Plastic Bags, for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	20	59%
Yes	14	41%
Grand Total	**34**	**100%**

Table C38. The response to the question “Select all programs or campaigns your business participates in regarding increased use of reusable bags and containers?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 22 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
Discount on purchase when customers bring in reusable bags or containers	2	6%
Educational program on reusable bags and containers	4	11%
Educational program on reusable bags and containers, Discount on purchase when customers bring in reusable bags or containers	1	3%
None	26	72%
Other,	3	8%
Grand Total	**36**	**100%**

Table C39. The response to the question “Does your business offer plastic containers/bags for product lines such as loose nuts, fruit, meats, vegetables and cereals, etc.?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 23 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No,	30	83%
Yes, all of our products are provided in that form	2	6%
Yes, some of our products are provided in that form	4	11%
Grand Total	**36**	**100%**

Table C40. The response to the question “For the items listed in question 23, do customers most commonly package the items with?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 24 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
Bring their own containers/bags	3	8%
Free plastic containers/bags available at your business	22	61%
Free reusable containers/bags available at your business	9	25%
Purchasable reusable containers/bags for sale at your business	2	6%
Grand Total	**36**	**100%**

Table C41. The response to the question “Does your business provide reusable bags to customers?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 25 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	27	75%
Yes, we provide them at no cost	7	19%
Yes, we sell them	2	6%
Grand Total	**36**	**100%**

Table C42. The response to the question “Please provide information on the average price per reusable bag to a customer.”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 26 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
Free	12	92%
Max price is __$5__ and min price is __$1___ (separate answers with comma):	1	8%
Grand Total	**13**	**100%**

Table C43. The response to the question “On average, what is the most common type of reusable bag your business sold in the last five years?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 30 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
Heavy plastic, HDPE plastic reusable bag	2	6%
Light plastic, LDPE plastic reusable bag	21	58%
Textile reusable bag (e.g., cotton, fabric/cloth-like)	10	28%
Woven and nonwoven polypropylene, polyester, and nylon	3	8%
Grand Total	**36**	**100%**

Table C44. The response to the question “Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 31 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
No	16	44%
Yes	20	56%
Grand Total	**36**	**100%**

Table C45. The response to the question “Are you willing to support additional waste reduction, reuse and recycling through increased fees?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 33 for Retailers Stakeholders survey responses.

Response option	Response result	% of total
Yes	12	33%
Not sure/depends	3	8%
No	21	58%
Grand Total	**36**	**100%**

C2.3. Stakeholder 3: Residents

The survey results for each of the 12 questions (and additional comment option) asked to Local Government Stakeholder(s) are shown in Tables C46-C65 and Figure C3. See Appendix C5 for the survey questions and Appendix C2.6 for the extended response summaries.

Table C46. The percent answered for each question for Residents Stakeholder survey based on the total number of participants (count total) and the total number of participants that responded to that specific question (count not answered).

Question	Count total	Count Not Answered	Percent Answered
Q1	2268	0	100%
Q2	2268	1055	53%
Q3	2268	0	100%
Q4	2268	0	100%
Q5	2268	0	100%
Q6	2268	0	100%
Q7	2268	0	100%
Q8	2268	0	100%
Q9	2268	0	100%
Q10	2268	0	100%
Q11	2268	0	100%
Q12	2268	0	100%
Q13	2268	0	100%
Q14	2268	0	100%
Q15	2268	0	100%
Q16	2268	0	100%
Additional comments	2268	854	62%

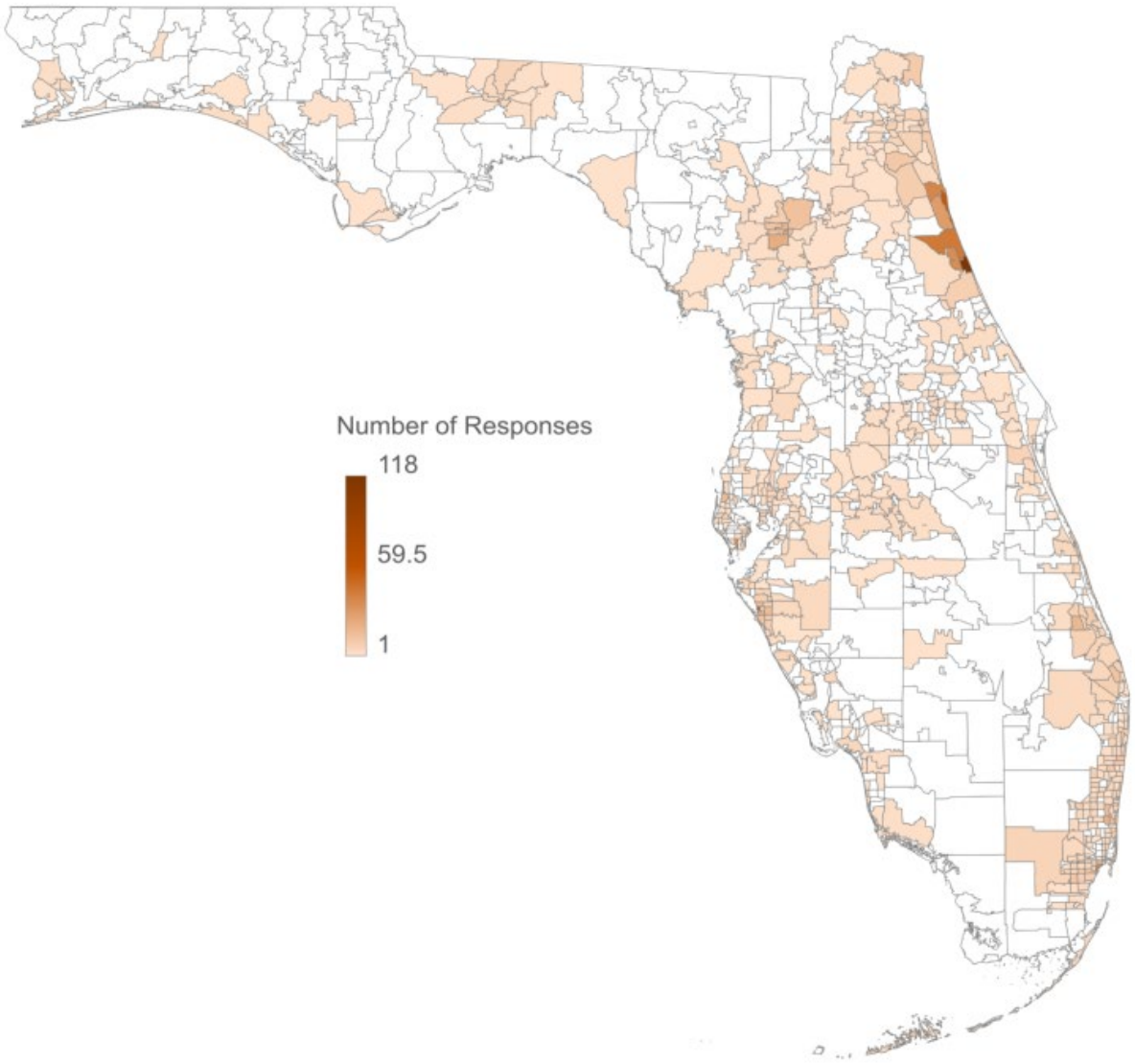


Figure C3. The location of the residents that participated in the Residents Stakeholders survey. Results from Question 1, Residents Stakeholders survey responses.

Table C47. The response to the question “How many people of the following age groups are in your household? Children 0-14 years”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 2, Residents Stakeholders survey responses.

Response option	Response result	% of total
0	851	70%
1	191	16%
2	141	12%
3	20	2%
4	4	0%
5	4	0%
7	1	0%
10	1	0%
Grand Total	**1213**	**100%**

Table C48. The response to the question “How many people of the following age groups are in your household? Youth 15-24 years”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 2, Residents Stakeholders survey responses.

Response option	Response result	% of total
0	764	62%
1	247	20%
2	146	12%
3	46	4%
4	23	2%
5	1	0%
6	2	0%
9	1	0%
10	2	0%
Grand Total	**1232**	**100%**

Table C49. The response to the question “How many people of the following age groups are in your household? Adults 25-64 years”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 2, Residents Stakeholders survey responses.

Response option	Response result	% of total
0	315	17%
1	466	25%
2	951	52%
3	85	5%
4	16	1%
5	2	0%
6	2	0%
7	1	0%
8	1	0%
9	1	0%
10	2	0%
Grand Total	**1842**	**100%**

Table C50. The response to the question “How many people of the following age groups are in your household? Seniors 65 years and over”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 2, Residents Stakeholders survey responses.

Response option	Response result	% of total
0	543	37%
1	460	31%
2	451	31%
3	7	0%
4	1	0%
6	1	0%
7	1	0%
8	1	0%
10	3	0%
Grand Total	**1468**	**100%**

Table C51. The response to the question “What is your gender?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 3, Residents Stakeholders survey responses.

Response option	Response result	% of total
Female	1668	74%
Male	551	24%
Other/Prefer not to answer	49	2%
Grand Total	**2268**	**100%**

Table C52. The response to the question “Are you the primary shopper for your household?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 4, Residents Stakeholders survey responses.

Response option	Response result	% of total
Equally shared with other family member(s)	750	33%
No	236	10%
Yes	1282	57%
Grand Total	**2268**	**100%**

Table C53. The response to the question “Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 5, Residents Stakeholders survey responses.

Response option	Response result	% of total
At both statewide and local levels	1837	81%
At local level	75	3%
At the statewide level	198	9%
No	158	7%
Grand Total	**2268**	**100%**

Table C54. The response to the question “For each shopping category please select how often you bring your reusable bag? Grocery”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 6, Residents Stakeholders survey responses.

Response option	Response result	% of total
Always/often	1465	65%
Never/rarely	285	13%
Sometimes	518	23%
Grand Total	**2268**	**100%**

Table C55. The response to the question “For each shopping category please select how often you bring your reusable bag? Clothing”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 6, Residents Stakeholders survey responses.

Response option	Response result	% of total
Always/often	464	20%
Never/rarely	1182	52%
Sometimes	622	27%
Grand Total	**2268**	**100%**

Table C56. The response to the question “For each shopping category please select how often you bring your reusable bag? Other Products”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 6, Residents Stakeholders survey responses.

Response option	Response result	% of total
Always/often	569	25%
Never/rarely	741	33%
Sometimes	958	42%
Grand Total	**2268**	**100%**

Table C57. The response to the question “How important is plastic packaging in your decision making when shopping?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 7, Residents Stakeholders survey responses.

Response option	Response result	% of total
Not important, I make my purchasing decisions using other criteria	453	20%
Somewhat important, if given the option between two products I will choose one with less plastic packaging	1531	68%
Very important, I go to stores that require customers to bring reusable containers	284	13%
Grand Total	**2268**	**100%**

Table C58. The response to the question “From the list below select all the types of environmentally conscious habits you include in your lifestyle.”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 8, Residents Stakeholders survey responses.

Response option	Response result	% of total
Bring reusable takeout/to-go containers to restaurants, Use reusable straws/do not use single use straws	1	0%
Minimize single use plastic items use	41	2%
Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants	2	0%
Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants, Use reusable straws/do not use single use straws	2	0%
Minimize single use plastic items use, Use reusable straws/do not use single use straws	11	0%
Refill reusable bottles	68	3%
Refill reusable bottles, Bring reusable takeout/to-go containers to restaurants	3	0%
Refill reusable bottles, Minimize single use plastic items use	40	2%
Refill reusable bottles, Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants	2	0%
Refill reusable bottles, Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants, Use reusable straws/do not use single use straws	2	0%
Refill reusable bottles, Minimize single use plastic items use, Use reusable straws/do not use single use straws	66	3%
Refill reusable bottles, Use reusable shopping bags	107	5%
Refill reusable bottles, Use reusable shopping bags, Bring reusable takeout/to-go containers to restaurants	8	0%
Refill reusable bottles, Use reusable shopping bags, Bring reusable takeout/to-go containers to restaurants, Use reusable straws/do not use single use straws	6	0%
Refill reusable bottles, Use reusable shopping bags, Minimize single use plastic items use	341	15%
Refill reusable bottles, Use reusable shopping bags, Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants	18	1%
Refill reusable bottles, Use reusable shopping bags, Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants, Use reusable straws/do not use single use straws	289	13%
Refill reusable bottles, Use reusable shopping bags, Minimize single use plastic items use, Use reusable straws/do not use single use straws	889	39%
Refill reusable bottles, Use reusable shopping bags, Use reusable straws/do not use single use straws	114	5%
Refill reusable bottles, Use reusable straws/do not use single use straws	33	1%
Use reusable shopping bags	57	3%
Use reusable shopping bags, Bring reusable takeout/to-go containers to restaurants	4	0%
Use reusable shopping bags,Bring reusable takeout/to-go containers to restaurants, Use reusable straws/do not use single use straws	2	0%
Use reusable shopping bags, Minimize single use plastic items use	50	2%
Use reusable shopping bags, Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants	2	0%
Use reusable shopping bags, Minimize single use plastic items use, Bring reusable takeout/to-go containers to restaurants, Use reusable straws/do not use single use straws	7	0%
Use reusable shopping bags, Minimize single use plastic items use, Use reusable straws/do not use single use straws	69	3%
Use reusable shopping bags, Use reusable straws/do not use single use straws	23	1%
Use reusable straws/do not use single use straws	11	0%
Grand Total	**2268**	**100%**

Table C59. The response to the question “If you do use disposable plastic shopping bags, what do you do with them after you bring them home?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 9, Residents Stakeholders survey responses.

Response option	Response result	% of total
Recycle them at a local store/facility drop-off site	699	31%
Reuse (e.g., trash can liner, shopping bag)	1497	66%
Throw them away	72	3%
Grand Total	**2268**	**100%**

Table C60. The response to the question “Which of the following statements most closely applies to you regarding disposable plastic bags, auxiliary containers and wrappings?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 10, Residents Stakeholders survey responses.

Response option	Response result	% of total
I know where and how to recycle them	1442	64%
I would like to recycle them, but I do not know how to	463	20%
Recycling of those materials is not accessible/available in my community	363	16%
Grand Total	**2268**	**100%**

Table C61. The response to the question “Do you participate in curbside pickup or delivery for groceries or monthly subscription services?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 11, Residents Stakeholders survey responses.

Response option	Response result	% of total
No/rarely	1626	72%
Yes, beginning in the last year (due to the Covid-19 pandemic)	463	20%
Yes, beginning prior to the last year	179	8%
Grand Total	**2268**	**100%**

Table C62. The response to the question “Does your municipality/county provide any education campaigns to discourage placement of disposable plastic bags, auxiliary containers and wrappings in curbside recycling?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 12, Residents Stakeholders survey responses.

Response option	Response result	% of total
I am not sure if I am allowed to place those materials in bin	243	11%
No, they do not have any campaigns I am aware of	1337	59%
Yes, they do have campaigns I am aware of	688	30%
Grand Total	**2268**	**100%**

Table C63. The response to the question “Are you aware of any disposable plastic bags, auxiliary containers and wrappings bans/laws/limitations in your county or municipality?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 13, Residents Stakeholders survey responses.

Response option	Response result	% of total
I do not know	527	23%
No	1444	64%
Other	81	4%
Yes, we had one that passed within the last 10 years and it is still in effect	104	5%
Yes, we had previously in the last 10 years	97	4%
Yes, we will soon have one	15	1%
Grand Total	**2268**	**100%**

Table C64. The response to the question “Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 14, Residents Stakeholders survey responses.

Response option	Response result	% of total
Yes	1784	79%
No	247	11%
Not sure/depends	237	10%
Grand Total	**2268**	100%

Table C65. The response to the question “Are you willing to support additional waste reduction, reuse and recycling through increased fees?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 16, Residents Stakeholders survey responses.

Response option	Response result	% of total
Yes	1691	75%
No	417	18%
Not sure/depends	160	7%
Grand Total	**2268**	100%

C2.4. Stakeholder 4: Manufacturers

The survey results for each of the 16 questions (and additional comment option) asked to Manufacturers Stakeholder(s) are shown in Tables C66-C78. See Appendix C5 for the survey questions and Appendix C2.6 for the extended response summaries. Note no responses were provided for questions 12 and 13.

Table C66. The percent answered for each question for Manufacturers Stakeholder survey based on the total number of participants (count total) and the total number of participants that responded to that specific question (count not answered).

Question	Count total	Count Not Answered	Percent Answered
Q1	4	0	100%
Q2	4	0	100%
Q3	4	0	100%
Q4	4	0	100%
Q5	4	0	100%
Q6	4	0	100%
Q7	4	0	100%
Q8	4	0	100%
Q9	4	0	100%
Q10	4	0	100%
Q11	4	0	100%
Q12	4	4	0%
Q13	4	4	0%
Q14	4	0	100%
Q15	4	0	100%
Q16	4	0	100%
Additional comments	4	4	0%

Table C67. The number of employees working for the company responding and the company name. Results from Questions 1 and 2, Manufacturers Stakeholders survey responses.

Company name	Number of employees
Gulf Coast Plastics	16
Refreshment Services Pepsi	84
SPX Flow	180
Supreme Paper	45

Table C68. The response to the question “Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 3, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
At both statewide and local levels	1	25%
No	3	75%
Grand Total	**4**	**100%**

Table C69. The response to the question “Do you manufacture disposable plastic bags, auxiliary containers and wrappings?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 4, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
Yes, in Florida	1	25%
No	3	75%
Grand Total	**4**	**100%**

Table C70. The response to the question “Do you sell disposable plastic bags, auxiliary containers and wrappings?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 5, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
Yes, in Florida	1	25%
No	3	75%
Grand Total	**4**	**100%**

Table C71. The response to the question “Do you manufacture reusable bags, auxiliary containers and wrappings?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 6, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
No	4	100%
Grand Total	**4**	**100%**

Table C72. The response to the question “Do you sell reusable bags, auxiliary containers and wrappings?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 7, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
Yes, in Florida	**2**	**50%**
No	2	50%
Grand Total	**4**	**100%**

Table C73. The response to the question “Please list several of your clients and the type of retailer they are (e.g., grocer, home improvement, big box, discount retailer, and general goods retailer) (If you cannot share this data write “NA”)”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 8, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
N/A	**3**	**75%**
We manufacture equipment that is installed in any global customer location.	1	25%
Grand Total	**4**	**100%**

Table C74. The response to the question “Please list the types of disposable plastic bags, auxiliary containers and wrappings sold?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 9, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
N/A	**3**	**75%**
Plastic shopping bags, carryout containers, paper bags	1	25%
Grand Total	**4**	**100%**

Table C75. The response to the question “Please list the types of reusable bags, auxiliary containers and wrappings sold?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 10, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
N/A	**3**	**75%**
Bottles	1	25%
Grand Total	**4**	**100%**

Table C76. The response to the question “Do your disposable plastic bags, auxiliary containers and wrappings contain recycled plastic content”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 11, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
No	**3**	**75%**
Yes, at least 20% of total plastic used is post-consumer recycled content	1	25%
Grand Total	**4**	**100%**

Table C77. The response to the question “Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 14, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
No	**2**	**50%**
Yes	2	50%
Grand Total	**4**	**100%**

Table C78. The response to the question “Are you willing to support additional waste reduction, reuse and recycling through increased fees?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 16, Manufacturers Stakeholders survey responses.

Response option	Response result	% of total
No	**1**	**25%**
Yes	3	75%
Grand Total	**4**	**100%**

C2.5. Stakeholder 5: Recycling Facilities

The survey results for each of the 12 questions (and additional comment option) asked to Recycling Facilities Stakeholder(s) are shown in Tables C79-C87 and Figure C4. See Appendix C5 for the survey questions and Appendix C2.6 for the extended response summaries. Not shown in the tables here are the responses for question 3 and 10. The responses for question 3 “Does your MRF process disposable plastic bags, auxiliary containers and wrappings?” was 100% “no, they are considered contaminants and are landfilled”. For question 10, “Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?” the response was 100% “yes”.

Table C79. The percent answered for each question for Recycling Facilities Stakeholder survey based on the total number of participants (count total) and the total number of participants that responded to that specific question (count not answered).

Question	Count total	Count Not Answered	Percent Answered
Q1	6	0	100%
Q2	6	0	100%
Q3	6	0	100%
Q4	6	0	100%
Q5	6	0	100%
Q6	6	0	100%
Q7	6	0	100%
Q8	6	0	100%
Q9	6	0	100%
Q10	6	0	100%
Q11	6	0	100%
Q12	6	0	100%
Additional comments	6	0	100%

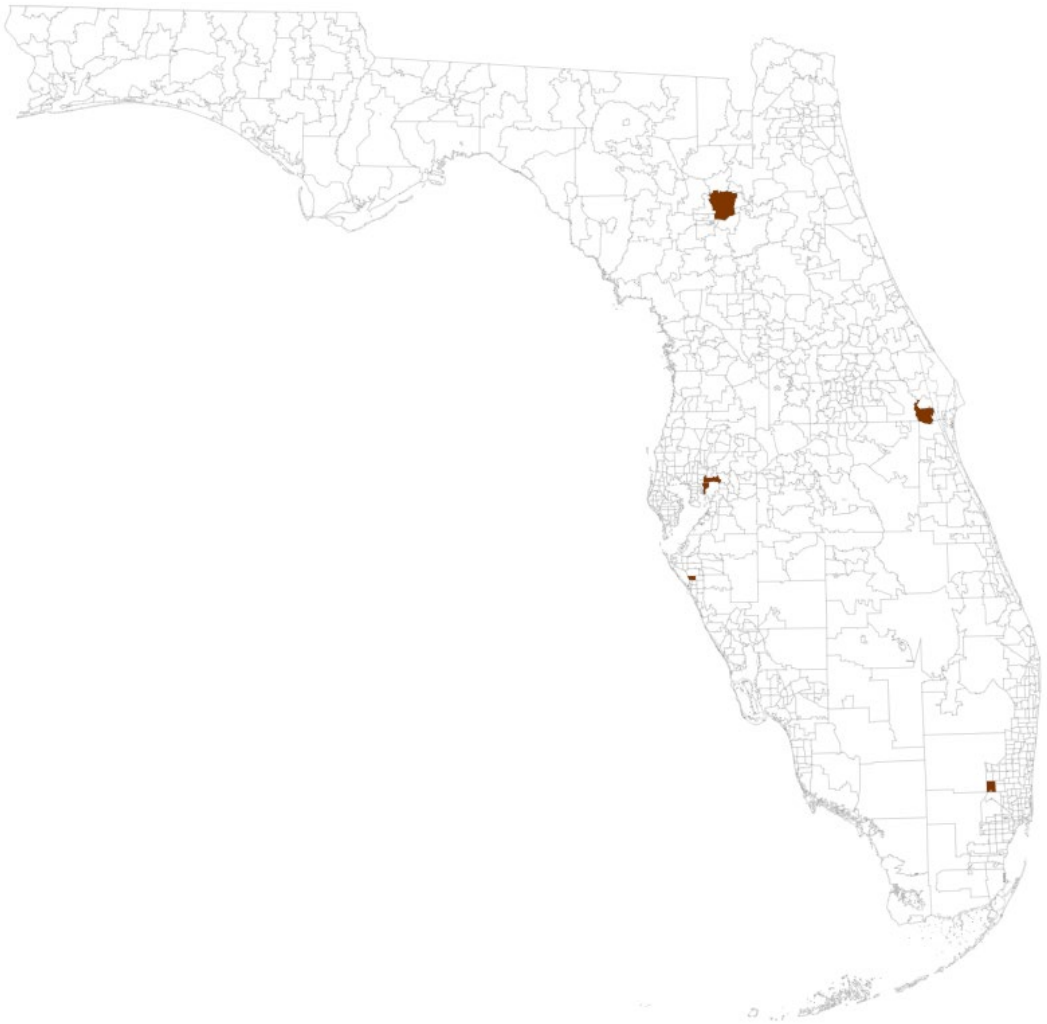


Figure C4. The location of the recycling facilities that participated in the Recycling Facilities Stakeholders survey. Results from Question 1, Recycling Facilities Stakeholders survey responses.

Table C80. The response to the question “Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 2, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
At both statewide and local levels	5	83%
At the statewide level	1	17%
Grand Total	**6**	**100%**

Table C81. The response to the question “Does your MRF have any issues with disposable plastic bags, auxiliary containers and wrappings (e.g., they cause damage to screens and stop operation)?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 4, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
Other,	1	17%
No, we do not have them in the incoming recyclables stream	1	17%
Yes, they cause shutdowns and damage other equipment	4	67%
Grand Total	**6**	**100%**

Table C82. The response to the question “On average, how often do disposable plastic bags, auxiliary containers and wrappings cause a shutdown in operations?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 5, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
Once a week	1	17%
Do not cause shutdowns	2	33%
Every day	3	50%
Grand Total	**6**	**100%**

Table C83. The response to the question “How long, on average, do the shutdowns last?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 6, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
At least one hour	4	67%
Do not cause shutdowns	2	33%
Grand Total	**6**	**100%**

Table C84. The response to the question “On a scale of to 1 to 5 (where 5 is most problematic), how problematic are disposable plastic bags, auxiliary containers and wrappings to MRF operations?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 7, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
Scale of 0	1	17%
Scale of 3	2	33%
Scale of 5	3	50%
Grand Total	**6**	**100%**

Table C85. The response to the question “Have you calculated the financial impact of disposable plastic bags, auxiliary containers and wrappings contamination?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 8, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
No, we do not track or estimate these numbers	3	50%
Yes, we estimate that per year we lose $_____ due to shutdowns in operation, rejected loads, etc.	3	50%
$30K in downtime and $500K+ to process, transport, and dispose of these items.		
Grand Total	**6**	**100%**

Table C86. The response to the question “Does your MRF or local government provide any education campaigns discouraging placement of disposable plastic bags, auxiliary containers and wrappings in curbside or commercial recycling?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 9, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
Yes	5	83%
Not sure	1	17%
Grand Total	**6**	**100%**

Table C87. The response to the question “Are you willing to support additional waste reduction, reuse and recycling through increased fees?”. The number of participants that selected that response option (or answer choice) is the “response result”. Results from Question 12, Recycling Facilities Stakeholders survey responses.

Response option	Response result	% of total
Yes	2	33%
No	1	17%
Depends	3	50%
Grand Total	**6**	**100%**

C2.6. Extended Response Questions Summary

Local Government Stakeholders

- Summarized results for response to question “What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings”:
    - Incentivize retailers to sell reusable bags and residents to use reusable bags.
    - Place a fee or tax on plastic bags when sold by retailers and restaurants for customers use.
    - Education and public awareness of reusable options.
    - Encourage the recycling of these products through new programs.
    - Ban them from being used and provide an alternative.
- Summarized results for response to question “Additional comments”:
    - Some businesses have adapted well without legislation.
    - A combination of measures is needed to reduce plastic pollution.
    - These laws are difficult to enforce, but many Florida local governments are willing to rise to the challenge.
    - The State of Florida, local governments, producers, and end-user businesses should create, fund, and maintain a large-scale outreach campaign to reduce the use of SUCP and polystyrene products and encourage the use of reusable or environmentally preferable alternatives.
    - Pre-emption is significantly and negatively impacting the ability of local governments to enact sustainability measures and other important efforts.

Retailers Stakeholders

- Summarized results for response to question “What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings”:
    - Customers will vote with their wallet, and regulations are not needed.
    - Need a valid alternative before banning anything.

    - Banning and elimination of plastic packaging products are needed in Florida.
    - Provide financial incentives for research and manufacturing of sustainable items.
    - Education to customers about reusable options and to retailers about possible collection and recycling options of plastic packaging products.
- Summarized results for response to question “Additional comments”:
    - No additional comments were provided by any participants.

Residents

- Summarized results for response to question “What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings”:
    - Discourage their use by requiring people to pay for plastic bags or bring their own reusable bags.
    - Educate people on how to properly dispose or recycle their plastic bags, wrappings, etc. Education on the fact that not all plastics are recyclable. Educate the public on the negative impacts of these products on our environment and on our health.
    - Impose fees on products (plastic bags, food packaging) at the source for those who do not bring their own packaging.
    - Incentivizes by charging customers and retailers to use plastic bags, and discount for using eco-friendly bags.
    - Increase number of drop-off points and expand/add to current local recycling collection programs.
    - Add a mandatory fee to items which use unrecyclable materials and discourage the use of disposables.
    - Allow for local governments and retailers to decide. Stop the state-wide preemption.
    - Ban or eliminate disposable plastic bags and all disposable plastic products/foam packaging.
    - Deposit law for disposable plastic bags.
    - Encourage multiple use bags and publicize recycling locations and rules. Encourage consumers to provide their own bags and offer the reusable containers and bags at discounted prices. Encourage businesses to use less containers for products and encourage customers to support these efforts.
    - Find better alternatives and provide resources for research on alternatives.
- Summarized results for response to question “Additional comments”:

- Florida needs stronger legislation to protect our environment. This state is directly impacted by the negative effects of pollution and the state should do its best to preserve our precious environment.
- The government cannot force this and this needs to come from the industry.
- Move to Florida from other states and countries and surprised at the lack of efforts of Florida to reduce use of plastic and to encourage recycling.
- Let the free market decide.
- Recycling information campaigns should increase in social media and all media.

Manufactures

- Summarized results for response to question “What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings”:
  - Do more to promote adherence to litter laws.
  - Recycling incentives for non-profit organizations and schools so these habits can start to be the normal practice for future years versus just more regulation by governments.
  - More education on the ability to recycle plastic material that we consume and dispose of as a result of our manufacturing operations.
  - Increase recycled content and recycling programs as well as use more compostable materials and develop compost facilities.
- Summarized results for response to question “Additional comments”:
  - No additional comments were provided.

Recycling Facility

- Summarized results for response to question “What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings”:
  - Put the responsibility on the producers of these items.
  - More outlets where people can drop off and services through waste management are needed for these products.
- Summarized results for response to question “Additional comments”:
  - Public needs more education on what to do with the bags, along with better recycling services for the bags.
  - These items are a real world problem for MRF's.
  - Need to limit the amount of plastic bags grocery stores can have or completely stop using them there.

C3. Groups and Organizations Contracted

Groups Interested in Reducing the Use of Disposable Retail Bags/Auxiliary Containers:

- Sierra Club Florida (Waste Minimization) https://www.sierraclub.org/florida
- ChicoBag (Sells Reusable Bags) https://www.chicobag.com/
- Audubon Society (Waste Minimization/Litter Reduction for Land Conservation and Wildlife Protection) https://www.audubon.org/
- Plastic Free Foundation (Helps People Limit Plastic Use) https://www.plasticfreejuly.org/
- Plastic Pollution Coalition (Encourages Refusal of Single-Use Plastics) https://www.plasticpollutioncoalition.org/
- The Story of Stuff Project (Provide videos and other resources on how to live a plastic-free lifestyle) https://www.storyofstuff.org/
- Post Landfill Action Network (Provides toolkit on how to jumpstart plastic-free campaigns on school campuses) https://www.postlandfill.org/
- Nature Bag (Sell Reusable Bags made entirely from natural Jungle vines) https://www.naturebag.org/
- Bagito (Sells reusable bags made entirely out of recycled plastics) https://www.bagito.co/

Groups Interested in Improving Bag/Auxiliary Container Technology:

- American Chemistry Council https://www.americanchemistry.com/default.aspx
- National Association for PET Container Recyclers (Support Plastic Recycling) https://napcor.com/
- BASF (Develops and Makes Biodegradable Plastics) https://www.basf.com/us/en.html
- Symphony Environmental (Makes degradable plastics/degradable plastic products) https://www.symphonyenvironmental.com/
- TIPA Compostable Packaging (Creates plastic packaging alternatives that behave like organic waste) https://tipa-corp.com/
- Genomatica (Develops sustainable plastics) https://www.genomatica.com/
- Green Dot Bioplastics (Make sustainable, compostable, and eco-friendly plastic resin) https://www.greendotbioplastics.com/
- Genecis (Converts food waste into biodegradable plastics) https://genecis.co/
- RWDC Industries (Mission to replace single-use plastics with other sustainable materials) https://www.rwdc-industries.com/
- Greenlid (Sells biodegradable containers to retailers/companies in place of plastic auxiliary containers) https://www.mygreenlid.com/
- Full Cycle (Converts organic wastes into biodegradable plastic) https://fullcyclebioplastics.com/
- Biodegradable Products Institute (Association promoting the use and production of biodegradable plastics) https://bpiworld.org/

Groups Interested in Increasing Bag/Auxiliary Container Recycling:

- American Chemistry Council https://www.americanchemistry.com/default.aspx
    - Operation Clean Sweep (Plastics Industry initiative helping prevent the release of plastic pellets, flakes, and powder into the environment) https://www.opcleansweep.org/
- National Association for PET Container Recyclers (Support Plastic Recycling) https://napcor.com/
- American Recyclable Plastic Bag Alliance (Promote Mostly Recycling of Plastic Bags but also Minor Reduction/Against Bans of Plastic Bags) https://bagalliance.org/

Groups Against Reducing Plastic Bag/Auxiliary Container Usage or Against Bans:

("California Secretary of State - CalAccess - Campaign Finance")

- Superbag (Against Bans/Plastic Bag Manufacturing Company/Promote Recycling) http://www.superbag.com/
- Advance Polybag Inc. (Against Bans/Plastic Bag Manufacturing Company/Support Recycling) https://www.apicorp.com/
- American Recyclable Plastic Bag Alliance https://bagalliance.org/
- Bag the Ban (Against Bans and Fees/Represents Plastic Bag Manufacturing and Recycling Industry) https://www.bagtheban.com/

C4. Efforts to Connect with Stakeholders

Table C88. Lengths of efforts to connect with stakeholders.

Organization	First email- 9/24	Second email- 10/05	Third email- 10/12	Response
Recycle Today Florida	X	X	-	Were unable to provide contacts willing to be a part of the research
Solid Waste Association Of North America	X	X	-	Suggested the Manufacturers Republic, SWIX, Encina and Nexuscircle
Florida Retail Federation	X	-	-	Were unable to provide contacts willing to be a part of research
Florida League Of Cities	X	-	-	Distributed the survey through an e-newsletter the week of October 4th
Florida Chamber Of Commerce	X	X	-	No response on the state level *
Florida Recycling Partnership Foundation	X	-	-	Provided contacts for the Florida Retail Federation
American Chemistry Council	X	X	-	Did not have contacts to provide
American Recyclable Plastic Bag Alliance	X	-	-	Are following the report closely, but do not have contacts to provide
Manufacturers Association Of Florida	X	X	X	No response after third email
Associated Industries Of Florida	X	X	X	No response after third email
Florida Restaurant And Lodging Association	X	X	-	Sent out the survey to network on Septemeber 27th and found a volunteer contact in McDonalds
South Florida Manufacturers Association	X	X	X	No response after third email
Bay Area Manufacturing	X	X	-	Do not maintain contacts
Nature Coast Manufacturing	X	X	X	No response after third email
Manufacturers Association Of Central Florida	X	X	X	No response after third email
Manufacturers Association Of The Space Coast	X	X	X	No response after third email
Mid-Florida Regional Manufacturers Association	X	-	-	Suggested contacting the Ocala Chamber of Commerce

Northwest Florida Manufacturers Association	X	X	X	Sent out survey in an e-newsletter
Sarasota Manatee Manufacturers Association	X	X	X	No response after third email
Southwest Regional Manufacturers Association	X	X	-	Responded stating they do not have time to be a part of the research
Treasure Coast Manufacturers Association	X	X	X	No response after third email
Volusia Manufacturers Association	X	-	-	Responded, but not to request to provide stakeholder contacts
Florida Makes	X	X	-	Socialized the project through network

Table C89. Connecting efforts with chambers of commerce per revised strategy.

Region	Contacted	Response
Charlotte County	X	Informed of Community Guide on Website that includes all partners
Cocoa Beach	X	No response
Greater Gainesville Area	X	No response
Greater Palm Bay Area	X	No response
Greater Pompano Area	X	No response
Key West	X	No response
Melbourne	X	No response
Ocala Metro	X	Provided Link to Directory of partners
Suwanee County	X	No response
Titusville	X	No response

Table C90. Nationwide sustainability reports reviewed.

Company	Sustainability Webpage	Sustainability Report	Report mentioning Sustainability	None
7-Eleven	X			
Aldi US*	X			
Amazon		X		
Best Buy	X			
Costco		X		
CVS Health Pharmacies	X			
Dollar General				X
Dollar Tree		X		
Home Depot			X	
JCPenney	X			
Lowe's			X	
Publix		X		
Sephora				X
Southeastern Grocers			X	
Target			X	
Ulta		X	X	
Walgreens			X	
Walmart	X		X	
Whole Foods	X			

Manufacturer Script

1. What is the number of employees working for this manufacture?
2. Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags
    a. Statewide or local level? Or both?
3. Do you manufacture disposable plastic bags, auxiliary containers and wrappings?
    a. If yes, to where? (Inside/outside FL and ask for zip codes)
4. Do you sell disposable plastic bags, auxiliary containers and wrappings?
    a. If yes, to where? (Inside/outside FL and ask for zip codes)
5. Do you manufacture reusable bags, auxiliary containers and wrappings?
    a. If yes, to where? (Inside/outside FL and ask for zip codes)
6. Please list several of your clients and the type of retailer they are (e.g., grocer, home improvement, big box, discount retailer, and general goods retailer) (If you cannot share this data write "NA"):
7. Do your disposable plastic bags, auxiliary containers and wrappings contain recycled plastic content?
    a. Ask for percentage and if the recycled content is post consumer or post industrial
8. What is the weight (in lbs) OR units of disposable plastic bags sold in the last 10 years on an annual basis? Please check off which data option(s) you will provide information on and if you prefer to send the data directly, please email ashleyricketts@ufl.edu and type "emailed."
9. What is the weight (in lbs) OR units of disposable auxiliary plastic containers and wrappings sold in the last 10 years on an annual basis? Please check off which data option(s) you will provide information on and if you prefer to send the data directly, please email ashleyricketts@ufl.edu and type "emailed."
10. Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?
11. What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings?
12. Are you willing to support additional waste reduction, reuse and recycling through increased fees?

Additional Comments?

Retailer Script

1. What product is generally sold at your store (groceries, clothing, etc.)?
2. Will your answers represent one business location or statewide businesses?
3. Does your business offer single-use plastic bags recycling options? Can you describe the process of collection and recycling/disposal? Is this a locally conducted or sent to out of county/state?
4. Do they offer recycling options for similar auxiliary containers like reusable bags, paper bags, gift bags, gift boxes, hat boxes.
5. How about recycling options for wrappings?
6. Does your business offer disposable bags to customers? Are there different types of disposable options (paper vs plastic)? Is there a fee for them? How much are they?
7. Does your business give preference when purchasing single use containers, wrappings, or plastic bags with recycled plastic content?
8. Did single-use plastic bags, auxiliary containers and wrappings increase in the last year due to the COVID 19 pandemic?
    a. If yes, by how much do you think by percentage it has increase?
9. Does your business provide reusable bags to customers? For free or a fee?
10. What is the average price per reusable bag for purchase for a customer?
11. Do you provide any incentive for using reusable bags/containers or for recycling single-use plastic products at your business?
12. Does your business have a product line that uses plastic container/bags? For example, meat or fruit/vegetable section
13. Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags? At a local level, statewide level, or both, or none?
14. Does your business offer or participate in educational programs on reusable bags and containers?

For the rest of the questions, we would like to gather actual measurements and data. What type of data do you track regarding disposable plastic bag and auxiliary materials use, recycling and disposal? Can you provide me your email so I can request this data through email?

15. What is the weight in pounds, or the number of units of disposable plastic bags, auxiliary containers and wrappings collected for recycling in 2020, 2015, and 2010 per business location?
16. Do you track the recycling rate of disposable plastic bags and auxiliary containers?
17. Do you track the amount in weight or unit basis on how many disposal plastic bags and containers are procured for your customers?
18. What is the weight in pounds or number of units of reusable bags sold in 2020, 2015, 2010 per store?

C5. Survey Distribution Tools and Survey Questions for all Stakeholders

Sample emails sent to stakeholders:

Email used for Stakeholders 1 and 2:

Subject: UF-DEP Survey on Disposable Plastic Bags, Auxiliary Materials and Wrappings

Hello,

The University of Florida (UF) is conducting a survey on behalf of the Florida Department of Environmental Protection (DEP) to learn more about the use of disposable plastic bags, auxiliary materials and wrappings (UF IRB Protocol Number IRB202101831) per section 403.7033 Florida Statutes. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities).

The study principal investigator is Dr. Tim Townsend from UF and the Sustainable Materials Management Research Laboratory. The survey will be administered online using Qualtrics, if you are able to **1)** complete the local government survey and **2)** distribute the survey link to your residents (e.g., through a list serve email, or by posting the link on your website/app, or sharing our social media post) it would help tremendously in gaining insight.

If you can distribute the survey on your website/app, please copy and paste the information below into your website and let us know that you were able to share the link:

> *The University of Florida (UF) is conducting an online survey on behalf of the Florida Department of Environmental Protection (DEP) to learn more about the use of disposable plastic bags, auxiliary materials and wrappings (UF IRB Protocol Number IRB202101831) by Florida residents. The study principal investigator is Dr. Tim Townsend from UF and the Sustainable Materials Management Research Laboratory. The survey will be administered online using Qualtrics from mid Sept. until Oct. 31st, if you are able to participate, please visit the link below.*
>
> *Link: https://faculty.eng.ufl.edu/timothy-townsend/survey/*

If you can only repost our social media post, you can find it here:

For Twitter:

https://twitter.com/FLDEPNews/status/1443327294060257281

For Facebook:

https://www.facebook.com/150139572008894 2/posts/3129880643907100/

Best regards,
UF Team.

Email used for Stakeholders 3, 4, 5:

Subject: UF-DEP Survey on Disposable plastic bags, Auxiliary Materials and Wrappings

Hello,

The University of Florida (UF) is conducting a survey on behalf of the Florida Department of Environmental Protection (DEP) to learn more about the use of disposable plastic bags, auxiliary materials and wrappings (UF IRB Protocol Number IRB202101831) per section 403.7033 Florida Statutes. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities).

The study principal investigator is Dr. Tim Townsend from UF and the Sustainable Materials Management Research Laboratory. The survey will be administered online using Qualtrics, if you are able to **1)** complete the survey and **2)** if appropriate to you, distribute the survey link to your organization's membership (e.g., through a list serve email, or by posting the link on your website/app, or sharing our social media post) it would help tremendously in gaining insight.

If you can distribute the survey on your website/app, please copy and paste the information below into your website and let us know that you were able to share the link:

> *The University of Florida (UF) is conducting an online survey on behalf of the Florida Department of Environmental Protection (DEP) to learn more about the use of disposable plastic bags, auxiliary materials and wrappings (UF IRB Protocol Number IRB202101831) by Florida residents. The study principal investigator is Dr. Tim Townsend from UF and the Sustainable Materials Management Research Laboratory. The survey will be administered online using Qualtrics from mid Sept. until Oct. 31st, if you are able to participate, please visit the link below.*
>
> *Link: https://faculty.eng.ufl.edu/timothy-townsend/survey/*

If you can only repost our social media post, you can find it here:

For Twitter:

https://twitter.com/FLDEPNews/status/1443327294060257281

For Facebook:

https://www.facebook.com/1501395720088942/posts/3129880643907100/

Best regards,
UF Team.

Social Media Facebook/Twitter Posts distributed to any Stakeholders willing to post on their websites or mail to their membership:

The University of Florida (UF) is conducting a survey on behalf of the Florida Department of Environmental Protection (DEP) to learn more about the use of disposable plastic bags, auxiliary materials and wrappings (UF IRB Protocol Number IRB202101831) per section 403.7033 Florida Statutes. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities).

The survey will be administered online from mid Sept. until Oct. 31st, if you are able to participate, please visit this link: https://faculty.eng.ufl.edu/timothy-townsend/survey/

Survey Questionnaires Posted on Qualtrics Online Survey Tool

Stakeholder Group: Local Governments

The Florida Legislature has amended section 403.7033 Florida Statutes requiring the Department of Environmental Protection to review and update the 2010 Retail Bags report and to evaluate the need for new or different regulation of auxiliary containers, wrappings, or disposable plastic bags used by consumers to carry products from retail establishments. The intent of this survey is to understand more about local government-level ordinances and initiatives regarding the use, management, and recycling or disposal of containers, wrappings, and disposable plastic bags. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities). To this end, we are requesting the following information that will be compiled into a Retail Bags Report and submitted to the Legislature by December 31st. The results of this survey can be found at https://faculty.eng.ufl.edu/timothy-townsend/survey/ and will be posted upon completion of the report.

- Auxiliary Containers – Secondary container into which a product is placed for transport by a consumer. It includes, but not limited to, reusable bags, paper bags, gift bags, gift boxes, hat boxes, cloth bags and food takeout boxes and clamshells. Disposable plastic bags have been intentionally excluded from this definition.
- Wrappings – Plastic films that are used to protect and transport the items within them; including, but not limited to, dry-cleaning, meats, fruits, bulk products, sandwiches, and newspaper. The focus for wrappings is on the external wrappings and not materials such as bubble wrap and tissue paper.
- Disposable plastic Bags – Disposable plastic film bags used by the consumer to carry products from restaurants and retail establishments in the sale of products and goods. These bags are not necessarily meant to be reused multiple times but may have beneficial secondary uses and may be recycled at certain retail establishments.

1) Name the municipality/county and department you are representing: _____
2) Population of Florida citizens represented: _____
3) Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?
    - At the statewide level
    - At local level
    - Both statewide and local level
    - No
4) Would such a regulation be effective?
    - No
    - Yes
    - I do not know
    - Other, _____
5) Did your entity have any disposable plastic bags, auxiliary containers and wrappings bans/laws/limitations in place prior to the 2010 legislative ban referenced in section 403.7033 Florida Statutes?
    - No
    - Yes, we had one that passed, and it is still in effect

- I do not know
- Other, _____

6) Who must comply with the ban/law/limitation? (e.g., retailers, residents, restaurants, etc.)
   _____
7) If there was/is a ban/law/limitation, please check off which materials are included in the ban/law/limitation:
   - ☐ Single use plastic straws
   - ☐ Single use plastic bags
   - ☐ Single use plastic cups
   - ☐ Single use plastic to-go containers
   - ☐ Single use plastic eating utensils
   - ☐ Styrofoam products
   - ☐ Plastic film products
   - ☐ Other_____
8) Does your entity provide any education campaigns to discourage placement of disposable plastic bags, auxiliary containers and wrappings in curbside recycling?
   - No, we do not have campaigns even though they are not recycled when placed in the bins
   - No, we do not have campaigns because residents can place them in the bins for recycling
   - Yes, we provide educational campaigns
9) Do you have any waste reduction or similar programs/incentives (e.g., litter campaigns, sustainability initiatives) in place for disposable plastic bags, auxiliary containers and wrappings? If yes, please describe.
   - No
   - Yes, _____
10) Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?
11) What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings?
12) Are you willing to support additional waste reduction, reuse and recycling through increased fees?

Additional Comments

Stakeholder Group: Residents

The Florida Legislature has amended section 403.7033 Florida Statutes requiring the Department of Environmental Protection to review and update the 2010 Retail Bags report and to evaluate the need for new or different regulation of auxiliary containers, wrappings, or disposable plastic bags used by consumers to carry products from retail establishments. The intent of this survey is to gather information from Florida residents' regarding the use, management, and recycling or disposal of containers, wrappings, and disposable plastic bags. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities). To this end, we are requesting the following information that will be compiled into a Retail Bags Report and submitted to the Legislature by December 31st. The results of this survey can be found at https://faculty.eng.ufl.edu/timothy-townsend/survey/ and will be posted upon completion of the report.

- Auxiliary Containers – Secondary container into which a product is placed for transport by a consumer. It includes, but not limited to, reusable bags, paper bags, gift bags, gift boxes, hat boxes, cloth bags and food takeout boxes and clamshells. Disposable plastic bags have been intentionally excluded from this definition.
- Wrappings – Plastic films that are used to protect and transport the items within them; including, but not limited to, dry-cleaning, meats, fruits, bulk products, sandwiches, and newspaper. The focus for wrappings is on the external wrappings and not materials such as bubble wrap and tissue paper.
- Disposable plastic Bags – Disposable plastic film bags used by the consumer to carry products from restaurants and retail establishments in the sale of products and goods. These bags are not necessarily meant to be reused multiple times but may have beneficial secondary uses and may be recycled at certain retail establishments.

1) Zip code of your residence: _____
2) How many people of the following age groups are in your household?
    - Children (0-14 years)
    - Youth (15-24 years)
    - Adults (25-64 years)
    - Seniors (65 years and over)
3) What is your gender?
    - Female
    - Male
    - Other/ prefer not to answer
4) Are you the primary shopper for your household?
    - Yes
    - No
    - Equally shared with other family member(s)
5) Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?
    - At the statewide level
    - At local level
    - Both statewide and local level
    - No

6) For each shopping category please select how often you bring your reusable bag?

Grocery	***Clothing***	***Other Products***
o Never/rarely	o Never/rarely	o Never/rarely
o Sometimes	o Sometimes	o Sometimes
o Always/often	o Always/often	o Always/often

7) How important is plastic packaging in your decision making when shopping?
    - o Very important, I go to stores that require customers to bring reusable containers
    - o Somewhat important, if given the option between two products I will choose one with less plastic packaging
    - o Not important, I make my purchasing decisions using other criteria
8) From the list below select all the types of environmentally conscious habits you include in your lifestyle.
    - ☐ Refill reusable bottles
    - ☐ Use reusable shopping bags
    - ☐ Minimize single use plastic items use
    - ☐ Bring reusable takeout/to-go containers to restaurants
    - ☐ Use reusable straws/do not use single use straws
9) If you do use disposable plastic shopping bags, what do you do with them after you bring them home?
    - o Throw them away
    - o Reuse (e.g., trash can liner, shopping bag)
    - o Recycle them at a local store/facility drop-off site
10) Which of the following statements most closely applies to you regarding disposable plastic bags, auxiliary containers and wrappings?
    - o I know where and how to recycle them
    - o I would like to recycle them, but I do not know how to
    - o Recycling of those materials is not accessible/available in my community
11) Do you participate in curbside pickup or delivery for groceries or monthly subscription services?
    - o Yes, beginning in the last year (due to the Covid-19 pandemic)
    - o Yes, beginning prior to the last year
    - o No/rarely
12) Does your municipality/county provide any education campaigns to discourage placement of disposable plastic bags, auxiliary containers and wrappings in curbside recycling?
    - o Yes, they do have campaigns I am aware of
    - o No, they do not have any campaigns I am aware of
    - o I am not sure if I am allowed to place those materials in bin
13) Are you aware of any disposable plastic bags, auxiliary containers and wrappings bans/laws/limitations in your county or municipality?
    - o No
    - o Yes, we had previously in the last 10 years
    - o Yes, we had one that passed within the 10 years and it is still in effect
    - o Yes, we will soon have one
    - o I do not know
    - o Other, _____

14) Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?

15) What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings?

16) Are you willing to support additional waste reduction, reuse and recycling through increased fees?

Additional Comments

Stakeholder Group: Retailers

The Florida Legislature has amended section 403.7033 Florida Statutes requiring the Department of Environmental Protection to review and update the 2010 Retail Bags report and to evaluate the need for new or different regulation of auxiliary containers, wrappings, or disposable plastic bags used by consumers to carry products from retail establishments. The Florida Department of Environmental Protection is interested in understanding more about Florida retailers' policies regarding the use, management, and recycling or disposal of containers, wrappings, and disposable plastic bags. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities). To this end, we are requesting the following information that will be compiled into a Retail Bags Report and submitted to the Legislature by December 31st. The results of this survey can be found at https://faculty.eng.ufl.edu/timothy-townsend/survey/ and will be posted upon completion of the report.

- Auxiliary Containers – Secondary container into which a product is placed for transport by a consumer. It includes, but not limited to, reusable bags, paper bags, gift bags, gift boxes, hat boxes, cloth bags and food takeout boxes and clamshells. Disposable plastic bags have been intentionally excluded from this definition.
- Wrappings – Plastic films that are used to protect and transport the items within them; including, but not limited to, dry-cleaning, meats, fruits, bulk products, sandwiches, and newspaper. The focus for wrappings is on the external wrappings and not materials such as bubble wrap and tissue paper.
- Disposable plastic Bags – Disposable plastic film bags used by the consumer to carry products from restaurants and retail establishments in the sale of products and goods. These bags are not necessarily meant to be reused multiple times but may have beneficial secondary uses and may be recycled at certain retail establishments.

1) Name of business (if you would like to remain anonymous write "NA"):
   _____
2) Zip code(s) of business(es) location (if you would like to remain anonymous write "NA"):
   _____
3) Please select all the types of materials commonly sold at your store:
   - ☐ Groceries
   - ☐ Clothing
   - ☐ Other products, _____
4) Are the answers you are providing today representing:
   - ○ One individual business location
   - ○ Multiple Florida business locations. Please provide the number of business locations: _____.
5) Do you believe regulation is necessary for at least one of the following: auxiliary containers, wrappings, and disposable plastic bags?

Auxiliary Containers	***Wrappings***	***Disposable Plastic Bags***
○ At the statewide level	○ At the statewide level	○ At the statewide level
○ At local level	○ At local level	○ At local level

o Both statewide and local level o No	o Both statewide and local level o No	o Both statewide and local level o No

6) Please select all the items below available, free of charge, for customers to protect purchases for transport from the retail establishment:
   - □ None
   - □ Yes, only plastic
   - □ Yes, only paper
   - □ Yes, reusable bags
   - □ Yes, plastic and paper
   - □ Boxes/Other_____
7) Please provide the name of the company that your business purchases single use auxiliary containers/wrappings/disposable plastic bags from (If you cannot share this data write "NA"):

   _____
8) When purchasing single use auxiliary containers, wrappings, or disposable plastic bags, does your business give preference to items with recycled plastic content?

Auxiliary Containers	***Wrappings***	***Disposable Plastic Bags***
o No o Yes	o No o Yes	o No o Yes

9) For question 8, did your business give preference because:
   - o It was included as part of your request for proposal (RFP) (e.g., your business is/was soliciting bids with desired specifications, including recycled content)
   - o Required to do so to meet local or state policy obligation
   - o Other considerations like price, availability or, durability
   - o Other, _____
10) Does your business collect information on the rate of customers bringing in their own bags? (If yes, please explain in the box below how the data is stored, please provide any numerical data you can share, and details like data are sent to corporate headquarters or does data remain in the database at each individual store (if you can provide any numerical historic data please email **ashleyricketts@ufl.edu**))
   - o No
   - o Yes
   - o _____
11) Does your business offer disposable plastic bags, auxiliary containers and wrappings recycling options?
   - o No
   - o Yes, we collect all together in one container and we have collection bins outside our store entrance
   - o Yes, we collect all together in one container and we have collection bins inside our stores
   - o Yes, we collect separately, and we have collection bins outside our store entrance
   - o Yes, we collect separately, and we have collection bins inside our stores

- Other, _____

12) Does your business track the weight or units of collected disposable plastic bags, auxiliary containers and wrappings for recycling?

Auxiliary Containers	***Wrappings***	***Disposable plastic bags***
o No	o No	o No
o Yes	o Yes	o Yes

13) For question 12, can you provide us numerical data for the weight or units of collected disposable plastic bags, auxiliary containers and wrappings for recycling?
    - o No
    - o Yes, and we can provide numerical data to you (please provide to ashleyricketts@ufl.edu)

14) What is the average weight (in lbs) **OR** units of disposable plastic bags, auxiliary containers and wrappings collected for recycling in 2020 per business location? (Note if you have multiple locations report here the average of them) (If you cannot share this data write "NA"):

Auxiliary Containers	***Wrappings***	***Disposable plastic bags***
Weight: ___ Units:____	Weight: ___ Units:____	Weight: ___ Units:____

15) What is the average weight (in lbs) **OR** units of disposable plastic bags, auxiliary containers and wrappings collected for recycling in 2015 per business location? (Note if you have multiple locations report here the average of them) (If you cannot share this data write "NA"):

Auxiliary Containers	***Wrappings***	***Disposable plastic bags***
Weight: ___ Units:____	Weight: ___ Units:____	Weight: ___ Units:____

16) What is the average weight (in lbs) **OR** units of disposable plastic bags, auxiliary containers and wrappings collected for recycling in 2010 per business location? (Note if you have multiple locations report here the average of them) (If you cannot share this data write "NA"):

Auxiliary Containers	***Wrappings***	***Disposable plastic bags***
Weight: ___ Units:____	Weight: ___ Units:____	Weight: ___ Units:____

17) Please provide the name of the company that your business location sells/gives/pays to remove the disposable plastic bags, auxiliary containers and wrappings collected for

recycling (If you cannot share this data write “NA”):

_____

18) Does the municipality/county where your business is located, have any disposable plastic bags, auxiliary containers and wrappings bans/laws/limitations? (Note if you have multiple locations select the most appropriate response)
    - o No
    - o Yes, we had previously in the last 10 years
    - o Yes, we had one that passed within the 10 years and it is still in effect
    - o Yes, we will soon have one
    - o I do not know
    - o Other, _____
19) Did disposable plastic bags, auxiliary containers and wrappings increase in the last year due to COVID 19 pandemic? (Hint: Review your procurement data for purchases of these items)
    - o No
    - o Yes, normal increase
    - o Yes, large increase due to pandemic
    - o Yes, large increase due to other reasons (e.g., business expansions, brand acquisitions, other marketplace developments)
20) For question 19, was this in response to a state or local government directive or policy?
    - o No, our own response to the pandemic
    - o Yes
21) Does your business prioritize contracts with packaging vendors that produce products with less packaging for customers purchases?

Auxiliary Containers	***Wrappings***	***Disposable plastic bags***
o No	o No	o No
o Yes	o Yes	o Yes

22) Select all programs or campaigns your business participates in regarding increased use of reusable bags and containers?
    - ☐ None
    - ☐ Educational program on reusable bags and containers
    - ☐ Discount on purchase when customers bring in reusable bags or containers
    - ☐ Charity donation when customers bring in reusable bags or containers
    - ☐ Other, _____
23) Does your business offer plastic containers/bags for product lines such as loose nuts, fruit, meats, vegetables and cereals, etc.?
    - o No
    - o Yes, some of our products are provided in that form
    - o Yes, all of our products are provided in that form
24) For the items listed in question 23, do customers most commonly package the items with?
    - o free plastic containers/bags available at your business
    - o free reusable containers/bags available at your business
    - o purchasable reusable containers/bags for sale at your business
    - o bring their own containers/bags

25) Does your business provide reusable bags to customers?
    - o Yes, we sell them
    - o Yes, we provide them at no cost
    - o No
26) Please provide information on the average price per reusable bag to a customer.
    - □ Free
    - □ Max price is _____ and min price is _____
    - □ N/A
27) What is the weight (in lbs) **OR** units of reusable bags sold in 2020 per store? (If you cannot share this data write "NA"):
    Weight: _____
    Units: _____ _
28) What is the weight (in lbs) **OR** units of reusable bags sold in 2015 per store? (If you cannot share this data write "NA"):
    Weight:_____
    Units: _____ _
29) What is the weight (in lbs) **OR** units of reusable bags sold in 2010 per store? (If you cannot share this data write "NA"):
    Weight:_____
    Units:_____
30) On average, what is the most common type of reusable bag your business sold in the last five years?
    - o Textile reusable bag (e.g., cotton, fabric/cloth-like)
    - o Woven and nonwoven polypropylene, polyester, and nylon
    - o Heavy plastic, HDPE plastic reusable bag
    - o Light plastic, LDPE plastic reusable bag
31) Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?
32) What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings?
33) Are you willing to support additional waste reduction, reuse and recycling through increased fees?

Additional Comments

Stakeholder Group: Manufacturers

The Florida Legislature has amended section 403.7033 Florida Statutes requiring the Department of Environmental Protection to review and update the 2010 Retail Bags report and to evaluate the need for new or different regulation of auxiliary containers, wrappings, or disposable plastic bags used by consumers to carry products from retail establishments. The Florida Department of Environmental Protection is interested in understanding more about Florida plastic bag manufacturers' perspective regarding the use, management, and recycling or disposal of containers, wrappings, and disposable plastic bags. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities). To this end, we are requesting the following information that will be compiled into a Retail Bags Report and submitted to the Legislature by December 31st. The results of this survey can be found at https://faculty.eng.ufl.edu/timothy-townsend/survey/ and will be posted upon completion of the report.

- Auxiliary Containers – Secondary container into which a product is placed for transport by a consumer. It includes, but not limited to, reusable bags, paper bags, gift bags, gift boxes, hat boxes, cloth bags and food takeout boxes and clamshells. Disposable plastic bags have been intentionally excluded from this definition.
- Wrappings – Plastic films that are used to protect and transport the items within them; including, but not limited to, dry-cleaning, meats, fruits, bulk products, sandwiches, and newspaper. The focus for wrappings is on the external wrappings and not materials such as bubble wrap and tissue paper.
- Disposable plastic Bags – Disposable plastic film bags used by the consumer to carry products from restaurants and retail establishments in the sale of products and goods. These bags are not necessarily meant to be reused multiple times but may have beneficial secondary uses and may be recycled at certain retail establishments.

1) Number of employees working for company responding to the survey:

   _____

2) Name of company responding to the survey:

   _____

3) Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?
   - At the statewide level
   - At local level
   - Both statewide and local level
   - No
4) Do you manufacture disposable plastic bags, auxiliary containers and wrappings?
   - Yes, in Florida
   - Yes, outside of Florida, where_____?
   - No
5) Do you sell disposable plastic bags, auxiliary containers and wrappings?
   - Yes, in Florida
   - Yes, outside of Florida
   - No
6) Do you manufacture reusable bags, auxiliary containers and wrappings?
   - Yes, in Florida

- Yes, outside of Florida, where_____?
- No

7) Do you sell reusable bags, auxiliary containers and wrappings?
   - Yes, in Florida
   - Yes, outside of Florida
   - No
8) Please list several of your clients and the type of retailer they are (e.g., grocer, home improvement, big box, discount retailer, and general goods retailer) (If you cannot share this data write "NA"): _____
9) Please list the types of disposable plastic bags, auxiliary containers and wrappings sold?
   - _____
   - N/A
10) Please list the types of reusable bags, auxiliary containers and wrappings sold?
   - _____
   - N/A
11) Do your disposable plastic bags, auxiliary containers and wrappings contain recycled plastic content (select all that apply)?
   - □ Yes, at least 20% of total plastic used is post-consumer recycled content
   - □ Yes, about 20-50% of total plastic used is post-consumer recycled content
   - □ Yes, greater than 50% of total plastic used is post-consumer recycled content
   - □ Yes, at least 20% of total plastic used is post-industrial recycled content
   - □ Yes, about 20-50% of total plastic used is post- industrial recycled content
   - □ Yes, greater than 50% of total plastic used is post- industrial recycled content
   - □ No
12) What is the weight (in lbs) **OR** units of disposable plastic bags sold in the last 10 years on an annual basis? If you can share this data, please email **ashleyricketts@ufl.edu** your data.
13) What is the weight of disposable auxiliary plastic containers and wrappings sold in the last 10 years on an annual basis? If you can share this data, please email **ashleyricketts@ufl.edu** your data
14) Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?
15) What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings?
16) Are you willing to support additional waste reduction, reuse and recycling through increased fees?

Additional Comments

Stakeholder Group: Materials Recovery Facilities

The Florida Legislature has amended section 403.7033 Florida Statutes requiring the Department of Environmental Protection to review and update the 2010 Retail Bags report and to evaluate the need for new or different regulation of auxiliary containers, wrappings, or disposable plastic bags used by consumers to carry products from retail establishments. The Florida Department of Environmental Protection is interested in understanding more about Florida materials recovery facilities' (MRF) perspective regarding the use, management, and recycling or disposal of containers, wrappings, and disposable plastic bags. We are administering five surveys to gather information from multiple stakeholder groups (governments, residents, retailers, manufacturers and recycling facilities). To this end, we are requesting the following information that will be compiled into a Retail Bags Report and submitted to the Legislature by December 31st. The results of this survey can be found at https://faculty.eng.ufl.edu/timothy-townsend/survey/ and will be posted upon completion of the report.

- Auxiliary Containers – Secondary container into which a product is placed for transport by a consumer. It includes, but not limited to, reusable bags, paper bags, gift bags, gift boxes, hat boxes, cloth bags and food takeout boxes and clamshells. Disposable plastic bags have been intentionally excluded from this definition.
- Wrappings – Plastic films that are used to protect and transport the items within them; including, but not limited to, dry-cleaning, meats, fruits, bulk products, sandwiches, and newspaper. The focus for wrappings is on the external wrappings and not materials such as bubble wrap and tissue paper.
- Disposable plastic Bags – Disposable plastic film bags used by the consumer to carry products from restaurants and retail establishments in the sale of products and goods. These bags are not necessarily meant to be reused multiple times but may have beneficial secondary uses and may be recycled at certain retail establishments.

1) Zip code location of the MRF: _____
2) Do you believe regulation is necessary for containers, wrappings, and disposable plastic bags?
    - At the statewide level
    - At local level
    - Both statewide and local level
    - No
3) Does your MRF process disposable plastic bags, auxiliary containers and wrappings?
    - Yes, they are processed and sorted at the MRF, baled, and sold domestically
    - Yes, they are processed and sorted at the MRF, baled, and sold internationally
    - No, they are considered contaminants and are landfilled
4) Does your MRF have any issues with disposable plastic bags, auxiliary containers and wrappings (e.g., they cause damage to screens and stop operation)?
    - Yes, they cause shutdowns and damage other equipment
    - No, they are in the incoming recyclables stream, but we do not have an issue with them
    - No, we do not have them in the incoming recyclables stream
5) On average, how often do disposable plastic bags, auxiliary containers and wrappings cause a shutdown in operations?

- Once a week
- Once a month
- Once every other month
- Other: _____

6) How long, on average, do the shutdowns last?
   - At least one hour
   - From one to three hours
   - Greater than three hours
   - Other: _____
7) On a scale of to 1 to 5 (where 5 is most problematic), how problematic are disposable plastic bags, auxiliary containers and wrappings to MRF operations? _____
8) Have you calculated the financial impact of disposable plastic bags, auxiliary containers and wrappings contamination?
   - Yes, we estimate that per year we lose $_____ due to shutdowns in operation, rejected loads, etc.
   - Yes, we have an actual value that per year we lose $_____ due to shutdowns in operation, rejected loads, etc.
   - Yes, I have other data I can provide to you (please email **ashleyricketts@ufl.edu**)
   - No, we do not track or estimate these numbers
9) Does your MRF or local government provide any education campaigns discouraging placement of disposable plastic bags, auxiliary containers and wrappings in curbside or commercial recycling?
   - No, they do not have any campaigns I am aware of
   - Yes, in partnership with local government
   - Yes, independent of local government
   - I am not sure
10) Do you believe that regulation on containers, wrappings and disposable plastic bags would be effective?
11) What suggestions do you have for managing disposable plastic bags, auxiliary containers and wrappings?
12) Are you willing to support additional waste reduction, reuse and recycling through increased fees?

Additional Comments

Appendix D: Assessment of Retailer and Manufacture Options

D1. Sustainability and Waste Reduction Goals of Three Florida Retailers

Albertsons ("Albertsons Companies Plastics and Packaging")**:**

- Has made a "plastic waste reduction pledge" company-wide which includes initiatives such as:
    - Ensuring 100% of the store's self-branded products ("Own Brands") will be recyclable, reusable, or industrially compostable by 2025.
    - Decreasing single-use plastic usage within stores and products.
    - Plastic packaging of the store's self-branded products will contain 20% recycled material by 2025.
    - "Own Brands" product packaging will provide clear recycling communications including the addition of QR codes by 2022.
    - Recycling operational plastics for use in new retail, industrial, and consumer items.
    - Share best practices with various of retailers, manufacturers, governments, and educations institutions.

Target ("Target Sustainable Products"):

- Members of the "New Plastic Economy Global Commitment" which Target pledges to work towards the following:
    - Elimination of problematic or unnecessary plastic packaging by 2025 through collaboration with the "US Plastic Pact."
    - Exploration of at least five reuse models to reduce and/or eliminate single-use plastic (piloted by 2025).
    - 20% post-consumer recycled content in owned-brand packaging by 2025.
    - Make all plastic packaging in owned-brands 100% recyclable, reusable, or compostable by 2025.

Walmart ("Waste"):

- Goal to achieve zero waste and landfill incineration by 2025.
    - In 2020, 82% of waste materials was diverted from landfill and incineration in the United States.
- Goal to achieve 20% of private brand plastic packaging in North America to be made of post-consumer recycled content by 2025. A similar goal is to reach 17% of private brand plastic packaging globally to be made of post-consumer recycled content by 2025.
    - In 2020, the percentage for both North America and globally was at 9%.
- Goal to have 100% of global private brand packaging is recyclable, reusable, or industrially compostable by 2025.
    - In 2020, 62% of private brand packaging was recyclable, reusable, or industrially compostable.
- In 2020, 99% of US general merchandise private brand primary plastic packaging was free of PVC.
- Goal to reduce reliance on plastic bags and engage customers to reduce, reuse, and recycle.

D2. Retailer Options: Stores Charge Fees for Disposable Plastic Bags

Retailers who offer complimentary plastic bags typically incorporate the cost of bags into the purchase price of their products; alternatively, they can directly charge customers for single-use plastic bags. Doing this explicitly attaches the idea that disposable plastic bags are an option rather than the default. Certain governments around the country legislate these fees, either by writing them into law or passing legislation explicitly banning these. In the absence of legislation, retailers have the opportunity to incorporate them and use the revenue as they decide.

Table D1. Examples of retailers that charge fees for disposable plastic bags and how they go about the process.

Retailer Name:	Type of Retailer:	Local or Chain:	Description:
Aldi's	General Grocer	Chain	• Plastic bags must be purchased rather than being complimentary ("About ALDI | ALDI US").
Save A Lot	Discount Grocer	Chain	• Plastic bags must be purchased rather than being complimentary ("Save a Lot Licensing")

D3. Retailer Options: Stores Do Not Offer Plastic Bags and Containers

Another option a retailer can incorporate into their stores is not offering single-use plastic bags/containers but rather putting the responsibility on customers on how they will carry out their items. Usually, this option is paired with an additional way customers can carry out their purchased items (e.g., reusable bags, old packaging containers). Utilizing this option can place more focus on the customer rather than the retailer in relation to using plastic bags, auxiliary containers and wrappings.

Table D2. Examples of retailers that require reusable bags and containers and how they go about the process.

Retailer Name:	Type of Retailer:	Local or Chain:	Description:
Costco Wholesale	Wholesale Retailer	Chain	• Does not provide shopping bags at checkout for customers due to increased costs and waste concerns ("Costco Customer Service"). ○ Customers are expected to carry out the items they refilled on their own.
Ecopod	Household Cleaning Product Refill Station	Local (Miami, FL)	• For bags specifically, there are no reusable nor disposable bags available at locations. ○ Customers are expected to carry out the items they refilled on their own.

D4. Retailer Options: Provide Reusable Bags and Containers to Customers

Providing reusable bags and containers to customers in place of SUCP items is an option retailers can integrate into their stores. When providing these products, the retailer also has the option of whether or not to charge for them. Requiring payment in comparison to giving out complimentary products.

Table D3. Examples of retailers that provide reusable bags and containers to customers and how they go about the process.

Retailer Name:	Type of Retailer:	Local or Chain:	Description:

Publix	General Grocer	Chain	• Reusable bags are available to customers for a fee ("Publix Sustainability").
			  ○ Save on average 45 million paper and plastic bags each month.
			  ○ Saved over 6.2 billion plastic bags since 2007.
			• Reusable bags are encouraged to be used by customers.

Aldi's	General Grocer	Chain	• Reusable bags are available to customers for a fee, and customers can use (for free) empty cardboard boxes that no longer shelve products for sale ("About ALDI | ALDI US").
Urban Outfitters	Clothing and Lifestyle Retailer	Chain	• Provide free fabric shopping bags to customers that are reusable. ○ Customers are encouraged to reuse these bags as they are both washable and made to last for many years ("URBN Reuse + Renewal").
Ecopod	Household Cleaning Product Refill Station	Local (Miami, FL)	• Containers at refill stations are free, customers pay for the actual item they are refilling and not the container. ○ This is subject to change in the future.

D5. Retailer Options: Provide Incentive for Using Reusable Bags and Containers

Incentives are an option that allows the customer to benefit from their actions while still giving them options. By providing an incentive for using reusable bags and containers, retailers are promoting the reduction of SUCP.

Table D4. Examples of retailers providing incentives for using reusable bags and containers and how they go about the process.

Retailer Name:	Type of Retailer:	Local or Chain:	Description:
Target	General Retailer	Chain	• Offer a five-cent discount for every reusable bag used within a purchase ("Target Sustainable Products").
Kalamazoo Olive Company	Specialty Store	Local (St. Petersberg, FL)	• When reusable bags are used, customers receive a one-dollar discount when making a purchase. • Receive a discount on purchases when returning clean bottles their products are sold in.

D6. Retailer Options: Provide In-Store Recycling of SUCPs

Another option retailers can implement is giving the opportunity for customers to recycle SUCP at their stores. This option focuses on recycling efforts rather than reduction efforts. Certain states have legislation that requires retailers to provide in-store recycling programs. Retailers have the ability to set up recycling programs regardless of legislation. In-store recycling is also beneficial in the sense that most curbside recycling facilities cannot properly recycle single-use plastic bags, so going through a retailer who could appropriately recycle the items could divert those potential mismanaged bags (Wagner, 2017).

Table D5. Examples of retailers who offer in-store recycling options for customers and how they go about the process.

Retailer Name:	Type of Retailer:	Local or Chain:	Description:
CVS	General Retailer	Chain	• Offer recycling services (in store and through mail-in) of plastic bags and auxiliary containers ("Go Green Sustainability Initiative – CVS Pharmacy").
Publix	General Grocer	Chain	• Offer recycling service of plastic bags and plastic films to customers. ○ 12,594 tons of mixed plastic was recycled by Publix in 2020 ("Publix Sustainability").
Winn Dixie	General Grocer	Chain	• Offer in-store recycling for both plastic bags and plastic film ("Southeastern Grocers: Corporate Social Responsibility Report 2020," 2020).

D7. Retailer Options: Provide Clear Instructions on Packaging of How to Recycle SUCPs

Proper recycling instructions are an important factor to divert unrecyclable materials away from recycling facilities. Well-informed customers may be less likely to improperly dispose of plastic bags, auxiliary containers and wrappings. Some companies that sell their products in grocery retailers have included the How2Recycle label on their products.

How2Recycle strives to clearly communicate recycling instructions to consumers. They take into account unclear labeling, variations in recycling programs, and inaccurate recyclability claims ("How2Recycle,"). Major retailers like Walmart and Target have added them to their own brand products ("Target Sustainable Products"). Labels include:

- Stating any additional steps required before you can recycle the item.
- A link to their website with more information on recycling.
- Whether the item is widely recycled, must be checked locally, not able to be recycled yet, or if it requires store drop-off.
- Type of material the packaging is made of.
- What specific packaging component the label is referring to.

Table D6. Examples of retailers who include recycling instructions on their SUCP items and how they go about the process.

Retailer Name:	Type of Retailer:	Local or Chain:	Description:
Walmart	General Retailer	Chain	• 57% of Walmart US private brand food/consumables supplier-reported sales came from items carrying the How2Recycle label ("Walmart Waste"). ○ Goal is for 100% of Walmart US private brand food and consumable packaging to include the How2Recycle label by 2022.
McDonald's	Restaurant	Chain	• Give instructions on packaging for both customers and employees for proper recycling of waste, including that of single-use plastics ("McDonald's Packaging & Waste").

D8. Retailer Options: Require Recycled Content in SUCPs

Retailers may require a specified amount of recycled material within their SUCP products. Some states have begun to implement legislation to this effect, however, retailers can enact this option without legislative enforcement. Certain retailers implement goals relating to this option in which they pledge to reach a specific amount of recycled material in their products within a time frame.

Table D7.. Examples of retailers requiring a certain amount of recycled material in their SUCP items and how they go about the process. Also included are examples of sustainability goals that certain retailers strive to achieve for in regard to this option.

Retailer Name:	Type of Retailer:	Local or Chain:	Description:
Albertsons	General Grocer	Chain	• Partnered with bag manufacturers to produce bags that are made from 65% recycled material. • Goal to have plastic packaging of the store's self-branded products containing 20% recycled material by 2025 ("Albertsons Companies Plastics and Packaging").
Walmart	General Grocer	Chain	• In 2020, the percentage of private brand plastic packaging made of post-consumer recycled content, for both North America and globally, was at 9%. ○ Goal to achieve 20% of private brand plastic packaging in North America to be made of post-consumer recycled content by 2025. A similar goal is to reach 17% of private brand plastic packaging globally to be made of post-consumer recycled content by 2025. • In 2020, 99% of US general merchandise private brand primary plastic packaging was free of PVC ("Waste").

D9. Manufacturer Options: Improve SUCPs Manufacturing

While many government options tend to focus on reduction or recycling of plastic bags, there is also the possibility of improving the plastic bag rather than reusing or eradicating them. Improving plastic bag technology directly targets the current methods of manufacturing SUCPs and attempts to enhance them in an environmentally friendly manner. Many companies are currently researching and working towards this goal.

Table D8. Advantages and disadvantages of improving plastic bag technology.

Advantages:	Disadvantages:
• **Reduces harmful plastic usage.** • **Creates jobs.**	• Could be costly to research. • Would take a large amount of time to implement.

Table D9. Companies and groups that work in the industry of improving SUCPs.

Company/Group:	Description:	Website:
BASF	Develops and makes biodegradable plastics.	https://www.basf.com/us/en.html
Biodegradable Products Institute	Association promoting the use and production of biodegradable plastics.	https://bpiworld.org/
TIPA Compostable Packaging	Creates plastic packaging alternatives that behave like organic waste.	https://tipa-corp.com/
Genomatica	Develops sustainable plastics/sustainable plastic products.	https://www.genomatica.com/
Genecis	Converts food waste into biodegradable plastics.	https://genecis.co/

D10. Efforts for Data Collection from Florida Retailers

Targeted Retailers Stakeholders:

- **National Scale:** Nationwide information was collected through public information found on company websites. Information was amassed from a combination of webpages dedicated to sustainability, released sustainability reports and Environmental, Social and Governance (ESG) reports.
- **Regional Scale:** Regional scale retailers, such as Albertson's and Publix, for example, were targeted when connecting with members of organizations such as the Florida Retail Federation and the Florida Chamber of Commerce. Connecting through these contacts did not lead to any contacts wanting to participate in this research except for Florida Restaurant and Lodging Association. Information on the efforts in connecting with stakeholders.
- **Chambers of Commerce Businesses:** Certain Chambers of Commerce were able to provide a list of their contacts within their regions. Retailers, restaurants, and manufacturers from the lists were contacted for data collection.
- **Sustainable-Centered Stores:** Connecting with sustainability-centered stores that target low-waste consumer options yielded successful interviews. These businesses being smaller scale also meant that contacts found online led directly to their store fronts rather than a customer service line, so communication was streamlined, and representatives of these stores were easier to reach.

Initial Strategy:

A priority for this effort was to connect with large-scale stakeholders that operate across the state of Florida. After several rounds of emails, responses were minimal; most of those which did respond indicated that they did not have contacts or information to share as well.

Revised Strategy:

Organizations and associations (such as those with memberships), for the majority, were unable to provide contacts for retailers at the state level. This forced a revision in our

strategy; and we therefore reached out to Chambers of Commerce(s) to gather contact information of stakeholders. The Chamber of Commerce regions contacted included: Ocala Metro Chamber of Commerce, Charlotte County, Cocoa Beach, Greater Gainesville Area, Greater Palm Bay, Greater Pensacola Area, Greater Pompano, Key West, Melbourne, Ocala Metro, Suwanee County and Titusville. The strategy behind selection of those Chambers of Commerce was to target both urban and rural areas of Florida and select chambers that are located geographically throughout Florida. Not all Chambers of Commerce were able to respond, but those that did offered directory lists of businesses in their respective regions. Maximum attempts to contact was conducted until the data acquisition period closed.

Finalized Strategy:

The majority of data that was collected came from the nationwide/international brands official websites, and smaller local-owned business that were contacted through regional chambers of commerce and with whom we were able to conduct phone interviews. Information collected from the retailers are presented in the next section.

Once we made contact with a retailer, we provided a link to the online survey. Phone interviews were also conducted with a representative whenever possible. Phone interviews were an opportunity to collect additional data which was too complex to include in the online survey, such as descriptions of recycling processes and efforts, and numeric data on weight or units of plastic handled over a given amount of time.

Restaurants were included in our outreach efforts, however, we were ultimately unable to connect with any. Restaurant contacts were provided by the Florida Restaurant and Lodging Association and Florida Fruit and Vegetable Association. Unfortunately, these contacts did not respond to our inquires or were unable to be participate in a phone interview. The exact scripts used in all contact efforts with stakeholders are listed in Appendix D. The complete list of all retailers with whom phone interviews were conducted is: EcoPod, ReSupply Market, Sans Market, the Health Basket and Bagito.

D11. Summary of Data Collected

Table D10. Reduction and recycling practices of the most prevalent Florida retailers. "✓" indicates that the store participates in the practice while "-" indicates that the store does not participate in the practice. Some additional notes are included regarding the practice to show more specificity.

Store:	Albertsons[a]	CVS[b]	Publix[c]	Target[d]	Walgreens[e]	Walmart[f]	Winn Dixie[g]
Reusable bags are offered.	✓	✓	✓	✓	✓	✓	✓
Reusable bags are encouraged.	✓	✓	✓	✓	✓	✓	✓
Have specific bagging practices to reduce plastic-use.	✓, Minimize the use of bags for items that do not require one.	✓, Minimize the use of bags for items that do not require one	✓, Instruct front-service clerks on proper bagging techniques.	-	-	-	✓, Train staff to maximize utility of the traditional plastic bag by filling to an average of six items.
Offer in-store recycling of plastic bags.	✓	✓, Mail-in services are also available.	✓	✓	-	✓	✓
Offer in-store recycling of plastic film.	✓	-	✓	-	-	✓	✓
Offer in-store recycling of plastic auxiliary containers.	-	✓, Mail-in services are also available.	-	-	-	-	-
Have sustainability or waste reduction goals in relation to SUCPs.	✓	-	-	✓	-	✓	-

[a]("Albertsons Companies Plastics and Packaging"), [b]("Go Green Sustainability Initiative – CVS Pharmacy"), [c]("Publix Sustainability"), [d]("Target Sustainable Products"), [e]("Reducing Our Carbon Footprint"), [f]("Waste"), [g]("Southeastern Grocers: Corporate Social Responsibility Report 2020," 2020)

Table D11. Information collected from local Florida retailers regarding their SUCPs reduction, recycling, and reusing practices. Specifically, these retailers have an emphasis on waste minimization as part of their business model. Information was collected through direct correspondence with these retailers.

Store:	Ecopod	Kalamazoo Olive Company	One World Zero Waste	Resupply Market	Sans Market	The Health Basket
Product generally sold at the store.	Household liquid product refills (e.g. laundry detergent).	Oils, vinegars, specialty kitchen wares.	Bulk food and environmentally friendly retail items. All reusable replacements for disposable products.	Low waste grocery, cleaning, and personal care items.	Everyday items.	Supplements and healthy alternatives.
One location or multiple locations.	Multiple locations throughout south Florida.	One location.	One location.	One location.	One location.	One location.
Offer single-use plastic bag, auxiliary container, or film recycling options.	Recycle containers through a local recycling partner known as “Lady Green Recycling.”	Offer recycling options for auxiliary containers.	No recycling options.	Not for customers but attempt to properly recycle all materials that may come their way.	Not for customers but attempt to properly recycle all materials that may come their way.	Attempt to properly recycle all materials that may come their way.
Offer disposable bags to customer.	No disposable bags at locations.	Use paper bags.	Offer free post-consumer recycled paper bags if customers do not bring their own containers.	Offer donated, already used paper bags or shopping bags.	Have recyclable and compostable paper bags for customers if needed.	Disposable paper bags are offered if customers do not bring their own reusable bag.
Give preference when purchasing single-use containers, wrappings, or plastic bags with recycled plastic content.	No preference.	Paper bags used as well as tissue used in packaging items is all made from recycled material.	Yes.	No major preference but are mindful of recycled content of products.	Avoid plastics in general including those that have recycled material in them.	No preference.
Effect of COVID-19 pandemic on single-use plastics in the last year.	Became one of their busiest times due to fear of contamination.	None.	None.	Not open prior to pandemic.	None.	Saw increased number of disposable items used due to fear of contamination.
Provide reusable bags or containers to customers.	Provide containers at locations.	Reusable bags are available.	Reusable bags and containers are available.	Reusable bags are available.	Sell reusable cotton bags and produce bags.	Reusable bags are available.
Average price per reusable bag or container for purchase for a customer.	Containers at locations are free.	Reusable bags cost customers one dollar each.	Around 2 dollars average.	Around 3 dollars average.	Reusable bags are around 16 dollars while produce bags are around 6 dollars.	Did not state price.

Provide incentives for using reusable bags/containers or for recycling products at the business.	No incentives.	Money back incentives for using reusable bags and returning clean bottles that their products are sold in.	Yes.	No incentives.	No incentives.	No incentives.
Have a product line that uses plastic containers or bags.	Has their own brand containers that are expected to be reused.	Do not.	Do not.	Bamboo brush that came with a plastic bag.	Do not.	Some plastic film in fruit and vegetable products.
Believe regulation is necessary for SUCPs.	Believes in regulation necessary at either a state or local level.	Believe regulation necessary at national level.	Believe regulation is necessary at a statewide level.	Believe regulation is necessary at state and local level.	Believe regulation is necessary at state and local level.	Believe regulation is necessary at state and local level.
Offer or participate in educational programs on reusable bags and containers.	Has spoken at schools for educational purposes.	Do not.	Yes.	Constantly educate on reusability of materials.	None specifically.	None specifically.

Appendix E: Review of Environmental Concerns with SUCP

E1. Plastic Bag Degradation

Global plastic usage has increased consistently for decades, from 1.5 million metric tons generated in 1950 to 368 million metric tons in 2019 (for the first time ever, plastic generation decreased slightly in 2020 to 367 million metric tons, due to COVID-19 impacts on the industry; Statista, 2021). Disposable packaging accounts for approximately 37% by weight (O'Brine and Thompson, 2010). Conventional plastic materials are substantially resistant to degradation: it is estimated to take more than 100 years for some polyethylene materials to degrade down to mineral form, where it can then be absorbed by plants and incorporated into the biosphere (O'Brine and Thompson, 2010). The effects of mineralized forms can have similar effects as exposure to microplastics (O'Brine and Thompson, 2010).

Most traditional plastic resins do not biodegrade, instead they photodegrade, breaking down due to UV exposure (NOAA, 2021). In scientific studies of plastic bag movement in the ocean, they have been found to float on the surface of the water, where UV exposure is highest, for about three weeks (Nauendorf et al., 2016). After this period, bags begin sinking to the ocean floor and are carried by ocean currents. The deeper the bag sinks, the less sunlight can reach the bag, and degradation slows down. Plastic bags have been found at the deepest point on Earth, the Mariana Trench in the Western North Pacific, over 10,000 meters below sea level (Chiba et al., 2018).

E2. Microplastic Impacts

Plastic in the form of microplastics are one of the most prominent forms of global water pollution (Karlsson et al., 2018). Polyethylene, the compound that constitutes most auxiliary wrappings and plastic bags, is the second most common microplastic found in tester samples (Karlsson et al., 2018). Plastic resin pellets are a primary ingredient used in the production of plastic consumer goods, including films like auxiliary containers, wrappings, and disposable bags. Plastic pellets can be lost (i.e., inadvertently released to the environment) at every stage of production (Karlsson et al., 2018), and because of their small size, pose an immediate threat to the receiving environment (Kühn et al., 2015). Plastic pellets are not eliminated in sewage waste or water quality treatments and thus continue to accumulate in the environment and in the food web (Bergmann, 2015).

Laboratory studies have reported that microplastics ingestion can impact animals' behavior, reproduction, appetite and growth (Alimba and Faggio, 2019). Seafood can be contaminated as microplastics bioaccumulate and spread through the food web. Humans who eat seafood may ingest these plastics, which have been linked to cancer, lung, and liver damage in humans (Pinto et al., 2021).

E3. Chemical Contaminants of Concern

Chemicals added to plastic resins to improve performance during their useful life may be released after disposal, leading to environmental impacts. Phthalates, which are common plastic additives, are a priority chemical according to the EPA (US EPA, 2019). In an experiment using simulated seawater to monitor plastic bag degradation in the ocean, Paluselli et al. (2019) measured phthalate leaching after only a short period of time. There is limited information in the scientific literature regarding human effects of phthalate

exposure; however, animal studies suggest there can be negative health impacts (Przybylinnska and Wyszkowski, 2016). Other chemical ingredients found in plastic products such as lead, styrenes, and BPA, and chemical byproducts of plastic degradation such as polycyclic aromatic hydrocarbons can negatively impact a variety of marine life (Bergmann, 2015).

E4. Marine and Land Animals Impact

Ongoing research has documented the migration of plastic bags and other kinds of plastic litter into marine and freshwater ecosystems, where they cause negative impacts to wildlife (Wilcox et al., 2018; FIU, 2021). A common theme in this research is the harm caused to native wildlife and the ubiquity of plastic pollution – observed on a large scale as visible plastic litter and measured as microplastics and chemicals present in environmental samples. Reports on the topic often include graphic images of animals which have been harmed or killed by plastic (Reddy et al., 2018). The number of marine species affected by any kind of plastic pollution, ingestion, entanglement, or microplastic absorption, has more than doubled since the late 1970s from 267 species to over 550 (Kühn et al., 2015). According to researchers Florida has a high number of incidents of plastic harming marine life (Warner, Kimberly et al., 2020). Based on Kühn et al. (2015) plastic pollution affects organisms through multiple pathways. Microplastics, both primary (from plastic pellet spills) and secondary (from the degradation of plastic consumer goods), can affect marine life including coral and aquatic vegetation. Kühn et al. (2015) reported that in Hawaii, 65% of some coral colonies were covered in some form of plastic debris and 80% of these colonies were partially or entirely dead as result of the detrimental coverage. Sand dunes can also capture significant amounts of plastic bag waste. During rainfall, the chemicals can leach into oceans via runoff and absorption by plant roots and seeds (Menicagli et al., 2019).

Appendix F: Estimates of SUCP Entering Florida's Environment

F1. Background on Marine Litter Estimates

Three recognized approaches to estimate the mass of plastic materials entering the ocean from each country are described in Jambeck et al. (2015), Lebreton and Andrady (2019); and Schmidt et al. (2017). The estimated mass of plastics entering the ocean (known as plastic marine debris or marine litter) from the US has been reported by each of these researchers. There are differences in the approaches, in which Jambeck et al. (2015) estimated the mass of marine litter from coastal populations, Lebreton and Andrady (2019) estimated the mass from both coastal and river populations, and Schmidt et al. (2017) estimated the mass from communities in river catchment areas.

In all three approaches they determined that high income countries, like the US, directly contribute to marine litter primarily through littering from coastal areas. While, countries with lower income levels will contribute to marine litter directly through littering from coastal/river catchment areas and as a result of plastics mismanagement in the coastal/river catchment areas. Mismanagement refers to EOL plastic products not collected through formal waste management (e.g., lack of collection services, proper recycling systems, and controlled landfills or combustion facilities). Other studies have reported that there are indirect methods that countries contribute to marine litter. Bishop et al. (2020) reported countries that export used plastic products (potentially through the recycling trade) may inadvertently release mismanaged fractions of plastics. However, for the scope of this Section only the direct estimates through littering will be used.

The general methodology for Jambeck et al. (2015), Lebreton and Andrady (2019); and Schmidt et al. (2017) followed first estimating the mass of plastics generated based on plastics composition in the waste stream, then the mass of plastics mismanaged, and the potential portion of that mass that enters the ocean either by coastal communities or coastal and river communities. If using this simplified approach on Florida, this would be done by combining the total collected "other plastics" and "plastic bottles" masses for 2020 (from DEP Annual Solid Waste Report for Florida), applying the assumption that 2% of that plastic waste is mismanaged as litter (from Jambeck et al. (2015)), then applying the assumption that 25% of the mismanaged plastics enter marine environments (Jambeck et al. (2015)). If following the Jambeck et al. (2015) approach (note the other researchers also followed this approach with some modifications) it would result in 6,863 tons of plastics entered into marine environments for 2020 from Florida. There is a potential uncertainty with the 6,863 tons estimate since it is based on assumptions (e.g., the 2% and 25%) that are not specific to Florida and does not distinguish between the plastic products (e.g., how much is plastic bags, auxiliary containers and wrappings). Therefore, in addition to that estimate, the mass of plastic bags, auxiliary containers and wrappings were estimated for Florida from 2013 to 2020 using actual measurements of plastic litter collected by Florida residents and reported by ocean cleanup organizations.

The following organization's Florida-specific coastal area cleanup data were compiled and how that data was used here is described:

- **Debris Tracker:** international online platform that is an open data citizen science tool that allows citizens to input the location, material type, and number of units

cleaned up. Managed by National Geographic. Data for Florida cleanups were retrieved from, but the corresponding time period is unclear. Data that was reported for Florida for total items cleanup was 248,365; plastic bags collected were 8,745 and plastic food wrappers were 23,323.

- **Ocean Conservancy TIDES:** international online platform that is an open data citizen science tool that allows citizens to input the location, material type, and number of units cleaned up. Managed by Ocean Conservancy. Data for Florida cleanups were retrieved corresponding to 2013 to 2020. Detailed data were retrieved for 2020 from 4,235 cleanups.
- **Surfrider:** national online platform that is an open data citizen science tool that allows citizens to input the location, material type, and number of units cleaned up. Managed by The Surfrider Foundation. Data for Florida cleanups were retrieved corresponding to 143 cleanups from time periods 2018 to 2021.

Table F1. Conversion factors in pounds/units provided by Ocean Conservancy.

Conversion	Pounds/ unit
Take Out/Away Containers (Plastic)	0.07
Take Out/Away Containers (Foam)	0.02
Grocery Bags (Plastic)	0.01
Other Plastic Bags	0.02
Other Plastic/Foam Packaging	0.02
Plastic Pieces	0.03

F2. Mass Estimates of Marine Litter from Florida

Using data from Surfrider an estimated mass of 19,582 pounds of all items collected at cleanups in Florida are reported, of which 545 pounds are specific to the plastic bags, auxiliary containers and wrappings for 2018-2021 (see Table F2). While, using data from Ocean Conservancy for Florida 2020 the total number of large items collected was 542,544 units (reported as 203,587 pounds), of which the plastic bags, auxiliary containers and wrappings comprised approximately 10% (on unit basis) (Table F3). For small fragments of foam, plastic, and glass, the plastic pieces comprised of 93% of the total small fragments collected in 2020 (Table F3). The results of the mass of plastic bags, auxiliary containers and wrappings collected at cleanups across Florida in 2020 reported in Ocean Conservancy is shown in Figure F1. The data in Figure F1 shows only data inputted by volunteers and organizations into the Ocean Conservancy database and is likely an underestimate of the mass of those plastic bags, auxiliary containers and wrappings littered into the marine environment.

According to annual unit basis data for 2013-2020 “grocery bags (plastic)” makes up the largest category relative to the plastic categories included in Table F3. This is shown in Figure F2 as well, where “grocery bags (plastic)” are associated with the greatest number of units collected at cleanups form 2013-2020. However, on a mass basis the “take out/away containers (plastic)” category is collected the most at cleanups in Florida from 2013-2020 as seen in Figure F3 and Table F5. The data in Ocean Conservancy is reported for cleanups from “land, underwater, and watercraft”, and the results for the 4,325 cleanups are summarized for 2020 for the categories included in plastic bags, auxiliary containers and wrappings in Table F4. From Table F.4, most items are collected

from land cleanups followed by watercraft and underwater. Again, the most commonly collected material for land, underwater, and watercraft is “grocery bags (plastic)”. Hardesty et al. (2021) used over 22,508 historic data points from Ocean Conservancy across the globe and found similar findings that plastic bags, take-away plastic containers, and take-away foam containers are included in the top 10 large items found. Hardesty et al. (2021) also found using global historic data from 7,290 underwater cleanups (provided by PADI AWARE) that plastic pieces, food wrappers, and plastic bags are included in the top 10 items found. This observation regarding the common presence of plastic bags and take-out containers as marine litter is widely discussed in literature and reports (Circularity Informatics Lab, 2021a, 2021b, 2019; Eriksen et al., 2014; Galgani et al., 2015; Moore et al., 2001; Tavares et al., 2020).

Several researchers evaluated scenarios of predicted growth in plastic waste and potential approaches to mitigate plastic pollution (Borrelle et al., 2020; Lau et al., 2020). The scenarios included a potential regulatory ban or tax on single-use consumer plastic products and an increase in beach cleanups as mechanisms to reduce plastic pollution. They both found that the efforts needed mitigate plastic pollution require extensive intervention and extraordinary efforts, and that a combination of regulatory and technological innovation is necessary.

Table F2. Plastic products included in the definition of “plastic bags, auxiliary containers and wrappings” reported by Surfrider for 2018-2021 to be collected from the 143 cleanup events across Florida.

Categories	Units	% of total units	Mass (lbs)
Plastic Bags (shopping/grocery) (#820)	2,126	3%	30
Foam Take-Out Food Containers (#834)	190	0.2%	4
Plastic fragments larger than a dime (#1841)	8,789	11%	262
Plastic fragments smaller than a dime (#843)	7,174	9%	214
Plastic Bags (other: zip-lock, trash, etc) (#821)	985	1%	20
Plastic Film/Wrapper (non-food or unknown) (#864)	719	1%	15
Total (these categories only)	**19,983**		**545**
Total (all categories including those not listed)	**81,627**		**19,582**

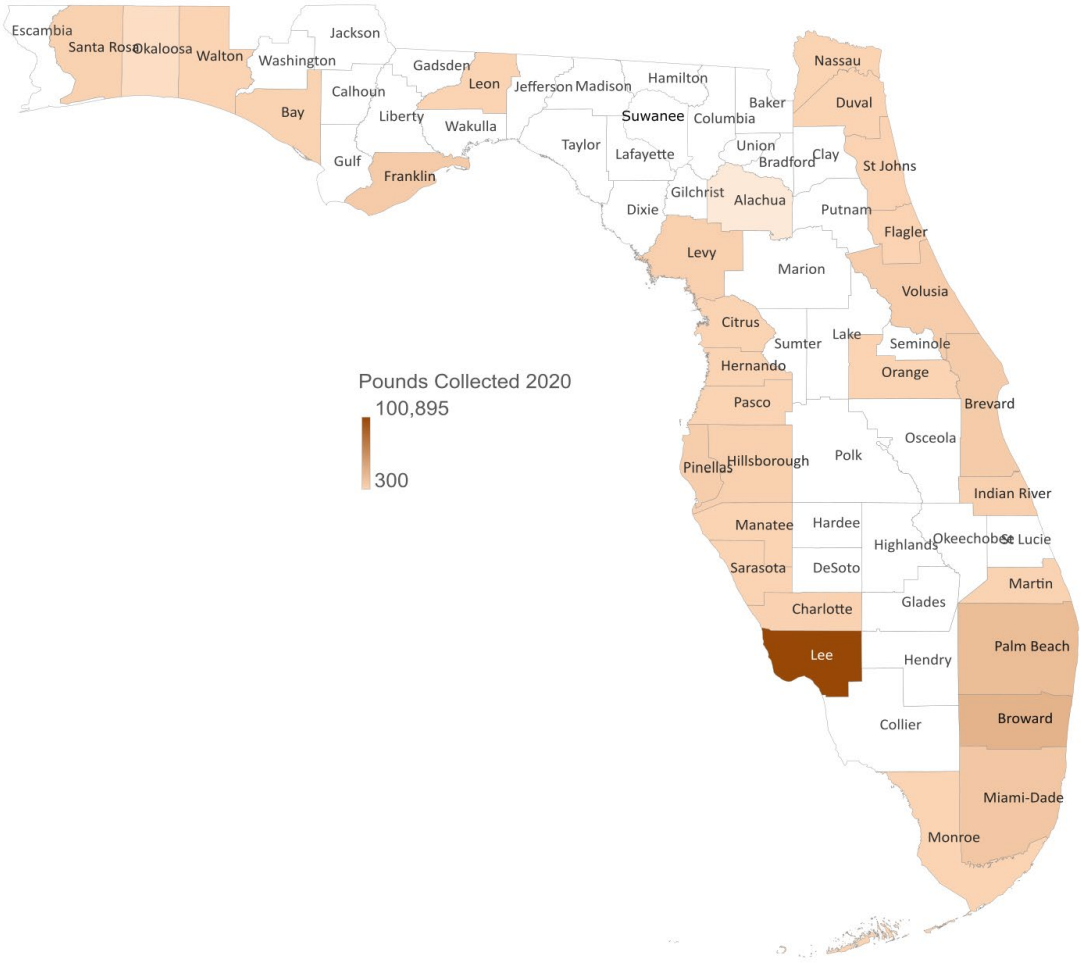


Figure F1. Florida county map depicting the pounds of plastic materials collected at each county’s cleanup events for 2020. Data from Ocean Conservancy only.

Table F3. The percent contribution each plastic bag, auxiliary container and wrapping relevant category makes up the total number units for large items and small fragments. Data from Ocean Conservancy.

% of Total Units	2013	2014	2015	2016	2017	2018	2019	2020
Large items								
Take Out/Away Containers (Plastic)	1%	1%	1%	2%	2%	2%	2%	2%
Take Out/Away Containers (Foam)	1%	1%	1%	2%	1%	1%	1%	1%
Grocery Bags (Plastic)	2%	2%	2%	3%	3%	3%	3%	6%
Other Plastic Bags	2%	2%	2%	2%	2%	2%	2%	0.2%
Other Plastic/Foam Packaging	2%	2%	2%	2%	2%	2%	2%	0.3%
Small Fragments								
Plastic Pieces	55%	60%	62%	65%	80%	72%	77%	93%

Table F4. The number of units of related Ocean Conservancy item categories (to plastic bags, auxiliary containers and wrappings) collected at land, underwater, and watercraft cleanups for the 4,325 cleanups for Florida in 2020.

Unit Basis 2020 (4,325 cleanups)	Land	Underwater	Watercraft	Total Items
Large items				
Take Out/Away Containers (Plastic)	13,103	13	262	13,378
Take Out/Away Containers (Foam)	6,947	9	183	7,139
Grocery Bags (Plastic)	30,226	57	734	31,017
Other Plastic Bags	1,023	35	33	1,091
Other Plastic/Foam Packaging	1,348	N/A	72	1,420
Small Fragments				
Plastic Pieces	127,135	459	1,102	128,696
Total Units	179,782	573	2,386	182,741

Table F5. The number of units of related Ocean Conservancy item categories (to plastic bags, auxiliary containers and wrappings) collected at the 4,325 cleanups for Florida in 2013-2020. To see the full list of items for 2020 see Table F7.

Unit Basis	2013	2014	2015	2016	2017	2018	2019	2020
Large items	*658,129*	*596,873*	*781,465*	*759,231*	*461,281*	*595,348*	*742,814*	*542,544*
Take Out/Away Containers (Plastic)	9,843	7,412	10,041	12,142	8,603	9,607	11,444	13,378
Take Out/Away Containers (Foam)	5,996	7,193	8,913	12,006	5,969	7,875	8,915	7,139
Grocery Bags (Plastic)	16,099	10,093	17,675	20,403	14,027	19,150	20,921	31,017
Other Plastic Bags	15,836	9,812	16,168	12,979	7,819	10,362	11,990	1,091
Other Plastic/Foam Packaging	14,245	10,839	18,252	15,090	8,538	12,021	14,285	1,420
Small Fragments	*155,107*	*118,136*	*171,103*	*217,865*	*174,749*	*209,120*	*378,862*	138,905
Plastic Pieces	85,988	70,828	106,429	141,191	138,999	151,414	290,155	128,696
Total Units (including items not listed here)	**813,236**	**715,009**	**952,568**	**977,096**	**636,030**	**804,468**	**1,121,676**	**681,449**

Table F6. The mass of related Ocean Conservancy item categories (to plastic bags, auxiliary containers and wrappings) collected at the 4,325 cleanups for Florida in 2013-2020. The mass was estimated using the number of units in Table F5 and conversion factors.

Mass Basis (pounds)	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Large items								
Take Out/Away Containers (Plastic)	687	517	700	847	600	670	798	933
Take Out/Away Containers (Foam)	133	160	198	267	133	175	198	159
Grocery Bags (Plastic)	229	144	252	291	200	273	298	442
Other Plastic Bags	326	202	333	268	161	214	247	22
Other Plastic/Foam Packaging	317	241	406	335	190	267	317	32
Small Fragments								
Plastic Pieces	2,563	2,111	3,173	4,209	4,144	4,514	8,650	3,837
Total Mass	**4,255**	**3,375**	**5,062**	**6,216**	**5,427**	**6,112**	**10,509**	**5,424**

Table F7. The number of units of all Ocean Conservancy item categories collected at the 4,325 cleanups for Florida in 2020.

No.	Item Category	Units Collected
1	**Plastic Pieces**	128,696
2	Cigarette Butts	92,719
3	Bottle Caps (Plastic)	70,384
4	Other Trash (Clean Swell)	65,300
5	Food Wrappers (candy, chips, etc.)	53,070
6	**Grocery Bags (Plastic)**	31,017
7	Straws, Stirrers	28,211
8	Beverage Bottles (Plastic)	26,092
9	Forks, Knives, Spoons	19,402
10	Beverage Cans	18,496
11	Other Packaging (Clean Swell)	15,737
12	Lids (Plastic)	14,154
13	**Take Out/Away Containers (Plastic)**	13,378
14	Cups, Plates (Plastic)	13,273
15	Beverage Bottles (Glass)	10,895
16	Fishing Gear (Clean Swell)	10,263
17	Personal Hygiene (Clean Swell)	9,737
18	Foam Pieces	8,272
19	Toys	7,493
20	Bottle Caps (Metal)	7,314
21	**Take Out/Away Containers (Foam)**	7,139
22	Other tobacco (packaging, lighter, etc.)	4,228
23	Construction Materials	3,799
24	Gloves & Masks (PPE)	3,641
25	Balloons	3,091
26	Strapping Bands	2,983
27	Glass Pieces	1,937
28	Beverages Sachets	1,756
29	**Other Plastic/Foam Packaging**	1,420
30	**Other Plastic Bags**	1,091
31	E-cigarettes	895
32	Rope (1 yard/meter = 1 piece)	735
33	Cigar Tips	592
34	Fishing Line (1 yard/meter = 1 piece)	584
35	Fishing Net & Pieces	568
36	Cups, Plates (Foam)	477
37	Other Plastic Bottles (oil, bleach, etc.)	427
38	Cups, Plates (Paper)	418
39	Paper Bags	324
40	Tires	274
41	Tobacco Packaging/Wrap	269
42	Cigarette Lighters	216
43	Fishing Buoys, Pots & Traps	176
44	Fireworks	174
45	Syringes	90
46	6-Pack Holders	72
47	Condoms	62
48	Diapers	60
49	Tampons/Tampon Applicators	43
50	Appliances (refrigerators, washers, etc.)	5

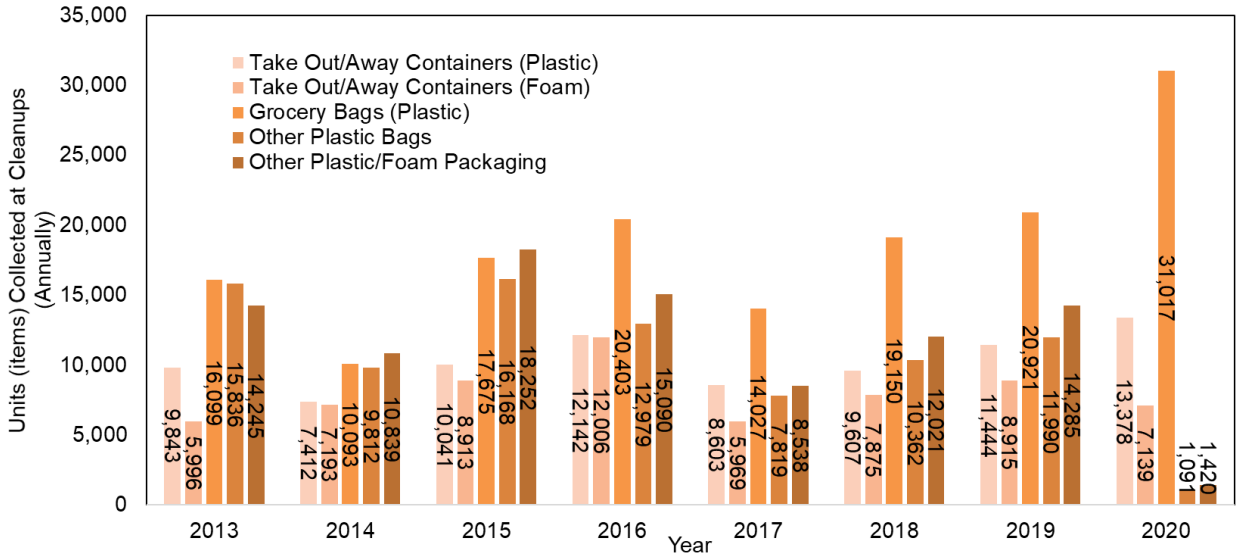


Figure F2. The number of units of related Ocean Conservancy item categories (to plastic bags, auxiliary containers and wrappings) collected at the 4,325 cleanups for Florida in 2013-2020.

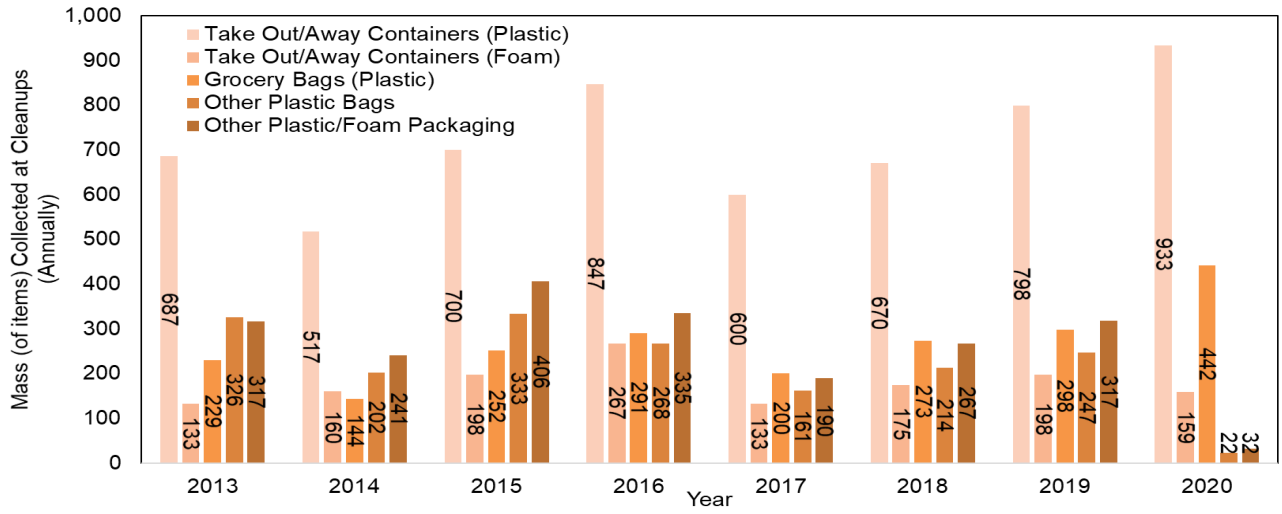


Figure F3. The mass of related Ocean Conservancy item categories (to plastic bags, auxiliary containers and wrappings) collected at the 4,325 cleanups for Florida in 2013-2020. The mass was estimated using the number of units in Figure F2 and conversion factors in Table F1.

F3. Key Takeaways on Marine Litter from Florida

- If following the Jambeck et al. (2015) approach it would result in 6,863 tons of plastics entered marine environments for 2020 from Florida but there is a potential uncertainty since it is based on assumptions not specific to Florida and does not distinguish between the plastic products (e.g., plastic bags, auxiliary containers and wrappings).
- Using data from Surfrider an estimated mass of 19,582 pounds of all items collected at cleanups in Florida are reported, of which 545 pounds are specific to the plastic bags, auxiliary containers and wrappings for 2018-2021. While, using data from Ocean Conservancy for Florida 2020 the total number of large items collected was 542,544 units (reported as 203,587 pounds), of which the plastic bags, auxiliary containers and wrappings comprised approximately 10% (on unit basis).
- The data from citizen science databases are likely an underestimate.
- The most commonly collected materials for land, underwater, and watercraft cleanups are plastic bags and take-away containers (foam and plastic).
- Several researchers evaluated scenarios of predicted growth in plastic waste and potential approaches to mitigate plastic pollution. General findings are that the efforts needed to mitigate plastic pollution require extensive intervention and extraordinary efforts, and that a combination of regulatory and technological innovation is necessary.

F4. Mass Presence of SUCP in Florida

Data was collected from two-season waste composition studies for the SUCP categories for four regions in Florida: Palm Beach County, Orange County, Aucilla Landfill Region, and Alachua County. The data shown in Table F8 is the average percentage of each material relative to the total waste collected per region. The results represent an average of residential and commercial waste stream samples.

Table F8. The material categories included in four waste composition studies that cover products in the SUCP category. Results for Solid Waste Authority of Palm Beach County (SWA), Orange County, Aucilla Landfill Region, and Alachua County with the associated years the studies were conducted.

Material	Description	SWA (2019)	Orange (2019)	Aucilla (2019)	Alachua (2020)
Expanded Polystyrene (food service)	Styrofoam food containers from fast food businesses	0.4	0.7	0.4	1.1
Expanded Polystyrene	Styrofoam, including packaging	0.6	0.9	1.5	0.4
Rigid Plastic (tubs, cups, lids)	Butter and yogurt containers and lids, clamshell containers	1.2	1.5	0.9	1.8
Rigid Plastic (food service plastics)	Plastic cups and containers from fast food businesses, utensils, straws	1.4	1.1	0.6	1
Grocery Bags	Bags with two handles, provided at stores such as Publix and Wal-Mart	1.2	1.6	1	1.3
Other Flexible Plastic	Household garbage bags, chip bags, Ziploc bags, saran wrap plastic, flexible packaging	6.9	7.8	7.1	7.9
Total		**11.7**	**13.6**	**11.5**	**13.5**

Appendix G: Life Cycle Assessment of Alternative Retail Bag Products

G1. Background on Alternative Bag Options

Policy and decision makers often rely on tools to understand and measure the impact of their decisions on the environment, economy, and society. Focusing on the environmental impacts, LCA is one of the most popular tools used by decision makers. LCA quantifies the environmental benefits or burdens associated with a material throughout its life cycle. The life cycle stages included in LCA begin at the extraction of raw materials, then extend to processing, manufacturing, use, and end-of-life management (Blikra Vea et al., 2018; Kirkeby et al., 2006; Laurent et al., 2014a; Reap et al., 2008).

The International Organization of Standards (ISO) developed guidelines referred to as ISO 14040 followed by LCA practitioners that include a description of the requirements for conducting an LCA. The four key phases included in ISO 14040 are: 1) goal and scope definitions; 2) life cycle inventory (LCI) analysis; 3) life cycle impact assessment (LCIA); and 4) life cycle interpretation. Figure G1 presents the four phases and examples of applying the results from interpretation.

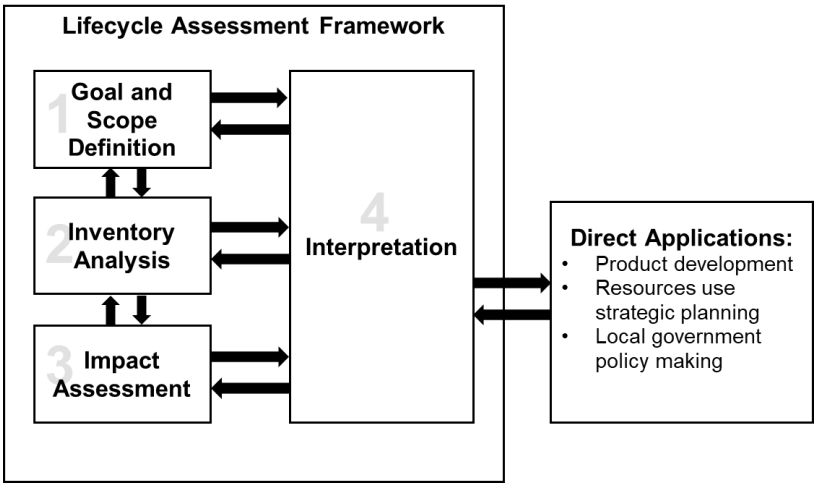


Figure G1. The four phases of an LCA study and example result applications.

The goal and scope definitions requires practitioners to describe the selected material or product of interest, functional unit (what is being evaluated), reference flow (how what is being evaluated is measured), system boundaries (life cycle stages), allocation methods (how data is proportioned), and impact categories (the environmental impact metrics). Often the functional unit is mistaken with the reference flow (Laurent et al., 2014b; Reap et al., 2008), whereby the functional unit must contain sufficient information to describe the function of the system (e.g., 1 ton of mixed MSW in the US comprised of 50% food waste and 50% yard trash) and the reference flow describes the physical unit of the system (e.g., 1 ton of mixed MSW). The LCI analysis is where LCA practitioners collect and store substances and emissions data related to each of their processes. For examples, a single process will generate a product that requires certain raw materials and energy (process inputs) and in doing so it will generate air and water emissions and solid waste (process outputs). The LCIA phase's main function is to convert the inventory

data from the LCI analysis into environmental impact indicators (e.g., climate change) using first a process to classify the LCI data followed by a process to characterize the classified data into indicators.

The lifecycle environmental impacts of a single-use plastic bag and its alternatives have been widely evaluated in literature and reports using LCA. Many of these studies rely on using different functional units, LCI, LCIA, and evaluate various questions. One general finding of all the studies is that a single-use plastic bag has the least environmental impact and that reusable bags have a higher environmental impact. Another finding (for many of the studies) is that there is a minimum number of times a reusable bag needs to be used to be equivalent in environmental impacts as a single-use plastic bag. Understanding the minimum number of reuse is important to decision makers, for example in Los Angeles, CA and Glendale, CA, as part of their plastic bag regulatory changes they mandated that the reusable bag is designed to last for at least 125 grocery shopping trips (Kimmel, 2014; Sapphos Environmental, Inc., 2012). Since reuse is critical, those studies were compiled and reviewed to understand the following two questions:

1. What is the minimum number of times a reusable bag needs to be reused to have equivalent environmental impacts as a single-use plastic bag?
2. Which reusable bag type requires the most uses and the least uses to be equivalent in environmental impacts to a single-use plastic bag?

Note: environmental impacts refer to the greenhouse gas (GHG) emissions (unless other indicator reported otherwise) from producing, manufacturing, and using a single-use plastic bag once for retail shopping, reuse as a garbage bin bag, and its end-of-life management (EOL). See Table G1 and G2 for more details specific to each of the five studies.

Although there are many reports on this topic not all had available and transparent data and methods reported to be able to calculate the reuse based on the equation presented in Appendix F, Table F.2. Therefore, of the total nine studies reviewed only five (Bisinella et al., 2018; CIRAIG, 2017; Civancik-Uslu et al., 2019; Environment Agency, 2011; Kimmel, 2014) were included as part of this short literature review to find the answers to the two questions above. The studies were from Denmark, United Kingdom, Canada, Spain, and United States. The studies each had some type of single-use plastic bag as a reference bag used to compare to alternative bags and these included LDPE average bag, HDPE conventional bag, conventional plastic bag, LDPE, and plastic retail bag made from 30% recycled content (RC). As a note, the other studies reviewed but not included were: Boustead Consulting & Associates, 2007; Bowyer, 2020; John Greene, 2011; and Muthu and Li, 2014.

The five studies included an evaluation of different types of single-use plastic bags and reusable bags, a picture of the types of bags evaluated in most of the studies is shown in Figure G2. In all, but for the CIRAIG, 2017 study, the environmental impacts were reported directly (see Table G2). However, since each study used different data and methods to conduct their LCA (see Table G3) the environmental estimates all had a different range. The exact environmental impacts estimate is not as important as what the big picture results of those estimates are, which are the answers to the two questions.

Figure G2. Pictures of the types of bags included in the study. Top (right to left): LDPE or HDPE average retail bag, Polypropylene (PP) non-woven, PP woven, recycled PET. Bottom (right to left): polyester PET, starch-complexed biopolymer, paper, cotton. Pictures from Bisinella et al. 2018.

G2. Measuring the Alternative Bag Environmental Impacts

The results for answering Question 1 are provided in Figure G3 and the results for answering Question 2 are supported in Table G1. Based on the studies' reported results, the number of times a reusable bag needs to be reused ranged from 0 to 20,000 times, depending on the type of reusable bag and the environmental impact indicator. Two examples where 0 reuse times were reported were for Bisinella et al. 2018 for GHG emissions indicator for biopolymer bag type and Environmental Agency, 2011 for GHG emissions indicator and for HDPE pro-degradant bag type. In both examples the bag type was made from biopolymer/ biodegradable material and for GHG emissions. The authors reported a 0 reuse because the GHG emissions from producing, manufacturing, and EOL treatment of that specific bag type was less than that of their reference single-use plastic bag (see Table G1). However, when looking at other environmental indicators beyond GHG emissions (for the Bisinella et al., 2018 example) the minimum number of uses needed was reported as 42 (not 0) (Figure G3). This example highlights to decision makers how it is important to understand the environmental impact across different indicators and not just one indicator. Also, important to understand is that the type of material itself, even within the same material category (e.g., biopolymers/ biodegradable) the number of uses needed will be different. Referring back to the Environmental Agency, 2011 example, when looking at Figure G3 the result for biopolymer bag type is 2 opposed to the HDPE pro-degradant bag type which was 0.

The ranking from the most to the least number of reuses needed for a reusable bag to have equivalent environmental impacts is summarized in Table G1 for the five studies. Three studies reported cotton reusable bags to require the most number of reuses, and this aligns with the findings from the United Nations (UN) report (Life Cycle Initiative, 2020). The UN report contains findings from a similar literature review of seven

reports/papers related to the topic. However, the UN report contains different objectives, one key difference is that results for which bag type is best versus worst to use depending on the environmental indicator (e.g., climate change, acidification, eutrophication, ozone impacts, land use change, and littering potential) is presented. Following cotton, the bag types that need to be used the greatest number of times were generally polypropylene (PP), paper, plastics (e.g., recycled PET, LDPE, HDPE), and biopolymer/biodegradable. Referring back to Figure G3, the range of number of times needed to be reused for GHG emissions only were: cotton (52-3,657 times); PP (5-13 times); paper (1-61 times); biopolymer/biodegradable (0-18 times); and plastic (0-11 times). Then, when including other indicators the range is: cotton (52-20,000 times); PP (5-98 times); paper (1-61 times); biopolymer/biodegradable (0-42 times); and plastic (0-84 times).

G3. Alternative Bag Environmental Impacts on Garbage Bag Use and Marine Litter

In all the studies they assumed that the single-use plastic bags would be reused as a garbage bin bag then disposed of. This assumption was applied as a result of the authors either conducting a survey or conducting other data collection efforts that asked residents how they manage their single-use plastic bags. Taylor (2018) conducted a similar study in California to understand how much the plastic bags were used as garbage bin bags to identify the impacts of garbage bag sales before and after a retail bag regulatory change. They found that there was an increase in garbage bag purchases after the regulatory change by comparing sales data before and after the regulation change. A flaw of this study however was that they did not include other experimental parameters or reasons as to why the increase in bag sales was observed. Furthermore, other statistical parameters including the data sample size and population, duration of the study, and methods for identifying the statistical significance between the sales data and the regulation change were not compared in the study with other similar studies to verify the findings accuracy. More studies, similar to Taylor (2018) are needed to more accurately provide a conclusion on the impact of garbage bags use and sales.

In LCA impact assessment methods, there is currently no widely recognized or used marine litter indicator. However, more recently researchers are working to develop a method to measure the potential impact of plastic litter in marine environments. Some examples include (Lavoie et al., 2021; Woods et al., 2021, 2019), however these methods differ in their data types used and approaches. Therefore, the estimates of plastic ocean litter were estimated using another method.

Table G1. Ranking of which reusable bag type needs to be reused the most to the least number of times to have equivalent environmental impacts (for GHG emissions) to a single-use plastic bag (see reference bag type).

Study	Country	Reference bag type	Bag type that needs to be used the most								Bag type that needs to be used the least
Bisinella et al., 2018	Denmark	LDPE average bag	Cotton organic	Cotton conventional	Composite	Recycled PET	PP non-woven	PP woven	Polyester	Paper	Biopolymer
Environment Agency, 2011	United Kingdom	HDPE conventional bag	Cotton	PP non-woven	Paper	LDPE heavy duty	Biopolymer	HDPE pro-degradant			
CIRAIG, 2017*	Canada	Conventional plastic bag	Cotton	PP woven	PP non-woven	Paper	Biopolymer	Plastic bag thick	Oxo-degradable		
Civancik-Uslu et al., 2019	Spain	LDPE	Paper	Bio-degradable	HDPE	PP					
Kimmel, 2014	United States	Plastic retail bag (30% RC)	PP non-woven	Paper (100% RC)	Paper (40% RC)	LDPE reusable	Plastic retail bag				

**refers to other environmental impact indicators that are not GHG emissions.*

Table G2. The estimated environmental impacts for various environmental impact indicators associated with the LCA methods in Table G2. Bolded red products are the refence bag type used to compare to the other bags (considered reusable). Blank data values refer to the results of the study either being not available at all or available in comparable units. RC refers to recycled content used in the production of the bag.

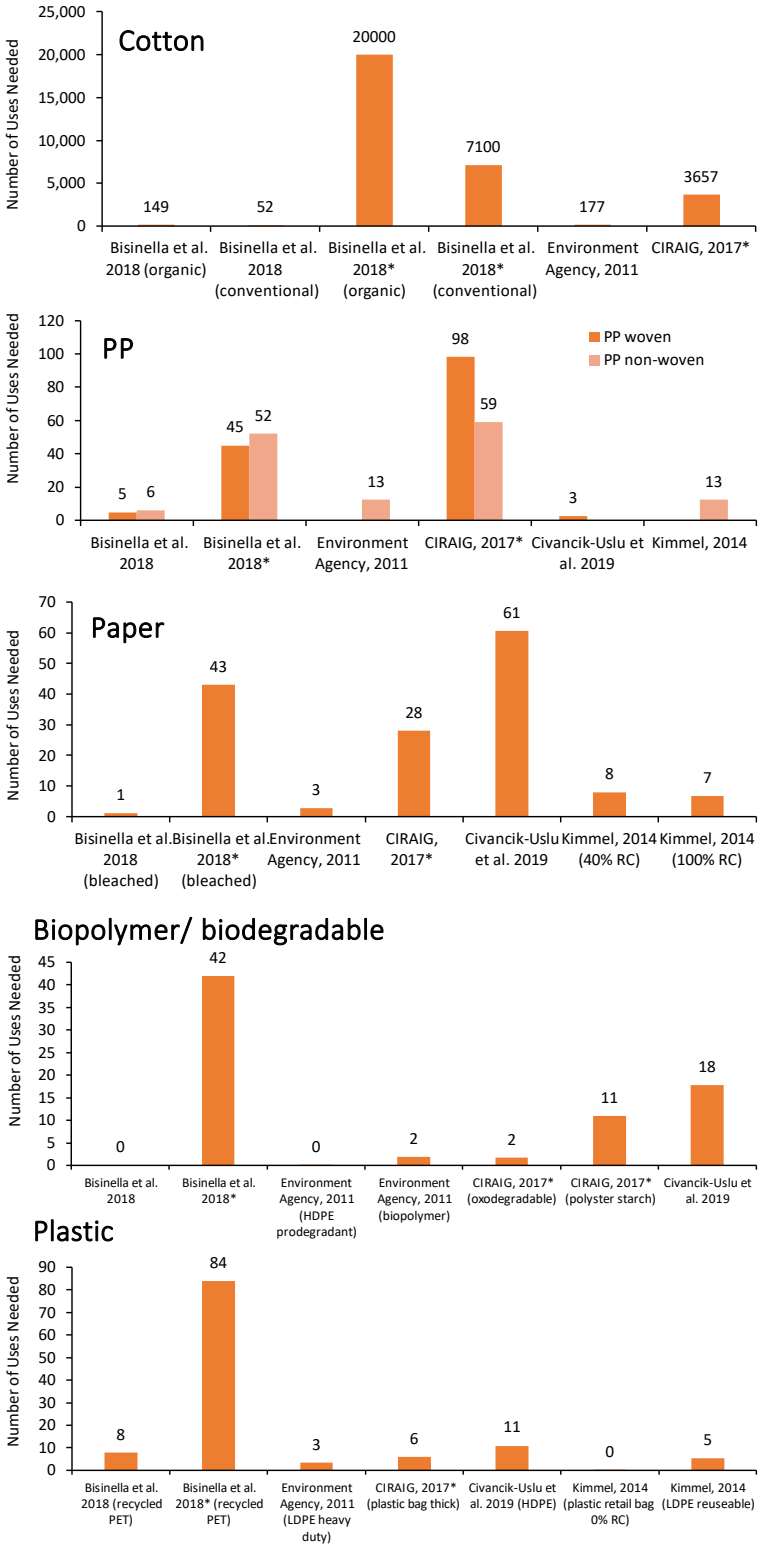
Author	Product Material Type	Product	kgCO2eq /kg	MJ/ kg	L Water/ kg	CTUh/kg	CTUe/kg	kgNeq/kg	mol H+ eq./ kg
Bisnella et al. 2018	Plastic	**LDPE average characteristics**	0.01	0.14	0.0037	-8.08E-10	0.006	2.02E-06	9.17E-06
	Plastic	PP non-woven	0.05	0.83	0.07	-4.28E-09	0.023	1.61E-05	4.83E-05
	Plastic	PP woven	0.05	0.75	0.06	-3.73E-09	0.019	1.35E-05	4.17E-05
	Plastic	Recycled PET	0.06	1.00	0.12	-7.50E-10	0.043	2.06E-05	9.17E-05
	Plastic	Polyester (virgin PET polymers)	0.02	0.34	0.04	-2.42E-10	0.014	8.22E-06	3.33E-05
	Bioplastic	Starch-complexed biopolymer	0.01	0.24	0.0018	2.78E-09	0.011	2.16E-05	6.17E-05
	Paper	Paper unbleached	0.01	0.10	0.03	7.54E-09	0.017	1.30E-05	3.50E-05
	Paper	Paper bleached	0.02	0.30	0.02	3.33E-10	0.011	1.58E-05	4.83E-05
	Textile	Cotton organic	0.92	17	6	1.74E-07	3	9.72E-04	4.75E-03
	Textile	Cotton conventional	0.33	6	2	6.08E-08	1	3.41E-04	1.67E-03
	Composite	Composite (jute, PP, cotton)	0.15	2	0.46	-1.14E-08	0.37	2.48E-04	9.17E-04
Environment Agency, 2011	Plastic	**HDPE conventional**	194						
	Bioplastic	HDPE pro-degradant additive	212						
	Plastic	LDPE heavy duty	420						
	Plastic	PP non-woven	390						
	Paper	Paper	158						
	Bioplastic	Biopolymer	36						
	Textile	Cotton	1483						
Civancik-Uslu et al. 2019	Plastic	HDPE	1226	31224	1776				
	Plastic	**LDPE**	18	448	36				
	Plastic	PP	5	80	5				
	Paper	Paper	536	7115	2364				
	Bioplastic	Biodegradable	1208	11387	24417				
Kimmel 2014	Plastic	Plastic retail bag	35	1000	63				
	Plastic	**Plastic retail bag (30% RC)**	33	833	63				
	Paper	Paper (40% RC)	16	444	193				
	Paper	Paper (100% RC)	14	185	88				
	Plastic	LDPE Reusable	36	1000	132				
	Plastic	PP non-woven	45	867	599				

Table G3. Details of how the LCA was conducted for each of the studies, including how the number of reuse times were calculated for each study. EOL refers to end-of-life management and RC refers to recycled content used in the production of the bag.

Author	Product Material Type	Product	Country	Model	Functional Unit (FU)	Reuse offset assumption	Reuse calculation	Number of bags (to be equivalent to FU)	Number of Uses (climate change impact)	Number of Uses (all indicators)	Product weight (kg)	System Boundary
Bisinella et al. 2018	Plastic	**LDPE average characteristics**	Denmark	EASETECH, Ecoinvent v3.4, ILCD 2011, IPCC	"Carrying one time grocery shopping with an average volume of 22 litres and with an average weight of 12 kilograms from Danish supermarkets to homes in 2017 with a (newly purchased) carrier bag. The carrier bag is produced in Europe and distributed to Danish supermarkets. After use, the carrier bag is collected by the Danish waste man-agement system". Average LDPE is the reference bag and footprints do not include reuse calculation	reusing a bag is assumed to avoid the emissions from production of a LDPE average bag, using it as a garbage bin bag, and EOL (incineration)	$x = \frac{LCIA_A - LCIA_{LDPE}}{LCIA_{LDPE}}$ Where, x- the reuse rate needed to produce a breakeven of environmental impacts of using a reusable bag instead of the disposable single use plastic bag. $LCIA_A$- the environmental impact (footprint) of producing, using, and EOL of a reusable bag $LCIA_{LDPE}$- the environmental impact (footprint) of producing, using, and EOL of a disposable LDPE plastic bag	1	0	0	12	Bag production, use as garbage bin bag, and incineration EOL; product weight is weight of products placed in container
	Plastic	PP non-woven						1	6	52		
	Plastic	PP woven						1	5	45		
	Plastic	Recycled PET						1	8	84		
	Plastic	Polyester (virgin PET polymers)						1	2	35		
	Bioplastic	Starch-complexed biopolymer						2	0	42		
	Paper	Paper unbleached						2	0	43		
	Paper	Paper bleached						2	1	43		
	Textile	Cotton organic						2	149	20000		
	Textile	Cotton conventional						1	52	7100		
	Composite	Composite (jute,PP, cotton)						1	23	870		

Table G3. Continued.

Author	Product Material Type	Product	Country	Model	Functional Unit (FU)	Reuse offset assumption	Reuse calculation	Number of bags (to be equivalent to FU)	Number of Uses (climate change impact)	Number of Uses (all indicators)	Product weight (kg)	System Boundary
Environment Agency, 2011	Plastic	**HDPE conventional**	United Kingdom	WRATE, SimaPro, Ecoinvent v2, IPCC 2007, CML 2 baseline 2000 method	"the carrier bags required to carry one month's shopping (483 items) from the supermarket to the home in the UK in 2006/07. "	reusing a bag is assumed to avoid the emissions from production of a HDPE conventional, using it as a garbage bin bag, and EOL	***Determined same as Bisinella et al. 2018 but used HDPE as reference (same as in study)***	1	0		0.008	Bag production, use as garbage bin bag, and landfill, incineration, recycling EOL; product weight is weight of bag itself
	Bioplastic	HDPE pro-degradant additive						1	0		0.008	
	Plastic	LDPE heavy duty						1	3		0.016	
	Plastic	PP non-woven						1	13		0.055	
	Paper	Paper						1	3		0.035	
	Bioplastic	Biopolymer						1	2		0.116	
	Textile	Cotton						2	177		0.183	
CIRAIG, 2017	Plastic	**Conventional plastic bag**	Canada	Ecoinvent v3.2 and Quebec BD-ICV database, NREL database, SimaPro 8.2, IMPACT World+ Method	"to package for the transport of 1 litre of products purchased by the individual when shopping in Quebec in 2016"	reusing a bag is assumed to avoid the emissions from production of a conventional plastic bag, using it as a garbage bin bag, and EOL	Not enough information provided to do Bisinella calculation, therefore reported data directly from CIRAIG, 2017	1		0		Bag production, use as garbage bin bag, and landfill, recycling EOL
	Bioplastic	Oxo-degradable						1		1.8		
	Bioplastic	Polyester starch						1		11		
	Plastic	Plastic bag thick						1		6		
	Paper	Paper						1		28		
	Plastic	PP woven						1		98		
	Plastic	PP non-woven						2		59		
	Textile	Cotton						1		3657		
Civancik-Uslu et al. 2019	Plastic	HDPE	Spain	Study developed and Gabi database 2005	"to faciliate the transportation of purchased food and drinks to an average household for one year, from one point of sale to the place of consumption."	reusing a bag is assumed to avoid the emissions from production of a LDPE, using it as a garbage bin bag, and EOL	***Determined same as Bisinella et al. 2018 but used LDPE as reference (same as in study)***	1	11		0.008	Bag production, use as garbage bin bag, and landfill, incineration, recycling EOL
	Plastic	**LDPE**						2	0		0.043	
	Plastic	PP						2	3		0.226	
	Paper	Paper						2	61		0.055	
	Bioplastic	Biodegradable						1	18		0.012	
Kimmel 2014	Plastic	Plastic retail bag	United States	SimaPro, US-EI 2.2 Database, Ecoinvent v2.2, IPCC 2007 100-year V1.02, Cumulative Energy Demand V1.08, and World ReCiPe Midpoint H/A V1.07	"Comparison of bags intended for one grocery bag use"	reusing a bag is assumed to avoid the emissions from production of a plastic retail bag (30% RC), using it as a garbage bin bag, and EOL	***Determined same as Bisinella et al. 2018 but used plastic retail bag (30% RC) as reference (same as in study)***	1	0		0.006	Bag production, use as garbage bin bag, and landfill, incineration, recycling EOL
	Plastic	**Plastic retail bag (30% RC)**						1	0		0.006	
	Paper	Paper (40% RC)						2	8		0.054	
	Paper	Paper (100% RC)						2	7		0.054	
	Plastic	LDPE Reusable						1	5		0.035	
	Plastic	PP non-woven						1	13		0.06	



*refers to other environmental impact indicators that are not GHG emissions.

Figure G3. Number of uses needed for a reusable bag to have equivalent environmental impacts (for GHG emissions) to a single-use plastic bag.

G4. Key Takeaways of Alternative Bags Use

- For some decision makers they include in their regulatory change a design specification for the reusable bag to be constructed to last for a certain minimum number of retail trips (reuses). For example in Los Angeles, CA and Glendale, CA, as part of their plastic bag regulatory changes they mandated that the reusable bag is designed to last for at least 125 grocery shopping trips.
- Based on the studies' reported results, the number of times a reusable bag needs to be reused ranged from 0 to 20,000 times, depending on the type of reusable bag and the environmental impact indicator.
- For decision makers it is important to understand how the results change depending on the environmental impact across different indicators and not just one indicator.
- Also important to understand is that the type of material itself used to make the bag, even within the same material category (e.g., biopolymers/ biodegradable) the number of uses needed will be different.
- Generally, the studies reported cotton reusable bags to require the most number of reuses, followed by PP, paper, plastics (e.g., recycled PET, LDPE, HDPE), and biopolymer/biodegradable.
- The range of number of times needed to be reused for GHG emissions only were: cotton (52-3,657 times); PP (5-13 times); paper (1-61 times); biopolymer/biodegradable (0-18 times); and plastic (0-11 times). Then, when including other indicators, the range is: cotton (52-20,000 times); PP (5-98 times); paper (1-61 times); biopolymer/biodegradable (0-42 times); and plastic (0-84 times).
- A potential impact of regulatory changes to retail plastic bags is an increase in sales of garbage bag bins but more research is needed to confirm this observation.
- In LCA impact assessment methods, there is currently no widely recognized or used marine litter indicator. However, more recently researchers are working to develop a method to measure the potential impact of plastic litter in marine environments.

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